



Victorian terrace: insulation, triple glazing & solar hot water; 60% carbon reduction



Overview

Age/Period:	1900
Type:	Late Victorian mid-terrace
Years in residence:	16
No. Bedrooms:	3
Wall type:	Solid wall
Area:	Widcombe

Key Features

- Internal solid wall insulation
- Under-floor insulation & heating
- Loft insulation
- Triple glazing
- Solar thermal hot water
- Energy efficient appliances and lighting

Introduction

Officially designated a 'super-home' for its energy efficiency, this mid-terrace house has reduced its carbon emissions by more than 60 per cent due to focusing on insulation and making use of passive solar gain from its south facing extension. When Ozzie and Mary bought their house it needed total refurbishment. Members of [Go Green Widcombe](#) (a local network of people promoting energy efficiency in the Widcombe

area), they decided to do a total eco-renovation of their home to make it as low energy as possible.

Once complete in 2010 the house was invited to join the national 'SuperHomes' network of extremely low energy refurbishments, and is one of only two homes in Bath to meet its standards. Solid wall insulation, under floor and loft insulation retain the heat while a triple-glazed south facing kitchen extension captures solar energy (passive solar gain). An efficient boiler with under floor heating is supplemented by solar thermal panels for hot water.

In 2010 the homeowners completed their retrofit and opened their home to the public, the first Green Home in Bath to do so. They had not moved in and were still putting the final touches to the renovations when the doors opened. In 2023, now resident for sixteen years, they are impressed with the warmth and comfort of their home.



Features

Insulation: solid wall, loft & under-floor

The solid external walls of the house were insulated internally with 110mm phenolic insulation, returned at the sides to minimise cold bridges. Insulating the bay windows and alcoves has only slightly reduced the room dimensions but has allowed for shelving and removed the need for radiators.

It is important when installing internal wall insulation to take professional advice as there is a risk with poorly designed internal wall insulation that interstitial condensation will build up over time in the solid walls and lead to structural damage. With non-breathable phenolic insulation, it is important that a carefully designed and detailed vapour control layer is installed.

The loft conversion was fully insulated in line with current building regulations. Roof insulation was 110mm phenolic insulation applied between and over rafters with all joints taped. Downstairs, the original suspended timber ground floor was replaced throughout with concrete slab, insulated with 100mm of Celotex. The under-floor heating, installed straight after the under-floor insulation provides a pleasant heat which rises through the house.

Glazing

Velux windows in the rear extension and loft conversion are triple glazed with a U-value of 1.0 W/m²K. This makes the most of passive solar gain (capturing and storing solar energy). A local joiner was commissioned to produce the bespoke bi-fold patio doors in the kitchen extension, which incorporate triple glazing units supplied by Saint Gobain, with a whole door U-value of 1.1 W/m²K. Original double glazing is retained in the rest of the house.

Solar water heating

Taking advantage of the house's south facing aspect, the roof is fitted with Kingspan Thermomax evacuated tube solar panels, total area 3m², supplying a 250-litre twin coil tank.

Solar Thermal is often better than solar PV for homes with limited roof space and 'hard' shading from nearby chimneys.

Energy efficient boiler & under floor heating

Gas heating is provided through an A-rated Vaillant ecoTEC plus 630 condensing gas boiler. The system has new controls and thermostatic radiator valves (TRVs) throughout. Gas powers the under-floor heating on the ground floor plus new radiators upstairs as well as the new efficient gas fire in the living room which provides secondary heating.

Appliances & lighting

The household uses low energy lighting throughout including 12 x 5W compact fluorescent spotlights in the kitchen area. Other low energy appliances include an A++ rated fridge freezer.

Future Plans

Ozzie and Mary are currently exploring an air source heat pump and would love to be able to go gas free.

Their foresight in installing underfloor heating if the heat pump can be designed to take advantage of it by running at lower flow temperatures may allow for a very efficient installation reducing carbon emissions by a further 90% and costs by 40%.