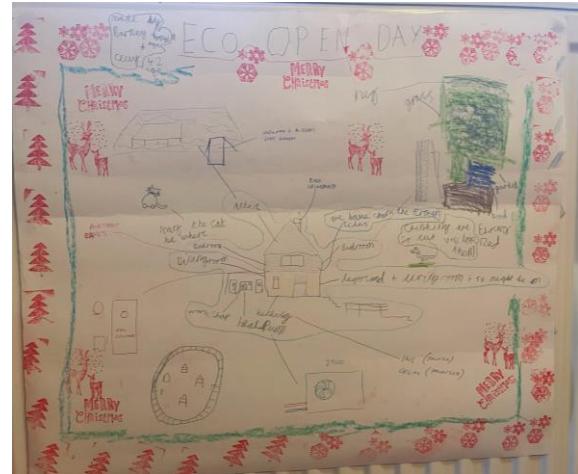




Eco-refurbishment of two 1950s system-built homes: insulation, heat pump, solar PV and batteries



Overview

Age/Period:	1949
Type:	End terrace/semi-detached
Fabric:	System built concrete panels
Area:	Weston

Key Features

- Internal wood fibre wall insulation
- Intermediate wood fibre batt insulation
- Celotex mansard roof insulation
- Solar PV and batteries
- Heat pump
- Rainwater recycling
- Draughtproofing
- Insulated loft hatch

Introduction

This case study explores two neighbouring Cornish system-built homes constructed shortly after World War II. Due to their identical construction, these homes faced similar challenges and serve as excellent examples of how to improve the energy efficiency of this type of housing.

As with many areas of Bath, a housing shortage following the war led to a rapid increase in council-developed homes. These homes were built quickly and efficiently, including [BISF homes](#) in Twerton

and [Cornish reinforced concrete panel homes](#) in Foxhill and other parts of Bath including these homes in the Southlands area of Weston.

Originally, both houses featured identical reinforced system-built construction with ground floor walls constructed of a reinforced concrete frame with concrete slats slotted between. The first floors were built with a timber frame mansard roof. Over the past seven decades, these types of homes have undergone various adaptations to address the challenges of their original design with the structural elements replaced with traditional blockwork as they neared the end of their life. Due to their unique construction, bespoke solutions, particularly for insulation, are often required as they lack traditional cavity walls.

Guy and Katie moved into their home in 2018, followed by their neighbours Harry and Megan in early 2024. Guy, with a background in sustainable construction, had a clear understanding of the necessary steps to improve the homes' energy efficiency. Both homes were largely uninsulated before the renovations began. A variety of techniques have been implemented, including various insulation methods, a heat pump, solar PV, batteries, and draughtproofing.

Guy and Katie: Having a child has radicalised our approach to climate emergency, and every decision we make about our home seeks to best safeguard the interests of our child, his peers and indeed the whole living world both now and in the future.



Features

Insulation to mansard roof

The first-floor walls, originally uninsulated, were constructed with timber frames and a tiled exterior. Guy assisted Megan and Harry in adding insulation. They removed the plasterboard and carefully installed Celotex insulation panels between the timber frames:



This work should have halved heat losses from the walls on the first floor. It's important when fitting Celotex like this to install it tight on the timber frames to avoid thermal bypass. Guy is planning to insulate his home's mansard roof in the future.

Solar PV and batteries

Megan and Harry have recently installed 7 solar panels on their roof and a 5.2 kWh battery system. This has helped them reduce their electricity costs and carbon emissions. In the future, they may be able to take advantage of cheaper overnight electricity rates to charge their battery and use the stored energy during the day.

Internal wall, intermediate floor and loft hatch insulation

While refurbishing the home's kitchen Guy has taken the opportunity to install breathable wood fibre insulation on the internal walls of the kitchen, and wood fibre batts in the ceiling to make the kitchen cosier.



Guy has also insulated the loft hatch which is a good DIY opportunity to reduce a home's heat losses. Draughtproofing has also been installed around the windows.

Heat pump

Guy and Katie have recently had a heat pump installed in this home by their energy supplier Octopus for under £2,400 net of the government's £7,500 BUS grant. To make the heat pump run efficiently Octopus have installed 7 larger radiators, and Guy has made an insulated cupboard for the hot water cylinder in the rear utility as there wasn't space in the main house. The heat pump should reduce the home's heating and hot water carbon emissions by more than 70%.

Low-impact living

Guy, Katie and their children are advocates of Active Travel, and try to travel as much as possible by foot, bike or public transport. They have done lots of biodiversity work in garden, including renovating/planting native hedgerows and digging a pond. They have a rainwater recycling system which takes water off the roof and is pumped to the top of the garden to supply their vegetables and support their chickens. Eventually the rainwater recycling system will be connected to their toilet.

Harry and Megan are planting a 'Tapestry Lawn' which is a grass free lawn, and have lots to say about that- and their wildflowers!

Recommended Installers

[Hawklane](#) for ecological building work including IWI, EWI, airtightness etc