CASE STUDY

Milk Street
3 Bed Victorian Terrace



This case study can be found online here

- Low-cost improvements
- 'Big' insulation works
- Glazing
- Lighting systems & electricals appliances
- High spec heating
- Renewables: heat
- Renewables: electricity
- Water management
- Sustainable building materials
- Lifestyle change

Terry and Paula have lived in their 1885 home for 16 years. It is within a Conservation Area and has solid stone walls.

Before the retrofit, the house had poor-quality uPVC windows, poor-quality timber and uPVC doors, single-skin rendered brickwork, no floor insulation, and minimal attic insulation. Heating was provided by a gas combi boiler and radiators, with an open fire also present. During the winter, the house was cold and experienced significant draughts.

For Terry and Paula, there was also a moral imperative to demonstrate that heritage properties can be sensibly decarbonised and remodelled to meet the climate emergency.

Terry is an RIBA Chartered Architect who has been practising low-carbon, sustainable architecture for more than 30 years, bringing significant professional experience to the retrofit of their own home.

Energy Efficiency Measures

The house, before it was refurbished, had an EPC (Energy Performance Certificate) of G and is now a B.

Draughtproofing: A lobby was added to the entrance, which ensures any valuable heat is retained in the house when the front door is opened. All new windows and doors have sealant tape and foam added when installed.

Ventilation: All new triple-glazed aluminium windows have night latches which help create the low-level background ventilation required for a healthy home. All wet rooms (i.e., bathrooms) have a silent mechanical extract linked to a humidity sensor, which ensures moisture and condensation are addressed.

Floor Insulation: Superfoil insulation was installed in the suspended floor joists. The new slab in the entrance had 100mm of Recticel floor insulation laid under the slab. All of these met the requirements for a new build house required by Building Regulations.

Wall Insulation: Because the house is in a conservation area and was an end-of-terrace, external insulation was not a practical solution as it would have been difficult to get planning permission, and we wanted to retain the appearance of the stone walls. Instead, we stripped the poor-quality plaster, which was delaminating from the walls. Independent treated 47x75mm timber studs were fitted that stood a minimum of 50mm from the inside face of the stone walls and were filled with 75mm of foil-backed EPS insulation. This way, any issues of damp were avoided, and there was a service void for any new wiring. Plasterboard was then fitted to the timber studs.

Air Source Heat Pump: The gas combi boiler was removed, and a new Valliant Ecotherm ASHP was fitted as part of the Renewable Heat Incentive. New efficient radiators were fitted as part of the refit.

Other Low Carbon Heating: The open fire was retained, and we regularly buy seasoned logs from Longleat with an external log store located in the new extension under the veranda roof.

Glazing: High-quality powder-coated aluminium triple glazing was fitted throughout, with a triple-glazed rear door to the garden. CPB of Corsham supplied and fitted them.

Smart Heating Controls: As part of the retrofit with the Valliant ASHP, a smart heating control with thermostats on each floor was installed so each area could be set and controlled separately.

Solar PV: Initially, we could not afford PV and batteries. As a result, even with all the measures, the ASHP made the electric bills very expensive. However, after three years, we used DES Energy Renewables, who fitted an array onto the gable wall overlooking Valis School.

Battery: A FoxESS Battery was installed as part of the PV installation.

Rainwater: Planning was granted for a green roof to the extension which will mitigate water run-off and a water butt has been fitted to the rear to retain any rainwater.

Natural or Low Embodied Carbon Materials: Dorset harvested larch was used to clad the extension, for the veranda decking and storage, and was used throughout the ground floor as new solid floorboards. When the house was being refurbished, the old materials were reused throughout the house, such as the old back door lintel, which was used as a shelf, the old Victorian pitch pine floorboards from the ground floor were used as various forms of internal cladding; and the demolished brick and quarry tiles were used for paved areas in the gardens. The extension was timber-framed instead of traditional masonry cavity construction. The kitchen is Dorset solid oak units and worktop with plywood carcassing.

Lifestyle/behaviour changes: We have totally come off gas, so we have an induction hob. With individual thermostats, rooms that are not used as much have their temperature turned down to 15 degrees C . All new appliances are A+ rated; we do not have a tumble dryer. Because the house has been retrofitted, the radiators for the upper floors do not come on as much as they would in a traditional house. We also use the open fire in the winter evenings. There is also a water butt in the garden, and most plants are not in pots with no lawn, so the garden needs significantly less watering.

Architects/Installers/Contractors: As I am an RIBA architect who specialises in sustainable retrofits, I utilised all my knowledge, skills and contacts to maximise the design. I used a group of various contractors whom I knew to carry out the work.
The ASHP installers were RGV in Amesbury, the PV & battery were DES Energy Renewables, and the windows were CBP in Corsham.

Learning: For various logistical reasons, we did not fit underfloor heating to the ground floor, which was a regret. I would have also increased the insulation to the ground floor, and we had to retrofit blinds to the rear ground-floor glazing to retain heat. I am not convinced about fitting ASHP to older properties without PV panels and batteries. However, if you can fit a good quantity of batteries and PV panels with good additional insulation, an ASHP may not be necessary as the PV and battery could provide the heating requirements.