Improving your home with retrofit: what we did

Stage 1 - 2014-2016

Insulation

1. External Doors

Draught strips, a flap for draughts through the letterbox and escutcheon on the keyhole.

2. Underfloor Insulation on ground floor

Between the floorboards and the joists in the dining room and in the hallway we inserted a layer of Superfoil (SF19FR) insulation in 2016. All the floorboards had to be lifted.

3. Internal wall insulation

Some external walls on first floor are papered with V600 thermal liner. This is like very thick wallpaper. It reduces heat loss and damp in corners and cupboards.

The walls in the conservatory are covered with 100mm PAVADENTRO wood fibre insulation boards and coated in lime mortar.

Glazing

4. Double Glazing

In 2016 when we did the first energy-saving measures, conservation officers did not like double glazing in listed buildings. We were allowed to replace one window because secondary glazing would have blocked the fire exit, provided the glass on the exterior layer was barrel glass. The space between the layers of glass is reduced by using inert gas. (argon filling U value 1.3).

5. Double secondary glazing

We installed secondary glazing units inside the other old windows: two Perspex sheets separated by a plastic spacer, kept in place by magnetic strips. They are quite heavy but stay in place well. Including the original glass there are now three layers to insulate against heat and cold, and stop draughts.

Heating

6. Removing the Aga

It might look romantic to have an Aga in our kitchen, but it meant we had to heat the room even in mid-summer. We took it out (selling it 2nd-hand) and put it in a radiator.

7. Heat Recovery Air Extractor

The fan in the kitchen transfers the heat in the air being extracted to heat up the air being sucked in. Ventaxia produce several sizes that fit the same sized holes as their range of simple extractor fans.

Energy generation and storage

8. Photovoltaic Panels

Planning permission was given only for panels that cannot be seen from a public street and are unobtrusive from both front and rear. They hide in our valley roof.

9. Energy-storage

Energy from the pv cells goes into a battery under the stairs. On a sunny day we store almost enough energy to keep us going till sunrise the next day.

Outside

10. Garden Pond

Reduces the rate of run-off at times of heavy downpour and attracts dragon flies and frogs.

11. Water-butt

Rainwater for washing windows and watering indoor plants, cutting our use of piped water.

12. Green wall

The greenery on the wall in the garden will hopefully increase CO_2 extraction.

13. Compost

Two tumblers for composting kitchen waste.

Stage 2 - 2023-2024

14. A Hemp Hat

With the ceiling and much of the walls in the roof space, the top floor rooms were cold in winter and hot in summer. We removed the old lath and lime plaster walls and ceiling, revealing the inside of the roof. We found considerable woodworm damage to the beams, and both purlins at the front were cracked. We also found there was no wall between us and the neighbouring house. A structural engineer advised how we could make this safe without destroying the house's history.

Once this was repaired, deep insulation was installed. In reverse order from the room: solo (smooth finish for lime plaster), on Diathonite Thermactive .037 (lime plaster with cork in it, for insulation), laid on laths; breathable membrane, taped to eliminate gaps; hemp between

joists, held in place by the membrane; another breathable membrane; roof cavity above the ceiling, but no cavity on the sloping walls.

The rooms lost about 6 inches length and breadth, maybe 3 inches in height.

15. Breathable Paint

The new plaster on the front top floor and the replastered upper part of the hallway was painted with Farrow and Ball casein distemper (available in standard F&B colours) and F&B limewash, because of the need to maintain breathability. We chose F&B primarily because of its ready availability and short delivery time.

16. Internal wall insulation in the kitchen

We installed Cromar Vent 3 breathable membrane behind the panelling and work units in the kitchen. The joiners carefully detached the units from the wall and replaced them successfully. All we had to do was touch up the paint.

We got an internal layer of Diathonite lime plaster covered with Solo smooth lime plaster added to the external kitchen wall which was only brick.

17. Underfloor Insulation on ground floor

We insulated under the kitchen floor in 2024. All the floorboards were lifted, breather membrane placed between and over each joist, Warmcel insulation between joists, Pro Clima DA airtight weather resistant vapour check membrane above joists and insulation, floorboards replaced, sanded and polished.

18. Heat Recovery Air Extractor

We installed a Brookvent heat recovery unit in the bathroom that alternates inward and outward air flows and transfers heat through a ceramic plate.

19. The end of gas

We replaced the gas hob with an induction hob.

We replaced the gas space and hot water heating with an air source heat pump.

We closed our gas account - no more standing charge

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Chronology

Action	Date	Comments
Acceptance of the need for double glazed window by conservation officers	July 2014	Conservation officers agreed to double glazing on one window to maintain a fire escape route. Double glazing of south-facing window refused.
Replaced all light bulbs with LEDs	Sept 2014	Probably the cheapest and simplest way of reducing electricity consumption.
Listed building consent for alterations	Sept 2014	A number of closely negotiated conditions
Acceptance of tender	July 2015	All major building items
Photovoltaic Cells	Dec 2015	Conservation officers required a reduction of panels from 12 to 8, and that they be mounted as out-of-sight as possible. They had to be repositioned to comply with the plans.
Double glazing and secondary double glazing	March – June 2016	
Conservatory made weathertight	Sept 2016	There was a long snagging list
Additional insulation work in conservatory	May 2017	To improve insulation and address condensation problems
Sign off of Battery Storage	Sept 2017	
Dining room and hallway underfloor insulation	March 2019	
Appointed Rupert Cook, architect, to recommend best measures to increase insulation	Jan 2022	To include: • target u-value • thermal continuity • managing risk of interstitial condensation • selection of insulation material, depending on location; performance/ hygroscopic/ low carbon/ non-putrescible

Action	Date	Comments
		• future damage to insulation/ vapour control/ airtight layer.
Agreed approach and narrowed down option preparatory to discussions with WCC	April-May 2022	
Appointed conservation architect/heritage adviser	May 2022	To support us on the application and to carry out the Statement of Significance, to provide advice from a heritage perspective on the proposals, liaise with the Conservation Officer and prepare the Heritage Statement required
Commissioned detailed survey report	June 2022	To show room dimensions etc etc etc
Asked WCC for pre-application advice	Oct 2022	
On-site discussion with architect, conservation architect/heritage adviser and WCC Historic Environment Team Leader	Nov 2022	
WCC Historic Environment Team Leader supports intention of project, says Listed Building Consent is required, but not full planning consent as the works are internal; and makes other comments:	Dec 2022	• insulation from below for the roof is preferred • ecological input not required • need method statements for each type of insulation/ wall/ floor/ roof type which should cover all the work included in the application, and specifications of these proposed materials. • suggests including the areas between the ceilings and floors, at the perimeter of the house, for completeness as a comprehensive approach to insulating the fabric of the house • use as a case-study
Listed building consent application submitted to WCC	Feb 2023	WCC has to consult neighbours and the historic environment officer.
City Council approved our application for permission for all potential works	April 2023	

Action	Date	Comments
Finding specialists for the work proves difficult. We decide to appoint a conventional builder to bring in specialist trades.	May-June 2023	This means we need a quantity surveyor to create a Schedule of Works pricing document which turns the design information into something they can price.
Commissioned Schedule of works from Quantity Surveyor at Evolution 5	July 2023	
We accept Evolution 5 offer to support us with the tender and getting a contractor into contract.	Sept 2023	They have access to a broader list of contractors and suitable trades; and tradespeople are more likely to prioritise work coming from them.
We decide to use Evolution 5 for construction management	Oct 2023	This approach gives more flexibility about what work is done when than going via a main contractor
Priced schedule of works completed	Nov 2023	
Decided what we could afford/what disruption we could cope with and agreed contract with Evolution 5	Nov 2023	
First quotation for air source heat pump (not in the contract with Evolution 5)	Nov 2023	We rejected because the firm was inflexible about what they said we needed to do (e.g. size of pump, replacing radiators). We approach Cinergi, a firm which a friend had used.
Asbestos survey	Jan 2024	Everyone had overlooked need for this before builders could strip out walls etc
Work started	Jan 2024	
Contract ended	July 2024	
Making good / redecorating	Aug-Sept 2024	