CASE STUDY

Innox Hill – 4 Bed 1980's Detached



This case study can be found online here

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

The renovation of this rare 1983 Ideal Homes Kit house demonstrates how a comprehensive retrofit can transform a tired, inefficient property into a comfortable, low-energy family home. Bought at auction in October 2024 in very poor condition, the house had no working central heating, a non-functioning gas boiler, broken radiators and poorly sealed double-glazed windows. The property has a brick and block ground floor with a timber-framed first floor, and already had solar panels with a Feed-in Tariff.

The main motivation for the retrofit has been comfort, alongside reducing running costs and making more ecological choices. As the house needed to be renovated from scratch, the approach was to incorporate energy efficiency and sustainability measures wherever practical, with the aim of creating "a nice place to live and somewhere we can be for the long term". The project is around halfway through the renovation, although most of the energy-focused improvements have already been completed. It demonstrates how a major renovation can be an opportunity to incorporate energy efficiency, comfort, reuse and lower-carbon choices from the outset, while showing that retrofit does not have to mean pursuing a "passive house" approach – it can simply be about creating a comfortable, practical and enjoyable home for the long term.

Energy Efficiency Measures

Insulation: The existing Rockwool wall insulation has been retained, with 100mm of external Celotex insulation added, together with a breather membrane before plasterboarding. The floors have 175mm of Rockwool between the floor joists. The warm roof has 200mm of Celotex, while the other roof will have 400mm of Rockwool.

Air Source Heat Pump: The previous gas boiler has been replaced with a 7kW Vaillant air source heat pump. Ecosolv Renewables installed the heat pump and hot water cylinder in around two days. The installation cost £2,900 to the household, alongside a £7,500 grant.

Underfloor Heating: Underfloor heating has been installed as part of the renovation, alongside the new heat pump.

Ventilation: A Vent-Axia MVHR system has been installed, with internal ducting throughout the house to provide mechanical ventilation with heat recovery.

Glazing: Around 90% of the windows have been replaced, mainly using Velfac and Idealcombi windows. A major part of the approach has been to avoid buying new windows where possible. Many were sourced through Facebook Marketplace at a hugely reduced cost, including windows removed from existing homes and brand-new windows that had been ordered incorrectly. The front door is also second-hand. Existing double-glazed kitchen windows that were still in good condition have been retained and sprayed to match the colour. The kitchen roof light also came from a skip.

Draughtproofing and Airtightness: Considerable attention has been given to airtightness, including sealing gaps with tape and sealing between layers of insulation. Fitting the vapour membrane and carrying out the general airtightness work has been described as the "most soul destroying" part so far because it was "very boring!", but it has been an important part of the retrofit.

Solar PV and Battery: The house already had solar panels with a Feed-in Tariff. A battery is planned for a future phase to make better use of the electricity generated.

Natural or Low Embodied Carbon Materials: More expensive natural insulation materials were generally avoided in order to keep the renovation within a manageable budget, with standard Celotex used instead. However, Marmoleum flooring has been used downstairs and cork flooring upstairs, with the natural and sustainable qualities being an important part of the

decision. Reuse has also been a key consideration, particularly through sourcing second-hand windows and doors.

Water Conservation: An underground rainwater harvesting tank is planned for a future phase, using the large hole left by one of the existing ponds. The necessary grey water plumbing has already been installed.

Waste and Reuse: Consciousness of waste has informed many of the renovation decisions. There are plans to reuse much of the concrete currently covering the garden, potentially using it in gabions and retaining walls when the garden is terraced, rather than sending it to landfill. Some general waste has inevitably gone into a skip because of the poor and contaminated condition of the property when it was purchased.

Lifestyle and Behaviour Changes: An electric cargo bike is used. The overall approach has been to make ecological choices where these also contribute to creating a comfortable, practical home for the long term.

Other Building Improvements: The renovation has included a full replacement of the plumbing and electrics, replacement of the cladding and roofs, and a full internal reconfiguration. The garage conversion is planned as a future phase.

Architects/Installers/Contractors: Barefoot Architects advised on the retrofit elements and internal reconfiguration, while a structural engineer provided sign-off for the warm roof. Ecosolv Renewables installed the heat pump and hot water cylinder, and Kevin Corcoran Flooring fitted the Marmoleum flooring. Most of the renovation work has been carried out themselves, with specialist support for plastering, the heat pump installation and the electrical rewire.

Learning: Having professional advice was particularly reassuring at the beginning, as there were concerns about the risks of condensation associated with retrofit. The architects helped with the insulation and membrane build-ups and provided the drawings needed for Building Control. Reusing windows and other materials has also helped keep costs manageable while reducing waste. The warm roof has been a particular success, both aesthetically and thermally. It was initially chosen partly because the existing low 1970s ceiling looked "pretty depressing" and the rafters were a chore to paint, but it has turned out really nicely. The owners particularly enjoy seeing the "massive wedge of insulation" sitting above the roof.