CASE STUDY

Suburban houses



Edinburgh is known for its historic tenements, but in fact most homes were constructed after 1919. Of its 232,000 homes, 64% of households live in flats or maisonettes, leaving 34% of Edinburgh households occupying houses.

These properties are either occupied by private owners or 'social landlords' with council or housing association tenants.

During the 'interwar' period – 1920s and 1930s – bungalows were common, with load-bearing masonry, rooms in the roof, and oversailing eaves and soffits. After the second world war, tower blocks became popular in housing schemes, most of which have been demolished due to poor building techniques. Today, far better methods are available and industrialised production is evolving once again, with timber as a particularly low-carbon emissions option.

The construction of a conventional house produces carbon emissions between 405 and 611 kilograms per sq.m, which could amount to 50 tonnes. We need to prioritise techniques of making our current homes perform better without resorting to demolition and rebuilding.

The bland appearance of post-1919 housing is more suited than tenements to adding modern external insulation.

Air-leakage through the walls should be reduced, but not so much that condensation builds up.

It needs care round doors, windows, and vents, but if airtightness is to be increased past this level mechanical ventilation can be installed.

Fabric can be upgraded first to avoid unnecessary wasted energy, but once this is done the heating systems can be de-carbonised.

With the Scottish Government's ambition to switch one million homes to low and zero-carbon heating, oil, gas, and coal will be replaced with electric systems.

Heat pumps

energy.

Heat pumps work much like a fridge in reverse, they use electrical energy to extract more energy from the surrounding air, ground, or water. The 'heat pump' unit is often located inside, like a boiler, but has a connection outside, either to a unit on the outside wall, or to boreholes into the ground.

Heat pumps produce water at a lower temperature, so can run for longer than a gas boiler. They also need bigger 'emitters', which is why they work well with underfloor heating. If they are connected to radiators, these often need to be larger.

Solar panels also offer a source of low carbon

Owner occupied homes

The case studies here are homes occupied by their owners. A key consideration is that economies of scale means more can be done for less. So, if you own your home, cooperating with neighbours and retrofitting several buildings simultaneously will be cheaper.

Example A: Calum Duncan Architects

This architect-designed upgrade of a suburban house in 2019 includes a remodelled interior, a small extension, external wall insulation and new windows and doors. A beautiful family home with increased energy efficiency and lower heating bills.

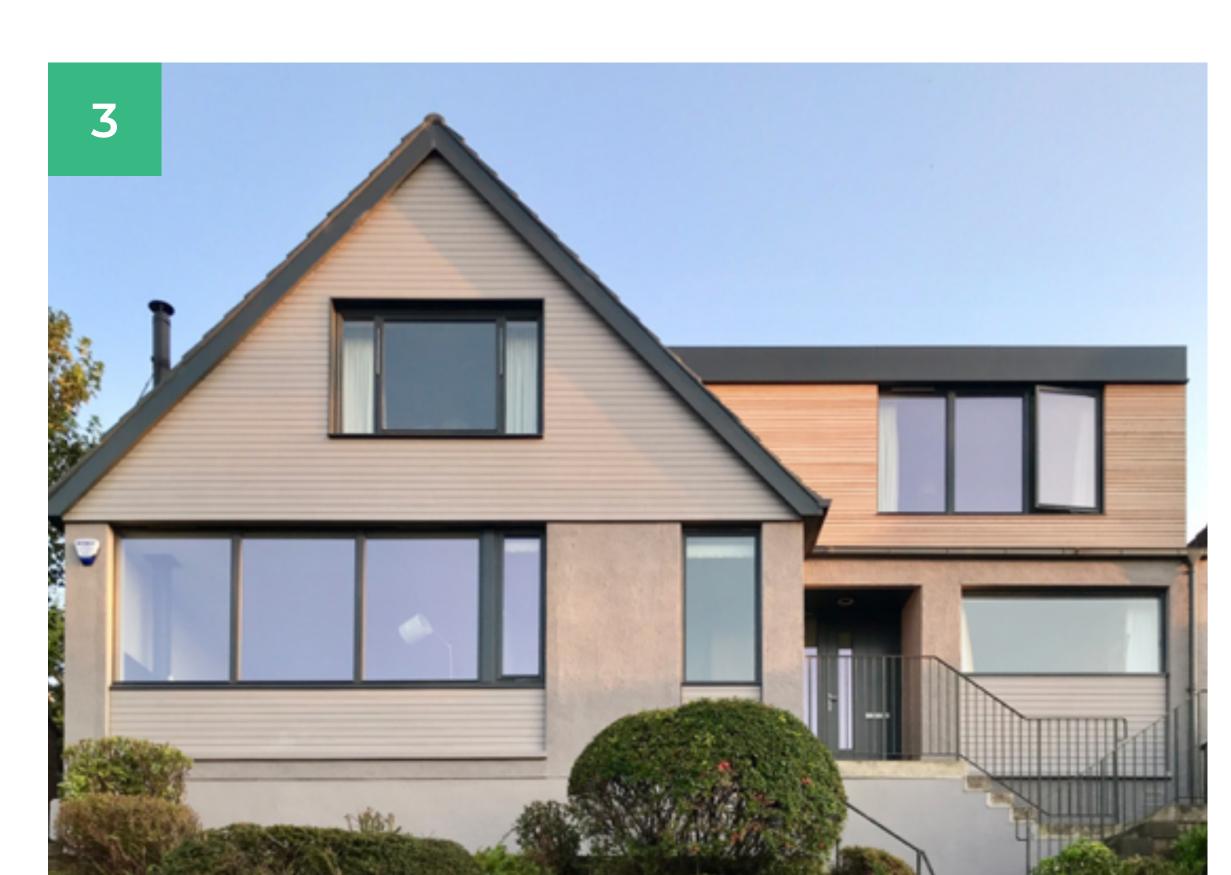
Example B: Home Energy Scotland

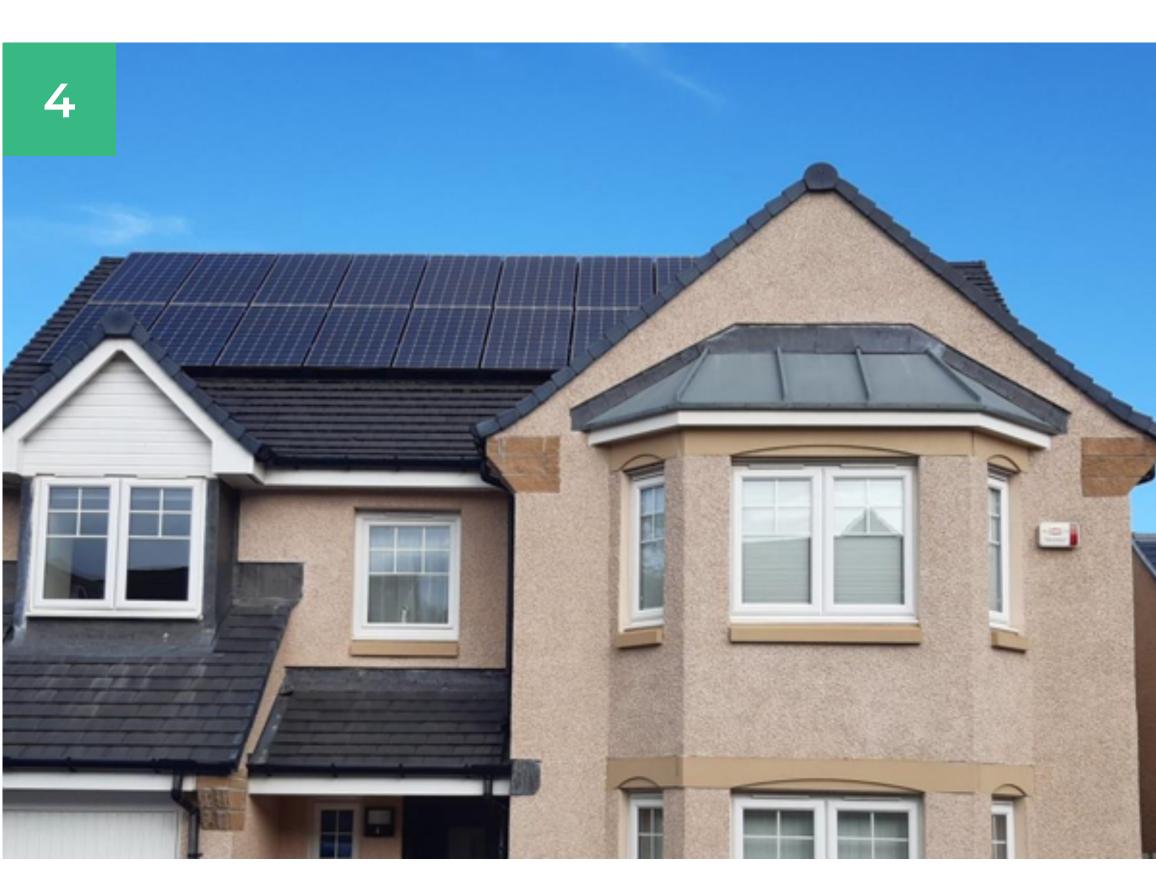
This house was built in 2013 with cavity construction insulated to a high standard. In 2015, the owners installed solar panels and, in 2018 – using funding through Octopus Energy, a sustainable energy supplier – put in an electric car charging point. This enables the solar panels to charge their electric car.

In 2020 the owners installed an air source heat pump, requiring larger radiators to be installed. According to the owners, this halved their energy bills in the winter months.













- Homes fit for heroes inter-war housing.
- 2 1960s Sighthill towerblocks by M J Richardson, CC BY-SA 2.0
- 3 Example A, Callum Duncan house upgrade.
- 4 Example B, Home Energy Scotland case study house, Midlothian.
- 5 Air source heat pumps.
- 6 External wall insulation construction diagram.

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and Calum Duncan Architects.

