



case study: retrofit for the future



Delivering durable change to social housing

HHP has refurbished two homes in Newark, using low tech durable solutions including insulation, passive solar heating and community renewable energy to deliver 80% cuts in carbon emissions

The homes

HHP is demonstrating its low tech approach to energy efficiency on two council houses in Newark. It completed the upgrades in October 2010, as part of a nationwide Retrofit for the Future programme for social housing which aims to address the challenge of making existing homes more energy efficient.

The pair of properties was built in the 1950s. They are a Wimpey 'no-fines' concrete construction, two of 300,000 similar properties around the country. Traditional energy efficiency measures such as double-glazing, an energy-efficient boiler, and loft insulation had already been installed. However, the properties still have a relatively high heating demand, with an average annual energy use of 44,000 kWh (costing approximately £2000).

These homes were chosen because one of the pair was void and the residents of the other house were keen to take part, even though this means temporarily leaving their home of 40 years.

The homes are managed by Newark and Sherwood Homes, on behalf of Newark and Sherwood District Council.

Win win win?

A solution for such a common form of social housing could help deliver Government goals for energy security, carbon emissions and fuel poverty.

HHP is grateful for support from our suppliers: Keyline, Knauf, Velux, Dimplex, EnviroVent and Yorkshire Window Co.

Design requirements

HHP aimed to help property owners achieve significant energy savings, develop comfortable homes and get good value for money. The design for the properties also had to deliver the following 'customer' requirements:

- Low maintenance and low cost for tenants
- 80% (or more) CO2 reduction
- Budget up to £150,000 per house

The solution

HHP's design meets these requirements, and more:

- Cost: £75,000 per house (prototype cost)
- Carbon savings: 82% CO2 savings
- Energy bills down by 60%
- Low maintenance solution: the design favours low tech solutions

It delivers this with

- Retrofitted, fully-insulated cavity walls
- Underfloor and loft insulation
- Double glazing upgraded to triple glazing
- Addition of a porch to cut heat loss and a sunspace to aid solar gain
- Passive solar heating, topped up with electric heaters
- Shares in a local community-owned wind turbine

The properties' energy use will now be monitored for 2 years to understand the performance of the energy efficiency measures, the impact of resident behaviour, and the residents' experience of the homes.

Insulation, insulation, insulation

Three types of insulation have been used to deliver significant energy efficiency: roofs, walls and floor.

The properties' roofs are already insulated to 250mm, but this has been increased to 700mm.

The uninsulated concrete ground floor was dug out to install 250mm of polystyrene insulation below a new concrete floor.

The biggest challenge is the solid wall, a type known as no-fines concrete which draws heat from the home.



This weakness has been turned into a strength by building an external brick wall, and insulating the resultant cavity between the brick and concrete walls. The original concrete wall will then act as a thermal store, releasing the heat back into the house when temperatures drop.

Passive solar: Space, heat and light

A sunspace has been built on the rear of the homes. This allows the homes to harvest the heat from the sun, an approach known as passive solar heating.

This heat will be stored in the thermal mass of the building thanks to the external insulation. In summer months this keeps the home cooler, and heat is then released during colder winter months.



Ideally this space would be built on the south of the homes, but in this case will be east-facing due to the location of the property.

The sunspace is also a practical space. It incorporates a new shower room and replaces some of the storage capacity lost to the fully-insulated loft. Additionally, rainwater will be harvested from the roof for use in the properties' gardens.

Community renewables

The high levels of insulation and passive solar heating will deliver savings of 7 tonnes of CO2 for each house.

A further tonne of CO2 will be offset through shares in a community-owned wind turbine in nearby Hockerton.

3000 shares were bought in the turbine on behalf of the homes, and will be held by Newark and Sherwood Homes. Revenue will be spent on the upkeep of the homes and other local projects.



HHP and NSH took this route because community scale renewable energy generation is more cost-effective, lower maintenance, and lower risk for the landlord.

Unfortunately current property energy performance measures cannot account for this type of generation.



HHP

HHP is a not-for-profit cooperative, run from the zero carbon Hockerton Housing Project, that aims to deliver sustainable change.

We are independent of product suppliers, and want only to help you achieve significant energy savings, develop comfortable homes and get good value for money.

HHP is tracking its progress at www.hhpnshtetrofit.wordpress.com

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acting as a catalyst for change

Members have breadth and depth of experience of assisting individuals and organisations across the public and private sector. We can help property owners every step of the way from design to delivery.