Delivering durable change to social housing

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

The homes

HHP is demonstrating its low tech approach to energy efficiency on two council houses in Newark. This project is 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 have already been installed. However, the properties still have a relatively high energy demand, with an average annual energy use of 44,000 kWh (costing approximately £2,000).

The homes were chosen as one of the pair was void. The residents of the other house were very 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.

Design requirements

HHP aims 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
- Ease of use and low cost for tenants
- 80% (or more) CO₂ reduction
- Budget up to £150,000 per house
- Completion by end 2010

The solution

HHP’s design meets these requirements, and more:

- Cost: £75,000 per house
- Relatively high as this is a prototype
- Carbon savings: 94% CO₂ savings
- Energy bills down from £2,000 to £500
- Timeline: completion by September 2010
- Low maintenance: the design favours low tech solutions over expensive technology:
  - Retrofitted, fully-insulated cavity walls
  - Underfloor and loft insulation
  - Passive solar heating, topped up with electric convector heaters
  - Shares in a local community-owned wind turbine

Risks remain, including:

- Quality of the original structure
- Calculations of the benefits of the thermal mass and solar passive heating solution
- Subsequent resident behaviour

These will be managed and monitored through the build and monitoring phases.
Insulation, insulation, insulation

Three types of insulation are needed to deliver significant energy efficiency: roofs, walls and floor.

The properties’ roofs are already insulated to 250mm, but this will now be increased to 500mm.

The uninsulated concrete ground floor will be 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 will be 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 will be built on the rear of the homes. This will allow 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 orientation of the houses.

The sunspace is also a practical space. It replaces some of the storage capacity lost to the fully-insulated loft, but is also a living space for drying clothes, growing food or just relaxing. 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 predicted 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.

3,000 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

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

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 retrofit progress at www.hhpnshretrofit.wordpress.com

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