Next-generation buildings

The Australian Government is moving towards mandatory disclosure of energy efficiency for existing housing stock, but just how easy is it to make an older house more efficient? **Paul Skelton** looks at the lessons learned from a British upgrade project.

Older properties make up 90% of total housing in the UK and produce 27% of the country's carbon emissions, so the introduction of legislation mandating disclosure of energy efficiency last year was an attempt to curb this environmental effect.

As with the proposed legislation in Australia, home-owners aren't required to upgrade – they just declare the efficiency of their home – but there is the same hope that market demand will promote 'green' home improvements.

However, there's confusion over just how easy it is to 'green' an existing dwelling.

In the UK, a partnership of 11 private and public organisations, under the banner of Generation Homes, is working to refurbish the housing stock.

The Generation Homes project, started in 2004, was initiated by ESD, a specialist provider of sustainable energy advice and solutions.

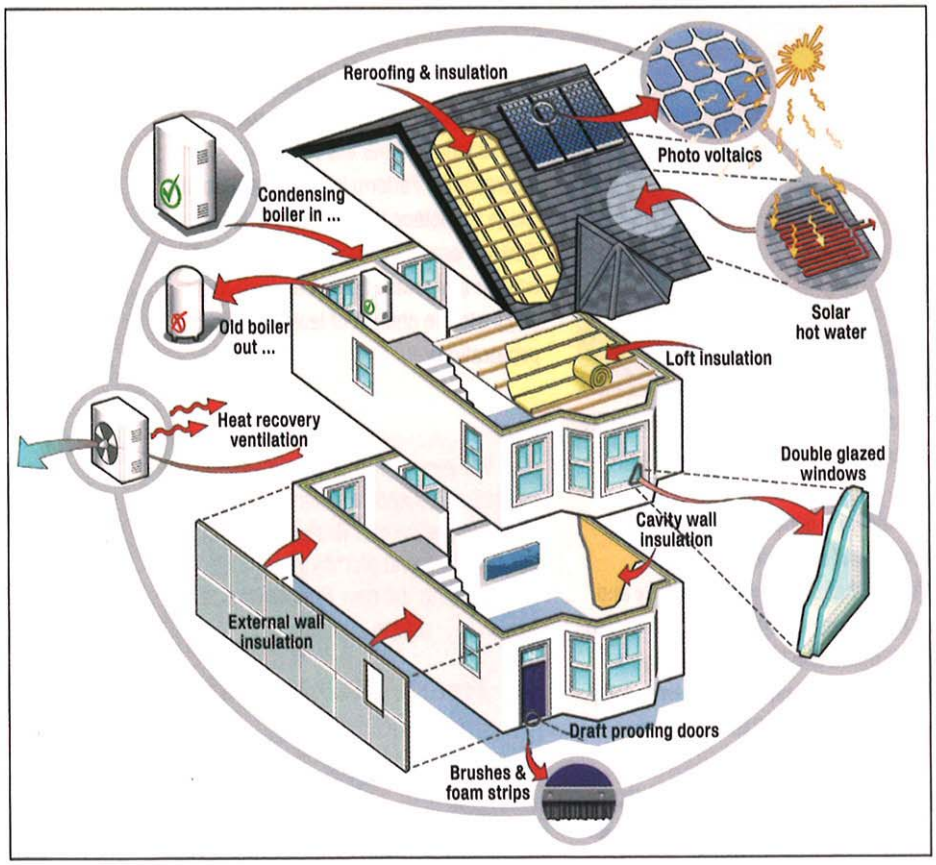

Photo: courtesy of Camco Group 2008

Energy reduction methods such as cavity wall insulation, new loft insulation (300mm), double glazing, draught proofing, mechanical ventilation with heat recovery, wastewater heat recovery and low-energy light bulbs were installed at the five test properties in the UK project.

Due to slow rates of replacement, 80% of the current UK housing stock will still be there in 2050, making it necessary to deal with any energy performance issues.

The Generation Homes initiative aims to establish a systematic approach to reducing carbon emissions from existing houses by more than 60% through deploying integrated low-carbon technical solutions as part of major refurbishment work.

As a result, individual houses will emit no more than 2t of CO_2 a year.

"Generation Homes was conceived as a program that acts as a catalyst in the process of achieving significant carbon savings in the existing housing stock," says ESD senior consultant Cathy Hough.

"Its objectives are to develop mechanisms for implementing 'ultra-low carbon' refurbishment projects and to deliver real demonstration schemes."

The Woodfields project – part of the Generation Homes program involving three semi-detached houses with three bedrooms and three bungalows with two bedrooms in a rural cul-de-sac in Woodfields, Hampshire – introduced a range of energy efficiency and renewable energy measures to existing properties.

Early figures estimate that carbon emissions are expected to be 2.5t of CO_2 a year, compared with 9.8t a year before the upgrade.

Cathy says the Woodfields project, completed in March 2007 and valued at almost £150,000 ($335,000), is an early test of a radical energy refurbishment scheme. The next stage involves the renovation of whole streets.

"Builders and contractors are key

stakeholders in the delivery of the whole-street, systematic refurbishment approach that is behind the Generation Homes concept. As the Generation Homes project moves into its advanced implementation stage we will be engaging closely with them in our partnership.

"Often a number of contractors will be involved in undertaking the refurbishment work and installing different technologies, which reflects the fragmented nature of the supply chain for extreme low-carbon refurbishment in the UK.

"However, in the small-scale pilot projects that we are developing, builders and contractors have been secondary to the housing association that is the key decision maker."

Energy-reduction methods such as cavity-wall insulation, new loft insulation (300mm), double glazing, draught proofing, mechanical ventilation with heat recovery, wastewater heat recovery and low-energy light bulbs were installed in the five test properties.

Each property was equipped with a roof-mounted array of 1kWp (kilowatt peak) photovoltaic panels, which generate DC electricity that is transformed into AC current using an inverter. This power is used directly in the household for lights and appliances, but also to power the heat pump.

Each installation produces up to 800kWh per annum and any excess power is sold back to the grid.

New heating systems were installed in the form of ground-source heat pumps, replacing the original solid fuel boilers. The pumps provide the entire demand for heating and hot water, with 3.5kW systems used for the bungalows and 5kW for the houses.

"The next stage of the project will be to roll out the Generation Homes concept and to deliver an advanced, large-scale demonstration project, covering 100-200 houses that will have sufficient critical mass to embed a trend in the housing sector," Cathy says.

"Ultimately the aim of the project is to bring the Generation Homes approach and standard into the mainstream." ■

CONTACT

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