Newsletter of Beacon Pathway

Facing

December 2006

Beacon
TOGETHER, CREATING TOMORROW'S HOMES

WISHING YOU A SAFE AND FESTIVE HOLIDAY SEASON, AND A WARM, DRY, COMFORTABLE SUSTAINABLE HOUSE IN 2007!

Rotorua NOW Home™

Beacon's second NOW Home™, a collaboration with Housing New Zealand Corporation, is now officially opened, tenanted and a two-year monitoring period is underway.

Beacon is hoping that, although the house is in a cooler climate, it will show the same efficiencies and savings as the Waitakere NOW Home™. Early results from the monitoring of the Waitakere home indicate a 25% saving in town supply water use and a 30% saving in energy use.

The NOW Home™ projects are trialling the design and construction of affordable, everyday homes that are warmer, healthier, cheaper to run, and kinder to the environment. The Rotorua NOW Home™ is designed quite differently to the Waitakere NOW Home™ with a butterfly shaped roof and a u-shaped floor plan providing a private deck area. The house is clad in a mixture of COLORSTEEL® and Shadowclad, and utilises cedar louvers for ventilation. A low emission pellet burner has been installed to supplement the passive solar heating on cooler days.

Some differences reflect the need to incorporate Housing New Zealand requirements and Maori values into the design. Fundamentally, though, the principles on which the house is built remain the same: passive solar design, exposed concrete floor to act as a heat sink, high levels of insulation, double glazing, solar water heating, rainwater harvesting and passive ventilation.

Built in Fordlands, Rotorua, the project reflects Housing New Zealand Corporation's support for Community Renewal. Strong community support was shown at the opening with performances by children from the local kohanga reo and kapa haka groups from the local high school. The house was opened by Steve Chadwick, MP for Rotorua, who gave her passionate and enthusiastic support to the project.

Waitakere NOW Home™

The results of the first year of monitoring the Waitakere NOW Home™ are currently being analysed. The house has continued to be appreciated by the tenants, and their feedback is helping to inform Beacon's research.

The Waitakere NOW Home™ will be open to the public in conjunction with EcoDay, a Waitakere City Council and Ecomatters Environment Trust event. This will be held on 4 March 2007, 10am – 4pm, Olympic Park, New Lynn.

For more information, visit **www.ecoday.org.nz**

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Retrofit NOW Homes™

One of Beacon's greatest challenges is to improve the sustainability of New Zealand's current housing stock. It is estimated that two thirds of New Zealand's housing stock was built prior to 1979. Beacon has been working on defining a High Standard of Sustainability for an individual house, based on data from the NOW Homes™. The next step is to find out what is required to retrofit existing houses to a High Standard of Sustainability.

The answer is being sought in the Retrofit NOW Homes™ project, underway in Papakowhai, Porirua. It aims to identify the best (most cost-effective and easy to implement) packages and combinations to significantly improve the standard of sustainability of the homes.

A review of previous retrofitting research (summarised opposite) has shown that changes have been relatively basic and have achieved only a 0.5-1ºC temperature gain, leaving homes still cold and unhealthy. Furthermore, any energy savings tended to be taken back as 'energy creep' to improve greater comfort.

In the Retrofit NOW Home™ project, 10 ordinary houses in Papakowhai, Porirua have been selected, covering a wide range of housing types and households.

Houses will be fitted with a range of different packages of energy, water, indoor environment quality and waste retrofit measures. The combinations of packages will test standard retrofit packages commonly used in New Zealand against what Beacon considers are moderate and high sustainability combinations. Key retrofit changes include improvements to thermal performance, energy-efficient water and space heating, and installation of water tanks.

The homes will be monitored, both before and after the features are installed, enabling Beacon to quantify the level improvement.

Research

Sustainability Options for Retrofitting New Zealand Homes – Energy

Many New Zealand houses are cold and damp and hard to heat in winter. In order to tackle this problem, a number of research programmes have been undertaken in the past decade to study the impact of retrofitting houses in New Zealand. To better understand the results of these studies, a desk-top study was carried out of all the existing research programmes that address the benefits of retrofitting houses.

In almost all instances, the selected programmes were aimed at low income households and included a standard package of measures - comprising ceiling insulation, basic underfloor foil and draught-proofing of doors. These measures generally achieved an average 0.5-1ºC temperature gain which was found to be insufficient to lift indoor temperatures into an acceptable zone of comfort (or health). Over time, it appears that much of the energy efficiency gains were taken back as 'energy creep' to increase the temperature and comfort levels of what were essentially often under-heated homes.

These findings tend to reinforce a growing body of evidence, both in New Zealand and overseas, about the need to link together packages of integrated solutions for householders. These would be underpinned by good thermal insulation and efficiency upgrades but would not rely on these actions solely to achieve desired outcomes. Overall, it suggests that retrofitting needs be less of a standardised package across the country, with more attention given to geographic location, the characteristics of the house, and individual household circumstances.

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Analysis of Currently Available Environmental Profiles of Building Products

Environmental life cycle assessment (LCA) is a tool for assessing the environmental performance of a building, a building construction or a building material by taking a systems perspective over the whole life cycle. This study summarises the work done in New Zealand and describes the most relevant overseas databases, analysing the applicability of international data to New Zealand situations.

The comparison of embodied energy and results for CO_2 emissions shows that New Zealand data differ significantly from overseas data. No general trends were evident: values were higher for certain products and lower for others. The main differences are due to country-specific processes and fuel use, but also due to variations in the methodology of data collection and assessment of environmental impacts.

Currently, New Zealand data are limited to energy use and CO_2 emissions for most building products. However, an overall environmental evaluation has to consider other aspects as well. The most important environmental impact categories are: acidification; eutrophication; ozone depletion; photochemical ozone creation; human toxicity; and ecotoxicity. For the assessment of these additional impacts, a full inventory of material and energy use of the whole life cycle is necessary.

The main building materials, where further LCA work is of special importance, are

1. Aluminium
2. Brick
3. Cement
4. Concrete
5. Fibre cement
6. Glass
7. Gypsum board
8. Fibre glass insulation
9. Plastic
10. Steel
11. Timber

SMART BUILD

The development of the new SmartBuild website is well advanced with a prototype site being launched to key stakeholders on 15 December. The website will remain off-line until the public launch in June 2007.

Beacon Pathway Ltd was contracted by the Ministry for the Environment to develop a one-stop, accessible, credible information resource for New Zealanders who are considering and undertaking building and renovation. The key aim is to answer these questions:

- **Why** should I consider making my home more sustainable?
- **What** are my best options?

SmartBuild will be closely linked to ConsumerBuild, which will provide additional building-related information on legal, health and safety, weathertightness and other similar issues (**www.consumerbuild.org.nz**).

A sister website is being developed by BRANZ Ltd to provide the industry with practical guidance on how to convert the information in SmartBuild into real buildings. It covers the practical aspects of passive design, site planning, building planning, energy, materials use, water use and the impact of climate change.

SB07 Conference Update

If you attend one conference next year, make sure it is **New Zealand Sustainable Building 07 – Transforming Our Built Environment**. The conference, to be held in Auckland 14-16 November 2007, has already attracted a number of exciting keynote speakers, including Michael Pearce, the designer of the new, 6 star, Greenstar-rated, Melbourne City Council building CH2.

A Call for Papers has been issued, and a Sponsorship and Trade Exhibition prospectus is available.

Further information on the conference is available from the conference website **www.sb07.org.nz**

or by contacting Lois Easton on **loise@beaconpathway.co.nz**