

BEACON FOR SUSTAINABILITY

Research consortium Beacon aims to see homes achieve a high standard of sustainability, and has developed benchmarks and checklists to help us get there.

By Lois Easton, Research Team Leader, Beacon Pathway Ltd

Beacon Pathway Ltd, a research consortium part-funded by the Foundation for Research, Science and Technology, aims to see the majority of New Zealand homes achieve a high standard of sustainability by 2012. Beacon has developed benchmarks for energy and water consumption and checklists for waste, indoor environment quality and materials. They represent a 'line in the sand' against which the sustainability of New Zealand's homes can be measured, and aim to help with both renovation of existing homes, and design of new ones.

Reducing CO₂ emissions

The building sector accounts for 30–40% of total global energy use, and has a huge role to play in reducing carbon dioxide emissions. According to a recent United Nations report, conservative estimates suggest that energy-efficient building design and construction practices could reduce CO₂ emissions by 1.8 to 2 billion tonnes. This is close to three times the amount scheduled to be reduced under the Kyoto Protocol.

Most importantly, this can be achieved by the greater use of existing technologies and practices, such as thermal insulation, solar shading and more efficient lighting and electrical appliances. For example, the International Energy Agency estimates that a total global switch from traditional incandescent light bulbs to compact fluorescent ones would, in 2010, deliver CO₂ savings of 470 million tonnes, or slightly over half of the Kyoto reductions.

Advanced and expensive high-tech solutions are often not needed, but the use of these will result in even greater reductions.

Sustainability = comfort and economy

More careful design and construction can impact on water consumption, waste generation, running costs and the well-being



The 13,500 litre rainwater tank at the Waitakere NOW Home® provides non-drinking water. (All photos by Deborah Dewhirst.)

of occupants. Sustainable homes are warmer, drier, more comfortable, resource efficient, cheaper to run and maintain, and cause less environmental harm.

New Zealand's houses have a reputation for being cold and damp. The country has one of the highest levels of asthma and bronchial diseases in the world with almost one in six people suffering from the disease. Our colonial mindset has been to 'harden-up' or put on another jersey, rather than build warm, comfortable homes. If we value our health, and that of our children, this needs to change. Basic measures such as improved insulation, incorporation of thermal mass,

passive ventilation and low allergen material use – in all houses – would significantly improve the nation's health.

In 2005, the Reserve Bank estimated residential dwellings to be worth a collective \$506 billion. Ninety percent of households' net worth is represented by housing assets, and yet most people have little idea of how their largest single investment performs in terms of energy consumption or water use. Few stop to consider the cost-savings that more efficiently-performing homes will achieve. Saving money on monthly bills will mean mortgages can be paid off more quickly, and homes that perform well are also likely to sell for higher prices, especially

if home performance rating schemes, like those in use in other parts of the world, take off in New Zealand.

Benchmarks for sustainability

Beacon has developed a series of benchmarks for a high standard of sustainability in homes. These focus on five key aspects: energy use, water use, indoor environment quality, waste and materials. Specifically, they involve:

- a reduction in energy use by 25% in new homes and 15% in existing homes
- a 25% reduction in water use in both new and existing homes
- indoor environment temperatures which meet the World Health Organisation standards of 18°C
- adequate ventilation without excessive draughts
- provision for waste minimisation during construction, renovation and operation of homes
- consideration of sustainability issues in the choice of materials used for construction or renovation of homes.

Beacon also believes that if New Zealanders are to enjoy the benefits of sustainable housing, the emphasis must be shifted from the 25,000 new homes we build each year, to affordable, attractive, practical and reliable methods of renovating our 1.6 million existing homes and the neighbourhoods in which they stand.

Achieving sustainability

Beacon has identified a range of ways to effectively and affordably enable homes to achieve the benchmarks. The features are grouped into low, moderate and high categories, reflecting both their impact on the sustainability of a home and the amount of capital investment required.

Basic low-cost measures which will have a modest impact on the sustainability of the home include:

- incorporation of passive solar design into new homes and extensions to existing homes
- fluorescent light bulbs
- outdoor clotheslines
- hot water cylinder wraps and pipe lagging
- draught stopping

- ventilated fridge spaces
- low-flow shower heads
- dual-flush toilets
- opening windows
- mechanical venting of bathroom and kitchen
- provision of space for recycling and facilities for collection and composting of organic waste
- use of materials for new homes and alterations to existing homes which have been selected with reference to a sustainability checklist
- elimination of unsustainable features such as air conditioning, in-sink waste disposal units and unflued gas heaters.

Moderate cost features, which will have a significant impact on the sustainability of a home, include:

- ceiling, external wall and underfloor insulation to meet 'better' recommended values for each climate zone
- rainwater tanks supplying the garden
- windows with passive venting
- thermal curtains and pelmets
- water and energy efficient appliances.

Depending on the type of home, some higher cost features such as solar hot water systems, insulation levels to meet 'best' recommended values for each climate zone, double glazing, greywater reuse or rainwater tanks supplying non-potable uses may be required to fully meet the Beacon high standard of sustainability.

Research continues

Beacon has developed two new research NOW Homes® (in Waitakere City and Rotorua) and is currently researching the effects of retrofitting 10 ordinary homes in Wellington. Data gathered from these projects will be used to verify and refine the benchmarks. Monitoring data from Beacon's Waitakere NOW Home® indicates that considerable energy and water savings and improvements in indoor environment quality can be achieved in an affordable home of standard appearance.

For more information, see www.beaconpathway.co.nz or www.nowhome.co.nz. ♦



A polished concrete floor absorbs solar warmth, while the thermal-backed curtains retain the heat after dark.



At the Waitakere NOW Home® 55% of hot water is heated by solar energy.