Newsletter of Beacon Pathway

# Facing

August 08

Beacon
TOGETHER, CREATING TOMORROW'S HOMES

In this issue:



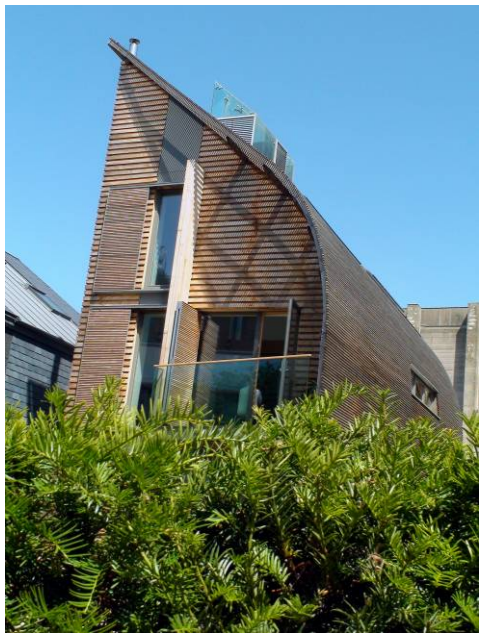
# Lessons from the UK Code for Sustainable Homes

An intrepid group of industry and government representatives is just back from a study tour to the UK to look at whether a New Zealand version of the UK Code for Sustainable Homes could be developed.

The tour was sparked by a report on the Future Homes 2007 Conference in the UK by Energy Research Team Leader, Verney Ryan. He found the UK was further ahead of New Zealand in achieving a sustainable residential built environment via government policy and action, and industry response.

Recent moves by the UK Government include the Code for Sustainable Homes, which makes commitments to building affordable homes, zero carbon homes and Ecotowns. Yvette Cooper, UK Secretary of State for Housing, claimed at the Future Homes Conference that the government has made a very clear choice **not** to take an incremental approach to requiring more sustainable housing. In her words, 'incrementalism will not get us there'. She declared that what is needed is a 'big revolution.'

The UK Government has provided a strong policy framework with the aim of delivering more homes, more social housing, more affordable housing and more green homes. The policy framework focuses on reducing emissions from housing by 60% (from 1990 levels) by 2050 and the first milestone targeting all new housing to be carbon zero by 2016.



*The Kingspan Lighthouse has achieved Level 6 of the **Code for Sustainable Homes**. It is a net-zero carbon home with zero carbon energy supply for space and water heating and home electricity demand.*

The tour included presentations from:

- The Department of Communities and Local Government, responsible for administering the Code for Sustainable Homes and the Building Code.
- The UK Green Building Council.
- The Building Research Establishment, responsible for the technical back-up to the Code for Sustainable Homes, and a tour of BRE's innovation park which includes Barrat Home and Kingspan Lighthouse constructed as show homes that meet high CSH standards.
- BEDZED Development – a demonstration of super efficient multiunit residential housing incorporating passive design, super insulation, biomass combined heat and power.

*The Stewart Milne Sigma Home has achieved Level 5 of the **Code for Sustainable Homes** with a 100% reduction in carbon dioxide emissions through solar, photovoltaic and micro-wind energy generation.*

## What is the Code for Sustainable Homes?

- This national standard for building sustainable homes came into effect in April 2007. It provides an independent assessment and rating system for new homes.
- The Code covers nine areas: energy and $CO_2$, materials, waste, health and wellbeing, ecology, water, surface water runoff, pollution and management.
- The Code provides every home rated against it with a star rating from 0 to 6 stars (1 is just above the current Building Code level and 6 is a zero carbon home). The Code provides minimum standards for key elements and rising standards for energy and water efficiency at each Code level. Code 1 is very achievable, Code 4 reasonably do-able, and Code 6 very hard at this point in time.
- The Code is a voluntary standard, although all homes built with funding from the UK Housing Corporation must meet Code level 3.
- The Government has introduced mandatory labelling for all new homes (effective April 2008). This means that all homes have to be rated against the Code although it is not mandatory to achieve any particular level (if they do not achieve level 1 they will receive a nil certificate).
- Energy Performance Certificates are required at point of sale or rental, but there is no mandated performance level.

## Insights from the tour

The Code for Sustainable Homes and the Building Code effectively work in tandem, with the CSH signalling to industry early the likely standards which will become mandatory in future reviews of Building Codes. This trial provides a clear policy roadmap for industry which gives product manufacturers, developers and house builders an investment timeline and more certainty that the R&D required to change to more sustainable building practices will prove worthwhile.

Of over 20 presentations, none advocated against the Code. Issues raised were with

- industry capability
- cost of assessment
- timelines

## 'No change' is not an option

Industry generally recognised the commercial opportunity in delivering to the Code and accepted that the construction industry has a central role in delivering development which is sustainable. Industries right across the value chain have to adapt quickly if they are going to survive.

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# Papakowhai renovations

Our first Renovation project of nine homes in Papakowhai, Porirua, is now well into the data collection phase.

### Early results

The most significant early results have been the reduction in reticulated energy needed for water heating. The solar hot water systems have saved 80% reticulated energy in one home and 60% in another. This is particularly encouraging as the monitoring period was over the winter months (May-September) and indicates that the panels were well oriented for winter sun. The installations were of a high specification – with panels twice the size of an installation undertaken under the EECA subsidy scheme.

The houses which had all parts of the thermal envelope insulated (walls, ceilings and floors) performed better than those which had only part insulation. This suggests that homeowners should insulate un-insulated areas before topping up already insulated areas.

### Benefits for householders

The Papakowhai householders consistently noticed increased winter warmth and drier homes. Householders felt changes in indoor comfort even when changes (according to monitoring data) were relatively small.

Unexpected benefits identified by householders included:

- noise reduction from double glazing and/or increased insulation
- reduced household stress associated with warmer winter indoor environments and, for those with solar water heating, increased access to hot water.

# Home*Smart* Renovations project needs homeowners

With the results from the Papakowhai Renovation project coming in, the Existing Homes team led by Lois Easton is working on the pilot project of 1000 Home*Smart* Renovations around New Zealand.

Home*Smart* Renovations bring homes to a High Standard of Sustainability – Beacon's benchmarks for an efficiently performing house – by improving energy and water efficiency, and ensuring a healthy indoor environment. They provide tools to help homeowners make good choices when they make (often expensive) changes to their homes.

The assessments and renovations will be carried out by our partners in the Home*Smart* Renovations project:

| | |
|---|---|
| EnergySmart | EnergySmart |
| Community Energy Action | community energy action |
| Energy Options | ENERGY OPTIONS |

We are looking for homeowners keen to improve their home's performance to reach a High Standard of Sustainability and able to fund the renovations over spring/summer 2008/2009 – either themselves or with assistance from EECA's interest-free loans for the energy efficiency upgrades.

To find out more, or register your interest, visit: **www.beaconpathway.co.nz/homesmart+renovations.aspx**

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# Waitakere NOW Home® - Results of the final year

The two year Waitakere NOW Home® project has finished and the results are informing Beacon's next step: Home*Smart* Homes around New Zealand.

So how did the Waitakere NOW Home® perform?

## Water efficiency

Low flow shower heads, flow restrictors on taps and low flow, dual flush toilets reduced total water use, including both reticulated and rain-water, to 189 litres per person per day in the first year, dropping to 172 litres in the second year.

The 13,500L rain tank supplied 47% of the home's water needs in year 1, and 52% in year 2. The tenants used only an average 100 litres of reticulated water per person per day in Year 1, dropping to 85 litres in Year 2. As their water supply was metered, this represented a considerable savings on water bills. Overall Waitakere NOW Home® reticulated water use in Year 1 was 40% less than the average in surrounding Waitakere City improving to 50% less in Year 2.

## Energy efficiency

### *Overall energy savings*

In their first year of living in the Waitakere NOW Home®, the tenants used 7400 kWh per year or 33% less than an average 4 person household with school age children. This was also 45% less than the tenants' energy use in the house they occupied over the year prior to moving into the Waitakere NOW Home®. The tenants were delighted with their lower energy bills which they noticed very early on.

In the second year, energy use rose to 8500 kWh over the year. While this is an increase in what was achieved in the first year, it is still 25% less than average 4 person households with school age children. Analysis shows that the tenants have changed the way they use the house, establishing a home office and using more electronic equipment. The lower running cost has buffered the household against rising energy prices, and continued to provide more disposable income. The tenants still saved energy compared to similar households, while maintaining a high degree of comfort and expanding their use of the house.

### *Home Energy Rating*

The Waitakere NOW Home® was rated under the Home Energy Rating Scheme and received 8 stars out of a possible 10.

## Water heating

In Year 1 the solar water heater provided more than half (55%) of hot water needs. That's equivalent to a saving of 1620kWh (compared to similar houses in the area) or about $275 on water heating alone.

In Year 2 the solar water heater provided 45% of hot water needs, 1880 kWh in total. Although the solar water heater provided more kWh in total, the increased hot water use by the household means that a lower proportion was provided by solar.

## Indoor environment quality

**Humidity:** Despite constantly using their dehumidifier in their previous home, the tenants noticed how much drier the Waitakere NOW Home® was. Humidity levels were all in the acceptable range for human health (25-75%), a good result given that the humidity levels in Auckland frequently exceed 75%. The tenants didn't unpack their dehumidifiers at all – there was no condensation and no mould. Their son's asthma improved rapidly and they were delighted to find after three months that he had hardly needed his nebuliser at all.

**Temperatures:** Designed to only need additional space heating on 10 days per year, the Waitakere NOW Home® has performed better with additional heating only required on two days per year. There is no inbuilt heating – the tenants have used a small fan heater when necessary.

The tenants appreciated the evenness and stability of the temperature – even in winter all rooms were warm and comfortable with the living room having an average winter temperature of 21.6°C and the bedrooms having average night-time winter temperatures of 17.4°C -17.7°C. The winter mean temperatures all exceeded World Health Organisation minimum of 18°C for living areas and 16°C for bedrooms (compared to 30% of New Zealand homes which regularly don't meet these standards).

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### A warm dry home is good for your family

The experience of our NOW Home® tenants indicates that warm dry homes are not only vital for health, they are important for mental health. Best of all for the family was the increased confidence and happiness they noticed since moving into the NOW Home®. Their boys are healthier and more confident, and they just don't get the winter blues.

The family started having friends around as the house was pleasant and spacious for entertaining. Their view: a good house positively contributes to strong family relationships.

> "We are happy here, which flows through to everything else. Everything has been better since being here".
>
> NOW Home® tenants

*General Manager Nick Collins presents our NOW Home® tenants, Joe and Hayley, with a gift to mark the end of the research project*

# New on our website

**Thermal Insulation in New Zealand Homes: a status report. McChesney, I., Cox-Smith, I., Amitrano, L**

A summary of this report is attached. Download the full report at:

**www.beaconpathway.co.nz/energy.aspx?PageContentID=1205**

**Best Practice Water Efficiency Policy and Regulations. Lawton, M., Birchfield, D., Kettle, D, and Trenouth, C.**

The need for a new water supply is the key driver for councils to consider demand management. This report reviews demand management practices in New Zealand and overseas, and the regulatory / policy approaches that impact on the degree of success of their uptake.

The technologies required to reduce water use are readily available. It is the quantity and quality of our water conservation policy and regulations that is lagging behind and that need further development if they are to better support the adoption of such technologies.

Our water researchers have been identifying the most effective pathway toward using water demand management as an alternative to a new supply source. The pathway includes education and awareness raising as well as other forms of policy including supportive regulation to be effective. A suite of policy instruments is required including: pricing which sends a financial signal to conserve; regulation to gain uptake of new technologies; and education which provides the understanding of the financial and wider benefits of conservation.

Case studies of water policies in Tauranga, Kapiti Coast, Auckland and Nelson are complemented by overseas case studies of Canada, UK, US and Australia.

This report is being published – watch out for the glossy version, *Slowing the Flow: Reducing Urban Water Demand in New Zealand.* Meanwhile, download the full research report at:

**www.beaconpathway.co.nz/water.aspx?PageContentID=1163**

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## House Owners and Energy: Retrofit, Renovation and Getting House Performance. Saville-Smith, K. (CRESA)

Which consumers are best targeted to achieve maximum take-up of energy efficiency retrofits of New Zealand homes? Three surveys of different groups were undertaken to find the answer:

- **High Energy Users** - important because they are the primary portion of residential energy use and may make up 15%- 25% of households.
- **Recent Movers** - important because they make immediate selection choices regarding the energy efficiency of their new home and often finance their new home to allow for both purchase and renovation.
- **Landlords** - important because homeownership in New Zealand is falling. Landlord decisions are likely to become increasingly important in determining the thermal performance of the housing stock and the conditions under which many households live.

The surveys show all three sets of house owners are resistant to investment in retrofitting. While High Energy Users and Recent Movers have histories of expending significant amounts on renovations, they do not address basic energy deficiencies easily retrofitted at low cost (draughty doors and windows; poorly insulated hot water cylinders and pipes; partial roof and underfloor insulation; inefficient heating and lighting.) Instead they put in complex systems but, despite these technological solutions, considerable proportions of owner occupiers found that they continued to have mould, damp and cold problems.

The Landlord Survey also suggests that regulation has limited impact and can not be considered the only pathway for promoting improved rental house performance. Almost two thirds (63.3%) reported they would insulate if the Government provided financial assistance, but very small proportions of landlords are aware of the grants available.

Find out more at:

**www.beaconpathway.co.nz/energy.aspx?PageContentID=1162**

## Submission to the Royal Commission of Inquiry into Auckland Governance

Auckland's governance arrangements will only deliver a successful, world-class and sustainable region if they are targeted at core sustainability principles and critical outcomes. Ensuring homes and neighbourhoods are more sustainably designed, built and renovated will reduce Council operating costs and improve the Auckland region's international competitiveness.

Existing local government practices to promote sustainable homes and neighbourhoods are highly variable across the region. This variability can add unnecessary complexity to already-extensive consenting processes, and raises issues of equity between cities. Some councils have excellent policies and programmes that would be beneficial to the wider region.

Our submission supported improved consistency in Council practices relating to sustainable homes and neighbourhoods, provided the most effective and sustainable policy practices from across the region were adopted. In particular, we recommended aligning:

- How policy statements and plans address sustainable housing and neighbourhoods.
- Building consenting processes, standardising assessment and pricing of solar hot water installation, grey water systems and non-potable use of rainwater.
- Councillor and officer upskilling in sustainable building practices.
- Shared research resources.

Read our submission to the Royal Commission at:

**www.beaconpathway.co.nz/submissions.aspx?PageContentID=871**

# Snippets

**Research Symposia:** In the last month, our researchers have shared their research with over 200 people in Auckland, Wellington and Christchurch at our annual research symposia. The presentations are on the website at: **www.beaconpathway.co.nz/research+symposium+2008.aspx**

**SB08 preparations:** The World Sustainable Building Conference (SB08), this year in Melbourne, is coming up from 21-25 September 2008. Beacon researchers have had 4 papers and a poster presentation accepted. Find out more at: **www.sb08melbourne.com**

**Sustainable Habitat Challenge 08:** teams around New Zealand are competing to design, develop, and build sustainable housing in their local community. Beacon's Neighbourhood Sustainability Framework and High Standard of Sustainability™ benchmarks are among the resources informing the project. Read more at: **www.shac.org.nz**

**Ecocity World Summit:** Beacon researcher, Denise Bijoux, presented a paper on the Neighbourhood Sustainability Framework to this San Francisco conference. The Summit sought to "launch a design revolution" in order to optimise the places and processes that comprise cities, towns and villages while retaining healthy relationships with nature. Well over a thousand participants attended including architects and planners, politicians and activists, NGOs and large multi-national corporations and bureaucrats, policy-makers, entrepreneurs, academics, artists and volunteers.

Read Denise's report at:

**www.beaconpathway.co.nz/neighbourhood+presentations+and+conference+papers.aspx**

**Brookers Building & Construction Law Conference 2008:** Lois Easton has just presented to this conference on *Smarter Homes: The Building Code and Sustainable Housing: Effects in Practice*.

**Sustainable Building Pathways:** Beacon has been part of an industry group which met to discuss what a 'sustainable building pathway' to foster the uptake of sustainable building practices might look like, and whether the industry wished to invest in proactively developing a sustainable building pathway.

**Water workshops:** The Beacon water team has been taking our learnings out to councils in a series of workshops. These bring together a good cross-section of council officers and contractors responsible for water management, and are often the first occasion for many staff across council to discuss demand management together. The first part of the workshop is a presentation of our research findings followed by a workshop format to elicit the most appropriate demand management approaches, both the technology and policy for their individual context. Beacon's role is in the workshop is informed facilitation; we are not there to try to tell the council what to do.

Interested?

Contact Maggie Lawton, **maggie@braidwood.co.nz**

**Auckland Regional Council technical advisory groups (TAGs):** These stakeholder groups are helping to develop climate change policy in the a range of policy areas – Transport, Waste; Water; Natural Hazards, Land, Civil Defence & Emergency Management, Ecosystems, People, Community and Culture, Business & Economy, Leadership and Energy. We are providing input to several of these groups.