



Facing

Newsletter of Beacon Pathway June 2012



In this issue	Message from the CEO	Page 2
	MSI capability funding for Beacon	Page 2
	New Category of Home leads to Warmframe™ technology	Page 3
	Hastings Best Home	Page 3
	Build Back Smarter – six houses signed up	Page 4
	▪ Christchurch repair and rebuild guides	Page 6
	▪ Retrofitting wall insulation	Page 6
	Study tour reports	
	▪ Prefab housing, China	Page 7
	▪ New housing developments, UK	Page 8

Welcome to *Facing*, the newsletter of Beacon Pathway Incorporated. Through it, we hope to keep you up to date with our activities and research.

Beacon symposia coming up

It's been two years since our last symposia so we think it is time to share what we've been doing and bring you up to date with our current projects.

We are planning three symposia, starting in Wellington, then in Christchurch and ending up in Auckland.

The programme is still being developed, but we'll be covering:

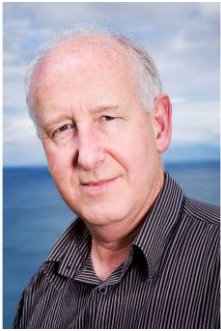
- The context, scale and opportunity for residential repair in Christchurch
- Progress on the Build Back Smarter project – what we are trying to achieve and how
- Learnings from the NZ Housing Foundation's HomeSmart Home

- Rebuild of new homes in Christchurch - new home guidelines and the Christchurch Housing Showcase
- The HIVE High Performance Home and Warmframe™ technology

The symposia will be free. Dates and venues are still being finalised.

We'll be sending invites out but feel free to indicate your interest now – contact Andrea Blackmore andreab@beaconpathway.co.nz to be sure of an invite.

We are also looking for sponsorship to cover lunch, snacks and post-symposium drinks - enquiries to glendal@beaconpathway.co.nz



Message from the CEO

The past 18 months have seen Beacon established as an Incorporated Society with the appointment of a Board. In the past year, Beacon has built solid foundations on

which to grow.

Beacon has commenced with flagship demonstration projects in both the new build (New Category of Home) and retrofit (Build Back Smarter) space. Despite the delays plaguing the Christchurch rebuild, Build Back Smarter is finally moving forward and we – and the participating homeowners – are keen to see the results. Behind-the-scenes work in the New Category of Home project has come to fruition and the first demonstration is about to get underway in the Prefab NZ Home Innovation Village.

Meanwhile Verney Ryan and I have been overseas looking at progress in China (prefab housing) and the UK (new housing developments). Sadly I have to report that we were both underwhelmed by what we saw. It's often tempting to think we are behind the times down here in New Zealand, but there was much we saw that was below New Zealand standards.

Beacon has been successful in securing capability funding from the Ministry of Science and Innovation. This will enable us to focus on establishing public good work towards the Society's goals.

Overall, we stand in a good position to make the most of the opportunities that the next year will bring. I'm looking forward to it!

Nick Collins

MSI capability funding

Beacon has secured some TechNZ funding over a two year period on the basis that we find matched funding for projects within the agreed objectives.

This funding is dedicated to capacity building. MSI sees organisations taking up Beacon's knowledge as effectively commercialisation, and sees the value in funding Beacon's capacity to drive change.

With the funding, Beacon will dedicate three core team members, each to a different objective: neighbourhoods, new homes and existing homes.

Neighbourhoods

This team member will bring together a new cluster of partners (industry, government, third sector) in a joint programme of work around neighbourhoods. The expectation is that this activity will help operationalise the Neighbourhood Sustainability Framework.

Medium density new build homes

This team member will be dedicated to the Christchurch Housing Showcase project. Christchurch City Council, Department of Building Housing and other Canterbury-based Beacon partners have signed up to a medium density new build exemplar development with winning designs selected from a high profile competition.

Retrofit of existing homes

Three pathways are important to create change in our existing homes: councils, skills training, and landlords. This team member will: encourage councils to use Beacon's resources; support trades training to build off our knowledge; and identify/address the barriers to landlord improvements of rental stock.

The New Category of Home project leads to Warmframe™ technology

Collaboration between NZ Steel, Insulpro Manufacturing, Fletcher Aluminium, Resene Paints and Rollforming Services, together with assistance from Beacon, has led to the development of a new wall technology, Warmframe™.

Originally conceived as a project to develop a New Category of Home, this team has been working 'in the shed' on a wall system which not only brings high thermal and acoustic performance but can boost productivity by assembly off-site.

With Warmframe™ developed, the project is moving on to demonstrate and evaluate the technology in actual houses. The first opportunity comes as part of the Prefab NZ Home Innovation Village (HIVE) in Christchurch.

The product partners have joined with architect, Anne Salmond, to produce a show home for this site using Salmond Architecture's High Performance House™ designs. This will be built using Warmframe™ composite steel frame technology and features thermally broken window joinery and non-allergenic anti-mould interior paint finishes.



Beacon's role will be to project manage the HIVE house (partner engagement, resolving design/technical issues, off-site construction, coordinating the 15 month demonstration period) and undertake monitoring and evaluation.

The New Category of Home project will continue with further demonstrations which will not only use Warmframe™ technology but be designed to perform to HomeSmart Home specifications: The next will be in a community housing development by New Zealand Housing Foundation. Again Beacon will be undertaking monitoring and evaluation of the houses.

For more information, visit:

www.warmframe.co.nz

Hastings Best Home

Beacon has provided technical advice to the Hastings District Council and Horvath Homes who are partnering in the construction of an exemplar sustainable home.

With construction due to begin in July, the Hastings Best Home will showcase best practice in sustainable building for the Hawkes Bay area. Beacon has used our HomeSmart Home specifications as guides to ensure high performance for the home and assisted with training HDC and builders/tradespeople involved in the project.

The house includes:

- Good passive solar design and use of thermal mass
- High levels of insulation
- Efficient space heating
- Solar energy and solar water heating
- Low energy lighting systems
- Kitchen / bathroom ventilation
- External shade for summer cooling

The aim is for the house to achieve a Homestar™ rating of 6 or higher.

Build Back Smarter – Six houses signed up

Build Back Smarter has its first six homes signed up to participate in the retrofit project. The project's aim is to show that home performance improvements can and should be included in the 'standard' repair of earthquake-damaged Christchurch homes.

The team has been working with insurers and their PMOs to identify suitable houses during the insurance assessment process. With delays to repairs, this phase of the project has taken longer than anticipated. However, the PMOs are now moving ahead with their repair programme and six homeowners have signed up in a short space of time.

As the homes are signed up, the pre-retrofit process covers:

- An assessment by Community Energy Action using Beacon's renovation plan builder tool

- An assessment by EECA of suitability for Warm Up New Zealand funding
- Development of an upgrade plan which is then discussed and agreed with all parties: insurer, PMO, homeowner, EECA and Beacon



The upgrade plans will cover improvements such as:

- Ceiling and underfloor insulation
- Wall insulation where cladding or lining is replaced
- Double glazing
- Efficient clean heating source
- Draught stripping
- Water efficiency – taps, shower heads, toilets
- Solar or heat pump water heating





The upgrade plan will be individualised to the circumstances of each house.

The first upgrade is scheduled to start on 2 July.

An overview of the houses

House	Earthquake damage repairs	Opportunity to improve performance
Huntsbury 1 	<ul style="list-style-type: none"> ▪ Complete re-clad of damaged brick veneer ▪ Lath and plaster linings to be replaced 	<ul style="list-style-type: none"> ▪ No wall insulation ▪ Some ceiling insulation ▪ Old underfloor insulation ▪ Old log burner ▪ Draughty doors and windows
Huntsbury 2 	<ul style="list-style-type: none"> ▪ Complete re-clad - damaged stucco over concrete block veneer 	<ul style="list-style-type: none"> ▪ No wall or underfloor insulation

Facing

<p>Woolston 1</p> 	<ul style="list-style-type: none"> ▪ Complete re-clad – damaged stucco over concrete block veneer ▪ Lath and plaster linings to be replaced ▪ House subsided 	<ul style="list-style-type: none"> ▪ Insul-fluff in ceiling only ▪ No wall or underfloor insulation ▪ Old wetback incinerator will not meet emissions requirements ▪ Cold and damp
<p>Cashmere 1</p> 	<ul style="list-style-type: none"> ▪ Foundation settlement ▪ Lath and plaster linings to be replaced 	<ul style="list-style-type: none"> ▪ No wall or underfloor insulation in the original part of the house
<p>St Martins 1</p> 	<ul style="list-style-type: none"> ▪ Complete re-clad – split block veneer ▪ New foundations required 	<ul style="list-style-type: none"> ▪ Old wood insulation blown into ceiling ▪ No wall or underfloor insulation ▪ Old wood burner
<p>Somerfield 1</p> 	<ul style="list-style-type: none"> ▪ Concrete ring foundation to be replaced with timber piles ▪ Lath and plaster linings to be replaced ▪ Chimney removed 	<ul style="list-style-type: none"> ▪ Thin insulation in ceiling ▪ No wall or underfloor insulation ▪ Old wood burner ▪ Old hot water cylinder

Christchurch – Build Back Smarter guides

As part of Build Back Smarter, Beacon has developed guides to building back smarter for Christchurch residents. These have been produced by Christchurch City Council and are being distributed to Christchurch residents.

Christchurch earthquake repairs and rebuilds provide an opportunity for residents to go a step further and consider improving their home's comfort and efficiency.

There are two guides:

For those building a new home: This guide, *Designing and Building a New Home*, provides a quick overview of what to consider when designing a new home. It is intended to help homeowners in their discussions with designers and builders.

For those repairing a home: This guide, *Repairing Your Earthquake-Damaged Home*, identifies the opportunities to improve a home's performance offered by typical earthquake repairs. It also indicates the financial, health and value benefits of the improvements, gives a cost estimate and suggests the steps to take to investigate the options.

The guides are available electronically or in hard copy from the Christchurch City Council website: www.ccc.govt.nz/homeliving/buildingplanning/designguides/index.aspx. We are trying to get them as widely distributed as possible so if you see an opportunity to pass them on through your networks, it will be gratefully received.

Retrofitting wall insulation – Fact bank and Build Back Smarter opportunity

Of the opportunities for upgrades offered by earthquake damage, none is greater than for wall insulation.

Wall insulation substantially adds to the comfort and efficiency benefits of a home. Even on a simple (energy savings based) cost benefit ratio, there is a 7.72 year payback on insulating the walls of Christchurch living rooms – and a 1.88 year payback on insulating the walls of bedrooms. Because New Zealand houses are so cold, insulating only ceilings and under-floors generally makes only small energy efficiency gains, and temperature gains do not raise houses to healthy levels – wall insulation is required for both healthy temperatures and energy savings.

Barriers to retrofitting wall insulation are the added cost of removing wall linings/claddings and inconvenience. Consequently, wall insulation is often only undertaken during major renovations, a once-in-30-year event. Only approximately 3,300 renovations annually in Christchurch include wall re-lining, compared to 110,000 earthquake damaged homes many of which require replacement of cladding or internal linings.

Beacon has begun a fact bank on retrofitting wall insulation, pulling together knowledge on benefits, issues and initiatives. This is available at: www.beaconpathway.co.nz/existing-homes/article/wall_insulation

Of the six case study houses in Build Back Smarter so far, four have substantial cladding damage (where the majority of the cladding will be replaced), and the remaining two, internal lining damage. This represents a significant opportunity to test the ease and process of wall insulation retrofit as part of the repair process.

The current approach in the NZ Standard (NZS4246:2006 *Installing Insulation in Residential Buildings*) is cumbersome and not regarded as an Acceptable Solution by the Department of Building and Housing. The Build Back Smarter project will be developing and testing Building Code-compliant installation methods for retrofitting wall insulation, including the potential use of new insulation products better suited to retrofit.

Prefab Housing, China

Verney Ryan reports on his study tour

In April, I attended a Prefab Housing exhibition in China. The exhibition showcased a variety of containerised housing solutions as container manufacturers diversify in tight economic times. However, these were mainly innovative for emergency housing and many would struggle to reach standards required for day-to-day living.



The prefabricated solutions that were on offer did not seem to fit into any market that we could imagine. Some of the modelled housing solutions from containers were being joined together to form populated housing developments – and these examples were from real projects that were under construction.



Overall, the general level of detail and finishing was not up to New Zealand standards, and some of the cladding and roofing systems were quite crudely thought through and unlikely to deliver an acceptable solution for New Zealand.



There appeared to be more evidence of copying than innovation: often showcased solutions appeared to be direct copies of overseas products, including some from New Zealand. However, often products were missing the crucial aspects that made them successful such as the use of high quality componentry.

Prefabrication was generally interpreted as the ability to develop housing more quickly and cheaply in a factory employing inexpensive low skilled labour. New Zealand has the opportunity to differentiate on the basis of factory controlled production quality, economies of scale and delivery, time and cost savings, and higher performance.

There were almost no examples of prefabrication for larger scale medium or high density housing – which in China, one would imagine, would be the norm. The idea of a solution which is ‘right for place’ was not immediately evident (so climate, water penetration, humidity – one size fits all)

New housing developments, UK

Nick Collins reports on his study tour

On my recent study tour to the UK, I visited eight housing developments in the UK and the EcoBuild conference and exhibition in London. Sadly, it is a somewhat depressing picture of the progress in new build developments.

Developers are building homes rather than neighbourhoods and this is impacting not only on the sustainability of the city but on the performance of the home. Developments were often not designed for solar gain, being laid out in a grid pattern aligned to existing roads with limited solar orientation of homes. Often the developments were not designed to integrate with public transport or include local facilities/retail, despite designing limited parking for one car families to encourage alternative transport. The lack of retail integrated into the development means continuing reliance on cars, and most developments had parking issues with more than one car per family.



A positive exception was the Triangle development by GreenSquare (a not-for-profit organisation) and Hab. This development focused on building a community from the very start. Before the development was even built, and during construction, there was considerable consultation with future residents on the design. Investment was made in community facilities such as access to communal cars, village green, shared kitchen gardens and tunnel houses.



The developers also worked with residents to establish a residents' association and provided training for individual residents leading the association. Triangle took another innovative approach to engaging with its community by providing home occupiers with resources and training in how best to operate their homes. This was particularly important where complex systems were installed, for example, ducted air source heat pumps which were quite different from normal heating systems.

Medium density issues

One lesson to be learned was the need for medium density developments to address issues with car ownership, use and parking, utilities and storage. Streets and footpaths clogged with parked cars were a common sight where developments planned for one car families only and parking spaces provided were limited. Without planning for alternative transport (i.e. linking homes to real time bus information, providing communal cars, providing bike storage / cycle lanes), space needs to be provided for two cars.

Furthermore, parking needs to be close to dwellings - where parking was provided in communal compounds, people just parked on street outside their houses, across footpaths and sometimes at oblique angles to road / parking spaces. In the Accordia Living development in Cambridge, parking issues were so severe that the local council was considering penalties for not using public transport.

The provision of utility space for rubbish and recycling bins needs careful thought. Councils provided up to three wheelie bins, but in medium density developments, these clogged footpaths and streets. The solution would appear to be either communal collection/storage, or a variety of bin sizes (not three big wheelie bins per apartment!).



Another medium density issue was a mismatch between design and lifestyle choices. There often appeared to be little space provided for recreational equipment – it was common to see bicycles, fridges and dryers on balconies, and back doors crammed with shoes and bikes – and in one case, kayaks.

The basics still wrong

Sadly, many of the basics were still being done wrong. It was disappointing to see a poor durability of materials:

- Paint finishes on concrete plastered poly-forms had not been adequately sealed so paint colour ends up leached by cement
- Paint finishes failing on north-facing wood
- Internal plaster cracking
- Timber weathering excessively on south faces
- Flashings were inadequate on some monolithic clad homes



Design shortcomings in homes were delivering sub-optimal outcomes:

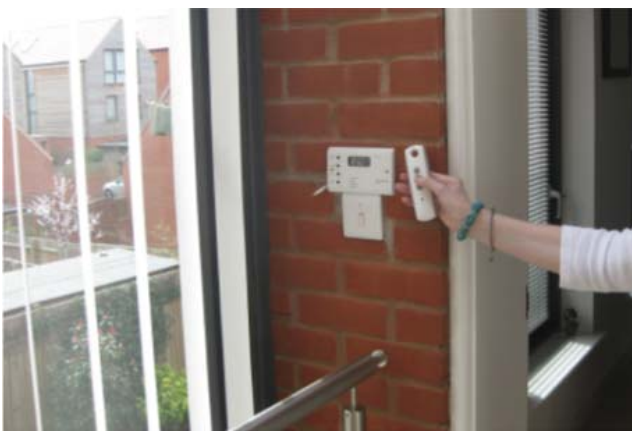
- Solar orientation was not a given
- High wooden gables were a design feature but meant access to recoat north-facing wood (a permanent cladding) was three floors up.
- Design was causing weathertightness issues – in one development, inadequate protection over the front door resulted in rain washing onto carpet and had to be modified later. In another there were no eaves and only small parapet flashings.

Indeed there was a surprisingly inconsistent use of features for high performance such as use of solar (heating, solar hot water, PV) or rainwater collection. Where technologies were included it was often to counter poor design – for example, houses had complex ventilation systems which ran all the time because the design did not cater for natural ventilation.

Interesting kit

On the upside, there were some interesting products and technologies:

- The Upton development in Northampton had a south facing atrium space had top vents which automatically opened at a pre-set temperatures, and floor to ceiling blinds activated automatically to provide shading.



- The Icon development used timber windows which could be opened on two planes and inverted for easy cleaning.
- The Triangle development used a thermal chimney to ensure fresh air and excellent ventilation in summer.

The Icon development had the most sophisticated systems. Homes had a complex heat recovery / ventilation system with vents in most rooms. Heating was also via double boiler system with the main boiler on the top floor, with input from a solar water heater, for heating water and central heating. Radiators were on flexible couplings and could be lifted off mounts for cleaning / painting. A slave boiler on the ground floor heated water for the kitchen and utility rooms.

