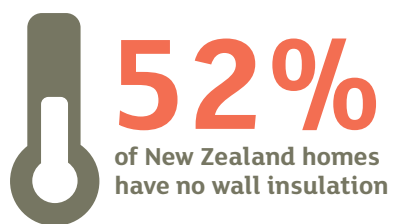




# Beacon Pathway Incorporated

## Annual Review 2013-2014





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BUILD BACK SMARTER HOMEOWNERS IN  
THEIR WARMER DRIER HOME.

## Vision

Creating homes and neighbourhoods that work well into the future and don't cost the Earth

## Purpose

The purpose of the Society is to transform New Zealand's homes and neighbourhoods to be high performing, adaptable, resilient and affordable through:

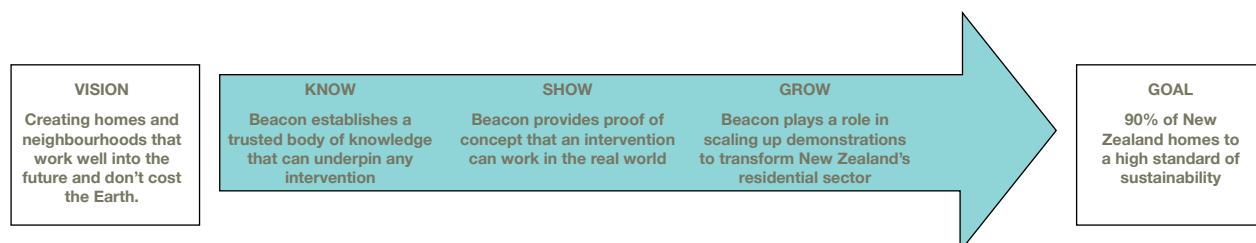
- Facilitating and undertaking demonstration projects which show the benefits of higher performing new and existing homes
- Facilitating and providing robust research which builds a fact-based platform for sustainable, affordable, buildable and comfortable homes
- Enabling Members to lead the transformation of the built environment in New Zealand
- Collaborating with and bringing together other stakeholders in New Zealand's residential built environment to create greater change

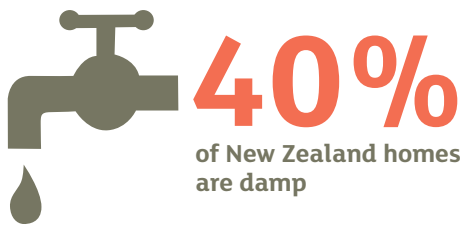
## Goal

To bring 90% of New Zealand's homes to a high standard of sustainability

## Beacon's pathway to the goal

To reach our goal of residential transformation, Beacon has defined a pathway of Know, Show and Grow. Beacon is constantly trying to move our projects to the next step in the pathway.





## Chairperson's Report

**2013-2014 has raised numerous challenges for Beacon as we reflect back over that period. We have taken the time to review our business model to ensure our work is viable and sustainable. This has been particularly relevant as Beacon has fully moved from a company with assured Government and shareholder funding to a not-for-profit incorporated society. Finding the right combination of income sources while, at the same time, not losing sight of Beacon's goal is our ongoing challenge.**

As part of business planning, the Board and management team have been exploring opportunities which align with, or deliver on, Beacon's goal. In addition to our traditional areas of strength in research and demonstration projects, we have identified the potential for Beacon to contribute its knowledge and expertise to the sector through training, toolkits, expert advice, networking and collaboration.

We would also like to leverage Beacon's credibility and independence to verify higher performance outcomes at various levels (from system to house) and develop a consumer strategy to progress a cohesive approach that can influence consumer demand for high performing homes. All of these business plan ideas will be a focus of the Board and management going forward.

The past year has also seen a further refining of Beacon's financial and management systems to support the developing business model. The management team have worked hard to reduce costs, prioritise work and develop further business opportunities. We end the financial year in a stronger position overall than a year ago and with optimism for the future.

At the 2013 Annual General Meeting we welcomed two new Board members. Dave Brown joined us from the Certified Builders' Association of New Zealand and brings a wealth of governance experience and technical building insight. Derek Heard from Tasman Insulation has provided insight into New Zealand's largest construction and building products company. Both Dave and Derek have quickly developed their understanding of the depth and scope of the Beacon business and are contributing to the Board's governance and business planning.

We asked you, our members and stakeholders, what was important to you about Beacon and what we could look to change or re-focus on. We appreciated your feedback and over the next year the Board will be reviewing Beacon's governance arrangements in the light of that feedback. What stood out was that you felt that Beacon's independence is one of our critical points of difference. The Board acknowledges that the perception of independence is important and sees that there is potential to add to, and further strengthen, Beacon's governance.

Finally, I would like to thank both the Board and the Beacon team for their ongoing commitment and efforts over the past year. With our members' and partners' support, we have completed several substantive projects including adding value to the Canterbury rebuild effort and trialling alternative methods of off-site construction in the stunning Warmframe™ duplex at Hobsonville Point, to mention just two. We are continuing to develop other exciting opportunities for the coming year. I know that these future projects will be tackled with the same high standards and enthusiasm our team always shows and I am confident that Beacon's work is bringing us ever closer to our goal.

Nga mihi

**Lesley Jenkins**, Chairperson



LESLEY JENKINS, CHAIRPERSON

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## Beacon's governance

**The governance structure of Beacon Pathway Inc. is laid out in the Rules of the Society, available on the Beacon website ([www.beaconpathway.co.nz](http://www.beaconpathway.co.nz)).**

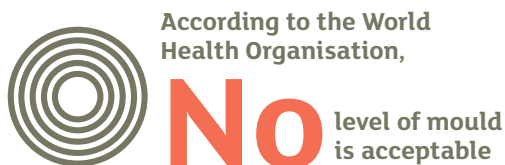
A Board, elected by members, governs the Incorporated Society and is responsible for strategy. It will consist of at least 5 members and no more than 7, with at least one independent Board director (i.e non-member).

Board Members are appointed for a term of two years and are then eligible for re-election.

### Board directors 2013-2014

Beacon's current Board of Directors was elected by Members at the 2013 Annual General Meeting. It comprises:

- **Lesley Jenkins** (Chairperson and independent member), Relationship Manager, Rodney and Hibiscus-Bays, Auckland Council
- **Scott Fuller**, Vice President Marketing and Sales, New Zealand Steel
- **Brian Fitzgerald**, Manager - Evaluation and Technical, EECA
- **Godfrey Hall**, Director, InsulPro Manufacturing
- **Derek Heard**, New Zealand Country Manager, Tasman Insulation
- **Dave Brown**, Chairperson, Certified Builders' Association of New Zealand



## CEO Insight

**As I write this, Beacon has reached a milestone: on 1 July the Beacon journey has been going for ten years; and on 1 November, we will have been an incorporated society for four years. For such a small and relatively young organisation, we make quite a difference. I am very proud of the impact we have made – but of course there is more to do!**

The last year has seen the completion of some significant projects. Three of these were in Christchurch as we focused on the opportunity for earthquake recovery to bring Cantabrians warmer drier homes. They included Build Back Smarter (upgrading during repair), the HIVE High Performance Home (combining off-site production and high performance in a new home) and the Breathe design competition (designing a medium density inner city neighbourhood).

The innovative New Category of Home project is drawing to a close, having provided partners with a real world setting to test and trial new ideas. And the potential to improve housing for the Ngāti Whātua o Kaipara community is one step closer with the completion of the first demonstration retrofit.

We have an exciting year ahead of us, with many new ideas in the mix, as well as some projects already underway and in the pipeline. We are particularly excited about our partnership with Nga Iwi Katoa on the Building Levy-funded project to develop a framework to assess the renovation potential of existing homes in Tāmaki.

In 2014, as part of our business planning process, we asked our stakeholders for feedback on Beacon's role and value to the sector, and how Beacon can best contribute to the residential building sector.

As a business planning tool, it's given us an insight into what we are getting right, what we can improve, and how we can work more effectively with the sector toward our goal.

We are delighted at the overwhelmingly positive response from those who have already worked with Beacon about the value of their engagement. They valued access to an independent organisation with a reputation for connecting and forging partnerships with sometimes very diverse parties, making the most of opportunities, enabling innovation, and delivering quality work.

Beacon's work in both informing and demonstrating improved sustainability in the built environment was highly regarded. Significantly, one of our most valued activities is pulling existing research together, writing what that might mean in the New Zealand context, and fuelling conversations and action to bring that about. Our connectivity across networks was a major plus for other organisations.

The feedback also encouraged Beacon to develop ways to ensure our information and messages are more widely known and understood. This reflects the need to stimulate demand for higher performing homes and neighbourhoods, and it's a message we've taken on board. One of our goals for 2014/15 is to develop a consumer strategy which picks up strands from across our work programme and weaves them into a consumer stimulation package.

The stakeholder feedback gives us confidence we are heading in the right direction, and that the ways we offer to engage with you and your organisations are meeting both our needs.

**Nick Collins, CEO**



NICK COLLINS, CEO





**BUILD BACK SMARTER UPGRADES INCLUDED  
RAINWATER TANKS FOR GREATER RESILIENCE.**

## What Beacon can do for you

**Beacon offers a range of services and expertise to other organisations sharing the same journey toward transforming New Zealand's houses and neighbourhoods.**

With an extensive knowledge base and experience in numerous collaborative demonstration projects over the last four years, we have a lot to offer.

We recognise organisations have different roles and remits in the residential sector. We are keen to understand your constraints and to work together to apply our know-how to help you reach your residential goals.

### **Walking alongside you: Become a member or partner.**

Our members share the goal of transforming New Zealand's homes and neighbourhoods. They also share the benefits of first-hand knowledge of Beacon's learnings and collaborating closely with other sector members.

### **Expanding our knowledge: Research and knowledge synthesis**

Beacon undertakes new research to fill the gaps in understanding house and neighbourhood performance. We pull together knowledge from our own and other research into a form that can be used to drive change.

### **Developing robust independent tools**

Beacon has a number of tools and resources in a useful form for end-users. We can offer support in how to use them and will work with you to tweak the tools as you might need for your own project.

### **Insight and analysis from our expert team**

Beacon's team offers technical insight, analysis and expertise on sustainable homes and neighbourhoods to your projects.

### **Scoping and managing projects**

We believe that research has to be tested in the real world. Beacon has extensive experience in scoping and running collaborative projects, both demonstration and for clients, and we believe evaluation and monitoring is an integral part of this.

### **Training and professional development**

Have our expert team develop bespoke workshops to enable your staff to make informed and well considered decisions about homes and neighbourhoods.

### **Bringing people together: Networks and connections**

One of Beacon's greatest resources is our extensive network across the housing sector. This enables us to draw together partners around an opportunity or project, leverage funding and other contributions, and link up opportunities and people.

## Walking alongside you: Membership and partnership

Our members share the goal of transforming New Zealand's homes and neighbourhoods. They also share the benefits of first-hand knowledge of Beacon's learnings and collaborating closely with other members across the sector. If membership's not for your organisation, we're happy to partner in other ways.

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### Society Members

**Certified Builders Association of New Zealand**

[www.certified.co.nz](http://www.certified.co.nz)



**Christchurch City Council**

[www.ccc.govt.nz](http://www.ccc.govt.nz)



**Energy Efficiency and Conservation Authority (EECA)**

[www.eeca.govt.nz](http://www.eeca.govt.nz)



**Fletcher Window and Door Systems**

[www.fwds.co.nz](http://www.fwds.co.nz)



**InZone Industries**

[www.insulpro.co.nz](http://www.insulpro.co.nz)



**New Zealand Steel**

[www.nzsteel.co.nz](http://www.nzsteel.co.nz)



**Resene**

[www.resene.co.nz](http://www.resene.co.nz)







## Partnerships - IAG

**Beacon and IAG have joined together in a partnership to build our combined knowledge and understanding of resilience at a community and household level, and to reduce risk relating to the residential sector.**



The partnership will be kicked off by a joint workshop session to share what we know about neighbourhoods, new-build and existing homes and the constraints, aims and goals of both organisations. This will define a joint programme of work that will form the basis of the partnership.

Beacon and IAG see benefits in working jointly, using available data and research from both organisations, to inform decision making at a local and central government level. There are opportunities for IAG's sustainability champions, team and customers to benefit from participating in Beacon projects and to learn from our knowledge and tools. Beacon has a wealth of homeowner information which can benefit IAG's 4000+ employees and over a third of the New Zealand insurance market.

### What our members say:

*We really value working with Beacon, as a member and within projects. The complex problems faced in Christchurch cannot be solved by a single organisation alone; it requires strong relationships, networks, aligned thinking and integrated solutions. This is where Beacon excels.*

*With an extensive multi-sector network (public, private, NGOs) and experience in collaborative projects, Beacon is an ideal body to facilitate the nationwide exchange of ideas and bring key organisations around the table. This has meant greater progress and an enhanced ability to leverage resources to deliver more than the Council could on its own.*

*Beacon's vision is also its strength. They are the keepers of a bold and compelling vision that aligns with our community outcomes (e.g. healthy, liveable, resilient). Holding that vision front of mind makes Beacon a real catalyst for change.*

*Beacon is independent and results-based – they come up with useful, practical and political solutions which the Council can readily use. Beacon produces a high quality of work in a suitable format, whether publications, tools or advice. They are also a critical friend, giving honest feedback on plans, policies and approaches.*

Tony Moore, Principal Advisor  
– Sustainability, Christchurch City Council

### Value for members

Being part of Beacon offers members a unique set of opportunities:

- Leverage of members' R&D investment via jointly funded Beacon projects.
- Direct learning through participation in Beacon demonstration projects. These draw on Beacon's unique evidence bases and are robustly evaluated to provide real world proof of concept. We 'wring the value' out of the demonstrations to drive change: we don't build show homes.
- Potential first mover advantage gained from members applying the learning from their engagement in Beacon-run projects.
- Access to Beacon's network facilitates collaborative work across the value chain: central government agencies, councils and industry.
- Access to Beacon's knowledge through uptake activities such as symposia, workshops, newsletters and briefings.

## Expanding our knowledge: Research and knowledge synthesis

Beacon undertakes new research to fill the gaps in understanding house and neighbourhood performance. We pull together knowledge from our own research and other work around New Zealand and the world into a form that means it can be used to drive change.



THE WINNING DESIGN IN THE BREATHE COMPETITION.

## Breathe design competition toolkit

The Breathe competition to design a new urban village for Christchurch came to a close in 2013 with Italian firm Anselmi Attiani Associated Architects winning top prize. Their design for 72 terraced houses and apartments will be built on an almost 1 hectare block opposite Latimer Square in the CBD.



Breathe began in 2012 when Christchurch City Council, the Ministry of Business, Innovation and Employment, and Beacon Pathway worked together to initiate a design and build competition to develop a concept for medium density living that would provide a variety of housing options and lifestyle choices based on sustainability, innovation and a strong sense of community.

The idea was to use the competition to create an exemplar housing development that would be the catalyst for modern urban living in the heart of the City, and attract a new and diverse residential community back into Christchurch.

Breathe attracted 58 eligible entries drawn from 15 countries, from which the judges identified four finalists who had three months to take their initial concepts through to a more developed design. This resulted in a single winning design for the identified site, with the option that the runners up had viable schemes that could potentially be delivered in other parts of the City.

The successful Breathe competition provided a useful model for others to consider in relation to urban revitalisation. Following Beacon's role in scoping and helping run the competition, we were asked to evaluate it, with a focus on providing guidance for other organisations looking to stimulate change through design competitions.

Beacon's Verney Ryan and Vicki Cowan interviewed key stakeholders in the competition (sponsors, judges, and competitors) to develop a picture of what was successful, and what could be changed for greater impact in the future.

Out of this work, we developed a toolkit to assist others in setting up a design and build competition both here in New Zealand and around the world. It is a starting point for marshalling resources and a guide to pre-planning what and how a competition can deliver.

The toolkit is available on Beacon's website [www.beaconpathway.co.nz](http://www.beaconpathway.co.nz)

### Rental housing fact bank

2014 has been the year of discussions on whether a Warrant of Fitness could be used to improve New Zealand's rental housing.

With a prominent debate and interest from central government, Beacon compiled a fact bank as a basis for informing discussions.

The Performance of Rental Housing fact bank brought together, in one place, all the legislation, agencies and mandates which have a role in governing rental housing quality. It covers what is known about the quality of rental housing stock, and the impact of housing quality on health and wellbeing. It also discusses the players and dynamics of the rental housing market, and the potential for market interventions.

The rental housing fact bank is currently being updated and will be available on Beacon's website [www.beaconpathway.co.nz](http://www.beaconpathway.co.nz)

### What our clients say

*"Beacon has played a key role in development of housing policy e.g. rental house quality (WOF). Great knowledge base that we know is credible and reliable and means we don't have to do it ourselves."*



BUILDING AND CONSTRUCTION MINISTER  
MAURICE WILLIAMSON, AND CHRISTCHURCH  
MAYOR BOB PARKER AT THE PUBLIC DISPLAY  
OF BREATHE ENTRIES.

## The value case for building back smarter

**Beacon's pilot project, Build Back Smarter in Christchurch, demonstrated with seven case study homes that home performance upgrades can and should be included in earthquake repairs. Beacon's vision was always for this to be the first step in a roll-out across earthquake-damaged homes in Canterbury.**

The pilot project established that homeowners, especially in Canterbury, need considerable support, and that upgrades should match the opportunities afforded by planned repairs. The demonstration successfully interested the Canterbury Sustainable Homes Working Party in the concept of offering a case management service to help homeowners identify the home improvements that are best undertaken alongside earthquake repairs and support them through the process.

Beacon was engaged to scope the establishment and potential of a service. One line of work was the preparation of an extensive value case for building back smarter based on the findings for the pilot project and drawing on other research.

The value case clearly identified that the earthquakes have created a once-in-a-generation opportunity to address some of the root causes of poor health and fuel poverty in Canterbury households. With adverse effects on health, mental health, education, employment, household finances, and social wellbeing, the cost of poor housing is a complex web falling on residents (homeowners, tenants), councils, district health boards, and government departments ranging across Health, Social Development, Housing, and Education.

Improving these houses brings value far beyond the homeowners themselves, and developing the value case has highlighted the value for central and local government in particular.

Beacon also explored how an actual intervention might work and has developed an innovative retrofit model which can be picked up and applied to other community retrofit programmes throughout New Zealand. The model provides an independent case management service to homeowners, which includes a thorough assessment, detailed upgrade plan, and assistance to access grants / funding. The case manager connects the homeowner with suitable trained and qualified contractors, and ensures quality checks before payments are made.

Although central government has not yet picked up the baton for providing the sort of all-round support and scaffolding Beacon has identified Canterbury homeowners need, this vision of a Build Back Smarter service has been incorporated in Green Party policy. Canterbury homeowners deserve warmer healthier homes and we will continue striving to push for a more comprehensive approach.

### What our clients say

*"Beacon's greatest value is compiling knowledge"*

*"I like that Beacon is independent and practical – their research is applicable and usable, tangible and relevant."*



## Developing robust independent tools

We recognise that knowledge needs to come in a form which can be applied in the real world. Beacon has a number of tools and resources in a useful form for end-users. We use these in our demonstration projects and offer them to other organisations. We can offer support in how to use them and will work with you to tweak the tools as you might need for your own project.

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## The Neighbourhood Sustainability Framework and tools

**Beacon's Neighbourhood Sustainability Framework and its assessment tools provide a means to measure and independently assess the sustainability of New Zealand neighbourhoods in order to inform neighbourhood-level decision making.**

The Framework supports communities, developers, planners, neighbourhood managers and councils in planning, developing and regenerating neighbourhoods.

Beacon's Neighbourhood Sustainability Framework comes with two assessment tools – an Observational Tool and a Resident Self-Report Tool – which apply the Framework to New Zealand neighbourhoods, either existing or planned.

The tools have now been refined to reference other sources of neighbourhood data and to make them easier for communities to use.



### Beacon tools help Hobsonville Point assess sustainability

Most recently Hobsonville Land Company has used the Resident Self-Report Tool to help assess the sustainability of the now-occupied Buckley Precinct. Its 2013 Sustainability Report includes the results of the survey and these results will be used to inform next steps in the wider development.

Interestingly, residents reported:

- 86% used a local park or playground in the last month
- 88% used the local café in the last week
- Nearly 90% visit the farmers' market monthly
- 87% say it is safe for children compared to 70% of Auckland residents
- 83% say it is safe to walk after dark compared to 56% of Auckland residents



OPENING OF FIRST HELENSVILLE  
DEMONSTRATION RETROFIT HOME.

## The Home Assessment and Prioritised Plan tool

The Home Assessment and Prioritised Plan (HAPP) tool is designed to:

- Assess a home's performance - indoor environment quality (warmth, dampness), energy efficiency (hot water, heating and lighting) and water efficiency.
- Produce a prioritised tailored upgrade plan to help homeowners decide on the steps to take to improve their home.

The HAPP tool was first developed and tested through a robust and peer reviewed research process in 2007–2008. Trained assessors from community organisations across New Zealand applied the tool to 650 homes in all three climate zones. This enabled the team to optimise the ease of use, consistency of output advice, and effectiveness of the prioritised plan.

The tool was subsequently used by building consent officers and Eco Design Advisors to assess approximately 400 homes in the Retrofit Your Home Programme (Auckland/Waitakere councils). It also underpinned the development of the online version of the Homestar rating tool.

Beacon's HAPP tool is currently being ported to a web platform to make it even more user-friendly and can be adapted for use in individual projects. Contact us to include it as a useful addition to any retrofit project.

### Build Back Smarter

The HAPP tool was also used in the Build Back Smarter pilot project to assess earthquake damaged homes in Canterbury. The tool was adapted to reflect the upgrades which could most easily be done during earthquake repairs (for example, wall lining or cladding replacement was the optimal time to add wall insulation).

### What our clients say

*"Beacon is critical in helping to ensure the good in-situ application and delivery of sound research and investigation."*

### Ngāti Whātua o Kaipara housing project

Beacon's HAPP tool has assisted Ngāti Whātua o Kaipara in the first stage of an ambitious project to improve housing for its whānau.

Two ex-Defence Force houses were moved from Hobsonville to a new site on Kaipara College land in Helensville to be a real life demonstration to local whānau of how a home can be retrofitted to be warmer, healthier and cost less to run.

The HAPP tool was used to assess the houses and develop a plan, not only for addressing deferred maintenance issues but to retrofit the houses to higher standards of performance. Alongside roof, wiring and structural maintenance and redecoration, the houses have had ceiling, walls and under-floor fully insulated in a quality installation by InsulPro. This should make these older homes considerably warmer – in fact, there is no heater although the option is open for a wood burner to be installed in the future. Energy efficiency has been improved by removing downlights and replacing them with more efficient lighting.

The first house was blessed and opened in June 2014, and is open to whānau and the local community as an example of what sort of house they can achieve and what the cost is.

## Scoping and managing projects

**Beacon has extensive experience in scoping and running collaborative projects.**

- We can help you to bring partners on board, and to facilitate the partnerships throughout the project.
- We can scope the project, defining work programmes and securing budgets.
- We can manage demonstration projects, engaging contractors, managing timelines and budgets.
- We can monitor the project, analysing and reporting on what went well and what didn't.

## The New Category of Home project

**The New Category of Home Project is the brainchild of New Zealand Steel and challenges the perception of cheap and nasty 'prefab'. It began with a vision of a new type of home that would perform to a high standard (meeting Homestar™ 8 and Beacon's HSS High Standard of Sustainability®) but which would also be delivered through off-site construction with all its potential cost and time savings.**

New Zealand Steel was joined by five other partners in the project: Fletcher Window and Door Systems, Frametek-RFS, InsulPro and Resene; and facilitating the process, Beacon Pathway.

The project commenced with an innovation phase which brought together the partners' technical knowledge and understanding of their own products to develop a new building system. Called Warmframe™, this combines steel framing, insulation and windows, with the potential to include claddings, linings and coatings. The result is a highly insulated system which can be built, either as walls, sections or entire buildings, in a factory.

The project then moved to a trial and demonstration phase to test the system's buildability and cost of construction, solve technical issues in a real life situation, and check the performance of the building system.

### What our clients say

*"Beacon's genuine interest and respect shown throughout every aspect of our project was of upmost importance for us to continue working together. The personal commitment demonstrated from Beacon staff towards supporting our project was hugely appreciated."*

### The HIVE High Performance House

The first trial was part of PrefabNZ's HIVE Home Innovation Village and used Salmond Architecture's High Performance Houses design (flexible modules suited to off-site construction) with the new Warmframe system. The house was fully built in the factory (framing, insulation, roofing, cladding, lining, windows) and transported by truck to site to be finished. Once complete, thermal testing and thermal imaging of walls and ceilings were undertaken. The house was open to the public over 2013 and then sold, testing consumer reaction and barriers to prefabrication.

### Hobsonville Point duplex

The second house in Hobsonville Point used a Universal Homes design with Warmframe, to trial two alternative methods of off-site construction: 2D walls and 3D modules (framing, insulation, windows). These were assembled inside a factory, transported to site, constructed, and finished with claddings and linings using traditional methods. Full thermal testing and monitoring of this house has yet to be completed.





## Learning about off-site construction

### 1. Off-site construction needs to be design-led

Both trials used existing house designs which proved counter-productive to the off-site manufacturing process. A design-led process would have prioritised design and systems more suited to efficient off-site manufacturing. This is an issue that deserves further exploration given that New Zealand's planning framework often ties homebuilders and designers into certain design forms even at the earliest planning stages such as overall subdivision or resource consent stages.

### 2. Working off-site brings benefits but needs to be well organised

Leasing and setting up a factory was relatively simple and cost effective, and using a good process engineer helps to establish streamlined and efficient ergonomic construction processes.

Quality, productivity and safety were substantively better in the factory than on-site. Having the correct materials and tools available in the weather-proof, single level environment of the factory has significant potential to accelerate construction.

### 3. What's the best scale to deliver off-site construction?

Testing various scales of off-site construction (entire 3D house, 2D walls, 3D modules) enabled some high level conclusions on efficiency of scale. The 3D components (upper stories) proved to be significantly more complex to construct and transport than the panelised components. They also took up significantly more factory floor space. However, working in 3D means there is more potential for a larger degree of finish to be completed in the factory before moving to site.

### 4. Need to extend from factory to site to change business as usual

The on-site construction phase was less efficient than expected as an already busy work force with business as usual constraints dealt with the introduction of innovation and the search for 'out of the box' solutions. Off-site construction needs to cover the entire process, from design to on-site fit-out.

### 5. Dealing with perceptions of 'prefabrication'

The experience of selling the HIVE house brought home a crucial barrier to off-site construction: the general perception from the market that a *prefabricated* house should be cheap. While there are significant productivity, efficiency, quality and cost benefits from whole house prefabrication, a partial prefabrication approach (e.g. wall panels) may be a more acceptable option within the market, while still realising some of the benefits.

It also suggests that a major learning for the industry is that we need to develop more sophisticated language to describe these innovations. The New Category of Home partners are dropping the term *prefabrication* from their lexicon in favour of talking about off-site construction.

## Opportunities to innovate

Fletcher Window and Door Systems found trialling and testing products in a real world environment a spur for innovation. Being part of the New Category of Home project has led the company to develop the new Smartfit® system to simplify and de-risk window installations into housing.

Smartfit® is a ready-to-fit window system. The windows arrive with built-in head flashings, jamb flashings, cavity closers, end dams and sill support bars, so they can be taken off the truck and fitted immediately. Clever water management features, mean no need to worry about internal tapes, flashings, or expanding foams / silicones.

"The skills that each of the partners and the Beacon team brought to the New Category of Home project were diverse and helped to fill in our technical knowledge gaps along the path to a successful outcome," says Product Development Manager, David Burggraaf. "The build off-site and panelised ethos of the project certainly helped with our learnings, thinking and final design. Smartfit is poised to do very well in this space."

## What our clients say

*"I find working with Beacon brings a real sparking of ideas. It's stimulating and that experience has led to further connections and projects for Beacon in our organisation."*

## Insight and analysis from our expert team

Beacon's team has extensive experience in sustainable homes and neighbourhoods. We can offer technical insight, analysis and expertise to your projects.

### Waimahia Inlet Housing Development

**Verney Ryan, our New Homes Programme Manager, applied Beacon's knowledge of home and neighbourhood performance to the concept phase for Waimahia Inlet, an affordable housing development by the New Zealand Housing Foundation.**

Beacon provided detailed comments on the masterplan and house designs for the development to highlight where improvements could be made to the affordability of the homes. Operating costs in terms of heating and doctors' bills are an important consideration for low income (and indeed all) households.

Verney focused on the overall orientation, shape and location of the houses and the design features within each house, recommending a range of changes including maximising solar orientation, reducing west-facing glazing, improving window placement and design for daylighting and ventilation, and matching hot water systems to household size for greatest cost effectiveness.

Auckland Council's Unitary Plan required houses in Special Housing Areas to achieve a minimum Homestar™ rating of six stars. Verney, who is also a certified Homestar assessor, assessed three basic 4-bedroom house designs prepared for Stage One of the Waimahia Inlet development against Homestar requirements.

His analysis indicated where each of the design could be upgraded to achieve a six star rating in a cost-effective manner. Recommendations included:

- Insulating concrete slabs
- Upgrading to double glazing
- Upgraded insulation
- Improved construction waste management
- A range of water-saving features
- Ticking off low cost and easily achieved credits

The report also highlighted the unique opportunity for the Waimahia development to incorporate features that will deliver affordable housing in terms of upfront capital cost, and also in producing dwellings that are comfortable, durable and have lower on-going running costs over their lifetime. Upfront capital costs for installation of items such as simple rainwater harvesting, more efficient heating, and higher levels of insulation and glazing provide reasonable periods of payback for any additional investment. With some minor additions and alterations, the Waimahia designs have the potential to achieve Homestar™ ratings of seven stars.

#### Special Housing Areas an opportunity for quality development

By fast-tracking housing developments in Special Housing Areas, the Government hopes to address the housing shortage which is contributing to unaffordability.

Beacon argues that quality house and subdivision design, which delivers desirable communities, reduced transport costs, reduced construction waste, higher performing homes and operational affordability, needs to be considered alongside quantity of housing.

The Special Housing Areas are an opportunity to influence our homes and neighbourhoods for the better – but our experience shows that this needs to be early in the process. Development plans need to consider the design of a community: infrastructure needs; increasing density while balancing shared and private space; retaining the best of existing neighbourhoods; and laying out a subdivision for optimal transport, solar orientation, safety and liveability. And that's even before the house designs are prepared.

Beacon's tools and expertise can help. Our Neighbourhood Sustainability Framework can be applied to planned developments to improve the sustainability and community aspects of both new and existing neighbourhoods. Our team can review both subdivision layout and individual or typology-based house design for optimal performance.



BEACON'S VALUE CASE FOUND GROUND VAPOUR BARRIERS AND UNDER-FLOOR INSULATION ARE BOTH WORTHWHILE.

## Turanga – Pacifica financial literacy

**Beacon team members Glenda Lock and Cambrian Berry have been working on the first step of Auckland Council's Turanga project. This is a Council initiative to understand and address financial literacy in the Pacifica communities of Auckland.**

In the first stage of the project, the team has interviewed 14 families about their financial wellness and goals. Each family has expressed an interest in home ownership in the future.

The work has deepened Beacon's understanding of the housing issues and needs of the Pacifica community and will provide a robust basis to contribute to later stages of the project. Housing is important part of the jigsaw in addressing outcomes for these families, and it is valuable to consider it alongside a financial literacy project.

## Rental housing policy advice

**Vicki Cowan and Lois Easton were contracted by the Ministry of Business, Innovation and Employment to support the Ministry in considering future rental housing policy options.**

The team provided access to research (both Beacon's and other institutions) and technical advice, joining representatives from BRANZ, ACC, EECA, Ministry of Health, and Housing New Zealand Corporation on the reference panel. Amongst other work, Beacon produced a value case for ground vapour barriers in addition to under-floor insulation – find this on our website [www.beaconpathway.co.nz](http://www.beaconpathway.co.nz)

## Expert review for Pure Advantage

**Beacon's experience in off-site construction (see page 13) proved valuable to Pure Advantage as they sought expressions of interest for an at-scale pilot project to deliver high performance, affordable residential housing using off-site manufacturing techniques.**

Beacon CEO, Nick Collins, provided expert advice as part of a panel evaluating and reviewing the expressions of interest from organisations with capacity in off-site construction for off-site manufacture of 300–500 affordable, green homes in Christchurch.

The expression of interest process gave Pure Advantage a reasonable knowledge base of who is doing what in off-site manufacture.

### What our clients say

*"I like the collaborative nature of Beacon. They pull a range of people from different backgrounds, experience and skillsets together to create innovative approaches and change. I like the people involved – they are enjoyable to work with."*

## Training and professional development

Beacon can share our knowledge and expertise via training and professional development for your organisation in whatever format is most appropriate. Whether it is developing bespoke professional development workshops to enable your staff to make informed and well considered decisions about homes and neighbourhoods, or facilitating sessions to develop housing strategies, Beacon has the skills to help.

## Venture Southland

Beacon has shared a long journey with Venture Southland, reaching way back to 2010 when Beacon was engaged to prepare a report on local housing assets, priorities for improvement, and the opportunities to drive change. In particular Beacon looked at the role of councils in facilitating sustainable building, something which Venture Southland had identified as a priority in their Energy Strategy.

One of Beacon's recommendations was to hold workshops for local councillors and council officers from the four district and city councils in the Southland area. Venture Southland worked to find funding for these, which Beacon supplemented as part of delivering to a retrofit research contract.

In October 2012 a day long workshop for councillors and council officers was held alongside Venture Southland's Advancing Energised Buildings conference. Beacon was an active contributor to the conference, providing a key note address and presentations on designing for the future, barriers to sustainable building, local government's role in sustainable building and initiatives from other regions. Beacon also facilitated the workshop, which resulted in a housing action plan for Southland.

Beacon's engagement with Venture Southland and the Southland councils has contributed to some exciting moves forward.

In 2013 Invercargill City Council launched an Eco Design Advice Service, employing Advisor Keiron O'Connell, and winning a national Innovation Award at the Annual Building Officials Institute of NZ Conference in Wellington in 2014.

In 2014 Invercargill City Council committed funding as part of the South City urban rejuvenation project for two demonstration homes: a new build and a retrofit.

The Council is showing significant leadership in demonstrating the building of affordable homes and the ways and methods of retrofitting existing homes. It recognises the importance of demonstration – the value in having open days and people walking through the facilities and understanding what has been done and why. Stage by stage documentation and evaluation of each demonstration is planned to maximise what can be learned from the projects.

Beacon congratulates Venture Southland and the Invercargill City Council on taking this step. It reflects many years of input from various groups around Invercargill and Southland.

The Venture Southland journey is a good example of Beacon's expertise and knowledge contributing to building capacity regionally. By sharing our learning on retrofitting and new home design of high performing homes, we see that others can share in this progress toward improving our housing stock.

### What our clients say

*"Beacon has created a greater awareness within our organisation relating to warmer drier healthier homes and the long term benefits to homeowners and / or tenants"*

*"Beacon talks about the rationale for doing things, explaining 'why' in ways that build on practical experience, help the decision making process and understandings of why it's worth investing in. Beacon has credibility because it's not just academic and they know the real life pressures people are under."*





## Home Performance Advisor training

**The need for industry standard training has driven the establishment of the Home Performance Advisor programme, a collaborative, not-for-profit initiative by Community Energy Network, Beacon Pathway, and The EnviroSchools Foundation.**



Beacon's research has long identified that getting independent, reliable and personalised advice is crucial to help homeowners move towards warmer, drier, healthier and more efficient homes.

The new Home Performance Advisor programme provides formal training and industry-recognised certification for those providing advice on performance, resource efficiency and general improvement of homes.

Advisors go through intensive science-based training to gain a comprehensive understanding of how a house functions as well as how to translate this into meaningful and relevant information for homeowners. Advisors are trained to provide a full assessment, diagnosis and recommendations tailored to the needs of the client. Crucially, advice is independent and not tied to a particular product.

Beacon's knowledge base on retrofitting existing houses underpins the training, together with the extensive experience of current community energy advisors. Pooling this knowledge and understanding has strengthened the training, ensuring it is both research and practically based.

The Home Performance Advisor programme, launched in 2014, now has twenty seven certified advisors across the country.

### Panapa's story

Of Uepohatu/Ngati Porou descent and hailing from Ruatoria, Panapa has first-hand experience of the poor quality housing in the Ruatoria community.

"Many of our people live in unhealthy homes," says Panapa. "This has a significant impact on the well-being of our people. This is represented by some of the highest negative statistics in health, employment and social well-being in the country."

Panapa was keen to initiate whanau-based housing projects in Ruatoria and sought Home Performance Advisor certification to give him the knowledge and credibility to kickstart these projects. Panapa successfully completed the programme and became a certified Home Performance Advisor.

His first assignment, assessing around 20 houses owned/managed by Te Runanga o Ngati Porou. These assessments are free to gain some momentum in weaving home performance knowledge into the fabric of the community. Panapa says "I am planting seeds into the community so that the incorporation of this knowledge is community owned and driven."

Even more exciting is Panapa's vision for where his Home Performance Advisor training could lead. He believes home performance advice could be implemented through local learning institutions such as marae, schools and the local polytechnic. Of upmost importance is adapting the home performance knowledge to existing local knowledge. "The rangatahi (adolescents) are the key focal point. They are the next generation of change makers. They are very open to new knowledge and ideas" says Panapa. "This sets up intergenerational change by making this knowledge the norm."

## Bringing people together: Networks and connections

One of Beacon's greatest resources is our extensive network across the housing sector, from central and local government, to industry, affordable and third sector housing providers, design and construction. This resource enables us to draw together partners around an opportunity or project, leverage funding and other contributions, and link up opportunities and people.

## Build Back Smarter pilot project

This ten home pilot project is the perfect example of Beacon leveraging its networks to get a project going to bring about change.

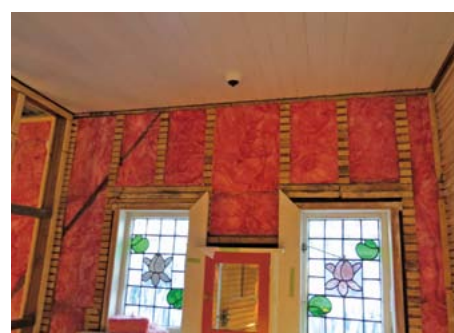
Soon after the earthquakes Beacon realised that the extensive repair required in Canterbury presents an opportunity to improve the region's existing housing stock because:

- The sheer number of houses needing major repair means wide scale improvement is possible
- Damaged linings and cladding mean there is an opportunity to make upgrades that would only usually occur once every 30 years
- It is an ideal opportunity to undertake upgrades that research says make a big difference to warmth, comfort and efficiency of houses, with follow-on improvement to health and productivity

Beacon successfully pulled together funding from EECA, Fletcher Building, Christchurch City Council, Christchurch Agency for Energy, and the Ministry of Science and Innovation for a demonstration pilot showing that home performance improvements can and should be undertaken during earthquake repairs. Beacon then worked with insurers (IAG and Southern Response) and project management offices (Hawkins and Arrow International) to recruit homeowners and to integrate upgrades with earthquake repair schedules.

Learnings from Build Back Smarter have influenced thinking about the rebuild in a number of ways:

- The case studies showed that upgrades should focus on interventions that can only be done during earthquake repair. Homeowners were pleased with results and ease of service but needed case management assistance to support them.
- There is greater scope for wall insulation than expected as it is more cost effective to replace plasterboard. Including wall and other insulation does not delay earthquake repairs. Beacon's experience informed the debate about whether homeowners should be allowed to include improvements and influenced EQC to change their policy on the matter.
- Build Back Smarter findings contributed to the Canterbury Sustainable Homes Working Party and led to the investigation into establishing a wider service to support homeowners (see page 9)



### What our clients say

*"The strength for me is how Beacon helps us to connect with other stakeholders and expands our view as well as activating us to do things differently. So partnerships and opportunities open up as a result."*

*"Beacon is credible with good networks and they make happen what they promise."*





THE 2013 STUDY TOUR VISITS SUBDIVIDED  
HOUSES IN VICTORIA, BC..

## A cosy comfortable home for these Build Back Smarter homeowners

The Mt Pleasant home of Peter and Debbie has been transformed from a draughty 1918 villa to a warm oasis.

Ironically they bought their hillside bungalow between the September 2010 and February 2011 earthquakes and the house suffered significant damage to its foundations and interior.

Peter and Debbie now have an efficient heat transfer system to take the heat from the living area to the southern side of the house; wall, ceiling and floor insulation including a vapour barrier; downlights replaced with LED lighting, an extract fan was installed in the bathroom and ensuite and timers added to the heated towel rails.

The difference to their home has been significant, says Peter.

"We come home and the house is warm. Even the rooms at the back of the house are as toasty as the living room."

To add to the warmth and energy efficiency of their home, Peter and Debbie paid for new double glazed uPVC windows for the whole house, the front of their home with its panoramic views from the ocean, over the city to the mountains, and a freestanding woodburner to replace the living flame gas heater that was seldom used due to its high running cost. Debbie had new curtains made and installed for the whole house but we never need to draw the curtains as the double glazing is so efficient.

Even with the cooler months they find they don't have to get the woodburner or heat pump up and running until 8pm, saving significantly on their power bills and the cost of fire wood.

Peter's office is on the southern side of the house and, being an asthmatic, he found the cold space affected his health. With heat transferred from the living area, he says his office is now as "toasty" as the rest of the home.

The wall, ceiling and floor insulation combined with the large double glazed windows at the front of the house has totally changed the feel of their home.

"The house feels more peaceful and you can feel the warmth as soon as you walk in the door. Everyone should be thinking of upgrading their homes when they're having their earthquake repairs done – it just makes sense and we are very grateful to have taken part in this trial for Build Back Smarter," says Peter.



## Study tours

Beacon is developing international connections which we open to our national network via study tours. Our 2013 tour of successful medium density development in Victoria BC, Seattle and Portland provided a rich resource of knowledge and contacts for participants. A wide ranging schedule of presentations has shared some of the new and exciting ideas we found with urban planners and councils back in New Zealand.

A return tour is planned in 2015 which will revisit the best of the developments we saw in 2013, plus add Vancouver to the itinerary. We're going to some inspiring new sites, and we'll be meeting with some great people who will tell us about their experiences creating, managing and living in high performing medium density homes and neighbourhoods.

Another 2015 study tour is planned to Munich, Frankfurt, Freyberg and Malmo, focusing on the lessons to be learned from European prefabrication and the delivery of resilient communities. Participants will learn from European manufacturers who are able to deliver high levels of quality, scale and affordability through a lean manufacturing process.

## What our clients say

*"We also see value in the study tours – we can't send loads of people but they are a way of growing our expertise that we couldn't do for ourselves."*



BEACON IS AN ACTIVE PART OF HOUSING FORA SUCH AS THE BUILDING A BETTER NEW ZEALAND CONFERENCE.

## Driving change

**Beacon's goal targets change across New Zealand: 90% of New Zealand homes reach a high standard of sustainability. Our eye is always on how to reach this goal, and whether the activities we are doing will get us closer. Projects, contracts, any activities we consider, are all assessed in terms of their contribution to a better residential built environment in New Zealand.**

As a not-for-profit organisation, the Society directly funds activities to drive change in addition to our externally funded portfolio of projects. These activities enable us to operate in the public good space, chasing opportunities to share our knowledge and collaborate with others on initiatives to unlock residential transformation.

### Using our knowledge to guide policy

Making submissions to local and central government policy and plans is one way Beacon contributes toward change across the sector.

In local government, Beacon has submitted to:

- Auckland Council draft Annual Plan
- Auckland Council proposed Unitary Plan
- Christchurch City Council District Plan Update
- Christchurch City Council draft Annual Plan.

On behalf of the Canterbury Sustainable Homes Working Party, Beacon also prepared an extensive submission to the Canterbury Earthquake Recovery Authority (CERA) on the 2013 Land Use Recovery Plan. This focused on orienting homes to the sun, providing for rainwater reuse / recycling, and encouraging Councils to negotiate with developers not to create covenants which set minimum house-size requirements and limit the acceptance of off-site manufactured new buildings.

### Contributing to aligned projects

Beacon was part of a retrofit champions group, joining Wellington City Council, Kiwibank, Akina, and the Sustainability Trust in developing a business model for a retrofit service.

Beacon's Vicki Cowan has been supporting a group of Dunedin students setting up a Rate My Flat scheme. So far, over 600 flats have been rated with 2000 flats targeted before the launch in July.

### Sharing our knowledge: Building a Better New Zealand Conference

Innovative ways to create better communities and improve the performance of existing buildings will be discussed by national and overseas speakers at the Building a Better New Zealand conference in September. The success of the 2007 and 2010 Sustainable Building conferences sparked Beacon to join BRANZ and MBIE in organising another national conference to focus on the built environment.

Beacon's Lois Easton was employed to chair the organising committee for the conference which has attracted some eminent overseas speakers. These included London's Deputy Mayor Richard Blakeway who has responsibility for overseeing the Mayor of London's statutory housing powers, and Tim Williams, the CEO for the Committee for Sydney, an independent think tank and champion for the whole of Sydney.

Beacon presented six papers to the conference, sharing our knowledge from medium density to offsite construction to the repair of Canterbury.





RESEARCH PROJECT OFFICER CAMBRIAN BERRY  
GETS FULLY INVOLVED IN THE HOBSONVILLE BUILD.

## What does the future hold?

### New possibilities

A piece of feedback we regularly receive is that, while it's important to understand how best to build and upgrade high performing homes, a key part of the jigsaw is consumers demanding warmer, drier homes that are more efficient. It is with this in mind that we are considering how Beacon might develop a consumer strategy. This strategy would gather together all the levers Beacon and our partners have (or could develop) into a cohesive approach to influence consumer demand for high performing homes.

Alongside this, Beacon's Board is investigating whether Beacon's credibility and independence could develop into a capacity to verify higher performance outcomes. Beacon already has a defined HSS High Standard of Sustainability® which sets benchmarks for a high performing house. These measures form a line in the sand, established through research and tested on real life demonstration houses, which could be applied as a basis for expected performance.



### Upcoming projects

- Beacon, Nga Iwi Katoa, and the New Zealand Institute of Economic Research are joining together, and working alongside other organisations such as the Tāmaki Redevelopment Company, to develop and test a framework for improved decision-making about existing homes at the level of a neighbourhood development. This Building Levy-funded project aims to improve understanding of the options for upgrading or placing poor building stock as part of the Tāmaki Regeneration in Auckland. The project will develop a decision making framework which pulls together house information, community and household information, and economic analysis.
- Beacon will be supporting Hobsonville Land Company in sharing its learnings on medium density neighbourhoods and housing. As our two organisations share common goals of high performing and affordable homes and neighbourhoods for New Zealanders, we are leveraging our communications to reach a larger and broader technical audience.
- Beacon has been engaged by Rodney Local Board to develop a set of simple tools communities can use to plan for and work with the Board over their own locality. While several Rodney townships have undertaken some form of locality-based planning, others are keen to engage in community-led planning but are unsure how to begin or progress this work. The toolkit will draw on the experience of those who have already undertaken community-led planning to cover: getting started, visioning and planning, action, reflection, measurement, assessment, and sustaining momentum.
- Beacon is developing construction waste guidelines for Auckland Council to assist builders and developers in Special Housing Areas to achieve the six star Homestar™ rating required by the Auckland Unitary Plan. The guidelines will focus on combining a practical site waste management plan with targeted resources and training to enable builders and subtrades to significantly reduce waste on site and meet the requirements of the special housing areas.



New Zealanders  
spread about

**70%**

of their lives in  
their homes

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## The Beacon team

**Beacon has a team of experts who have an in-depth understanding of New Zealand's residential sector and are well-connected across the sector. This multidisciplinary team has the skill and experience needed to drive uptake of the whole-of-house and neighbourhood approaches.**

Beacon Pathway Inc. was able to retain many of the original research team and has expanded to provide new skills and experience to meet the demands of new projects.

The team is a mix of contractors and permanent staff, providing flexibility both financially for Beacon and to meet demand.

Some staff are based in the Auckland office but others are spread around New Zealand: Wellington, Christchurch, Gisborne, Dunedin. The team have developed effective and sustainable working practices minimising travel and using skype and phone conferences to work together virtually.



### **CEO – Nick Collins**

Nick oversees direction and business management, identifies strategic opportunities and manages key relationships with members and across a wide range of stakeholders.

Nick has been with Beacon almost since the start, having led the original company for six years as general manager, before overseeing the transition to an incorporated society.



### **Knowledge manager – Vicki Cowan**

Vicki coordinates our project portfolio and ensures the quality of what we deliver – she wields the whip! Vicki has been part of Beacon since 2006 and represents Beacon in Wellington-based projects.



### **Programme manager – Lois Easton**

Lois is another longstanding Beacon staff member with extensive research and demonstration project experience in the Existing Homes area. Lois has a wealth of knowledge about retrofitting existing homes which she contributes widely to fora across the sector.



### **Programme manager – Verney Ryan**

Verney's extensive expertise in new build and sustainable design has been put to good use most recently overseeing the off-site construction of the innovative New Category of Home demonstrations. He also provides renewable energy and energy efficiency expertise to Beacon.



### **Programme manager – *Denise Bijoux***

Denise is leading Beacon's Neighbourhoods work. She was formerly part of Beacon Pathway Ltd's successful neighbourhoods team and brings extensive experience in social research, evaluation, assessment and strategic policy advice.



### **Project manager – *Glenda Lock***

Glenda is leading a range of projects centred in Auckland including the Tamaki project with Nga iwi Katoa and the toolkit for Rodney Local Board. With an extensive background in the local government sector, Glenda is our 'go to' person for work with councils.



### **Communications liaison – *Andrea Blackmore***

Andrea provides communications support for Beacon projects and coordinates media activities. She works across the projects to disseminate Beacon's research to end-users, including publishing Beacon's newsletter and maintaining the website. A Beaconite since 2005, Andrea holds Beacon's institutional memory – ask her anything and she will find it!



### **Research project officer – *Cambrian Berry***

A BSc graduate, Cambrian has been working with Beacon for a year now. Cambrian has spread his wings from new build (supporting the New Category of Home project) to include Auckland-based projects in the retrofit and neighbourhoods space.



### **Consultant – Dunedin – *Lisa Burrough***

Lisa has a long history with Beacon, managing our Indoor Environment Quality research stream during our consortium phase, on behalf of BRANZ. Now based in Dunedin, Lisa is our most southern team member, contributing her well-established building science qualifications and experience to a range of Beacon projects.



### **Consultant – *Sally Blackwell***

Sally has experience developing programmes to improve the energy efficiency of New Zealand homes from both a central government and community sector perspective. She has worked most recently setting up the Practitioners' Hub and Home Performance Advisor training for the Community Energy Network.

### **Project manager – Christchurch – *Roger Woods***

Roger joined Beacon to support our work on the Build Back Smarter Service project. Building off an extensive and varied career, Roger's management of an EQR Hub brings critical hands-on experience of the Christchurch rebuild to Beacon. Roger will support Beacon's delivery of projects to Canterbury.

**300,000**  
New Zealand homes have  
no insulation at all

## Find out more about Beacon

Our website includes all the research undertaken in Beacon's original government research contract, and information on current demonstration projects. The Resources section includes resources for:

- Homeowners  
(Homeowner Manual, fact sheets, case studies, articles)
- Local government  
(Resource Manual, home assessment tools, neighbourhood sustainability tools, water demand management tools, submissions)
- Central government  
(National Value Case for Sustainable Housing, fact banks, submissions)

[www.beaconpathway.co.nz](http://www.beaconpathway.co.nz)

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