

MT111

EXPLORING A COMMERCIALY VIABLE MODEL FOR RETROFIT

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WRITTEN BY Rachel Hargreaves

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EXPLORING A COMMERCIAILLY VIABLE MODEL FOR RETROFIT

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1. EXECUTIVE SUMMARY

A number of Community Trusts in New Zealand are involved in implementing retrofit programmes (mostly energy related) in the residential sector. This has, to date, mostly involved low-income households in relatively small numbers across New Zealand. Trusts, by their very nature, are largely reliant on grants and subsidies to carry out their initiatives for the benefit of their respective communities. About 17,000 houses have been retrofitted over the years the Energy Efficiency and Conservation Authority (EECA)'s grants scheme has been operating.

For Beacon Pathway Ltd to realise its sustainable housing goals, it needs to understand and potentially get involved in the 'retrofit scene' in New Zealand. For example, who the main players are, what commercial companies are already operating in this area, how Community Trusts operate, etc. and from this, identify key components of a commercially viable retrofit model. Ideally, the commercial retrofit model should complement and, if possible, strengthen the Community Trust work.

In order gain this understanding, this project has:

- Identified the New Zealand Community Trusts who are currently implementing residential retrofit programmes and described the nature of each programme.
- Investigated and described the Melbourne based (Australia) "Easy Being Green" (EBG) retrofit programme.

EBG are an organisation with an environmental and social purpose that is 'for profit'. Their vision is "to see that 70% of Australian households reduce their energy and water consumption by 30% over the next 10 years". They have developed a commercial model that supports households to reduce their environmental impact via a number of 'retrofit packages'. These include energy (lighting, insulation, draughtproofing), solar hot water, and water (options for greywater re-use, rainwater tanks and water-saving tapware).

- Provided an assessment of this commercial model with a view utilising a similar approach in New Zealand that compliments the work being undertaken by the Community Trusts

The following conclusions were reached:

- The products and technologies for retrofitting houses are readily available in New Zealand (especially related to energy efficiency measures) and there are a number of commercial companies already operating in this area (mostly providing services through grant and subsidies to low-income households). As a result, the current market is predominantly focused on low-income households and energy-efficiency products. This is a direct result of Community Trusts' setting up to be providers for EECA's Energy Wise Grants Scheme (often in conjunction with commercial companies). If EECA were not providing money for low-income retrofits the Trusts (and commercial companies) would not have developed in the way they have.

However, Beacon is not just about targeting the low-income sector; middle to high income earners are key customers. And, it is more than just energy, and so the focus needs to be broadened to other sustainability features – as EBG does. However, a key barrier to moving beyond low-income and energy is that most of the commercial models rely on government funding to some degree. The key question becomes, who will pay for a retrofit service?

EECA are looking at providing a rating tool (HERS) aimed at the middle to high income earners. NB: this was trialled in the 1990's by ECNZ (HERO) scheme; once again it was totally energy efficiency focused and the large setup and admin costs made it difficult to be sustainable. The HERS initiative may help drive uptake of retrofit measures by the middle and high income sectors (although would still be energy focussed).

- Assuming the housing data is correct in the 'RF1' report (PCP project), for Beacon's goals to be met around 130,000 houses would need to be retrofitted each year (from 2006-2012). Current retrofit figures stand at around 6000 per year. These figures would benefit from a review (as

inconsistencies in the figures have been identified while undertaking this project), in particular, incorporating the results of the 2004 House Condition Survey.

The potential for significantly increasing the numbers of houses that are retrofitted in New Zealand is moderate, as most New Zealanders are keen DIY'ers and interested in upgrading their homes. However, does this DIY predilection also mean that a company offering a non-subsidised 'one-stop-shop' approach (from advice through to installation) would be less effective? This raises the issue of 'cost of advice'. EBG charge \$185 for a site visit (and associated advice). Adopting a similar figure in New Zealand is likely to be a price barrier. In the mid 1990's ECNZ concluded the accepted 'value for money' amount in the market place for a home energy rating was \$75. In the Warm Homes initiative, the Warm Home Energy Check (WHEC) independent assessors collectively agreed to set a fee of \$99 as they felt the market would not pay anymore than this. A well developed sales model is a key requirement for any commercial model.

- Quality workmanship is an important aspect of retrofit work. This has been identified as an area of concern (as installing retrofit products is not a low skilled operation). This is especially important when moving beyond installing measures that are 'simple' energy efficiency ones (e.g. rainwater tanks). Community Trusts have utilised unemployed and often unskilled workers as part of their social sustainability commitments (getting pole trained and into the workforce). This could continue with a commercial model, however, stringent training requirements would be required.
- Finally, there is scope in New Zealand for a commercially viable retrofit model that focuses on all households and broader sustainability goals.

Recommendations

1. The commercial model should focus on middle to high income households (and thus leaving the low income market niche for Community Trusts and their partners / providers). NB: there is a 'grey' area at the interface between low-income households and those on the margin that would need to be addressed. The HERS initiative may assist uptake of broader energy options in higher income households (but this is still some way off).
2. The commercial model should aim to increase the services offered to beyond energy (such as the packages offered by "Easy Being Green"). Beacon could offer some financial or logistical support to encourage this transition to occur (especially for existing companies).
3. Up-to-date market analysis would need to be undertaken to determine what packages could be offered (in alignment with DIY culture and willingness to pay issues). These packages would ideally be as flexible as possible. In addition, any commercial venture would need to secure product supply and suitably qualified installers ('minimum fuss' approach) as there are a large number of target households (risk that demand would outstrip supply).
4. In addition, the commercial model would benefit from a 'green mortgage' assistance package to incentivise homeowners to go ahead with whichever retrofit option they choose.
5. Further issues for Beacon to explore could include:
 - a. What are the next immediate steps for Beacon to develop this model to build capacity and further support Community Trusts?
 - b. What would Beacon need to do to ensure there was a rating tool at point of sale (houses)?
 - c. Should Beacon just take the "Easy Being Green" packages and adapt them to New Zealand?

2. INTRODUCTION

2.1 Background

A number of Community Trusts in New Zealand are involved in implementing retrofit programmes (mostly energy related) in the residential sector. This has, to date, mostly involved low-income households in relatively small numbers across New Zealand. Trusts, by their very nature, are largely reliant on grants and subsidies to carry out their initiatives for the benefit of their respective communities. EECA has retrofitted about 17,000 houses over the years it has been operating the grants scheme in one form or another (pers. comm.. Katie Mathison, EECA, 29/8/05).

Beacon Pathway Ltd's (Beacon) vision is for 90%+ of housing in New Zealand to reach a high standard of sustainability by 2012, with the aim of delivering real solutions to enhance sustainability of the housing stock within a very short timeframe. To reach this goal, Beacon recognises that significant opportunities lie in retrofitting the current housing stock.

Beacon, therefore, needs to understand the 'retrofit scene' in New Zealand. For example, who the main players are, what commercial companies are already operating in this area, how Community Trusts operate, etc. and from this, identify key components of a commercially viable retrofit model. Ideally, the commercial retrofit model should complement and, if possible, strengthen the Community Trust work. This study fits into the Beacon research programme as follows.

2.1.1 Beacon's retrofit research programme

Beacon has a detailed programme of research underway that will inform the overall retrofit programme. This particular project crosses over all of the current work streams, in particular the 'Policy and Regulation' work stream and the 'National Scorecard' and 'Market Segmentation' projects.

Key work that has already been completed includes:

- Storey, J., Page, I., van Wyk, L., Collins, M., Krehl, T. "RF1 Housing Retrofit. Housing Interventions, Stock, and Markets" (2004). Beacon Pathway Ltd.
- Krehl, T. "Business Opportunity Home Makeover" (2004/05). Forest Research.

The executive summaries of these documents have been included as appendices to this report.

2.1.2 Putting the retrofit programme in context: the numbers

It is important for Beacon to gain a clear and accurate understanding of the scope and scale of the retrofit 'problem' in New Zealand. There appears to be incomplete and/or contradictory data in determining just how many houses in New Zealand require retrofitting and to what level. This is a key information gap for the Beacon research programme. This may be resolved somewhat by the results of the 2004 House Condition Survey (to be released shortly).

Initial work has produced the following picture; derived from the 'RF1' Beacon project by Storey et al (2004).

The total housing stock in New Zealand as at December 2003 was 1,571,000. We are currently adding to our housing stock at about 30,000 houses per year. Therefore our current housing stock is likely to be very close to 1.6M units. Of this total about 1.05M houses were built before 1979, i.e., before mandatory thermal insulation standards were introduced. About 120,000 units are estimated to have been built in accordance with the enhanced insulation standards introduced in 2000.

Data from the BRANZ House Condition Surveys (HCSs) undertaken in 1994 and 1999 suggests that some 63% of existing houses built prior to 1979 have been retrofitted with the pre-2000 level of ceiling insulation. On average about 25,000 pre-1979 houses have been retrofitted with ceiling insulation per annum during the period 1976 to 1999. Subfloor insulation appears to have been fitted in less than 1% of these houses.

The HCSs also indicates that the incorporation of other sustainability related features such as double glazing and solar water heaters is still very low. In December 2003, The Energy Efficiency and Conservation Authority (EECA) reported that there were some 22,000 (1.4%) of houses that had been fitted with solar water heaters. EECA estimates that 2000 new solar heating systems are installed each year.

In 1999, the HCS results suggest that only 2% of houses in NZ were fitted with double glazing. Although double glazing has become more prevalent in new houses since 2000 the total number of houses with double glazing is unlikely to have risen above 3%. It is not known what percentage of the double glazing has been retrofitted into existing houses.

Percentages of existing houses where other retrofit features are incorporated are very low; generally well down in single figures. In general terms it seems that very few New Zealanders incorporate sustainability features even when undertaking alterations or additions. The only exceptions are ceiling insulation (40%), hot water cylinder (HWC) wrap (18%), and dual flush toilet cisterns (15%).

By 2012 there will be approximately 1.8 million homes in NZ. Of these about 100,000 will have been built subject to the revised 2008 Building Code, which will include a number of sustainability provisions.

Of the retrofit programmes operating in NZ, between them they carry out retrofits on about 5500 house per year. This figure represents less than 0.04% of houses and is primarily focused on energy/comfort related upgrades.

(adapted from Storey et al, 2004)

Assuming these figures are correct, with the high number of existing houses that will continue to be part of the total building stock for a number of years and with retrofit figures this low, Beacon's goal of 90% of all New Zealand houses being of a high standard of sustainability by 2012 is a substantial task.

This project will inform the continuing phases of the Beacon retrofit research programme, in particular, the potential for developing a commercial model in order to target a significantly greater proportion of the existing housing market.

2.2 Terms of Reference

This study will:

- Identify the New Zealand Community Trusts who are currently implementing residential retrofit programmes.
- Describe the nature of each programme, with respect to:
 - How it is funded (including co-funding, subsidies, grants, etc)
 - The retrofit elements included (hot water cylinder wraps, lights, advice, etc)
 - How it is operationalised (number of houses, types of person carrying out the retrofit, eligibility criteria, overall management, etc)
 - Results to date
 - Future developments (if any)
- Investigate and describe the Melbourne based (Australia) 'Easy Being Green' retrofit programme in the same manner, including an analysis of the company's commercial model for implementation.
- Provide an assessment of this commercial model with a view utilising a similar approach in New Zealand that compliments the work being undertaken by the Community Trusts

2.3 Definition of Terms

There are a large number of Community Trusts operating in New Zealand. For the purpose of this project, we are only interested in those Community Trusts who are involved in residential retrofit programmes / initiatives. Community Trusts are also known as Charitable Trusts, and are governed by the law under the Charitable Trusts Act 1975.

In the context of this project, 'retrofit' is defined as an investment made in an existing house to include new systems or components that enhance its sustainability.

A sustainable house is one where social and cultural needs are met, where resources are (more) equally available to everyone, and where no irreversible damage to the environment is caused during its entire life-cycle (Hargreaves et al, 2004).

'House' is taken to mean any form of residential dwelling, e.g., apartment, town house, stand alone etc.

3. COMMUNITY TRUSTS IN NEW ZEALAND

3.1 List of Community Trusts

The Community Trusts in New Zealand that have been identified as being involved in residential retrofit programmes / initiatives are¹:

- WEL Networks (Hamilton)
- Energy Options (Rotorua, Eastern Bay of Plenty)²
- EcoMatters Environmental Trust (Waitakere)
- Community Energy Action (Christchurch)
- Hawkes Bay Power Consumers' Trust (Napier / Hastings)
- Huntly Energy Efficiency Trust (Huntly, Waikato)
- Tamaki ki Raro Trust (Manukau City)
- Te Aroha Kanarahi Trust (Mataroa District)
- Waitara Community Development Trust
- Warm Housing Whangarei Trust
- Kati Huirapa Runaka ki Puketeraki (Dunedin)
- Hutt Mana Energy Trust (Porirua)
- West Coast Development Trust (Buller)
- Southland Energy Efficiency Trust (Invercargill)

Some of these Trusts carry out the retrofits (provide materials and workforce) through programmes funded in part by the Trust and/or other agencies, e.g. EECA, energy retailers etc., while others have simply been set up out of the deregulation and restructuring of energy companies and act purely as funders of retrofit work.

For most Trusts the focus is solely improving the energy efficiency of homes, typically for low income households. This is because the main funder of residential retrofit programmes is EECA (funds are usually matched from Community Trusts, local councils, and/or utility companies, e.g., MainPower NZ).

The New Zealand commercial companies that are involved in (or are partners in) implementing residential retrofit programmes with or for Community Trusts are:

- Energy Smart (nationwide)
- Insulation Services (Napier, Hastings, Wairoa, Waipukurau, Waipawa)
- Insultech Group (Auckland, Christchurch)
- Spectrum Care Health Homes (Auckland, Hamilton)
- Negawatt (Wellington)

¹ Derived from EECA's webpage: "EnergyWise Home Grants – Current Projects for 2004/05" http://www.eeca.govt.nz/uploadedDocuments/Web_project%20list.pdf

² Energy Options operate as both a charitable company and a commercial entity, i.e can act as both funder and provider of retrofit services (see s. 2.2.2)

While not an exhaustive list, the number of Trusts and associated companies listed here indicates that there is a relatively high level of activity in the retrofit market in New Zealand.

3.2 Characteristics of selected Community Trusts

To investigate how Community Trusts operate, contact was made to each Trust (via email) asking them to respond to the issues as per the terms of reference. Five replied:

- EcoMatters Trust
- Energy Options
- Waitara Community Development Trust
- Hawkes Bay Power Consumers Trust
- Community Energy Action

Their replies are as follows (unedited).

Interviews were also held with:

- Energy Smart
- EECA

3.2.1 Ecomatters Trust

Respondent: Gretchen Schubeck.

How the Trust is funded (including co-funding, subsidies, grants, etc).

EcoMatters is funded through a combination of contracts, sales, grants and subsidies.

The retrofit elements included (hot water cylinder wraps, lights, advice, etc).

Ceiling and underfloor insulation, hot water cylinder wraps and pipe lagging, draughtstopping and energy advice

How the programme is implemented (number of houses, types of person carrying out the retrofit, eligibility criteria, overall management, etc)

EcoMatters has retrofitted a total of 650 houses in the past three years (both EECA work and HNZN). The teams are made up of predominantly referrals from Work and Income New Zealand (WINZ). 70% of EECA clients must be low income. EcoMatters has a fulltime Project Manager, part time administrator and two fulltime Supervisors.

EcoMatters main work streams are in the areas energy efficiency, water conservation and waste minimisation and the organisation runs a variety of community projects to support these work streams including a city wide water conservation project and the Sustainable Living Centre.

Results to date

(no response)

Future developments (if any)

(no response)

What are your views on expanding your operations to other building sustainability issues (other than energy), e.g, water saving devices, rainwater tanks, on-site stormwater control, home flood-proofing methods, etc?

EcoMatters is already working in some of these areas. In the coming year, EcoMatters will be developing a series of packages incorporating energy efficiency, water conservation and waste minimisation and these will be made available to both the residential sector and the business sector. EcoMatters is piloting a project with small businesses in New Lynn which will see an energy and water audit carried out and services aimed at improving environmental performance offered at a reduced cost.

What are your views on working with commercial companies to achieve your retrofit goals?

EcoMatters currently works with two commercial enterprises to carry out retrofitting work under a subcontract structure. EcoMatters has developed excellent relationships with the suppliers of materials required to carry out retrofitting work and is able to obtain most products at a substantial discount.

Are you interested in working with house owners that are middle to high income earners (or is this in conflict with your Trust model)?

EcoMatters is currently working with middle to high income earners and will be expanding further into this area in the coming year.

3.2.2 Energy Options

Respondent: Jo Hunt.

How the Trust is funded (including co-funding, subsidies, grants, etc)

Energy Options is a limited liability company owned by the Eastern Bay Energy Trust. We also have a charitable company (Energy Options Charitable Company) which can receive and apply for grants unavailable to standard companies. It is early days for this set-up but it seems to be working.

The retrofit elements included (hot water cylinder wraps, lights, advice, etc)

Ceiling and underfloor insulation, wraps and pipe lagging, draught exclusion. Sometimes lights, sometimes low-flow shower heads. Often energy audits/advice/advocacy.

How the programme is implemented (number of houses, types of person carrying out the retrofit, eligibility criteria, overall management, etc)

Several different projects running here, Rotorua, Gisborne, all differ but focus on low-income and poor health. All up we've worked on around 4,000 houses.

Results to date

(many!)

Future developments (if any)

Energy Options behaves in a commercial manner on lots of energy related products and services (solar hot water, space heating, lighting etc) we anticipate expanding the range – geographically and product/service.

What are your views on expanding your operations to other building sustainability issues (other than energy), e.g, water saving devices, rainwater tanks, on-site stormwater control, home flood-proofing methods, etc?

I expect that we will remain primarily focused on energy efficiency but we are definitely interested in all that improves the sustainability of the communities we work in.

What are your views on working with commercial companies to achieve your retrofit goals?

I am quite happy working with commercial companies however the privately owned companies can be inclined to put the profit motive well before the social, environmental, cultural. The community owned operators tend to be somewhat more holistic in their approach. It can be very difficult to compete when the two types of ownership mean very different response times, decision processes etc.

Are you interested in working with house owners that are middle to high income earners (or is this in conflict with your Trust model)?

Yes we work with mid-upper income house owners in all of our areas of operation.

3.2.3 Waitara Community Development Trust

Respondent: Ed Parker.

How the Trust is funded (including co-funding, subsidies, grants, etc)

We basically just get money for doing work. Our activities include painting and graffiti removal, providing casual and fixed term labour hire, doing odd jobs (building fences, cleaning up sections, gardening, etc), selling firewood and retrofitting houses.

We get grants from EECA, Taranaki Electricity Trust, Taranaki District Health Board, TSB Community Trust and others for retrofitting. But this is on a per m² of insulation installed at commercial rates so I see it as being paid to do work. The recipients of the donation are really the homeowners / occupants.

We have had grants from WINZ and CEG in the past, and the usual job plus / task force green subsidies. The New Plymouth District Council provide us with our premises rent free.

The retrofit elements included (hot water cylinder wraps, lights, advice, etc)

Ceiling, underfloor, cylinder wraps, light bulbs, shower heads, smoke alarms. We also have funding from ACC to install stair guards, non slip mats, window security stays, cupboard latches, visibility strips and electrical outlet guards.

How the programme is implemented (number of houses, types of person carrying out the retrofit, eligibility criteria, overall management, etc)

Most of our workers have been retrofitting for us for at least 2 years, some since 2000. We are particular about standard of work, and especially who we send into people's homes.

We will insulate anyone's house. Generally with any inquiries we ask a few questions. If it appears that that might qualify for a subsidy we send them an application form for a free or subsidised retrofit. Otherwise we offer to provide a quote.

We have a committee that approves applications.

Results to date

We have retrofitted around 1300 homes since 2000.

Future developments (if any)

We have started a broad initiative to have all homes in Taranaki warm dry and healthy by 2014. There is scope to bring more funding partners on board. And we can put together packages to get middle and high income earners in older houses to upgrade.

What are your views on expanding your operations to other building sustainability issues (other than energy), e.g, water saving devices, rainwater tanks, on-site stormwater control, home flood-proofing methods, etc?

The sooner we do this the better. Retrofitting will taper off at some point in the future - may be from 2010. We need to have other services and skills to be sustainable into the future.

What are your views on working with commercial companies to achieve your retrofit goals?

No problem doing this, as long as everyone involved has a clear purpose and adds value to the project. I don't enjoy being subcontracted to another party if they just take a cut for doing work that we do for them anyway.

Are you interested in working with house owners that are middle to high income earners (or is this in conflict with your Trust model)?

Yes we are. There is an education issue here, many people still don't understand the benefits of retrofitting. Middle income people still get sick living in cold damp houses, and waste energy trying to keep warm. Once they understand the benefits and want to get the work done then they are usually quite happy to pay to have it done.

Some of our funders are quite clear that they want to support projects that help the whole community, and they don't want to be associated with programmes aimed solely at low income households.

3.2.4 Hawkes Bay Power Consumer's Trust

Respondent: Ken Gilligan.

How the Trust is funded (including co-funding, subsidies, grants, etc)

Our trust receives dividends from the lines company and distributes funds direct to consumer-owners. WE ARE NOT a community trust, but a consumer trust.

NB: A community trust has a pot of cash, it is highly improbable they hold shares in lines companies, and are set up to generate benefits back to the community in financial grants and help for local community groups.

Consumer trusts (and 90% are this type) hold shares in lines companies, receive dividends can only look after the consumer owners, mainly by dividends or discounts from their power bill. There are mostly precluded from giving grants to the community.

The retrofit elements included (hot water cylinder wraps, lights, advice, etc)

We have retrofitted 400 homes in Hastings and Napier, all being full retrofits, ceilings, floors, doors/windows, hot water cylinders and lagging.

How the programme is implemented (number of houses, types of person carrying out the retrofit, eligibility criteria, overall management, etc)

We engaged a local company, approved by EECA to do the installations – 400 or so over 3 years. We managed the whole process internally.

Results to date

Excellent outcome, designed for homes involving low income people suffering cardiac and respiratory illnesses (old and young people only).

Future developments (if any)

We are about to start a campaign to wrap up to 30000 hw cylinders in Hastings and Napier. 3,500 planned for period Oct 2005 to Dec 2006.

What are your views on expanding your operations to other building sustainability issues (other than energy), e.g. water saving devices, rainwater tanks, on-site stormwater control, home flood-proofing methods, etc?

Not favoured.

What are your views on working with commercial companies to achieve your retrofit goals?

(no response)

Are you interested in working with house owners that are middle to high income earners (or is this in conflict with your Trust model)?

They should have done the retrofits by now and that is all we will support. Probably have to make a contribution to it.

3.2.5 Community Energy Action

Respondent: Ian McChesney

What are your views on developing a commercial model for the retrofit of houses in NZ?

There are already commercial businesses involved in retrofitting houses in New Zealand, e.g., EnergySmart, Insultech, Insulation Services (Napier), so to some extent viable commercial models already exist. There are a number of gaps in the services that energy retrofit organisations provide (and in the overall framework for provision) - most notably loans and other financial services, the lack of a home energy ratings scheme, and probably a lack of a 'one stop shop' capability from most businesses. A number of Trusts have working arrangements, including joint projects, with these commercial operators (e.g. EnergySmart is involved with a number of Trusts, including Community Energy Action).

Most Trusts rely on subsidies to support their core work. A strictly 'commercial' model won't offer much to this core business, because at the end of the day if houses occupied by low income households are to be retrofitted subsidies will continue to be needed. However, a new model may be able to offer new approaches for organisations involved in retrofitting, extend the service they provide, and perhaps assist with developing good business practices etc. All that could be helpful to Trusts/community groups.

One thing the Trusts all share is a strong sense of local identity with their area, and real concern if other organisations were being assisted to come in with new packages/funding/models that would endanger their core base of work. In other words, the desirable model for growth in this area is to largely grow and strengthen existing organisations rather than try and create new entities around a new model.

3.2.6 Energy Smart

Interviewed by Rachel Hargreaves and Lynda Amitrano

General discussion

Energy Smart are a commercial company who have been in operation for 8 years and have 35 staff. They offer a range of 'retrofit' services, such a project management (for Trusts and small businesses), energy audits, home safety and consumer-friendly education (education is a core service for them). Customer service and good quality workmanship (including auditing of work undertaken) are core issues for the company. They expressed concern with other operators and quality issues, especially the health and safety of staff. They also indicated that they are 'widening their net' into more areas than just energy (especially water conservation measures). They are not solely reliant on EECA money (they do around 30% of the Energy Wise Grant work).

They expressed concern about IP issues, and were not particularly keen on Beacon encouraging the establishment of other commercial companies to undertake the same kind of work. Before divulging any commercially sensitive information, they requested an MOU from Beacon.

They consider EECA as only interested in outputs (i.e. numbers of houses retrofitted) not outcomes, and are lowest price focussed.

They were very clear that a successful retrofit programme is all about building good relationships: adding value to customers, making the job 'hassle-free', taking any risk on-boards, fixing problems quickly and providing overall management. They are happy to work with mid to high income clients, but have a strong community focus and are concerned about those who just miss out (i.e. low income people who do not qualify for grants, but actually have even less disposable income available to them, most of which are also tenants).

In summary, Energy Smart consider the core features of a commercial retrofit model as providing good quality consistent advice and good quality workmanship. Any 'package' approach needs to be flexible, as every group / customer dealt with will want / need different things.

3.2.7 EECA

Interviewed by Rachel Hargreaves

General discussion

EECA regard the Home Energy Rating Scheme (HERS) as a key driver for significantly increasing the retrofit market in New Zealand. However, this scheme is at least two years away from being implemented and is strongly dependant on political will. They consider that any commercial retrofit model would work well with a HERS mechanism, and would be especially valuable for tackling middle income earners (although they recognise that there may have to be a low level subsidy incorporated into it).

They consider the key question for any commercial retrofit service as being "how many people will use the service". They suspect not many, which is why they are very keen on getting a mechanism like HERS implemented as a main driver for change / uptake.

They thought that there may be synergies with other programmes, such as MfE's 'Warm Homes' initiative: as the fires are removed, insulation (and potentially other sustainability features) could be installed at the same time. They also mentioned work that Matt Hickman had done on 'Green Mortgages' that may assist / drive a New Zealand commercial model.

In summary, EECA are very interested in a commercial retrofit model, especially for middle to high income earners.

Comments provided by Lynda Amitrano (22/8/05)

Proposed HERS scheme

EECA are committed under the NEECS strategy to set up and administer a HERS scheme. They have used the WHEC (Warm Home Energy Check) as a pilot. The nationwide rollout was supposed to be completed by 2006 to meet their strategy. However, this strategy is currently being reviewed (as of mid August 2005) so that could change. There are strong supporters for a scheme (within EECA) but also just as many saying it is not feasible and will not deliver the desired outcomes.

WHEC is now only used with the ECan Clean Heat project and EECA have stopped supporting any independent assessors. It is not surprising that it has only been successful as part of Clean Heat and the marketing and support of the programme for independent assessors was not ongoing. However, it has been very useful and successful as part of the Clean Heat programme. (LJA to edit)

It is not the technical development of this type of scheme that will make it successful although the time taken to complete an audit and the difficulty will have an impact. To develop a nationwide scheme and to adopt it the following must be addressed:

- commitment from government to develop and support the scheme
- a robust structure that gives support, training and auditing procedures to ensure high quality and consistency nationwide
- a strong view of how this works to deliver the successful outcomes. If the government want to have a large uptake it will need to be mandated in some way, e.g. at point of sale a house must have a current star rating. Mandating with larger number being required to get star rating will assist with the cost of a HERS programme.

There is significant ongoing admin costs with this type of scheme and to put these costs onto the consumer is likely to make it too expensive. Even with the Clean Heat programme the assessor felt if they charged more than \$99 it would price an audit out of the market. Note: Market research was carried out by EECA after it was launched but they did it too soon and only allowed 2-3 months worth of assessment time from the point the assessors were trained. The \$99 cost only just covers the assessors time and travel.

I see no reason why a HERS could not include wider sustainability audit features. It is a matter of the balance between the complexity of the audit and the cost people are prepared to pay.

From the work I have done in this area of the last 12 years I believe unless it becomes a mandatory requirement for point of sale then it will not be successful as the uptake rates will be too low. A classic example of this is the Real Estate group who were interviewed as part of an honours project with respect to their thoughts on the WHEC scheme. They were not prepared to promote or support it because it may be selling homes more difficult given often houses under the WHEC scheme would not achieve even 1 star!

The key to a successful HERS is getting the star rating balance right so a person in a typical Kiwi home does not feel too demoralised with getting a low star rating while a person who has put in a lot of features gets noticeably rewarded for this. Sounds easy - but it is not.

Green Mortgages

These have been very successful in the States however people use a lot more energy and they pay more for it than in NZ. A green mortgage is where you are allowed to take out a mortgage to improve the energy efficiency of your home and use the money saved to pay back the loan (which sometimes is

at lower rate because these people now are less risk to the bank). The difficulties in NZ for this type of scheme are:

New Zealand's energy prices are relatively low, so the payback is longer.

For the type of retrofit work we are talking about, often the amount of money required is small (e.g. under 10,000) which makes it less appealing to the banks as it means a high administration cost for a low borrowed amount.

In addition, because of existing low temperatures and poor heating systems, often the takeback is not in money so no real savings are made.

Banks tend to not understand the 'wider benefit' that this type of scheme could lead to which could improve their business. For them the numbers just do not stack up.

However there have been a couple of initiatives that have been set up through either council or govt. One is the interest free loan for Solar hot water systems run by EECA and the other has just recently been launched in Christchurch in conjunction with the Clean Heat programme. In both cases it is government money that has been used to support the initiatives - they would not be possible in a purely commercial environment.

4. 'EASY BEING GREEN'

The previous information provides a snapshot of the New Zealand residential retrofit 'scene'. The project brief also asks for an analysis of the Australian based company 'Easy Being Green' (EBG). The following information has been derived from the company website and from presentation material from the RMIT course: "Green Building and Design 2005" (these slides can be found in Appendix 3, supplied as hardcopy only). Further information was obtained from Rachel Ollivier (EBG Operations Manager), although specific commercial information was not forthcoming. However, EBG expressed a desire to work with Beacon to share learnings and progress this market in New Zealand.

4.1 About Easy Being Green

The Australian company 'Easy Being Green' (<http://www.easybeinggreen.com/>) are an organisation with an environmental and social purpose that is 'for profit'. Their vision is "to see that 70% of Australian households reduce their energy and water consumption by 30% over the next 10 years". They have developed a commercial model that supports households to reduce their environmental impact via a number of 'retrofit packages'. These include energy (lighting, insulation, draughtproofing), solar hot water, and water (options for greywater re-use, rainwater tanks and water-saving tapware).

Their mission is to establish EBG as the leading environmental service provider to households, initially throughout Australia. They say they will achieve this by being the trusted source of knowledge, product and choice; empowering people to choose solutions that reduce their impact on the environment.

Their primary goal is:

- To support households to reduce their impact on the environment, without requiring radical lifestyle change

Their secondary goal is:

- To foster social enterprise in communities of significant disadvantage.

The process involves three steps:

1. EBG assessors visit and provide customised recommendations for the home
2. The customer then chooses the 'easybeinggreen' solution that suits them (see packages, below)
3. EBG uses experienced project managers who organise and coordinate a quick and complete installation

4.2 The "package" approach

The EBG product offering comes as distinct packages. The packages range from cost-free ideas that will help customer to understand how they can better use their house, to technological solutions that will improve the energy and water efficiency of the home.

Energy package:

The energy package is focussed on being a low-cost solution that will improve the comfort of the home. The package includes a customised selection of lighting, draught sealing and insulation products.

Water package:

Control of water pressure through a mains restrictor device, or through individual taps is an effective conservation option. Current water prices do not make capture and reuse economically viable, but EBG supports households with a long-term commitment to water-saving by installing tanks and evaluating the potential for grey-water systems.

Solar Hot Water:

EBG provides a benefit/cost assessment for a solar hot water system.

Other affiliated products and services:

There may be other desirable products and services identified during the home visit. EBG provides links to providers of these products and services. (EBG also provide a ‘product catalogue’ which essentially provides a ‘eco-specification’ role for choosing products, materials and suppliers).

The home visit (no obligation) costs AUD\$185.

4.3 Results

EBG is a company with an environmental and social purpose that is ‘for profit’.

According to the presentation material (see Appendix 3), EBG piloted their programme in 2004, with 26 assessments completed.

Also mentioned in the presentation was that EBG have secured a financial arrangement with the ANZ bank, in that homeowners can pay for the EBG retrofit by putting the cost onto their mortgage.

Comments from Rachel Ollivier (EBG Operations Manager) are as follows:

The number of assessments complete

To date, around 200 assessments have been completed.

Of those assessments, how many went on to get a conversion? (and what package)?

Around 30-40 households have gone on to get a conversion. ‘Water’ is the most popular package, although they provide whatever features the homeowner wants (not ‘locked into’ a particular package).

Information on the ANZ mortgage package

Yes, EBG do have an arrangement with the ANZ Bank where customers can put the cost of the retrofit onto their mortgage. ANZ bank recognised this as a key customer need (based on their market survey results; 20% of their customers responded that it is was important to them). However, to date, no-one has taken this up.

Are there any government incentives?

A few city councils run energy auditing programmes for low income households, but provide minimal intervention (lightbulbs and showerheads). EBG deliver the auditing service for councils.

General comments

Having the capacity to deliver a retrofit programme is really important. EBG believe they have this capacity, but recognise that they are not even close to realising their full potential. They are working on a sales model to increase demand. EBG are happy to enter into discussions with Beacon to assist a retrofit programme in New Zealand. Contact Rachel Ollivier at Rachel@easybeinggreen.net

5. ASSESSMENT

The main aim of this study was to investigate the potential for success of a commercial retrofit model for New Zealand houses; one that complements and strengthens the Community Trust work while moving Beacon closer to realising its goals. The study also draws on previous work from the Beacon retrofit work stream, and from “Easy Being Green’s” experiences.

Key findings from the Krehl study (04/05) included:

- The very strong DIY culture in New Zealand and the desire by most people to upgrade their properties (however, they want ADVICE about how to do it themselves rather than a company to do the retrofit for them)
- The limited budgets for retrofitting (usually about \$5-10,000)
- There is very limited information for customers on pay back periods for retrofit work (or the added re-sale value of any work undertaken)

Key findings from Storey et al (2004) indicate that around 1.033 million houses in new Zealand were built prior to 1979 before mandatory thermal insulation standards were introduced. This is not to say that houses built after this time are any more sustainable or are in any less need of serious retrofitting (at least from an energy efficiency perspective). However, taking just the pre-1979 figures (and adjusting for those that have been retrofitted with ceiling insulation or a solar hot water cylinder) and incorporating the Beacon vision of 90% of these reaching a high level of sustainability by 2012, this means that around 890,000 houses are currently in need of retrofitting to some degree.

Without gaining in-depth details, it would appear that “Easy Being Green” has achieved modest success to date. Of interest is their ‘package’ approach (one-stop-shop) and the ability for customers to utilise a mortgage arrangement with ANZ back to fund their preferred conversion package.

From this study it has become clear that there are a relatively high number of stakeholders in the retrofit market in New Zealand (currently retrofitting around 6000 houses per year). There is a mix of funding mechanisms, although most of the work is community focused, targets low income earners, and is energy based.

5.1 Conclusions

The following summary points have been derived:

- The products and technologies for retrofitting houses are readily available in New Zealand (especially related to energy efficiency measures) and there are a number of commercial companies already operating in this area (mostly providing services through grant and subsidies to low-income households). As a result, the current market is predominantly focused on low-income households and energy-efficiency products. This is a direct result of Community Trusts’ setting up to be providers for EECA’s Energy Wise Grants Scheme (often in conjunction with commercial companies). If EECA were not providing money for low-income retrofits the Trusts (and commercial companies) would not have developed in the way they have.

However, Beacon is not just about targeting the low-income sector; middle to high income earners are key customers. And, it is more than just energy, and so the focus needs to be broadened to other sustainability features – as “Easy Been Green” does. However, a key barrier to moving beyond low-income and energy is that most of the commercial models rely on government funding to some degree. The key question becomes, who will pay for a retrofit service?

EECA are looking at providing a rating tool (HERS) aimed at the middle to high income earners. NB: this was trialled in the 1990’s by ECNZ (HERO) scheme; once again it was totally energy efficiency focused and the large setup and admin costs made it difficult to be sustainable. The HERS initiative may help drive uptake of retrofit measures by the middle and high income sectors (although would still be energy focussed).

- Assuming the housing data is correct, to realise Beacon’s vision around 130,000 houses would need to be retrofitted each year (from 2006-2012). Current retrofit figures stand at around 6000

per year. This assumption would benefit from a review, in particular, taking into account the results of the 2004 House Condition Survey.

The potential for significantly increasing the numbers of houses that are retrofitted in New Zealand is moderate, as most New Zealanders are keen DIY'ers and interested in upgrading their homes. However, does this DIY predilection also mean that a company offering a non-subsidised 'one-stop-shop' approach (from advice through to installation) would be less effective? This raises the issue of 'cost of advice'. "Easy Being Green" charge \$185 for a site visit (and associated advice). Adopting a similar figure in New Zealand is likely to be a price barrier. In the mid 1990's ECNZ concluded the accepted 'value for money' amount in the market place for a home energy rating was \$75. In the Warm Homes initiative, the Warm Home Energy Check (WHEC) independent assessors collectively agreed to set a fee of \$99 as they felt the market would not pay anymore than this. A well developed sales model is a key requirement for any commercial model.

- Quality workmanship is an important aspect of retrofit work. This has been identified as an area of concern (as installing retrofit products is not a low skilled operation). This is especially important when moving beyond installing measures that are 'simple' energy efficiency ones (e.g. rainwater tanks). Community Trusts have utilised unemployed and often unskilled workers as part of their social sustainability commitments (getting pole trained and into the workforce). This could continue with a commercial model, however, stringent training requirements would be required.
- There is scope in New Zealand for a commercially viable retrofit model that focuses on all households and broader sustainability goals.

5.2 Recommendations

1. The commercial model should focus on middle to high income households (and thus leaving the low income market niche for Community Trusts and their partners / providers). NB: there is a 'grey' area at the interface between low-income households and those on the margin that would need to be addressed. The HERS initiative may assist uptake of broader energy options in higher income households (but this is still some way off).
2. The commercial model should aim to increase the services offered to beyond energy (such as the packages offered by "Easy Being Green"). Beacon could offer some financial or logistical support to encourage this transition to occur (especially for existing companies).
3. Up-to-date market analysis would need to be undertaken to determine what packages could be offered (in alignment with DIY culture and willingness to pay issues). These packages would ideally be as flexible as possible. In addition, any commercial venture would need to secure product supply and suitably qualified installers ('minimum fuss' approach) as there are a large number of target households (risk that demand would outstrip supply).
4. In addition, the commercial model would benefit from a 'green mortgage' assistance package to incentivise homeowners to go ahead with whichever retrofit option they choose.
5. Further issues for Beacon to explore could include:
 - What are the next immediate steps for Beacon to develop this model to build capacity and further support Community Trusts?
 - What would Beacon need to do to ensure there was a rating tool at point of sale (houses)?
 - Should Beacon just take the "Easy Being Green" packages and adapt them to New Zealand?

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7. APPENDICES

7.1 Appendix One: Business Opportunity Home Makeover. An Investigation of the Retrofit and Renovation Market in New Zealand

By Tobias Krehl

Swiss School of Wood Engineering

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Summary

Situation

Housing is one of the most important factors for a national economy and well-being. People who live in homes that provide a comfortable, healthy and lifestyle-suitable environment are likely to feel happier and healthier. Housing that meets consumer needs helps to maintain a high level of productivity due to a high degree of satisfaction and good health.

About one third of New Zealand's housing stock can be called substandard according to international minimum requirements for housing and health. The main aspect is the lack of thermal insulation that causes indoor temperatures to lie beneath the recommended international standards. Lack of suitable housing accommodation in certain lower socioeconomic areas has also led to higher than average meningococcal and tuberculosis cases.

With Agenda 21 and the Kyoto Protocol New Zealand has committed itself to environmental issues that may impact upon the way our houses are built, and operate, from 2012. From this starting point the question arises how at least 500,000 homes can be improved, brought to a modern standard, retrofitted or upgraded.

The key factor to that task is motivated homeowners who see the need to upgrade their home and are willing to do so. One possible way to support a larger scale retrofit is to create a company that specialises in retrofit and home makeover and would offer a full overall service to the house owner.

Method

The two main areas of investigation in this case are:

- The general environment the company would operate in and
- The potential customers' requirements.

In order to gain the required information a literature and statistical data research was undertaken. The data research phase involved a survey with questionnaires to fill the information gaps, especially to understand customer requirements.

Results

The results of the literature research show that the general environment in New Zealand and the general mood in the country are supportive of the business idea. Mention of environmental and energy saving issues is plentiful.

Asking the homeowners what they want shows that their main emphasis lies on improving lifestyle and comfort and increasing the resale value of their house. The reasons why a makeover company would not find a broad acceptance at present are:

- the lack of money for retrofit,
- the high degree of Do-It-Yourself
- a developing rental market where landlords invest as little as possible in their rental property.

These main aspects would make it very difficult for a makeover business to be financially independent and get established.

An alternative way to approach the retrofit market might be to work closely together with hardware suppliers and architects and leverage off the already inherent DIY culture.

As things are changing and the building boom starts slowing down, building companies might look for new markets in order to find work. This could open the gates for alternative ways to upgrade homes and establish retrofit and energy efficiency as value adding measures.

7.2 Appendix Two: Housing Interventions, Stock, and Markets. RF1 Housing Retrofit

By John Storey, Ian Page, Louw van Wyk, Mike Collins and Tobia Krehl.

2004. Beacon Pathway Ltd.

SUMMARY

INTRODUCTION

The purpose of this project is to provide information that is useful to Beacon in designing the programme which will lead to 90%+ of existing houses in New Zealand achieving a sustainability standard by 2012 and to identify any gaps in our knowledge that would require filling in order to meet the programme objectives.

To this end three deliverables were required from this project:

- 1 A high level summary of relevant sustainability related retrofit interventions worldwide and their success factors.
- 2 A recapitulation of existing knowledge regarding the housing stock.
- 3 An overview of the existing knowledge regarding the retrofit market in New Zealand.

No original research was to be undertaken as part of this project. However while the essential output was a collection of existing knowledge, this programme also sought to:

- Define what information is required.
- Establish whether this information is already available and if so where and in what form is the information available.
- Assess what level of credibility can be assigned to the information.
- Establish what information is missing and assess how crucial the information is in establishing a satisfactory baseline for further research.
- Establish how this information can be obtained.
- Make an initial assessment of whether we might be able to use/adapt information from overseas.

WORLDWIDE INTERVENTIONS

Internationally, interventions in the retrofit area are extremely modest, by comparison with those directed towards new buildings. Interventions in the energy sector far outnumber those in all other areas of sustainability intervention.

Interventions in energy, materials, water and health sectors were investigated. These correspond to the sustainability sectors in the 2004 Building Act.

In each case regulatory instruments, economic instruments, information tools and ‘other’ interventions were examined.

Governments prefer to use regulation wherever possible, but it is rare for regulation to be applied retrospectively to existing houses. The UK is exploring ways that mandatory compliance might be written into the Building Code for addition and alteration work and for retrofitted appliances and fittings.

There are examples of regulatory instruments which have been used to target specific aspects of existing house upgrading.

Economic instruments, some of which are mandatory and others voluntary are generally the most successful types of intervention in the existing housing sector. Often the most successful voluntary packages are accompanied by incentive or subsidy payments as well as having good information/advice backup systems.

Information tools rarely operate alone as interventions.

Amongst the 'Others' category of interventions, government 'greener' purchasing policies and support for research are regarded as being successful. Different types of intervention seemed to be the most successful in different sectors.

No examples of technology based interventions were found in any of the four areas investigated. New Zealand could be a pioneer in this sector. NEW1 is seeking to establish the need for new or improved technologies and there is a possible link between RF1 and NEW1 in this respect.

Many of the most successful interventions are hybrid forms comprising elements of two or more of the aforementioned intervention types.

It may well be possible to adapt some of the successful overseas interventions for use in New Zealand. However, care needs to be taken in such adaptation to ensure that the social and economic context and the particular cultural mores that apply in New Zealand are carefully considered and integrated with the proposed programmes, otherwise successful outcomes are unlikely.

ENERGY

In the energy sector, voluntary economic instruments were the most successful with private owner occupiers, while regulation was necessary with private rental owners. Mandatory minimum energy standards for appliances were also successfully employed.

The Canadian **Energuide** programme was the most successful intervention discovered. It is a hybrid voluntary economic instrument. It is intended to improve the energy performance of both existing and new houses. It has been operating since 1998 and finally 'took off' last year when small incentive subsidies were introduced. This year it is expected that about 100,000 assessments will be carried out. The related upgrading can occur at any stage after the initial assessment occurs. The subsidy is paid against actual performance improvement measured by a post retrofit assessment.

The success of this scheme appears to be due to a combination of:

- An affordable before and after assessment scheme linked to modest, performance improvement subsidies.
- An advice and information system which empowers the householder to develop a package of energy related improvements in line with their personal circumstances.
- Good technical information backup which enables a householder to carry out some of the improvements on a DIY basis.
- Involvement of licensed contractors in the assessment programme who can also carry out the work on site. Contractors are spasmodically checked to ensure quality and lack of bias.
- Encouragement of other bodies to add to the value of the central government subsidy.

Residential Energy Conservation Ordinances (RECOs) operate in some parts of the USA and Canada. These are mandatory regulatory interventions, specifically targeted at upgrading the energy performance of the very poorest performing houses. In this case a house that is about to be sold must be fitted with a number of simple energy saving features before its legal title is allowed to be transferred. These features are usually cheap and simple elements such as weatherstripping, gap sealing, cylinder lagging and in some places roof insulation.

The success of this intervention lies in:

- Application to all houses irrespective of ownership at point of sale.
- Simple low cost measures with rapid payback.
- An easy and cost effective enforcement procedure.

- Use of targeted capital subsidy packages particularly in the private rental sector in some areas.

Weatherization programmes in the USA are run by the Department of Energy in conjunction with state or city authorities and are specifically targeted at improving the energy performance of houses occupied by low-income families.

The success of these programmes is due to:

- The award of substantive capital subsidies.
- Associated assessment and advice protocol which helps to ensure that the most cost effective solutions to upgrades are formulated on a case by case basis.
- Increasing flexibility in what can be included as a feature which attracts a subsidy.

The mandatory **BASIX** assessment scheme will be applied to all consented alteration and additions in NSW from 1 October 2005 when a 25% less greenhouse gas emissions target will be set. This will rise to 40% on 1 July 2006.

The success of this scheme is likely to relate to its mandatory nature, however as it will not come into force for another 11 months, this supposition is pure conjecture.

Several other intervention types have been successfully utilised in this sector including:

- Capital subsidy programmes
- Premium loan schemes
- Preferential loan schemes
- Energy tax schemes
- Tradable permit schemes
- Energy audit programmes
- Energy performance labeling
- Information and advice schemes

All have their particular merits advantages and disadvantages as discussed in the full report. It may well be worth utilising one or more of these schemes in the retrofit intervention programme and so they all need further investigation.

MATERIALS

In the materials sector landfill charges were the most successful intervention in improving resource recovery. 'Green' public procurement policies were successful across the whole area of resource recovery, deployment of sustainable materials and waste reduction. Information tools to inform and advise were also utilised but programmes did not always seem to be well thought out.

The Netherlands and Denmark have the most advanced systems of resource recovery in the world and have recently introduced zero waste legislation in the construction and demolition waste sector.

The success of this legislation is due to:

- The prior introduction of high landfill charges which took recovery rates well beyond the 90% point.
- Mandatory separation of materials
- Predominant use of 'waste' as road base
- Denmark has mandatory reporting policies in place to counteract illegal dumping practices

New Zealand has a national Zero Waste Strategy in place but a diverse collection of policies, because each local authority can set its own waste policy and landfill charges

There is very little legislation in any other aspects of material efficiency and conservation. What there is generally relates to health matters and is reported in that section of the report.

Green purchasing policy, where central and local government and government agencies lead from the front is the most effective intervention method across the whole materials sector. A number of assessment protocols are in place around the world such as **LEED** and **BREEAM** but none of these so far include a domestic retrofit assessment regime.

Lack of information and performance assurance seem to be the principal barriers to the employment of sustainable materials. There is a lack of knowledge and good published information in the area of design for disassembly and design to reduce waste.

WATER

Very few interventions in the water sector were identified but it was generally agreed that water metering and charging were the most successful foundation blocks to achieving water savings and this can either be accomplished through central or local regulation.

The Australian **BASIX** web based planning tool which targets 40% reduction in potable water use will be applied to all alterations and additions from 1 October 2005.

It is too early to assess success, but it is a mandatory scheme and will be applied to all consented work.

Water saving appliances, fittings and fixtures are labeled in quite a few countries but there are no known regulations to mandate their use.

HEALTH

There were few interventions in the health sector, probably due to the great uncertainties that still exist in this area. In this case, successful interventions were the imposition of mandatory standards relating to formaldehyde and VOC emissions.

Generally information tools were used to a considerable extent in this sector. The most successful scheme discovered is one recently introduced in Seattle, which is totally focused on retrofit. The programme includes advice on a full range of sustainability related features but 'sells itself' as the "**Healthy Home Program**".

The programme is still under development and the team is in the process of devising/organising an evaluation on its success. Preliminary indications are that there has been much interest in the scheme from residents but there is currently no feedback on whether interest has resulted in action.

Success factors are:

- Brightly coloured, visually appealing, simple to understand brochures, which provide clearly understood advice
- The willingness and availability of the programme leader to act as a contact/liaison point for further advice and clarification.

EXISTING HOUSE DATABASE SURVEY

The types of required data are in two main categories, physical characteristics of the housing stock, and occupant characteristics.

Information that is likely to be useful, (and reasons for its usefulness in brackets) are as follows:

Physical Characteristics of the Housing Stock

- Age structure of the stock, by region. (To identify pre-mandatory insulation houses, likely airtightness and underfloor insulation retrofit potential, hot water cylinder replacement potential).
- Type of dwellings, i.e. stand-alone, semi-detached, terrace housing, apartments. (The retrofit programme may require different measures for different types of dwellings).
- Demolitions/conversions by age group (i.e. what type and numbers of housing will be lost and not require upgrading).

Occupant Characteristics

- Breakdown by owner-occupiers, and renters. (Different programmes will be required for owners and landlords.)
- Breakdown by family type, including forecasts, and household income, (retrofit measures may vary depending on the types of family, and affordability).
- Some cross tabulations where possible, e.g. house age cohort by household income.

Physical Characteristics

Total housing stock in New Zealand as at December 2003 was 1,571,000. We are currently adding to our housing stock at about 30,000 houses per year. Therefore our housing stock is likely to be very close to 1.6M units. Of this total about 1.05M houses were built before 1979 when mandatory thermal insulation standards were introduced. About 120,000 units are estimated to have been built in accordance with the enhanced insulation standards introduced in 2000.

Figures are taken from Quotable Value NZ data, modified to take account of known minor inaccuracies and are regarded as having a high level of credibility.

Dwelling Types

Figures taken from the 2001 Census, which is a highly accurate and credible source, indicate that 82% of houses in NZ are detached single family houses. Most of the rest are semi-detached or units in 1 or 2 storey blocks. Despite the upsurge in multi-storey housing these represent only about 3% of the total housing stock.

Demolitions

BRANZ estimate that there are about 2000 (0.13%) house demolitions every year. This indicates that we are not so much replacing our housing stock as adding to it. This means that the problem with substandard houses is not fixing itself over time, but rather that as older houses deteriorate, the problems will get worse unless we take timely action.

There is currently no official data collected on the numbers, age, location, condition, or the reason for demolition of NZ houses. This is regarded as a significant data gap which should be filled.

OCCUPANT CHARACTERISTICS

Owner-occupiers and renters

68% of New Zealand homes are owner occupied, 26% are privately owned rental accommodation and 6% are publicly owned according to the 2001 census. Owner occupancy fell about 5% between 1991 and 2001. This is seen as a continuing trend.

About 51% of all owner occupied houses are owned with a mortgage. There appear to be no figures available for privately owned rental property with a mortgage.

It is suggested that there is currently insufficient data available concerning private rental property both in terms of the houses themselves but also concerning owner and occupant characteristics. As this sector currently comprises over one quarter of all New Zealand households and is likely to grow for the foreseeable future, the lack of reliable data is seen as a very significant gap in our knowledge and one that needs to be remedied as quickly as possible.

Family Types

The largest growth in family type occurs in the 'Couples with no children' sector which is predicted to overtake the largest sector 'Two parents +child(ren)' in 2006. By 2012 the prediction is that there will be 100,000 more 'couples' than 'two parent' households, 520,000 compared with 420,000.

'One person' households are also predicted to increase and should current trends continue are predicted to exceed 'two parent' households by 2016. These trends suggest that more existing homes will be adapted for the needs of adults rather than for children in the foreseeable future.

Likely types of modifications:

1. Conversion of spare bedrooms into other uses like home offices and gyms.
2. Additional bathrooms including en-suite for visitors.
3. Subdivision of larger dwellings into smaller household units, with parts for rent.

Both type 2 and 3 modifications provide opportunities for sustainability retrofitting.

Household Incomes

Amongst owner occupiers there are 319,000 low-income households (< \$30,000), 365,000 medium income \$30,001 - \$70,000) households and 250,000 high income (\$70,001>) households. It may be necessary to devise different levels of retrofit programmes for the different income groups.

RETROFIT MARKETS

The Physical Context

Housing Profile

Only about 89,000 pre World War One houses now exist in NZ. They are generally large, good quality and well built timber houses. Post WW I houses were of the same native heartwood construction, but were smaller, of poorer quality and less well built. There was an upsurge in quality just before the WW 2, but shortages of materials and labour during and after the war brought about a second period of lower quality standards. NZ's native forests were depleted by the late 50s and increasing substitution of traditional materials occurred after this time.

The biggest and most rapid changes to house construction occurred after the introduction of the Building Act 1991. Serious defects have occurred in a significant proportion of monolithic walling systems used in multi-unit and complex single unit housing constructions. This precipitated the development of the new Building Act 2004 which aims to reverse the perceived decline in industry standards. Funding and labour devoted to rectifying the weathertightness problems referred to may well be in competition with the funding and labour required by Beacon to affect its mandate.

Materials which are now recognised as hazardous materials are a significant issue in existing houses.

Chemical timber treatments, lead based paint, asbestos, lead and lead solder in plumbing, PCBs formaldehyde, solvent (VOCs) based materials, and some rots are all present to a lesser or greater degree across our existing housing stock. All are hazardous and all are costly to remove and dispose of correctly during retrofitting.

New Zealand houses have a well earned reputation for being cold, damp, draughty and mould ridden. Early indications from research being undertaken by the Wellington Medical School vindicate this widely held belief.

Water conservation has not been an issue in non-rural NZ until very recently and so water saving features are largely absent from existing houses.

Housing demand is changing due to the increased diversity of household make up, reduced birth rate, an aging population, reduced home ownership and the increased incidence of inner city living.

Renovations/Home Improvements

Of the \$5300M spent each year by New Zealanders on renovations, improvements, decoration and maintenance, only about 20% is spent on consented work, essentially additions and alterations. The TNS survey concludes that the size of the renovation segment of the market in New Zealand is about \$3200M. The renovation market, which includes additions and alterations, is the one which has the potential to incorporate sustainability related features as this expenditure is usually discretionary. The TNS survey also found that 60% of respondents said that they had undertaken home improvements in the previous 12 months.

All this information comes from credible sources, mainly the annual BRANZ Alterations and Additions Survey and the biennial TNS Home Improvement Survey.

Retrofit Programmes in New Zealand

The main retrofit programmes currently operating involve Housing New Zealand and EECA who between them carry out retrofits on about 5500 house per year. This figure represents less than 0.04% of houses and is primarily focused on energy/comfort related upgrades. House owners spend about \$1,050 million per year, or about 20% of the total existing house maintenance and improvement budget on alterations and additions. Research indicates that only a small percentage of this amount is spent on sustainability related retrofitting.

Virtually all the sustainability related retrofitting that occurs in New Zealand is related to energy saving or improving comfort levels in homes. Overseas research has indicated that most of the energy saving potential of such retrofit programmes is taken up by owners accepting higher comfort levels.

None of the active sustainability related retrofit programmes in New Zealand deal with water, materials/waste, or health to any significant extent. Only a tiny proportion of house owners seem aware of these matters and an even smaller fraction seems to be taking active steps to ameliorate this condition.

Retrofits Already Carried Out

Of our 1.6 million houses, about 1.033 million were built before thermal insulation standards were introduced in 1979. Only about 120,000 of our houses are thought to comply with the upgraded thermal insulation standards which became mandatory in 2000. These standards are about to be upgraded again, but will still fall well short of the thermal insulation standards specified in the NOW house brief.

Data from the BRANZ House Condition Surveys (HCSs) undertaken in 1994 and 1999 suggests that some 63% of existing houses built prior to 1979 have been retrofitted with the pre-2000 level of ceiling insulation. On average about 25,000 pre-1979 houses have been retrofitted with ceiling insulation per annum during the period 1976 to 1999. Subfloor insulation appears to have been fitted in less than 1% of these houses.

The HCSs also indicates that the incorporation of other sustainability related features such as double glazing and solar water heaters is still very low. In December 2003 EECA reported that there were some 22,000 (1.4%) of houses that had been fitted with solar water heaters. EECA estimates that 2000 new solar heating systems are installed each year. It has recently received funding to enable it to continue its 2000/2003 subsidy programme for an extra 444 house systems in 2004/2005.

In 1999 the HCS results suggest that only 2% of houses in NZ were fitted with double glazing. Although double glazing has become more prevalent in new houses since 2000 the total number of houses with double glazing is unlikely to have risen above 3%. It is not known what percentage of the double glazing has been retrofitted into existing houses.

Percentages of existing houses where other retrofit features are incorporated are very low; generally well down in single figures. In general terms it seems that very few New Zealanders incorporate sustainability features even when undertaking alterations or additions. The only exceptions are ceiling insulation (40%), HWC wrap (18%), and dual flush toilet cisterns (15%).

Government Interventions

Revisions to the Building Regulations 1992 following on from the Building Act 2004, the current review of the Residential Tenancies Act 1986, and the current development of the New Zealand Housing Strategy all present opportunities for Beacon to contribute to the development of policies which would support Beacon targets.

HNZ retrofit about 2500-2700 of their 66,000 houses each year. EECA currently funds or subsidises energy related retrofitting of about 3000 houses for low income families a year. This year extra funding has been made available and EECA expect to subsidise the retrofitting of about 6000 houses based on receiving matching funding from community trusts, local councils and utility companies.

The Human Context

There are significant benefits associated with the Beacon retrofit programme related to health, resource and economic sectors. In each case there are public, owner and occupier dimensions.

Improving the well-being of occupants results in a reduced burden on the health system, reduces absenteeism and improves people's satisfaction levels with their home. Making homes warmer and more comfortable tends to produce healthier living conditions and result in fewer respiratory and allergenic illnesses.

In terms of reduced resource use the Beacon programme directly contributes to several national strategies, NEECS; The NZ National Waste Strategy; The Climate Change Protocol; The Sustainable Development for New Zealand Plan of Action. Reduced resource use also is beneficial in reducing infrastructure costs such as the need for new power stations, landfills and increased capacity water and drainage mains. It also can help to reduce imports of new building materials and thereby the trade deficit.

Economic benefits accrue to house owner occupiers through reduced operating costs. It was difficult to find creditable cost benefit analysis information. In part this is because of the difference between potential and actual savings. For example adding insulation results in potential reduced energy use but many people prefer to increase comfort levels rather than save energy.

The benefits of improving house performance at the low end private rental market are not readily apparent. Occupiers also tend to be in favour of retaining the status quo, as improvements are inevitably followed by unwanted and in some cases unaffordable rent increases.

Winstone survey information suggests that around 60% of renovation is appearance driven and most of the rest is related to improving functional needs. However, closer inspection indicates that performance related improvement could be a part of the renovation in about 45% of circumstances. Less than #% of respondents considered improved house value as the prime motivator for renovation.

From the same survey more than 53% of renovations occurred within two years of purchase of the property.

Housing is the single most significant personal investment, accounting for 90% of net household wealth in NZ.

Surprisingly between 20-30% of high income households rent rather than own property. These properties are likely to be at the higher end of the property range and occupants are more likely to require higher performance levels than at the low end of this market. Beacon may be able to influence performance upgrades more easily at the upper rather than at the lower end of the market

More than 85% of people carrying out renovation work financed that work taking out a loan.

Questioned about information sources for renovation most people claimed that their main source of information was their own ideas, but it seems likely that these have been influenced and informed by most other information sources. Designers (architects, interior architects, landscape architects and architectural designers) were only cited as sources of information in 3.5% of cases and interior decorators in about 3% of cases.

Over 80% of people claimed experience in renovation in the FR/Krehl survey. But the level of DIY competence is not defined.

The potential for sustainability related retrofitting is huge as so little work has been carried out in this area to date. Large sums of money (\$5,300M) is spent on renovation each year and it appears that a high percentage of this money is debt free.

The main barrier is that most people do not regard sustainability as a motivating factor in terms of undertaking renovation or retrofitting work. None of the surveys yet carried out appear to ask why this is so or what would change owners priorities in this respect.

Much of the energy related cost involved will be recouped over time and will help to create a healthier and more comfortable environment. Expenditure related to improving well-being of occupants will be relatively easy to 'sell'. Resource conservation particularly related to water and materials will constitute more of a challenge as personal benefits are less certain. How to bring about a change in attitudes of the 'buying public' and the statutory authorities is the major challenge facing Beacon. A

combination of stick and carrots is called for and many of the successful interventions in this field are discussed in the worldwide interventions section of this report.

CONCLUSIONS AND GAPS

It is self evident that the Beacon target for this sector is extremely ambitious. If Beacon is to achieve the objective, the need for a comprehensive co-ordinated plan of action which tackles all areas and groups is vital and urgent. All segments of the home ownership and renter market must become involved. All areas of government, industry bodies, industry related NGOs, and building industry professionals and operatives must be actively and positively engaged in the process.

Of all the interventions reviewed in relation to existing buildings, the Canadian **Energide** Programme appears to be the most successful across all house owner sectors and seemed to have the most to offer our own programme. This programme was started in 1998 and has established 'stretch' targets for both existing and new homes. Their stretch target for existing homes is to make a 20% improvement in energy performance for 20% of their housing stock by 2010. Their 'stretch' target for new houses is for 80% of their new houses to match the energy performance of the **R2000** house by the same date.

If Beacon is to succeed across the sectors of energy, materials/resources, water and health and make meaningful interventions to bring 90%+ homes up to a defined sustainability standard by 2012, then it needs to be an order of magnitude more effective than **Energide**. This is a very tall order.

It is necessary to establish short term, medium term and long term objectives and the interventions utilised may well be different in each timescale, for energy, resources, water and health. The objectives and interventions may be different in each of the house ownership segments and even between sub-groups within each segment.

It is clear that some interventions have been much more successful than others in specific sectors.

It would be well worth exploring regulatory ways and means of mandating improvement in standards of existing homes, as this would have the biggest effect of all conceivable measures in improving sustainability standards in New Zealand. Regulatory Interventions are such an even handed and generally cost effective means of inducing change in large segments of the community that it would be worth exploring options and opportunities in regard to this instrument.

Beacon is faced with a unique opportunity to tie sustainability standards in with the major revision of the NZBC currently underway. Undoubtedly regulatory interventions effect the greatest change in the least time in the area they target. Therefore, Beacon should put itself in a position to maximise our input and influence on what is contained in the revised regulations. The new NZBC will have a maximum influence on new buildings and it is highly unlikely that retroactive clauses will be incorporated into the Code that require existing buildings to be brought up to code levels of performance. However, it may be possible to include clauses which require segments of existing buildings to be brought up to Code performance during substantial remodelling projects and additions and alterations, and to require all appliances to meet higher sustainability standards than those that currently apply. These measures would have the effect of upgrading the existing housing stock over time but are unlikely to have a really significant effect on large numbers of houses by 2012 as the revised Code is scheduled to come into force in 2008.

Such regulatory instruments often require a prolonged period of development and implementation and we cannot rely solely on such a measure. Therefore, as a parallel exercise short and medium term interventions must be put in place.

There are many successful interventions in the energy sector and it may be that we can not only adapt such programmes for use in New Zealand but extend their coverage to all four areas of intervention.

Within the energy field the most successful programmes appear to be the Canadian **Energide** system, the American/Canadian **RECO**, the Australian **BASIX** scheme the US **Energy Star** and our own **5 Star** and **MEPS** programmes. These should all be explored in greater depth to gain an understanding of their applicability to the Beacon situation. The US **LEED Residential** programme and the

Australian **BREEAM** programme warrant closer examination to discover whether we can use them to inform the building regulation changes and possibly introduce an effective assessment programme.

Landfill taxes_(landfill charges) proved to be the decisive intervention in The Netherlands and Germany to enable a zero C&DW target to be realised. The landfill ban mandated in both these countries simply confirmed the pre-existing condition and ensured there would be no backsliding. This legislation also had the effect of stimulating all manner of innovations, incentives and market developments connected with recycling, materials reuse, and new waste based materials and industries. Such programmes need to be developed in New Zealand alongside the increasing buy-in of the **Zero Waste** philosophy by territorial authorities all over NZ.

Lack of information and knowledge seems to be the principal barrier to employment of sustainable materials, design for disassembly and design to reduce waste. This barrier must be removed.

Improving water efficiency and conservation requires the mandatory introduction of water metering to be successful. The Australian **BASIX** system seems to be a good model here. However, as a short term measure, new water saving standards could be set for all water fixtures and appliances offered for sale in New Zealand. We might be able to adapt **Energy Star** measures for use in NZ or adopt the Australian **AAA** system.

Health is at once urgent and further behind in terms of the understanding and certainty we can bring to bear in devising appropriate and effective solutions. However, we can start by drastically limiting emissions allowed from formaldehyde and VOCs emitting materials as has happened in Germany and Denmark.

Very little information was found on mandatory retrofit programmes. This is seen as the most equitable, and cost effective intervention method and research is needed to establish how regulations can be best applied to retrofit situations.

Research is needed into ways to overcome government's apparent reluctance to provide energy saving incentives to owner occupiers and private landlords.

There is an enormous amount of information on energy equipment and energy saving. In fact there is probably too much for most people to cope with. There is a need to find user friendly ways of helping people to navigate their way through this morass of information.

Ways need to be found to involve, utility companies, mortgage lenders and insurance companies, and ethical funding agencies in the process of upgrading houses.

Government needs to be seen to lead the way in upgrading its own properties and in establishing greener procurement policies.

Cost effective, user friendly retrofit packages that take the hassle, angst and uncertainty out of the retrofit arena need to be devised.

It needs to be easier for people to access and utilise sustainable and healthy materials with assurance and performance certainty.

Programmes need to be devised to support people who want to start sunrise industries in the area of resource recovery, making materials from waste, improving recycled content in existing materials and reusing materials. Currently, there is very little support and plenty of discouragement, even barriers in place in this sector.

More work is needed on achieving proper ventilation all through the year in NZ houses. Currently it is either too much or too little in most homes. It is as important in achieving healthy homes as insulation and controlling chemical emissions.

The main gap in the housing database survey is the sparse **information available on the privately owned rental segment of the market**. This has grown to 26% of all households and the trend continues upward. We need to know more information on the location, age, condition and materials of the houses in this segment and to have more information on landlord and renter profiles. This sector is

regarded internationally as a difficult area in which to create performance enhancements and so we need all the information possible. This is regarded as a high priority item.

The focus of this report is on the demand side of the retrofit market as set out in the proposal. The assumption made was that the supply side of the market would be covered by another of the research programmes. Should this not be the case, **there is a need to carry out a data collection exercise related to the supply side of the retrofit market.**

BRANZ is currently considering what other features of housing should be recorded in the latest HCS to aid the Beacon retro-fit programme. It would be very worthwhile to prepare questions which would go some way to filling in the information gaps identified in this report. The HCS covers only owner-occupied houses and it is likely that rental units will have lower standards of insulation retrofit. A separate survey for private sector rental housing needs to be considered.

There are big variations in the estimated annual number of house demolitions (1000-7000). This discrepancy amounts to some 40,000 units over the duration of the Beacon programme. Little is known of the profile of the demolished houses, their age, type, size, location, ownership, etc. A survey to find out these factors would be valuable in assessing the impact of demolitions on the housing stock.

While information has been provided on the average length of stay in a house it would be useful to have information on the average length of occupancy for owner-occupiers. This would allow an assessment to be made on the effectiveness of measures to apply mandatory labelling or performance standards at point of sale (see RECOs above).

RECOMMENDATIONS

1. Re-examine the Beacon targets set for this sector.

It is vital to the success that these targets are set with great care and judgment in terms of what is possible and achievable over the next seven year period otherwise a great deal of work and money could be wasted.

A high level of specificity is required, both in terms of setting the sustainability standard and establishing the percentage of existing houses to receive retrofitting by 2012.

It may be that the sustainability standard set and the percentage of houses affected is different for new and existing houses. It should also be considered whether houses of different constructions and ages should have different criteria applied to them and if so what the targets are for each of the four sustainability sectors (energy, water, resources and health).

2. Develop a Plan of Action

Once the performance levels and retrofit targets have been established then it is necessary to establish short term, medium term and long term objectives for energy, resources, water and health categories. The interventions utilised to achieve these outcomes may well be different in each timescale and sustainability category. They are more than likely to be different in each of the house ownership segments and even between sub-groups within each segment.

3. Define and develop intervention packages suitable for all the different housing segments.

These would have to be identified and assessed in terms of effectiveness, likely success, the numbers of households affected and the timescale required to put them in place, then they could be assigned a priority rating.

4. Identify potential partnerships with aligned retrofit programs.

These may be local, national or even international partners. It would be highly desirable to establish partnerships which could leverage expertise, experience or influence.

5. Develop a series of 'standard' retrofit packages

The development of a series of cost effective, user friendly, hassle free, retrofit packages which would bring houses up to the standard(s) set.

6. Develop retrofit demonstration projects

7. Research and make available reliable information on investment payback for sustainability related retrofitting.

Lack of such information is seen as a barrier to investment by some segments of the community.

8. Obtain more data on the types, age and condition of privately owned rented accommodation.

It is likely that special measures will have to be taken to achieve upgrading in this area. Despite the fact that about 26% of households live in privately owned rented accommodation, very little data is available on the types or ages of dwellings or the people who rent the accommodation. This is regarded as a gap in knowledge that should be filled.

9. Obtain information on the supply side of retrofit markets

This report only covers demand side factors as defined in the research proposal. If supplied side information has not been covered by other Beacon research programmes such as IND1 this constitutes a substantial information gap which should be filled.

10. DIY survey

No information was found on the competence, willingness and level of support necessary for owners to carry out retrofitting work themselves. Many of the basic retrofit measures outlined in this report are relatively straight forward and probably could be tackled by house owners. If work was carried out by owners this could be a major boost to the Beacon programme. A survey is recommended to establish the facts outlined.

11. Expand HCS survey

A series of questions needs to be devised to add to the BRANZ HCS. These could add valuable data to further support the Beacon retrofit programme.

12. Demolitions

Little is known of the profile of the demolished houses, their age, type, size, location, ownership, etc. A survey is recommended to find out the profile and numbers of demolished houses in NZ.

7.3 Appendix Three: Easy Being Green. Presentation slides from “Green Building and Design” 2005.

[to be supplied in hardcopy]