



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

Retrofitting Homes to Achieve a High Standard of Sustainability

Beacon Stakeholder Symposium

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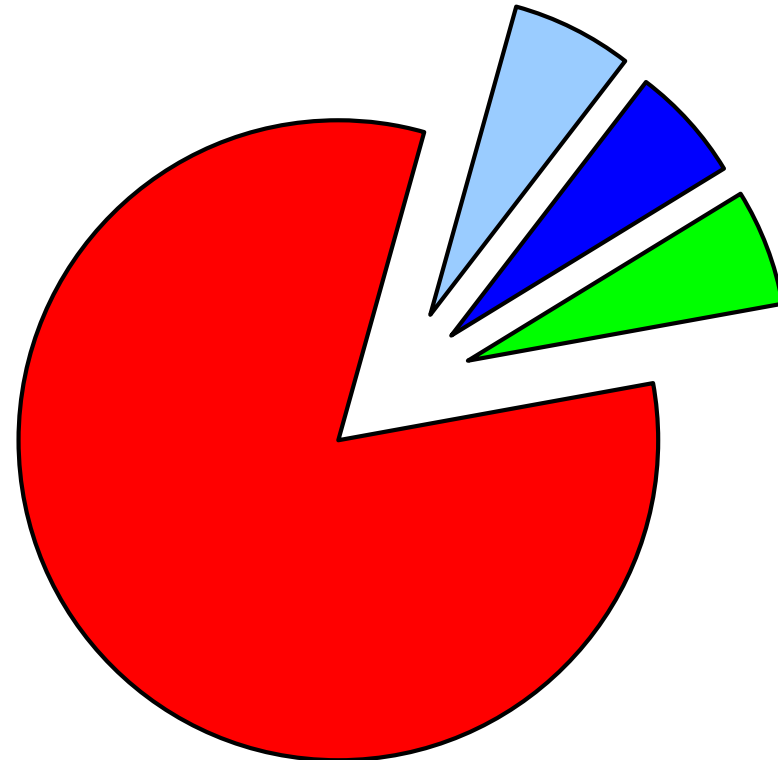
30 May 2007

Beacon Pathway Limited

Scale of the Challenge

1.7m NZ homes in 2012

- untouched
- minor renovations
- major renovations
- new build



Characteristics of the “red zone”



- Housing stock is **sub-standard**: cold (<16°C), damp (>70% humidity) and mouldy with very poor thermal performance
- Two thirds of energy used to **heat space and water**
- 21% of homes use **36% of energy** (not the warmest homes)
- One third of homes are **rented**
- Nearly one third of homes are in **Auckland** region – 7x more **rain** falls on it than is consumed...hardly any captured...
- Poor **Indoor Environment Quality** implicated in New Zealand having one of highest rates of **asthma** (cold/damp) in world and a high rate of gastroenteritis (mould).

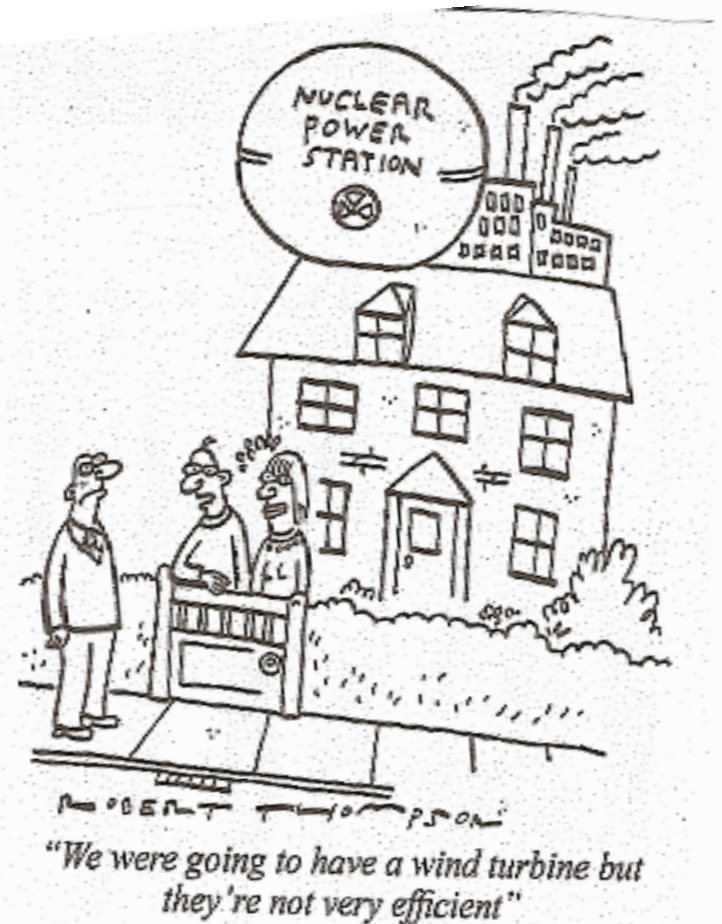
Who has a stake in the “red zone”?



- **Government**
 - Central (e.g. Kyoto, health, productivity, environment, energy infrastructure)
 - Local (e.g. water infrastructure, water quality, waste, health)
- **Industry**
 - Manufacturers/retailers, trades/professionals, utilities, insurers, financiers (e.g. anticipate trends and develop market response)
- **Consumers**
 - Homeowners, landlords, tenants (e.g. health, comfort, costs)

What is a sustainable retrofit?

- **Energy** (reducing demand from national grid, improve thermal performance, increasing use of renewable energy, better design)
- **Water** (reduced demand from reticulated water, integrated water management)
- **Indoor Environment Quality (IEQ)** (mean min 16°C in bedrooms and mean min 18°C in living spaces, relative humidity 20-70%, mould)
- **Materials / Construction Waste** (minimise environmental impact, reduced waste)
- **Cost Effective** (benefits > costs)



What is Beacon doing in the “red zone”?



1. Establish Value Proposition: Why change?

- **National Value Case** (underway)

2. Establish and Trial Best Practice: What should/could you do to your home(s)?

- Assessed performance of **current retrofit** programmes
- **NOW Home® Renovation Project**: retrofitting (three levels of intervention) and monitoring 10 homes in Papakowhai, Porirua (underway)

Key learning from ENERGY programmes



- **Current retrofit practice is inadequate**
 - Often basic ‘Standard’ insulation is applied, regardless of climate, and results in 0.5-1°C increase in indoor temperature
 - BUT where insulation + heating appliance supplied, get better energy and IEQ gains (e.g. ECan Clean Heat Programme)
- **Cost benefit too narrow and inadequate**
 - ‘Efficiency’ programmes targeted on low income homes: these tend to be under-heated and ‘take back’ savings in comfort.
 - No recognition of multiple benefits: efficiency, health, comfort

Key learning from WATER programmes

- New Zealand programmes **small-scale** and poorly documented (research opportunity)
- Subsidies for water-efficient appliances are effective and can transform the market (e.g. front loading washers in Australia)
- **Rainwater tanks** can deliver substantial water savings, but must be plumbed for **indoor AND outdoor** use
- Rainwater tanks **don't need to be big** to deliver substantial gains
- Council savings of 25% with **metering** (Tauranga and Nelson)
- Urban water is **not high profile** nationally

Beacon NOW Home[®] Renovation Project – Objectives



- To identify the best (most cost effective and easy to implement) packages and combinations of retrofit options to significantly improve the standard of sustainability of the homes.
- To develop a cost benefit analysis at a house level for a range of retrofit technologies in the areas of energy, water, IEQ and waste.



NOW Home[®] Renovation Project



- 10 “ordinary” homes in Papakowhai, Porirua
- Most homes built in the 60s and 70s
- Homes are fairly typical of the era – which is known to often be more difficult to retrofit for energy efficiency



NOW Home[®] Renovation Project

– Types of Homes



- Single **level** and two story houses
- A range of **building materials and typologies** (eg roof types, cladding, floor types)
- A range of **household types** in the middle income bracket
- Pre-retrofit data indicates living spaces meet **minimum temp** standards but bedrooms don't.



NOW Home[®] Renovation Project - Packages



Three different levels of intervention applied:

- i. **Basic retrofit** representing what can be expected to be delivered from some of the better existing energy and water retrofit programmes
- ii. **Beacon “standard” retrofits** – expected to bring houses a reasonable way towards a “high standard of sustainability”
- iii. **Beacon “high” retrofits** – expected to enable homes to achieve or exceed “high standard of sustainability” benchmarks

Key Research Partnerships

Research
Providers



Hosts



Suppliers
(products /
labour)



Key learning from NOW Home[®] Renovation Project

Interventions **not needing consent should be prioritised** and form the core of a 'standard' retrofit package:

- Draught stopping, CFLs, polythene on ground
- **Insulation** to 'best' standard in code in ceiling and under floor
- **Mechanical venting** in kitchen, bathroom, drier vented
- **Low flow** shower head, dual flush toilet and flow restrictors on bathroom and kitchen taps



More key learnings from Porirua...



A **moderate cost package** widely applicable might be the 'standard' package PLUS:

- **Insulation of walls**, if renovation planned
- **Space Heating** e.g. pellet burner, low emission wood burner, or heat pump with heat dispersal system
- **Hot water** e.g. Solar hot water or wetback hot water system



What is in Beacon's pipeline for the "red zone"?



- Establish **Value Propositions**: why would you, your council, your builder/plumber, bank, insurer, local hardware store, utility supplier, central government etc. value a sustainability retrofit of your home?
- Generate **Knowledge Base**: what retrofit options are best for your home (given it's characteristics and location).
- Provide a **Means to Measure** (rating tool): how can you reliably prove your home's performance against a "high standard of sustainability"?
- **Pilot 'interventions'**: confirm knowledge base AND "kick-start" the sustainability upgrade of New Zealand's housing stock by bringing together key players to achieve a **large scale retrofit of 1,000 homes** and pilot a rating scheme with councils.