

HR2374/2

Indicator Framework for Tracking the Sustainability of New Zealand's Residential Housing Stock

Second Draft (v2-4)

Beacon Pathway Limited

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About This Report

Title

Indicator Framework for Tracking the Sustainability of New Zealand's Residential Housing Stock: Second Draft

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Abstract

New Zealand's residential housing stock performs poorly in terms of key aspects of sustainability, including resource use, efficiency, environmental impact, health and comfort. There is no current means to track the sustainability of the national housing stock, nor clear responsibility for doing so. This document presents an Indicator Framework which begins to rectify this. The framework focuses on a limited number of sustainability domains which link to Beacon's High Standard of Sustainability™: energy, water, indoor environment quality, construction materials/waste, flexibility into the future and affordability of sustainability features. To this are added consumer demand, industry capacity, the policy and regulatory environment and developing a recognised definition of housing sustainability. Collective development and ownership of this framework is considered key to its effectiveness and this second draft is informed by stakeholder comments on an initial draft in June 2008.

Reference

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1 Introduction

Beacon Pathway Limited (Beacon) is a research consortium that aims to enhance the sustainability of New Zealand households and neighbourhoods.¹ A Beacon goal is to help bring the vast majority (90%) of New Zealand homes to a high standard of sustainability by 2012. Understanding how the housing stock is changing nationally in terms of key sustainability aspects such as energy and water use is needed to measure progress towards this goal.

Beacon has established that good information and indicators to track changes in the sustainability of New Zealand's housing stock nationally is lacking (Kettle 2008). To start addressing this information gap Beacon aims to develop, with other key agencies, an Indicator Framework that:

Presents a measurable set of indicators to track residential housing sustainability at the national level.

This document presents this Indicators Framework. It is a second draft, incorporating feedback from a first draft sent to a wide range of stakeholders for comment in June 2008 - see Appendix Two for a list of these stakeholders and a summary of feedback received.

2 Foundation of this Indicator Framework

This Indicator Framework (IF) is founded on ten outcomes identified through Beacon research. These outcomes were drawn from the definition of sustainability for New Zealand homes outlined within Beacon's "High Standard of Sustainability" (HSS™) and the key pathways that Beacon considers will influence housing sustainability. The outcomes involve the following domains:

- Energy
- Water
- Indoor environment quality
- Construction materials/waste
- Resilience and flexibility into the future
- Affordability of sustainability features
- Consumer demand
- Industry capacity
- Policy and regulatory environment
- Sustainability is defined for New Zealand homes

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¹ For information on Beacon Pathway Limited see www.beaconpathway.co.nz/.

These outcomes are based on current knowledge, but can be revised over time as the context changes. Taken together these outcomes create a picture of ‘sustainability’ as it relates to the national residential housing stock for the purposes of this Indicator Framework.

As noted this Indicator Framework (IF) is pitched at the overall sustainability of the **national residential housing stock**, rather than the sustainability of individual houses. There are numerous indicators and a growing number of schemes that assess the sustainability of an individual house, for example the Green Homes Scheme and the Home Energy Rating Scheme. While some of the data collected at the individual house level can inform a national level set of indicators, a major gap remains in terms of robust indicators of the **overall** sustainability of the national housing stock, including regional variations.

This IF applies to both new and existing private dwellings. Statistics New Zealand defines a ‘permanent private dwelling’ as one that accommodates an individual or group of people but is not open to the public. Permanent private dwellings include houses and flats, residences attached to a business or institution, baches, cribs and huts.

3 Rationale, audience and use

“Research conducted by Beacon and others shows that New Zealand’s housing stock is generally poor quality with poor environmental performance. Our houses are unhealthy for many, and are large consumers of energy, water and materials, creating an increasing burden on the economy”.²

The need for this Indicator Framework is demonstrated through five basic assertions:

- The quality and performance of the New Zealand housing stock is generally poor³.
- The housing stock tends to be built and maintained in environmentally damaging ways.
- New Zealand is facing major changes in the short to medium term, including demographic change, climate change, peak oil and other global resource shortages and economic instability. Our homes need to be resilient in the face of these forces.
- More sustainable housing is pivotal to the government’s vision of a sustainable nation.
- There is currently no coherent means or allocated responsibility in New Zealand for measuring the sustainability of the national residential housing stock⁴.

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² Beacon Pathway Limited (2007), *National Value Case for Sustainable Housing Innovations*, pg 9.

³ See for example Beacon Pathway Limited (2007), *National Value Case for Sustainable Housing Innovations*.

⁴ See Kettle, David, July 2008. Indicator Framework for Tracking the Sustainability of New Zealand’s Residential Housing Stock. Report HR2374/2 for Beacon Pathway Limited. This Working Paper was undertaken specifically to inform this Indicator Framework. It reviewed national and international housing indicator frameworks and identified a major overall gap in sustainability indicators at the national housing stock level.

While it is acknowledged that data gaps limit what can be measured, this IF seeks to tell a positive story of tracking towards a more sustainable housing stock in New Zealand.

The main audience for this IF is those who have a responsibility for and interest in increasing the sustainability of the national housing stock. It is also aimed at those with an interest in improving the information available in this area. This includes key government departments and agencies, industry, and Beacon shareholders and stakeholders. The hope is that this Indicator Framework will be picked up and ‘owned’ by some of these stakeholders, who will collectively adapt it over time as the context changes.

The intended uses of this Indicators Framework are as follows.

- To provide a foundation from which to track changes in key aspects of the sustainability of the residential housing stock into the future.
- To support strategic decision making and action leading to more sustainable homes (i.e. influence policy, planning, action and behaviour at agency level).
- To identify key levers of change and raise awareness of these.
- To be useful and relevant to the audiences above, to support uptake and use of this framework into the future.
- To catalyse better data and information gathering on the sustainability of New Zealand homes.

This Indicator Framework has been initiated by Beacon but is intended to become a constructive national tool that supports intensified, collaborative effort to improve the sustainability of the housing stock.

See Appendix One for a description of the method used to develop this IF and its limitations.

4 Definitions

In terms of definitions:

- **Outcomes** refer to the ultimate goal sought, as opposed to the steps that might lead us there.⁵
- **Indicators** are the flags or summary signals that can be used to identify change and describe a situation at a point in time. An indicator can be used to show the difference between a point and a target or to track the direction of change over time. They can involve quantitative statistical data or qualitative subjective information.
- **Measures** are the actual pieces of information or data used to describe an indicator, and for each indicator there are one or more measures that describe a specific aspect of that indicator.

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⁵ OECD Glossary of Statistical Terms <http://stats.oecd.org/glossary/detail.asp?ID=4796>.

5 The indicator set

For each of the ten outcomes underpinning the Indicator Framework (IF), a description of the outcome is provided, plus an explanation of why it is important, proposed core indicator/s and related measure/s, an explanation of the indicator/s, method used to collect it and data source. This Indicator Framework includes 14 core indicators and 12 ‘place holder’ indicators.

Given the significant data gaps encountered, as well as the core indicators further ‘place holder’ indicators for most outcomes are identified, to represent indicators that would be included were the data available. Thus each outcome has core indicators which together make up this IF (as summarised below), plus a set of additionally desirable ‘place holder’ indicators. These place holder indicators can provide a basis for advocating for new data collection to improve knowledge and the strength of this IF over time.

| Domain | Core indicator/s |
|---|---|
| Energy | <ul style="list-style-type: none"> ■ Pattern of residential reticulated electricity usage versus other sources of energy |
| Water | <ul style="list-style-type: none"> ■ Usage of mains water supply by New Zealand homes |
| Indoor environment quality | <ul style="list-style-type: none"> ■ Warmth and comfort ■ Indoor pollution ■ Household crowding |
| Materials/waste | <ul style="list-style-type: none"> ■ Construction industry energy demand profile |
| Flexibility into the future | <ul style="list-style-type: none"> ■ Size and type of national housing stock ■ Housing tenure |
| Affordability of sustainability features | <ul style="list-style-type: none"> ■ Comparative cost of key sustainability features |
| Consumer demand | <ul style="list-style-type: none"> ■ Sales of key sustainability products and services |
| Industry capacity | <ul style="list-style-type: none"> ■ Change/trend in products and services that support sustainable housing |
| Policy and regulatory environment | <ul style="list-style-type: none"> ■ Supportive policy environment ■ Supportive regulatory environment |
| Sustainability is defined for New Zealand homes | <ul style="list-style-type: none"> ■ Recognition of the HSS™ as a means to define household sustainability by consumers, industry and the government |

5.1 Energy

| | |
|--------------------------------------|--|
| Outcome | Ongoing reductions in reticulated electricity usage in New Zealand homes. |
| Why is the outcome important? | New Zealanders' energy use at home accounts for around 12 per cent of the country's total energy use, and \$1.1 billion is spent by households annually just to keep warm, heat water and run appliances (www.eeca.govt.nz) ⁶ . To move in the direction of carbon neutrality and to avert resource and supply crises, homes need to become more energy efficient, reduce their dependency on reticulated energy supply and increase their use of renewable energy sources to heat space and water. This outcome excludes household vehicle use, focusing instead on energy used within the home. |
| Core indicator | Pattern of residential reticulated electricity usage versus other sources of energy |
| Measured by | Total consumer energy use in the residential sector by fuel type and Petajoule |
| Explanation | This indicator tracks trends in household reticulated electricity usage nationally, compared to other energy sources, including solar, wood and gas. As homes become more energy efficient (through insulation, efficient appliances and lighting for example) and utilise more renewable sources of energy (such as sun, wood and wind) to heat space and water the mix of energy sources used should trend away from reticulated electricity. |
| Method and data source | Tracked quarterly and annually by the Ministry of Economic Development, since 1974 ⁷ . |
| Place holder indicator/s | Home energy ratings for new and existing homes |
| Measured by | Average Home Energy Rating Scheme (HERS) rating for new and existing homes |
| Comment | This data is being collected by EECA and would track home energy rating trends for new and existing homes. |

⁶ See <http://www.eeca.govt.nz/residential/index.html>.

⁷ See http://www.med.govt.nz/templates/StandardSummary_37.aspx for the data source and <http://www.med.govt.nz/upload/37899/A-table8.xls> for a summary of results from 1974 to 2006.

5.2 Water

| | |
|--------------------------------------|---|
| Outcome | Ongoing reductions in usage of reticulated water in New Zealand homes. |
| Why is the outcome important? | While New Zealand is relatively blessed with fresh water, the limits of fresh water availability and negative environmental impacts of water abstraction and wastewater disposal are clear (Easton 2006 p18). Of the 637 million cubic meters of water abstracted for consumption annually, New Zealand's rivers and lakes provide about 60%, with the remainder coming from groundwater (ibid). As well as reducing water use per capita and per household from reticulated sources, this outcome seeks an increase in household sourcing of water from alternative sources such as rainwater tanks. |
| Core indicator | Usage of mains water supply by New Zealand homes |
| Measured by | Domestic metered water supply consumption in litres per person and per household per day by region |
| Explanation | This indicator seeks a reduction in reticulated water use, ie increased water conservation per person and per household. High levels of water use places stress on rivers, lakes and ground water aquifers and compromises the sustainability of water supply from these sources. It also requires expensive investment in infrastructure to gather, deliver and dispose of water. |
| Method and data source | Data is available from Territorial Authorities for the 12 biggest cities ⁸ and can be compared with available rural Territorial Authority data. This data is the best available nationally, yet there are some differences as to how the data for the 12 biggest cities is collected. This information has been collected biannually since 2003. |
| Place holder indicators | <ol style="list-style-type: none"> 1. Quality of household water usage data available 2. Household use of rainwater tanks |
| Measured by | <ol style="list-style-type: none"> 1a. Proportion of Territorial Local Authorities and water providers that meter residential water use 1b. Proportion of Territorial Local Authorities and water providers that charge for water by the volume used <ol style="list-style-type: none"> 2. Household uptake of rainwater tanks (new and existing homes) |
| Explanation | A key issue for this outcome is improving the quality of data available to |



⁸ See http://www.bigcities.govt.nz/pdfs/2007/Quality_of_Life_2007_Natural.pdf for the 12 big cities data 2001 to 2006.

measure water use trends. Territorial authorities are generally responsible for the management of the municipal and community water supplies in their district⁹. Not all homes are connected to a metered water supply and water use is calculated differently by different local authorities. While an estimated 87.5 percent of New Zealand's population was connected to a registered drinking-water supply in 2002¹⁰, the smaller the population served by a water supply, the less likely it is that data is available, because of limited resources for metering and monitoring. Thus one of the place holder indicators suggests tracking the quality of water usage data by monitoring the number of homes with metered water use. Through a recent international review, Beacon research has identified water metering as one component of good practice water demand management (Lawton et al 2008).

An additional indicator (1b) tracks whether water is charged for by volume used, which provides an incentive to use less.

Place holder indicator 2 involves monitoring the uptake and use of rainwater tanks by households, which supports self-sufficiency in water supply and provides an on-site source of water in the event of disasters or reticulated water supply shortfalls.



⁹ Statistics New Zealand (2004), Physical Stock Accounts for Water, see www.stats.govt.nz.

¹⁰ See Annual Review of the Microbiological and Chemical Quality of Drinking-Water in New Zealand 2002, Ministry of Health (December 2003).

5.3 Indoor Environment Quality

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|--------------------------------------|---|
| Outcome | Homes are healthier and more comfortable through managing temperature and ventilation while controlling sources of pollution and moisture. |
| Why is the outcome important? | Despite our usually temperate climate, New Zealand houses are generally cold, damp and hard to heat in winter (Beacon October 2007 pg 10). Indoor Environment Quality (IEQ) encompasses aspects of the indoor environment which impact on the health and wellbeing of occupants (Beacon Homes Strategy 2007 p5). The health benefits of warm, dry, well ventilated homes are significant. Wellington School of Medicine research has found for example that families in insulated homes had fewer medical and hospital visits for respiratory conditions, and fewer days off work and school (2007 media release) ¹¹ . A Healthy Housing Index is being developed by BRANZ and the Wellington School of Medicine, and the 2005 Housing Strategy recommends surveying house conditions, but progress is slow nationally in capturing good data on the links between housing and health. |
| Core indicators | <ol style="list-style-type: none"> 1. Warmth and comfort 2. Indoor pollution 3. Household crowding¹² |
| Measured by | <ol style="list-style-type: none"> 1. Percentage of all homes fitted with insulation to the current Building Code minimum standards 2. Percentage of homes using unflued gas heaters 3. Percentage of people in private dwellings living in crowded households |
| Explanation | <p>A major national energy and health issue is the lack of insulation in New Zealand homes built before 1978, before insulation became mandatory. About 900,000 homes across New Zealand fall into this category, and around one-third of these have inadequate insulation. They are damp, cold, unhealthy and expensive to heat. Overall heating accounts for 20–30% of the average household's energy bill (www.eeca.govt.nz).</p> <p>Unflued gas heaters are banned in many countries, while many homes in New Zealand still rely on them (around 300,000). They are unhealthy as a source of indoor pollution (e.g. carbon monoxide, nitrogen dioxide, formaldehyde, benzene and fine particulates) and are inefficient (they produce wet heat making it harder to heat homes).</p> |

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¹¹ See http://www.otago.ac.nz/news/news/2007/05-03-07_press_release.html.

¹² Statistics New Zealand (2002), *Monitoring Progress towards a Sustainable New Zealand*, www.stats.govt.nz, p66.

Household crowding information is Census derived and uses a proxy by dividing the number of people in the household by the number of bedrooms. This provides an indication rather than robust information, given the influence of culture in how people live together. Household crowding is a complex indicator, and has been related to increased physical and mental illness, including infectious disease such as meningococcal disease, respiratory problems, poor social relations in the home, poor educational attainment and depression (Milligan et al 2006:118-119)¹³. The Census has found correlations between household crowding and geographic location, age, tenure, ethnicity and labour force status (ibid: 121).

Method and data source The BRANZ Ltd House Condition Survey, which is representative of the national housing stock, surveying 600 homes every five years, collects data on the type and thickness of insulation and on the presence and use of unflued gas heaters, with data collected since 1994.

Statistics New Zealand collects information on household crowding via the Census every five years.

Place holder indicators

1. Average indoor air temperature
2. Source control of moisture in homes – kitchen and bathroom ventilation
3. Presence of mould

Measured by

1. Percentage of homes with average indoor air temperature below WHO standards (18⁰C) in winter
2. Percentage of households with active ventilation of wet areas in homes – kitchen and bathroom
3. Percentage of homes reporting mould in any rooms

Explanation Indoor temperature and moisture are areas requiring further research in New Zealand. A reliable data source to measure average indoor temperature in winter is needed (note that BRANZ’s 2005 Household Energy End-Use or HEEP Survey has some baseline data on this but is not being repeated). Homes which are adequately heated and vented will not have mould on walls, ceilings or soft furnishings.

The BRANZ Ltd House Condition Survey (5 yearly) collects data on active ventilation of wet areas and degree of mould problems in every room (data collected since 1994).

¹³ Family Wellbeing Indicators from the 1981 to 2001 New Zealand Census, see www.stats.govt.nz.

5.4 Materials/waste

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|--------------------------------------|---|
| Outcome | The design, construction, renovation and demolition of homes minimises the environmental impact of materials used. |
| Why is the outcome important? | This outcome focuses on resource efficiency and on reducing the environmental impacts of construction materials used in relation to housing. The environmental impacts referred to here include those on land, air and water quality and waste to landfill. More sustainable materials are defined as supporting the use of renewable resources and the careful management of non-renewables (Smith in Easton 2006 p44). |
| Core indicator | Construction industry energy demand profile |
| Measured by | Change/trend in the energy demand profile of the construction sector |
| Explanation | This indicator shows the amount of energy used in Petajoules by the building construction industry, by type of energy including coal, diesel, petrol and electricity. The energy demand profile of the construction sector needs to be interpreted in light of building and housing sector trends, such as those outlined in the Building and Housing Trends Report regularly developed by the Department of Building and Housing ¹⁴ . |
| Method and data source | This data has been collected annually by Statistics New Zealand since 1997 ¹⁵ . |
| Place holder indicator/s | Residential construction waste sent to landfill New Zealand Waste Strategy targets relating to the building construction industry are met |
| Measured by | Amount of household construction waste per new build (in tonnes) Ministry for the Environment monitoring of relevant waste strategy targets |
| Comment | No reliable national data for these indicators is available to date. |

¹⁴ See <http://www.dbh.govt.nz/trends-reports> for the October to December 2007 report

¹⁵ See <http://www.stats.govt.nz/NR/rdonlyres/53912058-B25E-47D9-9489-03154CB29FCE/0/EnergyandtheEconomy.pdf> for 1997 to 2005 Energy and the Economy Report.

5.5 Flexibility into the future

“An accessible housing stock that meets the changing needs of disabled people and performs well for them, is a future proofed stock that will perform well for everyone” (Centre for Housing Research 2007 p8).

| | |
|--------------------------------------|--|
| Outcome | New Zealand’s homes increasingly support changes in function and use over time, and are adaptable and resilient in the face of local and global challenges. |
| Why is the outcome important? | As New Zealand’s population increases and changes the national housing stock needs to cater for both growth and diverse needs. This outcome tracks the ability of the housing stock to respond, anticipate and be flexible in the face of hard to predict but inevitable changes, including those brought about through climate change, changing demographics and economic, cultural and social trends. For example changing household composition, disability trends associated with an ageing population ¹⁶ and ease of changing a house over time are all fundamental here. While crucial to sustainable housing this outcome has few robust indicators available. |
| Core indicator | 1. Size and type of national housing stock 2. Housing tenure |
| Measured by | 1. Number of houses and flats by floor area, style and age of stock 2. Proportion of housing owned and rented |
| Explanation | <p>Indicator 1 allows for comparison between the changing housing stock and the changing population. It can identify differences between the type and extent of housing available and actual and projected changes in average household size. One example is housing availability for an ageing population where there may be more one and two person households, thus potentially a need for a greater number of smaller houses and units.</p> <p>Indicator 2 captures tenure information as a variety of studies indicate rental stock is more likely to perform poorly, thus be less sustainable (pers comm. Kay Saville-Smith). The nature of the rental market in New Zealand can be characterised as many small (i.e. few houses) landlords renting as an investment, resulting in tenants with low security of tenure. This has implications for the condition of the national housing stock.</p> |

¹⁶ Recent research Housing and Disability: Future Proofing New Zealand’s Housing Stock for an Inclusive Society (May 2007), Centre for Housing Research Aotearoa New Zealand, reveals that New Zealand’s current housing stock is not meeting disabled people’s housing needs. There is considerable unmet need for accessible, safe, warm, comfortable housing that works well for young and old people with impaired mobility.

| | |
|-------------------------------|---|
| Method and data source | Data for indicator 1 is collected by Quotable Value New Zealand quarterly since 1999, and is available from national to mesh block level (though it requires a customised order to receive). Household tenure data is collected via the five yearly Census. |
| Place holder indicator | Houses built in accordance with universal and accessible design principles |
| Measured by | New houses built in accordance with Lifetime Design Criteria (via LifeMark™ for new homes) |
| Comment | Lifetime Design Criteria standards are currently being developed for new housing. An aim is to ensure that new housing is built in a way that responds to changing needs of the occupants over their lifetime. NZCCS and the Ministry of Social Development are developing a new certification process for universal design housing (LifeMark™). While LifeMark™ is currently applicable to new homes, attention is being directed to existing homes. |

5.6 Affordability of sustainability features

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| Outcome | The costs (capital investment and running costs) associated with transforming New Zealand’s new and existing homes from their current (poor) state to one of a high standard of sustainability are increasingly reduced and affordable. |
| Why is the outcome important? | This outcome does not refer to housing affordability per se but to ‘affordable sustainability’ for householders when building, retrofitting or renovating. Affordable sustainability for housing focuses on the affordability of sustainability features such as insulation compared with non-sustainable options, and incentives in place to adopt more sustainable features. |
| Core indicator | Comparative cost of key sustainability features |
| Measured by | Cost comparison of water and energy sustainability features (retrofit ceiling and floor insulation, space heating, energy efficient lighting, water heating using gas, solar or heat pump systems, low flow water devices and appliances and water metering and pricing – potable water). |
| Explanation | The features above are included as baseline information exists for these from 2007, though others can be added over time. However the inclusion of this as a core indicator depends on whether an ongoing data source can be found. |
| Method and data source | Baseline information is available for 2007 from Beacon research ¹⁷ . Retaining this as a core indicator however depends on whether ongoing data collection can be arranged. |
| Place holder indicator | Uptake of incentive schemes to improve the performance of homes. |
| Measured by | Uptake of incentive schemes to improve the performance of homes. |
| Comment | This information would need to be obtained from the providers of these schemes. |

¹⁷ Based on adaptation of Beacon’s *National Value Case for Sustainable Housing Innovations*, October 2007.

5.7 Consumer demand

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| Outcome | Increasing consumer demand for products and services which deliver performance to a High Standard of Sustainability™ over conventional options. |
| Why is the outcome important? | This outcome seeks to track an upward trend in the demand for products and services that support improvements to the sustainability of New Zealand homes. Consultation is needed to identify which products and services to track and agreement on who will collect this data over time. |
| Core indicator | Sales of key sustainability products and services |
| Measured by | Number of key sustainability products and services sold (to be identified) |
| Explanation | Demand for key sustainability products and services is valuable information for the government and industry alike. |
| Method and data source | Beacon to benchmark for 2009 based on agreed products and services, with ongoing data collection to be negotiated with appropriate agencies. |
| Place holder indicator | Sustainable actions/behaviours in building and/or renovating a home |
| Measured by | Increasing trend of regular reported actions when building or renovating to design for maximum light, install insulation, water saving devices, insulate cylinder or pipes, install energy efficient heating systems and double glaze |
| Comment | Baseline information for this place holder indicator is available for November 2007 from the Ministry for the Environment Sustainability Benchmark Survey of 1,000 households nationally. |

5.8 Industry capacity

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|--------------------------------------|--|
| Outcome | Ongoing improvements in industry capacity (entire value chain) to supply consumers with products and services that deliver performance to a High Standard of Sustainability™ over conventional options. |
| Why is the outcome important? | This outcome seeks an upward trend in the ability of the industry to supply consumers with products and services to achieve more sustainable performance in their homes. |
| Core indicator | Change/trend in products and services that support sustainable housing |
| Measured by | Number and type of products and services listed in the Green Build Directory |
| Explanation | This provides a proxy measure only of changes in the number and type of products and services available to support increased sustainability of the housing stock. |
| Method and data source | Beacon to benchmark for 2009, with ongoing data collection to be negotiated with appropriate agencies. |
| Place holder indicator | Implementation of a proposed Green Builder training and accreditation programme |
| Measured by | Masterbuilders, Department of Building and Housing, BRANZ and Beacon are exploring a pilot study to develop this programme. Implementation and uptake of this programme could become an indicator within this framework over time. |
| Comment | New data or at least the collation of existing data is needed to track the number, type and uptake of qualifications. |

5.9 Policy and regulatory environment

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|--------------------------------------|--|
| Outcome | Ongoing improvements in the policy and regulatory environment that enable homes to be built and renovated to a High Standard of Sustainability™. |
| Why is the outcome important? | This outcome tracks the government removal of barriers and addition of incentives to support households to achieve improved home performance. |
| Core indicator | <ol style="list-style-type: none"> 1. Supportive policy environment 2. Supportive regulatory environment |
| Measured by | <ol style="list-style-type: none"> 1. Changes to the policy environment that support new and retrofit sustainable housing, including uptake of rating schemes into policy and regulation 2. Change/trend in consents that include sustainable building features |
| Explanation | New data is likely to be needed to scan the existing policy and regulatory environments and these may prove not to be fruitful indicators. The key aim however is to track the extent to which government is prioritising sustainable housing, even if the pace of policy and regulatory change tends to be relatively slow. |
| Method and data source | Baselines need to be set by Beacon and partners for 2009, and ongoing data collection negotiated for these to remain as core indicators. |
| Place holder indicator | None for this outcome. |

5.10 Sustainability is defined for New Zealand homes

| | |
|--------------------------------------|--|
| Outcome | The sustainability of New Zealand homes is defined in a robust and practical way that is recognised by consumers, industry and government. |
| Why is the outcome important? | This outcome seeks to ensure that when tracking “sustainability” of New Zealand’s housing stock, that a definition of sustainability is widely recognised and adopted. It acknowledges the need for this definition to rest on solid research about New Zealand homes and to reflect an acceptable ‘vision’ for New Zealanders regarding their homes. |
| Core indicator | A widely recognised definition of “what is a sustainable house”. |
| Measured by | The HSS™ is widely recognised by consumers, industry and the government as a basis for tracking housing sustainability |
| Explanation | Beacon has defined sustainability via the High Standard of Sustainability™ (HSS™), which could provide an appropriate starting point or benchmark for New Zealand homes overall. Testing the potential pathways for uptake and adoption of the HSS™ are part of the Beacon programme for at least the next two years. Tracking the usefulness and endurance of the HSS™ completes the “story” of this Indicator Framework, providing a link back to the individual homes whose improved performance it seeks to capture. |
| Method and data source | Beacon to benchmark. |
| Place holder indicator | None for this outcome. |

Appendix One: Method and limitations

This Indicator Framework is based on key outcomes relating to Beacon's High Standard of Sustainability. The process used to develop this Indicator Framework is as follows.

- A small Reference Group was formed to guide the framework, which includes experts in indicator and sustainability frameworks.
- One member of this group David Kettle developed a Working Paper which reviewed international sustainability frameworks and housing sustainability indicators.
- The Reference Group met on 31 March 2008 to discuss this Working Paper and define the purpose and approach to the development of the Indicator Framework.
- The Draft Indicator Framework was consulted upon during June, with feedback and recommendations for changes referred back to the Reference Group.
- This second Draft Indicator Framework is the focus of a workshop with key agencies in early August 2008.
- A final Indicator Framework and/or recommended next steps will be taken to the Beacon Board at the end of August 2008.

The draft indicators were selected by reviewing national data sets and key documentation, including the Working Paper by David Kettle, relevant websites and the literature outlined in the References. Where possible the following criteria were used to assess the applicability of measures and indicators for inclusion in this report, i.e. that they are:

- Directly relevant and meaningful to the outcome concerned.
- Measurable (quantifiable, with existing data to measure it). Note however that there are some indicators for which new data sources or data capturing processes are needed.
- Cost effective (obtainable at a reasonable cost in terms of time and financial resources).
- Valid (providing a true reflection of the issue and scientifically defensible and credible).
- Comparable (able to be compared accurately with similar indicators).
- Understandable and able to be presented in a simple way to target audiences.
- Responsive to changing conditions.
- Time related (showing trends over time, repeatable).
- Able to be disaggregated or broken down by demographic or other statistics.
- Leading/lagging (providing leading indicators to give early warning or predictors of change; providing lagging indicators to show effects or outcomes).

Further requirements for sustainability indicators include (Kettle 2008 p36 citing Bossel 1999):

- The number of indicators should be as small as possible, but not smaller than necessary.
- The process of finding an indicator set must be participatory to ensure that the set encompasses the visions and values of the community or region for which it is developed.
- A framework, process and criteria for finding an adequate set of indicators of sustainable development are needed.

Any indicator is by nature a partial and imperfect attempt to represent complex phenomena. Indicators are tools for trying to get a handle on concepts and realities that are complicated, interconnected and multi-layered. The hope is that together these indicators shed some explanatory light on what is happening in terms of the sustainability of New Zealand's 1.6 million homes in key areas.

A second limitation is that the indicators are confined to the issues covered by the outcomes in section three, and in particular the domains covered by the HSS™. While this assists the development of a focused set of indicators it inevitably leaves out key sustainability indicators for New Zealand housing (for example housing costs and affordability and residential solid waste production).

A third key limitation is that these indicators are as far as possible based on existing publicly available data and information, and given significant information gaps this leads to a less than ideal set. For 9 of the 28 proposed indicators however new data collection is required, and whether this can be achieved or not will determine their inclusion in the framework.

In a small number of cases no existing data source for a particular indicator has been found. In these cases feedback is sought from stakeholders as to whether an appropriate data source exists. As this is the first attempt at a national level indicator framework for sustainable housing there will be some trial and error.

Also, some indicators only have baseline information available, and rely on an agency taking responsibility for ongoing data collection and reporting. This will affect what can be included if no agency is willing to collect this information; these indicators have 'baseline only' against the measures provided. Some also provide a limited or proxy baseline, as they are based on a statistically small sample size but are nonetheless important indicators. Frequency of data collection is also an issue; some data is collected quarterly and some only every five years. This will have implications for benchmarking and for how often the Indicator Framework is reported against.

This Indicator Framework does not provide targets for indicators. This can occur if appropriate once the first benchmarks have been collated for the approved set, in consultation with key stakeholders. While Beacon has done some work on setting benchmarks and targets¹⁸ this will need to be revised and agreed with key stakeholders. Also, no weighting has been given to the indicators as this Indicators Framework is not taking a scorecard approach.

¹⁸ See Easton, Lois (2006), PR109 *Defining the Benchmarks for Beacon's High Standard of Sustainability*.

Appendix Two: Feedback on first draft of the IF

Feedback was received by representatives from the following agencies.

- Ministry of Economic Development
- Several Beacon representatives
- Master Builders
- Statistics New Zealand
- Green Building Council
- Otago University/Wellington School of Medicine
- Ministry of Health
- Consumer New Zealand
- BRANZ
- Building Research
- Ministry for the Environment
- Department of Building and Housing
- NZ Business Council for Sustainable Development
- Scion Research

Key themes

- General support for having such an Indicator Framework, with some queries on its use and relationship with individual home rating tools.
- However need to make a stronger case for the need, relevance, purpose and use of the Indicator Framework.
- Several queries on the inclusion of an outcome and indicator relating to Beacon's High Standard of Sustainability.
- More discussion needed on the concept of sustainability and rationale for outcomes and indicators chosen.
- Focus on outcomes with better data available and clarify how the weakness or lack of data sources will be addressed.
- Various suggestions to amend or remove particular indicators.
- Various suggestions to add particular indicators, but few major new data sources were identified (which indicates that the research undertaken to identify possible data sources was reasonably robust).

This exercise has affirmed that there are numerous data gaps in this arena nationally. It has also identified that government agencies are key partners to collaborate with as we move forward.

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