
# Development of a Single Residential Rating Tool for New Zealand

## June 2009

### By: Joint Venture Partners (New Zealand Green Building Council, Building Research Association of New Zealand and Beacon Pathway)

This is a scoping report for the Joint Venture Partners, Department of Building and Housing (DBH), Energy Efficiency and Conservation Agency (EECA), Ministry of Economic Development (MED), and Ministry for the Environment (MfE).

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# Executive Summary

This report sets the scene for the development of a single rating tool for new and existing homes in New Zealand. A number of industry and government stakeholders have been working in collaboration to investigate why New Zealand needs a rating tool, what criteria it could include, options to ensure wide scale efficient delivery, and most importantly how this could help improve the quality and performance of New Zealand housing stock while setting a best practice benchmark for new housing.

A New Zealand focused home rating tool has two unique functions:

1. It creates a common language that increases awareness on the quality of our homes including, most importantly, health & comfort and resource efficiency.
2. It creates a benchmark and allows supply and demand dynamics to drive investment decisions that improve the quality of our building stock (both new and existing) beyond what the building code permits.

A rating tool is an important part of a wider package of initiatives aimed at creating drivers in the property and construction industry that will:

- Stimulate economic activity in the residential sector.
- Maintain existing jobs and create new jobs.
- Unlock further private investment in existing homes, establishing the value of quality and performance in our housing, alongside the traditional values of location and aesthetics.

In February 2009, The New Zealand Business Council for Sustainable Development (NZBCSD) garnered industry-wide support for a *National Housing Upgrade Action Plan* from key industry leaders. It found that an estimated 1 million New Zealand homes are cold, damp and expensive to heat. Remedial performance upgrade costs for these existing homes have been estimated at $22 billion over a private housing stock valued at about $580 billion. These upgrades cannot be achieved with the current policy and regulatory settings. This action plan was the stimulus for a co-lead public private response. A single rating tool could act as a critical foundation to the action plan with its aim to be a simple, easily understood web-based interface for consumers. It would combine a ‘star’ rating and an annual estimate cost of operating for energy, water, etc. for a home with its current features, in order to achieve the WHO standard of an 18$^{o}$C average indoor temperature.

In response to the NZBCSD Action Plan, the New Zealand Green Building Council (NZGBC), BRANZ and Beacon Pathway have formed a joint venture to drive collaboration with industry stakeholders and government to develop a single residential rating tool for New Zealand’s new and existing homes.

Building rating tools are used in many countries around the world, with research now showing that homes with certified building ratings, sell quicker and for a higher value than non-rated homes. The benefits of a warm, well performing home are split into capital gain and in-use benefits (Figure 1). On top of the potential capital gain from investment in home performance, it has been found that every dollar spent on your home pays back twice in health benefits. This has value both to the individual and to the nation in health system efficiencies and productivity in schools and workplaces. A building rating system couples both intangible and tangible benefits that create long lasting value to the nation.

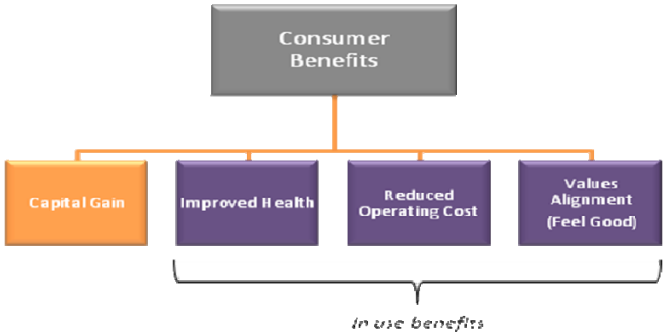



**Figure 1. Consumer benefits of a residential rating tool.**

Over the past three months, work has begun on scoping the needs of both industry and government to understand how a rating tool needs to function to drive activity and increase the performance of New Zealand Homes to meet WHO targets. This work has identified the need for a single rating tool that functions for both new and existing homes with the following attributes:

- Facilitates improvement of existing stock by clearly delivering useful retrofit priorities to consumers, and aligning with the Government's home insulation fund and other relevant programmes.
- Encourages action by providing consumers with information on the choices or actions they can take and the estimated costs and benefits of these actions.
- Provides achievable and consistent advice and standards over time that enables the building and construction industry to produce, install and maintain solutions that deliver real results for homeowners and occupiers.
- Enables the use of an online web-based tool that generates information on the expected building performance based on data about the house (as entered online by the user).
- A free or low-cost self-assessment so that acts as a "one-stop-shop" experience for consumers (i.e. connects the user to additional information and market solutions).
- Is objective and technically robust, while being easy to use.

This report outlines the draft rating tool framework that has been created over the past three months by a joint industry/government Technical Working Group, including a series of 38 questions that form the basis of the simple online self assessment. The categories Energy,

Water, and Health and Comfort have been set as the basis for the draft simple rating tool. The relative importance of each category has also been proposed (via weightings). It has been identified that this rating tool needs a strong consumer focus to target the mass market, rather than only meeting the needs of the best-practice segment of the market beyond current building code standards. This rating tool will be unique by creating a best practise target encouraging industry leadership, while also creating the value proposition to improve our existing housing stock to current building code levels. With this wide scope, further technical development will continue after the market analysis and further consumer testing is complete. This next phase of work is outlined in this report.

# Background

Beacon Pathway, BRANZ, and the New Zealand Green Building Council initiated discussions during a workshop in August 2007 that brought together a range of stakeholder organizations (listed in Appendix A), all of which expressed interest in finding a solution to improve the performance of New Zealand's housing stock. Since then, interested parties have aligned to drive a collaborative industry effort as outlined in this report.

As of March 2009, a group of industry and government stakeholders have been meeting regularly to develop the framework that would deliver a residential single rating tool for New Zealand homes. Stakeholders include BRANZ, NZGBC, Beacon Pathway, NZBCSD, Building Industry Federation (BIF), New Zealand Sub Contractors Federation (NZSCF), Department of Building and Housing (DBH), Energy Efficiency and Conservation Authority (EECA), Ministry for the Environment (MfE), Ministry of Economic Development (MED), Housing New Zealand Corporation (HNZC), Hobsonville Land Co, Righthouse, the Designers Institute of New Zealand (DINZ), the New Zealand Institute of Architects (NZIA), Opus International, Stonewood Homes and others.

There has been a high level of agreement that a 0 - 10 star rating system that would allow users to 'self rate' existing houses in the range of 0-4 stars (for free), while providing an independently certified rating above 4 stars (which users might pay for), is what is needed. One of the central aims is to provide a rating system that will help to unlock private investment in renovating New Zealand's poorly performing housing stock.

A star rating, coupled with a scheme that delivers credible independent advice about what needs to be done to a house to improve its rating, will assist homeowners in prioritising those improvements that upgrade the quality and performance of their homes.

## Benefits of a Residential Rating Tool

***Consumers***

- An independent and credible system to compare the performance and quality of homes at the point of purchase, upgrade or rental.
- A prioritised plan of interventions/solutions to improve the performance of a home.
- A rating system can help to communicate a deeper appreciation of the warmth, comfort and health of a home. This enables decisions to be made (i.e. trade-offs) between the initial capital costs required to achieve healthy and comfortable conditions, versus ongoing operational costs to achieve the same benefits.

- Enable consumers to make informed decisions that will allow them to live in a home that meets WHO minimum requirements for temperature and indoor pollutants.[1]

***Property Owners***

- Recognise the investment in upgrading a home to achieve higher performance levels, thus meeting the market demand for better performing rental homes.
- Provides independent and credible advice regarding improvements necessary to improve home performance, and a way of communicating the investment made to the potential tenant.

***Real Estate Industry***

- Provides robust and independent ratings of the performance and quality of a home, thereby creating a more efficient market with all "players" having access to balanced and robust information.

***Building Industry***

- Provides independent, publically available information as to the solutions to improve home performance.
- Creates a mechanism for industry leaders to differentiate themselves in the market.
- Supplies the homebuilding industry with a structured investment landscape, and greater certainty that the research and development required for higher performance products and building practices lead to sound investment decisions.
- Becomes the repository for experts and industry to apply their efforts, while avoiding inefficiency and confusion due to the development of competing tools.

***Central Government***

- The independent advice about priorities for improvement that is provided by the rating tool helps to encourage large scale renovation. Improving the performance of New Zealand homes contributes to improvements in the occupants' health.
- Signals the housing industry in advance as to which standards are likely to become mandatory in future reviews of Building Codes. This helps to trial improvements to the Building Code well before they become a regulatory minimum, thus avoiding unintended consequences resulting from drafting of untested regulations. With support from

[1] World Health Organization (2007). Development of WHO guidelines for indoor air quality. Retrieved on 22 May 2009 from http://www.euro.who.int/Housing/publications/publicationstop.

Government this effectively provides a mechanism for consultation and decision-making under one scheme, as well as making the process robust and transparent.

- A link between the rating tool and the Building Code means good/better/best is clearly flagged - something the current system of regulatory minimums doesn't do.
- Supplies the framework to deliver government programs and targets, such as minimum energy performance standards (MEPS) and carbon emissions/renewable energy targets.
- Could be designed to provide data to assist government in understanding the challenges that exist in the current housing stock, which would help to define the state of the housing 'problem' and target effective solutions.
- Internationally, governments of developed nations see green buildings as an opportunity to reduce green house gas emissions, address issues of energy security and supply, meet the demands of growing populations with current resources, and build resilience in infrastructure to counter the impacts of climate change.

Over the last few years, some of New Zealand's major residential builders have sought to communicate the environmental attributes of their developments and plans through branding initiatives and the creation of their own environmental credentials. A proliferation of self-created and self-certified green credentials could, over time, cause market confusion as consumers seek clarity about the many different offers. Consumers will look for an independent benchmark they can trust. A single residential rating tool will provide this independent, third-party benchmark.

Consumers, property owners, the real estate industry, the building industry and central government will all benefit from the single residential rating tool. Specific benefits to these parties are outlined in Appendix B.

## International Residential Rating Tools

One of the first green building rating tools to be commercialised was the Building Research Establishment's Environmental Assessment Method (BREEAM). This was introduced in the UK in 1990. Since then, there has been a rapid growth in the number of green building tools in the world and in the span of 17 years, more than 23 countries have developed green building assessment tools. [2]

Australia and the US have a plethora of residential rating tools. The UK has adopted a single rating tool philosophy with the introduction of the Code for Sustainable Homes in April 2007. This is a national standard for building better performing homes – it is an individual dwelling assessment, calculated at both the design and post-construction stages.

[2] Potbhare, V., Syal, M., Arif, M., Khalfan, M., and Charles Egbu. (2009). Emergence of green building guidelines in developed countries and their impact on India. *Journal of Engineering, Design and Technology*: 7 (1).

## Adding Value to a Home

Recent studies from overseas indicate that residential rating schemes can add value to housing stock that has been upgraded to meet higher standards. For instance, a study in Australia[3] found that:

- There is a statistically positive correlation between house price and the energy efficiency rating of a home.
- Some factors underlying an energy efficiency rating add value to a house for reasons other than energy efficiency.
- The implicit price range of the rating can be determined, but not the value being placed on rating disclosure itself.
- The study concluded there is a significant relationship between the house price and the rating.

A recent Seattle study in 2008 found that "environmentally certified homes sold for 5.9% more and stayed on the market for 24% less time than comparable homes" which were not environmentally certified.[4] Taking the average New Zealand sale price of a home[5] ($378,399 in March 2009), this data indicates that an environmental rating could be expected to increase the value of that home by approximately $22,325 (presuming that the rating indicates that the home is performing well). Further to purchase price, a New Zealand based study completed a cost-benefit analysis on the health benefits of insulation. This research determined that the amount invested in home performance delivers a double return on investment in health benefits.[6]

[3] Department of the Environment, Water, Heritage and the Arts. (2008). Energy efficiency rating and house price in the ACT: Modelling the relationship of energy efficiency attributes to house price (the case of detached houses sold in the Australian Capital Territory in 2005 and 2006). Canberra: Commonwealth of Australia.
[4] GreenWorks Realty. (2008). New green homes in King County sell faster with higher value. Retrieved on 10 May 2009 from www.greenworksrealty.com.
[5] Quotable Value Limited. (May 2009). QV national residential property indices for New Zealand. Retrieved 23 June 2009 from http://www.qv.co.nz/onlinereports/propertyvaluemap.htm.
[6] Chapman, R., Howden-Chapman, P., and O'Dea, D. (2004). A cost benefit evaluation of housing insulation: Results from the New Zealand 'Housing, insulation and health' study. Retrieved 10 May 2009 from http://www.uow.otago.ac.nz/academic/dph/research/housing/publications.html.

# Residential Rating Tool Framework

## Key Features of the Rating Scheme

- Applicable to both new build and existing houses
- A user-friendly web-based model that allows homeowners to complete a basic self-assessment of their (existing) home to prioritise home improvements.
- A detailed comprehensive rating of the quality and performance of new (or extensively renovated existing) “green” homes.
- The self-assessed (0-4 star rating) is compiled from points achieved in the categories of energy, health and comfort, water, and ‘other’. Ratings between 5 – 10 stars will have additional categories covering other important aspects of home performance and environmental impacts (i.e. waste, materials selection, etc).
- Higher ratings (5-10 stars) would be possible through an independently verified third-party evaluation of the home. This would produce a certified rating that could be used at the time of sale or rental.
- The online self-assessment process is expected to cover the majority of existing buildings, whilst the certification of homes rating above 5 stars is expected to deal primarily with major refurbishments and new buildings.
- The New Zealand Building Code (NZBC) could be calibrated (mainly for energy) at a certain star rating. In future, government could set targets to move the NZBC higher, signalling policy direction to industry.

The final web accessible tool will provide a prioritised plan of interventions/solutions to improve a home’s performance. This will provide independent, credible advice to help homeowners achieve a higher rating as they improve the standard of their home. This will include suggestions such as ceiling, wall and underfloor insulation, energy efficient water and space heating, water saving devices, etc. The assessment and solution aspects of the tool will also be able to provide a prioritised list based on the home’s unique variables, such as local climate, housing typology and the home owner’s personal circumstances.

The rating tool framework will include categories that are fundamental to improving the quality and performance of a home (Figure 2).

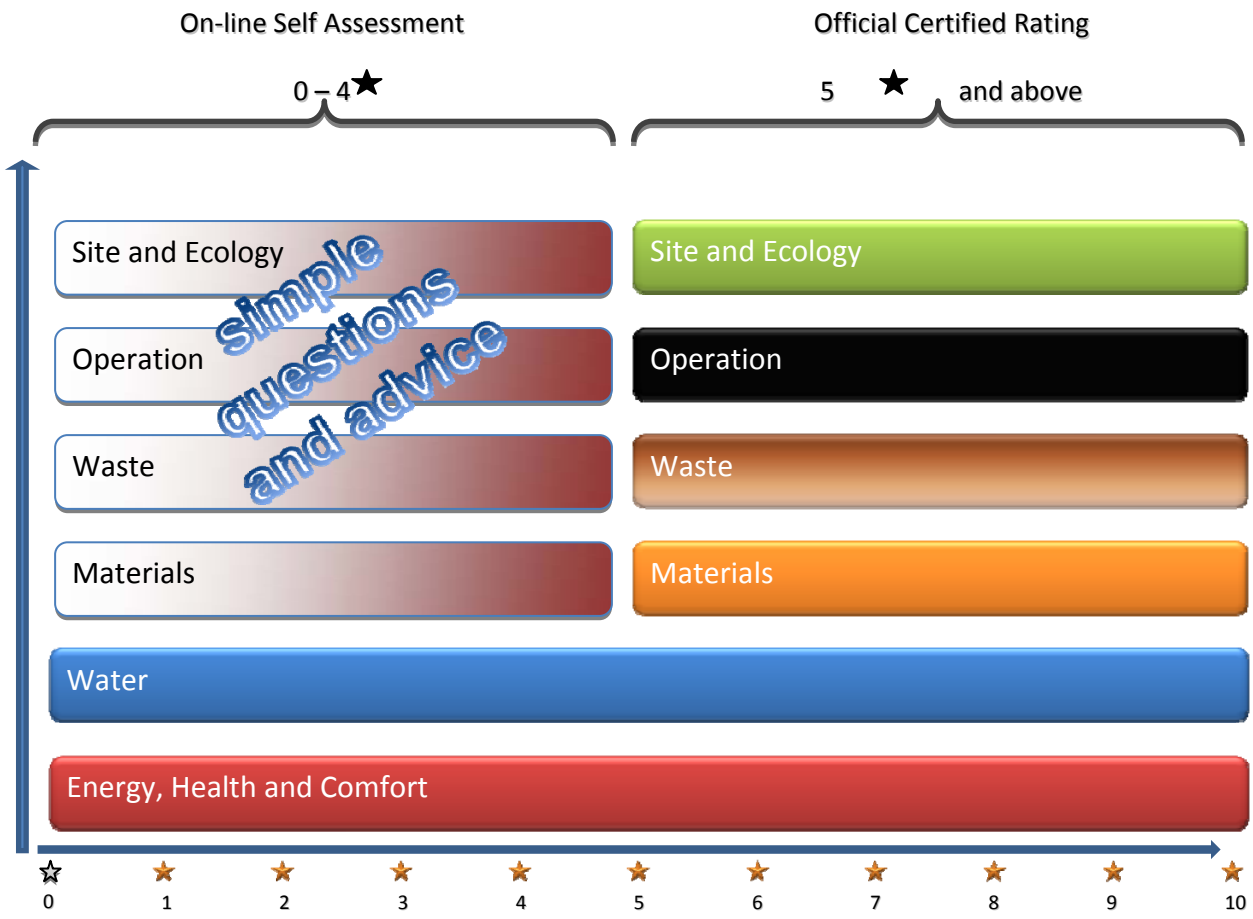



**Figure 2. Skeleton framework of the single residential rating tool.**

## The Rating Tool Framework

The NZGBC has a robust, inclusive and successful process for the development of new rating tools. This process has been implemented by green building councils around the world for the past ten years and is based on a consensus decision-making process with industry experts to ensure the final outcome is relevant for the marketplace, and therefore assured of high uptake and acceptance.

In line with this tried and tested method of developing successful rating tools, a Technical Working Group (TWG) of industry and government stakeholders was formed in April of 2009. This TWG met fortnightly over three workshop sessions, and included members from:

- BIF
- OPUS International/ NZIA
- Hobsonville Land Company
- Certified Builders Association

- EECA
- Righthouse
- University of Victoria
- MfE
- DBH
- NZBSF
- DINZ
- Stonewood Homes
- BRANZ
- Beacon Pathway
- NZGBC

***Skeleton Framework (0-10 stars)***

A base list of suitable rating tool criteria was developed by the technical team from analysis of international tools already in existence. These were further refined utilising existing research inputs from Beacon, BRANZ and the NZGBC. Key categories were developed to underpin the framework and the Technical Working Group assisted with refining the details of the categories through a peer-review process.

To create the rating tool framework, the concept of home performance and environmental impact was categorised. These categories within the rating tool framework will be used to assess/rate the attributes of a home, and provide retrofit and improvement advice. The categories identified are: Health and Comfort; Energy; Water; Materials; Waste; Operation; and Ecology and Site. These categories were identified as being important pillars within the rating tool framework by reviewing international residential rating tools, and ensuring the inclusion of environmental measurement criteria that is relevant to the New Zealand marketplace and environmental context.

Assessment criteria for the eight categories have also been developed in consultation with the Technical Working Group. Various means of assessment (measurement) of each category have been debated and approaches from key international tools considered. The description of what should be contained within each category and a suggested approach has been agreed upon by the TWG.

It is envisaged that all of the categories will contain credits that address initiatives that improve or have the potential to improve a home's environmental performance. Points will then be awarded for actions that demonstrate the home has met the credits criteria (and overall aims of the project). Further work will need to be undertaken to develop the specific credits and points

detail. A detailed excel spreadsheet which illustrates this proposed residential rating framework can be found in Appendix C.

**Development of Weightings to date**

Weightings were discussed at the third TWG workshop, and have been provisionally agreed to. A weighting factor will be applied to each category to reflect the overall importance of the environmental issue addressed by the category.

It is anticipated that the single (overall) score of a project will be determined by:

1. Calculating the score of each category.
2. Applying an environmental weighting to each category.
3. Adding all weighted category scores together.

The first step in the development of category weightings was to examine the approaches taken by other successful domestic rating tools. These domestic tools were compared both nationally and internationally in order to gain ballpark figures of what might be suitable for the New Zealand situation.

Currently, the NZGBC has a suite of non-domestic rating tools in operation, all of which have utilised weighting systems as part of the assessment procedure. Their category weightings have been largely based on the Australian versions of the tool, which in turn have been modified from UK studies – specifically those carried out by the Building Research Establishment (BRE). In the late 1990's, BRE initiated research to determine the relative importance of construction-related sustainable issues to establish a good degree of consensus on sustainability that exists between different interest groups. As their building assessment tools became successful and then exported internationally, so too did their weightings – with adaptations to reflect national conditions. The two tools most closely examined for this weighting alignment were the British *Code for Sustainable Homes* and the American *LEED for Homes*.

The categories within the proposed New Zealand residential tool are slightly different from other international tools. Due to these slight differences the second step in the development of the category weightings involved some additional (New Zealand specific) reassignment of the weightings between categories.

Finally, the weightings have been fine tuned by members of the Technical Working Group, who were asked to comment on their suitability, based on their own expertise and how the issues

would be perceived (and therefore valued) by the public. Weightings could possibly be reviewed and regionalised, to reflect local issues in the future.

The resulting categories and their respective weightings can be seen in Table 1. It should be noted that the tool weightings reflect current understanding of the comparative environmental/social impacts, so could change in the near future, as new New Zealand-specific evidence and studies come to light.

**Table 1. Proposed category weightings for the full skeleton framework (0-10 stars).**

| Category | Weighting |
|---|---|
| Energy & Health and Comfort | 45% |
| Water | 15% |
| Materials | 12% |
| Waste | 8% |
| Operation | 8% |
| Ecology and Site | 12% |

***Online Self-Assessment (0-4 stars)***

Online assessment questions to deliver a 0 – 4 star rating have been developed. The questions perform two key functions. Firstly, they provide the basis for credit allocation and generate a rating for the home. Secondly, the questions deliver input data that drive the creation of retrofit information and advice.

This work was led by technical staff from the three Joint Venture organisations. Collectively, this drew on considerable experience developing rating tools and knowledge around increasing the performance of new and existing homes. The proposed questions for the online assessment were refined by this group post-consultation with the TWG.

Points allocation (and the 'multipliers' required to give a star rating) have been progressed and a relative distribution of points has been suggested. Multipliers are necessary when an outcome depends on an interrelated factor. For example, an answer may depend on the answer to a previous question. The multipliers adjust the issue score (points) by accounting for various characteristics that modify the issues performance.

Appendix D shows the proposed questions that will appear on the online assessment, as well as the allocation and distribution of points amongst the user-posed questions.

Further work will be needed to transform the current calculations and rating workbook into a fully functioning online self-assessment tool. A mock-up, showing how the online user-experienced version of the rating tool might look, can be found in Appendix E. It is envisaged that top tips (in the form of 'pop up' windows) and tailored advice will create a very user-friendly interface.

**Development of Weightings**

A similar process to define weightings was undertaken for the online self assessment as was for the full skeleton framework (process defined above). The proposed weightings which will be applied to each category are listed below in Table 2.

**Table 2. Proposed category weightings for the online assessment framework.**

| Category | Weighting |
|---|---|
| Energy & Health and Comfort | 60% |
| Water | 20% |
| Other | 20% |

***Self-Assessment Questions for EECA***

The technical team produced a set of questions for EECA, which could form the basis of their online information for people accessing the Insulation Fund through the ENERGYWISE™ Warm Up New Zealand: Heat Smart Programme. The purpose of this is to ensure alignment with these two parallel work streams. Appendix F lists these questions.

# Project Plan

During Phase 1, the joint venture partners succeeded in aligning key stakeholders and developing a technical basis for the single rating tool. A plan for further development, including the funding model for this project, can now be designed. Phase 1 has now been completed, and we have defined two further distinct phases. Phase 2 involves understanding the market and consumer proposition to inform the rest of the technical development with a simple and compelling user interface. Phase 2 will also involve working and aligning with industry to enable them to be the key delivery mechanisms of the tool, ensuring uptake and results. Also, over the next few weeks the final business plan will be complete to form the basis for on going partnership and funding arrangements. Phase 3 is the roll out phase which includes marketing and education campaigns. A large amount of preparatory work is needed before the tool can be launched, therefore an overlap in the workloads of Phase 2 and Phase 3 will occur.

The overview below (Figure 3) shows the main work streams of all Phases and the overlap in timing of Phase 2 and 3. Understanding the target markets and the drivers of these markets affects the business model that is used to develop and run this tool. Work has now begun on Phase 2, with the market segments identified, and will provide the basis upon which the consumer experience will be developed.

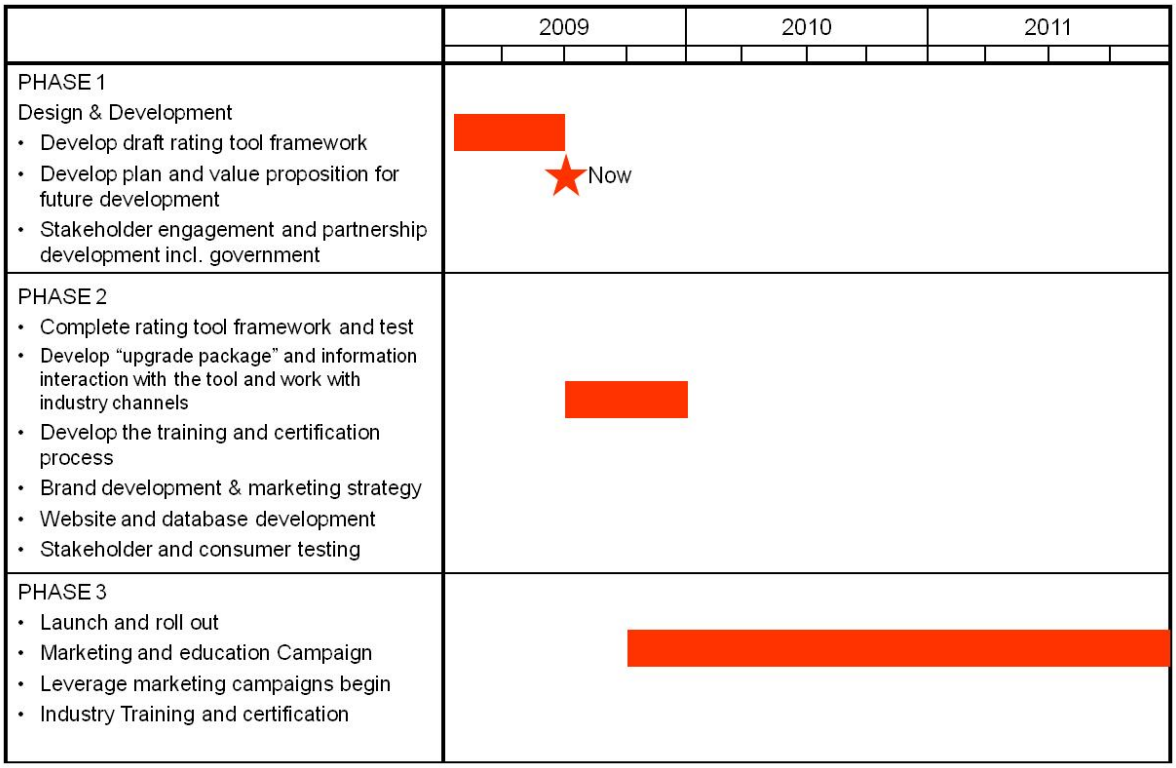



**Figure 3. Project overview (Phases 1, 2 and 3).**

## Phase 2

The initial focus of Phase 2 is to complete the business plan and define the delivery model for this programme to be self-sustaining in the long term. This will include certification and training costs, milestones, associated risks, resourcing, and how it will fit with the strategic plan of each partner. This is well developed, and will be presented to the entire governance group in early July. Secondly, Phase 2 will further define the value proposition to the different market segments and confirm involvement from interested industry partners. An outline of Phase 2 is shown in Figure 4. Although not defined in this overview, the aim is to have an online existing building self-rating tool fully functional in September, while piloting the whole framework for new buildings in October and November, to be ready for a December 2009 release.

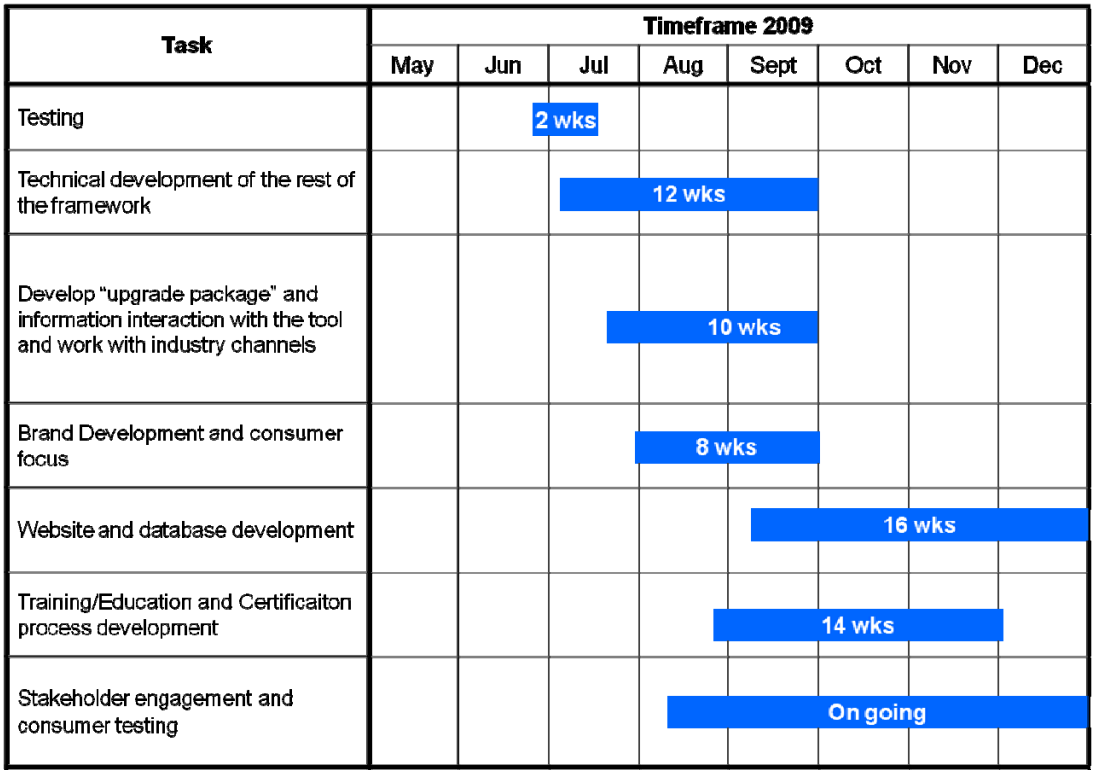



**Figure 4. Detailed timeline for Phase 2.**

### *Step 1 - Stakeholder Engagement (Testing)*

The first action for Phase 2 will be a series of stakeholder workshops. Through previous experience of the NZGBC, having widespread industry involvement in the development of all rating tools has proven to be a vital ingredient in the overall success and market uptake of the resulting tool. A focused stakeholder engagement plan has been developed to drive this activity as the next progression, emerging from wider discussions and meetings held over the past year.

These workshops will present the draft rating tool and project approach to a much broader range of stakeholders that were not part of the Technical Working Group. Three distinct levels of stakeholder engagement have been identified: the Governance Task Group; the Technical Working Group; and the member and public pilot process.

**The Governance Task Group**

This group is made up of invited partners who are asked to participate to provide broad strategic direction, ensuring that the outcome of this work meets the needs of industry and government.

Members of this (proposed) governance group are:

- Department of Building and Housing
- Energy Efficiency and Conservation Authority
- Ministry for the Environment
- Beacon Pathway
- NZGBC
- BRANZ
- Possible others to be decided
- With an Independent Chair

**The Technical Working Group**

As outlined above, a Technical Working Group (TWG) has been formed and currently consists of approximately 15 industry experts from all parts of the building value chain. This group has participated in an intensive technical tool development process. The personnel in this group may change, but the types of organizations to be represented will be similar to the current organizations and government departments.

**Stakeholder Engagement**

The NZBCSD have promoted the *National Housing Upgrade Action Plan,* which calls for public/private partnerships to collectively take action to improve the one million underperforming homes in New Zealand. To focus the interest garned by this action plan of various stakeholders and other interested parties (plus members of the NZGBC), all groups will be invited to be involved in the stakeholder engagement process. A list of identified stakeholder organizations can be found in Appendix G.

Focus or topic groups maybe formed during this development phase to re-inform the tool content and pitch.

### *Step 2 - Business Model*

Understanding the target markets as well as identifying the end-to-end consumer experience will inform the design of the business model. The joint venture partners have a high level of understanding of rating tools, the residential market, and the home construction and renovation markets. However, the most suitable and successful mass market business model for this project has not yet been formalised. A traditional business model creation approach will be used to ensure that the final project will be successful in the marketplace. This model will underpin the programme over the long term, and will consider:

- Scalability and efficiency of the certification process.
- Partnership options for delivery of key services such as training and certification.
- Demand of forecast scenarios that are closed-loop user-pays models once the development of the tool is complete.
- Partnership with REINZ to educate real estate agents and use point of sale opportunities to communicate value and drive uptake of certification.
- Leveraged promotional and marketing campaigns demonstrating the public/private partnership to add credibility to all involved parties and be an effective use of marketing budgets.
- Significant events that already occur will be leveraged to stimulate action (i.e. recognition of certified ratings by regulatory authorities, decreased processing time, and partnerships with utility companies to trigger action for high consumption households).
- Changes in the demographics of New Zealand and potential associated changes in the housing stock.
- Future environmental stresses and impacts.

### *Step 3 - Work plan for further technical development*

**Online self-assessment (0-4)**

Although the 0-4 star self-assessment questions have been developed, it is envisaged that a period of piloting will be required (with up to 10 houses) prior to this work being developed into a fully functional online assessment tool.

Website development will begin once this initial testing and verification work has been completed. Following this stage, a more comprehensive pilot will be required with a larger number of test houses and a wider group of industry test cases prior to a full public release of the tool.

This piloting period may take up to eight weeks and will allow for testing, revision and re-testing. Taking pre-pilot and piloting stages into account, it is anticipated that the online self assessment could be launched in September 2009.

**Entire Residential Rating Tool Framework (0-10)**

Although work on residential rating tools has been undertaken in other countries, it is critical that the residential rating tool is tailored and appropriate for New Zealand. The differences in the natural environmental will need to be taken into consideration, as will differences in the social, economic and cultural landscape.

The Skeleton Framework as presented in Appendix C will undergo further development in Phase 2, while testing and refining the delivery of the 0 – 4 star aspects of the scheme.

The technical work will continue in the same manner as Phase 1. The TWG will use a more detailed, focused approach by grouping the categories into the following areas:

**Group A**: Energy, Health and Comfort, Operation

**Group B**: Water, Site and Ecology

**Group C**: Materials, Waste

In order to complete the single residential rating tool framework the following work plan is proposed:

- A technical project manager will be responsible for the overall technical output/delivery of the residential rating tool framework. This project manager will also be responsible for communicating with the consumer/marketing group.
- Each group (A, B and C) will have a designated project leader who is responsible for communicating project outcomes between groups and the technical project manager. The project leader will be responsible for resolving issues in consultation with the technical project manager.
- Groups A, B and C will each meet every fortnight for the project duration. This timeframe is considered to be the minimum length of time in which information can be reviewed and re-presented to the group. Decision making will be an iterative process where proposals are tested, redrafted and tested once again. Several of these meetings will bring to entire TWG together as a whole to ensure topics are not viewed in isolation.

Once the technical detail has been agreed for all categories, relative weightings between the groups will need to be revisited. At this stage it is possible that further technical specialists will need to be called upon to ensure the relative importance of issues is captured.

***Step 4 - Delivery Mechanisms***

An analysis of international and existing local methods for delivering assessments for certified ratings has been carried out. Further investigation and consultation is needed to decide on the most applicable approach for this specific rating tool.

### *Step 5 - Education*

The success of the single residential rating tool will be underpinned by targeted and accessible educational programmes.

Education options will span:

- Introductory information courses for the public.
- An intermediate course for builders and installers.
- An advanced course for designers and consultants.
- Assessor training.

The content and delivery of these educational programmes will be set up and managed by the NZGBC using an outsourced model for scalability. Partners for these programmes are still being investigated.

### *Step 6 - Marketing and Communications*

The success of the marketing and communications programme will depend on developing powerful branding that all partners use in their individual campaigns. In addition to leveraging campaigns of all partners, collective media and promotional opportunities will be developed as part of the collective work program. This will be developed as part of Phase 3.

Areas to be addressed in the early stages of the programme include developing a marketing and communication strategy that:

- Creates demand and builds the brand for consumer recognition.
- Provides the early adopter users of the tool with a communication package that enables them to communicate the benefits to their clients.
- Develops relationships with real estate companies who will have an influential role in communicating the benefits of certified homes to the consumer.
- Targets potential users of the tool so they understand the benefits.
- Provides fact sheets, reference guides and technical information pitched at different target audiences using different methods of communication appropriate for the audience.
- Provides a long term framework for consumer education to increase demand for high performing homes while increasing the performance of existing homes.
- Recognises and rewards environmental leadership.

***Target Budget for Phase 2***

| | |
|---|---|
| Stakeholder workshops | 60k |
| Technical rating tool development | 150k |
| Develop “Upgrade Package” information | 60k |
| Website and database development | 100k |
| Training and certification process development | 100k |
| Consumer testing | 30k |
| **TOTAL** | **500k** |

A target of $250k of industry sponsorship has been set for Phase 2 of the project. This will be from a combination of sponsorship arrangements ranging from $50k to $100k. It is proposed that government matches industry input to the value of $250k from a combination of government budgets.

## Phase 3

This stream of work is primarily focused on the promotion of the rating system and information and education that is needed to ensure success of the system. Some of this work needs to overlap with Phase 2 as it requires a development phase. However, as these work streams are very different, they have been kept separate for reasons of clarity and resourcing. Phase 3 is anticipated to run for three years, finishing at the end of 2012.

The main areas of work for Phase 3 have been defined as:

Pre-Launch

- Brand development and consumer focus/testing to determine the most appropriate and consumer-friendly education programmes.
- Website development and testing involving experts with experience with other online rating systems, and the public to ensure a high level of usability.

- Develop training and certification programs to deliver the 5-10 star range of the rating tool. The different models that could potentially be used will be investigated, with the most scalable and appropriate system for New Zealand being implemented.

Launch and post-Launch

- Launch promotional campaign with partners, ensuring maximum exposure to the public as well as industry providers.
- Co-develop, with funding partners, a marketing strategy that has been identified and tested in the pre-launch phase.
- Maintain and manage tool programmes and relationships, allowing for changes to be implemented during the programme.
- Continued consumer engagement by accepting and managing feedback, which will be used to inform and adapt education programs, partner relationships, functionality of the online self-assessment, and the progress and success of the overall programme.

***Target Budget for Phase 3***

| | 2009 Preperation & Development | Year 1 Start Jan 2010 | Year 2 Start Jan 2011 | Year 3 Start Jan 2012 |
|---|---|---|---|---|
| INCOME<br>Industry partners:<br>2 Gold (100k 2009, 80k each year for 3 years)<br>4 Silver (60k 2009, 40k each year for 3 years) | 190k | 320k | 320k | 320k |
| EXPENSES: | | | | |
| Brand Development and consumer focus | 100k | | | |
| Website development | 100k | | | |
| Training and certification running | | TBC | | |
| Each partner spends between 200k – 1 million in aligned leveraged marketing campaigns | | 2-6 mill | 2-6 mil | 2-6 mill |

# Marketing Strategy

## Market Structure and Development

The residential housing industry encompasses a wide range of players including builders, owner-occupiers, investors and tenants. These players are involved in diverse housing activities spanning building, changes in ownership and changes in residence.

These players and activities fall into two largely independent clusters, namely “Build/Occupy” and “Invest/Rent”. These two clusters require distinct business and marketing models to drive uptake of a residential rating tool and ultimately improve the quality of housing in New Zealand.

The Build/Occupy cluster is characterised by a single decision maker who both invests in the home and realises the benefits of improvements. However, the current market fails to communicate the benefits of a higher performing home when the home change hands. This is due to the lack of a mechanism that can effectively communicated the benefits of a superior home to prospective buyers, thus enabling the seller to receive a higher selling price. A certified rating can influence the decision making at point of sale if this value is understood, or if it can be shown that certified ratings in other countries have increased the capital value of a home. Thus the language of a rating is of key importance to the way we understand the performance benefits of our homes.

The Invest/Rent cluster is characterised by a “split incentive”, due to a separation of benefits between the investor and the tenant (who directly benefits from improvements to a property). New Zealand’s high tenant turnover rate (estimated to be 40% per annum)[7] creates opportunities to influence the decisions or choices of these people. This area needs more investigation, as we need to understand the segmentation of the overall tenant market and their decision drivers. For a market-driven model to be successful, demand from this segment will need to be created before investors are likely to respond.

Investigation into grants and funding allocations from both Housing NZ Corporation (HNZC) and Work and Income NZ (WINZ) may provide a key to understanding the decision drivers of low-income tenants. These programs all need to be aligned and focused to increase the long term performance of New Zealand’s housing stock.

This investigation into the target markets demonstrates that the Build/Occupy cluster is potentially the ‘low hanging fruit’, as it appears to require less time and investment to deliver strong and focused results. However, our overall marketing strategy needs to consider the size of the market segments and what type of strategy should be adopted for each market segment.

The initial focus to reach the Build/Occupy segment (in order of priority) will involve:

- Linking and providing useful information for people accessing the EECA Heat Smart Scheme.

[7] Saville-Smith, K. (June 2008). House owners and energy: Retrofit, renovation and getting house performance (Report EN-6570). New Zealand: Beacon Pathway Limited.

- Mass market consumer focused market campaigns leveraged by both government and industry partnerships with common messaging, branding and information.
- Working with the real estate market to build awareness and promote the use of home ratings to communicate value between sellers and buyers.
- Driving the construction of ‘higher rating’ new homes and improvements through group builders, especially in show homes, so people can tangibly experience these improvements**.**

## Results and Measurement of Success

It has been recognized that alignment with government targets and work programs is of great importance during the development of the detailed business plan in Phase 2. During this development stage, a quantitative measurement system will need to be developed to measure the success and uptake of the entire program, for both self-assessments and certification. Working with stakeholders and industry partners, the most applicable metric for this measurement will be determined. This measurement system must be able to account for the successes of various marketing strategies, align with key performance indicators, and ensure that the expectations of all parties are met. Annual targets will be set to allow for the program to adapt to changing consumer and industry demands and market dynamics.

# Appendix A

Stakeholder organizations that attended the Home Rating Tools: Measuring the Performance of New Zealand Homes workshop in Wellington, in August 2007.

- Building Research
- Ministry for the Environment
- Registered Master Builders Federation
- Hobsonville Land Company
- Waitakere City Council
- Housing New Zealand
- Energy Efficiency and Conservation Authority
- DBH
- Landcare Research
- IPENZ
- Wellington City council
- URS NZ
- New Zealand Green Building Council
- Beacon Pathway
- BRANZ

# Appendix B

## Background to the residential rating tool

**In a period of recession and low new-build activity, our existing housing stock provides an opportunity to maintain and develop our building industry and the economy.**

Investing in New Zealand's residential infrastructure keeps the retail sector active, while at the same time, delivers higher performance of our residential built environment. Investing in New Zealand's residential infrastructure maintains employment and critical mass in the building, building product manufacturing and building retail industries. It also mitigates the risks of losing skilled tradespeople to offshore markets.

**Homes are a key component of New Zealand's urban infrastructure.**

Houses move on and off the rental market and through socio-economic groups as neighbourhoods transform over time - they are the one relatively static component in the built environment.

**The residential sector is a large source of employment.**

The house building and renovation industry is worth in excess of $12.0b annually and directly employs about 8% of the New Zealand workforce[8]. There is significant economic and social benefit in redirecting this resource to improving the current housing stock in recessionary times.

A standard 1940-1960 home[9] renovated for improved performance[10] would require an estimated 277 hours of labour split between a variety of sub trades. The data[11] indicates that, for every 1,000 houses retrofitted, a total of 151 full time equivalent jobs would be required for delivery solely of on-site retrofitting services, and a total of 392 full time equivalent jobs[12] would be required to provide the products and services involved in the renovation activity.

[8] Department of Building and Housing. (November 2008). Briefing for the minister for building and construction. Retrieved on 2 June 2009 from http://www.dbh.govt.nz/UserFiles/File/AboutUs/Strategic-Direction/pdf/BIM-building-construction-nov08.pdf

[9] Beacon Pathway has developed an approach to retrofitting NZ houses which defines a set of standard typologies in NZ housing. One of the largest groups of houses represented in this country is the 1940 - 1960 mass housing style. Research undertaken by BRANZ indicates that there are a total of 479,000 of these houses throughout NZ.

[10] The majority of NZ houses can be readily adapted through renovation to perform to a much higher standard in terms of warmth, health, comfort, energy and water use. For the purposes of this exercise, a standard renovation package for the house has been assumed. This incorporates ceiling and under-floor insulation, ground polythene vapour barrier, wall insulation, efficient heating device, heat transfer system, solar hot water heating, low flow water devices and low flush toilets, rainwater tank, hot water cylinder and pipe wraps, extract fans in kitchens and bathrooms, double glazing retrofitted into existing timber window frames (or secondary glazing/thermal curtains), on-site assessment of house and project management.

[11] Beacon Pathway Limited. (February 2009). Briefing: Large scale renovation is BIG on job creation. Retrieved on 18 May 2009 from http://www.nzgbcservices.org.nz/resources/BeaconPathwayBriefingforJobsSummit_Feb2009.pdf.

[12] These figures represent total numbers of full time equivalent employees required to carry out the work. The numbers have been developed from detailed analysis of the time required to undertake the variety of renovation tasks outlined in the footnote above.

**Benefits of undertaking wide scale renovation in relation to jobs**

- Renovation activity involves a broad spectrum of skills and trades from unskilled labour through to qualified electricians, plumbers and builders, hence providing a diversity of employment opportunities.
- The jobs and skills required by renovation activity are easily transferred into and out of new build activity - providing a flexible workforce. As the housing stock is upgraded and New Zealand lifts out of a period of recession, the developed skill-sets required for renovation can be easily retuned for the new build construction sector.
- Specific regional targeting of renovation activity based on housing stock is possible - assisting communities who are in greater need of securing jobs and retaining skilled workers.
- Renovation activity can utilise and target New Zealand-made products and services helping to support the wider local economy (e.g. using locally-made insulation materials).
- The need for an element of low skilled labour in renovation installation provides employment for those who need it most.

The standard employment multiplier of 2.6 for the industry sector is then used to account for the additional employment generated through manufacturing, retailing and servicing of retrofit interventions (e.g. manufacturing and retailing insulation, solar water heating systems, extraction fans, etc.)

# Appendix C

The skeleton framework of the residential rating tool, defining categories and sub-categories, as well as information on suggested approach and other comments.

| Cate-gory | *Sub-category* | Description | Suggested Approach | Cod-ing | Comments |
|---|---|---|---|---|---|
| **Health and comfort** | *Daylight-ing* | CSH approach considered where the proportion of natural interior light as a percentage of outdoor illuminance for critical spaces is assessed numerically. | In recognition of the importance of good natural lighting. | | Advice 0-4 band (basic question only); upper end calculator based on CSH. |
| | *Sound insulation* | Several alternatives being considered - including CSH (which relies on increases to UK Building Codes) and Beacons more checklist approach | Recognising high performance acoustic buildings | | 0-4 band not included ; upper level details to be decided |
| | *Moisture control* | Use Beacon Homesmarts tool for lower Stars. For 5 plus stars, active (rather than passive) ventilation requirements specified in NZBC: kitchens is 50 l/s intermittent or 12 l/s continuous; baths and toilets is 25 l/s intermittent or 10 l/s continuous; laundry is 20 l/s intermittent. | Ventilation to all key wet areas. Ensure lower star homes meet NZBC active or passive levels for controlled ventilation, where openable windows are OK. | | Upper level assessor will have to make NZBC compliant. |
| | *Lifetime Homes* | Several support documents are out there: BRANZ Homes Without Barriers; NZS 4102 (1996) safer house design (guidelines to reduce injury at home) NZS 4121 Design for access. | Considers car access, level entry, exterior lighting and entry shelter, doorway width, wheelchair access etc | | Not workable at the lower end; advice provided, link with (or align with) LifeTime Design for upper end. |
| **Energy** | *Whole house thermal perfor-mance* | Promote well integrated passive solar design | For 1-4 star homes use modified Beacon Home Smarts tool to asses and provide both design advice and star ratings. For 5+ stars use HERS rating tool only | | Upper end HERS assessors could double as Tool assessors (with training) |
| | *Hot water* | Promote the selection of more effective hot water heaters. | Efficiency assessed using the Beacon Home Smarts tool for lower stars and the HERS hot water heating rating tool for upper stars. | | |

| | | | | | |
|---|---|---|---|---|---|
| | *Space heating* | Promote the selection of more effective space heaters. | Efficiency determined by HERS space heating tool | | Link to thermal performance to ensure that rewarded properly for zero energy houses; ensure integrated approach |
| | *White ware and Applian-ces* | Promote the selection of more effective white ware and appliances | Efficiency points awarded based on Energy Star ratings | | Look at fridge rating and perhaps dishwasher (advice only) and link to educational issues; |
| | *Renew-able energy* | Promote the use of on-site renewables | Consider CSH for 5-10 stars, simple questions for lower star bands to promote renewables | | Consider CSH approach for upper end and for lower possible yes/no question (need to refine lower end) |
| | *Lighting* | Promote the selection of efficient lighting | 0-4 ask basic questions; upper end TBD; possible "Right Light" website link | | 0-4 ask basic questions ; upper end TBD; possible "Right Light" website link |
| | *Clothes line* | Minimise dependence on dryers. | Adequate and provision for clothes drying | | Exclude security as measure. Don't need "secure" but include covered area. |
| **Water** | *Internal potable water use* | Determines water consumption by number/type of appliances and flow rates with default usage values, accounting for collection of greywater | Consider CSH calculation tool approach (pg 107); potentially put into a user friendly spreadsheet | | Fine as is - but don't need internal/external division. Include water meter question. Review applicability of WELS |
| | *Rain-water harvest-ing* | Ensure that there are well sized facilities to hold rainwater | Questions in 0-4 indicate size and usage | | As above |
| | *Grey-water reuse* | Includes tank or dosing basin that can be used as part of an irrigation system, from clothes washing, showers and faucets | Include simple question in 0-4 | | Include in 0-4 band. |

| | | | | | |
|---|---|---|---|---|---|
| **Materials** | *Material selection* | Until the assessment of compatibility of overseas third-party eco-labeling schemes is determined (likely to be later this year), only recognise Environmental Choice labels. | Recognise Environmental Choice materials only:<br>- i.e. paint, carpets (wool and synthetic), thermal insulation, floor coverings, plasterboard, etc. | | Include in 0-4 band. |
| | *VOC's & Toxic Materials* | Use non-toxic materials with low emissions | See TWG consensus comments | | Incorporate GS NZ Office for upper end - lower end accounted for in Environmental Choice requirements. |
| | *Respon-sible sourcing* | Examines the following building elements: frame, ground floor, upper floors, roof, external walls, internal walls, staircase. | Consider CSH approach (pg 123) which examines only the basic building materials: steel, concrete and timber, in terms of chain of custody responsible sourcing | | Only to upper end. |
| **Waste** | *House-hold recycling facility* | Collection storage requirements are 100 litres volume for a single bedroom dwelling, with a further 70 litres for each additional bedroom. All containers must be accessible to disabled people, and sited on a hard, level surface. | Consider CSH approach, which specifies minimum sized receptacles for waste storage.. | | Only to upper end. |
| | *Construc-tion waste manage-ment* | Requires a site waste management plan, records that confirm the monitoring of site waste through the whole construction period. Plan produced according to REBRI Guidelines for 5-10 Star homes. | Monitoring and reporting of waste generated during the construction phase, both during and post construction. | | REBRI for upper end only |
| | *Compost-ing facilities* | Adequate composting for size of household. | Consider CSH approach: individual composting facilities for the householder, of a good location, size, storage, and instruction. | | Disposal of kitchen waste |
| **Operation** | *Home user guide* | Includes maintenance requirements diary, how to use specific environmental-related resources, log of all manuals/warrantees associated with installed appliances, and trade contacts used | Develop simple template, then integrate appropriate details from Beacons NOW 100 Home manual work | | Simple approach taken in 0-4, potential for more complex commissioning in 5-10 |

| | | | | | |
|---|---|---|---|---|---|
| | *Security* | Issues: having well-defined main entrance, no solid fences above 1.5m in height, Outdoor security lighting with motion sensors, means of venting place without reducing security. | Consider BEACONS Best Practice recommendations, which operates like a checklist, with user having to meet a minimum number | | Suggest approach in accordance with Beacons research |
| **Ecology** | *Ecologic-al value of the site* | Mandatory that the development site is a refurbished building or/ not on land of high ecological value.<br>None of the following criteria must be applicable to the site:<br>- Within 100m of a natural wetland, land containing threatened plant communities or organisms, land containing significant native plants (that cannot be practically retained within the proposed development). | To avoid building on ecologically valuable sites. Approach based on 'Eco-1' Green Star Office | | To be further explored |
| | *Land Use* | To encourage and recognise the re-use of land that has been previously developed. Points awarded where site has been previously built on (over 75% of site must comply). | Use Green Star Office 09 approach | | To be further explored |
| | *Contam-inated Land* | Where adequate steps have been taken to decontaminate encapsulate or immobilise previously contaminated land | Green Star Office 09 Use which recognises positive actions that mitigate contaminated land for building | | To be further explored |
| | *Change in ecologic-al value of the site* | Calculator compares the relative ecological value of land use before and after development. | To minimise impact and encourage enhancement. Approach based on NZ Green Star Ecology Calculator | | To be further explored |
| | *Top soil and fill removal from site* | Cut and fill balanced on site and topsoil maintenance plan ensures ecological value is maintained and utilised. | Use which recognises practices that reduce the amount of discarded topsoil and fill | | To be further explored |
| **Site** | *Building Footprint* | To encourage better use of land and materials | Determined through the Net internal floor area: net internal ground floor area is > 2.5:1. Different requirements for blocks of flats etc. Based on CSH approach. | | Too involved to be addressed in lower end. To be further explored for upper end. |

| | | | | | |
|---|---|---|---|---|---|
| | *Storm water manage-ment* | Minimise impermeable areas (strip driveways, paths, landscaping). Aim for maximum of 30% effective impermeable area of the site. Consider achieving hydraulic neutrality (no discharge from site) through using Low Impact Design techniques | Requirement for onsite stormwater management | | Include questions at lower end |
| | *Avoid-ance of flood risk* | Points awarded for development sited out of flood plains | Development in flood plain | | Information not obtainable or consistent between authorities |

| | | | | |
|---|---|---|---|---|
| *Resourse consump -tion adjust-ment factor* | Adjustment factor compensates for the overarching effect of home size on resource consumption by adjusting the threshold for each particular star category. | The larger the home size, the more resources are used, and the harder it is therefore to gain each star. | | Simple calculation included |

**COLOUR CODING KEY**

Aspects included within the 0 - 4 online self assessment tool, as well as 5-10 band.

Considered for the 5 - 10 Star band range, but not in the 0 - 4 band.

# Appendix D

The questions that will appear on the online self-assessment, and the points awarded for each.

| | ENERGY AND COMFORT | POINTS |
|---|---|---|
| 1 | What sources of energy are used in your home? | % |
| 2 | What sort of lighting do you have? | **7** |
| 3 | How many fridges or freezers do you have? | % |
| 4 | How many of them are….: | **6** |
| 5 | Do you generate any of your own electricity from renewable sources (such as photovoltaics, wind or hydro) | **15** |
| 6 | Do you have the same ceiling type thoughout your house? | % |
| 7 | What type of ceiling insulation do you have? | % |
| 8 | Can you easily acccess your whole ceiling space? | % |
| 9 | How thick is your ceiling insulation? | **14** |
| 10 | What is the coverage of your ceiling insulation like? | % |
| 11 | Have you had an addition to your house put on, post 1979? | % |
| 12 | How many different types of ceiling do you have? | % |
| 13 | How much, as a percentage, does ceiling #1 cover of the total ceiling space? | % |
| 14 | How much, as a percentage, does ceiling #2 cover, of the total ceiling space? | % |
| 15 | What level of bulky insulation in the external wall do you have? | % |
| 16 | Do you have the same flooring type throughout your house? | % |
| 17 | What type of floor insulation do you have? | 6 |

| | | |
|---|---|---|
| 18 | Can you easily access under your whole floor space? | % |
| 19 | What is the coverage of your floor insulation lilke? | % |
| 20 | Have you had an addition to your house put on, post 1979? | % |
| 21 | How many types of flooring do you have? | % |
| 22 | How much, as a percentage, does flooring #1 cover of the total floor area? | % |
| 23 | How much, as a percentage, does flooring #2 cover, of the total flooring area? | % |
| 24 | What level of bulky insulation in the external wall do you have? | % |
| 25 | Do you have a vapour barrier installed under your home? | **4** |
| 26 | Do you have secondary or double glazing? | **12** |
| 27 | Do you have thick blinds/drapes/curtains on your windows? | % |
| 28 | Do you have draft excluder, draught strips or seals on your windows and/or outside doors? | **5** |
| 29 | What is the main way you currently heat your home? | **10** |
| 30 | What is the main way that you heat your hot water? | **8** |
| 31 | What age is the electric hot water cylinder (years)? | % |
| 32 | Is it wrapped with insulation? | % |
| 33 | When you heat your house, can you achieve comfortable temperatures easily? | **3** |
| 34 | Does the lounge or living room get uncomfortably hot for extended periods during the summer? | **4** |
| 35 | Do you have a range hood in the kitchen which is vented to the outside? | **4** |
| 36 | Do all bathrooms/ensuite with baths or showers have mechanical fans that are vented to the outside? | **4** |
| 37 | Do you have an outdoor washing line? | **3** |
| 38 | Do you need a light on during a sunny day for activities like reading ? | |

## WATER

| | | POINTS |
|---|---|---|
| 1 | Are you connected to the town water supply? | **9** |
| 2 | Have you got a rain water tank or rain barrel? | **8** |
| 3 | What size is it? | **8** |
| 4 | What do you use the water from your tank/barrel/water butt for? | **8** |
| 5 | Do you have low flow shower heads or shower heads with flow rates below 9 litres per minute in all showers? | **3** |
| 6 | What are the toilets in the house like? | **5** |
| 7 | Do you have a grey water system? | **10** |
| 8 | How is your storm-water managed? | **6** |

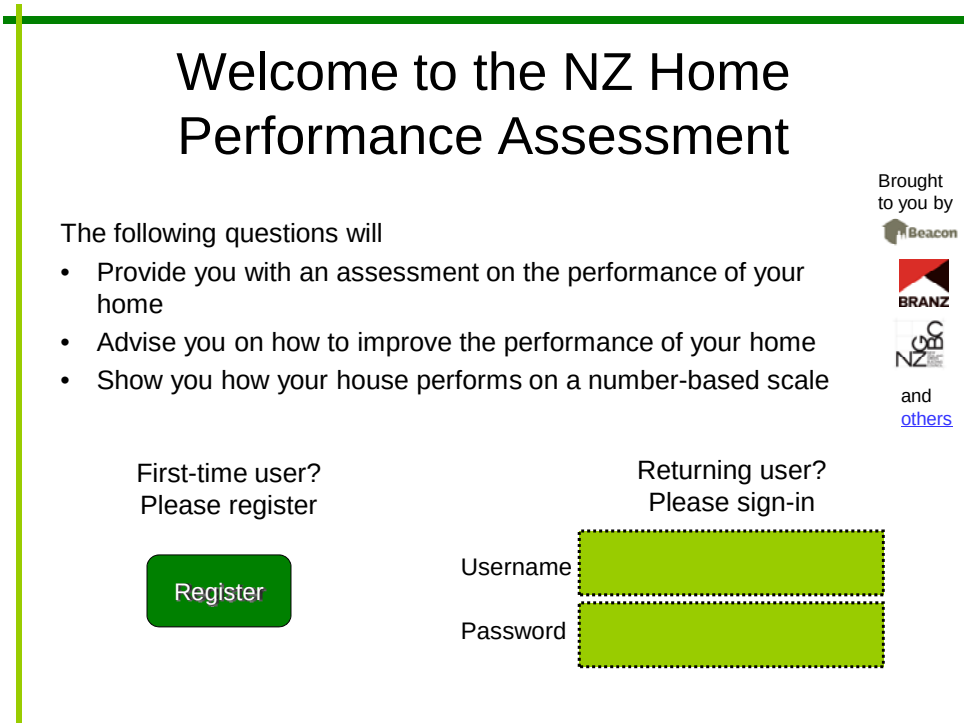
## OTHER

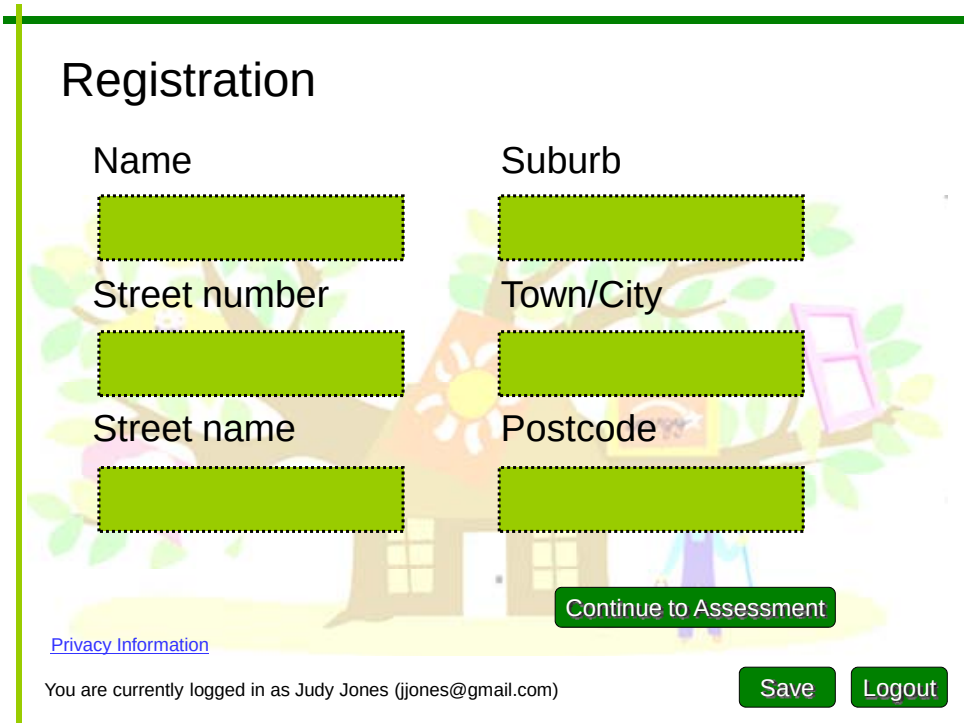
| | | POINTS |
|---|---|---|
| 1 | Have you spent $500 or more on Environmental Choice certified building products? | **3** |
| 2 | How do you dispose of your kitchen waste? | **6** |
| 3 | Have you prepared a home maintenance and operation manual? | **6** |
| 4 | Do any of the following apply?.... | **3** |

**NOTE: The '%' coded points indicate that the question has dependencies (multipliers) associated with it.**

# Appendix E

An example of the presentation of the online self-assessment.



## Registration

Name

Suburb

Street number

Town/City

Street name

The online rating system will allow the user to save their progress and return to complete the questions at a later time

Continu… Assessment

Privacy Information

You are currently logged in as Judy Jones (jjones@gmail.com)

Save Logout

## What type of home do you have?

Early Housing (pre-1890)

Art Deco (1925-1935)

Art Deco (1925 –1935)
Likely to require moderate to considerable effort and cost to energy retrofit

1970's Housing Pre-Insulation

Villa (1880-1920)

State Housing (1930-1970)

1980's Housing

Bungalow (1920-1940)

1960's and 1970's Multiunit Houses

1996-2007 Post-Insulation Upgrade

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Next Save Logout

## How big is your home?

**My home is…**

- ☐ Less than 100m$^2$
- ☐ 100-120m$^2$
- ☐ 121-140m$^2$
- ☑ 141 -160m$^2$
- ☐ 161-180 m$^2$
- ☐ 181 -200m$^2$
- ☐ 201-220 m$^2$
- ☐ 221-240m$^2$
- ☐ 241- 260m$^2$
- ☐ More than 260m$^2$

*A size guide: Two bedroom unit approx 75m$^2$; Average older 3 bedroom home approx 100m$^2$; Older 4 bedroom home approx 120m$^2$; More modern 3-4 bedroom homes are often greater than 150m$^2$.*

Next

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## Energy

**What sources of energy are used in your home** (click all that apply)**?**

- ☑ Electricity
- ☐ Reticulated/ Home gas
- ☐ LPG
- ☐ Renewables (solar/wind/hydro)
- ☐ Diesel
- ☐ Oil
- ☐ Wood/ Wood Pellets

Next

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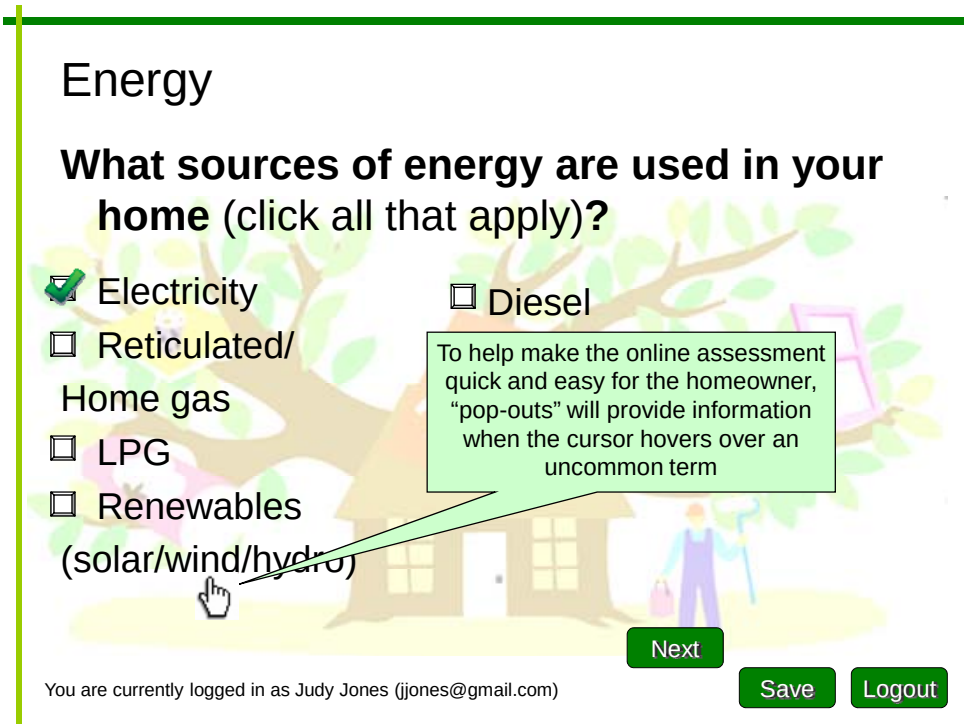
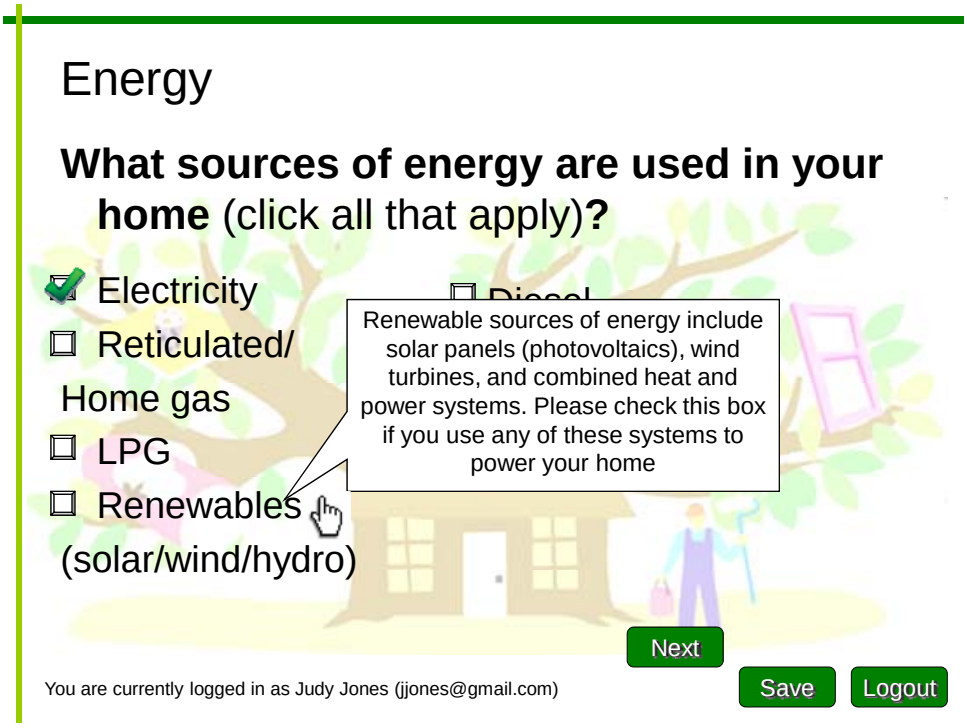

Energy
What sources of energy are used in your home (click all that apply)?
Electricity
Reticulated/ Home gas
LPG
Renewables (solar/wind/hydro)
Diesel
To help make the online assessment quick and easy for the homeowner, “pop-outs” will provide information when the cursor hovers over an uncommon term
Next
You are currently logged in as Judy Jones (jjones@gmail.com)
Save
Logout


Energy
What sources of energy are used in your home (click all that apply)?
Electricity
Reticulated/ Home gas
LPG
Renewables (solar/wind/hydro)
Renewable sources of energy include solar panels (photovoltaics), wind turbines, and combined heat and power systems. Please check this box if you use any of these systems to power your home
Next
You are currently logged in as Judy Jones (jjones@gmail.com)
Save
Logout

## Energy

**What is the main way that you heat your hot water?**

- [x] Electric hot water cylinder
- [ ] Gas (with hot water cylinder)
- [ ] Wetback
- [ ] Instant gas
- [ ] Instant electric
- [ ] Heat pump hot water system
- [ ] Solar Hot Water system

Next

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## Energy

**What age is the electric hot water cylinder (years)?**

- [ ] Post 2004
- [ ] Between 1997 and 2004
- [x] Prior to 1997 or unknown

Next

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## Water

**Is your hot water cylinder wrapped in insulation?**


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Save Logout

# **Tips and Advice**

- One possible way to present information to the homeowner would be through pop-up ‘tips’ (see next slide).
- Another way to present the information could involve a final summary report, suggesting changes to be made throughout the entire home.

## Advice

### Wrap/insulate your hot water heater

Your primary hot water cylinder was identified as being more than 12 years of age, therefore it will be poorly insulated. **We suggest that you look at either replacing it with a more efficient one, or putting on a cylinder wrap if practical**.
*If you are thinking of replacing your hot water system* you should consider the installation of a solar water heating system. By harnessing renewable energy from the sun to heat your water, you can reduce your hot water bills dramatically.

Next

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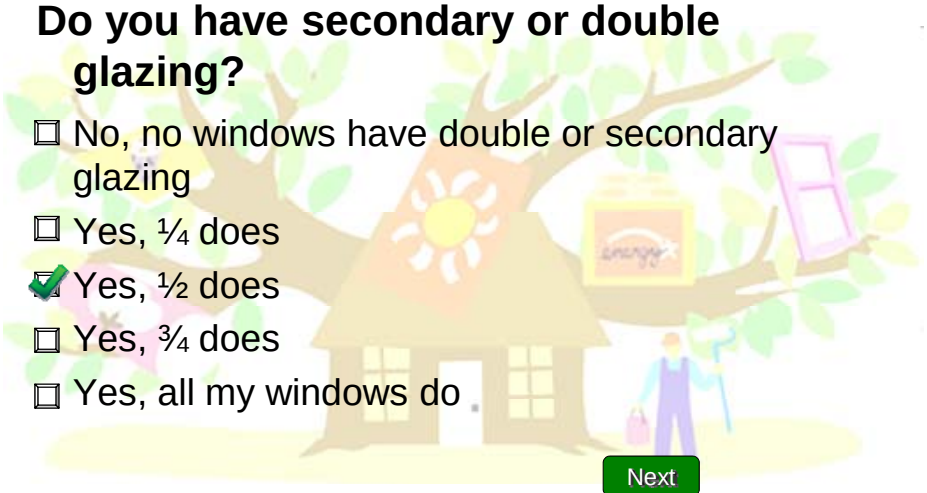
## Comfort

### Do you have secondary or double glazing?

- ☐ No, no windows have double or secondary glazing
- ☐ Yes, ¼ does
- ☑ Yes, ½ does
- ☐ Yes, ¾ does
- ☐ Yes, all my windows do



Next

You are currently logged in as Judy Jones (jjones@gmail.com) Save Logout

## Comfort

**When you heat your house, can you achieve comfortable temperatures easily?**

YES NO

Next

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## Water

**Have you got a rain water tank or rain barrel?**

YES NO

Next

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## Water

**What size is your rain water tank or rain barrel (litres)?**

Helpful converter

gallons

=

litres

- ☐ 1000
- ☑ 1000 - 2000
- ☐ 2000 - 5000
- ☐ 5000 - 10000
- ☐ 10000+

Next

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## Water

**What do you use the water from your tank/barrel/water butt for** (click all that apply)**?**

- ☐ Not at all
- ☐ For everything
- ☑ In the garden
- ☐ For toilet flushing
- ☐ In the laundry
- ☐ For hot water uses

Next

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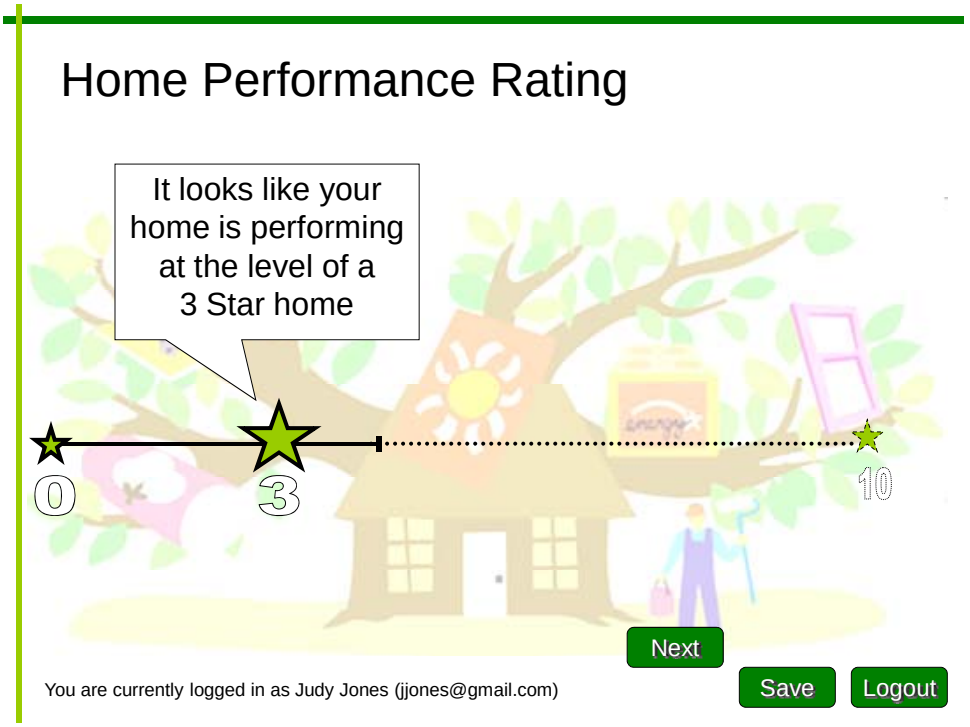
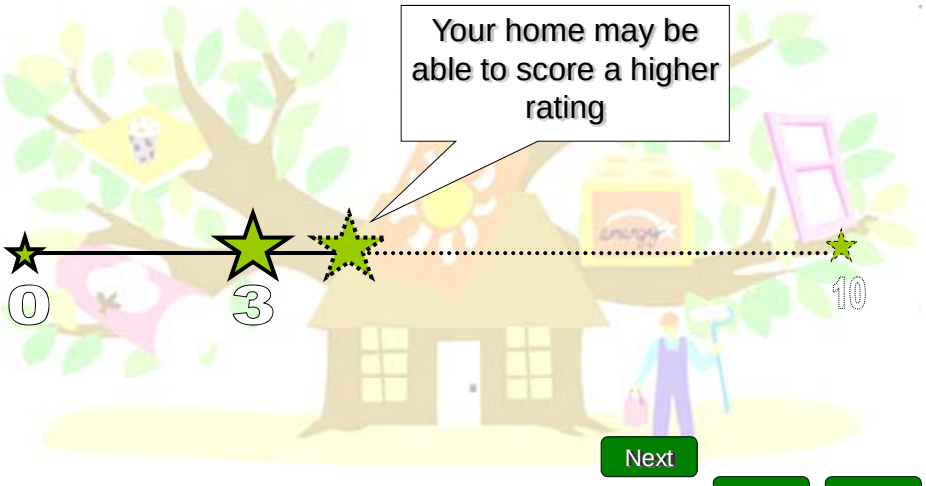
# **Final Feedback Types**

- There are a few different ways that the homeowner may see and review their results, and be presented with various prompts and options. Two different versions will be presented here.
- The best approach will be determined in the near future through consumer testing.



## Home Performance Rating

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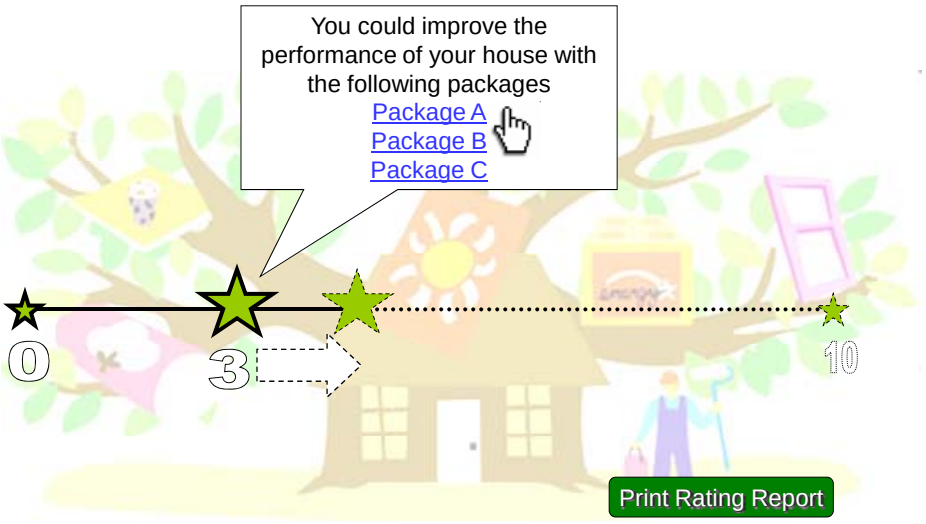
## Home Performance Rating

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# Package A

Find Local Package Providers

*This package is designed to improve environmental and heath performance of your home:*

- Cylinder wrap for primary hot water system $85 *[HIGH PRIORITY]*
- Close off open fire *[HIGH PRIORITY]*
- Draught strip windows $88 *[HIGH PRIORITY]*
- Draught stop doors $36 *[HIGH PRIORITY]*
- Roof insulation $1600 *[HIGH PRIORITY]*
- 7 CFL(s) $35 *[LOW PRIORITY]*

View Package B | Return to Assessment

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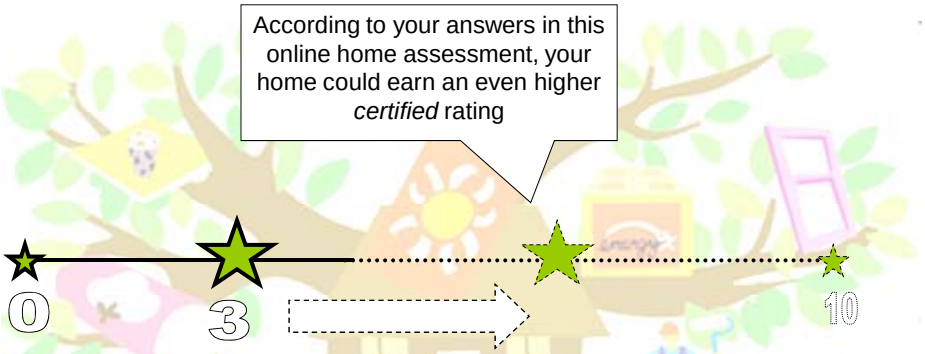
Save | Logout

# Home Performance Rating




Finish Assessment | How can I gain a certified rating?

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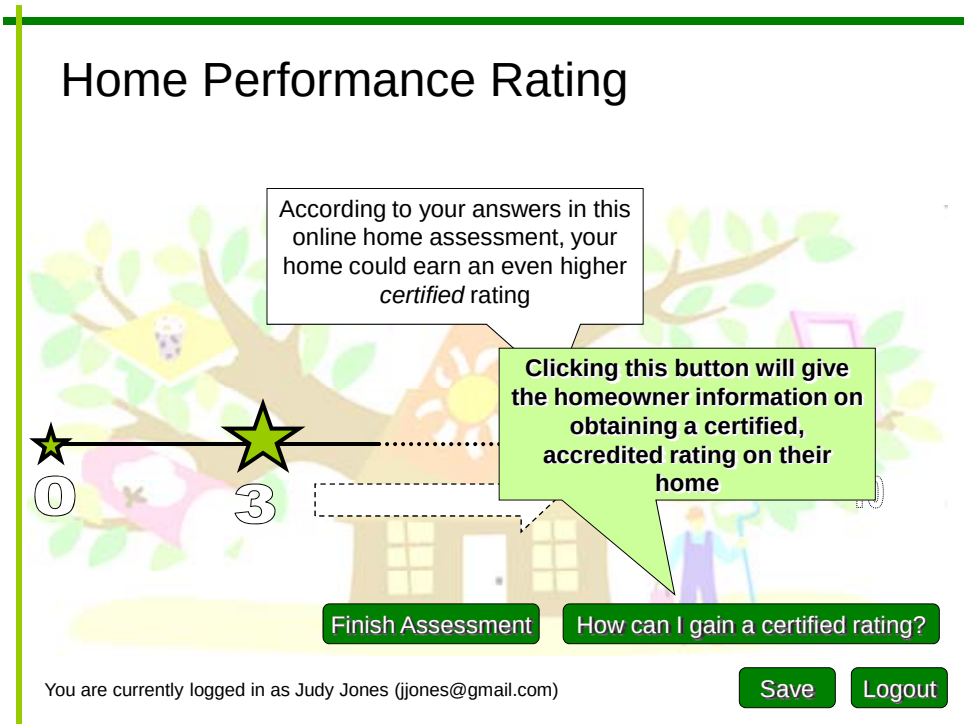
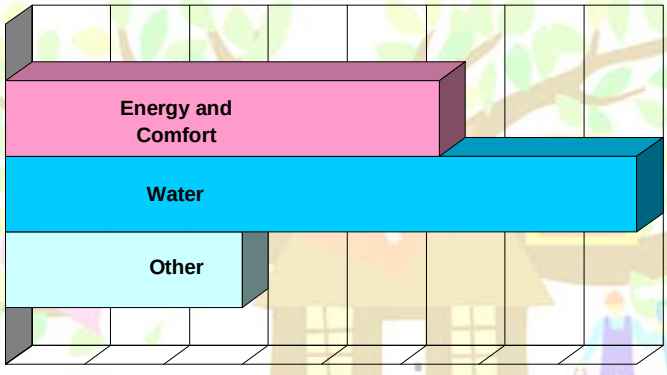
Save | Logout




# Other ‘Results Display’ Type

# Home Performance Rating

Your home has earned a 4 Star rating
*This is the highest rating that is available with this online assessment*



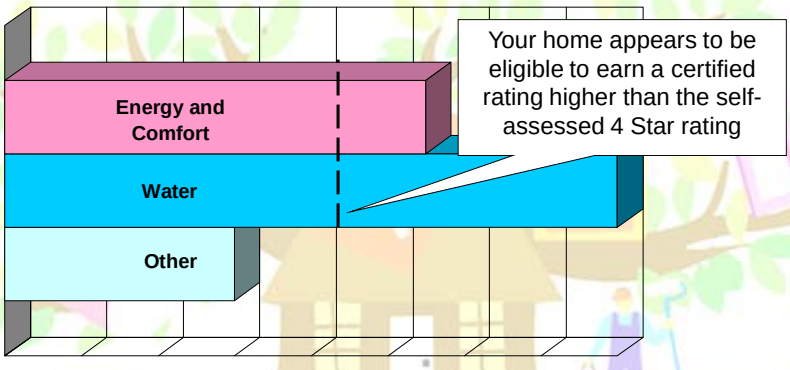

Next

You are currently logged in as Judy Jones (jjones@gmail.com)

Save Logout

# Home Performance Rating

Your home has earned a 4 Star rating
This is the highest rating that is available with this online assessment




Finish Assessment How can I earn a higher rating?

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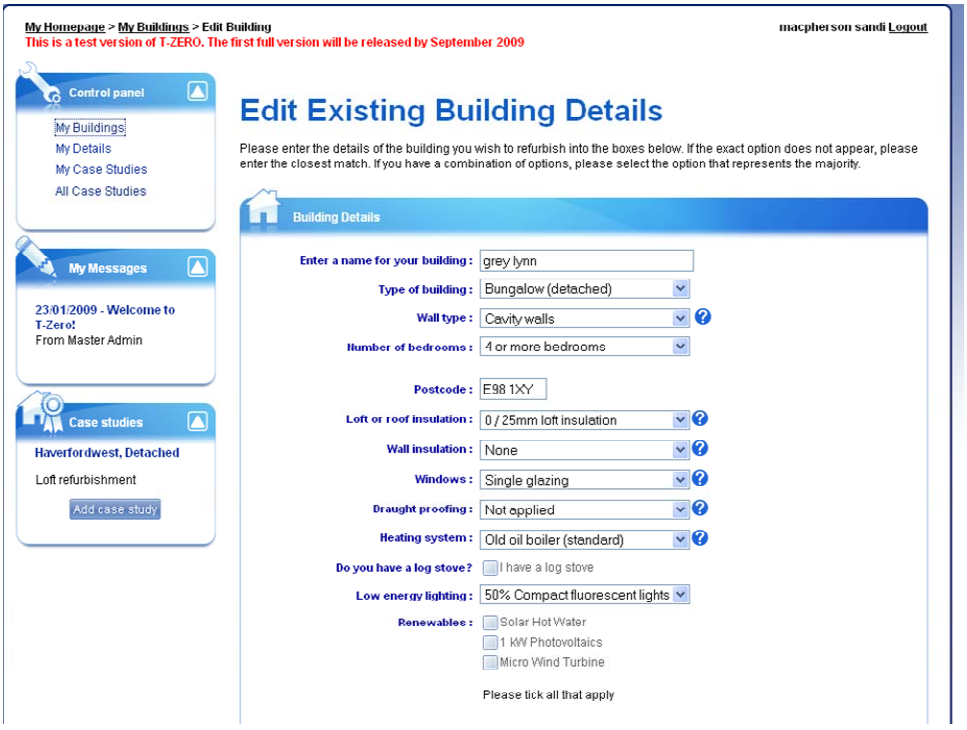
Save Logout

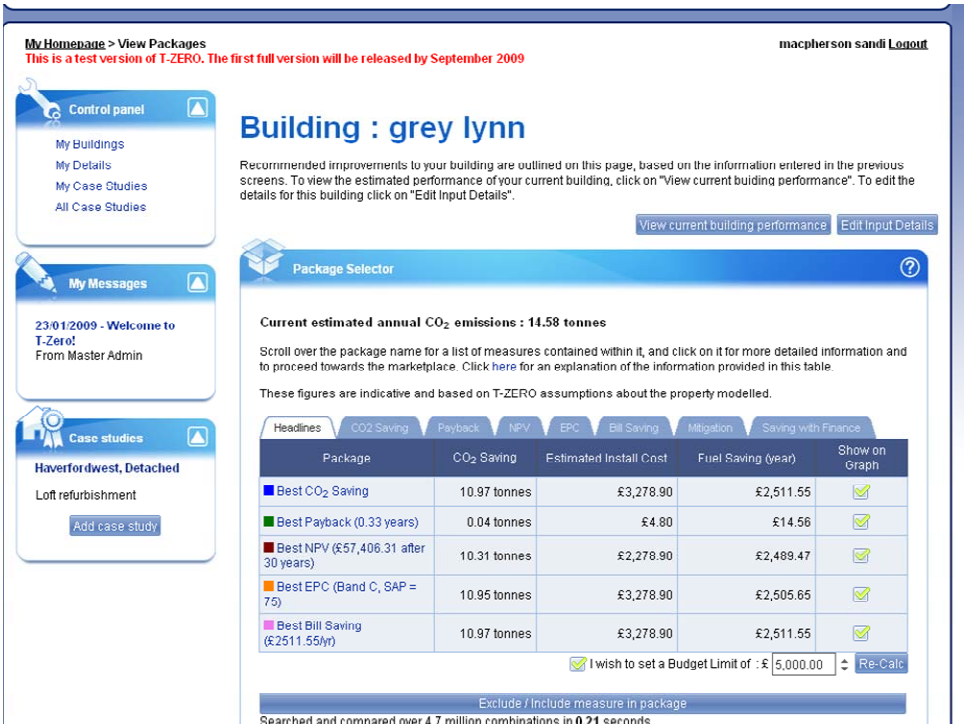
# Other Websites

- The following images show both input and output screens from other online home rating tools. These screens and their display methods present some potential options as to how we may provide information with our online rating system.
- Both of these systems are from the UK, and are focused on $CO_2$ reduction.

T-zero (http://www.tzero.org.uk/)

Act On CO2 (http://actonco2.direct.gov.uk/index.html)




My Homepage > View Packages
macpherson sandi Logout
This is a test version of T-ZERO. The first full version will be released by September 2009
Control panel
My Buildings
My Details
My Case Studies
All Case Studies
My Messages
23/01/2009 - Welcome to T-Zero!
From Master Admin
Case studies
Haverfordwest, Detached
Loft refurbishment
Add case study
Building : grey lynn
Recommended improvements to your building are outlined on this page, based on the information entered in the previous screens. To view the estimated performance of your current building, click on "View current buiding performance". To edit the details for this building click on "Edit Input Details".
View current building performance
Edit Input Details
Package Selector
Current estimated annual CO2 emissions : 14.58 tonnes
Scroll over the package name for a list of measures contained within it, and click on it for more detailed information and to proceed towards the marketplace. Click here for an explanation of the information provided in this table.
These figures are indicative and based on T-ZERO assumptions about the property modelled.
Headlines
CO2 Saving
Payback
NPV
EPC
Bill Saving
Mitigation
Saving with Finance
Package
CO2 Saving
Estimated Install Cost
Fuel Saving (year)
Show on Graph
Best CO2 Saving
10.97 tonnes
£3,278.90
£2,511.55
Best Payback (0.33 years)
0.04 tonnes
£4.80
£14.56
Best NPV (£57,406.31 after 30 years)
10.31 tonnes
£2,278.90
£2,489.47
Best EPC (Band C, SAP = 75)
10.95 tonnes
£3,278.90
£2,505.65
Best Bill Saving (£2511.55/yr)
10.97 tonnes
£3,278.90
£2,511.55
I wish to set a Budget Limit of : £ 5,000.00
Re-Calc
Exclude / Include measure in package
Searched and compared over 4.7 million combinations in 0.21 seconds


HTML version
Directgov
Public services all in one place
your home
your appliances
your travel
Home | Sign-up & Save
ACT ON CO2 Calculator
About your home
What type of property do you live in?
Flat
House
Maisonette
Bungalow
previous
next
Save your answers
sign-up
Your CO2 Calculations - FAQs | Act On CO2 | Directgov | Accessibility | Feedback | Your Privacy | © Crown copyright

# Appendix F

The following draft questions were developed for the EECA ENERGYWISE™ Warm Up New Zealand: Heat Smart Programme, to be used in an online self-assessment.

1. **What type of house do you live in? (Photos of typologies provided)**

2. **How big is your house?**

   Actual size [ ] $m^2$

Size guide- Two bedroom unit approx 75m2, older 3 bedroom home approx 100m2, older 4 bedroom home approx 120m2, more modern 3-4 bedroom homes are often greater than 150m 2)?

☐ Less than 100$m^2$ ☐ 100-120$m^2$ ☐ 121-140$m^2$ ☐ 141 -160$m^2$ ☐161-180$m^2$

☐181 -200$m^2$ ☐ 201-220 $m^2$ ☐ 221-240$m^2$ ☐ 241 – 260$m^2$ ☐Greater than 260$m^2$

3. **How many bedrooms does your house have?**

## ENERGY

4. **What sources of energy are used in your home?** (tick as many as apply)

☐ Electricity ☐ Reticulated gas ☐ LPG ☐ Other

☐ Onsite renewables (e.g. Solar, wind) ☐ Diesel ☐ Oil

☐ Home gas ☐ Wood ☐ Wood Pellets

5. **What sort of lighting do you have?**

   ☐ None of my lights are efficient or don't know

   ☐ 1/3 of the house has efficient lighting

   ☐ 2/3 of the house has efficient lighting

   ☐ The entire house has efficient lighting

6. **Are all of your refrigerator(s)/freezer(s)**

   ☐ More than 10 years old

   ☐ Less than ten years old

☐ Less than 10 years old AND has/have at least a four star energy label rating

7. **Do you generate any of your own electricity from renewable sources such as photovoltaic's, wind or hydro?**

   ☐ NO

   ☐ YES, up to 30% of total electricity

   ☐ YES, between 31% and 60% of total electricity

   ☐ YES, greater than 60% of total electricity

# THERMAL ENVELOPE

## Ceiling

8. **Can you get into your ceiling (i.e. does it have access hatch and / or crawl space?)**

   ☐ Yes ☐ No

9. **What type of ceiling insulation do you have?**

   ☐ Blown insulation or macerated paper

   ☐ Batts or blanket insulation

   ☐ No insulation or don't know

10. **What thickness of ceiling insulation do you have?**

    ☐ Less than 10cm

    ☐ 10-20cm

    ☐ 21 -30cm

    ☐ 30cm + ☐ No insulation or don't know

11. **What is the coverage of your ceiling insulation like?**

    ☐ Covers all of the ceiling well and is in good condition

    ☐ Patchy in places or poor condition

    ☐ None or don't know

## Walls

**12. What level of bulky insulation in the wall do you have?**

- ☐ No wall insulation, or don't know
- ☐ 1/3 of the house has wall insulation
- ☐ 2/3/ of the house has wall insulation
- ☐ The entire house has wall insulation
- ☐ The entire house has wall insulation installed in the last 10 years

## Underfloor

**13. What type of floor insulation do you have?**

- ☐ Foil
- ☐ Polystyrene
- ☐ Bulky insulation
- ☐ No insulation or don't know

**14. How much of your house floor is insulated?**

- ☐ No floor insulation, or don't know
- ☐ 1/3 of the house has floor insulation
- ☐ 2/3/ of the house has floor insulation
- ☐ The entire house has floor insulation

**15. Do you have a vapour barrier installed under your home?**

- ☐ No vapour barrier, or don't know
- ☐ 1/3 of the house has a vapour barrier
- ☐ 2/3 of the house has a vapour barrier
- ☐ The entire house has a vapour barrier

## Windows

**16. Do you have double or secondary glazing?**

- ☐ No, no windows have double or secondary glazing
- ☐ Yes, 1/3 of my windows have double or secondary glazing
- ☐ Yes, 2/3 of my windows have double or secondary glazing
- ☐ Yes, all of my windows have double or secondary glazing

**17. Do you have <u>thick</u> blinds/drapes/curtains on your windows?**

- ☐ No, no windows have thick drapes/curtains/blinds
- ☐ Yes, 1/3 of my windows have thick drapes/curtains/blinds
- ☐ Yes, 2/3 of my windows have thick drapes/curtains/blinds
- ☐ Yes, all of my windows have thick drapes/curtains/blinds

**18. Do you have <u>draught excluders, draught strips</u> or rubber seals on your windows and/or doors?**

- ☐ No
- ☐ Yes, 1/3 of my windows have draught stripping
- ☐ Yes, 2/3 of my windows have draught stripping
- ☐ Yes, all of my windows have draught stripping

## SPACE HEATING

**19. What is the main way that you currently heat your home?**

- ☐ Portable electric heaters (e.g. oil column, fan)
- ☐ Portable gas/LPG heater
- ☐ Fixed electric heater (e.g. wall mounted panel heater)
- ☐ Fixed unflued gas (e.g. wall mounted)

☐ Flued gas (with chimney or out the wall)

☐ Wood burner (less than 5 years old) ☐ Wood burner (5 plus years old)

☐ Heat pump (old)

☐ Heat pump (new)

☐ Open fire

☐ Wood Pellet Burner

☐ Oil/Diesel burner

☐ Coal burner

☐ Other (please identify) ☐ No heating

## WATER HEATING

20. **What is the main way that you heat your hot water?**

☐ Electric hot water cylinder ☐ Gas with hot water cylinder ☐ Wetback ☐ Instant gas
☐ Instant electric ☐ Heat pump hot water system
☐ Solar Hot Water system ☐ Solar Hot Water combined with a wetback

**21. Do you have a hot water cylinder and if so what age is it?**

☐ No, don't have one ☐ Yes, less than 5 years old

☐ Yes, between 5 and 12 years old ☐ Yes, more than 12 years

**22. If you have a hot water cylinder, is it wrapped with insulation?**

☐ No, don't have a cylinder ☐ Yes, have a cylinder and it is wrapped

☐ Yes, have a cylinder and it is not wrapped

# Appendix G

A list of stakeholder organizations that have expressed interest in a residential rating tool based on environmental or home performance criteria.

| | |
|---|---|
| ABSA<br>Aluminium Systems Ltd<br>Alutech Windows & Doors Ltd<br>Archaus Architects<br>Architectus Auckland<br>Asthma Foundation<br>Bank of New Zealand<br>Barfoot and Thompson<br>BCITO<br>Beacon Pathways<br>Bill English Office<br>Branz Ltd<br>Certified Builders<br>CMS Future-Proof Building Consumer<br>Contact Energy Limited<br>Council for Socially Responsible Investment<br>Cresa<br>Domestic Energy Users Network<br>Dulux NZ<br>Ebode / Heritage Design Group<br>EECA<br>Fletcher Building Ltd<br>Greenroofs Ltd<br>Group Building Solutions Ltd<br>Harcourts NZ<br>HERA<br>Hikurangi Foundation<br>Hobsonville Land Company Ltd<br>Home Energy Advice Centre<br>HSBC<br>IAG New Zealand Limited<br>InterfaceNZ<br>IPENZ<br>James Hardie<br>Jasmax Limited<br>Jennian Homes<br>Jennian Homes Canterbury Ltd<br>Jennian Homes Waikato Ltd<br>Jennian Homes Wellington Ltd | Lifetime Design<br>Master Builders<br>MED<br>Meridian Energy Ltd<br>Metro Water Limited<br>Metrowater<br>MfE<br>Mighty River Power Limited<br>Mitre10<br>Monier Brick<br>NZ Green Building Council<br>NZ Inst of Architects<br>NZ Metal Roofing Manufacturers Inc<br>NZ Steel<br>NZIA<br>Parex Industries<br>ProClima<br>Property Council of NZ<br>Property Investment Assn<br>Ramset NZ<br>Resene Paints Ltd<br>Right House<br>Rinnai<br>SCION Next generation biomaterials (formerly Forest Research)<br>Solid Energy New Zealand Limited<br>Standards NZ<br>Stonewood Homes<br>Tasman Insulation NZ Ltd<br>Thermosash Commercial Ltd<br>Treasury<br>TrustPower Limited<br>University of Otago<br>Vector Limited<br>Warren and Mahoney<br>Watercare Services Limited<br>Wattyl NZ Ltd<br>Westpac<br>Westpac New Zealand Limited<br>Winstone Wallboards |