

## **TRANSFORMING NEW ZEALAND'S HOMES**

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### **ABSTRACT**

The quality of our homes determines the amount of energy needed to keep us warm and the amount of water we withdraw from the environment. It also has impact on the local biodiversity, air quality, greenhouse gas emissions, and the health and well-being of people.

Recognising the importance of these issues, the Ministry for the Environment contracted the development of an on-line resource to encourage New Zealanders to improve the sustainability of their homes. The team lead by Beacon Pathway and Consumer's Institute, and supported by Building Research and the Department of Building and Housing, launched the resource earlier this year. The Department of Building and Housing is now responsible for the site and is maintaining continuity of management with Consumer and associated stakeholders.

The emphasis is on promoting the concept of "smart homes" - homes that are warm, healthy, deliver a great lifestyle, and are gentle on the environment. In the process of developing the resource, the team engaged with a wide group of stakeholders including the building industry and consumers to ensure that the website's information was practical, reliable, accessible and could quickly lead to action.

This paper presents this exciting new resource and outlines the approach used to entice consumers (home occupiers) and industry (home providers) to learn more about what options they have to improve their homes by using interactive tools that highlight the impacts the homes have on people's lives.

Importantly, this paper also outlines the network of government and industry led sustainable building initiatives that this website is connected to. The aim is for these initiatives to trigger a transformation of the New Zealand residential building sector leading to higher quality, better designed, healthy, less resource intensive, and carbon neutral homes.

### **KEYWORDS:**

Sustainable building, green building, smart homes, sustainable building and renovating, website resource.

### **1. INTRODUCTION**

Globally, the building and construction sector's environmental impacts are significantly greater than its contribution to Gross Domestic Product (GDP). From UNEP (2003), the global sector accounts for:

- 10 % of GDP
- 7 % of jobs
- 50 % of resource use
- 40 % of energy use

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- 40 % of greenhouse gas emissions.

A large proportion of our resources are unnecessarily consumed in our homes, significantly contributing to emissions of greenhouse gases and climate change. According to EECA New Zealand homes use 30% of New Zealand's electricity and 13% of total energy sources.

At the same time, a survey conducted by BRANZ Ltd () showed that close to a third of New Zealand homes were colder than the minimum standards recommended by the World Health Organisation: 16°C in bedrooms and 18°C in living areas. Energy Efficiency and Conservation Authority (EECA) reports that 45% of our homes suffer from problems associated with moisture.

This poor performance impacts on our health. Otago University School of Medicine reports that damp homes are associated with increased numbers of doctor's visits for respiratory problems. Close to 15% of New Zealanders suffer from allergies related to mould and spores that grow in most of our homes.

And it is not only health but also our pockets that suffer. A study by Parliamentary Commissioner for the Environment in 2004 showed that households using electricity as the main source of heat spend around \$120 per month on heating alone in winter.

It is widely considered that knowledge about the advantages of more sustainable homes is not mainstream. Where consumer demand does exist, there is often not industry expertise available to meet that demand.

Research indicates that one of the key barriers to investment in sustainable building and renovating practices is the lack of readily accessible and reliable information on the full range of options available and their benefits in terms of cost savings, health and wellbeing, and the environment.

The poor performance of many of New Zealand's current homes in relation to peoples' health and the environment is also of concern. Future housing, population and demographic projections show that we cannot solely rely on new builds and demolitions to improve housing stock. Resource use, urban land use and financial considerations mean that redevelopment and renovating of existing stock is also required.

The Smarter Homes project has been designed as a non-regulatory web-based tool to increase knowledge about the benefits of building and renovating more sustainably, and to provide technical information to advance industry 'best practice'.

The Smarter Homes website ([www.smarterhomes.org.nz](http://www.smarterhomes.org.nz)) was publicly launched in June 2007.

## **2. SMARTER HOMES – THE PROJECT**

### **2.1 Project Background**

As part of the 2003 budget the Ministry for the Environment received funding (\$0.9 million over three years) for a new initiative to help improve the performance of New Zealand's residential buildings so that they are healthier, more suited to peoples' needs and have less environmental impacts – i.e. to make them more sustainable.

The project was based on an Australian project called 'Your Home'. The major product of the Your Home project is available on [www.greenhouse.gov.au/yourhome/](http://www.greenhouse.gov.au/yourhome/). It consists of consumer information and technical information for designers and tradespeople to develop the desire, knowledge and skills to build and renovate more sustainable residential buildings.

The Smarter Homes project maximises the use of material made available from the Australian ‘Your Home’ project, as well as other New Zealand sources in order to ensure its usefulness, be cost effective, and avoid duplication.

### **2.1.1 What are sustainable buildings?**

There are many definitions of sustainable building (also known as Environmentally Sustainable Building (ESB), Green Architecture, and Green Building). However, most definitions capture similar issues related to the economic, environmental and social impacts of the construction of buildings and their longer term impacts. The California Sustainable Building Task Force considers sustainable buildings are sensitive to:

- Environment
- Resource and energy consumption
- Impact on people (quality and healthiness of the work or living environment and impacts on the wider urban environment)
- Financial impact (cost-effectiveness from a whole of life perspective)
- The world at large (a broader set of issues such as greenhouse gas emissions, ozone depletion)
- Impacts of the operation of building over its life time.

## **2.2 Project Objectives**

In order to contribute to more sustainable New Zealand residential housing, the Smarter Homes website aims to create and stimulate consumer demand through the provision of credible and accessible information. At the same time, it is designed to enable designers and tradespeople to use the information in order to develop the knowledge and skills to both anticipate and meet that demand.

In short, Smarter Homes has been designed to produce a comprehensive web-based information resource for sustainable residential building and renovating in a format that is supported and used by consumers, developers, tradespeople, councils, and industry trainers.

It uses independent research, where necessary, to maintain credible ‘best practice’ information focussing on affordable, practical and readily adoptable building solutions.

## **2.3 Critical Success Factors**

The critical success factors identified for the Smarter Homes project are:

- a) The information should be up-to-date, practical and technically sound
- b) The information should be endorsed and be easily used by target audiences listed in this document
- c) The information should strive to motivate the target audiences and should be well marketed
- d) The information resource should be self-supporting once set up and should continue to stimulate innovation in the sector
- e) The currency of the information is updated and maintained beyond the funding period (July 2007)
- f) Issues around defining ‘best practice’ are successfully negotiated within the context of the current Building Code Review and with links to best practice bodies such as Standards NZ and IPENZ
- g) Any significant risks around explicit or implicit endorsement of certain methods, materials and products are identified and managed
- h) The project should work alongside other related initiatives for mutual benefit and to avoid duplication (such as the Ministry for the Environment’s Warm Homes project, and the Energy Efficiency and Conservation Authority’s home heating and retrofit advice).

## **2.4 Target Audiences**

The primary target audience for Smarter Homes is consumers (home occupiers) and designers and tradespeople (home providers). The secondary audience is made up of industry trainers, councils, developers and building material and product companies.

The website focuses on people in the consideration stage: those renovating, building or buying homes in order to increase its efficiency in encouraging action.

The needs of these audiences differ between the new build process and the renovation process. For example, many new-builds involve large volume building companies, subcontractors and material suppliers, whereas many renovations involve 'do-it-yourselfers' and retail outlets.

The information needs of the target audiences were refined during the first phase of the project which involved reviewing the huge amount of literature available on sustainable building (both New Zealand and overseas), identifying the information gaps and conflicting information, and determining information needs of the target audiences.

## **2.5 What does Smarter Homes cover?**

Information relevant to all forms of residential living is included on Smarter Homes, from multi-story apartments to mixed use buildings to detached houses.

The information also covers all aspects of a building's lifecycle, including designing and building a new house, living (operation), maintenance, retrofits/renovations, demolition/reuse. The information also briefly covers buying and relocating a house. Designing and building a new house and retrofits/renovations were seen as the most important elements and these aspects therefore have the most coverage on the website.

In reviewing the Australian 'Your Home' model and the other information available, several significant gaps were identified that required addressing in order to meet user needs. The issues included:

- a) The breadth of coverage of topics, such as health, needed expanding to fit New Zealand conditions and priorities
- b) Similarly the coverage of the range of building types was too narrow (needs to cover detached houses through to apartments)
- c) The need to go beyond 'new builds' to address the existing New Zealand housing stock
- d) The depth of information coverage did not cover the technical 'how to carry out the work', which is a key impediment to uptake
- e) The resource will have a limited 'shelf life' unless there is ongoing support and commitment to update and maintain the currency of the information.

Smarter Homes has been designed to address all aspects of sustainability for residential building and renovating, including:

- Comfortable homes – warm, dry, quiet, natural light, liveable and appealing
- Healthy homes – quality indoor air, secure, safe, non-toxic
- Resource efficient homes – affordable, low-energy, low greenhouse gas emissions, water, materials, location (e.g. urban design aspects), durable (e.g. to climate change effects).

Importantly, the information is relevant to renovations of the existing housing stock, as well as new builds. Renovation is important because most of New Zealand's poorly performing (unhealthy and resource intensive) housing was built before 1970 (when basic insulation became mandatory). The rate of demolition and replacement by new builds will not significantly address this problem, even in the medium term.

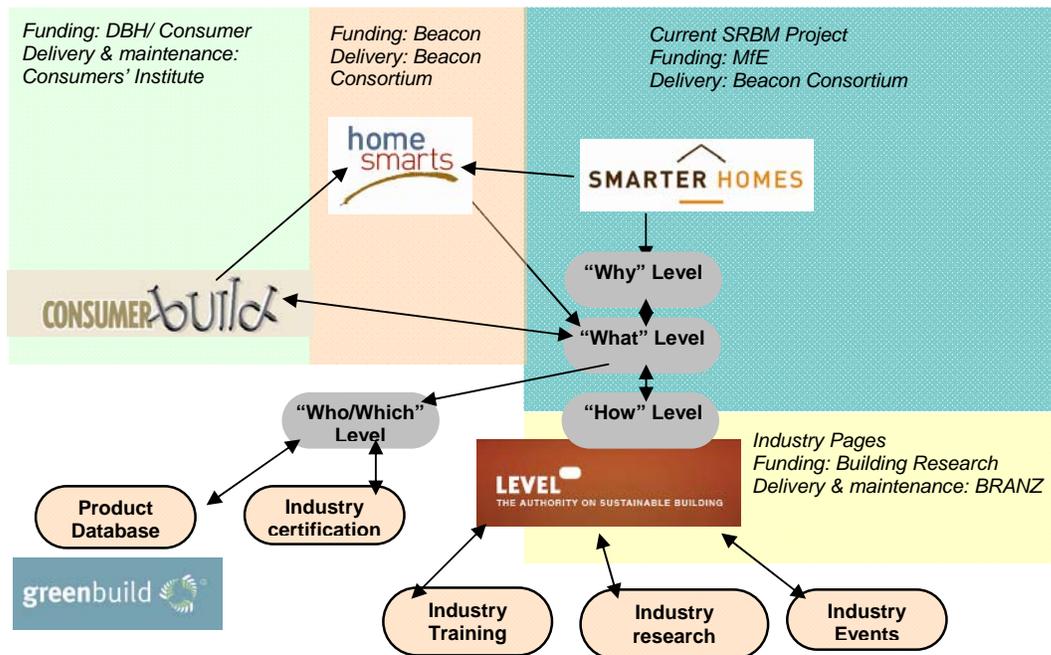
The information and case studies on Smarter Homes focus on improving mainstream design, construction methods and materials (such as wood and wood building systems). ‘Alternative’ materials and building systems (such as straw bales and mud bricks) are not a primary emphasis.

### 3. BUILDING ‘SMARTER HOMES’ – THE PROCESS & THE APPROACH

The contract for Phase 1 of the project (reviewing the Australian ‘Your Home’ model and the original project objectives) was completed by a research team headed up by Victoria University. A consortium led by Beacon Pathway Ltd delivered Phases 2 and 3 of the project (setting up the project management and developing the web resource and supporting material through to its public launch in June 2007).

From the outset, the Ministry’s approach to developing the resource focused on building partnerships and leveraging resources from other key players in the building sector, both government agencies and industry.

Figure 1 below outlines the wider strategic framework within which the Smarter Homes project was developed.



**Figure 1: Smarter Homes project partnerships**

This approach has ensured that the Smarter Homes website does not exist in isolation; rather it is supported and reinforced by a series of initiatives targeted at both consumers and industry to achieve transformation of the residential building sector. These initiatives include an array of Department of Building and Housing-led projects like the Building Code review and the energy efficiency consumer awareness raising campaign, as well as other projects like the development of a Home Energy Rating Scheme (HERS) by the Energy Efficiency and Conservation Authority (EECA), and Ministry for the Environment initiatives like the Warm Homes programme, Climate Change initiatives, and the NZ Urban Design Protocol.

The Ministry for the Environment and the Smarter Homes Project Team have also worked hard to ensure that there is ongoing ownership and commitment to the management and updating of the website beyond its 3-year funding period and the public launch in June 2007. The project was

initiated prior to the Department of Building and Housing being formed in November 2004. However, the Department now has a sustainable development mandate under the Building Act 2004 and has a significant role to play in providing best practice information to consumers and industry. The Smarter Homes website supports and reinforces much of the Department's work on sustainable building. As a result, the Department took on the long-term ownership and management of the website.

#### **4. SMARTER HOMES – LINKAGES WITH OTHER RESOURCES**

As mentioned, the Smarter Homes website does not exist in isolation. It has been developed to integrate with, support, and reinforce a series of initiatives targeted at both consumers and industry to achieve transformation of the residential building sector.

Smarter Homes provides information on why a user would want to build sustainably (i.e. the benefits), and what options there are to do so (e.g. design for solar gain, double glazing, insulation), with only a limited amount of information on how to carry out the work (e.g. to install double glazing and where to find a skilled supplier and installer).

Detailed how information (e.g. technical specifications, how to install products/features etc) has been developed by BRANZ in parallel with the Smarter Homes project with funding from Building Research. This website is called 'Level' and will be launched in tandem with Smarter Homes<sup>2</sup>.

The Smarter Homes website has been developed to integrate with the ConsumerBuild website<sup>3</sup>. This website is owned and managed by the Department of Building and Housing and the Consumers Institute. ConsumerBuild provides information on a variety of building issues including leaky buildings and weather-tightness. ConsumerBuild is seen as a key 'sister' site to Smarter Homes, with both websites having supporting and reinforcing messages, rather than competing against one another.

Beacon Pathway Ltd has also been developing a supporting tool in tandem with the Smarter Homes website. Called 'Home Smarts', this home assessment tool enables consumers to understand more about the quality and performance of their own home and how they could go about improving it. It aims to personalise the information on Smarter Homes to a specific type of home (e.g. an existing home with no insulation) or building/renovation job (e.g. bathrooms), taking into account the person's or family's budget. The Home Smarts tool links directly from the Smarter Homes website.

There are many other initiatives being developed by other building industry groups that are targeted at providing information to consumers on sustainable building products, including which products might be better suited for purpose, or better quality, than others. For example, the GreenBuild website being developed by a team of people led by architectural firm Warren & Mahoney Ltd.

#### **CONCLUSIONS**

A smarter home is a home that uses only a fair share of planets resources. Ecological footprint is a measure of total resources used to maintain one's lifestyle expressed in units of land – global hectares. With over 6 billion people living on Earth each of us can safely use 1.9 global hectares. There are many countries in the world that live well below this amount, while we in New Zealand use 5.9 global hectares per person. If everybody on Earth wanted to use the resources at this rate we would already need five planets. A smarter home is a home which maintains the lifestyle while using the resources of only One Planet.

Smarter Homes has been designed to help New Zealanders build and retrofit to achieve smarter homes, i.e, homes that are more sustainable, cost effective, healthy, affordable, attractive, and easier on the environment.

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<sup>2</sup> See [www.level.org.nz](http://www.level.org.nz)

<sup>3</sup> See [www.consumerbuild.org.nz](http://www.consumerbuild.org.nz)

Smarter Homes aims to provide credible and accessible information to consumers and industry on sustainable residential building and renovating. It helps link existing sustainable residential building initiatives and is an important part of achieving the broader goal of market transformation. The ownership of the site going forward rests with the Department of Building and Housing on behalf of Government. They are working with the Consumers Institute to manage and maintain site content and credibility.

Consequently the project aims at developing a long term vision for an information resource directly targeted at home occupiers and home providers, as well as a co-ordinated set of communication and stakeholder actions to support the resource and other aligned activities.

The partnership approach adopted during the development of the website has meant that the resource has a much higher likelihood of achieving wide market penetration and uptake than was originally possible at the initial project outset.

## **ACKNOWLEDGEMENTS**

I would like to take this opportunity to acknowledge the dedication and hard work of the Smarter Homes Project Team and the Project Board that have made this project so successful. This includes staff from the Ministry for the Environment, Beacon Pathway Ltd, the NZ Consumers Institute, URS NZ Ltd, Building Research, BRANZ, and the Department of Building and Housing. Thank you also to the many people and organisations who participated in the Smarter Homes Advisory Board and the Ambassadors Network.

## **References**