

Policy and regulation: clarification of Beacon's role

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A report prepared for Beacon Pathway Limited

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1 Executive Summary

The purpose of this paper is to assist Beacon Pathway Limited (Beacon) to influence policy and regulatory processes, in the most effective way, to aid the formulation and implementation of solutions to the problem of New Zealand's unsustainable homes and neighbourhoods. It answers three questions which impact greatly on Beacon achieving its goals:

- a) What is the role of Beacon in New Zealand's policy and regulatory process to achieve a high standard of sustainability across New Zealand's homes and neighbourhoods and how best can Beacon deliver on this role?
- b) What is Beacon's role with respect to residential rating tools?
- c) What are the high level pros and cons of Beacon embarking on a systems approach to focus its research around the component parts of the home?

Beacon is conducting research into how best homes and neighbourhood sustainability can be achieved in New Zealand. Beacon can provide invaluable technical knowledge to policy-makers about the nature and consequences of specific policy proposals, and provide evidence-based advocacy and lobby for government to implement policy based on its research results.

To utilise Beacon's research to best effect to influence policy, Beacon needs to understand the process by which policies and regulations are established and revised. Clearly defining Beacon's role in the policy and regulatory environment will enable Beacon to optimise scarce resources and ensure Beacon moves quickly to achieve its goal of 90% of New Zealand homes achieving a high standard of sustainability by 2012.

Part 3 of this paper outlines the policy cycle and key concepts in the policy process, summarising the policy and regulatory process, both generally and with regards to the New Zealand political system. It identifies and analyses the current role that Beacon is playing in this process and provides analysis of where Beacon should best focus its efforts to the greatest effect.

Beacon recognises that if you can't measure, you can't manage, and anticipates residential rating tools as a key component in measuring the sustainability of a house. Part 4 of this paper discusses the main residential rating tools currently under development in New Zealand and Beacon's role with respect to these rating tools.

Part 5 of this paper addresses the pros and cons of Beacon undertaking a systems approach to focus its research around the component parts of the home, and ways of addressing the issues raised by embarking on approach.

2 Introduction

The objective of this paper is to assist Beacon to influence policy and regulatory processes, in the most effective way, to aid the formulation and implementation of solutions to the problem of New Zealand's unsustainable homes and neighbourhoods.

Beacon is the vehicle chosen by a number of like-minded organisations that seek to radically change the design, construction and renovation of New Zealand's homes and neighbourhoods. Beacon aims to significantly improve housing sustainability through scientific research, communication, information sharing, advocacy, opinion forming and networking. The shareholding partners of Beacon are a unique mix of industry, local government and research organisations: Building Research, Scion, New Zealand Steel, Waitakere City Council and Fletcher Building. The Foundation for Research, Science and Technology matches funding from the shareholding partners.

Beacon's vision is to "create homes and neighbourhoods that work well into the future and don't cost the earth". To reach this vision Beacon is guided by two goals:

- 1) 90% of New Zealand homes will be sustainable to a high standard by 2012; and,
- 2) every new subdivision and any redeveloped subdivision or neighbourhood from 2008 onwards to be developed with reference to a nationally recognised sustainability framework.

The development and implementation of policies and regulations are key uptake pathways for Beacon's research. Policy and regulation is a vehicle for responding to the problem of New Zealand's unsustainable homes and neighbourhoods, as a means of improving the conditions in which New Zealanders live, and mitigating and managing the impact of poor quality housing on people, and on the local and global environment.

Government, both central and local, sets the policy and regulatory environment in which homes and neighbourhoods are built and retrofitted. Beacon is conducting research into how best homes and neighbourhood sustainability can be achieved in New Zealand. To utilise Beacon's research to best effect to influence policy, Beacon needs to understand the process by which policies and regulations are established and revised. Clearly defining Beacon's role in the policy and regulatory environment will enable Beacon to optimise scarce resources and ensure Beacon moves quickly to achieve its goals.

The purpose of this paper is to answer three questions which impact greatly on Beacon achieving its goals:

- 1) What is the role of Beacon in New Zealand's policy and regulatory process to achieve a high standard of sustainability across New Zealand's homes and neighbourhoods and how best can Beacon deliver on this role?
- 2) What is Beacon's role with respect to residential rating tools?
- 3) What are the high level pros and cons of Beacon embarking on a systems approach to focus its research around the component parts of the home?

3 Role of Beacon in the policy and regulatory process

Part 3 of this paper summarises the policy and regulatory process, both generally, and specifically with regards to the New Zealand political system. It identifies and analyses the current role that Beacon is playing in this process, and provides analysis of where Beacon should best focus its efforts to the greatest effect.

3.1 Policy Theory

The policy process has been the object of much discussion and debate, and section 3.1 gives a brief outline of some of the key definitions and concepts.

3.1.1 Definitions

Defining policy provides an indication of its multi-faceted nature. Government or public policy (referred to in this paper as simply “policy”) is inextricably tied to politics. Politics is classically defined as the process of determining *who gets what, when, and how* (Lasswell, 1958), or *the process of influencing the allocation of scarce resources* (Hughes & Calder, 2007, p.97).

It is critical to understand politics to understand how the policy process operates. This refers to both the formal Parliamentary system and to politics more generally. Hughes & Calder (2007) argue that politics is about:

- influencing – this implies opportunities exist to alter the outcome;
- allocation – decisions are made to divide or split between competing groups’ or individuals’ priorities or choices; and
- resources – people and money for example.

Policy

Jenkins (1978) states that *policy is a set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation.*

Public policy *is a choice made by government to undertake some course of action* (Howlett & Ramesh, 1995).

Public policy is whatever governments choose to do or not to do (Dye, 1978).

Policy analysis

Policy analysis as a key part of the process is just as complex to define as policy – for if policy is multi-faceted, so too is the analysis and development of it. The State Services Commission has released a number of documents on policy to instruct the New Zealand public service. It states (2000):

the hallmark of policy analysis is a systemic comparison of alternative policies in terms of goals that specify the desirable attributes of a good society (p.3).

High quality policy advice is free and frank, and allows decision makers to confidently and in a timely manner make decisions on how to address a particular policy problem, by presenting them with a range of clearly expressed, logical and practical options which have been developed through the application of analytic methods and information to that issue, and which set out the intended impact of each option in terms of the achievement of desired outcomes, plus mechanisms for implementation, monitoring and evaluation (p.3).

Hughes & Calder (2007) state that:

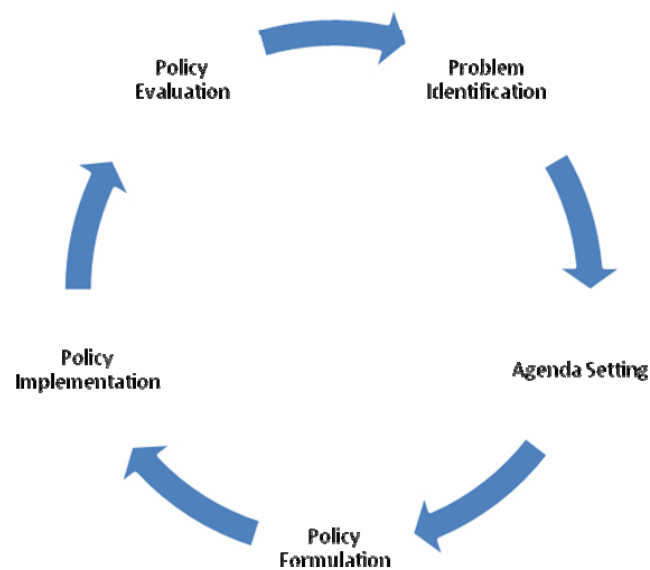
policy analysis is the process of working out solutions to problems and deciding which solutions are the best. It is a process to help decision-makers choose a preferred course of action from many competing and sometimes complex options under uncertain conditions (p.51).

3.1.2 The Policy Cycle

The development of policy is a dynamic and ongoing process consisting of several key components. It does not involve only one single event but is an iterative process. It is commonly described as a policy cycle, which forms a framework to consider the emergence of problems, the formulation of proposals for dealing with these problems and the introduction of these as the Government's stated policy.

The policy cycle describes the different activities in the process of creating policy and laws in any governmental system, and is widely utilised in policy literature. Note that the policy process is not a linear process, predictably following an ordered set of steps. Rather, policy-making is a multi-faceted and iterative process. The policy cycle does, however, outline the key components to be considered in the process.

Figure 1 The Policy Cycle



1) Problem identification and definition

The first step of the policy process is to identify that there is a problem. Problem identification is an essential step in going from a private to a public matter. There needs to be an understanding of the problem, with defined outcomes and a process for resolving tensions, identifying stakeholders and deciding their role.

The problem must be clearly defined, and articulated to policy makers. The problem definition stage of the policy cycle is important, because if this is wrong, the solutions and outcomes will be affected. It is important to recognise that how a problem is defined is integral to how later policy solutions will be formulated.

2) Agenda setting

Once policy issues are clearly defined (although often before), they are introduced to the political stage by different government institutions, individuals, interest groups, or specific events. The issue becomes part of the political decision-making agenda, meaning that a decision has to be made as to when and who will deal with the problem, and in what form. The agenda is the list of issues that are being seriously considered by government, and some theorists believe that getting it onto the agenda is the key hurdle for issues to become policy (Hughes & Calder, 2007).

The issues on the agenda of the Government or government departments are those that will be given time, attention, and resources. Not all important matters get on the agenda, and different issues are placed on the agenda for different reasons. It is also worth noting that simply getting on the agenda does not guarantee that an issue will be given prompt and thorough consideration and action.

The volume of demands placed on policy makers and the Government forces a choice among a wide variety of possible agenda items, each of which is complex, with a multitude of possible

interacting causes, possible solutions, side-effects (known and unknown), each with a price tag and accompanying vocal supporters or opposition with vested interests.

Issues get on the agenda for various reasons:

- because there is concern about them among the public;
- they are the focus of media attention;
- because they are a concern for politicians; or
- they are raised by government departments as part of their work programme, or review of other issues, policies or legislation.

3) Policy formulation

Once the issue is identified, clearly defined and has gained the attention of policy-makers and secured a place on the agenda, the issue is up for public discussion and a commitment by Government to act has been implied or given. Laws, regulations or policy are anticipated and resources are likely to be invested.

During this stage, policy analysis is carried out, information gathered and analysed, objectives defined and options assessed. A solution to the problem is worked out, accompanied by lobbying and political argument. This results in a new policy, law, provision or programme. This part of the process requires clear specification of the objectives that the policy will achieve and development of solutions – collecting evidence, appraising options, consultation, managing risks. At this stage, an item on the agenda is articulated into language for a bill or a policy statement.

Hayes (2003) defines policy formulation as *the development of an effective and acceptable course of action for addressing what has been placed on the policy agenda*. There are two parts to this definition. Firstly, the policy must be *effective*, i.e., a valid and implementable solution to the issue. Secondly, the proposed course of action must be *acceptable* or likely to be authorised by decision-makers i.e., politically feasible. This entails effective policy alternatives being developed based on sound analysis, a political choice being made among these alternatives, and the policy authorised through a political process such as legislation or regulation, or an official policy document. It is important to remember that elected officials always have the final choice among the policy alternatives presented to address an issue.

Hughes & Calder (2007, p.83) state that *the overall purpose of policy analysis is to identify options, and assess the consequences and important aspects of each one to allow the preferred option to be chosen*. Decision-makers can then make a decision based on the consequences of each option. Hughes & Calder (2007) set out the process of analysis in simple terms as:

- a) establish evaluation criteria. This is so that all of the options can be compared and one selected. This involves such things as cost, benefit, effectiveness, legality and political acceptability. Economic benefits need to be considered, as well as the consequences of the policy on particular groups.
- b) identify alternative options. While the solution to the issue may seem obvious, it is important to develop a range of options to address the issue. One option is always “do nothing”.

- c) evaluate the alternative options. What consequences will the alternative options have?
How much will each of them cost?

Having adequate and timely information is critical in this stage of the policy process, and both quantitative and qualitative data is important.

4) Policy implementation

The fourth phase of the policy process is implementation. This is where the selected policy that has been authorised must be applied to the real world, through deliberate activities by the government, government departments, or appointed parties, aimed at achieving the goals and objectives articulated in the policy statements or regulation. Implementation is all about putting solutions into effect – communicating policy, supporting those who deliver it, testing different options.

Often, to get a policy passed or approved it needs to be sufficiently vague to satisfy a large number of parties. The policy is given its final structure by public servants during the implementation process. It is the responsibility of the bureaucracy to interpret the policy into a concrete set of actions. Because of this bureaucratic discretion, interest groups continue their lobbying at the implementation stage.

5) Policy evaluation

Evaluation is the final stage of the policy cycle and closes the loop as it reflects back on the policy formulation and implementation. It returns the issue to the next round of the agenda setting process if the policy is not working as intended or if a problem is identified.

Even once a policy has been implemented, it is possible that the initial issue may not be resolved, may have unintended consequences, or may not be implemented properly. It is important to monitor the policy to see what kind of impact it has, any unintended consequences and to determine whether it should be changed (Hughes & Calder, 2007). A policy and its implementation can cause either positive or negative effects and political reactions, which lead to the continuation, change, or end of the policy and a return to the initial stage of problem definition. While there should be a formal evaluation and monitoring process, frequently there is a more direct and informal form of evaluation that feeds back into the cycle in the form of voter satisfaction, dissatisfaction or neutrality on the success of a policy.

In the policy process, much emphasis is put on the initial stages of policy development (problem definition and options development stages) and sometimes monitoring and evaluation are overlooked. The State Services Commission (2002) identified that in New Zealand quality evaluation is rarely carried out and when it is, evaluation is poor.

Policies should be evaluated to:

- Make public agencies responsible for explaining their actions to the public;
- Ensure that policies are effective;
- Identify any unintended outcomes (Hughes & Calder, 2007).

It should be noted that there are many theories regarding the process of policy development that are not discussed here, some that focus on the policy cycle, others that relate to relationships,

politics, society, resource allocation, windows of opportunity and more. However, in reality, policy development is less structured than most of the various theories and frameworks would lead us to believe.

3.2 New Zealand's policy and regulatory process

The policy cycle describes the process of creating policies and laws/regulations in any government system. In section 3.2 some of the players and specific aspects of the New Zealand process are discussed.

3.2.1 Policy makers

The primary policy makers in New Zealand are:

- elected representatives such as Government Ministers, and councillors of regional councils and territorial authorities. All have statutory policy and decision-making responsibilities under legislation such as the Building Act 2004 and the Resource Management Act 1991; and
- central and local government officials and policy analysts who have decision-making and/or operational policy-making responsibilities within organisations such as the Department of Building and Housing, Housing New Zealand Corporation, Ministry for the Environment, the Energy Efficiency and Conservation Authority, Ministry for Economic Development, Treasury, regional councils and territorial authorities. Officials provide policy analysis and advice (including scientific advice), purchase external advice, and liaise with other agencies for the overall purpose of assisting Ministers or councillors in their policy-making roles.

The Government's role in policy is multi-faceted and covers a number of functions. Ministers, who are Members of Parliament and accountable to Parliament, shape the direction of government to a large extent. They decide the Government's policies together in the form of Cabinet and Cabinet Committee meetings. Government policies and administration are also influenced by its agencies' baseline policies in the portfolios of each Cabinet Minister.

Cabinet sets strategies and programmes in place to advance the policies they consider important, and Ministers and government departments must develop policies in light of political preferences, officials' capacities, annually negotiated Budget resources, the competitive priority setting environment in which they have to engage, and current political will. Events such as the upcoming election in 2008, or specific events and crises, create impetus for strategic policy making and allocation of resources, making it increasingly difficult for those outside of government to add issues to the agenda.

Cabinet, Ministers, and government departments are all involved as the official policy-makers. However, many others outside of government participate in different ways, including interest groups, non-government organisations, researchers, contractors, and individual citizens. This input can be specifically sought out by government such as through consultation or tender processes, or can be initiated by the respective groups and individuals.

3.2.2 Raising issues to the agenda

There are a number of ways that issues are placed on the policy agenda as outlined above in the agenda setting stage of the policy cycle. Issues may be identified by Ministers or government departments, may be necessary for political purposes, or may relate to obligations such as international treaties.

However, New Zealand's political (and hence policy and regulatory) environment is relatively open (particularly when compared internationally) and there are a number of other avenues that policy issues can be brought to the Government's attention (Hughes & Calder, 2007 and Hayes, 2003):

- by individual citizens, particularly through such processes as writing / speaking to their local Member of Parliament;
- broader avenues of popular participation by which citizens can initiate public policy such as public meetings, through consultation, petitions, local body politics;
- larger public policy issues such as taxes, schools, and pollution are often brought by groups of people to government departments or MPs;
- policy champions, who initiate and sustain a particular policy crusade, can act as catalysts and mobilisers but need a strong case that resonates with the public. Champions can work from inside Government and are often invaluable allies for those working outside Government;
- the media is an influential avenue as it conveys messages not only to politicians but to a large sector of the population who then make demands according to what they have seen, heard, or been shocked by; and
- a crisis can abruptly change the agenda and become a policy trigger.

New Zealand is what is known as a pluralist democracy with competition for power among many groups in society, and issues get on the agenda and policies and regulation are made through a process of competition, negotiation, bargaining and compromise. There are complex system dynamics which provide opportunity for influence by those willing to participate.

The adoption of an MMP electoral process in particular has resulted in the need for a consensus building approach between political parties rather than the "winner takes all" approach of historical parliaments. Governments are now formed in which no single party has the required majority in Parliament. This means greater influence by smaller parties and a greater voice for a diverse range of constituents in Government and policy. This can for example, be through agreements with parties in power to implement certain policies in exchange for support on votes of confidence and supply in Parliament. These agreements to advance specified policies are reflected in the Budget formation process.

Factors that can influence an issue getting onto the agenda include:

- the number of citizens affected
- resources available
- representation or access to political processes
- intensity of advocacy
- skill and savvy used to promote or defend the interests of particular groups.

There are many interest groups in New Zealand, of different sizes, interests, and with different levels of power in the policy process. Resources play a major part in the ability of any group to influence. Groups that have larger numbers of members or access to people and funds can exert greater influence (Hughes & Calder, 2007). Hughes & Calder (2007, p.53) list a number of factors that contribute to an interest group's political influence:

- size of membership
- monetary and other resources
- cohesiveness
- skilful leadership
- social status
- presence (or absence of) competing organisations
- attitudes of public officials
- site of decision-making in political process.

Policy and politics are inextricably linked and this means that policy affects resource allocation and is affected by it. However, the political process based on bargaining and compromise, and allocation of resources, should not be confused with the analysis of policy as technical expertise as part of the policy process.

3.2.3 *Where to from the agenda?*

Once an issue is identified in the New Zealand policy process and it has succeeded in gaining a place on the agenda, there are a variety of ways that the process can develop depending on the issue and the political environment, the way the issue is defined and the proposed solutions.

While as Dye (1978) suggests, policy is whatever governments choose to do or not to do, their forms are usually more tangible and a policy can range from being a general principle adopted by the government or a department, to being a response to actual or potential problems, or a statement of intent/strategy. The products of policy-making in New Zealand include:

- legislation (and associated regulations that may sit under a piece of legislation)
- national policies and strategies
- national guidelines and standards
- local and regional policies, plans and by-laws
- economic instruments such as taxes, levies or charges
- information and educational programmes such as public awareness campaigns.

When preparing policy or legislation, New Zealand government departments are responsible for (Hughes & Calder, 2007):

- Clear identification of the policy problem
- Evaluation of the policy options
- Providing opportunities for public input

- Consultation with other departments
- Clear and simple presentation to Ministers
- Legislation that accurately reflects policy decisions
- Understanding legislation process and timing
- Maintaining a programme for amendments between drafting and refining policy.

Hughes and Calder also set out the general options that might be considered by Government if a change in legislation or policy is being proposed:

- no government intervention
- status quo (zero option)
- use of existing law
- increasing enforcement
- information and education campaigns
- economic options (such as taxes, subsidies)
- voluntary standards/code of practice
- self-regulation
- co-regulation

Legislation and regulations take a long time to come to fruition. Policy is usually developed first as any legislation will be based on the policy intent of the government's decision on that issue. Legislation follows and specific detailed regulations can be developed under a piece of legislation.

Parliament is the supreme legislative or law-making body in New Zealand, making the laws by which New Zealand is governed and determining the policies for the actions or non-actions that it takes. Proposed laws are introduced to Parliament as Bills. Bills can be introduced for a variety of reasons (Hughes & Calder, 2007):

- as part of the Government's political programme
- in response to the perceived needs of a community
- because the community has asked for a change in an existing law
- because a government department considers that an existing law is not working properly and has suggested changes
- to keep up with new ideas and developments in technology
- to meet international treaty obligations.

New Zealand's policy and regulatory process, like any other, is burdened by the complexity of established political processes, entrenched bureaucratic procedures, and frictions within the diversity of interested parties involved in government and policy-making. It is a continuing challenge for governments to pull together whole-of-government advice and whole-of-government solutions to problems even though that is often the most appropriate answer, and may be what citizens and Ministers want. Advice is often developed within individual government departments, and inter-agency consultation can be time-consuming and difficult.

This creates what is known as a “silo” effect. To counter this, central agencies such as the Treasury and the Department of Prime Minister and Cabinet try to ensure that a whole-of-government view is brought to bear on issues, and Cabinet meetings provide opportunities for Ministers from a range of portfolios to think about issues collectively. The sustainability of homes and neighbourhoods requires an integrated approach and there are a number of ways in which Beacon contributes to the policy process in this area.

3.3 Beacon’s current role

At its core, Beacon is a research-based organisation. Beacon also states that it is the vehicle chosen by a number of like-minded organisations that seek to radically change the design, construction and renovation of New Zealand’s homes and neighbourhoods. This implies that there is a drive to do something with the research produced, and do something on a national scale requiring large scale change. Beacon states that it aims to significantly improve housing sustainability through scientific research, communication, information sharing, advocacy, opinion forming and networking.

Beacon is a relatively small organisation in the policy process when compared with the enormity of the various government agencies and relative to many other national interest and lobby groups that approach government with policy issues. However, it is currently taking an active role to begin to influence policy and regulation with regards to the sustainability of New Zealand’s homes and neighbourhoods.

Through Beacon’s research programme and the actions of key members of Beacon, working relationships have been developed with a number of central government agencies:

- The Energy Efficiency and Conservation Authority (EECA)
- Department of Building and Housing (DBH)
- Housing New Zealand Corporation (HNZC)
- Ministry for the Environment (MfE)

At a local government level:

- Waitakere City Council is one of Beacon’s shareholders;
- Beacon has undertaken research directly with Auckland City Council, Christchurch City Council, Environment Canterbury, Kapiti District, and Hamilton City Council, building relationships at a project level; and
- provided 12 written submissions to the LTCCP round in 2006, and three oral submissions.

These working relationships take a number of different forms, with a direct partnership with HNZC ownership of the second NOW Home® in Rotorua, possible joint research with EECA, a contract with MfE to develop the SmarterHomes website (in conjunction with the Consumers Institute and URS), and participation in a process of providing information and formally making submissions to both DBH and EECA. Beacon has been outspoken in its submissions on the Building Code review, the Energy Strategy and the New Zealand Energy Efficiency and Conservation Strategy, and is making a targeted effort to ensure research-based evidence is placed before key people in Government departments. The upcoming National Value Case (NVC) is the most explicit example of this and draws together much of Beacon’s previous work.

Relationships are also being established with the Office of Prime Minister and Cabinet around Beacon's new flagship homes research programmes (NOW100 and Retrofit1000) and with the Ministry of Economic Development.

Key Government departments where Beacon has not yet succeeded in gaining traction with its research results and arguments for sustainability are:

- Treasury
- Ministry of Health
- MfE with regards to water

It could be argued that Beacon has taken a reactive non-influential role by merely making submissions to existing policy already under development. However, that would downplay the essential ground work that has been carried out by Beacon to establish its credibility within Government circles, networks that have been formed with a number of the key agencies, and relationships with strategic teams and individuals within government departments. Significant effort has been made with regards to advocacy with DBH and some with EECA, and changes to the Building Code and recognition of Beacon by EECA and improved communications testify to the success of this work. There is an increasing degree of confidence of Government departments in working with Beacon and the contract with MfE for SmarterHomes is a good example of this. Considering the size of Beacon and the resources allocated to activities such as advocacy and dissemination of its research to Government, this can be considered significant.

Beacon was initially set up as a research agency and it appears that advocacy and dissemination of information to create change may not have been recognised initially as a key role of Beacon. However, if Beacon wants its research to lead to change it needs to target it appropriately and ensure the messages reach policy-makers.

Beacon is having an impact and has laid excellent groundwork for a role that influences New Zealand's policy and regulatory process to achieve a high standard of sustainability across New Zealand's homes and neighbourhoods. However, it is important for Beacon to be more proactive than simply providing submissions on existing policy issues, as often key decisions are made before submissions are called for.

Beacon appears to have focused the majority of its efforts on the Department of Building and Housing to influence the Building Code Review. To ensure that 90% of homes reach a high standard of sustainability by 2012, wider effort will be required, with specific mandate and resourcing developed to implement this. There has been little mandate or resourcing put towards this aspect of Beacon's work. The National Value Case is a very good start, but once the process is in play, it will require significant effort and input. Until recently, a key area that Beacon has not invested in is the translation of its research-based work into policy-type products (such as the NVC) that are useful and applicable for Government to use.

3.4 How can Beacon best deliver?

The objective of this paper is to assist Beacon to influence policy and regulatory processes in the most effective way, and to aid the formulation and implementation of solutions to the problem of New Zealand's unsustainable homes and neighbourhoods. Beacon has laid the

ground work for a possibly significant role in influencing policy and regulation on the sustainability of New Zealand homes and neighbourhoods. Section 3.3 identifies opportunities over the course of the policy cycle with specific examples of particular agencies and opportunities.

3.4.1 Problem identification and definition

Problem identification is an essential step and one that Beacon can play a key role in. Beacon must ask whether the problem of unsustainable housing in New Zealand has been adequately defined and articulated to policy-makers. Are the policies and solutions currently being proposed to address sustainability appropriate to the problem that Beacon has identified? It is worth noting that a solely energy-based rating tool for a home does not address the sustainability of a home. The importance of water efficiency and indoor environmental quality appear to have little uptake at a government level and Beacon should investigate whether the problem of the unsustainability of New Zealand homes and neighbourhoods has been inadequately defined, or if it has not been placed on the policy agenda.

How a problem is defined is integral to how later policy solutions are formulated. If the sustainability of a home is defined as based on energy, solutions to energy inefficiency will be proposed, as at present. Beacon is in a position to use its research programme to define what makes an unsustainable house and what the problem in New Zealand is.

It is essential that when presenting the issue to Government, Beacon is clear as to what the problem is that Beacon wants them to address. Hughes & Calder (2007) suggest a list of questions to consider in identifying and describing a policy problem:

- Who has identified the problem?
- Is there agreement that there is a problem? If not, it is highly unlikely to get any kind of policy response.
- What evidence is there to support the fact that there is a problem?
- Why does the problem exist?
- Can the problem be addressed by public policy?
- Who does the problem affect?
- Is the problem seen differently by different organisations and groups in society?
- Is the problem fully understood? Can all the relationships between the factors that cause the problem be measured?
- What has been done so far to resolve the problem? Have other regions or countries experienced the same problem? How have they gone about addressing it?
- What outcome is Beacon hoping for?
- In identifying the problem, what are the specific characteristics of the state of the world that concern Beacon?
- What is it about the problem that makes it a matter of concern rather than something better left to private individuals or allowed to take care of itself?
- What is it that makes the problem hard to analyse and understand, or hard to get adequately attended to or solved?

- What is it that defines or bounds this problem area or this proposed programme? How much leeway or discretion is there in the way the problem can be defined, or the coverage of the programme?
- How do the dimensions of the problem and the effectiveness of the solution vary with the passage of time?
- What techniques of government intervention are relevant to this problem?
- Is the desired change incremental (i.e., happening in small steps) or systemic (involving large changes to the whole system)?
- What actions are various units of government currently undertaking that affect the problem, and what changes in action will your programme require?
- What interest groups will be affected?
- What research would help to understand the problem and its solution?
- When people disagree about whether the problem exists, or what the problem is, or how seriously to take it, or what to do about it, or how to judge success or failure, where exactly does their disagreement lie?

3.4.2 Agenda setting

Sustainability is firmly on the Government's agenda and significant changes to policy are being made to address this issue in a broader sense. However, the specific issue of the sustainability of homes and neighbourhoods does not appear to be on the agenda, other than related to the behaviour of householders.

Getting this issue on the Government's agenda will require much more than the writing of submissions. If appropriately presented and utilised, Beacon's National Value Case can contribute significantly to attainment of a place on the agenda for this issue.

There are also a number of other avenues that could be utilised in addition to the NVC to ensure its success, or in the case of it not having the desired effect:

- Direct contact with heads of government departments in addition to the presentation of the NVC.
- Encouraging wider acknowledgement of the issue among other interest groups. This could be achieved through direct contact with appropriate organisations, dissemination of information generally, or a targeted conference or forum for discussion of the issue with any resulting calls to action presented to the Government. The Sustainable Building Conference 2007 presents an excellent opportunity to ensure wider discussion around the issue.
- Collaboration with other groups, for example industry organisations, health organisations, and other research organisations could raise the profile of the issue nationally.
- Encouraging acknowledgement of the issue among the wider public. The most effective way of achieving this is through the media. For example, media releases to major newspapers, and approaching TVNZ or other news broadcasters. If Beacon's CEO or researchers were to appear on CloseUp or the Good Morning show this would raise public awareness of the issue significantly. Public concern is one of the key ways that issues get on the agenda.

- Other ways of utilising the influence of the media would be to hold a media event on the issue, or foster relationships with those involved in the production of media with a wide audience.
- One option often used by interest groups is to prepare a petition to the House of Representatives asking for action to change or amend a law or policy. However, note that there are a number of other more useful mechanisms and strategies that Beacon could use prior to a petition.
- Capturing the sustainability of homes and neighbourhoods as an election issue through direct lobbying of politicians (this would need to be carried out in conjunction with relationship building with government departments to ensure appropriate policy development post-election).

Policy is inextricably linked with politics, and the upcoming election is likely to demonstrate this. There is significant opportunity to influence the allocation of resources to the issue of the sustainability of homes and neighbourhoods. For example, coupling the issue of the sustainability of homes with the Government's wider sustainability agenda could help push the issue up the agenda. Through direct lobbying, Beacon could hope to influence either: the 2008 Budget prior to the election, or the first Budget announced after the 2008 election.

As the election draws nearer, there will be less time available for issues which are not considered a priority on the agenda. There is a short period of time for Beacon to communicate the importance of the issue of New Zealand's unsustainable homes and neighbourhoods to government departments, current Ministers and a range of politicians to get it on the agenda. It also needs to be on the agenda of the appropriate government departments. Because of the interrelated nature of sustainability, the sustainability of housing needs to be on the agenda of a number of different departments.

3.4.3 Policy formulation

Simply getting on the agenda does not guarantee that an issue will be given prompt and thorough consideration and action. Information is one of the most important tools available to policy analysts, and identification of, and access to, the right information is a critical part of the policy process. This is a key area where Beacon can provide valuable input to the policy process. The complexity of sustainability and the interactions both within a house, and between a home and external systems calls for robust research to underpin policy analysis and decisions. Beacon can provide invaluable technical knowledge to policy-makers about the nature and consequences of specific policy proposals.

In order to be an organisation that Government departments trust to provide robust information, or whom they contract to provide information, Beacon needs to have credibility, and in many cases, personal relationships with the specific policy teams doing the work. Significant groundwork has been laid in this area by Beacon in terms of its credibility and relationship building. It is important to maintain both of these aspects, and any trade-offs that may occur as a result of political lobbying must be carefully considered.

3.4.4 Policy implementation

Implementation is where policy solutions are put into effect, and is primarily carried out by Government departments. It is important that Beacon remain involved at this stage of the process as policies that are sufficiently vague to get approval from a large number of parties are rolled out into a tangible form at this stage. This involvement by Beacon may rely on maintenance of strong relationships with Government departments and those carrying out the policy analysis and implementation, or through demonstration of the practical aspects needed for the implementation of policies through its research programmes.

3.4.5 Policy evaluation

Beacon, like other non-government organisations can play a role in policy evaluation, both through formal avenues (contracts to evaluate a particular policy/programme) and informal avenues (feedback to policy-makers as to the effectiveness of a policy/programme).

3.4.6 Other opportunities

Beacon is attempting to place itself in the policy process as a change organisation, whereby its research is used to justify and bring about a change in the sustainability of New Zealand homes and neighbourhoods. It is essential that Beacon's communications with policy-makers remain research-based and robust as this is where Beacon's credibility lies.

In order to reach Beacon's goals, dissemination of its ideas and research information is necessary, and in many cases, advocacy is required. However, the requirement is for advocacy based on strong research and science underpinnings, genuine relationships, trust and credibility. It is to Beacon's credit that it shows a demonstrable belief in the issue of sustainability of homes and the importance of resolving it. Beacon does not just approach the Government encouraging it to participate in the solution; it can also demonstrate that Beacon stakeholders are already investing in the solution themselves.

Beacon has been building good foundations, but to influence the policy process to a significant extent, greater effort will be required to build and maintain relationships and disseminate Beacon's research results and arguments, as it faces a range of barriers. These barriers include:

- institutional lethargy
- lack of connected thinking both within and across Government departments
- lack of engagement with the full range of factors involved in the sustainability of homes and neighbourhoods – for example water use and IEQ.

There is a need for Beacon to expand its networks outside of Government so that Beacon is joined by others lobbying Government with the same concerns as Beacon, who also push to Government to recognise the value of Beacon's research and the solutions being offered.

Initiatives and relationships such as the proposed joint research with EECA are important and a sign of Beacon's increasing credibility, and need to be developed with other departments. Beacon needs to continue to build relationships with EECA, DBH, MfE, HNZC, DPMC, and MED in particular.

In addition, key Government departments where Beacon should focus effort and attention on building relationships and disseminating its key messages are:

- **Treasury** holds considerable influence in the policy process and allocation of resources. It is important that Beacon involves them in discussions and raises their awareness of the issue.
- **Ministry of Health (MOH)**. One of the key arguments around improving the sustainability of housing is the health benefits. Perhaps Beacon should target some research to quantify some of these or collaborate with other research organisations to present the case to MOH. There is also the opportunity to approach District Health Boards at a local level.
- **Ministry of Social Development**. The social aspect of sustainability could be a key leverage point for Beacon.
- **Ministry for the Environment with regards to water**. It is important in addressing the issue that the wider aspects of sustainability are recognised by policy-makers.
- **Local and regional authorities** should be a key focus for Beacon around water, and also provide a significant opportunity for action regarding energy. These organisations work at a local level in the community where change needs to occur and also move faster in terms of policy and local regulatory measures than Central Government. Buy-in can be sought through elements of the NOW100 and Retrofit1000 projects as well as those that Beacon already has relationships with.
- **Local Government New Zealand (LGNZ)** is an agency that Beacon could explore relationships with. While they represent all local government, not just those main urban councils that Beacon is most likely to focus on, LGNZ does provide an opportunity to produce guidance for local authorities on a large scale.

To ensure 90% of homes reach a high standard of sustainability by 2012, a specific mandate and resourcing will be needed to enable Beacon to influence the policy process and an investment by Beacon in the translation of its research-based work into policy-type products that are useful and applicable for Government to use.

This raises a tension between Beacon's goal of 90% of households reaching a high standard of sustainability by 2012 and its objectives relating to intellectual property. The two are not mutually exclusive but there is significant tension between influencing Government policy and achieving large scale change in the majority of New Zealand households, and keeping hold of research results for commercial gain. A clear distinction will need to be made by Beacon as to the priority of its goals and objectives, as whether research results are used for public good or commercial purposes will significantly affect their uptake.

It is also important to note that policy is not the end in itself. A particular policy document or set of regulations is not the absolute solution to achieving Beacon's goals. Beacon's goals are much wider than only the policy and regulatory process and any policy or regulation developed will form only part of the course of action to achieve these goals.

4 Residential rating tools

Residential rating tools currently have minimal uptake in New Zealand, but it is widely recognised that “if you can’t measure, you can’t manage”. Rating tools are anticipated to be a key component in measuring the sustainability of a house, as without some kind of rating tool it is not possible to set minimum performance criteria for a house, such as through revisions to the Building Code or Residential Tenancies Act. Section 4 discusses Beacon’s role with respect to residential rating tools in New Zealand. It discusses from a policy and regulatory perspective whether the existing tools, in some combination, will be sufficient for Beacon to reach its goal by 2012, and who and how Beacon should target to ensure the uptake of rating tools for homes and neighbourhoods.

Three main energy/sustainability residential rating tool initiatives are already under development in New Zealand:

- EECA’s Home Energy Rating Scheme (HERS);
- The New Zealand Green Building Council is collaborating with BRANZ to deliver a Residential Green Star (based on BRANZ’s Green Homes scheme); and
- Waitakere City Council is developing a network of interested stakeholders to develop its existing neighbourhood tool (TUSC) further.

Experience in Australia demonstrates that having a number of rating tools in the market causes confusion. An assessment has been made that Beacon would not succeed in developing a separate rating tool that would out-compete the residential rating tools already being developed in New Zealand. In order to avoid further confusion, and assist with the simplicity that the New Zealand market is seeking, Beacon’s strategy is to work with the owners of the tools already underway to achieve its goals. Beacon is working with EECA, The New Zealand Green Building Council and Waitakere City Council to underpin their metrics with sound science benchmarks based on Beacon’s High Standard of Sustainability and performance data from Beacon’s NOW and Retrofit Homes.

4.1 Residential rating tools in New Zealand

Section 4.1 describes the three main residential rating tools currently under development in New Zealand, the stage of development they are in, and the role that Beacon has played in their development so far.

4.1.1 Residential Green Star

BRANZ developed the Green Homes rating tool, which is New Zealand’s only independent method of assessing the environmental performance of new home designs. This is an impressive and comprehensive tool on an international scale for measuring the sustainability of a house. Developed by scientists it is detailed and technical, and a certificate is issued for those designs that have a good environmental performance. It is accessible to the public only through BRANZ for a commercial fee, and combined with little marketing and no incentives, has meant that uptake has been minimal. Beacon had no input into the development of the initial Green

Homes scheme as it was developed some years ago, but could influence the new Residential Green Star tool that is being developed.

The New Zealand Green Building Council is collaborating with BRANZ to deliver a Residential Green Star tool based on BRANZ's Green Homes scheme early in 2008. This tool is in its initial stages with significant opportunity for Beacon to influence its development. For example, the initial Green Homes scheme uses hypothetical data to provide a rating for a house, whereas Beacon is conducting work into a variety of houses and housing types and has actual measurements which could be used to underpin the new tool.

Beacon wants its High Standard of Sustainability (HSS) to underpin the benchmarks for each of the tools, in order to achieve its goal, and has already been involved in initial discussions with the Green Building Council. Due to the initial stage of development that the Green Star tool is in, it presents the greatest opportunity for Beacon to ensure that the HSS provides the new benchmarks underpinning the tool.

4.1.2 Home Energy Rating Scheme (HERS)

The Energy Efficiency and Conservation Authority (EECA) is currently developing the Home Energy Rating Scheme (HERS), which will be introduced on a voluntary basis in December 2007. It is anticipated that mandatory measures will follow in the next couple of years.

The intention of the scheme is to make New Zealanders aware of the energy performance of their houses, and will operate in a similar way to the star rating on appliances, with a home given an energy rating that reflects its performance after an inspection and assessment by an accredited assessor. The priority market is middle to high income earners, and landlords responsible for pre-1977 houses. It is not anticipated that the initial voluntary scheme will set minimum standards but it is intended to increase house buyers' awareness before purchasing a house. A "cut-down" tool is to be developed in 2008 that will be more user-friendly than the current tool, which is anticipated to require five days of training to be able to use it and four hours to undertake a rating assessment.

There are a number of issues to note around HERS regarding its use as a sustainability tool:

- it is currently an energy rating scheme only. It will not provide a complete sustainability rating for a house;
- the original scheme that HERS is based on is Australian and designed around the thermal envelope. It was not designed to handle hot water or space heating, or the New Zealand climate. These aspects are being addressed at the moment and the scheme redesigned around nine climate zones identified by NIWA. This is, however, being done within a short timeframe;
- these nine climate zones do not align with the climate zones currently set out in the Building Code and the rating tool does not appear to align with providing a verifiable method for acceptable solutions to the requirements of the Code;
- there are issues around the current deadline which will require a considerable push to provide a completed and workable tool within this short timeframe.

Beacon is supporting the development of HERS as much as possible, providing applicable information to EECA to influence its development. However, there is a clear need for the tool to become mandatory and to move from a mandatory energy rating tool to a mandatory sustainability rating tool. EECA very much holds the pen on the development of HERS, and is unlikely to realign the tool towards wider sustainability before the launch date at the end of the year.

However, the cut-down version of HERS to be developed in 2008 will be the next step in a user-friendly interface, and presents the possibility of using Beacon's data sets for standard typologies of houses to ensure it reaches a wider audience. There is significant opportunity for this user-friendly tool to be widened to a sustainability tool rather than purely energy.

4.1.3 Tool for Urban Sustainability – Code of Practice (TUSC)

TUSC is an online assessment tool developed by Waitakere City Council that rates the sustainability of urban residential buildings, subdivisions, and neighbourhoods. TUSC calculates the energy and water savings and wider stormwater and transport-related impacts of both existing sites and sites at the concept or design stage. It combines this information in both graphical and numerical form to show how sustainable a home, subdivision or neighbourhood is. The TUSC site contains a number of tools for different uses and users with the ability to view case studies, design a sustainable home, check the efficiency of an existing home, design a sustainable subdivision, or calculate a development remission from Waitakere City Council.

The TUSC tool is live and accessible to all households. While it is not as scientifically robust as the Green Homes Scheme or anticipated Green Star, it is functional and accessible. Anyone can go to the website and get a rating for their home. However, it is unlikely to apply to all areas of New Zealand and has been specifically used in Waitakere City to try and get a reduction in development contributions by demonstrating the sustainability of a development.

This rating tool could work well in conjunction with local authorities across New Zealand, and TUSC is developing a network of interested stakeholders to develop its tool further. It would be possible to have differential rating based on the sustainability of homes and alleviate contributions for development levies by demonstrating sustainability. It is particularly useful because it interfaces with geographic information systems (GIS) and would enable a builder/developer to access information from home.

However, it is not particularly robust at the moment with incomplete data underpinning it, and Beacon has offered assistance to Waitakere City Council to improve the tool and has a memorandum of understanding regarding it.

TUSC could be a useful tool for local government but it requires a clear and resourced path for uptake in the future, and issues have been raised regarding the intellectual property rights of the consultant who initially developed the tool – which is providing a barrier to further development of the tool.

4.1.4 Will they be sufficient?

From a policy and regulatory perspective, these tools, even in combination, will not be sufficient for Beacon to reach its goal by 2012.

Research conducted by EECA indicates that uptake of voluntary rating schemes internationally is just 1% even with incentives. All three of the main residential rating schemes are proposed to be voluntary, and the efficacy of any rating scheme on actual numbers of retrofitted houses is inconclusive.

The Green Star Scheme is currently in its initial stages of development. It is anticipated that it will be a voluntary, industry-based scheme, and anecdotal evidence suggests that Green Star tools only apply to the top 25% of the market. It would likely apply to new-build homes and not address the bulk of New Zealand housing stock that already exists.

The HERS tool will gain a significant push from Government and will have a much wider audience than the Green Star tool. It will however also be voluntary and while it is anticipated that HERS will become mandatory within a couple of years, it is unlikely that this will bring about a significant effect on housing stock by 2012 with a maximum window of three years. The turnover of home ownership, even if rental properties were included would not constitute 90% of the New Zealand housing stock.

TUSC is also a voluntary tool and so far has had minimal uptake. Although significant opportunity exists to expand the tool to other local authorities, without significant effort and resources invested in a path for uptake of this tool it could well remain within Waitakere City Council beyond 2012.

Until drivers are developed about the value of the home based on sustainability any rating scheme will struggle. If rating of a house was mandatory at point of sale or point of lease there would be considerably greater uptake and the possibility of reaching Beacon's goal by 2012. However, this is not anticipated within a timeframe that could enable Beacon's goal to be reached through any combination of the main residential rating tools. This is not to say that residential rating tools would not contribute to Beacon reaching its goal, but they will not constitute the primary avenue for this.

4.2 Ensuring uptake of rating tools

While residential rating tools will not be sufficient on their own for Beacon to reach its goal by 2012, they could contribute significantly as no assessment can be made of whether a house is sustainable or not, if no measure exists for doing so. With limited time and resources, and minimal uptake of residential rating tools so far in New Zealand, the question remains as to who and how Beacon should target to ensure the uptake of rating tools for homes and neighbourhoods.

It would be wise for Beacon to continue to attempt to get all three of the main rating tools to work together, and use the HSS to underpin each. New Zealand is not big enough to have a lot of different tools and it is essential if there are a number of tools, that these are comparable in some way to avoid confusion in the market. The opportunity exists to use the HSS for the Green Star tool and the cut-down version of HERS as these have both not yet been developed, although TUSC presents some difficulties due to IP issues with the developer of the tool now that it is already up and running.

Beacon is in a unique position, as a research-based organisation sitting outside the development of any particular tool, with a speciality in the sustainability of New Zealand's housing. Beacon

has recognised expertise in this area, has little vested interest in any particular tool (apart from Waitakere City Council as a stakeholder), and the ability to provide verifiable data from actual houses that can be used by the existing tools.

The Green Star tool provides an opportunity to develop a new sustainability tool using the HSS as its benchmarks, and it is essential that Beacon provides input into this from the very beginning. However, it is voluntary and aimed at the high end of the market with an associated level of uptake that will be too low to meet Beacon's goal by 2012. This is not to exclude the possibility that this tool could become mandatory in the future if it was developed well and included government agencies from the beginning, or if the right leverage was exerted on government.

The tool that will provide the greatest chance of achieving Beacon's goal is HERS. It is government funded and significant effort will be put into its uptake by the government. A clear path for its uptake on a large national scale will be established unlike the other two tools. It will be widely communicated to New Zealand, and is anticipated to become mandatory within a couple of years. Residential rating tools currently have minimal uptake in New Zealand and overseas, and if they remain voluntary there will always be minimal uptake. For large scale uptake as necessary to meet Beacon's goal, a mandatory tool is necessary.

The danger of Beacon focusing its efforts on HERS is that it is currently focused on energy, and unless EECA is convinced otherwise, or other agencies become involved, it could stay that way and may not become a wider-sustainability tool. HERS has been committed to being rolled out at the end of 2007. This is an ambitious target and EECA will not be looking to make any further ambitious additions to the tool at this stage.

The opportunity for a nation-wide, accessible sustainability tool that has the possibility of becoming mandatory lies within the second, cut-down version of HERS. It is possible that this could have a higher uptake than HERS itself simply because of accessibility issues. Beacon can contribute significant data to underpin this tool, particularly beginning with its work around standard typologies of houses. Beacon needs to be involved in the development of this tool from the beginning.

There is a clear need for HERS to become mandatory and to move from a mandatory energy rating tool to a mandatory sustainability rating tool. This will only be feasible when recognition is given to the importance of water, materials and IEQ. This is very unlikely to emerge from EECA and will require buy-in from other agencies. Beacon can influence this buy-in through provision of robust and timely research in the short-term, and dissemination of this research to government officials, initially through the National Value Case, and pressure on other Government departments to recognise wider sustainability issues for homes.

An additional avenue that Beacon could pursue in the very short term is an amendment to the Residential Tenancies Act to require rating at the point of lease for rental properties, which would feed into the requirement for a national rating tool. Work to review the Residential Tenancies Act is underway now and Beacon would need to act quickly to influence this.

5 Pros and cons of a systems approach

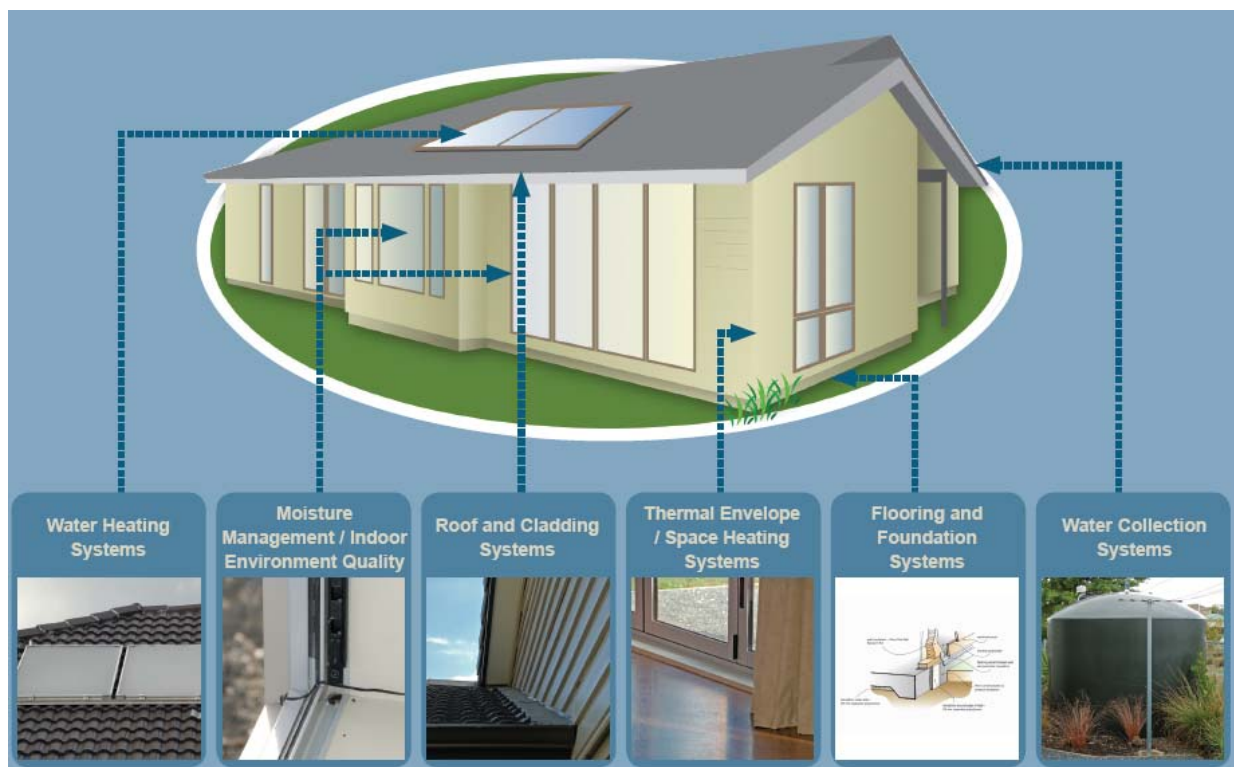
A system, such as a house, is an entity that maintains its existence and functions as a whole through the interaction of its parts. Systems thinking looks at the whole, the parts, and the connections between them, studying the whole in order to understand the parts (O’Conner & McDermott, 1997). In some cases the behaviour of the parts of a system will depend on how the parts are connected, and using a systems approach may provide additional insights when researching materials and system components. Part 5 of this report outlines the high level pros and cons of Beacon undertaking a systems approach to focus its research around the component parts of the home.

Undertaking a systems approach faces a number of barriers, particularly around the ability of it to be understood by stakeholders outside of Beacon. However, sustainability as a concept requires a systems approach, and although this may at first appear difficult to communicate, it is an essential change in current thinking about homes, research and policy. By first applying it to its research around the component parts of a home, Beacon will be able to eventually roll out such an approach to its whole operations.

5.1 Beacon’s systems approach

It is proposed that Beacon adopt a systems approach to its research programme around the component parts of a home. The draft business plan sets out an overview of the proposed systems approach, stating that *systems thinking will integrate and provide a common language between the market areas and the basic research areas of Beacon.*

Figure 2 Sets of systems in a home

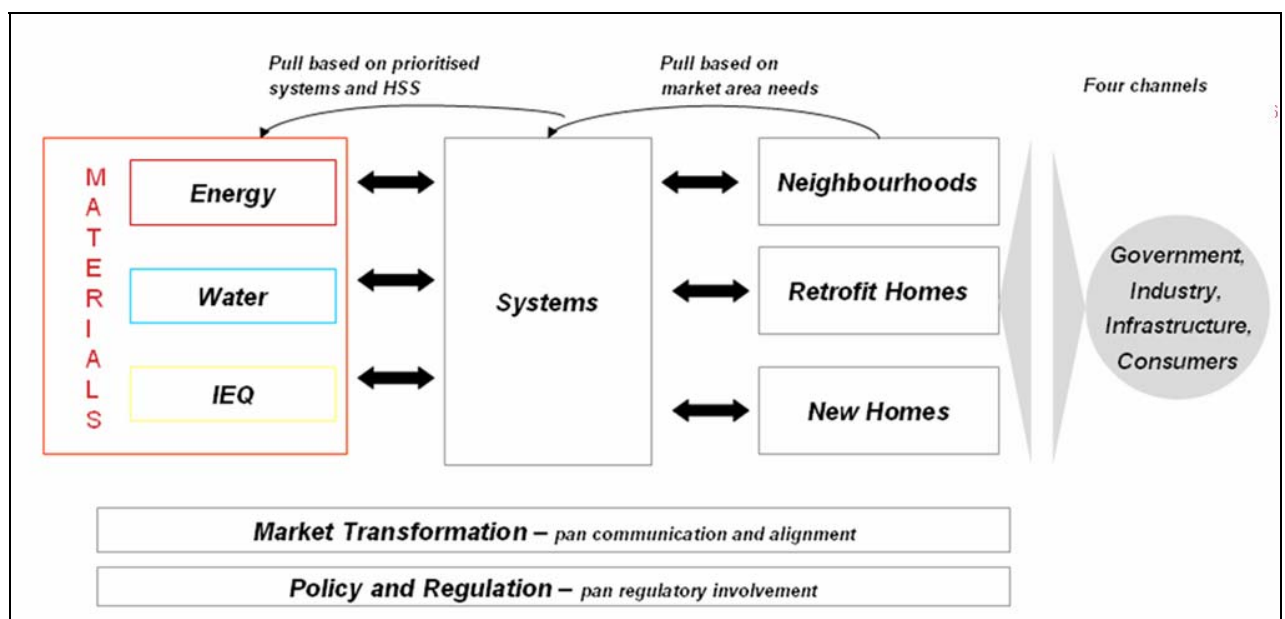


Beacon acknowledges that neighbourhoods and homes are made up of different systems that drive and determine the functionality, performance, use and aesthetics of a home within the residential built environment. Homes consist of a complex combination of systems (e.g. walls, roofs, floors, heating, ventilation etc.), each provides a specific performance level for a home and collectively they result in a certain level of comfort, resource use, and quality of life. Beacon proposes that these defined systems will provide the framework for achieving HSS outcomes.

It is proposed that a Systems Group be established. The market area groups will inform the systems group of the needs required and ways of packaging systems information for key partners and stakeholders. The systems group will maintain the definition of the HSS versions, and determine and prioritise the systems required to drive each version of HSS. This group will determine how systems need to perform to achieve HSS within a Retrofit, New Home or Neighbourhoods. This information, and the resulting gaps in systems or underlying materials, will then drive priorities back into the basic research areas of energy, water and IEQ. A systems approach will be used to define the design criteria for various functional components and systems in sustainable homes, in order to achieve the targets developed in the Research Pathways.

This approach is intended to facilitate the development of new components and systems that result in reduced environmental impacts. It is anticipated that there will be strong linkages to regulatory bodies and other industry pathways, such as design and evaluation tools, to ensure that new systems can be recognised, implemented and preferred where significant benefit is demonstrated.

Figure 3 Systems approach links market priorities and channels to basic research



5.2 Possible benefits of the systems approach

- A house is a system and the parts of the house its components that provide the functions that a house puts out for its occupants. Taking a systems approach will enable a greater understanding of this system and its parts.
- The systems approach will be understood and even supported by some in policy circles, although these are likely to be in the minority.
- Systems function as a whole and have properties above and beyond the properties of the parts that comprise them. These properties emerge from the system when it is working properly e.g., the thermal properties of a house do not hinge on one part but depend on the walls, ceiling, floors, insulation, and type of materials used. Using a systems approach will enable emergent properties to be identified, as well as areas to leverage improvements in the quality of housing by improving the different systems within a house and how well they work together. It may be possible to discover things that may not be seen by studying individual materials or parts of a house without looking also at the whole.
- It would be possible to relate the work to performance measures in the Building Code, and show how particular systems/combinations of components create systems that meet the performance measures in the Code.
- A systems approach will improve Beacon's ability to address the targets of the HSS e.g., improve energy efficiency, water efficiency, and environmental impact of materials, in a holistic way.
- A problem has been identified with respect to siloed thinking regarding materials within Beacon. Using a systems approach will provide a solution to this problem.
- Beacon has recognised that there is still much Beacon does not know about materials and the impact of materials over the life of a building, and a systems approach will enable this kind of learning to occur.
- The components of a house provide a potential area of step-change that Beacon could introduce to assist houses to reach a HSS.
- A systems approach to materials is a strength of particular shareholders within Beacon and it is good to build on the strengths present within the company.
- Systems thinking is forward thinking; it could put Beacon ahead of the game regarding materials and processes in construction and identify new sources of intellectual property, as well as improving internal processes and thinking, enabling people to do their jobs and research better. However, there needs to be a way of injecting the systems work back into other work that Beacon is doing to influence the projects already underway with the learnings from the systems approach.
- A systems approach will provide potential area of product development and IP, although this is likely to take some time.
- Beacon's core research focuses on ways to reduce energy and water use, and improve IEQ and materials. It is relatively uncomplicated and non-integrated. A systems approach provides an approach to research that deals with these aspects being complicated in the functioning of a home.

- A systems approach may assist in identifying viable options – both at the level of an individual house with regards to types of materials and ways of building, and at a national level regarding policy options – that will lead towards greater sustainability.
- Sustainability as a concept requires a systems approach, and although this may at first appear difficult to communicate, it is an essential change in current thinking about homes, research and policy. By first applying it to its research around the component parts of a home, Beacon will be able to eventually roll out such an approach to its whole operations.

5.3 Possible disadvantages of the systems approach

- The current climate in policy and regulation is not receptive for such an approach to building and retrofitting New Zealand homes.
- A systems approach will not be understood by many in Government as a systems approach does not get a lot of traction on any issue. There is a risk that such an approach may be impracticable to apply in government in the short term because of existing bureaucratic systems and methods of analysis. Government agencies are siloed internally and externally. Central government and policy makers are intently focused on their individual areas of mandate and are seldom interested in issues outside of those they deal with directly. The research will have to be interpreted well when presented to Government or it will be put in the “too hard” box.
- Systems analysis currently plays a relatively minor part in political and economic decision-making. The dominant social paradigm or worldview does not incorporate systems thinking.
- A systems approach is complex and involves large quantities of information to be pulled together. Some may find this involves information overload, where they may be used to dealing with one aspect.
- Within Beacon, a common language will be needed to communicate the new systems approach, and this is unlikely to be a language familiar with external stakeholders. The market does not talk about systems (this could either be a way ahead, and an area that Beacon could lead, or it could result in confusion, and the results of Beacon’s research being irrelevant to some stakeholders who cannot grasp the concepts).
- Some Beacon members could not describe the systems approach that Beacon is proposing to use when queried on it. If staff cannot articulate the approach, how will those outside of Beacon understand it or the outcomes of the research?
- Taking a systems approach to the components of a house does not deal with the interface between those systems and larger systems that are not directly related to materials, but which relate to the house and wider systems, e.g., industry issues, regulatory, and social or market issues.
- The capability of the New Zealand research industry to get their heads around it is questionable due to the generally weak skills in project management and collaboration in this sector. A systems approach requires considerable collaboration and recognition that no one person or organisation will know all of the parts of a system and of the need to collaborate with others who know how the other pieces work.

- A systems approach provides a potential area of innovation and product development. But when the strategic goal of 90% of homes being sustainable is considered, a systems approach to materials will have a lesser impact because it will provide for a focus on core research rather than a focus on uptake by households. The often long time period to develop new products and processes and need for testing means that there may be little that is marketable by 2012 that will significantly contribute to Beacon's goal.
- Any developments from this stream of work are likely to relate mostly to new homes and therefore not contribute significantly to Beacon's goal which requires significant change in the existing housing stock.
- A systems approach is not a simple approach. At a simplistic level, it may be too much for some to grasp and innovative ways of communication will be necessary.
- Interval IP management will be required by Beacon to ensure that any developments are not lost or sidelined.
- A mix of skills will be required for the systems group to take a systems approach. A team that does not have the correct mix of skills, expertise, and interdisciplinarity, may not take a systems approach at all but may continue with the current research approach.
- If it is to be taken up widely to meet Beacon's goal by 2012, a robust evidence base will be needed to ensure the Department of Building and Housing agrees on an acceptable solution under the Building Code and industry is convinced to change their practices – which requires materials available. Neither of which are likely by 2012.
- The diagram in the draft business plan appears somewhat deceptive, in that it would appear that a systems approach is being taken to the entirety of Beacon's work, whereas the description describes a systems approach applied only to materials and the research on the components of a house. A wider systems approach to all of Beacon's work would be much more complex and comprehensive, and require systemic change within Beacon itself.
- A systems approach will entail a new way of designing and undertaking research to the way that Beacon's research is currently set up. Beacon currently has approximately 20 research projects underway and a clear pathway will be needed as to how the new systems work will feed back into these projects, and how the different types of projects will mesh together.

5.4 Ensuring resonance for a systems approach

Sustainability is a concept requiring integration and a systems approach. Using a standard approach of analysing the parts of a system separately, without looking at the effect of the whole system will not capture the integrated nature of sustainability or the emergent properties of a house as a system when the parts of a house work together well. A house is a system and the parts of the house its constituent parts that provide the functions that a house puts out for its occupants. It is logical that when trying to improve the sustainability of a home that Beacon takes a systems approach to studying the component parts of a home. However, such an approach will face a number of barriers initially, both internally and externally.

To overcome these barriers, Beacon needs to influence those who will receive and use the outcomes of its research in order to ensure resonance with a systems approach.

Beacon will need to ensure a way of injecting the systems work back into its other work to influence what people are currently working on and ensure that everyone within Beacon understands the approach.

Beacon will need to provide an explanation of its approach and look to gain support from within the research sector, industry and Government departments. Convincing Government departments of the utility of a systems approach will require collaboration between Beacon and others in the sector.

Beacon will need to be clear about changes required to use the systems approach by other stakeholders. For example, the ability of the research to lead to acceptable solutions under the Building Code, and the need for industry to upskill to respond to changes in the way that houses are constructed as a result of the research.

It will be necessary to bear in mind when using a systems approach to researching the component parts of a house that these parts make up the system of a house which sits within a number of systems such as neighbourhoods, urban systems, transport systems, a city, political systems (local and national), regulatory and policy systems (Building Code, RMA, RTA, etc. that apply to a house), and wider environmental systems. There will be a need to recognise that taking a systems approach to the component parts of a house does not mean that Beacon is taking a systems approach to its overall work.

There is certainly a role for Beacon in providing an understanding of a house as a system to contribute to the understanding of sustainability for the nation. There is a need to incorporate information from different domains into a single decision-making process in a political and policy-making system that is divided into silos. The presentation of Beacon's research will need to be appropriately packaged to manage this relationship. While a systems approach will be useful to integrate Beacon's research it may initially require unpicking to repackage it for presentation to other stakeholders.

6 Conclusions

Beacon is conducting research into how best homes and neighbourhood sustainability can be achieved in New Zealand. This research can provide invaluable technical knowledge to policy-makers about the nature and consequences of specific policy proposals. Policies and regulations are key uptake pathways for Beacon research and there is a significant role that Beacon can play in the policy and regulatory process. Focusing Beacon's role in the policy and regulatory environment will enable Beacon to optimise scarce resources and ensure it moves quickly to achieve its goal of 90% of New Zealand homes achieving a high standard of sustainability by 2012.

Residential rating tools are anticipated to be a key component in measuring the sustainability of a house and by focusing on the development of the cut-down HERS tool and its transformation to a sustainability rating tool, Beacon will have widest influence by focusing on this area, although there is a risk that EECA will not allow the tool to be driven in this wider direction of sustainability. It is also important for Beacon to continue to work towards underpinning the main residential rating tools with its high standard of sustainability to ensure comparability in the market.

Beacon proposes to embark on a systems approach to focus its research around the component parts of the home. Undertaking such a systems approach faces a number of barriers, particularly around the ability of it to be understood by stakeholders outside of Beacon. However, sustainability as a concept requires a systems approach, and although this may at first appear difficult to communicate, it is an essential change in current thinking about homes, research and policy. By first applying it to its research around the component parts of a home, Beacon will be able to eventually roll out such an approach to its whole operations.

If Beacon wants its research to be used and to change the sustainability of New Zealand's homes and neighbourhoods, it needs to communicate it to Government. It needs to convince Government of the rationale underpinning this. This needs to be done with robust research and relationship building, and requires the allocation of time and resources to information transfer in an appropriate way to Government.

7 References

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