



NOW7

NOW Home Demonstration Home Hypothesis

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NOW Home, NOW7 Demonstration Home Hypothesis

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Executive Summary

Based on literature from overseas energy intervention programmes we investigated a process which could be adopted for developing a successful demonstration home strategy. The process consists of a six step planning and evaluation process including Problem orientation and specification of goals, Analysis of determinants and target groups, Design and implementation of the intervention, Process evaluation, Outcome evaluation, Goal achievement evaluation.

Project information about a number of New Zealand and international demonstration homes was collected using phone interviews and surveys. The case studies were evaluated in respect to the level of market impact and achieved consumer behaviour change. We were not able to find any existing demonstration home projects which included a full market impact evaluation, in particular an analysis of the impact on consumer behaviours. This limits the reliability of any market impact prediction, but also offers an opportunity for Beacon to obtain new research insights by conducting market performance research for these projects.

The success of a number of existing New Zealand demonstration homes could be evaluated. Provided the evaluation indicates that demonstration homes can be effective means to change behaviour, an optimum demonstration home strategy could be developed. This strategy could then be adopted by Beacon and other organisations to design optimum demonstration projects. It is conceivable that such a demonstration implementation process would be of commercial interest and could offer IP value.

The case study project managers generally considered their projects to be successful. Factors critical for market success were reportedly:

- A clear marketing strategy
- Independence
- A thorough research component
- Appropriate building design
- The provision of customised advice

A five step demonstration home evaluation methodology was developed, which can be applied to existing demonstration homes as well as to any future Beacon demonstration homes which aim at market transformation. The five evaluations criteria are: 1. Technology performance, 2. Building performance, 3. Visitor numbers, 4. Attitudes, liking and value changes and 5. Implementation behaviour change.

Interviews were conducted with the main NOW Home stakeholders and documents were analysed to identify the objectives for the use of the NOW Home as a demonstration home. The objectives between the partners had different emphasises. Most partners saw the NOW Home primarily as a research home. If Beacon intends to support marketing components of these objectives a stakeholder meeting to define target groups and measurable success indicators would be helpful. On that basis a marketing strategy could be designed.

Cost and likely success of the marketing measures supporting the NOW Home partner objectives were estimated. The estimated costs for different alternatives range from about \$55k to \$1M per year with set-up costs of between \$80k and \$500k.

Irrespective of the degree of intended marketing, the NOW Home will raise considerable public and industry interest. It is important to have mechanisms in place which provide effective and consistent technical information about the project. Suitable means of information dissemination include a website with technical information and a range of printed media (Strategy D in Appendix I). The linkage with the Sustainable Living Center may offer a cost effective opportunity to disseminate material.



The cost of implementing a comprehensive integrated marketing strategy aimed at changing consumer behaviour is significant. Three factors are important in respect to Beacon's resolve for implementing such a strategy:

- Do Beacon's company objectives justify spending money on satisfying marketing objectives as expressed by some of the stakeholders?
- Does the marketing of the demonstration home align with Beacon consumer research findings in Beacon project CON1?
- Does the limited evidence of market transformation success of other demonstration projects pose an unacceptable risk or not?

Action Items:

We recommend that :

1. BEACON implements NOW Home information dissemination mechanisms including a technical website and printed media (Strategy D in Appendix I). These form the initial step towards the formation of BEACON homes build protocols including user friendly 'how to' documentation, design guides, and suitable software.
2. BEACON implements a research programme to evaluate the market impact of existing demonstration homes. The output of this research would be an empirically based methodology to implement demonstration homes to achieve maximum market impact.

2. BACKGROUND

Beacon is undertaking research into how to drive consumer demand for greater levels of sustainability features in both new and used homes, and how to drive industry provision to meet that demand. Beacon has targets for homes meeting a sustainability standard (90+% by 2012) and the use of a Neighbourhood Sustainability Framework for all new or redeveloped subdivisions, from 2008.

A central feature of the proposed Beacon strategy is the design and construction of demonstration homes, both for new and retrofit. It has been suggested that 'demonstration is a central value of Beacon'. However, there is evidence from the UK and other locations that demonstration homes have not delivered the expected level of uptake of sustainability improvements. It is not clear whether this failure is a result of a poor hypothesis or poor implementation.

Beacon has a NOW Home in the final stages of planning. The NOW Home is a home designed using the current sustainability technologies and building methods, as long as those methods are mainstream and available to the public now within current cost dimensions. All design decisions were made with the criteria of maximising the sustainability features of the home.

There are a large number of ideas for maximising the impact of the NOW Home, however these are based on opinions and anecdotal evidence and it is not at all clear that the cost of these will be justified in terms of the return that is generated.

This research project aims at providing a basis for arguing in favour or against spending Beacon research money on demonstration homes and promoting the NOW Home as a demonstration home.

3. THEORY OF MARKET INTERVENTIONS

In 2001 the European SAVE study¹ thoroughly investigated 51 European case studies of programmes aimed at changing energy related behaviour. The authors developed a model on the basis of these experiences to assist others in setting up successful intervention programmes. The model process is outlined in Figure 1. The process, called "Beginning at the end", consists of six consecutive steps divided into two groups (quoted from Greer, 2001¹):

Planning:

- Step 1: Problem orientation and specification of goals and objectives
- Step 2: Analysis of determinants and target groups
- Step 3: Design and implementation of the intervention

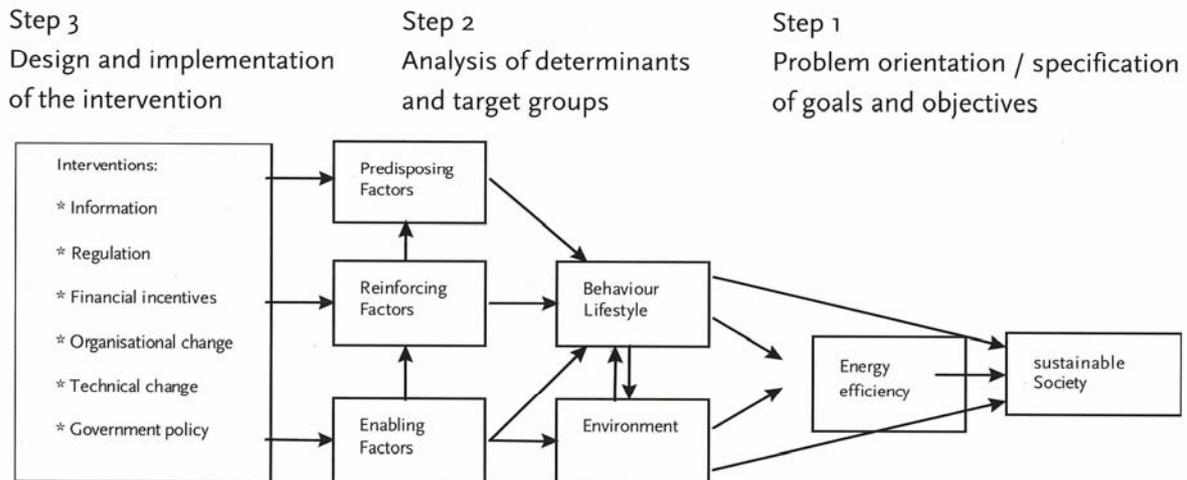
Evaluation:

- Step 4: Process evaluation of the intervention: Has the intervention been carried out as planned? What were the barriers that had to be dealt with?
- Step 5: To what extent has there been a change (improvement) in the determinants of change? Among which target groups?
- Step 6: To what extent were the ultimate and intermediate goals achieved?

It is important to note that this model does not start with the intervention, but rather with the analysis of the problem and the social context.

In Beacon's context, this initial phase might include analysis of demand to develop housing/ product/ service concepts offering high value to both householders and Beacon. This process has now commenced with several Beacon research programmes into consumer behaviour, neighbourhood and industry drivers.

Phase 1 planning



Phase 2: Evaluation

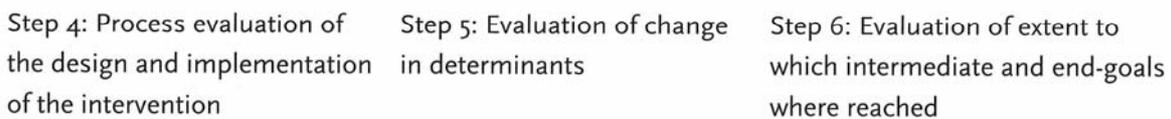


Figure 1: Greer et al. model of successful market intervention project design.

The model includes a detailed barrier analysis by evaluating various levels of determinants for each target group. The model distinguishes between three types of determinants:

1. 'Predisposing factors' which include knowledge, attitudes, beliefs, etc.
2. 'Enabling factors', such as availability of products, regulations, subsidies, etc.
3. 'Reinforcing factors' which include positive feedback, physical, social or financial benefits etc.

Different factors will be dominant for different target groups, i.e. barriers to change among those who are pre-disposed would more likely be related to 'enabling factors' rather than 'predisposing factors'.

75% of the 51 international case studies investigated by the SAVE study partners showed significant positive results. However, in many cases the objective of the intervention was not clearly enough defined at the outset. The results are very commonly expressed in terms of indicators of success such as sales figures, etc., rather than scientifically measured behaviour changes, and in many cases the recorded changes were transient and decayed after the intervention stopped. Some further findings of that research will be discussed in Beacon project CON1.

One of the key lessons was that in less than 20% of the cases the interventions were designed on the basis of a theoretical framework. Greers et al. found that those cases which either drew from theory or contributed general lessons to theory tended to be the most successful.

4. EXISTING DEMONSTRATION PROJECTS

4.1 Overview

We surveyed a number of existing New Zealand and international demonstration and show home operators via phone and survey forms. The results from the surveys are compiled in Appendices A to F.

The case studies were selected and evaluated in respect to their success in changing market behaviour. It needs to be noted that this may not necessarily be the objective of the majority of NOW Home stakeholders.

The case studies employed quite different marketing approaches, ranging from no active marketing at all to carefully designed marketing strategies based on market research and theoretical frameworks. Common to all of them is that none of them conducted a scientific programme success evaluation. The only success measure collected by most of the projects was the number of visitors (real or virtual internet). This is a pattern across all demonstration homes we have identified, here and internationally¹. This lack of reliable research knowledge offers an opportunity for Beacon to increase the understanding of market intervention programmes by conducting its own research into the success level of various demonstration projects.

4.2 Success factors

Although no quantitative information about the success of the case studies in respect to consumer behaviour change is available, the interviewed project managers generally had the feeling that their demonstration homes were successful.

Following are the most important success factors identified by them:

- **Marketing Strategy:** Developing an integrated marketing and communication strategy requires more time and effort. However this is seen as more effective in the long run than an ad-hoc implementation.
- **Independence:** Several of the demonstration project managers emphasised how important the perceived independence of the project from industry lobby groups is. Consumers value unbiased and technically sound information.
- **Research:** Scientific research in the house performance can be an important component for the marketing of demonstration homes. This makes houses stand out from other demonstration homes and leads to media interest and indirect marketing by other organisations.
- **Building design:** Informal feedback indicated that people seemed to prefer demonstration homes which are “ordinary homes” and didn’t look “odd”. However, we believe that this will ultimately depend on the selected target audience and a clear definition of what people perceive to be “odd-looking”ⁱⁱ. Both modern looking concrete/glass designs and rough sawn timber walls with grass roofs will fall in this unconventional looking category. We believe consumer research is required to refine our understanding of what the concepts of “ordinary looking” and “extra-ordinary looking” actually mean, and which of these are desired by specific consumer groups.
- **Customised advice:** One project manager in particular (Christchurch Energy Efficient Showhome) emphasised the importance of one-to-one personal advice.

ⁱ We have in the meantime also contacted the Civil Engineering Research Foundation (CERF) and Integrate Building and Construction Solutions (IBACOS), but have not received feedback at this stage.

ⁱⁱ The recent high publicity of the powered living home in Nelson would suggest that modern unconventional designs generate large public interest.

Other lessons learnt from these case studies included:

- **Free media coverage:** In many case studies most of the media coverage occurred “by default” and free of charge to the projects. There seems to be general media interest in the topic which can be utilized, at least for a few more years until the novelty factor of sustainable building wears off. Demonstration projects attracted attention because they are unique and news worthy, rather than because they are green or get international coverage. In the US case the most effective advertising angle seems to be a focus on the health benefits of the buildings. In one New Zealand and the Australian case external factors such as bad weather spells triggered instant media and public interest. The free media coverage does, however, not imply that there is no need for a well-defined information dissemination strategy. Rather on the contrary, because the communication is executed by independent media it is even more important that the content of the publicity is well defined and targeted.
- **Media:** Printed media such as brochures seemed to work well in communicating with the public. Internet websites were seen as a cost effective means of providing in-depth information.
- **Awards:** Winning awards helped make the project seem worthwhile. In one case (The Independent Show Home) the award was seen as adding to the demonstration home’s credibility. This may have been relevant particularly to this case, which was operated by a private person rather than a public body or company.
- **Industry Collaboration:** Industry collaboration did generally not work well with the exception of the Japanese case study. One of the reasons is probably that while the demonstration home has to provide unbiased information and advice to the consumer industry partners naturally expect business benefits, i.e. have little interest in showcasing their competitors’ products. We believe that one way to overcome this inherent conflict of interest is to establish collaboration with industry associations rather than individual members of the industry. The poor industry cooperation may also be an indication for possibly low quantifiable impact on product sales.

4.3 Cost/Impact analysis of show home projects

In section 3 we discussed the lessons learnt from a number of New Zealand and international case studies.

This section provides an assessment of their relative successes using basic measures of marketing effectiveness. The table below summarises the relative effectiveness of some of these homes in ‘demonstrating’ their features (the figures are set to an annual cycle).

Example	Target Group	Number in Target (N)	People Aware (%)	People Visiting (%)	Cost per Visitor (%)
The Independent Showhome, Christchurch	People interested in sustainability	12,000*	65%*	17%	\$10*
Christchurch Energy Efficiency Show Home	Homes needing energy efficient upgrades	60,000	80%*	8%	\$10
Waitakere Eco-friendly home, Waitakere	Local community	50,000	80%*	10%	\$20
IEA Task 28 Demonstration home, Kansas City	Local families fitting the LOHAS** characteristics	11,000	80%*	20%*	\$1
Australian Healthy Home, Brisbane	Research community and government agencies***	1,000	100%	10% 100%	NA

* Information lacking - educated guess based on existing information

** Lifestyle of Health and Sustainability

*** This home was initially targeted at the research community and key decision makers. Wider publicity was almost coincidental and the investment in the website and information material was required to satisfy public interest in a more effective manner.

Table 1: Visitor effectiveness evaluation of several show and demonstration home case studies

These examples indicate that the norm is for houses to be built as show homes, targeting the general public and aiming to sell sustainability concepts, products & technologies. In general they use basic assessments of what an optimal marketing strategy is, what best to build, who to target, and how best to implement the marketing.

Most times there is little or no assessment of whether the home has achieved this successfully, nor whether this has generated value for people who visited. Note that the Christchurch Energy Efficiency Show Home and the Waitakere Eco-Friendly Home have both developed plans to address such issues, but neither has implemented visitor-based assessments.

As a general result, we suggest the examples –with the exception of the US case study– have a vague idea of the nature, size and interests of their target market, so opting to use as many media as possible for a small budget. In spite of the utilisation of free media coverage the result is actually a comparatively high marketing spend. Although the visitor numbers are high, when one includes virtual visitors of websites, the level of achieved behaviour change seems comparatively small.

For example, the Christchurch and Waitakere homes spent between \$10 and \$20 per visitor on marketing the home. We suggest that a large proportion of their visitors were already pre-disposed to sustainability: visitor counts were therefore an effective measure of existing interest but not of marketing effectiveness nor of behaviour change.

Classical market adoption evidence suggests five typical adoption groups²: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. These groups adopt innovations generally in a sequential order. The time frame for this sequence depends on factors such as social context, the quality of the innovation and marketing success. One strategic review task for Beacon will be to clarify whether it is possible to target multiple of these consumer groups simultaneously or at least within rapid succession.

So the fundamental question is whether the demonstration homes should target the pre-disposed (such as innovators and early adopters) and/or the mainstream (such as early and late majority). Depending on the aims, very different marketing strategies might then emerge.

A useful guide to the planned market penetration of Beacon homes is the “Beacon Home Diffusion Curve” supplied by Kevin Golding to the NOW7 team on 6 September 2004. The graph is reproduced below. It suggests a three stage process (H1 to H3) between 2003 and 2012. The S-curve represents Roger’s diffusion curve of market adoption.

The diagram could be interpreted as a three layered envelope of market depth, i.e. the first envelope addresses a very narrow product of “sustainable constructions”, the second envelope encompasses also the society and community environment in which the buildings exist, and the third envelope encompasses the total mindset or paradigm of the society. The concept has parallels in Meadows³ system model of interventions, which will be further discussed in Beacon project CON1.

It is somewhat difficult to place the NOW Home at Olympic Place within this framework. On one hand the NOW Home has been designed to appeal the broadest possible audience (low cost, conventional appearance, etc.), on the other hand it is a single building providing technical solutions for sustainability issues. It therefore clearly falls within the inner “Sustainable Construction” envelope.

The diagram would suggest that an alternative effective approach might be to deliberately target the innovator and early adopter market segments with the first demonstration homes, using progressive unconventional designs. Once these market segments are captured and a product brand is established the mainstream market would follow. The “Beacon Design” may be out of reach for most, but individual components of the design can be afforded by most.

So rather than trying to conform to current conventional house design expectations the Beacon Homes could deliberately follow a different, but clearly identifiable design template. (Also refer to CON1 concepts about Economic, Humanistic and Naturalistic marketing approaches.)

Uptake

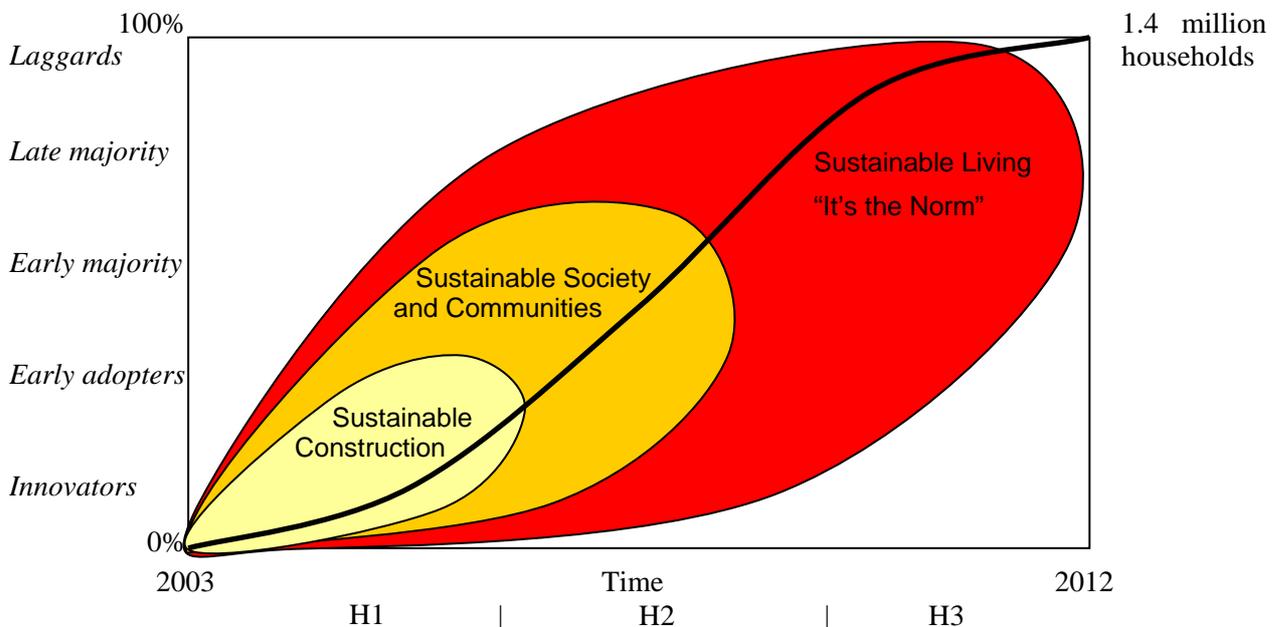


Figure 2: Beacon Home Diffusion Curve

Note that in general the examples given previously have adopted show home strategies with the intent of targeting the general public. But, as mentioned, we suggest the result has been to attract those already pre-disposed – Innovators and Early Adopters.

Demonstration homes may offer economies in promoting a cluster of sustainability-oriented products and interventions. This may be true, but note that the task of promoting is far more complex than for a single product/ intervention. Note too that a house is usually the largest single purchase a household will ever make, so in this sense a sophisticated marketing approach is entirely justified if rapid uptake is part of Beacon’s aims.

There are a number of consequences for Beacon’s approach to (demonstration) homes and how they can generate optimal value:

- Targeting – Identify the ‘right’ people to target within a strategy for change. Who the house is being built for shapes the design and success criteria of the house. Enhanced success includes providing the ‘right’ features to appeal to and convince the target. The examples above suggest about 5% of the general population have a pre-disposition towards sustainable house features. Beacon may decide to target these people (or alternately, those that are not pre-disposed), and the decision will then lead to decisions about what types of behaviour change to seek.
- The house itself – the house has to deliver both technological performance and appeal (social performance). That is, even a research home needs to be designed with a specific target market in mind. This also includes the ‘right’ technologies choices to be demonstrated to the target group.
- Message – targeting also means delivering well-crafted information, messages & emotional appeal to targets. Communicate in the ‘right’ way for these people through the media and personal channels that are most effective.
- Effect – the desired effect on the target needs to be carefully thought through: having people become aware of and visit a home is not sufficient as an outcome to aim at. That is, the effect of a home needs to aim at pushing the target one or two steps beyond their present level of engagement with sustainability.
- Behaviour Change – many examples worldwide measure behaviour change in terms of purchase of sustainable products or houses. However, among the pre-disposed this is not necessarily a change in behaviour, merely an elaboration of existing behaviours. Demonstration homes need to carefully define desired behaviour changes in their targets, ensuring these are translated into appropriate measures of change. After the market intervention the impact of these activities towards achieving change strategy goals needs to be assessed and measured.
- Budgets – the average cost-per-visitor for New Zealand projects is about \$14, with no attempts to recover this. We suggest that research-based marketing can lead to much higher efficiencies in spend and effectiveness in results.

5. GENERAL DEMONSTRATION HOME EVALUATION METHODOLOGY

The following criteria were developed to quantify measurable success criteria for demonstration projects.

The first two criteria evaluate the house performance irrespective of its use as a demonstration home. The later criteria address the questions of how well the house performs as a component of a marketing objective.

The achievement of each of the following listed success criteria is a prerequisite for the achievement of the next success criterion. Thus a behaviour change will only be achieved if each of the previous criteria has been achieved. It is for example unlikely that the house will achieve a good building performance (section 5.2) if the technologies do not perform (section 5.1). In a similar way it is unlikely that the demonstration home had any impact on target audience attitudes (section 5.4) if those

people haven't visited the house (section 5.3), either in person or through media such as internet and brochures.

It is therefore important to understand the dynamics between each of the success measures. Only by doing that, the chosen marketing approach can be analysed in ways that allow improving any future marketing strategies.

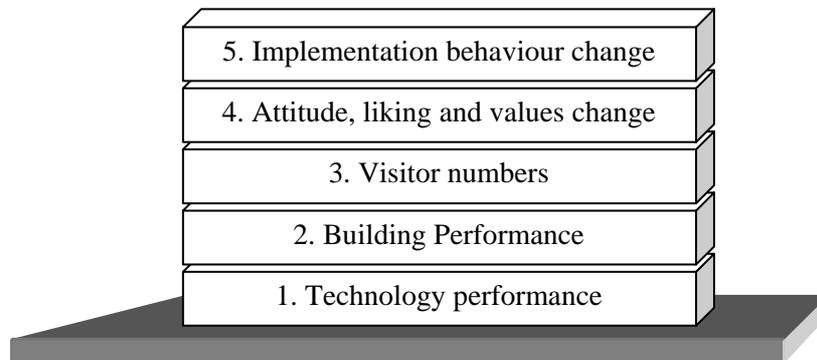


Figure 3: Demonstration home evaluation components

Unfortunately we were not able to find any demonstration home project which actually measured success on all five levels. Commonly the case studies collect data only up to level 3.

The quantitative performance measures within each criterion depend on the specific case. For example, Beacon may choose to use a demonstration home to demonstrate processes and products to industry opinion leaders only. In this instance, the aim is to change attitudes and behaviours of the builders, rather than the public. This building industry behaviour change might ultimately lead to a more effective sustainability shift than changing public attitudes and behaviours.

So while the criteria below are presented in general terms, they are provided as robust and effective measures when designed and applied properly.

5.1 Technology performance

Did the individual technologies perform as expected?

This question asks about the performance of individual technologies. It compares the actual performance with the supplier specifications and includes factors such as installation issues, product reliability, supplier service performance, etc.

5.2 Building performance

How well did the building meet the performance criteria defined in the outset?

Performance criteria can be classified in two groups:

1. Physically measurable quantities, such as energy consumption, indoor temperatures, waste disposal, air quality, condensation, impact on the environment, etc.
2. Lifestyle performance including comfort perceptions, health impact, aesthetic appeal, etc.

Rather than evaluating individual technologies separately (Section 5.1 Technology performance), this criterion looks at the integrated system performance. Sustainable housing generally relies heavily on the interaction of individual technologies. The measurable targets are defined within the sustainability framework (SF1.1, Level 5 targets and SF1.2).

In the NOW Home case the building performance criteria are identified in the NOW Home brief and include outcomes such as personal health, affordability, desirability, etc. The diagram below has a comprehensive list of these building performance criteria for the NOW Home.

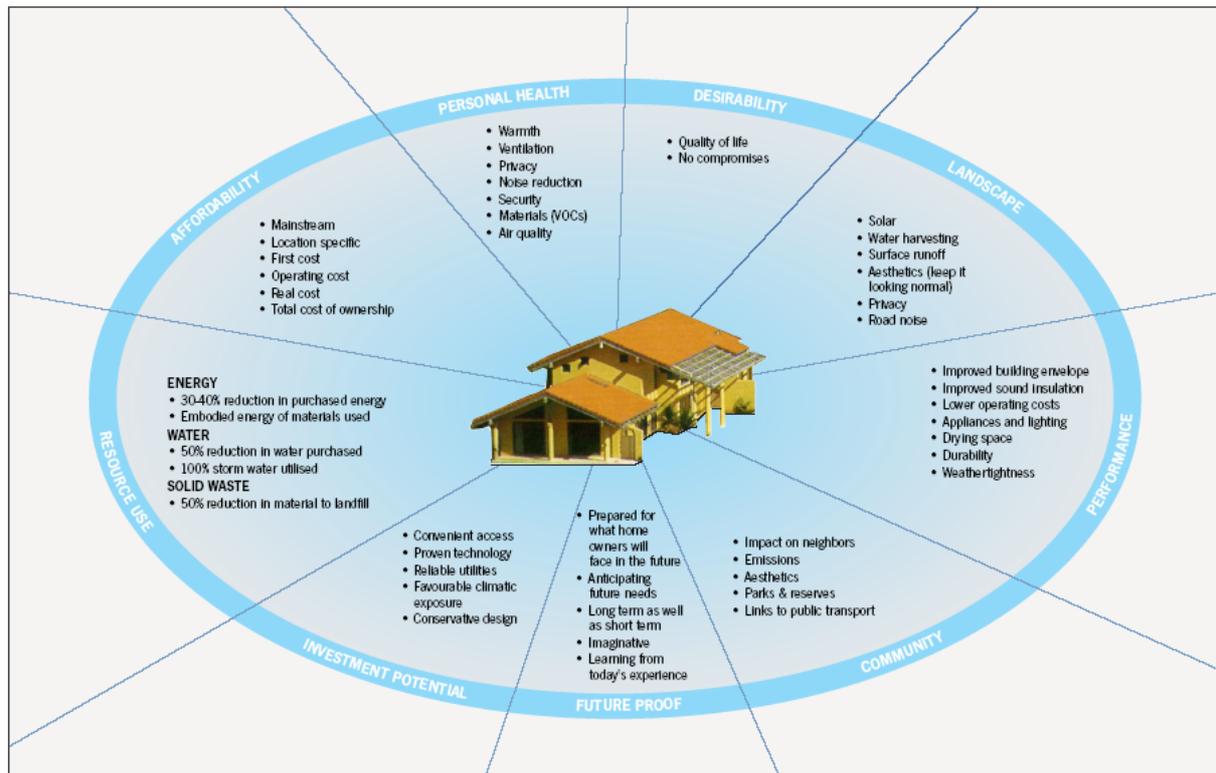


Figure 4: Maximising the potential for the footprint of a home (source: WWB, Kevin Golding)

Evaluation criteria 5.1 and 5.2 are sufficient, if the main purpose of the demonstration home is to demonstrate the technical potential of sustainable building technologies. If, however, the house objective is to reach out and transform the consumer market, further analysis in additional success criteria is required.

This 'building performance' criterion highlights one of the inherent conflicts of using a research house as a demonstration home. On one hand a demonstration home should perform to scientifically defensible performance criteria, on the other hand the evaluation has to take account of less tangible factors which are intimately linked with the way how this particular set of occupants interact with the building. Measuring occupied building performance is a research task, but in order to arrive at representative performance data a representative set of different occupants would need to be studied. For demonstration projects it is, however, tempting to choose occupants which are not representative, but rather predisposed to sustainable lifestyles, which to a degree compromises the validity of the research. These considerations have to be taken into account when interpreting the research results.

5.3 Visitor numbers

How many potential customers have actively interacted with the demonstration home?

One measure that is easily obtainable is the number of people who have interacted with the demonstration home. Interaction can be via visits to the house, access of a website, picked up a brochure, etc.

The case studies in this document indicate that this measure is commonly collected in many existing demonstration and show homes. Visitor numbers are usually based on visitor books, with comments

and contact details. This opens an opportunity to follow up some of the contacts and evaluate what and how much effect the visit has had on the household's behaviours such as product purchases.

5.4 Attitude, liking and values change

Did the demonstration project change people's attitudes, liking and value perceptions towards sustainable housing?

Market surveys can provide insight in the values which potential customers associate with products. Note that with the exception of the US example none of the case studies above were this sophisticated in their marketing evaluation.

One important prerequisite of consumer value changes is the association people have with the product brand. The brand summarises and communicates the value proposition. This measures the 'right' values alongside other values that might accrue to make sure people are learning/feeling the 'right' things from the brand. If they are not, there has to be a plan and the capacity to act on it.

It should also be noted that the creation of a brand does not necessarily require a conscious and structured effort by the project owners, but can be an unintentional result of informal communication channels, which are uncontrolled by the owners. The danger of such an uncoordinated brand creation is that the value associated with the brand can be undesirable.

In either case, the creation and target audience's value association with the brand plays an important role in shaping attitudes, liking and value changes.

Closely linked with brand recognition and brand perception is the question of whether people's attitudes towards sustainable housing were influenced through the demonstration home. Focus group meetings at the outset of the NOW Home design process have shown that the term sustainability does not have positive connotations for most people. However, the fact that this particular terminology is not favoured does not preclude the possibility that the concept itself, packaged in a different message, is seen as favourable.

So this evaluation criterion evaluates attitudes towards the concept of sustainable building, rather than the individual marketing message.

'Liking' and 'values' are closely related to attitudes. They are more direct and are also known to be more stable and closely aligned with behaviours. However, 'liking' can be too personal and 'values' can change too slowly to meet Beacon's needs.

A fourth measure in this category is how much learning/ knowledge about sustainable living was gained from the demonstration home. There is a school of thinking that "if people knew about all the benefits, they would automatically adopt the desired sustainable behaviour". This is demonstrably not the case, though homeowner learning is an important output for demonstration and show homes.

Trying to disaggregate these concepts allows an accurate design of successful intervention programs.

One significant challenge in evaluating this and any following success criteria is how to determine a causal relationship between the demonstration home and the outcome change (attitudes and behaviours). Most successful intervention measures are not stand alone processes, but an integrated range of measures such as for example subsidies, information and education campaigns, etc. Also unrelated external factors can have significant impact on people's attitudes, values and behaviours. Typical influences include world political events, the natural environment or demographic changes. Therefore it can be difficult to assign a clear impact value against one particular intervention measure, i.e. a demonstration home.

5.5 Implementation behaviour change

Has the demonstration home changed consumers' behaviours?

This is the ultimate yard stick against which any market intervention programme has to be evaluated.

There are two issues to consider here in the NOW Home context:

1. Is a demonstration home the best way to achieve the desired behaviour change?
2. What specific behaviours are expected of demonstration home visitors and how specifically will these be measured?

Both type and extent of behavioural change has to be determined and defined in measurable terms. Three broad categories of behavioural change can be identified:

1. **Peripheral change:** This category includes behaviour changes which do not *per se* lead to improved sustainability performances. It includes actions such as ordering information brochures, passing of information and opinions to other potential consumers, which may contribute to diffusion of information. These action can also be signs of changes in attitudes, however may not have lead to any objective sustainability improvements.

For example, in the REEP⁴ study, about one in every two people talked (i.e. each person talked to 0.5 others) – this wasn't enough to build quick adoption/ diffusion – REEP's marketing didn't make it 'talkworthy'. On the other hand, if every person talks about the NOW Home to only two others, it will lead to exponential growth and will not require any active marketing. The Christchurch show home case study refers to such a process. Such a situation will ultimately lead to the foundation for effective adoption/implementation behaviour change.

2. **Lifestyle change:** This includes permanent changes in everyday behaviour such as recycling, use of public transport, usage patterns of appliances and lights etc. These changes are not directly related to purchasing behaviour and are therefore sometimes difficult to measure. These effects are also not directly linked to a demonstration home objective in the Beacon context. Therefore measuring lifestyle changes is only of peripheral relevance in this project. These changes can often be related to Humanistic or Naturalistic market intervention approaches (refer to CON1 discussion).
3. **Purchasing decisions:** This includes the purchase of hardware such as energy efficient appliances, a solar water heater, a rain water tank or a whole building as well as the purchase of services to improve the sustainability of the household.

Capturing these changes is methodologically relatively straight forward, although the collection of sales figures can in practice be quite time consuming and complex. Although we have visitor databases of various show homes it may be difficult for these people to remember exactly what products they use and if they make the changes within the measurement timeframe. The latter two can be highly problematic. To compensate for these shortcomings it may be also useful to measure 'how likely visitors are to change their house within the next year' etc. This would capture some of the change in people's values and intentions.

6. DEMONSTRATION HOME RESEARCH GAP

As discussed before we were not able to find theoretical or case based studies within the timeframe of this project, which had quantified the success of sustainable demonstration homes in a systematic way as outlined in the previous chapter (Section 5).

This offers Beacon the opportunity to fill this research gap. The research would be aimed at improving the understanding of whether and how demonstration homes influence consumer behaviour and – if they seem to be effective intervention measures – to develop optimised implementation strategies.

In context the authors recommend the following research approach:

Stage 1. **Literature research:** Investigate whether there are international research programmes which have explored the effectiveness of demonstration homes on consumer behaviour. Because the existing research information base for sustainable demonstration homes seems very limited – if existent at all - this should also include research unrelated to sustainable buildings.

Stage 2. **Evaluate existing demonstration home success:** Beacon should invest research funding to accurately evaluate the consumer behaviour impact of a number of existing New Zealand demonstration home projects. In most cases visitor books are available and the required resources to follow up these contacts with a specific survey would require comparatively limited amount of funding. Evaluating these survey results in connection with the individual implementation features of each project would allow an accurate evaluation of a demonstration home strategy. Visitors to the existing demonstration home are probably not representative of the general population, which has to be considered when generalising the survey results.

Stage 3. **(Optional) Apply identified success factors to the NOW Home:** If the analysis of the existing demonstration projects indicates a success opportunity, the optimum demonstration strategy could be implemented for the NOW Home. The objective of this stage would be to refine an optimum demonstration home strategy by controlling the implementation factors, which are generally predetermined in the existing show home projects. The NOW Home would basically function as a pilot test case for the strategy and much emphasis must be put on the market impact evaluation. The NOW Home pilot demonstration home project should be evaluated against the criteria listed in section 5 and the strategy be further optimised. Beacon has to appreciate that implementing and testing a demonstration home strategy in the NOW Home would require substantial funding, and that the information gained from existing homes (stage 2) might be sufficient to achieve stage 3.

Stage 4. **Develop a generic demonstration home marketing strategy:** An optimised generic marketing strategy should then be developed. The strategy design should follow the six-step intervention development process described in section 3, and needs to be based around targeted market research results collected through work similar to Qzone's earlier market focus group research. This strategy can be offered to other organisations intending to set up demonstration home projects across the country. This process might also offer IP revenue opportunities for Beacon and will in the long term contribute to the Beacon objective of improving sustainability in 90% of NZ houses by 2012. Similar research has been conducted by the Civil Engineering Research Foundation⁵ ⁱⁱⁱ.

Such a research project (excluding stage 3) would cost in the order of NZ\$120,000 and will obviously be a function of number of case studies to be covered and availability of visitor records.

ⁱⁱⁱ We have contacted CERF, but not received any feedback.

7. NOW HOME STAKEHOLDER OBJECTIVES AND SUCCESS CRITERIA

7.1 Documented NOW Home objectives

We have investigated what objectives the NOW Home partners had documented during the NOW Home project setup and implementation. (Text in *italics* is quoted from the original documents)

Most organisations have reported their own objectives, rather than represented wider stakeholder objectives.

We attempted to apply the demonstration home evaluation methodology from section 5 to the individual NOW Home partner objectives. However, because the objectives and quoted success indicators were quite diverse and did not fit easily into a generic demonstration home evaluation structure, this did not appear to be effective. Therefore we use the quoted success indicators for each respective NOW Home partner.

7.1.1 Building Research Association

The Building Research Association objective for the NOW Home and its intended use at the time when the organisation decided to participate in the NOW Home project were summarised by John Duncan in an e-mail from 26/8/2004. John made the point that the Association was actually not one of the original NOW Home partners, and only bought into the project at a stage when the overall NOW Home concept was already formed.

When it first heard about the NOW House the Association's view can ... be characterized as ... implicit encouragement to BRANZ Ltd to work to assist its delivery, because of the importance of making the industry aware of sustainability issues which are much more deeply embedded in industry thinking in many other countries than in NZ. The expectation was that it was going to be a test bed (not dissimilar from the way the Rockhampton house has been used in Queensland) which was going to allow public education, and monitoring of what difference creating a 'sustainable' house would mean for living in it.

This implies the use of the NOW Home as a “test bed” for sustainability technology, but also as a “public education” vehicle. The monitoring of the house would make it a demonstration case for sustainable building practice. This statement suggests that the intended use was as mainly a demonstration home, and the research component was mainly meant to provide scientific evidence of the theoretical performance expectations, including both, pure technology performance, but also the success of interaction between technologies and occupants.

One of the key research outputs of the house would be the NOW Home design protocol and the knowledge of how to apply this protocol in practice. This would require a small number of actually built NOW Homes across the country.

There are no Association board papers which explicitly address the decision to invest in NOW Home. The Association Board approved the concept of moving toward involvement in a consortium (of which they were made aware that demonstration houses/neighbourhoods were anticipated to be involved) in March 2003, but this was generic at the consortium level, not at specific project level defining the purposes of the project.

7.1.1.1 Implementations

The NOW Home is seen by the Association as a “vehicle” to raise awareness in the industry. Particular reference was made to the example of the Rockhampton research house.

The Association contributed to an initial exploration of the idea of a TV series with the Gibson Group. This was seen as one element of a larger communication and marketing programme. The M3i document, which was developed with some input from BRANZ marketing management, was seen as the means to achieve these objectives.



The Association did not anticipate separate marketing efforts to the building industry.

7.1.1.2 Success Indicators

As measures of success public and industry feedback was quoted, one recent example being the number of responses to the Herald article about Beacon. This feedback was seen as opening further opportunities for technical education of members of the manufacturing and building industry. Both the number and type of enquiries were seen as useful measures of success of the NOW Home.

In order to assess the success of the NOW Home a systematic logging system should be set in place, which records number and type of inquiries. In order to facilitate this process it would be advisable to have one central communication point for any NOW Home inquiries. Once the website is set up web hits should be logged. It is further recommended to conduct industry surveys covering industry knowledge and value perceptions of the NOW Home at regular intervals.

7.1.2 Fletcher Building Ltd.

We have evaluated two key documents provided by Kevin Golding (“NOW Home Project.ppt” “NOW Home Project - 12-09-03.ppt”, which are attached in Appendices G and H).

The documents outline the concepts for the NOW Home research through the complete implementation process including customer input, design process and performance evaluation. By implementing the NOW Home through a complete development cycle it is aimed to identify the knowledge gaps and uncertainties, such as process management, tolerance uncertainty and build process, but also in respect to market uncertainty (perceived as high) and technical uncertainty (perceived as low).

Conducting such an evaluation requires a degree of pre-implementation research, which would allow testing the performance in hindsight.

The document also suggests that the NOW Home should be *able to demonstrate/test value at different stages of the project (from briefing design, construction, occupation, maintenance)*, i.e. the concept needs to be tested right through the channel and the design and build process, and with that feedback, the project can be front loaded with information that demonstrates and tests the value. Although it is not clearly spelled out for whom the value would be generated, this statement also implies a degree of “demonstration” aspects. The demonstration in this context seems to be, however, more aimed at the project partners, rather than external players or the public.

The second document identifies implementation and research components, which would allow the evaluation of, in particular, market and technical uncertainties. The NOW Home will provide a tangible real live example to expose any issues and then address them.

It clearly spells out several marketing interventions, however, with the explicit purpose of knowledge creation rather than achieving market share. Items such as “*brand recognition, test concepts with consumers, etc.*” are achieved through marketing activities (*Develop the value proposition. Test the vision. Is it compelling, believable? Build credibility and trust. Create an incentive for change.*), the objective is, however, to achieve greater understanding of the market. The NOW Home as a demonstration or show home would therefore only be a means to a (research)-end, and – considering the high cost of a marketing implementation - it has to be explored whether this is the most effective way to gain market certainty research outputs.

Technical uncertainty research covers both process and technological issues. This suggests a strong focus on research aspects of the NOW Home.

7.1.2.1 Implementations

Success will come exposing any issues arising during the house design and construction process and resolving them, so that future Beacon homes and other sustainable building projects can avoid or overcome these barriers. This means that in particular those aspects need to be evaluated which stood in the way of the delivery of the Now Home. These “problems” need to be built into the research process. Once the problems are fully understood the next stage will be to develop solutions for them.

To achieve success FB expects all aspects of the Now Home design and build process and occupancy to test the various uncertainties and provide considerable front end feedback into the project.

One quoted specific implementation step is the education of trades people to understand the sustainability terminology and to buy into the reasoning behind the design decisions. Without this constant reinforcement from Beacon it is expected that the builder would revert to traditional practices.

7.1.2.2 Success Indicators

Demonstration home success would be assessed through:

Testing the vision - success is when partners and industry players buy into the vision and tell Beacon there is good alignment with their strategic direction. Comments around the value proposition, credibility and trust flow from this. Achieving this relies on both valuable research output and technology transfer and outreach components.

In order to obtain quantifiable performance measures it is suggested to conduct regular partner and industry surveys.

Technical knowledge - Understanding the technical knowledge gaps and how they impact on the design and build process is the key feedback FB is looking for. The lack of appropriate design information from suppliers through the design phase is an example of this feedback, and how companies such as WWB need to respond.

The number and quality of sustainable design guidelines and protocols at various industry levels are a measure of performance towards achieving this objective.

Market knowledge - Market uncertainty is high and there is a need to front load all aspects of the Now Home project with as much feedback from the market as we can generate. Anecdotal evidence suggests that an important barrier to market adoption is getting the builder and sub trades to think in sustainability terms.

An indicator of success will be the number of industry inquiries about sustainable building information. Because of the feedback loop between designer, trades people and client also the perception of sustainability solutions by the general public will be an indirect indicator for industry pull towards sustainability.

7.1.3 Forest Research

We conducted interviews with John Gifford and Karen Bayne to establish the FR objectives for the NOW Home. Following these discussions FR provided the following summary:

The Now home at Olympic place was to be one representation of the NOW house concept on a given site.

The physical NOW Home was to be a research home to verify a hypothesis that sustainability in housing could be improved using NOW technology and that such technologies could be part of the progressive steps required to obtain the Post-Kyoto House. The results of the project were to be widely disseminated, including both to industry and the broader public.

The learnings were to be of direct value to the project participants, stakeholders, industry players and government organisations. Although the information was to be readily available to the broader public, the NOW Home was not envisaged to be a means for marketing the house or its contents. The emphasis was on learnings achieved from incorporating a range of concepts into the dwelling.

The NOW home was to identify key gaps and constraints and provide appropriate solutions by demonstrating a tangible, desirable and affordable option for everyday people. The ideas, prototypes and systems to be included into the NOW Home were to be based on existing concepts, limited only to that which could be readily achieved today (NOW).

Looking to the future the learnings and the identification of further gaps in information and technology identified through developing the NOW Home would then be applied to future projects (the THEN and FUTURE Homes).

7.1.3.1 Implementations

Key features of the project were to:

- Provide learnings;
- Identify gaps and constraints in technologies, systems and information;
- Take a whole systems approach to the development of a house from a sustainability perspective;
- Allow for effective monitoring of the whole process during all phases including designing, building and occupying the home
- Provide a tangible profile (i.e. a physical representation of the research output);
- Create a collaborative environment where broad expertise could contribute ideas and concepts to optimise the “NOW Home” solution and provide the ‘lead-in’ to a research consortium (Beacon).

7.1.3.2 Success Indicators

The tangible outcomes were to include:

- Building version 1 of the Post-Kyoto House;
- New IP in systems and know-how;
- Credibility and track record through the development of a brand and image (“future proof”)

The intangible outcomes of the project were to include:

- Encouraging industry to develop appropriate solutions;
- Creating a high profile project that would increase public attention;
- Providing a direct linkage between research and application;
- Having high value technical information dissemination;
- Identifying key gaps in current knowledge.

Measures of success were defined as:

- Completion of the design, build and occupy phases for the NOW Home at Olympic Place;
- Development of quality data and information demonstrating that the ‘NOW concepts’ can contribute (or otherwise) to sustainability in the residential built environment;
- The development of research and technical outputs that assist stakeholders and the public to improve the sustainability of existing and future dwellings;
- The development of IP which was to be of value to Forest Research;
- The development of enduring collaborative R&D programmes on sustainability for the residential built environment.

7.1.4 Waitakere City Council

The Agenda Report to the City Development Committee from 5 June 2003, by Annika Lane sets out the purpose of the NOW Home as follows:

The purpose of the NOW Home is to show how far we can go towards achieving Kyoto and Climate Change goals using existing and affordable technologies. The end goal is to develop a sustainable house “brand” that consumers and industry can relate to and duplicate.

The agenda report describes the use of the NOW Home as follows:

The collaborating parties propose that a family will live in the house for two years and will be appointed as park rangers in line with parks guidelines and the requirements of the Reserves Act 1977. During those two years the house will be monitored for its liveability, durability, effectiveness, savings associated with design etc. The house will be open to the public on certain days and times and will provide a link to the Sustainable Living Centre – creating a cluster of buildings at Olympic Park that are focused on the built environment.

The Agenda Report to the Long Term Council Community Plan Committee from June 2003 lists several BEACON programme outcomes including:

- *demonstration projects – sustainable homes (NOW Home; Then home; Future home, Future Neighbourhoods).*
- *Capturing hearts and minds - learning from demonstration homes what works and what doesn't and encouraging consumers to take up the sustainability framework – known as the BEACON solution.*

These statements suggest an intended use of the NOW Home as a demonstration home which implements theoretical sustainability solutions and with a strong research component aimed at development of sustainability design guides and better understanding of its sustainability performance.

At a higher level the NOW Home is also seen as playing a role in demonstrating national leadership for other TLAs.

The main research output from the NOW Home is the development of sustainable design protocols. The design protocol is seen as functioning both as an incentive for designers and developers by providing usable solution systems, but also as a way to streamline the building consent processes for sustainable building solutions.

A secondary research objective is the integration of sustainable housing into sustainable neighbourhoods. In this context the NOW Home is seen as contributing to the national Sustainable Programme of Action.

Beacon's role in this research would be to assist the TLAs evaluating the regulatory process for resource and building consent applications. In practice this will require an evaluation of the NOW Home building consent process and the development of ways to streamline this process. An improved sustainable design process which is closely aligned with regulatory processes could then function as a template for other councils to adopt similar sustainability programmes.

7.1.4.1 Implementations

Although there is a clear demonstration expectation, WCC sees the NOW Home predominantly as a research house ("80/20 ratio"). The demonstration component is a consequence of WCC's need to publicly demonstrate ratepayer value to its constituency.

An important implementation aspect for Waitakere City Council is the linkage of the NOW Home with the Sustainable Living Center, which is part funded through WCC. The NOW Home, the Center and the Eco Matters Trust building are seen as a cluster of sustainability showcases which complement each other.

The virtual home internet website is seen as one of the possible linkage opportunities. Visitors to the NOW Home could after the visit get additional background information about the NOW Home technologies in the Sustainable Living Center, which would offer a virtual website walk-through providing additional explanations and background info.

The Sustainable Living Center is seen as an information resource point for NOW Home related material, such as brochures, pamphlets, etc. The Center could also get involved in NOW Home management aspects such as guided tours through the NOW Home, passive surveillance and landscaping tasks.

Target market for the NOW Home is the general public, but also the industry via planned training programmes and workshops in the Sustainable Living Center.

7.1.4.2 Success Indicators

Success measure for these objectives would be the number of houses designed according to the NOW Home design protocol. This could be measured by analysing building consent records.

7.1.5 Energy Efficiency and Conservation Authority

We have asked the Energy Efficiency and Conservation Authority (EECA) to complete a baseline score card similar to the ones which the Beacon partners had completed. Based on this scorecard and personal communication with Heather Staley and Robert Tromp we have drawn the following conclusions:

EECA sees the purpose of the NOW Home as learning about the design, building and marketing process, rather than a direct tool for selling more NOW Homes. The NOW Home is seen as a real-life demonstration of the theoretical sustainability solutions. So the focus is much more on knowledge creation than outreach. EECA does not see a strong need for the NOW Home to be extensively marketed, but rather some sound analysis of the building process and performance of the building, in particular how the unusual NOW Home design process (no consumer client, abnormal commercial drivers like sponsors etc.) affected the eventual outcome.

7.1.5.1 Implementations and Success Indicators

EECA does not expect any specific actions to promote the NOW Home as a demonstration home. Success is mainly determined through the research output of the project.

7.1.6 Beacon

We have evaluated the final Beacon consortium proposal to the Foundation of Research Science and Technology from 9/5/03. The proposal makes references to the NOW Home as a reference point for sustainable development:

The NOW HOME – concept being developed now delivers the most energy efficient and sustainable home that 2003 technology can provide within constraints of affordability and desirability. The NOW HOME becomes a key benchmark against which to gauge and develop future solutions and the building of a BEACON solutions profile.

The research proposal goes on to identify several research objectives, one of them making particular reference to the NOW Home: homes and Neighbourhoods. The listed aims include both, scientific research questions as well as marketing aspects:

What science and technologies must come together to create a desirable, affordable, environmentally friendly home

Demonstrates the opportunity to build sustainable, energy efficient and desirable homes

BRAND reinforcement

The research outcomes show a clear demonstration focus:

Outcomes: Real houses that demonstrate BEACON technology and validate the key outcomes of this programme. In addition valuable outcomes will also be new Building Innovations (IP) and technology transfer outcomes such as “how to” guides.

The research question is targeted at both technology and performance research as well as consumer acceptance research:

Research question underpinning this Objective. What technologies must come together to achieve the target outcomes of minimised environmental impact, and maximised performance and consumer acceptance?

The research programme also identifies a clear information dissemination stage, which would be facilitated by the use of the NOW Home as a demonstration home:

Science Merit. The three components in establishing these houses are the Build Phase, the Monitor Phase and the Information dissemination phase.

In addition to the performance research components the document identifies several information dissemination mechanisms including “user-friendly ‘how to’ documentation, design guides and software”. It specifically talks about a “market launch” of NOW Homes:

Phase One - Year One and Two. Monitor the NOW HOME and validate the key hypotheses relating to energy demand and other performance criteria. Confirm the benchmark status by comparison with other energy monitoring data available through Household End-use Energy Programme (HEEP). Develop information dissemination material to initiate the foundations for developing the BEACON homes Build Protocols. These will include user friendly ‘how to’ documentation, design guides, and comparable software to ALF. Coordinate the market launch of NOW Homes through selective partnerships....

7.1.7 Design Brief for Olympic Place NOW Home

The NOW Home Design Brief from May 2003 identifies a number of project aims for the NOW House (sic). The brief has been signed off by Russell Burton, Manager Science Futures, FR, Harry O’Roukee, Chief Executive, Waitakere City Council and Wayne Sharman, Executive Manager, BRANZ Ltd.

The stated objective is the group’s objective. It is therefore not possible to identify whether the partners also had individual objectives and what they were.

*According to this document the NOW House research project is about **building houses for the post-Kyoto environment** (2012-2015), but constrained in the it can **only utilise NOW materials/technologies** (those currently available or able to be achieved today.)*

This suggests a strong research focus for the NOW Home. The document further identifies as one of its aims *to encapsulate what we know today about best practice in meeting the needs of the next decade.... The project aims also to demonstrate this via one possible solution on a given site.* The document goes on to specifically state that the NOW Home is not intended as a show home: *The built demonstration house will not be a show home, but rather an attempt to physically represent best practice, in order to assess gaps in meeting the needs and therefore set research priorities for future housing projects.*

Later in the document success criteria are defined:

A HOUSE that sets a new “benchmark” for understanding sustainability in the framework of affordable and desirable. The performance indicator for this includes that National interest in the project is very high.

The success of *Capturing the attention of the Nation* will be measured via *Media exposure, web hits and demand for information.*

These statements suggest extensive media exposure to the public.

7.2 Summary of Objectives

The following table provides an overview of the NOW Home partner's demonstration home objectives:

Organisation	Objective	Necessary Actions	Success Indicator
The Building Research Association	<ul style="list-style-type: none"> ▪ Industry awareness of sustainability issues ▪ Test bed of building performance in situ ▪ Public education 	M3i marketing strategy or similar (possibly including Gibson Group TV series)	Number and types of inquiries
Fletcher Building Ltd.	<ul style="list-style-type: none"> ▪ Identify knowledge gaps (market and technical) ▪ Brand recognition ▪ Consumer tests 	<p>Exposure of issues arising during the house design and construction process and resolving them. Once the problems are understood solutions need to be developed for them.</p> <p>All aspects of the Now Home design and build process (and occupancy) to test uncertainties and provide front end feedback into the project. This also includes aspects of industry education.</p>	<p>Partners and industry players buy into the vision and tell Beacon there is good alignment with their strategic direction.</p> <p>Understanding the technical knowledge gaps and how they impact on the design and build process.</p> <p>Generating market certainty to front load into all aspects of the Now Home project.</p>
Forest Research	<ul style="list-style-type: none"> ▪ Verify that sustainability in housing could be improved using NOW technology ▪ Verify that such technologies could be part of the progressive steps required to obtain the Post-Kyoto House ▪ Provide value to the project participants, stakeholders, industry players and government organisations ▪ Identify key gaps and constraints in technologies, systems and information and provide appropriate solutions to be applied to future projects (THEN and FUTURE Home) <p>(Not a means for marketing the house or its contents)</p>	<p>Systems approach to the development of a house from a sustainability perspective</p> <p>Effective monitoring of the whole process</p> <p>Provision of a physical representation of the research output</p> <p>Creation of a collaborative environment</p> <p>Wide dissemination of results, including both to industry and the broader public.</p>	<p>Completion of the design, build and occupy phases</p> <p>Quality data and information demonstrating that the 'NOW concepts' can contribute (or otherwise) to sustainability</p> <p>Research and technical outputs that assist stakeholders and the public to improve the sustainability of existing and future dwellings</p> <p>IP which was to be of value to Forest Research</p>

			Collaborative R&D programmes
Waitakere City Council	<ul style="list-style-type: none"> ▪ Priority on research, demonstration is secondary ▪ Show the position of the NOW Home in respect to Kyoto and Climate Change goals ▪ Capturing hearts and minds. End goal is to develop a sustainable house “brand” ▪ Demonstration of national leadership to other TLAs 	House monitoring and opening during certain days Link to Sustainable Living Center (using virtual home website and printed media) Guided NOW Home tours (Analysis of design and building consent process)	Number of houses designed according to NOW Home protocol
Energy Efficiency and Conservation Authority	<ul style="list-style-type: none"> ▪ Research is primary objective 	No designated marketing, focus on in-situ performance research	Research outputs (NOW Home design process and building performance)

Most NOW Home partners had several objectives for the NOW Home, generally encompassing aims ranging from pure research to broad marketing. For most of the partners research was the over-riding objective for the NOW Home. Research questions generally cover in-situ technology performance and design/implementation process research as well as market research.

Most of the partners also anticipate some demonstration aspects. The target audiences often differ for the partners, for example WCC aims at designers/builders in Auckland and the Association is anticipating nationwide industry feedback.

Some of the partners see commercialisation opportunities (WWB and FR) and expect consumer marketing (WCC). Several made reference to an overall marketing strategy. In contrast EECA does not anticipate any specific consumer marketing at all.

Success is defined by the partners at various levels, i.e. ranging from building performance research outputs (EECA, FB, FR) to consumer and industry behaviour change (WCC).

7.3 Objective Analysis

We have analysed the NOW Home partner objectives in respect to the cost and likely success of their suggested demonstration home objectives. The analysis assumes a series of activities which are part of an integrated intervention package. None of the interviewed partners suggested a preconceived marketing implementation, when asked about “actions necessary for achieving success”. We are therefore suggesting a number of alternatives of what marketing components could assist achieving the specified objectives.

The tabulated list of specific marketing intervention measures, their cost and likely success level is shown in Appendix I. This list is indicative only. For this analysis we attempted to apply a common success measure to each intervention strategy, namely the likely impact on houses by 2012, expressed as the number of buildings using some of the sustainability technologies as a consequence of the demonstration home.

The analysis assumes that the marketing is sustained for 7 years until 2012. The budgets cover the setup of the marketing programme and its maintenance until 2012. The budgets also cover the cost of

activity monitoring and impact monitoring, which are on average estimated at \$150k. The budget does not include the construction and performance research of the NOW Home.

It needs to be noted that we expect the impact of the demonstration home alone to be quite limited, in the lower single percent figures of the housing stock. The uncertainty of these figures is very large. But, while the absolute values are quite uncertain, the relative performance of the different marketing intervention options is much more certain, i.e. if the table suggests a 2% likely impact for one strategy and a 0.5% impact for another one, then the former one can be expected to perform substantially better than the latter.

7.3.1 The Building Research Association

The Association has a fairly broad demonstration objective including industry awareness, test of building performance in situ and public education. Explicit reference was made to the M3i communication strategy report as a basis for the marketing approach. A high impact marketing strategy of this type targeting industry as well as public consumers would cost in the order of \$7.3M over 7 years. It is estimated that this will lead to an approximate likely impact on housing of 5% of the housing stock (about 70,000 units). The alternative is a low key strategy, where success of the NOW Home as a public demonstration home is more incidental and a consequence of sound research outputs. This approach would be somewhat akin to the experience in the Rockhampton Healthy Home project. The budget for such a strategy would be approximately \$850k with a likely impact of about 1%.

7.3.2 Fletcher Building Ltd.

Fletcher Building's objective for the NOW Home focuses on research. However, one of the two expressed research components aims at understanding market uncertainties. One research approach would be to implement and subsequently scientifically evaluate one or more options for marketing the NOW Home. Which particular marketing level is going to be tested needs to be based on findings from consumer research (Beacon project CON1 provides some guidance on successful intervention concepts). The choice of marketing strategy will determine its cost. It can range from as little as \$500k if it targets only change agents to as high as \$7.3M if it targets change agents, opinion leaders and consumers, with an impact on sustainable housing development of 0.5% and 5% respectively.

Drawing on general marketing principles it is our opinion that the most effective marketing intervention for achieving the Beacon 90% sustainability goal is a fully integrated marketing approach as outlined at the end of section 4.3.

This should, however, not be read as implying that we believe that a demonstration home is necessarily the most effective market intervention, neither do we suggest that using demonstration homes alone will achieve the 90% sustainability target.

7.3.3 Forest Research

For Forest Research the physical NOW Home was to be primarily a research home. The research results of the project were to be widely disseminated, including both to industry and the broader public. The learnings were to be of direct value to the project participants, stakeholders, industry players and government organisations. The NOW Home was not envisaged to be a means for marketing the house or its contents.

The budget for a suitable set of information channels targeted at opinion leaders and the consumer is approximately \$1.2M over seven years. The impact of such a low key information dissemination strategy is estimated at 2% or about 30,000 units by 2012.

7.3.4 Waitakere City Council

Waitakere City Council seems to favour a more localised low key marketing strategy. Important components are the link with the Sustainable Living Center and an interactive website, printed information material and guided house tours, but also guidance material for developers to facilitate a streamlined consent process for sustainable buildings. It is anticipated that some of the marketing costs

can be shared with the Sustainable Living Center, such as for example an 0800 number advice service, etc. which will need to be corrected for in a real budget for any marketing implementation. Most important NOW Home objective for Waitakere City is the research aspect of the project.

The estimated budget this type of course excludes large scale promotional aspects and concentrates of information provision to public and industry. We estimate that such a strategy would cost approximately \$2M and would have an estimated impact of 3.5%.

7.3.5 Energy Efficiency and Conservation Authority

EECA does not anticipate any dedicated demonstration home marketing. The project will still require certain information transfer components. This situation aligns quite closely with the Rockhampton Health Home situation. That case study suggests that an effective means for information dissemination would be a technical internet website. In addition to that a set of printed material pitched at technical industry level would be necessary.

The budget of such an information strategy is about \$500k; the impact is estimated at less than 1%.

7.3.6 General Comments

1. Above budgets only cover marketing and evaluation components and do not include construction and research.
2. Irrespective of what marketing level Beacon is intending for the NOW Home it needs to anticipate that the house will raise public interest. Rockhampton Health Home example suggests that in the long run it is more cost effective to deal with media and public interest by establishing dedicated and controlled information channels, such as a website and some printed media. It also needs to be noted that the low cost of the Rockhampton website setup may be misleading because the cost of creating the scientific information content for the website is hidden in the research budget and was quite substantial.
3. The NOW7 project brief requested the financial analysis of individual NOW Home partner demonstration home implementations. In the previous sections we have provided budget information corresponding to these demonstration home implementations, i.e. we selected individual implementation components, which seemed to serve the NOW Home partners objectives. In our opinion the success of a marketing strategy should be fully integrated and targeted in order to have certain and maximum success.

8. CONCLUSIONS

Demonstration homes may offer economies in promoting a cluster of sustainability-oriented products and interventions. The task of promotion is far more complex than for a single product/intervention. A house is usually the largest single purchase a household will ever make, so in this sense a sophisticated marketing approach is entirely justified if rapid uptake is part of Beacon's aims.

Based on the review of a number of existing show and demonstration homes, based on the objectives and success criteria of the NOW Home stakeholders and based on the theoretical research available on the topic of market intervention programmes to change consumer behaviour towards energy efficiency we draw the following conclusions:

1. Irrespective of the degree of intended marketing of the NOW Home, the building will raise considerable public and industry interest. It is important to have mechanisms in place which provide effective and consistent technical information on the project. Suitable means of information dissemination include a website with technical information and a set of printed media (Strategy D in Appendix I). The linkage with the Sustainable Living Center will offer a cost effective opportunity to disseminate material. Such an information dissemination process would address the majority of the NOW Home stakeholder objectives. Additional measures such as TV advertisements, show home awards, etc would lead to a higher public awareness and market impact, but this did not seem to be a key NOW Home objective for the majority of the stakeholders.
2. Little quantitative information is available regarding the success of existing demonstration homes in respect to their impact on consumer behaviour. Therefore it would be instructive to scientifically evaluate the success of a number of existing New Zealand demonstration homes. Provided the evaluation indicates that demonstration homes can be effective means to change behaviour, an optimum demonstration home strategy could be developed based on guidelines and references provided in this and other Beacon reports (Beacon project CON1 provides high-level concepts for such market interventions). This strategy could then be adopted by other organisations to design optimum demonstration projects. It is conceivable that such a demonstration implementation process would be of commercial interest and could offer IP value.

The objectives of the individual NOW Home stakeholders have different emphasises. If Beacon intends to extensively market the demonstration home a workshop with the key stakeholders including parties which are currently not involved in the NOW Home and marketing experts might be useful. The workshop should aim at defining a set of quantifiable Beacon NOW Home demonstration objectives. Specific target groups and measurable outcomes need to be determined. Based on this a Beacon demonstration home marketing strategy for the NOW Home could be developed. The strategy could build on the existing M3i work, but would take account of the specific stakeholder objectives and would reflect the expressed stakeholder intentions.

9. APPENDICES

9.1 Appendix A: Case Study: Christchurch Energy Efficiency Show Home

Dr Leonid Itskovich, Energy Manager, Christchurch City Council

9.1.1 Background

Target audience for the house are “people in need” of assistance. The house is designed to address questions which are relevant to occupants of existing inefficient housing. It is estimated that about half of the 120000 houses in Christchurch fall under this category.

9.1.2 Building technology and performance

Because of this target group the council decided to use an existing 1960’s brick veneer building to showcase energy technologies suitable for such a building. Two reasons prompted the council not to use a new house: 1. new houses already have a reasonably good energy performance and 2. the new housing market is comparatively small. The displayed technologies are largely targeted at energy efficiency, but some water saving devices are also shown.

9.1.3 Marketing

The show home is open 6 days a week from 11:00am to 6:00pm. It is closed to the public on Wednesdays, but group tours can be arranged for this day. The house is staffed with a number of part-time advisors, who are Council employees. All advisors went through an extensive training programme to be able to provide sound technical advice. Another required skill is the ability to communicate well with the show home visitors.

Two issues in particular prompt people to visit the show home. For the majority the main concern is the desire to create a warmer and drier home. A minority of visitors are visiting the show home to learn how to reduce their energy bill. Although the house features a few non-energy technologies (water saving devices) the interest in these is very limited. Also the solar water heater draws comparatively little interest compared to features providing a warmer and drier home. The energy adviser also provides building design advice on building plans to visitors who are in the process of building a new house. Shown technologies are generally provided free of charge by the product suppliers. However, the council does ensure that only proven successful technologies are showcased. Although an attempt was made to include non-energy related sustainability technologies, the industry has not shown interest in participating.

The home attracts approximately 5000 visitors per year, which represents almost 5% of Christchurch’s household population. Due to lack of funding, there are no measured data available on any purchasing or lifestyle behaviour change of visitors. However, an indication of the show home impact is the fact that frequently people are returning to ask subsequent questions and want to find out more about other energy technologies. A number of visitors also report that they heard of the value of the show home through word-of-mouth. Another indicative success measure is that a major producer/supplier of thermal insulation in Christchurch advised that their sales increased by some 30% last year compared to previous years and that the number of new homes being built in Christchurch that have double glazing is around 50%. Without targeted research of the show home market performance it is of course difficult to establish causal links between these behaviour changes and the fact that Christchurch has a show home. However, the energy manager estimates that about half the visitors implement at least one of the showcased energy technologies in their own home. However, he also acknowledges that visitors

generally already perceive the need to improve their homes, mostly in respect to warmth and humidity, which is the main reason prompting them to visit the show home.

The council does not have a dedicated marketing strategy for the house. Product suppliers provide literature about their products; other literature is sourced from public agencies such as EECA and BRANZ. The council promotes the house through community newspapers, but instead of taking out adverts it usually gets free coverage through topical reports in the media. The council also has a monthly council newsletter, which regularly features the show home and it also occasionally sends out leaflets. One very telling aspect is that the interest in the show home sharply increases immediately after a cold weather spell.

The energy manager estimates the economic effectiveness of the show home better than most other market intervention techniques, including the provision of subsidies. The approximate cost to the council is \$10 per visitor. A large component of the cost is the above-average salary of the expert advisors in the show home. Even at a conservative success estimate of one implementation per four visitors this is a very cost effective market intervention measure compared to most other intervention programmes.

9.1.4 Success factors

The energy manager emphasises the importance of personalised one-to-one advice. Therefore the council is purposely not trying increase visitor numbers and advertises the show home actively only during the warm season. The council avoids having financial sponsors in order to ensure complete independence. The council has previously approached EECA with a recommendation to duplicate the Christchurch show home concept in other locations.

According to the energy manager the fact that the council has a show home “makes a huge difference”. A visit to the show home has a much higher impact than if the same energy advice would be provided in a normal setting, such as the council office building. The Council makes sure that only proven technologies are show cased in the show home. Although this can at times alienate individual sponsors, it builds crucial trust with the public visiting the show home.

Asked whether the Council sees any other more effective ways to improve the project, the energy manager suggested incorporating more non-energy sustainability features in the show home. In respect to the show home concept he considers the programme as optimised and had no specific recommendations for change.

The two most critical factors for the success of the Christchurch energy efficiency programme are the fact that the Council has a suitable show home and that the consumer advice is communicated in a personal one-to-one manner and is based on technically sound and unbiased expertise.

9.2 Appendix B: Case Study: Waitakere Eco-friendly home

Katja Lietz, Project Manager, Sustainability Projects

9.2.1 Background

Waitakere Properties Ltd (WPL) was engaged by Waitakere City Council to project manage the eco-friendly home, develop a concept brief and source relevant expertise to build it. The aim was to create a home within the 'typical' budgetary constraints a new home owner or builder would face and deliver a final product that not only met the Council's goals but was acceptable to the wider property market.

Early on in the planning process, WPL made a commitment that the end results be accessible to the wider community so people had the opportunity to experience eco-living first hand. As a result, the eco-friendly home was open to the public for six months from completion.

WPL and the Council hoped that during this time, those interested in building concepts and environmental issues will gain a better understanding of how cost-effective, eco-friendly home principles can be adapted to everyday home living.

9.2.2 Building technologies and performance

The installed building technologies include a wide range of sustainability features covering aspects of energy efficiency, health and safety, water conservation, and various other aspects of environmental sustainability.

All the installed technology seemed to be working during the period it was used as a show home. Visitors noted their impressions in a visitor's book, which could be analysed further.

9.2.3 Marketing

The house was built in 1998 and was open to the public for six months on three days per week (Wednesday afternoons, Saturday and Sunday). During the opening hours expert council staff or trained students were present to field visitor questions. During the six months approximately 5000 people visited the Eco-friendly home. There were also a number of workshops held at the home. No records were kept of how many brochures were handed out or of hits on the website. However even today there are still occasional inquiries from someone wanting to look at it. In the meantime the house has been sold and on-sold several times, however staying within the same family to the best of our knowledge.

WCC looked into assessing if there was a change in the sustainability of new homes by looking at basic features such as solar hot water, levels of insulation, etc. however found that it was too resource intensive to collect this information through the building consent process. Concern were also raised that asking such questions as part of the Building Consent application process was in violation of the Building Regulations (there is a prescribed form). The designer, Paul Heather, has probably benefited from the Eco-home exposure, although no specific follow up research has been conducted.

9.2.4 Success Factors

Informal feedback indicated that people seemed to like that it was an ordinary home and didn't look odd.

WCC did produce an extensive communications plan. It is not publicly available, but has been made available for Beacon research purposes.

The project manager found brochures and media coverage to work well in communicating with the public. At the time the house received extensive media coverage, including some TV coverage. Some of the sponsors promised to help with the promotion; however this did not work well.



Other communication channels were press releases resulting in articles in magazines and newspapers. Coverage was also provided through the Council newspaper. The house features and philosophy is described on a basic website (<http://www.waitakere.govt.nz/AbtCit/ec/ecoinit/ecohsebrochure.asp>).

Shortly after the Eco-home was closed for public visits the Council published the Sustainable home Guidelines, which kept the momentum and awareness around sustainable building up.

Close working relationship with the Building Biology and Ecology Institute and with some sponsors were established, however, the linkages with sponsors for marketing efforts had not been as effective as hoped for. Although the council tried to work with Master Builders setting up trade training courses in connection with the house, this did not eventuate. However the council ran workshops for the public on energy efficiency, water issues, general design and materials.

The house received a merit award at an EECA event. Winning this award helped make the project seem worthwhile to management. No specific analysis was conducted on whether the award also improved the marketing potential of the Eco-home.

9.3 Appendix C: Case Study: The Independent Show Home

Leo & Helen Schuler, 3 Sarahs Lane, RD 2, Christchurch 8021 (<http://www.showhome.net.nz/>)

9.3.1 Background

Leo and Helen Schuler, the people behind the Independent Show Home, emigrated from Switzerland in 2000. Leo Schuler is an experienced Electronics Engineer and Entertainment Electronics specialist and has been working in the entertainment sector for years. He is familiar with both building techniques and energy saving features which enables him to answer all those questions visitors of the Show Home might ask and will refer to the specialised suppliers.

The Independent Show Home was built in 2002 and until recently was open to the public once every fortnight. In 2003 it received a five star Warm home Energy Check rating.

9.3.2 Building technologies and performance

The overall performance of the employed technologies is good, although some of them show small quality issues. The table below was provided by the occupants and lists the performance of most of the energy related technologies. They also highlight the value of some of the less tangible benefits perceived by the occupants.

<i>Technology</i>	<i>Positives</i>	<i>Negatives</i>
Polystyrene Wall cladding (with plaster system)	<ul style="list-style-type: none"> ▪ Draught proofing ▪ Very good overall insulation, allowing the thermal mass of concrete walls to “work” 	<ul style="list-style-type: none"> ▪ Cracks at several positions (window sills) need maintenance
UPVC windows	<ul style="list-style-type: none"> ▪ NO condensation at all both on glass and frames ▪ Very strong, sturdy, adjustable (in case a door/window jams) ▪ Frames are easy to clean 	
Solar water heating	<ul style="list-style-type: none"> ▪ Works with no human input. ▪ Cost saver ▪ Aesthetically pleasing 	<ul style="list-style-type: none"> ▪ Small water leaks in system in need of attention ▪ Flashing around solar tray leaking (was probably the fault of the roofer, not the Solar guys)
Electric Under floor heating	<ul style="list-style-type: none"> ▪ Unobtrusive, gentle background heat. Does not take up any space. Cheap running costs (thanks to insulated concrete slab and use of night rate electricity) 	<ul style="list-style-type: none"> ▪ Temperature control dependent on slab temperature. Heating needs to be controlled using proper control system taking into account the outside temperature.
Tulikivi Soapstone Log fire	<ul style="list-style-type: none"> ▪ Low wood consumption ▪ Releases heat over time ▪ Looks good. ▪ Gentle radiant heat. ▪ Burns very clean 	
Energy saving Appliances by Bosch	<ul style="list-style-type: none"> ▪ Energy saving ▪ Quiet ▪ Excellent performance 	
Energy saving	<ul style="list-style-type: none"> ▪ Energy saving 	<ul style="list-style-type: none"> ▪ Not as bright light as “normal” bulbs

Light bulbs		
Fluorescent Lights	<ul style="list-style-type: none"> ▪ Energy saving ▪ Comfortable light for eyes 	
Robotic Lawnmower	<ul style="list-style-type: none"> ▪ Convenient! ▪ Quiet ▪ Non-polluting ▪ No regular service needed ▪ Mulches (=feeds) the lawn 	
Wool Insulation	<ul style="list-style-type: none"> ▪ Healthy ▪ Ability to absorb and release moisture 	

The occupants report that they are extremely satisfied with the house performance: “Thanks to the big thermal mass and good insulation we enjoy a stable living climate all year round. The passive solar design controls the amount of sun heating the house, we get plenty of free heat from the sun during winter, but no unwanted heat during summer. During the coldest nights (-7 deg C) we had no heater going at all. The temperature was 20 deg C at 11 PM and still 18 deg C at the next morning 7 AM. In summer, the inside temperature goes seldom above 24 deg C. We have had very hot northwesterly winds, the inside temp was 24 deg C in the morning, the whole day we had 31 deg C outside (with sunshine and howling north westerly). The inside temp didn’t rise at all (Of course we had windows shut). The “coldest” days inside the house are cold, muggy, dull days (maybe rain, no sun). The house doesn’t get any energy from the sun. Then we use the log fire, which we fire for around 2 hours after dinner. The radiant heat will keep us warm the whole night and the next day.”

9.3.3 Marketing

The occupants report that they had around 2000 visitors over a period of one year, around 200 hits on web site per month. Many people know about the Independent Show Home and reportedly appreciate that there is no sales pressure during the visit. This perception is enforced by calling the house the “Independent show home”. Nevertheless some suppliers increased business through the Show Home.

It seems that the Show Home largely appealed to members of the public who are already interested in sustainable technologies and who look for confirmation of their ideas. In some cases this helps them to fight their ideas with their designer/builder.

No formal follow up survey was conducted with the Show Home visitors, so no hard data about any lifestyle or purchasing behaviour changes.

9.3.4 Success factors

Asked about the features which made the Independent Show Home a success Mr. Schuler refers to a number of communication channels including articles in local newspapers, the website with technical details and useful links to suppliers and placing of flyers in shows or on supplier’s site. The Independent Show Home was the first house in Canterbury which achieved a five star energy rating, which added to its credibility

Marketing aspects which did not work as well as expected include the lack of visit referrals from suppliers. Suppliers also did not use vouchers for Show Home tours and Show Home B&B.

9.4 Appendix D: Case Study: Kansas City, USA, IEA Task 28 demonstration Project

Guy Holt, Marketing and Communication, NeXus Environmental Consulting

9.4.1 Background

Four single family detached homes built by Envision Development Corporation, a private corporation, are located in Raintree Lake Estates, Lee's Summit Missouri, USA. These homes were built in the estate section of this community and were built to accommodate the infill lot cost and up-scale location. These homes are speculative homes and are for sale. They have also served as successful models for prospective clients who desire building. They range in size from 3600 to 6300 square feet of conditioned space with 2200 to 4750 square feet of finished area. The fourth home was finished in September 2003. Currently "Vision homes" is breaking ground on a 70 acre private forest preserve near Lawson, Missouri. This new construction is a direct result of using the existing homes as a demonstration or showcase for the builder.

9.4.2 Building technology and performance

The objectives was to construct platinum level "Build Green" homes as defined by local home Builders Association (KCHBA) utilizing Energy Star (US EPA) and Health House (American Lung Association) standards with universal design elements. A whole systems approach looked at site, energy, materials, Indoor Air Quality (IAQ) and Recycling opportunities. For these Missouri (USA) homes with about 5400 heating degree days the designers considered construction costs, longevity, remodelling ease, maintenance and energy usage.

9.4.3 Marketing

NeXus Environmental Consulting was retained in late 2003 to market the existing speculative homes as well as attract buyers for additional building throughout the greater Kansas City Region.

Attitudes towards sustainable housing in the US are quite similar to New Zealand. In most cases visible attractive features have high priority. However, there seems to be a developing trend towards downsizing.

Also the approach to marketing is like bio-climatic design, i.e. an integration strategy, except for communications instead of solar or sustainable features. A Core Value Mosaic was developed along with consumer Benefit Ladders and SWOT analysis. Key demographic and psychographics sectors were identified. Most notably the growing influence of the emerging Cultural Creative (CC) consumer segment⁶ was considered. Competitive benefits and pinpointing branding opportunities has been the thrust of this campaign. An Integrated Market Communication strategy that uncovers these consumers is the focus of the execution strategy. It is primarily a relationship driven strategy.

Highly selective advertising aimed toward the local publications that the LOHAS^{6,7} consumer may read have been targeted. Advertisements have accompanied articles targeted to specific readership profiles. Advertisements in mainstream (Real Estate) publications are producing poor results.

Direct marketing has been limited (due to unavailability of appropriate lists for this segment); however, medical doctors, doctors of chiropractic as well as other "holistic" health care practitioners have been targeted for direct mail. Health clubs, gardening organizations and other selected affiliations are also being targeted. After sale follow up consists of a newsletter periodically sent to homeowners.

Public relations programs include a series of articles in local publications along with local and national press release. Recent contacts from nationally syndicated TV shows and local newspapers have been forthcoming. Again many feature articles were free of charge once the media interest was raised. The articles which generally featured a small footer with contact points and web addresses have been successful. It is estimated that this free promotion was worth between US\$20-30,000. The articles and



press releases also led to a few national inquiries. This has led to several build jobs and many other leads for remodelling and/or building.

Logo design is deemed extremely important to the Cultural Creative. Symbols are used to help brand the technical benefits of sustainable housing. Brand apostles among diverse CC companies have been recruited including VOLVO, KWP, Organic providers and doctors. Current price points and floor plans were decided upon before NeXus was retained. There is a stronger demand toward the median price in the area. This is driven by demographics, but value based decisions are the primary reason customer contacts have been made for new construction.

Although winning awards was considered to be used as one component of the marketing strategy no clear benefits were expected from a consumer impact point of view.

An interactive website was not considered an effective marketing tool. However, since the inception of the campaign the web hits have gone from a couple of hundred to sometimes over 5000 / month.

As of this writing, trade presentations are planned.

Cost sharing for publications will be among companies who supply materials as well as the builder and a local remodeler. The costs to make the house a demo project have been less than US\$5000, so the results of the articles and press release are considered to be very effective compared to other advertising which the company did for other projects.

In order to assess the effectiveness of the marketing campaign the company is tracking several indicators such as hits on the web site, phone calls from advertisers, and build jobs procured / dollar of advertising. The marketing team is still in the process of assembling more results from the execution, but it is becoming obvious that the strategy is delivering positive results. Web hits increased dramatically and media exposure has reduced much of our advertising budget. Even national inquiries have been forthcoming.

9.4.4 Success factors

Although developing an integrated marketing communication strategy requires more time and effort, this is seen as more effective in the long run than a stand-alone demonstration home.

The demonstration project has attracted attention because it is unique and news worthy, rather than because it is green or get international coverage. The most effective advertising angle seems to have been a focus on the health benefits of the buildings.

9.5 Appendix E: Case Study: Rockhampton Healthy home, Queensland, Australia

Dr Richard Hyde, Associate Professor, Director, The Centre for Sustainable Design, The University of Queensland⁸

9.5.1 Background

The design vision for the Healthy home was a “Water and Energy efficient home that promotes human wellbeing in a high density urban environment” (Chris and Kim Prosser – home owners 1999). This vision was fulfilled using a combination of design, construction material and coatings.

The declared aims of the home and its associated research programme were:

- Develop and test innovative environmental technology through design integration
- Evaluate and assess the potential of this innovative environmental technology to meet stakeholder needs
- Monitor the performance of this technology over time in a holistic context
- Promote the uptake of the environmental technology through demonstration of in-service usage

The project started as a private building project by the current owner of the house. Through coincidence he and Queensland University approached the same industry members simultaneously and realised that the research could be integrated well with the owner’s building intentions.

All the main industrial partners have formed a design group to investigate this integration. From these meetings each industrial partner identified a particular innovative proposal for the use of environmental technology. These have been integrated into a building design for a specific site in the northern suburbs of Brisbane, and a preliminary design was developed and costed. This was used as a vehicle to attract further industry partners.

9.5.2 Building technologies and performance

The innovative systems that were developed included:

Broadbeach Chiropractic: Design strategies for creating a "healthy" home, concern for air quality, sustainable development through reduction of site damage due to cut and fill; rehabilitation of site damage on sloping sites, integration of landscape and building design, maintenance of biodiversity and landscape buffers to adjacent properties.

PAA, TRADAC and Forest and Wood Products research and Development Corporation: Application of skeletal timber frame system, low-profile flooring system to provide a passive low energy building structure and hypar roof forms to accept integration of environmental technology.

Wood Science and Technology Institute: Use of fibre-reinforced plastics to increase strength and stiffness of framing members and reduce cost.

James Hardie Building Products: Lightweight single-skin system that promotes passive heating in winter and provides minimum thermal mass in summer.

WBM Consulting Engineers: Development of environmental innovative hydraulic and electrical systems: earth and landscape integrated water storage and grey water system and grid tied modular photovoltaic systems to reduce capital cost and facilitate retrofit as cell efficiency increases.

Extensive monitoring has taken place including air quality analysis, electromagnetic radiation surveys, thermal, lighting and ventilation studies, energy audits, hydraulic audits and a life cycle analysis. Today most of the monitored information is displayed in real time on the Health home website (http://www.housing.qld.gov.au/builders/research_house/index.htm).

The performance of the house clearly exceeds that of an average house. Like in the Christchurch show home case interest in the house tends to correlate with extreme weather conditions, in this case hot spells, during which the Healthy home has significantly lower indoor temperatures than other houses.

From the start the house was occupied by the owner builder, who partnered with the research

9.5.3 Marketing

There has been no dedicated marketing campaign advertising the house. For three years the house was open at regular times to visitors. Initially the house was promoted through word-of-mouth. Another effective channel were government organisations such as the AGO and the EPA. Because of its sustainability features and because of the research component, the house caught the attention of these organisations, which in turn promoted it free of charge to the Healthy home project through their own channels.

These indirect promotions ultimately lead to such a large number of inquiries that it became too ineffective for the Queensland University to field queries. That led to the development of the Healthy home web page funded through the EPA and the AGO. Most of the effort in the website creation went into writing the content, which was supported through the Department of natural Resources. Although the University had extensive scientific records, these had to be “translated” into public terminology. The layout of the website itself including the incorporation of real time monitoring data was comparatively easy and costed approximately A\$25k. The whole website creation took almost 1.5 years to complete. The fact that the website and the research was not funded and controlled by industry but rather through government organisations proved to be crucial for the credibility of the provided information.

The AGO used a video filmed about the Healthy home in a nationwide seminar series to the industry, which had a budget of A\$500k, and the house is now showcased on the AGO “Your home” website (www.greenhouse.gov.au/yourhome). This provided further free promotion for the Healthy home project.

Another coincidental driver was the adoption of Agenda 21 by many Australian councils.

Due to lack of funding there is no dedicated impact evaluation of the Healthy home marketing. The website receives approximately 600 hits per month and a series of product retailers have added links from their own sites to the Healthy home web site.

9.5.4 Success factors

The most critical success factor for the marketing of the Healthy home was the extensive scientific research in the house performance. This made the house stand out from most of the other show homes and lead to interest and indirect marketing by other organisations. It also proved to be important for gaining public trust in the performance of the implemented building technologies.

9.6 Appendix F: Case Study: Chiryu Demonstration Home, Japan

Okamoto Yasuo, Chiryu Heater Co., 2-33 Sakae Chiryu Aichi 472-0037 JAPAN

9.6.1 *Background*

Okamoto Solar House is in semi-urban town of Chiryu. The town is close to Nagoya in central part on pacific coast of the Japanese main island. This solar house is a single family house in a residential district. The project finished in February 2003.

9.6.2 *Building technologies and performance*

Other than 3 bedrooms, the house has an elder's room with kitchen and bathroom to allow possible homecare. The kitchen and dining room is often used for cooking lessons. The garden is designed to be a spiritual shelter in this crowded area.

9.6.3 *Marketing*

The demonstration building includes a heating system which is supplied by one of the project leaders. This meant that they made efforts to demonstrate and let people know about the building.

The Japanese public tends to be influenced by mass media, especially by TV. Therefore a lot of emphasis was placed on letting the house appear on TV programs. Presentations were repeatedly sent directly to programs in various TV stations. The producers were generally looking for the material for their program and the house ended up to be featured in several TV programs.

There was no formal marketing impact evaluation conducted. However, the project managers believe that the system was effective. On the day following the broadcast of one of the programs, the SSDA (Solar System Development Association), whose name and phone number was introduced, received between 50 and 100 inquiries, requesting their brochure about the "Hybrid Solar House".

Also approaches to magazines and newspapers seemed to work well. Editors or producers seemed to be for this type of material. The magazines and newspapers were mostly targeted at the general public, such as weekly magazines, morning paper, papers for homebuilders, as well as natural living magazines. The direct impact of these magazines was estimated to be limited; however, it was felt that they assisted building a brand value. This was considered to be important because there are a few known manufacturers and the product was new and not readily known.

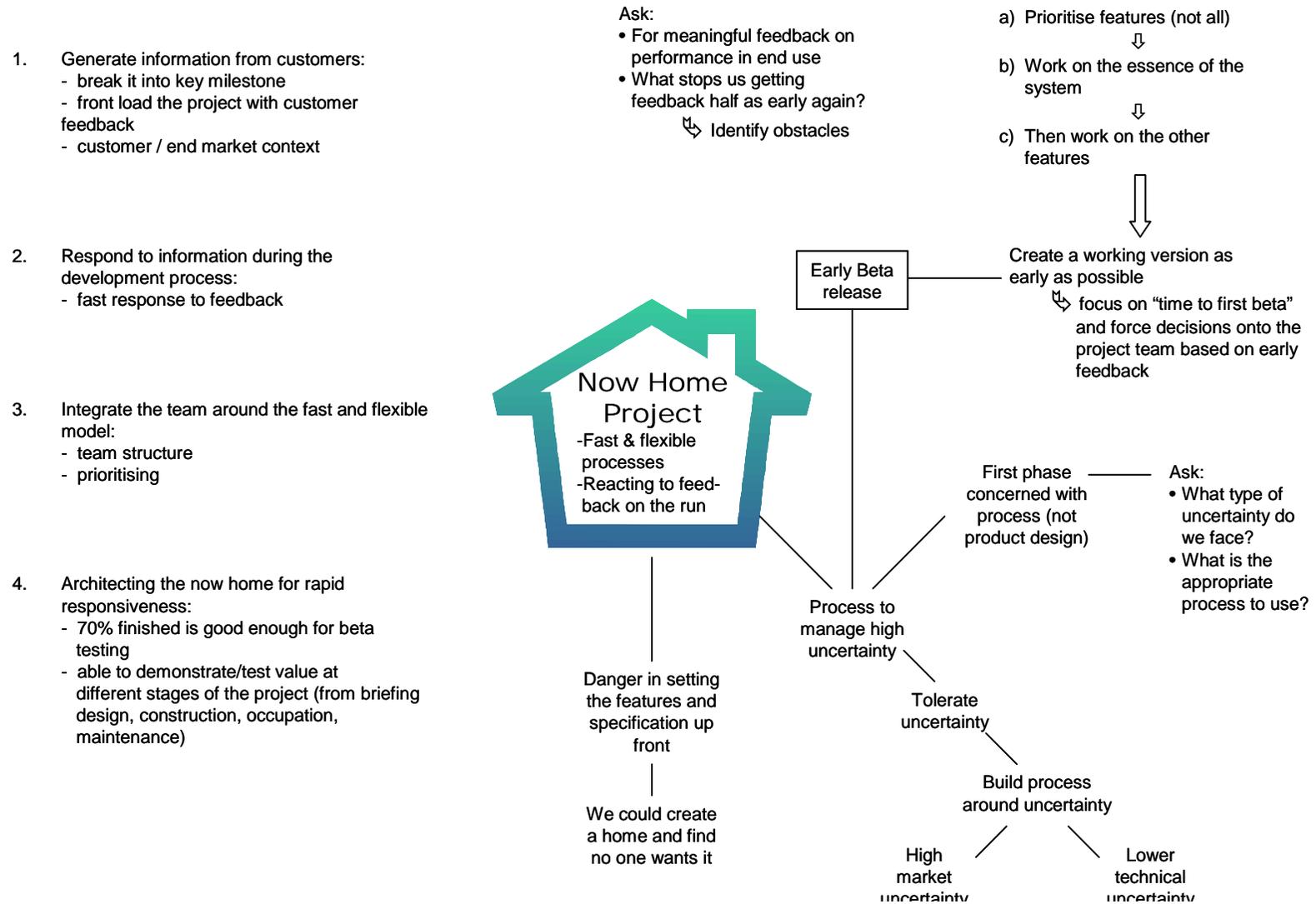
Seminars to educate the advantages of solar house for people intending to build their houses have been held more than 40 times a year throughout Japan, featuring the hybrid solar house "AMATELAS". Some 200 home builders were participating.

Within a year after the broadcast, 2 new home owners adopted the "Hybrid Solar House" system when they built their new house.

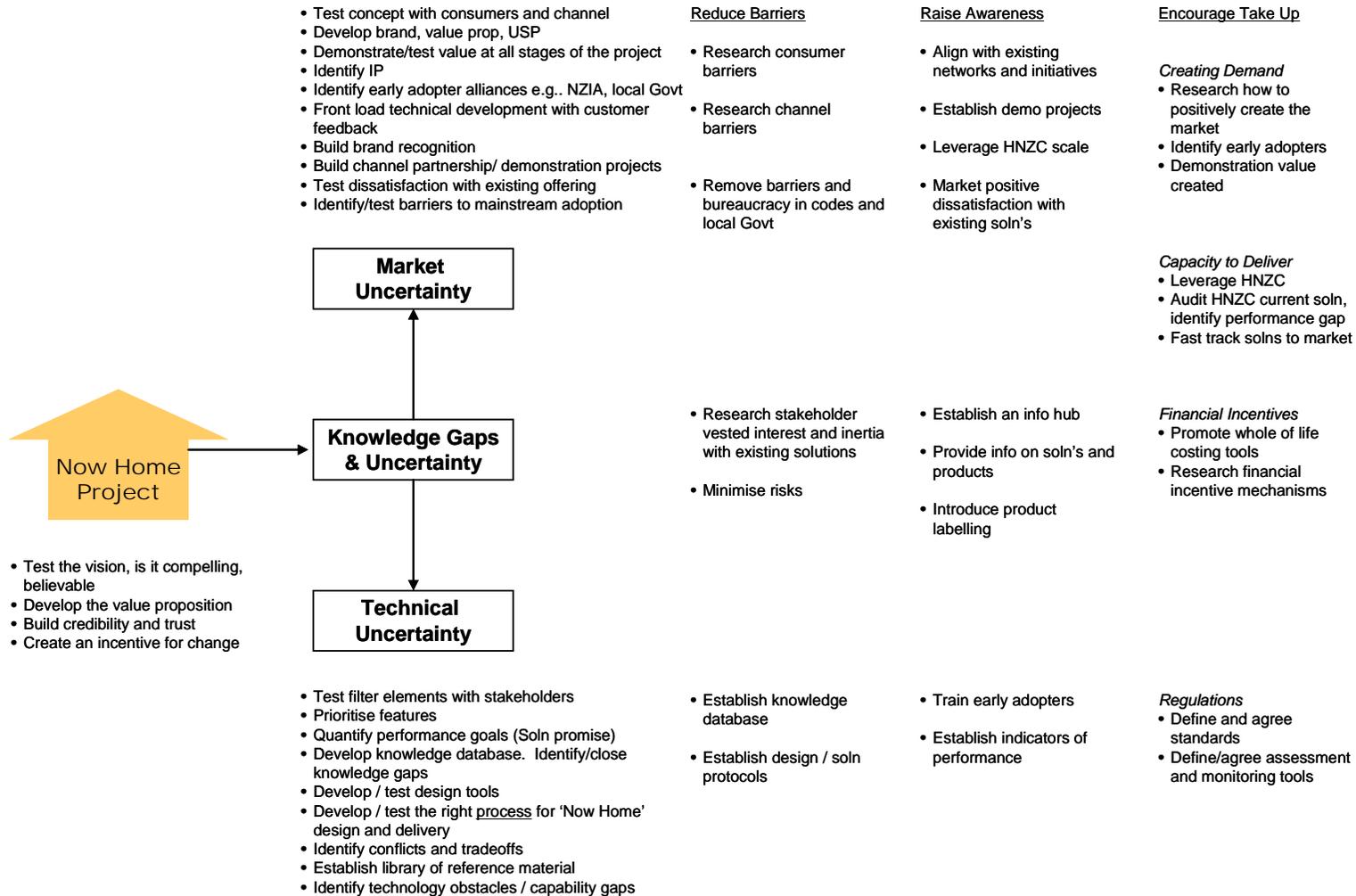
9.6.4 *Success factors*

One of the important lessons learnt from this example is that cooperation with industry members can work. It relies on a tight integration between industry and other partners, assigning clear responsibilities and offering direct advantages from the demonstration project.

9.7 Appendix G: WWB NOW Home Demonstration Concept (source WWB, Kevin Golding)



9.8 Appendix H: NOW Home Market and Technical Uncertainties (source WWB, Kevin Golding)



9.9 Appendix I: Budgets and Success Estimates for Stakeholder Objectives

Strategy	A	B	C	D	E	F	G
Stakeholders	The Building Research Association	The Building Research Association	Fletcher Building	Fletcher Building	Forest Research	Waitekere City	EECA
Likely impact on houses by 2012	5.0%	1.0%	5.0%	0.5%	2.0%	3.5%	0.5%
Likely success	60%	70%	60%	70%	50%	50%	70%
Number of households	69,000	13,800	69,000	6,900	27,600	48,300	6,900
Implementations	High Impact	Low Key	High Impact	Low Key	-	-	-
Set-Up 2005	\$505,000	\$285,000	\$505,000	\$80,000	\$440,000	\$475,000	\$80,000
Ongoing Annual 2006-2012	\$973,100	\$80,600	\$973,100	\$55,600	\$115,000	\$228,100	\$55,600
Total by 2012	\$7,316,700	\$849,200	\$7,316,700	\$469,200	\$1,245,000	\$2,071,700	\$469,200
<i>Change Agents</i>	\$50,000	\$40,000	\$50,000	\$50,000	\$0	\$20,000	\$50,000
Brand Development	\$20,000	\$20,000	\$20,000	\$20,000	\$0	\$20,000	\$20,000
Website	\$20,000	\$20,000	\$20,000	\$20,000	\$0	\$0	\$20,000
Website pdfs	\$10,000	\$0	\$10,000	\$10,000	\$0	\$0	\$10,000
Brochures*	\$25,000	\$0	\$25,000	\$25,000	\$0	\$25,000	\$25,000
Press release*	\$600	\$600	\$600	\$600	\$0	\$600	\$600
Direct mail*	\$5,000	\$0	\$5,000	\$0	\$0	\$0	\$0
<i>Opinion Leaders</i>	\$180,000	\$90,000	\$180,000	\$0	\$130,000	\$180,000	\$0
Brand Development	\$20,000	\$20,000	\$20,000	\$0	\$20,000	\$20,000	\$0
Branded product approvals	\$30,000	\$30,000	\$30,000	\$0	\$30,000	\$30,000	\$0
Design guides	\$10,000	\$10,000	\$10,000	\$0	\$10,000	\$10,000	\$0
Software	\$10,000	\$0	\$10,000	\$0	\$10,000	\$10,000	\$0
Website	\$20,000	\$20,000	\$20,000	\$0	\$20,000	\$20,000	\$0
Website pdfs	\$10,000	\$10,000	\$10,000	\$0	\$10,000	\$10,000	\$0
Technical manuals	\$30,000	\$0	\$30,000	\$0	\$30,000	\$30,000	\$0
Technical CD	\$50,000	\$0	\$50,000	\$0	\$0	\$50,000	\$0
Brochures*	\$25,000	\$0	\$25,000	\$0	\$0	\$25,000	\$0
TV sponsorships*	\$100,000	\$0	\$100,000	\$0	\$0	\$0	\$0
PR*	\$20,000	\$0	\$20,000	\$0	\$20,000	\$20,000	\$0
Direct mail*	\$10,000	\$0	\$10,000	\$0	\$0	\$0	\$0
<i>Consumers</i>	\$195,000	\$75,000	\$195,000	\$0	\$195,000	\$195,000	\$0
Brand Development	\$20,000	\$20,000	\$20,000	\$0	\$20,000	\$20,000	\$0
Sust. product endorsements	\$30,000	\$30,000	\$30,000	\$0	\$30,000	\$30,000	\$0
Website	\$25,000	\$25,000	\$25,000	\$0	\$25,000	\$25,000	\$0
Website pdfs	\$10,000	\$0	\$10,000	\$0	\$10,000	\$10,000	\$0
Print advertising*	\$100,000	\$0	\$100,000	\$0	\$0	\$0	\$0
Magazine inserts*	\$7,500	\$0	\$7,500	\$0	\$0	\$7,500	\$0
Radio advertising*	\$130,000	\$0	\$130,000	\$0	\$0	\$0	\$0
TV advertising*	\$300,000	\$0	\$300,000	\$0	\$0	\$0	\$0
0800 number/ call centre*	\$100,000	\$0	\$100,000	\$0	\$0	\$0	\$0
Consumer guide	\$60,000	\$0	\$60,000	\$0	\$60,000	\$60,000	\$0
Consumer CD	\$50,000	\$0	\$50,000	\$0	\$50,000	\$50,000	\$0
PR*	\$20,000	\$0	\$20,000	\$0	\$20,000	\$20,000	\$0
Home shows & all other events*	\$50,000	\$0	\$50,000	\$0	\$0	\$50,000	\$0
<i>Activity Monitoring*</i>	\$55,000	\$55,000	\$55,000	\$5,000	\$50,000	\$55,000	\$5,000
Change Agents*	\$5,000	\$5,000	\$5,000	\$5,000	x	\$5,000	\$5,000
Opinion leaders*	\$25,000	\$25,000	\$25,000	x	\$25,000	\$25,000	x
Consumer*	\$25,000	\$25,000	\$25,000	x	\$25,000	\$25,000	x
<i>Impact Monitoring*</i>	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000

* Items with asterixes denote annual figures

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