PR107

REGULATORY FRAMEWORK DEVELOPMENT: UNDERSTANDING CURRENT SUSTAINABILITY REGULATIONS AND POLICY

A REPORT PREPARED
FOR BEACON PATHWAY LIMITED

September 2006

The work reported here was funded by Beacon Pathway Limited
and the Foundation for Research, Science and Technology

FOUNDATION FOR RESEARCH SCIENCE & TECHNOLOGY
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Creating homes and neighbourhoods
that work well into the future
and don't cost the Earth

PR107 REGULATORY FRAMEWORK DEVELOPMENT: UNDERSTANDING CURRENT SUSTAINABILITY REGULATIONS AND POLICY

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ABSTRACT

This report updates, reviews and summarises policy and strategy development as well as relevant initiatives on urban sustainability by central and local government during 2005. It updates the 2005 PR101 report.

REFERENCE

O'Connell, M. 2006. *Regulatory Framework Development: Understanding Current Sustainability Regulations and Policy*

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CONTENTS

EXECUTIVE SUMMARY

This report aims to ensure Beacon Pathway Ltd (Beacon) and its providers have a clear understanding of the environment surrounding sustainability regulation and policy development in central and local government. To this end, the document contains an update, a review and summary of policy and strategy development as well as relevant initiatives on urban sustainability by central and local government during 2005. Work stemming from other providers is included where applicable. This report is complementary to other work being done in the Policy and Regulatory work stream, such as PR250 Submissions to Local Government Long Term Plans, PR251 Submissions to Central Government and the Policy and Regulatory Strategy in which Beacon identifies priority actions forward for Beacon in terms of engagement with central and local government policy and regulatory authorities.

The report is divided into six sections:

- Policy/regulatory development - central government
- Review and research - central government
- Policy/regulatory development - local government;
- Incentives for sustainability uptake
- Selected case studies
- Miscellaneous initiatives.

Please note that initiatives not significantly updated, in suspension, for example, have been removed from this study and can be found in the initial report (O'Connell, 2005).

Brief highlights of summary of key central and local government sustainability programmes that have emerged throughout 2005, policies or strategies and/or recent developments, associated with key environmental issues, are presented below:

- Kyoto Protocol entered into force on 16th February 2005 for period 2008-2012

- Kyoto policies (under review following official dropping of carbon tax in December 2005; Projects to Reduce Emissions, Negotiated Greenhouse Agreements, Energy Intensive Businesses, etc nominally still exist but their future form is uncertain) will be introduced/reinforced

- A National Energy Strategy is being developed and will available as a discussion piece in mid 2006

- The National Energy Efficiency Strategy (NEECS) is being reviewed in 2006 and intended to be re-released as Project Tui (2E – Energy Efficiency)

- Future (to 2050) scenarios outlined for electricity (Future Currents - The Parliamentary Commissioner for the Environment) and energy (A Sustainable Energy Future for NZ - New Zealand Business Council for Sustainable Development) respectively

- A 'Value Case for Sustainable Building in New Zealand' was released February 2006

- Variety of urban development strategies underway in cities such as Auckland, Wellington, Christchurch and Tauranga

- The New Zealand Housing Strategy (NZHS) was released in May 2005.

1. INTRODUCTION

The definitions of *sustainable development* and *sustainability* have been described (or attempted to be described – there is no 'one definition fits all' description) elsewhere for Beacon and Beacon consortium members (Hargreaves et al 2004) and will not be revisited here. In brief they indicate a quest to improve the quality of our lives and milieu, to prosper financially without destroying resources and life-nurturing systems on which current and future generations depend upon.

The planet's economic, environmental and social systems, and infrastructure are under pressure from major impacts such as resource depletion, ecosystem degradation and a rapidly expanding global population. In addition, climate change is undoubtedly of major concern as it has the potential to cause severe economic, social and environmental damage in the built environment[1]. Calls are being repeatedly made (internationally and nationally) by scientists, policy makers and politicians to make reductions in greenhouse emissions of the order of 70% (of 1990 levels) by 2050 so that the global climate system can stabilised by the end of the century. Peak Oil (the maximum rate of extraction of the global oil reserve) has also emerged as an issue of increasing global importance during the last 12-18 months. The government response is in this regard is not clear to date[2].

The Millennium Ecosystems Assessment (MEA) report released in March 2005 served to underline the extent to which humans live unsustainably in the built (and natural) environment; approximately 60% of the ecosystem services examined during the MEA are being degraded or used unsustainably, including fresh water, and the regulation of regional and local climate. The seriousness of these issues was underlined in a building context at the SB05 Tokyo Sustainable Building Conference '*Action for Sustainability*' by Princess Takamodo of Japan and Ernst von Weizsäcker of the German Parliament. However, while the rhetoric is increasingly strong, and often politicised, actions to tackle unsustainable living including building and construction practice rarely follow with any urgency - including New Zealand.

Beacon Pathway as an entity has moved increasingly from research on to the practical aspects of sustainable buildings. During 2005, the Beacon consortium successfully completed and opened the first NOW Home in August; and is now monitoring its performance remotely for resource use, noise, mould risk etc; Beacon has also summarised and released key findings of preliminary research undertaken in 2004 and 2005 (Beacon, 2005). Other projects, including neighbourhood examples, are planned for 2006 in (at least) Rotorua and Porirua.

As a result of increasing man-made pressures impacting on the urban environment, the New Zealand government and regulatory authorities, in the face of strong and convincing evidence (e.g. for climate change, potable water depletion, etc), are responding with a range of sustainability-related policies, strategies and initiatives. These are outlined in the sections following.

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[1] New Zealand climate change policy currently under review – see discussion below

[2] The annual EECA EnergyWise Council Forum, staged in Nelson, March 9-10, had the theme '*Planning for the end of an era: What can local government do to get ready for a world without cheap oil?*' One paper presented (by Cr Leah McBey, Dunedin City Council) examines the role of local authorities in preparing for a future of scarcer and more expensive petroleum products, and the impact of such on delivery of council infrastructure and services.

2. POLICY AND REGULATORY DEVELOPMENT - CENTRAL GOVERNMENT

The Parliamentary Commissioner for the Environment (PCE) has stated that the government intends to draw together all the strategies and initiatives under an overarching sustainable development strategy (PCE, 2002). This has not to date happened, though the UK (*Securing the Future* in 2005) and the Western Australian state government (*Hope for the Future* in 2003) have produced such strategies. Anecdotally, there have been some successes in moving the sustainability agenda forward in both central and local government, and some local case studies are discussed.

In the absence of any umbrella strategy, though the Sustainable Development Programme of Action (DPMC 2003) has been a step in that direction, there is explicit reference to sustainability in a number of statutes including the Resource Management Act (1991), the Energy Efficiency and Conservation Act (2000), the Local Government Act (2002) and the Building Act (2004).

While there has been some success in embedding the culture of 'sustainability thinking' across government agencies, the success of this process is dependent on getting buy-in from key senior staff (particularly the Chief Executive or equivalent) and other key personnel acting as 'drivers' of sustainability thinking and practice (and retention of that institutional knowledge should that person leave the organisation). There is anecdotal evidence of some agencies, at worst, resisting major change, or at best, 'acting sustainably' but in a pure financial sense.

2.1 Sustainable Management and Development

2.1.1 Resource Management Act

The Resource Management Act (1991) (RMA) is the core legislation intended to help achieve sustainability in New Zealand. The Act's purpose is to promote the sustainable management of natural and physical resources. The RMA, through district plans, has a number of built environment functions including: subdivision control, density/intensity of development and building orientation. It largely establishes the external context for buildings and other physical infrastructure.

The Amendment Act also makes explicit provisions within Section 7 of the RMA for all those persons exercising functions and powers under the Act to note particularly: the effects of climate change; the efficient use of energy from minerals and other sources of energy; and the benefits to be derived from the use and development from renewable energy.

2.1.2 Local Government Act

The purpose of the Local Government Act (2002) '*provides for local authorities to play a broad role in promoting the social, economic, environmental and cultural well;-being of their communities, taking a sustainable development approach*' (section 3(d)).

To assist the improvement of a better built environment, the Local Government Act (LGA) provides a new purpose for all Territorial Local Authorities (TLAs) based on sustainability principles, and the democratic promotion of those principles.

The taking of a sustainable development approach introduces a shift in emphasis to achieving sustainability compared to the practice of simply implementing the RMA. Whereas the RMA is focused on managing the adverse environmental effects of applicants' proposals, either through rules in a plan or through consent conditions, the LGA requires local government to show how its activities contribute to community outcomes and encourages partnerships of the public sector with both community interests and the private sector to achieve these outcomes.

This is a new paradigm for the private sector (which will include many aspects of the building and construction sector – developers, etc) in managing its resource plans because, fundamentally, the requirement now on local government is to describe its activities in terms of the service levels it proposes to meet for the contributions required under a Long Term Council Community Plan (LTCCP).

The LTCCP is based on regional and/or territorial community outcomes which have been identified in conjunction with local stakeholders. Plans will reflect the significant challenges facing districts and regions in terms of sustainable environmental management of natural resources - these will typically involve water and air resources but will also include land use and energy.

Local Government New Zealand produces useful guidance to the Local Government Act which spells out what local and regional authorities are required to do. The LTCCP's impact on urban sustainability is discussed in the territorial/regional case studies section.

2.1.3 The Local Government (Auckland) Amendment Act 2004

This Auckland region-specific amendment to the LGA gives effect to the Government's transport governance, regulatory and funding proposals for Auckland. Two new entities as subsidiaries of the Auckland Regional Council have been established as a result: the Auckland Regional Transport Authority (ARTA) and Auckland Regional Holdings (ARH). ARTA will plan, fund and develop Auckland transport infrastructure with Transfund and Transit. ARH was set up to provide sustainable funding for the Auckland region to assist Auckland Regional Council (ARC) to pay for essential public transport and stormwater infrastructure.

This Act has also been designed to provide regulatory traction to the region's (non-statutory) Growth Strategy (see also Section 2.6). In a process lasting more than a year, a stronger mandate is now being provided via the seven Auckland TLA's Regional Policy Statements to give effect (apply rules) to city and district plans[3]. A key aspect of the changes is to allow for intensified development close to transport (growth nodes), development that will not reduce amenity[4].

2.1.4 Sustainable Development Programme of Action (SDPA)

The SDPA, released in January 2003, focuses on the themes of energy, water, sustainable cities and child/youth development (DPMC 2003). The SDPA puts forward some key issues, approaches and guiding objectives to strengthen central government's decision making, and to ensure that sustainable development is at the core of all government policy.

The Energy theme is discussed under the 'National Energy Strategy' below. The Water theme has, to date, concentrated on management of freshwater resources with little of relevance directed at urban sustainability issues.

The Sustainable Cities programme of action has two major components:

- **National**: urban work programmes being undertaken by MfE: the Urban Design Protocol is one of these.
- **Regional**: the joint action plan for Auckland, the region which was identified as the priority region under this programme.

The SDPA is referenced where relevant below.

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[3] David Carew, Senior Advisor, Urban, MfE, pers comm., 12 June 2006.

[4] Research commissioned by ARC, ACC, WCC and HNZC (Syme et al 2005) indicates there is no conclusive evidence between intensive development and social problems.

2.2 Climate Change

The Kyoto Protocol came into force on 16th February 2005. The Kyoto Protocol commits New Zealand to reducing its greenhouse gas emissions back to 1990 levels, on average, over the period 2008 to 2012, or to take responsibility for any emissions above this level if it cannot meet this target.

With reference to the Governor-General's Speech from the Throne released after the 2005 general election, climate change was acknowledged as a big threat to New Zealand's land-based industries and that it was important for this country to move with the mainstream of international opinion in finding solutions to climate change.

In December 2005, however, it was announced that the proposed 2007 carbon tax will not proceed. In essence, this means that carbon emitters (including house and building owners /occupiers) will bear no effective social or environmental cost for their day to day activities. Other ways to reduce greenhouse gas emissions are now being considered by government officials.

The policy review process, following consultation with stakeholders, will culminate in a report of findings (including areas such as energy efficiency and conservation) due with the Minister by March 2006. The Projects to Reduce Emissions programme, if it is retained in the revised policy package, has the potential to act as and important conduit to micro-scale powering of urban and rural communities.

The Kyoto-based policies will also support national sustainable energy initiatives such as the revised NEECS and the proposed National Energy Strategy (see discussion below).

2.3 Energy

With reference again to the Speech from the Throne, the government has stated it will explore a wide range of potential energy scenarios in order to develop a National Energy Strategy with priority given to renewable energy sources. A more aggressive approach will be taken with respect to energy efficiency, in order to reduce the growth in demand, while also meeting the needs of households and businesses. Measures will include:

- increased support for solar water heating
- the introduction of a Home Energy Rating Scheme[5]
- improved building standards
- the use of passive solar design systems.

2.3.1 National Energy Efficiency and Conservation Strategy (NEECS)

The National Energy Efficiency and Conservation Strategy (NEECS) has two high-level (though non-mandatory) targets: (1) *achievement of at least 20% improvement in economy-wide energy efficiency by 2012; and (2) increased renewable energy supply to provide a further 25-55PJ of consumer energy by 2012.* The NEECS also has energy efficiency goals for buildings (one of five targeted sectors). The recent EECA annual reports indicate these targets may be difficult to achieve (EECA, 2005).

In August 2005, EECA announced a review of the NEECS (SEF, 2005a), the review exercise named 'Project Tui'[6]. The project timetable aims to provide the Minister of Energy

[5] The Minister of Energy announced on 30 May 2006 that $1.7 million has been allocated to the development of a home energy rating scheme (HERS). The priority market is middle to high income earners, and landlords, who are responsible for pre-1977 houses, especially the ca. 250, 000 homes not yet retrofitted with energy efficient measures. EECA is to lead the consultation process.

with a draft replacement by March 2006 so a revised strategy can be approved by September 2006.

2.3.2 National Energy Strategy

It is the intent of the government that the proposed National Energy Strategy integrates with Project Tui. Under the energy theme of the SDPA, the Ministry of Economic Development (MED) released a document entitled 'Sustainable Energy: Creating a sustainable energy system' as part of ongoing work in the energy theme. A number of national workshops were subsequently held in early 2005 though no recent material has been promulgated. The national strategy is being developed and will available as a discussion piece in mid 2006.

2.3.3 Policy Review and Settings

The Parliamentary Commissioner for the Environment (PCE) assesses the environmental performance of the broader electricity sector on an annual basis (PCE 2005a). Among the PCE's recommendations include the addressing (by the Electricity Commission and Minister of Energy) of market barriers for demand-side initiatives and distributed generation. This is of interest to councils, electricity lines companies, developers, etc, when considering installation of solar water heating, micro-wind applications, etc.

The PCE has also outlined two future energy scenarios (present to 2050) for *electricity* (*Future Currents*, PCE, 2005b) using fictional characters in an approach similar to that in *Room for a View* (Bates et al, 2003). 'Fuelling the Future' is essentially business as usual; whereas 'Sparking New Designs' is where changes toward a sustainable lifestyle have been made, such as focusing on easy technological changes and free audits to benefits of using energy wisely - which end up sparking bigger transformations.

The PCE is also preparing a mid- 2006 release on *distributed energy* and the extent to which our energy needs from dispersed and local sources can be provided for. The report is expected to have a considerable residential sector aspect.

2.4 Building and Housing

2.4.1 Building Act

The most significant government action to improve the quality of new housing construction and building work is the Building Act (2004). The purpose of the revised Building Act has been expanded to include concepts of health and safety, and sustainability.

In the Act, under 'Purpose', the key clause (3d) relating to sustainability states that '*…buildings are designed, constructed and able to be used in ways that promote sustainable development*'. Under 'Principles', key sustainability clauses relate to human health, whole-of-life costs, energy, materials, water and waste:

Inclusion of sustainability concepts will impact on the New Zealand Building Code as it is reviewed over the next two years[7]. The code will also require a definition of 'sustainable development' taking into account the world view (Hargreaves et al 2004a) and the New Zealand context. This still has not occurred at time of writing.

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[6] Tui is considered a positive /catchy acronym for Energy Efficiency or '2E'.

[7] The Minister for Building Issues announced on 27 May 2006 that the Building Code will be reviewed, with the review scheduled for completion, in two main phases, by 30 November 2007. The new code is projected to take effect in 2008.

An investigation into the relationship between the RMA and the Building Act (2004) (Hargreaves et al 2004b) has shown that, while there are some gaps and inconsistencies, generally there are few aspects of direct conflict between the two Acts.

2.4.2 New Zealand Housing Strategy

The New Zealand Housing Strategy (NZHS) was released in May 2005 and sets out priorities for housing and a programme of action to lead the sector over the next 10 years. The vision for the NZHS is that '…*all New Zealanders have access to affordable, sustainable, good quality housing appropriate to their needs*'.

The long-term social and economic costs of poor quality housing (e.g. poor health and educational achievement) mean that an investment in good quality housing makes good social and economic sense. The discussion document identified a number of areas for action to achieve the vision including:

- *working with industry and local government to bring about sustainable housing supply*
- *improving housing quality, assistance and affordability.*

2.4.3 Government Projects and Initiatives

In February 2006, MfE released the Value Case for Sustainable Building in which the authors assert that the case for building sustainably is now compelling. For example, operating savings costs alone are likely to be repaid for owner occupiers and tenants. The benefits are most apparent for the former where the marginal cost (taking a 20 year whole-of-life view) of sustainable building is repaid between five and six times.

The case studies show that, to achieve the above investment returns, the difference in the initial capital cost of sustainable buildings compared to conventional good quality buildings varies from 15% less to 11.5% more, with sustainable features initially costing an average of 2–6% more. While the focus of this study has been *non*-residential buildings (and a formal case for sustainable residential buildings has yet to be released), there appears to be a benefit in applying sustainability principles to larger developments – new subdivisions or neighbourhoods.

The Warm Homes project has been set up by MfE to examine ways to encourage New Zealand households to move to cleaner heating sources and increase household energy efficiency, and overall to achieve warmer and healthier homes. National Environmental Standards (NES) for air quality require councils and communities to deal with poor air quality in their areas.

The first phase of the Warm Homes project involved collecting data, assessing heating options, looking at best practice overseas, and investigating incentive schemes that encourage householders to choose cleaner heating.

To this end, MfE released a series of five Warm Home technical reports in late 2005. The reports discuss:

- a detailed study of heating options in New Zealand homes
- home heating methods and fuels in New Zealand
- social drivers.

The next phase of the Warm Homes project is focused on implementing the reports' findings. Pilot programmes have been undertaken in Tokoroa and Timaru.

In a related study, the Wellington School of Medicine has undertaken a number of projects in their Housing and Health Research Programme centred on providing a short-term body of knowledge related to the health effects of a warmer, drier indoor environment resulting from insulation retrofitting and installation of energy-efficient home heating. Some other forms of outcome evaluation are now taking place, such as the Community Energy Action (Christchurch) survey of houses retrofitted with insulation and heat pumps.

2.5 Waste

New Zealand Waste Strategy

Reducing waste in this country is a cornerstone of the government's commitment to sustainable development. The 2002 New Zealand Waste Strategy (NZWS) aims to weaken the link between economic development and waste generation by focusing on *waste prevention* rather than dealing with *end-of-pipe* disposal solutions. Targets set in the NZWS (e.g. for C&D waste) are not yet mandatory but were due for implementation by December 2005. They are national targets and their achievement is significantly dependent on the actions of local authorities. A number of councils have been progressive in putting waste management plans in place which take explicit account of the NZWS (and relevant examples are discussed under 'case studies').

Plastic is one of the five key packaging materials for which recovery targets have been set under the Packaging Accord. Plastics New Zealand (PNZ - contact: Ket Bradshaw) has released a recent report which examines sustainable end-of-life options for plastics in this country (Withington, 2005). The project was specifically developed to gain a better understanding of what happens to plastics at the end-of-life stage; to then be able to determine feasible, sustainable solutions for increasing recovery. The report shows that nearly 20% of the plastic produced in 2004 was utilised by the construction sector (mainly PVC and EPS – expanded polystyrene). In order to determine the plastic material available for recovery (and potential re-use in, say, the construction and housing sectors) in New Zealand, accurate data are needed on the amount imported and exported.

2.6 Transport

New Zealand Transport Strategy (NZTS)

The government's vision for transport requires that economic development, social cohesion and environmental improvements must be progressed in parallel. The government's overall vision, outlined in the 2002 New Zealand Transport Strategy (NZTS), for transport is that: '*…by 2010 New Zealand will have an affordable, integrated, safe, responsive and sustainable transport system*'.

The government has stated that transport policy will reflect New Zealand's national commitment to energy efficiency and internationally to the Kyoto Protocol. The emergence of Peak Oil as a global and national issue is also demanding a response from the government, regional and territorial authorities as the country responds to the reality of a future of non-cheap oil from conventional sources. A future of scarcer and more expensive oil will almost certainly drive closer integration of building, land-use and transport policy.

2.7 Water

The overarching goal of the water theme of the SPDA is: *adequate, clean freshwater available for all*. Access to water is seen a fundamental precondition for development and is obviously vital to the functioning of industrial processes, buildings, etc.

Much of the country's urban water infrastructure is aging (in some places around 100 years old) and in need of replacement. There are issues surrounding costs of improving water supplies and wastewater/stormwater management. Climate change impacts including severe rainfall events will also place stress on existing infrastructure.

2.8 Urban Design and Sustainability

Urban Design Protocol

The New Zealand Urban Design Protocol (UDP) was released in March 2005 and aims to make New Zealand towns and cities more successful by using quality urban design to help them become more competitive, liveable, environmentally responsible, inclusive, distinctive and well-governed. The Protocol identifies seven essential design qualities including Custodianship – 'ensuring design is environmentally sustainable, safe and healthy'.

An Urban Design Toolkit released in February 2006 supports the implementation of the UDP. Tools, grouped in five categories, are designed to help in understanding the urban context, encouraging community involvement, increasing the understanding of urban design issues, describing intended design outcomes, establishing design processes, and organising people and resources.

3. POLICY AND REGULATORY DEVELOPMENT - LOCAL GOVERNMENT

All regional councils are required to have prepared, under the RMA, a Regional Policy Statement (RPS) which highlights the need to address issues with regard to energy, water, urban form, transport, etc. RPS's are currently going though a nationwide review process. Using Environment Canterbury's RPS as an example, an RPS typically contains unrealistic 'deliverables', outcomes expected that cannot be delivered by the council by itself. The review process seeks a closer working together with regional stakeholders to address key issues (such as urban sprawl). The RPS will need to be closely aligned with outcomes sought in the LTCCP process and policy instruments.

3.1 Climate change

The New Zealand Climate Change Office continues to work in partnership with local government on climate change via five main work programmes including the Communities for Climate Protection' programme (CCP), guidance for councils on adaptation to climate change, and public education.

The CCP initiative was released in July 2004 by the government (and delivered by the International Council for Local Environmental Initiatives – ICLEI) is part of programme to help councils reduce greenhouse gas emissions at both corporate and community level. The 17 councils (regional and territorial) in the programme represent approximately 50% of New Zealand's population.

The RMA is periodically reviewed. The Resource Management (Energy and Climate Change) Amendment Act 2004, released in March 2004, recognises that, while greenhouse gas emissions are local, the greater impact is experienced collectively nationally. A private members bill[8] is seeking to repeal those sections of the 2004 Amendment which prevented the consideration of climate change in the granting of air discharge consents and the

[8] The Resource Management (Climate Protection) Amendment Bill was drawn via the Members Ballot on 17th March 2006 and passed a first reading in the House on March 30th.

formulation of regional plans. While it is difficult to predict the outcome of this process, Labour has indicated it will support the bill, which may mean that Regional and Local Councils are able to include provisions to address climate change in their Regional and District Plans.

3.2 Energy

Section 5 of the Resource Management Act (RMA) requires regional councils to promote the sustainable management of the region's natural and physical resources, which include energy sources. The RMA amendments of early 2004 also make explicit provisions within Section 7 of the RMA to take into account the *benefits to be derived from the use and development from renewable energy.*

The extent to which regional authorities can take energy efficiency considerations into account is not entirely clear. While the RMA represents one of the stronger routes by which renewable energy uptake can be encouraged and achieved, very little in the way of case law specific to renewable energy has yet emerged[9].

The national legislative situation obliges regional councils to address energy issues locally through the development of regional policies. As such, the energy chapter of a Regional Policy Statement has the potential to give effect to the RMA requirements.

There are relatively few councils active in developing sustainable/renewable/locality energy strategies though this is changing through the EnergyWise Councils[10] Forum and the involvement of Local Government New Zealand[11]. The most comprehensive ones to date are those prepared by the Southland and Canterbury regions but Environment Waikato, Nelson City, Tauranga City and Kapiti Coast District and Waitakere City are also actively developing energy strategies.

3.3 Air quality

The RMA specifically addresses the discharge of contaminants to air. Having clean air in places where people live is an important goal in the Government's environmental policy. To that end, five national environmental standards for the protection of air quality were introduced in October 2004.

Air pollution is both a big city, a small town, and, in some cases, a region-wide problem in New Zealand: fine particulate matter being of greatest concern. Environment Canterbury (ECan), Nelson City Council and the Auckland Regional Council have all produced air quality plans that attempt to reduce air pollution by phasing out open fires and inefficient, older model appliances. ECan's Clean Heat Project, while mainly focusing on improving local air quality, brings about energy savings by ensuring that the insulation of all houses included in the scheme is at Building Code level or above. In total, over 2500 houses have been retrofitted each year since the project began. By 2013, National Environmental

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[9] The strongest case to date relates to the Awhitu peninsula wind farm development. The Environment Court ruled in favour of the applicant (Genesis) based on the development satisfying Section 7b of the RMA: '*the efficiency of end use of energy'*. In this case, electricity is supplied directly into the local network at the point of demand – i.e. a nearby local community) (SEF 2005b).

[10] The EnergyWise Councils partnership is designed to strengthen the relationship between EECA and local government, with the intent of fostering a collaborative approach to improving energy choices in councils and their communities. Support for energy efficiency in residential homes is a key work stream of the partnership (see footnote 3 about re-launched HERS)

[11] Jane Johnston, Senior Policy Analyst, Environment and Regulation, Local Government New Zealand), pers comm., 10 March 2006

Standard for air quality will require that 42,000 Christchurch homes are brought up to code standard.

3.4 Housing and building

Ancell (2005) has explored a model for socially sustainable housing based upon a survey of persons living in medium density housing in central Christchurch. Key themes guiding the research included affordability, housing quality and neighbourhood quality. In relation to housing quality, issues of functionality, liveability, comfort and security were important aspects by which interviewees judged the quality of their housing; noise and safety were important aspects for neighbourhood quality.

Queenstown Lakes District Council released during 2005 an Affordable Housing Strategy[12]. Adequate housing includes the suitability of the dwelling to meet the specific needs of the household, in terms of the quality of the design and construction of the dwelling and its facilities and services, including reasonable physical condition, energy efficiency and privacy; and the suitability of the location enabling the household to access facilities without long car trips. It had been identified in the strategy's development that restricted access to affordable housing is having adverse economic, social and environmental effects.

A number of councils, including Auckland City Council, are more closely examining, and realising the need for, affordable housing; Waitakere City Council is also developing a housing strategy. The opportunity exists (for Beacon and others) to retrofit poor quality housing stock to a sustainable building standard in conjunction with the other aspects which require upgrading. Housing New Zealand Corporation (HNZC) has a Local Government Housing Fund designed to encourage Councils to keep and expand their existing rental housing stock.

3.5 Waste

The NZWS has been an effective catalyst for action in the regions. Important developments include adoption of strategy targets by a large number of local authorities, and/or expanding their own waste management and minimisation services such as providing more curbside recycling and a project to reduce the volume of construction and demolition waste.

All regional councils appear to adopt their targets directly from the NZWS with subtle variations to these targets (e.g. in Taranaki). Environment Waikato produced a Regional Waste Management Strategy in September 2003. In what is fairly indicative of regional council approaches to date, the strategy (which is non-statutory guidance) outlines how Environment Waikato will work with territorial authorities and local communities to implement the NZWS with regard to construction and demolition wastes.

All councils are required to have produced a Waste Management Plan (as a statutory requirement of the LGA 2002). Local government (and sometimes regional government) has a significant role to play with waste because they are actively involved in its collection, and, in many instances, its disposal. In support of the plans, many Councils have Cleaner Production Programmes or Waste Minimisation Programmes (some of these are discussed under Case Studies below) and already play an active role in trying to reduce waste: Kaikoura District Council is one of the more proactive TLAs in this regard.

The NZWS focuses on solid waste from households and industry. It commits to zero waste as a long term vision. However, actual practice regionally is variable. Strong barriers to waste reduction remain such as the low cost of waste disposal in some regions, the

[12] Affordable housing is defined as being affordable if households can access adequate housing by spending a maximum of 30% of their gross income.

subsidising of landfills from rates and curbside recycling being undercut by 'wheelie-bin' collection.

3.6 Transport

Virtually all major councils and regions have, as obliged under their regional plans, have implemented a Regional Land Transport Strategy, for example, the Auckland region. The Auckland Regional Land Transport Strategy is strongly linked (as required under the Local Government (Auckland) Amendment Act 2004) to the Regional Growth Strategy and is therefore of relevance to Beacon's *Neighbourhoods* work stream.

Christchurch City Council (CCC) and Environment Canterbury (ECan) are asking the community to take a 'futuristic look' at public transport as they work to update the Christchurch Public Passenger Transport Strategy. Members of the public are being asked to consider what the Metro service should be like in 2016, what goals should be and how to reach those goals.

While Christchurch does not have the degree of transport issues facing the Auckland metropolitan region, factors such as increasing population and ballooning traffic congestion are key issues to be considered. A draft strategy will be prepared following the March 2006 consultation process and will go out for public comment later in 2006.

3.7 Water

Many councils are also working with consultants on improving or upgrading stormwater infrastructure, in part as preparation for the more intense rainfall events predicted to occur with regional climate change (Wratt et al 2004).

A number of councils do not have water strategies, including regions prone to water shortages (particularly Canterbury). However, the Auckland Regional Council and all the Auckland local councils have produced strategies eg. Waitakere City's *Our Water Our Future* and their *Urban Stormwater Strategy*. The Auckland Regional Council also has its *Air, Land and Water Plan* (also discussed below) which focuses on stormwater and wastewater disposal as well as water abstraction issues.

In urban situations, local (and sometimes regional) councils are involved in the direct provision of not only water supply and disposal infrastructure, but also the provision of the water and the treatment of the wastewater. They also provide urban stormwater systems; in the Auckland Region there are very detailed requirements around stormwater treatment standards. This represents a major investment by Auckland's councils as water infrastructure represents 25% or more of their budgets on average[13]. Most Auckland region councils charge for water and Auckland City charges for wastewater; North Shore City and Waitakere City are currently considering charging for wastewater. By doing so, the market condition for water savings to be worthwhile is being created.

ECan agreed (at its June 2006 meeting) that it needs to establish a process for consultation on water charging, a process which would include discussion of options (one of which may be 'do nothing'). Given ECan's responsibilities vs. TLA responsibilities, the charging we are talking about is for the natural water takes at the point of source. If charges proceeded, it would be the City Council that gets charged and how/if they choose to pass it on would be their responsibility. Based on the Auckland experience, charging for limited resources would tend to indicate that by charging, users will start to self-monitor their use and become more efficient users of the resource.

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[13] Pers comm., Lois Easton, Beacon Pathway, May 2006.

Water conservation is also a key sustainability aspect of the new Building Act; changes to the NZBC will very likely require amendments to regional authority planning and policy (relating to buildings) to reflect this.

4. LOCAL GOVERNMENT – CASE STUDIES

Long-term planning is increasingly required to effectively manage urban development (growth) in New Zealand. Tremaine (2005) argues that an understanding of development drivers[14] is a critical component of development management.

Schedule 10 of the LGA requires local government to have a good understanding of the impact of future development on its infrastructure. As a key tool of the LGA, the LTCCP is becoming an increasingly important instrument for the long-term planning process. It is difficult to assess how effective they will be at this stage with regard to such plans' impact on urban sustainability; however, following release of draft LTCCPs for the 2006-2016 period for public consultation during mid 2006, the picture ought to be much clearer.

A number of development management approaches have been analysed by Tremaine (2005) and some of these are discussed in the following sections. For the purposes of this report, development management and other urban sustainability initiatives are examined as 'case studies' for greater Auckland, greater Christchurch, Tauranga, Kapiti Coast and Nelson.

4.1 Greater Auckland Region

One of the major components of the Sustainable Cities programme of action is the joint action plan for Auckland, a three-year partnership from 2003-06 involving the region's seven local councils, the regional council and a number of government agencies. Communities are also participating in many parts of the programme. Work strands include urban form, design and development and sustainable communities. Additionally, Waitakere City Council (WCC) has produced a booklet profiling building demonstration projects which exhibit a range of sustainable building technologies. This Council's administration building, complete with a green roof, is due to open in June 2006.

As part of a cross-government desire to improve the quality and liveability of our urban areas, the Auckland Regional Council (ARC), in conjunction with MfE, has showcased some good examples of urban design and development from across New Zealand. These urban design case studies, some of which made sustainability features a key criteria of the design, demonstrate attempts to embody and deliver urban design principles and the benefits of incorporating quality urban design. ARC also has a Residential Design Guide which is a strategic part of Auckland City Council's Liveable Communities strategy, developed to guide regional development to the year 2050.

The TUSC (Tools for Urban Sustainability – Code of Practice) project (see also Section 4.3) is a project (with the assistance of Waitakere City Council and MfE) aimed at producing a web-based analysis tool to assess and plan new urban developments against sustainability indices. TUSC intends to be a framework that produces a flexible and evolving Code of Practice that easily adapts to make use of latest analysis techniques, accurate and contextual environmental data, new treatment technologies and design practices, up-to-date

[14] Development drivers include population, demographic trends such as changes in household composition, decline in city environmental quality and 'baby-boomers' cashing in the household asset (Tremaine 2005).

monitoring databases and an expanding set real-life case studies. It is being designed to fit within local planning contexts and aid implementation of local community goals and objectives throughout the country.

Additional key Auckland regional initiatives include:

- WCC's 'Sustainable Home Guidelines' continue to be popular and provide a practical guide for good practice eco-building with up to date information about energy, water, materials, safety, waste and other eco-building issues for (eco) home builders and/or retrofitters.
- North Shore City has a range of 'Good Solutions Guides' (*on website under 'Our Environment' and 'Housing and Urban Design*) which address urban design issues, heritage and some aspects of sustainability. These have been utilised strongly by the various TLAs in the Auckland Region
- A range of Auckland region councils (e.g. Waitakere City, North Shore City and Rodney District) offer subsidies for a range of water saving measures, e.g. rainwater tanks, water audits, etc
- WCC is offering the EcoWise West programme to subsidise the installation of energy efficiency measures (e.g. hot water cylinder wraps, floor & ceiling insulation) into low income homes (whose occupants suffer from chronic illnesses)
- ARC has produced guidance on Low Impact Design (Water) (contact: Earl Shaver). The purpose of this document is to provide an alternative approach to site design and development (from a stormwater management context) mainly for residential land development (also refer to Landcare Research's LIUDD project in Section 6)
- Sustainable Living programmes (Sustainable Household courses offered within the Auckland region - see also Section 5.3) are provided in conjunction with Waitakere City (physically opposite the NOW Home in New Lynn) and North Shore City (part of the Kaipatiki project). The courses, delivered by the Eco Matters and Kaipatiki Trusts respectively, are designed to provide a "holding hands with the community" approach.
- There are a variety of waste initiatives underway in the Auckland region aimed at the building sector (e.g. REBRI – see below in Section 5.4) and at households (e.g. the MfE- and regional council –supported Reduce Your Rubbish, which has an Auckland section)
- The Proposed Auckland Regional Plan: Air, Land and Water (ALW Plan) has been prepared by ARC. The Plan is primarily a 'rulebook' to implement the ARC's statutory functions, along with mechanisms such as education and advocacy, to achieve the ARC's desired environmental results.

4.2 Greater Christchurch region

A key initiative in Canterbury is the Greater Christchurch Urban Development Strategy (GCUDS), whose forum includes Christchurch City Council (CCC), Waimakariri District Council, Selwyn District Council plus ECan. The UDS (contact: AliceAnn Wetzel, ECan) was initiated in February 2005. Three 'development options' (the fourth listed is business as usual):

- A – development concentrating within Christchurch City and larger towns in adjoining districts
- B – balancing of urban development between existing built areas with some expansion into adjacent areas

- C – disperses development out around the greater Christchurch area away from established urban areas

The options were presented to the public mid-year with the public submissions (over 3,200) overwhelmingly in favour (90% - ca 60% for Option A) of not wanting 'business as usual' or the dispersal option (Option C).

Common themes emerging included:

- a need for passenger rail services (along existing corridors at least)
- the importance of developing and using urban design principles that include energy-efficient homes with public/green space
- the need to focus on the development of urban villages or neighbourhood activity centres designed around walking and cycling.

A first draft of the GCUDS is due by end-June 2006 followed by agreement by Strategy partners and a public consultation process.

Community and Public Health (CPH) in Christchurch have also sought to highlight, in a health impact assessment (HIA) study (available on the GCUDS website), the relationship between policy and planning decisions and the influence they have on community health. Many of the findings of HIA parallel findings of the GCUDS consultation – eg. the public strongly desire that water quality/quantity be protected; the study recommends protecting aquifer catchment zones and integrating water management with urban planning. It should be noted that the *Christchurch Groundwater Recharge Zone* has been selected as ECan's case study under the Urban Design Protocol (in that unfettered urban development will not be allowed above it).

CCC has nine key community outcomes (to 2012) in its LTCCP. These include 'a well-governed city' (*decision makers plan for a sustainable Christchurch*) and 'an attractive and well-designed city' (*attractive neighbourhoods and well-designed transport networks*).

In relation to waste, the CCC pioneered the concept of imposing a levy on household waste going to landfill and uses it to fund TerraNova (formerly the Recovered Materials Foundation). TerraNova are giving (financial) backing in early 2006 to a project which will result in a biofuel being produced from algae which forms at the City's sewage treatment works. TerraNova continues to increase the diversion of materials for the waste stream for reuse and recycling. There are likely to be unexplored market opportunities for building materials.

With regard to ECan, sustainability strategies in the Canterbury region have, to date, involved stakeholders from the outset and, crucially, have integrated science-based decision-making to support the basis for the strategy[15] (Jenkins 2006). This has been applied at least to water and energy portfolio issues; and there is no reason why this approach cannot be applied to wider urban issues such as urban energy systems, housing form and neighbourhood design.

Since the Clean Heat project began in Christchurch, more than 6000 homes have been converted (open fires and inefficient log-burners replaced), about 10,000 homes have gone through the assessment process and a further 14,000 have registered interest. As a measure of its success to date, the scheme has experienced a '$2.6m air quality blowout' (Press 2006). National Environmental Standards (NES) for air quality have been enforced by the MFE which state that polluted regions must reduce air particulate levels incrementally

[15] Pers comm., Bryan Jenkins, Chief Executive, Environment Canterbury, in presentation to Sustainable Otautahi-Christchurch AGM, 28 June 2005.

until 2013, otherwise ECan will not be able to issue resource consents to organisations (especially schools and hospitals) currently using non-electricity fuel sources.

Extension of the Clean Heat programme to the smaller regional towns of Kaiapoi, Rangiora and Timaru has also been considered in the 2006 LTCCP community consultation process. However, concerns expressed by ratepayers over the amount of general rate funding required to support the programmes has seen ECan defer Clean Heat conversions and adopt instead an education and marketing programme for 2006/07[16].

Additional key Canterbury regional initiatives include:

- The 'Central City Urban Revitalisation' project (Contact: Dave Hinman, CCC) has a range of targeted projects including residential development. For example, a former growers' market site is being targeted as a medium density residential development in conjunction with an inner-city winery
- Property Ventures (Contact: David Henderson) have plans for a urban village, Sydenham Square, which is predominantly made up of a style of building called a 'Live-Work Unit'; properties that incorporate both commercial and residential real estate contained within one central city block
- Ngai Tahu Development Holdings (Contact: Dean Maddren) also have plans for at least two, substantial, 'low-energy' developments within Christchurch[17]
- CCC's Sustainable Building Guide promotes environmentally sustainable development and encourages people to design new residential buildings so that they interact positively with the various elements of their local environment. A related document refers to buying a section and includes guidance to designing and building a house
- CCC intends to produce a 'city-wide sustainable energy plan' in 2006 but little information is forthcoming on the substance of this proposed project[18]
- A successful series of cross-sector, multi-disciplinary energy seminars were held throughout Canterbury in late 2005, in part to support the intent of the Regional Energy Strategy. The community feedback received is helping revise the strategy and to produce a series of cross-sector (including housing development) action plans[19].

Progress on the Sustainable Christchurch project, set up in the early part of this decade, appears to have been halted since the departure of the project initiator. In spite of this setback, successful projects include several community gardens and the application of energy efficiency principles to community buildings such as libraries and swimming complexes.

4.3 Kapiti Coast District

Kapiti Coast District Council (KPDC) has adopted the concept of sustainable development as a basic building block of the Community Plan, known as *Kapiti Coast: Choosing Futures*.

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[16] Refer to ECan media release from 7 June 2006.

[17] Dr Bryan Jenkins, Chief Executive, Environment Canterbury, pers comm., November 2005; and Dene Maddren, Ngai Tahu Property, pers comm., April 2006

[18] Pers comm., Leonid Itskovich, Energy Manager – Corporate Services Unit, CCC, May 2006.

[19] The first such grouping is the Canterbury Energy Strategy Forum consisting of

The KCDC recognises the potential for climate change to have impacts on its region as the region is prone to periods of seasonal drought and water restrictions. The Kapiti Coast District Council (KCDC) is both an EnergyWise Councils Partnership member, has an Energy Efficiency Strategy, and is part of the Communities for Climate Protection programme. These programmes incorporate the values which underpin the KCDC's LTCCP and organisational approach to sustainable development.

The development of a *Medium Density Housing Design Guide* for developers, planners and architects is a step forward for the Council's sustainable urban design goals. This guide emphasises sustainable environment and internalised impacts plus consideration of transport nodes and amenities to encourage energy efficiency. Also, design guidelines promote the adoption of an alternative and more sustainable approach to subdivision and development by advocating general principles of good urban design.

4.4 Nelson City

Nelson City (NCC) is developing a Nelson Urban Growth Strategy (NUGS). Two clear issues have risen from the NUGS submission process. Residents that submitted to NUGS want to see a greater coordination of the strategy with the Long Term Council Community Plan (LTCCP) and they have also requested NUGS have a scope broader than just residential development. As a result, Council is considering other development-related issues, and looking at aligning the processes for recreation, city centre development, transport and commercial activity. A final strategy is unlikely to be available until mid 2006.

Besides Christchurch, Nelson is the only other city to date that has its own Clean Heat. Since the programme launch in February 2004, over 300 homes have joined the programme with a substantial central government funding boost received in late May 2006 to allow for more facile open fire replacement. There are no substantial differences to the Christchurch programme.

4.5 Tauranga City

Tauranga City Council (TCC) is in the process of developing a range of initiatives including visions, strategies and policies to inform Tauranga's future direction, based on what the Council is seeking to achieve for its citizens and visitors to the region.

TCC has a SmartGrowth strategy. The strategy is for managing future development in the western Bay of Plenty sub-region but currently has no statutory status. However, the primary policy base for increasing the mandate of the strategy will centre on changes currently proposed to Environment Bay of Plenty's Regional Policy Statement (RPS). The SmartGrowth strategy is also supported through the Regional Land Transport strategy. RPS amendments being considered will play a crucial role in anchoring and implementing the settlement patterns and the underlying "Live, work and play" concepts of the strategy.

The city has also recently undertaken public consultation on its Urban Design Strategy, a three-year plan intended to enable the Council and private interests to promote and achieve high quality urban design in Tauranga.

TCC is also a member of the EnergyWise Councils Partnership. Energy efficiency has, through consultation, been identified as an important issue for the community. Council has specified a number of issues and actions it will take to continue to improve energy choices for the city, which will be developed and implemented through Council's 2006-2016 LTCCP.

5. BUSINESS AND 'THINK TANK' INITIATIVES

While not strictly associated with government, the following are important players or initiatives (both national and international) associated with urban and / or building sustainability.

5.1 New Zealand Green Building Council

The New Zealand Green Building Council (NZGBC), newly incorporated in 2006, will be a broad-based inclusive coalition of property and building industry representatives (including Beacon) and government agencies. It will engage the property and construction sectors – owners, developers and end-users and those involved in design, supply, construction and property management. The objective is to promote the mainstream adoption of sustainable building principles, policies, practices, standards and tools.

The outcome will be a more sustainable future with buildings that are environmentally responsible, economical, healthy and fit for purpose. Initial work by the NZGBC is focusing on the development of a New Zealand-applicable commercial building rating tool.

5.2 New Zealand Business Council for Sustainable Development

The New Zealand Business Council for Sustainable Development (NZBCSD – key contact: Claire McShane) is a leading advocate on issues associated with sustainable development. Their mission is to provide business leadership as a catalyst for change toward sustainable development, and to promote eco-efficiency, innovation and responsible entrepreneurship.

In late 2005, NZBCSD released 'A Sustainable Energy Future for New Zealand by 2050' as a result of concern by NZBCSD members that successive governments had failed to put a long-term sustainable energy plan in place (NZBCSD, 2005). Four scenarios (Growth, Transformation, Shielded, and Conservation) are offered to demonstrate how the country might look in 2050 and to consider how we might get there (mainly in terms of energy demand and GDP growth). Under the Transformation scenario, households are predicted to use less energy and in many cases generate their own energy (from solar panels). Under the Conservation scenario, affordability of energy services is protected for low-income households (NZBCSD, 2005)[20].

5.3 Sustainable Business Network

The Sustainable Business Network (SBN) is a nationwide forum for businesses that are interested in sustainable development practice to get together and make it happen. SBN also provides a useful on-line resource: Sustainable Building Cluster Resources**.** One of the clusters being targeted by SBN is the sustainable building cluster and they have been actively involved in setting up the NZGBC.

5.4 Forestry Industry

The forestry industry is an agglomeration of many organisations (including the NZ Forest Owners Association) which, from time to time, releases policy-applicable information. Recently, in response to the dropping of the carbon tax (discussed in Section 2.2), a forestry industry grouping released a document 'Unlocking the Potential of Forestry' in which they

[20] The NZBCSD document (NZBCSD 2005) and the PCE's Future Currents document (PCE 2005b) are reviewed by Chapman and Piddington (2006).

argue that 'carbon emissions must bear a price'. They go on to add this is particularly relevant for the construction industry where forest (timber) products compete in the market place directly with building products of higher embodied energy (such as steel, aluminium and cement); and make the case for the government to legislate (for the 2008-2012 period) greenhouse gas liability to fall upon the product manufacturer (thereby incentivising design and construction in wood wherever feasible).

5.5 Other sustainability-focused organisations

Sustainable Aotearoa New Zealand (SANZ – key contacts: Dr John Peet; Dr Jim Salinger, NIWA) is a network of practitioners in the area of the ethics and practice of sustainability; their vision is to drive the country towards achieving long-term sustainability.

Other 'grass root' organisations such as Sustainable Otautahi-Christchurch (SOC) have been formed during 2005 and are strong lobbyists for advocating the inclusion of sustainability aspects in proposed or existing urban initiatives such as elevating the importance of energy in the Christchurch region's Urban Development Strategy (discussed in Case Studies below).

Sustainable Wanaka (contact: Megan Williams) is a charitable trust which wishes to actively influence community decisions and to work co-operatively to position Wanaka as "New Zealand's most successful sustainable community". The organisation holds monthly forums and has actively engaged with a number of business sectors (the local building and construction community as well as activity, accommodation and transport and retail/hospitality operators) in projects to help realise its vision.

The Natural Step (TNS) is an organisation (NZ contact: Lin Roberts) providing a strategic planning tool for sustainability. The Natural Step Framework is a clear, conceptual, scientifically-based framework that explains the 'why' and 'how' of a long-term vision for a truly sustainable society. The framework can be applied to any sector or project and its use has been well documented employed or investigated by a number of businesses for building/construction projects including Beacon (Hargreaves et al, 2004).

6. MISCELLANEOUS INITIATIVES

6.1 Urban studies and practicalities - New Zealand

CHRANZ (Centre for Housing Research in New Zealand) has issued a number of recent reports on housing including The Future of Housing in New Zealand (by BRANZ and Scion) and Regional Housing Markets in New Zealand: House Price, Sales and Supply Responses (by Motu).

In the BRANZ study, a set of thought-provoking and realistic scenarios have been generated to show how New Zealand's housing sector might look in 2030. The four scenarios and their accompanying explanations are aimed at policy makers, the building industry and consumers as a springboard for dialogue and action.

A key finding of the Motu study is that land prices have an important impact on new house supply. High construction costs (e.g. stricter building regulations) can potentially have a similar effect.

Impacts of climate on urban infrastructure have been studied by a team lead by Dr Nigel Jollands at the New Zealand Centre for Ecological Economics has undertaken a case study of impact on by climate change on Hamilton City's infrastructure and services. The authors

model climate change impacts on key urban aspects including water supply, energy demand and transport.

6.2 Sustainable housing

In addition to Beacon, a number of companies have emerged that offer their customers housing with 'energy efficient' and/or 'environmentally friendly' features as prominent aspects in their product. These include Powered Living (Nelson-based), Arhaus (Auckland-based) and Evolution Homes (Christchurch-based). There is no scope in this report to make any comparison of these home products with the proposed NOW Home though, generally speaking, these companies are targeting 'new build' rather than the retrofit market.

Build Your Dream provides practical house building information to help consumers make informed choices about their house building project. The company has a detailed section on 'energy efficient homes' and information (and links) are provided for such homes in a range of price bands (new construction).

6.3 Sustainable living

The Sustainable Households programme (contact: Rhys Taylor) has been developed in several New Zealand centres since 2001 by a variety of local and regional Councils. Assisted for its first three years by MfE's Sustainable Management Fund (*Project 7067*), the programme is now self-financing, as additional Councils have become subscribers (currently, about eighteen councils).

The programme is about raising awareness of environmental impacts and aspects in relation to home living and how household occupants can make positive behavioural changes and take practical action to live more sustainably; for example, how to reduce water use and invest in more durable and energy efficient appliances.

6.4 Building resource efficiency

Resource Efficiency in the Building and Related Industries (REBRI) promotes, advocates, and assists resource efficiency measures in the building and related industries. Begun in 1995 as an MfE-funded collaborative effort between ARC, BRANZ, ACC, REBRI has expanded to include other Auckland regional councils, other regional centres and industry players. In 2003, the National Construction and Demolition Waste Reduction Project was set up with the aim of developing tools and helping industry, councils and the community to reduce C&D waste at landfills and clean fills (required as part of meeting the targets of the NZWS – see Section 1.5).

6.5 'Green' mortgages

The Indigo Financial Group in the US promotes an 'energy efficient mortgage' (EEM) based on a scheme to assist low- and middle income homeowners 25 years ago. Currently, EEMs make up less than 1 percent of total mortgage lending market in the US, however, rising energy prices and the increasing visibility of green construction are contributing to their increasing popularity[21].

Some 'green' lenders are becoming more innovative in the service they offer; the Countrywide company also allows homeowners to increase their buying power through fuel

[21] Accessed 4 April 2006 at http://www.emagazine.com/view/?2487

efficiency - homeowners who commit to taking bus or train to work can qualify for energy-efficient mortgages based on transportation savings[22].

Such a 'green' mortgage scheme does not appear as yet close to fruition in New Zealand[23] (for energy efficiency or any other sustainability features) but their feasibility has been discussed as part of MfE Warm Homes initiative. A New Zealand organisation called Prometheus Ethical Investment lends to environment friendly and socially valuable projects including renewable energy and sustainable land care.

6.6 International

The Royal Commission on Environmental Pollution reported in March 2005 that the UK needs to achieve a 60% reduction in CO_2 emissions by 2050 if significant climate change is to be avoided[24].

The 40 percent house project is the result of a research programme that focuses on how significant ('deep') cuts can be made to carbon emissions whilst successfully meeting household needs. The project studies behavioural and technological changes in the search for how UK households can meet the 60% target including investigating the supply of energy through household-level new and renewable energies (including heat pumps, solar thermal and PV, and micro-combined heat and power); and examining the load profiles of individual appliances and the extent to which these can be modified, with a consequent reduction in peak load.

The London Borough of Woking is likely the first UK authority to have adopted a comprehensive Climate Change Strategy, one on a scale that is likely to meet the 'deep cut' targets indicated above. A first step towards putting the Strategy into action has been taken with the publication of guidance on Climate Neutral Development. The guidance encourages developers to design and build new development which does not contribute to the causes of climate change, and is resilient to future changes in climate.

Of interest on this theme, in Australia there has been significant progress made on the installation of 'smart metering' (especially Sydney region) which is reputed to cut many power bills by 10 and 30 percent (Frew, 2006). The system is based on the amount of electricity consumed in peak, shoulder and off-peak pricing periods (as opposed to a flat tariff).

Similarly, in Japan, an 'energy diary' system is being trialled that offers customers instant feedback on not just electricity but other energy sources used within the dwelling with reported decrease in energy consumption of 18% in the trial sample (Fitzpatrick, 2005). The author understands that Meridian Energy is investigating a similar system for its customers[25].

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[22] Accessed 3 April 2006 at http://www.nwcurrent.com/efficiency/residential/2502276.html

[23] The author informally approached his own mortgage lender (New Zealand Home Loans) in early 2005 to gauge 'green mortgage' interest locally. Their response was (edited) "*…I was not aware of such a thing… the immediate answer is that …such a thing is currently not on our drawing board. If things change I will let you know*".

[24] This target is fully supported by authors such as Professor Robert Lowe (University College London) in his seminal 2000 *Building Research & Information* paper 'Defining and meeting the carbon constraints of the 21st century'. This author argues much higher reductions are possible with available technology but are not necessarily currently politically acceptable.

[25] Pers comm., Roger Sutton, CEO, Orion NZ Ltd, 9th February 2006.

7. BUILT ENVIRONMENT RESEARCH

7.1 Foundation for Research, Science & Technology

Urban design research funded by FRST (Contact: Ruth Berry) totals approximately $14 million and spans three Foundation portfolios; Sustainable Communities; Resilient Infrastructure and Communities; and Network Services and Utilities.

A number of 'expired' projects have been removed from last year's report for this year. Below is a summary of urban design research projects currently being funded under a range of categories relating to urban sustainability.

7.1.1 Sustainability

- *Building Capacity* (C09X0310); Provider: Landcare Research; Contact: Richard Gordon; Timeframe: Oct 2003 – Jun 2009. A six-year programme which focuses on the key issues faced by society embarking on the sustainable development journey, namely the understanding of sustainability, attitudes and behaviours shown by individuals and organisations.
- *Sustainable Pathways* (MAUX0306); Provider: Massey University; Contact: Assoc Prof Murray Patterson; Timeframe: Oct 2003 – Jun 2009. This research will enable cities and regions to plan for sustainable development, by providing them with authoritative information on alternative future development scenarios.
- *Learning Sustainability* (OPSX0303); Provider: Opus International Consultants; Contact: Dr Vincent Dravitzki; Timeframe: Oct 2003 – Jun 2009. This research recognises the strong relationships between settlement form, liveability and environmental performance.

7.1.2 Housing-related

- *Weathertight Buildings* (BRAX0302); Provider: BRANZ Ltd; Contact: Mark Bassett; Timeframe: Jul 2003 – June 2009. To improve the ability of buildings to control moisture from rain water leaks and other sources
- *Sustainable Earth-fibre Housing* (UOAX0305); Provider: University of Auckland; Contact: Kepa Morgan; Timeframe: Jul 2003 – June 2007. This research will develop appropriate technology for earth fibre composite wall construction and optimise end-user adoption of the technology trial results.
- *Future Building Systems* (UOCX0302); Provider: University of Canterbury; Contact: Professor John Mander; Timeframe: Jul 2003 – June 2009. This research will investigate and develop a completely new, modular, seismically damage-resistant, building system constructed from modern high performance concrete materials.

7.1.3 Health

- *Functional Safe Built Environments* (WROX0302); Provider: Canesis; Contact: Simon Causer; Timeframe: Jul 2003 – Jun 2007. To quantify exposure to major particulate indoor air pollutants and come up with a range of methods to reduce exposure to these substances.

7.1.4 Low Impact Urban Design

- *Low Impact Urban Design* (C09X0309); Provider: Landcare Research; Contact: Dr Charles Eason; Timeframe: Oct 2003 – Jun 2009. The programme is designed to radically improve urban sustainability by making LIUDD mainstream practice by implementing a four pronged approach: (i) identifying ways of overcoming social and institutional barriers to LIUDD; (ii) integrating natural features and technologies and

improved catchment management processes in urban development; (iii) comparing cost-benefits of different approaches to underpin rational choices; and (iv) improving the interactions between governance and land use.

7.1.5 Energy (Efficiency)

- *Renewable Distributed Energy* (CO8X0203); Provider: Industrial Research Ltd; Contact: Alistair Gardner; Timeframe: Jul 2002 – Jun 2008. The programme aims to show that it is possible in many regions to deliver a positive economic result for distribution network management by combining novel control and metering techniques with emerging demand side micro-scale distributed energy technologies.
- *Mitigating CO_2 Emissions through Enhanced Uptake of Energy Efficiency* (UOOX0206); Provider: University of Otago; Contact: Assoc Prof Bob Lloyd; Timeframe: Jul 2002 – Jun 2006. The research programme investigates energy efficiency gains in public housing as Housing New Zealand implements a government sponsored residential assistance programme.
- *Towards the Zero Energy House* (BRAX0201); Provider: BRANZ Ltd; Contact: Albrecht Stoecklein; Timeframe: Jul 2002 – Jun 2006. This programme seeks to establish a framework to allow the evaluation of new technologies related to energy efficiency in the building fabric, understanding the effects on matching the energy supply and demand.
- *An Energy Demand Model of New Zealand Residential Buildings* (BRAX0301); Provider: BRANZ Ltd; Contact: Nigel Isaacs; Timeframe: Jul 2003 – Jun 2007. From the knowledge of how, where and why energy is used in New Zealand homes, a model of the residential energy sector will be developed with a goal of improving the overall energy efficiency, reduce greenhouse gas emissions and identify new energy opportunities in the residential sector.
- *Solutions for Energy Efficiency at Work and at Home* (UOWX0302); Provider: University of Waikato; Contact: Dr Bernard Guerin; Timeframe: Jul 2003 – Jun 2007. To improve competitiveness for New Zealand industry through research aimed at achieving increased energy efficiency and conservation by two major players – intensive industry and households.

7.1.6 Other

- *Living Urban Environments* (CO9X0208); Provider: Landcare Research; Contact: Dr Charles Eason; Timeframe: Jul 2002 – Jun 2005. The programme aims to enhance the indigenous biodiversity of urban environments and increase their resilience to human activities.
- *Planning Under Co-operative Mandates* (RMA and Local Government Act); Provider: University of Waikato; Contact: Prof Neil Ericksen; Timeframe: Jul 2003 – Jun 2009. The programme aims to determine the effectiveness of district plans achieving their expected environmental results under the RMA (1991) and Local Government Act (2002).
- *Building Attachment in Families and Communities* (RESX0201); Provider: Centre for Research Evaluation and Social Assessment; Contact: Ms Kay Saville-Smith. The programme seeks to enhance the capacity of local communities affected by residential movement and transience to sustain community attachment and optimise the social and economic well-being of the community and the individuals and families living or working within it.

7.2 MfE Sustainable Management Fund (SMF)

Key contact: Pam Harvey

The objectives of the SMF are to make a positive difference to the environment by funding projects that fit under one of the following four topic areas (Freshwater Management Initiatives; 'Adopt A' Schemes; Urban Sustainability; Community-level Climate Change); that strengthen proactive partnerships between the community, industry, iwi and local government; and those that involve the community in practically focused "action for the environment". Some key projects are listed that are either ongoing or are running as self-funded community programmes:

- *TUSC – Tools for Urban Sustainability Engineering Code of Practice* (contact: Darren Utting)

The purpose for the TUSC project is to provide a single user-friendly interface for Developers, Practitioners, Compliance Officers, and Policy Makers that will deliver cost-effective urban sustainability outcomes in both new developments and urban retrofit or intensification projects.

- *Construction and Demolition Waste Reduction* Contact: Roman Jaques (BRANZ)

Building Research are currently involved in a two-year collaborative project with nine TAs and RONZ, providing a comprehensive set of measures aimed at reducing waste. Educational, legislative and practical support documentation for seven industry sectors will be provided, as part of this program. The website charting progress is frequently updated.

7.3 Other research

The University of Auckland (School of Architecture – key contacts: Professor Brenda Vale or Assoc Professor Robert Vale) run a couple of joint projects with Landcare Research:

- "*Self-sufficient neighbourhoods*" which currently focuses on the pros and cons of rainwater tanks, plus some more wide-ranging issues round the need for self-sufficient neighbourhoods
- "*Learning sustainability - urban form and futures*" which examines the kinds of urban forms that may be more or less sustainable depending on the kinds of futures in which these forms may exist.

8. SUMMARY

This report provides an update to Beacon of the recent and current situation regarding urban sustainability in New Zealand. Where appropriate, domestic case studies have been included as they can provide useful instructional feedback for centres / regions that have made limited practical progress or 'cleared the way for' sustainable development.

Beacon's vision is '*Creating homes and neighbourhoods that work well into the future and don't cost the Earth*'. The growing business consensus, in building and other sectors, is that this is a truism: tackling the challenges of achieving urban sustainability is an opportunity and not a cost – which requires taking a longer-term or bigger-picture view. And there are now proven business opportunities with regard to sustainable buildings in New Zealand, not just internationally. The emergence of the NZGBC will likely have a considerable impact on moving the sustainable building agenda forward.

Urban sustainability is a complex subject and the challenge is to move from the 'desk' to the 'dirt'. However, there still exists a lack of political and institutional will to pull the disparate threads together to make policy link with practical outcomes. While much legislation and regulation strongly emphasise the concept of sustainability in their purpose and principles

statements, on-the-ground outcomes are less visible. The situation is currently not helped by policy 'confusion' or inaction with regard to key factors such as energy , climate change and transport.

There are a number of important factors not covered in this review as they lie beyond the scope of this report to address. This includes a closer examination of economic, corporate and institutional systems and practices and how these relate to achieving urban sustainability. As time progresses, it is expected players from these sectors will also become involved in achieving Beacon's objectives.

The challenges to achieving sustainability in the urban environment therefore remain but there is increasing quantitative, qualitative and anecdotal evidence that progress, albeit slow, is being made.

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