The Key Drivers and Barriers to the Sustainable Development of Commercial Property in New Zealand

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Abstract In 2011 research was conducted to identify the key drivers and barriers to the sustainable development of commercial property in New Zealand (NZ) by surveying a cross-section of these market participants. The overall aim of the research was to identify any barriers that need to be overcome so that progress can be made towards advancing the sustainable building agenda in NZ’s commercial property sector that will help improve building energy performance and reduce greenhouse gas emissions. The results indicate there remain key issues for the property industry to resolve, the most significant of which is the commercial property sectors’ view of the cost premium for green buildings versus conventional buildings.

Worldwide initiatives, such as the Kyoto Protocol (Ministry for the Environment, 2010), which seeks to address global warming by setting targets for participating countries to reduce their greenhouse gas emissions, are underway in an effort to manage natural resources and the environment in a sustainable manner. It has been estimated that buildings contribute around 30% of greenhouse gas emissions globally (Arnel, 2010).

According to Klein, Drucker, and Vizzier (2009, p. 3), “The built environment thrives on the use of vast amounts of resources, including land, materials, energy and water... Yet opportunities for reducing damage to the environment present themselves throughout the entire process.”

It has been estimated that buildings contribute around 30% of greenhouse gas emissions globally.1 In 2002, eight countries responded to concerns about the impact of the property sector on the environment by establishing the World Green Building Council (WorldGBC). A number of other countries have subsequently joined the WorldGBC, including New Zealand (NZ). The stated mission of the WorldGBC is to “accelerate the transformation of the built environment towards sustainability” (World Green Building Council, 2010). One of the most advanced Green Building Councils is the United States Green Building Council (USGBC). The mission of the USGBC is to: “transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life” (USGBC, 2011).
While the NZ Green Building Council (NZGBC) was only established relatively recently in July 2005, and is lagging behind the major markets of Australia, United Kingdom, Canada, and the U.S. in terms of the number of Green Star rated buildings, research indicates that sustainable buildings will play an important role in NZ property portfolios in the future (Myers, Reed, and Robinson, 2008).

In NZ, key stakeholders in a position to influence sustainable property development in the market place include: the NZGBC, the NZ government, corporate tenants, major developers, institutional property investors and, to some extent, financiers. For the purposes of this research, a sustainable commercial property, or green building, is one that fits the social, environmental, and economic balance stated in the Brundtland definition of sustainability, evidenced by the property being certified by an independent third party. In NZ’s case, this independent third party is the NZGBC, which administers the Green Star building rating system.

**Literature Review**

**New Zealand Green Building Council**

The establishment of the NZGBC in July 2005 and the progressive development of the Green Star NZ rating tools have provided participants within the NZ property industry an initial framework to progress the investment in, and the financing and construction of, sustainable buildings. The NZGBC became a member of the World Green Building Council in 2006, bringing NZ into the international green building framework, yet maintaining its own identity.

The purpose of the NZGBC is to accelerate the development and adoption of market-based green building practices. The NZGBC achieves these aims through: (1) setting standards of best practice through the adaptation of the Green Star rating tool; (2) education and training for all areas of the building industry value chain; and (3) providing access to networks, information and resources for its members to actively lead the market (NZGBC, 2011a).

Green Star NZ is a comprehensive, national, voluntary environmental rating scheme that evaluates the environmental attributes and performance of NZ’s buildings using a suite of rating tool kits developed to be applicable to each building type and function. Currently, for non-residential property, rating tools are available for the following property types/categories: office, interiors, industrial, and education.

Green Star works by evaluating a building against a number of categories that assess the environmental impact that is a direct consequence of a building’s site selection, design, construction, and maintenance. The nine categories included within all Green Star rating tools (NZGBC, 2011a) are (1) management, (2) indoor environment quality, (3) energy, (4) transport, (5) water, (6) materials, (7) land use and ecology, (8) emissions, and (9) innovation.

While the NZGBC continues to work on rating tool design and development and to promote the sustainable development of NZ’s property sector, to date rating
tools are only available for the design and built stages of a building’s lifecycle within the above categories. Tools have yet to be developed for other property categories including retail and tourism properties.

An example of the NZGBC’s current efforts to promote sustainable development more widely is an initiative that the NZGBC has worked on with the Christchurch City Council, subsequent to and as a result of the devastation from the Canterbury earthquakes. This initiative includes the development of a new building rating tool specifically for the Christchurch recovery efforts called Building a Sustainable Environment (BASE). BASE is a simple, introductory-level green building assessment for the Christchurch Central City rebuild. The Central City Plan for Christchurch proposes that new office, retail, apartments, and mixed-use buildings within the Central City must achieve a ‘pass’ score under BASE. The tool has been developed as a separate, but complementary building assessment offering to the NZGBC’s existing Green Star tools (NZGBC, 2011b).

**Government Policies & Incentives to Improve the Energy Efficiency of Buildings**

In 2001, the NZ government introduced the New Zealand Energy Efficiency and Conservation Strategy (NZEECS). The NZEECS is prepared in accordance with the Energy Efficiency and Conservation Act 2000 and outlines government policies, objectives, and targets, and as required by the Act, will be in force for a period of five years. It is a detailed action plan for increasing the uptake of energy efficiency, conservation, and renewable energy programs across the economy. A second version of the NZEEC Strategy was published in 2007 that looked at the lessons learned under the previous Strategy. A third edition of the NZEECS (2011–2016) was released in 2011 that sets the government’s policies, objectives, and targets for the next five years and outlines the means by which these will be achieved.

The sections of the NZEECS of most relevance to commercial property is “Business” and “Public Sector,” two of the six sectors identified that will contribute to the overall NZ Energy Strategy 2011–2021 goal. The other four sectors are: Transport, Homes, Products, and the Electricity System. According to the NZEECS, “The greatest areas of potential improvement (in energy efficiency, ed.) are the transport and business sectors, followed by the residential sector,” (Energy Efficiency and Conservation Authority, 2011, p. 17).

According to the NZEECS 2011, “Energy efficient commercial building design and the use of building materials that enhance energy efficiency offer major opportunities to lock in substantial energy savings through a building’s life,” (EECA, 2011, p. 21). To assist the raising of building performance, the government pledges to invest in further research into how energy is used in buildings that will inform a review of the building code. Further, the government supports the adoption of market-based solutions that set aspirational goals above minimum standards that include the use of building performance rating tools, such as those developed by the NZGBC. The government recognizes that more energy-
efficient buildings require greater building management and technical expertise and is committed to further investing in building the capability and capacity of the building and construction sector.

Additionally, under NZEECS 2011–2016, the government’s procurement reform provides an important lever to support public sector agencies in making energy-efficient choices in the purchase and lease of energy-efficient buildings. As such, “local government has a significant role in providing community leadership, long-term investment planning and implementing building, resource management, and transport legislation,” (EECA, 2011, p. 27).

A 2009 Ministry for the Environment (MFE) report entitled New Zealand’s Fifth National Communication under the United Nations Framework Convention on Climate Change identifies policies and measures applicable to the commercial property sector. These include programs run by the EECA to support businesses to become more energy efficient: financial assistance through the Electricity Commission to improve electricity efficiency, and initiatives developed by MPI to increase the use of wood as a construction material as MAF-sponsored research shows that wood-based building products have a lower greenhouse gas footprint than other construction materials (Ministry for the Environment, 2011).

The EECA provides information on new technologies and energy management and one-on-one support for energy-intensive businesses. Grant funding is available for energy and design audits and also for new or under-utilized technology improvements. Up to 40% of the total project cost is available (up to $100,000), or up to 75% of the cost of a feasibility study (up to $10,000) for new technologies. Examples of technologies funded include fans and boiler controls, bio-digesters, and heat recovery systems (Ministry for the Environment, 2011).

The EECA is also the principal sponsor for the introduction and use of the National Australian Built Environment Rating System (NABERS) in NZ and has negotiated a license from the Australian government for an initial term of five years with an option to extend for a further five years. NABERS measures an existing building’s environmental performance during operation. It rates a building on the basis of its measured operational impacts in categories such as energy, water, waste and indoor environment (NABERS, 2010). The EECA is seeking to partner with the NZ property industry to administer the NABERS scheme in NZ. The EECA expects to formally launch NABERS (for office energy only, initially) in NZ by January 2013.

The Electricity Commission offers financial assistance to businesses in the commercial sector to improve their electricity efficiency. Businesses can apply for part-funding from the Electricity Commission for electricity efficiency projects where there is a current barrier preventing such projects from proceeding. These projects target efficiency measures such as upgrades of building management systems, lighting replacements, replacement of inefficient chiller systems, or installation of monitoring and targeting systems (Ministry for the Environment, 2011).

In addition to the specific government policies and measures outlined above, the general controls of building and environmental legislation, such as the Building
Act 2004 and Resource Management Act 1991, provide a broad framework to encourage sustainable development of the commercial property sector.

**Drivers and Barriers to Green Building**

A study of the NZ property sector by Myers, Reed, and Robinson (2008, p. 318) found that “the perception of the investor and developer markets in NZ was that sustainable buildings will play an important role in property portfolios in the future. Although there is uncertainty about the value and market for sustainable buildings at the present, investor optimism was clearly identified. However, the level of uptake and investment in sustainable buildings would be accelerated if evidence for the financial case for sustainable buildings was proven.”

There is a lack of research in NZ about the financial performance of green buildings compared to conventional buildings. However, in Australia, a study by Newell, MacFarlane, and Kok (2011) to assess the value premium of both NABERS energy and Green Star ratings in the office market found that a 5 star NABERS energy rated building delivered a value premium of 9% compared to a non-rated building, with a 5 star Green Star rating showing a premium in value of 12% compared to a non-rated building. A 3–4.5 star NABERS energy rated building achieved a 2%–3% value premium compared to a conventional building.

There are a number of quantitative studies of financial performance of green buildings in the U.S., where sales data are more readily available and sustainable ratings for buildings have been in existence longer [Leadership in Energy and Environmental Design (LEED) was developed in 1998 in the U.S.] than is the case for Australia or NZ (2003 and 2005, respectively).3 For example, a study by Fuerst and McAllister (2009) of the effect of eco-labeling (LEED and ENERGY STAR) on the occupancy rates of commercial offices in the U.S. found a significant positive relationship between occupancy rate and the eco-label. Controlling for differences in age, height, building class, and quality, the results suggest that occupancy rates are approximately 8% higher in LEED-labeled offices and 3% higher in ENERGY STAR-labeled offices. Miller, Spivey, and Florance (2008), using the CoStar database, found that LEED buildings command rent premiums of $11.33 per square foot over their non-LEED peers and rental rates in ENERGY STAR buildings represent a $2.40 per square foot premium over comparable non-ENERGY STAR buildings. ENERGY STAR buildings are selling for an average of 5.76% more, while LEED buildings command a 9.94% premium.

Drivers for green building, other than financial performance, are outlined, for example, by Yudelson (2010), and include:

- Utility cost savings for energy and water.
- Maintenance cost reductions.
- Increased value from higher net operating income (NOI), due to higher rents and greater occupancy in certified buildings.
- Increased occupier productivity, due to improved health of tenants, and reduced absenteeism.
Marketing benefits, especially for developers and building owners.

Public relation benefits, especially for developers, building owners, and managers.

Recruitment and retention of key employees.

Demonstration of commitment to sustainability and environmental stewardship.

According to Ang and Wilkinson (2008), regulation is the tool government uses to drive the market toward more energy-efficient buildings. In addition, according to Bond (2010), in Australia the government and other public-sector bodies are leading by their examples in their briefs for sustainable buildings. Large progressive corporations in the private sector are also a leading driver for green buildings (Bond, 2010, p. 5). Many companies today have a strong environmental focus and sustainability policy at the core of their business, which leads them to occupy a green building.

Smith and Baird (2007) found that ‘rising energy costs’ is one of the primary drivers for sustainable buildings in NZ. Although according to the Green Building Council of Australia (2008), tenants have become less focused on savings in operating costs, and are placing a higher value on the intangible benefits, such as productivity, staff attraction and retention, and reduced sick leave and absenteeism. Miller, Spivey, and Florance (2008) estimate the productivity benefits from environmentally sustainable building designs to be as much as 10 times the energy savings from green efforts.

Despite the advantages of sustainable buildings, there are many barriers to investing in greening buildings (Urban Land Institute, 2009; Bond, 2010; Yudelson, 2010):

- **Financial Considerations:** One of the biggest barriers to investing in green buildings is the perception that they cost more compared to conventional buildings. However, according to Davis Langdon (2007), there is no significant difference in average costs for green buildings as compared to non-green buildings.

- **Split Incentives:** Another barrier is split incentives between landlord’s and tenant’s where the landlords are investing in green buildings but the tenants are benefiting through reduced energy and water costs, greater productivity, etc.

- **Lack of Knowledge and Experienced Workforce:** A lack of practical understanding among building owners about energy efficiency and green building, including overestimates of the initial cost premium, hinders the implementation of sustainability measures.

- **Lack of Incentives:** Incentives are not strong enough to change behavior. Energy prices are still low and tax and other political incentives are not significant enough to change behavior.

According to Choi (2009), the benefits of green buildings are only evident over the longer period and recommends documenting and communicating the cost,
benefits, and performance of green buildings as part of the strategy to increase adoption of green building practices.

The next section will briefly describe the research methodology and data set. The results are then discussed. The final section provides a summary and conclusion.

**Research**

Due to the limited number of sales of green buildings in NZ, a quantitative study to determine any expected value premium from such buildings was not possible. Instead, this study investigates the barriers and drivers to sustainable development, not to prove the “business case” for such development, but to learn what the industry perceives the drivers and barriers are to the uptake of sustainable building practices.

**Methodology**

The drivers and successes as well as the barriers and impediments to the uptake of sustainable practices were investigated. This involved a combination of an in person structured interview with a representative of the NZGBC and an online survey of participants in the commercial property sector.

**Survey Samples**

An interview was arranged with the NZGBC’s Director of Business and Technical, Rohan Bush, as the CEO’s nominee for the interview. The sample for the online survey of commercial property sector professionals and executives was compiled from various professional registers and websites, including the NZGBC’s website, the Property Institute of NZ membership directory, the Property Council of NZ membership directory, and the NZ Institute of Architects directory. This sample of 300 people consisted of property investors, property developers, property managers, architects, building contractors, financiers, project managers, and property consultants.

**Data Collection Methods**

The interview with Rohan Bush was conducted using a semi-structured questionnaire pre-approved by the NZGBC. The online survey of the commercial property sector was conducted utilizing Qualtrics online survey software. Due to the length of the overall survey and to encourage respondents to answer all applicable questions, the survey was structured in two parts. Section one targeted developers, investors, and managers and section two targeted the balance of the sample. With the exception of just a few questions that reflected the particular sample segment, the questions in section two mirrored those in section one.

The online survey had five sections. The first section was designed to capture information about the respondents, their companies, and whether or not they have experience in green building. The second section focused on respondents who
indicated they have experience in green building and sought to capture their views on a range of issues around their involvement in green building including key drivers and barriers to green building. The third section focused on the respondents who do not have any experience with green buildings, but expressed an interest in becoming involved in this sector of the industry. The fourth section focused on the respondents who indicated no interest in green building and sought to understand their reasons. The fifth section sought to capture all respondents’ views on the capacity of the NZ property sector to drive forward the sustainability agenda and what changes and improvements they view as being required to increase green building investment and development in NZ’s commercial property sector.

A survey link along with an explanation of the purpose of the survey was emailed to each person in the sample, inviting them to participate. A follow-up reminder email was sent one week after the initial email. The level of response to the online survey is discussed below. Responses from the survey were downloaded and analyzed using Excel. Numerical results are expressed as either an average of the scores for each category for a particular question (the lower the score, the more significant) or as a percentage of the total responses received for a particular question.

Results

NZ Green Building Council Interview Results

The interview was conducted with the NZGBC’s Rohan Bush. Questions were structured in two sections and were designed to obtain input from the NZGBC in seven key areas including:

1. Where the NZGBC is in its development as an organization.
2. The current view of green building within the public and private sectors.
3. The overall level of interest in green building.
4. Drivers and barriers to green building.
5. The status of the Green Star certification system.
6. Education of property practitioners on green building.
7. The Christchurch rebuild.

The NZGBC Organization. The NZGBC has been in existence for over six years and has grown considerably. There are 13 full-time staff equivalents employed by the NZGBC and the organization’s work program addresses both residential and commercial buildings.

The NZGBC continues to attract a large number of organizations as members and enjoys a high level of industry support. Approximately one-third of the NZGBC’s income comes from membership subscriptions, a further third from running education and training programs, and the final third from running events and
managing special projects. While the NZGBC has progressed in its organizational development and in gaining industry support, until such time as it is fully resourced (including financing and staffing levels) to allow for further tools development, the industry as a whole will be somewhat hampered in its uptake of green building.

**Current State of NZ’s Green Building Industry.** The NZGBC considers that the current state of the green building industry in NZ is “developing” since the existing buildings performance tool, other building type tools, and NABERS are not yet in place. The NZGBC considers that the public are “moderately interested” in green building and observed that the media often picks up on events such as a new Green Star rated building being completed or a green building event being held. Notwithstanding this, the NZGBC believes that further education of the public is required concerning green building.

The NZGBC also considers that the government is only moderately interested in green building and that while there is some ministerial support, green building is not a top priority for the present government. It was noted that there is, however, some project-based government funding available. In comparison to its views on the government and public’s interest in green building, the NZGBC considers that the commercial property sector is very interested in green building given it has a registered membership of 450 businesses and organizations, generally good attendances at events, and a good uptake of Green Star ratings.

**Drivers and Barriers to Green Building.** When asked to rank various options (from 1 to 10, 1 being the most significant) as to what prevents the incorporation of sustainable features in developments, low client demand was ranked as the most significant, followed by high costs versus low perceived benefits. This response suggests that a lack of government incentives is a significant barrier to green building development, implying that increased government incentives would help to overcome the issue of cost. The full rankings are shown in Exhibit 1.

In terms of the drivers to green building development, an industry rating system was ranked as the most important driver, followed by competitive advantage, and thirdly tenant satisfaction and productivity. Exhibit 2 shows the full rankings.

Perhaps not surprisingly, the NZGBC identified the most significant driver as the Green Star rating system that it promotes. Beyond this, the rankings given by the NZGBC imply that market-related factors such as ‘competitive advantage’ are more significant drivers of green building than ‘government policy’ and regulatory controls such as the building code.

**Green Star Ratings.** The NZGBC licenses Green Star from the Green Building Council of Australia (GBCA) and has to obtain approval from the GBCA for changes to Green Star in NZ. While there are significant cost savings to the NZGBC by effectively ‘piggy backing’ on the GBCA, the NZGBC does not have the freedom to change Green Star in NZ as it so chooses.

The numbers of buildings that have been certified either with a Green Star design or built rating are shown in Exhibit 3. These figures indicate that two-thirds of
### Exhibit 1 | Barriers to the Incorporation of Sustainable Features in Developments

(1 = most important, and 10 = least important)

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other (nil response)</td>
<td>10</td>
</tr>
<tr>
<td>Unwillingness to pay additional costs</td>
<td>4</td>
</tr>
<tr>
<td>Low client demand</td>
<td>1</td>
</tr>
<tr>
<td>High Costs vs low perceived benefits</td>
<td>2</td>
</tr>
<tr>
<td>Limited availability of new technology</td>
<td>9</td>
</tr>
<tr>
<td>Lack of government incentives</td>
<td>3</td>
</tr>
<tr>
<td>Unreliable/improved technology</td>
<td>5</td>
</tr>
<tr>
<td>Poor access to information</td>
<td>6</td>
</tr>
<tr>
<td>Lack of owner/occupier awareness</td>
<td>7</td>
</tr>
<tr>
<td>Lack of developer awareness</td>
<td>8</td>
</tr>
</tbody>
</table>

### Exhibit 2 | Drivers of Green Building Development

(1 = most important, and 10 = least important)

<table>
<thead>
<tr>
<th>Driver</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater availability of green products</td>
<td>9</td>
</tr>
<tr>
<td>Increased education</td>
<td>10</td>
</tr>
<tr>
<td>Industry rating system (Green Star)</td>
<td>1</td>
</tr>
<tr>
<td>Building code</td>
<td>8</td>
</tr>
<tr>
<td>Government policy</td>
<td>6</td>
</tr>
<tr>
<td>Rising energy costs</td>
<td>7</td>
</tr>
<tr>
<td>Superior building performance</td>
<td>5</td>
</tr>
<tr>
<td>Lower Lifecycle costs</td>
<td>4</td>
</tr>
<tr>
<td>Competitive advantage</td>
<td>2</td>
</tr>
<tr>
<td>Tenant satisfaction &amp; productivity</td>
<td>3</td>
</tr>
</tbody>
</table>
Exhibit 3 | Green Star Certifications

<table>
<thead>
<tr>
<th>Tool</th>
<th>4 Green Stars</th>
<th>5 Green Stars</th>
<th>6 Green Stars</th>
<th>New Buildings</th>
<th>Existing Buildings&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office V1 &amp; 2009</td>
<td>22</td>
<td>24</td>
<td>3</td>
<td>38</td>
<td>11</td>
<td>49</td>
</tr>
<tr>
<td>Office “As Built”</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Industrial Design 2009</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Education Design 2009</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Interior 2009</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>42</td>
<td>6</td>
<td>59</td>
<td>11</td>
<td>77</td>
</tr>
</tbody>
</table>

Note:
<sup>a</sup>Retrofit

Green Star certifications have been awarded for newly constructed office buildings and around 78% of all Green Star certifications awarded to date have been for new buildings.

Over half (55%) of the ratings are for 5 Green Stars, compared to 36% for 4 Green Star and only 8% are 6 Green Star. This indicates that the market has an appetite for a 5 Green Star office product notwithstanding that a cost premium may apply in comparison to a conventional building or a 4 Green Star product. However, a 5-star rating is still more readily obtainable compared to a 6-star rating, where the cost premium can be significant. The “As Built” rating, which is based on performance data collected over a year and used to indicate whether the building is performing as designed, is less common, with only 17% of office ratings being “As Built.” This may be due to the use of ratings primarily for marketing purposes (to sell or lease space), as well as the additional cost of obtaining the “As Built” rating.

When asked to give an indication of any cost premium for building a green versus a non-green building of 4, 5, and 6 Green Stars, the NZGBC advised that no comprehensive research had yet been undertaken to test this in NZ, but that international research indicates that if a project is managed correctly, there is the potential for no cost premium to achieve a 4 or 5 Green Star certification. However, when not managed correctly, a 4 Green Star building can cost up to 5% more than a non-green building and a 5 Green Star building can cost up to 10% more than a non-green building. A 6 Green Star building, if managed correctly, has the potential to only cost around 5% more, but if not managed correctly, it could cost up to 10% or more than the cost of a non-green building. The NZGBC considers that one of the main barriers to the commercial property sector’s uptake of the Green Star certification system is the cost of obtaining certification. To address this issue, the NZGBC is planning a tool review with the objective of reducing the cost of obtaining certification by 20% to 30%. 
Exhibit 4 summarizes the response by the NZGBC to the question around what can be done to improve the uptake and incorporation of energy/water saving (or generating) features into the design of new buildings and the retrofitting of existing buildings.

It is interesting to note that the NZGBC regards the introduction of a performance-based rating system, such as NABERS, as the most important thing that can be done to improve the uptake and incorporation of energy/water-saving features into new or existing buildings. There is presently a lack of tools available in the NZ market to properly rate the performance of commercial buildings with regard to energy and water consumption, although NABERS NZ is to be introduced in early 2013.

The next highest ranked action was mandatory reporting of energy performance. This is not employed as a tool to drive uptake of energy efficiency in NZ but it has been introduced with some success in Australia. Gunawansa and Kua (2011), who compared the mitigation and adaptation strategies of three coastal cities in two countries: Singapore, San Francisco, and Miami-Dade, also found that mandating green building design and construction has a direct impact on the diffusion of green buildings and recommend this as a successful strategy.

Further, the NZGBC does not believe that buildings need to recertify their Design and/or Built rating at periodic intervals. That is, once certification is achieved, unless refurbishment/redevelopment occurs, the certification continues indefinitely. Rather it is more appropriate that the operational performance of these buildings is measured and certified through a performance tool, such as NABERS.
To this end, the NZGBC has been working with the EECA to bring NABERS into NZ as a joint industry/government initiative. While the NZGBC would like to have developed its own Green Star building performance tool (close to a NABERS equivalent), due to funding restrictions and the EECA being keen on introducing NABERS into the NZ property market, it is likely that NABERS will become the property industry benchmark in NZ for measuring the environmental performance of commercial buildings.

The NZGBC considers that the introduction of NABERS into the NZ market will provide the following opportunities: (1) benchmarking of individual buildings and portfolios; (2) increased ability to improve the environmental performance of a building on a measured basis; and (3) better level of information available for existing and/or prospective tenants of a building.

In commenting on the strengths and weaknesses of NABERS, the NZGBC noted that NABERS is relatively simple and cost effective to manage. It is also highly flexible in that it can be applied to a ‘base building,’ an individual tenancy, or an entire building. The main weakness of NABERS that the NZGBC identified is that it is not a holistic approach to the assessment of a building’s environmental performance. Ideally, the NZGBC would like to see a Green Star design, built and performance-based system in place for the design and ongoing management of green-rated commercial buildings in NZ.

**Education of Property Practitioners.** While the NZGBC runs training programs for those who wish to become qualified practitioners and/or accredited professionals in the application of Green Star, it considers there is also a need for increased education of asset and property managers in the management of Green Star certified commercial property. The NZGBC is working with universities, technical institutes, and the Property Institute of NZ to ensure all relevant professions have access to quality education on green buildings.

**Christchurch Rebuild.** The final question to the NZGBC was in relation to the opportunities that the rebuild of the Christchurch CBD presents for the NZGBC to promote green building in NZ. The NZGBC recognizes that the Christchurch rebuild provides an opportunity for it to demonstrate leadership and to facilitate property industry and community discussion around the sustainability of the built environment. The NZGBC sees the Christchurch rebuild as an opportunity to make greater progress in advancing the sustainability of NZ’s built environment.

**Results from the Survey of the Commercial Property Sector**

The online industry survey of 300 NZ-based property professionals was undertaken in 2011. The survey was divided into two sections: section one asks questions about the respondent and their company’s background; section two asks questions about the respondent’s involvement with “green” buildings. The overall response rate was 18.67% \( (n = 56) \) after one follow-up reminder. Of the 56 people who participated, 34 (60.7% of those that responded, or 11.3% of the total sample) were involved in green buildings.

The sample of property professionals, many of whom are key players in NZ’s commercial property sector, included investors, developers, asset and property
managers, building contractors, architects, financiers, project managers, and property consultants. Exhibit 5 provides a breakdown of the professional backgrounds of the 300 people invited to take part in the survey.

For reasons not disclosed, financiers and project managers chose not to participate. Exhibit 6 provides a breakdown by profession of the 56 respondents. The largest respondent group was architects, followed equally by developers, investors, and managers. The ‘Other’ category was made up of corporate real estate managers, quantity surveyors, engineers, an energy management provider, and occupiers.

Section One: Company Information. Over three-fourths (77%, n = 43) of respondents hold senior management positions: managing directors or senior managers. The ‘Other’ category was represented by mid-tier property managers and property specialists. The majority of respondents were men (89%, n = 50) with 70% (n = 39) of the respondent’s company’s operational location being in Auckland, NZ’s largest commercial property market, 16% (n = 9) in Wellington, the capital city of NZ, 5.4% (n = 3) in Christchurch, and 7% (n = 4) located throughout NZ. The companies had been involved in the NZ property industry for a wide range of time periods from 3 years to 100 years (mean = 24.6 years). Exhibit 7 indicates that the spread of categories within which the respondents operate is strongly weighted towards commercial office, industrial, and retail property, with close to one-third being involved with a combination of these property types. The ‘Other’ category represents primarily residential, hotel, motel, and retirement village property types.
Exhibit 6 | Respondent Categories

- Developers: 8%
- Investors: 8%
- Managers: 8%
- Architects: 15%
- Project Manager: 3%
- Property Consultants: 4%
- Contractors: 0%
- Financiers: 0%
- Other: 10%

Exhibit 7 | Property Categories

- Commercial: 51%
- Industrial: 39%
- Retail: 45%
- Health: 22%
- Education: 23%
- Other: 21%
- Comm, Ind & Retail: 11%
- Combination: 17%
Respondents were asked to indicate how their company addresses the issues of sustainability, in house. The sustainability focus of the respondents’ companies is shown in Exhibit 8. While it is perhaps not surprising that reducing energy consumption has a far greater focus amongst the respondents (66%) than the other categories, it is interesting to note that location also ranks highly, implying that ease of access to public transportation and other services is of high importance to many respondents. It is also worth noting that nearly one-third of respondents are yet to focus on sustainable practices within their organization. The ‘Other’ category includes items such as “we encourage cycling to work” and “Green Star certification for operators,” “staff programs, stakeholder engagement, community engagement,” and “we design to Green Star principles.”

Section Two: Green Building Involvement. When asked to indicate whether they had participated in green building, 34 respondents (60.7% of responding sample) indicated that they have, either as an investor, manager, developer, building contractor or consultant in the delivery of a green building project. Of the remaining 22 respondents (39.2%), 13 indicated that they intended to become involved in green building in the future, seven indicated they did not have such intentions, and two did not respond to this question. Overall, the respondents indicated a high level of interest in green building.

Feedback from the respondents who indicated that they either have had no involvement in green building to date or have no interest in green building at all is covered later. The responses to questions about building sustainably from the
34 respondents (11.3% of the total sample) who are involved in green building are considered next.

**Respondents Who Are Involved in Green Buildings**

The respondents involved in green building were asked how long they have been involved. From the 21 responses received (37.6% of the total respondent group of 56), the experience ranged from one to six years, with an average of four years. The number of buildings, new or retrofitted, that respondents have been involved with either to develop, manage or own varies between one and ten, with only one respondent indicating the higher level of involvement, and the mode is three. While these statistics indicate that the respondents are relatively light on green building experience, it is put more in perspective when one considers that the NZGBC was only established in July 2005.

Exhibit 9 indicates that the primary categories for new green buildings that the 21 respondents have involvement with have been the office and industrial sectors, with “other” represented by schools/education, hospital laboratories, and community buildings. Only ten respondents have involvement with green retrofitted buildings, and this has again focused on the office sector, but these respondents are also involved in the other sectors to a lesser extent.

**Drivers and Barriers to Green Building.** When asked to indicate their reasons for being involved in green building, 16 (80%) of the 20 respondents indicated that “benefit to the environment” is the primary driver, closely followed by “tenant demand” (75%, n = 15) and corporate social responsibility (60%, n = 12). Exhibit 10 outlines these responses. These results suggest that the commercial
property sector sees green building as offering a balance between the commercial and environmental aspects of property investment and development.

Only half (17) of the respondents involved in green buildings answered the question about where the demand for green buildings is coming from. The majority (94%) of those respondents consider that the demand comes from the client, less than half believe it comes from their recommendations to clients, and 23.5% said it was due to government requirements to procure or occupy green buildings. Only 17.6% said it was due to the NZ Building Code requirements and another 17.6% said it was for “Other” reasons such as a global response or tenant expectations.

Exhibit 11 indicates that the most preferred sustainable features being incorporated into new buildings are, in order of preference, air conditioning, light zoning/sensors, and thermal zoning. Similarly ranked for retrofitted buildings, most preferred were light zoning/sensors, followed by air-conditioning, and thermal zoning. The least preferred sustainable features indicated for both new and retrofitted buildings were waterless urinals and renewable energy sources. The ‘Other’ category includes features such as rain water harvesting, smart metering, and building management systems. There were 18 responses to the question on new building features representing 53% of the sample that is involved in green buildings, i.e., 34 (or 32% of all 56 respondents to the survey), and 13 responses
Exhibit 11 | Preferred Sustainable Features

<table>
<thead>
<tr>
<th>Sustainable Features</th>
<th>New Build Rank</th>
<th>Retrofitted Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-conditioning</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Light zoning &amp;/or light sensors</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Thermal zoning</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Low ozone depleting potential refrigerants</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Solar hot water systems</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Bicycle racks and shower</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Automatic external louvers</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Use of renewable energy sources</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Waterless urinals</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

for the question relating to retrofitted building features (38% of those involved in green buildings).

Next, respondents were asked to identify the most energy efficient sustainable building design features that they have used to achieve positive sustainability outcomes and to indicate payback periods where available. Answers were quite varied and included: “Good internal light composition, cross ventilation along with good thermal properties in construction materials.” “Upgrade to high frequency (HF) ballasts and eco fluorescent lighting: payback of approximately 2.1 years.” “Solar orientation to maximize natural light to floor plate.” “Daylight harvesting/daylight improvement: payback less than six months.” “Reduce open plan lighting levels to 400 lux.” “Separate metering of energy.” “Passive design coupled with solar shading and mixed mode natural ventilation.” “The use of VRV air-conditioning, light zoning, and sensors.” “Minimizing internal applied finishes, lighting and air-conditioning zoning, external sun shade devices.” “Passive ventilation, water reducing elements, solar: payback around five years.”

Respondents were also asked to identify the most effective building materials they have used to achieve energy-efficient, sustainable building outcomes and to indicate payback periods where available. Again, answers were quite varied and included: “Fly ash concrete, even though the cement is considered problematic.” “Recycled materials (green rated).” “Low E glazing.” “Exposed concrete for durability and thermal storage.” “Timber.” “Recyclable polyester insulation.”

These responses indicate that to a certain extent the industry is aware of and has implemented a range of energy-efficient design features, technologies, and materials in buildings to achieve positive sustainability outcomes. Although there appears to be somewhat limited knowledge amongst the respondents of the payback periods of incorporating these design features, technologies, and building materials.
When asked whether buildings that are designed to be more energy efficient are actually being used in a way that maximizes their energy/resource use performance, 29% of the 21 respondents to this question answered yes, 33% answered no, and the remainder were unsure. Those that answered ‘no’ indicated that better education of owners, managers, and occupiers of green buildings is needed. One respondent also noted that there are no measures to ensure that green buildings are operated as designed. Another noted that there is inadequate handover information/user guides provided to occupiers.

Respondents were asked if they know what the average energy/water saving is for a green building compared to a conventional building. The majority (86%) of respondents answered ‘no,’ indicating that there is a real need to educate and get information into the market around the performance of green buildings compared to conventional buildings. The introduction of a system such as NABERS will give more certainty to those involved in the property industry around the actual environmental performance of green buildings and will assist in the management of these buildings.

Exhibit 12 shows that according to respondents the primary barriers to the incorporation of sustainable features in developments are the market’s unwillingness to pay for the additional costs of sustainable features and that the market is yet to be fully convinced that the extra cost of building green is supported by the benefits. There is also an indication that the market would respond more favorably to green building if there were government subsidies and incentives for doing so. The ‘Other’ category includes statements such as “our buildings are relatively new” and “not enough incentives.”

Exhibit 13 shows that the primary driver of green building is tenant satisfaction and productivity. Today, many corporations have sustainability policies integral to their business operations. The requirement to occupy a green building is often
Exhibit 13 | Drivers of Green Building Development

<table>
<thead>
<tr>
<th>Driver</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenant satisfaction and productivity</td>
<td>1</td>
</tr>
<tr>
<td>Superior building performance</td>
<td>2</td>
</tr>
<tr>
<td>Rising energy costs</td>
<td>3</td>
</tr>
<tr>
<td>Competitive advantage</td>
<td>4</td>
</tr>
<tr>
<td>Lower lifecycle costs</td>
<td>5</td>
</tr>
<tr>
<td>Industry rating system (Green Star)</td>
<td>6</td>
</tr>
<tr>
<td>Government policy</td>
<td>7</td>
</tr>
<tr>
<td>Building code</td>
<td>8</td>
</tr>
<tr>
<td>Increased education</td>
<td>9</td>
</tr>
<tr>
<td>Greater availability of green products</td>
<td>10</td>
</tr>
</tbody>
</table>

Exhibit 14 | Benefits of Green Buildings

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy cost savings</td>
<td>1</td>
</tr>
<tr>
<td>Increased property value</td>
<td>2</td>
</tr>
<tr>
<td>Increased rent</td>
<td>3</td>
</tr>
<tr>
<td>Marketing potential</td>
<td>4</td>
</tr>
<tr>
<td>Healthy indoor air quality</td>
<td>5</td>
</tr>
<tr>
<td>Decreased obsolescence</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
</tbody>
</table>

mandated by a company’s sustainability policy. Therefore, it is not surprising that the industry rated tenant satisfaction and productivity as the key driver of green building development. Other key drivers include superior building performance and rising energy costs, followed by competitive advantage and lower lifecycle costs. Over the medium to longer term, it is these factors that set green buildings apart from traditional buildings.

Cost of Green Buildings. When asked to indicate what clients would consider an acceptable level of additional cost for incorporating sustainable features into a building, more than half of the respondents (52.9%) indicated that clients would accept a premium of up to 5%. The balance of the respondents was evenly split between no additional cost and a 5% to 10% additional cost. Exhibit 14 indicates respondents’ views of what they believe clients would consider the important financial and non-financial benefits for additional costs that may be incurred for
Exhibit 15 shows respondents views on the question of what the cost premium is (if any) for a green building versus a non-green building for a 4, 5, and 6 Green Star rating. The responses indicate that of the 17 respondents who answered this question over three quarters (76%) felt that there is a cost premium to achieve a 4 Green Star rated building of 3% to 10%. This is a wide variance for what can be described as an “entry level” Green Star rating and is markedly different to the NZGBC’s response to this question, which was zero increased cost if managed correctly, up to 5% otherwise.

The same issue appears to exist for 5 Green Star rated buildings. The industry response indicates a cost premium of 6% to 20%: 35% thought there would be a 6% to 10% premium and 41% felt the premium would be 11% to 20% premium. The NZGBC has indicated zero cost premium if done properly and up to 10% premium otherwise. Likewise, 82.4% of respondents indicated an 11% to 20% or more premium for a 6 Green Star rated building; 47% responded that they felt the premium would be 11% to 20% and 35% responded that they felt there would be a 20% or higher premium. Whereas the NZGBC advised a premium of 5 to 10% depending on how well a project is managed. This issue of the cost premium for green buildings versus non-green buildings is clearly something that the industry is weary of and appears to be a major barrier to the progress of green building in NZ.
Exhibit 16 | Actions to Improve Energy/Water Savings

<table>
<thead>
<tr>
<th>Actions</th>
<th>New Build Rank</th>
<th>Retrofitted Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building code</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Change in legislation</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>More rebates/subsidies</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Building certification</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mandatory energy efficiency</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Availability of products</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Better advertising</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Interestingly, when asked if a project’s profitability was projected to be lower due to green building practices being implemented would they still proceed, over half (53%, n = 9) of respondents answered ‘yes’ and 47% (n = 8) answered ‘unsure.’ Significantly, none of the respondents answered ‘no,’ indicating a degree of interest in green building, despite the sensitivity to a ‘cost premium’ for green buildings.

**Energy and Water Savings.** Respondents were asked to indicate what more they think can be done to improve the uptake and incorporation of energy/water savings (or generating) features into the design of new buildings and the retrofitting of existing buildings. Responses were similar for new and retrofitted buildings. Exhibit 16 shows that the industry considers that changes to the building code, legislation, and increased financial incentives are required to improve the uptake of energy/water saving features, indicating that the industry is not likely to implement energy/water saving measures voluntarily. Other suggestions included increasing water charges.

**Sustainability Agenda.** When asked to give their opinion of how important the sustainability agenda is to the NZ commercial property sector, the majority of respondents think that the sustainability agenda is important. Over half (54%, n = 20) think that it is fairly important, 27% (n = 10) very important, and 16% (n = 6) indicated it was extremely important to the NZ commercial property sector.

**Industry Capability.** Respondents were asked whether they consider that the NZ property industry has the knowledge/skills, technology, and resources to drive the sustainability agenda. Exhibit 17 shows that over half of the respondents answered ‘yes’ for each category, highlighting that they consider that the industry is generally well placed to advance green building in NZ.

Those respondents who answered ‘no’ to any category were asked to give a brief explanation of what knowledge/skills, technology or resources are required. Some constructive suggestions were received. The answers given are summarized as follows:
### Knowledge/Skills:
Need for simpler tools for rating of sustainability and information of the financial benefits and costs for achieving ESD properties; lack of experience and knowledge of green building technologies and products; industry needs to consider more than individual buildings and look instead at systems: ecology and natural systems, urban design, integration of buildings and landscape.

### Technology/Resources:
Lack of information on energy consumption of different classes and grades of property; need for a mandatory building energy rating system to reward green buildings or at least those that are energy efficient.

#### Changes and Improvements
The final general question asked respondents to identify the changes and improvements that are required to increase green building development and investment in NZ’s commercial property sector. A range of suggestions were put forward by 32 respondents (57%). These suggestions have been categorized under four headings: central and local government policy, cost/benefit, education, and building rating systems.

### Central and Local Government Policy
1. Mandatory disclosure of a building’s environmental performance.
2. Regulation requiring sustainable features in buildings.
3. Introduction of central and local government subsidies, including tax breaks for certified buildings.

### Cost/Benefit
1. More empirical evidence to demonstrate the benefits of green building to tenants and investors.

### Education
1. Begin with education within schools and other learning institutions.
2. More training and education of all involved in the sustainable development and retrofitting of commercial property.

### Rating Systems
1. Reduce the NZGBC cost of certifying a building by 50%.
2. Introduce a compulsory rating system for energy and water use. The planned introduction of NABERS will generate a new level of interest.
Future Participation in Green Building. Of the 22 respondents that have not been involved in green building, two-thirds (n = 14) indicated that they intend to become involved in the future; 79% of their involvement will be in office properties. This focus on offices is similar to that Exhibit 9. There is an increase in expectations for both new and retrofitted retail property even though the NZGBC has yet to release a set of Green Star tools for retail property. While the retrofitting of industrial property is seen as important for those with an intention to get involved in green building, there is less focus on interiors, compared to those already involved in green building (Exhibit 18).

When asked to indicate their reasons for planning to become involved in green building, over nearly two-thirds (64%, n = 9) of the 14 respondents that answered this question advised that benefit to the environment and corporate social responsibility are the primary drivers. For this group, tenant demand was far less a factor (36%) than for those who have already had involvement in green building (75%, see Exhibit 10). These results are shown in Exhibit 19.

The respondents who indicated no intention to become involved in green building gave a number of explanations for this. In their view, green building was just a fad, and although nice to have they did not see it as essential. Others indicated that it was for economic reasons or that their clients are not interested in green building options and are solely focused on immediate financial returns.

Statistical Analysis

A number of tests were run to determine if there were significant differences in responses between the varying professional groups. Cross tabulations and chi-
square tests were performed, and Cramer’s V and Phi obtained. However, there were no significant differences in responses between the varying professional groups for any of the questions. A limitation of the study was the small sample size. However, as more buildings become rated Green Star and with growing tenant and investor demand for green rated space and buildings, we expect an increase in involvement from many of the professional groups, particularly with the introduction of the NABERS NZ rating tool and if this were to be made mandatory, as it has been in Australia.

**Conclusions and Recommendations**

Green building is relatively new to the NZ commercial property sector, yet there are indications that as economic conditions improve, green building activity is poised to grow. In particular, the rebuild of the Christchurch CBD will provide a significant opportunity for the promotion and advancement of green building in NZ. The NZGBC expects to play a key role in the promotion of green building in the rebuild of Christchurch in terms of the training of professionals and facilitating property industry and community discussion around sustainability of the built environment.

It is anticipated that the NZGBC’s review and expected reduction in charges for Green Star will encourage a greater number of property developers and investors
to seek a Green Star rating for their buildings. The timing for completion of this review will be particularly relevant to the Christchurch rebuild. The introduction of BASE as an introductory level green building assessment specifically for the Christchurch rebuild should encourage developers and investors to incorporate sustainable features in their commercial properties and is a positive step for Christchurch. The NZGBC should also look at developing rating tools specifically for smaller projects that can be applied universally across NZ’s commercial property sector. This will encourage developers and owners of smaller commercial properties to participate in sustainable development.

As the property sectors key promoter of green building, the NZGBC needs to better educate the public and users around the benefits of green building. One of the significant barriers to the uptake of green building is the markets view of the cost premium for green building versus conventional building. There appears to be a difference of opinion between the NZGBC and that of industry on this issue. Given that cost premium was a common barrier to green building identified from the literature review, it would tend to support the findings from the industry survey. The solution to overcome this barrier appears to lie with the NZGBC and its training function. The NZGBC needs to clearly demonstrate to the commercial property sector the business case for green building. Otherwise, in the absence of government intervention, the growth of this sector will be very much determined by growth in tenant or end-user demand, which was identified by both the NZGBC and industry survey as a key factor in the uptake of green building at present.

It is also evident that the NZGBC needs to resolve its funding issues in order that staffing levels can be increased sufficiently to develop a full suite of Green Star rating tools, which will in turn provide a comprehensive green building ‘design’ and ‘built’ certification system to the NZ commercial property sector. There is also an opportunity for educational providers and professional bodies to incorporate green building education within their established qualifications for the medium to longer term supply of qualified professionals to the property sector.

Clearly, in achieving a green building solution there are design features and materials that are preferred by the industry. However, the actual use and management of green buildings needs attention, as the results from the survey indicate. This is also a matter that can be addressed by the universities and professional bodies in the training of asset, facilities, and property managers.

While central government could play a more direct role in encouraging the commercial property sector towards green building, by reinstating the green leasing policy and through regulation, tax breaks, and other incentives, the present government is more inclined to allow market forces to determine the level of green building that occurs. However, the government is somewhat supportive of sustainable development, as evidenced by the funding available through EECA, MAF, and the Electricity Commission. In particular, it is the EECA that is a key sponsor for the introduction of NABERS to the NZ property sector.
The introduction of NABERS NZ was identified by both the NZGBC and industry as providing a significant opportunity to promote and grow the level of market participation in green building in NZ. This is particularly relevant for the existing commercial building stock. Although the NZGBC would like to provide a comprehensive design, built, and performance-based assessment system, Green Star does not assess the ongoing environmental performance of green buildings.

The key industry drivers for being involved in green building are a balance between environmental/social conscience and the commercial/financial imperatives of commercial property investment and development including the opportunity to secure good quality tenants. As noted above, this industry enthusiasm for green building is somewhat tempered by the perception that green buildings are significantly more expensive to develop than conventional buildings. Looking forward, this is a matter that needs to be resolved within the property industry for green building to become the benchmark for the design and development of buildings within NZ’s commercial property sector.

Endnotes
2 The report Our Common Future (1987), put forward by the World Commission on Environment and Development (subsequently renamed the Brundtland Commission), popularized the notion of “sustainable development” and is defined in the report as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”
3 BRE Environmental Assessment Method (BREEAM) was one of the earliest rating tools to measure the sustainability of new non-domestic buildings, developed in the U.K. in 1990.

References
Bond, S. Best of the Best in Green Design: Drivers and Barriers to Sustainable Development in Australia. PRRES Conference, Sydney, 2010.


The participation of the NZGBC and its Director—Business Development and Technical, Rohan Bush, in the structured interview is appreciated. The participation of the respondents to the industry survey is also greatly appreciated.

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