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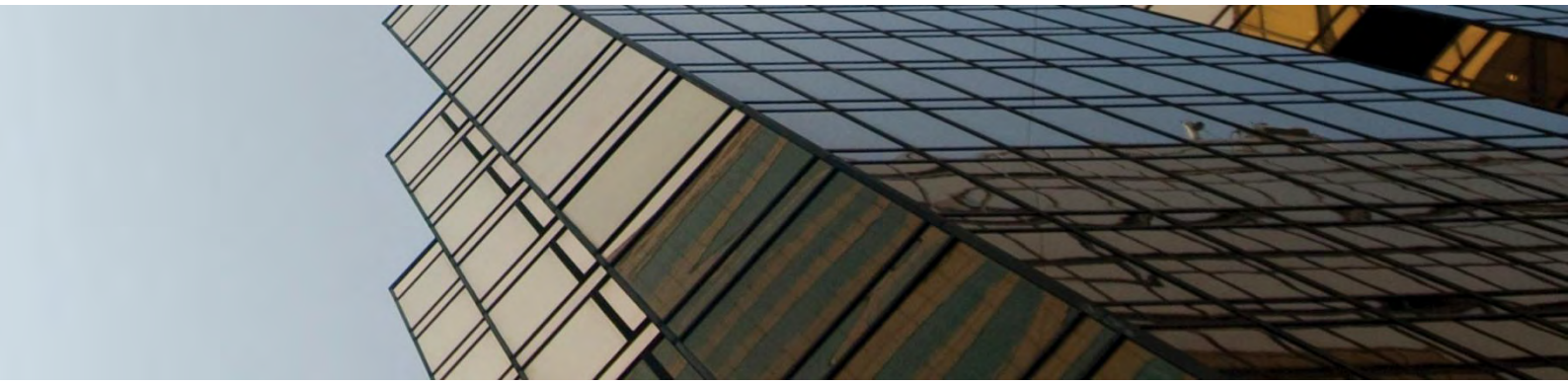

STUDY REPORT SR 260/1 [2011]

BEES INTERIM REPORT

Building energy end-use study - Year 4

INSIGHT INTO BARRIERS

Kay Saville-Smith

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BEES publications can be downloaded from the BEES website - http://www.branz.co.nz/bees

Following is a list of other reports in the BEES Year 4 series:

- Camilleri, M., & Babylon, W.M (2011). BEES (Building energy end-use study) Year 4: Detailed monitoring, BRANZ study report 260/2, Judgeford.
- Bishop, R., Camilleri, M & Isaacs, N. (2011). BEES (Building energy end-use study) Year 4: Delivered daylighting, BRANZ study report 260/3, Judgeford.
- Bishop, R., Camilleri, M & Isaacs, N. (2011). BEES (Building energy end-use study) Year 4: Achieved conditions, BRANZ study report 260/4, Judgeford.
- Bishop, R., Camilleri, M. & Burrough, L (2011). BEES (Building energy end-use study) Year 4: Temperature Control, BRANZ study report 260/5, Judgeford.
- Bishop, R. (2011). BEES (Building energy end-use study) Year 4: Electrical loads, BRANZ study report 260/6, Judgeford.
- Isaacs, N. (2011). BEES (Building energy end-use study) Year 4: From Warehouses to Shops - Changing Uses in the Non-residential Buildings Sector, BRANZ study report 260/7, Judgeford

PREFACE

Understanding how energy and water resources are used in non-residential buildings is key to improving the energy and water efficiency of New Zealand's building stock. More efficient buildings will help reduce greenhouse gas emissions and enhance business competitiveness. The Building Energy End-use Study (BEES) is taking the first step towards this by establishing where and how energy and water resources are used in non-residential buildings and what factors drive the use of these resources.

The BEES study started in 2007 and will run for six years, gathering information on energy and water use through carrying out surveys and monitoring non-residential buildings. By analysing the information gathered, BEES aims to answer eight key research questions about resource use in buildings:

1. What is the aggregate energy and water use of non-residential buildings in New Zealand?
2. What is the average energy and water use per unit area per year?
3. What characterises the buildings that use the most energy and water?
4. What is the average energy use per unit area for different categories of building use?
5. What are the distributions of energy and water use?
6. What are the determinants of water and energy-use patterns e.g. structure, form, function, occupancy, building management etc?
7. Where are the critical intervention points to improve resource use efficiency?
8. What are the likely future changes as the building stock type and distribution change?

Understanding the importance and interaction of users, owners and those who service non-residential buildings is also an important component of the study.

For the BEES study, non-residential buildings have been defined using categories in the New Zealand Building Code, but in general terms the study is mainly looking at commercial office and retail buildings. These vary from small corner store dairies to large multi-storey office buildings. For more information on the building types included in the study please refer to BRANZ report SR224 Building Energy End-use Study (BEES) Years 1 & 2 (2009) available on the BEES website (www.branz.co.nz/BEES).

The study has two main methods of data collection – a high level survey of buildings and businesses, and intensive detailed monitoring of individual premises.

The high level survey initially involved collecting data about a large number of buildings. From this large sample, a smaller survey of businesses within buildings was carried out which included a phone survey, and collecting records of energy and water use and data on floor areas. The information will enable a picture to be built up of the total and average energy and water use in non-residential buildings, the intensity of this use and resources used by different categories of building use, answering research questions one to four.

The detailed monitoring of individual premises involves energy and indoor condition monitoring, occupant questionnaires and a number of audits, including: appliances, lighting, building, hot water, water, and equipment.

This report presents data and analysis drawn from the high level survey and targeted interviews carried out during the fourth year of this six year study. This report looks at barriers preventing uptake of solutions for resource efficiency in non-commercial buildings both from interview data with landlords and investors as well as from tenants. This information is valuable to understand how to promote or regulate resource efficiency solutions for buildings. The data and analysis in this report contributes to answering research questions six to eight. This is one of seven interim reports giving a snapshot of analysis completed to date. When all data collection has been completed further analysis will be reported on with the full sample including relationships between end-uses, building types and services.

In the remaining two years of the BEES study, further work is planned that looks to identify and classify the different groups of landlords and buildings managers, understand how many buildings fit into the different groups and see if the resource consumption is affected by how the building is owned, operated and managed.

SUMMARY

- High level surveys and a small number of in-depth interviews with building managers and owners have been used to examine barriers to uptake of resource efficiency solutions and technologies
- Management of buildings is either done as a form of self employment or as an investment this affects how resource efficiency is looked at although they both have the same goal of having the best return on their investment.
- Resource efficiency or 'green buildings' are seen as less of a priority now compared to a year ago
- Low take up of resource efficiency solutions in non-residential buildings in NZ. There are two models that are used to explain this – 'Vicious circle of blame' where all parties blame another for not providing, demanding or paying for resource efficiency and 'split incentives model' where the group paying for the improvements are not the same as the group benefiting.
- New Zealand non-residential building types are very diverse, building owners and managers have large contrasts in the extent to which they are aware or driven by issues of building performance
- Further in-depth work will be done in this area over the next year of BEES determining the representativeness of this work.

This research has provided preliminary insights into the complex value chain and diverse variations of ownership, occupation and building management by interviewing four particular types of stakeholders. They are:

- Owner occupiers with tenants.
- A hands-on landlord with a multi tenanted building.
- A facilities manager that manages the facilities of a number of buildings for a number of landlords.
- A property portfolio manager.

These can be categorised into stakeholders that see buildings as a form of self employment (the owner occupier and the hands on landlord), and stakeholders that see the buildings as an investment vehicle (the facilities and property portfolio managers).

The former take a do-it-yourself approach to building management, in which four goals are evident:

- Reducing direct and indirect costs.
- Keeping tenants satisfied.
- Securing a steady, not necessarily a maximised, income stream.
- Being accountable to no one but themselves.

Their activities are marked by minimisation of their active engagement in the management of each building while at the same time keeping their tenants 'happy' and reducing direct cash expenditure. The balance between these imperatives is achieved by:

- Commissioning out tasks which are time consuming and unpredictable in terms of outcome achievement

- Substituting professional building management. This is couched in terms of a perceived lack of value for money from building managers, the ability of landlords to undertake facilities and building management more effectively than building managers and the preferences of tenants.
- Substituting all or part of professional trade provision of repairs, maintenance and refitting with personal labour. Those needs are often described as relatively minimal.

These landlords did not use property managers because they are do-it-yourselfers in relation to property maintenance and refit. Both tasks they approached in very much the same way as do-it-yourself home owners do. That is, with a combination of: confidence in their own abilities; wanting to directly manage any necessary trades; and in the belief that the repairs and maintenance work is relatively minimal.[1]

Where the buildings were seen as a form of self employment, the owner/managers typically are not exposed to energy costs. All costs are directly charged to tenants. For these landlords, energy efficiency is largely a matter for the tenants and they have no control over it. That there might be some advantage in reducing the energy costs through more efficient systems is not an idea that is given any serious attention. This notion of tenant sovereignty around resource consumption is also evident around those managing non-residential buildings as a revenue generating asset for investors.

The stakeholders in the second category are focussed on buildings as an investment vehicle, which means ensuring the buildings are operated at the premium end of the market to attract strong income and investment returns. That performance is measured through energy efficiency and includes.

- Reducing the operational costs of the building.
- Maintaining tenants that are willing to pay premium pricing within the market using buildings of that particular rating.

A number of measures of building performance are used to indicate asset value and the long term performance value of a building in that context. They include: energy and water consumption performance; building systems such as air conditioning and other operating systems that drive costs; and maintenance and replacement costs. Indeed, the costs associated with improving building performance, especially through close building management, is seen offering very real returns in new as well as existing older buildings: The organisations in which these interviewees work dedicate significant in-house and contracted in resources to building management for higher performance.

This shows the maximisation of income is a very different goal from the self-employed landlords where stability of income is the underpinning theme. For those looking to maximise the income potential of the asset, there is a link between performance and income. Achieved performance, especially in relation to energy and water consumption, are seen as important aspects of a building in attracting tenants.

Where buildings are seen as an investment vehicle both interviewees argued that tenants required demonstrated proof of the bottom line benefits of energy and water efficiency. Consistent with overseas experience, they both saw current benchmarks and performance monitoring as inadequate and unlikely to generate demand and/or a willingness to pay premium prices.

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[1] See Saville-Smith 2005 and Saville-Smith and Amey 1999.

Rating tools are seen as particularly useful as a means by which the competitive advantage of better performing buildings can be made clear to tenants and to allow tenants promote themselves in the market. The latter, however, is seen as of less interest to tenants than in the recent past. Other mechanisms, green leases and higher efficiency plant band technical solutions, are treated with some degree of caution. This is partly because green leases are seen as being in very embryonic form and the whole leasing process as being contingent and shaped by lease negotiations.

Technical solutions are often seen as not having sufficiently short payback periods to attract either owner or tenant action. The notion of payback for tenants was a consistent theme in the interview with the National Facilities Manager:

This shifts attention from the traditional focus on, respectively, the views, behaviour and comfort of occupants, the skills of facility managers and availability of efficient technologies. It highlights the importance of landlords and tenants. It highlights the moral hazard embedded in the value chain and the way in which players tend to distance themselves from the resolution performance issues through a vicious circle of blame.

Both the premise survey data in New Zealand and the interview data show that the broad shape of the dynamics identified overseas are also apparent in New Zealand. Both those data sets, however, suggest that the New Zealand situation is characterised by extreme diversity. That diversity is associated among building owners and managers with extreme contrasts in the extent to which they are aware or driven by issues of building performance.

That diversity and those profound differences in approach to building management must reinforce the view that there is no silver bullet in the non-residential buildings sector to improve resource efficiency. Significant effort is required to:

- Identify and classify the different segments of landlords and building managers in New Zealand;
- Establish the quantum of non-residential stock associated with each of those segments.
- Establish the relative resource consumption in buildings operated by those landlord segments.
- Explore the range of specific triggers in each segment that might drive resource optimisation.

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1. INTRODUCTION

Those interested in reducing energy use and increasing energy efficiency in non-residential buildings focus attention on four aspects of the building and its use. They are:

- The building itself – its design, materials and integral plant.
- The use to which the building is put including the appliances and equipment associated with that use.
- The occupants and users of the building and their pattern of behaviours,
- How buildings are managed by owners and/or tenants.

This report focuses on the last of the three. That is how buildings are managed by owners. It pays particular attention to the potential for non-technological aspects of the non-residential building sector to present barriers to the take-up of resource efficiency opportunities.

The report is structured around three parts. Firstly it considers international perspectives and approaches to resources optimisation in the non-residential building stock. Second, it considers the extent to which barriers identified in the international literature and, consequently, solutions to those barriers might be pertinent to New Zealand given its particular profile of ownership and tenancy, and the way in which some key stakeholders perceive their interests, outcomes and motivations in relation to the ownership, leasing and management of non-residential buildings.

The report is based on:

- A review of selected international literature;
- Data generated by premises surveyed as part of the BEES programme; and
- Data generated by a set of qualitative interviews with those that might have an interest in resource efficiency in the non-residential stock. That is:
- Landlords of non-residential stock who directly manage their buildings.
- Facilities managers that manage buildings on behalf of landlords.
- Property portfolio managers who acquire, dispose of, and manage buildings across a wide portfolio of buildings leased and rented to a diverse set of tenants.
- Property managers for businesses who manage those buildings (acquired through ownership or lease) necessary to deliver business operations or services.

An individual in each of these categories was interviewed to undertake a preliminary exploration of their preoccupations.

This report is structured as follows:

- Section 2 sets out the objectives, scope and key components of BEES as whole.
- Section 3 provides an overview of:
- The data relevant to this report generated through the surveys of premises in non-residential buildings; and
- The qualitative interviewing used to explore issues of resource optimisation from the perspectives of landlords, building managers and property portfolio managers.
- Section 4 reviews international approaches and perspectives on resource optimisation in non-residential buildings.
- Section 5 focuses on the drivers of resource efficiency and has a particular focus on explanations of low take-up of technical and behavioural solutions.
- Section 6 considers the extent to which prevailing explanations of barriers to take-up may be relevant to New Zealand given the particular ownership/tenancy profile of New Zealand's non-residential building stock.

- Section 7 explores the themes arising from the qualitative interviews in relation to the principal interests, motivations and preoccupations of key stakeholders in the non-residential buildings sector. This provides a basis for developing methods to explore these issues across the non-residential buildings sector.
- Section 8 makes some preliminary comments on direction and potential for encouraging resource efficiency.

1.1 Terms and Definitions

One of the problems of research into energy efficiency and non-residential buildings is the problem of terminology and definitions. BEES is concerned with non-residential buildings. But not all non-residential buildings fall within the BEES study. The boundary of the building stock for BEES excludes residential buildings. All non-residential buildings are included except: outbuildings; ancillary buildings; industrial buildings (except warehouses); and communal non-residential assembly service.

When dealing with overseas research the study boundaries of BEES more or less fit with what are often referred to as commercial buildings and sometimes office buildings. In this report, the nomenclature used reflects the source of the data. As such, when the term non-residential building is used it means that the data is derived from the BEES study or other research using that term. When the term "commercial building(s)" is used this reflects the boundaries of the overseas study or commentary from which the data or analysis is drawn. This approach is also used in relation to the term "office building(s)".

2. THE BEES PROGRAMME

The BEES (Building Energy End-use Study) programme is concerned with understanding the how, why, where and when of energy and water use in New Zealand's non-residential buildings.

Through collection and analysis of data on buildings along with their water and energy uses, BEES is intended to assist private and public sector agencies and organisations to identify opportunities for increased operational efficiency by providing new knowledge and better understanding of the: relative importance of building design, use and function; quantity and types of energy and water end-uses; and opportunities for targeted management to optimise energy and water use through: building design and construction; building management; and occupant behaviours.

Infobox 1 sets out the research components of BEES, along with the primary research methods and key questions. Infobox 2 provides a summary of the key research questions driving BEES and their alignment with policy, management and practice issues.

Infobox 1: Research Components, Method and Key Research Question Alignment -

Research Component	Method	Key Questions
• Aggregate Resource Use Patterns (Energy and Water)	Valuation Data Extraction and Analysis Web Search Data and Analysis Premise phone surveys, meter data	1-3
• Determinants of Resource Use (Energy and Water)	End-use Monitoring in Sub-set of Buildings. Interviewing and Surveying	4-6
• Managing and Improving Resource Efficiency	Case Studies, Feasibility Studies and Topic analysis	1-7
	In-depth interviews and analysis Review of international practice	
• Future demand and potential	Modelling & Simulation, topic reports	8

Infobox 2: Alignment of BEES Objectives and Contributions

Key Research Questions	Contribution to Policy, Management and Practice
1. What is the aggregate energy/water consumption of non-residential sector buildings? 2. What is the average kWh/m^2/annum? 3. What categories of non-residential buildings appear to contribute most to the aggregate energy/water consumption of the commercial sector buildings?	▪ Highlight importance of commercial buildings in context of NZ energy/water use ▪ Allow policy sector to consider potential of intervention in relation to quantum of resource use. ▪ Provide crude indication of possible intervention targets.
4. What is the average kWh/m^2/annum of each selected non-residential building category? 5. What are the uses to which energy/water are directed? 6. What are the determinants of those patterns of use: a. Building structure and form b. Function c. Other attributes: ▪ Climate ▪ Ownership ▪ Multi-use ▪ Occupancy ▪ City/town position ▪ Building age	▪ Allow policy sector to consider potential of intervention in relation to quantum of resource use. ▪ Indicate possible intervention targets and the variables important in developing interventions. ▪ Establish extent of variation in resource use and determinants. ▪ Provide crude indicator of the types of intervention that might be critical ranging from education/information, incentives and disincentives, regulation.
7. What are the critical intervention points to improve non-residential building resource efficiency: ▪ Building envelope and amenities ▪ Building Management ▪ Occupant behaviour	▪ Establish the range of interventions programmes and regulatory requirements for building stock efficiency improvements
8. What is the likely change in energy and resource demand from the non-residential sector buildings into the future as stock type and distribution changes?	▪ Provide forecasts of resource efficiency as building stock changes in quantum and type. ▪ Identify risks and opportunities for manage resource e consumption in the commercial sector.

3. THE DATA

The primary data presented in this report is drawn from surveying of premise owners or managers in eligible buildings and subsequent qualitative interviews with four building managers/owners.

3.1 Premise Surveying

The BEES project has collected extensive data on the building characteristics of the non-residential building stock in New Zealand. 366 premises in non-residential buildings provided data around building characteristics, tenure, lease and management arrangements for the buildings in which they are situated through telephone surveying.

Those 366 premises were made up of participants in two telephone surveys. The first telephone survey was with Strata 1-4 buildings. The second telephone survey was with premises in Stratum 5 buildings. The definition of strata for BEES is described in Isaacs (2009). The size strata which were used to allocate businesses in buildings for the phone survey are as follows: Stratum 5 minimum floor area 9,000m^2; Stratum 4 minimum floor area 3,500m^2; Stratum 3 minimum floor area 1,500m^2; Stratum 2 minimum floor area 650m^2; and Stratum 1 minimum floor area 5m^2.

The Strata 1-4 telephone survey was undertaken by New Zealand Research Ltd in February and March 2010. The questionnaire used in surveying was redeveloped by CRESA in the light of previous pilot findings and to better accommodate the needs of New Zealand Research Ltd's CATI technology (Appendix A).

New Zealand Research Ltd was provided with 1647 business contacts believed to be associated with 494 buildings that appeared to be BEES eligible based on analysis of valuation data, web-based and business directory information, and on-site observation data. 261 businesses completed a questionnaire. The response rates are a little lower but consistent with previous piloting ranging from the lowest response rate at 16 percent in stratum 4 building businesses to a response rate of 21 percent in stratum 3 building businesses.

Table 1 shows the business premise response rate overall as well as the response rates prevailing for those buildings that have fully met the rules for recruitment as well as for those buildings that have not yet met the recruitment rules for strata 1-4 buildings. Table 1 clearly shows the relative ease of recruiting Stratum 1 buildings. This appears to reflect the smaller size of those buildings and the lower number of premises in those buildings. The 261 businesses represent 171 buildings in Strata 1-4.

Table 1: 1st Wave Strata 1-4 Response Rates by Stratum and Building Recruitment

Strata	Total Response	Response for Fully Recruited Buildings	Response for Buildings Not Yet Recruited
Stratum 1	19%	86%	7%
Stratum 2	20%	66%	10%
Stratum 3	21%	62%	15%
Stratum 4	16%	63%	13%
Total	***18%***	***68%***	***12%***

The telephone survey for Stratum 5 was undertaken by New Zealand Research Ltd in May and June 2010. The questionnaire used in surveying was slightly amended in the light of Strata 1-4 1st wave

survey results (Appendix B). New Zealand Research Ltd was provided with 1,659 business contacts believed to be associated with 124 buildings that appeared to be BEES eligible based on analysis of valuation data, web-based and business directory information, and on-site observation data.

Table 2 sets out the characteristics of the comparative yields for the two premise surveys. That shows the tendency for Stratum 5 to have higher proportions of businesses that were un-contactable or subject to problems with listings which were unusable such as wrong numbers, duplicate phone numbers or wrong/unconfirmed buildings.

Table 2: Outcome of Business Premises Identified for Telephone Survey Recruitment

Outcome of Listed Premises	Strata 1-4 Listings	Stratum 5 Listings
Unusable	10.3%	23.0%
Non-contacts	8.6%	20.9%
Refusals	61.9%	44.0%
Head office referrals	3.8%	5.2%
Complete interviews	15.8%	6.4%

Notably, once contact was actually made, the response rate was higher among premises in Stratum 5 buildings than among premises in Strata 1-4 buildings. Among Strata 1-4 of those to be contacted 61.9 percent refused with 38.1 percent either completing an interview or referring on to a head office. By comparison among the Stratum 5 contacted premises, only 44 percent refused with the remaining 56 percent either completing an interview or referring to a head office for completion. The comparatively low yield among Stratum 5, then, was due to issues around the accuracy and currency of the contact addresses supplied for surveying. The response rate for Stratum 5 was comparatively high.

3.2 Building Manager Interviews

The original research plan for BEES envisaged a set of 'qualitative interviews' associated with a selected sub-set of buildings that were being monitored in detail. Difficulty in achieving a representative distribution of detailed monitored buildings, to date, has meant linking the building manager interviews with the detailed monitoring was not possible. However, the diversity of building management arrangements revealed in the aggregate resource use telephone surveying combined with the review of international policy and practice, suggested that having a preliminary exploration at least of the way in which those that manage non-residential buildings perceive and act on their priorities would be desirable (presented in section 7).

Three sets of individuals concerned with non-residential building management are set out in Table 3.

Table 3: Categories of Building Managers

Sector	Focus
A. Facilities Management • Hands on landlords/multi tenant building • Owner occupier landlord with tenants • Provider of facilities management on behalf of landlords • High-end complex building facilities management	• Extent/intensity of management and scope of work • Focus of facilities management in particular building • Engagement with tenants • Key priorities for facilities manager • Mechanisms used to define facilities managers' performance. • Mechanisms to measure building performance.
B. Property Portfolio Managers	• Priority given to resource (energy and water) optimisation in investment, acquisition and disposal choices. • Mechanism for ensuring resource optimisation in building design, build. • Mechanisms to manage tenant resource use. • Extent of control over facilities management in buildings and focus/priorities for facilities management
C. Property Managers for Green/Social Responsibility Companies	• Extent to green brand drives building selection and operation • Criteria for building selection • Extent of management to optimise resource use • Management tools and user education

Four interviews were undertaken with managers in two of those sets – those concerned with the facilities management and those concerned with property portfolio management. A property manager involved in providing for the property needs of a business presenting itself as a green, socially responsible business also provided information about his experiences and priorities in the property market.

Those interviews are contextualised by data from the BEES survey of 366 businesses and a review of relevant overseas policy and research.

4. PERSPECTIVES ON RESOURCE OPTIMISATION

There has been considerable debate internationally about the extent to which the non-residential building sector's resource efficiency, particularly energy efficiency, is critical to economic, social and environmental outcomes. While that debate has focused primarily on energy consumption; it has more recently begun to embrace concerns around water use and the efficiency of water consumption.

Across the policy, research and industry arenas, there is broad agreement that resource performance in non-residential buildings reflects a complex interaction between the:

- design, materials and construction of a building;
- equipment used within the building which in turn can be broadly divided into that equipment that is used to operate the building and that equipment used by premises within the building to undertake their business functions;
- behaviour of building users; and
- ownership and managerial arrangement of the building and its operation within the context of those arrangements.

There is also widespread recognition that resource optimisation in the commercial building sector can be achieved through what might be described as technological solutions. That is, solutions focused on the fabric, construction and design of buildings as well as installation of more efficient elements such as lighting and space conditioning systems. However, while improved resource efficiency is technically possible, the take-up of the design, construction and systems that will deliver those efficiencies has been slow in both new and existing buildings. As previously noted, the term 'commercial building' is most frequently used in the overseas literature. This is often not transparently defined. It tends to be used to cover office and retail buildings. This is broadly aligned to the BEES non-residential buildings. It is not, however, necessarily the same. Because of that, where overseas research and commentary refers to commercial buildings in this generic manner, that term is employed in the discussion.

The international response to this apparent tardiness has manifested itself in three ways. They are:

- Firstly, a desire to demonstrate the need and benefits of retrofitting and/or building new resource efficient non-residential buildings.
- Secondly, the development and implementation of a range of mechanisms to promote the adoption of technologies that contribute to resource efficiency.
- Finally, there has been, largely as a reaction to the limited impact of the previous strategies an increasing preoccupation with the nature and motivations of those involved in the commercial real estate industry both in relation to supply chain and in relation to the motivations of building consumers.

Those responses, of course, are not mutually exclusive and are frequently entwined in both the commentary and research around resource efficiency in the commercial buildings sector as well as in policy and industry responses to the resource efficiency imperative. The remainder of this section provides a brief discussion of each of these responses.

5. OPTIMISING RESOURCE EFFICIENCY: NEEDS AND BENEFITS

The focus on resource efficiency in the built environment, both residential and non-residential, has emerged over a number of years with increasing intensity. The drivers of that concern are both multiple and dynamic. The environmental movement's concern with and a desire to reduce the impact of the infrastructure of reticulated energy production – hydro dams, coal and gas extraction and nuclear generation – on biodynamic systems catalysed the initial concern with energy efficiency.

More recently, the need for both energy and water efficiency have been couched around three major themes. They are:

- Resource efficiency as a means by which to reduce the demand for costly infrastructure and development.
- Resource efficiency as a means by which building owners and occupants can achieve better value for money and reduce the costs of energy and water consumption.
- Resource efficiency as crucial to addressing climate change.

Initially the commentary around interventions to increase resource efficiency was characterised by a preoccupation with energy, and a focus on three sectors: the residential buildings sector, the transport sector and the industrial sector. That energy efficiency focus still tends to dominate the resource efficiency agenda.

There has, however, been a distinct shift to the attention being paid to the commercial buildings sector. This reflects emerging recognition internationally that the energy consumption in the sector broadly embracing private offices, retail, leisure, hospitality and warehouses has shown significant growth with little energy efficiency gains. That growth has been obscured for many years.

Disaggregated analysis, however, shows that the commercial sector in the United Kingdom not only increased its energy consumption between 1973 and 2000, but failed to wring any energy efficiency gains over that period. There was no improvement in the ratio between energy consumption and GDP over the last two decades in the commercial sector during the last two decades of the twentieth century.[2] Worldwide buildings contribute to 30-40 percent of energy use. In Europe it is estimated that commercial buildings account, on average, for 36 percent of the energy used in buildings and 8.17 percent of total energy use.

Some commentators argue that residential buildings present the greatest potential for aggregate energy savings or benefits derived from improved energy efficiency. Others suggest that "energy efficient improvements in commercial buildings represent an important path to energy saving."[3] Ciochetti and McGowan conclude that in the United States: "While residential buildings consume the majority of energy in the building sector this is due to the sheer number of homes in the U.S." On the floor area basis, however, they argue that "residential consumption is almost half that of commercial office

[2] Wade, Pett and Ramsay, 2003.

[3] Next 10, 2010.

buildings." That high level of energy consumption, they argue may mean that the commercial buildings sector provides more opportunity for energy efficiency improvement than residential buildings.[4]

Within the non-residential building sector, commentators have suggested that for new commercial buildings significant savings in energy use of 75 percent or higher per building can be made. The potential savings per existing building are generally presented as being less. However, because most energy is consumed in existing non-residential buildings and existing residential buildings make up the bulk of buildings in the short to medium term, there is an increasing recognition of the need to establish effective ways to retrofit existing commercial buildings. The need to improve the efficiency of the equipment used to operate the buildings themselves and used by the businesses situated in them is also becoming highlighted in research, industry and policy commentary.[5]

There are a number of benefits that commentators have and are associating with improving the resource efficiency of buildings in the non-residential stock. Because of the international concerns around climate change in recent years, many of those benefits are calculated in terms of reductions in CO_2 emissions. However, there are a wide variety of co-benefits cited by commentators including:

- job creation;
- enterprise development and business opportunities;
- energy security and resilience;
- increased economic competitiveness;
- improved indoor and outdoor air quality;
- increased comfort and improved quality of life.[6]

A recent survey of landlords and tenants in the European commercial buildings sector found that tenants, investors, owners and developers had an interest in green buildings both as a business asset and as providing benefits in relation to operating costs. That survey found relatively little variation between landlords and tenants around the benefits of buildings that minimise resource use. Benefits reported by landlords and tenants together were:

- 24 percent – reducing energy and water consumption;
- 23 percent – savings in building running costs;
- 9 percent – reducing carbon emission;
- 6 percent – enhanced corporate image.[7]

It is notable that 'hard' benefits related to costs for tenants and, consequently, potential for higher capital returns to owners and developers are much more attractive to the landlords and tenants in this survey than what might be described as 'soft' considerations such as image and corporate responsibility related concerns about climate change.

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[4] Ciochetti and McGowan, 2009.

[5] Nelson, Rakau and Dorrenberg, 2010.

[6] Levine, 2007; Saville-Smith and Warren, 2010.

[7] Rossall, Peeters and Creamer,2009.

Both academic and market researchers overseas have pursued the issue of the returns to landlords, investors, developers and tenants in a proliferation of research over the last few years designed to demonstrate the value case for resource efficient buildings, particularly energy efficient buildings. The benefits identified in that research include:

- Higher effective rents;
- Increased transaction values; and
- Financial returns that meet the hurdle rates of institutional investors.[8]

The metrics around the demonstration of economic benefits for the range of stakeholders in the commercial buildings sector is generally agreed, however, to be embryonic. Those metrics are seen to be limited in so far as they: Have a weak evidential base; Are not established as accepted both in relation to measure and scope; and, do not necessarily 'read to' or measure the particular interests of stakeholders and their particular roles within the complex value chain that makes up the commercial buildings sector.

Pett and Ramsay describe those stakeholders as consisting of seven categories, each with somewhat different interests and roles, in the commercial building sector. They are: Investors, property developers, construction companies, property managers, professional advisers, policy and governance and users/occupiers (Infobox 3).[9] Others see the critical stakeholders as primarily landlords and tenants.

[8] Kok et al., 2010.

[9] Pett and Ramsay, 2003.

Infobox 3: Stakeholders and Roles in the Commercial Buildings

Investors	Invest in property to earn income and/or capital growth. Range from private individuals to banks and financial companies to balance fund portfolios. Companies invest in their own and other property to maximise return on capital assets. Insurance/superannuation companies use investments to manage future liabilities.
Property developers	Profit from buying land or property, developing and redeveloping property, property to earn increased returns on investment and costs of upgrade. Can carry out design and building process, may subsequently own and manage property. They employ constructions companies, architects and property management companies.
Construction companies	May be property developers but may simply make profit from the construction process.
Property managers	Rent, lease and manage tenancies of properties often on behalf of other organisations. Maximise rental return for the owners (landlords or investors)
Professional advisers	Includes architects, designers, land surveyors, valuation surveyors, building services engineers, facilities managers.
Policy and regulatory agencies	Those involved in policy, planning and legislation relating to property and environment including policing regulatory compliance.
Users	Strategic users – managers of firms using offices and require them to provide a place where the firm operates. Operational users – are premises managers and may be environmental or energy managers. Passive users – are for this purpose taken to be anyone who works in or uses the building as a client or consumer. Firms that use offices fall into owner occupiers or tenants, whether they own the building (owner occupiers) or whether they lease it (tenants).

5.1 Incentivising and Regulating Resource Efficiency

In addition to, and in part driven and rationalised by, commentary around the need and benefits of resource optimisation in the commercial buildings sector, has been the proliferation of instruments and mechanisms designed to promote the adoption of resource, in particular energy, efficient design, construction and operational practices in the commercial building sector.

Some of those instruments and mechanisms involve mandatory regulated standards for appliances, building and/or system performance. There are other tools which encourage consumer sovereignty through the disclosure of performance related information.

There is an increasing range of market based tools which encourage resource efficiency through incorporating resource efficiency into the contracting, leasing and procurement processes already existent in the commercial building and real estate supply chains. Those include such developments as energy performance contracting and co-operative procurement. Finally there are a series of tools which involve direct financial transactions such as taxes or tax exemptions, charges, capital subsidies, grants and subsidised loans.

Table 4 provides a brief summary of the array of approaches used internationally and indicates the countries in which those approaches have been adopted.

Table 4: Tools and Policy instruments by Type and Selected Examples of Tools Adopted (2007)[10]

Tools and Policy Instruments	Countries	Type
Appliance standards	EU, US, Japan, Australia, Brazil, China, NZ	Mandatory/regulatory
Building codes	Singapore, Philippines, Algeria, Egypt, US, UK, China, EU, NZ	Mandatory/regulatory
Procurement regulations	US, EU, China, Mexico, South Korea, Japan	Mandatory/regulatory
Mandatory labelling and certification programmes	US, Canada, Australia, Japan, Mexico, China, Costa Rica, EU, NZ	Mandatory/regulatory
Energy efficiency obligations and quotas	UK, Belgium, France, Italy, Denmark, IE	Mandatory/regulatory
Utility demand-side management programmes	US, Switzerland, Denmark, Netherlands, Germany, Austria	Mandatory/regulatory
Energy performance contracting	Germany, Austria, France, Sweden, Finland, US, Japan, Hungary	Economic/market based
Co-operative procurement	Germany, Italy, UK, Sweden, Austria, Ireland, Japan, Poland, Slovakia, Switzerland	Economic/market based
Energy efficiency certificate schemes	Italy, France	Economic/market based
Kyoto Protocol flexible mechanisms	China, Thailand, Central and Eastern Europe	Economic/market based
Taxation (on CO2 or household fuels)	Norway, Germany, UK, Netherlands, Denmark, Switzerland	Financial
Tax exemptions / reductions	US, France, Netherlands, KO	Financial
Public benefit charges	Belgium, Denmark, France, Netherlands, US	Financial
Capital subsidies, grants, subsidised loans	Japan, Slovenia, Netherlands, Germany, Switzerland US, Hong Kong, UK, China, Russia, India, Indonesia, Iran, South Africa, Venezuela, Kazakhstan	Financial
Voluntary certification and labelling	Germany, Switzerland, US, Thailand, Brazil, France, NZ	Support, information a voluntary action
Voluntary and negotiated agreements	Mainly Western Europe, Japan, US, NZ	Support, information a voluntary action
Public leadership programmes	NZ, Mexico, Philippines, Argentina, Brazil, Ecuador, NZ	Support, information a voluntary action
Awareness raising information campaigns	Denmark, US, UK, Canada, Brazil, Japan, NZ	Support, information a voluntary action
Mandatory audit & energy management requirement	United Sates, France, Egypt, Australia, Czech Republic,	Support, information a voluntary action
Detailed billing and disclosure programmes	Ontario, Italy, Sweden, Finland, Japan, Norway, California	Support, information a voluntary action

[10] Main source for this table is Levine, 2007. The Table was developed in Saville-Smith and Warren, 2010.

5.2 Low Take-Up of Resource Efficiency Solutions

Previous research in the BEES programme suggests that jurisdictions supporting the adoption of technical design, construction and systems solutions by an integrated range of these tools and mechanisms tend to be most successful in promoting resource efficient new buildings and encouraging retrofitting in existing buildings.[11] However, even where an active and diverse range of tools and policy instruments exist, the commercial building market has shown considerable resistance to change.

In that context, there has been a proliferation of commentary and some studies around the institutional structure and dynamics of the commercial building sector. Broadly, that research and commentary had postulated two models to explain sluggish take-up of energy optimisation in the commercial building sector. Those are the "vicious circle of blame" model and the "split incentives model".

5.2.1 Vicious Circle of Blame

The first model emerged about a decade ago and portrays the sector as characterised by inertias in the supply chain which building occupiers and tenants have little ability to influence. In this model the supply chain is portrayed as conservative, fragmented, self-maximisers unwilling to supply buildings that are fit for purpose. Stakeholders in the supply chain are seen as persistently rationalising the failure to deliver technically achievable resource performance outcomes by citing barriers presented by other stakeholders. This 'circle of blame' model (see Figure 1) has been cited explicitly or implicitly as justification for the institution of regulatory requirements around resource performance in commercial buildings.

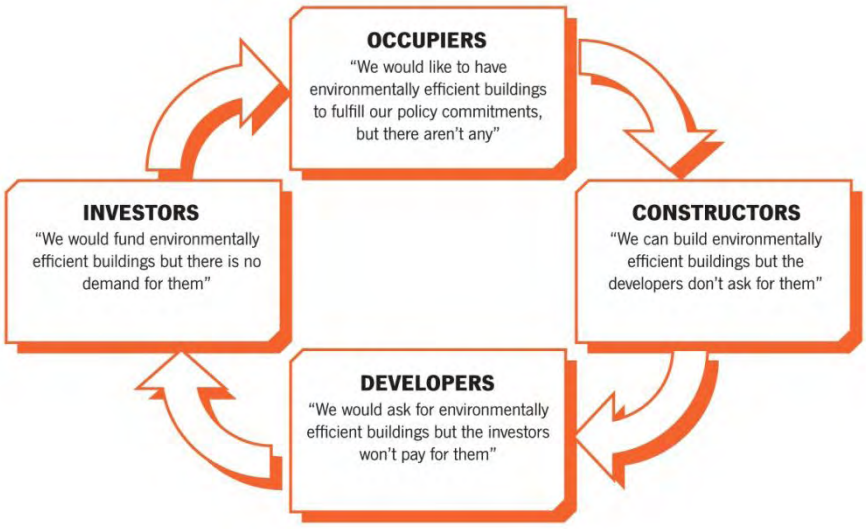


Figure 1: The Commercial Building "Vicious Circle of Blame"[12]

[11] Saville-Smith and Warren, 2010.

[12] Reproduced from Pett and Ramsay, 2003.

5.2.2 The Split Incentives Model

The second model of the commercial building sector that has emerged as explaining a tendency for take-up to be inhibited is the split incentive model.

The split incentive model postulates principal-agent market barriers in commercial buildings. Principal-agent barriers arise when a party that makes decisions is not affected by the consequences of these decisions. In the context of energy efficiency in non-residential buildings, two scenarios are commonly referenced as examples of this split incentive.

One scenario relates to where a building owner takes the burden of costs associated with designing and constructing a high efficiency building but the advantage lies with tenants who benefit through reduced utility costs. Of course, the other example is where tenants bear the costs of retrofit, outfitting, or managing energy more efficiently with benefits residing with building owners by way of improved valuation or reductions in utility costs where tenants are in gross rent contracts.

Split incentives which allow individuals to act in ways that incur costs that they themselves do not have to bear according to economists generate moral hazard and ultimately distorted and inefficient markets. It is in the context of this form of market failure that responses have emerged. The first response has been regulation attempts to inhibit the generation of costs that are unmanaged by market mechanisms. The second response also involves interventions through public, rather than market actors, by way of government incentives. Those incentives effectively compensate for the cost arising for market players acting to reduce real costs, but costs to which they may not be exposed because of the principal-agency affect. These responses both of which are governmental interventions, either nationally or at the local level, have been the primary mechanisms implemented to date in international jurisdictions.

Other more market-based responses are emerging to deal with the problem of split incentives and the moral hazard associated with them. All of these attempt to address a fundamental problem of asymmetric information between the principal and the agent. Those are:

- The promotion of incentive compatibility. This involves attempts to demonstrate and quantify the distribution of costs and benefits across the value chain in ways in which those costs and benefits are seen as (and are) equitably distributed.
- Managing split incentives through contractual mechanisms.
- Instituting market mechanisms that make transparent the performance of commercial buildings and, consequently, provide for premium market pricing in response to reduced moral hazard.
-

Those responses are manifesting themselves in the emerging:

- Development of green leases and contracts;
- Building accreditation, certification and performance measurement; and
- Development of accountancy valuation and payback analyses that recognise the premium values that may be associated with “green buildings” and may off set increased initial investment over building life-cycles.

5.2.3 How Useful Are These Models?

Even overseas, there is considerable debate about the effectiveness of both the exploratory model and the tools and instruments for stimulating market transformation in the non-residential buildings sector. This reflects:

- A lack of systematic evaluation of different policy instruments. [13]
- Deficiencies in the operating and transaction data which might demonstrate the performance benefits (financial and otherwise) of commercial buildings that optimise resource use compared to those that do not.[14]
- A lack of agreed standards for resource optimal and other buildings.
- Variability across the value chain in relation to both their awareness and their 'valuation' of resource optimisation.

What is clear, however, is that there is a complex value chain in which decisions are made around developing and redeveloping buildings, selecting tenancies, and retrofitting and refitting buildings and/or the premises inside them. Across that value chain there is a multiplicity of perspectives around the benefits associated with resource optimisation.

The current set of emerging responses tend to be geared to that part of the commercial buildings sector that is involved in new building development, significant redevelopment and/or organised around the interests of major investors and significant anchor tenants. This raises issues around the extent to which the dynamics of the commercial buildings in New Zealand are likely to be most effectively addressed through that focus.

Two sets of data are used to come to some preliminary reflections on that issue. Firstly, data pertaining to the non-residential building sector drawn from surveys of premises undertaken in the BEES programme in 2010 and secondly, four interviews with owners and active consumers of non-residential buildings. These are designed to explore themes that may indicate qualitative differences between different sets of building managers to establish whether there appears to be different approaches among the diversity of building ownership and management relations evident in BEES surveying. If there is prima facie evidence in New Zealand, as there appears to be overseas, that the different segments in the non- residential building sector have different interests in relation to buildings, this then raises the issue of mapping out those approaches in relation to the building stock and resource consumption.

[13] Ries, Jenkins and Wise, 2010.

[14] Nelson, Rakau and Dorrenberg, 2010.

6. DYNAMICS IN NZ'S NON-RESIDENTIAL BUILDING STOCK

The literature around resource optimisation in non-residential buildings indicates some key dynamics that provide opportunities to improve the performance of buildings and/or reduce moral hazard associated with split incentives between landlords and tenants.

6.1 Moral Hazard and Split Incentives

At the heart of the split incentives argument is a division between the interests of owners and tenants. The split incentive takes one of two major forms. The first form is where tenants pay directly for their energy and/or water. Under that arrangement, the building owner has no direct[15] incentive to improve the thermal envelope, lighting or operating systems of a building in ways that will reduce energy and/or water consumption among tenants.

The other form of split incentive is where a tenant's access to energy and/or water is provided through the rental payment itself. Under those conditions, it is argued that tenants have no incentive to behave in ways that will minimise resource use because the costs of energy and water use are fixed by the existing rent, and the landlord has little ability to monitor or modify the behaviours that generate excess consumption.

In that context, two characteristics of the New Zealand non-residential building stock become important:

- Firstly, the tenure status of premises occupying non-residential buildings.
- Secondly, whether tenants access utilities directly or through a gross rent arrangement.

5.1.1 Tenure Status of Premises in Non-Residential Buildings

Of the 366 premises participating in the BEES surveying of Strata 1-5 buildings, the vast majority are tenants. A tiny number of premises are sub-tenants and the remaining businesses are owner occupiers (Table 5).

Table 5: Tenure Status of Participant Premises

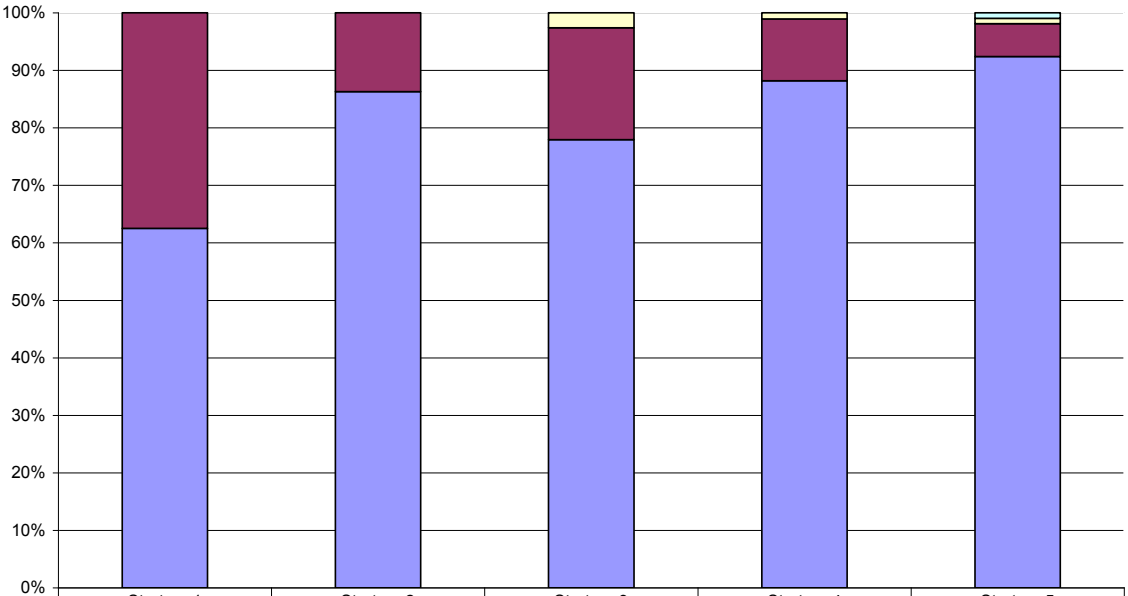
Tenure	Premises	% Premises
Tenants	308	84.2
Owner-occupiers	53	14.5
Sub-tenant	4	1.1
Unknown	1	0.3
Total	366	100.1

It is notable that the pattern of occupying premise tenure varies from stratum to stratum. Of the 105 premises in Stratum 5 buildings, 92.4 percent are tenants compared to only 62.5 percent of premises

[15] It can be argued that even under those circumstances, building owners might have some incentive if operating cost savings by tenants could be partially at least transformed into increased rents.

in Stratum 1 buildings, 86.3 percent in Stratum 2 buildings, 77.9 percent of buildings in Stratum 3 buildings and 88.2 percent of premises in Stratum 4 buildings (Figure 2).

The substantial minority of premises in Stratum 1 buildings that are owner occupied suggests that interventions to encourage resource efficiency in those buildings may need to be of a very different nature than those for other strata. There is no split incentive for these owner occupiers.



	Stratum 1	Stratum 2	Stratum 3	Stratum 4	Stratum 5
Unknown	0	0	0	0	1
Sub tenant	0	0	2	1	1
Owner occupier	15	7	15	10	6
Tenant	25	44	60	82	97

Figure 2: Tenure Status of Premises in Strat1-5 Buildings

5.1.2 Accessing Energy and Water

There is a distinct difference between the pattern of payment for water compared to the pattern of payment for energy which goes beyond whether utility costs by tenants are paid within their rent or additional to it. That is, irrespective of the building stratum in which a premise is located and irrespective of tenure, there are significant proportions of premises that report either not paying for water or not knowing whether they pay for water. The lack of exposure to a pricing mechanism for water is particularly evident when comparing electricity to water (Table 6).

Table 6: Exposure of Premises in Strata 1-5 BEES Buildings to Electricity and Water Pricing

Payment Method	Electricity		Water	
	Premises	%	Premises	%
Paid directly to a supplier	264	72.1	54	14.8
Itemised and paid to landlord	43	11.7	43	11.7
Non-itemised in rent	35	9.6	103	28.1
Do not pay	0	0.0	106	29.0
Payment not known	24	6.6	60	16.4
Total	366	100	366	100

Among the 366 premises in Table 6, there are 309 premises occupied by tenants or sub-tenants. 74 percent of those tenants or sub-tenants pay for their electricity directly to a supplier while 23.3 percent paid for electricity to their landlord. This means almost a quarter of tenant and sub-tenant premises[16] operated in an environment in which their electricity consumption had no immediate or direct impact on their operating costs. Indeed, of the tenants or sub-tenants who paid their electricity through their rent, 43 percent had no idea of their energy consumption because their energy use was not itemized as a separate item in their rent.

It should be noted that where tenants are billed for their electricity directly by a landlord, even where it is itemised, tenants are generally unable to negotiate alternative supplies. In around 10 percent of cases, they will be entirely buffered from the cost implications of their energy consumption and the building's energy efficiency.

6.2 Greening Buildings: Tenancy Change and Refitting

The international literature identifies that change of tenancy and refitting offer opportunities to tenants and landlords respectively to retrofit and improve the resource performance of existing buildings. Changing tenancy also provides an opportunity for tenants to select new resource optimal buildings, and investors/developers to attract tenants to new buildings. Under those circumstances, the patterns of non-residential building turnover, tenancy change, and duration of occupation become critical issues.

6.2.1 Tenancy Change

Table 7 sets out the occupancy duration of premises in Strata 1-5 buildings in the New Zealand non-residential building stock. Those occupancy patterns suggest significant churning of occupation around the seventh year. Nevertheless, around a quarter of premises have retained their occupation of a building for twelve years or more

[16] That is, all those who have no direct payment relationship with the power supplier. It should be noted that even where electricity may be itemized in the context of a landlord's accounts, tenants have little ability to influence the conditions of supply or, indeed, the calculation of the allocation of costs for public spaces.

Table 7: Duration of Premise Occupation

Duration of Occupation	Premises	% Premises
1 year or less	43	12.3
2-6 years	151	43.4
7-11 years	68	19.5
12-16 years	39	11.2
17-21 years	16	4.6
22 years or more	31	8.9
Total	348*	99.9^

** 18 missing cases ^ Total percent varies from 100 due to rounding*

Owner occupiers have particularly long duration times. The average duration of occupation for all premises is 9.1 years, but for owner occupiers it is 19.4 years. Among tenants the average duration time is 7.4 years.

The tendency for a significant churn after six years is likely to reflect the prevailing use of fixed term leases among the 85.6 percent of premises that are tenanted (Table 8). Fixed term leases are frequently set at three or six year terms with rights of extension for a further period of three years. There is also some variation in the duration of occupation in each stratum. Table 9 sets out the average, median and range of occupation durations for premises in Strata 1-5 respectively.

Table 8: The Lease Arrangement of Tenant Premises

Lease Type	Premises	% Tenanted Premises
Fixed Term Lease	219	70.2
Periodic Lease	45	14.4
Other	12	3.8
Unknown	36	11.5
Total	312	99.9*

** Total percent varies from 100 due to rounding*

Table 9: Occupation Durations for Premises in Strata 1-5

Premise Location	Mean Years	Median Years	Minimum Years	Maximum Years
In Stratum 1 Building	15.8	10.5	< 1	52.0
In Stratum 2 Building	6.5	5.0	< 1	25.0
In Stratum 3 Building	10.9	6.0	< 1	66.0
In Stratum 4 Building	8.3	5.0	< 1	99.0
In Stratum 5 Building	7.4	5.0	< 1	92.0

6.2.2 Refit

It is notable that 59.2 percent of premises reported having undertaken some sort of refit of their premises within their current building. Refits and fit-outs tend to be associated with take-up of a new tenancy. In premises occupying Stratum 5 buildings these frequently consisted of fitting out empty shell spaces. By contrast premise refits in Strata 1-4 buildings tended to be modifications of already fitted out

spaces. These modifications were directed primarily to cosmetic appearance and spatial redistribution. Moreover, while a small number of premises referred specifically to installing or changing the air conditioning and/or heating system, and undertaking plumbing or lighting fit-outs, no premises indicated that they were prompted by or concerned with reducing energy or water consumption.

6.3 Managing Building Performance

For many years, the physical management of building systems has been a primary focus of initiatives to optimise resource performance. The survey of premises in New Zealand's non-residential buildings explored the nature of the tenant and building management in the building that they occupied. The managerial status of the buildings in which premises were located is extremely diverse, and in some buildings and for some premises management appears to be quite distanced. This is particularly the case in Strata 1-4 buildings.

Among premises in Strata 1-4 buildings, over a fifth reported that the building is neither managed by a landlord nor a building manager. The proportion of premises in Stratum 5 buildings in which neither a landlord nor building manager was reported is considerably smaller at only 5.7 percent of premises in that stratum. Indeed among premises in Stratum 5 buildings, over a third of premises (35.2) reported that their building was managed by both a building manager and the landlord. Management by building managers or landlords models were also reported by significant proportions of premises in Strata 1-4 buildings (Table 10).

Table 10: Building Management of Participant Premises

Building Management	% Strata 1-4 Premises	% Stratum 5 Premises
No building management	22.6	5.7
Landlord manages the building	36.8	31.5
Building manager manages the building	36.8	24.8
Building managed by landlord and building manager	3.8	35.2
Not known	0.0	2.9
Total	100	100.1

** Total percent varies from 100 due to rounding*

7. MANAGING BUILDINGS: PERSPECTIVES AND APPROACHES

It is clear that if New Zealand's non-residential building sector and stock is characterised by anything, it is diversity. The buildings are physically diverse, and they are put to use by a diversity of business sectors. As Table 11 shows, the business sectors represented by the premises participating in the first wave of BEES surveying embraced everything from wholesale trade to construction. That diversity is also evident in the patterns of ownership, and occupation, and building management in the New Zealand non-residential buildings sector.

Table 11: Business Sectors Using Non-Residential Buildings

Business Sector	Strata 1-4		Stratum 5		Total	
	Premises	*%*	*Premises*	*%*	*Premises*	*%*
Retail Trade	77	29.5	33	31.4	110	30.1
Property and business services	47	18.0	31	29.5	78	21.3
Finance and insurance	36	13.8	9	8.6	45	12.3
Government administration and defence	25	9.6	8	7.6	33	9.0
Health and community services	14	5.4	7	6.7	21	5.7
Personal and other services	12	4.5	4	3.8	16	4.4
Education	9	3.4	3	2.9	12	3.3
Not stated/Unclear	8	3.1	3	2.9	11	3.0
Accommodation, cafes and restaurants	7	2.7	3	2.9	10	2.7
Construction	7	2.7	2	1.9	9	2.5
Manufacturing/ Other Manufacturing	6	2.3	1	1.0	7	1.9
Communications services	6	2.3	1	1.0	7	1.9
Cultural and recreational services	3	1.1	0	0.0	3	0.8
Wholesale trade	2	0.8	0	0.0	2	0.5
Electricity, Gas and Water	2	0.8	0	0.0	2	0.5
Total	**261**	**100**	**105**	**100**	**366**	**99.9**

** Total percent varies from 100 due to rounding*

Whether that diversity is similar to the extent of diversity overseas has not been subject to analysis at this point. Irrespective, if we are to understand how buildings are managed and the extent to which they are (or are not) managed for resource optimisation, practices across their diverse conditions need to be analysed, we will need to better understand the perspectives of the diversity of actors involved in building management in the various permutations of ownership, occupation and management found within the non-residential buildings sector.

As it has been previously noted, BEES envisaged a set of interviews and surveys with owners and building managers in a representative set of monitored buildings. Those have been delayed while a representative set of monitored buildings is being established. While that is being completed, we have sought some preliminary insights into this complex value chain and diverse permutations of ownership, occupation and building management by interviewing examples of four particular types of stakeholders. They are:

- Owner occupiers with tenants.
- A hands-on landlord with a multi tenanted building.
- A facilities manager that manages the facilities of a number of buildings for a number of landlords.
- A property portfolio manager.

Those four interviews were undertaken using semi-structured interview guidelines and conversational interviewing techniques. Each interview explored:

- The scope of their role in relation to non-residential buildings.
- The focus and outcomes sought in relation to facilities management.
- The nature of their engagement with tenants
- Their key priorities and how they measure whether those key priorities have been achieved.
- Their views on building performance and how it is measured.
- Views on the imperatives for building sustainability and pathways to achieving sustainability.

The following discussion provides an analysis of the data generated by those interviews. It starts with a brief description of the interviewees themselves. It then focuses on how those interviewees articulate their perspectives and approaches to:

- The goals of building management and involvement in the non-residential buildings sector.
- Building and tenant management.
- Building maintenance, repair and refitting.
- Building performance and resource optimisation.

The analysis around each of those themes compares and contrasts two broad categories of interviewees. Those are:

- Those for whom leasing and tenanting buildings is effectively a form of self-employment, and
- Those for whom buildings are effectively an investment vehicle.

7.1 The Interviewees

Infobox 4 provides a brief summary of the background and current position in the non-residential buildings market for each interviewee.

Infobox 4: Building Stakeholder Interviews

Building Stakeholder Category	Characteristics
Owner Occupier with tenants (Landlord 10)	A residential landlord for 30 years this landlord has been a landlord of commercial buildings for 10 years. The landlord owns four multi-storey commercial buildings, all in Wellington and not exceeding four storeys. The landlord retains a residential portfolio that exceeds in number his commercial portfolio. In addition to his property portfolio, he runs a service business from one of the buildings he owns. He estimates that managing his commercial buildings takes around 2.5 percent of his time.
Hands on landlord with multi-tenant building (Landlord 8)	This landlord started his career running a building company and as a builder. He previously had an extensive residential property portfolio that he rented until 2005. He has divested himself of that portfolio and replaced it with a single 8-floor, multi-tenanted office building in the central business district. He has been a commercial landlord for that building for the last eight years. On average he expects to spend around 1.5 hours or less a day managing the building. This varies according to his tenancy and refit schedule.
Facilities Manager on behalf of Landlords	This interviewee is the national facilities manager for a Trust that acquires properties which will lead the market in terms of operational efficiency. The interviewee is a full-time manager of the portfolio's facilities and has been with this landlord since 1997. He manages outsourcing of facilities management of individual buildings in a property portfolio values at $NZ 1.85billion. The majority (60 percent) of the property assets consist of retail while the remainder is made up of office buildings. 49 percent of the property is in Auckland with the remainder being in Christchurch, Wellington, Palmerston North and Hamilton.
Property Portfolio Manager	This interviewee joined a property trust in 1994 and has been in a managerial position since 2003 of a property network with a portfolio of 81 buildings valued at $NZ933 million and over 290 tenants. The average value of a property is $11.4 million. The interviewee's role is to ensure the portfolio's investment performance and rental yield performance.

7.2 Building Management: What is the Goal?

These four interviewees presented a contrast around goals for those involved in non-residential buildings as primarily a form of self-employment compared to those who are participants in generating value for investors in non-residential buildings. The analysis of these interviews does not generalise to the population of owners. It identifies the potential of an ideal type and taxonomy that may allow us to explore further whether these types are prevalent across the sector and the types of buildings they may acquire. This approach is a well established method of preliminary exploration and analysis.

7.2.1 Buildings as self employment

The former take a do-it-yourself approach to building management, in which three goals are evident:

- Reducing direct and indirect costs.
- Keeping tenants satisfied.
- Securing a steady, not necessarily a maximised, income stream.

- Being accountable to no one but themselves.

Two of the interviewees treat buildings as self-employment. Both have come from the residential sector as landlords with one purchasing his only commercial building eight years ago (Landlord 8) and the other purchasing his first commercial building ten years ago (Landlord 10). The latter still has more residential buildings than commercial buildings and uses one of his own multi-tenanted buildings for operating his array of business interests.

Their activities are marked by minimisation of their active engagement in the management of each building while at the same time keeping their tenants 'happy' and reducing direct cash expenditure.

The balance between these imperatives is achieved by:

Commissioning out tasks which are time consuming and unpredictable in terms of outcome achievement. Consequently, both Landlord8 and Landlord10 contact real estate agents to undertake tenant recruitment, but do not use building managers.

> *"I use an agent for letting vacant premises but do all the facilities management myself. That includes everything - fit-out, on-going maintenance and day-to-day management of tenants as required... When a letting agent has signed up a new tenant, I have the agent introduce me and the tenant and then I take over from there. I try to get to know tenants and be as approachable as possible – Some things tenants prefer that they can speak direct to a landlord rather than having to go through a property manager." Landlord8*

> *"In general for recruiting tenants for the commercial properties I use real estate agents – I could do it myself but just as efficient to use agents. That said, most recently had a downstairs space available at [....] and just placed a small notice in the window – I let it within a week from someone walking past. Day to day property management and tenant management I do myself." Landlord10*

Substituting professional building management. This is couched in terms of a perceived lack of value for money from building managers, the ability of landlords to undertake facilities and building management more effectively than building managers and the preferences of tenants.

> *"Don't use a building manager. There is nothing they can offer that [I] can't do myself and therefore it's just an unnecessary cost. Not a hard job, nothing to it. Costs for the owner can actually go up because of poor decisions made by building mangers ... A certain percentage of tenants like dealing direct with the owner." Landlord8*

> *"Don't use a building manager and there are several reasons for this. First you lose contact with tenants and that is an important part of staying on top of any issues with the building. Property managers do not have a real understanding of what maintenance is required and what needs to be planned for. They are reactive not proactive. From being a tenant myself and having not used a property manager I know that property managers are very reactive. That costs. Reactive work can end up costing a lot more than if you do work on a regular basis. Know of other buildings where large repairs were required which could have been avoided if maintenance was done proactively. Do it yourself gives you certainty. Know I'll do it right first time." Landlord10*

Substituting all or part of professional trade provision of repairs, maintenance and refitting with personal labour. Those needs are often described as relatively minimal.

> *"Do most building related tasks both refitting and on-going maintenance. Will use specialised tradesmen if it is a task I can't do – for instance air conditioning or electrical work. If you buy*

buildings with good bones and keep them regularly maintained they don't need a lot of work. This building [owner occupied building] was structurally very sound – gutted and replaced bathrooms and kitchen in my space and added on two tenancies as a new addition to the building. Other than that it's really just been painting and decorating... If you have lots of parties they are all trying to do the cheapest job possible and they won't do the job with the same care and attention that the owner would. Owner occupiers probably do a better job on maintaining buildings because the straight owners are just interested on maximising return from investment whereas the owner occupier also has to work in the building." Landlord10

"My involvement in the building varies – particularly intensive around the fit-out period when first purchased the building (at the time had 3 vacant floors) and then a subsequent tenancies have come vacant and I have able to fit-out remaining floors. As a general rule it is part-time. I have a building company that come in to do all fit-out work – I often still chip in with painting, building etc." Landlord8

Overall, Landlord8 and Landlord10 do not use property managers because they are do-it-yourselfers in relation to property maintenance and refit. Both tasks they approached in very much the same way as do-it-yourself home owners do. That is, with a combination of: confidence in their own abilities; wanting to directly manage any necessary trades; and in the belief that the repairs and maintenance work is relatively minimal.[17]

"Building is washed (including windows) once per year, windows cleaned 3 other times annual (so roughly quarterly). Other than washing – building envelope doesn't require other maintenance. Pipes etc are copper and electrics all sound." Landlord8

"I try to fix problems as soon as they are brought to my attention. Have a maintenance schedule for specific components that need regular checking but other than that try to keep larger jobs and redecorating for between tenancies. I do have a maintenance budget but it is more a contingency and hasn't had any major problems." Landlord10

Refitting is largely superficial in nature and minimised as much as possible and tenants are fitted to the building. Most tenants are undemanding.

"I don't really worry about performance as such – As a small landlord you get it [the building] running as smooth as possible and then you max out. There is only so much the market is willing to pay so you can't keep trying to squeeze more returns out of the building." Landlord8

"If there are any particular problems with performance the tenants will let me know. I am seen regularly and they can make contact with me as needed – they keep me informed it's a partnership. I tried to find the right tenant for the right space and this has meant fairly minimal refitting being required. In 10 years as a commercial landlord none of my tenants has requested specific features to be added or removed from the buildings." Landlord10

7.2.2 Buildings as an Investment Vehicle

Two interviewees saw buildings primarily as an investment vehicle despite having somewhat different roles in relation to those buildings.

The national facilities manager has a full-time role in ensuring that the buildings in his employer's portfolio are managed efficiently. He does this by contracting out the facilities management of individual

[17] See Saville-Smith 2005 and Saville-Smith and Amey 1999.

buildings. That contracting out is undertaken within set parameters that reflect his perspective on the goal of non-residential building management. That is ensuring buildings are operated at the premium end of the market to attract strong income and investment returns. That performance is measured through energy efficiency.

The interviewee involved in property portfolio acquisitions and management is also concerned with buildings that show strong income potential and investment returns and seek to manage them to:

- Reduce the operational costs of the building.
- Maintain tenants that are willing to pay premium pricing within the market for buildings of a higher level.

A number of measures of building performance are used to indicate asset value and the long term performance value of a building in that context. They include: energy and water consumption performance; building systems such as air conditioning and other operating systems that drive costs; and maintenance and replacement costs.

The goal of cost reduction noted by these two interviewees is not significantly different from Landlord8 and Landlord10. The manner, in which it is pursued, however, is very different. Significant effort is put into benchmarking building performance and identifying elements of that performance that are amenable to improvement.

The National Facilities Manager is entirely focused on those issues full time and considerable effort is made to benchmark and monitor buildings in his Trust's portfolio. A similar view is expressed by the Property Portfolio Manager.

> *"The company has set up systems and benchmarks over the course of 7 to 8 years. They have a means of tracking and benchmarking from previous years and also from building to building. For each building they have a rolling 12 month per square metre measurement and within that they have a budget and a benchmark. Incentives may exist from time to time for a facilities manager to achieve certain goals. There will be a mix of outsourced people on the ground an additional person backing them up and finally reporting to national Facilities Manager." National Facilities Manager*

> *"We can pick up very quickly if a building is out of step. As we have a large enough portfolio we are able to benchmark buildings against each other in-house." Property Portfolio Manager*

Indeed, the costs associated with improving building performance, especially through close building management, is seen offering very real returns in new as well as existing older buildings:

> *"We have found that the majority of savings can be made manually without sophisticated systems as long as you are managing responsibly... Just because it is an old building with no rating does not mean we cannot attain savings... Over the past three years we have really made improvements around 12% in savings related to total wastage." Property Portfolio Manager.*

The organisations in which these interviewees work dedicate significant in-house and contracted in resources to building management for higher performance:

> *"Our facility managers are instructed to focus on tenant occupancy and service to the tenant, therefore they would spend 50% of their time answering tenant queries. When looking at improving the actual performance of a building we do bring in consultants, but between the property managers and the facilities managers they can identify situations when a building is not performing efficiently." Property Portfolio Manager*

The maximisation of income is a very different goal from the self-employed landlords. For them stability of income is the underpinning theme. Performance and income are largely decoupled. For those looking to maximise the income potential of the asset, there has to be a link between performance and income. Indeed, achieved performance, especially in relation to energy and water consumption, are seen as important aspects of a building in attracting tenants.

> *"It actually works from a marketing perspective because 80% of it actually saves you money." Property Portfolio Manager*

There are, however, limits to the return on resource efficiency, particularly with the new policy settings around tax and in the context of the international recession. Recent tax changes have changed the structure of costs around retrofit, plant and equipment improvements.

> *"Post budget a very large expenditure on green upgrades has been cancelled as there is now a financial disincentive to do so. Air conditioning will only last for 15 years and in a 50 year building cycle you are going to replace the air-conditioning 2 or 3 times. Lift is a great example, where we had plans for lift upgrades, now we will be maintaining the current equipment and yes it will mean additional energy costs but changes in depreciation will mean that it is not viable anymore. We have been encouraged to do the right thing but been dis-incentivised not to." Property Portfolio Manager*

The problems around depreciation changes have been exacerbated by tenant hesitation to undertake upgrades in the context of the international recession.

> *"Even tenants are not interested now because they don't want to pay more rental for a green building than they would pay for a normal building... Even some of our Government tenants where we have proposed green upgrades have said that they would prefer a lower rent. Tenants are quite happy to work with you to save money but in terms of being able to hang a badge on themselves and say we are in a green building that is less important now than it was 12 months ago." Property Portfolio Manager*

> *"In the current climate the market is not really seeing much "green ambition" with potential future demand. The supply side by way of technical ability and products is substantially ahead of the demand side... Currently energy is at a price where it does not encourage savings; it really needs to go up tenfold to have an effect on tenant behaviour." National Facilities Manager*

7.3 Tenants and Getting Better Resource Performance

For the self-employed/owner occupier landlords, the notion of building performance in relation to resource optimisation is completely foreign. This is not to say that they do not respond to excess resource consumption.

Landlord8 replaced the water system after being confronted with significant water charges associated with a failing, elderly system. Unable to pass the costs of water use on to his tenants, he replaced the system at considerable expense because the on-going costs of water was undermining his income and the payback period for the new water system was attractive.

Neither Landlord8 nor Landlord10, however, are typically exposed to energy costs. All costs are directly charged to tenants. For these landlords, energy efficiency is largely a matter for the tenants and they have no control over it. That there might be some advantage in reducing the energy costs through more efficient systems is not an idea that is given any serious attention.

"Electricity in the building is arranged and paid by me and then on-charged to the tenants quarterly. The electricity is around $40,000 per annum so is run as a separate business and I take a small margin on it to cover costs. One or two tenants don't pay on time. But I can't really do much about saving electricity as tenants have control over their spaces but I did tell tenants with electric boilers to not use them or to only turn them on 5 minutes before needing hot water. One of those on all the time costs about the same as having every light on the floor on all day. I don't bother to shop around too much for power – says there have been a lot of new companies sprouting up but many of them are retailers so prefers to deal with the actual supplier companies. My concern is less around costs and more around continuity of supply." Landlord8

"Rates/Insurance/Water etc paid by me and I factor those into the gross rental charged for each tenancy. In general other energy utilities are the tenant's responsibility. At the moment there is an issue with [Building] as the two new tenancies are on the same electricity meter as one of the original tenancies. This is being worked on and I hope work will be completed soon which will mean each tenancy is on its own meter. I keep energy separate because it means I don't have to act as a bank and also gives the tenant flexibility if they want to shop around for a plan that suits them." Landlord10

This notion of tenant sovereignty around resource consumption is also evident around those managing non-residential buildings as a revenue generating asset for investors.

"Haven't really entered the area of the tenants' space. Tend to just control the base building. [We do] provide their tenants' with a manual incorporating "green tips" .The protocol of the company is to allow tenants their own space without interference. As a Landlord they do support the tenant in sustainable behaviours but don't actually promote it" National Facilities Manager.

Nevertheless, there is a considerable interest in the ways in which tenants can be encouraged to reduce resource consumption.

"There is really very little control over tenants. This leads to an interesting relationship. A typical tenant occupies approximately 1000 sqm which equate to approximately $10-15,000pa of electricity cost. To reduce that cost markedly a consultant would have to be engaged making the total cost of savings a very small percentage of the running cost of a business. The landlord generally only has circuited lighting for the control of the base building. If the tenant wants to install energy friendly systems they have to pay extra, this is declined by most. Some may agree to pay for guards to turn off excess lights at night. Some tenants when signing up to a new lease or renewing a lease may negotiate for the landlord to install eco friendly lighting systems at no cost to the tenant. The cost dilemma is clear to the tenants as in order to incorporate energy efficient lighting systems there is a 7 to 8 year payback period. However in order to reward such initiatives there needs to me more and more payback." National Facilities Manager

"Even though the tenant is paying the costs of the energy does not mean that [we do] not have to focus on it as it will have an effect on the rental attainable on a building... Many landlords and tenants fail to focus on the consumption and cost of energy but once you can provide evidence and information a lot of them will... We do have meetings with tenants so we can progress further and maintain a focus. We find this works better with a facilities or property manager on a one to one with the tenant. This allows us to get a really good understanding of the tenant's business needs and then coming up with a profitable solution... If a tenant has certain requirements for example wanting to keep lights on the whole time we will work with them through our facilities managers to see if we can come up with a more efficient solution to keep the cost and energy consumption down." Property Portfolio Manager

7.4 Tools for Getting Better Resource Performance

It is unsurprising that those involved in non-residential buildings as primarily a form of self-employment appear to have little interest in tools or mechanism for getting better resource performance. For those who are participants in generating value for investors in non-residential buildings, getting tenants to be committed and willing to invest in resource optimisation is an on-going, if not always actively pursued, challenge.

Three issues preoccupy these interviewees. They are the:

- Problem of demonstrating the value of resource optimisation.
- Appropriate mechanisms to manage split incentives.
- Conditions and policy settings needed to prompt take up.

7.4.1 Demonstrating Value

Both the National Facilities Manager and the Property Portfolio Manager argued that tenants required demonstrated proof of the bottom line benefits of energy and water efficiency. Consistent with overseas experience, they both saw current benchmarks and performance monitoring as inadequate and unlikely to generate demand and/or a willingness to pay premium prices.

> *"The challenge around the landlord and tenant situation is based around a risk and reward basis... There are challenges with benchmarking in New Zealand as compared to other countries due to the small sample size. [We] do work with their sister company in Australia to help establish benchmarking, aspirational targets, budgets and targets (covering not only energy but also water and waste). Difficult for landlords and tenants to prove they act in a sustainable way. Really need some measurement tool to encourage competition between tenants. This works effectively overseas (Australia and the UK). There is a requirement for clear measurements, currently it is difficult to find out what is real and what is not (green hype and green wash is prominent). Tenants want to see independent ratification. Motivation will only really occur when there is a rating tool for the whole rather than the base building." National Facilities Manager*

> *"Even though the tenant is paying the costs of the energy this does not mean that [we do] not have to focus on it as it will have an effect on the rental attainable on a building. Many landlords and tenants fail to focus on the consumption and cost of energy but once you can provide evidence and information a lot of them will... [Tenants] don't want to pay more rentals for a green building... Anecdotally we believe this is because green buildings have not been able to demonstrate that they deliver the results they were designed to deliver. For example air conditioning power usage has been higher than designed if you compare it with a more basic system." Property Portfolio Manager*

The preoccupation with new buildings in current performance rating systems is also seen as a barrier to both market transformation and engagement with particular tenants:

> *"As a nation we are failing as we are focussing too much on new buildings and not enough on existing buildings. We should be working more on the working relationship between the landlord and tenant to ensure that wastage is eliminated" Property Portfolio Manager.*

7.4.2 Mechanisms to Deal with Split Incentives

Rating tools are seen as particularly useful as a means by which the competitive advantage of better performing buildings can be made clear to tenants and to allow tenants promote themselves in the market. The latter, however, is seen as of less interest to tenants than in the recent past. Other

mechanisms, green leases[18] and higher efficiency plant band technical solutions, are treated with some degree of caution.

Green leases are seen as being in very embryonic form and the whole leasing process as being contingent and shaped by lease negotiations.

> *"Green leases have not been utilised [ ] yet in New Zealand. Not perceived as having real teeth." National Facilities Manager*

> *"We have no standard lease, but if we did it would be predicated by the tenant paying everything and the landlord paying nothing! It really depends on each individual circumstance. For example in Wellington with a Government tenant we are negotiating a lease that would encourage us and the tenant to work together on reducing costs... We should be working more on the working relationship between the landlord and tenant to ensure that wastage is eliminated. I am currently working with our lawyer to come up with some lease guidelines so we can make the relationship work." Property Portfolio Manager*

Technical solutions are often seen as not having sufficiently short payback periods to attract either owner or tenant action.

7.4.3 The Pre-conditions for Change

The notion of payback for tenants was a consistent theme in the interview with the National Facilities Manager:

> *"Currently tenants do not perceive enough financial benefit, for example generally for a tenant to install appropriate technology to reduce consumption requires a 7-8 year payback period which is too long for most tenants."*

> *"The cost dilemma is clear to the tenants as in order to incorporate energy efficient lighting systems there is a 7 to 8 year payback period. However in order to reward such initiatives there needs to be more and more payback."*

Getting that pay back was seen as requiring a significant increase in resource costs and significant rewards for being a tenant in a resource efficient building. Technical change, operating improvements, changes in the pricing structure of resource consumption and ensuring that tax and other systems supporting transformation were all identified as critical elements. All required leadership across the value chain.

> *"There is an indication that things are beginning to change, but clear leadership is required. Future change can only happen if tenants and landlords change their mind set. There is plenty of technology to complement behaviour but it is a change of behaviour that will make the most difference. For market transformation to occur there must be clear leadership." National Facilities Manager*

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[18] A Green lease normally requires Environmental Sustainable Development outcomes and associated requirements for meeting them, an environmental management plan, or user guide on the correct and sustainable use of the building.

8. MOVING FORWARD ON BEES RESEARCH FOR CHANGE

The emerging focus internationally on resource optimisation in non-residential buildings, particularly commercial buildings, is on the nature and dynamic of the ownership, occupier and building management interface. This is increasingly seen as the centre of both resistance to change and also presenting the most potent opportunities for change where there are an array of both behavioural and technical solutions to the problem of improving the resource performance of non-residential buildings.

This shifts attention from the traditional focus on, respectively, the views, behaviour and comfort of occupants, the skills of facility managers and availability of efficient technologies. It highlights the importance of landlords and tenants. It highlights the moral hazard embedded in the value chain and the way in which players tend to distance themselves from the resolution performance issues through a vicious circle of blame.

The premise survey data in New Zealand show that the permutations of ownership and management which appear to impact on resource efficiency overseas appear in the New Zealand context. The New Zealand situation is characterised by diversity. These qualitative interviews suggest that this may be associated with contrasts in the extent to which building owners and managers are aware or driven by issues of building performance and their different approaches to building ownership and management. If so, this would reinforce the view that there is no silver bullet in the non-residential buildings sector to improve resource efficiency. This project will be putting significant effort into:

- Identifying and classify the different segments of landlords and building managers in New Zealand;
- Establish the quantum of non-residential stock associated with each of those segments.
- Establish the relative resource consumption in buildings operated by those landlord segments.
- Explore the range of specific triggers in each segment that might drive resource optimisation.

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APPENDIX A

BUILDING ENERGY END-USE (The Survey)

Research New Zealand #4060

DATE March 2010

Good morning/afternoon/evening, could I please talk to name.

Good morning/afternoon/evening, my name is ^I from Research New Zealand.
This building has been randomly selected as part of BRANZ' five-year research programme on Building Energy use. The results of the survey will help identify opportunities to improve energy and resource efficiency of non-residential buildings.

If necessary: We called earlier and spoke to name who said that you would be the best person for us to speak to.

The survey takes about 10 minutes. When would suit or is now a good time?

If person not available, ask:
When would be a good time for me to call back to speak to him/her?

Make appointment

If person not appropriate, ask:
Should I speak to another person?

Get name and ask to be put through to appropriate contact.

Background information only if needed:

- This is genuine research. I'm not selling anything.
- CRESA (The Centre of Research, Evaluation and Social Assessment) is a private research

company whose research focuses on encouraging community development and sustainable communities. They have been commissioned to do this particular survey on behalf of BRANZ.

- The only people who will have access to the data from this survey are the research team from Research New Zealand, CRESA and BRANZ.
- All data being collected will be used for research purposes only.
- At the reporting stage, all the data will be aggregated so that no individual, building or building occupant details will be identified in reports or research summaries.

Read

This interview is being recorded for quality control and training purposes.

Qualifying questions

Q.1 Before we begin, can I just confirm that you work for [**business name**]?

1 ..... Yes
2 ..... No

Q.2 And that your business is situated in or has a site at [**address**]?

1 ..... Yes
2 ..... No

If 0 or 0=2 Terminate

Termination statement: Thanks for that, but for this survey we need to talk to people based in specific buildings around New Zealand and I don't think you're in the specific building we are looking for. Thank you for your time.

Q.3 Thanks for that. Now, can you tell me, is your business a tenant or an owner-occupier of this building?

1 Tenant

2 Sub-tenant

3 Owner occupier

Q.3a **If 0=1 or 2 ask, else go 0** Is your [lease/sub-lease]…**Read**

1 Periodic on a weekly basis

2 Periodic on a monthly basis

3 Fixed term lease with right of renewal

4 Fixed term lease with no right of renewal

96 Other Specify **Do not read**

98 Don't know

Q.3b **If 0=3 or 4 ask, else go 0** And how many years is the lease for?

1 Answer **Specify years**

98 Don't know

Q.3c **If 0=3 ask, else go 0** How often is the right of renewal?

1 Answer **Specify years**

98 Don't know

Q.4 Is your business operated from more than one site? If necessary: That is, do you have branches or offices in other locations?

1 Yes

2 No

Q.5 How many floors does your business occupy in this building?

1 Answer **Specify number**

2 All of them

Q.6 What size is the building, or your portion of the building, in square feet or metres?

1 Square feet **Specify**

2 Square metres **Specify**

98 Don't know

Q.7 When did you start operating from this building?

1 Answer **Specify month and year**

98 Don't know

Q.8 Has your business undertaken new fit-out of the building or your portion of the building either when you moved in, or since?

1 Yes

2 No

98 Don't know

Q.9 **If 0=1 ask, else go 0** What did this involve?

1 Answer **Specify**

98 Don't know

Q.10 The next few questions are about energy and fuel use. That is only the energy and fuels used within your business in this building. So please don't include fuels for vehicles or plant used outside the building.

Which of the following energy and fuels does your business use, in this building? Read Code many

1 Electricity reticulated from the grid

2 Natural gas

3 Diesel or Fuel Oil (excluding use for electricity generation or vehicles)

4 Wood, wood waste or biomass

5 Coal

6 Electricity which is self-generated

7 Geothermal energy

Q.11 You said your business uses **insert first mentioned from 0**, is the bill for this itemised and paid to your landlord, is it included in your rent and not itemised, or do you pay the supplier (i.e. the gas or electricity company) directly?

And what about your **read each coded at 0**?

If 0=3 go to 0

	Paid direct to supplier	Itemised and paid to landlord	N/A energy/fuels included in rent and are not demised
a. Electricity reticulated from the grid	1	2	3
b. Natural gas	1	2	3
c. Diesel or Fuel Oil (excluding use for electricity generation or vehicles)	1	2	3
d. Wood, wood waste or biomass	1	2	3
e. Coal	1	2	3
f. Geothermal	1	2	3

Q.12 [What about your water?] Is your water use paid …**Read**

1 Directly to a supplier

2 To your landlord through an itemised account

3 Included in your rent and not itemised

4 Or do you not pay for water usage

98 Don't know **Do not read**

Q.13 **If any 1's coded at 0a-b or 0 ask, else go to 0** We are really interested in the energy and water use in the whole building. This will be calculated by adding up the energy and water use of each business. Because you pay for your energy and/or water use directly to a supplier we can save you some time by going directly to the relevant supplier to collect energy or water information. Would you like us to do that? Remember the data will be kept anonymous and confidential.

1 ..... Yes - agree to supplier providing information
2 ..... Might agree to supplier providing information, but would like to know more about it first (i.e. what information will be supplied, who will have access to it etc.)
3 ..... No - won't consent to supplier providing information but happy to provide direct off our supplier bills
4 ..... No - do not agree to supplying water/energy data billed by a supplier at all

Q.13a **If 0=2 ask, else go to Q** At the end of this survey, we will pass your contact details on to BRANZ, and ask them to call you to explain in more detail what kind of information they are after and how it will be used. Is that okay?

1.....Yes
2..... No

Q.14 **If 0=1 ask, else go 0** BRANZ will need to get your consent for water or energy information to be collected from a supplier. Would you like us to send the consent form by fax, post, or email?

1 Fax
2. Post
3. Email

Q14aa Who should we address that form to?

1.....Answer **Specify**

Q14.a **Ask if 0=1** What is the best fax number?

1.....Answer **Specify**
2.....No fax number / refused

Q.14b **Ask if 0=2** What is the postal address?

1.....Answer **Specify**

Q.14c **Ask if 0=3** What is the e-mail address?

1.....Answer **Specify**
2.....No email address / refused

Q.15 **If 0=3 ask, else go to 0** As you are happy to simply tell us straight from your bills what your energy and water use is, we can collect that now or get a researcher to phone you back or send you something in the post or by e-mail to complete. Which would you prefer? If necessary The type of information we need is mainly around the kilowatt hours or units used by your business for each month of the last financial year.

1.....By phone now - go to ENERGY AND WATER sheet
2.....Researcher to call back get name and direct phone number **Specify name and direct phone number**
3.....E-mail **Specify name and e-mail address**
4.....Post **Specify name and postal address**

Q.16 **If any 2's coded at 0a-b or 0 ask, else go to 0**; You said you pay for some, or all your energy or water direct to your landlord as an itemised component of your rent. We'd like to collect information from you about this. We can collect that now or get a researcher to phone you back or send you something in the post or by e-mail to complete. Which would you prefer?

1 .....By phone now - go to ENERGY AND WATER sheet
2 .....Researcher to call back **Specify name and direct phone number**
3 .....E-mail **Specify name and e-mail address**
4 .....Post **Specify name and postal address**
97 ...No do not agree to supply any energy/water use data itemised by the landlord

Q.17 Now, just a few final questions. Please can you tell me about the sector your business operates in. Would you describe it for example as retail or commercial or finance or something else?

1. ....Answer **Specify**

Q.18 How many employees do you have working in this building? If necessary An estimate is okay.

1 .....Answer **Specify number of employees**

Q.19 How many of your staff in this building are…**Read**

1 .....Managers **Specify**
2 .....Professionals **Specify**
3 .....Technicians and Trades Workers **Specify**
4 .....Community and Personal Service Workers **Specify**
5 .....Clerical and Administrative Workers **Specify**
6 .....Sales Workers **Specify**
7 .....Machinery Operators and Drivers **Specify**
8 .....Labourers **Specify**
96 ...Other **Specify**

If 0 code 2=0 go to 0 You mentioned that you have [**insert number from 0 code 2 specify box**] professionals working in your business, from this building. Can you please tell me what type of professionals these people are?

1 .....Answer **Specify**

Q20 In your business, in this building, how many of the following electronic appliances do you have? Read

1 .....Computers **Specify**
2 .....Computer servers **Specify**
3 .....Electronic whiteboards **Specify**
4 .....Projectors **Specify**
5 .....Printers **Specify**
6 .....Photocopiers **Specify**
7 .....Stand alone faxes **Specify**
8 .....Cook tops or ovens **Specify**
9 .....Refrigerators **Specify**
10 ...Dishwashers **Specify**

11 ... Water coolers **Specify**
12 ... Microwaves **Specify**

Q21 Do you have centralised air conditioning?

1 ..... Yes
2 ..... No
98 ... Don't Know

Q22 Do you have central heating?

1 ..... Yes
2 ..... No
98 ... Don't Know

Q23 Are there any air supply vents in the ceiling, the floor or walls of the areas your business occupies?

1 ..... Yes
2 ..... No
98 ... Don't Know

Q24 Can staff open and close windows?

1 ..... Yes
2 ..... No

Q25 Are any windows double glazed? **Probe for clear answer**

1 ..... Yes - All
2 ..... Yes - Some
3 ..... No
98 ... Don't know

Q26 How many clients or customers come into the building on a typical working day?

1 ..... Answer **Specify number**

Q27 How many hours in a typical twenty-four hour **weekday** would you have staff in this building?

1 ..... Answer **Specify hours**

Q28 How many hours in a typical **weekend** would you have staff in this building?

1 ..... Answer **Specify hours**

Q29 Is there a building manager or landlord that looks after your building? Probe for clear answer

1 ..... Yes - building manager
2 ..... Yes – landlord
3 ..... Yes, both
4 ..... No, neither

Q29a **If 0=1 ask, else go 0** Can you please tell me the name of the Building Manager?

1 ..... Answer **Specify name of building manager**
99 ... Refused

Q29b What agency do they work for?

1 ..... Answer **Specify name of agency**
2 ..... They do not work for an agency / they are private
99 ... Refused

Q29c And what is their phone number?

1 ..... Answer **Specify phone number, including area code**
98 ... Don't know
99 ... Refused

Q29d **If 0=2 ask, else go 0** Can you please tell me the name of the Landlord?

1 ..... Answer **Specify name of landlord**
99 ... Refused

Q29e What agency do they work for?

1 ..... Answer **Specify name of agency**
2 ..... They do not work for an agency / they are private
99 ... Refused

Q29f And what is their phone number?

1 ..... Answer **Specify phone number, including area code**
98 ... Don't know
99 ... Refused

Closing Questions

Q30 Do you have any other comments you'd like to make about the subject of this interview?

1 ..... Comments **Specify**
2 ..... No

Q31 May I please confirm your name in case my supervisor needs to check on the quality of this interview? **Record first and last name**

Those are all the questions I have. Thank you very much for your help. My name is Q0IV from Research New Zealand. If you have enquiries about this survey, please ring the Project Manager, Katrina Fryer on our toll-free number: 0800 500 168. (Wellington respondents 499-3088). If you would like to know more about the research in general call Kay or Ruth at CRESA on 0508 427 372.

1. ....Yes **Skip to end**
2. ....No

ENERGY AND WATER SHEET

Energy

E1: Supplier of:

	2008 supplier	2009 supplier
❑1 Electricity reticulated from the grid		
❑2 Natural gas/LPG		

E2: Amount used

E2a. Electricity: The quantity can be found on your electricity bills

Month – Start at the first month of their financial year	Kilowatt-hours	Actual or Estimate

E2b. **Natural Gas:** The quantity can be found on your gas bills

Month – Start at the first month of their financial year	Kilowatt-hours	Actual or Estimate

E2c. **LPG:** The quantity can be found on your gas bills

Month – Start at the first month of their financial year	Units – Please Specify	Actual or Estimate

Water

W1: Supplier of:

	2008 supplier	2009 supplier
❑$_1$ Water		

W2: How much were you charged for water?

i) the last financial year _____ date period ended _____

ii) Year previously _____ date period ended _____

iii) Year before that _____ date period ended _____

APPENDIX B

BUILDING ENERGY END-USE (Wave 1)

Research New Zealand #4060

DATE May 2010

Good morning/afternoon/evening, could I please talk to name.

Good morning/afternoon/evening, my name is ^I from Research New Zealand.

Your building has been randomly selected as part of BRANZ' five-year research programme on Building Energy use. The results of the survey will help identify opportunities to improve energy and resource efficiency of non-residential buildings.

If necessary: We called earlier and spoke to name who said that you would be the best person for us to speak to.

The survey takes about 10 minutes. When would suit or is now a good time?

If person not available, ask:
When would be a good time for me to call back to speak to him/her?

Make appointment

If person not appropriate, ask:
Should I speak to another person?

Get name and ask to be put through to appropriate contact.

Background information only if needed:

- This is genuine research. I'm not selling anything.
- CRESA (The Centre of Research, Evaluation and Social Assessment) is a private research company whose research focuses on encouraging community development and sustainable communities. They have been commissioned to do this particular survey on behalf of BRANZ.
- The only people who will have access to the data from this survey are the research team from Research New Zealand, CRESA and BRANZ.
- All data being collected will be used for research purposes only.
- At the reporting stage, all the data will be aggregated so that no individual, building or building occupant details will be identified in reports or research summaries.

Read
This interview is being recorded for quality control and training purposes.

Qualifying questions

Q1 Before we begin, can I just confirm that you work for [**business name**]?

1.....Yes
2.....No

Q.2 Is your business is situated in, or does it have a site at [**address**]?

1.....Yes
2.....No

Q.2a **If 0=2 ask:** Are you able to answer questions about the [**address**] site?

1 ..... Yes
2 ..... No

If 0=2 Terminate: Thanks for that, but for this survey we need to talk to people based in specific buildings around New Zealand and I don't think you're in the specific building we are looking for. Thank you for your time.

Q.2b We are collecting this data on behalf of CRESA and BRANZ, for a project called BEES. They may want to follow up with you later on. However, we cannot identify anyone who has participated in this survey without getting their permission first. Can you please confirm that you are happy for the BEES team to have access to your individual survey results, and also to your contact details?

If necessary: All data being collected will be used for research purposes only. At the reporting stage, all the data will be aggregated so that no individual, building or building occupant details will be identified in reports or research summaries.

If 'no', probe for clear answer

1 Yes, I am happy for them to have access to my individual results and contact details
2 No, I do not want them to have access to my individual results
3 No, I do not want them to have access to my contact details
4 No to both

If 0=2 or 4 Terminate: Thank you for time, but without your consent I cannot continue with this interview.

Q.3 Thanks for that. Now, can you tell me, is your business a tenant or an owner-occupier of this building?

1 ..... Tenant
2 ..... Sub-tenant
3 ..... Owner occupier
98 ... Don't know

Q.3a **If 0=1 or 2 ask, else go 0** Is your [lease/sub-lease]…**Read**

1 ..... Periodic on a weekly basis
2 ..... Periodic on a monthly basis
3 ..... Fixed term lease with right of renewal

4 .....Fixed term lease with no right of renewal
96 ...Other **Specify** **Do not read**
98 ...Don't know **Do not read**

Q.3b **If 0=3 or 4 ask, else go 0** And how many years is the lease for?

1 .....Answer **Specify years**
98 ...Don't know

Q.3c **If 0=3 ask, else go 0** How often is the right of renewal?

1 .....Answer **Specify years**
98 ...Don't know

Q.4 Is your business operated from more than one site? **If necessary:** That is, do you have branches or offices in other locations?

1 .....Yes
2 .....No
98 ...Don't know

Q.5 How many floors does your business occupy in this building? **Read**

1 Less than half of one floor
2 Half or more of one floor
3 One whole floor
96 ...More than one floor **Specify number**

Q.5a How many floors or storeys does this building have?

1 .....Answer **Specify number**

Q.6 What size is [the building/your portion of the building], in square feet or metres?

1 .....Square feet **Specify**
2 .....Square metres **Specify**
98 ...Don't know
.....

Q.7 When did you start operating from this building?

1 .....Answer **Specify month and year**
98 ...Don't know

Q.8 Has your business undertaken new fit-out of the [building/your portion of the building] either when you moved in, or since?

1 .....Yes
2 .....No
98 ...Don't know

Q.9 **If 0=1 ask, else go 0** What did this involve?

1 .....Answer **Specify**
98 ...Don't know

Q10. The next few questions are about energy and fuel use. That is only the energy and fuels used within your business in this building. So please don't include fuels for vehicles or plant used outside the building.

Which of the following energy and fuels does your business use, in this building? **Read Code many**

1 .....Electricity reticulated from the grid
2 .....Natural gas
3 .....Diesel or Fuel Oil (excluding use for electricity generation or vehicles)
4 .....Wood, wood waste or biomass
5 .....Coal
6 .....Electricity which is self-generated
7 .....Geothermal energy
98 ...Don't know

Q.11 You said your business uses insert first mentioned from 0, is the bill for this itemised and paid to your landlord, is it included in your rent and not itemised, or do you pay the supplier (i.e. the gas or electricity company) directly?

And what about your **read each coded at 0**?

	Paid direct to supplier	Itemised and paid to landlord	N/A energy/fuels included in rent and are not itemised	Don't know
a. Electricity reticulated from the grid	1	2	3	98
b. Natural gas	1	2	3	98
c. Diesel or Fuel Oil (excluding use for electricity generation or vehicles)	1	2	3	98
d. Wood, wood waste or biomass	1	2	3	98
e. Coal	1	2	3	98
f. Geothermal	1	2	3	98

Q.12 [What about your water?] Is your water use paid …**Read**

1 .....Directly to a supplier
2 .....To your landlord through an itemised account
3 .....Included in your rent and not itemised

4 ..... Or do you not pay for water usage
98 ... Don't know **Do not read**

Q.13 **If any 1's coded at 0a-b or 0 ask, else go to 0** We are really interested in the energy and water use in the whole building. BRANZ will calculate this by adding up the energy and water use of each business. Because you pay for your energy and/or water use directly to a supplier they can save you some time by going directly to the relevant supplier to collect energy or water information. Would you like them to do that?

If necessary The type of information they need is mainly around the kilowatt hours or units used by your business

1 ..... Yes - agree to supplier providing information
2 ..... Might agree to supplier providing information, but would like to know more about it first (i.e. what information will be supplied, who will have access to it etc.)
3 ..... No - won't consent to supplier providing information but happy to provide direct off our supplier bills
4 ..... No - do not agree to supplying water/energy data billed by a supplier at all

Q.13a **If 0=2 ask, else go to 0** At the end of this survey, we will pass your contact details on to BRANZ, and ask them to call you to explain in more detail what kind of information they are after and how it will be used. Is that okay?

1 ..... Yes
2 ..... No
96 ... Can BRANZ please contact someone else/Head Office **Specify name and contact details**

Q.14 **If 0=1 ask, else go 0** BRANZ will need to get your consent for water or energy information to be collected from a supplier. Would you like them to send the consent form by fax, post, or email?

1 Fax
2 Post
3 Email

Q14aa Who should they address that form to?

1 ..... Answer **Specify**

Q.14a **Ask if 0=1** What is the best fax number?

1 .....Answer **Specify**
2 .....No fax number / refused

Q.14b **Ask if 0=2** What is the postal address?

1 .....Answer **Specify**

Q.14c **Ask if 0=3** What is the e-mail address?

1 .....Answer **Specify**
2 .....No email address / refused

Q.15 **If 0=3 ask, else go to 0** As you are happy to simply tell them straight from your bills what your energy and water use is, I can arrange for a researcher to phone you back or send you something in the post or by e-mail to complete. Which would you prefer? If necessary The type of information they need is mainly around the kilowatt hours or units used by your business

1 .....Researcher to call back **Specify name and direct phone number**
2 .....E-mail **Specify name and e-mail address**
3 .....Post **Specify name and postal address**

Q.16 **If any 2's coded at 0a-b or 0 ask, else go to 0;** You said you pay for some, or all your energy or water direct to your landlord as an itemised component of your rent. BRANZ would like to collect information from you about this. If that's okay, I can arrange for a researcher to phone you back or send you something in the post or by e-mail to complete. Which would you prefer?

If necessary The type of information they need is mainly around the kilowatt hours or units used by your business

1 .....Researcher to call back **Specify name and direct phone number**
2 .....E-mail **Specify name and e-mail address**
3 .....Post **Specify name and postal address**
4 .....No do not agree to supplying any energy/water use data itemised by the landlord

Q.17 Now, just a few final questions. Please can you tell me about the sector your business

operates in. Would you describe it for example as retail or commercial or finance or something else?

1 Answer Specify

Q.18 How many employees do you have working in this building? If necessary An estimate is okay.

1.....Answer **Specify number of employees**

Q.19 How many of your staff in this building are…**Read**

Note to interviewer: If staff have shared roles, select all roles that apply (i.e. double-count).

1.....Managers **Specify**
2.....Professionals **Specify**
3.....Technicians and Trades Workers **Specify**
4.....Community and Personal Service Workers **Specify**
5.....Clerical and Administrative Workers **Specify**
6.....Sales Workers **Specify**
7.....Machinery Operators and Drivers **Specify**
8.....Labourers **Specify**
98...Other **Specify**

Q.19a **If 0 code 2=0 go to 0** You mentioned that you have [**insert number from 0 code 2 specify box**] professionals working in your business, from this building. Can you please tell me what type of professionals these people are?

1.....Answer **Specify**

Q20 In your business, in this building, how many of the following electronic appliances do you have? **Read**

Note to interviewer: If they have a combined printer/copier, select 'photocopier' but record that that it is '1 photocpier/printer' etc in the speci field.

1 ..... Computers **Specify**
2 ..... Computer servers **Specify**
3 ..... Electronic whiteboards **Specify**
4 ..... Projectors **Specify**
5 ..... Printers **Specify**
6 ..... Photocopiers **Specify**
7 ..... Stand alone faxes **Specify**
8 ..... Cook tops or ovens **Specify**
9 ..... Refrigerators **Specify**
10 ... Dishwashers **Specify**
11 ... Water coolers **Specify**
12 ... Microwaves **Specify**

Q.21 Do you have centralised air conditioning?

1 ..... Yes
2 ..... No
3 ..... Don't Know

Q.22 Do you have central heating?

1 ..... Yes
2 ..... No
3 ..... Don't Know

Q.23 Are there any air supply vents in the ceiling, the floor or walls of the areas your business occupies?

1 ..... Yes
2 ..... No
3 ..... Don't Know

Q.24 Can staff open and close windows?

1 ..... Yes
2 ..... No

Q.25 Are any windows double glazed? **Probe for clear answer**

1 ..... Yes - All
2 ..... Yes - Some
3 ..... No
4 ..... Don't know

Q.26 How many of your clients or customers come into the building on a typical working day?

1 ..... Answer **Specify number**

Q.27 How many hours in a typical twenty-four hour weekday would you have staff in this building? **Note: the answer cannot be more than 24 hours**

1 ..... Answer **Specify hours**

Q.28 How many hours in a typical weekend would you have staff in this building? Note: the answer **cannot be more than 48 hours**

1 ..... Answer **Specify hours**

Q.29 Is there a building manager or landlord that looks after your building? Probe for clear answer

1 ..... Yes - building manager
2 ..... Yes – landlord
3 ..... Yes, both
4 ..... Yes, but landlord IS the building manager
5 ..... No, neither
98 ... Don't know

Q.29a **If 0=1 ,3 or 4 ask, else go 0** Can you please tell me the name of the Building Manager?

1 ..... Answer **Specify name of building manager**
98 ... Don't know
99 ... Refused

Q.29b **If 0=99, go to 0** What agency do they work for?

1 .....Answer **Specify name of agency**
2 .....They do not work for an agency / they are private
98 ...Don't know
99 ...Refused

Q.29c And what is their phone number?

1 .....Answer **Specify phone number, including area code**
98 ...Don't know
99 ...Refused

Q.29d **If 0=2, 3 ask, else go 0** Can you please tell me the name of the Landlord?

1 .....Answer **Specify name of landlord**
98 ...Don't know
99 ...Refused

Q.29e **If 0=99, go to 0** What agency do they work for?

1 .....Answer **Specify name of agency**
2 .....They do not work for an agency / they are private
98 ...Don't know
99 ...Refused

Q.29f And what is their phone number?

1 .....Answer **Specify phone number, including area code**
98 ...Don't know
99 ...Refused

Closing Questions

Q.30 Do you have any other comments you'd like to make about the subject of this interview?

1 .....Comments **Specify**
2 .....No

Q.31 May I please confirm your name in case my supervisor needs to check on the quality of this interview? **Record first and last name**

Those are all the questions I have. Thank you very much for your help. My name is Q0IV from Research New Zealand. If you have enquiries about this survey, please ring the Project Manager, Katrina Fryer on our toll-free number: 0800 500 168. (Wellington respondents 499-

3088). If you would like to know more about the research in general call Kay or Ruth at CRESA on 0508 427 372.