Understanding carbon emission mitigation in the New Zealand accommodation industry:
A mixed methods study

Amber Knowsley

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LIST OF ABBREVIATIONS

AA	Automobile Association
AUT	Auckland University of Technology
AUTEC	Auckland University of Technology Ethics Committee
CGC	Consumer Generated Content
CO$_2$	carbon dioxide
CRI	Crown Research Institute
COP21	21st Climate Conference Paris
EECA	Energy Efficiency and Conservation Authority
GHG	Greenhouse gas
IPCC	Intergovernmental Panel of Climate Change
ISO	International Organisation for Standardisation
LEDs	Light Emitting Diodes
MfE	New Zealand Ministry for the Environment
NZETS	New Zealand Emissions Trading Scheme
ORP	Oxidisation-Reduction Potential
SMTEs	Small to Medium Tourism Enterprises
SPSS	Statistical Package for Social Sciences
TIANZ	Tourism Industry *Aotearoa* New Zealand
UNEP	United Nations Environment Programme
UNFCCC	United Framework Convention for Climate Change
UNWTO	United Nations World Tourism Organisation
VCUs	Verified Carbon Units
YHA	Youth Hostel Association

ATTESTATION OF AUTHORSHIP

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Amber Knowsley

Signed:

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ABSTRACT

The accommodation sector is a key source of greenhouse gas emissions within tourism, and therefore there is a need to understand emission mitigation in the sector. As there is a geoscientific consensus that excessive emissions are responsible for climate change, international efforts towards a low carbon economy need to be realised. The 2015 Paris Climate Agreement will facilitate efforts by all parties to mitigate carbon, with New Zealand's current target to reduce greenhouse gas emissions by 30 per cent below 2005 levels by 2030. It is suggested that due to its high energy use, the accommodation sector has excellent potential to lower its emissions. Previous research in New Zealand on the accommodation industry has not focused specifically on the mitigation initiatives being undertaken, nor the motivations for doing so. Therefore, the primary aim of this study is to examine the extent to which carbon emission mitigation initiatives in the New Zealand accommodation industry are currently being implemented.

A mixed methods research design, with two sequential phases, was adopted for this study. Phase One consisted of a national online survey, gathering information on the accommodation industry's emission mitigation initiatives and motivations for implementing them. Phase Two undertook a case study which holistically investigated emission mitigation initiatives, environmental certification and corporate motivations at New Zealand's only carbon neutral certified hotel. Statistical analysis of 566 survey responses reveals that recycling is the most implemented initiative throughout the industry, with almost all properties undertaking this initiative. Accommodation categories in the luxury cluster implement more emission mitigation measures than either mid-range or budget cluster properties. Accommodation providers that hold a Qualmark™ Enviro award are more likely to implement LED lighting, have a 'Switch Off' policy and provide a towel reuse option, however, they are equally as likely as those who do not hold the award to recycle and select Energy Star appliances. In addition, analysis shows that some establishments who hold this award do not actually implement some of the initiatives studied. Corporate motivations for implementing initiatives indicate that 'ecological responsiveness' is behind recycling; however, the other four main initiatives are reported to be undertaken due to 'competitiveness'. The case study reveals specific details of environmental sustainability and mitigation initiatives at New Zealand's only certified carbon neutral accommodation establishment. This provides a role model establishment for other accommodation providers to emulate in a move towards a lower carbon operation. However, it is also suggested that there were still opportunities for the organisation to further lower its emissions, and capitalise on its carbon neutral status through marketing and advertising.

Implications of this study showed that there is potential for the New Zealand accommodation sector to become a role model of environmental sustainability and emission mitigation behaviour, as the majority of respondents were interested in lowering their carbon emissions further, as well as currently undertaking initiatives to do so. The results should be of interest to carbon mitigation

businesses such as Enviro-mark, industry stakeholders such as Tourism New Zealand, Qualmark Enviro and tourists, and government policy makers when considering New Zealand's 2015 Paris Climate Agreement targets, as mitigation of emissions will be required from all sectors, including accommodation.

1.   INTRODUCTION

This introductory chapter presents the statement of the problem, and then background to the study, providing context. This chapter then states the purpose of the study and introduces the main research aim and the five main objectives that were designed to build knowledge towards answering the main aim. An overview of the methodology and methods of this study is followed by the significance of this study to the field of tourism, accommodation and climate change. Finally, the structure of the remaining chapters is presented.

1.1.   Statement of problem

Both the tourism and accommodation industries are sources of global greenhouse gas (GHG) emissions (Gössling, 2011). As these emissions are thought to be exacerbating global warming, and the associated climate change (Cuff & Goudie, 2009; Hansen *et al*., 2016; Richardson & Ward, 2011), the management of these emissions is critical. Both internationally and in the New Zealand context, there "is a growing realisation that both policy and practical responses are required if tourism is to deal with climate change effectively" (Becken & Hay, 2012, p.5). Therefore, not only is the need to address emission mitigation becoming more pressing to protect humanity and the environment, such management of carbon emissions are likely to become mandatory with the ratification of the 2015 Paris Climate Agreement (Rowling, 2016). However, in terms of the tourism and accommodation industries, it has been suggested that "few stakeholders seem to wish to engage with the abstract concept of CO_2 [carbon dioxide]" (Gössling, 2011, p. xvi). This study seeks to understand the New Zealand accommodation industry's levels of engagement ('the extent') with carbon dioxide (CO_2) emission mitigation initiatives.

1.2.   Background to the study

Globally, both natural and anthropogenic GHGs are being released into the atmosphere, and of these, heat trapping CO_2 is one of the most prevalent (IPCC, 2015). As the levels of heat trapping compounds such as carbon dioxide and other GHGs increase in the atmosphere, the heat from the Sun is trapped on Earth rather than being released out into space (Cuff & Goudie, 2009; Richardson & Ward, 2011). This trapped heat is believed to be exacerbating the issues of global warming and climate change (Halmann & Steinberg, 1998). The international body of scientists tasked with collating data and research on climate change, the Intergovernmental Panel on Climate Change (IPCC), recently reported that, not only is the warming of the climate system unequivocal, but it is extremely likely that human influence has been the dominant cause of these environmental changes (IPCC, 2015). Globally, these GHGs have been identified by scientists as largely responsible for the increase in temperature both in the atmosphere and oceans, which is thought to intensify changes in worldwide weather cycles (Cuff & Goudie, 2009; Richardson & Ward, 2011). These changes appear to be generating extreme and unpredictable weather including unprecedented hurricanes and cyclones, droughts, loss of snow and ice in alpine areas, and increasing sea levels, putting many low lying areas and islands in immediate danger of flooding (IPCC, 2015), all of which affect the tourism and accommodation industries. Furthermore,

the IPCC reported in its most recent assessment (fifth), that continued creation of excessive GHG emissions will cause further warming and climate changes, and that limiting these changes would require substantial and sustained GHG emission mitigation (IPCC, 2015). One method of mitigation emphasised by Meadowcroft (2013), is to stop the "releases of greenhouse gases associated with fossil fuel usage as quickly as possible" (p. 148), and, that such mitigation was currently the most urgent climate related challenge humanity faces.

The tourism industry has potential to move towards a low carbon economy. A low carbon economy is one that requires a decrease in traditionally used fuel sources such as fossil fuels, and an increase in the adoption of low-carbon alternatives (Foxon, 2013). Globally, the tourism industry is thought to be responsible for five per cent of all GHG emissions ('UNWTO', 2017), and therefore has the potential to mitigate its emissions, supporting a global shift towards a low carbon economy. It is suggested that as the need for an understanding of tourism's environmental impact becomes progressively recognised as important, and in some instances legally required, so does the need for information on the environmental effects of tourism (Gössling *et al*., 2005). In a New Zealand context, tourism is reliant on the continued preservation of the country's natural environment, and there is an ongoing dialogue between industry stakeholders about how best to manage environmental sustainability, including the mitigation of carbon emissions. Furthermore, New Zealand Tourism suggests that environmental baseline measures need to established, from which the industry can gauge its performance going forward ('Ministry of Business, Innovation and Employment', 2016).

As a major subsector of tourism, the accommodation industry represents approximately 21 per cent of emissions from tourism globally, which amounts to one percent of all global emissions (UNWTO, 2015). Although one percent seems to be a small figure, accommodation establishments are known as high emission sources due to their perpetually active nature and many areas of energy expenditure. It has been shown in numerous studies that hotels (and to varying extents, other accommodation types) consume high amounts of energy (Becken, Frampton, & Simmons, 2001), which in turn, unless is being received from renewable energy sources, creates GHG emissions, most notably carbon dioxide. It been argued that mitigation measures of these emissions should be supported by tourism stakeholders as they "yield practical and tangible short-and medium-term benefits and address local sustainability issues" (Weaver, 2011, p. 5). Therefore, it is suggested that the accommodation sector has significant emission mitigation motivation and potential through the implementation of environmentally sustainable initiatives. Many initiatives are available to the accommodation industry to lower emissions including installing energy efficient lighting and electricity saving devices, installation of low-flow shower heads, investment in renewable energy sources, reduced water flow toilet flushing, towel reuse policies, low energy mini bars, appliances being switched off by staff when not in use, refillable toiletries for guests, and recycling (Gössling *et al*., 2005).

1.3. Purpose of the study

The purpose of this study was to gain further understanding of the New Zealand accommodation industry in respect to its carbon dioxide emission mitigation measures. Therefore, this study sought to answer the following central research aim:

> **To examine the extent to which carbon emission mitigation initiatives are implemented in the New Zealand accommodation industry.**

To provide information to answer to this central research aim, the study was directed by the following five objectives:

> **Objective One:** To identify emission mitigation initiatives being implemented by the New Zealand accommodation industry.

> **Objective Two:** To identify if luxury accommodation properties implement more emission mitigation initiatives than mid-range or budget ones.

> **Objective Three:** To ascertain if properties holding a Qualmark™ Enviro[1] award implement more mitigation initiatives than those without the award.

> **Objective Four:** To examine the motivations of the New Zealand accommodation industry for implementing mitigation initiatives.

> **Objective Five**: To provide a holistic investigation of emission mitigation initiatives, environmental certification and corporate motivations at New Zealand's only carbon neutral certified hotel.

Overall, the purpose of the study was to contribute new knowledge on the subject of carbon mitigation initiatives in the New Zealand lodging industry. To achieve this outcome, a mixed methods approach was utilised and is introduced next.

1.4. Overview of the methodology

In order to examine the objectives of the study, a pragmatic, mixed methods approach was adopted, using an explanatory follow up design (Creswell & Plano Clark, 2007). This design began

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[1] Qualmark Enviro is a nationally recognised New Zealand environmental award for tourism businesses, available in three levels – gold, silver and bronze depending on the extent of the organisation's environmental undertakings (Qualmark, 2016).

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with the collection of quantitative data through on online survey, followed by the collection of qualitative data using a case study method to provide deeper, more holistic information on the main theme of the study – carbon mitigation. These two methods were labelled Phase One and Phase Two respectively. Phase One consisted of a nationwide online questionnaire, which was sent to accommodation establishments to gather mainly quantitative data. This survey measured the operationalisation of emission mitigation initiatives, and motivations for doing so, as well as other information relating to environmental sustainability in the New Zealand accommodation industry. Phase One addressed research Objectives One, Two Three and Four presented earlier. Phase Two was undertaken to answer Objective Five, and consisted of a case study of New Zealand's only carbon neutral certified hotel. The data was mixed at three different levels throughout the study – during interpretation, during the survey which was mainly quantitative but also had qualitative aspects, and by using the information from the survey to inform the case study.

1.5. Significance to the field

This study is one of few available examining carbon emission mitigation in the New Zealand accommodation industry, therefore contributes new information on the subject of accommodation and carbon mitigation practices in New Zealand. Although some mitigation initiatives were previously identified and studied in the New Zealand accommodation industry in research by Becken (2013), Becken *et al*., (2001), and Becken & Patterson (2006), this study provides new knowledge on the practical initiatives that establishments in the sector are currently implementing to lower their carbon emissions. Furthermore, it is significant that due to the respondent rate (*n*= 566, 33 per cent response rate), the survey results are able to be generalised to the New Zealand accommodation population as a whole. The quantitative phase of this study is potentially replicable in any country (allowing for country specific amendments, for example changing Qualmark™ Enviro to the Canadian Green Hotels Association). The study also presents a case study of the only certified carbon neutral accommodation establishment in the New Zealand. The case study used triangulation to provide a holistic overview of the journey the hotel undertook to achieve its carbon neutral certification, its current environmental sustainability measures and provides evidence a carbon neutral accommodation can operate in a 4.5-star market. Although because of the method of data collection the case study is not generalisable, nor exactly replicable to any significant extent, the case study format could also be used to create similar studies in other locations. Overall, this study provides new knowledge in the field of tourism and emission mitigation, and the results from this empirical research provide an important benchmark for tourism and accommodation stakeholders.

1.6. Structure of the study

This chapter provides a background to the study, and an introduction to the research aims and objectives. The next chapter, the literature review, aims to contextualise this study by providing further background to the themes of this research, as well as presenting previous research and revealing areas of the relevant topics that have not been thoroughly investigated to date. Chapter

Three then introduces the methodology of the study, introducing and justifying the use of pragmatism and mixed methods as well as the study instruments for data collection. Chapter Four presents the findings and analysis of Phase One of the study, which are presented objective by objective. Next Phase Two of the study is presented, a case study of New Zealand's only certified carbon neutral hotel, the Sudima Hotel Auckland Airport. A discussion and the implications of the results are given in Chapter Six, which is also presented in an objective by objective format. Finally, Chapter Seven provides the conclusion of the study that summarises the key findings and critically reflects on the results and methods of the study. This chapter also presents limitations of the study, and key recommendations for further research in the field of tourism, accommodation and climate change mitigation.

2. LITERATURE REVIEW

This section presents previous literature highlighting the connection between tourism, accommodation and climate change, both internationally and in New Zealand. First, the key concepts of climate change are presented, including both sides of the 'debate' regarding the causes of climate change, and the measures currently being undertaken to address climate change on a global scale are introduced. Secondly, the impact climate change is having on tourism and accommodation is introduced, followed by how the tourism and accommodation industries are contributing to climate change. Thirdly, environmental sustainability in tourism and accommodation industries is introduced with a focus on emission mitigation. Following that, practical initiatives that are available to the accommodation industry to mitigate its carbon emissions are considered, and finally, theoretical approaches to corporate motivation and environmental sustainability are introduced.

2.1. A brief history and key concepts of climate change

Climate change and global warming are terms commonly used when discussing environmental aspects of the Earth. These two terms are often interchanged, but are notably different. Climate change refers to long-term change in the climate of a region or place, and is not limited to the warming and cooling of temperatures. Global warming on the other hand, is long-term increases in the Earth's average temperature globally. Although the Earth has warmed and cooled naturally a number of times over the last 20,000 years, the anthropogenic creation of greenhouse gas emissions in the current warming period require closer attention. Since the Industrial Revolution, human activities have created highly concentrated amounts of GHG emissions, mainly through the use of fossil fuels (Scott, *et al*., 2012). Over this same time period, scientists have noted that the climate system has warmed, with temperature increases being observed in both "global average air and ocean temperatures" (Richardson & Ward, 2011, p. IX). Of the twenty GHGs produced both naturally and by humans, CO_2 is the focus of this study because it is an abundant heat trapping gas produced by fossil fuels, and remains in the atmosphere for longer than the other major heat trapping gases (Cuff & Goldie, 2009; Ekwurzel, n.d.). CO_2 is also perhaps the most commonly known of the GHGs, used in its shortened form in many everyday terms such as 'carbon footprint' and 'low carbon economy'. Once CO_2 is produced, only some is naturally absorbed by micro-organisms, plants, oceans and atmosphere, where it is measured in parts per million (ppm) (Cuff & Goudie, 2009). In 2008, the amount of CO_2 in the atmosphere was discussed by Hansen *et al*., who warned that if humanity wished to preserve the planet, the level of CO_2 in the atmosphere would need to be reduced to 350ppm at the most. However, in May 2013, for the first time since records began in 1958, average daily levels reached 400ppm, and the 2015 global average of CO_2 concentration was 399.4 ppm, another new record high (ESRL, 2016). Any more CO_2 produced than can be naturally absorbed by the methods mentioned previously is considered excessive, and since these emissions have heat trapping abilities (Cuff & Goudie, 2009), any excessive CO_2 in the atmosphere is thought to be contributing to the issues of global warming and climate change (Halmann & Steinberg, 1998). Those who take the position that global warming and climate change are exacerbated by excessive levels of GHGs are considered to

take the mainstream climate change approach. Although there is almost a consensus among climate scientists that GHGs emissions are the cause of these issues, the opposing views are presented here.

2.1.1. The climate change debate

Although there is, what is thought by many peer reviewed authors and geoscientists (including Carlton, Perry-Hill, Huber, & Prokopy, 2015; Cook *et al.*, 2013; Oreskes, 2004; Powell, 2016), to be a consensus that climate change is occurring and that the causes are anthropogenic, there are those who reject this mainstream climate science position. These 'skeptics' include private individuals (McCright & Dunlap, 2011), public figures such as Lord Christopher Monckton ('The Lord Monckton Foundation', 2016), and also peer reviewed academics across diverse fields (including Michaels, 1994; Shani & Arad, 2015; Tol, 2014). Michaels' (1994) research explored the greenhouse effect, forecasts about climate temperatures, and the politicisation of global warming. At the time of his research, he concluded that global warming did not have the required scientific basis for any action to be taken, and any action that was to be taken was just unnecessary financial cost (Michaels, 1994). Two decades later, Tol's (2014) paper reported that faulty data was used in Cook *et al*'s., (2013) research claiming that 97 per cent of climate scientists agreed that climate change was a human caused phenomenon. Therefore Tol (2014) claims that the often repeated assertion that 97 per cent of climate scientists agree that anthropogenic actions are causing climate change, "does not stand" (p. 701). Further research in the field of tourism by Shani and Arad (2015), critically evaluated previous climate change literature with a focus on the tourism industry. They reported in their findings, that current scientific literature does not make a strong case for anthropogenic global warming, and suggest that if global warming does occur in the future, that it will actually benefit the Earth and its inhabitants (Shani & Arad, 2015). In addition, powerful groups such as the Republican Party in the United States of America, frequently propose climate change is not occurring due to human interventions (Båtstrand, 2015; Jacobs, 2016; Milman, 2016a; Nuccitelli, 2015). Furthermore, the Republican Party has appointed Mr. Scott Pruitt as the head of the Environmental Protection Agency (EPA). Pruitt flatly rejects the overwhelming scientific evidence that anthropogenic carbon dioxide emissions are the leading driver of climate change (McLaren, 2017), stating on CNBC News that "…no, I would *not* agree that it's [carbon dioxide] a primary contributor to the global warming that we see" (Davison, 2017; DiChristopher, 2017). Also supporting climate scepticism, some American media organisations such as Fox News (Nuccitelli, 2013) and The Wall Street Journal (Bast & Spencer, 2014), generally report from a contrarian[2] position (Nuccitelli, 2013).

Contrarians often cite natural variability as a driver of global warming and climate change. Three main naturally climate-altering sources suggested most commonly are - solar variability, water vapour and volcanic eruptions. Solar variability refers to the changes in amounts of radiation emitted from the Sun that reach the Earth (Cuff & Goudie, 2009). Research explaining the causes

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[2] A term coined by Oreskes (2004), to collectively name those opposed to human induced climate change.

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of climate change due to solar variability by Soon, Legates, & Baliunas (2004) and Soon (2005; 2009), suggested that fluctuations of the Sun are the cause of global warming and climate change. However, it was revealed that Soon had a possible conflict of interest, as his research was funded in part by the American fossil fuel energy industry (Goldenberg, 2015), and therefore these results should be analysed with this in mind. Nevertheless, because the science surrounding measurement of the Sun's variability is still in its infancy, it should not be discarded from the climate change discourse (Cuff & Goudie, 2009). Water vapour is a heat trapping gas that is also thought to impact climate change, as "the warming brought about by increased carbon dioxide allows more water vapour to enter the atmosphere" ('NASA', 2016), thus trapping more heat on Earth. Supporting this natural cause of climate change, Solomon *et al.*, (2010) stated that water vapour is an important driver of global surface climate change. Finally, volcanism has been attributed as a possible cause of climate variations for thousands of years (Robock, 2000), as the gases and dusts released by volcanic forcing (explosions) can remain in the atmosphere, trapping heat on Earth, and are suggested to be a factor in natural climate change (Robock, 2000).

In contrast to these climate change 'skeptic' positions, the majority of peer reviewed literature supports that anthropogenic activities are causing climate change. Research by Crowley (2000), supporting this human induced climate change position, utilised modelling, carbon dating and ice core analysis to research the past 1,000 years of climate change, and concluded that an:

> agreement between model results and observations for the past 1000 years is sufficiently compelling to allow one to conclude that natural variability plays only a subsidiary role in the 20th-century warming and that the most parsimonious explanation for most of the warming is that it is due to the anthropogenic increase in greenhouse gases (p. 270).

Since Crowley's (2000) study, many authors have stated that about 97 per cent of all peer reviewed scientific literature supports the idea that climate change is occurring, and that the causes are anthropogenic (including Carlton, Perry-Hill, Huber, & Prokopy, 2015; Cook *et al.*, 2013; Oreskes, 2004; Powell, 2016). Further supporting this view a survey of 3,146 geoscientists concluded that, the debate surrounding the authenticity of global warming, climate change and the major role that humans play in these phenomenon was "largely non-existent among those who understand the nuances and scientific basis of long- term climate processes" (Doran & Zimmerman, 2009, p. 22). Sterman (2011), in his research investigating communicating the risks of climate change, reiterated the IPCC's statement that "most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations" (p. 5). Further supporting these findings, recent research that re-examined Cook *et al*'s., (2013) results, also concluded that climate scientists are "virtually unanimous" (p. 1) in agreement that climate change is real and human-made (Powell, 2016). Another recognised proponent that climate change being caused by humans is international group Greenpeace ('Greenpeace', 2016), who support the position that climate change is not only occurring, but causing negative global impacts. Also lending his support to the climate change issue is well known actor Leonardo DiCaprio ('Leonardo DiCaprio', 2016). Furthermore, the

former US President Barack Obama publically supports this position, even using social media to confirm his position, tweeting in 2013, "ninety-seven percent of scientists agree: #climate change is real, man-made, and dangerous" (Powell, 2016, p. 1). Finally, a recent report analysing "directly attributable, and verifiable statements" (p. 1), found that at the time of publication (2016), current world leaders from all nations, were in agreement that there is a climate crisis that needs to be addressed, and that "if elected, Trump would be the only world leader to deny the science of climate change" ('Sierra Club Home Page', 2017). The world leaders who are taking emission mitigation related climate action are discussed next.

2.1.2. Taking climate change action on a global scale

Despite the aforementioned 'disagreement' regarding the root causes of climate change, the world leaders of the international community are working towards a global agreement to mitigate emissions produced. The goal of this climate action is to limit the average global temperature to well below 2°C (above pre-industrial levels). It is currently 1°C above pre-industrial levels (US Department of Commerce, 2017). The goal of keeping the increase in temperature below 2°C is thought to be able to reduce the most "harmful effects of climate change" (Edenhofer, 2014, p. 37). In December 2015, 195 countries adopted the first ever global legally binding climate agreement at the United Framework Convention for Climate Change (UNFCCC) 2015 Paris Climate Conference (COP21), referred to as the Paris Climate Agreement ("European Commission," 2016). This agreement required a minimum of 55 parties, comprising of at least 55 per cent of global emissions, to officially sign the deal before it would become a reality. This agreement entered into force in November 2016, after 74 countries (accounting for 58.82 per cent of total global GHG emissions) ratified the agreement ('UNFCCC', 2017). The world's two largest economies, between them responsible for 40% of global emissions, China and the United States of America (USA/US), joined the Paris Climate Agreement in September 2016 (Leber, 2016), and after signing the agreement, former US President Barack Obama stated that he hoped this agreement would inspire further climate action around the world ('Paris climate deal', 2016).

Now in force, the Paris Climate Agreement will ensure "all parties have a legally binding obligation to prepare, maintain and communicated a nationally determined mitigation contribution" (EU, 2016). One member of the signing parties for the Paris Climate Agreement, the United Kingdom (UK), has already developed a framework specifically to mitigate carbon emissions through its Climate Change Act 2008. This Act established a framework to develop an economically credible emissions reduction path for the country. Part of that reduction goal was realised in 2014, when UK emissions were 35 per cent below 1990 levels ('Carbon budgets', 2016). Other countries that have official governmental support for climate change mitigation include Mexico, which adopted the General Law on Climate Change in 2012 (Friedman, 2012). This General Law commits the country to reducing its emissions by 50 per cent from 2000 levels by 2050 ('Climate Action Tracker', 2016). Many other countries, as diverse as Sweden, Zimbabwe, Peru, Mongolia and Australia have all also created legislation that commits them to mitigation climate change on a national level (Nachmany *et al.*, 2014). These isolated governmental actions indicate that there is

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a movement, by both developed and developing countries, towards climate change legislation. However, with the ratification of the Paris Climate Agreement, a global framework of carbon mitigation is being created.

On the global stage, New Zealand is already supporting this move towards carbon neutrality, as one of the countries that has ratified its 2015 Paris Agreement to mitigate carbon emissions. By ratifying the Paris Agreement, New Zealand should benefit both environmentally and financially, as "there is overwhelming evidence that economies that actively align governance, policies and funding to secure environmental performance targets enjoy significant economic benefits as a result" (Mills, 2011, p. 1). This ratification reinforces the country's commitment to climate change mitigation, however, the current Climate Change Issues Minister of New Zealand advises that all parts of society should still play their part in the transition to a lower emissions economy (Sherman, 2016). Once the 2015 Paris Agreement goes into force, the transition to a lower emissions economy will require drastic mitigation measures to achieve the goal of reducing GHG emissions to 30 per cent below 2005 levels by 2030, as New Zealand's net greenhouse gas emissions increased 63 per cent between 1990 and 2008 ('Key Findings on New Zealand's Progress Using a Sustainable Development Approach', 2011). Further to this, despite being renown as 'clean and green', Schott (2010) found that there was an emphasis on the need for a national approach to address environmental issues in New Zealand. The New Zealand Ministry for the Environment (MfE) is currently tasked with addressing environmental issues, and providing environmental stewardship for a prosperous New Zealand - *tiakina te taiao kia tōnui a Aotearoa* ('Ministry for the Environment', 2016).

One of the three main priorities stated by the Ministry for the Environment is for New Zealand to become a "successful low-carbon society that is resilient to climate change impacts on its climate, economy and lifestyle" ('New Zealand's 2030 climate change target', 2016). Supporting this endeavour are two particularly relevant government Acts regarding climate change mitigation in New Zealand - the Climate Change Response Act (2002), and the Energy Efficiency and Conservation Act (2000). The Energy Efficiency and Conservation Act (2000) established the Energy Efficiency and Conservation Authority (EECA), with a goal of "an economy wide improvement of energy intensity of 1.3% per year" (Nachmany *et al.*, 2014, p. 410), through various initiatives. Under the Climate Change Response Act (2002), a national emissions trading scheme (New Zealand ETS), was established, and was noted as New Zealand's primary response to climate change (Nachmany *et al.*, 2014). However, currently the New Zealand ETS does not cover all sectors of industry, with tourism excluded from its reporting structure. Although both these Acts include elements of emission mitigation throughout them, neither are focused solely on lowering carbon emission levels similar the UK's Climate Change Act (2008). In response to this, a New Zealand climate change movement group, Generation Zero, is drafting cross-party legislation for New Zealand based on the UK's Climate Change Act (2008). If accepted, the "Zero Carbon Act will establish a legally-binding framework that sets an emissions

pathway to the long-term goal of being zero carbon[3] by 2050" (McLaren, 2016). The Zero Carbon Act will oblige the government to implement policies that support the pathway to a carbon free society, ensuring that New Zealand industries and individuals are carbon neutral, and will demand that an independent organisation monitor progress and suggest further mitigation initiatives.

The possibility of this new Zero Carbon Act combined with the Paris Climate Agreement suggests that New Zealand should be on track to cut emissions to at least 30 per cent below 2005 levels by 2030, operating successfully as lower carbon economy. Assisting the transition to a lower emissions economy are various enterprises who assist organisations to lower their carbon emissions. CarboNZero is a New Zealand owned carbon footprint certification scheme based on "solid science and international best practice" ('Enviro-Mark Solutions', 2016). This organisation provides expert guidance and comprehensive carbon reporting, benchmarking and management to those wanting to operate in a carbon neutral manner. The certification recognises both products and organisations that "measure their GHG emissions, understand their carbon liabilities, and put in place management plans to reduce emissions in their organisation and more widely through their supply chain" ('Enviro-Mark Solutions', 2016). Furthermore, it also offers credible and verified carbon credits to offset any remaining unavoidable emissions. The carboNZero certification is issued after an international standard, independent audit is satisfied. This certification is voluntary and requires financial commitments by the organisation seeking accreditation towards operating with zero emissions. In summary, despite a lack of complete consensus on the causes and extent of climate change, greenhouse gas emissions are the most pressing global issue facing tourism (Gössling *et al.*, 2005). Not only are the tourism and accommodation industries experiencing the physical impacts of climate change, they also play a "significant role in climate change" (p. 342) through "human-induced greenhouse gas emissions" (Hall, Amelung, Cohen, Eijgelaar, Gössling, 2015, p. 342). The effects of climate change on the tourism and accommodation industries, and their contributions to the issue of climate change, are discussed in the following section.

2.2. Tourism, accommodation and climate change

As a multidimensional industry (Scott, *et al.*, 2012), 'tourism' includes both international and domestic travel of people who are travelling outside of their usual environment for less than one year, for purposes that include leisure, business and visiting friends and family, and include an overnight stay (Gössling, 2013a). Current projections forecast the international tourism industry to continue to grow, with tourist arrivals worldwide expected to increase by 3.3 per cent a year from 2010 to 2030, reaching 1.8 billion by 2030 (UNWTO, 2015). For the majority of visitors, some kind of commercial or private accommodation is a necessity when travelling, making the accommodation industry an important sub-industry of tourism (Lim, Chang, & McAleer, 2009). Therefore, as the numbers of tourists grow, the amount of required accommodation rooms will

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[3] Multiple definitions for zero carbon, or carbon neutral, are discussed by Gössling (2009), and although an exact definition is elusive, it is concluded that the term carbon neutral is generally understood to mean that an entity is not contributing to the net increase of global greenhouse gas emissions.

also rise, indicating that the accommodation industry will continue to play an important role in tourism.

The tourism and accommodation industries are interconnected with climate change in multiple ways. This relationship has resulted in the emergence of a distinct sub-field of academic research investigating the interconnectivity between tourism, the accommodation sector and the causes of, and issues resulting from, climate change. Among the many contributors, are studies by Becken (2004, 2013), Becken & Patterson (2006), Becken and Hay (2012), Becken *et al.*, (2001), Bohdanowicz, (2005; 2006; 2011), Bohdanowicz, Churie-Kallhauge, Martinac, and Rezachek (2001), Cohen, Higham, & Cavaliere (2011), Cohen, Higham, and Reis, (2013), Gössling (2001, 2011, 2013), Gössling *et al.*, (2007), Gössling and Hall (2006; 2008), Gössling, Scott, Hall, Ceron, and Dubois (2012); Hall (2008), Hall *et al.*, (2015), Hall and Higham (2005); Higham and Cohen (2011), Mair (2011), Peeters, Gössling, and Becken (2006), Scott (2011), Scott and Becken (2010), Scott, Hall, and Gössling (2012), Scott, Peeters, & Gössling (2010), Tol (2014) and Weaver (2011). This is by no means an exhaustive list, however, many of these key contributors are dominant throughout this study due to the substantial amounts of literature they have produced on tourism, accommodation and climate change – especially in the New Zealand context. It is of note that the majority of authors in the field of tourism, accommodation and climate change agree that climate change issues are "extremely significant" (Hall *et al.*, 2015), and that "in the decades ahead, climate change will become an increasingly pivotal issue affecting tourism development and management" (Yang, 2010, p. 212).

2.2.1. Climate change impacts on tourism

The effects of climate change have already been felt by tourism operators around the world (Agnew & Viner, 2001). Tourism businesses are under direct climate related threat which may result in loss of clientele causing lost income, or physically in terms of weather related destruction of property or natural outlooks (Scott *et al.*, 2012). These authors also drew attention to increasing climate changes amplifying tourist deterrents. Although there are many deterrents, two are introduced here. First, climate change is thought to be exacerbating more extreme weather events such as cyclones (Scott *et al.*, 2012). This is exemplified in changing weather patterns which are increasing the frequency and strength of cyclones in popular tropical tourist destinations such as the Caribbean (Granvorka & Strobl, 2013) and the South Pacific. Although cyclones have always been a part of the tropics, an increase of them due to the warmer seasons, creates the potential for extra physical damage to the areas, and personal safety risk to tourists and locals (Figure 2.1). An example of this damage was caused by Cyclone Winston, the most powerful storm on record in the Southern Hemisphere, which swept through Fiji in 2016, closing and damaging resorts across the island (Holmes, 2016). With increasing cyclones, not only is the risk to guests heightened, the accommodation providers may incur extra financial costs of rebuilding the infrastructure, as well as lost revenue from having to close the property for repairs, all of which negatively impact the industry as a whole.
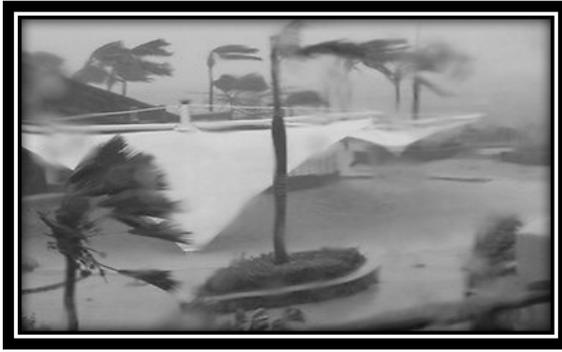
Figure 2.1 View of a hotel swimming pool during Cyclone Evan (2012) on Fiji's popular tourist destination, Denarau Island. Picture: Brendan O'Farrell (Barrett, 2012)

Secondly, in stark contrast to tropical cyclones, another destination where tourism is dependent on the natural environment, are good snow conditions for alpine activities (Hall, 2006; Scott *et al*., 2012). A 2012 report on the Winter tourism industry in the US found that due to declining guaranteed snowfall, ski resorts were relying on snowmaking facilities, which consume up to 50 per cent of their energy costs (Burakowski & Magnusson, 2012), presumably also creating the equivalent GHG emissions. On the other side of the Atlantic ocean, recent media reports from Europe showed a lack of snowfall for its 2015 season, resulting in the lower slopes in the German and Swiss Alps being almost completely bare of expected snow, causing tourists to seek higher altitudes or rely solely on manmade strips of snow (Figure 2.2) (Kitching, 2015).

Figure 2.2 Mild conditions left ski slopes almost bare at Tegelberg, in Schwangau, Germany in the Winter of December 2015 (Picture: Alamy Live News ('Alamy', 2016)) (Kitching, 2015)

This type of tourist deterrent may impact the New Zealand alpine tourism economy in the future as well, as research on predicted future snow levels in New Zealand showed that snow levels will continue to decrease in New Zealand, impacting a range of areas including alpine tourism (Hendrikx, 2010). New Zealand tourism can be seen to be especially vulnerable from the effects of climate change, as tourism forms an integral part of the country's economy. In the year to June 2016, the tourism expenditure in New Zealand was NZD$29.8 billion, with NZD$11.8 billion from international visitors ('Ministry of Business, Innovation and Employment', 2016). The industry also provided 4.7 per cent of employment for the country, and was only second in export earnings to

dairy, beating other traditional export earners - wood, meat and crude oil (Key Tourism Statistics, 2015). These figures reveal how economically important tourism is to New Zealand. Although New Zealand is not considered a developing country[4], it is still one that is "potentially both highly vulnerable to climate change and highly economically dependent on tourism" (Scott *et al.*, 2012, p. 214). Therefore, as the climate, and any changes that occur to it, have a direct effect on the economic viability of destinations, tourist choices and the industry as a whole (Hall *et al.*, 2015), New Zealand should be particularly aware of the climate change.

2.2.2. Climate change impacts on the accommodation industry

The impacts of climate change manifest in many different physical ways, which exposes the accommodation industry as one of the most vulnerable to climate change because of their fixed assets (Su, Hall, & Ozanne, 2013). One natural issue thought to be exacerbated by climate change is the increase in sea levels, which in turn increases the risk of flooding that impacts coastal areas. These areas are commonly used for campgrounds and accommodation properties that provide guests with water views and access for activities such as swimming, boating and fishing. With increased sea levels, flooding can intensify, causing these areas to become more prone to having to evacuate guests (Eder, 2016). Considering that most campgrounds in New Zealand rely on the Summer holiday period (December/January) for their annual income (Blundell, 2006), if flooding occurs during this period, it could be financially crippling to the these type of accommodation providers (Figure 2.3).

Figure 2.3 Campers' tents under water at Cook's Beach, North Island, New Zealand in 2013 (Photo: Matt Corbett).

Also associated with increasing sea levels, erosion can be aggravated by increased volumes of water. New Zealand, with its 15,000 kilometres of coastline, is prone to suffer from this issue. This is exemplified by the erosion at the *Punakaiki* Beach Camp on the West coast of the South Island, which in 2016, lost 11 metres of coastline in one month to the high tides (Carroll, 2016). Geographically juxtaposed to that beachside camp, a campground on the East coast of the North Island had also lost camp sites to coastal erosion over the last seven years (Mitchell, 2016)

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[4] "A developing country is one in which the majority lives on far less money—with far fewer basic public services than the population in highly industrialized countries. Incomes are usually under US$2 per day and a significant portion of the population lives in extreme poverty (under US$1.25 per day)" ('The World Bank', 2016).

(Figure 2.4), and subsequently had to close (Gullery, 2013). This indicates that it is not a localised issue, but one that impacts all coastal areas. In contrast to coastal erosion, climate change is also impacting alpine locations where many types of accommodation can be found to house people engaging in winter leisure activities such as skiing or snowboarding. As accommodation establishments in these areas also likely rely on seasonal tourism for their annual income, loss of snow will result in a decline in guest numbers, which over the long term is not financially sustainable. An example of this is when the New Zealand ski season of 2014 received such limited natural snowfall on the country's alpine resorts, that some were only kept operational by unprecedented use of snow makers (Perry, 2014). During that time, one ski operation stated it could not pay staff until the area opened for business, and had actually been refunding costs to tourists who had booked ski and accommodation packages (Perry, 2014).

Figure 2.4 Between 2009 (left) and 2016 (right) in Clifton on the Hawke's Bay, New Zealand, a campground lost sites and roads were damaged due to coastal erosion (Mitchell, 2016).

Both these examples of climate change impacting the natural environment show that not only is the changing climate impacting the natural surroundings of accommodation businesses, it is also negatively impacting their financial positions, or more drastically, the physical location of the establishment is being threatened. Therefore, the preservation of the natural environment these accommodation properties inhabit is imperative for the continued enjoyment of tourists, as well as the livelihoods of the owners, operators and employees. However, the tourism and accommodation industries are not only on the receiving end of the impacts of climate change, they are also contributing to the GHG emissions that are associated with the changing climate, and are discussed subsequently.

2.2.3. The tourism industry's CO_2 emissions contribution

In 2005, the international tourism industry was thought to be responsible for five per cent of global greenhouse gas emissions, with the three main sources of emissions attributed to aviation (40%), transport (35%), accommodation (21%) and activities (4%) (Gössling, 2011; UNWTO, 2015). Of these GHG sources, the United National World Tourism Organisation (UNWTO) estimated that aviation accounted for 40 per cent of tourism's contribution to global emissions (UNWTO, 2015), and it is well documented that long haul flights are a major source of GHG emissions (Higham, Cohen, & Cavaliere, 2014). The creation of these emissions is one reason that even though

tourism is "recognised as a highly climate-sensitive industry", it is "also a growing contributor to anthropogenic climate change" (Scott *et al.*, 2012, p. 213). This is noteworthy, as there are currently no policies limiting travel emissions, and based on current research, tourists are currently generally unwilling to curb aviation travel (Cohen *et al.*, 2011; Higham & Cohen, 2011; Higham, Cohen, & Cavaliere, 2014).

The remote geographic position of New Zealand makes it susceptible not only to climate change in regard to loss of biodiversity and natural beauty, but it is also particularly exposed to the impact of any forthcoming regulatory regimes on long-distance travel (aviation and cruise ships). As the New Zealand tourism industry earns approximately 75 per cent of its international expenditure through tourists arriving on long-haul flights (Hall, 2006), such flights are of particular importance to New Zealand as a destination (Gössling, Scott & Hall, 2013). It is suggested that therefore any limitations on carbon emissions for travellers and tourists will negatively impact the New Zealand tourism industry. Fortuitously for New Zealand tourism, despite growing environmental concerns surrounding the environmental impacts of aviation, current research suggests travellers will continue to make the long haul flights necessary to experience New Zealand (Barr, Shaw, Coles, & Prillwitz, 2010; Cohen *et al.*, 2011; Dickinson, Lumsdon, & Robbins, 2010; Higham & Cohen, 2011; Higham *et al.*, 2014). Whilst in the New Zealand, tourists contribute to national carbon emissions through travel, accommodation categories, and visiting attractions such as adventure recreation (Becken & Patterson, 2006). Through these activities, tourism in New Zealand was suggested to be a major source of emissions for the country, relative to other sectors, and therefore a key contributor to climate change through its use of fossil fuels (Becken & Patterson, 2006). However, most pertinent to this study, are the emissions from the accommodation industry which was found to produce 21 per cent of tourisms' global emissions (UNWTO, 2015).

2.2.4. The accommodation industry's emissions contribution

Globally, the accommodation industry is thought to be responsible for 21% of all tourism carbon dioxide emissions ('UNWTO', 2017), and is forecast to grow to account for a quarter of these emissions by 2035 (de Grosbois & Fennell, 2011). Hotels specifically account for around 1% of total global GHG emissions (Gössling, 2011), and though this small percentage may seem insignificant, growth in the industry means relatively increasing contributions towards negative environmental impacts especially as the accommodation industry uses vast quantities of energy, raw materials, water and products (Michailidou, Vlachokostas, & Moussiopoulos, 2016). Due to this, equally large volumes of waste and emissions are produced. Energy use and emissions generated by the day to day operations and activities within an accommodation establishment have been the subject of previous studies both worldwide and specifically in New Zealand (including Becken, 2013; Becken & Hay, 2012; Bohdanowicz, 2005, 2011; de Grosbois & Fennell, 2011; Gössling, 2011; Graci & Dodds, 2008). From these studies, and other research, energy consumption at accommodation establishments has been identified as a key driver of emissions (Becken, 2013). For example, Gössling (2011) discussed international accommodation providers,

Hilton, who were found to have average energy use values of 322MJ per guest[5], compared to Scandic hotels where guests averaged 172MJ per night, although actual emission amounts created from these were not reported in that study (p. 73). However, Gössling (2011) suggested that the equivalent emission amounts for these two hotel chains would be 4.6kg CO_2 per guest night for Scandic, and 44kg CO_2 per guest night at Hilton (p. 73).

Investigation into energy consumption throughout the New Zealand accommodation industry to provide a benchmark for future sustainable development to be measured against was conducted by Becken *et al.*, (2001). They found that hotels were the largest energy consumers (110MJ equating to 7.9kg CO_2/ guest night), and noted that with their broad range of services, hotels had potential to achieve energy savings across a number of areas. Motels were ranked just below hotels in energy consumption levels, although it should be noted that Becken *et al.*, (2001) reported that this energy consumption level was a result of large visitor nights, rather than actual energy use per night (Table 2.1). Table 2.1 shows a correlation between the energy use per night, and the amount of emissions created per visitor night – the higher the energy use per visitor night, the more emissions created. This shows that hotels use more energy than other types of accommodation properties (Becken *et al.*, 2001). However, mitigation initiatives to combat the emissions generated from these energy levels have not been investigated to date.

Table 2.1 *Becken et al's., (2001) mean energy efficiencies for various New Zealand accommodation categories*

Category	Used by (% of international tourists)	Energy use per square meter (MJ/m2*year)	Energy use per visitor-night (MJ/visitor-night)	CO2 emissions per visitor-night (g)2
Hotel/lodge	56.1	571	155	7895
B&B (inc. yacht and farmstay)	8.3	300	110	4142
Motel	23.9	250	32	1378
Backpacker	12.5	617	39	1619
Campgrounds (inc. cabins, free camping, huts)	10	n.a.	25	1364

One reason that hotels consume more energy is that energy use is perceived to equate with comfort, exemplified by the use of 24-hour air conditioning, constant lighting, and heated swimming pools. As a general rule, "the more luxurious the accommodation, the more energy will be used" (p. 72), due to larger spaces to heat/cool, and more amenities including electrical appliances for guest use (Gössling, 2011). This "high energy use is even, in some businesses,

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[5] The measurement MJ denotes a megajoule. This is a unit of measure relating to energy and is used to measure emissions.

seen as a sign of quality and potency" (Gössling, 2011, p. xvii). Focused on the New Zealand accommodation sector, research by Becken (2013) explored energy saving measures undertaken, but did not explicitly focus on lowering carbon emissions. Becken's (2013) research reported that the motel category was poorly represented, and the survey did not include all the accommodation categories in New Zealand. Furthermore, the study results were unable to be generalised to the New Zealand accommodation industry due to the number of respondents and response rate achieved. The previous research presented here indicates that the tourism industry is not a passive recipient of the impacts of climate change, but also "non-negligible contributor to climate change through GHG emissions derived especially from the transport and accommodation of tourists" (Yang, 2010, p. 212). Therefore, methods the industry is currently undertaking to mitigate these GHG emissions through environmental sustainability programmes are discussed throughout the following sections.

2.2.5. Environmental sustainability in tourism

The term sustainability, rooted in the Latin, *sustinere* (to support), has multiple definitions throughout literature (Johnston, Everard, Santillo, & Robert, 2007). However, despite these multiple definitions, the need to manage the world's resources so that both the current and future generations will not be compromised is central to the concept of sustainability (Brundtland, 1987). This concept was the focus of 'Our Common Future', a paper published by the World Commission on Environment and Development (Brundtland, 1987), which introduced the theory that sustainable development has three interlinked pillars – economic development, social equity and environmental protection, all equally important and interdependent (Brundtland, 1987). Two decades later, the additional pillar of climate change was introduced by the tourism specific Davos Declaration (World Tourism Organisation & United Nations Environment Programme, 2008), which proposed that climate change should also to be taken into consideration when applying sustainable practices. Furthermore, the Davos Declaration stated that one of the four key areas recommended for action by the industry, was to "mitigate greenhouse gas emissions from the tourism industry (especially from transport and accommodation activities)" (World Tourism Organisation & United Nations Environment Programme, 2008).

However, despite the Brundtland report (1987) and Davos Declaration (2008), throughout the tourism industry sustainability and sustainable development are still part of an ongoing dialogue among stakeholders. Williams and Ponsford (2009) found that even though tourism was transitioning towards more sustainable practices, the process still required a greater degree of co-ordination between these stakeholders to actually achieve sustainability. This transition had previously been discussed by Gössling *et al.*, (2005), who had noted that throughout the tourism industry there was a consensus that development should be sustainable, however questions remained about how to achieve the goal (Gössling *et al.*, 2005). It seems the fragmented, multidisciplinary and political nature of tourism can hinder co-ordination efforts around sustainability issues and setting good policies (Soteriou & Coccossis, 2010), making the goal of sustainability difficult to achieve. These points highlight how difficult the implementation of the

2015 Paris Climate Agreement could be considering it has been 30 years since the Brundtland (1987) report, and it appears that the tourism industry at least, has still not come to a consensus on how best to implement environmental sustainability. Despite the lack of consensus throughout the industry stakeholders, progress is being made by many accommodation establishments which are introduced next.

2.2.5.1. Environmental sustainability in the accommodation industry

Internationally, it has been proposed that the accommodation industry is in the midst of a sustainable awakening (Prairie, 2012), with environmental sustainability issues being widely recognised as an important pillar of the industry (Budeanu, Miller, Moscardo, & Ooi, 2016). Earlier support for this statement was found by Bohdanowicz and Zientara (2008) who discovered that "many of the hotel companies provide extensive information on their commitment, initiatives and achievements on their corporate websites" (p. 272). The hotel companies discussed in their research included some of the best known chains and groups around the world (e.g. Accor International, Hilton Hotels, Club Mediterranean and Fairmont Hotels and Resorts), however, the focus of their case study was hotel chain Scandic, "a pioneer of sustainability work" (Bohdanowicz and Zientara, 2008, p. 272). Their case study investigating Scandic provided a holistic overview of the Corporate Social Responsibility (CSR) aspects of the company through both primary and secondary research, however did not focus on carbon emissions or their mitigation at the hotels. However, subsequent research on ten of the top hotel chains worldwide revealed, that while all corporate groups provided some information on their websites about their environmental sustainability, only four published formal sustainability reports (Jones, Hillier, & Comfort, 2014). However, a lack of industry wide guidelines for accommodation organisations who provided their environmental sustainability information was discovered in Ricaurte's (2011) study, and it was concluded that there were no clear, uniform guidelines for reporting environmental sustainability, making it difficult for stakeholders to make comparisons (Ricaurte, 2011).

In a New Zealand context, the "accommodation industry constitutes a vital part of the tourism product and will play a critical role in achieving sustainable tourism" (Becken, Frampton & Simmons, 2001, p. 372). There are innumerable accommodation establishments in New Zealand that display environmental sustainability as part of their product offering to guests, however two exemplary establishments are introduced here, with both properties past winners of the annual New Zealand Hotel Environment Award – the Langham Auckland and the James Cook Grand Chancellor, Wellington. The Langham Auckland is a 5-star hotel in central Auckland that holds a gold EarthCheck[6] certification as well as a Qualmark Enviro Gold award. Management states that the hotel's key environmental sustainability initiatives include:

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[6] "EarthCheck is the world's leading scientific benchmarking, certification and advisory group for travel and tourism" ('EarthCheck', 2016).

- General Sustainability Training for all staff through the staff induction programme;
- Formation of a 'Green Team' of employees, who volunteer to lead environmental initiatives at the hotel;
- Locally sourced products from within the community as well as nationwide;
- Staff awareness through training, notice boards and participation in events;
- Reducing the consumption of water, energy and waste going to landfill;
- Waste separation and recycling including food waste and general recycling
- Energy saving light bulbs in all rooms;
- Room thermostats with motion sensors being trialled;
- Linen and towel re-use card in all rooms; and
- Replacement of Perchloroethylene-based dry cleaning machine ('Langham Hotels & Resorts', 2016)

In the capital city of New Zealand, the 2014 winners of the Hotel Environmental Award, the James Cook Grand Chancellor Wellington, also hold a gold EarthCheck certification and a Qualmark Enviro Gold. The hotel management states its environmental sustainability initiatives as:

- Dedicated 'Green Team' which includes executive management;
- Water conservation programs;
- Efficient heating and electricity systems;
- Staff training and education in environmental and sustainability practices;
- Recycling programmes - including glass, plastics, paper and organic waste (to reduce carbon emissions);
- Preference given to environmentally responsible vendors; and
- Green-friendly waste disposal programs, housekeeping practices and laundry options ('Grand Chancellor Hotels', 2016)
-

Although these two New Zealand hotels indicate they are implementing many general environmental sustainability initiatives, mitigation of carbon emissions are only specifically mentioned once. However, as it has been suggested that the most important sustainability measure in accommodation properties is to reduce energy use, which in turn lowers carbon emissions (Scott, Gössling, *et al*., 2012), these hotels appear to be implementing measures such as efficient heating and electricity systems, which also mitigate their emissions. Indicating their commitment to environmental sustainability, both these establishments held Qualmark™ Enviro Gold and gold Earthcheck certification. Environmental accreditation awards are one method of assessing an accommodation establishment's environmental sustainability and are introduced next.

2.2.5.2.   International environmental accreditation awards

Environmental sustainability measures across the international accommodation industry are varied, and how properties publically portray their sustainability strategy to attract guests is

unregulated. No international governing body exists in the accommodation industry, to provide consistent and accurate regulation of information to guide guests' sustainable accommodation choices. This lack of consistent, overarching governance may be the reason that the phenomenon known as 'greenwashing' occurs in the accommodation industry. Greenwashing is defined by Walker and Wan, (2012) as "symbolic information emanating from within an organisation without substantive actions" (p. 231). This occurs when businesses align themselves with current environmental trends, whilst not implementing the actions necessary to actually be sustainable, and has been noted that it is an issue that the accommodation industry faces in particular (Mowatt & Morrow, 2013). It is likely that lack of mandatory regulatory bodies within the industry perpetuates this problem, although other industries also suffer from the same issue. To try and limit the occurrences of greenwashing, voluntary accreditation bodies give the accommodation industry sustainability frameworks on which to base their environmental practices. Guests, and other stakeholders, requiring reassurance of an environmentally sustainable accommodation, can look for any environmental certification held by the establishment. As well as providing guests with confidence that the organisation is undertaking the environmental initiatives that are required to gain the certification, this process "can help organisations meet stakeholder requirements, demonstrate good corporate citizenship, manage risk, develop business efficiencies, achieve cost savings and gain market access" (Mills, 2011). However, as there are so many different certifications available, and with an absence of agreed standards, it is a challenge for guests to choose environmentally certified establishments they can trust (Esparon, Gyuris, & Stoeckl, 2014).

There are a multitude of industry accreditation and third party programmes that organisations can choose from, however the International Organisation for Standardisation (ISO) and Green Globe are two of the most internationally well known. The ISO is an "independent, non-governmental membership organisation and the world's largest developer of voluntary International Standards" ('ISO', 2016). The ISO 14001 in particular, is an environmental management scheme of standards that consider environmental issues such as "air pollution, water and sewage issues, waste management, soil contamination, climate change mitigation and adaptation, and resource use and efficiency" ('ISO', 2016). However, most pertinent to this study, is ISO 14064-1 which specifies principles and requirements for the quantification and reporting of greenhouse gas emissions, and removal within an organisation. Overall, the ISO label provides an assurance to stakeholders, both internal and external, that the environmental impact of the establishment is being measured and continually improved. Green Globe is a global sustainably focused accreditation organisation affiliated with the United Nations World Tourism Organisation and the Would Tourism and Travel Council. Green Globe offers certification for sustainable tourism of companies and organisations who are "committed to making positive contributions to people and planet" ('Green Globe', 2016). Other international accommodation specific eco-ratings include Green Key, Green Seal, European eco-label, British Green Tourism Business Scheme, Canada Green Key Eco-rating System, Ecotourism Australia and Taiwan Green Mark Hotel.

2.2.6. From environmental sustainability to a focus on carbon emission mitigation

The definition of mitigation is 'to make or become less severe or harsh', or to 'moderate' ('Oxford dictionary', 2014) . However, for the purpose of this study, the IPCC definition of mitigation as 'an anthropogenic intervention to reduce the sources of greenhouse gas emissions' will be used (IPCC, 2015). Additionally, the current study defines mitigation not only as the intervention to reduce GHG sources, but an action specifically intended to reduce the effects of climate change (Swart & Raes, 2007). This mitigation of emissions has been stressed as important by Gössling *et al*., (2005) who emphasises there is a need to reduce greenhouse gas emissions, and the IPCC categorically state that to combat climate change, mitigation of emissions must be sought (IPCC, 2015). Furthermore, as previously discussed, the 2015 Paris Climate Change Summit (COP21) realised an agreement between international government officials that global emissions needed to peak as soon as possible, and thereafter a rapid reduction must occur ('Paris Agreement - European Commission', n.d.). The ongoing importance of reducing global emissions is also strongly emphasised by climate scientists, who recently declared that this issue is "a global emergency [and] fossil fuel CO_2 emissions should be reduced as rapidly as practical (Hansen *et al*., 2016).

Although sustainability in tourism may be a difficult goal to achieve**,** Gössling (2009) observed that internationally, an increasing number of tourism destinations such as Costa Rica, plan to become carbon neutral in response to pressure on the tourism industry to reduce its GHG emissions (p. 17). However, planning this goal, and actually achieving it are very different, as becoming fully carbon neutral as a country is understandably a very challenging task[7]. Despite the challenges, Costa Rica is currently operating as a low carbon economy. This popular tourism destination is moving towards a carbon neutral status across all industries, but promoting this specifically through tourism, which is attracting visitors and gaining international accolades (Salazar, 2013). The example of Costa Rica is noteworthy to this study, as it is comparable to New Zealand in its population size and its reliance on the preservation and regeneration of the country's natural beauty and biodiversity to attract tourism. One tool developed in Coast Rica to facilitate the ongoing connection between tourism's stakeholders and environmental sustainability, is a 'Sustainable Hotel Practices Guide', that lists the accommodation properties in accordance with their sustainable features ('Sustainable Hotel Practices Guide', 2016).

Throughout the international accommodation industry, a multitude of properties are implementing practices to lower their carbon emissions. The importance of undertaking emission mitigation in the accommodation industry was highlighted by Bohdanowicz, Zientara, and Novotna's (2011)

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[7] The nation of Bhutan is currently the only country that can claim, not only carbon neutrality, but carbon negative status. This means that "according to recent figures, the country emits around 1.5 million tonnes of carbon annually, while its forests absorb over 6 million tonnes" (Dady, 2013; Mellino, 2016). Whether or not this status translates into more tourism for Bhutan remains unanswered, and would be an interesting subject for further research.

research that focused on carbon emission reductions in Hilton's "we care!" programme. Hilton reported that the programme's initiatives resulted in an eight per cent emissions reduction (per guest night) over three years at its European properties (Bohdanowicz *et al.*, 2011). Many other large international accommodation property groups are also introducing emission specific reduction programmes throughout their properties including InterContinental Hotel Group's Green Engage™ System which includes the Holiday Inn and Crown Plaza chains ('Major hotel chains commit to reduce carbon footprint', n.d.). In a global hotel investigation by Jones *et al.*, (2014), Hyatt reported targets to reduce its greenhouse gas emissions by 25 per cent by 2015, and Wyndham Worldwide's goal is to reduce its carbon dioxide emissions by 20 per cent by 2020. Starwood Hotels and Resorts proposed a 30% reduction in GHG emissions per built hotel room by 2020 ('Starwood Hotels & Resorts', 2016), and Marriott was reported as undertaking projects to reduce greenhouse gas emissions and developing industry standards for carbon measurement (Jones *et al.*, 2014). Previous studies specifically focused on the New Zealand accommodation sector's carbon emission management includes Becken *et al.*, (2001), which explored the variances in energy consumption between different categories of accommodation, and established a benchmark for each categories' annual energy use, but did not investigate mitigation initiatives to curb energy usage. Further research also by Becken (2013), explored energy saving measures undertaken by the New Zealand accommodation industry, however, it did not explicitly focus on initiatives that can lower carbon emissions. When implementing emission mitigation initiatives to achieve these reductions, high profile hotel chain, Wyndham Worldwide, acknowledged that "the first step in reducing our environmental footprint is to measure impact" (Jones *et al.*, 2014, p. 9).

2.2.7. Measuring carbon footprints

To be able to monitor and measure GHG reductions, initially the environmental footprint of the organisation must be ascertained. This refers to the total emissions of greenhouse gases that are attributed to an organisation. To assess this 'footprint', the CO_2 emissions that are created during the activities of the property are measured. Activities such as transport, air conditioning and other uses of energy contribute the majority of the carbon footprints, mainly through the use of fossil fuels ('EPA', 2016). Although the concept of creating and measuring carbon footprints is not without contention (Wiedmann & Minx, 2007), the footprint is usually calculated by measuring the amount of energy and transport used directly by the organisation, and indirectly from products and services it uses (Cuff & Goudie, 2009). There are numerous ways for accommodation properties to measure anthropogenic emission outputs, including online calculators such as the Hotel Carbon Measurement Initiative (HCMI). The HCMI aims to align the accommodation industry in how it reports on carbon emissions, helping stakeholders understand the carbon footprint of the property (Bowling, 2012). It is also possible to engage the services of an expert emission measurement organisation such as carboNZero. Companies such as carboNZero provide an accurate measurement and accounting of emission baselines, and provide guidance about initiatives to mitigate emissions for the organisation.

To provide assistance to stakeholders interested in overarching environmental sustainability, but also specifically on the mitigation of emissions, there are two leading accreditation schemes that embody the themes discussed in this paper, Qualmark Enviro™ and carboNZero™. These schemes are both are partially supported by the New Zealand government, but participation by organisations remains voluntary. The Qualmark™ certification system assesses establishments within tourism. It is a nationally recognised accreditation programme that invites New Zealand tourism establishments to be assessed, with the aim of becoming part of the Qualmark™ brand which rewards their dedication to creating an excellent experience for their visitors. It is supported by both Tourism New Zealand (a government entity), and the Automobile Association of New Zealand (a privately owned entity). Under the umbrella of Qualmark™, and of particular interest to this study due to its environmental focus, is the Qualmark Enviro™ Award.

Qualmark Enviro™ offers accreditation levels of bronze, silver and gold to New Zealand businesses that specifically want to be recognised for their high performing sustainable tourism practices (Table 2.2). The achievement of a Qualmark Enviro™ Award indicates that actions, initiatives and management of resources and social impacts are being managed by the business, over and above minimum expectations ('Qualmark', 2016). Qualmark™ state that any Qualmark Enviro™ accredited business is considered to be conducting their business in an environmentally sustainable manner and are implementing such activities as energy efficiency, water and environmental conservation, waste management (recycling), and community support ('Qualmark', 2016) (Figure 2.6). These accreditations cost each accommodation establishment upward from NZD$475, with ongoing annual fees, depending on the size of the business, which may preclude some accommodation owners from achieving this award, despite adhering to the criteria of the award. Currently about 20 per cent of accommodation establishments in New Zealand hold a Qualmark Enviro™ award.

Figure 2.5
A Qualmark Enviro Award logo (bronze)
('Qualmark', 2016)

CarboNZero™ accredits carbon neutral businesses and products. CarboNZero™ is part of Enviro-Mark Solutions, which is a subsidiary of Landcare Research. Landcare Research is a New Zealand crown research institute (CRI), formed in 1992 as an independent company with the core purpose of driving innovation in the management of terrestrial biodiversity and land resources. One of their four key responsibilities is to "improve the measurement and mitigation of greenhouse gases from the terrestrial biosphere" ('carboNZero and CEMARS certification programmes', 2016). CarboNZero™ assists with measuring an organisation's greenhouse gas emissions through use of specifically designed measurement tools in line with international standards set by the International Organisation for Standardisation (ISO). As noted earlier, the ISO are an organisation that issue standards to provide companies and organisations with practical tools to manage their responsibilities. CarboNZero state that "certification provides independent assurance that your carbon footprint or management system is accurate, complete and in line

with international standards and best practice." ('Enviro-Mark Solutions', 2016), and CarboNZero™ certification was the world's first carbon certification programme to be accredited under ISO standards ISO 14065 and ISO 14064-1.

Table 2.2 Qualmark Enviro awards key action areas to achieve certification ('Qualmark', 2016)

Qualmark Enviro awards key action areas to achieve certification
Qualmark Enviro Bronze
Minimum requirements have been met (waste reduction/recycling, environmental checklist complete, environmental claims are verified)
Initiatives are in place to mitigate major energy, water and waste usage
Significant contribution towards community or conservation activities
Documented monitoring of a relevant resource usage
Individuals or teams within the business have been given formal responsibility to ensure the environmental action plan is being implemented
A sustainability policy/statement has been completed and is being publicly displayed
Qualmark Enviro Silver
Considerable initiatives are in place to mitigate major energy, water and waste usage
Significant contribution to one or more community or conservation activities
Documented monitoring of one or more relevant resource usages
Staff are trained and follow the environmental action plan and can communicate it
Qualmark Enviro Gold
Significant initiatives are in place to mitigate major environmental impacts of the business under a "do no harm" principle
Significant contribution to at least one community and one conservation activity
Documented monitoring of one or more relevant resource usages
Evidence that the business is taking a proactive role and is an exemplary advocate of responsible tourism

Currently, there is only one New Zealand accommodation provider listed as being certified carbon neutral by carboNZero™ - the Sudima Hotel Auckland Airport ('Sudima Hotels', 2016). Other properties state that they are working towards a carbon neutral status, however, without more information about what the emissions profiles and mitigation actions of the establishment are, or evidence of a recognised accreditation, it is difficult to corroborate without further study. As researchers have found that "certification is highlighted as a key sustainable tourism management tool" (Esparon *et al.*, 2014), it is suggested that in an approaching low carbon society, organisations like carboNZero™ will become invaluable to businesses needing to manage, and mitigate, their carbon outputs.

2.2.8. Mitigation initiatives in the accommodation industry

The accommodation industry has the capacity to "reduce the negative effects of the greenhouse effect by implementing effective energy conservation and carbon reduction (ECCR)" (p. 199) through various initiatives (Teng, Horng, Hu, Chien, & Shen, 2012). At year end July 2016, there had been over 33 million total guest nights stayed in New Zealand ('Ministry of Business, Innovation and Employment', 2016). These millions of guest nights created significant carbon dioxide emissions, and will continue unless abated. Significantly for this study, as mitigation is a vital responsibility of the tourism industry (Becken and Patterson, 2009), the accommodation industry has many mitigation initiatives it can implement. The initiatives that can be undertaken to mitigate emissions have been identified in previous research on the accommodation industries'

responses to climate change by Su *et al.*, (2013), based on environmental practices recommended by the UNTWO and United Nations Environment Programme (UNEP). From this, and other research in the area of carbon emissions and the accommodation industry, it was found that the most widely adopted mitigation initiatives in the accommodation industry were recycling, installing energy efficient light bulbs, other energy reduction methods (such as installing high starred Energy Star appliances), using sensors or timers to save electricity (or having a Switch Off policy), and providing a towel reuse option (including Becken, 2013; Bruns-Smith, Choy, Chong, & Verma, 2015; Gössling, 2011; Goldstein, Cialdini, & Griskevicius, 2008; Manaktola & Jauhari, 2007; Singh, Cranage, & Lee, 2014; and Vernon, Essex, Pinder, & Curry, 2003). These five initiatives, referred to as "low hanging fruit" (p. 85) by Becken (2013) indicate that they are considered relatively easy initiatives to implement, but research in New Zealand on the extent that they are being undertaken is lacking. Informed by previous studies, these five main initiatives, identified as a focus for the current study, are introduced next in the context of previous studies on the accommodation industry.

2.2.8.1. Recycling

Accommodation waste is made up of wet and dry waste, with the hotel industry being "one of the major contributors of organic/wet waste in landfills, which is the main cause of GHG emissions" from landfills (Singh *et al.*, 2014, p. 13). Wet waste is comprised of food, garden and cooking wastes, whereas dry waste includes recyclable waste such as paper, aluminium, plastics, cardboard and others. Non-recycled waste is a large source of emissions, with Singh *et al.*, (2014) claiming that when waste is disposed in landfills, it produces methane gas, 25 times more potent than carbon dioxide emissions (p. 13). Research has found that "recycling and composting can produce significant emissions reductions", through reduced energy consumption (Singh *et al.*, 2014). Not only is recycling environmentally friendly, but organisations can "also make profits out of a proper recycling practice" (Singh *et al.*, 2014). Such profits can be realised quickly, as many recycling methods have a short payback period and can yield significant financial savings (Bader, 2005). Despite these benefits, research on US resorts found that although most implemented recycling, the results depended on the materials involved. Metals, paper and plastic were more generally recycled, whereas wet waste such as cooking oils, shampoos and soaps were recycled less (Bruns-Smith *et al.*, 2015). Other research indicated that an average hotel is estimated to be able to reduce its emissions equivalent to the use of 90 passenger vehicles annually through recycling (Singh *et al.*, 2014). Research on the amount that hotels in Sweden and Poland recycle was undertaken by (Bohdanowicz (2006), and it was reported that 80% of Swedish hotels recycled, whereas only 30.6% of Polish ones did, however it must be noted that her study was over a decade ago and these figures are potentially quite different today. Additionally, Canadian research on bed and breakfast establishments discovered that recycling was practiced by all respondents in their qualitative study (*n*=8)(van Haastert & de Grosbois, 2010).

2.2.8.2. Installation of energy efficient lighting

Energy efficient lighting has been noted in numerous studies as being an energy saving measure (including Bohdanowicz, Zientara, & Novotna, 2011; Bruns-Smith *et al.*, 2015; van Haastert & de Grosbois, 2010), which equates to reduced carbon emissions from the energy savings. This initiative is highlighted as a 'low hanging fruit' (standard) opportunity for accommodation organisations to lower their energy use, costs and emissions (Bruns-Smith *et al.*, 2015). This initiative was reported by Rahman, Reynolds, & Svaren (2012) that 77.11% of responding hotels in their 2012 research had replaced incandescent bulbs with energy efficient ones (p. 726). Additionally, research on the Taiwanese accommodation industry, concluded that incandescent and halogen light bulbs should be avoided when increasing energy efficiency in a hotel (Tsai, Lin, Hwang, & Huang, 2014). Furthermore, the installation of energy saving lighting was thought to be "typically an area of significant saving potential" (Bohdanowicz, 2006, p. 671), as not only are energy saving bulbs more energy efficient, using only one fifth as much as an incandescent bulb, they last longer and therefore require less replacements than incandescent bulbs. In the New Zealand context, Becken (2013) reported that this energy saving initiative (measure), was the initiative undertaken the most by accommodation providers. Overall, this initiative has been noted as the most common method of not only saving energy and curbing emissions, but also accomplishing financial savings (Teng *et al.*, 2012).

2.2.8.3. Installation of Energy Star appliances

Figure 2.6
New Zealand
Energy Star label

Energy Star is a programme that helps identify energy consumption and promotes energy efficiency in products and buildings. According to Energy Star, its products have helped create energy efficiency for over 20 years ('Energy Star', 2016). Their programme also provides guidance on how to save energy, save money, and protect the environment ('Energy Star', 2016) with each certified product using less energy, and creating fewer of emissions. Energy Star is "the most widely recognised symbol for energy efficiency in the world, helping families and businesses save US$362 billion on utility bills, while reducing greenhouse gas emissions by 2.4 billion metric tons since 1992" ('Energy Star', 2016). The Energy Star label (Figure 2.6), indicates that the higher the star rating, the more energy efficient the appliance is. In New Zealand, Energy Star is part of the government agency EECA, which is working to improve the energy efficiency of New Zealand businesses. Energy Star certified products are noted as a common indicator of corporate energy efficiency, and have been widely adopted by hotels (Park, Kim, & McCleary, 2014). This initiative can assist an accommodation property in becoming more energy efficient, which is the cheapest and fastest way to cut energy bills and reduce carbon pollution ('NRDC', 2016), and it has been reported that "hotel energy saving measures incorporate the installation of energy-saving devices and products" (Teng, Horng, Hu, Chien, & Shen, 2012, p. 200). Furthermore, this emission mitigation initiative was ranked eighth (out of 30), in research on the Taiwanese accommodation industry, indicating that it is considered an important environmental practice (Su *et al.*, 2013).

2.2.8.4. Implementing a 'Switch Off' policy

The presence of a Switch Off policy was found in research on US accommodation establishments, and reported that hotels there had a 73.30% positive response rate in training staff to turn lights off when guest rooms were unoccupied (Rahman *et al.*, 2012). Although that does not include all electrical items, it gives an indicative guideline for further research on this initiative. Additional research focused on mitigation measures in the accommodation industry, found implementation of this initiative to be rated 19th (out of 30) in hotels in Taiwan (Su *et al.*, 2013, p 101). Other examples of accommodation establishments that have implemented this policy as part of their environmental sustainability measures, includes hotels in London, England and the Falkland Islands, that operate Switch off policies encouraging office staff to turn off computer equipment and printers when not in use ('Draycott Hotel', 2016, 'Malvina House Hotel', 2016).

2.2.8.5. Towel reuse option

Water is not only a precious resource, but also a source of energy consumption. Water conservation is already practiced in many accommodation establishments, commonly seen with the use of towel re-usage requests. Findings suggest that 30 to 40 per cent of a hotel's energy consumption is created by laundry (and catering) services (Bruns-Smith *et al.*, 2015). Furthermore, reusing towels not only helps save energy and conserve water, but also reduces the amount of detergent pollutants created by the laundering. Other factors generated by reusing towels are cost savings realised by the accommodation provider such as reducing wear and tear (during transport and laundering) thus lowering replacement costs, using less energy created by the process of laundering the items, and also lowering staff costs by decreasing housekeeping's time replacing linen in each guest room. Additionally, due to the lowered energy use, emissions are also decreased, lowering the accommodation's carbon footprint. Therefore, it seems logical to find that towel-reuse programmes have become a common green practice in the accommodation industry (Bruns-Smith *et al.*, 2015). Goldstein, Cialdini, & Griskevicius (2008) noted that travellers were increasingly becoming urged by their accommodation providers to reuse their towels as part of an environmental strategy. Subsequently, their research uncovered that guests were more likely to reuse their towels when they learned that most others were also participating (Goldstein *et al.*, 2008). Goldstein *et al*'s., (2008) study also suggested that the industry standard for accommodation establishments adopting a towel reuse to be at 75% (Goldstein *et al.*, 2008), however, Australian research found that towel reuse in motels in the state of Victoria reported an 84% uptake (Mair & Bergin-Seers, 2010).

2.2.9. Corporate motivations and barriers

It has previously been suggested the term 'motivation' in a business context was rooted in the corporate world's emphasis on maximising profits (Okereke, 2007). However research on SMEs (albeit in the manufacturing industry in Holland), found that the most important reasons given for investing in environmental issues were to improve working conditions, followed by legislation requirements, moral duty, serving stakeholders (employees and clients), image of the firm including making the mission statement clear, and noted last, was cost savings (Masurel, 2007).

A more recent international study indicated that companies specifically in the accommodation industry were "being driven as much by a search for business efficiency gains as by a genuine concern for sustainability and the maintenance and enhancement of natural eco systems" (Jones *et al.*, 2014). Despite this report, ethical considerations are also suggested as motivators, with some companies being genuinely motivated to take climate action without direct external pressure such as regulations or public opinion (Okereke, 2007). Accordingly, it is suggested that the corporate motivations of companies to undertake climate action has also progressed from an oppositional stance towards a more engaged one (Okereke, 2007). There has been a shift away from policy debates surrounding international corporate climate action, and towards implementing frameworks to address climate strategy, where practical actions to fight climate change are undertaken by firms (Okereke, 2007). Such 'environmental engagement' by businesses in the accommodation industry (and tourism generally), refers to the businesses "response to environmental issues, including their reasoning and motivation for managing and adopting environmental practices" (Sampaio, Thomas, & Font, 2012, p. 235). Corporate motivations specifically regarding energy efficiency were compiled by Becken (2013), based on studies by el Dief and Font (2010) and Okereke (2007), and indicated that "apart from economic reasons, there are a number of reasons that motivate businesses towards energy efficiency, including stakeholder pressure, strategic proactivity, institutional dynamics, managerial ethics and organisational context" (p. 72). However, not included was undertaking an initiative specifically to mitigate carbon emissions, an area which this study seeks to understand further.

There are numerous theories of corporate motivation and barriers that could be applied to environmental sustainability (including Maslow's Hierarchy of Needs and Herzberg's Motivation-Hygiene Theory), however, as the focus of the current study is on the actual implementation of emission mitigation initiatives, only one main motivation and barrier theory are discussed here. Three motivators proposed by Bansal and Roth's (2000) theory of ecological responsiveness model were adapted for the current study. Bansal and Roth (2000) suggested three basic motivations for ecological responsiveness within the corporate structure – competitiveness, legitimation and ecological responsibility. 'Competitiveness', in their analysis, was defined as ecological responsiveness to improve profitability and competitiveness through lower costs (Bansal & Roth, 2000), and was simplified to *'motivated by financial savings'* for respondents in the current study. 'Legitimation' stemmed from a motive to comply with legislation, however, 'legitimation' was not researched in this study as there is currently no binding environmental legislation in New Zealand specifically related to emission mitigation in the accommodation industry. However, 'ecological responsibility', a motivation that stems from a genuine concern for the well-being of the environment (Bansal & Roth, 2000), was adapted for the current study as *'motivated by lowering emissions'*. Juxtaposed with corporate motivations to implement environmental initiatives, are what are known in corporate strategy as 'barriers to motivation'. Although not investigated at length here, some barriers to undertaking climate related strategies and initiatives include a lack of a long term climate change policy framework, uncertainty around government action on climate change, and uncertainty of the company's position in the

marketplace in regard to climate change policy (Okereke, 2007). However, it must be noted that with the ratification of the 2015 Paris Climate Agreement, two of these barriers have the potential to be broken down, allowing companies to move forward on climate action. In addition to these barriers, the most significant barriers to implementing environmental management for SMEs and facilities operating in service sectors, are the costs of the environmental management (Ervin, Wu, Khanna, Jones, & Wirkkala, 2013).

In terms of corporate motivations, and barriers, to environmental initiatives, this study sought to understand if the New Zealand accommodation industry was being motivated to lower its carbon emissions either because of the of environmental damage caused by the emissions themselves, or to save money. Two of the corporate motivations suggested by Bansal and Roth (2000) were adapted and simplified into *'motivated by financial savings'* and *'motivated by lowering emissions'* for this study. Because corporate motivations and barriers were not examined in depth in this study (the focus being on the *actions* of each accommodation establishment regarding emission mitigation initiatives), a closer investigation of the New Zealand accommodation sector dedicated to the motivations of, and barriers to, implementing emission mitigation initiatives would be of interest to tourism corporate management, academics, policy makers and other stakeholders.

2.3.   Summary of literature review

This chapter introduced literature pertaining to tourism, climate change, and most importantly for this study, the accommodation industry. The review began with a brief history of climate change and the debates that continue regarding the causes and severity of the issue. This was followed by an introduction to the measures being implemented on a global scale to mitigation emissions with the intention of keeping the average temperature of the Earth below 2°C above pre industrial levels. There was then an introduction to the impacts that climate change is having on the tourism and accommodation industries, and also how they are contributing to global GHG emissions. Environmental sustainability in tourism is part of an ongoing worldwide trend, which Gössling (2005) emphasised was "a key concept for tourism researchers" (p. 417), and was introduced next. As an important part of environmental sustainability, the review then focused on previous literature on the mitigation of carbon emissions, and how mitigation is being implemented in the accommodation industry. The review then introduced five key emission mitigation areas and theoretical concepts of corporate motivation to undertake such initiatives. Throughout this literature review, it is apparent that there is an ongoing discourse focused on climate change and environmental sustainability within the global tourism industry, however, there was notably less literature specifically on the mitigation of carbon emissions in the accommodation industry. Therefore, it is clear that more research regarding climate change action in the accommodation industry, with a focus on emission mitigation initiatives, is required to gain a better understanding of the sector as a whole. Although it was shown in this literature review that previous research in this area had been conducted (including Becken, 2013; Becken *et al*., 2001; Becken & Hay, 2012; Becken & Patterson, 2006; Hall, 2006), this study sought to expand on the knowledge gained from these studies, and present new findings to provide further understanding of emission

mitigation in the New Zealand accommodation industry. The methodology and methods of this mixed method study are discussed in the following chapter.

3.   METHODOLOGY

This chapter introduces the methodology and methods of this study by describing the approach and strategies applied to answer the main question and objectives introduced in Chapter Two. This chapter discusses the philosophical underpinnings on which the study's methodology is based. This introduction includes the ontological, epistemological and axiological foundations of research, including the chosen paradigm for this study. The rationale for using a mixed methods methodology, which was constructed of a survey and a case study, are presented next. The two data collection instruments are presented initially as two separate phases. First, Phase One introduces the development of the questionnaire, the data collection process, and how the survey was analysed. Secondly, Phase Two undertook a case study, examining the survey themes more holistically, through investigation of New Zealand's only certified carbon neutral hotel. The data collection and analysis of the case study are introduced, and are followed by the ethical approval of this study. This chapter concludes with a closing summary of the methodology and methods applied in the study and an introduction the Chapter Four.

3.1.   Research paradigms

A paradigm is a "set of beliefs – an overarching conceptual construct, a particular way in which scientists make sense of the world" (Crotty, 1998, p. 35). Furthermore, a paradigm defines, for its holder, the way the world is viewed including the individual's place in the world (Guba & Lincoln, 1994, p. 107). Therefore, philosophical paradigms are thought to structure the way research is conducted (Creswell, 2009), as "different ways of viewing the world shape different ways of studying the world" (Crotty, 1998, p. 66). Ontology relates to the philosophical assumption that defines the nature of reality. Historically, two distinct and opposing forms of research have been used to pursue scientific and social science investigations. Researchers that follow the paradigm of positivism/post positivism contend that there is a singular reality that can be discovered through objective, value free inquiry (Feilzer, 2010). However, a constructivist/interpretivist paradigmatic view, is that there is no such thing as a singular reality, and therefore inquiry must be subjective by its very nature (Feilzer, 2010). These two paradigmatic assumptions about what 'reality' is, and what can be known about it, are diametrically opposed, and because of this, a "debate has raged, and continues at least to simmer at the level of philosophy or paradigm" (Greene & Caracelli, 1997, p.7). Pragmatism is a departure from these two opposing paradigms, and instead advocates the existence of both "singular and multiple realities" (Creswell and Plano Clark, 2007, p. 24). This pragmatic suggestion that there are multiple viewpoints possible regarding social realities (Teddlie and Tashakkori, 2009), is the paradigmatic choice for this study.

Epistemology as a philosophical viewpoint asks three fundamental questions, 'what is knowledge?', 'what can we know?' and 'how do we know what we know?' (Creswell & Plano Clark, 2007; Greco & Sosa, 1999). Positivism's epistemological perspective is one of absolute objectivism where there should be no interaction between the researcher (the knower) and the research subject (the known) (Teddlie & Tashakkori, 2009). Similarly, post positivism strives for objectivity, but allows some interaction (Creswell, 2009). In comparison, a constructivist paradigm

is one which suggests that "time-and context-free generalisations are neither desirable nor possible" (Onwuegbuzie, Johnson, & Coluns, 2009, 125). Therefore, in a constructivist view, where truth is created by the study subject's interactions with the world around them, meaning is constructed through interaction (Grey, 2009). In contrast to these standpoints, this study adopts pragmatism, which allows the researcher/participant/respondent relationship to have a subjective, or an objective viewpoint, depending on the stage of the research (Teddlie & Tashakkori, 2009). Finally, axiology is described as the 'role of values' in social inquiry (Teddlie & Tashakkori, 2009). For positivists, this means that the values the researcher holds should in no way influence the results of the research. Post positivists however, claim that the research process can be influenced by the values of the researcher. Constructivist axiology is bound by the values of the researcher, whereas pragmatists suggest that, although the values held by the researcher are important, they do not bind the inquiry (Teddlie & Tashakkori, 2009). Furthermore, Teddlie and Tashakkori (2009) noted that, in social inquiry, pragmatism seeks the "best explanations within personal value systems" (p. 88), and therefore, it is applied in this study.

3.2.   Rationale for pragmatism

Pragmatism, as a theoretical position, "privileges practice and method, over reflection and deliberative action" (Denzin & Lincoln, 2011, p. xii). This idea of focusing on practice and method influenced the choice of pragmatism, as the aim of the study was to produce "socially useful knowledge" (Feilzer, 2010, p. 6), "without being limited or inhibited by philosophical assumptions" (Greene & Caracelli, 1997, p. 8). Philosophically, "pragmatism embraces the two extremes normally espoused by positivism/post-positivism and those supported by interpretivists" (Pansiri, 2005, p. 197). Therefore, although pragmatism recognises that there are "philosophical differences between the various paradigms of inquiry" (p. 8), they also suggest that paradigms are "logically independent and therefore can be mixed and matched, in conjunction with choices about methods, to achieve a combination" (p. 8) that best answers the study questions (Greene & Caracelli, 1997). This allows pragmatists to integrate perspectives and approaches, and reject the incompatibility stance that research paradigms must remain separate (Johnson, Onwuegbuzie, & Turner, 2007, p. 125). Furthermore, pragmatists consider that by mixing approaches together, using a combination of methods and ideas to help "best frame, address, and provide tentative answers", the research aim will be best answered (Johnson *et al.*, 2007, p. 125). Pragmatism was also chosen as the best philosophical choice because it is concerned with the "consequences of initiatives" and is "real-world practice oriented" (Creswell and Plano Clark, 2007, p. 22). To achieve this, pragmatism embraces ideas from both sides of the paradigm debate and inserts these ideas into real world circumstances (Teddlie & Tashakkori, 2009). Furthermore, it is thought that fundamental principles within pragmatism "suit the analysis of problem solving as a human activity" (Morgan, 2014, p. 1046), and that a pragmatist's mandate is not to necessarily find the 'truth' or 'reality', but "to facilitate human problem-solving" (Powell, 2001, p. 884). Given that this study ultimately seeks to add knowledge about mitigating carbon emissions, seen by many as a human problem, pragmatism was chosen as the best paradigm for this study.

In conjunction with this philosophical choice, the research design of mixed methods was selected, and is justified next.

3.3.   Research design and rationale: mixed methods research

Mixed methods research, at its simplest definition, is both qualitative and quantitative approaches used within a study (Teddlie & Tashakkori, 2009), which allows verification and/or corroboration of one method by the other (Pansiri, 2006). Because pragmatism focuses on the questions and outcomes of the study, rather than the methods used (Creswell & Plano Clark, 2007), it allows the researcher to make decisions about which methods to use based on how useful they are for addressing the particular question, issue or problem being investigated (Denscombe, 2014). Supporting this choice, Davies (2003) espoused the virtues of opportunities arising from mixing quantitative and qualitative methods specifically in tourism. This methodology of mixed methods allows "combining" (p. 24), where researchers collect both qualitative and quantitative data, and "mix them" (Creswell and Plano Clark, 2009, p. 24). The crucial consideration for mixed methods research is how well the research tools work to answer the aim of the study, rather than how well they fit within a specific research philosophy (Denscombe, 2014, p. 158). Furthermore, the choice of mixed methods allowed dual methods of research to be applied instead of choosing either quantitative or qualitative methods, the traditional mono-method approaches (Denscombe, 2014). It was mooted that mixed methods was "pragmatically relevant and useful, and more dialectically insightful and generative, even if the accompanied by unresolved tensions" (Greene & Caracelli, 1997, p. 13), than using a single method. Therefore, in this study's pragmatist view, it was not only allowable to mix methods from alternative paradigms of research, but was actually desirable to do so in order to provide answers that worked better than those based on the use of just quantitative or just qualitative research (Denscombe, 2014, p. 159). Mixed methods design "allows researchers to mix and match design components that offer the best chance of answering their specific study questions" (Johnson & Onwuegbuzie, 2004, p. 15). Furthermore, Fielding (2012) noted that "mixed methods potentially offers depth of qualitative understanding with the reach of quantitative techniques" (p. 124), and it is thought that if "the qualitative and quantitative data are valid and credible, then the mixed study will have high overall data quality" (Teddlie & Tashakkori, 2009, p. 209).

The data collection of this study began with the quantitative data ('Phase One'), and was followed by gathering qualitative data ('Phase Two'), therefore the study followed a sequential timeline (Creswell & Plano Clark, 2007). This was a "two-phase mixed methods design" (p. 71), or an explanatory follow up design (Creswell & Plano Clark, 2007). By using this design, a deeper understanding of the themes and initiatives explored in the survey was created, allowing all of the objectives to be answered. This study followed Creswell & Plano Clark's (2007) proposal to use a follow-up explanations model, where a researcher needs qualitative data to expand on quantitative results. Creswell and Plano Clark (2007) also suggested that the two phases of the mixed methods design should be allocated a weighting, where one phase has more emphasis placed on it. As the study's Phase One aligned with four of the five objectives of the study, more

emphasis (or weighting) was placed on this phase. Mixed methods relies on the "explicit relating of the two data sets" according to Creswell and Plano Clark (2007), which is when the data is mixed in the study. This 'mixing' occurred in the study at all three procedures suggested by Creswell and Plano Clark (2007). First, the data sets were merged during interpretation (results reported separately, but merged during conclusion), secondly the quantitative survey had small qualitative aspects to it (respondents were given the option to add a comment on some questions), and finally, the data from the survey informed the course of the case study, which connected the two methods.

Tourism, and its sub-industry accommodation, are complex phenomena, making them very challenging issues to study comprehensively (Puhakka, Cottrell, & Siikamäki, 2014). As this study sought to understand the New Zealand accommodation industry as a whole, but also to generate a deeper understanding from a wide range of perspectives (Greene & Caracelli, 1997), the application of mixed methods provided this opportunity. This choice of mixed methods allowed the study to make both "predictions on the basis on a large-scale survey" and also to have a "highly interactive relationship to answer complex questions" (Teddlie and Tashakkori, 2009, p. 90). Further to this, Li, Pan, Zhang, and Smith, (2009) had suggested that more research employ the combined use of qualitative and quantitative methods in order to provide particularly rich and robust inquiries in environmentally related hospitality research. Furthermore, by employing both a quantitative survey, and a qualitative case study, the study drew from the different strengths and minimised the weaknesses of both methods. Therefore, as the aim of this study was to provide further understanding about the emission mitigation initiatives in the New Zealand accommodation industry, a mixed methods approach was undertaken. The first phase of the study was a survey with a questionnaire, and the rationale for the use of these particular methods is given below.

3.3.1. Rationale for using a survey and questionnaire

Quantitative surveys in tourism have been performed in prior research related to this study topic including Esparon *et al*'s., (2014) investigation of visitors' perceptions of the importance of environmental certification, and Gurran, Norman and Hamin's (2013) research on climate change adaptation in coastal Australia. By applying this same objective approach, this study was able to collect quantifiable information from the New Zealand accommodation industry, in a simple format that could then be generalised, one of the main purposes of performing quantitative research (Creswell, 2009). The first phase of this mixed methods study was a quantitative, 30 question, nationwide survey ("Carbon Footprint Survey"; see Appendix A). Objectivity, along with closed-ended questions that relate variables to each other (Creswell and Plano Clark, 2007), is considered key to quantitative study. In addition, Veal (1997) suggested that "questionnaire-based surveys are used when quantified information is required concerning a specific population and when individuals' own accounts of their behaviour and/or attitudes are acceptable as a source of information" (p. 72). As the management at individual accommodation establishments were being

asked about their behaviour (mitigation initiatives) and attitudes (motivations), and information regarding the whole industry was sought, this type of objective method was chosen.

Online surveys have been reported to be "increasingly popular for data collection" (p. 58), and of the online survey programmes, Qualtrics was among the most popular (Pan, Woodside & Meng, 2013). For this study, Qualtrics (Qualtrics. 2016) was used to create an online questionnaire, which was easy to use and convenient for respondents to reply to. Not only was this a convenient method, Bocklisch, Bocklisch and Krems (2011) also noted that because empirical study questions are used in social sciences, "questionnaires are widely used as an appropriate measurement tool" (Bocklisch, Bocklisch, & Krems, 2011, p. 592). This type of electronic questionnaire format was previously used by tourism researchers including Brammer, Hoejmose, & Marchant's (2012) research regarding environmental management in the United Kingdom, carbon offset research by MacKerron, Egerton, Gaskell, Parpia, & Mourato (2009) and Becken's (2013) energy use research on the New Zealand accommodation industry. In addition to the survey used to gather generalisable data, a case study was also undertaken, the rationale for which is presented next.

3.3.2.   Rationale for a case study

Even though the quantitative survey collected data about many aspects of carbon emission mitigation in the New Zealand accommodation industry as whole, it was unable to provide confirmation regarding the initiatives, or a deeper, more holistic exploration of carbon neutrality in the industry. To help investigate the key themes of the survey in more detail, a single qualitative case study was also undertaken. The use of a single case study was deemed appropriate as the study subject was the only example of a carbon neutral accommodation provider in New Zealand. This single case study thoroughly studied the details of the organisation through many different methods within the case study creating triangulation, therefore improving the rigor of the case study. The use of a single case study was considered by Mariotto, Pinto Zanni, and De Moraes (2014) as a way to "gain a deep understanding of one particular case" (p. 363), and not to provide wider, "universal laws" (p. 363). Furthermore, by using only a single case, a "more precise understanding of the circumstances in which the phenomena occurred" (Mariotto *et al*., 2014, p. 363) was facilitated. Therefore, this single case method, according to Mariotto *et al*., (2014), tends to be more reliable than multiple case studies, and was utilised in this study. In addition, according to Gillham (2000), "a common discrepancy is between what people say about themselves and what they actually do" (p. 13), which this case study sought to alleviate.

Previous case study based research regarding in the field of tourism has been undertaken to gain a deeper understanding of a range of subjects including a holistic approach in Davidson, Timo, & Wang's (2010) investigation into labour turnover in Australian hotels, Haskell & Tunnell's (2010) research on the budget accommodation industry in New Zealand, and Law, De Lacy, Lipman, & Jiang's (2016) case study of Bali tourism transitioning to a green economy. Most topical to this study, case studies were used in Boukas and Ziakas' (2015) exploration of sustainability in Cyprus

tourism through both qualitative interviews and documentary analysis, Bohdanowicz and Zientara's (2008) study on industry leader in environmental sustainability, Scandic Hotels, and Australian climate change research incorporating survey, focus groups and documentation review, to "explore the survey themes in greater detail" (Gurran *et al*'s., 2013, p. 103).

Final justification to undertake a case study was that "frequently, case studies also offer explanations of why the entity acts as it does." (Thomas, 2003, p. 33). Additionally, a 'green' case study such as this one was considered beneficial in providing some guidance towards best practice (Laing & Frost, 2010) in the accommodation industry. The decision to utalise only one 'case' for this study was twofold. First, the 'case hotel' was the only accommodation in New Zealand registered as carbon neutral with carboNZero, and secondly, in line with Dyer and Wilkins (1991), it was considered that an in depth investigation of one establishment would be more reliable and valid that multiple superficial case studies. Therefore, this case study sought to provide an in-depth understanding of a carbon neutral accommodation establishment in New Zealand, thereby making a new contribution to the existing body of knowledge in the areas of tourism, accommodation and climate mitigation.

3.3.3. Bias

Previous research in the accommodation industry suggested that hoteliers may have overstated their pro-environmental behaviours because of pressures to appear socially responsible (Bohdanowicz, 2005). The anonymity of an online survey hoped to limit this *social desirability factor*, where respondents might be inclined to provide answers which they think are 'expected', rather than the truth (Denscombe, 2014). Because of the online nature of the questionnaire, there was also a lack of interviewer bias, however each individual respondent could still interpret the question in their own way, which is why the questions had to be clear, concise and unambiguous. Therefore, Veal's (1997) principles of creating a successful questionnaire were applied to this study, including avoiding jargon, simplifying whenever possible, and avoiding ambiguity or leading questions. Further measures to avoid bias included, keeping the length of the survey as short as possible whilst still gathering enough information to make the survey valid, designing and presenting the survey in a straight forward and easy to use style and personalising the accompanying introduction email as much as possible (Czaja & Blair, 2005; Veal, 1997). Another issue that online surveys have encountered, is a bias against those who do not use the Internet. However, according to Dolnicar *et al*., (2009), tourism "industry professionals, for instance, must use the Internet daily, so a sample of industry professionals might more reliably be captured through an online survey" (p. 296). Bias could still be introduced by people ignoring or deleting the email thinking it is spam, not having time or inclination to respond, undeliverable email addresses, not understanding the instructions, privacy or security issues or because of language or literacy barriers (Veal, 1997; Evans & Mathur, 2005; Pan, Woodside, & Meng, 2014; Denscombe, 2014). Finally, participation in this study was voluntary, and therefore there was a potential bias towards businesses that were more interested in environmental sustainability and carbon footprints. This study should therefore be "interpreted as the "positive end" of a spectrum

of business perspectives and practices" (p. 77) similar to Becken's (2013) suggestion in a study on the New Zealand accommodation industry's energy engagement.

3.4. Phase One: survey questionnaire development

To create the survey specifically focused on initiatives to mitigate carbon emissions, various sources were adapted to develop the questionnaire. Su *et al*., (2013) had previously investigated the level of implementation of measures recommended by the UNTWO as a response to climate change, and these measures were adapted for this study. In addition, another key source of information used to develop the questionnaire was a journal article on environmental initiatives in the London hotel industry (Knowles, Macmillan, Palmer, Grabowski, & Hashimoto, 1999) (Figure 3.1). Although the article was published nearly two decades ago, all of the sustainability initiatives discussed in it were similar, if not identical, to ones presented by the more recent sources discussed in this section.

- reduce environmental impact
- initiatives to reduce consumption of resources
- exploiting renewables
- reducing environmental pollution
- exploiting reusable items, recycling
- protecting biodiversity
- environmental policy or statement
- membership to professional institution or trade association with an environmental policy
- notifying guests about environmental initiatives
- environmental reviews or audits, negotiating with suppliers
- membership of environmental organisation

Figure 3.1 Survey items adapted from Knowles, MacMillian, Palmer, Grabowski & Hashimoto (1999)

An example of another source of information used to create the questionnaire for this study, was an International Tourism Partnership paper, "Going Green: minimum standards towards a sustainable hotel" ('Going Green', 2016). This paper suggested six main areas of interest for accommodation providers wanting to become more environmentally sustainable, and provided further inspiration for the survey questions for this study. The environmental sustainability items featured in both these sources, as well as information from additional literature seen in Chapter Two, were adapted to create the current survey components discussed next.

The main feature of this study's questionnaire, were five emission mitigation initiatives thought to be easily implementable throughout the accommodation industry, and were previously introduced and discussed in Chapter Two (2.2.8). These five initiatives were recycling, installation of energy efficient lighting, purchasing of high rated Energy Star appliances, implementation of a Switch Off

policy, and providing a towel reuse option in guest rooms. They are referred to in this study as the Big Five because of the quantity, and their relative importance to the study. Questions pertaining to the Big Five mitigation initiatives offered respondents a binary choice of *yes* or *no* (two questions also offered a non-applicable choice). For example:

Question: Does your establishment recycle? *yes/no*

Respondents who replied affirmatively, were then asked to select motivations for their choice. For example:

Question: Are the following reasons to recycle important or not important to your establishment?

a) Saves us money on landfill fees by reducing the amount of rubbish we have
important/not important

b) Recycling helps us cut carbon emissions
important/not important

c) Recycling is better for the wellbeing of the Earth
important/not important

d) Guests have requested that we recycle
important/not important

e) Recycling helps us save money on rubbish bags
important/not important

f) Recycling saves us money of rubbish collection fees
important/not important

The question offered a dichotomous choice of answer, presenting absolute opposite options. Examples of this dichotomy are yes/no, true/false, fair/unfair, agree/disagree (Explorable, 2016), however, this study presented important/not important. In hindsight, this question would have been greatly improved by rewording the questions and presenting a 5-point Likert-type scale, with options from 'extremely important' through to 'not important at all', similar to Baloglu and Jones (2015) in their research on the U.S. luxury accommodation industry, Puhakka *et al*'s., (2014) research on Finnish sustainability perspectives or research by Su *et al*., (2013) on the Taiwanese accommodation industry. Furthermore, it is acknowledged that 'important' and 'not important' are somewhat arbitrary, and subjective in their meaning, especially as they were not defined in the survey. However, it was assumed for this study, that the terms important and not important related to the most general definitions of 'to be of significance or value' or 'to not be of significance or value' respectively. In addition to the Big Five, 12 less commonly implemented mitigation initiatives were also developed, and are referred to in this study as the 'additional mitigation initiatives'. These initiatives were also adapted from the studies introduced in Chapter Two, and consisted of initiatives that could be implemented by accommodation establishments, but perhaps required more investment (financial and/or human resources) by an accommodation management team. These emission mitigation initiatives were allocated to five key categories of environmental

sustainability (Figure 3.2). Survey respondents were asked to indicate if they undertook any of these additional mitigation initiatives by ticking the corresponding box if they had done, or currently did, any of them. Respondents were not asked to justify or explain motivations for their answer further.

Land management
Replant trees in New Zealand
Replant wetlands in New Zealand
Energy conservation
Install key card switches in guest rooms
Install clean energy sources (wind turbine, solar panels, hydro or thermal)
Source local produce
Water conservation
Install low flow shower heads or taps
Fit toilets with half flush options
Waste management
Use refillable guest toiletries
Use recyclable materials in staff offices
Specific emission management
Encourage staff to carpool or use alternative transport (e.g. bicycles) to come to work
Financially sponsor international forest replanting or protection (offsetting)
Offset your guest's emissions

Figure 3.2 Additional mitigation initiatives that the accommodation industry may undertake

Another facet of the study, was identifying whether accommodation establishments that produced the most emissions also implemented the most emission mitigation initiatives. To achieve this, types of accommodation were formed into clusters, using guidance from previous studies that had categorised accommodation establishments into groups (including Becken, Frampton, & Simmons, 2001; Haskell & Tunnell, 2010; Lockyer & Roberts; 2009; Madden, 1995; Rahman, Reynolds, & Svaren, 2012). These newly formed clusters are displayed below (Figure 3.3).

Luxury cluster:
hotels, luxury lodges, lodges, boutique hotels, resorts

Mid-range cluster:
motels, bed and breakfasts, apartments, holiday homes, farmstays, homestays

Budget cluster:
backpackers, campgrounds, hostels, holiday parks

Figure 3.3 Clusters of accommodation categories in the study

In addition, the survey asked questions about general characteristics of the accommodation establishment including the property's category, the respondent's position at the property, the type of ownership, and employee numbers. Further questions regarding the establishment's Qualmark™ Enviro and other environmental certification status, Corporate Social Responsibility (CSR) policy status, use of carboNZero suppliers, if there had been any carbon footprint calculations done, and interest in lowering emissions (or not) in the future were also asked. The

questionnaire also provided opportunity for the respondents to add limited qualitative information on some questions.

3.4.1. Phase One: data collection

At the time of this study, Statistics New Zealand reported that there were 4,400 accommodation establishments that met its criteria of an accommodation provider in New Zealand. As email contact information for those 4,400 establishments was unavailable from Statistics New Zealand due to the confidentiality clause in the Statistics Act 1975, a database of emails was instead created by the researcher from the Tourism New Zealand website, which allowed public access to the email address of each accommodation provider. The Tourism New Zealand accommodation website is an advertising platform for New Zealand accommodation establishments. This website was chosen because an accommodation establishment could list itself at no cost, which limited bias against those who could not afford to, or did not wish to, purchase a membership to an accommodation directory such as the Automobile Association (AA) or Tourism Industry Association of New Zealand (TIANZ) which was previous used by Becken, (2013).

To create the database for this study, every accommodation property listed on the Tourism New Zealand website was systematically searched for host names and a contact email address. Initially this exercise was done manually, where the email and name of the host were 'cut and pasted' from the contacts on their website, into an Excel spreadsheet. However, this method was too time consuming and subsequently an online programme Email Hunter for Chrome ('Hunter for Chrome', 2016) was used to extract the email addresses automatically. Although faster, this automation resulted in a non-personalised approach being taken, as only the email address could be extracted, not the host names. At the time of this email collection, the 3,233 accommodation establishments on the Tourism New Zealand website were grouped according to 15 different categories. These categories not only encompassed all the Statistics New Zealand, and TIANZ accommodation categories, but actually comprised of a much wider range. The segregation of the accommodation industry into separate categories, allowed an understanding of the emission mitigation initiatives undertaken by different categories, as well as of the New Zealand accommodation industry as a whole. Becken, Frampton, & Simmons (2001), had previously segregated the industry for their research into "hotels and lodges, motels, B&Bs, backpackers and hostels, and campgrounds" which they deemed "a useful tool for understanding energy use patterns" (p. 384). The categories used in this study are displayed in Figure 3.4.

To calculate the required sample size for meaningful results in the current study, the whole population figure of 4,400 was entered into Creative Research Systems website ('Creative Research Systems', 2016), with the confidence level set at 95%, and the margin of error set at 5%.

Hotels
Boutique Hotels
Lodges
Luxury Lodges
Resorts
Motels
Apartments
Backpackers
Hostels
Holiday Parks
Campgrounds
Bed & Breakfast
Holiday Homes
Farm Stay
Homestays

Figure 3.4 Categories of accommodation on the Tourism New Zealand website surveyed in the study

Literature suggests that these two figures are normally used in social sciences (Gray, 2009). The margin of error figure indicates if the analysed results can be accepted as statistically significant or not. By setting this margin of error at 5% (or lower) ($p \leq .05$), the "probability of the difference occurring by chance is less than five times out of a hundred" (p. 4), which, if realised, indicates that something other than chance has affected the outcome (Ho, 2006). The online calculation generated a sample size of 354 respondents required to achieve generalisability for the study, which was realised with a total of 566 respondents.

3.4.2. Phase One: survey process and analysis

Previous researchers in the field of tourism who employed an online survey technique include Brammer *et al*., (2012), in their work on environmental management, and Becken's (2013) study regarding energy use and saving opportunities in the New Zealand accommodation industry. There Becken (2013) utilised a partnership with the Tourism Industry Association of New Zealand (TIANZ) and employed a sampling technique that sent all of the members in the TIANZ database an online survey via email, which this study emulated by creating a Tourism New Zealand accommodation database. This study's questionnaire was implemented through an online survey programme, Qualtrics, which sent each potential respondent an email with a link to the survey. Over a three-week time frame in November/December 2015, 566 complete surveys were received realising a 32.85% response rate, discussed further in Chapter Four. To provide a comparison of industry survey response rates, previous accommodation research (although different in its methodology to this study, and also based in different countries) reported response rates such as 25.5% for Swedish hotels, and only 16.5% for Polish hotels using an email based survey (Bohdanowicz, 2006). In a New Zealand context, Becken's (2013) survey research reported

27.4% response rate, and this is noted by Becken (2013) to compare favourably with her previous Automobile Association (AA) survey response rate result of 19% (Becken, 2013). A warning from Veal (1997) suggests that although "surveys with only 30 per cent response rates are regularly reported in the study literature" (p. 154), this rate of response raises questions about the survey's validity when "70 per cent of the target sample is not represented" (Veal, 1997,. p. 154). Finally, despite Veal's (1997) warning that lower response rates may not be valid, previous accommodation research with relatively low response rate percentages still "provided valuable insight into environmental attitudes in the hotel industry" (Bohdanowicz', 2006, p. 667).

The quantitative nature of the survey meant that the data collected enabled "inferences for the entire population and generalisation of the findings" (Altinay & Paraskevas, 2008, p. 101). To enable this generalisation, simple inferential as well as descriptive statistical analysis were performed on the data collected from the survey. To perform these statistical tests, Statistical Package for Social Sciences (SPSS) was used. The use of SPSS allows social scientists to run statistical programmes without "special knowledge of their mathematical constructs" (Miller, Acton, Fullerton, & Maltby, 2002, p. 1). Initially the data set was 'cleaned' by removing incomplete surveys, and the data was re-labelled for ease of use. This allowed cross tabulations to be performed on different variables to produce data to analyse. A cross tabulation creates a basic picture of how two variables inter-relate (Miller *et al.*, 2002). To provide answers for Objective One, cross tabulations were performed between all of the Big Five and additional emission mitigation initiatives, and the categories of accommodation. While these cross tabulations were being performed, a Chi-square test was also included. This was used to determine whether or not there was a statistically significant association between the two variables (Miller *et al.*, 2002). The results and the associated significance tests were recorded and analysed. Objective Two required recoding of the category variables to create clusters of luxury, mid-range and budget properties. These clusters were formed with guidance from previous researcher's indications of types of accommodation (including Becken, Frampton, & Simmons, 2001; Haskell & Tunnell, 2010; Lockyer & Roberts; 2009; Madden, 1995; Rahman, Reynolds, & Svaren, 2012) (Figure 3.3). SPSS recoding was used to pair each cluster in a cross tabulation with the Big Five, and additional mitigation initiatives to identify if the luxury cluster were implementing more mitigation measures than the other two clusters, and to see if these results were statistically significant. Recoding of variables was also performed to provide information to answer Objective Three. This was required to group the responses regarding holding a Qualmark™ Enviro award or not, as they were initially reported separately as 'gold', 'silver', 'bronze', 'no' or 'pending'. Cross tabulations were then performed, with the addition of the Chi-square test, on the accommodation categories and the new variable, to determine if holders of the award also implemented more emission mitigation initiatives. Objective Four required many cross tabulations to be performed, as each category and each motivation variable needed to be recorded and analysed. The responses were then identified as either 'financially motivated' or 'emission mitigation' motivated. Results from these analyses are reported in Chapter Four.

3.5. Phase Two: case study rationale, research instrument and design

The second phase of this study was a case study. This case study investigated, as a single exemplary example, the only carbon emission neutral accommodation establishment in New Zealand - the Sudima Hotel Auckland Airport. This study took the form of a single example where the hotel represented an 'unusual case', a choice supported by Gerring (2007) who noted that "case study research, by definition, is focused on a single, relatively bound, unit" (p. 33). A case study "typically consists of a description of an entity and the entities actions…and can be of various sorts including organisations" (Thomas, 2003, p. 33). Furthermore, a case study allows the researcher to "retain a holistic and real-world perspective" (Yin, 2014, p. 4). Yin (2014) suggested that the use of a case study arises out of the need to understand a "complex social phenomenon" (p. 4). The Sudima Hotel Auckland Airport could be viewed as a 'complex social phenomena', as it is a large, multi-departmental hotel, with over 60 staff, 150 guest rooms, numerous conference facilities, and operates carbon neutrally. Ultimately, the Sudima Hotel Auckland Airport was the best choice for this phase of the study, as the main objective here was

The organisation sought for this case study was one that potentially provided a 'best practice' model due to its carbon neutral status. To source this 'case', "carbon neutral + accommodation + New Zealand" was entered into a Google search. This technique was previously utilised by Dhanda, (2014), in their research on carbon neutrality in hotels and resorts. The initial search identified only one potential participant – the Sudima Hotel Auckland Airport, as they were the only carboNZero certified accommodation organisation in New Zealand, a title they still retain in March 2017.This type of purposive sampling was described by Maxwell (2010) as when a specific entity can provide important information that cannot be sourced as well from other choices. The term purposive sampling can further be defined as choosing particular respondents based on their specific characteristics to answer the study aims and objectives. As the objective of this case study was to provide a holistic investigation of emission mitigation initiatives, environmental certification and corporate motivations, The Sudima Hotel was selected as an "information-rich case…from which one can learn a great deal about matters of importance...a case worthy of in-depth study" (Patton, 1990, p. 181).

The case study investigation of the hotel took advantage of a combination of research methods – primary research in the form of both face-to-face and via email interviews and survey data, as well as secondary documentation and online reviews research along with observation, all methods recommended by Denscombe (2014) for a case study design. These multiple sources of "evidence" (p.12) are factors in performing a case study which Yin (2014) noted are a case study's "unique strength" (p. 12). During the case study, one open-ended, semi structured, face-to-face interview was conducted. The interview took place in the 'natural setting' of the hotel lobby, and intended to learn the hotel management's actions and motivations regarding the environmental initiatives at the hotel. Saunders, Lewis, & Thornhill (2003) had found that managers of accommodation establishments were more likely to agree to a face to face interview than a questionnaire, especially if the topic in question is relevant and interesting to their current

situation. However, the Hotel Manager in this case study agreed to undertake both. He also agreed to be identified in the study. One advantage of using open-ended questions was that the respondent's answers were not "unduly influenced by the interviewer or by the questionnaire wording" (Veal, 1997, p. 164), and gave the respondents an opportunity to expand their answers. This use of open-ended questions was to create "verbatim replies from respondent that can provide a rich source of varied material which might have been hidden by categories on a pre-coded list" (Veal, 1997, p. 165). Examples of the semi-structured interview questions are below ("Semi structured questions for the accommodation establishment" see Appendix B):

> a)   Your property has a Qualmark™ Enviro Silver Award. How long have you held this award? What specific initiatives do you undertake to maintain your award?
>
> b)   As you undertake these initiatives, how important is lowering your carbon footprint compared to lowering your financial costs?
>
> c)   Do you undertake any other activities to specifically lower your carbon footprint, and if so, what do you do?

Furthermore, by using documents regarding the hotel's carbon emissions, a formal framework for other case study evidence to be related to was created (Gillham, 2000). This helps the case study's validity, as the information from the documentation, and evidence from elsewhere, is compared. This method of validating the case study through the use of documentation is valuable, as it complements other data gathered (Teddlie & Tashakkori, 2009). Another method used in the case study, was an analysis of guest reviews on TripAdvisor. TripAdvisor is a Consumer Generated Content (CGC) tool that allows online reviews of travel related entities (Filieri, Alguezaui, & McLeay, 2015). The exploration of the reviews on the TripAdvisor website was undertaken to include an important aspect of the accommodation industry, the guests' experiences. Guest reviews were searched for comments about the hotels' two main carbon mitigation differentiators: no mini-refrigerators in guest rooms, and the hotel wide chilled beam air conditioning system. This method was chosen both because it avoided further primary data collection (and therefore, ethics approval), but also, because it would provide candid feedback on hotels that primary interviews granted by hotel management might not necessarily provide. TripAdvisor was chosen as it is the world's largest online travel site, and provided a search feature which minimised the time spent performing this data collection task. Finally, observation of the hotel was performed by the researcher by staying there as a guest similar to previously undertaken research by Sampaio *et al*., (2012), in her study of environmental accommodation in Scotland. As the Hotel Manager also undertook the same online survey questionnaire as was used in Phase One of this study, comparison were able to be made between the outcomes of the survey and observed practices of the hotel. This led to verification of some of the aspects of emission mitigation and environmental sustainability at the hotel. Observation such as this is considered particularly useful due to the methodological weakness of self-reporting (Teddlie & Tashakkori, 2009). The observation undertaken at the hotel was unobtrusive and nonreactive,

which allowed examination of the hotel without interfering or changing it, a method suggested by Teddlie & Tashakkori, (2009).

3.5.1.   Phase Two: case study data collection

For the case study interviews, a purposive sampling technique was used. The Hotel Manager of the case hotel, and the Enviro-Mark Solutions senior advisor responsible for the carboNZero certification of case hotel, were selected. An initial introductory email was sent to the head office of the hotel, which received a positive response, and an introduction to the Hotel Manager. An email was then sent to the Hotel Manager, containing the Auckland University of Technology's (AUT) standard letter of engagement, along with a short personal email explaining the study, and requesting an interview. The face-to-face, semi-structured interview was granted in March 2016, and took place at the hotel site in Auckland, New Zealand. Additionally, Enviro-Mark Solution's senior advisor, who was responsible for the Sudima Hotel Auckland Airport's carboNZero certification, was interviewed via email. The Senior Advisor was also sent AUT's standard letter of engagement and he agreed to be identified throughout the study. The questions asked were also open ended, and were based very closely on the interview questions given to the Hotel Manager, research regarding carboNZero's certification processes, and confirmed other information gathered about carboNZero. Documentation studied to provide evidence in the case study included the carboNZero summary of certification for the hotel over the past three years. This publically available documentation includes historical information about the hotel, its emission sources, and amounts of carbon dioxide equivalents for the period, and future reduction commitments. Other documentation reviewed was sourced from news publications ('Ecolab', 2016 ;'AccomNews', 2016) and tourism organisations ('Tourism Export Council New Zealand', 2016). The hotel's own website and Enviro-Mark/carboNZero websites were also used as a source of evidence, similar to using 'documentation', which Gillham (2000) suggested epitomises the case study strategy. Unfortunately, neither the hotel's financial statements nor CSR policy documentation were available to inform the study.

As travellers are increasingly relying on reviews on TripAdvisor to plan their holidays, including choosing their accommodation (Filieri, Alguezaui, & McLeay, 2015), additional secondary research using TripAdvisor was performed on comments that guests had left after staying at the hotel regarding the lack of mini-refrigerators in the guest rooms, or how the chilled beam air conditioning had impacted their stay. This method allowed the participants to describe their stay at the hotel through their view of reality. All reviews of the hotel were taken into account, the first being recorded in 2012 when the hotel opened (*n*= 904). Key words related to refrigeration in the guest rooms, or the chilled beam air conditioning were searched for. It was assumed that because the TripAdvisor reviewers were not aware they would be part of this study, they were not impacted by a social desirability bias, as previously discussed in Chapter Three. Finally, an observation of the hotel was carried out during the face-to-face interview process, and during a separate visit to the hotel as a 'mystery' guest. The hotel was observed in a general, holistic manner, with notes taken on how various elements key to the carbon neutral status of the hotel impacted the guest

experience, for example, the lack of mini refrigerators in the room and the effectiveness of the chilled beam air conditioning system. It is acknowledged that this was not an objective undertaking as the observer viewed the hotel through the lens of their own preconceptions, standards and values.

3.5.2. Phase Two: case study data analysis

A holistic, or contextualising, strategy was employed to analyse this case study as a whole. This strategy interpreted the case study as a complete text, looking for interconnections, and disparities, among the different aspects of it (Teddlie & Tashakkori, 2009). This use of 'contextualising' the data places an emphasis on the case study in context, rather than breaking it down into categories (Teddlie & Tashakkori, 2009). This study was partially modelled on Bohdanowicz & Zientaras' (2008) case study on the Scandic Hotel Group, but retrospectively, the style of this study would have benefitted from following their case study more closely. As qualitative data analysis is an iterative process that involves going back and forth to the data sources, even as the research report is being written (Teddlie & Tashakkori, 2009), the case study as a whole was constantly being reanalysed as new information was uncovered. In qualitative research, validity determines whether the information provided in the case study is accurate, can be trusted, and is credible (Creswell & Plano Clark, 2007). Validity was provided through 'disconfirming evidence', which is where there is a disparity in the evidence, showing that the data analysis is accurate "because in real life, we expect evidence for themes to diverge and include more than just positive information" (Creswell & Plano Clark, 2007). The other validity measure implemented in this study was that of data triangulation (Creswell & Plano Clark, 2007; Teddlie & Tashakkori, 2009). This meant that evidence for information presented was provided separately from more than one source within the case study. Not only this, but as discrepancies were found, they were able to be investigated further using various sources of evidence, a case study tool advocated by Gillham (2000).

After the interview was transcribed, initial notes about the responses were made. Some of the themes in the interview were used to confirm other sources of information, and others were used as a starting point to research further, for example, the Senior Advisor at carboNZero's involvement with the hotel. Furthermore, documentation reviewed for this case study was used to support Objective Five, by identifying and confirming emission mitigation initiatives implemented by the hotel, as well as gaining a deeper understanding of the hotel's levels of comfort and service overall. Additionally, online reviews were analysed both qualitatively and quantitatively. Key words and phrases were identified and counted, and frequency analysis was applied to illuminate other aspects of the case. Finally, observational data collection provided "overpowering validity" as "observation is the most direct way of obtaining data" (Gillham, 2000, p. 46). Field notes of the observations were made at the time, and subsequently reviewed for contextual value towards building the case study as a whole. Physical 'artefacts' were also noted and/or photographed, for example, the environmental sustainability information card in the guest room.

3.6. Ethics approval and risks

Prior to the empirical data being collected, approval from the Auckland University of Technology Ethics Committee (AUTEC) was required. Ethics committees provide an independent review process for researchers to "systematically reflect on the potential risks participants in relation to the specific study activities at the beginning of their study" (Paoletti, Tomas, & Menendez, 2013, p. 4). It is mandatory at Auckland University of Technology to be granted Ethics Approval before embarking on any data collection involving human participants. The approval was required by Auckland University of Technology to protect the privacy and identification of the respondents, their responses and the researcher. Reiterating these points, Czaja and Blair (2005) wrote that informed consent and protection of confidentiality were two concepts central to study respondents. Within the study, the survey and interview questions were designed to negate any possible embarrassment, discomfort, anxiety or psychological harm to the participants, mainly due to the nature of the study topic. The questions presented in the project were also designed not to contain any sensitive personal issues that could result in creating a bias towards any gender, culture, age, ethnicity or nationality groups. In the application for ethics approval, the purpose and specific procedures intended for the study project were specified. This included specific details of potential participant's initial contact methods, data collection, data storage, intentions for current and future data use and access. The majority of this information was also provided, in a condensed manner, to participants in a Participant Information Sheet. A consent form was also submitted for approval, to be signed by potential interview participants agreeing to take part in the study. The committee granted the ethics application in February 2015 (15/29) ("Ethics approval from AUTEC" see Appendix I). In conclusion, although many studies have found incentives to increase response rates for online surveys (Dolnicar, Laesser, & Matus, 2009), Auckland University of Technology Ethics Committee does not allow the use of incentives within its study projects and therefore no incentives, except an aggregated copy of the results, were offered to respondents.

3.7. Summary of methods and methodology

This chapter shows that there was a pragmatic process applied to all methods of this study, beginning with the clear aim of gaining an understanding of emission mitigation in the New Zealand accommodation industry. This chapter introduced the paradigm of pragmatism that the study was based on, followed by a rationale for using a mixed methods approach, survey and case study. Then the method of the first phase of the study was presented, with the development of the questionnaire, data collection and analysis process explained. Although using a survey meant that the results were generalisable to the population as a whole, it also meant that clarification from the respondents was impossible, a disadvantage recognised in online surveys (Veal, 1997). Additionally, Veal (1997), wrote that the researcher can never be sure about the honesty or accuracy of their participant's responses, and that "in some instances people may deliberately or unwittingly distort or 'bend' the truth" (p. 34). Further to this point, Gray (2009) noted that because a survey is only able to record people's perceptions, they perhaps behave differently in practice. To try and alleviate these issues, further investigation regarding the actual

behaviour in the New Zealand accommodation industry was undertaken by a case study on New Zealand's only certified carbon neutral accommodation provider - Sudima Hotel Auckland Airport. This case study sought to provide some clarification on the themes from the survey and highlight 'best practice' environmental initiatives. By utilising a pragmatic, mixed methods approach, this study was able to report both broad, generalisable and detailed, holistic findings about carbon mitigation in the New Zealand accommodation industry. The following chapter reports the results from Phase One of the study, a nationwide survey on emission mitigation initiatives in the New Zealand accommodation industry.

4.   RESULTS: PHASE ONE

The purpose of this chapter is to present the results from the survey questionnaire that was sent out by email to accommodation providers throughout New Zealand. Material provided in this chapter demonstrates achievement of the first four objectives, and therefore provides much of the information needed to also satisfy the main aim of the study. This chapter is divided into sections by the objectives, and will firstly present the survey's response rate and participants' characteristics. Veal (1997) noted, data collected by quantitative methods are predisposed to statistical analysis and that "conclusions are based on such analysis" (p. 71). Therefore, the analysed data will then be presented objective by objective (one to four), with the descriptive and statistical analysis of each, followed by a brief summary of each objective. This chapter concludes with a summary of the survey results, and an introduction to Chapter Five: the Sudima Hotel Auckland Airport case study.

4.1.   Survey population and characteristics

The survey participant database was gathered from the Tourism New Zealand accommodation website, a free advertising platform for New Zealand accommodation establishments. The Tourism New Zealand website grouped accommodation establishments according to the 15 different categories (Table 4.1), which were used in this study. By segregating accommodation providers into categories, it allowed the study to have both an overview of the whole New Zealand industry, and also enabled closer investigation of the individual categories.

4.1.1.   Response rate

The number of accommodation establishments on the Tourism New Zealand website numbered 3,233 at the time of the study. However, after all the potential participants' emails were uploaded into Qualtrics, the number of email addresses showed only 2,330. This difference is attributed a non-sampling error in the email collection procedure, or a duplication of accommodation establishments within the categories on the website. Despite this discrepancy, the 2,330 potential participant emails were sent. From those, 77 emails bounced back and 530 further duplicates were deleted automatically, leaving 1,723 potential participants. It was hoped that by sending this large number of emails out, that the target response number for generalisability (n= 354[8]) would be met, as it represents only 20 per cent of the whole population. A feature engaged during this study was a time limit that gave respondents a three-week window in which to respond. This allowed a reminder to be sent to potential participants when they had a week left to complete it. Importantly, this action generated another 118 responses. At the close of the three-week survey window, 601 responses were recorded in Qualtrics. However, only 566 responses were recorded 'complete', and therefore only those were analysed. This gave the survey a response rate of 32.85% (566/1723 = 0.3285 x 100 = 32.85%) was achieved. This response rate is considered a typical, if not better, percentage for an online survey (Kaplowitz, Hadlock, & Levine, 2004). This response rate of 32.85% was higher than some previous research in the field of tourism and

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[8] n = number

accommodation such as Baloglu & Jones (2015), who received a 9.4 per cent response rate from their research on American luxury accommodations, and research by Becken *et al.*, (2001), who reported a 19 per cent overall response rate from their national New Zealand survey. As the survey was anonymous, respondents were asked to self-identify the category that best described their accommodation establishment from the 15 provided by Tourism New Zealand. Frequency analysis revealed that the largest number of respondents were bed and breakfasts (28.6%, *n*= 162), and the lowest response was from the resort category (0.53%, *n*= 3) (Table 4.1).

Table 4.1 *Frequency of respondent categories in the survey*

	n	%
Hotel	20	3.5
Boutique Hotel	14	2.5
Lodge	25	4.4
Luxury Lodge	12	2.1
Resort	3	0.5
Motel	133	23.5
Apartment	21	3.7
Backpackers	21	3.7
Hostel	15	2.7
Holiday Park	37	6.5
Campground	11	1.9
Bed & Breakfast	162	28.6
Holiday Home	59	10.4
Farm Stay	18	3.2
Homestay	15	2.7
Total	**566**	**100**

It is worthy of note that no category was under represented in the study. This is in contrast to Becken *et al*'s., (2001) survey that reported the bed and breakfast category was under represented, and Becken's (2013) research where responses were heavily weighted towards campgrounds and bed and breakfasts, with motels being poorly represented. However, it is important to emphasise that although all 15 categories were represented in the data, because of the small number of some respondents, this study's results can not necessarily be generalised for individual categories. Despite this relatively small number of respondents in some categories, it is suggested that the study still provided valuable environmental insights into the accommodation industry categories, similarly to Bohdanowicz's (2006) research outcomes, where although the response rate (per category) was quite low, the information gathered was still deemed meaningful. Furthermore, because the study received *n*= 566 responses, it allowed this survey's results to be generalised for the population of New Zealand accommodation establishments, as only *n*= 354 were required to assume generalisability.

4.1.2. Respondents' characteristics

Respondents were first asked a series of questions regarding their position, job title, type of ownership, if they were the decision maker at the property and how many employees there were at property. First, each respondent was asked to identify their position at the establishment (Table 4.2). This was intended to help ensure that the participant was aware of any initiatives taking place at the property and therefore could answer the questions accurately. An important finding was that the majority of respondents were owners (82.02%, *n*= 488), followed by managers (18.82%, *n*= 112), as previous research had found that managerial support in implementing sustainability in accommodation establishments was imperative. Only a very low percentage (0.84%, *n*= 5), indicated that they held the position of Sustainability Manager. Additionally, respondents indicated if they were actually the decision maker for the establishment, with the majority noting that they were (81.7%, *n*= 461) (Table 4.3). This was important for the study because it showed that the person engaging in the survey could influence the practices undertaken at the establishment. The majority of accommodation establishments were reported to be independently owned and operated (89.62%), followed by the chain or group owned accommodations (7.08%) and 'others' such as council owned, leased and partnership, made up the remainder (3.30%).

Table 4.2 *Frequency analysis of respondents' roles*

	Respondents' roles	
	n	%
Owner	488	82.02
Manager	112	18.82
Sustainability Manager	5	0.84
Other	20	3.36
Total	**595**	**105.04***

*Notes: Please note that five per cent of respondents reported they held more than one of the positions suggested, causing the total to be more than 100 per cent.

Table 4.3 *Frequency analysis of the decision makers at their establishment*

	Is the respondent the decision maker?	
	n	%
Yes	479	80.64
No	76	12.79
Other	39	6.57
Total	**594**	**100.00**

Regarding employee numbers, the majority of respondents reported between 0 – 5 employees (78.45%, *n*= 447), and a further 15.85% indicated between 6-15 employees. Only 3% of respondents reported between 16 and 25 employees, and less than 2% indicated over 61 employees. This showed that a large percentage of the survey respondents were small to medium

tourism enterprises (SMTEs), which is typical for the accommodation industry (Coles, Dinan, & Warren, 2016). Unfortunately, it was not clear from this question if any of the respondents were large tourism enterprises, classed as having over 250 employees or more (Coles *et al*., 2016), and therefore this question could have been improved by the addition of higher ranges (e.g. 100 – 199, 200+), to report this information more accurately.

4.2. Objective One: To identify emission mitigation initiatives being implemented by the New Zealand accommodation industry

4.2.1. The Big Five mitigation initiatives

Objective One sought to identify emission mitigation initiatives that the New Zealand accommodation industry is implementing. The term Big Five refers to five very common emission mitigation initiatives, which were chosen as a focus in the survey: recycling, installation of energy efficient lighting, purchasing of high rated Energy Star appliances, implementation of a Switch Off policy and providing an option for towel reuse in guest rooms. To answer this objective, survey respondents were asked to indicate if they undertook each of these initiatives using a dichotomous yes or no answer (Figure 4.1). Responses per accommodation category are displayed in Appendix C: "Emission mitigation initiatives undertaken per category in the New Zealand accommodation sector", and are discussed subsequently.

4.2.2. Recycling

The majority of respondents were shown to recycle at their establishments (97.5%, *n*=552). This is very encouraging for this initiative, especially as (Singh *et al*., 2014) found that about 88% of waste from hotels was recyclable or compostable, and that this initiative reduces carbon dioxide emissions. All respondents in the following categories indicated that they recycle: hotels, boutique hotels, luxury lodges, resorts, backpackers, holiday parks, campgrounds, and farm stays. Apartments reported the lowest level of recycling, but even they reported 95.5% (*n*= 19) affirmatively overall. This indicates that recycling is a very well implemented initiative across the accommodation industry of New Zealand. Regarding separate recyclable items, results showed that glass was the most commonly recycled material (97.46%), followed closely by paper and cardboard (96.55%), and plastics (95.64%). Recycling aluminium was reported to be fourth most common (86.57%) and organics (compostable food and garden waste) was least popular with only two thirds of respondents noting they did this (68.24%).

4.2.3. Energy efficient lighting installation

Energy efficient lighting installation (LEDs or other long lasting, energy saving bulbs) was reportedly undertaken across the industry as a whole, with a 93.6% (*n*= 530) affirmative response over all. Per category, boutique hotels (*n*= 14), lodges (*n*= 25) and resorts (*n*= 3) reported that all respondents in these categories had implemented this emission mitigation measure. There was a high application of this initiative, with all but three types of accommodation reporting over 90% implementation. The three categories that reported the lowest installation percentages were

holiday homes (86.4%, *n*= 51), homestays (86.7%, *n*= 13) and farmstays (88.8%, *n*= 16). Although the extent to which this initiative is implemented within each property is unclear, results of the survey show that a majority of establishments in New Zealand have moved toward at least partial installation of low energy lighting sources.

4.2.4. Energy star appliances

The Energy Star rating is awarded to qualified products and appliances that are extremely energy efficient. When last purchasing electrical appliances, respondents were asked if they thought it was important to have a high Energy Star rating (resulting in more energy efficiency). This question offered a non-applicable choice for those accommodation establishments who had not purchased any items recently, however, there was a good response rate for this question (*n*= 524), indicating that a majority of respondents answered the question. Out of these, 78.7% (*n*= 444) specified that it was important to them to have a high Energy Star rating, whereas only 14.2% (*n*= 80) indicated it was not, with the remaining respondents reporting non applicable (*n*= 7.1%). Per category, homestays reported the highest response (93.3%), whereas lodges (64%), resorts (66.7%) and hostels (66.7%), indicated that this initiative was not an important consideration when last purchasing appliances. Furthermore, a high Energy Star rating was only considered important by 70% of hotels, and 74.4% of motels. This suggests that hotels and motels, who usually house many electrical appliances, have potential to make further emission mitigations solely through choosing high rated Energy Star appliances for their future purchases.

4.2.5. Switch Off policy

A Switch Off policy encourages both guests and staff to turn off appliances, and other sources of energy use like lighting, air conditioning and computers, when they are not in use. Overall, only 56.7% (*n*= 317) of respondents replied that they had a policy in place. No category reported that they unanimously had this policy in place, although hostels (78.6%, *n*= 11), backpackers (71.4%, *n*= 15) and hotels (70%, *n*= 14) had the highest response rates. Boutique hotels (42.9%, *n*= 6), homestays (46.7%, *n*= 7) and holiday homes (51.7%, *n*= 30) indicated that they had the least number of establishments with this policy in place.

4.2.6. Towel reuse option

Respondents were asked if their guests were given the option to reuse their towels in their rooms, rather than having them laundered daily. Just under two thirds of all establishments reported they had this policy in place (63.7%, *n*= 356). Per category, all resorts (*n*= 3) provided guests with this option, and hotels reported a 95% (*n*= 19) implementation. Luxury lodges reported only 50% affirmative (*n*= 6), which makes it the lowest ranked category of accommodation establishment. This may be due to the luxury definition of this category, where guests likely expect a freshly laundered towel at all times. This question also provided the option of non-applicable for establishments that do not normally provide an amenities or towel service (campgrounds, holiday parks, hostels and backpackers). This non applicable choice garnered a 14% (*n*= 78) response from the industry as a whole.
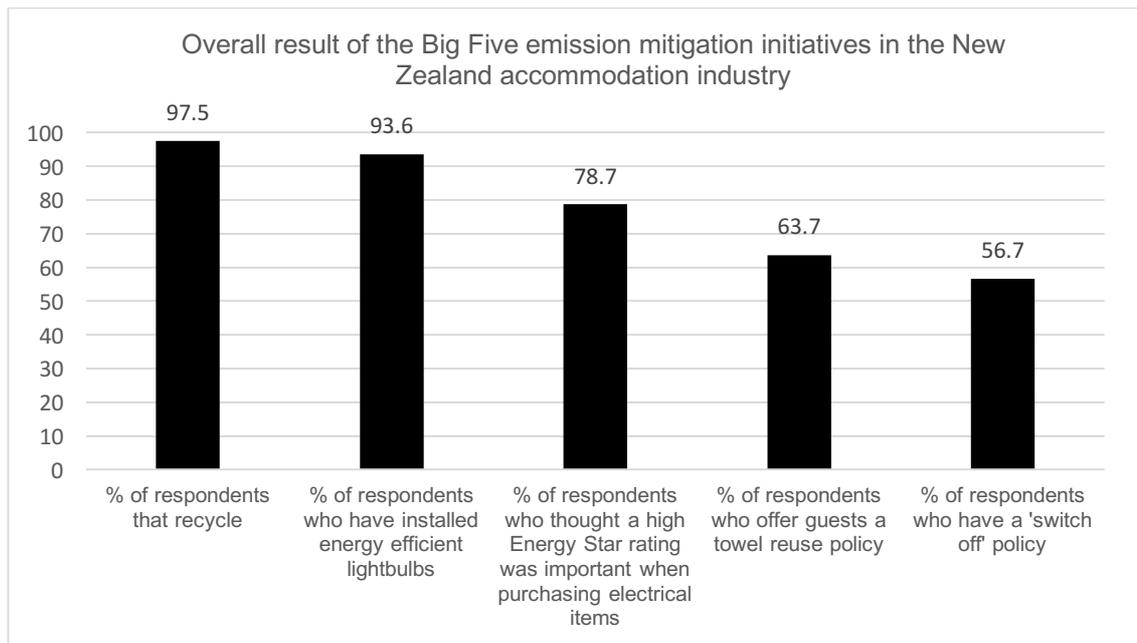
Figure 4.1 Overall result of the Big Five emission mitigation initiatives in the New Zealand accommodation industry

4.2.7. Additional emission mitigation initiatives

Twelve additional mitigation initiatives were also investigated in the survey ("Cross tabulation of twelve additional emission mitigation initiatives undertaken by categories in the survey" see Appendix D). These initiatives required potentially more investment (financial and/or time) from the property management team. Respondents were asked to indicate if they undertook any of these additional mitigation initiatives (multiple selections were allowed). Each initiative was allocated to a general area of environmental sustainability and are reported on in these areas below.

4.2.7.1. Land management

Replanting trees in New Zealand was reported by just over half of respondents (51.42%, n= 272). Farmstays were the highest respondents with 88.89% (n= 16) reporting they planted trees. Homestays reported the second highest percentage in this area with 80.00% (n= 12) followed by lodges with 73.91% (n= 17). The three lowest category positions reported were by motels (25%, n= 30), hostels (25%, n= 3) and, hotels (33.33%, n= 6). Respondents reported sourcing local produce 69.75% (n= 369) across the industry, which was the second highest response. Again farmstays reported the highest percentage of accommodation establishments that implemented this initiative with 88.89% (n=16). Boutique hotels and luxury lodges were equally responsive to this question, both with 83.33%. Homestays reported 80.00% (n=12), with bed and breakfasts indicating 82.91% (n= 131). However, not all establishments provide food for their guests, therefore the results of this question need to be interpreted with this in mind. However, of the

categories that usually provide meals for their guests, the least responsive category was again hotels (66.67%, *n*= 12), followed by resorts (66.67%, *n*= 2) and lodges (69.57%, *n*= 16).

4.2.7.2.   Energy conservation

The installation of key card switches in guest rooms, only reported 6.24%, (*n*= 33). Here hotels and resorts performed the best with 33.33% each. These two property types led boutique hotels and hostels (16.67% each) in this innovation. Reporting that none of their categories had installed key card switches in guest rooms were luxury lodges, apartments, holiday parks, farmstays, campgrounds, and homestays. Installation of clean energy sources reported a 20.42% response rate across the industry. By category, farmstays indicated that 50% have implemented this initiative, the highest response. Homestays were second (46.67%, *n*= 7), and boutique hotels third (41.67%, *n*= 5). Notably, every category except resorts and campgrounds reported the installation of some clean energy. Further to this, over a quarter of holiday homes, backpackers, lodges and luxury lodges all indicated that they had undertaken this initiative to some extent.

4.2.7.3.   Water conservation

The highest reported initiative across the industry, was the installation of half flush toilet options (85.8%, *n*= 450). Resorts indicated that they had all implemented this initiative, and homestays indicated that 93.33% (*n*= 14) had also. Homestays therefore reported a higher installation of half flush toilets than both boutique hotels and luxury lodges (91.67%). Hostels (*n*= 11) also reported a 91.67% implementation with hotels stating that only 66.67% (*n*= 12) of their accommodation establishments had installed a half flush toilet option, the lowest response. Low flow shower heads or taps also reduce the water consumption, and this initiative was reported as fifth most popular across the whole industry, with just over half of respondents engaging in it (51.04%, *n*= 270). All resorts noted that they undertook this initiative, with backpackers and holiday parks both reporting the second highest implementation of this initiative at 60% each. Campgrounds recorded the lowest uptake of this initiative with only 18.18% (*n*= 2). Interesting to note that campgrounds and holiday parks, who are very similar in their product offering, had such opposing results.

4.2.7.4.   Waste management

Although recycling was part of the Big Five initiatives, additional waste management in the accommodation industry was also considered. The use of refillable guest toiletries was investigated, and was found to be the third most popular initiative (60.30%, *n*= 319). Resorts (100%, *n*= 3), luxury lodges (75%, *n*= 9) and farmstays (72.22%, *n*= 13) were the top performing categories in this area. The lowest ranked categories were hostels (25%) which is unsurprising considering they normally do not provide toiletries for guests, however, juxtaposed with this finding, hotels, which almost always provide toiletries, were also ranked in the bottom three with only 33.33% of properties reporting they use refillable guest toiletries. Using recycled materials in staff offices was the sixth most reported initiative (40.26%, *n*= 213). In fact, all categories indicated that they undertake this initiative to some extent, with lodges (56.52%, *n*= 13), hotels (55.56%, *n*= 10) and hostels (50%, *n*= 6), ranking top three. The categories not implementing this initiative

as much as others, and bottom of the ranking, were boutique hotels, resorts, farmstays and homestays all with 33.33%. Bed and breakfast category reported the lowest uptake of this initiative with only 31.01% (*n*= 49) using recycled materials in their offices.

4.2.7.5. Emission specific management

The initiative to encourage staff to carpool or use alternative transport such as public transport, bicycling, or walking, to travel to work was only reported by 9.64% of respondents over all. Of these respondents, the resort category specified they undertake this initiative the most with 66.67% (*n*= 2) noting that they do this. Of the other categories, hotels and hostels indicated that a quarter of them suggest this initiative to their employees, however, all the other categories showed very low uptake for this initiative, although only luxury lodges reported no implementation at all. Financial sponsorship of international forestry replanting or protection (offsetting) was reported by only 4.73% (*n*= 25). The categories that reported the highest uptake of this initiative were lodges (17.39%, *n*= 4), who led homestays (13.33%, *n*= 2), and hotels (11.11%, *n*= 2). Although the result was very low, only five categories reported that they do no offsetting of this type – resorts, apartments, backpackers, hostels and campgrounds. Finally, the least reported alternative mitigation initiative was 'offsetting of guest emissions' (3.59%, *n*= 19). Here, categories indicating that they undertook guest emission mitigation, were mostly situated in the budget cluster – hostels (8.33%, *n*= 1), holiday parks (8.57%, *n*= 3) and campgrounds (9.09%, *n*= 1). It is acknowledged that actual reported numbers are very low here, but relative to other categories in the study, the result is surprising as these type of accommodation establishments do not emit as many emissions as other establishments (Becken *et al*., 2001). Furthermore, homestays reported that they implemented the most in this category with 13.33% (*n*= 2), relative to the other categories of accommodation. Finally, the most unexpected result of the survey was in response to Question 29 which asked respondents if they were interested in lowering their carbon emissions (Figure 4.2). It was very clear from the response that a majority of respondents were interested in lowering their emissions and is important new knowledge in this area of research (.
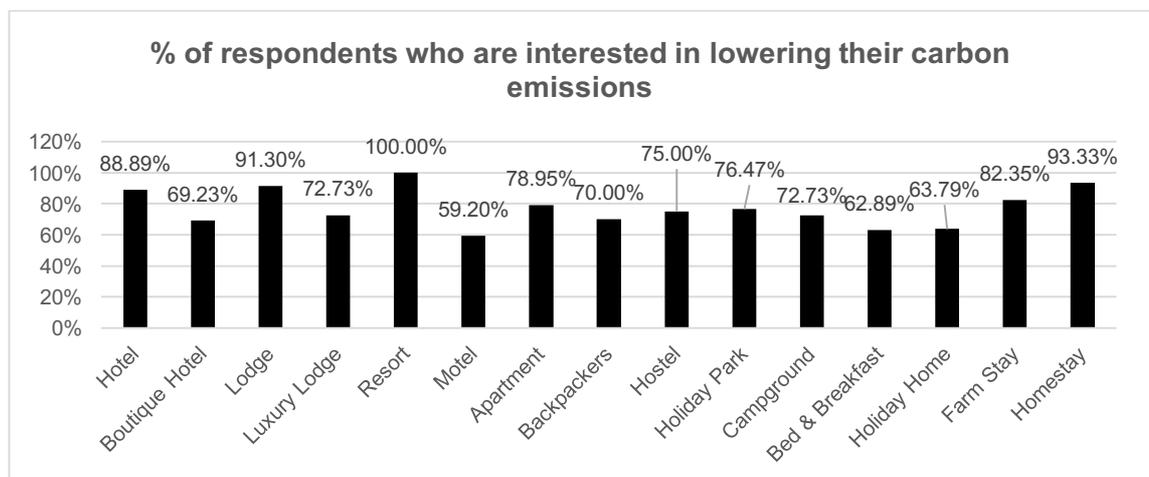
Figure 4.2 Percentage of establishments who are interested in lowering their carbon emissions

To summarise this section, Objective One examined the New Zealand accommodation industry regarding the implementation of emission mitigation initiatives. Across the industry, recycling was the initiative implemented to the greatest extent (Figure 4.3), with almost all respondents noting they recycled. Ranked after recycling, the installation of energy efficient lighting was also implemented to a large extent, with only slightly less respondents indicating they had installed these lightbulbs than they undertook recycling. The extent to which an Energy Star rating of appliances was considered important when purchasing them, was also quite prevalent across the industry, but this finding highlights an opportunity for further emission reduction through this initiative. Providing guests with an option to reuse their towel was only implemented by two thirds of the industry, and having a Switch Off policy was implemented least across all categories in the industry, with only just over half implementing this initiative.

Ranked averages of Big Five emission mitigation initiatives

% of initiatives implemented

Type of accommodation	%
Resort	93.33%
Hotel	88.52%
Hostel	87.23%
Apartment	84.89%
Farm Stay	84.76%
Holiday Park	83.51%
Boutique Hotel	83.12%
Backpackers	82.95%
Campground	82.91%
Motel	82.44%
Lodge	80.67%
Bed & Breakfast	78.81%
HomeStay	78.56%
Holiday Home	77.77%
Luxury Lodge	75.00%
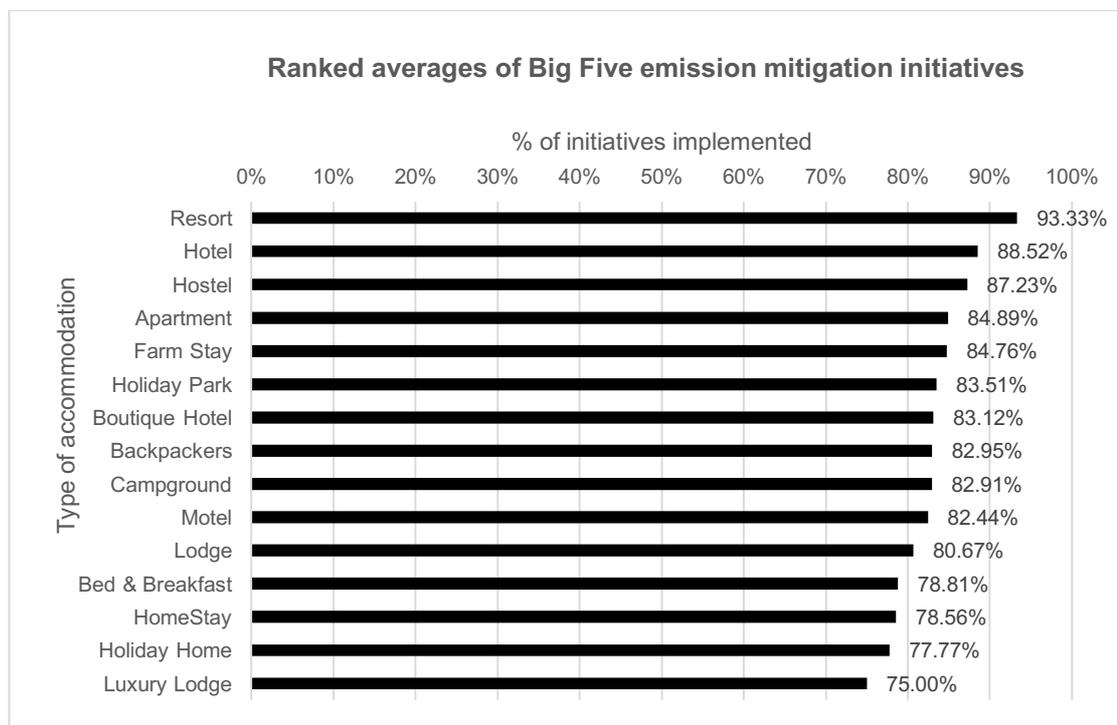
Figure 4.3 Ranked averages of Big Five emission mitigation initiatives by category in the New Zealand accommodation industry

To determine which category was implementing these initiatives to the greatest extent, the average scores of each category were found (by adding the responses in each initiative and dividing by the number of respondents in each category) and compared (Figure 4.3). Results showed that by category, resorts were the undertaking the five most common emission mitigation initiatives to the greatest extent, whereas luxury lodges reported to be the least engaged in these emission mitigation initiatives. It was also discovered that a majority of establishments were interested in lowering their carbon emissions further.

4.3.   Objective Two: To identify if luxury accommodation establishments implement more emission mitigation initiatives than mid-range or budget establishments

As discussed in Chapter Three, each category was grouped into a cluster entitled either luxury, mid-range or budget (Figure 3.3). These new clusters were then cross tabulated with the Big Five mitigation initiatives. This simple statistical analysis was used to identify which cluster undertook more emission mitigating initiatives compared to the other clusters. Each cluster was ranked first, second or third according to the amount of emission mitigation initiatives it was undertaking, with 'first place' indicating that more initiatives were being implemented relative to the other two cluster categories (Table 4.4). For example, it was found that the accommodation establishments in the budget cluster undertook more recycling as a cluster than either the luxury or mid-range clusters and subsequently were ranked in 'first place', and the accommodation establishments in the luxury cluster were found to undertake more recycling than those establishments in the mid-range cluster, therefore ranking them in 'second place'. The results of the cross tabulation are presented per cluster next.

Table 4.4 *Rankings of accommodation clusters for the Big Five mitigation initiatives*

	First Place	**Second Place**	**Third Place**
Recycling	Budget	Luxury	Mid-range
Energy efficient lighting	Luxury	Budget	Mid-range
Energy Star purchasing	Mid-range	Luxury	Budget
Switch Off policy	Budget	Luxury	Mid-range
Towel reuse option	Luxury	Mid-range	Budget

4.3.1.1.   Budget cluster

Results showed that in regard to recycling, the budget cluster ranked first with all respondents reporting they recycled (100%, *n*= 84), However, this result was not statistically significant at *p*-value = 0.185. In the energy efficient lighting initiative, the budget cluster ranked second (95.2%, *n*=80). This result was not statistically significant either (*p*-value = 0.260). When reporting the importance of choosing an Energy Star appliance, the budget cluster ranked third (72.6%, *n*= 61). This result was not statistically significant either at *p*-value = 0.069. Findings indicated that the Switch Off policy for this cluster ranked them first (69.9%, *n*= 58). This result was found to be statistically significant with a *p*-value of 0.031. Reporting on their implementation of a towel reuse option, the budget cluster ranked third (48.2%, *n*= 40) which was statistically significant at *p*-value = 0.000. This cluster had the highest response in the non-applicable choice (33.7%, *n*= 28).

4.3.1.2.   Mid-range cluster

This cluster was ranked third for the recycling initiative 96.8% (*n*= 395). This result was not statistically significant at *p*-value = 0.185. They ranked third also for energy efficient lighting (92.6%, *n*=378). This result was not statistically significant (*p*-value = 0.260). However, the Energy

Star initiative was led by the mid-range cluster (81.0%, *n*= 329), although this result was not statistically significant either at *p*-value = 0.069. The mid-range cluster also placed third for implementing a Switch Off policy (54.2%, *n*= 218), but were ranked second for the towel reuse initiative (64.9%, *n*=261). This result was found to be statistically significant at *p*-value = 0.000.

4.3.1.3. Luxury cluster

This cluster was ranked second for the recycling initiative (98.6%, *n*= 73). This result was not statistically significant at *p*-value = 0.185. The luxury cluster reported that they had the highest installation of energy efficient lighting (97.3%, n=72), although this result was not statistically significant (*p*-value = 0.260). Findings regarding Energy Star rated appliances showed that the luxury cluster was second (73.0%, *n*= 54), however this result was not statistically significant either at *p*-value = 0.069. This cluster ranked second in relation to having a Switch Off policy (55.4%, *n*= 41). The towel reuse option initiative ranked this cluster first with 74.3% (*n*= 55), and was also found to be statistically significant at *p*-value = 0.000. The option of 'non applicable' showed this cluster ranked third (6.8%, *n*= 5).

4.3.1.4. Objective Three: To identify if establishments with a Qualmark™ Enviro award implement more mitigation initiatives than those without

The Qualmark™ Enviro award, introduced in Chapter Two, is available to businesses that want to be specifically recognised for their environmentally sustainable tourism practices. This certification is a voluntary method to indicate an accommodation property has attained a certain level of environmental sustainability. The level of achievement is rewarded by three levels of Qualmark™ Enviro accreditation – gold, silver and bronze. Gold signifies the highest level of environmental and social responsibilities with strong leadership and advocacy, silver shows exceptional levels of resource and social management and bronze rewards outstanding levels of these (Enviro-mark, 2016). According to Qualmark™, *n*= 862 New Zealand accommodation establishments hold one of these awards, equating to about 20% of establishments throughout the country being certified with a Qualmark™ Enviro award (862/4400 = 0.1959 x 100 = 19.59%). Analysis of the current studies' respondents showed that 14% (*n*= 79) indicated they held a Qualmark™ Enviro award rating of any level.

4.3.1.5. Qualmark™ gold, silver and bronze accredited accommodation and their mitigation initiatives

Of the 14 per cent of respondents that reported they held a Qualmark™ Enviro award, 2.32% (*n*=13) held gold, 4.63% (*n*=26) silver and 6.06% (*n*=34) bronze. Categories who held the highest percentage of gold awards per category were resorts (33.33%, *n*= 1), followed by hotels (25%, *n*= 5,), lodges (8.33%, *n*= 2) and luxury lodge (8.33%, *n*= 1). The highest silver status recipient was tied between luxury lodges (*n*= 4) and resorts (*n*= 1) with 33.33% each. Holiday parks reported the highest percentage of accredited bronze awards with 18.92% (n= 7) followed by motels (11.45%, *n*= 15). Neither backpackers (*n*= 22) nor homestays (*n*= 16) reported any Qualmark™ Enviro accreditations, and bed and breakfasts reported only one bronze award

(0.60%, n= 1). A cross tabulation showed that even though individual accommodation establishments held a Qualmark™ Enviro certification, they did not necessarily implement mitigation initiatives (see "Cross tabulations of Qualmark™ Enviro holders and non Qualmark™ Enviro holders and the Big Five emission mitigation initiatives" see Appendix E). Three gold Qualmark™ Enviro holders indicated that they did not have a Switch Off policy at their accommodation establishments, and two gold holders reported they did not have a towel reuse policy in place. One silver Qualmark™ Enviro holder showed that they did not have any energy saving lighting at their property, and five reported that purchasing Energy Star appliances were not important. Additionally, a further five silver Qualmark™ Enviro holders reported that they did not have a Switch Off policy and six stated they did not have a towel reuse option for their guests. In the bronze category, one establishment did not recycle, and another did not have installation of energy efficient lighting. Furthermore, four bronze holders did not think Energy Star appliances were important, and nine did not have a Switch Off policy. Finally, three bronze holders did not have a towel reuse option for guests.

4.3.1.6. The Big Five mitigation initiatives and Qualmark™ Enviro holders

Further analysis using a cross tabulation on each of the Big Five mitigation initiatives and Qualmark™ Enviro holders was undertaken to ascertain if those holding a Qualmark™ Enviro award undertook more mitigation initiatives than those without the award ("Cross tabulations of Qualmark Enviro holders and non Qulamark Enviro holders and the Big Five emission mitigation initiatives" see Appendix E). The recycling initiative analysis showed that holding a Qualmark™ Enviro accreditation did not increase the percentage of accommodation providers who indicated they recycle. Across all accommodation establishments both holders of the award, and non-holders, returned 97.5%. However, holders of Qualmark™ Enviro awards did engage in more installation of energy efficient light bulbs (97.5% cf. 93.0%), a small difference that could be considered insignificant. Similarly, there was only a tiny difference in results (0.6%), between holding a Qualmark ™ Enviro award and not, regarding a high Energy Star rating being important when purchasing appliances, again such a minor variation they could be considered equal, indicating no difference between Qualmark™ Enviro holders and those without the certification. However, a much higher percentage of respondents who reported they have a Switch Off policy also hold a Qualmark™ Enviro award (74.0%, n= 57 cf. 53.9%, n= 260). This result was found to be statistically significant (p-value= .001). Another, more noteworthy gap, was also reported in regard to more Qualmark ™ Enviro holders providing guests with the option to reuse their towels (80.8%, n= 63 cf. 60.9%, n= 293). This result was also statistically significant (p-value= .003).

4.3.1.7. Objective Four: To identify the motivations of the New Zealand accommodation industry for implementing mitigation initiatives

As previously discussed, the survey questioned respondents about the implementation of the Big Five mitigation initiatives, using a binary choice of yes or no (two questions also offered a 'non applicable' choice). Respondents who replied affirmatively were then asked to select reasons (motivations) for their choice. The motivations were a given in another binary choice of 'important'

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or 'not important'. These responses were then identified using Bansal and Roth's, (2000) theoretical model of ecological responsiveness as either motivated by 'competitiveness' ('financial savings') or 'ecological responsiveness' ('emission mitigation'). These responses helped form an overview the motivations behind the implementation of emission mitigation initiatives in the New Zealand accommodation industry.

4.3.1.8.   Recycling

Respondents indicated that the wellbeing of the Earth was the most important motivation for recycling (96.0%, *n*= 525). Results showed that second to that (84.6%, *n*= 455) respondents considered cutting their carbon emissions was an important motivation to recycle. Financial savings by lowering landfill fees were reported as an important motivation to recycle by 70.4% (*n*= 375) of respondents, and furthermore, just over half of respondents (56.4%) noted that financial savings on both rubbish collection fees, and rubbish bags, were important motivations to recycle. When an accommodation establishment reported they did not recycle, they were asked to provide a reason for why they did not (Figure 4.4) (see Appendix F "Survey respondents' reasons given for not recycling").

Figure 4.4 Motivations reported for not partaking in a recycling initiative

Of the respondents' motivations not to recycle, 'not having any council recycling collection' was the most frequently reported (16.28%, *n*= 5), and 'not having any facilities to store recycling' reported by 12.79% (*n*= 11) of respondents. One respondent noted they did not know which materials were recyclable (1.16%, *n*= 1), and others reported that they do not recycle because they 'did not think that recycling makes a difference' (2.33%, *n*= 2), or that they 'have not thought about recycling' (1.16%, *n*= 1). Additionally, five qualitative responses were obtained, including "we do not have any refuse collection at our property so to save space we burn paper and plastics (which I know is not a good thing for the environment)", which indicates environmental sustainability knowledge, but lack of solutions from local government.

4.3.1.9. Energy efficient lighting

Lowering energy costs through lower energy expenditure (96.92%, *n*= 504) was the most frequently reported as important in this category. This response was closely seconded by respondents reporting that the quality of the bulbs, and their longevity, were important (93.08%, *n*= 471). The third highest motivation reported was that 83.46% (*n*= 424) of respondents noted lowering light bulb replacement costs were important, and fourth highest showed lowering carbon emissions through the bulbs lasting longer was important for 81.20% (*n*= 406) of respondents. In fifth place, lowering carbon emissions through more efficient energy use of the LEDs was important for 80.59% (*n*= 411) of respondents. The least important motivation was found to be that guests had requested these types of lighting. The look of the energy efficient light bulbs was reported to not be important by 86.13% (*n*= 416) of respondents, with light and heat outputs also noted as not important by over half of respondents (59.71%, *n*= 292).

4.3.1.10. Energy Star rated appliances

When asked if a high Energy Star rating was important when purchasing electrical equipment, respondents noted that lowering energy costs were the most important, with almost all participants agreeing (98.16%, *n*= 426). Also reported as important, were lowering their carbon emissions through lowering their energy use (85.34%, *n*= 361). This was followed by the updated technology of the item being important (80.00%, *n*= 336), and also important was the ECCA's (Energy Efficiency and Conservation Authority) approval on the item (78.12%, *n*= 332). Of the least importance, were the look and/or size of the item (38.16%, *n*= 158), and a lower cost to purchase (46.73%, *n*= 193).

4.3.1.11. Switch Off policy

Of the respondents who indicated they implemented a Switch Off policy at their accommodation establishments, 98.74% (n= 314) reported that it was important to them to lower their energy costs through this method. However, 84.59% (n= 258) of respondents noted that lowering their carbon emissions through lowering their energy use was an important motivation to have this policy in place. Lengthening the lifespan of the appliance (78.62%, n= 239), and reducing heat build-up (61.81%, n= 186) were also indicated as important by respondents.

4.3.1.12. Towel reuse option for guests

A majority of respondents reported that they found lowering their costs through less laundering important (92.92%, *n*= 328). Providing a towel reuse option for guests was considered important to lower their carbon emissions through less laundering (less energy use) by 83.04% (*n*= 284) of respondents. Lessening wear and tear on the items was reported important by 71.59% (*n*= 247) of participants, with lessening staff/housekeeping time in guest rooms reported by just over half of respondents as important (52.80%, *n*= 179). It appears from the results relating to Objective Four, that lowering financial costs is currently considered an important motivation for implementing four out of the five Big Five mitigation initiatives. Of the five most common initiatives undertaken by accommodation establishments, recycling was the only mitigation initiative in which

respondents reported that mitigation of their carbon emissions was more important than financial savings.

4.3.1.13. Summary of results

This chapter presented the main findings from the quantitative data derived from the analysis of the survey respondents. An introduction to the participants' characteristics and an overview of the sample population was provided to begin the chapter. The online survey that collected the data shown in these findings realised a 33% response rate (*n*= 566), making the results generalisable to the New Zealand accommodation industry. Findings were then analysed objective by objective. Objective One found that the accommodation industry in New Zealand engages in all five of the Big Five initiatives that mitigate carbon emissions. Out of the Big Five (recycling, energy efficient lighting installation, Energy Star appliance purchasing, Switch Off policy and towel reuse option), recycling was implemented to the greatest extent. Installation of energy efficient light bulbs was also implemented widely throughout all categories of accommodation. The Energy Star rating of an appliance was considered by the majority of respondents, however, this result leaves scope for this initiative to be implemented further. The two mitigation initiatives that reported the least engagement were implementing a Switch Off policy and providing a towel reuse option for guests. Therefore, these two initiatives have a lot of potential for further implementation across the New Zealand accommodation industry, as they are not currently extensively undertaken. Objective Two sought to identify if luxury, mid-range or budget clusters of accommodation establishments mitigated more emissions than the others. Although both the budget cluster and luxury cluster had an equal number of first place results, the luxury cluster was found to have more second place results, indicating that it undertook the greatest amount of emission mitigation initiatives across the industry. However, the budget cluster was shown to implement more emissions than the mid-range cluster. This indicated that the categories in the mid-range cluster undertook the least emission mitigation initiatives overall, when compared to the categories in the luxury and budget clusters.

Objective Three identified that accommodation establishments that held a Qualmark™ Enviro award engaged in more mitigation initiatives than accommodation establishments that did not hold the award. Overall, these results showed that only two out of five initiatives were performed better by those accommodation establishments that held a Qualmark™ Enviro award. These two initiatives were statistically significant in this study. Furthermore, it was surprising to learn that some establishments who hold the Qualmark™ Enviro award did not engage in some of the Big Five mitigation initiatives, despite most of them being considered 'standard' for the industry (Bruns-Smith *et al*., 2015). Motivations for implementing the initiatives investigated in the survey were reported in Objective Four. Results showed that financial savings ('competitiveness') were an important motivation to undertake the Big Five initiatives in four out of five initiatives, with emission mitigation ('ecological responsiveness') considered an important reason to engage in recycling only. Based on these results and analysis of the survey, the first four of the research objectives have been achieved. These results provided new knowledge on a broad range of

emission mitigation practices and motivations in the New Zealand accommodation industry. The next chapter presents Phase Two of the study. Phase Two was designed to provide detailed information about the themes of the survey, to gain a deeper, more holistic understanding of the only certified carbon neutral establishment in the New Zealand accommodation industry, through the application of a case study. The results of both Phase One and Phase Two will be discussed in Chapter Six.

5.   RESULTS: PHASE TWO

This chapter presents Phase Two of the study which satisfied the fifth objective of providing a holistic investigation of emission mitigation initiatives, environmental certification and corporate motivations at New Zealand's only carbon neutral certified hotel. This was a single case study that purposively selected the Sudima Hotel Auckland Airport ('the hotel'), as it was the only certified carbon neutral accommodation organisation in New Zealand. This chapter presents a brief history of the hotel, followed by an introduction to the hotel's relationship with carboNZero, including the process of certification. Next, the hotel's emission mitigation initiatives are reported, along with extra environmental sustainability features of the hotel. Finally, the corporate motivations of the hotel management for undertaking the emission mitigation initiatives, and operating carbon neutrally are presented. This chapter concludes with a summary of the case study, and an introduction the next chapter.

5.1.   A brief history of The Sudima Hotel Auckland Airport

The hotel was constructed in 2011, two kilometres from the Auckland International and Domestic Airports. This hotel is owned by the Hind group of companies and is part of a national chain of hotels (also located in Rotorua, Hamilton and Christchurch, but these locations are not certified carbon neutral). The Hind group controls approximately 800 hotel rooms across New Zealand and Australia, with 2016 revenues forecast to exceed NZD$39 million ('New Zealand Hotel Industry Conference', 2016). The hotel is a 4.5- star, 153 room hotel offering superior rooms, executive rooms and an executive suite. The hotel offers three types of rooms, all with double glazing and standard room features of a Qualmark rated 4.5-star hotel in New Zealand, including tea and coffee making amenities, safe deposit box, iron and ironing board, hairdryer, broadband/Wifi internet access and bathroom amenities. However, in line with the carbon neutral status of the hotel, they do not offer a minibar/refrigerator in the rooms, contrary to most standard 4.5 star hotels in New Zealand. The hotel offers 126 superior rooms selling from NZD$169 per night, with 26 executive rooms selling from NZD$209 per night. Executive rooms include extra amenities such as bath robes, writing desks, complimentary local calls and bottled water. Selling from NZD$309 per night, the executive suite is the hotel's most luxurious room which offers a lounge and television area, a stocked work desk, and is the only guest room in the hotel that provides a mini refrigerator (fully stocked). All rooms also feature the hotel's environmentally sustainable air conditioning units (chilled beam). The hotel also features a 200 person capacity conference facility, a heated indoor swimming pool and fully equipped gym. In addition, the hotel provides an onsite restaurant and bar with 24-hour room service available. Around the clock airport transfers are offered by shuttle bus, and there is also a complementary car park for guest use for the duration of their stay. High speed internet Wifi access is offered. All these aspects of the hotel combine to create a large, comfortable, Qualmark 4.5-star accommodation establishment, operating successfully as carbon neutral. This hotel also holds a Qualmark™ Enviro rating of silver in addition to their carboNZero certification.

5.1.1. The Sudima Hotel Auckland Airport's carboNZero certification

This particular hotel property (Sudima Auckland Airport), is the only accommodation provider in New Zealand registered with carboNZero. Previously introduced in Chapter Two, carboNZero is currently available in 17 countries, with the certification mark recognised in over 60 countries (Enviro-Mark, 2016). When engaged by an organisation, carboNZero provide emissions experts and use of computer software that identifies the areas that need to be measured. Once the measurement process is complete, carboNZero helps the organisation to implement strategies to manage and reduce its emissions. To facilitate this, achievable goals are set to manage the emissions going forward, and they provide independent auditing to verify the data reported. Subsequent to this reduction of emissions within the organisation, carboNZero helps the organisation to offset any remaining emissions through verified carbon credits, to achieve its net zero balance of emissions (Figure 5.2).
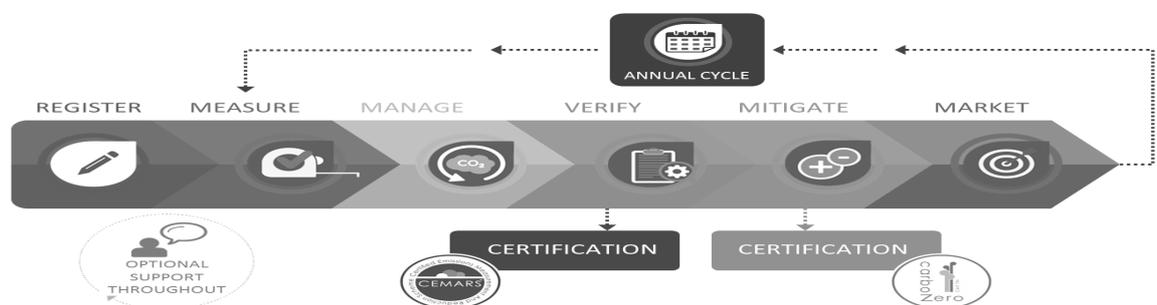
Figure 5.1 CarboNZero certification and annual process (carboNZero, 2016)

Membership fees to join carboNZero are based upon the size and complexity of an organisation. CarboNZero gives a guide to costs as follows, "for a small, simple, office based organisation with 1-2 offices and under 15 employees, the membership starts at approximately NZD$4,600 annually" (Enviro-Mark, 2016). The auditing of the organisation is an additional cost, and is based on the time needed to complete the onsite audits. Furthermore, the purchase of carbon credits increases the cost dependent on how many credits are required to offset any unavoidable emissions generated by the organisation. Because of these variables, the cost for each individual organisation is different. In return for the financial investment to become a carboNZero member, benefits include both financially and socially responsible ones. The financially driven benefits include identification of business efficiencies, cost savings and market access. When asked what financial benefits the hotel receives from its carboNZero accreditation, the HM reported that although there are no financial records to compare (because they have always operated carbon neutrally), he did specify that the organisation had likely saved money through the implementation of energy saving lighting. However, he also noted that because environmentally sustainable items such as recycled printing paper still cost more than un-recycled, the cost is higher in some areas.

CarboNZero suggests that more holistic benefits of being certified by them include improvement in staff engagement. This benefit was highlighted by management, who noted that because the carboNZero certification and other environmental sustainability initiatives, "the employees [are]

proud of being part of a company that is [going] in an environmental direction". Other holistic benefits include gaining a moral and reputational advantage, and demonstrating good corporate citizenship('Enviro-Mark Solutions', 2016). An additional benefit proposed by carboNZero, is the satisfaction of stakeholders and supply chains ('Enviro-Mark Solutions', 2016), an area that the former Project Executive of the hotel noted as important. The Project Manager during the build phase of the hotel indicated that certification was important to hotel management as "…third-party certification – where an independent certification body audits your practices against the requirements of the standard – is a way of signalling to your stakeholders that you have implemented the standard correctly" (Jhunhjunwala, 2014). The Sudima Hotel Auckland Airport's stakeholders would include guests, shareholders, employees or other companies wishing to do business with a carbon neutrally accredited accommodation or conference provider.

To begin the process of becoming carbon neutral, the hotel requested an initial assessment from carboNZero to "give an approximation on likely carbon emissions" (S. McKenzie, personal communication, 26 May, 2016). After this process, the organisation registered as a member of the programme. There was then a rigorous process of measuring all the hotel organisation's carbon emissions over a six-month period. This process measured not only the organisation's direct emissions, but also their indirect ones, discussed later in this chapter. This meant that all services, goods and products connected to the hotel were assessed for emission levels including vehicles, business travel, fuel and electricity, paper and waste ('Enviro-Mark Solutions', 2016). The hotel "took six months to determine current actual carbon emissions by measuring all goods and products supplied to the hotel by more than 20 companies" (Jhunhjunwala, 2014). Assessment also took place regarding the hotel's use of "…natural gas and electricity and the quantities and disposal of waste; and tracking air and car travel by our staff" (Jhunhjunwala, 2014), as well as petrol, diesel, road freight and R-404A[9]. From these assessments, the hotel management were required to implement changes in their practices and features where necessary, to reduce and mitigate emissions each year.

To assess these mitigation practices, one of the ongoing requirements to remain certified with carboNZero, is to have a carbon footprint data and management plan (Emissions Management and Reduction Plan) which is assessed annually, and the hotel prepares its carbon footprint data and management plan according to the programme requirements (S. McKenzie, personal communication, 26 May, 2016). These reports are prepared by the hotel with evidence for the footprint calculations to be audited on by carboNZero (S. McKenzie, personal communication, 26 May, 2016). These audits then form a "Summary of carboNZero Certification", a publically

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[9] R-404A refers to a refrigerant that is commonly in HVAC/Air conditioning systems and chiller systems. It only causes carbon emissions if the system has a leak and the gas escapes into the atmosphere (referred to as fugitive emissions).

available document (Enviro-Mark, 2016). The "Summary of carboNZero Certification" groups emissions into three classifications (known as 'scopes'), made up of direct and indirect emissions. Scope One consists of direct emissions from sources that are owned or controlled by the organisation. An example of these are coal fired boilers, fuel combustion from company vehicles, business use of rental or leased cars, and emissions from air conditioning or refrigerant systems. Scope Two consists of indirect emissions that occur as a consequence of the activities of the organisation but at sources owned or controlled by another company. Examples of these would be emissions created from purchased electrical power used throughout the organisation. Scope Three consists of mandatory emissions from other indirect emission sources created by the activities of the organisation but not from sources owned or controlled by the organisation itself. Examples in this area are business travel, freight and couriers, waste to landfill, and water and wastewater usage. Additionally, scope three has an optional inclusion of emissions embodied from the use of paper in the organisation, business travel accommodation and staff commuting and from such 'one time' activities such as building construction. Currently two years of publically available carboNZero certification records are available for the hotel organisation.

5.1.2. First and second year certification

Measurements of operational emissions for the organisation were taken in the following areas, natural gas (energy), electricity, waste landfilled, R-404A, air travel – domestic, short haul and long haul, diesel (transport), LPG and petrol use. These emission measurements were then combined to create annual emissions as tonnes of carbon dioxide equivalents (t CO_2e) for the hotel organisation. The base year (January 2013 – December 2013) shows that the operational GHG emission sources for the hotel were made up mainly of the use of natural gas (48%), and electricity (35%), and waste landfill (8%). Other factors measured were use of road freight, diesel (1%), petrol (1%), air travel – domestic (2%), international short and long haul (1%) and R-404A (4%). These emissions, broken down into their scopes are displayed in Table 5.1.

Table 5.1 *Emissions as tonnes of carbon dioxide equivalents (t CO_2e) for the period January 2013 to December 2013*

	Base Year t CO_2e (2013)	Second Year tCO_2e (2014/2015)
Scope One	257.6	247.51
Scope Two	169.32	146.39
Scope Three	54.56	60.6
Total Inventory	**481.48**	**454.5**

The second certification period (April 2014 – March 2015) measured the same operational emissions sources, and revealed that there was a decrease in overall emissions throughout the organisation even though there was a slight increase in Scope three's total (2013: 54.56 t CO_2e; 2014: 60.60 t CO_2e) (individual figures for each emission source were unavailable for Year Two).

From these totals, it is clear to see that there has been a decrease in the emissions generated by the hotel in the second period of certification.

Once the hotel management have prepared their annual report that provides evidence of their emissions, the hotel offsets the remainder of their unavoidable emissions by purchasing carbon credits. These Verified Carbon Units (VCUs) are equivalent to one tonne of emission reductions. These VCUs are then retired which offsets the GHG emissions from the activities undertaken by the organisation. Each VCU has a unique identification number so that they can be tracked, and are used to ensure that when the credit is purchased and retired, it cannot be sold onto anyone else (VCS, 2016). This process means that for every carbon credit retired, there will be one less tonne of carbon dioxide released into the atmosphere. In its first year of certification, the hotel offset 482 MW equivalent credits comprised of three different wind power projects, but in Year Two, only one wind power project was selected for the 455.8 MW equivalent of credits. Overall the hotel has decreased their emission outputs each year that they have been part of the carboNZero organisation. To achieve these decreasing levels of emissions, the hotel undertakes a variety of initiatives specifically focused on the mitigation of their emissions.

5.2. Emission mitigation at the hotel

Recycling is an important aspect of the hotel organisation's day to day operations. Throughout the hotel, they recycle paper and cardboard, glass, organics (food and garden waste) and plastics, but not aluminium. The HM noted that the hotel has a waste disposal and recycling process with different areas such as dry waste, wet waste and cardboard, all being dealt with separately to maximise the recycling efficiencies. Furthermore, as part of their carboNZero commitment, the hotel management "engages with people who handle our waste; it's not that we just let them go and pick it up and 'bye bye', but we look into these things. They are well monitored". Additionally, the hotel is currently assessing how they treat their organic waste, with the possibility of building an onsite organic waste disposal unit, an initiative specifically aimed at reducing their emissions. Thousands of lightbulbs are installed throughout the Sudima Hotel Auckland Airport, with the HM citing more than 2,000 bulbs throughout the hotel. He acknowledged that although LED bulbs "are not cheap to buy", they are an investment, as LED bulbs can last up to 50,000 hours which can translate to 20 years of life for a single lightbulb. Another initiative undertaken at the hotel, was purchasing of high Energy Star rated electrical items. The HM noted that "definitely there is an impact [savings] in operational costs, such as things like energy saving appliances". However, verification of these appliances was not possible during the course of the case study. The hotel reported that they have an official Switch Off policy which encourages employees and guests to turn unused electrical items off, including lights. The hotel is also fitted with sensor light switches that are triggered by personnel and guests as they enter or leave the rooms. The HM explained that "we practically don't have any light switches anymore" and everything is on sensor, including the staff changing rooms and management offices. These sensors allow the lights to turn off when there is no movement in the room, and that sometimes they turn off even when there is someone still in the room, due to lack of enough movement. The HM stated that basically, the only manual

switches that the hotel still had were electrical sockets. During the observation of the hotel, it was noticed that on arrival in the guest room, a standing lamp was on, which does not strictly adhere to implementation of this initiative (although the lightbulb was an energy efficient one). The HM had noted that the hotel had installed key card switches in guest rooms, and this initiative was verified during the observation of the hotel. This automatically implements the Switch Off policy for the lights when a guest leaves the room. A towel reuse policy at the hotel was indicated by the HM in the survey. During the onsite inspection, it was discovered that towel reuse option provided in the guest room was a door hanger that stated:

> "hang me outside your door before midnight and your room will receive a light service the next day. Your choice to help reduce our environmental impact is greatly appreciated".

Although this is technically providing an option to reuse the towels, it was neither obviously located, nor specifically encouraging guests to reuse their towels. This is something the hotel could address as previous research has found guests response for this initiative is improved when provided with information suggesting that others in the hotel (or generally) are also participating in this initiative (Goldstein *et al.*, 2008).

5.2.1.   Air conditioning

The hotel uses chilled beam heating and cooling units in lieu of traditional air conditioning units. This is an extremely important part of the hotel's emission reduction policy. It is a state of the art, computer managed system that uses hot and cold water to create different air temperatures in the guest rooms (and throughout the property), as well as allowing fresh air to circulate in the rooms. The system is a Planford 'chilled beam' system and is based on the induction principle. The guest rooms are controlled by a wall thermostat that allows for either chilled or heated water to circulate through the 'fins' of the system. By using the chilled beam system in the guest rooms, the rooms are very quiet compared to more conventional hotels where fan coil units or other types of air conditioners are installed, which usually make guests aware of their presence by their operating volume. This project was first of its kind in New Zealand and the project was valued at NZ$2 million in 2011 ('Watertech Plus', 2016). Although this was a large amount of financial investment, the hotel owner commented that "the initial costs are indeed higher but the payback is great" (Nadkarni, 2011). Despite the system's environmental accolades, research on TripAdvisor found that many guests had had problems with the units. Key words 'air conditioning', 'air con' and 'temperature' were searched, and 33 reviews were found. Of these, 26 were negative, such as:

> "the air conditioner control on the wall is very ineffective and slow in response. Moreover, I like to breath [sic] outside fresh air from time to time but the window cannot be opened"; and
> "there is a [sic] air conditioning system called "Chilled Beam Air conditioning", this is supposed to be very enviro friendly compared to traditional air con. Well I must say I have seen this before in some offices and for me it is not that impressive being very slow to react to any

temperature change. In fact, my room was very cold (winter here in Auckland) and, we just could not get the room warm".

These reviews show that the air conditioning units can be temperamental, although it should also be noted that temperature is an individual preference. Although these reviews were not discussed with the HM due to the timing of the interview and the online research, the hotel is aware that their system does not always perform correctly, as indicated below:

INTERVIEWER: "Have you ever had an issue with the computer system (that controls the air conditioning units)…?"
HM: "Sometimes it imbalances…"

In contrast, there were five more positive guest reviews on TripAdvisor, that noted the benefits of this system, for example:

"rooms are of average size but are very clean and comfortable with efficient air conditioning"; and
"…the air conditioning delivered the perfect room temperature".

However, the majority of reviews on TripAdvisor regarding the air conditioning were negative ($n=$ 26), with only five being positive.

5.2.2. Refrigerator-free guest rooms

The hotel also chooses not to place minibar refrigerators in each of their rooms, lowering their carbon emissions. The reasoning for this was that in the founding management's experience, "minibars are hardly used. They just consume a lot of electricity, need more resources to maintain and have over the years, just become another fixture in hotels." (Nadkarni, 2011). Research analysing TripAdvisor, found that the lack of refrigeration in the guest rooms at the Sudima Hotel was the most commonly mentioned issue in guest reviews. Out of the $n=$ 901 reviews about the Sudima Hotel Auckland Airport, $n=$ 67 specifically mentioned the lack of refrigeration negatively:

"I would have expected a small fridge in the room, unfortunately ours didn't have one";
"room was generous in size and well appointed although no mini fridge";
"no real fridge in room"; and
"the room was of the quality I expect of Sudima but not having a fridge in the room was quite a shock. There was certainly room to put one in so I'm not sure why they haven't".

An attempt was subsequently made hotel management to answer the reviewer about why there was no refrigerator in the room through a response on TripAdvisor. The Executive Assistant Manager at the hotel replied that:

"not having fridge in the room has been one of our efforts in support to the environment which has succeeded us in achieving New Zealand's first carboNZero certification. But we certainly have fridges in stock and make these available on request".

This type of response is beneficial to the reputation of the hotel, as previous research has found that it is important for a manager to respond to negative online feedback preferably within 48 hours of the review (Zhang & Vásquez, 2014). Although the guest appeared to be uncertain of why there was no refrigerator in the room, during the observation at the hotel, a clearly displayed brochure (on recycled card) was available in the guest room. This card explained many of the environmental aspects of the hotel, noting that "our contemporary, fridge-less rooms have been estimated to reduce our carbon footprint by 236 trees per year. Five years = 1,180 trees". In contrast, other guests were aware of the environmental reasons for not having a refrigerator in the rooms. These reviewers, although still noting the lack of refrigeration, also acknowledged the environmental reasons behind the decision:

> "although you MUST book a fridge as all rooms have had their refrigerators removed to be more 'green'", "the hotel has no mini bar, and they proudly proclaim this is saving them in power bills (I suppose they are right)";
> "room fantastic albeit no fridge which is described in hotel info as part of a 'green' strategy to reduce CFC's"; and
> "there are no mini bar fridges in the hotel rooms to reduce carbon emissions".

These reviews counteract the earlier possibility that the hotel was not informing their guests about the reasons for the lack of refrigerator in the rooms, as clearly a number of guests were aware of the reasons for this initiative. Finally, some reviewers noted that they actually did have a refrigerator in their rooms ($n= 2$), that it was fine that there was not a refrigerator ($n= 3$) or that they were happy that there was not a refrigerator ($n= 9$), for example, "no bar fridge in the room (on enviro grounds) and I like that because the noise of them drives me spare". These indicate a more positive response to this emission mitigation initiative.

5.2.3. Additional environmental sustainability initiatives

The guest rooms also operate without paper compendiums. These compendiums traditionally hold all the relevant information about the hotel in a paper format. At the hotel, this information is shown on the in-room televisions instead. The intention of this is, "as soon as a guest walks into their room for the first time, the TV turns on displaying the compendium. This way, guests are alerted to the fact that they have all the information they need at the tips of the fingers. The compendium is updated and maintained electronically which means we don't have to print a new copy for each of our 153 guest rooms every time we make a change" (Jhunjhnuwala, 2015). This initiative not only saves the hotel financially, but also in the time taken to print and distribute the compendiums each time an update is required. During the participant observation, the electronic compendium was unable to be accessed, despite a replacement remote control and help from the staff. This technical issue was not explained, and is a negative aspect of the environmentally friendly compendium system. Another aspect of the hotel, are the guest toiletries that are provided in recyclable bottles made in New Zealand exclusively for Sudima Hotels and Resorts by Healthpak New Zealand. The range of toiletries are named Rang Kavita meaning song of colour. This toiletry range is designed especially for Sudima Hotel Group and features the artwork 'The Cup' by Mrs. Jhunjhnuwala. The range includes revitalising body wash, conditioning shampoo,

body cream and soap. The contents of the shampoo, body wash and lotion are biodegradable, GE free and not tested on animals. The manufacturers, Healthpak, do not appear to be currently certified with carboNZero, contrary to the hotel's survey which indicated they use a particular guest toiletries supplier specifically because they certified by carboNZero. Hotel management was asked to comment further on this finding after the initial interview, but no reply was received to date.

The hotel engages in further emission reduction initiatives including the installation of low flow shower heads or taps which were difficult to verify during the observation, as they look the same as 'regular' showerheads and taps. They had indicated that they had installed toilets with half flush options, which was verified as true during the observation. Although sourcing of local produce was not indicated on the HM's survey, a percentage of locally sourced produce for the hotel restaurant comes from an onsite organic vegetable and herb garden. This lowers their 'food mile emissions', as well as providing guests with fresh, organic produce. The HM indicated in the survey that the organisation offsets their guest's emissions, however, had previously stated in the interview that the organisation was only interested in this initiative:

> INTERVIEWER: "In regards to your guest's emissions, do you have anything in place to offset their emissions and/or would that be something that you are be interested in in the future?"
> HM: "In a way, yes. I was just trying to see, what is it we can do for the guest's emissions? I don't yet see what are the areas, how can we offset their footprints?"
> INTERVIEWER: "And how to measure them? Is that something you could be interested in?"
> HM: "Oh yes"

Further environmental sustainability features are implemented at the hotel, and although these are not directly regarded as emission mitigation initiatives, they are part of the overall environmental sustainability of the hotel. A non-chemical, indoor, heated pool is provided for guest use. It is cleaned by using an Enviro-swim ES – 3 Electronic Oxidization (ORP generator/Ionization) system. The system uses copper and silver to sanitise the water, as copper is a powerful natural algaecide (used for killing and preventing the growth of algae) and silver is a powerful natural biocide (a microorganism intended to destroy any harmful organism by biological means) ('Watertech Plus', 2016). Therefore, when copper and silver are combined, introduced to water using electrolysis, and with the addition of an oxidizer, they become a potent sanitizer. Instead of using chlorine as an oxidizer (to clean the pool), this system uses an electronic oxidizing unit ('Watertech Plus', 2016). This is known as Oxidisation-Reduction Potential (ORP). This means that the water is cleaned through electrolysis, rather than by using harsh chemicals. Additionally, ultrasonics are used to further improve the water quality by removing and preventing the formation of silica (calcium) scale ('Watertech Plus', 2016). This process improves the efficiency of the pool filtration, circulation and heating equipment, as well as reducing the operating costs. Overall, the Enviro-Swim system is very low maintenance as the oxidizer plates and copper/silver electrodes are self-cleaning and the ultrasonic system is

maintenance free ('Watertech Plus', 2016). This positively benefits the environment, guest health and also lowers the organisation's financial costs.

Additionally, cleaning products by American based Ecolab are used to clean the hotel. The main cleaning product used throughout the hotel is Neutral Disinfectant Cleaner, a "multi-purpose, neutral pH, germicidal detergent" that "disinfects, cleans and deodorizes hard nonporous inanimate surfaces: floors, walls, metal surfaces, stainless steel surfaces, glazed porcelain, plastic surfaces. It can be used to clean and disinfect porous surfaces such as upholstery, drapes, carpets, bedding, shower curtains, and mattresses" ('Ecolab', 2016). Further environmental sustainability initiatives include the hotel being built on a North-South orientation to maximise the sun's energy in the Southern Hemisphere, and the gardens are planted with New Zealand native trees and plants. The building was initially outfitted with green technologies such as a 25,000 litre tank for harvesting rain water, which is used for non-human consumption activities (toilet flushing). The most recent initiative is the installation of electric car charge stations in the hotel's car park. Further future targets set for the hotel include a feasibility study for the installation of solar panels, a gas and waste audit, installation of a heat exchanger for the domestic hotel water supply and an organic waste treatment system. This section of the case study has revealed that the Sudima Hotel Auckland Airport undertakes many emission mitigation and environmental sustainability initiatives to maintain their carboNZero status, whilst maintaining a high level of service and comfort to their guests.

5.3. Corporate motivations for creating a carbon neutral organisation

The initial motivation for designing, building and operating a carbon neutral hotel was due to the founding family being "very much into environmental, social concerns", and were interested in creating a "green carbon zero hotel", according to the HM. This indicates that they were driven by 'ecological responsiveness' as a corporate motivator. The Project Executive, a member of the founding family, was a driving force behind creating the hotel this way. As the hotel was designed from the blueprint stage to be a carbon neutral entity, it gave the organisation an excellent opportunity to initiate carbon neutrality. It is of note that planning and constructing a new building is something that both the HM and the Project Manager strongly recommended for any accommodation organisation interested in becoming certified carboNZero. Reflecting on the creation of the hotel, the Project Executive recalled that as the initial investment was already made in the building, it was a natural step to see what else they could do to reduce their impact on the environment. It was important to note that because it was planned for the hotel to be environmentally cutting-edge right from the start, it gave them a unique opportunity to design a futuristic building with its environmental impact in mind (Leslie, 2015). The hotel owners were further motivated to become the first certified carbon neutral accommodation provider in New Zealand, hoping to attract clientele who were interested in lowering their own carbon footprints. The hotel owners believed that it was a unique selling point, "going carboNZero ensured that our carbon footprint was neutralised, thereby giving us something concrete to relate to our guests." (Leslie, 2015). Supporting New Zealand tourism's 100% Pure campaign was another motivation

behind their decision to undertake the ground breaking project, "it seems to us that the combination of New Zealand's 100% pure tourism marketing campaign and high international visitor numbers means that our hotels should be walking the talk, and we are happy to be the first to demonstrate that carbon neutrality is possible in our industry" (Plaza, 2014). Further research on the historical and current operational motivators and barriers of this hotel would be an area of interest to a variety of industry stakeholders and academics.

5.3.1. Motivations to implement specific emission mitigation initiatives

The hotel management reported whether it considered 'financial savings' ('competitiveness') or 'emission reductions' ('ecological responsibility') as motivations to undertake each of the Big Five initiatives. Regarding the motivations for recycling, the HM indicated that two out of three motivations considered important were driven by 'ecological responsibility', however only one was specifically to lower carbon emissions. 'Competitiveness' was reported once as an important motivation to recycle, but reported twice as not important. This indicates that 'ecological responsibility' rather than 'competitiveness' are the motivations for recycling at the hotel. Although the installation of energy efficient lighting was noted by the HM to "…really cut operational costs", it appeared that the hotel management's motivations for installing this initiative were equally 'competitiveness' and 'ecological responsibility' motivated. The motivations for selecting high Energy Star rated appliances for the hotel were to lower energy costs ('competitiveness'), but also to lower carbon emissions ('ecological responsibility'). However, the lower cost to purchase was also reported as important ('competitiveness'). This suggests that 'competitiveness' motivations were the main drivers behind this initiative for the hotel. Motivations for implementing an organisation wide Switch Off policy were reported by the hotel to be both 'competitiveness' and 'ecological responsibility'. The Hotel Manager indicated that the hotel provides a towel reuse option in its guest rooms, and again, this initiative appeared to be equally motivated by 'competitiveness' and 'ecological responsibility'. Overall results from the survey undertaken by the HM indicate that the mitigation of emissions ('ecological responsibility') is the most important motivation for implementing these Big Five initiatives (100%), whereas the motivation to lower costs ('competitiveness') was reported as important less (77.77%).

5.4. Summary of the case study

This chapter addresses the fifth research objective - to provide a holistic investigation of emission mitigation initiatives, environmental certification and corporate motivations at New Zealand's only carbon neutral hotel. First, the hotel's history and carboNZero accreditation process were presented. The actual amounts and sources of emissions generated by the hotel were revealed, and year on year progress was highlighted showing that the hotel's emissions have decreased over all. Following that, the hotel's emission mitigation initiatives were reported, highlighting how the hotel manages the Big Five mitigation initiatives. These were followed by additional mitigation initiatives that the hotel undertakes specifically to lower their carbon emissions including a state of the art air conditioning system and removal of refrigerators from the guest rooms. Further environmental sustainability measures at the hotel were then presented. Guest perceptions of

these two initiatives were investigated through online reviews of the hotel and were presented concurrently throughout the chapter. Motivations for deciding to create a carbon neutral hotel were discussed and it appeared that the original motivations for the hotel were 'ecologically responsive' ones. However, motivations for the implementation of the Big Five initiatives were then reported. Results showed that the motivations were financially driven ('competitiveness') but this area requires further investigation to form comprehensive conclusions about the corporate motivations of management at the hotel. Finally, although this hotel organisation implements numerous emission mitigation actions, they are still actively seeking ways to further reduce their carbon emissions and state that their main reason for doing so is the "help lower global carbon emissions". The information presented in this chapter reporting on emission mitigation and environmental sustainability at the Sudima Hotel Auckland Airport are discussed in the following chapter, along with the results from Phase One of the study.

6. DISCUSSION: PHASE ONE AND TWO

This chapter presents a discussion of the study as a whole. The discussion is set out objective by objective, and provides insights into emission mitigation initiatives and motivations by the New Zealand accommodation industry. Further implications of the study are highlighted within each objective, and each objective is concluded with a brief summary. The chapter concludes with an overall summary of the discussions and implications presented in the chapter, and introduces the following chapter.

6.1. Objective One: To identify emission mitigation initiatives being implemented by the New Zealand accommodation industry

The first objective of this study was to identify emission mitigation initiatives implemented in the New Zealand accommodation industry. The Big Five, and the additional initiatives, were analysed to determine which, if any, were being undertaken. In addition, each separate category of accommodation was examined to identify if any were implementing more, or less, initiatives compared to other categories throughout the New Zealand accommodation industry, and are discussed in relation to each other in this section.

6.1.1. Recycling

Previous research on recycling as a waste management initiative suggested this particular action is standard in the accommodation industry (Bruns-Smith *et al*., 2015; Rahman *et al*., 2012; Singh *et al*., 2014). This was confirmed by the current study as recycling was found to have the highest implementation out of all the mitigation initiatives in the study. Regarding specific materials that are commonly recycled, Singh *et al*., (2014) reported that there was considerable potential for financial savings by segregating bottles, cans, newspapers and cardboard. Although the current study did not investigate the extent to which recycled items were separated for recycling, findings showed that glass, paper and cardboard, and plastics were recycled more than aluminium and organics/compostables. As organic/compostable materials were reported to be the least recycled, perhaps due their wet composition which presents more recycling challenges than dry items (Singh *et al*., 2014). As organic waste from hotels is known as "one of the major contributors of organic/wet waste in landfills, which is the main cause of GHG emissions" (Singh *et al*., 2014), this finding presents a significant opportunity for the accommodation industry to find onsite recycling solutions for organic waste such as a Big Hanna Composter (Big Hanna, 2016), both to save money on waste disposal and to mitigate GHG emissions. One study into the barriers to undertaking environmental practices had found that the cost of implementing environmental management was the main reason given not to do so (Ervin *et al*., 2013). However, of the very few respondents who indicated that their establishment did not recycle, the most commonly reported reason was that there was 'no local government funded collection service'. As the location of each respondent was unknown, these accommodation establishments may be located in rural areas where such a collection service is not practical or financially viable. This finding may influence local, and central government policy makers, to expand recycling collection to all areas of the country, considering how important recycling waste is for environmental sustainability in

terms of decreasing landfill and mitigating emissions. It is unsurprising that this initiative received the highest response rates given recycling's relative ease of implementation and its place as a mainstream behavioural norm in New Zealand. Not only is it a well-known and highly adapted initiative in New Zealand generally, legislation such as the Waste Minimisation Act (2008) "encourages a reduction in the amount of waste we generate and dispose of in New Zealand". These results show that the accommodation industry is implementing recycling extensively, and mitigating emissions in the process. However, although almost all accommodation industry properties recycle, further waste education for both accommodation management and guests would be beneficial so that this initiative continues and grows. Overall, the high response to this initiative shows that the amount of unnecessary landfill being created by the accommodation industry is limited, and because of this, emissions are being mitigated.

6.1.2. Energy efficient lighting installation

Rahman, Reynolds, & Svaren's (2012) US based research reported that 77 per cent of all responding hotels had implemented energy saving lighting, which are in line with the results of this study as it was found that the installation of energy efficient lighting was even more widespread throughout the New Zealand accommodation industry, placing this initiative second only to recycling. It was thought noteworthy that this initiative was reported to be implemented by all respondents in five different accommodation categories, but that these five categories were from opposite ends of the accommodation 'cluster scale' in terms of product offering and service. Three were from the luxury end (hotel, boutique hotel, resort) and two from the budget end (hostel, backpackers). This implies that this initiative is not only beneficial, but also accessible, to all types of accommodation, and is an initiative that can be easily and cost effectively implemented. Even though this initiative is regarded as a relatively easy and cost effective one to implement, the survey revealed that holiday homes, home stays and farmstays reported low implementation of energy efficient lighting. Although these three categories are normally based in private houses, explanation to why this type of light bulb was not such an important consideration for these types of properties in particular was not addressed in the survey. It could be due to a higher purchase cost per item, making the bulbs prohibitively expensive for smaller, family operated establishments, although this cost is decreasing rapidly over time. Another reason for this lack of implementation in these particular accommodation establishments, could be that the actual hue of the light provided by the energy efficient lighting was offputting, as older energy efficient lightbulbs were bright and harsh, perhaps not suitable for the ambience of a private home environment. However, this lack of ambient light can now be alleviated through the use of a 'warm white' energy efficient bulb that produces a softer light tone ('Integral LED', 2016). Therefore, despite de Grosbois and Fennell's (2011) warning that the extent to which the energy saving lighting had been installed throughout an establishment was difficult to assess, the results from the study suggest that because of the large extent to which this initiative is implemented across all categories of accommodation in New Zealand, it is also lowering its carbon emissions by using less energy. By implementing this initiative, accommodation establishments are also able to lower their waste production, due to the increased lifespan of the energy efficient bulbs compared to

incandescent ones, which also lowers emissions due to less landfill creation. This not only reduces waste production, but also creates financial savings through purchasing lower volumes of lightbulbs. Future improvements in the technology and design of the bulbs, coupled with decreasing cost per item and changes in legislation regarding lowering carbon emissions, should encourage accommodation management to replace all energy inefficient bulbs with energy saving ones.

6.1.3. Energy Star appliance purchasing

Previous research in this area by Bohdanowicz (2006), showed that only 58.2% of Swedish hotels, and 41.9% of Polish hotels implemented energy efficient equipment. Bohdanowicz' (2006) research focused solely on hotels, so in comparison, results from this study showed hotels in New Zealand reported a much higher percentage when last purchasing energy efficient appliances. However, per category, hotels were actually ranked relatively low out of all the categories, whereas previous literature had found this initiative to be wide spread in hotels (Park *et al*., 2014). This initiative was also previously discussed in research on bed and breakfast operators in Canada who reported that they looked for energy rated appliances when making purchase decisions (van Haastert & de Grosbois, 2010). Bed and breakfast respondents in the current study ranked fourth (out of 15), which supports van Haastert and de Grosbois' (2010) finding that it is an important initiative for this category of accommodation. Endorsing Bruns-Smith *et al*'s., (2015) study findings that the implementation of energy efficient appliances (or equipment) was found to be prevalent throughout the most environmentally sustainable resorts in the US (ranking fourth out of 22 initiatives surveyed) (Bruns-Smith *et al*., 2015), resorts in New Zealand indicated they all have undertaken this initiative. It was found in this study that homestays had by far the highest response across the industry. This indicates that energy efficiency is important to smaller accommodation providers, perhaps to lower their energy costs for the property since the owners/managers reside there too.

Across the sector, this study found that a majority of New Zealand accommodation providers indicated high Energy Star ratings for appliances were considered important when making a purchase of electrical goods. Although not directly comparable to this study due to the differences in methods, research by Becken (2013) had found energy efficient equipment (also not specifically Energy Star rated), was implemented by only about 7% of respondents in the New Zealand accommodation industry, making it the fifth (out of 16) most popular initiative in that research. The current study found this initiative to be the third most popular (out of five). This indicates that there has been an increase in this initiative over the last three years perhaps due to the prevalence of Energy Star rated appliances, a lower purchase cost or as this study found, to lower energy costs. In conclusion, these results indicate that there is further opportunity in the accommodation industry in New Zealand to implement this initiative more – decreasing both emissions and energy costs. To increase uptake on this initiative, increased education on the products available by the manufacturers or Energy Star would be beneficial. Similar to energy efficient lighting, forthcoming

technological advances coupled with decreasing price points, as well as any kind of carbon legislation may prompt an increase in this initiative in the future.

6.1.4. Switch Off policy

As an energy saving measure, Becken (2013) had found that the initiative "Switch off appliances" was highly reported in research on the New Zealand accommodation industry, ranking second only to installation of energy saving lightbulbs as an energy saving measure. A similarly strong result was cited by Rahman *et al*., (2012) in their hotel research (75.30%) (p. 726), although their result was specifically regarding turning lights off, rather than a complete Switch Off policy, which is a more involved undertaking. Their hotel specific result was corroborated by this study which found hotels in New Zealand reported an almost equal uptake to Rahman *et al*'s., (2012) North American finding. However, the overall results of the current study differs from Rahman et al's., (2012) findings, as it was found that having a Switch Off policy was the least implemented initiative, with just over half of all respondents reporting it a part of their operations. Although this was the least implemented of the Big Five initiatives, it was interesting to still find that over half of the properties do have this policy in place. It is also important to note that the details of what constitutes a Switch Off policy at each accommodation establishment was not ascertained. This may therefore have created an inconsistent finding. It is also of note, that the wording of this survey question was potentially ambiguous, and Switch Off policies for guests and staff should have been addressed separately. The result of this study shows that although this initiative is of interest throughout half of the industry, overall there is a low uptake. This may be because of the service led nature of the industry. This service orientation may limit the opportunity for a Switch Off policy with guests, as they likely expect appliances and fittings to be easily usable, if not already on, for their comfort (for example, the television in a guest room on standby, or even on already when the guest arrives). Because of this initiatives low implementation, there is potential for further education for accommodation establishments on the benefits of Switching Off though industry events such as Tourism Industry *Aotearoa's* (New Zealand) trade show event, "Trenz", or similar platforms. Additionally, there is further opportunity for technological applications such as movement sensors, or computerised timers, to automate this initiative.

6.1.5. Towel reuse policy

Previous research regarding the provision of a towel reuse option for guests had suggested that the industry standard reports about 75% implementation of this initiative (Goldstein et al., 2008). This figure was similar to Bohdanowicz's 2006 report that two-thirds of both Swedish and Polish hotels indicated having a towel reuse programme in place. However, this study found that providing a towel reuse option for guests is not as prevalent in New Zealand accommodations as the industry standard (Goldstein et al., 2008), with only about 60% of establishments reporting they have this in place. Although lower than industry norm, this study's' result was much higher than Becken's (2013) result that showed the 'reuse of towels option' was implemented by only 1.9% of respondents, and ranked second to last of the 16 surveyed energy saving measures. An interesting finding in this section was that luxury lodges reported only 50% provided this towel

reuse choice. An explanation for this may be because the luxury segment of the industry provides a particularly high level of comfort and services to guests, who are accustomed to exclusive amenities and treatment (Bohdanowicz et al., 2001). This indicates that guests at luxury lodges may not be inclined to reuse a towel, or that the lodge assumes that they will not, and do not offer a towel reuse option. Also noteworthy, was the finding that some establishments in both boutique hotels and lodges (both also in the luxury segment), reported 'non applicable' in this question. No explanation for this was found, as it would be very uncommon for either of these categories to not provide a towel service. Further study to discover why these categories chose non applicable would be of value academics in this area. This question could have been improved by prompting those respondents who indicated they did not provide a towel reuse policy, or that it was 'non applicable', to answer further questions about their reasons. To access this information, a basic question such as "please indicate why you have selected 'non applicable'", with a variety of choices such as "we do not provide towels for guests", "guests bring and use their own towels", and "other (please specify)", would provide further answers.

The overall finding in the study for this initiative showed that towel reuse policies are not extensively implemented across the New Zealand accommodation industry. As this initiative saves not only water and electricity, but also reduces the use of detergents and prolongs the life of materials (Bohdanowicz, 2006), accommodation establishments in New Zealand that are interested in lowering emissions, lowering costs, and providing guests with environmental choices, would be well advised to implement this strategy. Providing education about the benefits of this initiative, both in terms of lowering costs, water use and mitigating emissions, for establishments that do not provide a towel reuse option, would increase the implementation of this initiative. The Ministry of Business, Innovation and Employment monitors trends in the commercial accommodation sector in New Zealand, and could be a driving force behind a campaign to encourage accommodation establishment management to implement this initiative.

6.1.5.1. Additional initiatives – land management

Of the 12 additional initiatives, the second most popular initiative reported was using locally sourced produce, indicated by almost 70% of respondents. Of the individual categories, farmstays reported the highest percentage of properties implementing this initiative, which is likely to be explained by the rural location, especially as New Zealand is an agricultural country with the ability to local produce throughout the country. It is also surmised that these properties grow their own produce, creating the ultimate 'local produce' source. The least responsive categories (of those who usually provide meals for their guests) were hotels, resorts, and lodges. These results may be explained by the location of the properties – hotels being more urban, and resorts and lodges being in more remote, perhaps inaccessible locations (possibly alpine or island based), where produce may not grow easily, and therefore local produce is less available. Replanting trees in New Zealand was the third most popular of the additional initiatives, with just over half of respondents indicating they did this. Farmstays, again, were the most common respondents reporting that they planted trees. This again may be explained by the rural location of these

properties, with the ability to plant trees on their own land. The high response of this category in this initiative could be due to both accessibility, and also to provide necessary shelter for their own dwellings, gardens or livestock. With only just over half of respondents indicating that they replant trees in New Zealand, this mitigation technique could easily be increased across the accommodation industry. National accommodation providers could look at engaging in partnerships with organisations such as Trees for Survival (who are currently supported by Accor Hotels), Tane's Tree Trust, or Trees for Travellers, to encourage and implement this emission mitigation activity across New Zealand. It was unclear from the survey how the establishments implemented this initiative, and this information would have been valuable to the study.

6.1.5.2. Additional initiatives – energy conservation

Further to installation of energy efficient lighting, use of Energy Star rated appliances and implementing a Switch Off policy, accommodation establishments can choose to partake in other energy saving initiatives. One such initiative is the installation of renewable energy sources such as wind turbines, solar panels, hydro power or thermal power. The study found that there was a 20% implementation rate across the New Zealand sector. This is an important finding for the industry, as previous Greek research discovered that tourists were more far more likely to choose hotels that had renewable energy sources (Tsagarakis et al., 2011, p. 1341). Tsagarakis et al., (2011) also determined that properties investing in renewable energy sources would recover their investment costs through increased customers and sales, and furthermore be able to use it as a green marketing tool. Per category, this initiative was widely reported across all categories except resorts and campgrounds. Farmstays and homestays reported the highest numbers, although boutique hotels also reported a relatively high uptake. This is a good result for the mitigation of emissions in the New Zealand industry, as the use of gas and diesel, both "major sources of carbon dioxide emissions" (p. 74), have been noted as important energy sources at hotels in previous research (Becken, 2013). Results of the current study show that there is an interest across the industry in renewable energy sources, and also a small movement away from traditionally important energy sources. This is beneficial to the environment, both in terms of local pollution reduction, and globally in terms of lowering carbon emissions. However, as only one fifth of the accommodation industry in New Zealand are showing signs of engagement with installation of renewable energy sources, further education by the renewable energy industry about the benefits of renewable energy sources, as well as decreasing prices of the technologies involved, will be required to encourage the other 80 per cent of establishments to adapt renewable energy sources.

6.1.5.3. Additional initiatives – water conservation

Accommodation establishments investigated by Bruns-Smith et al., (2015), reported that water use reduction efforts have considerable benefits, mainly in decreased costs, noting that this initiative saved a hotel US$1.50 per room, per month. Similar cost benefits are being applied to the New Zealand accommodation industry, as the most frequently reported additional initiative was installation of half flush toilets in properties. This initiative creates water conservation and

lowers energy use, therefore also curbs emissions. Results of this study show that per category, resorts, homestays, boutique hotels, luxury lodges and hostels are the top performers for this initiative. This is a mixture of different types of accommodation, showing no clear pattern. However, because this initiative is highly implemented across the industry, perhaps this indicates installation of this initiative is going to increase across all categories as bathrooms are refurbished, updated or newly built. Although Becken (2013) had previously noted that low flow shower heads were one of the initiatives that accommodation establishments thought may lower guest comfort, results of the current study show that installation of low flow shower heads and/or taps was adopted by half of the respondents. These results show that as only half of all respondents have installed low-flow shower heads and/or taps, it has the potential to become more common over time, especially as properties undertake refurbishments, or new hotels are built in the future with this initiative as standard practice.

6.1.5.4. Additional initiatives – waste management

The supply of guest toiletries in an accommodation establishment has long been associated with small plastic bottles of 'one use' products. These small containers are then discarded, creating large volumes of waste from such small items. One method of alleviating this issue is to use refillable products. The use of refillable guest toiletries was reported by 60% of respondents in the current survey. It would be very interesting to investigate exactly how the establishments achieve this – whether they have large bottles that remain in the guest bathrooms that are refilled, or whether they just refill the small bottles. Both these options are time consuming for housekeeping/employees refilling the bottles, and it would be interesting to investigate the practical application of this particular initiative further. It would also be interesting to see what guests thought, as hygiene is a sensitive issue with personal care products. Recyclable materials in the staff offices was reported as the sixth most popular emission mitigation initiative. Because recycled materials are usually still more expensive than non-recycled, it was interesting to find that this particular initiative was implemented widely across the industry. Per category, all categories reported they used recycled items in their staff offices. Bed and breakfasts reported the least uptake of this initiative. This result may be because many bed and breakfasts are located in a private home, and do not necessarily have an office at the property. Overall, this result shows that environmental sustainability is part of everyday activities in all categories of accommodation in New Zealand, even if just a small part such as using recycled paper.

6.1.5.5. Additional initiatives – specific emission mitigation

Encouraging employees to carpool, or use alternative transport to their cars, to come to work was reported very poorly across the industry as a whole. This is definitely something that could be improved upon with minimal effort by the organisation to arrange carpooling, incentives for using clean transport (bicycle/walking), subsidies for public transport, or providing group transport. This would not only mitigate emissions, but also provide a solution to congestion in the cities, and parking problems at the accommodation sites. The two least popular initiatives in the survey were offsetting guest emissions and offsetting through international financial sponsorship. Homestays

reported they undertook the highest amount of offsetting guest emissions. This is an interesting category to report this, as homestays are privately owned accommodation establishments that do not have large numbers of rooms, or guests, and therefore do not emit relatively large amounts of emissions. Offsetting (internationally), was reported by less than five per cent of the respondents. However, of all the categories, only five did not undertake any offsetting at all. For both of these initiatives, the accommodation industry has an opportunity to engage with organisations that are replanting trees, or performing other offsetting actions, both in New Zealand and internationally. By forming such a partnership, accommodation providers would be able to offer emission mitigation as a guest incentive, as well as offsetting some of their own operational emissions.

To summarise Objective One, this study showed that carbon emission mitigation initiatives were implemented throughout the accommodation industry in New Zealand. However, the extent to which the initiatives were undertaken varied both by different categories, and for each initiative. Generalised across the industry, recycling had the highest positive response, and energy efficient lighting installation reported to be the second most implemented initiative. Purchasing of Energy Star rated appliances ranking third, and towel reuse policies were reported to be applied by only two thirds of respondents, ranking this initiative fourth. Ranked fifth was having a Switch Off policy at the establishment, with only just over half of respondents noting there was one.

6.2. Objective Two: To identify if luxury properties implement more emission mitigation initiatives than mid-range or budget establishments

The respondents in this study came from all categories in the New Zealand accommodation industry. These categories were aggregated into clusters as discussed in Chapter Three. After cross-tabulations had been performed on the different mitigation initiative variables, the clusters were then ranked first, second or third, according to their results, with first place indicating more initiatives had been implemented.

6.2.1. Budget cluster

It was only the budget cluster that reported a 100% recycling rate, ranking them first in this initiative. This is likely because recycling is known as a 'low hanging fruit' initiative, meaning that it is one of the easiest to implement. This initiative is also known to have a short payback on any financial outlay, making it attractive to any establishment wanting to lower costs and increase profit. One of the categories in this budget cluster was hostels. The Youth Hostel Association (YHA) of New Zealand has been committed to the conservation of energy, recycling, using recycled products, minimising pollution, using environmentally friendly materials and products as well as supporting the protection of wildlife (Haskell & Tunnell, 2010). However, due to the anonymous nature of this study, it is not known if any of the participants were actually part of the YHA. Further research into the mitigation initiatives of the YHA as an environmental benchmark for the hostel accommodation category, would be beneficial to industry stakeholders such as travellers and the hostel sales and marketing personnel. This budget cluster placed also placed

first in the Switch Off policy initiative, which is presumed to be to maximise energy cost savings, however, the reasons for this were not uncovered by this study. It may be the result of the properties being smaller and more personal thus encouraging a Switch Off policy to greater effect. It may also be that it is more obvious in these smaller properties when lights or appliances are left on when unattended, and therefore supports implementation of this policy. The budget cluster came in second place in the installation of energy efficient lighting initiative, also presumed to be to save money on energy costs. Trailing the other two clusters, the budget cluster came in third place in both 'purchase of high Energy Star rated appliances', and 'offering a towel reuse option'. However, as previously discussed, the result for towel reuse initiative may be because the categories in this cluster do not necessarily offer towels, impacting the outcome of this result.

6.2.2. Mid-range cluster

The mid-range cluster led in the 'important to choose high Energy Star rated appliances' initiative. This may be because the categories in this cluster include motels, apartments and holiday homes that often have multiple appliances such as microwaves, and washing machines/dryers. The use of these appliances creates an electricity bill that the owner of the property must pay. Therefore, keeping the energy costs low is probably a priority for these establishments, and installing the highest rated energy efficient appliances makes a lot of commercial sense. The mid-range cluster was second place in the towel reuse option. This was an unexpected result as the categories in this cluster usually provide towels, but do not usually cater to 'luxury' guests. It was therefore assumed that this cluster would report the highest amount of implementation for this initiative, but the luxury cluster did instead. The mid-range cluster reported the lowest recycling implantation. Despite this placement, the response was still at a very high rate, still indicating that recycling is highly implemented throughout the New Zealand accommodation industry. The mid-range cluster also reported the lowest response to installation of energy efficient lighting, however, again, the response is still relatively very high, and only five per cent less than the top place cluster. This cluster also scored lowest regarding the implementation of a Switch Off policy. Becken (2013) had previously found that bed and breakfasts and motels appeared to engage in less energy savings than the other categories. The findings of this study concurs with Becken's (2013) results, as the mid-range cluster, which includes bed and breakfasts and motels, was found to implement the least amount of emission mitigation initiatives overall.

6.2.3. Luxury cluster

According to Becken et al., (2001) hotels in New Zealand are the category that use the most energy. Gössling's (2001) case study findings endorsed Becken's (2001) result, noting huge amounts of energy required for upscale hotels (p. 140). As the luxury cluster in this study included hotels and other similar, 'upscale' establishments, it was assumed that this cluster would also emit the highest amount of emissions. Prompted by this assumption, the luxury cluster was analysed to see if it undertook more emission mitigation initiatives than the other two clusters. Results found that the luxury cluster placed first for two of the Big Five initiatives, and placed second for three, indicating that they undertook the most emission mitigation initiatives. The luxury

cluster reported the highest installation of energy efficient lighting. This finding is contrary to Becken's (2013) finding that businesses are sensitive to implementing measures that may, or are perceived to, compromise guest comfort such as energy-efficient lighting. This cluster also ranked first in the towel reuse policy initiative. This was an unexpected result for two reasons. First, due to this cluster of properties being the 'luxury' grouping, they are known for providing guests with full amenities, especially towels, and having these refreshed constantly provides guest with "hints of luxury" (Tzschentke, Kirk, & Lynch, 2008, p. 174). Secondly, as discussed previously, the budget properties may not even provide towels making this initiative moot for them, leaving the mid-range cluster assumed to perform the best on this initiative. The luxury cluster did not perform well in three initiatives (recycling, Energy Star, and Switch Off). This result may be linked to the suggestion by Baloglu & Jones (2015) that any program that might even remotely compromise guest-service standards is rejected by the luxury segment properties. Although it is difficult to see how installing Energy Star appliances would compromise guest services, this cluster only ranked second in this initiative. However, in regard to the Switch Off policy, Baloglu and Jones' (2015) suggestion may be pertinent, as luxury cluster guests likely expect lights and electrical appliances to be on in their guestrooms each time they enter. This may account for why the luxury cluster ranked second in this initiative. However, despite this suggestion, it is interesting that Baloglu & Jones (2015) also note that since their survey, they observed 'luxury' guests becoming more willing to be involved in sustainability (p. 245).

To summarise this objective, it was proposed by the researcher that because the categories in the luxury cluster were the highest users of energy, that they would also be the highest implementers of mitigation initiatives. Results of the study confirmed this, as they placed first in two of the five initiatives (energy efficient lighting and towel reuse option), and second in the remaining initiatives, thus indicating they undertook more initiatives than the other two clusters. The three initiatives that this cluster did not perform well in were suggested to be because of the perceived 'luxury' status of the accommodation, which was also suggested as a reason by Baloglu and Jones (2015). However, the cluster (budget) that contained the categories the use the least amount of energy, also placed first in two initiatives (recycling and Switch Off policy). The discussion highlights that these initiatives also were cost saving, and may be the reason that this cluster performed well on these initiatives. The mid-range cluster therefore only placed first once (Energy Star appliances). The reason for this was surmised as being because these categories of accommodation often have multiple electrical appliances, and again, cost savings are probably paramount for the owners. This meant that the mid-range cluster reported the lowest response in three of the five initiatives, relegating it to the worst performing cluster across all emission mitigation initiatives.

6.3. Objective Three: To identify if establishments with a Qualmark™ Enviro award implement more mitigation initiatives than those without

Environmental tourism certification in New Zealand is led by Qualmark™ Enviro as a nationally recognised accreditation for tourism businesses wanting to communicate their environmental stance. Baloglu and Jones (2015) reported that 63% of upscale or luxury US hotels did have some kind of environmental certification. The current study received a 14% response rate from accommodation establishments indicating a Qualmark™ Enviro award is currently held. Results from the study show that across the New Zealand accommodation industry, establishments with a Qualmark™ Enviro award implemented more mitigation initiatives than those that do not hold the certification. However, the results of the two groups were very close in three out of five of the initiatives (Table 6.1). This indicates that there is not a huge amount of difference in initiative implementation between those who have the award and those who do not in three of the mitigation initiatives identified here. This similarity in results raises questions of how the Qualmark™ Enviro award is actually beneficial to an accommodation establishment in terms of environmental sustainability and emission mitigation, and would be an area of interest for further research.

Table 6.1 *Comparison of Qualmark Enviro award holders and non-award holders survey responses*

	% of respondents who hold a Qualmark Enviro Certification	% of respondents who do not hold a Qualmark Enviro Certification
Recycling	97.5	97.5
LEDs	97.5	93
EnergyStar	78.2	78.8
Switch Off policy	74	53.9
Towel reuse option	80.8	60.9

Most surprisingly, the study discovered that holding a Qualmark™ Enviro award does not guarantee that individual properties implement all the mitigation initiatives discussed in this study. As reported in Chapter Four, not all the accommodation establishments that held a Qualmark™ Enviro award undertook all of the Big Five initiatives. Some of the award holders did not even recycle, which is one of the mainstays of the award (Figure 6.1). The study found that one Enviro Bronze certified property reported that even though they held a Qualmark™ Enviro award, they did not recycle. Recycling is known one of the major components of environmental sustainability, and a prerequisite of attaining a Qualmark™ Enviro award, at even the bronze level as displayed in Figure 6.1. Even though it was just one property out of all the respondents who said they held

a Qualmark™ Enviro, it still raises the question of how that particular property retains their environmental certification, whilst not recycling. According to the survey results, this property (an independently owned motel with 5-16 employees) stated that they did not have the human resources to sort the rubbish from the guest rooms on site. This issue relates to Tzschentke et al's., (2008) finding that a lack of infrastructure specifically prevents small environmentally accredited businesses from undertaking further environmental action. However, this lack of infrastructure would be easily solved in this case by a basic two rubbish bin system in the guest rooms alleviating this issue, and allowing the property to recycle.

Energy efficient lightbulbs are cost effective over time, reduce heat, and require less replacements. Even though this initiative is also considered an easy one to implement, results show that two properties who hold a Qualmark™ Enviro do not have these type of light bulbs installed on their properties. Although these two properties are clearly the minority, it is somewhat surprising given the availability of energy efficient lightbulbs, and ease that they can be implemented. This relatively simple initiative is illustrated in Rahman et al's., (2012) research which cites the Grand Hotel in Michigan, who switched to energy-efficient lightbulbs (along with other low cost practices), enjoyed "dramatic cost savings" (p. 723), as well as the associated mitigation of emissions. Finally, when asked if their establishment provided a towel reuse option, it was interesting to note that 14.1% (n= 11) of Qualmark™ Enviro holders did not provide a towel reuse option for their guests. Because of the method of information gathering, it is unknown why these respondents did not provide this option and an in depth study similar to Goldstein et al's., (2008) study would add to the overall picture of New Zealand accommodation practices. Although the reasons for the lack of initiative implementation by some of the respondents who hold an award is unknown, questions are raised as to how the establishments hold an award, yet do not undertake some of the minimum requirements. This lack of initiative implementation by accredited establishments leads to the possibility of 'greenwashing' by the accommodation in question. This refers to an organisation that displays environmental certification, but does not actually undertake the measures to fulfil its environmental obligations. This result also raises questions about the quality of the assessments by the accrediting body. Is the accrediting organisation providing regular and thorough checks of the establishments to ensure implementation of the required initiatives? Further research in this area would be of interest to multiple stakeholders in the accommodation industry including tourists choosing environmentally sustainable accommodation, and Qualmark Enviro and its associated entities.

To summarise this objective, this study found that accommodation establishments that hold a Qualmark™ Enviro accreditation were found to engage in more emission mitigation initiatives in two out of five factors. However, the results showed that there was not a substantial difference between certification holders and non-certification holders in the other three initiatives. This finding reflects Bruns-Smith et al., (2015) finding that, although certification is valuable, it "is not necessary for a property to demonstrate environmental responsibility" (p. 12). The discovery of this lack of significant differentiation between three of the five initiatives, is similar to Buckley's

(2012) study, that concluded an assessment of case studies focusing on eco-certification by noting "there seems to be little indication that eco-certification approaches have yielded any improvement in environmental outcomes" (p. 89). Buckley (2012) had also noted that research on tourism's eco-labelling, eco-certification and eco-award programmes remains poorly studied, and may be because of the lack of transparency around them. Therefore, the findings of this study shed more light on the subject, but further research into this area is required, starting with a closer investigation of establishments that do have eco-certification, and those who implement environmental practices without formal eco-certification. Overall, this findings from this objective provides new knowledge on the connection between holding a Qualmark Enviro accreditation and mitigation initiatives as research in this area had not ever been done before. It is surmised that Qualmark Enviro would be interested in the findings, and could use the information to inform their marketing towards the accommodation industry in New Zealand in the future.

6.4. Objective Four: To identify the motivations of the New Zealand accommodation industry for implementing mitigation initiatives

The following section discusses the motivations of the New Zealand accommodation industry in relation to their emission mitigation initiatives. Each of the Big Five mitigation initiatives are examined separately and related to previous research and Bansal and Roth's (2000) theory of ecological responsiveness model of motivation. Results of this study showed that the two most frequently reported motivations for recycling were both environmentally based, one specifically to reduce emissions, and the other for the general environmental wellbeing of the Earth. This finding places this initiative in the 'ecological responsiveness motivation' category according to Bansal and Roth's (2000) theory of ecological responsiveness. Although Singh et al., (2014) reported that "hotels should practice recycling more rigorously, not only to help the environment, but also to realise some potential monetary benefits" (p. 13), it appears that the New Zealand accommodation industry appears to be involved in recycling more to help the environment and lower emissions, than to realise monetary benefits. Responses to questions about motivations for not recycling, found that only a very small percentage of the New Zealand accommodation sector were prevented by cost, from recycling (see Appendix F "Survey respondents' reasons given for not recycling"). This implies that the industry does not suffer from cost as a barrier as suggested by Ervin et al., (2013), and a new understanding was gained about barriers to environmental engagement in New Zealand, including a lack of facilities to store recycling, a lack of local recycling facilities, a lack of local government recycling collection programmes and a lack of education about recycling.

In contrast to the motivations to recycle, this study found that motivations for the implementation of low energy lighting were much more financially driven than those for recycling with 'lowering energy costs through lower energy use' stated as the main reason for undertaking this activity. This indicates that 'competitiveness' was the main motivation. This result may indicate that respondents did not equate this initiative with the mitigation of emissions, or that financial savings

really are the most important reason to implement this initiative. Either way, the initiative is being implemented extensively across the accommodation industry of New Zealand, which is beneficial for the environment regardless of the motivations. When asked about motivations to purchase Energy Star appliances, respondents thought lowering energy costs was the most important motivation for purchasing an Energy Star rated appliance, again placing this initiative in Bansal and Roth's (2000) 'competitiveness' motivation. Bohdanowicz (2006) had previously noted that people had claimed that such efficient equipment was prohibitively expensive, and although the costs of energy efficient equipment have most likely decreased since 2006, the finding is valid in the New Zealand context. Again, the 'competitiveness' motivation can be applied to the findings that implementing a Switch Off policy were financially based, with almost all respondents noting that lowering energy costs was the most important reason for having such a policy.

Regarding implementation of a towel re-use initiative, previous research suggested that up to 40 per cent of a hotel's energy consumption is created by laundry (and catering) (Bruns-Smith et al., 2015). This figure does not separate out towels, but gives an overall impression that energy consumption used to launder towels is an energy intensive activity. Bruns-Smith et al., (2015) had also noted that because of this energy use, the towel re-use initiative has become a common occurrence in the accommodation industry. This study found the main motivation for this initiative was to lower costs through less laundering, again falling under the 'competitiveness' motivation suggested by Bansal and Roth (2000). Across all the Big Five initiatives, 'competitiveness' in terms of financial savings was identified as more of a motivation to engage in the carbon reduction initiatives, than to curb emissions specifically. This confirms research by Hall (2006) on accommodation businesses in rural New Zealand, that found that issues of climate change were not considered important when compared to other concerns, such as the costs of operating the business. However, it is mooted that with the forthcoming regulatory changes to GHG emissions through the ratification of the Paris Climate Agreement, the issues of climate change will become more important to the industry, and another study in this area after the Paris Climate Agreement comes into force in New Zealand would be worthwhile.

One of the most revealing findings of the study was regarding motivations for respondents to not to want to lower their emissions further (Question 30) (see Appendix H "Motivations for not wanting to lower carbon emissions"). Results showed that of the respondents that answered this question, only three of the 15 categories of accommodation reported that they did not want to lower emissions further due to financial barriers ("we think it is too expensive to do"). It is acknowledged that this question would have been much more robust if it had been presented on a Likert-type scale, and on its own would be a complete topic of further investigation. In conclusion, through the new knowledge created by this study, it is clear there is a strong interest in carbon mitigation by the New Zealand accommodation sector. This finding should be interesting to entities such as Tourism New Zealand as a marketing tool for 'green' travellers, and by carbon management companies such as carboNZero, that could profit from the explicit interest identified in this study. This result can also inform policy makers about the current state of the

accommodation sector in New Zealand (motivated by 'competitiveness'), when exploring ways to encourage the sector to lower its carbon emissions towards a low carbon economy (through subsides or financial incentives).

6.5. **Objective Five: To provide a holistic investigation of emission mitigation initiatives, environmental certification and corporate motivations at New Zealand's only carbon neutral certified hotel**

A holistic investigation into The Sudima Hotel Auckland Airport was undertaken. This hotel was selected purposively, being a 4.5 Qualmark™ star rated hotel that operates carbon neutrally – the only one in New Zealand that is certified by carboNZero. As this study sought to further understand carbon mitigation in the New Zealand accommodation industry, this particular case provided the opportunity to collate existing information, and create new knowledge, about operating as a carbon neutral property in New Zealand. In terms of the Big Five, it was not surprising to identify the hotel undertook them all. The hotel recycled all materials suggested in the survey except aluminium. It also had a comprehensive wet and dry waste system in place, with an onsite organic waste disposal undergoing a feasibility study. In addition, the organisation performed due diligence on their offsite waste disposal companies to ensure their own environmental sustainability procedures were in place, before engaging their services. The lighting at the hotel has been energy efficient since it was first built, and this initiative generates a cost saving for the hotel as well as lowering its overall carbon footprint. One curious finding was that although The Sudima Hotel reported in their survey that they have a towel reuse policy in place, during the observation at the hotel it was found that the policy information was in an obscure location, essentially hidden from guests. Furthermore, the information was written on a doorknob hangar (similar to a "Do not Disturb" sign), which requested guests to hang it outside the door before midnight if they required a "light service" the next day (it did not state what a "light service" entailed). This process is suggested to be a convoluted process for guests who are holidaying or on business, and have other things to focus on. When encouraging guests to reuse their towels, US research discovered that cards in the bathrooms, with normative appeals such as "the majority of guests reuse their towels", resulted in superior towel reuse action by guests (Goldstein et al., 2008). Taking that finding into account, it is suggested that this initiative at the hotel could be improved to encourage more guests to choose the "light service" option.

Although the hotel management implemented all of the Big Five initiatives to a high level, only a few of the additional initiatives were undertaken including installation of low flow shower heads and half flush toilets. However, they had also installed a low energy air conditioning system to reduce energy use and have removed mini-refrigerators from the guest rooms, which although beneficial to the environment through lowered emissions, was unpopular with guests on TripAdvisor. The emission mitigating decision by the hotel management not to have mini-refrigerators in the guest rooms was the most commonly mentioned issue in the guest reviews on TripAdvisor. Although refrigerators are available on request at the hotel, this initiative appeared to be very unpopular with guests, and one that they could consider remedying through better

marketing, or informing guests as they book or check in. The other most frequently mentioned issue on TripAdvisor was the air conditioning system. Although it is a state of the art system, which is very environmentally friendly and quieter than standard air-conditioning units, it appeared to cause many problems for guests during their stay. To alleviate these issues, the hotel may benefit from additional signage in the rooms on how best to operate the system.

Not only does the hotel management fulfil the mitigation requirements set by the ISO 14001 and carboNZero, it also implements additional initiatives that provide further environmentally sustainable responsiveness by the hotel. It was also noteworthy that the hotel did not mention their carbon neutral status on their internet home page, as a previous study had found that marketers at 'green' hotels should actively promote their green campaigns (Han, Hsu, & Chwen, 2010), however this was something that the HM was hoping to rectify in the near future. There was no explanation given other than it had not been implemented by the hotel's corporate headquarters yet. This was considered perplexing, as the hotel management had made it very clear in the interview that they were extremely supportive of 'green' behaviours, and it seems out of character that they would not use their carbon neutral status to attract 'green' travellers or conferences. Although it had been previously suggested that it is a challenge for hotel managers to successfully integrate environmental sustainability practices without compromising service (Rahman et al., 2012), this case study found the hotel management not only demonstrated excellent levels of environmentally sustainable accommodation whilst operating carbon neutrally, but also provided all the hospitality services most guests seek from a 4.5-star hotel, which contradicts earlier research that energy use and 'luxury' are inextricably linked in the accommodation sector. The hotel management's carbon mitigation practices and procedures throughout the hotel, although requiring continual improvement, are nevertheless exemplary, and the hotel should be seen as a role model for all accommodation providers in New Zealand.

6.6. Summary of discussion and implications

This study provides an understanding of the current environmental sustainability status of the New Zealand accommodation sector, particularly regarding its emission mitigation actions, and its readiness for a potential move toward a low carbon economy. Research on the New Zealand accommodation industry prior to this study had focused on energy savings but not specifically on the mitigation of carbon dioxide emissions associated with energy use. Findings revealed that some mitigation initiatives are extensively implemented across the industry, with almost all accommodation establishments implementing recycling and energy efficient lighting, whereas others such as having a towel reuse policy, were not as popular. The study showed that accommodation categories in the luxury cluster do more to mitigate their emissions than those in the other two clusters, which was a particularly important discovery, as the luxury category has traditionally produced more emissions than other types of accommodation categories. It was also found that holders of the Qualmark™ Enviro award did more to mitigate emissions than those that did not hold the award, however, surprisingly, not all individual properties undertook all the Big Five initiatives, with one property not even recycling. The main motivation for mitigating the Big

Five initiatives was reported by respondents as financially driven ('competitiveness'), except for recycling, which was environmentally motivated ('ecologically responsive'). Finally, the Sudima Hotel Auckland Airport was investigated to explore the main themes of the survey in greater detail and potentially provide a carbon neutral benchmark establishment for the New Zealand accommodation sector. Although the results showed the hotel was exemplary in its carbon mitigation initiatives and other environmental sustainability measures, there were still areas for improvement, such as the installation of renewable energy sources and capitalising on its carbon neutral status to attract 'eco' travellers.

Results of this study show that there is potential for the New Zealand accommodation sector to become a role model for environmental sustainability and emission mitigation behaviour, as the majority of respondents were interested in lowering their carbon emissions and were undertaking initiatives to do so. Many entities (both private and public) could capitalise on this trend towards a lower carbon sector, and New Zealand therefore has the potential to lead the global accommodation industry towards carbon neutrality. This would provide excellent marketing opportunities for Tourism New Zealand and the '100% Pure New Zealand' campaign, as well as other tourism and travel entities. Results of this study will also appeal to the current 'green' market of travellers and tourists. In addition, as the Paris Climate Agreement comes into force, regulations on carbon emissions by travellers could be offset by choosing New Zealand as a destination because of its low carbon/carbon neutral accommodation sector. The accommodation sector in New Zealand may be well positioned to assist in offsetting guest emissions created by their international (and domestic) flights, by implementing all of the initiatives discussed in this study. Previous research on offsetting tourist emissions in New Zealand did not consider the potential of accommodation industry it its evaluation (Smith & Rodger, 2009). Results of this study could also be used by accommodation establishments throughout the New Zealand to advertise that they are part of a growing movement towards carbon mitigation and environmental sustainability. To further encourage and support this shift, the creation of an industry guide specific to mitigating carbon footprints in the New Zealand accommodation sector would be beneficial; and this study provides a wealth of information about what the sector is already doing, and what more needs to be done to become increasingly ecologically responsive. Results of this study also have the potential to encourage other sectors to become more aware of carbon mitigation and create the opportunity for them to see how their own activities compare to others in the accommodation sector.

As part of a move towards a lower carbon sector, it would be beneficial to many tourism stakeholders to have an online "New Zealand Sustainable Accommodation Practices Guide", similar to that available in Costa Rica, as mentioned in Chapter Two. This would provide one "go to" place where information on the environmental sustainability aspects of the accommodation industry in New Zealand is available. It is considered that all of tourisms' stakeholders would benefit from such a database. This research shows that there is already a strong implementation of environmental sustainability and emission mitigation initiatives in the New Zealand

accommodation sector, and policy makers should be aware of the sector's strong position. The creators of the potential Carbon Zero Act may be interested in the sectors' current implementation levels and interest in curbing carbon emissions, and could be used as an example of what needs to be done, and how to do it, to become carbon neutral. Government support in the form of education, subsidies or incentives to move towards carbon neutrality would be readily accepted by the sector according to results of this study. Overall, the study shows that the majority of the New Zealand accommodation industry is implementing environmental sustainability initiatives that also mitigate emissions, but is implementing the initiatives for financial savings ('competitiveness') rather than for environmental ('ecological responsiveness') reasons. However, regardless of the motivations, the end result is mitigating the impacts of climate change through the lowering of emissions, so as long as they continue with their initiatives, and perhaps add others they do not currently have in place, this should be considered encouraging progress towards an environmentally sustainable, low carbon accommodation industry in New Zealand. Furthermore, results of this study may encourage accommodation owners, operators and managers to engage in further emission mitigation initiatives if they recognise that they are not implementing the initiatives that their competition or contemporaries are, or want to be seen as 'best practice' models in the industry.

This chapter presented a discussion of the five main objectives in relation to the overall aim of the study, providing explanation and considered opinions about the outcomes of each objective as well as discussing the implications of the study results. The following chapter concludes the study by providing an overview of the key findings, critical reflections on the five man objectives and methods, as well as presenting limitations and recommendations for further research in the field of accommodation and carbon emission mitigation.

7.   CONCLUSIONS

The field of tourism, accommodation and climate change is not a new area of investigation, yet research on emission mitigation initiatives throughout the accommodation industry was lacking. Therefore, the central aim of this study was to gain an understanding of the extent to which the New Zealand accommodation industry was implementing carbon emission mitigation initiatives. This final chapter presents a summary of key findings, followed by critically reflexive reflections and conclusions regarding the five main objectives and the methods used, and limitations of the study. Following that, recommendations for further research in the field of accommodation and carbon emission mitigation are suggested. The chapter is concluded with a final reflection on the study.

7.1.   Summary of key findings

To give the reader an easily accessible overview of the most pertinent research findings of the study, a summary of the key findings with critical reflections by the author is presented here (Table 7.1).

Table 7.1 *Summary of key findings*

Key finding	Critical reflections
Recycling is the most commonly implemented initiative by accommodation providers in New Zealand (97.5 %).	Almost all accommodation establishments in New Zealand recycle to some extent. Indicates emissions are being mitigated through less landfill.
Most accommodation providers have energy efficient lightbulbs installed in their properties (93.6 %).	Almost all accommodation establishments in New Zealand have installed energy savings lighting to some extent indicating that energy costs, energy use and emissions are being cut.
Purchasing high rated Energy Star appliance was important for 78.7% of respondents.	Most New Zealand accommodation establishments consider Energy Star ratings as important when purchasing new appliances, although further energy, cost and emission savings could be realised through further uptake of this initiative.
A towel reuse policy is implemented at 63% of properties	Just over half of New Zealand accommodation establishments have a towel reuse policy in place. Lower than industry standard (75%) (Goldstein et al., 2008). Potential to increase uptake of initiative.
A Switch Off policy is implemented at 56.7% of properties.	Just over half of the New Zealand accommodation establishments have a Switch Off policy at their property. Sensor/timers suggested to be more effective.
The most implemented additional emission mitigation activity is the installation of half flush toilets (86%).	Most New Zealand accommodation establishments are saving water and energy, as well as curbing emissions from this initiative.
Half of the accommodation providers engage in a tree replanting scheme.	Further research into the specifics of this result would be of interest, as it is unclear how the accommodation providers implement this initiative, or for what reasons

	(motivations). Further partnerships between the accommodation sector and tree planting schemes would be beneficial.
Only 14% of accommodation providers in New Zealand hold a Qualmark™ Enviro accreditation.	A response consistent with Qualmark's official number of award holders (20%)(Qualmark, 2016). Opportunity for Qualmark to become more involved with the accommodation industry highlighted.
The majority of accommodation providers do not hold any other type of environmental accreditation.	Further research here would be of interest, to ascertain why there is such a low uptake of this initiative. Lack of agreed standards, and too many choices are suggested as possible causes.
The most popular additional 'green' certification is GreenLeader by TripAdvisor.	A free, online based accreditation that seems to be gaining support from accommodation providers in New Zealand.
Only one accommodation provider holds a carboNZero certification and operates carbon neutrally.	The Sudima Hotel Auckland Airport provides a benchmark for other accommodation providers to use as a 'role model' for environmental sustainability and carbon mitigation initiatives.
Accommodation providers that hold a Qualmark™ Enviro Certification were more likely to have a Switch Off policy and provide a towel reuse option.	Operationalisation of these two initiatives was much higher at establishments that also had a Qualmark award, showing that Qualmark does impact the environmental sustainability of an accommodation in some areas. This result was statistically significant.
Accommodation providers that hold a Qualmark™ Enviro Certification and those who do not were equally as likely to recycle and purchase Energy Star rated appliances.	Although not statistically significant, this result shows that there was no difference between those who held the award, and those who did not, indicating that the award is does not indicate more environmental sustainability in these areas.
The luxury cluster of accommodation establishments operationalises more mitigation initiatives than the mid-range or budget clusters.	It was proposed that the luxury cluster emitted more emissions than the other clusters, however it appeared from the results that it also mitigates more than the other two clusters.
The wellbeing of the Earth was cited as the most important reason to recycle.	The only 'ecologically responsive' motivation reported by a majority of respondents, but noteworthy that it was not specifically to lower carbon emissions.
Lowering costs was the most important reason for installing energy efficient light bulbs, purchasing Energy Star Rated appliances, having a Switch Off policy, and to have a towel reuse policy in place.	Financial savings ('competitiveness') was reported as most 'important' for the other four Big Five initiatives.
Only 3.13% of respondents indicated they had calculated their carbon emissions.	A very small response considering the availability of online calculators, and carbon emission specialists like carboNZero. This result was statistically significant.
68.40% of respondents indicated they would be interested in lowering their carbon emissions.	Almost ¾ of respondents indicates an interest in future emission mitigation especially considering how many respondents indicated they had not calculated their emissions previously.
Almost half of the respondents indicated that the main reason they wanted to lower their	In line with future carbon emission mitigation policies, half of the New Zealand accommodation industry appears willing to

emissions was "to help lower global carbon emissions".	undertake the necessary initiatives to lower its carbon emissions. This result was statistically significant.
Only about a quarter of respondents indicated that their main reason for lowering carbon emissions was "to save money on energy costs", and just under another quarter indicated that the main reason was to "lower local pollution".	Interesting that although current motivations for implementing emission mitigation initiatives showed that financial savings ('competitiveness') were more important than environmental ones ('ecological responsiveness'), lowering emissions going forward appears to be driven by environmental motivations first ('ecological responsiveness'), and financial savings second ('competitiveness') (out of five). This result was statistically significant.

This summary highlights the most salient and surprising findings from the study, demonstrating the extent to which new knowledge on the subject of carbon emission mitigation in the accommodation industry has been produced.

7.2. Critical reflection of the study results

This study achieved an almost 33 per cent response rate, with a total of 566 respondents. This response rate compares very well with previous research in the area, and because of the number of respondents, is also generalisable to the New Zealand accommodation industry as a whole. The study also covered a wide variety of accommodation categories, more than had been previously studied in the New Zealand context, therefore was able to present information from a wider group of respondents than previous studies. It was also noteworthy that none of the categories of accommodation were underrepresented. The study found that recycling was prevalent throughout the industry, indicating that accommodation establishments in New Zealand are performing well in this area. This is an important result, as not only is recycling important for environmental sustainability and is "at the forefront of successfully managing the problem related to waste" (p. 13), it also creates monetary benefits for the organisation (Singh *et al.*, 2014). Most importantly for this study, this discovery confirms that the industry is lowering its emissions, as previous literature suggested that recycling can reduce the amount of GHG emissions produced (Singh *et al.*, 2014). Installation of energy efficient lighting was not implemented as extensively as recycling, but was still widely undertaken, and was ranked second out of all the initiatives. This result showed that the industry is curbing emissions through this initiative. Considering this is one of the most accessible initiatives, it is encouraging to see that it is being implemented throughout most of the industry. It is significant that cost savings were reported in the study as the main motivation to implement this initiative, indicating that further cost reductions of the lightbulbs will encourage those who have not implemented this initiative yet to do so. Although previous research in Europe by Bohdanowicz (2006) reported that energy efficient equipment was prohibitively expensive, purchase of a highly rated Energy Star appliances was reported as an important consideration by almost 80 per cent of respondents. A cost analysis on the difference between Energy Star rated and non-Energy Star rated appliances was not performed in the study,

but would have been an interesting area to research, to ascertain if cost was still considered a barrier to implementing this initiative in the New Zealand context.

Implementation of a Switch Off policy at the property, was the least reported initiative of the Big Five. This may be because of the level of guest comfort or image that a property projects, that it is not considered practical to undertake, or it has not been considered as an important initiative by management. The study would have benefitted from further probing responses by asking why they did not implement this initiative, however due to the already large volume of questions in the study, it was not deemed appropriate. Findings regarding the implementation of a towel reuse programme found that it was not as well implemented as expected. Guest comfort was suggested to be a reason for this low uptake. The expected result was that the New Zealand accommodation sector would report levels similar to the industry standard of 75 per cent (Goldstein *et al*., 2008), but the study reported only 63 per cent uptake. This result is similar to the low level of implementation found by Becken (2013) in this area. One interpretation of this finding is that the New Zealand accommodation industry does not consider this initiative important due to generally abundant water sources, and reasonable energy costs, resulting in financially viable laundry services. As the literature suggested that the Big Five emission mitigation initiatives were, easily implementable, one might argue that the results of the study are actually disappointing in terms of the extent to which each initiative was implemented (with the exception of recycling perhaps), was not 100 per cent. The question generated from this area of the study is "if these Big Five are so 'easy' to undertake – why is there not 100 per cent implementation across all categories?". This study did not focus solely on this area of emission mitigation, and because of this, it lacked the depth needed to ascertain the answer to this question, and would be an interesting area of further research. The results of the study show that many New Zealand accommodation establishments are already achieving some emission mitigation, even though the majority still indicate that the reasons are because of 'competitiveness' (financial savings) rather than 'ecologically responsiveness' (cutting emissions). Out of the five main emission mitigation initiatives explored in this study, only recycling was reported to be motivated more by environmental reasons (but not emission mitigation specifically). The survey design is acknowledged to have flaws, and the collection of data about motivations could have been improved through the use of a Likert-type scale.

This study provided new knowledge that a percentage of the New Zealand accommodation sector did not want to lower their emissions due to perceived expenses to do so. However, it has been reported that climate change mitigation can be profitable for businesses, which theoretically negates any claims that mitigation is too costly for their business. Finding a way to educate the industry on this matter would be beneficial to all tourism stakeholders in New Zealand. As the world moves towards a lower carbon economy, it is thought that a fundamental shift away from high carbon emitters will ensue (Gössling *et al*., 2005). With the ratification of the Paris Climate Agreement that will create legally binding mitigation goals, the accommodation industry should anticipate such changes that may push guests away from energy-intense accommodation

establishments. Therefore, as it is known that larger, more luxurious properties consume more energy and emit more emissions, this study sought to identify if the luxury cluster of accommodation establishments also undertook more emission mitigation initiatives than those in other clusters. As well as answering Objective Three, this finding is beneficial to the accommodation categories that make up the luxury cluster, as they will be able to market themselves well in a low carbon economy. With this transition to a low carbon economy in mind, the study illuminates the mid-range and budget accommodation categories need to adopt more environmental practices, especially those that mitigate emissions to balance their energy consumption and ensure they remain competitive in a potentially low carbon market. Perhaps these findings will motivate the management and owners of such properties to encourage and support further environmentally sustainable practices including emission mitigation.

The Qualmark™ Enviro award is an assessment based on high performing sustainable tourism practices within an organisation. It was revealed in this study, that holders of a Qualmark™ Enviro award implemented more initiatives than non-holders, however, individual properties did not necessarily undertake all emission mitigation initiatives discussed. This was a surprising discovery, as the basic tenet of the Qualmark™ Enviro award includes recycling (Figure 2.6). This finding led to questions about the possibility of greenwashing by the accommodation establishment, and also the assessment processes of the accrediting body, both of which would be fascinating topics for further research. It was also uncovered in the study that some respondents were disillusioned by the Qualmark Enviro organisation, with cost being stated as the main reason for not continuing with the certification. This is an area that may be of interest to Qualmark, and other accreditation schemes, perhaps initiating a restructure of the accreditation process allowing all accommodation providers to join more easily and economically.

The need to identify role models of environmental sustainability was an area that Gössling (2011) identified as a key challenge in carbon management. Through this case study it was revealed that the hotel under investigation was an excellent role model for environmental sustainability in the accommodation industry in New Zealand. Not only has the hotel been operating carbon neutrally since 2013, management goes above and beyond the requirements of CarbonZero certification, engaging in many initiatives such as planting the gardens with native New Zealand plants and trees, harvesting rain water to use for grey waste (such as toilets), and growing its own produce to supplement the onsite restaurant. The case study also found that hotel management considered lowering emissions ('environmental responsiveness') was more important than cost savings ('competitiveness') over all the Big Five initiatives, but also that the hotel specifically noted it had saved money in areas such as energy efficient lighting. However, the case study also revealed that the hotel does not currently capitalise on its ecological responsiveness through the marketing opportunities presented by being New Zealand's only carbon neutral accommodation, and increased exposure to eco-travellers through updating the website and advertising at trade shows would be beneficial to occupancy rates at the hotel. This case study also reported that although the Sudima Hotel Auckland Airport is decreasing its emissions year on year, there is still

opportunity to increase the number of emission mitigation initiatives, for example, to install clean, renewable energy sources, something the hotel is currently investigating. The case study highlighted that a carbon neutral accommodation can also be a full service establishment, with facilities including 24-hour room service, heated indoor swimming pool, fully equipped gym, numerous convention spaces as well as a restaurant and bar, debunking the idea that luxury equates with energy use. This case study presented an accommodation organisation that shows that carbon management – even carbon neutrality – is economically feasible for the accommodation industry in New Zealand. This hotel should therefore be considered a benchmark establishment for the New Zealand accommodation industry interested in operating in a low, or zero carbon capacity. Overall, this new knowledge of the New Zealand accommodation sector can be used in a variety of ways, and was gained from a mixed methods study, a reflection on which is presented next

7.3. Critical reflection on methods and limitations

The methods used in this study sought to provide a broad picture of the New Zealand accommodation industry's emission mitigation initiatives through a generalisable survey, and an in-depth, holistic case study. Using a mixed methods methodology employed the strengths, and diminished the weaknesses, of both methods. Although time consuming, and requiring two separate types of analysis, the use of a mixed method study provided opportunities that a single method would not offer. For example, the case study provided the opportunity to ask the hotel's management to clarify some responses to the survey, which led to a deeper understanding of the hotel's recycling procedures, benefitting the case study. However, it is acknowledged that a more structured case study approach would have been useful, as would the hotel's financial reports, environmental sustainability policy and information regarding guest and employees motivations. Regarding motivations, it is important to note that the study intended to be empirical, even practical, in nature, and a study using corporate motivational theory to investigate carbon emission mitigation would be a fruitful approach for future research.

The method of compiling the database used for the current study may have resulted in a number of email addresses being lost in the process, or inputted incorrectly, and may explain the differentiation in number of accommodation establishments on the Tourism New Zealand website and the lower number of survey emails sent out. A more thorough check of the email addresses being collected in the initial data collection phase would have been beneficial. This would ensure that all the categories, and all the emails belonging to each category are present and correct. It must also be acknowledged that there was an error on the survey system for this question that forced respondents to answer Question 16 ("Please tell me why you do not recycle"), even if they had previously indicated that they did recycle. This resulted in a large number of additional responses which were not actually useful, for example "we DO recycle", and may have been offputting to some respondents. Further pilot testing of the survey would have eliminated this issue. In the survey, regarding the respondents' positions at the establishment, the question would have been improved with supplying only a single choice option i.e. 'please select the <u>one</u> that

best describes your position at the establishment'. As it was, respondents were able to select multiple responses which made the results unclear. Furthermore, in the 'number of employees' question, the numbering should have been from 1-5 rather than 0-5. A small matter, but equally important to be accurate, although certain accommodation establishments could technically have no employees, for example, a homestay, so perhaps it was accurate to have a 'zero employees' choice. Another limitation in this section, was that the size of the property was unidentified. This was, in hindsight, potentially important, as property size affects the level of carbon emissions released due to numerous factors including increased electricity use in larger properties. This could have been covered to some extent with a question about how many guest rooms the property had. It is also noted that it was almost high season in New Zealand during the time of the survey data collection, and some potential respondents replied they did not have time to undertake the survey then. The survey may have been more successful during the quieter, shoulder seasons (April/May/September/October), although some establishments close during these periods as well. Finally, for survey characteristics, respondents in the current survey were self-selecting, and as Becken (2013) suggested, they may represent those in the industry that have an interest in environmental matters.

One major exclusion from the study was not asking respondents about their heating and air conditioning in the survey, however, the case study covered it at length. This was an important omission as heating and cooling of the air in the accommodation industry is typically the largest end use of energy (Becken, 2013). Other sections of the study should have been replaced with this topic so that the survey was not lengthened. Another issue with the survey was that when respondents were asked about their CSR marketing in Question 11, the question was slightly ambiguous, as the example given with the question was, 'do you advertise on your website that you have an environmental policy in place?'. This may have caused respondents to be uncertain of how best to respond, i.e. if their policy was an important part of their marketing, but they did not advertise it on their website, either way they responded would not have been accurate. Another limitation on this question, was that the survey did not investigate the contents of the CSR (or other) policies reported by the accommodation industry, nor did it verify their claims, and this area would be of interest for further research. However, this would have been another whole study itself, and is suggested as a good topic for future study. As previously mentioned, identifying the motivations using a two-point 'scale' did not provide the best results. By using a Likert type 5-point scale, additional statistical analysis would have been able to be performed producing more reliable and valid results. Furthermore, it is acknowledged that asking respondents to use 'important' and 'not important' were potentially very subjective in their meaning, especially as they were not defined in any way in the survey. However, it was assumed for this study, that the terms 'important' and 'not important' meant the most general definitions of 'to be of significance or value', or 'not to be of significance or value' to the respondent. Finally, in hindsight, the survey questions were too numerous and too varied in their subject matter, and it would have been much improved by limiting the questions to the main themes of the study.

7.4. Recommendations

Several recommendations for further research have arisen from this study. It is suggested that more in depth research in the area of energy efficient lighting could investigate the actual extent to which energy efficient bulbs are implemented in the accommodation industry, to gather a fuller overview of this initiative in the accommodation industry. This could be in conjunction with an energy saving lightbulb supplier or manufacturer such as Switch Lighting ('Switch Lighting', 2016), who are a New Zealand LED lighting manufacturer, to encourage implementation and provide educational services on the many benefits of this initiative. As the survey was voluntary, this may have resulted in responses that were at the 'greener end' of the industry scale. Therefore, it is suggested that a nationally known organisation, such as Statistics New Zealand or Tourism New Zealand, could replicate aspects of the study, to gain a comparison to the results of this study. It was clear that the guest's perspective was missing from the study, except partially in relation to the Sudima Hotel Auckland Airport, when guest reviews on TripAdvisor were analysed. This secondary research was not able to identify guest's motivations about their choice to stay at the Sudima Hotel Auckland Airport, and further study here either through interviews with hotel guests and/or a survey of hotel guests, would be enlightening for academic purposes, and of interest to the hotel's marketing and management teams.

As previous mentioned in Chapter Six, this study uncovered that holding a Qualmark Enviro award did not necessarily equate to the establishment undertaking the basic environmental measures required by Qualmark. Therefore, this study could be the catalyst for further research into this area, starting with a closer investigation of establishments who implement environmental practices without formal eco-certification, and why they do not have the certification, would be very interesting to the accommodation industry, academics, and the organisations who provide eco-certification. In addition, further research into the corporate motivations of why environmental certifications are held, and what benefits are realised by the accommodation establishment is suggested as area of interest. In addition, further in-depth research measuring the extent to which environmental initiatives are implemented by establishments that do have eco-certification, compared to those who do, would also shed light on some of the issues discovered by this study. As it was noted that the number of establishments that hold a Qualmark Enviro was very low, perhaps Qualmark Enviro would benefit from a campaign targeting the accommodation industry in New Zealand, providing information about the benefits of joining the group, and assessing the reasons why more accommodation establishments have not joined already.

7.5. Concluding thoughts

This pragmatic study generates useful new knowledge about the New Zealand accommodation industry regarding its current carbon emission mitigation undertakings. In the last decade, two strands of research in New Zealand on the energy use in tourist accommodation have been prevalent. The first of these was measuring energy use in accommodation businesses and identifying areas to reduce consumption, and the second dealt with drivers for implementing environmental measures such as motivations, attitudes and customer preferences. The new

knowledge from this study introduces a third strand of research that provides insight into the many aspects of actual emission mitigation initiatives being implemented in the New Zealand accommodation industry. It is concluded that the results of this study reveal that the New Zealand accommodation industry is not only willing to engage in the 'abstract concept of CO_2', but that it currently implementing substantial initiatives to mitigate its emissions, which adds new knowledge to the body of research in this area.

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9. APPENDICES

Appendix A Carbon Footprint Survey

Carbon Footprint Survey

Q1 Please select the category that best describes your accommodation establishment.

Hotel (1)

Boutique Hotel (2)

Lodge (3)

Luxury Lodge (4)

Resort (5)

Motel (6)

Apartment (7)

Backpackers (8)

Hostel (9)

Holiday Park (10)

Campground (11)

Bed & Breakfast (12)

Holiday Home (13)

Farm Stay (14)

Homestay (15)

Q2 What is your position at the establishment?

Owner (1)

Manager (2)

Sustainability Manager (3)

Non applicable (5)

Other (please specify) (4) _____

Q3 Which of the following best describes the type of establishment ownership?

International chain or group (1)

National chain or group (2)

Independently owned (3)

Other (please specify) (4) _____

Q4 Are you the person who makes decisions regarding upgrades at your accommodation establishment? For example, would you be the person to make the decision regarding installing a new, more efficient heating system?

Yes (1)

No (2)

Other (please specify) (3) _____

Q5 How many employees (or hosts) does your property have (including casual, part and full time)?

0 - 5 (1)

6 - 15 (4)

16 - 25 (5)

26 - 35 (6)

36 - 45 (7)

46 - 60 (8)

61 + (9)

Q6 Does your establishment hold a Qualmark™ star rating?

Yes (1)

No (2)

If No Is Selected, Then Skip To Does your establishment hold a Qualma...

Q7 What Qualmark™ star rating does your establishment hold?

5 (1)

4 1/2 (2)

4 (3)

3 1/2 (4)

3 (5)

2 1/2 (6)

2 (7)

1 1/2 (8)

1 (9)

Q8 Does your establishment hold a Qualmark ™ Enviro Star Rating?

Yes - Gold (1)

Yes - Silver (2)

Yes - Bronze (3)

No (4)

Pending approval from Qualmark™ Enviro (5)

Q9 Does your establishment hold any of these types of certifications or ratings?

Certified by CarboNZero (1)

Green Globe Certification (2)

Green Star New Zealand Certification (3)

ISO 14001 Certification (4)

EarthCheck (5)

CEMARS (Certified Emissions Measurement and Reduction Scheme) (6)

No (7)

Other(s) (please specify) (8) _____

Q10 Does your establishment have an Corporate Social Responsibility, environmental or sustainability policy?

Yes (1)

No (2)

If No Is Selected, Then Skip To Does your establishment recycle?

Q11 Is your policy an important part of your marketing? eg/ do you advertise on your website that you have an environmental policy in place?

Yes (1)

No (2)

Other (please specify) (3) _____

Q12 Is lowering your carbon dioxide emissions (known as your 'carbon footprint') a reason for having an environmental policy?

Yes (1)

No (2)

Q13 Does your establishment recycle?

Yes (1)

No (2)

If No Is Selected, Then Skip To Please could you tell me why you do n...

Q14 Please indicate which materials you recycle.

Paper and cardboard (1)

Glass (2)

Aluminum (3)

Organics (food and garden waste) (4)

Plastics (5)

Q15 Are the following reasons to recycle important or not important to your establishment?

	Important (1)	Not Important (2)
Saves us money on landfill fees by reducing the amount of rubbish we have (1)		
Recycling helps us cut carbon emissions (2)		

Recycling is better for the wellbeing of the Earth (3)		
Guests have requested that we recycle (4)		
Recycling saves us money on rubbish bags (5)		
Recycling saves us money on rubbish collection fees (6)		

Q16 Please could you tell me why you do not recycle? (please choose as many as apply to you)

We do not have the facilities on site to store recyclable materials (before collection or off site removal) (1)

There are no local facilities that accept recyclable items eg/ refuse station or recycling facilities at the local rubbish dump (2)

There is no council recycling collection for this establishment's location (3)

We do not have the human resources to sort recycling from rubbish from guest rooms/rubbish bins on site (4)

It is too expensive to pay for a recycling service (5)

We do not know which materials can be recycled (6)

We do not think it makes any difference, so we don't do it (7)

We have not thought about recycling (8)

None of these (9)

Other (please tell me why you do not recycle) (10) _____

Q17 Does your establishment have any energy efficient lightbulbs or LED installed?

Yes (1)

No (2)

If No Is Selected, Then Skip To The last time your establishment purc...

Q18 Please indicate if the following are important or not important reasons that you installed energy efficient or LED lightbulbs.

	Important (1)	Not Important (2)
To lower our carbon emissions through more efficient energy use (1)		
To lower our lightbulb replacement costs (2)		

To lower our energy costs through lower energy use (3)		
For the look of the lightbulbs (4)		
To lower heat output from the bulbs (5)		
For the brightness of the bulbs (6)		
Guests have requested them (7)		
To lower our carbon emissions through bulbs lasting longer (8)		
For the quality of the bulbs ie/ that they last longer (9)		

Q19 The last time your establishment purchased any electrical items (eg/ televisions, washing machines), was it important to you that the item had a HIGH Energy Star® rating (ie/ MORE energy efficient)?

Yes (1)

No (2)

Not applicable (3)

If No Is Selected, Then Skip To Does your establishment have a 'Switc...If Not applicable Is Selected, Then Skip To Does your establishment have a 'Switc...

Q20 Are these reasons important to you for choosing a HIGH Energy Star® (or energy efficient) item?

	Important (1)	Not Important (2)
To lower our energy costs (1)		
To lower carbon emissions by lowering energy use (2)		
For the updated technology of the item (3)		
For the look and/or size of the item (4)		

Because of the item's Energy Efficiency and Conservation Authority (ECCA) approval (5) Lower cost to purchase (6)		

Q21 Does your establishment have a Switch Off policy (eg/ guests are asked to turn the lights out when leaving their room or staff are asked to turn off appliances when not in use)?

Yes (1)

No (2)

If No Is Selected, Then Skip To Do you have an option for your guests...

Q22 How important or not important are these reasons for your establishment having a Switch Off policy?

	Important (1)	Not Important (2)
To lower our energy costs (1) To lower our carbon emissions through lowering our energy use (2) To lengthen the lifespan of the appliances (3) To reduce heat build up eg/ in the kitchen (4)		

Q23 Do you have an option for your guests to reuse their towels rather than have them laundered daily? eg/ do you have a sign in the bathrooms asking guests to choose between reusing their towel or having them refreshed.

Yes (1)

No (2)

Not applicable (3)

If No Is Selected, Then Skip To Below is a list of types of suppliers...If Not applicable Is Selected, Then Skip To Below is a list of types of suppliers...

Q24 How important or not important are these reasons for your establishment to have a towel reuse policy in place?

	Important (1)	Not Important (2)

To lower costs through less laundering (1)		
To lower carbon emissions through less laundering (less use of energy) (2)		
To lessen wear and tear on the items (3)		
Guests have requested this service (4)		
It is what our competitors are doing (5)		
To lessen staff/housekeeping time in each room (6)		

Q25 Below is a list of businesses that are certified by CarboNZero in New Zealand. Please indicate if you use any of them because they are certified with CarboNZero and are therefore operating in a carbon neutrally?

Taxis (1)

Guest toiletries (2)

Freight (3)

Wine (4)

Drinking water (5)

Advertising (6)

Web design (7)

Office equipment (8)

Couriers (9)

Composting (10)

Architects (11)

Building works (12)

Paint products (13)

Air-conditioning and ventilation systems (14)

Other (please specify) (15) _____

None of these (16)

Q26 Please indicate by ticking the box, if your establishment does or has done any of the following?

Replant trees in New Zealand (1)

Replant wetlands in New Zealand (2)

Install key card switches in guest rooms (3)

Install clean energy sources (wind turbine, solar panels, hydro or thermal) (4)

Install low flow shower heads or taps (5)

Fit toilets with half flush options (6)

Use refillable guest toiletries (7)

Source local produce (8)

Use recyclable materials in staff offices (9)

Encourage staff to carpool or use alternative transport (eg/ bicycles) to come to work (10)

Financially sponsor international forest replanting or protection (offsetting) (11)

Offset your guest's emissions (14)

Q27 Has your property ever calculated its carbon emission outputs?

Yes (4)

No (6)

Other (please specify) (5) _____

Q28 Would your establishment be interested in lowering your carbon emissions?

Yes (1)

No (2)

If No Is Selected, Then Skip To What is the main reason(s) for your e...

Q29 What is your main reason for wanting to lower your carbon emissions?

To save money on energy costs (1)

To help lower global carbon emissions (2)

Because our guests demand us to (3)

To lower local pollution (5)

Other (please specify) (4) _____

Q30 What is the main reason(s) for your establishment not wanting to lower your carbon emissions? (choose as many as apply)

We think it is too expensive to do (1)

We do not know what to do to lower our emissions (2)

We think it is too time consuming (3)

We think it is too difficult to do (4)

We think it is too hard to maintain (5)

We think we have enough carbon emission cutting actions in place already (6)

We do not think carbon emissions are a problem (7)

No one else is doing anything, so why should we? (8)

Other (please tell me why not) (9) _____

Appendix B Semi structured questions for accommodation establishment

1.   What is your position at this hotel?

2.   How long have you held this position?

3.   What began your journey towards carbon neutrality?

4.   Who was the instigator?

5.   Do you know why it was decided?

6.   Were there any initial goals for the hotel by becoming registered with CZ?

7.   What was your starting point – for example, were you already in business when you started the process, or was it from beforehand? Eg/ built the hotel from scratch intending it to be carbon neutral?

What sustainability measures did you have in place prior to becoming carbon neutral?

Were any of these measures you had in place discarded during the carbon neutral process?

8.   Who was in charge of the process – Sustainability Manager? Corporate office? Project Manager?

9.   Do you have a Sustainability Manager now?
Why not?/Yes (may I speak with them?).

10.   Who undertook the measuring of the carbon emissions initially?

11.   What actions did they have to undertake to measure your (then) current emission profile?

12.   How did they do that?

13.   How long did it take?

14.   What resources did you have to use on this process – financial and human?

15.   What actions did you have to then implement to satisfy the carboNZero accreditation?

16.   Did you implement anything MORE than they required? Eg/ Are any of the sustainability measures you have in place NOT part of the carbon neutral process?

17.   How long did the whole process take from initial idea to accreditation?

18.   How does it work after the initial accreditation? For example, how long before you have to be re accredited by CarboNZero?

19.   Have you had to make many changes after each accreditation revisit? Anything unforeseen?

20.   Have you had any issues with guests who want refrigerators in their rooms and don't care about the reasons that you do not? Any other issues because of the carbon neutral actions you have implemented? Any positive feedback?

21.   Your project Manager is quoted saying the certification by CarboNZero is "valuable proof" of your green credentials, and that "guests and potential visitors weren't

necessarily aware of [y]our advanced position…". What measures do you take to portray your status to potential guests and visitors?

22. What financial benefits have you seen from making the changes?

New guests specifically because of the accreditation?
More returning guests?
Do you have a way of measuring these?
Lower overhead costs?

23. What holistic benefits have you seen from making the changes? For example, retention of staff?

Recommendations from other sources?
Publicity?
Interest from travel agents?
Interest from 'green' affiliated groups?

24. How is the certification process going for your other properties? Hamilton, Rotorua, Christchurch and Brisbane?

25. Do you know of anyone else in the New Zealand accommodation industry who has made these same changes?

26. One of the actions you measured prior to accreditation was staff travel. How do you feel about the possibility of offsetting guests' travel emissions in the future?

27. Do you think that the hotel benefits from this accreditation or was it an unnecessary expense with no return on investment?

28. Do you have any advice for other accommodation establishments who are interested in either lowering their emissions or becoming carbon neutral like yourselves?

Appendix C Emission mitigation initiatives undertaken per category in the New Zealand accommodation industry

	Does your establishment recycle?		Does your establishment have any energy efficient lightbulbs or LED installed?		The last time your establishment purchased any electrical items (eg/ televisions, washing machines), was it important to you that the item had a HIGH EnergyStar rating (ie/ MORE energy efficient)?		Does your establishment have a 'Switch Off' policy (eg/ guests are asked to turn the lights out when leaving their room or staff are asked to turn off appliances when not in use)?		Do you have an option for your guests to reuse their towels rather than have them laundered daily? eg/ do you have a sign in the bahrooms asking guests to choose between reusing their towel or having them refreshed.	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Hotel	22	0	20	1	14	3	14	6	19	1
Boutique Hotel	14	0	14	0	12	0	6	8	8	3
Lodge	24	1	25	0	16	6	13	12	19	4
Luxury Lodge	12	0	11	1	10	2	6	6	6	6
Resort	3	0	3	0	2	0	2	1	3	0
Motel	129	5	124	10	99	25	82	47	100	25
Apartment	19	2	20	1	18	2	11	9	15	1
Backpackers	22	0	21	0	17	3	15	6	7	5
Hostel	16	0	15	0	10	1	11	3	6	3
Holiday Park	37	0	34	3	26	7	25	12	23	6
Campground	11	0	10	1	8	2	7	4	4	1
Bed & Breakfast	163	4	157	8	139	19	76	86	97	49
Holiday Home	59	2	51	8	45	8	30	28	29	13
Farm Stay	19	0	16	2	15	2	12	6	12	3
Homestay	16	0	14	2	15	0	7	9	8	5

Appendix D Cross tabulations of twelve additional emission mitigation initiatives undertaken by categories in the survey

Please select the category that best describes your accommodation establishment.		Replant trees in New Zealand	Replant wetlands in New Zealand	Install key card switches in guest rooms	Install clean energy sources (wind turbine, solar panels, hydro or)	Install low flow shower heads or taps	Fit toilets with half flush options	Use refillable guest toiletries	Source local produce	Use recyclable materials in staff offices	Encourage staff to carpool or use alternative transport (eg/ bicycles)	Financially sponsor international forest replanting or protection (offsetting)	Offset your guest's emissions	Total
Hotel	n	6	1	6	1	10	12	6	12	10	5	2	1	18
	%	33.33%	5.56%	33.33%	5.56%	55.56%	66.67%	33.33%	66.67%	55.56%	27.78%	11.11%	5.56%	100.00%
Boutique Hotel	n	6	2	2	5	11	11	8	10	4	1	0	0	12
	%	50.00%	8.33%	16.67%	41.67%	91.67%	91.67%	66.67%	83.33%	33.33%	8.33%	0.00%	0.00%	100.00%
Lodge	n	17	7	2	6	13	20	14	16	13	3	4	3	23
	%	73.91%	30.43%	8.70%	26.09%	56.52%	86.96%	60.87%	69.57%	56.52%	13.04%	17.39%	13.04%	100.00%
Luxury Lodge	n	8	2	0	4	6	11	9	10	3	0	1	1	12
	%	66.67%	16.67%	0.00%	33.33%	50.00%	91.67%	75.00%	83.33%	25.00%	0.00%	8.33%	8.33%	100.00%
Resort	n	2	1	1	0	3	3	3	2	1	2	0	0	3
	%	66.67%	33.33%	33.33%	0.00%	100.00%	100.00%	100.00%	66.67%	33.33%	66.67%	0.00%	0.00%	100.00%
Motel	n	30	3	18	9	63	106	70	66	59	13	3	1	120
	%	25.00%	2.50%	15.00%	7.50%	52.50%	88.33%	58.33%	55.00%	49.17%	10.83%	2.50%	0.83%	100.00%
Apartment	n	7	1	0	2	7	14	11	12	7	1	0	0	19
	%	36.84%	5.26%	0.00%	10.53%	36.84%	73.68%	57.89%	63.16%	36.84%	5.26%	0.00%	0.00%	100.00%
Backpackers	n	7	3	1	5	12	17	9	12	9	1	0	0	20
	%	35.00%	15.00%	5.00%	25.00%	60.00%	85.00%	45.00%	60.00%	45.00%	5.00%	0.00%	0.00%	100.00%
Hostel	n	3	0	2	2	7	11	3	6	6	3	0	1	12
	%	25.00%	0.00%	16.67%	16.67%	58.33%	91.67%	25.00%	50.00%	50.00%	25.00%	0.00%	8.33%	100.00%
Holiday Park	n	25	4	0	8	21	28	19	21	17	6	3	3	35
	%	71.43%	11.43%	0.00%	22.86%	60.00%	80.00%	54.29%	60.00%	48.57%	17.14%	8.57%	8.57%	100.00%
Campground	n	7	2	0	0	2	8	4	4	5	1	0	1	11
	%	63.64%	18.18%	0.00%	0.00%	18.18%	72.73%	36.36%	36.36%	45.45%	9.09%	0.00%	9.09%	100.00%
Bed & Breakfast	n	93	23	1	35	80	138	107	131	49	11	6	4	158
	%	58.86%	14.56%	0.63%	22.15%	50.63%	87.34%	67.72%	82.91%	31.01%	6.96%	3.80%	2.53%	100.00%
Holiday Home	n	33	14	0	15	22	43	37	39	19	2	2	2	53
	%	62.26%	26.42%	0.00%	28.30%	41.51%	81.13%	69.81%	73.58%	35.85%	3.77%	3.77%	3.77%	100.00%
Farm Stay	n	16	8	0	9	10	14	13	16	6	1	1	1	18
	%	88.89%	44.44%	0.00%	50.00%	55.56%	77.78%	72.22%	88.89%	33.33%	5.56%	5.56%	5.56%	100.00%
Homestay	n	12	4	0	7	14	14	6	12	5	1	2	2	15
	%	80.00%	26.67%	0.00%	46.67%	46.67%	93.33%	40.00%	80.00%	33.33%	6.67%	13.33%	13.33%	100.00%
Total	n	272	74	33	108	270	450	319	369	213	51	25	19	529
	%	51.42%	13.99%	6.24%	20.42%	51.04%	85.07%	60.30%	69.75%	40.26%	9.64%	4.73%	3.59%	100.00%

Appendix E Cross tabulation of accommodation clusters and the Big Five initiatives

Accommodation Category Clusters		Does your establishment recycle?		Does your establishment have an energy efficient lightbulbs or LED installed?		The last time your establishment purchased an electrical items was the high Energy Star rating importaint to you?			Does your establishment have a 'Switch Off' policy?		Do you have an option for your guests to reuse the towels rather than have them laundered daily?		
		Yes	No	Yes	No	Yes	No	Non applicable	Yes	No	Yes	No	Non applicable
Luxury	n	73	1	72	2	54	11	9	41	33	55	14	5
	%	98.6%	1.4%	97.3%	2.7%	73.0%	14.9%	12.2%	55.4%	44.6%	74.3%	18.9%	6.8%
Mid range	n	395	13	378	30	329	56	21	218	184	261	96	45
	%	96.8%	3.2%	92.6%	7.4%	81.0%	13.8%	5.2%	54.2%	45.8%	64.9%	23.9%	11.2%
Budget	n	84	0	80	4	61	13	10	58	25	40	15	28
	%	100.0%	0.0%	95.2%	4.8%	72.6%	15.5%	11.9%	69.9%	30.1%	48.2%	18.1%	33.7%
Total	n	552	14	530	36	444	80	40	317	242	356	125	78
	%	97.5%	2.5%	93.6%	6.4%	78.7%	14.2%	7.1%	56.7%	43.3%	63.7%	22.4%	14.0%

Appendix F Survey respondents' reasons given for not recycling

Please could you tell me why you do not recycle? (please choose as many as apply to you)

Category of accommodation		We do not have the facilities on site to store recyclable materials (before collection or off site removal)	There are no local facilities that accept recyclable items eg/ refuse station or recycling facilities at the local rubbish dump	There is no council recycling collection for this establishment's location	We do not have the human resources to sort recycling from rubbish from guest rooms/rubbish bins on site	It is too expensive to pay for a recycling service	We do not know which materials can be recycled	We do not think it makes any difference, so we don't do it	We have not thought about recycling	None of these	Other (please tell me why you do not recycle)	Total
Hotel	n	0	0	0	0	0	0	0	0	0	0	0
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Boutique Hotel	n	1	2	2	0	0	0	0	0	0	0	3
	%	33.33%	66.67%	66.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Lodge	n	0	1	1	0	1	0	0	0	2	1	3
	%	0.00%	33.33%	33.33%	0.00%	33.33%	0.00%	0.00%	0.00%	66.67%	33.33%	100.00%
Luxury Lodge	n	0	0	2	0	0	0	0	0	0	1	3
	%	0.00%	0.00%	66.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	33.33%	100.00%
Resort	n	0	0	0	0	0	0	0	0	0	0	0
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Motel	n	5	0	3	6	3	0	0	0	14	6	26
	%	19.23%	0.00%	11.54%	23.08%	11.54%	0.00%	0.00%	0.00%	53.85%	23.08%	100.00%
Apartment	n	0	0	0	0	0	0	1	0	0	2	3
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	33.33%	0.00%	0.00%	66.67%	100.00%
Backpackers	n	0	0	0	1	1	0	0	0	3	1	5
	%	0.00%	0.00%	0.00%	20.00%	20.00%	0.00%	0.00%	0.00%	60.00%	20.00%	100.00%
Hostel	n	0	0	0	0	0	0	0	0	2	0	2
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	100.00%
Holiday Park	n	0	0	0	0	0	0	0	0	6	0	6
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	100.00%
Campground	n	0	0	0	0	0	0	0	0	1	0	1
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	100.00%
Bed & Breakfast	n	4	0	4	0	0	1	1	1	10	5	23
	%	17.39%	0.00%	17.39%	0.00%	0.00%	4.35%	4.35%	4.35%	43.48%	21.74%	100.00%
Holiday Home	n	1	0	1	0	0	0	0	0	4	1	6
	%	16.67%	0.00%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	66.67%	16.67%	100.00%
Farm Stay	n	0	0	1	0	0	0	0	0	2	1	3
	%	0.00%	0.00%	33.33%	0.00%	0.00%	0.00%	0.00%	0.00%	66.67%	33.33%	100.00%
Homestay	n	0	0	0	0	0	0	0	0	0	2	2
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Total	**n**	**11**	**3**	**14**	**7**	**5**	**1**	**2**	**1**	**44**	**23**	**86**
	%	**12.79%**	**3.49%**	**16.28%**	**8.14%**	**5.81%**	**1.16%**	**2.33%**	**1.16%**	**51.16%**	**26.74%**	**100.00%**

Appendix G Cross tabulations of Qualmark Enviro holders and non Qualmark Enviro holders and the Big Five emission mitigation initiatives

Qualmark Enviro * Does your establishment recycle? Crosstabulation

			Does your establishment recycle?		
			Yes	No	Total
Qualmark Enviro	No	Count	475	12	487
		% within Qualmark Enviro	97.5%	2.5%	100.0%
	Yes	Count	77	2	79
		% within Qualmark Enviro	97.5%	2.5%	100.0%
Total		Count	552	14	566
		% within Qualmark Enviro	97.5%	2.5%	100.0%

Qualmark Enviro * Does your establishment have any energy efficient lightbulbs or LED installed? Crosstabulation

			Does your establishment have any energy efficient lightbulbs or LED installed?		
			Yes	No	Total
Qualmark Enviro	No	Count	453	34	487
		% within Qualmark Enviro	93.0%	7.0%	100.0%
	Yes	Count	77	2	79
		% within Qualmark Enviro	97.5%	2.5%	100.0%
Total		Count	530	36	566
		% within Qualmark Enviro	93.6%	6.4%	100.0%

Qualmark Enviro * The last time your establishment purchased any electrical items (eg/ televisions, washing machine... Crosstabulation

			The last time your establishment purchased any electrical items (eg/ televisions, washing machine...			
			Yes	No	Not applicable	Total
Qualmark Enviro	No	Count	383	69	34	486
		% within Qualmark Enviro	78.8%	14.2%	7.0%	100.0%
	Yes	Count	61	11	6	78
		% within Qualmark Enviro	78.2%	14.1%	7.7%	100.0%
Total		Count	444	80	40	564
		% within Qualmark Enviro	78.7%	14.2%	7.1%	100.0%

Qualmark Enviro * Does your establishment have a 'Switch Off' policy (eg/ guests are asked to turn the lights out w... Crosstabulation

			Does your establishment have a 'Switch Off' policy (eg/ guests are asked to turn the lights out w...		
			Yes	No	Total
Qualmark Enviro	No	Count	260	222	482
		% within Qualmark Enviro	53.9%	46.1%	100.0%
	Yes	Count	57	20	77
		% within Qualmark Enviro	74.0%	26.0%	100.0%
Total		Count	317	242	559
		% within Qualmark Enviro	56.7%	43.3%	100.0%

Qualmark Enviro * Do you have an option for your guests to reuse their towels rather than have them laundered daily... Crosstabulation

			Do you have an option for your guests to reuse their towels rather than have them laundered daily...			
			Yes	No	Not applicable	Total
Qualmark Enviro	No	Count	293	114	74	481
		% within Qualmark Enviro	60.9%	23.7%	15.4%	100.0%
	Yes	Count	63	11	4	78
		% within Qualmark Enviro	80.8%	14.1%	5.1%	100.0%
Total		Count	356	125	78	559
		% within Qualmark Enviro	63.7%	22.4%	14.0%	100.0%

Appendix H Motivations for not wanting to lower carbon emissions

What is the main reason(s) for your establishment not wanting to lower your carbon emissions?	Hotel		Boutique Hotel		Lodge		Luxury Lodge		Resort	
	n	%	n	%	n	%	n	%	n	%
We think it is too expensive to do	3	21.43%	3	27.27%	3	20.00%	6	54.55%	1	33.33%
We do not know what to do to lower our emissions	4	28.57%	1	9.09%	3	20.00%	2	18.18%	1	33.33%
We think it is too time consuming	3	21.43%	1	9.09%	2	13.33%	2	18.18%	0	0.00%
We think it is too difficult to do	2	14.29%	0	0.00%	1	6.67%	4	36.36%	0	0.00%
We think it is too hard to maintain	1	7.14%	1	9.09%	1	6.67%	3	27.27%	0	0.00%
We think we have enough carbon emission cutting actions in place already	4	28.57%	5	45.45%	3	20.00%	3	27.27%	1	33.33%
We do not think carbon emissions are a problem	0	0.00%	1	9.09%	1	6.67%	0	0.00%	0	0.00%
No one else is doing anything, so why should we?	1	7.14%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Other (please tell me why not)	3	21.43%	2	18.18%	6	40.00%	3	27.27%	0	0.00%
Total	**14**		**11**		**15**		**11**		**3**	

	Motel		Apartment		Backpackers		Hostel		Holiday Park	
	n	%	n	%	n	%	n	%	n	%
We think it is too expensive to do	36	33.96%	6	42.86%	4	23.53%	1	11.11%	5	20.00%
We do not know what to do to lower our emissions	33	31.13%	3	21.43%	4	23.53%	4	44.44%	5	20.00%
We think it is too time consuming	25	23.58%	2	14.29%	5	29.41%	2	22.22%	9	36.00%
We think it is too difficult to do	18	16.98%	3	21.43%	5	29.41%	0	0.00%	3	12.00%
We think it is too hard to maintain	17	16.04%	1	7.14%	2	11.76%	0	0.00%	3	12.00%
We think we have enough carbon emission cutting actions in place already	28	26.42%	2	14.29%	5	29.41%	1	11.11%	10	40.00%
We do not think carbon emissions are a problem	8	7.55%	1	7.14%	0	0.00%	0	0.00%	0	0.00%
No one else is doing anything, so why should we?	4	3.77%	0	0.00%	1	5.88%	0	0.00%	0	0.00%
Other (please tell me why not)	16	15.09%	2	14.29%	2	11.76%	2	22.22%	2	8.00%
Total	**106**		**14**		**17**		**9**		**25**	

	Campground		Bed & Breakfast		Holiday Home		Farm Stay		Homestay	
	n	%	n	%	n	%	n	%	n	%
We think it is too expensive to do	1	12.50%	22	17.32%	4	7.84%	1	6.25%	1	16.67%
We do not know what to do to lower our emissions	2	25.00%	30	23.62%	12	23.53%	4	25.00%	1	16.67%
We think it is too time consuming	0	0.00%	9	7.09%	4	7.84%	0	0.00%	0	0.00%
We think it is too difficult to do	0	0.00%	5	3.94%	5	9.80%	1	6.25%	0	0.00%
We think it is too hard to maintain	0	0.00%	5	3.94%	3	5.88%	1	6.25%	0	0.00%
We think we have enough carbon emission cutting actions in place already	6	75.00%	61	48.03%	19	37.25%	8	50.00%	5	83.33%
We do not think carbon emissions are a problem	1	12.50%	6	4.72%	4	7.84%	1	6.25%	0	0.00%
No one else is doing anything, so why should we?	0	0.00%	1	0.79%	1	1.96%	0	0.00%	0	0.00%
Other (please tell me why not)	1	12.50%	23	18.11%	15	29.41%	2	12.50%	6	100.00%
Total	**8**		**127**		**51**		**16**		**12**	

Appendix I Email for survey participants

Dear

My name is Amber Knowsley and I am a student at Auckland University of Technology). I am currently writing a Thesis on the mitigation of carbon dioxide emissions within the accommodation industry of New Zealand.
I hope to find out more about the actions different accommodation establishments are taking to reduce or cut their carbon dioxide emissions. I will be exploring which category of accommodation are doing the most to curb their emissions and how they are achieving the mitigation.

This survey is designed to help me understand the accommodation industry in New Zealand and if it is engaging in lowering carbon emissions as a whole, by category or at all. I would like to find out if the accommodation industry in New Zealand is setting a benchmark that other countries can follow in regards to carbon emission management, or if it is lagging behind the other international accommodation industries. This will help inform policy makers both from within and outside the tourism and accommodation industries in regard to the future of emission management in New Zealand.

Aggregated results of the survey will be available after the research is completed to inform industry operators and other tourism and hospitality researchers of what I find. You will have the option to be sent a copy that will reveal what your category of accommodation is doing relative to others.

Your answers are confidential and cannot be linked to your personal details. By taking the survey you are giving consent to be part of this research.

Participation is voluntary - to participate, simply answer the questions below. I would appreciate it if you could complete this as accurately as possible. All questions are optional but it would be very much appreciated if you could complete as many as possible. The survey will run until middle of December 2015 and take around 5 – 10 minutes to complete, depending on your answers.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Kate O'Connor, ethics@aut.ac.nz, 921 9999 ext 6038.

For further information about this research contact the researcher:

Ms Amber Knowsley
c/- Dr Tomas Pernecky
School of Hospitality and Tourism
Auckland University of Technology
New Zealand
carbonresearchnz@gmail.com
+64 27 514 4545

Participant Information Sheet

Date Information Sheet Produced:

29 March 2016

Project Title

Exploring carbon dioxide mitigation in the New Zealand accommodation industry.

An Invitation

My name is Amber Knowsley, and I am a student at AUT University's School of Hospitality and Tourism in my final year of my Masters degree. My research is interested in the accommodation industry, the environment and sustainability. I am conducting a study involving establishments in the accommodation sector of New Zealand's Tourism industry and I would like you to be part of it. If you decide to participate in this study I will ask you about your establishment's environmental policies, particularly regarding carbon emissions and any procedures you have in place to lower them.

Participation in this study is voluntary and if you decide to participate, you can withdraw at any time prior to the completion of data collection without any adverse consequences.

What is the purpose of this research?

The aim of this research is to draw attention to carbon 'footprint' reduction measures that are in place throughout New Zealand's accommodation sector. This research will help identify the current practices in regard to curbing carbon emissions within the accommodation sector in New Zealand and fill a gap in the current published literature. This research will result in me gaining my Masters qualification and be published in related journals.

How was I identified and why am I being invited to participate in this research?

You were identified because your establishment is registered with carboNZero and you are in the Auckland area. You are being invited to participate because your establishment's name was connected with the accommodation industry in New Zealand, and was found using a Google search.

What will happen in this research?

If you agree to participate we will agree on a place to meet so I can interview you. If you like, I can come to your accommodation establishment at a time that is mutually agreeable.

I will go through this information sheet with you to see if you have any questions, then ask you to sign a consent form allowing me to interview you.

I will be asking you some questions about what you do at your business in regards to curbing carbon emissions – subjects like recycling and using energy efficient equipment will be discussed.

I will make a digital recording of the interview, and take notes. You can withdraw from the study and withdraw your data up until I have finished the interviews.

What are the discomforts and risks?

You will be asked about your environmental policy and procedures, which may cause some slight discomfort to you, depending on the answers you provide. There is a small risk for me to be going to an unknown site to interview but will be negated as detailed below.

How will these discomforts and risks be alleviated?

I will be accompanied to the interview by my friend who will wait in the hotel lobby or at a nearby location while the interview is conducted, and meet me afterwards.

If you do feel uncomfortable at any point we can take a break, you can decline to answer my questions, or you can pull out of the study altogether and your recording and notes relating to your interview will be destroyed with no repercussions.

Nothing that you tell me will be published in any way that may identify you. If you wish, you can see the final report before going to publication. The organisation you work for will also not be identified unless you grant me specific permission to do so.

What are the benefits?

I hope to raise awareness of the accommodation sector's carbon footprints and what can be done to lower them. I also expect to publish my findings in academic journals that may benefit other researchers or interested parties.

How will my privacy be protected?

Your name and information that may identify you will be confidential to me, and not shared with anyone else.

What are the costs of participating in this research?

The interview will take around 30 minutes.

What opportunity do I have to consider this invitation?

You have two weeks to consider this invitation.

How do I agree to participate in this research?

Please respond to this email and let me know you are happy to be interviewed so we can arrange a time and place to suit you. I will send you a consent form to sign before we start the interview.

Will I receive feedback on the results of this research?

If you would like the results of the study, you can note this on your consent form, and I will email you the completed paper when it is finished.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the researcher, Amber Knowsley by email: carbonreserachnz@gmail.com or phone: 027 514 4545.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Kate O'Connor, ethics@aut.ac.nzπ, 921 9999 ext 6038.

Whom do I contact for further information about this research?

Researcher Contact Details:

Amber Knowsley 027 514 4545

Project Supervisor Contact Details:

Dr. Tomas Pernecky tomas.pernecky@aut.ac.nz

Dr. Jill Poulston ph. 09 921 9999 ext 8488 jill.poulston@aut.ac.nz

Approved by the Auckland University of Technology Ethics Committee on 23 February 2015 , AUTEC Reference number 15/29

Consent Form

Project title: ***Exploring Carbon Dioxide Mitigation in the New Zealand Accommodation Industry.***

Project Supervisor: **Dr. Tomas Pernecky and Dr. Jill Poulston**

Researcher: **Ms. Amber Knowsley**

- ○ I have read and understood the information provided about this research project in the Information Sheet dated 29/03/2016.
- ○ I have had an opportunity to ask questions and to have them answered.
- ○ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ○ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- ○ If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- ○ I agree to take part in this research.
- ○ I wish to receive a copy of the report from the research (please tick one): Yes○ No○

Participant's signature:..……………………………………………………

Participant's name:...……………………………………………………

Participant's Contact Details (if appropriate):

…………………………………………………………………………………..

…………………………………………………………………………………..

…………………………………………………………………………………..

…………………………………………………………………………………..

Date:

Approved by the Auckland University of Technology Ethics Committee on 23 Feburary 2015

AUTEC Reference number 15/29

Note: The Participant should retain a copy of this form.

Appendix L Ethics approval from AUTEC

AUT
UNIVERSITY
TE WĀNANGA ARONUI O TĀMAKI MAKAU RAU

**A U T E C
S E C R E T A R I A T**

23 February 2015

Tomas Pernecky
Faculty of Culture and Society

Dear Tomas

Re Ethics Application: **15/29 Exploring carbon dioxide mitigation in the New Zealand accommodation industry.**

Thank you for providing evidence as requested which satisfies the points raised

Your ethics application has been approved for three years until 23 February 2018.

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through http://www.aut.ac.nz/researchethics. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 23 February 2018;

- A brief report on the status of the project using form EA3, which is available online through http://www.aut.ac.nz/researchethics. This report is to be submitted either when the approval expires on 23 February 2018 or on completion of the project.

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this.

To enable us to provide you with efficient service, please use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at ethics@aut.ac.nz.

All the very best with your research,

Kate O'Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: Amber Knowsley ambermariek@gmail.com