Green energy initiatives in the hotel industry: factors influencing adoption decisions

by

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A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Environmental Studies
in
Geography - Tourism Policy and Planning

Waterloo, Ontario, Canada, 2013

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including

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Abstract

Adopting green energy initiatives is deemed significant in reducing the carbon footprint of the hotel industry. In general, energy-efficient and renewable energy technologies offer wide applications in the hotel industry. The adoption of these technologies improves energy performance and reduces dependence on fossil fuels. Hotel organizational commitment towards sustainability is highly inconsistent across the industry. Essentially, this industry represents a continuum of adopters; some hotels are leaders who proactively adopt innovative and state-of-the-art technologies, while others adopt only basic practices, such as reusing towels.

There exist several challenges to shifting hotel organizations toward implementing green energy measures. Sharing best practices and learned lessons is essential to convince less committed hotel organizations to take action. Along with sharing information, it is important to identify similarities and differences in decision-making on green energy measures in both committed and less committed hotels. This study explores factors affecting decision-making on green energy measures in the hotel industry. In particular, it examines the business case for these measures and identifies challenges that prevent hotel managers from taking action. The study findings suggest that similarities and differences among best practice and other hotels are related to the approaches taken in decision-making by hotel managers in the adoption of green energy measures in terms of short/long term energy planning, resource intensity and views about sustainability. The study further highlights success factors contributing to increased use of green energy measures and areas that need to be addressed in order to encourage hotel managers to adopt green energy measures.

Key words: hotels, green energy measures, adopter characteristics, organizational factors, structures and processes, success factors

Acknowledgements

First and foremost, I am thankful to my advisor, Dr. Paul Parker, for supporting this topic; which is my passion, that falls within the realm of sustainable tourism business policy and management. He has provided immense guidance and always pushed me to think unconventionally. His passion for green energy will forever remain a source of encouragement for me.

Second, I am thankful to Dr. Ian Rowlands for being on my committee. I have enjoyed discussing several areas of my thesis with him in the "Sustainable Energy Policy Research" lunch hours. Having had the opportunity to work with him in my first job as well, I have learnt a lot from him; especially, in understanding the role of academics in transforming current debates from conventional to innovative sustainable solutions and driving sustainable policy issues in industry and government, overall.

Third, I recognize the efforts of Ms. Andrea Myers from Green Key Eco Rating Program and Hotel Association of Canada, in providing me guidance in choosing the appropriate hotel case studies for the thesis.

Last but not the least, I appreciate the incredible support offered to me by my family and close friends throughout the duration of my thesis. Thesis completion is a challenging process and requires strong motivation, determination and patience. I am really grateful for the love and timely advice from my family and constant encouragement from close friends and relatives.

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1.0 Introduction

1.1 Background

Tourism, as a global economic sector, represents 5% of global Gross Domestic Product (GDP) and accounts for 8% of total employment. The international tourism sector has an industry value of US 1 trillion dollars a year (UNWTO, 2012). There are approximately four billion domestic arrivals per year and 940 million international tourist arrivals. However, the tourism sector also significantly contributes to greenhouse gas (GHG) emissions; approximately 5% of global emissions in 2005 (D. Scott, Peeters, & Gössling, 2010; United Nations World Tourism Organization [UNWTO]-United Nations Environment Programme [UNEP]-World Meteorological Organization [WMO], 2008). According to recent studies (Chiesa & Gautam, 2009; Metz, Davidson, Bosch, & Meyer, 2007), the accommodation sector alone accounts for 3.5% of global building emissions, (i.e., 284 $MtCO_2$. These large scale economic and environmental impacts set the background for increasing consumer support for green tourism in mass and alternative types of tourism (Pratt, Rivera, & Bien, 2011; UNWTO, 2012). The deployment of sustainable initiatives such as energy-efficiency and renewable energy technologies offer existing solutions to address the problems associated with rising GHG emissions. (UNWTO, 2012)

1.2 Sustainable tourism: terms and definitions

Sustainable tourism is more significant to tourism businesses in destinations where

tourism is dependent on the qualities of the natural environments such as snow conditions,

biodiversity, beaches, and landscapes etc. (Simpson, Gossling, Scott, Hall, & Gladin,

2008) Protection of both, environmental and cultural resources, is particularly important

for any tourism destination. One of the most acceptable definitions of sustainable tourism

comes from the Brundtland report definition of sustainable development applied to

tourism. "Tourism which meets the needs of tourists, the tourism industry and host

communities today without compromising the ability of future generations to meet their

own needs" (WCED, 1987, p. 43). In Canada, the overarching sustainable tourism policy

suggests that,

> Key tenets of sustainable tourism are that a sustainable tourism business fulfills
> economic, environmental and socio-cultural obligations while generating income,
> contributing to employment, maintaining cultural integrity, and preserving essential
> ecological processes and biological diversity (Tourism Industry Association of
> Canada [TIAC], Canadian Tourism Commission [CTC] and Parks Canada, 2008,
> p.1).

1.2.1 Introduction to sustainability in the hotel industry

Sustainable tourism is inclusive of the notion of greening the accommodation sector as

well. 'Green Hotels' is a term for sustainable hospitality operations based on the

underlying principles of reducing operational impacts on the environment and society. A

more resource-oriented definition of green hotels is "Green hotels are environmentally

sustainable properties whose managers are eager to institute programs that save water,

save energy and reduce solid waste while saving money to help to protect our one and only earth" ("Green Hotels Association," n.d.).

While there is no single definition of hotels that adopt sustainable measures, 'green hotels' can be used as the term to associate with programs and/or mechanisms enabling GHG emission reductions. Green hotels are often referred to as sustainable, environmentally friendly, high performance, etc. However, there is no consistency in the expectations or threshold for a 'sustainable' or 'green' hotel.

1.3 Sustainability guidelines in the hotel industry

Sustainability guidelines prove to be a strong planning instrument for the hotel industry as it comprehensively addresses the economic, environmental and socio-cultural impacts. United Nations and other 'agents of government' have developed sustainability principles and codes of conduct. Sometimes, these codes of conduct are a precursor for tougher regulation and sometimes they are supported by regulation in some countries (Bohdanowicz & Hawkins, 2011). Bohdanowicz & Hawkins (2011) note that the international nature of some of the codes of conduct is more powerful than regulation. Examples of internationals agreements include Agenda 21 (1992), The Johannesburg Declaration on Sustainable Development (2002). In Canada, the National Roundtable on the Environment and the Economy (NRTEE) and the TIAC has developed the codes of conduct for sustainable tourism. The sustainable tourism policy in Canada is adopted on a voluntary-basis and serves as a guiding instrument for sustainable planning for the tourism sector.

1.3.1 Corporate social responsibility in the hotel industry

The World Business Council for Sustainable Development had described Corporate Social Responsibility (CSR) as the business contribution to sustainable economic development. Industry Canada understands CSR as a way firms integrate social, environmental and economic concerns into their values, culture, decision making, strategy and operations in a transparent and accountable manner and thereby establish better practices within the firm, create wealth and improve society. However, there exists no universally accepted definition of CSR, as it is still an evolving concept (Industry Canada, 2012). Given the level of inconsistency in terms and definitions that appropriately communicate sustainability for the hotel industry, it is still challenging to predict the success of CSR measures in business value, and other reasons/opportunities why investments in sustainability may prove valuable in the long term.

The hotel industry engages in Corporate Social Responsibility (CSR) to promote sustainable measures adopted by hotel organizations. The underlying principles of sustainability for the hotel industry differ across organizations. Typically, 'Corporate Social Responsibility' (CSR) or 'Responsible Business' are terms that define the underlying principles by which the hotel industry practices sustainability (Bohdanowicz & Hawkins, 2011). The CSR definition is based on triple bottom-line parameters, which determine profitability from economic, social and environmental perspectives. The degree of responsibility demonstrated by the hotel industry varies, as a few companies such as chain hotels are more stringent about CSR practices than others. Essentially, these measures are adopted on voluntary basis by hotel management, and more commonly by chain hotels (Bohdanowicz & Hawkins, 2011). Voluntary initiatives provide global hotel

businesses with the means to conduct responsible business and improve performance by application of standardized responsible business practices across several jurisdictions (Bohdanowicz & Hawkins, 2011; Kanie & Haas, 2004).

It is challenging for hotel organizations to set measurable goals without strong industry benchmarks for resources such as energy, water and waste. Resource benchmarking enables optimum resource usage, developing common indicators, and setting thresholds and protocols, (Gössling & Bohdanowicz, 2009). Bohdanowicz & Hawkins (2011) summarized the sustainability principles for responsible hospitality under three important themes: Responsible stewardship of the environment, respect for people and communities, and fairness and transparency.

1.4 Opportunities to implement sustainable measures in the hotel industry
1.4.1 Increasing investments in the hotel industry

The hotel industry constitutes a significant portion of the accommodation sector. There exists around 301,400 hotel properties worldwide and over 13 million rooms (Bohdanowicz & Hawkins, 2011). According to the Hotel Association of Canada (HAC), in 2011, the Canadian hotel industry constituted of more than 8500 hotels, motels and resorts, employed 284,000 people, and generated more than $16 billion as national accommodation revenue (Pollard, 2012). According to STR/McGraw Hill Construction Dodge Pipeline Report published in 2012, Canada boasts 432,276 hotel rooms, both chain affiliated and unaffiliated. In total, 195 hotel projects adding 21,011 rooms to the existing stock are in the pipeline. The same report suggests that economic crisis in the past five years affected the hotel industry significantly. However, a 0.3% increase in 2012

investments in hotels from 2011 indicates a positive recovery of the market. From an investment standpoint, the largest investments are observed in upper midscale, upscale and economy segments representing growth of 30% in rooms. Almost 2268 rooms of unaffiliated hotels are under construction. There is clearly an opportunity to impart resources in sustainability planning in chain and independent hotels as new investments are being made in hotel properties.

Although energy-efficiency improvements in the Canadian commercial building sector show energy savings of $3 billion since 1990, this is more than offset by the increase in floor space area and use of auxiliary equipment in the past twenty years (Governement of Canada, 2011). Given the rising global trend for tourism and the growing energy intensity of most trips, future emissions from the tourism sector are expected to increase substantially, even considering current trends in technological energy-efficiency gains in transport (air and ground) and accommodation sector (Simpson et al., 2008).

1.4.2 Rising energy prices

In the past two decades, the Canadian accommodation sector has shown total percentage growth in heavy fuel oil; 444% and use of coal and propane; 95% (Government of Canada, 2012). While energy demand has increased, energy prices have also shot up in the same time frame. Natural gas prices indicate 156% total growth in 20 years, light fuel oil; 136% and heavy fuel oil; 228%. The use of electricity in the accommodation sector in Canada has grown by 40% between 1990 to 2009, and the prices of electricity itself have grown by approximately 40% (Government of Canada, 2012). Reducing energy demand is

appealing to hotel decision-makers, for energy costs range from $15/m^2 to $50/ m^2 in Canada (OEE, 2003)

1.4.3 Increasing financial risks

The Stern review (2006) warns that the economic costs of mitigation actions are smaller now than they are likely to be in the future. Hence, it is the right time for tourism stakeholders to shift their focus towards sustainable practices (Cabrini, Simpson, & Scott, 2009; Stern, 2006). According to the report published by the United Nations Environment Program Finance Initiative (UNEP FI) and World Business Council of Sustainable Development (WBCSD) in 2008, there exists a financial risk if sustainability is not implemented in the hotel industry because of its direct and cumulative impacts on biodiversity, environment and society

1.4.4 Rising consumer demand for travel

Studies by (Cabrini, Simpson, & Scott, 2009; Conrady & Buck, 2011; Scott et al., 2010; Simpson, Gossling, Scott, Hall, & Gladin, 2008) suggest that the global consumer trend forecasts highlight that travelers intend to make shorter trips for destination experience and increase preferences towards staying at luxury accommodations. These trends lead to higher energy consumption per guest night

1.5 Energy and sustainability in the hotel industry

Since the oil crisis in the 1970's, there is an understanding that dependence on fossil fuels needs to be reduced. The use of alternative energy such as renewables is crucial to the discussion of shifting energy supply to more sustainable options. The Agenda 21

introduced in 1992 recognizes the role of sustainable development from tourism and since then, there is increasing awareness about sustainability issues and how to address them. The Second International Conference on Climate Change and Tourism held in Davos in 2007 recognized the significance of using energy-efficient and renewable energy technologies in the hotel industry to reduce its carbon footprint (Cabrini, 2009)

Energy sustainability is gaining increased attention from all industries because of the significance of global climate issues and the creation of national emission reduction targets, e.g. Kyoto Protocol targets, by many countries. Key means to reduce greenhouse gas (GHG) emissions include increasing energy-efficiency and substitution to less carbon-intensive fuels. Although Canada withdrew from the Kyoto agreement and associated emission targets for 2012, the Government of Canada has associated itself with the Copenhagen Accord. With this, Canada has committed to reduce carbon emissions by 17% below 2005 levels by 2020 (Government of Canada, 2010). The agreement adopts the approach to continue the promotion of mitigation actions, to enhance cost effectiveness, and to utilize market-based opportunities (Government of Canada, 2009).

The Intergovernmental Panel on Climate Change (IPCC) proposes reducing energy consumption and increasing the share of renewable sources in the energy mix through on-site production as key mitigation measures for the building sector. The global residential and commercial building sector accounts for 7.9% of GHG emissions (direct) (IPCC, 2007). The World Travel and Tourism Council (WTTC) has also established aspirational CO_2 emission reduction targets of 25% (in absence of an international agreement) to 30%

(in presence of an international agreement) by 2020, from 2005 levels and 50% by 2035 World Travel & Tourism Council, 2009).

There is much activity in building the capacity of the tourism sector and particularly in the hotel industry, to properly achieve the GHG emission reduction targets. The UNWTO promotes energy-efficiency and renewable energy technologies in the hotel industry by investing in pilot projects such as Hotel Energy Solutions (HES) in Europe, Caribbean Hotel Energy Efficiency Action Programme (CHENACT) in the Caribbean Islands and, Program for Energy Efficiency (PEEK) in Indonesia. Hotel managers in both, developed and developing countries need to adopt sustainable measures in order to successfully achieve the desired targets of the industry.

The sustainable tourism policy in Canada is comprehensive and includes economic, environmental and socio-cultural components of sustainable tourism. This is important in the context of green energy initiatives. For example, increased deployment of green energy initiatives enables creating jobs and economic opportunities in the communities within Ontario. (Ontario's Long-Term Energy Plan, 2012).

1.5.1 The Green Energy Act

The Green Energy Act in Ontario promotes the growth of renewable energy projects and green economy. The Government of Ontario aims to foster energy conservation among all Ontarians and energy efficiency in the broader public sector in Ontario. The primary

components of the Green Energy Act in Ontario are inclusive of implementing renewable

energy Feed-in Tariff (FIT) Program and pursuing aggressive energy conservation targets.

This definition is a good starting point for discussion of what sustainable/green energy

measures have been implemented in Ontario commercial buildings, under this Act. While

the components included in the green energy definition may be different in other cases,

this study will use the green energy definition, under the Green Energy Act.

Commercial building retrofit programs available from the provincial government in

Ontario and local utility companies include saveONenergy Retrofit Program,

saveONenergy Small Business Lighting, Commercial Energy Audit Program (Enbridge)

and others such as Ministry of Energy -Incentives Programs for Business . Energy

conservation programs offered in other provinces in Canada and federally are based on a

similar green energy definition as that of Green Energy Act.

Lastly, the definition of green energy initiatives is consistent with the guidelines of the

sustainable tourism policy in Canada. For example, increased deployment of green energy

initiatives enables creating jobs and economic opportunities in the communities within

Ontario. (Ontario's Long-Term Energy Plan, 2012).

1.6 Rationale for the study

Urgent action needs to be taken by tourism stakeholders to combat increasing GHG

emissions. In the coming years, the global tourism CO_2 are projected to increase by 130%

from 2005 to 2035, as indicated by the business as usual scenario prepared for UNWTO-

UNEP-WMO (2008). The Davos report published in 2007 emphasizes that serious action

towards reducing GHG emissions from the tourism sector need to be taken in order to minimize climate change impacts on this sector.

There exist several opportunities in hotel buildings to implement sustainable practices.. A report published by the National Roundtable on the Environment and the Economy (NRTEE) in collaboration with the Sustainable Development Technology Canada (SDTC) in 2009, recognizes the role of energy-efficient technologies in the overall contribution towards reduction of CO_2, to meet targets set by the federal government. It sets the stage to understand the value proposition of energy conservation and effiency measures in the commercial building sector.The federal government estimates that ecoEnergy for Retrofit Initiative reduced GHG emissions by 4.78 million tonnes between 2008 and 2012 (Office of the Auditor General of Canada, 2012).

Generally, there are efforts taken towards improving sustainability from both tourism sector and hotel industry perspectives. Typically, the mechanisms identified in past studies to make the shift towards sustainability include energy conservation programs that help reduce energy use and provide a starting point for companies to change management practices, improve energy-efficiency to reduce CO_2, adopt renewable energy technologies to reduce dependence on fossil fuels, carbon sequestration (planting trees to act as carbon sinks), and carbon offsetting (Cabrini, 2009; Dalton, Lockington, & Baldock, 2009; Simpson et al., 2008). Hotels tend to adopt a combination of such measures when planning to lower carbon emissions.

The energy consumption of hotel buildings in the commercial building sector in Canada is significant. Accommodation buildings, which includes the hotel industry, represent high energy intensity; 1.68 GJ/m^2, following healthcare; 1.77 GJ/m^2 (Natural Resources Canada, 2011). Energy use data for commercial buildings shows that the accommodations sector accounts for the smallest share of establishments' i.e.1.6% and yet, it makes up 7% (62 966 905GJ) of energy consumption in the (C&I) sector in Canada (Natural Resources Canada, 2011). Therefore, there may exist potential opportunities to address climate change issues in the hotel industry.

The opportunity to make pro sustainability decisions in the hotel industry emerges from daily energy consumption in operations. An average full-service (with restaurant and pool) hotel of 12,000 m^2 uses 100-200 GJ of energy/per room annually. (Office of Energy Efficiency [OEE], 2003). Typical annual energy costs in the hotel industry in Canada vary from $15/m^2 to $50/m^2 (OEE, 2003). In order to promote effective decision-making in the hotel industry, it is important to thoroughly understand how energy is used in the hotel and where opportunities for change exist.

Sustainability decisions related to energy consumption in the hotel building are dependent on energy use and energy source. The typical energy use breakdown in the Canadian hotel industry according to OEE (2003), is space heating (35%), water heating (15%), lighting and other service amenities (14%), kitchen (9%) and cooling (8%). Hotel energy use also varies depending upon activity type, size and age of building. Such operational parameters affect energy usage in the building. The energy source determines the level of CO_2

emissions associated with the service. For example, the electricity generation in Ontario contributes to carbon intensity of 100g CO_2 eq/kWh; the carbon intensity levels have reduced over the last decade ("Environment Canada - Climate Change - Electricity Intensity Tables," 2012). Electricity is generated from different sources such as hydro, nuclear, coal, wind etc. in different provinces. The carbon intensity of electricity thus varies by more than a factor of 10 depending on the province being studied. It's important to determine relatively the best energy source in terms of lower GHG emissions for every province in order to make sound sustainability decisions.

Some benefits of adopting sustainable technologies in the hotel industry have been identified in the past. Hotel buildings have the ability to showcase and support the promotion of energy-efficiency and renewable energy technologies (Moiá-Pol, Karagiorgas, Coll-Mayo, Martínez-Moll, & Riba-Romeva, 2005). Hotel buildings provide a platform to demonstrate how sustainability can be seamlessly integrated in daily operations. This is beneficial for staff and consumer education and awareness and to some extent influences customers to choose environmentally friendly hotels. It allows imbibing behavioral changes in staff and consumers which results into lesser energy usage (OEE, 2003). It allows reducing GHG emissions thus supporting the national emissions target set by the Government of Canada, and in integrating 'sustainability' in design and operations of hotels in Canada, which is strongly indicated in the sustainable tourism policy (see Appendix C). It is particularly suitable for examining the role of sustainable technologies in the hotel industry in Canada. Several studies have also pointed out that almost 20-30% savings are possible through energy conservation measures.

Decision-making takes place at the managerial levels in hotels, especially daily operational decisions. It is crucial to integrate managerial perceptions about sustainable technologies in order to better understand the 'energy efficiency gap'. It is important to recognize the 'integrative' approach adopted in this study, which assesses both social and technical dimensions in studying decision-making related to sustainable energy technologies. This approach is different from the 'singular' approach conventionally followed in energy policy studies (Parker, Rowlands, & Scott, 2003).

In order to examine the energy-efficiency gap in the hotel industry, it is important to gain an understanding of why some organizations fail to adopt innovations while others succeed. The theory of diffusion of innovations is relevant in this context and enables recognition of differences between adopter characteristics. Further, it is useful to examine why differences in adoption exist among organizations, it does not particularly allow understanding of sociotechnical barriers that may limit organizational ability to innovate. It is important to include the challenges posed by operational parameters of the hotel building in order to fully understand the issues.

Past studies (Dalton et al., 2009; Graci & Dodds, 2008; Le, Hollenhorst, Harris, McLaughlin, & Shook, 2006; Sloan, Legrand, Tooman, & Fendt, 2009; Smerecnik & Andersen, 2011; Thuot, Vaugeois, & Maher, 2010; Tzschentke, Kirk, & Lynch, 2008) highlight managerial motivations and challenges about adoption of sustainable measures addressing adopter characteristics and/or sociotechnical barriers. While some studies focus

on studying a topic through a particular perspective, this study allows more flexibility in examining the topic. The topic needs further investigation to fully explore factors affecting managerial decision-making in the Canadian hospitality context.

Scholars have studied barriers to energy-efficiency in the commercial building sector from several perspectives, such as neoclassical economics (cost-benefit), institutional economics (principle-agent and transaction cost), behavioral economics, sociology and psychology in an attempt to bridge this gap (Stern, 1986; Howarth and Andersson, 1993; Jaffe and Stavins, 1994a; Howarth and Sanstad, 1995; Brown, 2001; Sorrell et al., 2004). Organizational decision-making, in the social science realm, focuses on internal (resource-based theory) and external (stakeholder theory) factors affecting decision-making. Market transformation studies particularly focus on individual or organizational decision-making factors, as proposed in the Diffusion of Innovations Theory (DIT), introduced by Rogers in 1962. Over 4000 studies have used the four tenets of this theory namely, characteristics, time, communication channels and social system (Rogers, 2003).

1.7 Goals and objectives of the research

There exist reasons, as explained above, why some organizations should proactively shift their resources towards sustainable technologies. However, it is still quite unclear how this shift towards sustainability occurs among sustainability leaders. With the increasing importance of sustainability observed in the actions of the financial markets and government, there are strong reasons for 'late adopter' companies to also take this issue seriously. Sharing best practices and lessons learned from industry-specific sustainability

leaders provides a good starting point for the promotion of energy-efficiency in the hotel industry.

The goal of this research is to examine factors affecting decision-making regarding sustainable practices, especially sustainable energy initiatives, in the hotel industry in Canada. Specifically, the objectives of this research are:

1. To review the business case for green energy initiatives for the hotel industry.

2. To assess challenges to adoption of green energy initiatives in the hotel industry.

3. To examine factors affecting decision-making among committed (best practice) and less committed hotels regarding green initiatives.

4. To elucidate the lessons learned regarding decision-making about green energy initiatives in the hotel industry.

In conclusion, there is an opportunity and need to examine what differentiates some hotel organizations from others in regards to their commitment towards sustainability, in particular, improving energy performance by the adoption of energy conservation, efficiency and renewable energy measures/technologies. These technologies will be referred to as sustainable measures/initiatives in this study. As the study aims at showcasing views of a range of accommodation providers that have implemented green energy measures,

The structure of the thesis is as follows. Chapter one introduces the topic and sets the context for research in sustainability and hotels. Chapter two explores relevant and existing literature on sustainability in the hotel industry, use of energy conservation, energy-efficiency and renewable energy technologies and diffusion of innovation theory in this context. Chapter three describes the research methods used to approach this topic. Chapter four presents the findings and results though qualitative and quantitative research methods. Chapters five and six, respectively, present the discussion and conclusions of this study.

Chapter Two

2.0 Literature Review

This chapter reviews existing literature on the topic of sustainability in the hotel industry. The chapter aims at highlighting research gaps and areas where there is need for further and in-depth research within the scope of this topic. While there exists vast literature on sustainability, this study focuses on understanding decision-making within the hotel industry alone. The chapter begins with setting the context for sustainability in the hotel industry, reviews past studies to identify drivers and barriers to adoption of sustainable initiatives, identifies operational parameters for implementation of green energy measures, and lastly reviews past studies that showcased differences between early and late adopters of green energy measures.

2.1 Need for improving sustainability in the hotel industry

The accommodation sector accounts for 21 percent of emissions from the tourism sector (Chiesa & Gautam, 2009) The contribution of the accommodation sector towards global carbon emissions is often regarded as insignificant when compared to a manufacturing unit (Bohdanowicz & Hawkins, 2011; Bohdanowicz, 2006; Graci & Dodds, 2008; Mensah, 2006). One of the reasons for this is because a hotel property on an individual basis does not have equal environmental impacts as compared to a manufacturing unit (Céspedes-Lorente, Burgos-Jiménez, & Álvarez-Gil, 2003). This also explains to some extent why regulation related to emissions control in the tourism sector is less stringent than in the manufacturing industry.

2.1.1 Green washing in the hotel industry

The hotel industry, in particular, has been accused of green washing for many years (Abraham, 2009). The proliferation of green hotels globally has raised the question whether 'green' is being used as just a marketing ploy to make false statements to attract consumers. Yet, there is evidence of hotels implementing several green measures for reasons of reducing costs and social responsibility. In this context, Abraham (2009) quotes,

> It is my personal opinion that at this point in time both statements are true. To this date many unscrupulous hoteliers are claiming that they are ''green'' by simply hanging a sign and declaring themselves to be ''green'' (Heung et al., 2006). Others claim to be ''green'' by instituting some simple practices such as changing the bedding and towels less frequently or eliminating disposable toiletry containers in guest bathrooms. Last, but not least, some of these hoteliers join commercial ''green'' marketing and central reservation associations that advertise and promote ''green'' hotels for a fee and grant membership in their associations without ever checking the credentials of the applicants, And since the laws and/or regulations of most countries and states do not have a legal or a universally accepted definition of what is a ''green hotel'' the practice of using ''green'' as a marketing ploy is still exercised in many parts of the world. (p.1)

The above statement attacks the fundamental issue of 'trustworthiness' towards the hotel industry. This issue is crucial to the discussion of the state of environmental affairs in this industry. The concerns raised within this context are associated with three important topics. First, it is relatively simple to gain green certification for a hotel; second, hotels can market themselves as green by simply adopting low cost environmental measures as opposed to implementing innovative and sustainable technologies; and third, some countries have insufficient legislative guidance on definition of a 'green hotel' and supervision of standards that must be maintained by these hotels. These reasons reinforce

the slow adoption of green energy measures, which genuinely brings carbon reduction apart from cost and marketing benefits.

In order to chart a path towards sustainability for the hotel industry, the underlying issue of 'trust' needs close attention. Although the hotel industry has endorsed sustainability in its 'mission statements', there is still less public disclosure in terms of sustainability reporting practices (Courtland, 2010; de Grosbois, 2012). Corporate Social Responsibility (CSR) reporting in the hotel industry highlights several loopholes in perceived environmental performance of the hotel company and actual performance. Hotel companies publish CSR reports that lack transparency and accountability, which is important to stakeholders who are interested in engaging in business with the organization (De Grosbois, 2012). For example, from an investor's perspective, it is crucial to understand how environmental performance was calculated and its significance in financial statements. Under the same brand, more than one type of ownership model may be in practice.

2.2 State of sustainability in the hotel industry

In the 1990's, environmental programs were introduced in the hotel industry and a cohort of hotels' companies introduced environmental programs within the same decade as it was considered a valuable competitive strategy. While sustainability was still a new idea then, it is not the case in the current environment. There exists substantial knowledge on the topic of environmental management in hotels, published through environmental reports, academic articles, travel magazines, websites and certification schemes. Best practice examples are recognized by means of environmental awards and media. There is growing

exchange of information among stakeholders through conferences, seminars, workshops and think tanks (Bohdanowicz, 2006).

From a tourism sector perspective, several efforts are being taken to address inconsistency in benchmarking industry energy performance. The International Tourism Partnership (ITP) and the World Travel & Tourism Council (WTTC) seeks to unite the efforts of hotel companies to measure carbon emissions and communicate carbon metrics using a standardized methodology based on GHG protocol standards to allow better comparison of energy performance within the industry. Sustainability reporting standards have also improved through Global Reporting Initiative (GRI) that incorporates standardized reporting framework for hotel organizations, which includes social, environmental, economic and governance dimensions. Concrete steps need to be taken towards sustainability information disclosure, which makes hotel organizations accountable for their performance (Green Hotelier, 2012).

2.3 Green energy initiatives in the hotel industry

Green energy initiatives include energy conservation and renewable energy projects. Essentially, renewable energy technologies produce energy using harvested energy from the nature (i.e. sun, wind etc. in broadest terms), and provide solutions that reduce dependence on fossil fuels (Yalcintas & Kaya, 2009). Energy conservation measures including energy-efficient technologies, on the other hand, reduce energy demand.

2.3.1 Approaches towards energy management in the hotel industry

Hotel managers may be driven to make decisions related to sustainable technologies based on an underlying sustainable strategy. For example, Bohdanowicz & Hawkins (2011) decipher two basic approaches taken towards dealing with the carbon challenge in the hotel industry. First, implementing measures to improve energy-efficiency in business as usual procedures and second, crafting a low carbon future for the business that entails adoption of renewable energy such as solar, wind, geothermal and biomass. There is a third approach, carbon offsetting, which is another way of pursuing a carbon neutral status for the business. The first approach enables adoption of more mainstream/conventional (and commercialized) sustainable technologies such as energy-efficient technologies while the second approach promotes use of more alternative technologies like renewable energy, which may be more sustainable in the long-term but have limited commercial applications in the present terms. Renewable energy and energy-efficient technologies reduce GHG emissions. The implementation of both approaches may be considered innovative. The third approach is not addressed in this research study.

2.3.2 Business case for green energy initiatives in the hotel industry

Energy conservation measures save costs. There are several studies that indicate 20% and more energy savings can be brought by integrating energy conservation and energy-efficiency measures in hotel buildings (Bohdanowicz & Hawkins, 2011; Kok, McGraw, & Quigley, 2011; OEE, 2003; Simpson et al., 2008). The following table summarizes the financial business case for the typical retrofit options available for the hotel industry.

System	Estimated Energy Savings*	Approximate Payback*
Lighting and Electrical	0.06 GJ/m^2	4 years
Motors	0.02 GJ/m^2	5 years
HVAC	0.20 GJ/m^2	6 years
Domestic Water	0.09 GJ/m^2	4 years
Controls	0.07 GJ/m^2	5 years
Building Envelope	0.03 GJ/m^2	8 years

Table 2.4 Energy savings from hotel retrofits

Adopted from (OEE, 2003)

* Figures are estimates from projects that have received energy-retrofit financial

incentives through the EII.

2.3.3 Types of green energy initiatives adopted in the hotel industry

There exists a range of sustainable initiatives from simple to complex and conventional to

innovative. For example, the adoption of simple low cost measures such as reusing linen

and towels, recycling, shutting equipment when not in use are rarely considered as

innovative practices. Mainstream sustainable technologies includes the use of energy-

efficiency measures/equipment such as dryers, elevators, dish washing machines, energy-

efficient lighting, energy management systems (EMS); building design techniques that

maximize the available daylight include: insulation and thermal mass to reduce indoor

temperature variability, orienting new buildings to gain maximum sunlight and natural

ventilation and wherever appropriate shading the building. Renewable energy

technologies such as solar thermal and solar PV are relatively more popular than other technologies that use clean and renewable sources of energy including biogas, combined heat and power systems (CHP), geothermal systems, green power, micro-hydropower, solar photovoltaic systems, solar water heating and wind energy systems (Daly, Glassmire, Langham, & Paddon, 2010).

2.3.4 Conventional and innovative green energy initiatives

The distinction between *conventional* and *innovative* technologies is important to differentiate between hotels that are more committed towards sustainability. However, there exists no universal definition of these terms that highlight the differences. Further, renewable energy or energy-efficiency technology implementation is determined by several organizational and operational factors (Diener, Parekh, & Pitera, 2008). Every hotel may have a different set of organizational and operational factors, which may determine the level of sustainability achievable. One of the ways to distinguish between sustainability measures is based on environmental certification programs (Diener et al., 2008). Each environmental certification program may follow its own framework for rating hotels.

2.4 Decision-making related to green energy initiatives in the hotel industry

Decision-making related to green energy initiatives in the hotel industry responds to the proposed mitigation actions (UNWTO-UNEP-WMO, 2008). Rational decision-making related to energy promotes the idea of optimizing resources to operate efficiently and eventually reduce carbon footprint by shifting towards renewable energy technologies.

From a hotel organizational standpoint, it's important to recognize the success of the approach (eliminate, reduce, substitute and offset) towards energy management in energy savings terms rather than simply emphasizing any one approach.

2.4.1 Role of organizational and operational factors in implementing green energy initiatives

Organizational factors affect energy usage in different types of hotels. These factors include size, ownership, Star category, number of rooms, clientele type (business/vacation), location (rural/urban), climate zone, and types of services offered to guests (Bohdanowicz & Hawkins, 2011; Sloan, Chen, & Legrand, 2009). Zografakis et al., (2011) conclude that hotels owned and operated by the same party tend to successfully implement required measures to reduce energy consumption.

Operating factors are important for consideration of different end-use applications. Operating factors fall under three main groups: facility characteristics that include facility type (urban hotels, hostel, restaurants etc.), size (No. of rooms), star category and facility area; site-specific information and impact of location on climate conditions, peak load time, level of energy consumption for space climatization and water heating, energy supply sources; facility zoning areas include guest room, public areas and the service areas (Ali et al., 2008). Other physical attributes that contribute to energy use include age of the property, hours of operation, general habits of energy users in the building and types of equipment used (Natural Resources Canada, 2011). Zografakis et al's. (2011) study in Crete hotels indicates that the extent of greenness of a building is determined by the energy building code in the year of construction of the building.

Business decision-making must be understood when reviewing energy demand and supply decisions. In that sense, hotels largely demand energy for electricity, heating and cooling, equipment and lighting. In the hotel industry in Canada, the increase in demand for air conditioning and auxiliary equipment such as computers has increased considerably implying higher energy costs (Governement of Canada, 2011). To draw a clear picture, businesses should be aware that 1°C rise in summer is more cost intensive than a 1°C drop in winter, from an energy usage standpoint (Chiotti, 2001). Better energy and cost management also means investing in a strong building system that together includes other building components such as insulation, window glazing, glass facades and green roofing. Such investment is often done in phases, depending on financial feasibility and building conditions (Kneifel, 2011). The inability to improve thermal performance of buildings could lead to increase in GHG emissions, with the increase in air conditioning.

Energy wastage occurring from energy source (production), through transmission systems to end-use are well known. For example, to light some light bulbs, natural gas is converted into electricity, transmitted to end-use and electricity is converted into light energy; only 2% is actually used energy (Canadian Council of Chief Executives, 2011). It is important to note the existing energy sources in a particular location.

Structural and operational parameters that indicate average energy consumption in hotels vary by floor area (energy intensity) and per guest night, respectively. Energy intensity varies across nations, depending on several factors such as type of building (activity),

geographic location and size of the building. Studies indicate that on an average, US lodging buildings showed energy use as 48-947 kwh/ m^2 (EPA, 2008). A study in Ottawa conducted in the hotel industry in 1991 shows energy intensity of 689 kwh/m^2 (OEE, 2003). While the Antalya region in Turkey in a Mediterranean climate shows energy intensity between 129- 646 kwh/m^2. On the other hand, Bohdanowicz & Martinac's (2007) study of a comprehensive assessment of energy use in Hilton and Scandic hotels reports energy usage as 322 MJ/guest night and 172 MJ/guest night respectively. As half of the energy use in both hotels is electricity, corresponding emissions calculated are based on emissions factors of UK or Germany and Nordic mix respectively. Hence, the corresponding emissions from Hilton hotels produce 44 kg CO_2 per guest night with emission factor 0.5 kg CO_2/kWh, while Scandic hotels produce 4.6 kg CO_2 per guest night with emission factor 0.096 kg CO_2/kWh (Andersson & Lukaszevicz, 2006). Below figure summarizes the factors that affect energy usage in hotel industry.
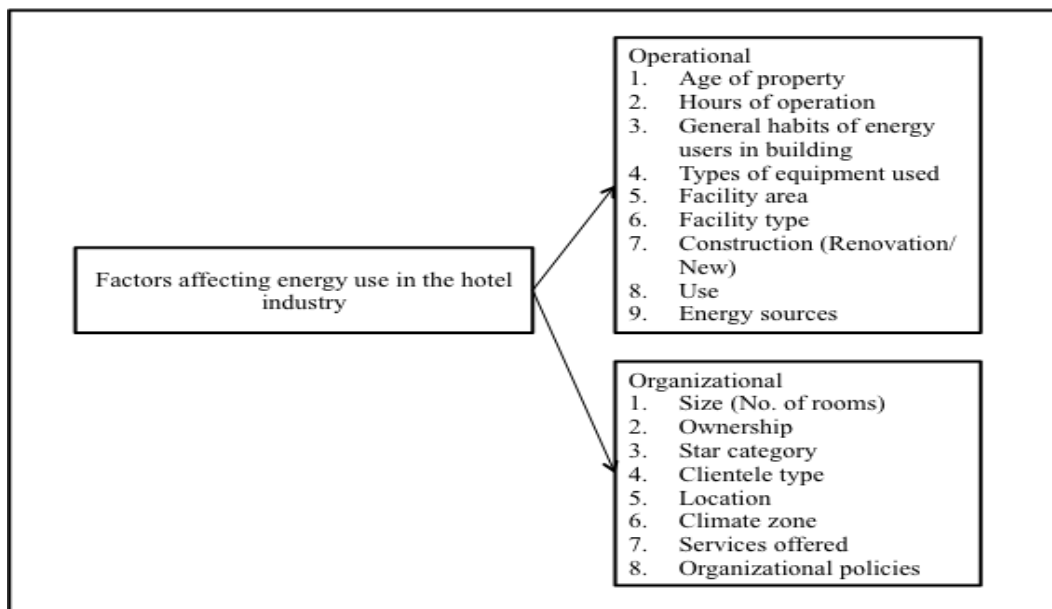
Figure 2.2 Factors affecting energy usage in the hotel industry

In other studies, several reasons were highlighted for the high-energy usage and barriers to adopting energy-saving and renewable energy technologies in the hotel industry. Zografakis et al. (2011) carried out a study in Crete hotels and indicated that age of building dictated the energy building code followed at the time of construction. Hotels before 1979 were not obligated to integrate thermal insulation. Hotels that are owned and operated by the same party tend to adopt sustainable technologies. Clearly, the role of new and old construction is quite crucial in determining the extent of renovations possible for the building. Information gaps among hotel managers about available technologies and accessing programs was a prominent issue. Zografakis et al. (2011) found that financial incentives and better awareness and information material are preferred means for better market penetration of these technologies, as suggested by hotel managers.

The rising cost of energy and securing reliable energy supplies are additional practical reasons for the adoption of renewable energy sources. Nelson (2010) proposed such measures in the Caribbean hotel industry, however, noting some major issues in the diffusion of renewable energy technologies. Capital investment and disturbing the comfort of guests were identified as key barriers. At the same time, non-existence of environmental stewardship, lack of knowledge about issues related to energy and climate change and lesser market and institutional pressure triggered resistance towards adoption. Better exposure to international best practices and further research in other destinations would enrich knowledge and information and provide an opportunity to exchange lessons among operators who take actions on voluntary terms.

Studies have further assessed the feasibility of renewable energy technologies in the hotel industry to meet rising energy demand of hotels. Hotels aiming at reaching carbon neutral status or become 'top performers' in energy management pursue this option seriously. Renewable energy can be either purchased from power/utility providers with little difference in prices or it could be generated on-site. Although there is mutual consensus over the positive replacements of systems to renewable ones, the payback for generating on-site energy using solar Photovoltaic (PV) in a small-medium sized hotel is still quite long, typically 10-12 years (Dalton et al., 2009). Given this fact, a supportive infrastructure and stakeholder co-operation are crucial for the success of such projects. Some commercially viable applications of renewable energy technologies in the hotel sector include solar water heater, space heating, solar Photovoltaic (PV), solar passive house techniques, ground source heating to name a few (Bohdanowicz & Hawkins, 2011). Some of the overarching barriers to diffusion of these technologies have been the long payback period, applicability of systems for the given geographical conditions and climate zone and that some of these mechanical systems need to be supported by conventional fossil fuels.

2.4.2 Examples of decision-making related to green energy initiatives
a. Renovation versus new construction

Several sociotechnical factors impact the energy usage in buildings and more so, in hotel properties. From a building standpoint, climate change impacts vary with building type, scale, use, construction and location (Camilleri, Jaques, & Isaacs, 2001). According to the Commercial & Institutional Survey Consumption of Energy Survey conducted in 2008, the oldest commercial buildings are located in Ontario and Quebec averaging 38.4 and

29

34.7 years respectively. As a rule, newer buildings tend to be more energy-efficient than older buildings. Old and new buildings deal with a different set of expectations and pressures with regards to sustainable technologies. Renovation is a more financially attractive option than the reconstruction or demolition of an existing building. It offers the opportunity to make rational use of resources by adopting energy-efficient measures or exploiting renewable energy sources options (Yalcintas & Kaya, 2009).

b. Reducing energy demand versus dependence on fossil fuels

The results from the study conducted by Yalcintas & Kaya (2009) in Hawaii, found that energy conservation/efficiency measures such as replacing cooling towers, putting energy management systems with variable frequency drives (VFD), changing to energy-efficient lighting brought almost 15-30% energy savings, depending on retrofit project. These measures were considered as suitable propositions from cost and energy savings point of view when compared to replacing with renewable energy technologies. The two types of technology replacements explained below assess decision-making from a business perspective. In case 1, a full service 2200 room property used 1400-ton capacity chillers for air conditioning. As part of assessing the value proposition for retrofitting by either integrating energy-efficient equipment like energy management system (EMS) and VFD on the air handling units or replacing the whole system by solar PV. With the first option, the hotel would save 151KW (28%) savings that would cost $1,125,000 (based on $0.20 per kwh) with a payback period of 4.3 years. The renewable energy installation (725 KW capacity) would cost $7,250,000 ($10 per KW for installation) without federal and state incentives with a payback period of 17.3 years, after deducting incentives. Hence, the

study aimed at attending to careful planning of technology change, while showing the available options, in terms of technologies to best fit a capital budget and requirements of a business.

They also suggested making conservation and efficiency a priority for businesses before investing in renewable energy technologies. Further policy implications were related to making conservation measures mandatory by government. While renewable energy technologies served the long-term vision of a sustainable future, energy-efficient and conservation measures were considered as short-term mechanisms to reduce dependence on fossil fuels.

Hatice (2010) assessed the energy savings achieved by a better building envelope of an old building by energy modeling for three scenarios using e-Quest. Benchmarking against ASH- RAE ST90.1: 2004 Energy Standard for Building Except Low-rise Residential Building basically included measures like increasing wall insulation and improving window glazing, reducing number of exterior windows. The third scenario also considered adding shading elements as part of passive solar techniques. The results pointed out that the old building used 40% less energy for the third scenario, performing the best out of the three given scenarios. The point is that green measures that seem simple could have great benefits if put to use with thorough understanding of its costs and benefits.

c. Rational use of energy services

From a tourism energy policy perspective, Xydis, Koroneos, & Polyzakis (2009) assessed energy and exergy efficiency of the main energy sources for hotels in Greece, i.e. electricity and fuels. As electricity is directly convertible, electricity showed high energy and exergy efficiency and it was concluded that increased use of electricity in the hotel industry would mean increasing efficiency, while diminishing environmental impact. The study proposed the need to switch to alternative and renewable energy sources such as natural gas, biofuels, electricity and solar, especially because of the operational environment in the hotel industry. Studies in sustainable technology have proposed realistic business solutions and proven that commercial buildings can achieve savings of 20-30% or more by simply adopting conventional energy-efficient technologies such as thermal insulation, day lighting controls, window overhangs and low-emissivity windows (Kneifel, 2010).

2.5 Motivations to adopt sustainable measures in the hotel industry

Past studies note the existing gaps between motivations to adopt sustainable measures and actual adoption of those measures. Motivations to adopt sustainable measures in the hotel industry have been studied using many theories. Amongst them, the resource-based theory, stakeholder theory, and institutional theory provide perspective on what motivates or inhibits hotel mangers from adopting sustainable measures (Hart, 1995; Rivera, 2002, 2004) as cited in (Graci, 2008). The resource-based theory focuses on internal and external resource capabilities to mobilize organizational change, giving utmost importance to economic benefits deriving from adoption (Graci & Dodds, 2008). The stakeholder

theory assumes interested groups such as residents, government, activist groups,

tourist/guests, national business chains, competitors, employees and local businesses to

influence adoption decisions of organization, excluding the role of any internal factors that

may also affect decision-making (Bansal & Roth, 2000; Gil, Jimenez, & Lorentec, 2001).

The neo-institutional theory on the other hand, posits that organizational behavior towards

adoption is dependent on external environment factors such as the organization's

corporate stance, policies, organization structure, and issue management strategies.

Table 2.1 provides a summary of past studies that examined the gap between intention to

adopt and actual adoption of environmental measures in the hotel industry.

Location/ Number of respondents (Hotel owners and managers)	Level of participation (Based on number of hotels participating in environmental program/s)	Types of environmental measures/technologies adopted (High to Low in popularity)	Drivers for adoption (High to Low)
Sweden N=225 Bohdanowicz (2006)	High N=77%	Energy-efficient lighting (76%), water fixtures (more than 60%), reuse of linen and towel programs (72%), sorting waste and recycling program (90%), leaflets encouraging guests to save resources (40%)	Reducing operational costs, meeting customer expectations, decreasing environmental impact
Poland N=124 Bohdanowicz (2006)	High N=77%	Energy-efficient lighting (70%), water fixtures (45%), reuse of linen and towel programs (65%), sorting waste and recycling program (77%), leaflets encouraging guests to save resources (22%)	Reducing operational costs, meeting customer expectations, Improve hotel image
Croatia N=30 Bohdanowicz	Low N=Less than 26%	Energy-efficient lighting (23%), reuse of linen and towel programs (23%),	Reducing operational costs, Improve

(2006)		sorting waste and recycling program (36%), leaflets encouraging guests to save resources (6%)	hotel image, meeting customer expectations
Ghana N= 52 Mensah (2006)	Medium N=58%	Energy-efficient lights (95%), reuse of linen and towel program (72%), trained staff to be eco-friendly (71%), used eco-friendly products (71%), supported local communities (70%), used low flow showerheads (67%), used solar energy for heating water (8%)	Cost savings, maintaining safe & healthy environment
United States (US) N= 217 Nicholls & Kang (2012)	High N=73%	Proper disposal of waste such as batteries, oil, etc., Energy-efficient lighting in guestrooms and bathrooms, water-efficient fixtures, sorting and recycling waste in guest rooms, office space and kitchen, purchase/use of locally grown foods	
United States (US) N=166 Chain hotels=80 Independently owned hotels=86 Rahman (2012)		**Chain hotels-**Energy-efficient lighting, Training staff to turn off lights when rooms are unoccupied, Training staff to turn off air conditioners when rooms are unoccupied, reuse of linen and towel program, providing guests with tips and suggestions to save water and energy, donate leftover and used old furniture and appliances. **Independent hotels-** Recycling containers in guestrooms, returning dry cleaned laundry without plastic, buying paper products that are unbleached or bleached	

		using a chlorine-free process. Training staff to turn off lights/heaters when rooms are unoccupied, providing guests with tips and suggestions to save water and energy.	
Turkey N= 54 Erdogan & Baris (2007)	Medium N=62.5%	Energy-efficient lighting (94%), reuse of linen and towel program (74%), training of staff to be eco-friendly (72%), used eco-friendly cleaning products (72%) support for local community (70%)	Reducing operational costs, competitive advantage
Canada (Bed & Breakfasts) N= 146 Dodds & Holmes (2011)	High	Use of environmentally-friendly cleaning supplies, reducing heat and air conditioning, use of compost, reuse of towel, use of low flow showerheads and toilets.	Cost savings, tax rebates, certification program

Table 5.2 Actions taken by hotel managers towards sustainable measures

Based on the above table, the types of environmental measures adopted in the hotel industry show varied levels of adoption. Overall, most popular measures in the hotel industry are energy-efficient lighting, reuse of linens and towels, education and training of guests and employees and recycling. Other measures that are adopted by some, more than others include using water-efficient fixtures, sorting waste, marketing sustainability efforts to guests in the form of leaflets/brochures, and supporting local community activities. Typically, low adoption measures include using solar water heaters, composting and participating in sustainable purchasing policy.

Several motivations influence the adoption of environmental measures in the hotel industry. Hotel managers are influenced by more than one factor in order to make a strong

business case for adoption of sustainable measures. Table 2.1 identified drivers that influence adoption, including consumer demand, economic incentives and competitive advantage. Improving hotel image and environmental concern in the Swedish, Polish and Croatian hotel industry. Similarly, Graci & Dodds (2008) examine the business case for adoption of sustainable practices in the hotel industry in Canada. The benefits of increased environmental commitment include cost savings, competitive advantage, customer loyalty, employee retention, awards and recognition, regulatory compliance, risk management and increased brand value/social responsibility.

The intention to adopt sustainability measures influences types of sustainability measures adopted by the hotel managers. Cost savings is the topmost driver to adopt environmental practices. This is clearly illustrative in the high adoption rates of measures such as reuse of linens and towels, as it saves energy and water costs and; energy-efficient lighting, as indicated to have a good business case and profitable from long-term savings perspective (Bohdanowicz 2006). Bohdanowicz's (2006) study with Swedish, Polish and Croatian hotel managers indicates cost savings and customer demands to be strongest motivators of adopting environmental measures for managers from all three countries. Yet, Swedish hotels show higher rates of adoption of sustainable practices than Polish and Croatian. Swedish hotels consider reducing environmental impacts more important than improving hotel's image, according to the study.

The intention to adopt sustainable measures maybe governed by mandatory or voluntary action taken by hotel managers. Bansal & Roth (2000) findings show that competitiveness, legitimation and social responsibility are the most important motivations

to adopt ecologically sustainable practices in organizations. Those sustainable measures that are highly promoted and economic incentives are offered to adopt them are widely popular. Energy-efficient lighting is a good example of such a norm. Similarly, legislation is also considered a strong trigger for adoption of certain sustainable measures such as proper waste disposal of oil and batteries. While North American hotel managers have adopted this practice widely, the Turkish hotel industry is still lagging. The laws regarding waste sorting are less rigid in Turkey (Erdogan & Baris, 2007; Nicholls & Kang, 2012). Nicholls & Kang's (2012) findings suggest that although environmental certification programs are considered to bring competitive advantage, and show higher levels of intention to adopt (54%), in practice; only a small number of hotel managers actually adopt them, representing 11% of respondents. However, among the adopters, 3% adopted LEED, indicating that there exist few hotel managers who believe in going beyond the norms.

The reasons for adopting some sustainable measures more than others in the hotel industry are still not fully understood (Graci & Dodds, 2008). Questions emerging from previous studies include identifying opportunities to strengthen sustainability commitment among hotel managers and delving deeper into understanding what contextual factors affect decision-making related to sustainable measures in the hotel industry.

2.5s.1 Role of contextual factors in adopting sustainable measures

The study conducted by Rahman (2012) in the US highlights differences between the types of sustainable measures adopted by chain and independent hotels. Recycling and education are among the most adopted measures in independent hotels while chain hotels

adopt more strategic practices. Nicholls & Kang's (2012) study in the US support these findings and further highlight low adoption of environmental training to employees, use of green messaging in promotional literature and use of organically grown food in independent hotels.

Mensah's (2006) findings from Accra suggest that 3-5 star category hotels adopt more environmental practices than one-two star category. It should be noted that nearly half the sample of 3-5 Star hotels in this study were chain-affiliated. Erdogan & Baris's (2007) findings in the Turkish hotel industry support Mensah's (2006) findings. Sustainable technologies adopted in higher star category hotels include energy saving technologies, keycard control system and solar water heaters, to some extent. Typically, higher star category hotels also tend to be large hotels, based on the number of rooms.

Gil et al (2001) empirical study in the Spanish hotel industry determines motivations for hotels to adopt environmental practices and its results on firm financial performance based on stakeholder pressures, operational management variables, size, age of facility and chain affiliation. In their study, organizational characteristics play a significant role in deployment of environmental practices in organizations (Gil et al., 2001).

From a contextual standpoint, socio economic variables such as education background of owners and hotel managers are associated with level of knowledge and expertise required to build organizational capabilities (Erdogan & Baris, 2007; Mensah, 2006). Other issues that emerge from the above studies such as lack of knowledge among employees, lower employee interest in environment and participation in green meetings, lack of cohesiveness in the industry with regards to other hotels, tourism association and network,

local government and suppliers who tend to influence decision making of hotel managers (Bohdanowicz, 2006; Erdogan & Baris, 2007; Mensah, 2006; Nicholls & Kang, 2012; Rahman, 2012).

The role of contextual factors is highlighted in order to provide meaningful insights about firm motivations. These factors enable the context to be set for further exploring why decision-making related to sustainable measures in the hotel industry differs among different groups of adopters, based on resource capabilities, organizational characteristics, management policies and stronger network. The several characteristics and processes existing within hotels provide the rationale for differentiating between adopter categories and studying how their motivations vary from one another and what types of sustainable measures they adopt.

2.6 Challenges in adopting sustainable measures

The impediments to sustainability vary based on level of adoption of sustainable measures (Sloan, Legrand, et al., 2009; Thuot et al., 2010). Sloan, Chen, & Legrand's (2009) study indicates that best practice hotels in sustainability consider staff attitudes, market response and confusing eco-labels available for adoption, as important barriers to further adoption of sustainable measures. Financial feasibility, of course is commonly considered a barrier to adoption. A similar assessment carried out by Thuot et al.,(2010) shows that those businesses that are ahead in this game faced typical barriers such as co-operative legislative practices and costs while those behind, complained of barriers like conflicting business priorities. There exists a lack of programs and policies that address the challenges of rural sustainable tourism businesses based on their level of commitment (Thuot et al., 2010). Other rural tourism businesses outlined high capital investment, lack of incentive

programs, other business priorities, lack of suppliers selling sustainability products and shortage of good tradespeople as barriers to adoption of sustainable measures.

Thuot et al's., (2010) study indicates that environmental measures being adopted by sustainable tourism businesses include energy-efficient light bulbs, hiring local people and purchasing from local suppliers while other measures related to waste and water management, educating tourists are measures adopted more by innovative business operators. The findings from this study suggest that there is lack of useful information and that which is explained in simple terms, relevant marketing channels, access to programs and training and education for tourism operators.

2.7 Factors enabling adoption of sustainable initiatives
2.7.1. Characteristics of sustainable measures

Past studies show consistency with the Diffusion of Innovations theory framework to properly predict the likelihood of adoption of sustainable measures in the hotel industry (Le et al., 2006; Smerecnik & Andersen, 2011). Overall, complexity, observeability, and relative advantage provide good reasons for adoption/rejection of certain measures. The role of uncertainty in gaining results from adoption of sustainable measures is at the core of decision-making among hotel managers. In the Vietnamese hotel industry, hotel managers adopt commercialized and successful innovations that have been adopted by other hotels. They believe that relative advantages such as corporate image enhancement, customer preference, and cost savings from adoption of sustainable measures are not certain. This attitude is similar in the North American context as well. However, there

exist hotels in North America that have successfully adopted innovative sustainable

measures and received competitive advantage from being green. Le et al. (2006)

recognize the need for exchange of lessons between developed and developing countries

2.7.2 Characteristics of adopters of sustainable measures in the hotel industry

The characteristics of adopters of sustainable measures may vary based on contextual

factors. These include factors such as location (urban/rural), ownership

(chain/independent) , types of business (Eco Lodge/hotels) etc. However, there still exist

similarities in adopters who are typically early in investing in sustainable measures than

their counterparts. These characteristics are discusses below.

a. Opinion leadership

An important finding from the study carried out by Smerecnik & Andersen (2011) is the

crucial role of environmental opinion leadership in the process of diffusion of innovations.

Hotel managers that successfully adopt sustainability measures are information carriers for

sustainability in the hotel industry. Typically, these opinion leaders have better

recognition as environmental leaders in the hotel industry; they have wide exposure to

mass media and boast of a strong personal network available through their socioeconomic

status. These factors enable opinion leaders to influence other hotel managers in the

industry (Rogers, 2003). North American hotels and resort managers study shows that

environmental opinion leadership positively correlates with adoption of sustainability

innovations. Smerecnik & Andersen (2011) indicate that opinion leadership enables

enhancing the hotel image because of easier accessibility to communicating and informing

sustainability practices implemented in the hotel(s) at public forums, seminars and

conferences. It further enhances public image and enables support from local community through advocacy.

Opinion leadership is an important characteristic in the rural context as well. Thuot et al (2010) study of rural tourism businesses in British Columbia indicates that most rural sustainable tourism business operators are self-starters with only a few who follow market leaders and borrow ideas. These businesses are primarily value-driven and motivated to protect environmental resources.

b. Sustainability structures and processes

Hotels that lean towards better environmental management have a business strategy in place to successfully integrate sustainability in their products and processes. Those hotels that aim to improve their environmental profile put in place environmental management systems, implement environmental certification programs, regularly conduct energy audits and take corrective actions by investing in sustainable technologies. These hotels have a fully functional green team that facilitates the implementation of green measures in the hotel. The benefits of implementing these sustainability structures and processes is related with better sustainability recognition for the hotel (Sloan, Legrand, et al., 2009).

c. Broader vision about sustainability

 The study conducted with Germany and Estonian hotel managers highlights lessons learned from best practice hotels and indicates that these hotel managers carried a broader vision about sustainability and considered other factors apart from competitive advantage and cost savings to influencing decision-making. These factors include increasing

consumer market for green travel, rising energy costs and social responsibility. An example of how best practice hotel managers transform their sustainability vision into practice is by prioritizing investments in employees' education and training for efficient operational management rather than extensively focusing on increasing visibility of their environmental initiatives. Studies also indicate that education and training of employees can bring considerable energy savings in hotels (Bohdanowicz & Martinac, 2007; Sloan, Legrand, et al., 2009).

According to past studies, the role of opinion leadership, decision-making structures and processes, and embracing a broad vision of sustainability have enabled implementing sustainability measures in some hotels more than others. More research is required that recognizes the success factors facilitating positive change among hotel organizations towards sustainability. Further research should also attempt to fully understand how these characteristics play a role in decision-making related to green energy measures in the hotel industry. Below figure summarizes the above discussions and indicates the components to be studied in this research.

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┌─────────────────────────────────────────────────────────────────────────┐
│  ┌──────────────────────────────┐   ┌────────────────────────────────┐   │
│  │ Business case for adoption of │   │                                │   │
│  │ green energy measures         │   │ Challenges in adoption of green │  │
│  │ 1.  Cost savings              │   │ energy measures                │   │
│  │ 2.  Environment               │   │                                │   │
│  │     consciousness             │   └────────────────────────────────┘   │
│  │ 3.  Improve environmental     │   ┌────────────────────────────────┐   │
│  │     image of the hotel,       │   │ Factors affecting Manager/     │   │
│  │ 4.  Competitive advantage,    │   │ Owners' decision-making        │   │
│  │ 5.  Education                 │   │ of green energy initiatives    │   │
│  │ 6.  Policy                    │   │                                │   │
│  │ 7.  Consumer demand           │   │ 1. Organizational and          │   │
│  │ 8.  stakeholder influence     │   │    operational characteristics │   │
│  │ 9.  Economic/social           │   │    of the hotel                │   │
│  │     incentives)               │   │ 2. Opinion Leadership          │   │
│  │                               │   │ 3. Decision-making structures  │   │
│  │                               │   │    and processes in the hotel  │   │
│  │                               │   │ 4. Vision of sustainability    │   │
│  └──────────────────────────────┘   └────────────────────────────────┘   │
└─────────────────────────────────────────────────────────────────────────┘
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Figure 3.2 Managers/owner's decision-making in green accommodations, committed and less committed hotels

2.8 Conclusion

In summary, there is a great need to explore further why some organizations succeed and others fail to adopt sustainability in their business. Overall, it is important to better understand the motivations and challenges behind adopting green energy measures. Better understanding of determinants of decision-making about green energy initiatives and assessing reasons for success or failure should enable the identification and development of better support mechanisms for businesses to achieve positive environmental performance.

Chapter Three

3.0. Methods

This research project examines the introduction of green energy initiatives in the hotel industry based on a review of relevant literature, conducting key informant interviews and analyzing performance data when they are available. The following chapter discusses in detail the approaches used to achieve the research goal and objectives.

3.1 Qualitative Research

This research explores factors affecting decision-making in relation to adopting green energy initiatives in the hotel industry. It is guided through the twelve themes of qualitative inquiry, elicited by Patton (2002). The research study offers valuable insights into understanding needs of different user segments. It is expected that more specialized new themes will emerge through data analysis. A grounded theory approach enables construction of new theories by studying past and present involvements of people, perspectives and research practices. Charmaz (2006) believes this method allows flexibility in data analysis, for ideas/themes to emerge later in the analysis.

3.2 Location

The data were collected from accommodation providers in Canada, primarily Ontario. Two hotels were also selected from Quebec and one from British Columbia, based on the recommendations of Green Key Global experts. Location affected case selection because the researcher was located in Ontario and conducted many interviews in person. However,

access to information was also important so facilities in other provinces with recognized high performance in this area were included. Interviewees included those individuals who were instrumental in implementing Green Key Global certification program in the hotel. Green Key Global experts provided the contact information of these individuals, or green champions. The green champion for the hotel could hold any of several positions: developer, owner, general manager or maintenance manager.

3.3 Research Methods

3.3.1 Interviews

Interviews are the most commonly used data source for conducting qualitative research (Roulston, 2010). Interviews have been selected as the key data collection instrument for this research as the topic is exploratory in nature, allowing experts such as hotel developers, general managers, and maintenance/engineering managers to share current perceptions of the state of environmental affairs in the hotel sector (Creswell, 2009). Face-to-face and telephone interviews were conducted with 18 experts from the accommodation sector in Canada. Being in-depth and semi-structured, the interview questions provided a guide to generate an effective dialogue with the participants about decision-making regarding sustainability measures.

The limitations of relying on qualitative interviews are validity, credibility and accuracy of claims made by the participants. Qualitative interviewing was considered a suitable option for data collection as it allowed information exchange on past, present and future events. The quality of the research design was improved by framing open-ended and short questions to extract rich, descriptive and relevant data from the interviewee. The main

questions were appropriately followed-up, to clarify meanings or gather knowledge on certain aspects. Wherever possible, hotel responses were checked for accuracy with publicly available documents from the organizations such as hotel websites, annual reports and sustainability reports, and green certification rating points.

3.3.2 Numerical data analysis

Quantitative data in this study were primarily used as means for comparison of interview data with actual numerical data representing energy performance of hotels (Creswell, 2009). Additional documents that present utilities (energy and gas) performance over time (2-5 years) were collected. At the same time, some chain hotels publicly reported their sustainability procedures. Overall, to support the qualitative data, quantitative data sharing in the form of gas and energy costs was encouraged from the interviewees. These energy cost and usage data allowed comparison of data across hotels with varying degrees of commitment to sustainability practice.

3.4 Sampling Strategy

The research questionnaire aimed at collecting data from a range of hotels; those that showcased best practices in energy management and those that had adopted at least minimum green energy initiatives. Such a sample enabled understanding similarities and differences in decision-making in more committed hotels than others. Hotels implementing best practices in energy management would be referred to as committed hotels (CH) while others that have implemented minimum measures would be less committed (LH) hotels. The sample size agreed upon was 18 as it was difficult to get timely responses from hotel developers, owners and managers. The snowballing sampling method helped increase the sample size of the study. While there existed no universal

framework that differentiated the extent of greenness of a hotel, this study used the framework provided by a green certification system, Green Key Eco Rating Program.

There are a number of green certification systems in the hotel industry and it is difficult to identify which one shows greater credibility across the sector. Green Keys Global was chosen as it is a part of the Hotel Association of Canada, the largest industry association representing the hotel industry in the country. The Hotel Association of Canada involves all accommodation types and hence, this program (Green Key Eco Rating Program) is geared towards certifying different accommodation types such as hotels, resorts, Bed & Breakfasts and Eco lodges. The Canadian hotel industry consists of at least 1500-2000 hotels green key certified hotels out of approximately 8400 hotel properties overall (Green Key Global, n.d.). The Green Key Eco-Rating Program is defined as a "graduated rating system designed to recognize hotels, motels and resorts that are committed to improving their environmental and fiscal performance." The ratings are based on the results of a comprehensive environmental assessment (Green Key Global, n.d.)

Hotels properties are awarded a 1-5 Green Key rating. The program mainly assesses 5 main operational areas of a property including corporate environmental management, housekeeping, Food & Beverage operations, conference & meeting facilities, and engineering. The assessment encompasses 9 sustainable practices including energy conservation, water conservation, solid waste management, hazardous waste management, indoor air quality, community outreach, building infrastructure, land use, and environmental management (Green Key Global, n.d.).

Energy conservation measures in this assessment include range of green energy measures both energy conservation and efficiency, and renewable energy technology showing consistency with the definition of "green energy" within the Green Energy Act.

3.5 Selection of Participants

Hotel ratings were inadequate to select best practice hotels in energy management, as it did not provide any additional information on the green energy measures. Hence, hotels that have implemented superior energy related initiatives in the Green Key Eco-Rating Program and scored '5' green keys or won the 'Energy & Environment Award' were selected. Experts from the Green Key Eco-Rating Program were consulted to select appropriate best practice cases. The interview questionnaire was discussed with the Green Key expert. Follow up emails for questions unanswered or clarify responses were sent to respondents and changes were made accordingly.

Three committed hotels were chosen from outside of Ontario based on the Green Key expert recommendation. As the sample was chosen based on the Green Key Rating System, the evaluation of hotels on adoption of green energy measures was consistent across the sample. Although one may argue that external factors such as provincial government policies may influence adoption of green energy initiatives in some provinces more than others, the literature review suggests that very little differences existed among energy conservation programs exist across provinces.

There existed very few examples of hotels that implemented renewable energy technologies such as solar, wind, hydroelectric and biogas among the sample chosen from the Green Key Eco Rating program. Although the commercial energy requirements of a hostel, eco lodges were different from a typical hotel, there were lessons to be learned from those accommodation providers that had implemented renewable energy for commercial purposes. In order to understand the factors affecting adoption of renewable energy in the hotel industry, it was important to include these examples as well. Accommodations that implemented renewable energy technology were selected from the Green Lodging News website. The website enlists accommodations in North America that have implemented renewable energy in the 'Renewable Energy All Stars' section. The six accommodations listed on the website included 3 Eco lodges and 1 hostel.

Table 3.5 describes the participants in this study. To protect identification of interviewees, the name of the hotels and the interviewee designations are not mentioned in Table 3.5. Further, the sample is divided into three classifications namely, Green accommodations (GA), Committed hotels (CH) and Less committed hotels (LH). The abbreviations and respective serial numbers from this table will be used as references for the interviewees throughout the text.

Hotels and accommodations	Ownership type	Location	Accreditation/Awards
Green Accommodations (GA)			
1.	Independent	Bancroft, ON	Green Lodging News

		Muskoka, ON	Website. "Renewable
2.		Tobermory, ON	Energy All Stars"
3.			
4.		Toronto, ON	
Committed Hotels (CH)			
1.	Chain	Victoria, BC	5 Green Keys
2.	Independent	Quebec City, QC	5 Green Keys, Energy & Environment Award 2010
3.	Chain	Ottawa, ON	5 Green Keys
4.	Chain	Saint-Hyacinthe, QC	5 Green Keys, Energy & Environment Award 2011
Less Committed Hotels (LH)			
1.	Chain	Kitchener, ON	3 Green Keys
2.	Chain	Waterloo, ON	3 Green Keys
3.	Chain	Guelph, Waterloo, ON	4 Green Keys
4.	Chain	Kitchener, ON	4 Green Keys
5.	Chain	Guelph, ON	3 Green Keys
6.	Chain	Kitchener, ON	3 Green Keys
7.	Chain	ON	3 Green Keys rated portfolio
8.	Chain	ON	No certifications in the

			portfolio
9.	Chain	ON	3 & 4 Green Keys rated portfolio
10.	Chain	ON	3 & 4 Green Keys rated portfolio

Table 6.1 List of participants from committed and less committed hotels

	Committed hotels and accommodations								Less comitted hotels									
	GA1	GA2	GA3	GA4	CH1	CH2	CH3	CH4	LH1	LH2	LH3	LH4	LH5	LH6	LH7	LH8	LH9	LH10
Renovation (R)/New construction(N)	R	R&N	N	R	R	R	R	N	R	R	R	R	R	R	N/A	N	N/A	N/A
Certification	×	Audobon Intl(4/5)	LEED G-(Ver.1)	×	GKG-5	GKG-5	GKG-5	LEED-C (Ver.1), GHG-5	GKG-4	GKG-3 (no longer)	GKG-4	GKG-4	GKG-3	GKG-3	GKG	GKG	GKG	GKG
Physical charateristics																		
Age of building (Years)	30	7-100	7	100+	105	113	30	1	28	25	40-50	40-50	32	21		11		
Floor area (sq.ft)			7567	10500				59987		33,160			86186	87000				
Organizational Charactristics																		
Size (No. of rooms)	17	11 cottages	6	114 beds	477	45	496	94	98	85	201	184	136	172		3 hotels	15-20 hotel	400+ hotels
Ownership																		
Independent	✓	✓	✓	✓		✓							✓					
Owned and Operated										✓	✓							
Franchise based								✓	✓			✓		✓	✓	✓	✓	✓
Management Contract					✓		✓											
Star categorization (AAA Diamond rating)	Not rated	Not rated	Not rated	Not rated	4	Not rated	4	3	3	2	4	3	3	3		N/A	N/A	N/A
Services offered	Limited	Limited	Full	Limited	Full	Limited	Full	Limited	Moderate	Limited	Full	Full	Full	Full	Full	N/A	N/A	N/A
Operational cycle- All Season (A)/Seasonal (S)	S	S	S	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Location-Urban (U)/Rural (R)	R	R	R	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Table 3.2 Physical and organizational characteristics of the participating hotels

R	Renovation
N	New Construction
A	All seasonal
S	Seasonal
U	Urban
R	Rural

3.6 Interview Questions

The interviews consisted of several open-ended questions that intended to elicit views and opinions of the participants. Barring one question, all questions sought similar information from both committed and less committed hotels in terms of implementing green energy initiatives. The recruitment letter, and Interview Questions to committed and less committed hotels are included in Appendices. Examples of the common open-ended questions include:

No.	Questions
1.	To begin with, can you tell me in broad terms how your company approaches decisions related to energy & environmental performance?
2.	How did this hotel first become involved in green energy technologies?
3.	What are the sources of information for adoption of innovations such as green energy?

Table 3.3 Examples of common open-ended questions

The literature identified certain factors that drive adoption of green energy initiatives in the hotel industry. The interview questions below aim to verify and supplement the list of success factors and challenges to implement green energy initiatives among committed and less committed hotels. Questions that collected specific information on energy usage and costs were also included in the interview. Some hotels supplemented this information by providing utilities data. The questions are as follows:

No.	Questions
1.	How important were the following drivers to get involved in adopting green energy technologies? (Rate the factors on scale of 1 to 7. 1 being lowest and 7 being highest). Drivers: cost savings, environment consciousness, improve environmental image of the hotel, competitive advantage, education, policy, consumer demand, stakeholder influence, and economic/social incentives.
2.	How important is the role of organizational factors in selecting green energy technologies? (Rate the factors on scale of 1 to 7. 1 being lowest and 7 being highest). Factors: size, ownership, star categorization, services offered, operational cycle (seasonal/whole year), location climate, and organizational policies.
3	Can you tell me more about your energy use and costs in the hotel? - In what proportion of your energy is generated on-site and purchased?

Table 3.4 Examples of common rating/numerical data collection questions

Questions asked specifically to less committed hotels were as follows:

No.	Questions

1.	I want to start by giving you a list of five electricity related initiatives that your firm could hypothetically adopt. Can you please take a moment to rank them from the most likely to the least likely to be implemented by your company? Co-generation, purchasing green electricity from the grid, energy conservation, generating on-site green electricity, increasing energy efficiency. Other?
2.	Can you please explain to me what factors you considered when you rated the different initiatives?
3.	What are the challenges involved in taking further steps to improve your energy performance?

Table 3.5 Questions for less committed hotels only

Interviews lasted for on average 45 minutes to 1 hour, and were conducted in mutually agreed locations. Some independent accommodation owners conversed for 2-2.5 hours and explained their experiences in more detail than others. In total, 18 companies were included in this study. Owing to access to information and limitations of location, this research gathered data mostly from hotels that were within the range of 2 hours from Waterloo. The response rate to the request for an interview was 18 out of 23. Pilot interview was conducted with the General Manager of a hotel in Waterloo. This sample was not included in the final data set. Minor changes were made in the questionnaire based on the pilot interview.

Expert's Role	No. Of Participants
Owners & Developers	8
General Managers	6
Maintenance/Engineering Managers	4

Table 3.6 Profile of the participants

3.7 Data Analysis & Interpretation of Data

Barney G. Glaser and Anselm L. Strauss developed grounded theory and advocated that development of theories was grounded in data rather than deducing testable hypothesis from existing theories. Although classical grounded theorists placed emphasis on discovery of theories through data without any preconceived ideas, scholars modified this basic framework (Bryant, 2002, 2003; Charmaz, 2000, 2006; Clarke 2003, 2005; Seale, 1999) to provide flexibility to researchers in terms of adhering to grounded theory guidelines (coding, memo- writing, and sampling for theory development, and comparative methods) and allow conducting research on diverse topics. Simply put, Charmaz (2006) views grounded theory as a means to learn about the topic at hand and to allow theory development.

The data analysis process begins with coding the transcribed data. Hence, keeping with the grounded theory principles and practices, 17 interviews were audio recorded and transcribed (one participant refused recording of the conversation and notes were taken). The data were rendered to coding, as the first step of analysis. As defined by Charmaz (2006, p. 46), "Coding is the pivotal link between collecting data and developing an emergent theory to explain these data. Through coding, you define what is happening in

the data and begin to grapple with what it means". Initial coding offers a useful tool to

analyze actions and processes grounded in the data. The codes were created using gerunds

to communicate the action in the code. Once the data have been transcribed, line-by-line

coding helps in documenting observations of people, setting and context. Constant

comparison of the data highlights similarities and differences and hence, incident-by-

incident coding is the next step in grounded theory analysis as it allows developing an

analytic sense of the data rather than a taken-for-granted approach. Third, focused coding

is a synthesizing process wherein codes that are frequently seen in the data and best

explain the actions, eventually become categories. These categories are finally related to

subcategories by axial coding, resembling the data that has been fractured during initial

coding and enabling coherence to the emerging analysis. Subsequently, memo-writing,

which helps in all phases of coding, plays a crucial role in documenting ideas, and

facilitates rich and strong analysis of the data. The interviews, both in-person and

telephone, were audiotaped with the approval of the participants. The interviews were

transcribed and analyzed by using the data analysis software, NVIVO 8.

At several levels of analysis, careful attention was given to classification and meanings of

data. Multiple combinations of classifications were tried and tested on the data to decide

the best fit to achieve the objectives of the research. Attention was also paid to keywords

and checking meanings of those words as perceived by the interviewees. The following

steps were observed while analyzing the data. First, the codes between 'committed' and

'less committed' hotels were compared and contrasted and organized depending on the

topic at hand. Second, keeping in mind the several topics, further broader categories

emerged named under, 'Opportunities', 'Challenges', 'Characteristics' and 'Processes'. Third, the codes were sorted under each category, and arranged organization-wise. It made it possible to completely understand the context and factors underlying the decisions made by committed and less committed organizations.

Preliminary results of this study in the form of a draft conference paper were shared with the senior leadership from Green Key Eco Program.. The feedback gained from them included re-phrasing the term 'less committed' to 'in-transition' hotels in order to attach a more positive connotation, which enables hotels to stay encouraged about taking steps in greening. However, this suggestion was not adopted in this thesis as it was easier to distinguish the role of 'committed' and 'less committed' hotels[1]

3.7 Ethical Considerations

The research proposal went through an ethics review at University of Waterloo that assessed the potential risks and benefits from this study. Following ethics approval from the committee at the University of Waterloo, recruitment letters and consent forms were emailed to individuals from organizations, identified by the Green Lodging News and hotel websites or provided by Green Key Eco Rating Program. The individual or company names were undisclosed in the research.

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[1] Ms. Andrea Myers, Director-Member Programs, Green Key Eco Rating program, Hotel Association of Canada reviewed the preliminary results and gave feedback.

Chapter Four

4.0 Results and Findings

This chapter presents results and findings from the research. This chapter is divided into three parts. The first part introduces broader innovation priorities of hotels, which set the context for innovation in the hotel industry. It further delves into green energy measures adopted in committed and less committed hotels and describes the drivers enabling adoption of these measures. The chapter establishes an understanding of attitudes among hotel managers and owners towards the adoption of green energy measures and searches for inconsistencies between claimed attitudes and actions. The second part assesses the role of operational and organizational factors in decision-making related to green energy measures, providing insights on opportunities and challenges in their adoption. The third part explores the structures and processes existing in committed and less committed hotels in relation to sustainability. Lastly, a snapshot of the utility data of past three to five years contributes to the discussion associated with decision-making related to green energy measures.

The chapter provides the context associated with decision-making related to sustainable technologies in committed and less committed hotels to gain in-depth understanding of existing opportunities and challenges. As mentioned in Chapter 3, , the analysis is primarily based on two groups: committed hotels and green accommodations; and less committed hotels. The respondents are divided into three categories: green accommodations GA, committed hotels CH and less committed hotels LH.

4.1. Innovations in the hotel industry

Hotel managers and developers pursued innovative measures to increase market size and expand business opportunities. Respondents explained that in general, investing and managing higher 'star category' hotels potentially made a strong value proposition. The uniqueness offered by the product allowed buy-in of both corporate and leisure clientele, enabling strong competitive advantage over other hotels in the area.

Wherever possible, hotel managers prioritized cost-effective investments that also enabled wider recognition of their efforts. Hotel managers made investments in innovative green energy measures, as part of an allocated budget for periodic renovation and replacement of furniture, fixtures and equipment. Such decisions were mostly vested in best economic returns for the dollar invested. Respondents invested in sustainable practices that provided visibility to guests and facilitated marketing green efforts.

4.2 Innovative and conventional sustainability technologies adopted in the hotel industry

Table 4.1 lists green energy initiatives, reported by hotel and accommodation managers participating in this study. The table is useful to gain an understanding of what types of green energy initiatives hotel managers have adopted. The table has been collated based on respondent information during interviews. Due to limited time during the interview, hotel respondents were unable to provide a comprehensive list of the green energy measures and other sustainability measures implemented in the hotel. Hence, the researcher included measures identified on participant hotel websites as well. Wherever possible, respondent information regarding adopted sustainability measures and

certification(s) were checked for accuracy of claims by accessing publicly available reports from LEED and corporate brand sustainability reports. It was also helpful to refer to the Green Key/LEED/Audubon International green certification program criteria to differentiate between program ratings. It further allowed establishing types of measures that met the minimum threshold and those that surpassed the minimum threshold. Although this table identifies the green energy measures of participant hotels, it does not indicate the extent that each sustainability measure was implemented in the hotel.

The categories emerging from the above information and review of literature included 'resource conservation', 'energy-efficiency', and 'renewable energy'. A fourth category 'other' represented miscellaneous green energy measures implemented in the hotel. This study does not delve into detailed discussions of each measure. Based on the literature review, the adoption of resource conservation measures is the minimum that can be adopted by hotel managers while the adoption of energy-efficient and renewable energy technologies is considered more innovative. It should be noted that these categories are defined to provide general guidelines to achieve the purpose of this study and may not correlate directly with energy performance. Measuring energy performance for all of the hotels is beyond the scope of this study.

As gathered from respondent interviews, there exist differences in the actions taken among committed hotel and less committed hotel managers. Overall, committed hotel and accommodation and less committed hotel managers showed wide adoption of measures in the 'resource conservation' category, as compared to 'energy-efficiency', 'renewable

energy' and 'other' categories. Committed hotel and accommodation owners and managers and less committed hotel managers most commonly adopted measures such as energy-efficient lighting, reuse of linen and towel program and recycling. Hotel managers also showed strong interest in adopting energy-efficient equipment, as observed in Table 4.1. Across the sample, renewable energy technologies showed low adoption rates in the hotel industry.

Measures		Committed hotels and accommodations								Less committed accommodations									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Conservation	Recycling	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓					✓
	Linen reuse program	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓					✓
	Shutting drapes	✓	✓	✓	✓	✓	✓	✓	✓				✓						
	Shutting off equipment	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓					
	Using organic composter	✓			✓	✓			✓										
	Using water diverters	✓	✓	✓	✓	✓	✓	✓	✓		✓								
	Low flow shower heads	✓	✓	✓	✓	✓	✓	✓	✓										
Energy efficiency	Lighting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	Water heating									✓			✓	✓		✓			
	Cogeneration	✓		✓										✓					
	(Ptac units,thermostats, variable speed drivers, washers, dryers, televisions)	✓		✓		✓				✓		✓	✓			✓	✓		✓
	Using eco friendly products		✓																
	Windows							✓											
	Insulation							✓								✓			
	Electric Vehicle (EV)													✓					
Renewable energy	Solar PV	✓				✓													
	Solar thermal				✓				✓										
	Geothermal					✓													
	Green roof		✓																
	Purchasing green energy																		
	Micro hydro							✓											
	Passive Solar haus								✓										
	Straw bale								✓										
	Carbon Credits		✓																
Other	Greening supply chain	✓																	
	Buying local	✓																	
	Beekeeping		✓						✓										
	Gardening		✓																
	Breeding flock of hen								✓										
Total		13	12	9	8	9	10	10	13	4	2	2	6	7	0	4	2	1	4

Table 4.1 List of green energy measures adopted in committed and less committed hotels

Hotels showed varying levels of adoption of the measures under the first two catgories.

Energy conservation measures, typically low cost ones such as 'recyling' and 'reuse of

linens and towels' were adopted widely across committed hotels and accommodations and less committed hotels. Other low cost resource conservation measures such as 'shutting drapes' to prevent heat loss and 'shutting lights when not in use' did not show wide adoption in the less committed hotels. Energy-efficient lighting was adopted most widely across the sample. Hotel respondents also claimed energy-efficient equipment to be adopted during renovations replacing older less efficient systems. Energy-efficient water heating showed average level of adoption, in both categories of hotels. Other measures under this category such as insulation, energy-efficient windows and using eco- friendly products were adopted more widely by managers in committed hotels than less committed. Typically, advanced technology such as building management systems and cogeneration were adopted by few committed hotel managers, and only one less committed hotel manager. One less committed hotel manager also adopted an electric vehicle (EV).

Among the three categories in the sample, green accommodation owners showed adoption of advanced energy systems that were less adopted for usage in the commercial building sector. These technologies included strawbale insulation, micro hydroelectric plant and solar passive haus. On the other hand, committed hotel managers indicated adoption of more commercialized technologies as compared to green accommodations. Committed hotel managers also indicated adoption of measures from all four categires in table 4.1. This is evident from the following quote.

> Our elevators will produce power to run themselves or a portion of themselves so as
> the elevator runs up and down; it generates its own power. Our technology is the re-
> gen, same as Cogen. We are now in the process of installing motion sensors,
> dimmers on all outside stair walls, fire exits. So, we have 6 stair walls in the

building that can be dimmed down for 30% lighting capacity. And when the sense motion, they go on full blast. We are looking at solar panels on our roof. We have a beautiful gas fireplace in our lobby that we are looking at capturing that heat and putting it through a heat pump and then using to heat the pool. So, we are always on a look out for innovative ideas and ways we can save on our utility consumption and carbon offsets. (CH3, 2012)

Less committed hotel managers adopted energy-efficient measures that were proven technologies and adopted by other committed hotel managers as well. These hotel managers focused their efforts towards adoption of resource conservation and energy-efficiency measures. Renewable energy technologies, overall, showed the lowest adoption rates in the hotel industry with the exception of some proven commercial applications such as solar thermal and solar PV. CH2 hotel website indicated the intention to adopt vacuum tube solar hot water panels to offset grid energy consumption in the year 2013.

Committed hotel managers put efforts to market their credentials to guests by implementing Eco meeting programs and purchasing carbon credits. Less committed hotel managers offered such programs, but it was not indicated during the interview or on the hotel website. The role of corporate environmental policy was particularly highlighted by respondents in terms of implementation of environmental programs. These managers showed participation in greening supply chain, buying locally grown food and gardening as well. Other measures such as beekeeping, breeding flock of hens at the green accommodation were typically adopted by green accommodation owners situated in rural areas.

The sustainability measures listed in the table 4.1 provided an overview of actions adopted by the particpants in this study. From the above table, it was evident that differences existed in types of sustainability measures adopted by committed and less committed hotel managers. However, with the exception of one hotel manager, it should be noted that committed hotel and accomodation managers and less committed hotel managers were motivated to show at least a minimum level of participation. This study further delved into drivers behind the decisions of hotel managers to adopt sustainable technologies.

4.3 Attitudes and actions of hotel managers towards green energy measures

The drivers towards adopting sustainable technologies were assessed for each type of accommodation/hotel. One committed hotel did not respond to this question.
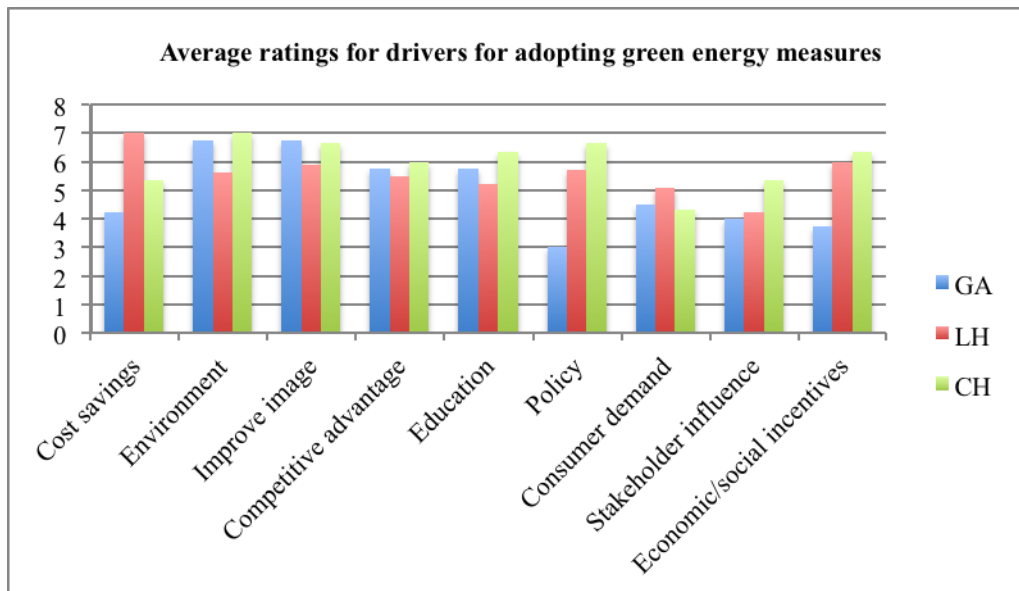

Figure 4.1 Average ratings for drivers for adopting green energy measures

The Fig. 4.1 indicated higher ratings of drivers in general, among committed hotels in comparison to less committed ones. 'Environment consciousness' and 'improving

environmental image' were particularly rated '7' by GA respondents. The LH group

respondents marked 'cost savings' highest. All three groups' respondents were driven by

'competitive advantage'. The CH group of respondents indicated 'policy' as a strong

driver while GA group respondents did not. 'Economic incentives' on the other hand, was

rated high by CH and LH group respondents. The LH group of respondents rated

'education' lower than the other two groups of respondents.

Some hotel owners and managers participated in global, national or local environmental

programs that enabled adoption of green energy technologies identified in the 'energy-

efficiency', 'renewable energy' categories in Table 4.1. For example, one committed hotel

was part of the Carbon Disclosure Project, a global company initiative to address the

carbon challenge within their portfolio of hotels. Similarly, another less committed hotel

was part of the City of Toronto environmental initiative 'Deep Lake Water Cooling',

which enabled a savings of almost 90 percent in energy consumption for air conditioning

compared to conventional equipment. This research does not describe the workings of

every decision related to sustainability; it highlights selected prominent decisions made by

hotel owners and managers to illustrate decision-making criteria.

4.3.1 Drivers for adoption of green energy technologies by GA owners

The respondents from this group indicated 'environment consciousness', 'improve

environmental image of the hotel', to be strong drivers and 'cost savings', to be the least

strongest driver to adopt green energy technologies. The respondents' ratings for other

drivers were divided. 'Stakeholder influence' and 'policy' rating showed that half of the

respondents from this group believed them to be strong enablers of adoption of green energy technology while the other half did not. Only one respondent in this group rated '7' for 'economic incentives'. Barring one respondent, 'education' was rated high. 'Consumer demand' was not rated as high as 'competitive advantage'.

Overall, the GA group respondents portrayed distinctive attitudes from each other. It is important to note that green energy technologies adopted by GA group were innovative or that they were among the early adopters (table 4.1). Government policies were often not in place to facilitate such technology adoption.
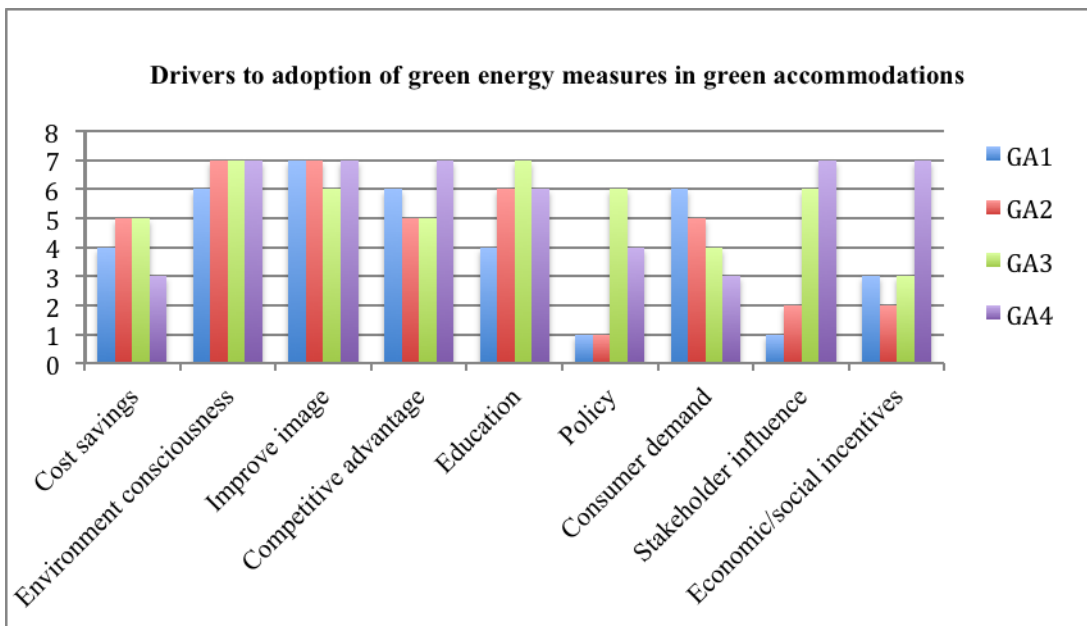
Figure 4.2 Drivers for adoption of green energy technologies by GA owners

4.3.2 Drivers for adoption of green energy technologies by LH managers

The LH group respondents overall rated 'cost savings' as the strongest driver to adopt green energy technologies, followed by 'improve environmental image of the hotel' and 'competitive advantage'. Most of the hotel respondents claimed implementing low cost

measures such as 'recycling', 'reuse of linens and towels', 'shutting curtains to prevent heat loss' and 'shutting equipment when not in use'. Three respondents in this group rated 'education' lower in other motivations. This indicated that LH group respondents were not entirely convinced about the potential of 'education' to become a driver for sustainable technology adoption.

Figure 4.3 Drivers for adoption of green energy technologies by LH managers

4.3.3 Drivers for adoption of green energy technologies by CH managers

As seen in Fig. 4.4 below, in the CH group, the majority of the respondents rated all drivers as strongly influencing their decisions about adoption of green energy technology, except respondent CH2. There was a significant difference in the rating of the CH2 respondent in comparison to the other hotel respondents within the group. CH2 respondent showed less motivation for 'cost savings' and 'consumer demand' for driving decisions

related to adopting green energy technology. CH2 respondent also rated 'education' lower than other respondents in the group. CH2 was a small and independently owned hotel while the other two hotels in the group were large chain-affiliated hotels.
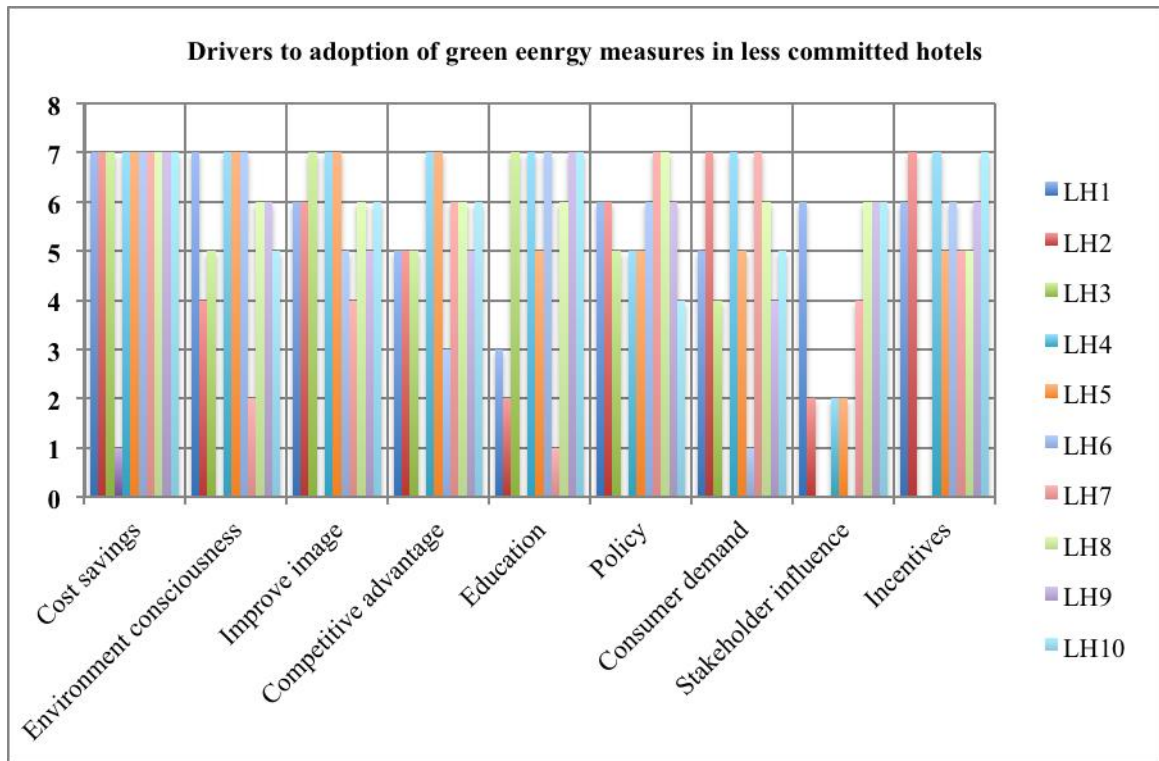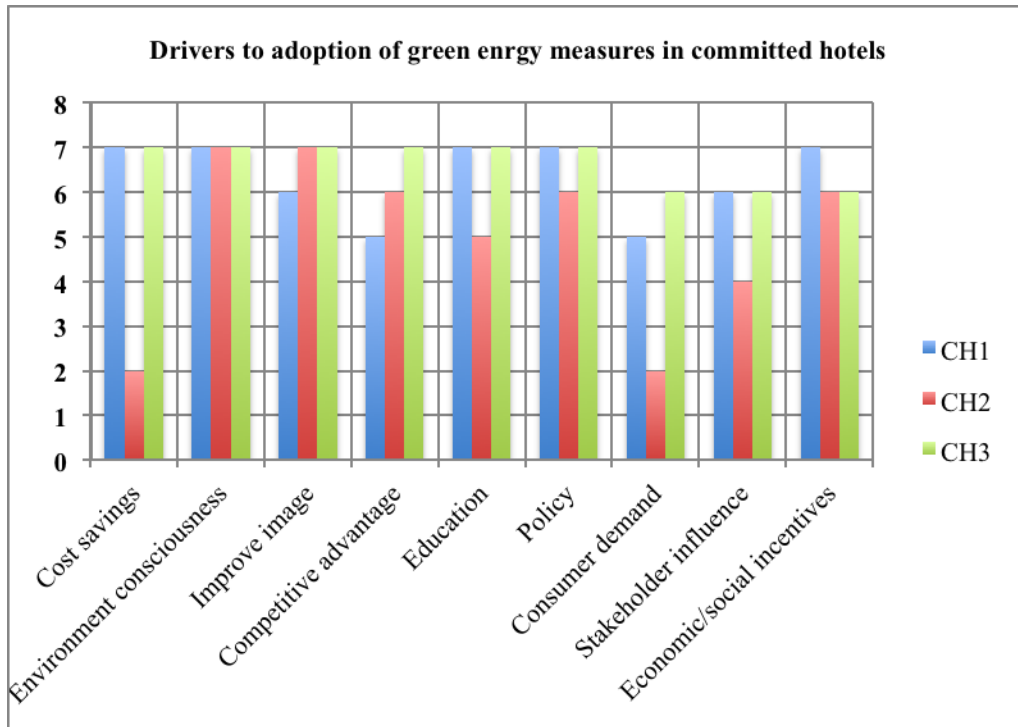

Figure 4.4 Drivers for adoption of green energy technologies by CH managers

The business case for adoption of green energy technologies for hotel managers showed some similarities and differences between the two groups, CH and LH. To an extent, 'stakeholder pressure', 'competitive advantage' and 'consumer demand' together drove hotel managers to make decisions in favor of sustainability. The CH group respondents took action in marketing their efforts to gain competitive advantage over other hotels to attract consumers. Mostly CH group respondents indicated that large group bookings were given to hotels that adopted green measures, overall. Hotel managers believed that the business clientele, especially meeting groups, chose to stay at hotels that adopted green measures. Hotel managers were denied business from some large corporations because of

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low environmental standards, adding pressure to improve energy performance. In order to respond to this consumer demand and cope with stakeholder pressure, committed hotel managers ensured increasing green ratings to convince meeting planners about their sustainability efforts by putting in place eco meeting program, purchasing carbon credits and increasing green ratings by pursuing more superior certification programs like LEED (Ref. Table 4.1). The LH group respondents marketed their environmental efforts as well; however, they did not participate in as many sustainability programs as their committed counterparts. A good example of 'stakeholder pressure' and 'competitive advantage' was observed in the following statement.

> A lot of group bookings, they send out a sheet to check on the environmental programs we have, what kind of lights, etc. and most likely they will not stay with us if we don't match their standards. I see that come across quite often in the last 5 years (CH1, 2012)

In terms of consumer demand, the reactions of hotel managers were mixed. There existed consumer demand for sustainability in the corporate clientele, as pointed out by the majority of the hotel managers. However, there was still some disagreement related to meeting 'luxury' expectations of consumers under strong sustainability terms. In addition, one hotel manager also commented about putting off the 'anti-environment' community by being more sustainable.

With respect to 'education', one hotel manager commented about the lack of knowledge among hotel staff in regards to environment. Hotel managers acknowledged that hotel staff needed to be better informed and trained in order to achieve the sustainability goals set by the leadership of the hotel. It should also be mentioned that hotel respondents from

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the LH group complained about lack of resources from owners and chain organizations to motivate participation of staff in tracking energy data or actively engaging them in sustainability actions. This is evident from the following statement made by a (LH, 2012) respondent,

The company has given the freedom to do the right thing for our hotels. From IHG, the Holiday Inn brand, they have some different training they provide from the brand's side. They have a program Green Engage. It's been in the system for a while but it's a big project to get it done and we are not all part of it yet. With all these environmental programs the fee is not a big deal, it's the input of the information and on a day-to-day basis a hotel runs, it takes time to input this information. Sometimes, we do some things that are great for the environment in day-to-day living. We don't even consider the environmentally friendly aspect of it. So, we get into that routine a lot because we don't really have time to tag what we do. So that's a challenge that I find.

In spite of adopting many green innovations, small businesses struggled to compete with chain hotels. They did not receive enough recognition and remained "the little guy". They were unable to offer the price elasticity that hotels managed due to economies of scale. Often, the small and medium-sized hotels and accommodations complained about how hotels took up measures to merely form a good image for consumers and hence their own efforts to truly contribute only received similar/lesser recognition. Moreover, small rural and remote tourism businesses suffered because of lack of access to skilled labor. Hence, accommodations operated on contract labor, leading to inconsistent service. Access to trustworthy suppliers and contractors was challenging, as noted by the owners. It also took longer to get help, in case of any small system failures. Unlike in hotels, there did not exist any maintenance department to handle such problems. Essentially, education was an important aspect of small and independent businesses as these hotels and accommodations were largely based on owner's/an individual's ideas of sustainability. Hence, the onus of

training the staff about green initiatives and increasing business was on the owner's alone. Such issues were more straightforward in chain hotels because of better support systems to enhance training and education of staff, formal sales department to increase revenues, etc. While the small-sized independent hotels competed with their chain counterparts, less committed chain hotels also competed with committed hotels in terms of better resources and sustainability processes. It was important to identify the challenges of the hotel and accommodation segment to foster co-operation and understanding in the sector at large.

Being a small operating business, it was difficult to convince government authorities that their energy systems were superior. They were innovative and risk-taking and hence proposed technologies that were less commercialized. This hampered support from government officials as well because some technologies were unconventional. As one Eco lodge owner commented,

> In the case here, the [local] building department is wretched. They are really hard to work with. You have to have everything lined up. In fact when we built our straw bale home, they knew very little about straw bale and were quite resistant about approving it as they did not understand it. In fact, one of the inspections we had to get passed, they were not willing to do the inspection. (GH2, 2012)

It became difficult to access grants and economic incentives and gain co-operation of government officials to support cutting edge technologies, as there was no formal application process setup for unconventional technologies. Further, these accommodations barely qualified as commercial units as they were small in size between 5000 and 10000 square feet. Most government grant and certification programs like LEED, were primarily designed for generic commercial buildings. Thus, small businesses tailored their ideas to

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fit into the requirements prescribed by the grant application. One Eco Lodge owner

provider complained,

> I tried so much. I sent a letter on the provincial level, to the Ministry of
> Environment, Ministry of Natural Resources, Industry, Tourism, the Premier and
> then I did the same on the federal level. I talked to my MP and MPP from Markham
> and MP and MPP from Bancroft where the lodge is, and all I got from them was,
> "Yeah, that's a great idea, Best of Luck". I got nothing. Somebody said, well, we
> can give you, there is a provincial program and you can get your PST back and then
> I looked at it, it's only valid for private residences, so if I got applied and audited,
> they would say, this is not a house or a cottage, this is a commercial unit and so the
> amount of paperwork that I would have to fill out and then having to apply for it and
> carry the risk of paying back all that, I said, "Forget it"! I just funded it myself.
> (GA1, 2012)

Another Eco Lodge owner commented,

> In fact, the LEED requirement initially the first part was very site specific, which
> made sense and it kind of fit into their program. But, you look here and this place
> and I had to count every tree to 5ft sq. grid. So, we did a site survey and that helped
> us protect some big trees here. Actually, I could cut some of those big trees for a
> good view and the Niagara Escarpment does not say a word. So the Niagara
> Escarpment tells you how you can build and what you can build, they do not tell you
> what products to use, that was my choice and it would be easier for me to say, I am
> building an Eco lodge than them to say what is an Eco lodge? Because I am not
> commercial, I am recreational. I just made LEED fit into my criteria. (GA3, 2012)

The findings showed that committed hotel and accommodation owners and managers

were able to translate their beliefs about sustainability into action by adopting green

technologies that were representative to some extent of their level of commitment.

However, there existed challenges in going forward from beliefs to action for the LH

group respondents. To describe what factors allowed committed hotel and accommodation

owners and managers to advance their beliefs into action, the business case of green

energy technologies is described. The business case for green technologies for LH

respondents in the future is also addressed below.

4.4 Business case for green energy technologies in the hotel industry

CH hotel managers described the value proposition for green energy technologies to be in a payback timeframe of 2-5 years. The hotel managers focused on savings as a driver and took a calculative approach towards energy planning at the hotel property level. CH managers were seriously looking into adoption of renewable energy and had conducted feasibility analysis of the same. These managers had looked into adoption of cogeneration technology as well and some had already adopted the same. CH3 manager had invested $1.5 million (CAD) in renovating all the elevators in the hotels and replacing them with new ones that would run on the cogeneration technology. These hotel managers also identified the application of such technology in other areas of the hotel. For example, capturing heat from a fireplace in the lobby to heat swimming pools, by putting it through heat pumps or reclaiming waste heat from shower drains and using the same to warm up cold water supply for the shower.

The decision to adopt green energy technologies was based on need and opportunity. Hotel managers used simple applications such as putting variable frequency drives on kitchen hoods, fans and other motors so in quieter times, the system ran on low power, saving cost and electricity. Similarly, energy-efficient lighting was used wherever it would bring hotel managers maximum energy savings. For e.g. LED's were used for 24-hour light emitting external hotel signboards and public spaces within the hotel. LH hotel respondents explained that 'purchasing green electricity' was considered for adoption strongly. However, the decision to adopt or reject was based on green electricity rates. LH

managers analyzed the value proposition based on annual cost savings. Hotel managers also mentioned that their Local Distribution Companies (LDC's) offered to change from variable pricing to fixed pricing and some hotel managers were keenly looking into that option.

Typically, hotel managers preferred investing in more commercialized technologies rather than piloting new technologies. It was helpful to make a case for a well-established technology as opposed to less known one to the senior management. As renewable energy technologies were new in the market and only a handful of hotel managers had adopted them, they lacked majority support. Hotel managers that preferred to follow the leaders, focused on integrating more conventional technologies.

Although table 4.1 showed lesser market penetration of sustainable technologies in the LH group, the following graph indicated the potential for these technologies' adoption in the future. 'Energy conservation' and 'increasing energy-efficiency' measures were indicated as most likely to be adopted, while 'generating on-site renewable energy', 'cogeneration' and 'purchasing green electricity' were least likely measures to be adopted by the LH managers.

There were a small percentage of respondents that indicated positive inclination towards adoption of more innovative measures. Two LH respondents did not answer this question. Further, a few hotel managers reported lack of knowledge about the below technologies.
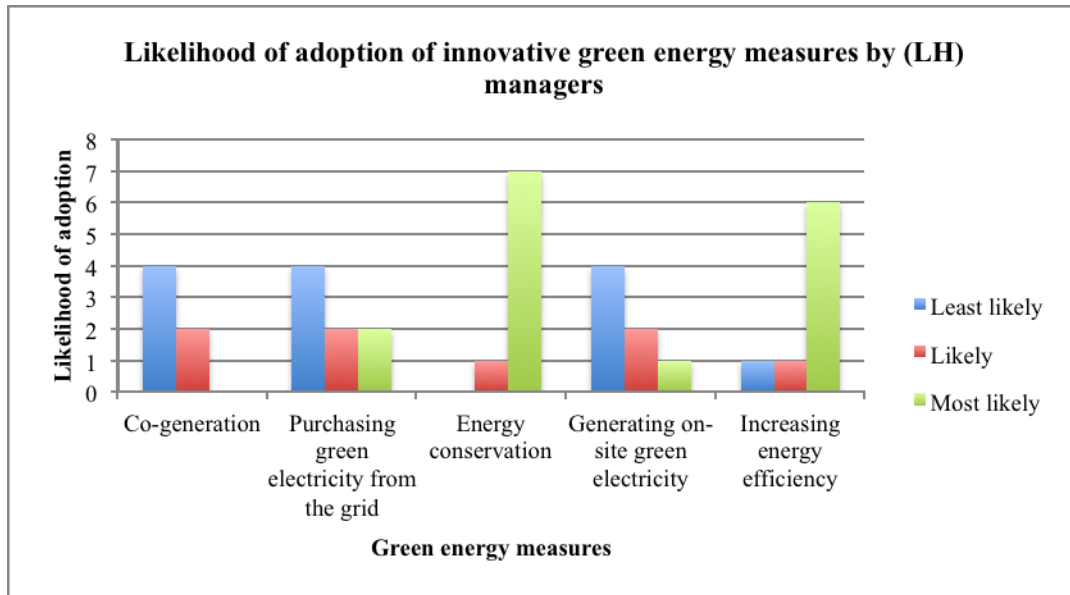
Figure 4.5 Likelihood of adoption of innovative green energy technologies by LH managers

The LH managers were prepared to adopt 'energy conservation' measures, as they were low cost based. Most LH managers were determined to meet the 1-3 year's return on investment timeframe preferred by their leadership. 'Increasing energy-efficiency' by replacing old inefficient equipment by efficient ones fitted well within this scope. Typically, adoption of 'renewable energy' technologies took longer for payback. For 'renewable energy' technologies, very few LH managers considered their adoption because of their long payback time. However, hotel managers acknowledged that if leading hospitality brands adopted these practices, they might follow suit. As one LH manager commented,

> For doing it commercial, it's a huge cost like solar panels. I just don't know who is going to bite the bullet. I think I can see the big hotels doing it like the Ritz Carlton or J.W. Marriott, Hiltons. I just think that it's only a question of time when people will because if you can imagine the amount of energy that you can utilize with solar and if that can heat up rooms to servicing…For me, I think cost is a major factor and as an owner, you have to consider it. The way I look at it is what is my cost and payback of that solar panel. I see the payback as 5 years, but you have to look at the

cost to justify that payback to say 2,3,4,5 years. I think hotels have looked into it, but who is going to be the guinea pig. I mean when you look at showerheads or CFL bulbs, it's taken so long for hotels to adopt them and some of them still haven't. In this industry, I have always learnt that who is going to be the first to do it and once they find out 1,2,3, hotels have done it, everyone jumps on the bandwagon and that's how it works (LH1, 2012).

The value proposition for producing on-site renewable energy was indicated in decisions made by GA owners. These owners were willing to spend upfront money in investing in solar PV and hydroelectric power plant. One owner explained that the money spent on hydroelectric power plant was estimated to be $80,000 but at the end, it amounted to $120,000. The owner did not calculate the payback for this project. On the other hand, another GA owner explained the analysis carried out to measure end cost savings as follows.

> We get paid through the MicroFIT program 80Cents per Kw/hr. So, our solar panel system was $40000 and in year 1, we produced 5500 KWh so 80Cents per KWh, it was about $4400CAD is about how much we received from Toronto Hydro. So that's about 11% ROI. So, now the argument is 56 cents, but I think there are enough improvements in the systems so there is still opportunity. But what the 80 cents did do was to create the opportunity for 56 cents. One of the things about solar PV is about the elevated price. People don't make sense of this green electricity concept about selling back to project. It's not really a false economy. Electricity production is blurry and you really don't know the true costing. The idea is why pay the mega electricity provider who fails to meet his commitment as opposed to an individual investing in clean energy. (GA4, 2012)

Largely, the decision to connect to the electricity grid to supply solar or hydroelectric power was based on the rates offered by the provincial government for the supply of green power to the grid. Given that GA1 was located remotely, the infrastructure costs to connect to the grid were very high and hence, the owner decided to use the on-site produced electricity for his own purpose alone. Another reason to support this decision was related to the electricity price for hydroelectric power 13¢/KWh as opposed to

80¢/KWh for solar electricity. To some extent, GA3 owner benefitted from being located closer to the grid in order to use the MicroFIT program.

GA owners believed in recovering their costs by marketing their efforts to consumers. Typically, green efforts could be measured against increase in occupancy. As explained by GA4 owner assumed occupancy to be 65-70% average in the next five years and hence calculated return on investment as follows,

> The hospitality analyst had to determine the viability of our project. But his evaluation about energy stuff from the marketing stuff, his projected increase in occupancy because of the green stuff was 3%. In reality, 3% is about 35-40000 CAD. So, in six years if we create 240000 from the green energy story side of things, that more than offsets all the green energy investments. So, it's worst on the conservative review also makes sense because all the people who don't care about the green energy stuff are still impressed when they are here. (GH4, 2012)

The above value proposition among CH and LH hotel managers and GA owners described what factors are accounted to make a strong financial case for approval by management or for a self-decision. GA owners were somewhat flexible in their terms to meet specific timeframes, and readily invest upfront in green energy technologies. Hotel managers on the other hand, were bound by the financial business case recognized by senior management in the company. The next results shed further light on what factors may/may not affect the decision-making of hotel managers in terms of adoption of green energy technologies.

4.5 Challenges in decision-making related to green energy technologies in the hotel industry.

The similarities and differences in decision-making related to green energy technologies were drawn from a range of organizational and operational factors. The lack of action taken towards pursuing green energy technology is explained based on these factors. The results are discussed keeping the same framework that was used to study drivers in the adoption of green energy technologies. Hence, the results will be divided in groups as above, namely, GA, CH and LH. One hotel from the CH group did not participate in rating organizational factors. Another respondent from GA group only answered part of it.

As observed in Fig.4.6 below, the three groups indicated how strongly some organizational and operational factors affected decision-making in the adoption of sustainable technology. 'Ownership' 'location' and 'climate' overall, were factors that were strongly considered before adoption of sustainable technology in all groups. CH and LH respondents, considered 'size' to play a significant role in decision making about adopting sustainable technology. The three groups' respondents considered the role of 'organizational policies' to affect decision-making in somewhat different degrees. Among them, the CH group showed 'organizational policies' to strongly affect decision-making. 'Star categorization' was also considered as an important factor in the discussion related to sustainable technologies in these three groups.
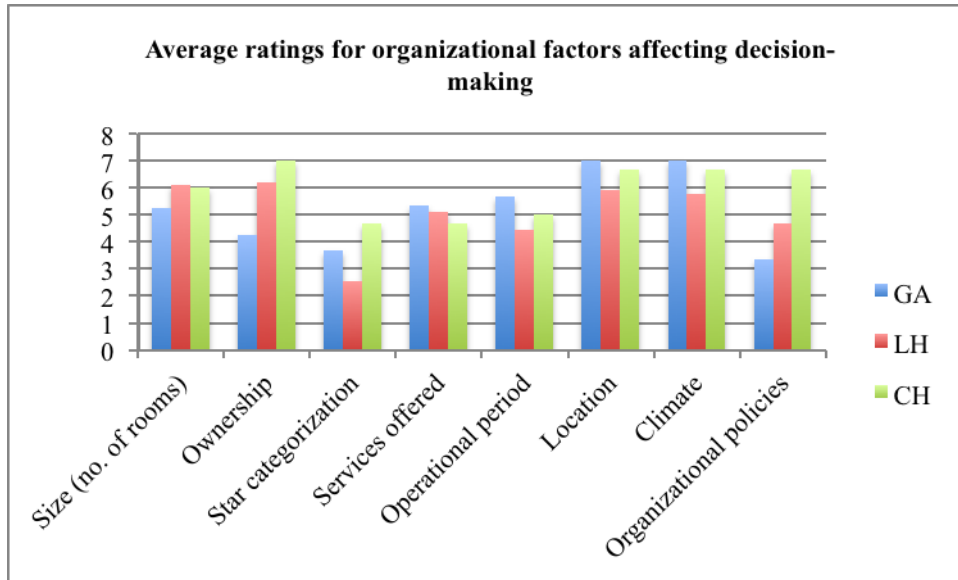
Figure 4.6 Average ratings for organizational factors affecting decision-making of owners and managers

4.5.1 Organizational factors rated by GA owners

Typically, GA group respondents' rated '6' or '7' on operational factors such as 'size', 'operational cycle', 'location' and 'climate' to play an important role in decision-making about sustainable technology. Given that GA group adopted most innovative energy systems such as micro hydroelectric plant, straw bale insulation for their cottages and solar passive haus, the relevance of these factors was deemed important. Other organizational factors, however, were rated lower, such as 'ownership' and 'organizational policies'. Being independently owned hotels, organizational policies were self-driven mandates rather than formally endorsed as observed in chain hotels. It must be noted that GA owners at times, interpreted the role of 'ownership' to make the decision-making process easier in independently owned businesses. This is especially the case where 'ownership' is rated typically, '6' or '7'. Similarly, two hotels did not rate 'star categorization' factor as it was interpreted as 'AAA Diamond star categorization', used

for hotels only. The researcher pointed out that this factor was included to better understand service-levels to play a role in decision-making regarding sustainable technology.
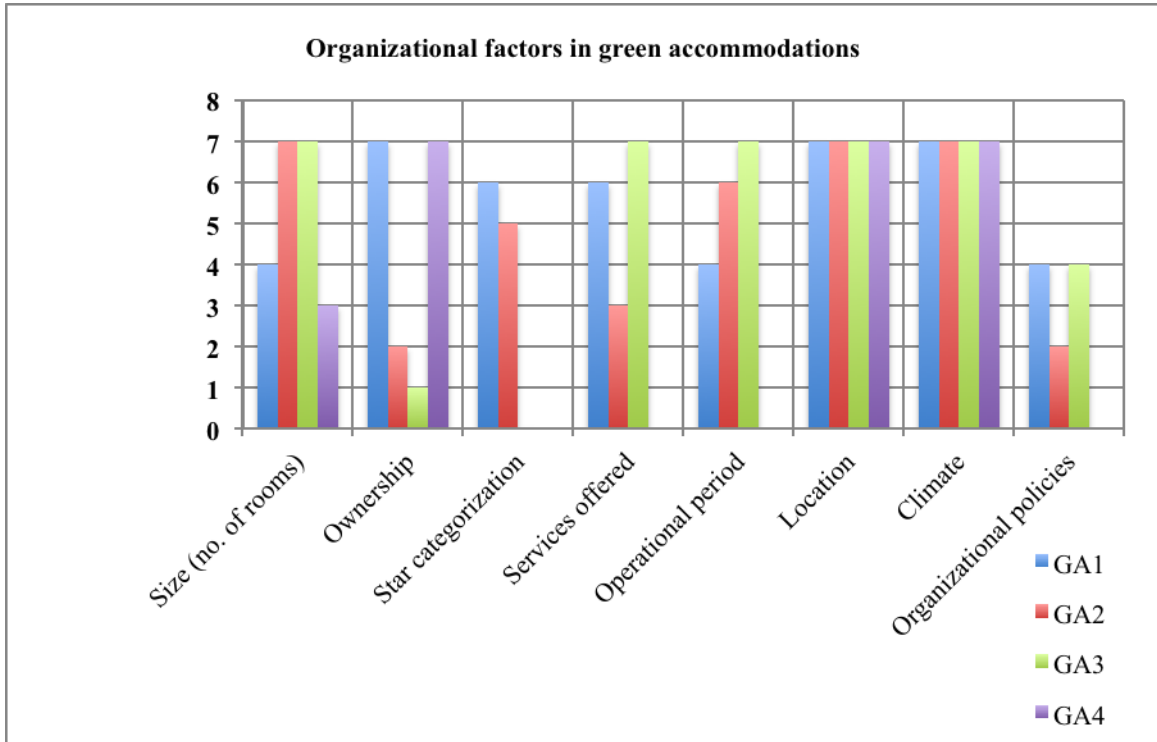
Figure 4.7 Organizational factors affecting decision-making of green accommodation owners

4.5.2 Organizational factors rated by LH managers

As seen in Fig. 4.8, the LH group respondents overall rated 'size' and 'ownership' high and believed it to play a strong role in decision-making related to sustainable technologies. 'Services offered' and 'operational cycle', were also considered to play an important role in decision-making. The responses on 'operational cycle', 'star categorization' and 'organizational policies' were the most widely dispersed in the range of '1 to7'. LH6 and LH1 rated lower on 'organization policy' to affect decision-making. LH1, LH2 and LH8, showed low ratings for 'star categorization' to influence decision-making about

sustainable technologies. LH1, in particular, rated low on both these factors indicating that the hotel respondent was not bound by any mandates that may require adoption of green measures. A few of the less committed hotels' respondents acknowledged that they were unaware about how decisions regarding technologies were associated with 'location' and 'climate'.
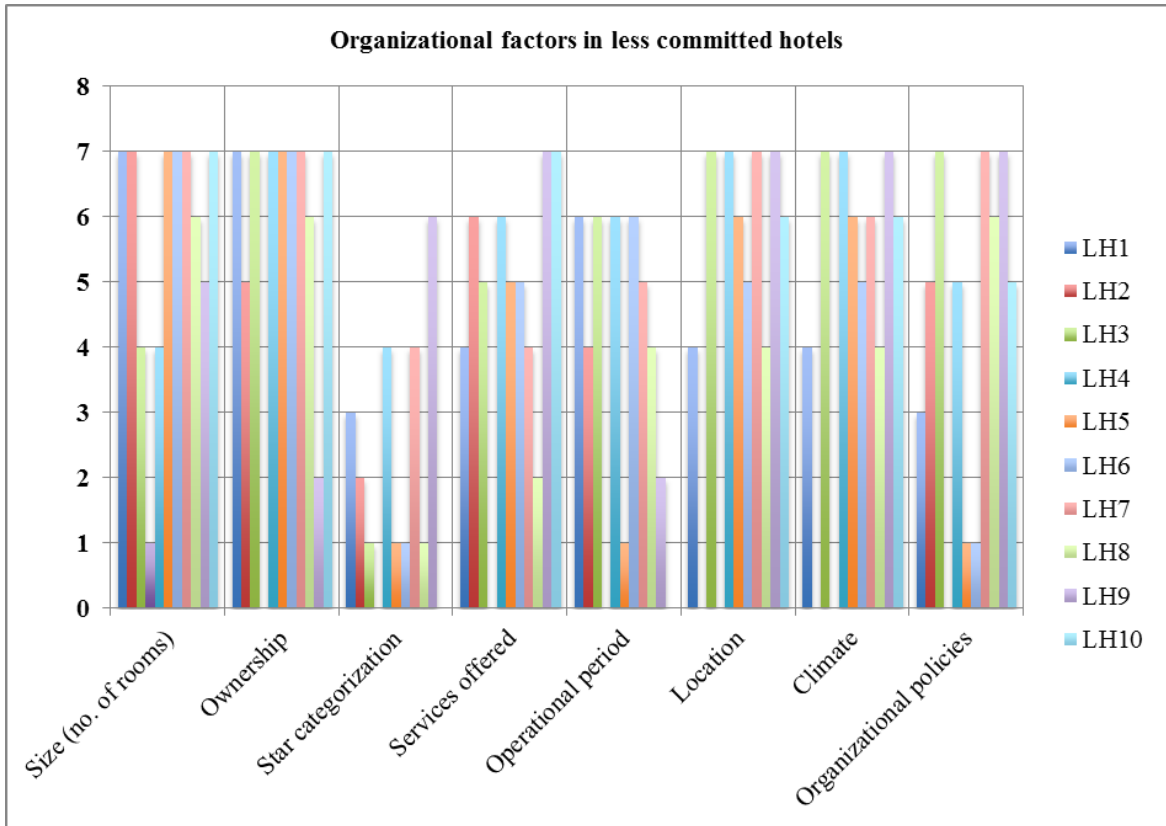
Figure 4.8 Organizational factors affecting decision-making of LH managers

4.5.3 Organizational factors rated by CH managers

Similar to findings from Fig. 4.8 CH2 respondent showed significantly different ratings than the other two respondents in this group in Fig. 4.9. 'Star categorization', 'services offered' and 'operational cycle' was rated low as compared to CH1 and CH3. In spite of being an independent hotel, CH2 respondent rated 'organization policies' as high. Overall,

both CH1 and CH2 considered all factors to play an important role in decision-making about green energy technology.
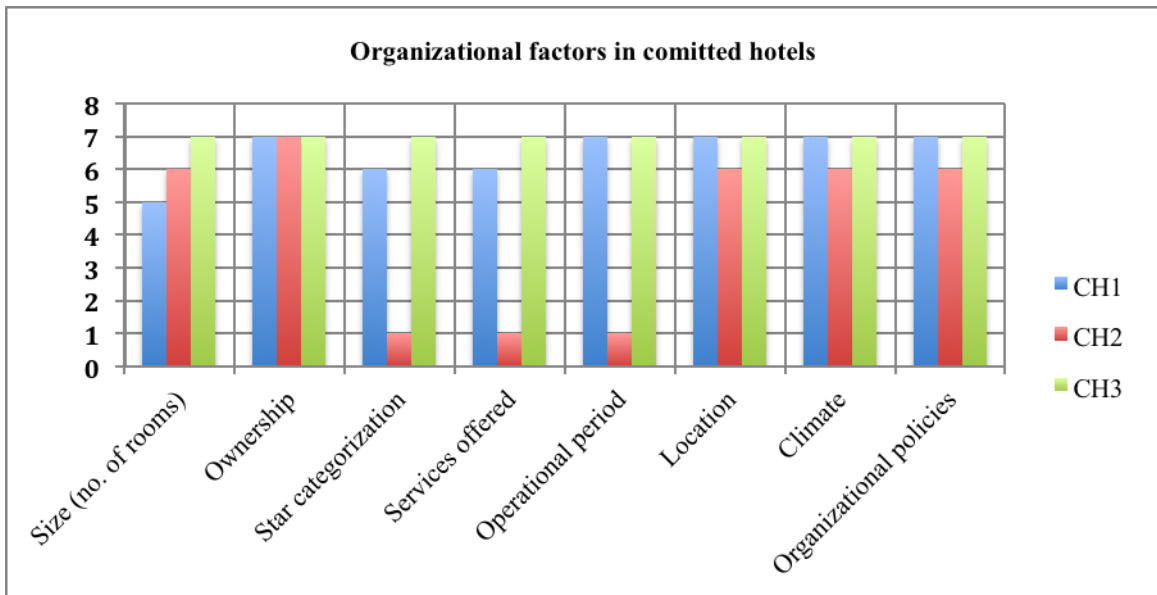
Figure 4.9 Organizational factors affecting decision-making of CH manager

Hotels, in general, showed similar ratings except for 'organizational policies' and 'star categorizations' between CH and LH groups. The GA group indicated that operational factors played an important role in determining decisions related to green energy technologies. Through the discussion of these factors, three factors that emerged to be significantly affecting decision-making regarding green energy technology was the 'age of building, 'stage of construction' and 'clientele' type.

The following table provides an overview of what decision-making structures and processes made the value proposition for green energy measures.

	GA1	GA2	GA3	GA4	CH1	CH2	CH3	CH4	LH1	LH2	LH3	LH4	LH5	LH6	LH7	LH8	LH9	LH10
Certification	×	Audobon Intl(4/5)	LEED G-(Ver.1)	×	GKG-5	GKG-5	GKG-5	LEED-C (Ver.1), GHG-5	GKG-4	GKG-3 (no longer)	GKG-4	GKG-4	GKG-3	GKG-3	GKG	GKG	GKG	GKG
Processes																		
Tracking and monitoring	✓			✓	✓	✓	✓	✓		✓	✓		✓	✓	✓		✓	✓
Capital Plan	×	×	×	×	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Energy audit	×	×	×	N/A	EU	EEC	EEC	×	EU	EEC	I	×	EEC	EEC	I	×	EEC	EEC
Certification	×	Intl(4/5)	(Ver.1)	×	GKG-5	GKG-5	GKG-5	(Ver.1),	GKG-4	3 (no	GKG-4	GKG-4	GKG-3	GKG-3	GKG	GKG	GKG	GKG
Green commit	×	×	×	×	✓	×	✓	✓	×	×	✓	×	×	×	✓	×	×	×
Green champi	Owner	Owner	Owner	Owner	C. Engg	Owner	C. Engg	Developer	Owner	GM	GM, MM	GM	GM, MM	HRM	Developer	Developer	Developer	OM

Table 4.2 Decision-making structures and processes of the participating hotels

I	Internal
E	External
U	Utility Provider
EEC	Energy Audit company

Age of building

The age of the building was an important criterion considered while making decisions regarding green energy technology. Hotels and accommodations that were more than a century old were restricted to only change things that affected the internal design and infrastructure, while preserving the external heritage features. Energy systems in such buildings were old, outdated and had high GHG emissions. Dealing with old technology and infrastructure presented an opportunity to change to green technology. However, often it was difficult to retrofit everything at once. Hence, hotels planned a capital budget that included renovation in phases, approximately every five years. Older buildings lacked insulation in ceilings and walls and hotels primarily invested in improvements to the building envelope to reduce heat loss and utility bills. Hotels and accommodations invested in wall insulation. This was especially observed among hotel developers who owned the hotels and did not build to sell. Wall insulations were seen as a long-term cost saving measure and hoteliers sometimes went beyond the required standard, especially in very cold regions. Hotels were restricted by space and design specifications of heritage properties thus preventing them from exploring some possibilities for generating on-site renewable energy. Regardless, committed hotels and green accommodations such as CH2 and GA4 successfully managed to incorporate superior green energy technologies that resulted in vast improvement of energy performance. For example, GH4 respondent informed that the 100-year old building used only 1500W of energy, when the entire building was lit. This amount is equivalent to energy consumed while using a hairdryer. This information is also available on GH4 website.

Stage of construction (retrofitting/new construction)

As a rule, it was considered easier to build new buildings more energy-efficient than retrofit old buildings. New hotels used better technology because of improved building standards and were more efficient from the start. Essentially, retrofitting and new construction projects provided opportunities to managers to implement green measures. It was possibly easier for hotel managers to build a new hotel based on LEED certification guidelines and achieve higher ratings, but that did not mean that older hotels could not achieve the same status. LH group hotel managers were not informed and/or motivated to adopt superior green building certification programs or other green programs, even if there existed an opportunity to retrofit/ build new.

An example of one such an opportunity was embedded in LH8 manager's comments about ownership mandate desiring to operate hotels that are owned by them and built from ground-up. Essentially, new construction provided the opportunity to build under improved energy-efficiency guidelines. GA2 built a straw bale home that constituted R-value of 50 for walls, which was double the norm. In this study, best practices representing both, retrofitting and new construction were identified.

Size

Several issues were considered while deciding about green energy technologies to be included in new/old buildings. Scale of impact was one of the most important points raised while considering any technology. Wherever possible, hotel respondents assumed a good value proposition to be where maximum output for the minimum dollar was achievable. Hence, given the choice to implement a particular technology in a 100-room hotel versus a 400-room hotel, the latter yielded better results

when measured in return on investment and energy savings terms. From a technical standpoint, the capacity of technologies was dependent on size and usage of utility services. On the other hand, it would be ideal to set this factor in context of a business case and eventually the size would make a difference on how critically any proposition was looked into. For example, if it made sense to change Ptac units in all rooms of a hotel, it would be done. However, sometimes hotels implemented it for one section due to high upfront costs and used the net cost savings to simply implement it in the other sections. The other advantage to it was that some hotel managers were concerned about the success of green energy technologies. This practice was more commonly observed with energy efficient lighting and motion sensors in guestrooms.

Ownership

The decisions in hotels were largely influenced by operational and organizational factors as compared to independent hotels. Essentially, both, committed and less committed hotels were chain affiliated. As compared to independent Eco lodges and hotels, chain affiliated hotel managers made decisions in a hierarchal structure. In such a bureaucratic environment, hotel managers complained about long turn around times regarding capital requests, less empowerment to sustainability champions in terms of financial investments, and overall inefficiency in the decision-making process. However, these issues were dependent on the ownership structure: franchise-operated or management-contract based. While sustainability structures were present in both, committed and less committed hotels, the former were more rigid in their processes than the latter. For example, a franchise-based hotel manager commented,

> The brand does not have a stipulation that you have to hold a green key rating but some brands I have worked do have a stipulation that you must have a green program. I don't believe Choice Hotels does, but we do it for our clients. (LH2, 2012)

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On the other hand, a management-contract based hotel manager commented, "Stakeholders have a say but at the end of the day its about making money and I have to say that our owners to the upmost extent are willing to do not just following green practices but exceeding it (CH3, 2012)

The contractual agreement between owners and franchise or management-contract included terms and conditions for financial investments related to furniture, fixtures and equipment. In comparison to family-owned ownership structures, management-contract based hotels in this study offered more financial flexibility and empowerment to the General Managers with respect to making decisions within the operational budget. For example, changing incandescent bulbs to LED (Light-emitting Diode) and CFL (Compact Fluorescent lamp) was implemented under the operational budget of a chain hotel and did not need corporate approval while such changes involved a higher authority in family-owned franchised properties. Among the committed hotels, CHI and CH3 were management-contract based hotels that operated under the supervision of the respective chains. The efforts to take up environmental measures were observed from owners and the chain counterpart. These hotels were bigger in size and the hotel environmental champions were empowered to make any changes below CAD 10,000.

In franchise-based operations, the decision-making process was predominantly owner-driven while the chain simply outlined few environmental criteria. These environmental criteria in some cases included forming a 'green committee', based on chain organizational policy. In the case of LH6, the organization policy focused more on being socially responsible and less on environmental initiatives. Given that the ownership did not mandate any environmental action either, the hotel staff carried out minimum measures that were required to remain Green Key certified. In this research study, the

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franchise-based hotels were small to medium sized family-owned businesses and the owners took up

any decisions beyond CAD 1000, giving little room for hotel property managers to take any action.

One of the franchise-based hotel respondents explained, "Based on the dollar amount. Under CAD

1000, the decision would be under a property manager, anything between CAD 1000-5000, regional

director of operations an anything above that would come back to headquarters and ultimately to

me". (LH7, 2012)

Family-owned structures, sometimes, provided an opportunity for owners to operate on their own

terms with minimum interference from chain headquarters. While some less committed hotels and

developers took a conservative approach towards investing in environmentally friendly technologies,

CH4 declared that they would construct new buildings along LEED certification guidelines.

> They decided to build the first LEED hotel in Canada on top of the 5 Green Keys, which the
> two other hotels in St Hyacinth also have but we do have the distinction of being LEED
> certified. The Robin Group is also breaking ground on a second LEED certified property,
> which will be of the next standard (level) of LEED certification. (CH4, 2012)

It was completely at the discretion of the developers to choose any hotel brand. Sustainability could

be only one factor considered when signing up with a hotel brand. Other factors were driven by

market research and brands were chosen based on type of service (4 Star, 5 Star), product and

competition. A typical developer would choose a brand based on the following assumptions. As

commented by the developer,

> I built two hotels in the upper mid range where nobody has built in that range and I felt that all
> were 4 Star (full service hotels). And they were anywhere from being 30-100 years old. I felt
> that if I tap into that 4 Star market (upper market) and provide the same kind of service and
> quality of the facilities then I should be able to do much more business. And that is my
> strategy. Unique product is my strategy. Choosing brand is also a part of the strategy that if
> you choose a location and there are already 6-7 Marriott brand then you can't do that brand and
> we will look for Hilton. This is how we go about from one brand to the other. (LH9, 2012)

REIT-owned hotels went through a portfolio evaluation every three months and it would be decided

if the property should be sold or held. Usually, those hotels being evaluated for selling did not

receive priority in terms of any capital investment from the owners. As LH3 respondent commented,

> The owners are BCMCI and they are also the owner of brand. But this, as many companies such as investment houses, I've been told that they are BC's version of the Ontario pension fund. Really, they are about investing in return for their investors and so having a brand in hotels and real estate, it all fits in and every three months, they make an evaluation of their portfolio and make a determination as to whether buy, hold or sell strategy. For the past two years, they have been looking at what to do and hence, in that environment they don't want to make any capital ballads (commitments) unless it's actually required. (LH3, 2012)

In this manner, the decision-making regarding sustainable technologies was quite complex in chain-

affiliated hotels. While complexities were involved in decision-making in chain affiliated hotels,

independently owned hotels showed a relatively simpler process of decision-making, requiring no

formal proposition and consent from stakeholders to make any changes.

Services offered

For hotels, the more services offered, the more energy needed. It also meant that if there were

services offered, there were opportunities to involve green energy technology. For example, hotels

considered solar heating their swimming pools as it provided a value proposition and offered an

opportunity to gain competitive advantage. As a rule, the more the services, the better the case for

renovations, whether guestrooms, back-of-the-house, meeting rooms, etc. Essentially, hotel

respondents explained that they would consider innovating in areas visible to guests to gain

recognition. However, ultimately, if it made more sense to change back-of-the-house technology like

water condensing units, as it presented a better value proposition for both dollar and energy savings,

management would approve such projects.

Location

For remote accommodations, where energy supply was a challenge, the operations were only run seasonally depending on flow of water and sun light. The issue largely co-existed with the location of a property in terms of access to energy resources. The seasonal cycle not only dictated operations to be run for certain seasons, but also affected the critical planning for energy costs. For example, GA2 owners operated old cottages only in the summer, as they were less insulated and could not hold heat in them, during the winter. As the old cottages were shut for the winter season, the owners did not invest in improving insulation and believed they would rather build new cottages that were environmentally- friendly. Hence, they built a passive solar haus and straw bale insulated home with R-value 50. Hotels operated year round and altered energy usage based on needs for heating and cooling. For example, cooling costs were higher than heating costs and it made business sense to gain benefits by cutting base demand by 5% rather than cutting peak demand by 10%. The peak demand had been for natural gas mainly used for heating purposes, while electricity was the main energy source for cooling.

Clientele type

As reviewed in the literature, the 'user' component of energy affects energy consumption in several ways such as time spent in the guestroom and services used by the guests and/or consumer habits. In hotels, the 'business' or 'leisure' client type may affect the extent of energy used in the hotel. A LH respondent gave an example of a group of teenagers using more services offered in the room such as hair dryers, coffee makers or having long showers in comparison with a business clientele that has limited energy usage because of spending lesser time in the guestrooms.

The time-of-use pricing program may also have been associated with 'clientele type'. Green accommodations attracted leisure guests who used maximum energy in the evening, during low peak hours. The service expectations from green accommodations was lower than hotels and hence, the former took more freedom in exercising time-of-use pricing policy by communicating to guests about using resources carefully. Given the leisure schedule of clients, the maximum energy usage was in the low peak hours, during evenings as opposed to hotels, where business took place in peak hours. Hence, the green accommodation owners indicated that laundry could be done in low peak hours as well. Hotel managers indicated that they had tried implementing time-of-use pricing program but it did not save them as much money due to lack of flexibility in business operations. Hotel managers considered consumer demand for sustainability still a. This assumption was not based on any real data but by practical experiences in day-to-day activities.

Climate

Climate was also considered a significant determinant required to choose energy systems. GA1 respondent explained how climate affected the turbine capacity for operating the micro hydroelectric plant at an Eco Lodge. In winter, the waterfall was strong and hence turbines, both, 4KW and 8KW operated together to meet heating requirements of the lodge. In the summer, the waterfall was less and the 8KW turbine would operate alone to meet the energy needs of the lodge. It was commonly observed that hoteliers remained uninformed about the role of climate in selecting sustainable technologies. However, some interviewees were well versed and explained the analysis carried out during selection. CH1 was located in the temperate climate and used heating most times of the year. It made business sense to invest in efficient heating pumps and boilers. At the same time, hotels in

Ontario and Quebec geared efforts towards electricity conservation and invested in good chillers and refrigeration.

In summary, the operational and organizational factors set the stage for decision-making in committed and less committed organizations. Several factors, as described above, emerged as essential elements for building the value proposition for green energy technologies as well. Table 4.2 provided the context underlying decisions made regarding green energy technology within committed hotels and accommodations and less committed hotels. From an operational perspective, both committed and less committed hotels faced similar situations, as identified in literature. However, committed hotels showed better performance in energy management practices than less committed hotels. Given that both, committed and less committed hotels share the same nature of business and give importance to similar organizational and operational factors, it would be beneficial to identify why committed hotels outperformed their counterparts. The similarities and differences between organizations are examined based on three parameters that may have affected decision-making of hotel managers and accommodation owners related to sustainable technologies: formal and informal decision-making structures, processes within hotel organizations, and formal and informal information networks. This study based findings on the terms that processes such as collection of energy data, tracking and monitoring of the data were indicators of sound decision-making strategies in the organization.

4.6 Decision-making structures and processes

4.6.1 Formal and informal decision-making structures

Green Committees

Essentially, committed hotels and accommodations were driven to improve environmental performance due to existing resources and processes related to decision-making. In committed chain hotels, there existed formal sustainability structures that were responsible for planning high-level sustainability goals and executing the deliverables through a formal hierarchical system. These committees were often referred to as 'green team' or 'responsible business team'. Depending on the scale of operation, information and knowledge was shared in a top-bottom approach through the organizational structure. The role of these sustainability structures was to outline the goals to be achieved by the hotels and to encourage property-level staff to participate in achieving the targets. Every property under the hotel chain, was responsible for managing, monitoring and reporting sustainability performance of the hotel. As a green team leader of a committed chain hotel described,

> We have broken that green committee into three sub-committees, one sub-committee is working on only waste diversion, mainly, how can we increase the waste diversion from 64% to even more. Another sub-committee is working on our utility consumption, so how can we decrease our water, gas and electricity consumption and our third sub-committee is working on 5 green keys for meetings. So, we have the 5 green keys for hotels but we are sitting at 4 for meeting planners. (CH3, 2012)

Most commonly, the General Manager of the hotel was appointed as the sustainability champion by the corporate management and made responsible to operationalize organizational policies at the property-level. A green committee typically consisted of head of departments. Broadly, the functions of the green committee were to identify opportunities to improve environmental performance and implement the plan of action put together by the committee. The role of the 'green committee' was

similar across hotel chains. There may have been some differences based on the specific deliverables outlined by each hotel chain. The General Manager worked closely with the Director of Engineering/ Maintenance Manager in order to mobilize sustainability in the property. This structure was found to be similar within some less committed hotels as well. In most formal decision-making units in this study, the financial controller/ Chief Financial Officer (CFO) made the final decision about investing in sustainable technologies, with no or less influence of the Director of Engineering /Maintenance and General Manager.

In general, committed and less committed hotel managers indicated preference towards commercialized green energy technology as opposed to piloting any new technology. Despite the personal environmental consciousness of key staff members who participated in daily hotel operations and were aware of how much needed to be done to improve environmental performance, only those proposals that met financial criteria were accepted. This can be clearly seen in the statement given by a committed chain hotel Director of Engineering,

> Now, at the end of the day, it has to make sense. So, to our financial controller it might be a no.7 but to me, it might not be necessary a no.7. Yes, we do green initiatives not only to impact the earth and carbon offset but to save money as well. (CH1, 2012)

The existence of a formal decision-making unit at every property streamlined sustainable planning for the entire chain. It should be noted though that each property manager proposed different sets of technology improvement options with no certainty of which proposal may or may not pass through and how much time it may take for approval.

The difference between chain affiliated and independently owned hotels was related to organizational structure. In green accommodations, the decisions were primarily self-driven, with no formal committee to supervise green operations within the lodge. The owners of the green accommodations voluntarily took responsibility of reaching out to alternative options and conducting research by themselves in order to gain ideas about innovative sustainable technologies. Most times, the owners made quick decisions and hence plans were implemented sooner than in chain hotels. The project size determined the length of decision-making from proposal to implementation.

Environmental champion

Committed hotel chains pointed out how hotels within the same portfolio were competing to reach the aggressive goal set by the hotel chains. As there existed internal and external competition to pursue green measures, committed hotels intended to stay ahead of the game, at all times. In order to keep up with the green trends, most often, the General Manager or Maintenance Manager/Director of Engineering was given an additional role of leading the green committee and managing the environmental operations within the property.

At the property-level, there was no formal position that coordinated sustainability functions, unlike at corporate level. The General Manager was given the role of leading the 'green team'. It was assumed that the General Manager possessed holistic knowledge about the property and understood the environmental impacts for the organization. This job was handed to the General Manager on top of their regular job. It was also indicated in this study that hotel managers changed every few years because of changing brands. Hence, an individual who had worked in the property for a long period of time and was well versed with its conditions was often times preferred for this position. In one

hotel, the Human Resources Manager was appointed as the 'green committee' leader, based on length of service.

Essentially, environmental champions played a crucial role in gaining buy-in from leadership/management, staff and consumers to implement sustainable technologies. These individuals were primarily responsible to maintain relationships with stakeholders, vendors/suppliers and industry associations, who were their major sources of information about new technology. They were responsible to be updated about new and innovative technologies by attending tradeshows, exhibitions and/or other media events.

The appointment of a 'green team' leader was observed in some hotels more than others. Although sustainability champions were passionate about improving energy and environmental performance in their respective properties/chain, they could only perform within their set limits approved by developers, owners and corporate management. As noted by one respondent,

> Government policy is unreliable as it keeps changing with moving governments. The other thing is that when the Green Energy Act came into place, I tried to exploit the opportunity but nobody in this group was even aware of what it meant. Hence, it's very difficult to push such mandates through the company. (Undisclosed, 2012)

4.6.2 Formal and informal processes

Capital budget

Committed chain hotels usually prepared a five-year capital plan, and the General Manager in consultation with the Director of Engineering and green team cautiously prioritized which projects needed to be submitted for approval. A committed hotel respondent commented,

The decision-process basically involves myself and my team and if it requires capital funding, I collect all the information and quotes, produce an ROI on it and then it goes to my account and we put in what is called an AFE (Approved Financial Expense) which is a true financial expense. Then it goes to our regional office for approval. They say Yes/No. (CH1, 2012)

In less committed hotel chains, the decision-making process was similar. A hotel manager commented,

I have a 5-year capital plan so there are projects that we want to address in the next 5-year period. So it not like we cannot do them sooner but it's budget related. What money is going to be approved for this year or second year. It's more of a wish list because what might be allocated for year 4, we might do in year 2. Depends on circumstances. (LH5, 2012)

In green accommodations, decisions related to capital were based on annual net profit and owners generally planned any capital investments one season ahead. Few respondents from less committed hotel group had probed into creation of a green fund to rotate investments in sustainable technology.

Energy Audits

Based on the interviews, hotels conducted internal and/or external energy audits. Hotel chains that renovated and retrofitted equipment/technologies based on third party energy audits made significant changes by improving insulation levels of walls and ceilings, used cogeneration technology, generated on-site renewable energy like solar, upgraded to more energy-efficient equipment, e.g. boilers, lighting, variable speed drives on kitchen fans, etc.

Hotel managers indicated that implementing an internal energy audit was a good starting point to identify opportunities for adoption of low cost measures. It also facilitated educating staff about cost and energy savings achieved through environmental measures.

> Throughout 2010 we have been focused on electricity and mainly lighting because that is your single biggest consumable electricity and because we don't have capital dollars, for us, green is about staff education and its about making sure that every employee understands the basic cost in a term they can understand. When I say that we spend $577,000 CAD every year in electricity, it doesn't mean anything to them, but when I tell them that T12 fixture burns and costs 3.5 cents an hour to have lit, they can understand   that. (LH3, 2012)

Given that energy audits were expensive, it was valuable to understand how hotels perceived the use of internal audits. It allowed education of staff by communicating impacts of energy usage on the environment and the business. It was an essential step to take up internal energy audits for beginners in order to create their strategy towards achieving maximum energy-efficiency in operations. Those hotel managers who were unable to afford external energy audits, gained informal guidance on energy management from existing suppliers and green contractors.

Government incentive programs encouraged hotels to conduct formal energy audits. The government offered rebate programs that covered 50% of costs on energy audits. Committed hotel managers took up this opportunity more than less committed ones and other green accommodation owners. Developers and owners often with the help of third party auditors assessed the property at the time of acquisition but did not continue the energy assessment periodically. Regardless of whether government rebates on energy audits existed or not, these developers and owners conducted an external energy audit. Hence, the impact of government rebates on adoption of energy audits was a matter of 'timing' more than enabling the decision to implement. One committed hotel was part of the Carbon Disclosure Project and established its energy audit report online, indicating a strong case of 'transparency' in the hotel industry.

4.7 Information sources and networks

Typically, information about new green energy technology was available through numerous media options. Such information was also popularly shared through interpersonal communication. Essentially, the hotel General Manager/ the Director of Engineering/Maintenance Manager of committed hotels and less committed hotels were a part of larger industry associations like the Hotel Association of Canada (HAC), Ontario Hotel, Restaurant & Motel Association (OHRMA) and received information from similar sources such as suppliers, online resources like the LEED website and other sustainability websites, magazines, and government utility programs like those run by Natural Resources Canada. Some hotel environmental champions partnered with local associations to discuss new ideas and similar business issues, and to connect with likeminded individuals/businesses to share experiences and best practices. This was particularly seen in committed hotel managers who were had a strong network of people that exchanged knowledge and information about new technologies. It was also observed in family owned properties wherein owners were part of family business associations. The social network of hotel environmental champions enhanced the possibilities of learning about new ideas and alternatives related to sustainability.

Among green accommodations, a personal network provided a useful resource for learning about innovative technologies and gaining support in moving towards their implementation. An owner of a LEED Gold-certified Eco Lodge commented,

> Before solar, I wanted to put up wind turbines here but the turbines had to be off the building and along migratory flight paths so I looked at all the aspects and how much power was actually lost in going from where it was being stored, where solar was convenient. The cost was almost similar but solar made more sense. This information was found through interested people and not even LEED. It was all still new then. (GA3, 2012)

As early adopters of the technology, the owners of green accommodations researched companies supporting good business practices by visiting tradeshows and exhibitions, calling companies and forming informal associations with competitors. These owners maintained close relations with fellow operators in their immediate locality, rather than directly competing with them. This attitude is evident from the comment made by an Eco lodge owner,

Our industry association here is not our competitor, we trade business and want to keep our occupancy levels high here. If one cottage is doing well that's good for us because we know we will be doing well too. Our competitors are other destination spots like Cuba, Niagara. (GA2, 2012)

There were considerable similarities and differences between green accommodations, less committed and committed hotels in terms of existing information sources in relation to sustainable technology. As explained in the above paragraphs, green accommodation owners received information and innovative solutions regarding green energy technologies through media, Internet, tradeshows, expos, and personal or informal networks. On the other hand, less committed hotels and committed hotel managers identified suppliers, industry associations such as Hotel Association of Canada (HAC) and OHRMA, and utility providers that provided information about sustainable technologies and other environment conservation programs to be good sources of information. The corporate chain or REIT was also a good source of information for new technologies for hotel managers. Hotel managers indicated that corporate chains held bi-annual/ annual conferences for hotels within their portfolio wherein hotel managers received an opportunity to exchange information and learn about new ideas from fellow-managers. However, this practice was only seen in few hotel chains included in this study. This list may not be comprehensive but included Starwood Hotels, Fairmont Hotels and Westmont Hospitality Group. In addition, committed hotel managers indicated attending conferences, seminars, giving interviews to share best practices in different media. In all, these hotel

managers claimed that they were leading in environmental stewardship in their corporate portfolio and generally, among the other hotels in the city and nation and that other hotel managers looked up to them for their achievements in improving sustainability performance. Rather than being followers, committed hotel managers proactively reached out to include innovative sustainability measures and improve current energy performance.

There were some differences in terms of the network for sharing information between hotels and green accommodations. It is important to note that unlike green accommodations, hotel managers were uninformed about what practices their fellow hotels had adopted in relation to sustainability. Albeit the same ownership, the hotel managers shared no sense of belonging towards the ownership and operated in isolation. Further, hotel managers criticized other managers for being discrete about details of 'how-to' reduce emissions targets and maximize cost-savings.

In summary, several support mechanisms in the hotel industry were in place, but there existed a lack of initiative to drive the sustainability agenda forward. The structural differences between ownership models played a crucial role in determining the extent of decision-making taking place at the property-level and the decision-making authority at the managerial level. The characteristics of green accommodation owners and committed and less committed hotels are somewhat representative of the approach taken towards decision-making of green energy technologies, as seen in the above findings. The qualitative findings are supplemented with energy consumption data to enable a stronger understanding of how decision-factors played out in actual energy performance

4.8 Energy consumption data

The consumption data are examined to see if it is consistent with the adoption of measures described in the previous sections that may have affected decision-making about sustainability technologies and in turn impacted energy performance levels. There may be more factors than mentioned below that were considered during evaluation of sustainable measures implemented. At the same time, it cannot be assumed that the effects observed in energy performance over the years were because of the sustainable technologies implemented alone. It must be noted that the data provided by hotels were incomplete and only five hotels provided such information. Tables 4.3, 4.4, 4.5, and 4.6 demonstrated energy performance in less committed hotels, as classified in this research study. Table 4.7 presented utility data of a committed hotel. The data shown below are not comprehensive as it was difficult to gain access to such information. The hotel identity is not disclosed in these data. However, all hotels below are based in Ontario. In hotels 'A', 'B' and 'C', fossil fuels are predominantly natural gas.

Hotel A	2010	2011	Difference (%)	Energy costs (2010)	Energy costs (2011)	Difference (%)
Electricity (KWH)	352,292	345,982	- 1.8	$39,287	$40,909	4.1
Fossil Fuels (eKWH)	255,076	257,823	1.1	$7,202	$7,158	-0.6
ekWh per Square Foot	18.5	18.3	-0.6			
ekWH per room	7,146	7,104	-0.6			
Heating Degree Days	6868	7076	3.0			
Cooling Degree Days	681	682	0.1			

No. of rooms= 85 , Year Built = 1987 , Floor area= 33,160 sq. ft

Table 4.3 Utility consumption data of hotel A

Hotel B	2010	2011	Difference (%)	Energy costs (2010)	Energy costs (2011)	Difference (%)
Electricity (KWH)	1,736,898	1,820,128	4.8	$176,315	$199,899	13.4
Fossil Fuels (eKWH)	1,689,805	1,697,494	0.5	$46,600	$46,379	-0.5
ekWh per Square Foot	39.76	40.81	2.6			
ekWH per room	25,196	25,865	2.7			
Heating Degree Days	6868	7076	3.0			
Cooling Degree Days	681	682	0.1			

No. of rooms= 136, Year Built = 1980 , Floor area= 86186 sq. ft.

Table 4.4 Utility consumption data of hotel B

Hotel C	2010	2011	Difference (%)	Energy costs (2010)	Energy costs (2011)	Difference (%)
Electricity (KWH)	1,726,664	1,743,012	0.9	$162,546	$186,143	14.5
Fossil Fuels (eKWH)	1,026,660	1,132,760	10.3	$38,808	$39,866	2.7
ekWh per Square Foot	31.6	31.9	4.4			
ekWH per room	16,008	16,720	4.4			
Heating Degree Days	6868	7076	3.0			
Cooling Degree Days	681	682	0.1			

No. of rooms= 172, Year Built = 1991, Floor area= 87000 sq. ft.

Table 4.5 Utility consumption data of hotel C

Figure 4.10 Utility consumption trends in hotel D

Utility Consumption Trends
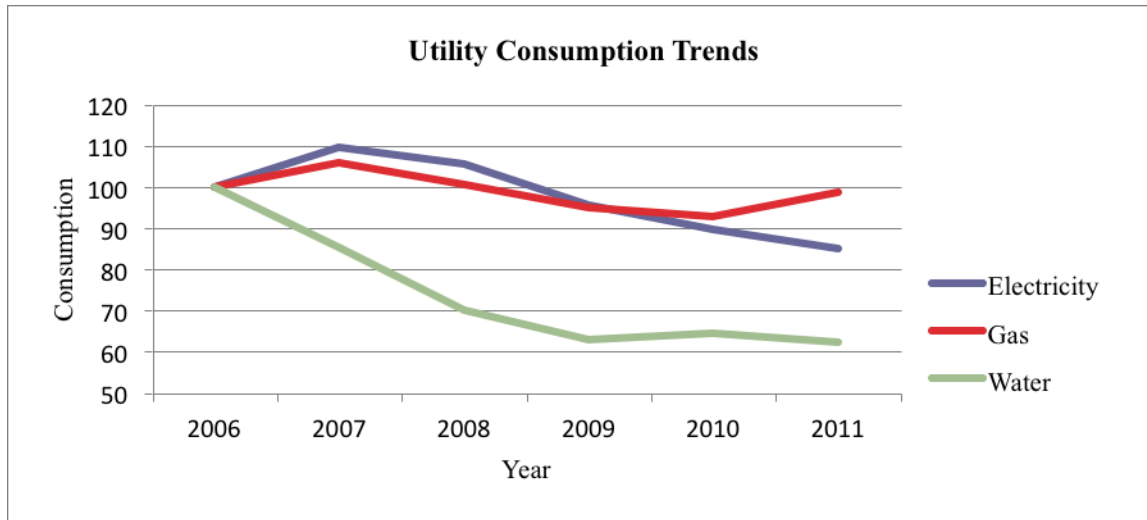
Hotel D	2006	2007	2008	2009	2010	2011
Electricity	3,229,128	3,537,120	3,408,360	3,087,840	2,895,240	2,746,640
Change from previous year (%)		9.53	-3.64	-9.4	-6.2	-5.13
Natural Gas	3,445,547	3,644,277	3,456,892	3,266,325	3,190,444	3,397,583
Change from previous year (%)		5.76	-5.14	-5.51	-2.32	6.49
Water	52,059.5	44,440	36,506	32,800	33,671	32,413
Change from previous year (%)		-14.63	-17.85	-10.15	2.65	-3.73
ekWh per Room	33208	35729	34156	31613	30277	30569

Table 4.6 Utility consumption data of hotel D

Hotel E	2009	2010	2011
Electricity	3,087,840	2,895,240	2,746,640
Water	32,800	33,671	32,413
Change from previous year (%)		2.65	-3.73

No. of rooms= 500, Year Built = 1982

Table 4.7 Utility consumption data in hotel E
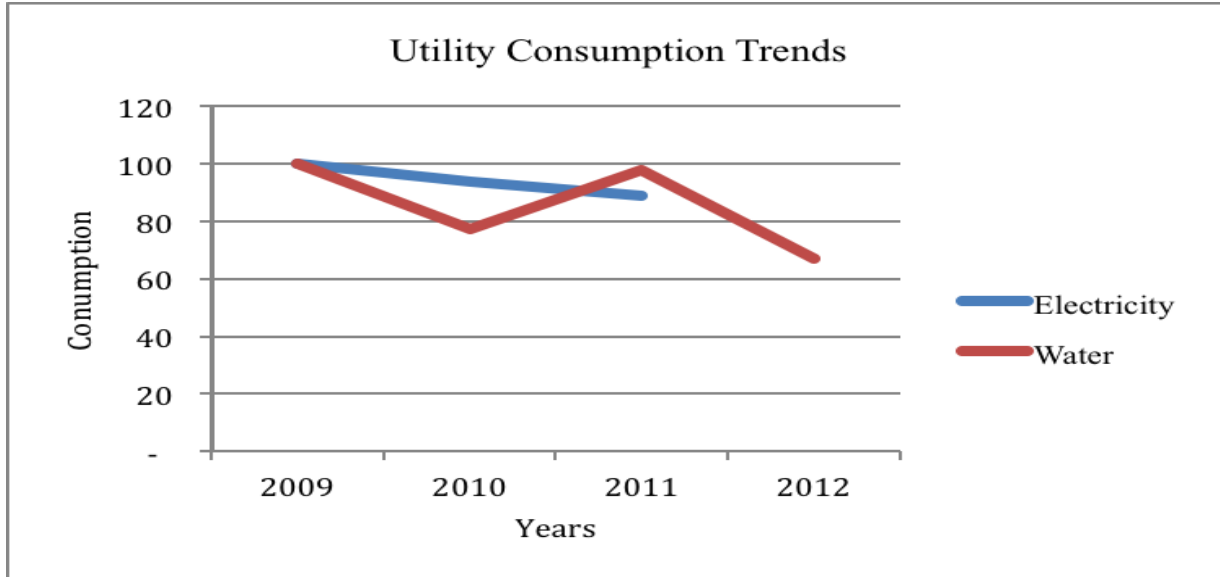
Figure 4.11 Utility consumption trends in hotel E

There are several operational and organizational differences between the five hotels, as presented above. Essentially, all five hotels were chain-affiliated. Hotel 'A', 'B' and 'C' were owned and operated by the same party and were franchise-based, while Hotel 'D' was owned and operated by the same party. Hotel 'E' was operated through a management-contract. The above hotels operated during all seasons. Apart from Hotel 'A', the hotels were full-service hotels. Full service hotels included a fully operational restaurant, and other enhanced features in guestrooms, bathrooms and public areas while limited service offered basic services to guests in terms of lodging and served continental breakfast only. These classifications were based on AAA Diamond Star Categorization guidelines. Similarly, Hotel 'A' was '2' Star Diamond rated, Hotel 'B' and 'C' were '3' Star Diamond and, Hotel 'D' and 'E' were '4' Star Diamond rated. All of the above hotels were renovation-based rather than newly constructed projects. Hotel 'E' was the largest in terms of room-

size, 500 guestrooms, followed by Hotel 'D' with 200 guestrooms. Hotel 'A' was the smallest, comprising 85 guestrooms.

Hotels 'B' and 'C' were more than double the floor size of Hotel 'A'. Hotel 'D' was the oldest among the five hotels mentioned above while Hotel 'C' was the most recently built. All five hotels were built at least 30 years ago. All hotels generally showed higher usage of electricity than fossil fuels. Barring hotel 'B' and 'C', other three hotels have reduced electricity usage over time. Hotels 'D' and 'E' electricity usage reduced in the past three to five years by an average of 5% annually. In Hotels 'B' and 'C', the electricity use between 2010 and 2011 increased by 4.8% and 0.9% respectively and corresponding electricity cost increased by 13.4% and 14.5% respectively. In Hotel 'C', the use of fossil fuels increased by 10.3% and corresponding costs increased by 2.7%. The lowest energy consumption per room was observed in hotel 'A' while the highest was indicated in Hotel 'D', among Hotels 'A', 'B', 'C' and 'D'. The lowest energy consumption per sq. ft is indicated in Hotel 'A' and highest is reported in Hotel 'B'. Hotel 'D' showed significant negative change in water consumption, while Hotel 'E' showed negative change yet to a lesser extent. Natural gas consumption increased in all hotels; however, the largest increase was observed in Hotel 'C'. The reasons for decrease in energy costs for fossil fuels may be because of the reduced unit costs of natural gas in the past two years.

The above hotels showed differences in the types of processes adopted. Apart from Hotel 'A', all hotels were Green Key certified '3', '4' or '5'. At the time of the interviews, Hotel 'A' was '3' Green Key certified, however, shortly after, it lost its rating. All hotels, except Hotel 'D', implemented an external energy audit. It must be noted here that all hotels, except Hotel 'E' changed brands every 5-

10 years. If the ownership also changed, the new owners conducted an energy audit before purchase through an engineering company. While Hotel 'E' indicated regular implementation of external energy audits through an engineering company, Hotel 'D' conducted a rigid internal process routinely. Also, Hotel 'D' at the time of the interview was being considered for sale by the parent company and owners did not desire to put any resources. Except Hotel 'E', REIT's owned the other hotels in the group. Hotel 'A' had no green committee and generally, decisions related to energy and environment were taken by the parent company with consultation of the General Manager. The hotel manager indicated that there was no mandate to have a green committee either by the brand or the owners. All other four hotels had green committees. Similarly, Hotel 'A' and Hotel 'C' managers indicated that the ownership consulted with the General Manager or Human Resource Manager (green team leader) for any energy and environment decisions while Hotels 'B', 'D' and 'E' indicated that Maintenance Managers or Director of Engineering was consulted in this regard. These managers assisted the General Managers to make decisions related to sustainable technology, and championed new technology. However, the final decision was made by the ownership. Hotel 'E' respondent emphasized the alignment of interest between the owners, General Managers and the chain in terms of achieving sustainability goals. Hotel 'E' was a part of the Carbon Disclosure Project for calculating GHG emissions. Hotel managers of Hotels 'A', 'B' and 'C' reported that owners conducted periodic seminars to promote sustainability within the portfolio, giving General managers the opportunity to share practices. Hotel 'E' manager also indicated the chain to regularly supply sustainability-related information and conduct conferences, seminars to keep member hotels engaged and share best practices. Energy data tracking and monitoring process was implemented in all hotels.

In summary, the findings from energy data retrieved from Hotels A, B and C indicated that energy costs were an important determinant of energy planning for hotel managers. It is true that the other hotels did not provide energy costs so it is not possible to make any assumptions. However, energy consumption in Hotel D was rigorously managed by implementation of regular internal energy audits and education of employees. Hotel E published energy audit data online to provide transparency but overall, in this hotel, several organizational factors, structures and processes in place triggered energy management planning.

The above findings presented an integrated picture of what opportunities and challenges exist in adopting green energy technologies. Further, how some hotels were successful in overcoming it enabled identification of some key characteristics of adopter organizations. Lessons learned from these findings are observed in the emerging opportunities and challenges identified as potential 'success' factors and 'gaps' identified among existing operations. The next chapter discusses these themes and provides areas that may need further investigation.

Chapter Five

5.0 Discussion

The preceding chapters have drawn attention to several facets of decision-making in relation to green energy measures in a small sample of Canadian hotels. This chapter reviews issues emerging within this research. The identification of the priorities of hotel management was crucial to the understanding of the extent of sustainability integrated in the organization. Past studies identified the existence of a gap between attitude and action towards sustainability measures in the hotel industry. This research addressed some areas referenced in the literature as 'gaps', especially those that existed between reported attitudes and actions of hotel managers. This chapter is organized to compare and contrast the approaches taken in decision-making by hotel managers in the adoption of sustainable technologies based on short/long term energy planning, resource intensity and holistic/focused views about sustainability. The second part identifies success factors that enabled hotel managers to commit, and the third part examines gaps that emerged from the findings of this research.

5.1 Approaches towards decision-making for green energy measures

The research findings support two approaches, implementing measures to improve energy-efficiency in business as usual procedures, and crafting a low carbon future for the business that entails adoption of renewable energy such as solar, wind, geothermal and biomass, described by Bohdanowicz & Hawkins (2011) taken in reaction to the carbon challenge in the hotel industry . Some hotel managers ceased their efforts to improve energy performance after having achieved the minimum required status issued by the Green Key Eco Rating Program that enabled a level of green certification through deploying low cost environmental programs and energy-efficient lighting. Other managers pursued sustainability by adopting more innovative and advanced technologies such as

renewable energy technologies and were moving forward towards crafting a low carbon future for their organization. Below are the characteristics of green accommodations and their owners that represent a very good example of 'low carbon future for energy' in the accommodation sector.

Green accommodation owners endorsed sustainability, partly based on green certification program guidelines and partly on their perceived definition of 'green'. Owners (usually one or two), with the help of few (typically 2 to 3) seasonally employed staff, managed these accommodations during operating season, summer or winter. Except GA4, they were located in a rural setting, closer to nature. Being smaller in size than hotels, these accommodations hosted 30-114 guests at one time (see Table 4.2).

There were similarities between owners' of green accommodations. The green accommodation owners took a progressive approach towards decision-making. These individuals/partners showed exceptional performance in the adoption of innovative green energy measures. As early adopters of renewable energy technologies, the owners of green accommodations reported high levels of interest in gaining technical knowledge about the green energy measures and learning about their overall impact on reducing GHG emissions.

Green accommodation owners were highly influenced by personal philosophy about sustainability. Each owner was inclined towards building a sustainable business, based on their own experiences and knowledge about environmental issues at large. GA1 owner applied his own professional expertise to build a micro hydroelectric plant and supply electricity to an old lodge that was off the grid. The lodge received recognition through the "Ontario Tourism Award for Sustainable Tourism"

in 2012. Similarly, GA3 owner focused on energy efficient building design and Lifecycle Cost

Analysis (LCA) and received LEED Gold certification- one of the first of its kind for an Eco lodge.

Another example of an innovative partnership arrangement was observed in the business model of

GA4 wherein the developer invested in building a green hostel as part of his sustainable investment

policy. GA3 owner's efforts to build LEED Gold certified Eco Lodge was commended in several

publicly available documents from vendors, suppliers, of this lodge and this example was chosen as

best practice on many green building websites as well.

In this study, the role of the individual in driving the sustainability agenda forward for the

organization was found to be crucial in developing the roadmap for green energy in the future. While

green accommodation owners possessed very sound knowledge on environmental problems and

solutions, these individuals did not particularly represent a financial business case for these green

energy measures. Committed hotel managers were able to engage existing resources and provide

very practical solutions for problems in energy management and the way forward. Hence, the

approaches taken by managers were in part a result of the existing conditions presented by contextual

and organizational factors.

Diener et al (2008) examined the business case for 'high performance' in eight hotels, validating that

set financial norms and ownership models were important challenges to the adoption of green energy

measures in the accommodation sector. An important finding from this study is the lack of a

consistent vision among hotel managers to develop sustainability. In some organizations,

sustainability was treated as an 'item 'on the agenda of the manager and not integrated in every

decision. Instead of treating it as a one-time investment, if it were treated as a code of conduct to

operate a business, the decision-making would show more inclination towards a long-terms savings approach, overall education and engagement of staff, using efficient use of existing resources and continuously seeking for innovative means and mechanisms to operationalize the opportunities.

The challenges related to decision-making and energy planning in hotels was a function of the existing organizational factors. The ownership models had implications on the extent of sustainability pursued in the hotels and accommodation. The study findings pointed out that although there existed challenges based on ownership structures, the best practice hotels in this study were from small and independently owned rural accommodations and medium sized urban hotels that operated on management contracts, This indicated that there was still insufficient knowledge among the majority of hotels studied about how to move forward. This indicated the need for exchange of lessons and information among players in this group.

5.2 Success factors

5.2.1 Attitude

Hotel managers that had a broader vision about sustainability took more strategic actions than those triggered by one or two drivers, especially cost savings, or improving the image of the hotel. Successful hotel managers had leveraged funds received through economic incentive programs, and provided a strong business case to the senior leadership at the organizations for the adoption of sustainable equipment/technology. Successful hotel managers had control mechanisms in place such as sustainability decision-making structures and processes that facilitated efficient decision-making. These managers sought energy audits implemented by engineering companies, or Local Distribution Companies (LDC's) as part of the respective provincial government program, before deciding about replacing/adopting green energy measures. The findings from the study by Sloan, et al. (2009) also

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highlighted that best practice hotel managers in Germany and Estonia based decisions related to adoption/replacing green energy initiatives on a broader range of factors rather than cost savings and improving hotel image alone.

5.2.2 Personal and organizational characteristics

Personal characteristics of the hotel managers such as level of understanding about environmental issues and experience, level of involvement in environmental activities, level of risk-taking capacity, and information networks influenced their decision-making related to green energy measures in the hotel. Some organizational factors; but not only limited to these, such as size, location and climate played a role in determining the scope of 'green' activities within each organization. The committed hotel managers were well equipped to fully understand how these factors played out in actual energy usage from demand and supply-side.

Thuot et al. (2010) and Tzschentke, Kirk, & Lynch (2008) findings about characteristics of early adopters of sustainability measures in small and medium tourism business operators in rural British Columbia and Edinburgh were similar to this study. Green accommodation owners typically, early adopters, were self-starters and faced challenges such as lack of legislative policy support for technologies and resources such as shortage of qualified trades people and staff. In spite of such challenges, such owners invested in innovative green technologies, with minimum consideration of the financial feasibility of the technology.

5.2.3 Maximizing opportunities

Decisions related to green energy measures were driven by opportunity. Although there existed motivation to pursue green energy measures, hotel and accommodation managers' decisions were

triggered when there emerged an opportunity from renovation, new construction or existing incentive programs (e.g. saveonenergy) or opportunity to develop a small renewable electricity generation project such as the MicroFIT. Other favorable conditions that enabled pro sustainability decision-making included self-created mandates by developers, owners and managers (subject to limitation depending upon ownership structures), existing environmental policies created by the organization and enrolment in a green certification program. The onus of identifying the opportunity to introduce any sustainable measure/technology was entirely voluntary.

The difference between committed and less committed chain hotels, in particular, in relation to decision- making structures and processes was the integral quality- tenacity. As part of the chain cohort, most of the chain hotel managers put in place green structures and processes; some were more committed than others. Further, committed hotels tended to implement all of the decision-making structures and processes as mentioned in Table (4.2). What appealed to the less committed hotel managers were those practices that demanded minimum resources (money, time, know how etc.)

5.2.4 Buy-in of senior-level management

The senior leadership among hotels and accommodations played an essential role in driving sustainability. Among independent hotels within this sample, the owners were committed to pursuing sustainability as observed in the types of green energy measures adopted. These owners succeeded in overcoming early adopter challenges such as lack of resources, lack of support from government programs and lack of formal guidelines for greening. Among chain hotels however, there were varying levels of commitment observed in the senior leadership. The senior leadership in committed

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hotels provided an encouraging environment to practice sustainability by putting in place a tangible sustainable policy, awards and recognition for sustainable hotel properties within the large chains. A sustainable policy enabled hotels to create formal sustainability mandates, structures and processes to improve energy and environmental performance at the property-level.

5.2.5 Working as a team

Successful managers and owners of green accommodations worked collectively to pursue sustainability. Regardless of the differences in organizational factors, these individuals engaged all parties at the hotel or accommodation to implement sustainability. While green accommodation owners ensured strong and proactive communication between engineers, architects and the trades' team, committed hotel managers kept all parties of the hotel informed about their sustainability goals and rigorously followed a systematic plan that facilitated interdepartmental co-ordination and smooth flow of communication. Even though one individual led the team, the onus to pursue sustainability was taken up by all members of the green team.

5.3 Areas that need to be addressed going forward

5.3.1 Enriching the role of environmental champions

Environmental champions were found to be crucial to achieve sustainability in hotels. The role of an environmental champion in the hotel was held by different individuals and in varying capacities, even under a similar ownership structure. For example, within chain hotels, one hotel appointed the Human Resources Manager as the environmental champion while in other hotels; the General Manager was given this responsibility, with strong support of the Maintenance Manager/Dir. of Engineering. Among independent hotels and accommodations, the owner voluntarily took measures

to introduce green energy measures. In a family-owned business, the developer or owner took up this responsibility. The extent of empowerment given to make decisions about investments in green energy measures was dependent on the ownership structure as well. Within this sample of participants, committed hotel managers mentioned the recognition received within the portfolio for their green efforts.

5.3.2 Improving level of commitment towards sustainability from senior leadership

The challenges faced by chain hotel managers towards achieving sustainability were multifaceted. This study mainly focused on challenges faced by the property-level management. However, hotel manager comments indicated issues that existed at the senior-management level. For example, the lack of internal push at the senior-management level was inherently an issue of preference of financial business case over environmental by the senior hotel management. What propositions would be approved by the senior-level management determined what types of green energy technology/measures were proposed by the property hotel management. In the REIT operating models, the uncertainty of the 'future' of the property in terms of ownership and sale influenced the types of green energy technology investment proposals the senior level management approved. In such a case, pursuing sustainability was not a priority for either senior level or property level management.

5.3.3 Recognizing 'full' potential of education and training of hotel staff

Few hotel managers realized the multiple benefits achieved from education and training hotel staff. More often hotel managers implemented low cost energy conservation measures for straightforward reasons such as 'cost savings' and 'improving the green image of the hotel'. Few hotel managers

understood that implementing energy conservation measures also led to improving knowledge and education of hotel staff, overall. Education and training hotel staff was beneficial to address skepticism related to environmental actions in the hotel as well; an issue that was raised by hotel managers. Further, in some cases, hotel managers that were restricted from investing funds in green energy measures found that educating and training staff about energy conservation measures enabled informing and convincing them about its impacts on the business and environment. The implementation of internal energy audits facilitated this process and enabled staff to be engaged closely in monitoring energy consumption of the several 'users' in the hotel. The ability of hotel managers to maximize resources within the given environment deserved more attention and recognition from senior-level management. Nicholls & Kang (2012) study found that education and training received lesser recognition in independent hotels in the US. This study supported the findings of (Sloan, Chen, et al., 2009) that hotel managers overall, focus more on technology adoption that receive customer visibility rather than improving existing operational management by investing in staff training and education.

The property-management staff was uneducated of the critical role of organizational factors in determining the implementation of green energy measures. These hotel managers remained unaware of any government offered energy and environmental programs/policies and economic incentives. Education and training about environmental impacts on business provided tools to hotel managers to make a stronger value proposition for environmental technologies to their senior-level management. Without having understood how these technologies impact the bottom-line and environment, hotel managers may have come across as 'less convincing' to their senior-level management. Further, in

spite of existing information sources such as utility companies, vendors and suppliers, media, hotel managers showed little interest in pursuing these technologies.

5.3.4 Bridging information gaps

Essentially, the hotel industry was a social system; some lead while others followed. Opinion leadership played a crucial role in promoting green energy measures in the hotel industry. Simply put, if leaders in luxury hospitality adopted these measures, then other hotel managers would also consider it. This attitude was observed in this study wherein less committed hotel managers often compared measures against committed hotels. Moreover, due to the high level of competition in this industry, hotel managers remained discrete about sharing 'how-to' information related to implementation of environmental measures in their hotels.

At the property-level as well, there existed several information gaps that resulted in the lack of efforts to pursue sustainability. Mainly, there existed poor information flow between departments such as Maintenance and Finance, where the former often considered Finance responsible for the disapproval of sustainability proposals. Although there existed a green team at the hotel consisting of all departmental heads, in reality, it was questionable how committed all hotel managers were towards pursuing sustainability. On the same note, sustainable innovations at the property-level were not encouraged through staff, but mostly were raised within the green team. There was no means of tracking whether each departmental head communicated with their staff about environmental actions. In other words, there were no formal mechanisms in place that ensured that all employees were engaged in promoting sustainability within their scope of work.

5.3.5 Varying expectations about sustainability from stakeholders

The attitudes and actions of hotel managers towards sustainability were influenced by the perceived importance about stakeholder expectations. In this study, stakeholders were mainly identified as hotel staff, consumers, senior-level management and shareholders. Hotel managers viewed green energy measures to be presenting a strong business case if they appealed to all or most of these stakeholders. In that sense, the decision of choosing one technology over another was to some extent based on how these stakeholders valued the green efforts taken by the hotel manager. Le et al. (2006) and Smerecnik & Andersen (2011) studies also found that hotel managers perceived 'simplicity of use' and 'observeability' as most important innovation characteristics for adoption of sustainable technologies.

This may be one way of examining how decision-making was affected within this sample of hotel managers; there may be more factors that affect managerial decision-making. However, the fundamental issue was that stakeholders desired to be recognized as 'socially responsible' without fully understanding what was required to transform business as usual processes.

Overall, hotel managers remained unconvinced that in Canada, sustainability operations were being pursued seriously, at least in the hotel industry. The priorities of hotel management were highly business focused, giving little attention to how sustainability impacted day-to-day business decisions. The lack of communication between the several industry players kept this industry from looking into innovative sustainability solutions that may have emerged in other industries such as 'manufacturing'. The next chapter presents the limitations of this research study and identifies areas for further research.

<div align="center">**Chapter Six**</div>

6.0 Conclusion

> "With challenging economic conditions still existing in many markets, hoteliers often lack the time and resources to properly evaluate the business costs and benefits of investment into environmental technologies and sustainability initiatives. HVS contends that these potential investments require the same pragmatic, analytically-based evaluation as any other business decision-focusing on the minimization of risk and optimization of return on investment". (Goldstein & Primlani, 2012, p. 8)

The purpose of this research has been to explore factors affecting decision-making regarding green energy measures in Canadian hotels. The opportunities and challenges in the adoption of green energy measures and identifying why some hotels succeed while others fail to adopt these measures have been addressed in the previous chapters. This chapter summarizes the findings and suggests areas that may be pursued in future research. The contributions and limitations of this study are also included in this chapter.

6.1 The way forward:

6.1.1 Support mechanisms to encourage sustainability in the hotel industry

a. Economic incentives/tax rebates for energy conservation/renewable energy programs

This study found a positive inclination among hotel managers towards using economic incentives as a strategy to convince senior-level management about investing in energy-efficiency/conservation measures or energy audits. The provincial governments of Ontario, Quebec and British Columbia offer energy conservation programs and incentives that promote the use of green energy measures in the commercial building sector at large. Although not a majority, many respondents were at least aware of the MicroFIT program in Ontario that promotes generation of on-site renewable energy in commercial properties such as hotels and the committed hotel managers had proposed the

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implementation of projects under the program to their senior management. If energy costs increase in the coming years, it would be important to craft an energy management plan that can accommodate and/or be tailored to fit the context of the hotels. There was a general sentiment that incentive programs may be a good means to encourage adoption of green measures in the hotel industry. Further studies should investigate how successful these incentive programs are in terms of uptake, and stimulating investment from the hotel industry. Studies should also look into how the existing programs can be improved or expanded.

b. Support mechanisms to promote sustainability in the hotel industry

This study informs the need to create strong support systems that facilitate hotel managers to table 'industry issues' and work at a local-level to maximize energy-efficiency. To that effect, respondents indicated the usefulness of participating in local/regional/national educational or other forums that address sustainability challenges of several similar businesses. There exist several avenues for such exchange of information to occur by attending conferences, workshops, seminars, etc. Specifically, the exchange of lessons from individuals with sound knowledge of sustainability issues and its impacts on business supports the overall development of sustainable tourism industry in Canada. Early adopters of green energy measures are a good resource for the tourism sector to understand early adopter challenges and provide favorable technology facilitating conditions that enhance managerial decision-making in their own organization

Another example of such a mechanism has been that implemented by Tourism Vancouver. Tourism Vancouver in partnership with BC Hydro appointed an 'energy specialist' to guide hotels, restaurants

and attractions in energy-efficiency and conservation measures. The success of such support mechanisms needs further investigation.

6.1.2 Strengthening regulatory measures to promote adoption of green energy measures

Ontario's new building code, effective at the end of 2012, is a positive step towards promoting sustainability in commercial buildings. This is one way of driving the hotel industry to adopt at least the minimum green measures required under the building code. Based on the findings of this research, decision-makers believed that stronger regulations for sustainability measures indicated the seriousness of the government to make changes in this direction. It positively influenced key decision-makers in the hotel organization to consider 'sustainability' as a criterion during retrofitting or adopting new technology.

6.2 Limitations of this study

This research highlights lessons learned from a small sample of 18 hotel organizations. This study included hotels from the Green Key Eco Lodging Program. The sample was limited to this program alone and especially, to those hotels that were recommended by experts of this program. Although this study is a good starting point to the discussions of promotion of green energy measures in the hotel industry, it would be useful for further studies to examine more factors to fully understand decision-making related to green energy measures. Further, it will be beneficial to compare and contrast green energy practices with similar organizational and structural characteristics. The results will provide stronger representation of one group of hotels with similar characteristics.

6.3 Contributions of this research

Specifically, this approach contributed to better understanding of the characteristics and processes among hotels that support the adoption of green energy measures. Theoretically, this research contributed to the identification and importance of opportunities and challenges in the adoption of green energy measures and sustainability overall in the hotel industry, especially from organizational decision-making perspective. Practically, the research provides valuable information to industry associations that will enable them to focus on relevant topics in regards to adoption of green energy measures in the hotel industry. Industry associations that promote sustainability can be strong mediums of communications between policy and practice will benefit from this study, in terms of suggesting relevant issues to government and industry. Important leadership and educational forums, conferences and seminars can use the issues identified in this study as points of discussion among stakeholders.

In summary, the challenge of climate change needs to be addressed by sharing responsibility. As sustainable operations have proven that it leads to resource efficiency, better corporate image and culture and long-term business growth, hotels must overcome the fear of transforming to a greener business. The commitment needed to make this shift is required from all stakeholders in the hotel industry and positive steps have been taken in this direction. External challenges to the business, economic, natural and political conflicts can obstruct this progress, however, initiatives should continue to be taken on all scales of impact to maintain closeness and healthy competition in this industry rather than fierce rivalry. It is as important to recognize efforts taken towards achieving sustainability among less committed or transitioning hotels as it would be for committed hotels.

Designing an appropriate support system to suit requirements of different businesses within the accommodation industry are necessary, especially considering where in the adoption curve do these businesses exist. What might be applicable to committed organizations may not be relevant to those that have not reached that stage yet. Hence, careful planning and consideration of the identified issues will be very useful to promote sustainability in this industry.

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Appendix A

Interview Questions for Committed hotels towards adoption of green energy technologies

1. Innovation Priorities

1.1 What are the top 2-3 areas of innovation for your hotel?

2. Decision-making related to green technologies

2.1 To begin with, can you tell me in broad terms how your company approaches decisions related to energy & environmental performance?

Probe

-Who is involved in the decision making process?

-What stakeholders do you consider before adopting any new green technology?

-What criteria do you consider? (E.g. cost, profile, certification)

- Can you explain to me the analysis that is carried out to evaluate the different initiatives?

3. Adoption of green energy technologies

3.1 How did this hotel first become involved in green energy technologies?

Probe

-Did an individual/unit or department champion the initiative/ green energy technology?

-What units or departments within your company were involved in this decision?

-How long did the decision-making process last?

-Who made the final decision to adopt the initiative/technology?

-How important were the following drivers to get involved in adopting green energy technologies? (Rate the factors on scale of 1 to 7. 1 being lowest and 7 being highest)

Drivers include cost savings, environment consciousness, improve environmental image of the hotel, competitive advantage, education, policy, consumer demand, stakeholder influence, and economic/social incentives.

3.2 What are the sources of information for adoption of innovations such as green energy?

Probe

-What are the primary sources for information about new initiatives/green energy technologies?

-How can we improve the information available for the promotion of green energy technologies within the hotel industry?

4. Technologies/Initiatives adopted to improve energy performance

4.1 Can you tell me what has been done in this hotel to save/reduce energy?

Probe

-What are the various technologies adopted by your hotel namely structural, operational and behavioral to improve energy usage/performance?

- Approximately, in what proportion of energy savings have been achieved by energy efficiency, energy conservation and renewable energy?

-Did your hotel undergo an energy audit before adopting any sustainable energy technology?

-Which areas in the hotel are prioritized to improve energy performance? How do you decide which area in the hotel should be targeted first?

4.2 Can you explain your selection process among various green energy options?

Probe

-What is the ideal information required to make the business case for energy efficient/ renewable energy technology to be adopted in your hotel?

- What measures did your company use to assess particular green technologies?

For example: energy savings per year, emission savings per year, cost savings per year and payback period.

4.3 What are the challenges involved in taking further steps to improve your energy performance?

4.4 How important is the role of the following organizational factors in selecting green energy technologies? (Rate the factors on scale of 1 to 7. 1 being lowest and 7 being highest)

Factors include size, ownership, star categorization, services offered, operational cycle (seasonal/whole year), location climate, and organizational policies.

5. Energy Consumption patterns in the hotel

5.1 Can you tell me more about your energy use in the hotel?

Probe

-In what proportion of your energy is generated on-site and purchased?

Total Annual Energy Consumption	Quantity	Cost ($)
Total purchased		
Total On-site renewable energy		

-Which are the key areas in the hotel that need to improve its energy performance?

5.2 When do you have peak demand? Has this changed in response to time of use rates?

6. Finances

6.1 Can you tell me about the funding sources used to support adoption of sustainable measures in your hotel?

Probe

-What are the typical costs associated with adopting green technologies. Can you give me an example of a recent project?

-What is a typical time line for a green energy initiative?

Appendix B

Interview Questions for Less Committed hotels towards adoption of green energy

1. Innovation Priorities

1.1 What are the top 2-3 areas of innovation for your hotel?

2. Decision-making related to green technologies

2.1 To begin with, can you tell me in broad terms how your company approaches decisions related to energy & environmental performance?

Probe

-Who is involved in the decision making process?

-What stakeholders do you consider before adopting any new green technology?

-What criteria do you consider? (E.g. cost, profile, certification)

- Can you explain to me the analysis that is carried out to evaluate the different initiatives?

3. Adoption of green energy technologies

3.1 How did this hotel first become involved in green energy technologies?

Probe

-Did an individual/unit or department champion the initiative/ green energy technology?

-What units or departments within your company were involved in this decision?

-How long did the decision-making process last?

-Who made the final decision to adopt the initiative/technology?

-How important were the following drivers to get involved in adopting green energy technologies? (Rate the factors on scale of 1 to 7. 1 being lowest and 7 being highest).

Drivers include cost savings, environment consciousness, improve environmental image of the hotel, competitive advantage, education, policy, consumer demand, stakeholder influence, and economic/social incentives.

3.2 What are the sources of information for adoption of innovations such as green energy?

Probe

-What are the primary sources for information about new initiatives?/green energy technologies?

-How can we improve the information available for the promotion of green energy technologies within the hotel industry?

4. Technologies/Initiatives adopted to improve energy performance

4.1 Can you tell me what has been done in this hotel to save/reduce energy?

Probe

-What are the various technologies adopted by your hotel namely structural, operational and behavioral to improve energy usage/performance?

- Approximately, in what proportion of energy savings have been achieved by energy efficiency, energy conservation and renewable energy?

-Did your hotel undergo an energy audit before adopting any sustainable energy technology?

-Which areas in the hotel are prioritized to improve energy performance? How do you decide which area in the hotel should be targeted first?

4.2 I want to start by giving you a list of five electricity related initiatives that your firm could hypothetically adopt. Can you please take a moment to rate them from the most likely to the least likely to be implemented by your company?

Co-generation, purchasing green electricity from the grid, energy conservation, generating on-site green electricity, increasing energy efficiency. Other?

4.3 Can you please explain to me what factors you considered when you rated the different initiatives?

4.4 What are the challenges involved in taking further steps to improve your energy performance?

4.4 How important is the role of organizational factors in selecting green energy technologies? (Rate the factors on scale of 1 to 7. 1 being lowest and 7 being highest)

Factors include size, ownership, star categorization, services offered, operational cycle (seasonal/whole year), location climate, and organizational policies.

5. Energy Consumption patterns in the hotel

5.1 Can you tell me more about your energy use in the hotel?

Probe

-In what proportion of your energy is generated on-site and purchased?

	Quantity	Cost ($)
Total Annual Energy Consumption		
Total purchased		
Total On-site renewable energy		

-Which are the key areas in the hotel that need to improve its energy performance?

5.2 When do you have peak demand? Has this changed in response to time of use rates?

6. Finances

6.1 Can you tell me about the funding sources used to support adoption of sustainable measures in your hotel?

Probe

-What are the typical costs associated with adopting green technologies. Can you give me an example of a recent project?

-What is a typical time line for a green energy initiative?

Appendix C

Tourism Industry Association of Canada and National Roundtable on the Environment and the Economy

Topics	Guidelines
Policy, planning and decision-making	Commit to excellence in incorporating sustainable tourism principles in all aspects of policy, planning, and decision-making.
	Prepare an environmental policy statement and action plan. Establish an environmental committee to develop programs and generate staff support.
	Establish a monitoring and evaluation program to assess progress.
Guests	Reinforce environmental awareness among guests. Inform guests of environmental programs and advise how they can cooperate in conserving energy and water, and the recycling of waste.
The Host Community	Encourage the development of community and regional infrastructure for the collection, storage and processing of recyclable materials.
	Donate excess food to local shelters and community groups as possible within the framework of applicable health regulations.
	Support cultural and environmental programs of community groups and organizations.
Development	Respect natural and cultural, surroundings in the scale, siting, design, and operation of new facilities, expansions and renovations. As possible, enhance the quality of the landscape.
	Design and develop facilities taking into consideration efficient use of energy and materials, the sustainable use of natural resources, the minimization of adverse environmental impacts and waste generation, and the safe and responsible disposal of residual wastes.
	Consult with the Royal Canadian Institute of Architecture to select materials that are non-toxic and which are least harmful in their harvesting, mining, or manufacture, use and disposal.
Natural, Cultural, and Historic Resources	Consider the use of local culture and local artists to enhance new and renovated buildings and the use of local materials in construction.
	Commit to the preservation and restoration of historic hotels when economically viable.
Conservation of Natural Resources	Practice energy conservation in all areas including heating, air conditioning and lighting. Consider the use of solar energy in new facilities and as possible, upgrade to more energy efficient systems in all facilities.

	Encourage the use of public transportation and ridesharing among employees and facilitate walking, jogging, bicycling to work by installing showers, lockers and bicycle racks.
	Practice water conservation and install as possible, water conserving fixtures.
	Purchase recycled and unbleached paper products for guest rooms, dining facilities and office use.
	Conduct periodic energy and water audits.
Environmental Protection	Minimize and strive to eliminate release of any pollutants.
	Minimize the generation of waste through reduction, reuse, and recycling. Dispose of waste in an environmentally safe manner.
	Seek out practical options for the diversion of waste to useful purposes such as composting and conversion of food leftovers to animal feed.
	Use environmentally friendly guest amenities.
	Purchase supplies in bulk as practical and utilize dispensers in dining facilities for condiments, soft drinks and dairy products where health regulations allow.
	Work with suppliers to develop environmentally friendly products, to reduce packaging and to develop re-usable shipping containers.
	Periodically check air conditioning systems and refrigeration units for leaks to prevent loss of freon.
	Reduce indoor air pollution by installing air-cleaning plants.
Marketing	Reflect environmental initiatives in marketing and promotion programs.
Research and Education	Support and encourage research related to the reduction, recycling and reuse of wastes and the advancement of knowledge contributing to sustainable tourism including the development of sustainable tourism indicators. Support and initiate research which monitors consumer response to sustainable tourism initiatives.
	Educate and motivate staff regarding the implementation of environ- mental policies with the aim of instilling an environmentally and culturally caring work ethic consistent with health and safety factors.
	Remain informed of significant developments regarding relevant environmental practices.
Public Awareness	Encourage the development of public policy, and industry, government and educational initiatives, which increase environmental and cultural awareness, understanding of the concept of sustainable development and the contribution of tourism towards these ends.
Industry Cooperation	Cooperate within the industry, with government, and with other organizations working towards the aim of sustainable tourism and an improved quality of lie in destination areas.

	Cooperate with community organizations and other local industries in achieving sustainable development goals of the community.
Global Village	Encourage participation in events such as Tourism Awareness Week, World Tourism Day, Heritage Day, Parks Day, Earth Day, Environment Week, and UNESCO World Decade for Cultural Development.