Energy conservation measures in the hotel sector in Kwa-Zulu Natal, South Africa

Reshma Sucheran*
Faculty of Management Sciences,
Durban University of Technology,
PO Box 1334, Durban, 4000, South Africa
Telephone: 2731 3735509Email: reshma@dut.ac.za

&

Urmilla Bob
University of KwaZulu-Natal
South Africa

Corresponding author*

Abstract

The depletion of energy resources is a major threat facing the tourism and hospitality industry. In particular, the hotel sector is associated with excessive consumption of energy and is regarded as a significant contributor to greenhouse gases. This study examines energy conservation measures of star graded hotels in terms of various hotel characteristics. The results, based on a sample of 60 hotel managers, indicate that majority of the hotels in the study engage in some form energy conservation practice. In addition, chain, business and higher star hotels display higher levels of energy conservation measures. Solar energy and key card systems were the least practiced energy efficient measure amongst all hotels in the study. The results obtained indicate that hotel managers need to engage in proactive energy conservation practices aimed at reducing greenhouse gas emissions. The study also provides managerial implications for hoteliers to improve and diversify their energy management practices.

Keywords: energy conservation, climate change, greenhouse gas emissions, solar energy, hotels, environmental management.

Source: http://home-designs-interesting-wallpaper.blogspot.com/2014/01/green-technology-energy.html
Introduction

The natural environment is currently under threat in terms of global warming, the depletion of the ozone layer, the over-consumption of non-renewable resources, global air pollution, traffic patterns and waste generation (Chan and Hawkins 2012; Peric et al. 2013). Tourism is not immune to these concerns (Holden 2003; Tang 2015). According to the United Nations World Tourism Organization (UNWTO) (2014:10), “international tourism continued its momentum with a 5% growth in 2013, or an additional 52 million international tourists, bringing up the world total to a record 1,087 million arrivals”. This mass growth of tourism has led to the over-consumption of resources (Han et al. 2011; Tortella and Tirado 2011) and tourism is now regarded as an “extractive industrial activity” (Garrod and Fyall 1998:199).

Agenda 21 for the Travel and Tourism Industry, formulated by the World Travel and Tourism Council (WTTC) and the UNWTO, identified global warming and greenhouse gas emissions as the major environmental issues facing the tourism industry (Cheung and Fan 2013; Tsagarakis et al. 2011). Moreover, McKercher et al. (2010), Scott and Becken (2010), Tang et al. (2011), Teng et al. (2012), Sanyé-Mengual et al. (2014) and Katircioglu (2014) believe that tourism is a major contributor to greenhouse gas (GHG) emissions and consequently a “non-negligible contributor to climate change” (Yang 2010:213). The United Nations Environmental Program (UNEP) and the UNWTO (2012), estimates that the tourism sector contributes to 5% of global GHG emissions and this figure is likely to grow considerably in the future. “As the tourism industry grows, so does tourism-related energy consumption and corresponding greenhouse gas emissions” (Nelson 2010:347). Hence, in the move towards a low carbon tourism industry, the sector has set targets of a 50% reduction of GHG emissions by 2035 (World Travel and Tourism Council 2009).

An integral component of the tourism industry is the hotel sector. According to the Intercontinental Hotel Group (IHG) (2013), the global hotel industry constitutes approximately 14.6 million rooms with an estimated the global hotel room growth rate at 3% annually. The growing number of tourists worldwide inevitably leads to higher occupancy rates, rapid hotel development and the higher consumption of energy and resources which is consequently “imposing an increasing ecological footprint” (Chung and Parker 2010:49). In particular, the hotel sector is associated with the excessive consumption of energy (Cheung and Fan 2013; Penny 2007; Chou 2014; Lu et al. 2013) and accounts for 21% of total tourism sector GHG emissions (UNEP and UNWTO 2012). This figure is predicted to rise by 3.2% per year (Yang 2010). Evidently, the hospitality industry can no longer ignore its contribution to greenhouse gas emissions (Hsiao, et al. 2014; Grosbois 2012; Rodriguez and Cruz 2007).

Research confirms that due to their operational characteristics, hotels are amongst the highest energy consuming buildings after shopping malls and hospitals (Farrou et al. 2012). For example, Hotel Energy Solutions (2011), estimates that a typical hotel releases between 160 to 200kg of CO\textsubscript{2} per m\textsuperscript{2} of the room floor area annually. The large consumption of energy resources has therefore prompted the hotel sector to explore sustainable energy practices (Hsiao et al. 2014; Miao and Wei 2012). Whilst some studies have examined energy management practices and performance in the hotel sector (Shiming and Burnett 2002; Cheung and Fan 2013), the most widespread investigations have been on energy consumption and audits in various types of accommodation sectors (Chan and Hawkins 2012; Khemiri and Hassairi 2005; Xin et al. 2012; Ayoub et al. 2014) and the level of CO\textsubscript{2} emissions generated from hotels (Tsai et al. 2014; Sanyé-Mengual et al. 2014; Wang 2012). Despite the number of studies on energy consumption in the accommodation sector, very few studies have focused on
the energy conservation measures employed in this sector. More specifically, there is a dearth of such research for the hotel sector in South Africa. In an attempt to fill this research gap, this paper examines the energy conservation practices of the hotels in KwaZulu-Natal (KZN). Moreover, this study contributes to the relevant literature by examining the key energy saving measures adopted by hotels in KZN and by further examining these practices across various hotels characteristics such as hotel grading, hotel size, ownership type, number of years in operation and hotel target markets.

Literature Review

Environmental management in the accommodation sector was initiated over half a century ago. Since, a number of studies have concentrated on this issue (Ayuso 2007; Bohdanowicz 2006; Chan et al. 2014; Cheung and Fan 2013; Chou 2014; Erdogan and Baris 2007; Fraj et al. 2015; Katircioglu et al. 2014; Lu et al. 2013; Miao and Wei 2012; Park and Kim 2014; Penny 2007; Rodriguez-Anton et al. 2012; Lu et al. 2013). A study on Swedish and Polish hotels disclosed that the majority of hoteliers (95%) expressed serious concern for the environment which led to priority being given to environmental issues at a national level (Bohdanowicz 2006). Knowles et al. (1999), in their research on the London hotel sector, claims that 94% of hotel managers were found to be taking some form of action on environmental issues in the management and operation of their hotels. However, despite the attention to environmental management issues in a number of hotels, Knowles et al. (1999:262) advises that the hotel sector “exhibits a gap between environmental good intention and action” and the “challenge lies in getting businesses to adopt environmentally-friendly practices” (Erdogan and Baris, 2007:611). Even though a number of hotels may show an interest in environmental aspects, only a few carry out formal environmental audits (Park and Kim 2014) as many managers may still be “operating with the old world mental models” that do not consider the value of the environment (Brown 1996:19). The global trend is to therefore encourage hotels to engage in green practices (Han et al. 2011; Chou 2014; Hsiao et al. 2014) and an increasing number of hotels are now embarking on the implementation of eco-friendly practices and environmental strategies (Han et al. 2011; Hsiao et al. 2014; Kang et al. 2012; Min 2011). The most common action areas of sustainable environmental practice include energy conservation, water conservation and waste management (Ayuso 2007; Rahman et al. 2012).

The accommodation sector has been identified as a key sector of the tourism industry for improving energy consumption, given that the sector accounts for 21% of the tourism’s industry total CO₂ emissions (Nelson, 2010). Research undertaken by Becken et al. (2003), Gossling et al. (2003), Chung and Parker (2010) and Gossling et al. (2015), verify that hotels are associated with the largest energy use compared to all other accommodation establishments and Wiberg (2009) claims that CO₂ emissions from the hotel sector are likely to increase by 170% by 2035. The huge growth in the hotel industry has therefore considerably affected the environment at a global level (Rodriguez and Cruz 2007) and the sector is particularly associated with the excessive consumption of energy (Alexander 2002; Cheung and Fan 2013; Nikolaou et al. 2012; Shiming and Burnett 2002; Ali et al. 2008; Bohdanowicz et al. 2001; Khemiri and Hassairi 2005; Yang 2010; Min 2011; Teng et al. 2012; Wang 2012). A reduction in energy consumption in hotels can greatly reduce carbon emissions and therefore reduce the negative effects of GHG emissions for this sector (Tang et al. 2011). Therefore, “the thrust of the green campaign in the hospitality sector has focused mainly on energy savings” (Mensah 2006:418) and environmental management practices undertaken by hotels tend to emphasize energy conservation (Knowles et al. 1999; Penny 2007; Shiming and Burnett 2002).
Energy is an important resource for the operation of hotels, of which a large proportion is used for lighting, heating, air-conditioning and laundry facilities (Chan 2008; Nikolaou et al. 2012; Shiming and Burnett 2002; Teng et al. 2012). Electricity is considered to be the main form of energy used in hotels compared to gas, diesel and coal (Zografakis et al. 2011). For example, the total energy consumption of hotels in Hong Kong is dominated by electricity and accounts for 73% of energy use (Shiming and Burnett 2002). Notwithstanding, Teng et al. (2012) maintain that hotels can reduce their energy consumption by 20-40% without affecting the functionality of the hotel.

There are a number of measures aimed at reducing greenhouse gas emissions from energy usage in hotels. Several studies have examined how hotels have embraced energy reduction or renewable energy systems in their operations. Common practices include the use of energy-efficient lighting, installation of renewable energy systems, energy saving power cards, the use of solar energy (Erdogan and Baris 2007; Min 2011; Teng et al. 2012; Nikolaou et al. 2012), the use of occupancy sensors to control lighting (Tari et al. 2010), thermopane windows (Chung and Parker 2010), good insulation (Alexander 2002), key-card systems (Nikolaou et al. 2012), reviewing of utility bills (Kattara and Zeid 2002), the use of energy-efficient appliances (Mensah 2006), maximizing the use of natural light (Ali et al. 2008) and the installation of compact fluorescent light bulbs (Liu and Sanhaji, 2009). These measures are believed to have greatly reduced energy consumption in hotels. In particular, Bohdanowicz (2006) believes that lighting has a significant saving potential in hotels. Depending on the size of the establishment, lighting can account for up to 40% of the hotels energy consumption and is regarded as the “second largest energy-using system in a hotel” (Alexander 2002:4). Similarly, Edorgan and Tosun (2009), Min (2011) and Teng et al. (2012) cited energy efficient lighting as the most common energy-saving method in hotels.

Solar power is also increasingly being used and is considered a “limitless natural resource with economic and environmental benefits” (Alexander 2002:4). For example, Nikolaou et al. (2012) maintain that just over half the hotels in Corfu Island, Greece, installed water solar heaters. However, hotels in Central Antalio declined to use solar panels as they considered these to be rather expensive and hoteliers are not convinced that they are a viable investment (Edorgan and Tosun, 2009). The use of solar energy for hot water provision was also investigated by Chan et al. (2013) who found that hotel managers usually postponed the adoption of solar energy for a number of reasons. Managers were largely concerned about the noise being generated during the installation of such equipment and the associated costs of such equipment. They also indicated that roof top areas could be converted to other income-generating purposes such as extending guest floors and function rooms.

Conserving energy leads to considerable cost savings and many energy conservation programs in hotels focus on managing energy due to the financial gains (Ali et al. 2008; Erdogan and Baris 2007; Knowles et al. 1999). However, hoteliers are often concerned with the initial costs of setting up energy saving programs (Rahman et al. 2012). Cheung and Fan (2013) argue that a relatively large investment in solar-based energy is required and the payback period is usually more than five years. In Istanbul, Turkey, an investment in 40 solar panels was found to have a payback period of two years. Bohdanowicz et al. (2001) claim that the payback period for installing energy-saving lighting equipment is typically less than three years. For example, the Sheraton Tacoma Hotel installed 2 000 compact fluorescent light bulbs which resulted in a cost saving of US$15 000 and a payback period of 18 months (Alexander 2002). Despite the impressive cost savings and excellent
return on investment with such practices, hotels often simply cannot afford the upfront costs.

**The situation in South Africa**

According to Donev *et al.* (2012), the electricity consumption in South Africa is rapidly accelerating and the country has also experienced a number of power outages. Evidently this electricity crisis indicates that economic growth and environmental sustainability are “consistently in tension with each other” (Krupa and Burch 2011:6254). The Living Planet Report indicates that the biggest challenge for South Africa is to offset carbon emissions and the country expects to generate 50% of its energy from renewable resources by 2030 (World Wildlife Fund – South Africa (WWF-SA) 2010). South Africa has the fourth largest carbon footprint in Africa (Etheridge 2012) and according to the Global Environmental Performance Index 2012, South Africa is “the biggest emitters of GHGs in Africa” (Rondganger 2012:1).

South Africa has initiated efforts to address environmental concerns and more especially energy conservation. Such efforts are evident in a number of policies, legislations, and agreements that are aimed at environmental and energy management. In particular, South Africa responded to the 1992 United Nations Conference on Environment and Development with the 1996 White Paper on the Development and Promotion of Tourism in South Africa which proposed **Responsible Tourism** as key guiding principle for tourism development in South Africa and implies that the tourism industry has a responsibility to the environment (DEAT 1996). The Responsible Tourism Manual for South Africa (RTMSA) was formulated in 2001 followed by the Responsible Tourism Guidelines in 2002, which identified specific ways in which responsible tourism can be realized. South Africa has also formulated a number of policies and programs that address energy conservation. These include The National Climate Change Response Policy for South Africa (Department of Environmental Affairs 2011a), The National Strategy for Sustainable Development and Action Plan 2011-2014 (Department of Environmental Affairs 2011b), the Draft National Tourism and Climate Change Response Program and Action Plan (Department of Tourism 2011), The White Paper on Renewable Energy (Department of Minerals and Energy 2003), National Minimum Standard for Responsible Tourism (Department of Tourism 2012), Draft National Greenhouse Gas Inventory for South Africa (Department of Environmental Affairs 2014a), White Paper on Environmental Management Policy (Department of Environmental Affairs and Tourism 1997), and the Draft Environmental Impact Assessment (EIA) Guideline for Renewable Energy Projects (Department of Environmental Affairs 2014b).

The hotel sector in South Africa is well positioned to reduce its carbon footprint a number of hotels throughout the country have embarked on energy saving measures. For example, the Hotel Verde, in Cape Town, is famed as being “South Africa's greenest hotel” and is a considered a showcase for “most environmentally conscious technological installations and operation practices in the world” (African Business Review 2013:13). The hotel aims to reduce energy consumption by installing shading, energy efficient lighting, double glazed windows, and geothermal heating and cooling design systems (Moodley 2013). Moreover, Tsogo Sun claims to be actively incorporating environmental practices into its core business strategies. With regards to energy conservation, the Tsogo Sun group aims to minimize GHG emissions from their operations, reduce energy consumption through the responsible use of energy and implement sustainable energy solutions (Tsogo Sun 2014). The Hilton Group has also made significant progress in energy conservation in South Africa. More than 17 000 energy-saving lights have been installed at the Hilton Sandton, Hilton Durban and Hilton Cape Town and this initiative is expected to reduce approximately 2 700 tonnes of CO₂.
annually (Green Lodging News 2012). According to Tourism KwaZulu-Natal (TKZN) (2007), owners of the Table Bay Hotel in Cape Town, the Palace of the Lost City at Sun City and the Pezula Resort Hotel in Knysna have initiated a carbon neutral program called Leading Green. For every online guest booking made, these companies donate R3.50 to the Sustainable Travel International, a non-profit organization. Sun City, a Sun International resort was also able to decrease its energy consumption by 32.1% in 2010/11 through various green energy measures (Sun International 2011).

Methodology

The study setting is the province of KwaZulu-Natal in South Africa. Hotels in KwaZulu-Natal range from small private hotels to large national hotels that boast international standards. Hotels included in the study were selected according to hotel grading ranging from 1 star to 5 star categories as graded by the Tourism Grading Council of South Africa (TGCSA). A total of 142 star-graded accommodation establishments were identified for the study. A census of all star-graded hotels were included in the study and therefore a total of 142 hotel managers were targeted. A response rate of 60 hotels was attained for this study.

Quantitative data was elicited from hotel managers through online web-based, self-completion questionnaires. The general managers of the selected hotels were contacted telephonically and informed about the purpose of the study and asked to participate in the study. An email was sent to the managers of the selected hotels which required the managers to access a link to a web page which contained the questionnaire. Email and web surveys are fairly easy to set up and administer and is able to reach a widely dispersed population (McGivern 2006). The online user-administered questionnaire was chosen for a number of reasons. Firstly, the population was distributed over a large geographical area and it was not feasible to travel to administer the questionnaires. Secondly, the use of an online survey reduced the cost paper, postage and employing researchers to administer the questionnaires. Thirdly, the online surveys tended to have a quicker response rate. Lastly, the database of hotels and lodges revealed email addresses and websites necessary for online surveys. The questionnaire was compiled using the Google Documents internet survey software package. The questionnaire comprised two sections. Section one entailed questions related to the characteristics of hotels in terms of star grading, hotel size, ownership type, number of years in operation and the hotel’s key market. Section two examined energy conservation practices within the hotel.

The data collected from the survey questionnaires was edited, coded and processed using the Statistical Package for Social Scientists (SPSS). Babbie (1990:239) asserts that “the heart of survey analysis lies in the twin goals of description and explanation” and de Vaus (2002:203) maintains that “before analyzing data we must be clear about the question we are trying to answer”. Univariate and bivariate analysis were conducted to analyze key variables how relationships between variables such as hotel characteristics (de Vaus 2002; Sekaran and Bougie 2009; Pieterson and Maree 2011). The data was presented in tables and graphs.

Results and discussion

Mensah (2006)argues that it is imperative to identify and evaluate the characteristics of hotels as this affects its environmental actions. Table 1 presents the profile of hotels in the study was analyzed according to hotel size, star grading, years in operation, key markets and ownership type.
Table 1: Hotel characteristics

<table>
<thead>
<tr>
<th>Hotel and characteristics</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel size (n=60)</td>
<td></td>
</tr>
<tr>
<td>1-50 rooms</td>
<td>68</td>
</tr>
<tr>
<td>51-100 rooms</td>
<td>18</td>
</tr>
<tr>
<td>101-200</td>
<td>12</td>
</tr>
<tr>
<td>&gt;200 rooms</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Star grading (n=60)</td>
<td></td>
</tr>
<tr>
<td>1 star</td>
<td>8</td>
</tr>
<tr>
<td>2 star</td>
<td>7</td>
</tr>
<tr>
<td>3 star</td>
<td>45</td>
</tr>
<tr>
<td>4 star</td>
<td>33</td>
</tr>
<tr>
<td>5 star</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Number of years in operation (n=60)</td>
<td></td>
</tr>
<tr>
<td>Less than one year</td>
<td>10</td>
</tr>
<tr>
<td>1-5 years</td>
<td>12</td>
</tr>
<tr>
<td>6-10 years</td>
<td>22</td>
</tr>
<tr>
<td>11-15 years</td>
<td>20</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Key market (n=60)</td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>20</td>
</tr>
<tr>
<td>Leisure</td>
<td>47</td>
</tr>
<tr>
<td>Business and leisure</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
<tr>
<td>Ownership type (n=60)</td>
<td></td>
</tr>
<tr>
<td>Chain hotel</td>
<td>30</td>
</tr>
<tr>
<td>Independent hotel</td>
<td>70</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The profile of hotels in the study was analyzed according to size, star grading, years in operation, key markets and ownership type. Hotels included in the study varied in size and capacity. A large proportion of hotels (68%) had 1 to 50 rooms whilst 18% had 51 to 100 rooms, and 12% had 101 to 200 rooms. Hotels with more than 200 rooms constituted 2%. In terms of star grading of the establishments, the largest proportion was 3 star hotels (45%) followed by 4 star hotels (33%). Majority of the hotels in the study (78%) were established facilities, having been in operation for more than a decade. In terms of the key market segments, the largest share of hotels (47%) were orientated towards the leisure market. A further 20% hotels identified businesses as their key market, whilst 33% of hotels were orientated towards both a leisure and business market. Independent hotels constituted 70% of hotels whilst 30% belonged to a hotel chain or group.

Fig. 1 Perceived environmental impacts of the hotel
The study clearly indicates that hotels are perceived by themselves to have negative impacts on the environment. According to Figure 1, hotel managers identified high levels of energy consumption (67%) to be the key detrimental impact of their hotel on the environment. This clearly resonates with the existing literature which shows that hotels consume the largest amount of energy compared to other accommodation establishments (Nelson 2010; Chung and Parker 2010). Although the CO2 emission levels and energy usage of each hotel were not established in this study, hotel managers believe that energy usage in hotels is a key environmental threat in their operation.

Fig. 2 CO2 Emissions from Global Tourism 2005 and 2035

This data further reinforces the trends evident in Figure 2 which confirms that CO2 emission is a major concern in the future in relation to the accommodation sector globally. The accommodation sector is the highest emitter of CO2 after the transport the sector. Within a period of thirty years, there will evidently be a rapid increase in CO2 emissions from the accommodation sector (Wiberg 2009). This predicted trend may entail detrimental environmental consequences if measures are not put in place to reduce energy consumption in hotels.

Table 2: Energy conservation measures in hotels

<table>
<thead>
<tr>
<th>Hotel’s energy conservation measures</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel uses energy-saving light bulbs</td>
<td>98</td>
</tr>
<tr>
<td>Hotel reviews utility bills to monitor energy consumption</td>
<td>82</td>
</tr>
<tr>
<td>Hotel uses energy-efficient appliances to reduce energy consumption</td>
<td>82</td>
</tr>
<tr>
<td>Hotel has an energy management program or policy in place</td>
<td>50</td>
</tr>
<tr>
<td>Hotel uses alternative energy sources other than electricity</td>
<td>47</td>
</tr>
<tr>
<td>Hotel uses solar energy</td>
<td>22</td>
</tr>
<tr>
<td>Hotel uses key-card control system in guest rooms</td>
<td>23</td>
</tr>
</tbody>
</table>

Respondents were asked to indicate the energy conservation strategies that they implemented in their hotels. As displayed in Table 2, the most widespread energy saving practices undertaken by most of the hotels in the study was energy-efficient lighting (98%) through the use of energy-saving light-bulbs. This is encouraging, given that South Africa intends on phasing out and ultimately banning all energy-consuming light bulbs by 2016 (Carnie 2011). Teng et al. (2012) corroborates that energy-efficient lighting is the most common method of realizing energy savings in hotels.
The study also reports that 82% of hotels reviewed utility bills, and used energy-efficient appliances in an effort to reduce energy consumption. Half of the respondents mentioned that they had an energy management program or policy in place. Evidently, the use of solar energy was the least used energy conservation measure in the hotels (22%) and this is corroborated by Chan et al. (2013:76) who state that “only a small number of hotels, no matter new or existing ones, install solar water heaters”. Key card control systems were installed in 23% of hotels in the study. This is contrary to the practice in Corfu Island, Greece, where 81% of the hotels had electronic key cards installed (Nikolaou et al. 2012).

There is clearly willingness on the part of hotel managers in the study to reduce and monitor energy use. However, the nature and the extent of the methods employed differ. Additionally, the uptake of alternative and more importantly renewable energy sources, such as solar energy, is low. There is thus, significant potential within the accommodation sector in KZN to further reduce energy consumption. Solar energy is a limitless natural resource and generates huge economic and environmental benefits. South Africa receives intense solar radiation throughout the year (Donev et al.2012) and is “endowed with renewable energy resources” (Pegels 2010:4952). According to the WWF-SA (2012), it is disappointing to note that South Africa has only deployed 220 000 solar water heater systems instead of the intended one million and “so far the potential for solar energy use as an alternative to fossil fuels remains largely underutilized” (Donev et al. 2012:3003). Teng et al. (2012) correspondingly advise that hotels should take full advantage of solar energy. However, resistance to the use of solar energy use in the hotel sector may be attributed to a number of factors such as lack of awareness on the benefits of solar energy use, lack of policies to facilitate the growth of solar energy technology, lack of appropriate knowledge; lack of training on the installation and maintenance of solar energy technology, and the high initial cost of solar water heating systems. Furthermore, there is little or no reliable data that confirms the economic viability and environmental justification of such technologies.

Table 3: Hotel’s energy conservation measures by hotel characteristics

<table>
<thead>
<tr>
<th>Hotel characteristics</th>
<th>Energy management policy</th>
<th>Solar energy</th>
<th>Energy-saving light bulbs</th>
<th>Key cards in rooms</th>
<th>Revie ws energy bills</th>
<th>Alternative energy sources</th>
<th>Energy-efficient appliances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star grading</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 star</td>
<td>20</td>
<td>40</td>
<td>100</td>
<td>0</td>
<td>80</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>2 star</td>
<td>25</td>
<td>50</td>
<td>100</td>
<td>75</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>3 star</td>
<td>48</td>
<td>19</td>
<td>96</td>
<td>37</td>
<td>82</td>
<td>59</td>
<td>82</td>
</tr>
<tr>
<td>4 star</td>
<td>60</td>
<td>10</td>
<td>100</td>
<td>5</td>
<td>85</td>
<td>20</td>
<td>85</td>
</tr>
<tr>
<td>5 star</td>
<td>75</td>
<td>50</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Hotel chain</td>
<td></td>
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<tr>
<td>Independent</td>
<td>41</td>
<td>26</td>
<td>100</td>
<td>16</td>
<td>81</td>
<td>55</td>
<td>83</td>
</tr>
<tr>
<td>Chain</td>
<td>72</td>
<td>11</td>
<td>94</td>
<td>39</td>
<td>83</td>
<td>28</td>
<td>78</td>
</tr>
<tr>
<td>Hotel size/rooms</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>1-50</td>
<td>46</td>
<td>24</td>
<td>100</td>
<td>15</td>
<td>81</td>
<td>44</td>
<td>81</td>
</tr>
<tr>
<td>51-100</td>
<td>36</td>
<td>18</td>
<td>100</td>
<td>55</td>
<td>82</td>
<td>64</td>
<td>73</td>
</tr>
<tr>
<td>101-200</td>
<td>86</td>
<td>14</td>
<td>86</td>
<td>29</td>
<td>86</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>&gt;200</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Years in operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 years</td>
<td>57</td>
<td>29</td>
<td>100</td>
<td>77</td>
<td>57</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>6-10 years</td>
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<td>39</td>
<td>100</td>
<td>15</td>
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<td>11-15 years</td>
<td>42</td>
<td>17</td>
<td>92</td>
<td>25</td>
<td>100</td>
<td>42</td>
<td>83</td>
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<tr>
<td>&gt;15 years</td>
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<td>18</td>
<td>100</td>
<td>14</td>
<td>91</td>
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<td>96</td>
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<td>Key Markets</td>
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<td>Business</td>
<td>67</td>
<td>8</td>
<td>100</td>
<td>42</td>
<td>100</td>
<td>67</td>
<td>83</td>
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<td>4</td>
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Table 3 presents correlations between energy conservation measures and hotel characteristics such as star grading, type of ownership, hotel size, number of years in operation and key markets. Overall, cross-tabulations indicate that higher graded hotels engaged in higher levels of energy conservation measures. This may be ascribed to the fact that higher rated establishments generally consume substantially more energy than the others due to the large number of facilities and services that they offer (Wang 2012). In particular, the study reveals that the use of solar energy was mostly evident in 1 star (40%), 2 star (50%) and 5 star (50%) hotels. Only 19% of 3 star hotels and 10% of 4 star hotels made use of solar energy. Seventy five percent of 2 star hotels used key cards in guestrooms whilst this practice was non-existent in 1 star and 5 star hotels'. A larger proportion of higher graded hotels (more than 48%) had an energy management policy in place. The use of energy-saving lights was a common practice for all star-graded categories of hotels in the study.

Key cards are an important energy saving measure for hotels as it avoids the unnecessary consumption of electricity. When a guest inserts the key card in the energy saving device on entering the room, the electricity is switched on. On leaving the room, the guest removes the key card from the device and the electricity is switched off. Key-cards are considered a high impact energy saving measure and a low cost measure and a number of hotels have reported to have reduced energy use by up to 30% through the use of key cards (Nikolaou et al. 2012; Erdogan and Baris 2007). The highest evidence of the use of key card systems in the study was in 2 star hotels (75%). Thirty seven percent of 3 star hotels and only 5% of 4 star hotels had key card systems in place. The absence of key card systems was reported in 1 star and 5 star hotels’. Opposing results were found by Nikolaou et al. (2012) whereby 80% of managers in 5 star hotels, 57% of managers in 4 star hotels and 40% of managers in 3 star hotels have adopted the key card systems.

Cross-tabulations were also undertaken in relation to energy conservation measures and hotel ownership type. Although chain hotels have shown a greater involvement in environmental actions, the use of solar energy and alternative energy sources is practiced significantly more for independent hotels than chain hotels. This is an interesting finding as it may indicate some of form of resistance from this particular sector to embrace change. Chain hotels need to embrace the policy changes that require the use of solar energy sources as they possess the resources to make radical environmental changes. Park and Kim (2014) argue that hotel ownership type can either enhance or restrict the discretion of managers in the hotel operation. In independent hotels, managers exercise a greater degree of discretion over policies and practices whilst managers of chain hotels have limited discretion as they are bound by contractual agreements between hotels and chains. The presence of an energy management policy and key card systems in guestrooms is significantly higher in chain hotels compared to independent hotels. Chain hotels are often well-established facilities and usually have sufficient resources to engage in energy saving practices. Furthermore, managers of chain accommodation establishments are more likely to follow the environmental policies set by the chain group. The reviewing and monitoring of energy bills is carried out by the majority of hotels in both types of hotel ownership categories. This is possibly due to the fact that this practice does not entail the need for additional human and financial resources and is considered as an effective, yet inexpensive, environmental practice.

The study reports that larger hotels generally displayed higher levels of energy conservation practices. Measures such as an energy management policy, the use of key cards in guestrooms, reviewing of energy bills and the use of energy-efficient appliances was evident in all large hotels that comprised more than 75 rooms. Rahman et al. (2012) believe that the willingness to engage in environmental concerns depends on the size of a hotel and larger facilities naturally entail greater consumption of energy. Correspondingly,
Tsai et al. (2014) claim that an increase in the physical size of a hotel results in a higher level of CO₂ emissions per person per night. This is largely ascribed to the fact that larger accommodation establishments have a higher number of guests and offer more facilities services that utilize energy. Smaller hotels displayed higher levels of energy conservation practices in terms of solar energy (24%), energy-saving light bulbs (100%), and alternative energy sources (44%).

Energy conservation practices between older and newer hotels in the study varied. Establishments that were less than 10 years old demonstrated higher levels of energy conservation practices in terms of an energy management policy, the use of solar energy and the installation key cards in guestrooms. Given that environmental management is a fairly recent phenomenon in the hotel sector in South Africa, it is assumed that newer hotels will embrace energy saving technologies such as solar energy and key cards in the developmental and planning stages of the establishment. Such technologies may be non-existent or outdated in older hotels. However, a larger proportion of older hotels use energy-saving light bulbs (100%), alternative energy sources (50%), energy efficient appliances (91.2%) and reviewed energy bills (94.1%)

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Older hotels may be more established facilities and therefore may have the resources to embrace the technologies. It is therefore easier for established accommodation facilities to embrace new technologies and energy saving measures. With emerging and newer establishments, there should be subsidies in place to assist with greener technologies and equipment.

Overall, business hotels showed a higher environmental commitment to energy conservation. In particular, a higher proportion of business hotels had an energy management policy in place (67%), used energy-saving light bulbs (100%), had key cards in guestrooms (42%), reviewed energy bills (100%), used alternative energy sources (67%) and used energy-efficient appliances (83%). Business hotels tend to be more luxurious and offer higher quality facilities services to cater for the needs of the business market. Such facilities include gymnasiuems, swimming pools, conference facilities, spas, restaurants and business centres which generally consume high levels of energy (Teng et al. 2012). Consequently, higher levels of hotel facilities services are usually associated with higher average CO2 emissions per person (Tsai et al. 2014) as the most common consumption of energy among hotel guests is from restaurants, swimming pools, spas and overly spacious guest rooms (Teng et al. 2012). Hotels targeted at the leisure market showed higher usage of solar energy (29%) and the use of low energy consuming materials (86%).

Conclusion

The study provided an insight into the types of energy conservation practices in hotels in KwaZulu-Natal, South Africa. A number of hotels are implementing a number of energy saving measures. A higher implementation of these measures was evident in higher star-graded hotels, chain hotels and business hotels. Whilst the most common energy saving measure practiced by all hotels was the use of energy-saving light bulbs. Solar energy, the use of alternative energy sources and key card systems were the least practiced energy efficient measure amongst hotels in the study. Overall, although various energy conservation practices are evident to some extent, the use of solar energy and key card systems is least evident in majority of hotels. The data reveals that there is some initiative on the part of hotel managers in the study to reduce energy use. However, the nature and the extent of the methods employed by the hotels differ.

Larger hotels, that comprise additional energy consuming facilities and services, should embrace a greater level of energy conservation measures. Similarly chain hotels should become more actively involved in energy saving initiatives as they tend to have the financial and human resources for the implementation of such measures. Moreover, energy conservation policies and measures can be set up by the hotel chain for implementation at individual hotels within the chain. There is also a need for creating awareness on the implementation and
benefits of solar energy systems and to initiate policies on solar energy and alternative energy sources for the hotel sector. Although majority of hotel managers perceive high levels of energy usage as a key environmental impact of their hotels, their implementation of energy saving initiatives are limited. Energy monitoring systems need to be set up for hoteliers to encourage regular monitoring and reporting of energy saving measures. It is also recommended that the accommodation sector accurately measure energy usage in hotels in order to report and control consumption. Useful indicators must be put into place to monitor energy usage and it is important to develop effective benchmarks for evaluating energy performance for this sector.

References


Zografakis, N., Gillas, K., Pollaki, A., Profylienaou, M., Bounialetou, F.