An Examination of Hotel's Use of Carbon Offset Programs as an Environmental Sustainability Measure

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Abstract

This study aimed to 1) empirically examine the hotels and resorts located around the world that have defined and introduced carbon offset programs for their guests and 2) identify whether individual hotels and resorts that are not part of a major global chain have also introduced carbon offset programs. An in-depth qualitative instrumental case study research approach was usedin this study. The study period was from 2010 to 2022. The qualitative data gathered for the study was analyzed by document analysis. The case study revealed that hotels located in Australia, Canada, Costa Rica, throughout Europe, Ireland, Mauritius, Rwanda, South Africa, Tanzania, United States, and the United Kingdom have introduced carbon offset programs as a key environmental sustainability measure. The earliest reported adoption of such a program date back to 2010, when Canada-based Coast Hotels & Resorts and the Westin Melbourne Hotel located in Melbourne, Australia launched carbon offsets programs for their guests. The case study found that individual hotels are also offering carbon offset programs as a sustainabilty measure. Hilton Hotels has introduced a carbon offset program for events and meetings held in its properties in Malaysia, Singapore, Thailand, and in sixty hotels located throughout Africa, Europe, and the Middle East. Radisson Hotels introduced its "100% Carbon Neutral Meetings Program" in 2019, and this program forms part of its group-wide commitment to reduce emissions across its 1,600 hotels by 30%. A key finding of the study is that some hotels are enabling their loyalty program members to redeem their points for carbon offsets, whilst other hotels are offer voluntary carbon offset programs for their guests. The case study also revealed that the carbon offset programs offered by hotels include reforestation, renewable energy projects in developing countries as well as water stewardship programs, which are also located in developing countries.

Keywords: Carbon offsets, case study, hotels, sustainable hotel measures

Introduction

In recent times, carbon offsets have increasingly been adopted and used as a measure to mitigate climate change (Arendt, Bach & Finkbeiner, 2021). Carbon offsets enable greenhouse gas (GHG) emitters to comply with an emissions cap through the payment to others outside of the capped sectors to reduce emissions (Haya, Cullenward, Strong, Grubert, Heilmayre, Sivas & Wara, 2020). Carbon offsets are now being widely used by individuals, corporations, and governments to mitigate their greenhouse gas emissions. Carbon offsets are predicated on the assumption that carbon offsets reflect equivalent climate benefits achieved elsewhere (Badgley, Freeman, Hamman, Haya, Trugman, Anderegg & Cullenward, 2022). Carbon offsetting has thus been extensively embraced as a market-based solution to global warming (McAfee, 2022).

Many businesses are now offering their customers voluntary carbon "offset" certificates so they can compensate for their greenhouse gas (GHG) emissions (Spiekermann, 2014). Like other businesses, hotels have now implemented carbon offset programs as part of their effort to become carbon neutral (Dhanda, 2014). Managing hotel carbon emissions has become a significant issue and has attracted public and national interest in recent times. Importantly, carbon emissions from tourism accommodation premises are one of the major contributors for greenhouse effect particularly so in urban areas and this could result in the detrimental impact to the surrounding environment (Othman, Abu Kasim, Has-Yun Hashim & Mohd Noor, 2015). Thus, the use of carbon offset programs can be used as by hotels as a measure to help offset their impact on the environment.

The key objective of this study is to empirically examine the hotels and resorts located around the world that have implemented carbon offset programs as part of their sustainability policy. A further objective is to identify whether individual hotels and resorts that are not part of a major global chain have implemented such carbon offset programs for their guests. The study period is from 2010 to 2022.

The remainder of the paper is organized as follows: The literature review is presented in Section 2. The research method that underpinned the study is outlined in Section 3. The case study is presented in Section 4. Section 5 presents the key findings of the study.

Literature Review

Carbon Offsets: A brief overview

According to Downie (2007), "a 'carbon offset' is used to describe the process whereby individuals, businesses, or governments purchase 'credits' generated from projects that claim to reduce greenhouse gas (GHG) emissions in the atmosphere". The idea underpinning carbon offsets is that the removal of greenhouse gases (GHGs) via such projects counterbalances emissions that

are produced from other sources (Downie, 2007). Over the past two decades or so, a greenhouse gas (GHG) emissions market has evolved. The origins of this emissions market lie in the negotiations from the United Nations Framework Convention on Climate Change (UNFCCC) and the subsequent inclusion in the Kyoto Protocol, in recognition for the requirement for mechanisms to drive cooperation between countries as well as lowering emissions costs (Harris, 2007). Lovell (2010) has observed that "carbon offsets are produced and sold under the international climate change regime (the United Nations Kyoto Protocol) and also within an expanding voluntary offset market in which companies and individuals can voluntarily opt to compensate for their greenhouse gas emissions". Voluntary carbon markets provide businesses and individuals with the opportunity to offset all or part of their carbon footprints (Kuhn & Uler, 2019). Carbon offset schemes have important environmental benefits as they enable businesses to invest in environmental projects around the world to balance out their own carbon footprints. A carbon offset program may involve the implementation of clean energy technologies or alternatively the purchase of carbon credits from an emissions trading scheme. Other carbon offset schemes include the capture of carbon dioxide (CO_2) directly from the air from the planting of trees (Clark, 2011). The direct link between atmospheric carbon dioxide (CO_2) levels and terrestrial ecosystems has resulted in governments and private entities to explore the possibility of increasing the rate of growth in forests as a means of converting existing carbon dioxide (CO_2) into sequestered carbon stocks (Neil Sampson & Sedjo, 1997).

Carbon offsets may have a direct link to national or intergovernmental regulations, or alternatively they may be voluntary in nature (Green, 2011). The voluntary carbon offset market is comprised of businesses, governments, organizations, organizers of international events, as well as individuals, taking responsibility for their carbon emissions through the voluntary purchase of carbon offsets (Taiyab, 2006). In recent times, voluntary carbon offsets (VCO) have been introduced around the world as a means of compensating personal carbon emissions related to travelling (Kerner & Brudermann, 2021). Voluntary carbon offsets now account for a growing share of the carbon market, and these carbon offsets have the potential to contribute to meeting greenhouse gas emissions targets and reducing anthropogenic climate change. Furthermore, certain types of voluntary carbon offset projects may also deliver co-benefits including safeguarding or promoting biodiversity, supporting human development and poverty reduction, and enabling market and technology development in low-carbon sectors (MacKerron, Egerton, Gaskell, Parpia & Mourato, 2009).

Carbon offsets are typically organized as projects with discrete timetables and the associated activities. Carbon offset projects include the building of renewable energy capacity, the capture of methane from organic sources, increasing the energy generation systems efficiency,

and planting or re-planting of forested areas (Green, 2011, p. 49). Carbon offset programs potentially deliver sustainability co-benefits, to stimulate technology development and transfer, and also to develop human and institutional capacity for reducing emissions in sectors and locations that are not included in a cap-in-trade or a mandatory government policy (Kolmuss, Lazarus, LeFranc & Polycarp, 2010).

Environmental impact of hotels

The hotel industry has a range of adverse impacts on the environment (Baxter & Srisaeng, 2021). In conducting their operations, hotels consume significant amounts of resources. It has been estimated that around 75% of hotels' environmental impacts can be directly associated with the excessive consumption of resources. The principal areas of environmental impact are energy, water, emissions (Bohdanowicz, Zientara, & Novotna, 2011), congestion and noise (Florido, Jacob & Payeras, 2019), and waste (Parambil, 2020). Furthermore, hotels produce carbon dioxide (CO_2) emissions as a byproduct of their operations (Baxter & Srisaeng, 2021). Gössling, Peters, Ceron, Dubois, Patterson, and Richardson (2005) have noted that a hotel emits an average 20.6 kg of carbon dioxide (CO_2) per room night. At destinations that do not have the appropriate infrastructure and systems to manage these environmental impacts, severe degradation of the environment can occur (Parambil, 2020).

The regular renovation and replacement of furniture, appliances and facilities can also result in adverse environmental impacts through purchasing decisions and increased waste generation. Upon closing, a hotel's environmental impacts come from the disposal of materials which are removed from the hotel to refurbish it, convert it for other uses, or through the demolition, and from the work performed during these activities (International Union for Conservation of Nature and Natural Resources, 2012; Parambil, 2020). Also, there potentially could be some toxic materials present at the property. In such an event, the chemicals could require careful handling and management (Parambil, 2020).

A hotel generates carbon emissions, during all stages of the guest stay, including the room where the guest(s) sleeps, the meals eaten, the facilities that are used and the preparation for the entertainment enjoyed by the guest(s) (Le Grand, Sloan & Chen, 2017).

Research Methodology

Research approach

An instrumental case study is the study of a case, for example, a business or company, that provides insights into a specific issue, redraws generalizations, or builds theory (Stake, 1995, 2005). The instrumental case study research approach enables researchers to gain an enhanced understanding of a specific phenomenon. An instrumental case study is designed around

established theory of the phenomenon that is being empirically examined (Grandy, 2010). The present study was designed around the established theory of carbon offsetting (Brohé, Eyre & Howarth, 2009; Kollmuss, Lazarus, Lee, LeFranc & Polycarp, 2010; Zhou, 2020).

Data collection

The data used in the study was obtained from a range of company materials that were available on the internet and these records formed the source of the case study evidence. An extensive search of the leading tourism journals, hotel industry magazines and textbooks were also conducted in the study. This study used secondary data. The three principles of data collection as recommended by Yin (2018) were followed: the use of multiple sources of case evidence, creation of a database on the subject and the establishment of a chain of evidence.

Data analysis

The data collected for the case study was examined using document analysis. Document analysis is quite commonly used in case studies. Document analysis focuses on the information and data from formal documents and a firm's records that are collected by a researcher(s) when conducting their study (Andrew et al., 2011; Yin, 2018). Following the approach recommended by Scott (1990, 2014) and Scott and Marshall (2009), the documents gathered in the present study were examined according to four criteria: authenticity, credibility, representativeness and meaning.

The document analysis was undertaken in six distinct stages:

- Phase 1: The first phase involved planning the types and required documentation and their availability for the study.
- Phase 2: The data collection phase involved sourcing the documents and developing and implementing a scheme for the document management.
- Phase 3: The collected Documents were examined to assess their authenticity, credibility and to identify any potential bias.
- Phase 4: The content of the collected documents was carefully examined, and the key themes and issues were identified.
- Phase 5: This phase involved the deliberation and refinement to identify any difficulties associated with the documents, reviewing sources, as well as exploring the documents content.
- Phase 6: In this phase the analysis of the data was completed (O'Leary, 2004, p. 179).

Following the guidance of Yin (2018), the study's documents were downloaded and stored in a case study database. All the documents gathered for the study were all written in English.

Each document was carefully read, and key themes were coded and recorded in the case study research framework (Baxter, 2021; Baxter & Srisaeng, 2020).

Results

Canada-based Coast Hotels & Resorts introduced a carbon offset program that became effective June 1, 2010, whereby guests staying at any of the hotel chain's 17 participating Canadian properties can voluntarily offset their greenhouse gas (GHG) emissions from their hotel stay by purchasing carbon credits in eco-friendly projects. Coast Hotels & Resorts is encouraging guests to add $1 per day to their room bill to purchase carbon credits equivalent to one night's stay at the hotel. Members of Coast Hotels & Resorts' loyalty program have the option of reducing their environmental footprint by redeeming 25 Coast Rewards points that can be used to purchase sufficient carbon credits to offset each night's stay. Coast Hotels & Resorts has purchased carbon credits from Pacific Carbon Trust, a Crown Corporation established by the British Columbia (BC) Government to deliver B.C.-based greenhouse gas offsets. Acting on the hotel chain's behalf, Pacific Carbon Trust will apply these carbon credit payments to purchase carbon offsets from emission-reducing fuel switching and energy efficiency projects located throughout British Columbia (BC), thereby making a guest's hotel night completely carbon neutral (Cision, 2010).

Costa Rica-based Hotel Villa Florencia has introduced a voluntary guest carbon offset program whereby the hotel's guests can compensate the greenhouse gas (GHG) emissions from electricity consumption and transportation. The objective of the hotel's carbon offset program is the promotion of sustainable development and tourism. Costa Rica has introduced a program whereby tourists can compensate their carbon emissions caused by international flights and car rental through the investment in programs that preserve and reforest natural areas in the country (Hotel Villa Florencia, 2022).

Crowne Melbourne, located in Melbourne Australia, has partnered with Carbon Neutral to provide Crown customers with the opportunity to offset their hotel, conference, and event emissions, with these emissions offset being certified under the Australian Government's National Carbon Offset Standard. Crown has invested in many sustainability initiatives to reduce the company's carbon emissions. These initiatives include upgrading the lighting systems across the complex to light emitting diode (LED) technology, installing daylight and occupancy sensors for lighting control, utilizing carbon dioxide (CO_2) sensors to reduce ventilation requirements, optimizing kitchen exhaust fan and IT room cooling systems, installing variable speed drives on cooling towers and air handling units, improving the property's tri-generation system and increasing its waste diversion rates from landfill (Crowne Melbourne, 2022).

Hilton Worldwide launched a carbon-offset program for events and meetings held at select hotels across Southeast Asia in October 2012 (Sowamber & Ramkissoon, 2019). Under the program, which has no additional cost to customers, Hilton measures the carbon generated by all events at 11 of its properties in Malaysia, Singapore, and Thailand, and subsequently purchases carbon credits to offset their environmental impact. The carbon credits will be used to fund renewable energy projects in Borneo and Cambodia. Working with Climate Friendly, a carbon offset solutions provider, Hilton has identified two initial beneficiaries of the program: the Borneo Rainforest Rehabilitation Project and Cambodia Cookstove Project. The 11 hotels that took part in the launch phase of the program are: Conrad Centennial Singapore (pictured), Hilton Singapore, Hilton Kuala Lumpur, DoubleTree by Hilton Kuala Lumpur, Hilton Petaling Jaya, Hilton Kuching, Millennium Hilton Bangkok, Conrad Bangkok, Hilton Phuket Arcadia Resort & Spa, Hilton Pattaya and Hilton Hua Hin Resort & Spa (Lyons Hardcastle, 2012). Hilton Worldwide expanded their Carbon Offset Program in Southeast Asia in 2014 with three new renewable energy projects being added to the program. The Mungcharoen Biomass Project in Thailand, the Musi Hydro Project in Indonesia, and the Song Ong Small Hydro Project in Vietnam will join the Borneo Rainforest Rehabilitation Project in Malaysia as beneficiaries of the program. As of January 1, 2014, four new hotels joined the existing 13 already taking part in the program following its launch in 2012. The new hotels are DoubleTree by Hilton Sukhumvit Bangkok, Hilton Sukhumvit Bangkok in Thailand, and two hotels in Vietnam – Hilton Hanoi Opera and Hilton Garden Inn Hanoi (Pattaya Mail, 2014). Hilton Hotels has also partnered with social enterprise South Pole to offset the carbon footprint of meetings and events across approximately 60 hotels that are in Europe, the Middle East and Africa at no extra cost to the customer. The program was initially launched in The Netherlands in May 2021, has been extended to more hotels across the region. This initiative will complement existing efforts by Hilton Hotels to deliver low environmental impact solutions that limit waste and increase the focus on local sourcing and is in support of Hilton's "Travel with Purpose 2030 Goals" to cut its environmental footprint in half and double its social impact by 2030. Carbon credits will be allocated to a range of projects which support Hilton's "Travel with Purpose 2030 Goals". These projects include repairing and maintaining boreholes in Rwanda to increase access to safe water sources, the construction of a geothermal power plant in Turkey to generate clean, emissions-free energy and the development and maintenance of wind farms in India and the United States (Hilton Hotels, 2021).

In partnership with GreenDreams, the Protea Hotel Balalaika, that is in Sandton in the City of Johannesburg, launched a carbon offset program for its guests in 2015. At no additional cost to customers, the Protea Hotel Balalaika will offset the carbon emissions produced by the guests'

use of their meeting rooms and conference facilities by purchasing carbon credits. The carbon credits will be used to fund the "Wonderbag Project" in South Africa (Jonckie, 2015).

The Hotel Doolin located in Co Clare, Ireland, has become the first hotel in Ireland awarded carbon neutral status. The hotel has been recognized by "The Green Hospitality Programme" for its implementation of a carbon and waste reduction plan - and for offsetting carbon emissions by planting trees. A green team was established at the hotel in 2012 with the goal of reducing the hotel's carbon footprint. The hotel offsets carbon emissions by planting native Irish trees through a nearby charity (Mannion, 2019).

Mauritius-based Veranda Leisure, and Hospitality (VLH), operators of Heritage Resorts and Veranda Resorts, became the country's first hotel operator to offer carbon neutral hotel stays for their guests when it introduced its carbon offset program in October 2021. The company's carbon neutral program is titled "Now for Tomorrow". Heritage Resorts began offering guests carbon neutral stays at its two hotels, Heritage Le Telfair, and Heritage Awali in Bel Ombre – by offsetting all carbon dioxide (CO_2) emissions that would be generated by a hotel stay. The carbon neutral stays are achieved through the purchase of carbon credits with the Aera Group, an environmental commodity trader, and also through local carbon offset projects, which include the construction of a photovoltaic farm. For guests staying at Veranda hotels, a voluntary contribution to these projects will be offered to customers. The "Now for Tomorrow" program comprises five areas of action, in accordance with the Mauritius Business SignNatir pact, namely energy transition, circular economy, protection of biodiversity, living and integrated communities, as well as inclusive development (Paul, 2021).

Melia Hotels International, headquartered in Spain, announced a plan that lets its loyalty program members use their points to pay for carbon offsets in 2019 (Simms, 2021).

Radisson Hotels have introduced a "100% Carbon Neutral Meetings Program" in 2019, and this program forms part of its group-wide commitment to reduce emissions across its 1,600 hotels by 30%. Meetings and events that were booked at any Radisson Hotel Group property across its Europe, Middle East, and Africa (EMEA) portfolio and occurring before the end of March 2022 were to have their carbon dioxide (CO_2) emissions double offset free of charge. The "Carbon Negative: Planet Positive" initiative was available at 400 hotels across the region and was introduced by the hotel operator to both stimulate the meetings and events sector and to ensure these have a positive impact on the environment (Escobar, 2021; Lennon, 2021). Radisson Hotel Group automatically offsets the carbon footprint of every single meeting and event taking place at any of our hotels throughout the world. Radisson Hotels have partnered with First Climate, one of the world's largest carbon offset organizations, and the carbon offset projects help reduce emissions whilst also having a positive social impact (Radisson Hotels, 2022).

SH Hotels & Resorts, which has hotels in the United States and in London, United Kingdom, has introduced its "Mission by SH" program, The program allows its members to direct their loyalty credits to efforts to offset carbon emissions around the world. Guests can earn rewards worth as much as 4 percent of the money spent at the company's hotels, such as 1 Hotel South Beach and the Baccarat New York. The earned credits can then be used to fund forest preservation in the United States, wind power projects in India, as well as other environmental protection initiatives. The eco-minded loyalty program is a collaboration between SH Hotels and CarbonClick, a firm that was established to help businesses and customers address climate change (Clark, 2021; Simms, 2021).

South Africa-based Singita Safari Lodges and Reserves has introduced a carbon offset program for its guests staying at the company's properties in Rwanda, South Africa, Tanzania, and Zimbabwe. All the monies raised from the carbon offsets program will be used to purchase verified carbon credits from accredited service providers in each region in which Singita operates. Funds generated will be used to purchase verified carbon credits from service providers which include Climate Neutral Group's "Wonderbag" project in South Africa and Carbon Tanzania's Yaeda Valley Forest project in Tanzania. In Rwanda, carbon credits will be bought from Carbon Tanzania, and in Zimbabwe, from the Climate Neutral Group – until accredited local offset providers for those countries are identified (Luxury Australian Travel Trade E-News, 2021).

The Comfort Inn® by the Bay hotel, located in San Francisco, has partnered with Tradewater to become the first hotel in San Francisco to offer guests a voluntary carbon offset program while offsetting the carbon footprint of the hotel (Choice Hotels International, 2022).

The Parkside Hotel & Spa, which is based in Victoria, Canada, is a carbon neutral company. Since 2019, the company has measured and offset its greenhouse gas (GHG) emissions. The hotel's emissions are offset with Offsetters, who is one of Canada's major carbon management solutions providers. The Parkside Hotel & Spa carbon offset projects create both environmental benefits and additional social benefits to the communities surrounding them. The hotel's carbon offset projects are the Great Bear Forest Carbon Project, Quadra Island Forestland Conservation Project, and the Three Gorges Solar Power Project, which is in China (The Parkside Hotel & Spa, 2022).

The Westin Melbourne Hotel located in Melbourne, Australia unveiled a new initiative in April 2010 that offers the option to offset the carbon emissions generated from hotel stays or business events. The 'Make a Green Choice' program was developed by the hotel in association with green partner, Climate Friendly and provides guests and clients the option to pay a tailored offset fee which is then invested in projects to reduce greenhouse gases. The Green Choice offset program is an important part of the hotels long term strategy for reducing its overall carbon footprint (Spice Hotel & Venue News, 2010).

United Arab Emirates-based Time Hotels introduced a carbon offset program for its guests at two of its properties – Time Oak Hotel, and Time Plaza Hotel in 2014 (Elliot, 2014; Navdar, 2015). Monies raised from the program are transferred to Swiss non-profit organization Myclimate, and all the money raised will support two projects in Africa, including a solar lighting initiative in Ethiopia, which will replace traditional kerosene lamps. The second program funds energy-efficient cooking stoves for displaced families living in temporary camps in Darfur, Sudan (Navdar, 2015).

Virgin Hotels is working towards a net zero carbon footprint. The company has introduced its "Guest Powered Carbon Offset Program", under which guests can purchase a carbon offset, thereby neutralizing the carbon emissions of their stay by supporting a carbon-reducing project that is located somewhere else in the world. Monies earned from the program are used to support renewable energy projects in developing countries located primarily in India and China. The company's "Refresh Carbon Offset Portfolio" combines water stewardship projects with renewable energy projects. These carbon offset projects deliver many environmental and community benefits such as reducing carbon emissions, improving water stewardship, and positively impacting people's health in some of the most vulnerable areas of the world.
(Virgin Hotels, 2016).

Conclusions

This study has used an in-depth qualitative instrumental case study research approach to empirically examine the hotels and resorts located around the world that have implemented carbon offset programs to help reduce their carbon footprints, and thus, help mitigate their impact on the environment. The study period was from 2010 to 2022. The qualitative data was analyzed by document analysis.

The case study revealed that hotels located in Australia, Canada, Costa Rica, throughout Europe, Ireland, Mauritius, Rwanda, South Africa, Tanzania, United States, and the United Kingdom have introduced carbon offset programs as a key environmental sustainability measure. The earliest reported adoption of such a program date back to 2010, when Canada-based Coast Hotels & Resorts and the Westin Melbourne Hotel located in Melbourne, Australia launched carbon offsets programs for their guests. The case study found that individual hotels are also offering carbon offset programs as a sustainability measure. Hilton Hotels has introduced a carbon offset program for events and meetings held in its properties in Malaysia, Singapore, Thailand, and in sixty hotels located throughout Africa, Europe, and the Middle East. Radisson Hotels introduced a "100% Carbon Neutral Meetings Program" in 2019, and this program forms a key element in the company's group-wide commitment to reduce emissions across its 1,600 hotels by 30%. A key finding of the study is that some hotels are enabling their loyalty program members to redeem

their points for carbon offsets, whilst other hotels are offer voluntary carbon offset programs for their guests.

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References

Andrew, D.P.S., Pedersen, P.M. & McEvoy CD. (2011). *Research methods and design in sport management*. Champaign: Human Kinetics.

Arendt, R., Bach, V., & Finkbeiner, M. (2021). Carbon offsets: An LCA perspective. In S. Albrecht, M. Fischer, P. Leistner & L. Schebek (Eds.), *Progress in life cycle assessment 2019. Sustainable production, life cycle engineering and management* (PP. 189-212). Cham: Springer.

Badgley, G., Freeman, J., Hamman, J.J. Haya, B., Trugman, A.T., Anderegg, W.R.L. & Cullenward, D. (2022). Systematic over-crediting in California's forest carbon offsets program. *Global Change Biology*, 28(4), 1433-1445. https://onlinelibrary.wiley.com/doi/10.1111/gcb.16008

Baxter, G. (2021) Achieving carbon neutral airport operations by 2025: The case of Sydney Airport, Australia. *Transport and Telecommunication*, 22(1), 1–14. https://doi.org/10.2478/ttj-2021

Baxter, G. & Srisaeng, P. (2020). Environmentally sustainable hotel operations: The case of the Shangri-La Group. *Journal of Sustainable Tourism Development*, 2(2), 1-26.

Baxter, G. & Srisaeng, P. (2021). An assessment of the environmentally sustainable hotel operation: The case of Centara Hotels & Resorts, Thailand. *Journal of Sustainable Tourism Development*, 3(2), 1-33.

Bohdanowicz, P., Zientara, P., & Novotna, E. (2011). International hotel chains and environmental protection: An analysis of Hilton's we care! programme (Europe, 2006–2008). *Journal of Sustainable Tourism*, 19(7), 797-816. https://doi.org/10.1080/09669582.2010.549566

Brohé, A., Eyre, N., & Howarth, N. (2009). *Carbon markets: An international business guide*. London: Earthscan.

Choice Hotels International. (2022). Enjoy a great night's rest in the heart of the city. Retrieved from https://www.choicehotels.com/california/san-francisco/comfort-inn-hotels/ca004.

Cision. (2010). Coast Hotels & Resorts launches carbon offset program for guests. Retrieved from https://www.newswire.ca/news-releases/coast-hotels--resorts-launches-carbon-offset-program-for-guests-544115532.html.

Clark, D. (2011). A complete guide to carbon offsetting. Retrieved from https://www.theguardian.com/environment/2011/sep/16/carbon-offset-projects-carbon-emissions.

Clark, P. (2021). Sternlicht Luxury Hotels tap carbon offsets for loyalty program. Retrieved from https://www.bloomberg.com/news/articles/2021-04-22/sternlicht-luxury-hotels-tap-carbon-offsets-for-loyalty-program.

Crowne Melbourne. (2022). Carbon offset program. Retrieved from https://www.crownmelbourne.com.au/general/crown-environment/carbon-offset-program.

Dhanda, K. (2014). The role of carbon offsets in achieving carbon neutrality: An exploratory study of hotels and resorts. *International Journal of Contemporary Hospitality Management*, 26(8), 1179-1199. https://doi.org/10.1108/IJCHM-03-2013-0115

Downie, C. (2007). Carbon Offsets: Saviour or cop-out? Research Paper 48. Retrieved from https://www.researchgate.net/profile/Christian-Downie/publication/252440172_Carbon_Offsets_Saviour_or_cop-out/links/55de9df508ae7983897d1861/Carbon-Offsets-Saviour-or-cop-out.pdf.

Elliot, M. (2014). TIME Hotels launch first carbon offset accommodation. Retrieved from https://www.traveldailymedia.com/time-hotels-launch-first-carbon-offset-accommodation/.

Escobar, M.C. (2021). Radisson Hotel Group becomes world's first hotel group to offer carbon negative meetings. Retrieved from https://hospitalitytech.com/radisson-hotel-group-becomes-worlds-first-hotel-group-offer-carbon-negative-meetings.

Florido, C., Jacob, M., & Payeras, M. (2019). How to carry out the transition towards a more circular tourist activity in the hotel sector. The role of innovation. *Administrative Sciences*, 9(2), 47. https://doi.org/10.3390/admsci9020047

Gössling,S., Peters, P., Cerone, J.P., Dubois, G., Patterson, T., & Richardson, R.B. (2005). The eco-efficiency of tourism. *Ecological Economics*, 54(15), 417-434. https://doi.org/10.1016/j.ecolecon.2004.10.006

Grandy, G. (2010). Instrumental case study. In: A.J. Mills, G. Durepos & E. Wiebe (Eds.), *Encyclopedia of case study research*, Volume 1 (pp. 473-475). Thousand Oaks: SAGE Publications.

Green, J.F. (2011). Carbon offsets. In T. Hale & D. Held (Eds,), *Handbook of transnational governance: Institutions and innovations* (pp. 371-376). Cambridge: Polity Press.

Harris, E. (2007). *The voluntary carbon offsets market: An analysis of market characteristics for sustainable development*. London: International Institute for Environment and Development.

Haya, B., Cullenward, D., Strong, A.L., Grubert, E., Heilmayre, R., Sivas, D.A., & Wara, M. (2020). Managing uncertainty in carbon offsets: insights from California's standardized approach. *Climate Policy*, 20(9), 1112-1126. https://doi.org/10.1080/14693062.2020.1781035

Hilton Hotels. (2021). Hilton launches carbon neutral business meetings in Europe, Middle East, and Africa. Retrieved from https://newsroom.hilton.com/corporate/news/hilton-launches-carbon-neutral-business-meetings.

Hotel Villa Florencia. (2022). Hotel Villa Florencia carbon offset program. Retrieved from https://villaflorencia.com/sustainable_tourism/carbon_offset_program.html.

International Union for Conservation of Nature and Natural Resources. (2012). Biodiversity: My hotel in action: A guide to sustainable use of biological resources in the Caribbean. Gland: IUCN.

Jonckie. (2015). Protea Hotel Balalaika Sandton launches carbon offset programme. Retrieved from https://www.insurancechat.co.za/2015-11/protea-hotel-balalaika-sandton-launches-carbon-offset-programme/.

Kerner, C., & Brudermann, T. (2021). I believe I can fly—Conceptual foundations for behavioral rebound effects related to voluntary carbon offsetting of air travel. *Sustainability*, 13(9), 4774. https://doi.org/10.3390/su13094774

Kollmuss, A., Lazarus, M., Lee, C., LeFranc, M., & Polycarp, C. (2010). *Handbook of carbon offset programs: Trading systems, funds, protocols and standards*. London: Earthscan.

Kuhn, K.U., & Uler, N. (2019). Behavioral sources of the demand for carbon offsets: An experimental study. *Experimental Economics*, 22, 676-704. https://doi.org/10.1007/s10683-018-09601-y

Le Grand, W., Sloan, P., & Chen, J.S. (2017). *Sustainability in the hospitality industry: Principles of sustainable operations* (3rd ed). Abingdon: Routledge.

Lennon, M. (2021). Radisson to double carbon offsets on EMEA meetings. Retrieved from https://www.hotelmanagement.com.au/2021/10/20/radisson-to-double-carbon-offsets-on-emea-meetings/.

Lovell, H.C. (2010). Governing the carbon offset market. *Climate Change*, 1(3), 353-362. https://doi.org/10.1002/wcc.43

Luxury Australian Travel Trade E-News. (2021). Singita introduces carbon-neutral guest stays. Retrieved from https://latteluxurynews.com/2021/09/03/singita-carbon-offset-guest-stays/.

Lyons Hardcastle, J. (2012). Hilton launches carbon-offset program in Southeast Asia. Retrieved from https://www.environmentalleader.com/2012/10/hilton-launches-carbon-offset-program-in-southeast-asia/.

MacKerron, G.J., Egerton, C., Gaskell, C., Parpia, A., & Mourato, S. (2009). Willingness to pay for carbon offset certification and co-benefits among (high-)flying young adults in the UK. *Energy Policy*, 37(4), 1372-1381. https://doi.org/10.1016/j.enpol.2008.11.023

Mannion, E. (2019). How a west of Ireland hotel became Ireland's first and only carbon neutral hotel. Retrieved from https://www.rte.ie/news/2019/1112/1090384-how-a-west-of-ireland-hotel-became-carbon-neutral/.

McAfee, K. (2022). Shall the American Association of Geographers endorse carbon offsets? Absolutely not! *The Professional Geographer,* 74(1), 171-177. https://doi.org/10.1080/00330124.2021.1934879

Navdar, P. (2015). Time Hotels offsets 326 tonnes of carbon emissions. Retrieved from https://www.hoteliermiddleeast.com/business/23193-time-hotels-offsets-326-tonnes-of-carbon-emissions.

Neil Sampson, R., & Sedjo, R.A. (1997). Economics of carbon sequestration in forestry: An overview. In R.A. Sedjo., R. Neil Sampson., & J. Wisniewski (Eds.), *Economics of carbon sequestration in forestry* (pp. S1-S8). Boca Raton: CRC Press.

O'Leary, Z. (2004). *The essential guide to doing research*. London: SAGE Publications.

Othman, R., Abu Kasim, S.Z., Has-Yun Hashim, K.S., & Mohd Noor, N.F. (2015). Novel landscape design model system approach: Monitoring, predicting and calculating carbon sequestration rate for tourism accommodation premises green spaces. *Jurnal Teknologi*, 77(30), 89-99. https://doi.org/10.11113/jt.v77.6872

Parambil, M.A. (2020). Hotel industry and environmental impact. Retrieved from https://www.slideshare.net/AMALDASKH/hotel-industry-and-environmental-impact.

Pattaya Mail. (2014). Hilton Worldwide adds new beneficiaries and hotels to Carbon Offset Program in Southeast Asia. Retrieved from https://www.pattayamail.com/travel/hilton-worldwide-adds-new-beneficiaries-and-hotels-to-carbon-offset-program-in-southeast-asia-34439.

Paul, M. (2021). First carbon neutral hotel stays launched in Mauritius. Retrieved from https://www.traveldailymedia.com/first-carbon-neutral-hotel-stays-launched-in-mauritius/.

Radisson Hotels. (2022). Carbon neutral meetings: Join our journey towards a greener future. Retrieved from https://www.radissonhotels.com/en-us/meeting-conference-hotels/carbon-neutral.

Scott, J. (1990). *A matter of record: Documentary sources in social research*. Cambridge: Polity Press.

Scott, J. (2014). *A dictionary of sociology* (4th ed.). Oxford: Oxford University Press.

Scott, J., & Marshall, G. (2009). *A dictionary of sociology* (3rd ed.). New York: Oxford University Press.

Simms, D. (2021). Forget massages: This luxe hotel loyalty program can be used to help offset carbon emissions. Retrieved from https://robbreport.com/travel/hotels/luxury-hotels-loyalty-program-offset-carbon-emissions-1234609331/.

Sowamber, V., & Ramkissoon, H.R. (2019). Sustainable tourism as a catalyst for positive environmental change: The case of Lux* Resorts & Hotels. In D. Gursoy & R. Nunkoo (Eds), *The Routledge handbook of tourism impacts: Theoretical an applied perspectives (pp. 338-350)*. Abingdon: Routledge.

Spice Hotel & Venue News. (2010). Westin Melbourne unveils new green event initiatives. Retrieved from https://spicenews.com.au/hotel-venue-news/westin-melbourne-unveils-new-green-event-initiatives/.

Spiekermann, K. (2014). Buying low, flying high: Carbon offsets and partial compliance. *Political Studies*, 62(4), 913-929. https://doi.org/10.1111%2F1467-9248.12044

Stake, R.E. (1995). *The art of case study research*. Thousand Oaks: SAGE Publications.

Stake, R.E. (2005). Qualitative case studies. In N.K. Denzin & Y.S Lincoln (Eds.), *The SAGE handbook of qualitative research* (pp. 443-466). Thousand Oaks: SAGE Publications.

Taiyab, N. (2006). *Exploring the carbon market for voluntary carbon offsets*. London: International Institute for the Environment and Development.

The Parkside Hotel & Spa. (2022). We are a carbon neutral company. Retrieved from https://www.parksidevictoria.com/specials/carbon-neutral-company.

Virgin Hotels. (2016). The guest powered carbon offset program. Retrieved from https://virginhotels.com/assets/uploads/2016/10/Content-for-Guest-Powered-Carbon-Offset-Program.pdf.

Yin, R.K. (2018). Case study research and applications (6th ed). Thousand Oaks: SAGE Publications.

Zhou, S.W.W. (2020). *Carbon management for a sustainable environment*. Cham: Springer Nature Switzerland.

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