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Sustainable Environmental Practices in the Hotel Industry: An Analysis of Organizational Impacts and Guest Perceptions

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Abstract

The hotel industry is an important component of tourism development and contributes significantly to income generation, employment, visitors' experience and destination development. At the same time, hotel operations are resource intensive and involve substantial consumption of energy, food, water, chemicals and other materials, together with the generation of solid waste, and wastewater. Environmental sustainability has become an increasingly important concern within hospitality management. Hotels across the world have introduced a range of green practices, including renewable energy, energy conservation, water saving technologies, waste reduction, recycling, guest participation programmes, sustainable procurement, eco-friendly housekeeping and green construction. The present review examines the current state of research on sustainable environmental practices in hotel industry, with particular emphasis on conservation of natural resources, socio-economic and environmental impacts of green practices and guest perception towards environmentally responsible hotel operations. Existing studies indicate that environmental practices can generate environmental benefits while also, reducing operational costs, improving operational efficiency, and increasing guest satisfaction and loyalty. However, hotel size, ownership, financial resources, employee knowledge, technological capabilities, regulatory conditions, and perceived consumer demand still influence the adoption of such practices. In India, research on green hotels is expanding, but destination-specific evidence remains comparatively limited. Therefore, heritage tourism destinations such as Agra provide an important context for examining the implementation and consequences of sustainable environmental practices. The review concludes by identifying research gaps and proposing an integrated conceptual perspective connecting hotel characteristics, management commitment, green practices, environmental and socio-economic outcomes and guest perceptions and behavioural intentions.

Keywords: Sustainable hospitality, green practices in hotels, resource conservation, guest perception

Introduction

Tourism and hospitality have become important determinants to economic development, employment generation and destination competitiveness. Hotels are one of the central components of the tourism system because they provide accommodation, food and beverage services and other facilities to visitors. However, the operation of these facilities requires continuous consumption of natural resources and produces different forms of environmental pressure. Hotel rooms require electricity for lighting, heating, cooling and entertainment; kitchens

consume energy, water and food materials; laundry operations require substantial quantities of water and electricity. These accommodation facilities generate solid waste, wastewater and packaging waste. Consequently, the environmental performance of hotels has become an important component of sustainable tourism.

Environmental sustainability within the hotel industry has been a concern for several decades. Early research focused on the environmental management practices of hotels and demonstrated that accommodation establishments consume considerable quantities of natural resources while producing environmental impacts at the destination level. Erdogan and Baris (2007), examined environmental protection and conservation practices among hotels and highlighted the importance of energy, water and waste management. Bohdanowicz (2005) also demonstrated the growing environmental awareness among the hotel managers and the importance of environmental management within the European hospitality sector. Mensah (2006) found differences in environmental management adoption according to hotel category and reported that larger hotels were more likely to have formal environmental practices.

The increasing recognition of resource scarcity, climate change, pollution and biodiversity loss has strengthened the sustainability agenda within hospitality. Hotels have therefore increasingly adopted the concept of the "green hotel," generally referring to accommodation establishments that attempt to minimize negative environmental impacts through managerial, technological and behavioural interventions. Green practices may include waste minimization, energy efficient equipment, sustainable purchasing, renewable energy, water conservation,recycling, ecofriendly cleaning materials, environmental education, linen and towel reuse programmes, and guest participation.

research on green hotels has expanded over the past few years. Acampora et al, (2022) reviewed many Scopus-indexed publications and demonstrated the substantial growth of research on green hotels, including research concerning environmental practices, consumer behaviour and economic outcomes. More recently, Mensah et al, (2025) reviewed 561 articles and found that research on environmental practices in hotel sector has increased significantly. Their review identified energy conservation, consumer perceptions and corporate sustainability strategies as

major themes, while also highlighting gaps related to green supply chains, sustainable leadership, digital sustainability, and longitudinal research.

An even more recent systematic review by Acampora and colleagues examined 318 peer reviewed articles and identified continuing conceptual and contextual weaknesses in green hotel research. In particular, the review noted the absence of universally consistent definitions of green hotels, limited stakeholder diversity and insufficient contextualization of green practices. It also highlighted greenwashing as an underexplored issue in tourism and hospitality research. These findings indicate that green hotel research has moved beyond the simple question of whether hotels should become environmentally responsible and is increasingly concerned with how sustainability is implemented, communicated, measured and experienced by stakeholders.

The present review is particularly relevant to the proposed study of sustainable environmental practices in the hotel industry of Agra. Rather than concentrating exclusively on individual environmental practices, the review integrates four major dimensions corresponding to the proposed objectives: the conservation of natural resources through green practices, the socio-economic and environmental effects of such practices, guest perceptions and preferences concerning environmentally responsible hotel operations.

Sustainability in the Hotel Industry

Sustainability in hospitality has gradually developed from a relatively narrow environmental-management perspective into a multidimensional concept incorporating environmental, economic and social considerations. The

traditional environmental management approach concentrated primarily on reducing pollution and resource consumption, whereas contemporary sustainability research recognizes the importance of integrating environmental objectives with organizational performance, stakeholder interests and destination development.

Environmental management in hotels may be understood as the systematic integration of environmental considerations into hotel policies, operations and decision making. Chan and Hsu (2016), in their review of environmental management research in hospitality, demonstrated the breadth of the field and its connections with environmental strategy, green supply chain management, stakeholder management, employees' involvement and organizational performance. Their review also identified environmental management as an increasingly important field within hospitality research.

Thus, sustainable environmental practices should not be viewed as isolated technological interventions. They represent an integrated management approach in which environmental objectives are embedded within hotel strategy, employee practices, procurement, guest communication and stakeholder relationships.

Environmental Footprints of Hotel Operations

Hotels differ considerably in size, category, location, facilities and business model, but almost all accommodation, establishments consume substantial quantities of resources. The major environmental dimensions generally include energy, water, solid waste, waste water, food waste, chemicals, transportations and construction materials.

Bohdanowicz (2005) showed that environmental awareness within European hotel organizations was influenced by organizational characteristics and environmental concerns. Erdogan and Baris (2007) similarly emphasized the importance of conservation practices in reducing the environmental impact of hotel operations. Earlier research conducted by Kirk (1996) and Knowles et al (1999) also emphasized that environmental management should become an integral element of hospitality management rather than being treated as an additional operational activity.

The environmental impact of hotels is particularly significant because hotels operate within destinations where their resource consumption is connected to the availability and quality of local natural resources. This is especially relevant in water stressed destinations. A systematic review of hotel water research by Gabara Mallorqui et al (2021) emphasized water consumption, water management, impacts of water use and good practices as major research areas and focused on continuing gaps in the measurement and management of hotel water consumption.

Energy Conservation and Energy Efficiency in Hotels

Energy management signifies one of the most extensively researched dimensions of hotel sustainability. Hotel energy demand is generated by lighting, heating, ventilation and air conditioning systems, elevators, kitchens, refrigeration, laundry, water heating and recreational facilities. Consequently, improvements in energy efficiency can potentially generate simultaneous and economic benefits.

Common energy conservation measures include occupancy sensors, energy-efficient air conditioning systems, LED lighting, automatic energy controls, building insulation, solar water heating, energy monitoring, efficient boilers and photovoltaic electricity generation. Through a systematic review of energy and water conservation in tourist accommodation, Warren and Charnley (2017) depicted the substantial potential for resource saving interventions while also identifying gaps in knowledge regarding implementation and innovation. Green practices are increasingly moving from low cost behavioural interventions towards technology intensive approaches. Hotels can monitor electricity consumption through digital systems, automate lighting and temperature control and use renewable energy to decrease dependence on conventional energy sources. However, adoption may be constrained

by capital requirements, technological knowledge, building characteristics and uncertainty regarding investment returns.

The Indian context is particularly relevant. D'Souza (2023), investigating four and five star hotels in India, reported substantial engagement with energy efficiency, waste reduction initiatives, while also identifying comparatively limited adoption of renewable energy sources such as solar and wind. This highlights that environmental commitment does not necessary imply equal adoption across all green technologies.

Water Conservation and Waste-water Management

Water is an important environmental resource in hotel operations. Hotels use water for bathing, laundry, landscaping, sanitation, swimming pools, food preparation, and cleaning. Water intensive operations can become particularly problematic in destinations experiencing seasonal or chronic water stress. Water saving measures are low-flow showerheads, low flow taps, water metering, leak detection, dual flush toilets, rainwater harvesting, water efficient laundry systems, and grey water or treated wastewater reuse. Hotels may also introduce towel and linen reuse programmes to reduce both water and energy consumption associated with laundry.

Gabarda Mallorqui et al, (2021) showed that hotel water research covers consumption, management, impacts and good practices, while identifying methodological and measurement gaps. A systematic review highlighting water-saving measures analysed 39 studies and found that low cost interventions were among the most widely applied practices, while reclaimed water approaches represented an important area of research. The review also identified a lack of evidence concerning the relationship between water saving measures and hotel competitiveness.

Guest involvement is particularly important in water conservation. Towel and linen reuse programmes for example require guests to understand the environmental rationale. Perceptions of hotel water conservation and waste reduction practices can affect guests perceived value, participation intentions and loyalty, with environmental concern playing a moderating role (Han et al, 2011).

Waste Management and Resource Recovery

Waste is another major element of sustainable hotel operations. Hotels produce food waste, metals, paper, glass, plastics, discarded guest amenities, packaging materials and garden waste. The hospitality sector's reliance on buffets, individually packaged amenities, and food preparation can contribute significantly to waste generation.

Sustainable waste management follows a hierarchy that emphasizes prevention and reduction before reuse, recycling, recovery and final disposal. Hotels can decrease waste by purchasing products in bulk, introducing refillable dispensers, eliminating unnecessary packaging, segregating waste at source, composting organic waste, recycling materials and redistributing surplus food. Gohoungodji and Chembessi (2026), through a systematic review of 159 studies, recognized waste reduction as one of five major strategies for circular transformation in hospitality, together with energy efficiency, water management, renewable energy and carbon reduction.

Food waste is particularly important because banquets, restaurants, and buffet services can produce substantial quantities of organic waste. Recent research is progressively investigating technology, monitoring systems and managerial interventions for food waste reduction in hotels. Such approaches show that waste management should be considered not only a disposal problem but also an issue of procurement, production planning, portion control, inventory management and consumer behaviour.

Green Housekeeping and eco-friendly guest services

Housekeeping signifies a critical operational area for environmental sustainability because it involves water, energy, chemicals, detergents, textiles and plastic packaging. Conventional housekeeping practices may include

daily replacement of towels and bed linen, individually packaged toiletries and extensive use of chemical cleaning agents. Green Housekeeping programmes commonly involve towel and linen reuse, refillable dispensers, environmentally preferable cleaning products, microfiber cleaning technologies and reduced use of disposable materials. These measures can decrease resource consumption without necessarily reducing service quality.

However, green housekeeping's success depends on effective communication. Guests need to understand why particular practices are being implemented and should not perceive them simply as cost cutting measures. Environmental attributes can lead to customer satisfaction, although their contribution varies according to nature of the service attribute (Robinot and Giannelloni 2010). Therefore, hotels must ensure that environmental initiatives are presented as authentic elements of responsible hospitality rather than substitutes for expected service standards.

Renewable Energy and Low carbon Hospitality

The transition to renewable energy has become increasingly relevant to hotel sustainability. Solar water heating, solar photovoltaic systems, geothermal technologies and other renewable energy technologies can potentially decrease fossil fuel dependence and green house gas emissions. Renewable energy adoption is often more difficult than implementing behavioural or low cost conservation measures. Infrastructure constraints, capital requirements, maintenance requirements, and uncertain payback periods and technical expertise can discourage adoption. D'souza (2023) showed that Indian hotels demonstrated environmental commitment but that renewable energy adoption remained an area with scope for improvement.

This distinction is integral for empirical research. A hotel may have a formal environmental policy but may still depend heavily on conventional energy. Therefore, future research should distinguish between formal commitment, environmental awareness, measurable environmental performance and implementation intensity.

Environmental Management Systems and Organizational Commitment

A hotel may purchase energy efficient equipment, but without employee participation, monitoring and management support, the long term effectiveness of such interventions may be limited. Chan and Hsu (2016) showed the importance of organizational and strategic dimensions within hospitality environmental management research. At the organizational level, inadequate professional advice, barriers may include lack of knowledge and uncertainty, degrading outcomes, implementation costs and limited resources. Buffa et al (2018) further demonstrated environmental management practices among small medium sizes hotel enterprises and examined the importance of organizational practices, communication and external incentives in supporting sustainable business models.

Socio-economic Impacts of Green Practices

The environmental benefits of sustainable practices in hotel industry are generally more than their socio-economic implications. However, sustainability initiatives may influence hotel performance through multiple pathways. Resource conservation may decrease electricity and water expenditure, whereas waste reduction can reduce disposal costs. Energy-efficient equipment may need higher initial investment but potentially generate long term savings. Sustainable procurement can create local economic linkages, whereas environmental certification and credible green branding may contribute to organisational reputation. Research concerning small and medium sized hotels depicted that financial constraints and the availability of incentives can influence environmental management adoption. Hence, the socio-economic assessment of hotel sustainability should consider both costs and benefits rather than assuming that all green practices immediately improve financial performance.

Environmental Benefits and Sustainable Development Goals

Green practices in hotel industry have direct association with many sustainable development goals. It's evident that the United Nations Sustainable development Goals (SDGs) are a collection of seventeen interconnected global goals established in 2015 by the U N General Assembly to remove poverty, protect the earth and to ensure peace and prosperity by 2030. Green practices in hotels are helpful in achieving the set target. In hotel, water conservation contributes to SDG 6 that is clean water and sanitation, energy efficiency and renewable energy contribute to SDG 7 that is affordable and clean energy for all, waste reduction and sustainable procurement relate to SDG 12 that is responsible consumption and production while green house gas reduction contributes to SDG 13 that is climate action.

D'Souza (2023) demonstrated Indian four and five star hotels in relation to achieve the above sustainable development goals and reported strong engagement with several environmental practices, while identifying renewable energy as an area requiring further attention. Abdou et al (2020) demonstrated green hotel practices in association with environmental Sustainable Development Goals and examined that hotel practices can contribute to several SDGs simultaneously.

Guest Perceptions of Green Hotels

Guest perception is one of the most extensively investigated areas of green hotel research. Hotels may implement environmental practices, but the effectiveness of these initiatives is based on whether guests recognize, understand and value them. Guest perceptions represent perceived environmental responsibility, awareness of environmental initiatives, perceived value, trust, satisfaction, service quality, hotel image, willingness to participate and intention to revisit.

Merli et al, (2019) showed that guests who experienced environmentally responsible hotel practices positively evaluated the environmental commitment of hotel, with implication for satisfaction and loyalty. Han et al (2010) used the Theory of Planned Behaviour to explain consumers' intentions to stay at green hotels whereas Lee et al (2010) showed the importance of green hotel image in shaping behavioural intentions.

Sustainable Hospitality in the Indian Context

India represents an important context for green hotel research because of its rapidly developing tourism and hospitality sector, diverse destinations and substantial variations in environmental conditions. A study by Manaktola and Jauhari (2007) remains one of the important early studies of consumer attitudes towards green practices in the Indian lodging industry. This study demonstrated consumer awareness of environmentally responsible hotel practices and helped establish green consumer research within Indian hospitality literature. D'Souza (2023) demonstrated that Indian four and five star hotels were implementing several practices associated with above SDGs 6, 7, 12 and 13, while renewable energy remained a comparatively challenging area.

Recent Indian studies are also evaluating the association between green practices and consumer decision making. Wani et al (2025) demonstrated the association between green hotel practices and traveller decision making in India; Kini et al (2026) examined personal values, environmental factors and demographic moderators in Indian consumers' green hotel preferences.

Conclusion

The literature demonstrates that green practices have become an increasingly important element in hotel industry. The concept of green hotels has evolved from relatively simple resource conservation initiatives towards a multidimensional approach involving environmental management systems, renewable energy, employee engagement, circular economy, environmental communication, guest participation and stakeholder collaboration.

Energy and water conservation remain integral components of hotel sustainability, while waste reduction, food waste management, recycling and sustainable procurement are increasingly important. Existing studies also demonstrate that green practices may have economic and social consequences. Hotels can benefit from improved resource efficiency, reduced operating costs, enhanced reputation and stronger associations with environmentally conscious guests. Perception of guests constitutes another integral dimension. Several studies indicate that guests can respond positively to credible green practices, with relationships observed between satisfaction, loyalty, environmental perceptions and behavioural intentions. However, environmental sustainability does not necessarily dominate hotel choice decisions. Location, price, comfort and service quality may remain important factors, creating a gap between environmental attitudes and actual behaviour.

In India, scholarly research is expanding in-relation to green consumer behaviour, environmentally responsible hotel management and sustainable development goals. Nevertheless, an important research gap persists, regarding destination-specific research integrating hotel practices with environmental and socio-economic outcomes and guest perceptions. Agra offers an appropriate setting for examining sustainable hospitality practices due to the strong relationship between its tourism economy and its major heritage destinations. A systematic assessment of the hotel sector in Agra can therefore help in expanding the existing literature by evaluating the adoption of sustainable practices, exploring their perceived environmental, socio-economic outcomes, investigating guest perceptions and preferences regarding environmentally responsible hotel operations. By bringing these dimensions together, such an approach can provide both theoretical and practical contributions to sustainable hospitality research and destination management.

References

Acampora, A., Lucchetti, M. C., Merli, R., & Ali, F. (2022). The theoretical development and research methodology in green hotels research: A systematic literature review. *Journal of Hospitality and Tourism Management, 51*, 512–528. https://doi.org/10.1016/j.jhtm.2022.05.007

Bohdanowicz, P. (2005). European hoteliers' environmental attitudes: Greening the business. *Cornell Hotel and Restaurant Administration Quarterly, 46*(2), 188–204.

Buffa, F., Franch, M., & Rizio, D. (2018). Environmental management practices for sustainable business models in small and medium sized hotel enterprises. *Journal of Cleaner Production, 194*, 656–664. https://doi.org/10.1016/j.jclepro.2018.05.143

Chan, E. S. W., & Hsu, C. H. C. (2016). Environmental management research in hospitality. *International Journal of Contemporary Hospitality Management, 28*(5), 886–923.

D'Souza, E. (2023). Green hotel practices and Sustainable Development Goals: An Indian perspective. *International Journal of Current Science Research and Review, 6*(12), 7517–7528. https://doi.org/10.47191/ijcsrr/V6-i12-09

Erdogan, N., & Baris, E. (2007). Environmental protection programs and conservation practices of hotels in Ankara, Turkey. *Tourism Management, 28*(2), 604–614.

Gabarda-Mallorquí, A., Garcia, X., Fraguell, R. M., & Ribas, A. (2021). Are hotel stay characteristics influencing guests' environmental behaviour? Predicting water conservation habits. *Current Issues in Tourism, 24*(16), 2342–2356. https://doi.org/10.1080/13683500.2020.1829565

Gohoungodji, P., &Chembessi, C. (2026). The circular turn in hospitality: Strategies, drivers, and impacts of circular practices in the hotel industry—A systematic review. *Sustainability*, *18*(14), 7123. https://doi.org/10.3390/su18147123

Han, H., & Kim, Y. (2010). An investigation of green hotel customers' decision formation: Developing an extended model of the Theory of Planned Behavior. *International Journal of Hospitality Management*, *29*(4), 659–668. https://doi.org/10.1016/j.ijhm.2010.01.001

Han, H., Hsu, L. T. J., Lee, J. S., & Sheu, C. (2011). Are lodging customers ready to go green? An examination of attitudes, demographics, and eco-friendly intentions. *International Journal of Hospitality Management*, *30*(2), 345–355. https://doi.org/10.1016/j.ijhm.2010.07.008

Kirk, D. (1996). Environmental management for hotels. *International Journal of Hospitality Management*, *15*(3), 261–277.

Kini, R. S., Dinesh, T. K., & Ani, A. (2026). Decoding consumer choice in green hotels: A mixed-method analysis of attributes, values and pro-environmental intentions in India. *Global Business Review*. https://doi.org/10.1177/09721509261443975

Knowles, T., Macmillan, S., Palmer, J., Grabowski, P., & Hashimoto, A. (1999). The development of environmental initiatives in tourism: Responses from the London hotel sector. *International Journal of Tourism Research*, *1*(4), 255–265.

Lee, J. S., Hsu, L. T. J., Han, H., & Kim, Y. (2010). Understanding how consumers view green hotels: How a hotel's green image can influence behavioural intentions. *Journal of Sustainable Tourism*, *18*(7), 901–914. https://doi.org/10.1080/09669581003777747

Manaktola, K., & Jauhari, V. (2007). Exploring consumer attitude and behaviour towards green practices in the lodging industry in India. *International Journal of Contemporary Hospitality Management*, *19*(5), 364–377.

Mensah, I. (2006). Environmental management practices among hotels in the Greater Accra Region. *International Journal of Hospitality Management*, *25*(3), 414–431. https://doi.org/10.1016/j.ijhm.2005.02.003

Mensah, C., Azila-Gbettor, E. M., Novieto, D. T., Coffie, G. H., &Adzivor, E. K. (2025). Tracing the evolution of environmental practices research in the hotel industry: A mixed-review perspective. *Research in Hospitality Management*, *15*(2), 171–191. https://doi.org/10.1080/22243534.2025.2483753

Merli, R., Preziosi, M., Acampora, A., & Ali, F. (2019). Why should hotels go green? Insights from guests experience in green hotels. *International Journal of Hospitality Management*, *81*, 169–179. https://doi.org/10.1016/j.ijhm.2019.04.022

Robinot, E., &Giannelloni, J. L. (2010). Do hotels' "green" attributes contribute to customer satisfaction? *Journal of Services Marketing*, *24*(2), 157–169. https://doi.org/10.1108/08876041011031127

Wani, M. D., Shah, S. A., & Dada, Z. A. (2025). Eco-conscious tourism in India: Investigating the interplay between green hotel practices and traveler decision-making. *Tourism and Hospitality Research*. https://doi.org/10.1177/14673584251334238

Warren, C., & Becken, S. (2017). Saving energy and water in tourist accommodation: A systematic literature review (1987–2015). *International Journal of Tourism Research*, *19*(3), 289–303. https://doi.org/10.1002/jtr.2112