

Green Practices in the Hospitality Industry: A Review of Current Literature and Emerging Trends

Dr Manoj Kumar¹, Mr Pushpender²

¹Associate professor: IHTM MDU ROHTAK

²Research Scholar: IHTM MDU ROHTAK

Mail Id: manoj.ihtm@mdurohtak.ac.in¹, pushpender.rs24.ihtm@mdurohtak.ac.in²

Abstract

Environmental sustainability has become a strategic and operational priority in the hospitality industry because hotel operations require substantial quantities of energy, water, food, materials and other resources while generating wastewater, food waste and solid waste and greenhouse-gas emissions. This review synthesizes current literature on environmental practices in hotels and examines emerging trends that are likely to shape the next phase of sustainable hospitality. A structured narrative review approach is used to organise the literature into established operational practices and emerging strategic and technological developments. The review shows that current hotel practices are concentrated around energy efficiency, renewable energy, water conservation, wastewater reuse, waste prevention and recycling, food-waste management, sustainable procurement, reduction of single-use plastics, green housekeeping, sustainable building design, green human resource management, guest participation, environmental management systems and certification, low-emission mobility and community engagement. Emerging trends include artificial intelligence and predictive analytics, Internet of Things-based monitoring, smart buildings, circular economy models, net-zero strategies, electrification, carbon accounting, regenerative hospitality, biodiversity-positive operations, climate-resilient design, low-carbon food systems, green finance, supply-chain transparency and stronger scrutiny of greenwashing. The literature indicates a transition from isolated conservation activities to integrated, measurable and technology-supported sustainability systems. The paper concludes that future progress will depend on management commitment, credible measurement, employee capability, guest trust, supplier collaboration and context-specific investment decisions.

Keywords: *Green practices, hospitality industry, green hotels, sustainability, environmental management, circular economy.*

1. Introduction

The hospitality industry is a major component of the tourism economy, but the delivery of accommodation, food, comfort and leisure services is resource intensive. Hotels consume energy for heating, ventilation and air conditioning (HVAC), lighting, hot water, refrigeration, kitchens, laundries, lifts, swimming pools and digital systems. They also consume water in guestrooms, kitchens, laundries, landscaping, cooling towers, spas and cleaning activities. At the

same time, hotel operations generate food waste, packaging, plastics, wastewater, used oils, chemicals and greenhouse-gas emissions. These characteristics have made environmental management an important area of hospitality research and management practice (Bohdanowicz, 2006; Gössling et al., 2012; Mensah, 2006).

Recent research showed that hotel operators were increasingly aware of environmental concerns but that the depth of implementation varied across national and organisational contexts. Bohdanowicz (2006), in a comparative study of Swedish and Polish hotels, found broad recognition of the need for environmental protection while also showing that economic conditions and public policy influenced environmental attitudes and action. Mensah (2006) similarly documented variation in environmental management practices among hotels in the Greater Accra Region. These studies helped establish that environmental awareness alone does not guarantee systematic implementation.

The meaning of a green hotel has expanded substantially. A green hotel is no longer understood only as a property that asks guests to reuse towels or switch off lights. Contemporary sustainable hospitality involves environmental considerations in building design, energy and water systems, procurement, food and beverage operations, housekeeping, employee management, guest engagement, transportation, supply-chain relationships, performance measurement and communication. Research has also linked environmental practices with operational efficiency, competitiveness, reputation and behavioural outcomes. Kularatne et al. (2019) found that environmental responsibility can enhance hotel efficiency, particularly through energy efficiency and waste management. Studies of guests have shown that perceptions of environmental practices can influence behavioural intentions, revisit intentions and willingness to support green hotels (Berezan et al., 2013; Han et al., 2010; Kang et al., 2012; Merli et al., 2019).

The literature is also moving beyond traditional conservation practices. Recent research examines digital transformation, green technology adoption, circular economy models, employee pro-environmental behaviour, smart hotel systems and new forms of environmental performance measurement (Alreahi et al., 2023; Elshaer et al., 2025; Sheikh et al., 2024; Thongmun et al., 2025). Recent reviews and bibliometric work also show continued expansion and diversification of green hotel research (Sahu et al., 2026; Yang et al., 2026). This development creates a need for a consolidated review that distinguishes established practices from emerging trends and explains the direction in which sustainable hotel management is evolving.

So this paper reviews the literature around two central questions: what green practices are currently followed in the hotel industry and what emerging environmental trends are likely to shape the future of hotel operations and strategy?

2. Conceptual Background

Green practices in hospitality can be understood as policies, technologies, operational routines and behavioural programmes designed to reduce negative environmental impacts and improve the responsible use of energy, water, materials and ecosystems. In practice, hotel environmental management extends across engineering, housekeeping, food and beverage, purchasing, human resources, construction, landscaping, transport and guest relations (Bohdanowicz, 2006; Mensah, 2006; Robin et al., 2017).

The literature suggests a distinction between relatively simple conservation practices and more advanced environmental capabilities. Basic practices include LED lighting, switching off unused equipment, linen and towel

reuse, waste separation and environmental messages. Advanced practices can include renewable energy systems, wastewater treatment and reuse, intelligent building controls, formal environmental management systems, certified green construction, carbon accounting, circular procurement and decarbonisation planning. The adoption of these practices is shaped by technological characteristics, organisational readiness, management support and the external environment (Chan, 2018; Langgat et al., 2023).

Several theoretical perspectives help explain green hotel behaviour. The Theory of Planned Behaviour has been used to explain intentions to choose green hotels; attitudes, subjective norms and perceived behavioural control are important predictors of behavioural intention (Han et al., 2010). The Resource-Based View and Natural Resource-Based View treat environmental knowledge, capabilities, technologies and organisational culture as resources that may contribute to competitiveness. Stakeholder Theory highlights pressures and expectations from guests, employees, investors, regulators, suppliers, local communities and certification organisations. Institutional Theory explains how regulation, industry norms, imitation and legitimacy pressures encourage environmental adoption. Recent studies also use the Technology-Organisation-Environment framework to explain adoption of environmental technologies and practices (Langgat et al., 2023).

3. Review Methodology

This paper adopts a structured narrative review design. The purpose is to synthesise a broad and interdisciplinary body of hospitality sustainability research rather than statistically aggregate effect sizes. The review draws on peer-reviewed studies and review articles concerning green hotels, environmental management, energy and water management, waste reduction, sustainable food systems, green human resource management, environmental technology, guest behaviour, certification, circular economy, smart hotels and decarbonisation.

The analytical framework follows the two research objectives. Literature was classified into two dimensions. The first dimension covers established green practices already documented in hotel operations. The second dimension covers emerging technologies, business models, strategic concepts and research themes that are receiving increasing attention. Priority was given to literature directly related to hotels and hospitality, while selected tourism sustainability studies were used where they provide essential sector-wide context, such as water management.

Because this is a narrative review rather than a formal systematic literature review, the study does not claim exhaustive database coverage. The strength of the approach is thematic integration across operational, behavioural, technological and strategic literature. A future systematic review could extend this work by using a preregistered search protocol, explicit database search strings, inclusion and exclusion criteria, quality appraisal and PRISMA-based screening.

4. Green Practices Being Followed in the Hotel Industry

4.1 Energy Conservation and Energy Efficiency

Energy management is among the most established areas of hotel environmental practice. Hotels have relatively continuous energy loads because guestrooms and public areas require thermal comfort, lighting and hot water, while kitchens, refrigeration, laundries, lifts and leisure facilities add further demand. Common practices include LED lighting, motion and occupancy sensors, key-card master switches, energy-efficient appliances, high-efficiency boilers

and chillers, preventive HVAC maintenance, improved insulation, heat recovery and building energy-management systems. Research indicates that environmentally responsible practices can improve hotel efficiency, particularly through better energy efficiency and waste management (Kularatne et al., 2019).

4.2 Renewable Energy Adoption

Renewable energy is an increasingly important extension of energy efficiency. Depending on location and building characteristics, hotels may use solar photovoltaic systems, solar thermal water heating, geothermal systems, biomass and renewable electricity procurement. Efficiency and renewable energy are complementary: efficiency lowers energy demand, while renewable energy reduces dependence on carbon-intensive sources. Adoption is affected by capital cost, ownership structure, local climate, grid conditions, incentives and technical capability. Technology adoption barriers remain important, particularly when systems are complex or require significant investment and specialist knowledge (Chan, 2018).

4.3 Water Conservation and Management

Water is central to guestrooms, kitchens, laundries, cooling systems, swimming pools, spas, cleaning and landscaping. Tourism water use is highly context dependent, and regional concerns can be severe where tourism demand is concentrated in dry or water-stressed destinations (Gössling et al., 2012). Common hotel measures include low-flow showerheads, efficient taps, dual-flush toilets, leak detection, smart metering, efficient laundry machines, linen and towel reuse, rainwater harvesting, greywater reuse, treated wastewater use for non-potable purposes, drought-tolerant landscaping and drip irrigation. Water management should therefore be understood as both an operational efficiency issue and a destination resource-security issue.

4.4 Waste Prevention, Segregation and Recycling

Hotels generate paper, cardboard, plastics, glass, metals, food waste, used cooking oil, garden waste, textiles, furniture and electronic waste. Common practices include source segregation, recycling partnerships, paperless processes, reusable containers, bulk dispensers, e-waste collection, composting, furniture refurbishment and donation of usable surplus items. The literature increasingly favours a hierarchy that prioritises prevention and reduction before reuse, recycling, recovery and disposal. This reflects the wider transition from end-of-pipe waste treatment toward resource efficiency and circularity (Robin et al., 2017; Elshaer et al., 2025).

4.5 Food-Waste Reduction

Food waste is a major environmental and economic issue in hotel food and beverage operations. Waste can occur during purchasing, storage, preparation, buffet display and plate consumption. Hotels can reduce waste through demand forecasting, inventory rotation, smaller buffet displays with frequent replenishment, menu engineering, waste measurement, employee training, safe surplus redistribution and composting. Digital forecasting and data analytics are increasingly relevant because they can improve purchasing and production decisions. The underlying priority remains prevention first, followed by redistribution and resource recovery. (A Ben Youssef et al; A. Zeqiri, (2022).

4.6 Sustainable Procurement and Green Supply Chains

A hotel's environmental footprint extends beyond the property boundary. Food, beverages, amenities, linen, furniture, cleaning products, construction materials and outsourced services create upstream impacts. Green procurement

practices include local and seasonal sourcing where appropriate, reduced packaging, reusable and refillable products, certified goods, durable equipment, low-toxicity cleaning products and environmental assessment of suppliers. The growing emphasis on value-chain impacts is pushing hotels to consider not only what happens inside the property but also how products are produced, transported, used and recovered.(Alreahi, M., Bujdosó, Z., Dávid, L.D., & Gyenge, B. (2023).

4.7 Green Housekeeping

Housekeeping directly influences water, energy, chemical and material consumption. Green housekeeping practices include linen and towel reuse programmes, environmentally preferable cleaning products, accurate chemical dosing, microfiber cleaning systems, refillable amenities, reduced unnecessary room servicing, employee training in chemical handling and efficient laundry procedures. Guest-facing programmes need credible communication because poorly designed messages may be interpreted as cost cutting rather than environmental responsibility. Guest perception research indicates that credible environmental action can support favourable behavioural intentions (Merli et al., 2019).

4.8 Green Building Design and Certification

Environmental performance is strongly influenced by decisions made during design and construction. Building orientation, envelope performance, insulation, glazing, ventilation, daylight, landscaping and equipment choices affect resource use over the life of a hotel. Strategies include passive design, natural ventilation where appropriate, high-performance envelopes, daylight utilisation, efficient glazing, green roofs, recycled or locally appropriate materials and efficient HVAC systems. Green building and hotel certification schemes can provide structure and market signals, but their value depends on standard quality, verification and continued performance. Research on certification increasingly examines how certification levels interact with sustainability performance and guest outcomes (Goodarzi et al., 2025).

4.9 Green Human Resource Management

Employees are central to environmental performance because they operate equipment, purchase materials, prepare food, clean rooms and communicate with guests. Green Human Resource Management integrates environmental goals into recruitment, induction, training, appraisal, employee participation, green teams, rewards and leadership development. Reviews of GHRM in hotels emphasise the importance of training and development in shaping employee attitudes and behaviour (Alreahi et al., 2023). Empirical research also shows that GHRM practices can promote organisational citizenship behaviour for the environment and contribute to environmental performance (Sheikh et al., 2024).

4.10 Guest Participation and Green Consumption

Guests influence resource use through thermostat settings, shower duration, towel use, food consumption and waste disposal. Hotels encourage participation through conservation information, linen reuse, recycling facilities, refill stations, sustainable transport information and reward programmes. The Theory of Planned Behaviour has been used to explain green hotel choice intentions (Han et al., 2010). Other studies show that guests may respond positively to credible green practices, although responses differ according to environmental concern, perceived value and

willingness to pay (Kang et al., 2012; Merli et al., 2019). Sustainable service design should therefore make participation easy and compatible with service quality.

5. Emerging Green Trends in the Hotel Industry

5.1 Artificial Intelligence and Predictive Environmental Management

Artificial intelligence is emerging as a tool for predictive rather than purely reactive environmental management. AI can combine occupancy, weather, historical consumption, booking and equipment data to support HVAC optimisation, demand forecasting, food-waste prediction, preventive maintenance and anomaly detection. The practical value of these systems lies in identifying waste and inefficiency earlier and enabling automated or decision-supported responses. Research on green technology adoption in hotels is increasingly examining perceived benefits, compatibility and complexity as determinants of adoption. (Qi, Y. (2024).

5.2 Internet of Things and Smart Hotels

IoT technologies connect sensors, meters and equipment to provide continuous operational data. Hotel applications include occupancy detection, smart thermostats, automatic lighting, water-leak alerts, sub-metering, equipment-condition monitoring and indoor environmental quality monitoring. Smart hotel research is also beginning to examine whether technology amenities, smart attributes and green communication can encourage sustainable guest behaviour (Thongmun et al., 2025). The emerging model is a responsive hotel in which resource use is adjusted more closely to actual demand.

5.3 Circular Economy Models

Circular economy thinking represents a shift from the linear take–make–use–dispose model toward systems that retain materials and value through reduction, reuse, repair, refurbishment, redistribution and recycling. Hotel applications include refill systems, reusable packaging, furniture refurbishment, textile recovery, mattress recycling, food redistribution, composting, supplier take-back arrangements and service-based procurement models. Recent hospitality research links digital transformation and circular economy practices with sustainability performance, indicating that circularity is becoming a strategic rather than purely waste-management topic (Elshaer et al., 2025).

5.4 Carbon Accounting and Sustainability Data

Hotels are increasingly expected to measure energy consumption per occupied room, water use per guest night, waste generation, waste diversion, food waste, renewable energy share and greenhouse-gas emissions. Better data supports benchmarking, investment decisions and credible communication. The broader shift is from activity reporting–such as stating that a hotel has a recycling programme–to outcome reporting that shows measurable reductions over time. (Migdadi, Y.K. (2022).

5.5 Regenerative and Biodiversity-Positive Hospitality

Regenerative hospitality goes beyond reducing negative impacts and asks how hotel activity can contribute to ecological restoration and community resilience. Potential activities include habitat restoration, native species recovery, watershed protection, soil regeneration, local wealth creation and cultural preservation. Related biodiversity-positive practices include native landscaping, reduced pesticide use, wildlife-friendly lighting, habitat connectivity,

coastal restoration and responsible seafood procurement. These areas remain conceptually promising but require stronger hotel-specific metrics and empirical evaluation. (McGregor, K., Becken, S., Vada, S., & Mackey, B. (2024).

5.7 Climate-Resilient Hotel Design

Hotels face physical climate risks including heatwaves, drought, flooding, storms, coastal erosion and wildfire. Sustainability planning is therefore expanding from mitigation toward adaptation and resilience. Relevant measures include flood-resistant design, water-security planning, passive cooling, resilient landscaping, emergency energy systems, diversified supply networks and property-level climate risk assessment. Future sustainable hotels will need to be both low-carbon and capable of operating under changing climate conditions. (Abdou, A.H., Hassan, T.H., & El Dief, M.M. (2020).

5.8 Low-Carbon and Sustainable Food Systems

Hotel food sustainability is expanding beyond waste reduction toward plant-forward menu design, seasonal procurement, responsible seafood, supplier traceability and partnerships with more sustainable agricultural systems. This reflects recognition that environmental impacts occur throughout the food value chain. Hotels with significant food and beverage operations can therefore influence sustainability through menu design, procurement standards and demand forecasting as well as waste management. (Artini, N.K., Rukmiyati, N.M., & Yusmarisa, N.L. (2024).

5.9 Green Finance and Investment

Environmental performance is increasingly connected with asset value, operating risk and investment decisions. Green finance and sustainability-linked investment can support building retrofits, renewable energy, efficient cooling, water treatment and climate resilience. As lenders and investors request better environmental data, hotel sustainability management is likely to become more closely integrated with finance, risk management and capital planning. (Zhang, L., Huang, F., Lu, L., Ni, X., & Iqbal, S. (2021).

5.10 Transparency and Greenwashing Scrutiny

As environmental marketing becomes more common, vague or unsupported claims create reputational and regulatory risk. Hotels can strengthen credibility by using specific claims, publishing comparable performance indicators, explaining boundaries and limitations and using credible third-party verification where appropriate. Recent green hotel research identifies greenwashing, stakeholder diversity and contextual differences as important areas for future investigation (Yang et al., 2026).

5.11 From Guest Sacrifice to Sustainable Convenience

A major service-design trend is the movement away from framing sustainability mainly as guest sacrifice. Smart controls, efficient equipment, refill systems, responsible procurement and low-carbon infrastructure can reduce impacts while maintaining comfort. Research on guest behaviour suggests that green practices are more likely to support positive responses when they are credible and compatible with perceived service value (Berezan et al., 2013; Merli et al., 2019).

6. Discussion

The literature demonstrates an evolution in hospitality sustainability. A first generation of practices concentrated on simple conservation measures such as switching off lights, reducing linen washing, controlling water consumption

and separating waste. A second generation introduced formal environmental policies, management systems, certification, green procurement, employee training and performance monitoring. The emerging third generation is characterised by digitalisation, smart resource management, renewable energy, electrification, carbon accounting, circular economy models, climate resilience, biodiversity concerns and stronger transparency requirements.

This transition does not mean that traditional practices have become unimportant. Energy efficiency, water conservation and waste prevention remain foundational. The difference is that they are increasingly being connected through data, automation, formal targets and cross-functional management. Research continues to show that environmental performance depends on management support, organisational capability and employee participation, not simply on the purchase of new technology (Alreahi et al., 2023; Chan, 2018; Sheikh et al., 2024).

The review also indicates that green practices can create multiple forms of value. Environmental responsibility can support operational efficiency (Kularatne et al., 2019), competitiveness and performance (Kusa et al., 2023; Perramon et al., 2022), and favourable guest responses (Berezan et al., 2013; Merli et al., 2019). The positive outcomes are not automatic. Poor implementation, inconvenient guest programmes, weak employee engagement and exaggerated claims can reduce effectiveness and trust.

Five interacting dimensions appear central: technology, management, employees, guests and external stakeholders. Technology enables efficient equipment, monitoring and analytics. Management provides investment, targets and accountability. Employees convert policy into daily routines. Guests influence consumption and respond to service design. Regulators, investors, suppliers, communities and certification bodies shape external expectations. Effective sustainability strategy therefore requires coordination across all five dimensions.

7. Challenges in Implementing Green Practices

Despite increasing adoption, implementation barriers remain significant. Advanced technologies and retrofits may require high initial investment. Hotels may lack expertise in energy management, carbon accounting, sustainable procurement and data analysis. Organisational resistance can occur when environmental practices are treated as additional tasks rather than part of operational quality. Ownership and management structures may also create split incentives when the party funding improvements does not capture all resulting savings.

Technology adoption is also influenced by compatibility, complexity and organisational readiness. Chan (2018) highlights barriers to environmental technology adoption in hotels, while Langgat et al. (2023) show that ease of use and top-management support are important determinants of sustainable-practice adoption. Employee capability is another critical issue; green HRM and organisational support can influence whether environmental policy becomes consistent workplace behaviour (Alreahi et al., 2023; Sheikh et al., 2024).

Measurement and comparison are difficult because hotels vary by climate, size, facilities, service level and occupancy. A resort with extensive pools and landscaping cannot be compared mechanically with a limited-service urban hotel. Performance indicators therefore need both standardisation and contextual interpretation. Finally, the growth of environmental communication increases the importance of evidence. Hotels that make broad green claims without measurable support risk losing guest and stakeholder trust.

8. Research Gaps and Future Research Directions

Several research gaps emerge from the review.

First, more longitudinal studies are required because much hospitality sustainability research is cross-sectional. Longitudinal designs would show whether practices produce sustained environmental improvements over time.

Second, future research should measure actual resource and emissions outcomes in addition to intentions, perceptions and self-reported practices.

Third, more attention is needed for small and independent hotels. Large chains often have greater access to finance, technology and specialist staff, while smaller properties may face distinct constraints. Research on independent hotels shows that local context and organisational conditions matter for environmental adoption (Robin et al., 2017).

Fourth, AI, IoT and smart hotel technologies require rigorous field evaluation. Future studies should quantify actual energy, water, waste and carbon outcomes and consider rebound effects, cybersecurity, data governance and maintenance capability.

Fifth, circular economy research should move from conceptual discussion to detailed studies of procurement, reverse logistics, reusable packaging, textile recovery, furniture life extension and supplier take-back systems.

Sixth, regenerative hospitality and biodiversity-positive operations require clear definitions and measurable indicators.

Seventh, climate adaptation deserves more hotel-specific research alongside mitigation.

Eighth, research should examine how guests distinguish credible sustainability communication from greenwashing.

Ninth, greater stakeholder diversity is needed, including employees, suppliers, communities, investors and regulators, a gap also highlighted in recent reviews of green hotel research (Yang et al., 2026).

Finally, more regional and destination-specific studies are required. Environmental priorities differ by climate and ecosystem. Water management may dominate in arid destinations, cooling efficiency in hot climates, heating performance in cold regions and biodiversity protection in ecologically sensitive areas.

9. Managerial Implications

Hotel managers should move from isolated environmental activities toward integrated sustainability systems with baselines, targets, assigned responsibilities, budgets, training, monitoring and periodic review. Priorities should be based on property-specific environmental impacts rather than the simple adoption of fashionable practices.

Sustainability should be embedded across engineering, housekeeping, food and beverage, procurement, human resources, finance, sales and marketing. Accurate measurement is essential because managers cannot reliably prioritise investment or demonstrate improvement without credible data. Employee training should be practical, continuous and linked to job responsibilities. Evidence on GHRM indicates that environmental training, organisational culture and employee participation can contribute to pro-environmental behaviour and performance (Alreahi et al., 2023; Sheikh et al., 2024).

Guest engagement should focus on convenience, transparency and service quality. The literature suggests that guests can respond favourably to credible green practices and that environmental concern can influence willingness to support

green initiatives (Kang et al., 2012; Merli et al., 2019). Managers should therefore avoid guilt-based communication and instead make sustainable choices easy and meaningful.

Supplier collaboration is also increasingly important. Hotels should establish environmental procurement criteria, collect relevant supplier information and explore reusable, repairable and take-back models. Finally, sustainability communication should use specific, measurable and verifiable claims. Credibility will become increasingly important as greenwashing receives greater scrutiny.

10. Conclusion

This review addressed two objectives: to trace out green practices currently followed in the hotel industry and to identify emerging green trends. Regarding the first objective, the literature shows that hotels use a wide range of practices including energy efficiency, renewable energy, water conservation, wastewater reuse, and waste prevention and recycling, food-waste reduction, sustainable procurement, single-use plastic reduction, green housekeeping, sustainable building design, green HRM, guest participation, environmental management systems, certification, sustainable transport and community engagement.

Regarding the second objective, the review identifies artificial intelligence, predictive analytics, IoT monitoring, smart buildings, circular economy models, net-zero strategies, electrification, carbon accounting, regenerative hospitality, biodiversity-positive operations, climate-resilient design, low-carbon food systems, green finance, supply-chain transparency and stronger greenwashing scrutiny as major emerging directions.

The overall direction of the literature is clear: hotel sustainability is moving from fragmented conservation measures toward integrated, measurable and technology-supported management systems. Yet technology alone will not determine success. Management commitment, employee capability, credible data, guest trust, supplier collaboration, investment capacity and local environmental context remain decisive. The future green hotel is therefore best understood not as a property with a collection of isolated eco-friendly features, but as an organisation in which environmental responsibility is integrated into design, operations, human resources, purchasing, finance, guest experience and long-term strategy.

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