Sustainable Green Practices in Hotel Operations: Reducing Waste and Energy Consumption in Ghana Hotels

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ABSTRACT

This study investigates the role of sustainable green practices in hotel operations, focusing on waste reduction and energy conservation in the Kumasi Metropolis. The research employed a mixed-method approach, using questionnaires administered to 100 hotel staff and managers. Findings revealed that the most widely implemented waste reduction strategies included waste segregation (RII = 0.78) and food waste minimization (RII = 0.76), while composting (RII = 0.56) and structured staff training (RII = 0.66) were weakly adopted. On energy conservation, LED lighting (RII = 0.84), equipment maintenance (RII = 0.80), and guest awareness campaigns (RII = 0.78) were the most effective practices, whereas renewable energy adoption remained low (RII = 0.56) due to high costs and lack of incentives. The study also established that green practices contribute significantly to cost savings and improved reputation among eco-conscious guests. However, challenges such as high initial investment, limited staff training, and policy gaps hinder widespread adoption. The research concludes that sustainable green practices are achievable and beneficial if supported by stronger managerial commitment, government incentives, and stakeholder collaboration. Recommendations include integrating sustainability into hotel policies, enhancing staff capacity-building, and providing government subsidies for renewable energy adoption.

Keywords: Waste reduction, Energy conservation, sustainable green practices

INTRODUCTION

The hospitality industry is recognised as one of the largest and fastest-growing global service sectors, contributing significantly to employment creation, tourism growth, and overall economic development (UNWTO, 2024). According to the World Travel & Tourism Council (WTTC, 2023), tourism and hospitality together accounted for over 10% of global GDP prior to the COVID-19 pandemic, and the sector continues to be a key driver of foreign exchange earnings and socio-economic transformation in many countries. However, the growth and operational activities of this industry come with considerable environmental challenges, including excessive energy use, high water consumption, solid waste generation, and greenhouse gas (GHG) emissions (Bohdanowicz & Martinac, 2023).

Hotels, in particular, are highly energy-intensive facilities. Their daily operations require substantial inputs for heating, ventilation, and air conditioning (HVAC) systems, lighting, laundry services, food storage and preparation, water heating, and entertainment amenities (Mensah, 2022). It is estimated that hotels consume up to 50% more energy than other commercial buildings of similar size and occupancy levels (Sustainable Hospitality Alliance, 2023). This high demand for resources not only increases operating costs but also amplifies the industry's carbon footprint, contributing to climate change and environmental degradation.

In the past two decades, growing environmental awareness among consumers, tighter government regulations, and global climate change commitments such as the Paris Agreement have spurred calls for the adoption of sustainable green practices within the hospitality sector (UNEP, 2022). Sustainable green practices refer to

operational strategies that aim to minimise environmental impact through efficient resource use, waste reduction, and energy conservation, all while maintaining or enhancing service quality (Chan et al., 2021). Such practices in hotels include waste segregation and recycling programmes, installation of solar panels, and use of LED lighting systems**,** water-efficient fixtures**,** food waste composting, smart energy management systems, and the integration of renewable energy sources into daily operations.

Consumer expectations have emerged as a powerful driver for sustainability transformation in the hospitality industry. Recent surveys indicate that 76% of global travellers now prefer to stay in eco-friendly accommodations, with a substantial proportion willing to pay more for sustainable options (Booking.com, 2023). This shift in market preference suggests that environmental responsibility is no longer just an ethical imperative but a competitive differentiator in the global hospitality market.

Several pioneering hotels have demonstrated that sustainability and profitability can go hand in hand. For instance, Proximity Hotel in the United States reduced its overall energy consumption by over 40% through innovative measures such as solar water heating**,** regenerative elevators, and high-efficiency lighting (Chen et al., 2023). Similarly**,** ITC Hotels in India have achieved significant milestones in waste diversion, water recycling, and renewable energy adoption**,** earning prestigious LEED Platinum certifications for their properties (Gössling, and Buckley, 2022). These examples illustrate that with proper investment and management, green initiatives can lead to environmental conservation, operational cost savings, and enhanced brand image.

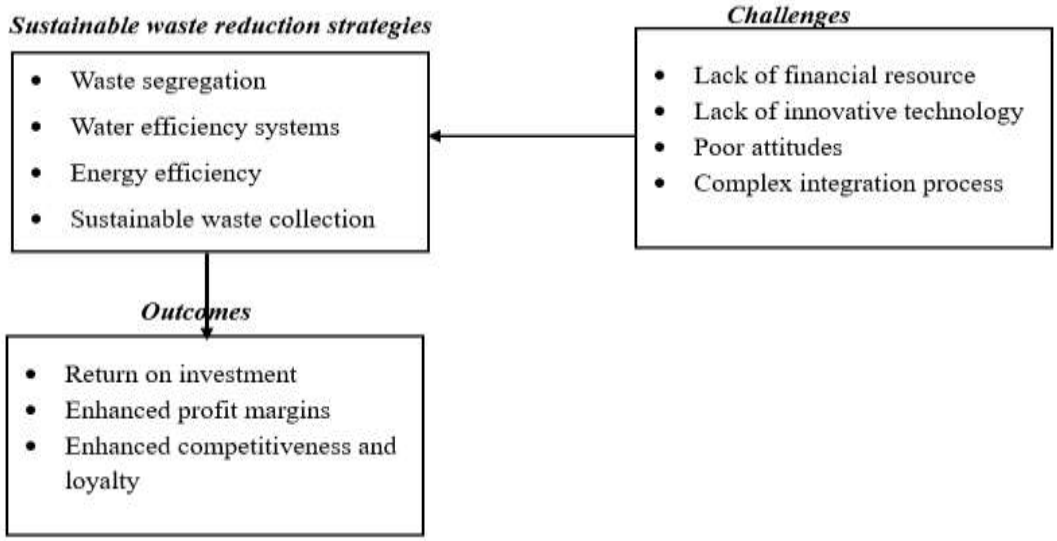
Furthermore, the global transition toward greener hotels aligns with the United Nations Sustainable Development Goals (SDGs), particularly SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action). By integrating sustainability into their operations, hotels not only contribute to environmental protection but also create social and economic value through job creation, community engagement, and guest education on sustainable living. Ultimately, the adoption of sustainable green practices in hotel operations is increasingly seen as a strategic necessity rather than a mere marketing choice. As resource scarcity, energy price volatility, and environmental regulations intensify, hotels that fail to adapt risk losing competitiveness, market share, and stakeholder trust. Therefore, this study examines the role of sustainable green practices in reducing waste and energy consumption; while highlighting the economic and reputational benefits such practices can bring to the hospitality sector.

Although sustainable green practices have been widely acknowledged for their environmental, economic, and reputational benefits, many hotels particularly those in developing economies have been slow in embracing and integrating these practices into their operations. This slow adoption can be attributed to multiple interlinked challenges, including high upfront capital investment, lack of technical expertise, insufficient government incentives, and limited awareness of the long-term operational savings associated with sustainability initiatives (Mensah, 2022). One of the most significant barriers is the perceived financial burden. Many hotel operators view sustainable technologies, such as solar power systems, water recycling units, and energy-efficient HVAC installations, as prohibitively expensive. In contexts where access to affordable financing is limited, decision-makers often prioritise short-term operational needs over long-term environmental goals. This short-term thinking perpetuates reliance on energy-intensive systems and inefficient resource usage, further increasing operational costs over time. A related challenge is the limited availability of skilled personnel and technical know-how to design, implement, and maintain sustainable systems effectively. In many developing regions, sustainability training is not yet a standard part of hospitality management or engineering curricula. This lack of expertise leads to operational hesitancy, with hoteliers uncertain about the feasibility and effectiveness of adopting green practices.

Compounding these issues is the rise of “greenwashing,” the practice of making unsubstantiated or exaggerated claims about environmental responsibility in order to appeal to eco-conscious guests (Han et al., 2023). This has become a growing concern in the global hospitality sector. When hotels engage in greenwashing, they risk eroding consumer trust, damaging brand reputation, and undermining genuine sustainability efforts. The absence of robust monitoring systems, transparent reporting mechanisms, and internationally recognised certifications such as Green Key or LEED exacerbates the problem, making it difficult for stakeholders to differentiate between authentic environmental stewardship and marketing spin.

In many emerging markets, uncertainty regarding the return on investment (ROI) from sustainability projects also deters hoteliers from committing to large-scale environmental initiatives. Without empirical data or case studies relevant to their local context, many hotel operators remain unconvinced that adopting green practices will result in measurable financial benefits. As a result, waste generation, excessive energy consumption, and inefficient water use persist, placing additional strain on both hotel finances and the environment. This situation ultimately limits the hospitality sector's contribution to broader environmental sustainability goals, such as those outlined in the United Nations Sustainable Development Goals (SDGs). Without deliberate and sustained efforts to overcome these barriers, hotels risk falling behind in a rapidly evolving global market where environmental responsibility is becoming not just a competitive advantage, but a baseline expectation. The conceptual framework shows the relationship of drivers of sustainable practices and the benefits as well as challenges, which are illustrated in Figure 2.1.

Figure 2.1: Conceptual Framework



Source: Author (2025).

Integration of sustainable practices such as sustainable waste management (example, waste segregation, installation of energy efficient systems, and electrical appliances, etc.) is increasingly gaining attention in the hotel sector of the hospitality industry. However, challenges such as lack of financial resources, lack of innovative technology, poor attitude of users, complex integration process etc. which are captured in the conceptual framework can also impede successful integration of sustainability practices in tourism and hospitality business operations. Nonetheless, the study conceptualises that, hotels that are able to implement these practices are expected to witness increased return on investment, net profit margins and competitiveness through brand loyalty.

METHODOLOGY

Three forms of research methods (quantitative, qualitative and mixed methods) are commonly applied in academic research. Qualitative research is based on lived experiences of participants hence it is best for studies that involve behaviour patterns. This method is also subjective hence raises concerns on biasness (Creswell, 2007). Essentially, the study could not apply qualitative research method because of the subjectivity flaws it possess. This paved way for quantitative research method that is derived from the positivist philosophic paradigm. Quantitative research method is very objective since it applied mathematical laws and models hence application in this study allowed for utilisation of descriptive statistics (mean, standard deviation and relative importance index) which were adequate for objective interpretation of the results.

Study Area

The study was conducted in selected hotels within Kumasi Metropolis**,** Ghana. This area was chosen due to its vibrant hospitality sector, which caters to both domestic and international tourists, and its growing recognition

of sustainable tourism practices. The hotels within this area vary in size (small, medium, and large), star classification (budget to luxury), and ownership (locally owned vs. international chains). This diversity provided an opportunity to explore how different categories of hotels adopt and implement sustainable practices in waste and energy management.

Target Population

The population for this study comprised managers, supervisors, and staff members of hotels operating within the study area. Specifically, the following categories were targeted:

- **General Managers and Operations Managers:** Responsible for policy-making, budgeting, and strategic decision-making on sustainability.
- **Housekeeping and Front Office Staff:** Involved in daily energy use (lighting, HVAC systems, and laundry) and waste management.
- **Food and Beverage Staff:** Involved in kitchen operations where food waste and energy consumption are significant.
- **Maintenance/Engineering Staff:** Responsible for energy systems, lighting, water heating, and equipment maintenance.

The choice of this population is based on the fact that these categories of staff are directly involved in daily hotel operations that significantly impact waste generation and energy consumption.

Sample Size and Sampling Techniques

Records from the Ghana Tourism Authority showed a total of 225 registered star and budget hotels in Kumasi. The population size in the sample size determination was therefore set at 225. This helped in the application of the Yamane's (1967) formula for sample size determination at a 95% confidence level and a 5% margin of error. Based on the number of registered hotels in the study area, the sample size was calculated as follows:

$$n= \frac{N}{1+N(e)^2}$$

Where:

- n = sample size
- N = total population
- e = margin of error (0.05)

The sample size calculation is as follows:

$$n= \frac{225}{1+225(0.05)^2}$$

$$n= \frac{225}{1+225(0.0025)}$$

$$n= \frac{225}{1+0.5625}$$

$$n = \frac{225}{1.5625}$$

n= 144.

The study was expected to engage 144 respondents, nonetheless, 100 out of the 144 questionnaires distributed were returned and considered valid for analysis. Probability sampling in the shape of simple random technique was used to draw the 144 respondents. The names of all managers and staff of the 225 registered hotels in Kumasi

metropolis were gathered to formed the sampling frame/pool. The names of the actual respondents were randomly drawn from the pool until the 144th participant was sampled. Simple random sampling was used because the study intends to avoid selection bias. Thus, each member of the target populations was given an equal selection chance through application of simple random sampling (Creswell, 2007), thereby eliminating selection bias.

Sources of Data

The study utilized both **primary** and **secondary data** sources.

- **Primary Data:** Obtained directly from hotel managers through questionnaires. This provided firsthand information on existing practices, challenges, and perceptions.
- **Secondary Data:** Obtained from journals, books, policy documents, hotel sustainability reports, United Nations World Tourism Organization (UNWTO) guidelines, and reports by Ghana Tourism Authority. These were used to compare and validate the primary findings.

Data Collection and Instrumentation

The study used a survey tool designed in a five-point Likert scale format (example; 1= strongly disagree, and 5= strongly agree). The study intended to examine sustainable practices in hotel operations from an objective standpoint. Hence it became plausible to utilise an instrument allowed to gathering of numeric data that would fit the adopted statistical models (descriptive statistics). The survey tool was structure in five parts. The first section focused on gathering data on relevant demography of the participants such as years of experience, educational background. Section two contained questions on waster reduction practices of hotels. Section three had questions and responses on cost-saving potentials and return on investment of sustainable energy practices. Section four and five had questions on challenges and barriers on implementation of sustainable practices in hotel operations and recommendations to enhance implementation of sustainable practices in hotel business context.

Reliability and Validity

Confirmatory factor analysis was performed in SPSS as the statistical approach to check the loading factors of each response which was used to measure the research objectives. Results showed that all the items (responses) on each research objective had a minimum loading factor of 0.7 implying that, the instrument maintained adequate statistical reliability and validity for analysis as recommended by Cronbach (1951).

Data Analysis

The data were initially subjected to cleaning where those having missing values of more than 5% were excluded from the analysis, this was done to ensure adequate internal validity and reliability of the instrument. Furthermore, the consistency of the data collection instrument was tested through confirmatory factor analysis. In this test, responses with loading factor lower that 0.5 were ignored since this implied that, such responses were not loading properly hence could negatively affect the statistical models used for the study. Mean and standard deviation and relative importance ranking (descriptive statistics) were also used to ascertain the central tendencies of the responses. This was used because the responses on each of the study's objective were ranked on a five-point agreement scale mean and standard deviation offered relevant insight on where each of the responses were clustering along the scale making the interpretating easier. Statistical Package for Social Sciences (SPSS) version 26 was used for data entry and generation of descriptive statistics output.

Results

Table 1: Waste Reduction Practices (RII Ranking)

Statement	Mean	RII	Rank
Separate bins for different waste types	3.9	0.78	1

Food waste minimized (portion control/reuse)	3.8	0.76	2
Recyclable materials given to recycling companies	3.6	0.72	3
Paperless systems encouraged	3.4	0.68	4
Staff trained on waste segregation	3.3	0.66	5
Composting of organic waste	2.8	0.56	6

Source (Field Survey, 2025)

The findings revealed that the use of separate bins for waste segregation (RII = 0.78) was the most widely implemented waste management practice among the hotels surveyed. This reflects a growing awareness of the importance of sorting waste at the source, which is often the first step in building an effective waste reduction system. Closely following this, food waste minimization strategies (RII = 0.76) such as portion control and reuse of leftovers were also highly prioritized. This is not surprising, as food waste represents one of the largest waste streams in hotel operations and directly affects operational costs.

Table 2: Energy Management Practices (RII Ranking)

Statement	**Mean**	**RII**	**Rank**
Use of LED/energy-efficient bulbs	4.2	0.84	1
Regular servicing of equipment for efficiency	4.0	0.80	2
Guests encouraged to conserve energy	3.9	0.78	3
Energy-efficient HVAC systems	3.7	0.74	4
Energy-efficient water heating systems	3.5	0.70	5
Motion sensors/timers for lighting	3.2	0.64	6
Solar/renewable energy usage	2.8	0.56	7

Source (Field Survey, 2025)

The results show that the adoption of low-cost and accessible technologies such as LED lighting (RII = 0.84) was extremely high across hotels in Kumasi Metropolis. This is consistent with global trends, as LED bulbs are affordable, energy-efficient, and easy to install without requiring major infrastructural changes. Similarly, routine maintenance of equipment (RII = 0.80) was widely practiced, highlighting management's recognition of the cost-saving potential of keeping electrical and mechanical systems in optimal condition. Regular servicing not only reduces energy consumption but also prolongs the lifespan of hotel assets, thereby lowering repair and replacement costs. Another important finding was the role of guest involvement through energy conservation signage (RII = 0.78)**.** Hotels actively encourage guests to conserve electricity, often through reminders to switch off lights and air conditioners when leaving rooms, or by using key-card systems that automatically cut power when rooms are unoccupied. This practice demonstrates the sector's understanding that sustainability is a shared responsibility between staff and guests, and that behavioral changes can make a measurable difference in reducing energy consumption.

In contrast, the study revealed that renewable energy adoption (RII = 0.56) was the least implemented energy-saving measure. The study showed that the high upfront cost of installing solar panels and other renewable technologies discouraged many hotels from investing in them. Furthermore, respondents noted the lack of adequate government support, incentives, and financing mechanisms to make renewable energy adoption more feasible. This suggests that while hotels recognize the long-term benefits of renewable energy, systemic and financial barriers remain a major obstacle to its widespread adoption. Overall, the findings highlight a two-tier approach to energy management**:** while low-cost and easily accessible practices are being fully embraced, high-cost innovations such as renewable energy require stronger institutional support to become mainstream in hotel operations.

Cost-Saving Potential and Return on Investment

The study revealed several important insights regarding the economic benefits associated with the adoption of sustainable green practices in hotel operations. Survey responses consistently highlighted cost-saving outcomes across different areas of waste and energy management. Firstly, hotels that had switched to LED lighting systems reported up to 20–30% reductions in energy bills. This represents a significant saving, particularly for mid- and large-sized hotels where lighting accounts for a substantial proportion of total energy use. LED bulbs were noted not only for their energy efficiency but also for their durability, which reduces replacement frequency and further lowers operational costs.

Secondly, the practice of routine maintenance of equipment was found to improve operational efficiency while simultaneously lowering long-term repair and replacement costs. Proper servicing of air conditioners, boilers, refrigerators, and kitchen equipment enhanced performance, reduced energy wastage, and prevented costly breakdowns. This preventive approach was emphasized in the survey as a practical strategy for cost control. Thirdly, food waste reduction through portion control and reuse strategies emerged as a cost-effective practice. Hotels that actively monitored food portions reported a decline in purchasing costs for raw materials and a reduction in waste disposal expenses. By aligning portion sizes with guest demand, hotels were able to strike a balance between guest satisfaction and cost savings.

The findings suggest that the adoption of sustainable green practices generates tangible long-term financial benefits for hotels. Incremental efficiency practices such **as** LED lighting, equipment maintenance, and portion control were identified as clear and immediate sources of return on investment (ROI), making them highly attractive to management. These practices are relatively low-cost, easy to implement, and deliver measurable outcomes within short to medium timeframes. In contrast, the adoption of capital-intensive technologies such as solar energy and advanced HVAC systems was noted to be much more limited. Respondents explained that although renewable energy offers strong long-term savings and environmental benefits, the high upfront investment costs and absence of government subsidies or incentives make it less attainable for most hotels, especially budget and mid-range establishments. As a result, ROI for such technologies remains less visible in the short term, discouraging widespread adoption.

Beyond financial benefits, managers also stressed the reputational value of sustainability initiatives. Hotels that visibly adopt eco-friendly practices are more likely to attract eco-conscious guests, particularly international travelers who prioritize sustainability in their choice of accommodation. This reputational enhancement not only strengthens competitiveness but also aligns hotels with global trends in responsible tourism. Overall, the results underscore the dual value of sustainability: it is not only an environmental necessity but also a strategic investment. By focusing on low-cost efficiency measures while planning for the gradual integration of advanced technologies, hotels can realize both economic and reputational gains**,** thereby securing a sustainable competitive edge in the hospitality sector.

Challenges and Barriers

Table 3: Challenges to Adoption of Sustainable practices

Challenge	**Frequency**	**Percentage (%)**	**Rank**
High cost of green technologies	70	70.0	1
Limited staff training/awareness	60	60.0	2
Lack of support from management	45	45.0	3
Inadequate government policies/incentives	42	42.0	4
Limited space for renewable installations	30	30.0	5
Resistance from staff/guests	25	25.0	6

Source (Field Survey, 2025)

The findings show that the main barrier to adopting sustainable practices in hotels is the high cost of green technologies (70%)**,** especially for capital-intensive options like solar energy. Limited staff training (60%) also hinders consistent implementation, as many employees lack the technical knowledge to apply sustainability practices effectively. In addition, policy gaps, weak managerial enforcement, and inadequate government incentives further slow adoption. While hoteliers recognize the value of sustainability, these financial, technical, and institutional challenges limit its widespread application.

Recommendations and Stakeholder Roles

The study identified several strategies to enhance the adoption of sustainable green practices in hotel operations. These strategies involve collaboration among multiple stakeholders, including government, hotel management, staff, guests, and external partners.

Government

One of the strongest recommendations was for the government to provide tax incentives, subsidies, and financing schemes to offset the high upfront cost of renewable energy technologies such as solar panels and efficient HVAC systems. Respondents stressed that without government support, many hotels, particularly budget and mid-range ones, will remain unable to invest in these long-term solutions. Furthermore, respondents suggested that the government should strengthen and enforce environmental policies within the hospitality industry to ensure compliance. Clear policy direction and consistent regulation were seen as vital to creating an enabling environment for sustainability.

Hotel Management

Hotel managers were urged to institutionalize sustainability by embedding green practices into their operational policies. This includes developing clear guidelines on waste segregation, energy efficiency, procurement of eco-friendly supplies, and continuous performance monitoring. Respondents emphasized the need for hotels to allocate dedicated budgets for sustainability upgrades rather than treating them as optional expenses. Investment in regular and structured staff training was also highlighted as essential to improve technical capacity, ensure consistency in implementation, and cultivate a culture of environmental responsibility within hotels.

Staff and Guests

Staff and guests were identified as central actors in ensuring the success of sustainability initiatives. The study recommended awareness campaigns targeting both groups to promote behavioral change and commitment to green practices. For staff, this means consistent reminders and training on proper waste segregation and energy-efficient operations. For guests, hotels should increase the use of signage, digital communications, and incentive programs to encourage active participation in energy and waste reduction. Recognition and reward schemes such as “green champion” awards were suggested as effective motivators for compliance.

External Stakeholders

Finally, external partners such as recycling companies, NGOs, and environmental agencies have a vital role to play. Recycling companies should collaborate with hotels by providing regular waste collection and ensuring proper recycling channels are available**.** NGOs and environmental agencies were recommended to support hotels through training, capacity building, advocacy campaigns, and technical assistance in areas such as composting and renewable energy projects. Such partnerships can bridge knowledge gaps and reduce the resource burden on hotels, making sustainable practices more feasible and effective. Overall, the findings highlight that sustainability in hotel operations requires a multi-stakeholder approach. Government must create an enabling policy and financial environment, hotel management must lead through institutional commitment, staff and guests must adopt behavioral change, and external partners must provide technical and infrastructural support. Together, these roles form an interconnected system that can accelerate the adoption of green practices, reduce waste and energy consumption, and improve both economic and environmental outcomes in the hospitality sector.

DISCUSSION OF FINDINGS

The results revealed that waste segregation, food waste minimization and recycling partnerships were the most commonly implemented strategies. These findings highlight a growing awareness of the need to minimize waste streams at the source, consistent with Kasim (2017), who found that waste sorting and recycling are entry-level practices widely adopted in developing economies. Food waste minimization also reflects hotels' concern with both **cost** reduction and environmental responsibility, as food waste is one of the largest contributors to operational inefficiency (Mensah & Blankson, 2014). However, the adoption of composting and structured staff training was weak. The study revealed barriers such as lack of space, limited technical expertise, and inconsistent training programs. This is in line with Boateng (2020), who reported that while Ghanaian hotels demonstrate willingness to implement sustainability initiatives, infrastructural and technical limitations restrict their ability to implement advanced strategies. The findings suggest that although hotels are making progress with basic waste reduction, long-term systemic practices remain underdeveloped.

Hotels in Kumasi demonstrated strong adoption of LED lighting, equipment maintenance**,** and guest awareness campaigns. These practices are low-cost, accessible, and deliver immediate financial benefits. Jones et al. (2016) argue that such practices are widely adopted in hotels globally because they require minimal investment while providing measurable returns. The emphasis on guest involvement also reflects a growing recognition that sustainability requires behavioral change among both staff and guests (Han et al., 2018). By contrast, renewable energy adoption was limited, with managers citing high upfront costs and inadequate government incentives**.** Similar studies confirm that renewable energy adoption in Ghana's hospitality sector is slow due to financing barriers and weak policy frameworks (Adom et al., 2020). This reflects a two-tier energy strategy: hotels are willing to adopt affordable efficiency measures, but more advanced technologies require stronger external support.

The study found that sustainable practices generate significant economic benefits**.** Hotels reported 20–30% savings on energy bills from LED bulbs, reduced long-term costs through routine maintenance, and decreased food procurement/disposal costs from portion control. These findings are consistent with Robinot and Giannelloni (2010), who showed that sustainability practices contribute to both cost reduction and competitiveness in the hospitality sector. Incremental efficiency measures, such as LEDs and maintenance, had clear and immediate ROI**,** making them highly attractive. However, capital-intensive technologies such as solar energy and advanced HVAC systems had limited adoption due to their delayed returns and high upfront costs. Adom et al. (2020) similarly argue that without financial incentives, firms in Ghana struggle to adopt renewable energy despite its long-term potential. Importantly, managers highlighted the reputational benefits of sustainability, as eco-conscious guests increasingly prefer hotels that demonstrate environmental responsibility. This finding aligns with studies that show sustainability enhances brand image and customer loyalty in the hospitality sector (Han et al., 2018)

The greatest challenge identified was the high cost of green technologies (70%)**,** followed by limited staff training and awareness (60%)**.** These results confirm earlier findings that financial and human resource constraints are key inhibitors of sustainability adoption in Ghanaian hotels (Mensah & Blankson, 2014). Additional barriers included lack of management support (45%)**,** weak government policies (42%)**,** and space limitations (30%)**.** Resistance from staff and guests (25%) also emerged as a minor barrier, highlighting the need for stronger awareness campaigns. These findings resonate with Chan et al. (2017), who reported that sustainability initiatives often fail without adequate leadership commitment, financial support, and behavioral change among staff and customers.

RECOMMENDATIONS AND STAKEHOLDER ROLES

The study emphasized that sustainability in hotel operations requires a multi-stakeholder approach. Respondents recommended:

- **Government**: providing tax incentives, subsidies, and financing schemes to offset high investment costs, as well as enforcing environmental regulations.

- **Hotel Management**: institutionalizing sustainability policies, allocating dedicated budgets, and investing in structured staff training.
- **Staff and Guests**: participating in awareness campaigns, practicing energy and waste reduction behaviors, and being motivated through recognition schemes.
- **External Stakeholders**: recycling companies and NGOs partnering with hotels to provide infrastructure, technical expertise, and advocacy

These recommendations highlight the interconnected nature of sustainability adoption, where collaboration among multiple actors is crucial.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest: The authors declare no conflict of interest.

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