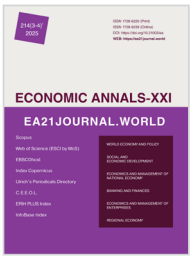

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Green hotel certification: an analysis of the readiness of hotels in Bali

Abstract. The hospitality industry plays an important role in supporting sustainable development, but faces challenges related to environmental impacts, especially in energy, water, and waste management. This study aims to analyze the readiness of 4 and 5-star hotels in the Nusa Dua area of Bali, in achieving Green Hotel certification based on the Greenship for Existing Building standard from the Green Building Council of Indonesia. Data was collected through in-depth interviews and document analysis to identify efforts, constraints, and factors that influence the implementation of Green Hotel principles in 2023-2024. The results show that the majority of hotels have implemented green policies, such as the use of renewable energy and waste management, but face challenges in the form of high initial investment costs and a lack of technical understanding among staff. Factors that influence readiness include policy support, technological infrastructure, and the level of awareness of hotel management and guests towards the importance of sustainability. These findings suggest the need for systematic improvements through enhanced documentation systems, structured energy and water management programs, and capacity-building initiatives. Furthermore, this research contributes to the realization of a sustainable hospitality sector in Bali and serves as a model for similar tourism destinations.

Keywords: Environmental Policy; Resource Efficiency; Sustainable Tourism; Energy Management; Eco-Certification; Bali; The St. Regis Bali Resort; The Westin Resort Nusa Dua Bali; Nusa Dua Beach Hotel & Spa; Melia Bali; Grand Hyatt Bali; Sofitel Bali Nusa Dua Beach Resort; Marriot's Terrace Nusa Dua & Renaissance Bali Nusa Dua; Merusaka Nusa Dua; and The Laguna Luxury Collection Resort & Spa
JEL Classification: E41; E64; I18; J28; J21
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1. Introduction and Brief Literature Review

The global tourism industry has emerged as a pivotal driver of economic growth, contributing over 10% to the world's GDP and creating one in every ten jobs worldwide (UNWTO, 2023). However, the rapid expansion of this sector has raised concerns about environmental degradation, especially in high-demand destinations (Purnaya, 2016; Astawa,et al., 2022). The hospitality industry, as a key component of tourism, has been identified as a significant contributor to environmental impacts, notably through excessive energy consumption, water use, and waste generation (Gössling & Hall, 2019). These environmental challenges underscore the importance of sustainability initiatives, such as Green Hotel certification, to promote responsible tourism development (Wiraharja & Adyatma, 2024).

The proliferation of unsustainable practices in the hotel sector is influenced by several factors, including a lack of environmental regulation enforcement, limited awareness of sustainable practices among hotel operators, and inadequate financial incentives for adopting green technologies (Sobuj et al., 2021). In many developing countries, the hospitality industry prioritizes short-term profitability over long-term sustainability, further compounding these issues. Technical barriers, such as insufficient knowledge of energy-efficient systems and a shortage of trained staff, also hamper the implementation of sustainable operations (Berezan et al., 2013).

As a consequence, these factors have led to increased carbon emissions, water pollution, and the accumulation of solid waste in tourism destinations (Han et al., 2018). In popular destinations such as Bali, which is highly reliant on tourism, the cumulative environmental impact of hotels threatens natural resources and undermines local sustainability goals. Moreover, tourists increasingly prefer eco-conscious accommodations, and failure to address these environmental concerns may result in reduced competitiveness (Jones et al., 2014).

This research focused on three main problems:

1) how efforts have been made by hotels in Nusa Dua, Bali, in implementing Green Hotel principles;
2) what are the obstacles faced in its implementation;
3) factors that influence the readiness of these hotels to obtain Green Hotel certification.

The benefits of the research include:

1) for hotel managers, this research provides practical guidelines and recommendations for implementing Green Hotel principles effectively;
2) for Indonesia Tourism Development Corporation (ITDC), the results of the research can support policy planning and regional facilities (Muda et al., 2025);
3) for the government, this research offers data to formulate policies that support the development of Green Hotels;
4) for academics, this research is a reference and contribution to the development of knowledge related to Green Hotels in Indonesia.

2. Method

This study employed a qualitative research design to examine the readiness of 4- and 5-star hotels in Nusa Dua, Bali, in implementing environmentally sustainable practices aligned with Green Hotel certification standards. The research approach focused on gathering descriptive data through in-depth engagement with relevant sources (Fadillah et al., 2024). The research population included all 4- and 5-star hotels in the Nusa Dua area that had been operational for a minimum of three years. A purposive sampling technique was used to select hotels based on their classification, operational history, and accessibility for field research. Of the 19 hotels meeting these criteria, 18 were analyzed due to scheduling conflicts with one hotel. A thematic analysis approach was used to identify recurring patterns and critical factors influencing the readiness for certification. Triangulation was applied by comparing interview data with documentary evidence to enhance the validity of findings.

3. Result

To analyze the readiness of these hotels in obtaining Green Hotel certification, it is based on the evaluation of three main aspects that become the assessment criteria in the certification. The three aspects include Energy Efficiency and Conservation (EEC), Water Conservation (WAC), and Material and Resource Cycle (MRC). Further elaboration on each aspect will be described below.

Energy Conservation and Efficiency (EEC)

The analysis of Table 1 is compiled based on the energy consumption data of 18 hotels that fall into the category of mandatory or not yet mandatory to implement energy conservation, with an energy consumption limit of 500 TOE per year:

Table 1 provides structured information on the status of energy conservation obligations based on the annual energy consumption of each hotel. From the energy consumption data for 18 research object hotels that fall into the mandatory category for implementing Energy conservation because they use energy greater than 500 TOE per year as many as 9 hotels, namely, The St. Regis Bali Resort, The Westin Resort Nusa Dua Bali, Nusa Dua Beach Hotel & Spa, Melia Bali, Grand Hyatt Bali, Sofitel Bali Nusa Dua Beach Resort, Marriot's Terrace Nusa Dua & Renaissance Bali Nusa Dua, Merusaka Nusa Dua, and The Laguna Luxury Collection Resort & Spa.

While other hotels namely Courtyard by Marriott Bali Nusa Dua Resort, Novotel Hotel & Residences Bali Nusa Dua, Ayodya Resort Bali, Mercure Bali Nusa Dua, Marriott's Bali Nusa Dua Gardens, The Grand Bali Nusa Dua, Amartera Villas Bali Nusa Dua and Kaysumanis Nusa Dua Private Villa & Spa have not yet entered into obligations according to these regulations, because their energy use is still below 500 TOE per year for more details can be seen in Figure 1.

Table 1:
Bali hotel energy consumption threshold data referring to PP 33/2023

No.	Hotel Name	Energy Consumption	Category
1	A	< 500 TOE	Not Mandatory Energy Conservation
2	B	< 500 TOE	Not Mandatory Energy Conservation
3	C	< 500 TOE	Not Mandatory Energy Conservation
4	D	> 500 TOE	Mandatory Energy Conservation
5	E	< 500 TOE	Not Mandatory Energy Conservation
6	F	< 500 TOE	Not Mandatory Energy Conservation
7	G	< 500 TOE	Not Mandatory Energy Conservation
8	H	< 500 TOE	Not Mandatory Energy Conservation
9	I	< 500 TOE	Not Mandatory Energy Conservation
10	J	> 500 TOE	Mandatory Energy Conservation
11	K	> 500 TOE	Mandatory Energy Conservation
12	L	> 500 TOE	Mandatory Energy Conservation
13	M	> 500 TOE	Mandatory Energy Conservation
14	N	> 500 TOE	Mandatory Energy Conservation
15	O	> 500 TOE	Mandatory Energy Conservation
16	P	> 500 TOE	Mandatory Energy Conservation
17	Q	> 500 TOE	Mandatory Energy Conservation
18	R	> 500 TOE	Mandatory Energy Conservation

Source: Authors' survey

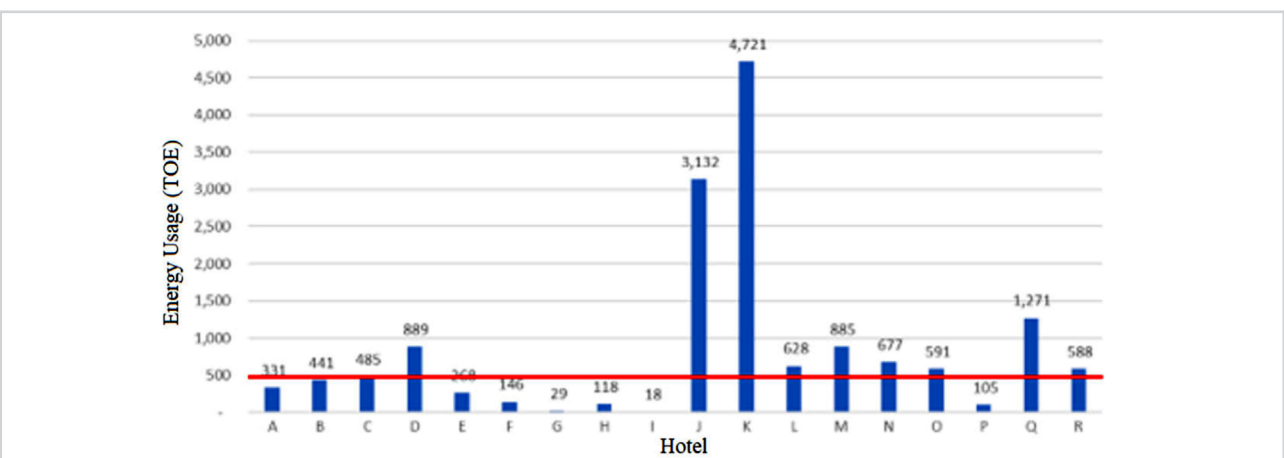

Figure 1:
Energy profile of Nusa Dua Bali hotels
Source: Authors' survey

Discussion in terms of Greenship for Existing Building Requirements

One of the important requirements that must be met is the commitment of top management, which is realized in the form of an official statement letter. This letter must be accompanied by a documentation system that includes guidelines and standard operating procedures (SOPs). The system must cover crucial aspects such as energy usage monitoring, setting energy saving targets,

and action plans that have a specific timeframe and are implemented by a designated energy team. In addition, hotels are required to organize consistent energy-saving campaigns. This campaign should involve the installation of permanent materials on each floor of the hotel, such as stickers, posters, or email reminders, designed to raise awareness about energy savings among hotel staff and guests. Based on the analysis, it can be seen that 18 hotels already have energy-saving commitments and conduct energy-saving campaigns, but do not yet have a documentation system (NA), in the form of Guidelines or procedure systems governing Energy Management (Winanti et al., 2025).

The other mandatory requirements are to show the electricity IKE for the last 6 months to be smaller than the reference standard electricity IKE determined by GBC INDONESIA (Office 250 kWh/m^2 per year, Mall 450 kWh/m^2 per year and Hotel or Apartment 350 kWh/m^2 per year) and show an energy saving of 5% or more, between the average energy consumption of the last 1 year and the average energy consumption of the previous 1 year. From the analysis, it can be seen that all hotels in the research sample have not met the measured indicators. These indicators include achieving an Energy Consumption Intensity (ICI) that is below or equal to the predetermined ICI standards (ICI $\leqslant$ ICIs) in the last six-month period, as well as energy savings of 5% compared to energy consumption in the previous year. All hotels studied have the same score of 9, meaning that they only fulfil 25% of the maximum value fulfilment in this criterion. This is because the implementation of energy conservation and efficiency has not been carried out systematically based on the Energy Management system standard reference, namely the Indonesian National Standard (SNI) ISO 50001: 2018.

Water Conservation and Efficiency (WAC)

The discussion for the WAC criteria is carried out from two sides, namely the side of the statutory requirements related to Green Hotels and the side of Green Hotel certification requirements that refer to the requirements of the Greenship for Existing Building from the Green Building Council.

Discussion from the Regulatory Side

Based on Law Number 28 of 2002 concerning Building, water management in the hospitality sector is required to be carried out responsibly. The aim is to ensure the availability of clean water, prevent environmental pollution, and support the sustainability of water resources. In the Nusa Dua area of Bali, the water sources used by hotels vary greatly. Some hotels utilize boreholes, as the availability of groundwater in the area is still abundant. In addition, some hotels are also connected to the Perumda Air Minum Tirta Mangutama Badung (PDAM) network, although the utilization is not optimal. In many cases, the PDAM network is only used as a backup or simply to fulfill licensing requirements. On the other hand, seawater management is also one of the main sources. The area manager, ITDC, has provided a seawater treatment plant using Sea Water Reverse Osmosis (SWRO) technology to meet clean water needs in area.

All 18 hotels in the study have utilized the SWRO facility provided by ITDC. Water usage through this facility varies, with usage volumes ranging from 22,564 litres to 500,199 litres per year which is more clearly shown in Figure 2.

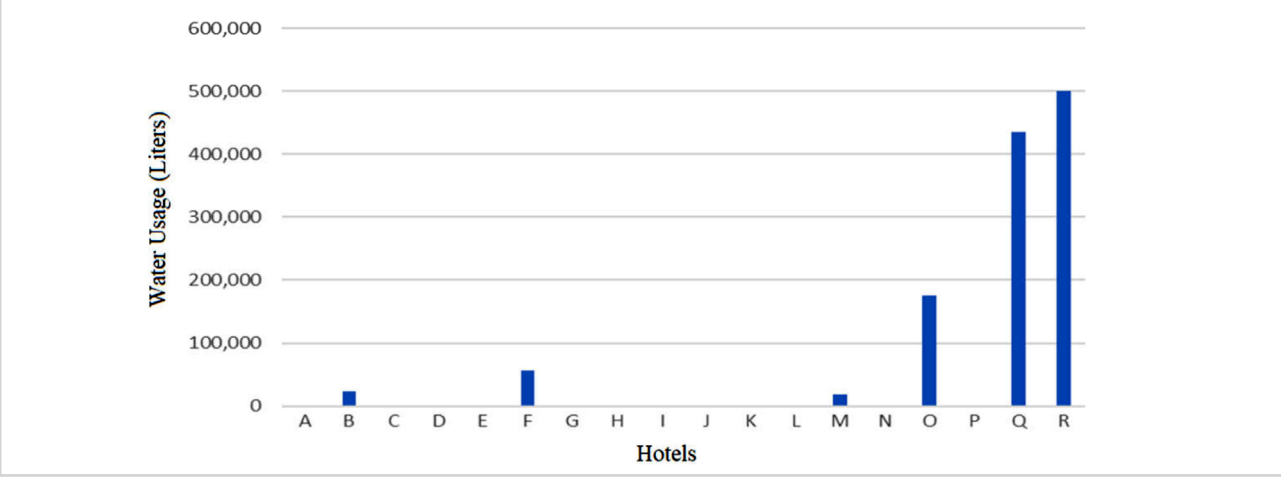

Figure 2:
Water consumption of hotels in Nusa Dua Bali
Source: Authors' survey

Discussion in Terms of Greenship for Existing Building Requirements

For mandatory requirements regarding the existence of a statement letter containing a commitment from top management that includes water conservation, the existence of a documentation system that includes procedures (SOPs) regarding monitoring, savings targets, and action plans for a certain period of time by the water conservation team and the existence of a campaign in order to encourage water conservation with a minimum of permanent installation of written campaigns on each floor, including: stickers, posters, emails. From the analysis, on water management policy, it can be seen that 18 hotels already have a commitment to water conservation and conduct water conservation campaigns (Y), but do not yet have a documentation system (NA) in the form of guidelines or procedure systems governing water management.

Based on the results of the assessment of the water conservation criterion, there is a variation in the level of achievement among the hotels analyzed. A total of five hotels scored 8, reflecting a 40% fulfilment level of the maximum score for this criterion. Four other hotels scored 7, indicating a compliance level of 35% of the maximum score. The remaining eight hotels have a lower level of achievement, which is below 20% of the maximum score. These results indicate a significant difference in water conservation efforts among the assessed hotels, with most falling short of the maximum potential expected.

Material Resources and Cycle (MRC)

The discussion for the MRC criteria is carried out from two sides, namely the side of the legislative requirements related to Green Hotels and the side of Green Hotel certification requirements which refer to the requirements of the Greenship for Existing Building from the Green Building Council.

Discussion from the Regulatory Side

According to Law No. 28 of 2002, buildings must meet technical standards related to health, safety, and sanitation, including waste management. In Nusa Dua, Bali, hotels have implemented systems such as waste segregation for organic, inorganic, and hazardous materials, supported by ITDC's integrated waste management. Despite these efforts, data collection remains limited due to the absence of proper documentation systems and the lack of direct involvement from personnel responsible for waste management. These challenges may affect the accuracy of the analysis regarding the volume and handling of waste generated by hotels in the region (Figure 3).

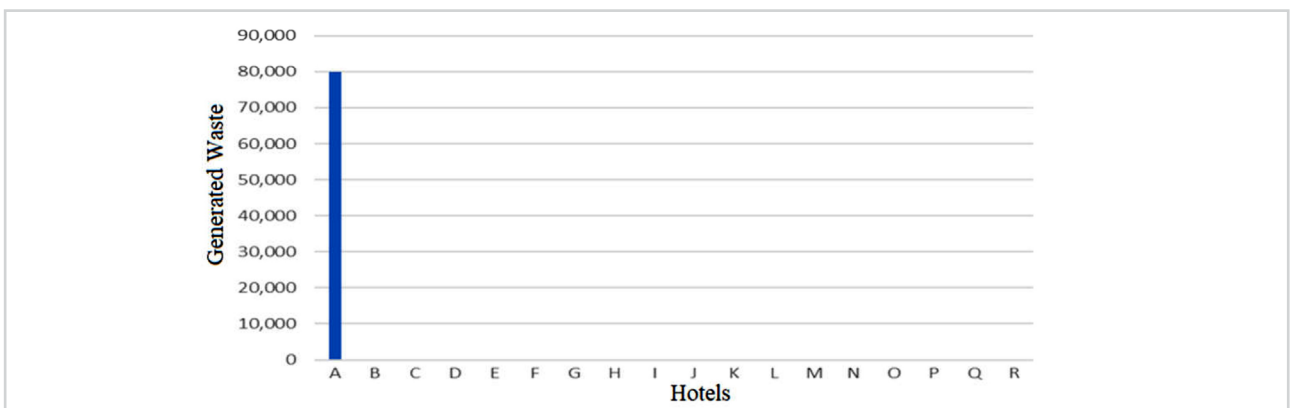

Figure 3:
Generated waste profile
Source: Authors' survey

Waste management in the ITDC Nusa Dua area involves the separation of domestic waste into organic, inorganic, and hazardous categories. Organic waste is composted, while inorganic waste is recycled. Hazardous (B3) waste is managed by licensed third parties. Liquid waste is treated using eco-friendly stabilization ponds that rely on microorganisms and sunlight for natural decomposition. The treated water is then filtered through a lagoon and reused for irrigation, reducing the demand for clean water. This integrated system highlights ITDC's commitment to sustainability and ensures compliance with environmental regulations through safe, regulated waste processing and disposal.

Discussion in Terms of Greenship for Existing Building Requirements

Mandatory requirements regarding the use of non-CFC refrigerants and fire extinguishing agents with an Ozone Depleting Potential (ODP) value of less than 1 have been met by all hotels analyzed. If CFCs are still used as refrigerants, an audit is required as well as a phase-out plan within the next three years, including efforts to reduce CFC consumption due to leaks or breakdown of refrigeration machinery. This should be stated in the Refrigerant Management System Plan (RMS Plan).

The results on the material resources assessment criteria and its cycle for all hotels that are the object of research have met the requirements, as evidenced by the acquisition of a score of 12 by each hotel. The conclusion of the overall analysis shows that all hotels that are the object of research have a readiness level of less than 50% to obtain Green Hotel certification. The highest level of readiness is in the range of 40-45%, which is achieved by several hotels such as Courtyard by Marriott, Novotel Hotel & Resort Bali, and Ayodya Resort Bali. Meanwhile, most of the other hotels have readiness below that figure. Figure 4 below provides a more detailed overview of the readiness levels of the hotels analyzed.

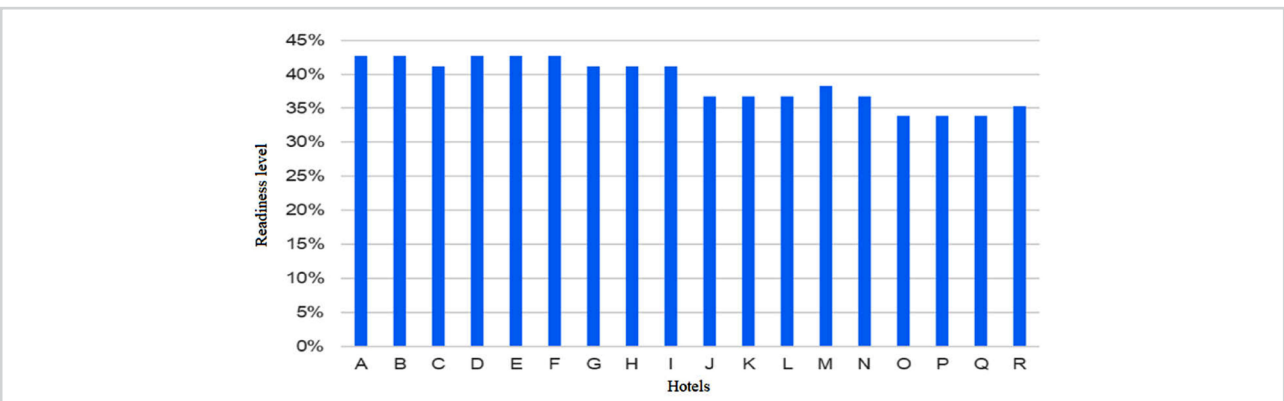

Figure 4:
Hotel for Green Hotel certification
Source: Authors' survey

Figure 4 illustrates the readiness level of hotels in Nusa Dua, Bali, to achieve Green Hotel certification. Most hotels fall below the 50% readiness threshold, indicating that significant improvements are still required to meet Greenship standards. Key areas needing enhancement include energy efficiency, water conservation, and waste management. However, adoption of these green practices is often hindered by high initial investment costs and limited technical knowledge among staff.

Additional challenges involve insufficient policy support, inadequate infrastructure, and low awareness among management and guests. Despite these constraints, support from ITDC and government regulations offers potential pathways for progress. To improve readiness, hotels must adopt structured sustainability programs, improve staff training, and invest in efficient technologies. Systematic documentation, performance monitoring, and strategic partnerships can help raise certification scores and align operations with the Green Building Council's Greenship for Existing Building criteria.

4. Conclusion

This study analyzes the readiness of 4- and 5-star hotels in the Nusa Dua area, Bali, to obtain Greenship for Existing Building certification issued by the Green Building Council Indonesia. The results show that the majority of hotels have adopted environmentally friendly policies, such as utilizing renewable energy and managing waste. However, the main challenges faced include high initial investment costs and lack of technical understanding among staff. Based on interviews and observations conducted with 18 hotels, it was found that readiness in the aspects of EEC and WAC is still low. In contrast, the MRC aspect showed a better level of readiness. These findings emphasize the need for systematic improvement in the implementation of energy management, water conservation, and waste management so that Green Hotel principles can be applied more effectively. Government regulatory support and collaboration with ITDC are important opportunities

to support these sustainability initiatives. However, limited resources, technical knowledge, and financing remain significant barriers. Thus, it is concluded that despite a strong commitment to sustainability, hotels in Nusa Dua need to optimize the implementation of the Green Hotel program in order to fully meet the Greenship certification standards. This research provides practical recommendations for hotel management to improve resource efficiency while strengthening sustainability-oriented marketing strategies. In addition, the results of this study can be used as a reference by ITDC and the government in formulating policies that support the development of environmentally friendly hotels. Thus, this research contributes to the effort of realizing a sustainable hospitality sector in Bali as per the vision of «Nangun Sat Kerthi Loka Bali».

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