



Implementation of Green Technology and Sustainable Business: Case Study of Hotel ABC in Bali

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Abstract. The purpose of this research is to provide an in-depth analysis of the use of green technology and sustainable business practices in Hotel ABC, Bali. This study was inspired by the compliance of the hospitality sector with the Net Zero Emission 2060 in Indonesia and the increasing demand of international tourists for eco-friendly accommodation in Bali. Although the hotel has not yet been granted green building certification, it has implemented some environmentally friendly efforts in its operations. A qualitative case study method was used. Data collection was conducted through in-depth interviews with the General Manager, Chief Engineer, and Sustainability Manager, firsthand observation of green technology systems including solar panels, smart energy management, and water recycling, and analysis of sustainability reports (2022-2025). Source and methodological triangulation were used to establish the trustworthiness of the data. The results are expected to position Hotel ABC as a place that embraces Balinese traditional values and digital innovation such as energy monitoring with IoT and a totally digital, plastic-free guest experience. The key enablers are strong leadership commitment and market demand from environmentally conscious visitors whereas the key hurdle is the significant upfront expenditure. Following the implementation, operational costs were cut by more than 20% and the resort's reputation as a sustainable hotel has grown. This case study provides practical examples and context-specific recommendations for other hotels situated in tourist destinations who wish to use green digital advances. It also contributes to the development of sustainable business models in the Indonesian hospitality industry.

Keywords: Green Technology, Sustainable Business, Digital Innovation, Case Study, Hotel Bali .

1 Introductions

1.1 Background

Bali is the best tourism destination in Indonesia; in 2024 it received 16.02 million international tourists [1]. This increased number of tourists directly impacts the rise in energy and water usage and trash output from the hotel sector. But Bali also faces environmental concerns such as a clean water problem and pollution from plastic trash. The hotel industry in Bali needs to change to green technology and sustainable business methods in order to maintain the sustainability of tourism [2]. This technique is two-pronged: reduce ecological impacts and reflect Tri Hita Karana, the Balinese philosophy of balance among humans, environment and the holy. Therefore, this approach is no longer an option, but a strategic imperative to allow Bali's tourism sector to grow sustainably. The aim is to preserve natural resources and cultural identity for the future generations.

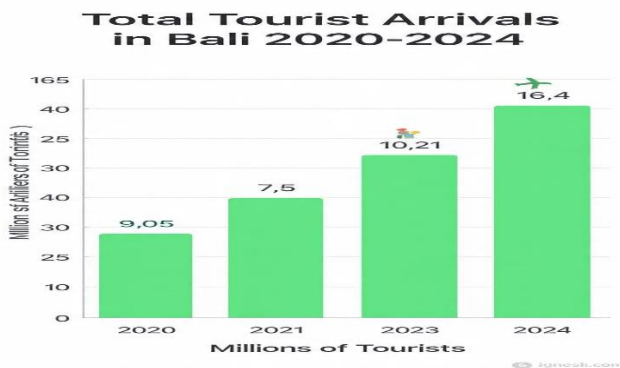


Fig. 1. Total Tourist Arrival in Bali 2020-2024. Sources: BPS, 2024

Figure1 shows that the COVID-19 epidemic caused a substantial decline in the number of tourists visiting Bali after 2020. But visitor numbers began to rise steadily from 2021 and continued to rise to 2024. Restrictions lifted after the conclusion of the pandemic, but recovery was slow. Many cities experienced a drop in tourism during that period due to lockdowns and social distancing measures to curb the virus' spread.

The application of green technology and sustainable business has a significant impact on the hotel industry in Bali for three reasons. Firstly, from the environmental point of view. Bali is confronting a clean water problem, coral reef deterioration and piles of

rubbish at the Sarb agita landfill. The Intergovernmental Panel on Climate Change [3] points out that the tourism industry in coastal zones is extremely vulnerable to the impacts of climate change. Those that do not adapt risk losing attractiveness as tourist sites and incurring operational losses.

Secondly, from an economic and market perspective. According to the IBM Institute for Business Value [4], 85% of tourists worldwide would be more likely to stay in an accommodation that demonstrates dedication to sustainability. In addition, the application of green technology can decrease the running expenses of hotels by 15-25% within the next 3-5 years due to the efficiency of energy and water [5].

Third, from the angle of culture and regulation. Sustainability is in line with the native wisdom of Bali, Tri Hita Karana, which is about harmony between humans, nature and God [2]. The Bali Provincial Government has also published rules such as Governor Regulation No. 97 of 2018 on minimizing plastic trash and Governor Regulation No. 45 of 2019 on Clean Energy which need the participation of tourism enterprises [6]. This project aims to perform a comprehensive study on the implementation of green technology and sustainable business practices in Hotel ABC in Bali. The study is driven by two main reasons: the role of the hospitality industry in achieving Indonesia's Net Zero Emission 2060 target and the increasing demand for eco-friendly accommodation by global tourists in Bali. While the hotel has not yet been awarded green building certification, it has already implemented a number of green practices in its daily operations.

1.2. Green Technology

Green technology is a term used to describe advances that reduce environmental damage by improving energy efficiency, minimizing waste and using renewable resources. The 4R idea of reduce, reuse, recycle and recover is at the heart of this technology. The range is wide, including solar and wind power, electric vehicles, green building design, as well as water purification and waste management technologies. If hotels do not adapt, climate change impacts could increase their operational costs and decrease their attractiveness as tourism destinations [7][8][9].

Green technology [10] is crucial in lowering greenhouse gases emissions in the context of climate change. The IPCC [3]; [11] states that the transition to clean energy can reduce global emissions by up to 45% by 2030 if supported by adequate policies. From an economic perspective, the use of green technology by enterprises can also yield financial benefits. argue that green innovation creates shared value through enhancing the company's competitive advantage, and at the same time, brings social and environmental benefits [11]. The World Bank also notes that by improving the energy efficiency of industrial processes, costs might be reduced by 20 to 30 percent in the long term.[5]

But there are still hurdles in the adoption of green technologies in developing countries. The biggest barriers are the high initial investment cost, lack of infrastructure and insufficient technology knowledge [5]. Fiscal incentives, regulations and public-private partnerships are required to make green technologies more accessible, the OECD [6] said.

1.3. Sustainable Business

A sustainable business is a business strategy that balances the three pillars of profit, people and earth, known as the Triple Bottom Line [8]. The basic objective of a sustainable business is to produce profit and have a positive influence on society and the environment [12]. Companies that choose this path are interested in the effect of their activities on employees, communities and ecosystems. ESG, which stands for Environmental, Social, and Governance, is one of the most popular frameworks [13]. The Environmental component will target emissions reduction and energy efficiency enhancement. The Social aspect encompasses employee well-being and responsibilities towards communities. The Governance dimension involves openness and commercial ethics [13].

The advantages of sustainable business have been demonstrated. According to the Harvard Business Review, organizations that adopt sustainable methods have 4.7% greater long-term financial performance than traditional companies [11]. Moreover, 85% of customers worldwide believe they prefer to buy from brands that care about sustainability [4]. Climate change and lack of resources can jeopardize business continuity on the risk side. The IPCC [3] warns that enterprises that fail to react to climate threats may suffer significant losses by 2030. This is why many companies are starting to switch to renewable energy and a circular economy [14]. Governments and investors are also driving the shift. According to OECD [6], green rules and financial incentives promote the implementation of sustainable business practices. Institutional investors now take ESG parameters into account when making investment decisions [12]. Sustainable business is not an option anymore but a need for competitiveness and long-term sustainability [15].

2 Materials and Methods

A qualitative case study technique was used. Top management were interviewed, green systems such as solar energy, smart energy, and water reuse were seen, and sustainability reports from 2022-2025 were used to collect primary data. Data credibility was validated by triangulation of sources and methods. In addition, the study also analyzed current literature on green technology uptake in hotels to establish a Bali-specific implementation strategy. Further interviews with key HR personnel in the hospitality business in Bali were performed to understand the perspective of implementers. The research adopted a qualitative case study technique. Data were acquired through in-depth interviews with the General Manager, Chief Engineer and Sustainability Manager, firsthand observation of green technology systems such as solar panels, smart energy

management and water recycling, and the production of sustainability reports from 2022-2025. Validity of data was guaranteed through triangulation of sources and methods. A review of practices from different prior studies on adoption of green technology and sustainable business in hotel industry was also performed. After this, a framework was designed to be applied to hotels on the island of Bali. In the context of the island of Bali, various key informants were interviewed in-depth to study the viewpoints of the human resources that would integrate green technology and sustainable business in the hotel industry.

3 Results and Discussions

3.1. Company Profile

ABC Hotel & Spa Resort was launched in Indonesia on 25 November 2013 as an affiliate of an international hospitality business based in Singapore, and as part of a wider corporate goal to extend luxury lodging into prominent tourism locations. The growth of the Indonesian tourism sector, especially in Bali, accompanied this expansion and created a property designed to combine international luxury standards with local cultural identity (company's corporate profile and annual report). The company commenced commercial operations in 2017 with the launch of ABC Hotel & Spa Resort in Bali, Indonesia, a five-star luxury hotel in a natural setting with green valleys, flowing rivers, natural waterfalls and terraced rice paddies that continue to attract domestic and international tourists. The operating idea of the resort is directed to the merging of modern luxury with Balinese history and culture as evidenced by guest housing, spa services, dining facilities, and supporting amenities designed to reflect this cultural perspective [16].

The company's mission is to be a premier hospitality provider of exceptional accommodation built on comfort, elegance and guest experience. This vision is made real through a commitment to professional service standards, quality of facilities, infusion of local culture and natural environment into the guest experience, and a particular focus on the sustainable development of the tourism sector through responsible business practices. The resort's product line demonstrates this devotion, comprising lodging categories such Deluxe Rooms, Deluxe Premium Rooms and Private Pool Villas, alongside spa treatments, food and beverage outlets and supporting facilities [16].

ABC Hotel & Spa Resort offers more than just a place to stay. The hotel is also active in the food and beverage, wellness and events segments making it a full-fledged hospitality destination and not just a place to sleep. It has F&B options including in-room and in-villa service, poolside and patio dining, a café and lounge, an Italian restaurant and an all-day dining outlet serving foreign and local fare. The resort has ballroom and meeting facilities for up to 500 guests for the MICE sector. Wellness offerings include a yoga pavilion, exercise facility, natural soaking pool and kids activity spaces. Together, these amenities strengthen the resort's position in the wellness and leisure tourist sector [17].

3.2 Implementation of green technology in the hotel industry in Bali

The application of green technology in the hotel business in Bali is progressive and systematic. This is referring to the ASEAN Green Hotel Standard and CHSE Guidelines of the Ministry of Tourism and Creative Economy so that its implementation is measurable and sustainable [17] A full explanation of the implementation stages is given in Table 1.

Tabel 1. Stages of Green Technology Implementation in Hotels

No.	Stage	Main Activity	Examples of Hotel Implementation	Objectives / Impact	Data Source
1	Planning & Audit Stage	Energy, Water, and Waste Audit	Conduct energy audits, water audits, and waste audits with the assistance of professional consultants.	Identify the baseline of resource consumption and areas of inefficiency.	Ministry of Tourism and Creative Economy, CHSE Guidelines
2	Design & Policy Stage	Developing Green Policies & Standard Operating Procedures (SOPs)	Establish energy-saving policies, prohibit single-use plastics, and implement environmentally friendly procurement practices.	Strengthen management commitment and establish standardized sustainable operating procedures.	Bali Tourism Board, <i>Bali Green Hotel Program</i>
3	Energy Implementation Stage	Energy Efficiency & Renewable Energy	Install solar panels, LED lighting, automatic sensors, and inverter air-conditioning systems.	Reduce CO ₂ emissions and decrease electricity costs by approximately 20–30%.	Bali Provincial Energy and Mineral Resources Office, <i>Langit Biru Program</i>
4	Water Implementation Stage	Water Conservation & Recycling	Implement rainwater harvesting systems, sewage treatment plants (STP), low-flow showerheads, and refill water stations.	Reduce water consumption by approximately 15–25% and minimize wastewater generation.	PDAM Bali, BAPPEDA Bali
5	Waste Management Stage	3R (Reduce, Reuse, Recycle)	Establish hotel waste banks, compost food waste, and collaborate with local waste banks.	Achieve Zero Waste to Landfill and support the circular economy.	Bali Provincial Environmental Agency (DLHK), Tourism Adiwiyata Program
6	Green Building & Landscape Stage	Green Building & Ecosystem	Develop green roofs, use locally sourced building materials, plant trees, and create rainwater absorption gardens.	Reduce the urban heat island effect and increase carbon sequestration.	Green Building Council Indonesia (GBCI)
7	Human Resources & Education Stage	Staff Training & Guest Awareness Campaigns	Provide green practice training for employees, install eco-labels in guest rooms, and encourage guests to participate in environmental programs.	Foster a green workplace culture and enhance the hotel's brand image.	PHRI Bali, ASEAN Green Hotel Standard
8	Monitoring & Certification Stage	Evaluation & Certification	Regularly monitor environmental KPIs and obtain certifications such as CHSE, ASEAN Green Hotel, and EarthCheck.	Validate sustainability performance and strengthen competitiveness in the international tourism market.	Ministry of Tourism and Creative Economy, EarthCheck, ASEAN Green Hotel Standard

sources: process by Author, 2026

Table 1: Stages of Green Technology Implementation in Hotels, describes the step-by-step process of adopting green technology and promoting business sustainability in the hotel sector of Bali. The following section provides a full walk-through as a realistic simulation of the planning, execution and evaluation phases to ensure that the strategy is adapted to the specific characteristics of hotels in Bali

Phase 1 – Planning & Initial Audit Phase 1 begins with the Planning & Initial Audit. At this step the audits are performed to define the initial conditions. The hotel must conduct an energy audit, water audit and waste audit to acquire baseline data on resource utilization. These audits are significant as a reference for setting savings targets in compliance with the CHSE Guidelines [17] of the Ministry of Tourism and Creative Economy of the Republic of Indonesia. Up next is Phase 2, the Policy Development & Design phase. Following the audits, the hotel management establishes a Green Policy and Standard Operating Procedures (SOPs). These measures are banning single-use plastics, green procurement, and energy-efficient operational requirements. PHRI

Bali's Bali Green Hotel initiative encourages hotels to adopt policy documents endorsed by management as a first step of commitment [18].

Stage 3: Putting Energy Efficiency into Practice. In this phase hotels begin to implement energy saving and renewable energy technologies. Examples include upgrading to LED lighting, installing motion sensors, using inverter-based air conditioners and installing rooftop solar PV systems. The Bali Provincial Energy and Mineral Resources Office data suggest that such measures can reduce hotel power consumption by 20–30%, and also support the Blue-Sky program. **Stage 4 is Water Conservation Implementation.** Given Bali's vulnerability to water scarcity, saving water is a priority. Major measures include rainwater harvesting, construction of wastewater treatment plants, the installation of low-flow shower heads and refill stations for drinking water. The Bali Provincial Development Planning Agency says these techniques can help cut water use by 15-25%.

Stage 5: Disposal of waste. Hotels adhere to the 3R method – Reduce, Reuse, and Recycle. The practical methods are the establishment of an internal trash bank, the installation of composting equipment for organic waste and collaboration with community waste banks. These measures are consistent with the zero waste to landfill plan for tourism from the Bali Provincial Environment and Forestry Agency. **Stage 6 is the Green Building and Landscape stage** and focuses on optimizing building design. Properties feature green building ideas including vegetated roofs, local materials, water absorption gardens and natural airflow systems. Compliance is measured using GREENSHIP rating system established by Green Building Council Indonesia.

Stage 7 is Guest Awareness and Human Resource Development. “Green technology's effectiveness depends very much on people. As a result, hotels must train all personnel and notify visitors through in-room eco-labels and promote the conservation of water and energy. ASEAN Green Hotel Standard requires that 100% of workers are aware of ecologically friendly procedures. The last phase is **Stage 8: Monitoring and Certification.** This includes tracking KPI based performance and periodic assessments. Hotels can then apply for certifications like CHSE from the Ministry of Tourism and Creative Economy, ASEAN Green Hotel, or Earth Check. These certificates not only reflect the sustainable efforts but also enhance the prestige of a hotel in the worldwide tourism sector. These eight processes help Balinese hotels reduce their influence on the environment, lower costs by 20-30% and boost their reputation as eco-tourism destinations.

3.3 Implementation of Sustainable Business in Hotel Industry in Bali

The hospitality sector is a major contributor to tourism in Bali, and contributes more than 60% of the Gross Regional Domestic Product of the province [1]. But such rapid growth is putting a lot of pressure on the environment, local communities and cultural assets. This means that sustainable business practices are essential for the long-term sustainability of tourism in Bali.

Adoption of Sustainable Business Practices in Bali's Hotel Sector

Sustainable Business concept in Hotel Industry

Sustainable business in hotels is a business method that considers the three pillars, Profit, People, and Planet, or the called Triple Bottom Line [8]. In Bali, this concept is developed into Catur Purusa Artha that is in line with the cultural values of Tri Hita Karana, which are harmony with God, humanity, and environment [2].

The sustainable practices of the Balinese hotels are based on four primary pillars, i.e. Economic (Profit), Social (People), Environmental (Planet) and Governance. In the Economic pillar, hotels aim to be cost-efficient by using green technologies such as solar energy systems and water conservation solutions, which are known to cut operating costs by 15% to 25% [5]. Moreover, hotels work with local MSMEs to provide food, handicrafts, and services to build the local economy [11]. Meanwhile, in Bali, hotels have begun to employ community empowerment programs in the implementation of the Social Pillar – People. Examples include training of local personnel, internship programs and empowering tourism village's surrounding the hotels [12]. The Social side of ESG [4] also includes employee welfare, gender equality, and the preservation of Balinese culture through traditional dance performances and the use of traditional clothes [4].

The Environmental Pillar – Planet is next – minimizing single-use plastic waste, zero-waste programs, waste management and water conservation [8]. The devotion to the environment by many hotels in Bali is demonstrated through certifications like Earth Check, Green Globe, and CHSE [7]. Resorts in Nusa Dua and Uluwatu also participate in reforestation and coral reef protection [3]. Lastly, the Governance dimension is fulfilled by yearly sustainability reports to ensure openness and ethical corporate practices, as well as active engagement with stakeholders. This is further strengthened by the Bali Provincial Government with Governor Regulation No. 97 of 2018 on Restriction of Plastic Waste Generation. [6]

The hotel industry can benefit from the application of sustainable business strategies in several ways. One significant upside is competitive differentiation: data shows that 85% of passengers globally choose hotels with a visible commitment to sustainability.[4] Secondly, Cost Savings: Better energy and water efficiency reduces operating expenses in the long run [9]. Third, Community Support: Good links with traditional villages help lessen societal disputes [12]. Fourth, Climate Resilience: It lowers the risk of climate change consequences on the tourism company [3].

However, there are several barriers to the adoption of sustainable business practices in the hotel industry, e.g. high initial expenditures, inadequate managerial awareness and the possibility of greenwashing [5]. Education, financial incentives and support from the government and associations such as PHRI Bali are needed [6]. A very practical way of dealing with the problem of large upfront expenses is for all stakeholders to cooperate to establish an enabling environment for long-term economic success. The initial outlay is huge, but the advantages will be shared by all the parties concerned in

the long term. The use of green technology is a strategic approach to ensuring that the environment of the next generation will be healthy, comfortable and safe.

The result is expected to show Hotel ABC combines the local wisdom of Bali with digital innovation, like IoT-based energy monitoring and a 100% digital plastic-free guest experience. The key forces driving this are the demand from ecologically conscious travelers and rigorous management commitment. The only problem is that it requires a big initial expenditure. Implementation results: operating cost savings of more than 20% and improved brand reputation as a sustainable resort. The case study provides practical examples and advice for other hotels in tourism destinations to use green digital innovation. It also helps in establishing sustainable business models in the Indonesian hotel industry.

4 Conclusion

Sustainable practices at Bali's hotels are not only a matter of honoring guest preferences – they are key to maintaining the destination's long-term viability. By incorporating local cultural values, green technology and community empowerment, Balinese hotels may position themselves as global examples for sustainable tourism. In example, there are a number of benefits to using green technology and sustainable business practices at Hotel ABC. This includes more competitiveness, lower operating costs due to energy and water efficiency, improved interactions with surrounding villages that help prevent social tensions, and greater resilience to climate-related threats that affect tourism. On the other side, there are also barriers including expensive upfront costs, inadequate managerial awareness and the potential of greenwashing. This needs to be supported with education, economic incentives and assistance from the government and industry associations like PHRI Bali.

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