

Four-Star Hotel with Green Building Approach in Gorontalo City

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Abstract

Gorontalo City, as an emerging tourism destination, requires sustainable accommodation facilities to support responsible development. This study examined the design of a four-star hotel incorporating a green building approach that integrated environmental principles without compromising comfort and service quality. The research employed a qualitative descriptive method with an analytical focus on energy efficiency, sustainable materials, waste management, and integration with the surrounding environment. The findings showed that the application of green building concepts in the proposed hotel included LED lighting systems, renewable energy utilization, wastewater treatment systems, and land-use optimization through mechanized parking facilities and green open spaces. The strategic location near Planet Waterboom and Gorontalo Business Centre (GBC) provided added value in terms of accessibility while also presenting challenges in balancing commercial activities with environmental preservation. This hotel design not only served as a model for sustainable property development in Gorontalo but also had the potential to increase environmental awareness among visitors and stakeholders in the tourism industry.

INTRODUCTION

This research was motivated by the urgency of integrating green building principles into the hospitality industry (Li et al., 2017), particularly in the development of four-star hotels in Gorontalo City. In response to global environmental challenges, environmentally responsible approaches have become increasingly important in the construction and hospitality sectors. This condition encourages innovative approaches to transform conventional (Kim & Han, 2010) building design and operational practices into more efficient and sustainable (Ding, 2008) systems (GBCI, 2020).

Climate change and environmental degradation have affected various sectors, including the hospitality industry. The increasing severity of environmental challenges highlights the need for a fundamental transformation of conventional development practices. This transformation requires the integration of sustainability principles to reduce energy consumption while addressing environmental challenges (Anisa, 2020).

The construction sector contributes significantly to carbon emissions and environmental impacts. Data on carbon emissions from building projects demonstrate the substantial environmental burden associated with construction activities. Therefore, the adoption of environmentally responsible technologies and design strategies is essential, requiring the hospitality industry to implement future-oriented building approaches that minimize environmental impacts.

Globally, the development of green building practices has received increasing attention from various countries. Numerous initiatives and certification systems encourage the adoption of international standards, such as GREENSHIP and LEED (Scofield, 2013), which aim to reduce emissions and improve resource efficiency. This paradigm shift not only supports

environmental protection but also enhances the economic competitiveness of the hospitality sector (Umar, 2020).

Gorontalo City has significant potential as a sustainable (Yusof & Johari, 2014) tourism destination experiencing continuous growth. Its unique natural and cultural resources provide opportunities for developing an environmentally responsible tourism hub. Increasing awareness among communities and local governments regarding sustainable development has encouraged the integration of ecotourism concepts with accommodation facilities that minimize environmental impacts (McDonough & Braungart, 2002).

The growth of the tourism sector, combined with increasing environmental awareness, creates opportunities for the development of hotels based on green building concepts. The demand for accommodations that prioritize sustainability values continues to increase as tourists become more concerned with environmental conservation. This trend encourages stakeholders in Gorontalo to consider the development of accommodation facilities aligned with sustainability principles.

Preliminary analysis (Darko & Chan, 2016) indicates a significant gap in the availability of green building-based hotels in Eastern Indonesia, particularly in Gorontalo. Although government institutions and investors have recognized the region's tourism potential, the implementation of green building systems within the hospitality sector remains limited. This gap provides opportunities for introducing innovative approaches to the design and operation of sustainable buildings (Chan et al., 2009).

This condition also represents a strategic opportunity to introduce environmentally responsible development as a competitive advantage. The limited availability of green building-certified accommodations in Gorontalo encourages architects and developers to integrate sustainable technologies and passive design (Yeang, 2008) strategies that have the potential to reduce energy consumption. Such innovations not only contribute to environmental conservation but also provide long-term operational efficiency for hotel management.

Architecture plays an important role in implementing green building concepts. Passive design strategies that optimize natural lighting and ventilation, combined with the use of environmentally friendly local materials, provide a foundation for achieving sustainability objectives and potential certification standards. The integration of sustainable technologies, including natural cooling systems and renewable energy utilization, demonstrates the contribution of architecture in reducing environmental impacts (Susepti et al., 2017).

The overall concept (Berardi, 2013) illustrates the potential synergy between sustainable development and tourism growth (Kibert, 2016). By adopting standards such as GREENSHIP (Indonesia, 2016) or LEED, four-star hotels in Gorontalo can reduce carbon emissions while increasing economic value through improved energy efficiency and operational performance. In the long term, the development of green buildings within the hospitality industry can become a model for balancing luxury, comfort, and sustainability.

This research aimed to develop a four-star hotel design concept in Gorontalo City that integrated comprehensive green building principles (Zuo & Zhao, 2014). The primary focus was to design a building that fulfilled sustainability standards from an architectural perspective while considering efficiency, environmental responsibility, and user comfort.

The proposed design emphasized passive strategies, including optimal building orientation, natural lighting, and cross-ventilation, to reduce dependence on mechanical energy systems. The application (Han et al., 2010) of sustainable technologies was also incorporated through environmentally responsible energy utilization and material management systems to support long-term building performance.

Furthermore, this research aimed to develop a sustainable hotel design (Chen et al., 2019) prototype adapted to the environmental conditions of Gorontalo. The prototype integrated passive design strategies, sustainable local materials, and green technology solutions

to create an adaptive design approach based on climate conditions and local characteristics (Affiifi Mayssara, 2018).

Finally, this study analyzed the potential impacts of green design implementation on building performance. The analysis included energy efficiency, emission reduction, and user comfort aspects to evaluate the overall contribution of sustainable design strategies to building performance.

METHODS

This research employed a qualitative method with a design analysis approach to evaluate the application of green building principles in four-star hotel development in Gorontalo. Data were collected through literature reviews, field observations, and design document analysis. The analysis focused on site planning, energy efficiency, material selection, and indoor environmental quality. This approach aimed to identify challenges and potential innovations that could be integrated to support the achievement of green building standards within the hospitality context of Gorontalo.

RESULTS AND DISCUSSION

Planning Location



*Figure 1. 1 Planning Location
(Source: Personal Documentation, 2025)*

The location located on Jalan Jenderal Sudirman, Limba U Dua, South City, Gorontalo City, Gorontalo, offers various advantages for the construction of a Four Star Hotel with a green building approach. This area has been included in the Office land use zoning plan, which shows that city regulations and planning support commercial infrastructure development and support business activities. This makes it easier to integrate the hotel with the surrounding environment, especially in meeting the needs of public facilities and accessibility.

In terms of infrastructure, this location already has adequate supporting facilities. The availability of good road access, a stable power grid, clean water system, and modern communication connections are the main factors in ensuring the continuity of hotel operations. The existence of public facilities such as shopping centers, restaurants, and business areas around the location is also an added value for hotels in attracting tourists and business people who visit Gorontalo City.

With a land area of 3,520 m², this site provides enough space for building planning that prioritizes the principle of green buildings. Land use can be optimized with designs that pay attention to environmental sustainability, such as the use of natural lighting, rainwater management systems, and green areas that can improve air quality and comfort for guests. The existence of green open space in the hotel complex will also provide added value in creating a more beautiful atmosphere and supporting the environmentally friendly concept.

Site Boundaries

- The north is directly adjacent to GBC (Gorontalo Business Centre).
- To the east is directly adjacent to the Planet Water Boom.
- The south is directly adjacent to Fitrah Mandiri Housing.
- The west is directly adjacent to the residential area.



Figure 1. 2 View to Site
(Source: Personal Documentation, 2025)



Figure 1. 3 View From to Site
(Source: Personal Documentation, 2025)

Site Analysis

PSU (Road)

To the site location can be accessed from JL. Gen. Sudirman, who has more than 9 meters and uses asphalt materials. JL. Gen. Sudirman already has a lane for pedestrians but a lane for cyclists is not yet available. In time, the circulation design will be improved.

SPAM

Right in front of the site where the entrance will be built, there is a road leading to the site. In addition, there is a road to the west of the site that will be the entrance to the site.

SPAL

The selected site has a fairly efficient drainage network and is ready to support development. Further details about this drainage system will be explained through the attached

image, which will clearly show the water flow paths. This is important to ensure that the site remains safe from inundation

Electricity

The chosen site has access to the electricity network from PLN which is located not far from the site.

Telecommunications

The importance of the internet network as a hotel facility so for hotel design, there must be an internet network facility. Network utilities are already available on site areas, so there's no need to worry anymore.

Waste

The chosen site has a comprehensive waste management system, starting from the TPS located in front of the site to the Main Waste Bank. This process will be described in more detail in the attached drawing, which depicts waste transport lines and collection points. This ensures that waste management is carried out efficiently and the environment is kept clean.



*Figure 1. 4 PSUs Around the Site
(Source: Personal Documentation, 2025)*

The following are the results of the site calculation applied by the RTRW

Buildings:

1. The maximum allowable GDB is 60%
2. KLB of 4.8
3. The maximum allowable KDH is 20%

Site area: $\pm 3.520 \text{ m}^2$

Location : JL. Jend. Sudirman, Limba U Dua, South City, Gorontalo City, Gorontalo

The following are the results of the site calculation applied according to the Gorontalo City RTRW:

Land Area $\pm 3,520 \text{ m}^2$

Land area that can be built (Land Area x KDB) KDB 60% x 3,520 m^2 = 2,112

KLB: 4.8 x 3,520 m^2 = 16,896

16,896 M2 = 8

2.112 m^2

KDH 20 % x 3,520 m^2 = 704 m^2

With the availability of the site area is $\pm$. 3.520 m², while the site area for Hotel planning is 10.083 m².

Detail	Ruang KOT M.A		Jenis Area	GAB.
	Dibutuhkan	Tidak Dibutuhkan		
Basement		1.088 m ²	88 m ²	1.180 m ²
Lantai 1	1.215 m ²	113 m ²	128 m ²	1.483 m ²
Lantai 2	1.254 m ²	113 m ²	128 m ²	1.483 m ²
Lantai 3	880 m ²	188 m ²	113 m ²	942 m ²
Lantai 4	880 m ²	88 m ²	113 m ²	880 m ²
Lantai 5	880 m ²	88 m ²	113 m ²	880 m ²
Lantai 6	880 m ²	88 m ²	113 m ²	880 m ²
Lantai 7	880 m ²	88 m ²	113 m ²	880 m ²
Overlap Lantai 1			88 m ²	88 m ²
Overlap Lantai 2			88 m ²	88 m ²
Overlap Lantai Atas			88 m ²	88 m ²
TOTAL	1.714 m ²	1.587 m ²	2.363 m ²	9.083 m ²

Figure 1. 5 Analysis of floor calculations
(Source: Personal Analysis, 2025)

Concept of Planning

This Four-Star Hotel is designed with the concept of Green Building, prioritizing various aspects of sustainability such as site management, energy and water efficiency, indoor air quality, and the use of environmentally friendly materials. In addition, waste and waste management is also an integral part of its design. Each element is designed to reflect eco-friendly principles to create a comfortable and sustainable stay for guests. The performance assessment at the design stage includes seven aspects with 29 assessment parameters, totaling 165 points, along with the target achievement of points for green building standards.



Figure 1. 6 Site Plane
(Source: Personal Documentation, 2025)

GBC (Gorontalo Business Center)

The hotel building is located in Gorontalo City, precisely in Limba U Dua, South City, Gorontalo City, adjacent to the GBC (Gorontalo Business Center) Ruko area. This strategic location facilitates the accessibility of guests to business centers, offices, and other commercial facilities, while supporting the concept of sustainability through the implementation of eco-friendly design that reduces negative impacts on the surrounding ecosystem.

Entrance Hotel



Figure 1. 8 Entrance Hotel
(Source: Personal Documentation, 2025)

The hotel building has an entrance located on the north side, requiring visitors to pass through the GBC (Gorontalo Business Center) Ruko area before reaching the main lobby. The placement of the entrance at this location was chosen to maximize land efficiency while utilizing existing routes around the business center.

Parking Water Boom



Figure 1. 8 Planet Water Boom Parking
(Source: Personal Documentation, 2025)

It is located in the strategic area of Gorontalo City, directly adjacent to the Planet Waterboom parking area on the east side. Even though they are close, the parking facility is not part of the hotel property, but belongs to the waterpark management that can be used by general visitors. The existence of this parking location actually provides added value for the hotel because it provides additional accessibility for guests without the need to allocate special land.

Hotel



Figure 1. 9 Hotel Lobby
(Source: Personal Documentation, 2025)

This four-star hotel offers premium facilities that meet the standards of high-end accommodation, including a fine dining restaurant, spa & wellness center, a swimming pool with city views, and a large capacity meeting room with the latest technology. The elegant

interior design combined with an energy-efficient smart room system reflects the commitment to guest comfort as well as environmental sustainability. Supporting facilities such as a 24-hour concierge, premium room service, and exclusive lounge area further affirm its position as a star-rated accommodation with a sustainable approach in Gorontalo. Green concepts are integrated without sacrificing luxury, such as the use of eco-friendly materials in furniture and integrated waste management systems that reduce ecological impact.

Planet Water Tree



Figure 1. 10 Planet Water tree
(Source: Personal Documentation, 2025)

It occupies a strategic location in Gorontalo City, directly adjacent to Planet Waterboom as one of the main tourist destinations in the region. The proximity to this tourist attraction provides an accessibility advantage for hotel visitors as well as an added value in terms of market potential, without sacrificing the principles of sustainability that are carried.

Hotel Mechanical Parking



Figure 1. 11 Mechanical Parking
(Source: Personal Documentation, 2025)

Integrating mechanical parking facilities as an innovative solution to optimize land use while reducing environmental impact. This vertical parking system is designed with energy-friendly technology that minimizes electricity consumption through motion sensors and solar panels.

Drop Area

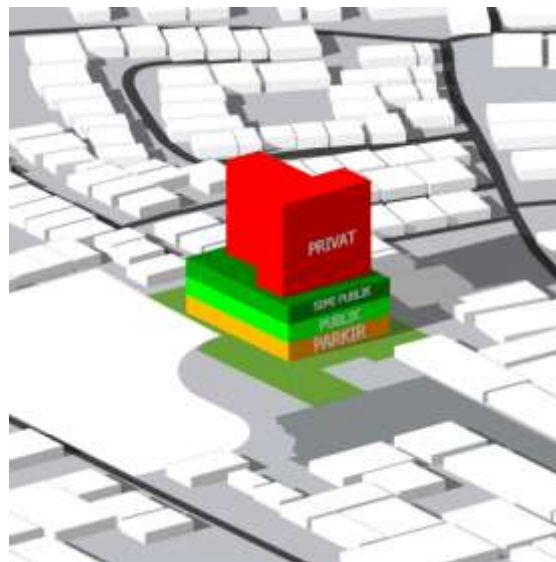


Figure 1. 12 Drop Area
(Source: Personal Documentation, 2025)

The guest area drop facility located on the east side of the building, is specially designed to ensure efficient accessibility. The area is equipped with a green canopy with vines that serve as natural shade as well as help absorb air pollution. Its location which is directly connected to the pedestrian path of the GBC Shophouse allows guests to switch to eco-friendly transportation.

Zoning Concept

Zoning planning for a Four-Star Hotel in Gorontalo City with the concept of green buildings must be in line with land use regulations and sustainability principles. Located on Jalan Jenderal Sudirman, Limba U Dua, South City, this area is in an office zone, so hotel design needs to consider interaction with the surrounding environment as well as its impact on the city's ecosystem. The use of 3,520 m² of land can include various elements such as public areas, eco-friendly facilities, and green open spaces to support the concept of sustainability. Zoning regulations allow for the application of energy-efficient technologies, efficient waste management systems, and architectural designs that optimize natural ventilation. With this approach, the hotel not only achieves luxury hospitality standards, but also contributes to environmental sustainability and the improvement of the quality of the Gorontalo City area.



*Figure 1. 13 Zoning Concepts
(Source: Personal Documentation, 2025)*

CONCLUSION

The design of a four-star hotel incorporating a green building approach in Gorontalo City successfully implemented sustainability principles through various aspects. The green building concept was realized through optimized energy efficiency, environmentally responsible material selection, and an integrated waste management system while maintaining the comfort and service quality expected from a four-star hotel.

The strategic location adjacent to the Gorontalo Business Center (GBC) and Planet Waterboom provided accessibility advantages while demonstrating the potential for environmentally responsible development. This design showed that sustainability principles could be effectively applied in emerging regions such as Gorontalo.

The results of this design are expected to serve as a reference for future sustainable property development in Eastern Indonesia and encourage broader implementation of green building practices within the tourism sector.

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