

Pillar

1

SUSTAINABLE PLANNING AND DESIGN FOR CONSTRUCTION

To facilitate sustainable masterplanning featuring climate-responsive design, integrated transport and super low energy buildings with smart features



KEY CONTENTS FOR FY2021



Green Building Index (GBI) certification

Page 84



Green mobility transportation

Page 86



Adoption of Miyawaki methodology

Page 85



Energy efficiency and adoption of renewables

Page 88



Direct and indirect GHG emissions

Page 87



Water management

Page 89



Circularity through efficient waste management

Page 90

Photo: twentyfive.7

SUSTAINABILITY REPORT

ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) IS A KEY THEME IN GAMUDA AND OUR PRIORITY. THIS IS HIGHLY RELATABLE AS THE CONSTRUCTION SECTOR HAS A LONG-TERM IMPACT ON CLIMATE CHANGE AND BEING RESPONSIBLE FOR MORE THAN 30 PERCENT OF GLOBAL CARBON EMISSIONS AND NEARLY A THIRD OF ALL WASTES.

Gamuda aspires to **Build Right. For Life.** As ascribed in the first pillar of the Gamuda Green Plan 2025 (GGP 2025), a development and infrastructure player like Gamuda can make the most impact in terms of concept planning and design; where up to 80 percent of a building or project's environmental impacts throughout its life cycle can be effectively mitigated.

Pillar 1 of the GGP 2025 commits the entire Group with specific steps to **reduce corporate direct and indirect greenhouse gas emissions (GHG) intensity by 30 percent in 2025, and by 45 percent in 2030.** Our Group's carbon reduction initiatives will target Scope 1 (direct) and Scope 2 (indirect from the generation of purchased electricity) emissions. Reduction in Scope 2 emissions will be particularly challenging given Malaysia's heavy reliance on

coal-fired electricity generation but we are encouraged by the recently revised national target of 31 percent renewable energy (RE) share by 2025.

Our carbon reductions will primarily be achieved via enabling RE supply for our offices, project sites and assets via a combination of direct on-site feed-in supply complemented by off-site RE trading and purchase mechanisms. In tandem, we will improve the productivity of our operations by maximising the efficiency of raw materials and resources, and reducing wastage throughout our operations. We will also introduce ESG evaluation criteria in our procurement framework to drive sustainable change in our supply chain in an effort to reduce our Scope 3 emissions.

CLIMATE CHANGE SCENARIO PLANNING

Gamuda undertakes climate change scenario planning to model our projects against a wide range of plausible future conditions. The process allows Gamuda to anticipate the long-term performance of our projects on economic, environmental and social (EES) parameters, tailoring our decisions to meet the identified EES targets. **It also drives Gamuda's preparedness towards adopting the Task Force on Climate-related Financial Disclosures (TCFD) framework and aligning with the Science Based Targets initiative (SBTi).**

Climate change scenario planning is used in designing the Penang South Islands (PSI) project. Taking into account issues such as rising sea levels, the PSI is designed for climate resilience, in line with the latest recommendations from Intergovernmental Panel for Climate Change (IPCC), the National Physical Planning Council (NPPC) and Low Carbon Cities Framework (LCCF).



Photo: Penang South Islands

Sustainable Planning and Design for Property and Infrastructure

Sustainable planning and design are the philosophy of designing the built environment to realise financial, ecological and social sustainability.

Sustainably masterplanned projects have immense potential to realise GHG emissions reduction across the entire project's life cycle by lowering electricity and water usage requirements during the construction and operational phases.

With that in mind, Gamuda has set forth clear plans and targets in the GGP 2025 by aiming for **40 percent reduction in carbon dioxide equivalent (CO₂e) emissions compared to business as usual (BAU) by 2030 for all our developments and townships** via:

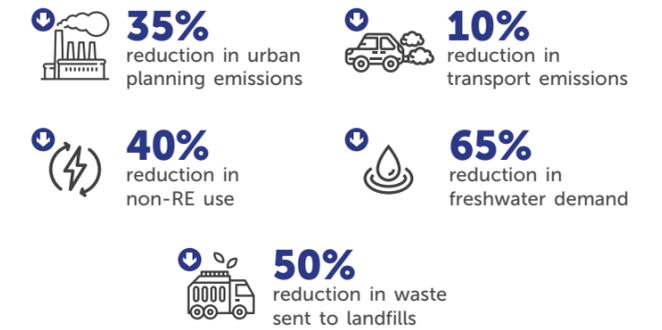


Photo: SplashMania at Gamuda Cove



Photo: SplashMania at Gamuda Cove

SplashMania at Gamuda Cove

SplashMania at Gamuda Cove is envisioned as a sustainable water park in the region that incorporates meaningful environmental initiatives. Set as Asia's largest rainforest-themed waterpark, 70 percent of the landscape will be dedicated to green spaces. Our strategy focuses on three main aspects: water, energy and waste management. The approach is to reduce the environmental impact through energy-efficient technologies, sustainable products and building materials.

A crucial aspect of a water park is the management of water resources. While we prioritise a clean water supply for all activities, we will use recycled rainwater for park-wide irrigation and non-potable use. Water-efficient fittings, including low-flow and touchless sensors with a dual flush system, will be installed in the toilets.

Energy management is another aspect of the water park components that utilise significant energy: the water pump,

filtration, and lighting systems. We are committed to managing energy efficiently with the implementation of the solar farm, installation of solar photovoltaic (PV) panels, solar street lighting, energy-saving pumps, fittings and refrigerators, chlorofluorocarbons (CFC) free air conditioner and light-emitting diode (LED) for all lightings.

All types of waste generated from the water park will also be well-managed. Some of the main initiatives include having a composting yard to form compost from organic waste. The derived compost will be utilised for landscaping purposes within SplashMania and Gamuda Cove. We will also ensure 100 percent biodegradable food packaging by all the business vendors and systematic waste segregation for effective recycling.

SplashMania would be a safe and fun recreational destination with minimal environmental footprint with these sustainable initiatives in place.

SUSTAINABILITY REPORT

LOW CARBON URBAN PLANNING

The practice of sustainable design at Gamuda starts within the masterplan and building architecture. Taking into consideration of the user's needs of the built environment upon project completion while all the time conserving the use of natural resources. This accounts for embodied and operational carbon with land spatial planning, material choice, traffic demand and patterns, energy and water consumption, and waste management, which affects carbon emissions in a life cycle approach.

This is reflected in the commencement of an analysis framework for Green Building Index (GBI) certification for our under-construction residential phases, namely the Monarc and Ilaria in Gamuda Gardens; Herons and Waterlily in Gamuda Cove, respectively. In addition, we are planning towards a GBI Platinum rated office cluster within the heart of Gamuda Cove. This is a continuation of our sustainability drive with GBI as an industry recognised green rating tool which we have obtained a Gold Standard for The Robertson and HighPark Suites.

Moving forward, all of the Group's future projects and developments will be GBI certified.



Gamuda's development principles show respect for the existing landform. Listening to what the land has to tell us in determining the development area so as to minimise impact, increase biodiversity and improve natural environment. Gamuda has also adopted the Miyawaki forest method, pioneered by a Japanese botanist, with the aim of creating dense urban forests from degraded soils within a short span of 20 to 30 years. Through sustainable masterplanning, Gamuda has managed to set aside large tracts of green, brown and blue landscapes in its developments, to meet the needs of the present without compromising the ability of future generations to meet their own needs.

No	Development	Landscape Area (acres)	Percentage of Landscape Area	Number of Trees Planted
1	Bandar Botanic	192.4	16%	66,770
2	Bukit Bantayan Residences	1.3	7%	629
3	Celadon City	42.8	19%	5,615
4	Gamuda City	24.5	6%	3,896
5	Gamuda Cove	25.9	2%	11,256
6	Gamuda Gardens	50.6	6%	13,081
7	HighPark Suites	3.4	77%	620
8	Horizon Hills	357.1	30%	50,513
9	Jade Hills	57.3	16%	10,179
10	Kota Kemuning	421.6	23%	82,500
11	Kundang Estates	21.3	24%	4,351
12	Madge Mansions	0.2	10%	313
13	The Robertson	1.9	63%	634
14	twentyfive.7	17.7	10%	14,482
15	Valencia	101.3	35%	16,726
16	Yen So Park	236.6	42%	20,516
Total		1,555.9		302,081

Further information on our biodiversity-related efforts is provided in Pillar 3 on pages 118 to 123.

Percentage of landscape area = landscape area/development area.
Landscape area includes green area, golf course, streetscape planting, and waterbody only.
Ernst & Young has assured the percentage of landscape area for Jade Hills, Gamuda Gardens, and Gamuda Cove only.

To further mitigate the environmental impacts of our construction-related activities, we aim to better manage the GHG emissions through optimising the associated construction operations and minimising the embodied carbon in buildings from our material processing and construction. Moving forward, we will be reducing our embodied carbon through the following:



Digital Industrialised Building Systems (IBS)

Faster installation, reduce on-site work and construction waste



Recycled Content Materials

High recycled content rebar, aluminium and steel materials



Regional Materials

Locally manufactured materials and products to shorten transportation distance



Concrete Usage Index (CUI)

Optimise concrete mix to reduce the concrete usage

SUSTAINABILITY REPORT

SUPPORTING GREENER TRANSPORTATION

The daily movement of people to meet the necessities of working, recreation and living is a huge contributor to carbon emissions. That is why transportation and mobility are central considerations in sustainable developments.

Gamuda is at the forefront of enabling greener transport mobility to reduce emissions. The planning provision for smart infrastructure in our developments promotes low carbon mobility with increased public mode share at 70 percent compared with private mode share at 30 percent. This also includes the preparation for charging stations for electric vehicles (EVs) and increased cycling and walking modes.

Through our involvement as the project initiator and management of the Klang Valley Mass Rapid Transit (KVMRT) Projects, this is a greener mode of mass transit that is more affordable and accessible. Such leads to less congested roads and smaller carbon footprint for commuting Malaysians.

The MRT Putrajaya Line design is recognised by the Construction Industry Development Board (CIDB) of Malaysia with the achievement of a Five-Star Sustainable INFRASTAR certification for prioritising sustainability practices.

Zero-carbon transportation is a key feature of Gamuda Land developments. Our goal is to establish a cycling and pedestrian network of 250km within our developments to facilitate an ecologically friendly lifestyle among its residents. This is in addition to our masterplans being EV-ready with the implementation of the Green Transportation Mobility Plan via E-bus, E-tram, and E-bikes.

The masterplan for PSI has also set aside 20 percent for public open spaces comprising public parks, beaches and esplanades. This is accompanied with a comprehensive 140km network of well-shaded pedestrian and cycling paths complete with bicycle stations. This is part of the masterplan for PSI that aims for 80 percent reduction in transport emissions that puts low carbon mobility at the forefront.





Five-Star Sustainable INFRASTAR certification from CIDB for MRT Putrajaya Line design



ALLEVIATING ENVIRONMENTAL IMPACT BY REDUCING OUR EMISSIONS

Gamuda is dedicated to reducing our direct and indirect GHG emissions as outlined in the GGP 2025 and the national policy on energy and emissions matters. We set forth our emissions intensity reduction goal for Scope 1 and Scope 2 as 30 percent by 2025 and 45 percent by 2030.

For FY2021, the Group has increased the number of sites where our GHG emissions are tracked, reflecting the aim to ensure better transparency of our actual carbon footprint.

GHG Emissions

Total GHG Emissions for FY2021 in tonnes CO₂e:



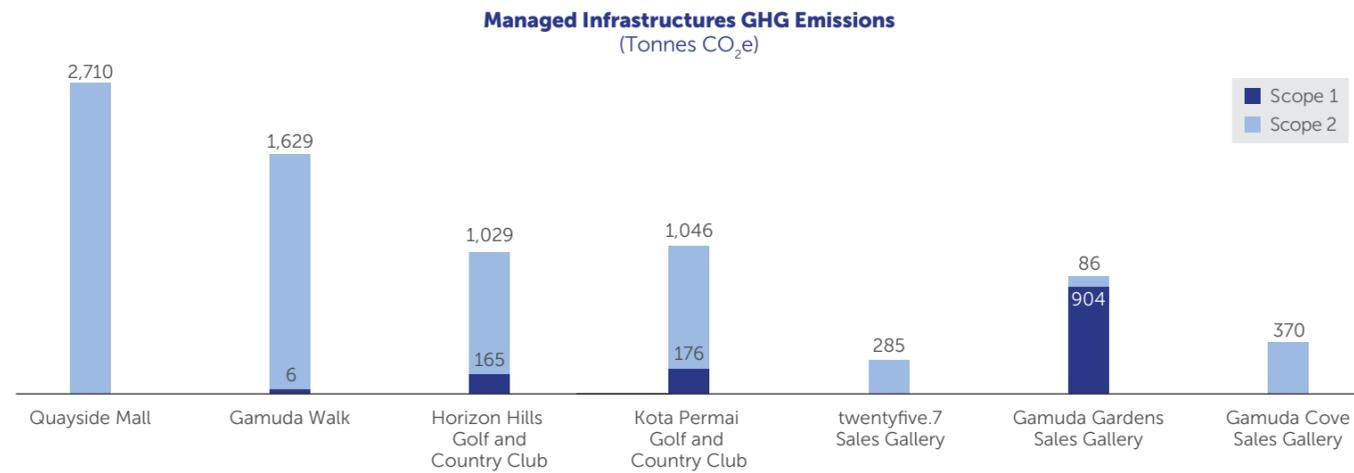
Managed Infrastructures consists of Quayside Mall, Gamuda Walk, Horizon Hills Golf and Country Club, Kota Permai Golf and Country Club, Sales Gallery – twentyfive.7, Sales Gallery – Gamuda Gardens, Sales Gallery – Gamuda Cove.
Construction Sites consists of MRT Putrajaya Line, Gamuda Gardens, Gamuda Cove, twentyfive.7, Jade Hills, Horizon Hills, PSI Site Office.
Operating Plants consists of Gamuda Digital IBS, Banting and Sepang factories. Methodology of calculation was in reference to GHG Protocol.

Construction sites remain the biggest contributor to our Scope 1 emissions as both petrol and diesel are consumed in the course of our building activities.

Gamuda measures its emissions based on the GHG Protocol Corporate Accounting and Reporting Standard (GHG Protocol) methodology and utilises the European Network of Construction Companies for Research and Development's Construction CO₂e Measurement Protocol (ENCORD), which is a guide for construction companies.

SUSTAINABILITY REPORT

The total electricity consumption for Menara Gamuda, Managed Infrastructures, Construction Sites and Operating Plants in FY2021 was 22,111,360kWh



ENERGY EFFICIENCY AND ADOPTION OF RENEWABLES

Green electricity is the key to the world moving towards net-zero. The government and the energy commission have developed a roadmap (30 percent of the electricity generated to be from renewable sources by 2025 in Malaysia). To tackle climate change, it is a multi-pronged approach by both the public and private sectors.

Gamuda continues to make progress on its transition to RE. It started in 2020 with the installation of solar PV panels on the rooftop of Gamuda Gardens sales gallery and badminton hall, measuring 1,880sqm with a total capacity of 310.2kWh. Power generated is used to operate the central lake's fountain and waterfall, while excess energy is tapped to power the sales gallery. The installation has provided estimated energy savings of 250,000kWh annually and cost savings of RM90,000 per year.

In FY2021, Gamuda installed 1,677 pieces of solar photovoltaic modules at the Celadon Sports and Resort Club in Vietnam. Covering 4,800sqm on the roof, the solar modules generate an average of 84,000kWh per month of clean energy for usage during the day time that reduces electricity consumption and GHG emissions, contributing to 40 percent savings in annual total electricity consumption.

In line with our GGP 2025 Pillar 1 commitment to reduce our CO₂e emissions compared to BAU by 2030 across our developments, we will be installing solar panels across the following six developments in FY2022.

The Celadon Sports and Resort Club is the largest sports complex in the west of Ho Chi Minh City, and it is the first complex to operate entirely on solar energy. It stands as a beacon for the deployment of future sustainable energy solutions for Gamuda Land developments.

Feasibility studies and plans are being undertaken to expand the RE footprint in our existing developments and projects via progressive solar panel retrofits. In addition, we are actively exploring and accessing various renewable energy solutions and market available instruments and mechanisms to achieve our ultimate goal of 40 percent reduction in non-RE use by 2025.

Another commitment towards RE is reflected in the PSI, whereby its Green Tech Park is designed for 100 percent RE usage that is able to meet the estimated power requirement of 65MW.



MAXIMISING EFFICIENCY IN OUR WATER CONSUMPTION

Freshwater is a valuable resource. Various sustainable water consumption practices have been instituted in our developments. These include rainwater harvesting, using recycled lake water for irrigation, carefully selecting plants and shrubbery that require less water for landscaping and even installing water saving features across our developments.

Across Gamuda Land developments, all future high-rise and residential buildings, including commercial properties will have rainwater harvesting technology.

Moving forward, all landscape irrigation across Gamuda Land developments will be of non-potable water from rainwater harvesting technology. In plan to meet this by 2030, utilities retrofitting is being done.

For PSI, planning for reduction in freshwater demand starts with efficient water management from state-of-the-art dual-purpose sewerage treatment plant that recycles water for non-potable uses. This will augur an approximate reduction of freshwater demand by 70 percent.

Water Consumption Across Our Operations in FY2021



Managed Infrastructures consists of Quayside Mall, Gamuda Walk, Sales Gallery and Office – Gamuda Cove, Sales Gallery and Office – twentyfive.7, Kota Permai Golf and Country Club, Horizon Hills Golf and Country Club.
Construction Site consist of MRT Putrajaya Line.
Operating Plants consists of Gamuda Digital IBS, Banting and Sepang factories.

Recycled Water Across Gamuda Land's Construction Sites in FY2021

	Gamuda Cove	Jade Hills	twentyfive.7	Gamuda Gardens	Horizon Hills
Recycled Water (m ³)	322,918	3,690	2,281	3,324	2,120

As stipulated under Pillar 1 of the GGP 2025, our ambition is to conserve freshwater by reducing consumption and increasing reuse and recycling. By the end of FY2021, we have recycled a total of 334,333m³ of water across Gamuda Land's construction sites. In line with the requirements set out by the environmental regulators, MRT Putrajaya Line has placed water treatment plants at the construction sites. This is to ensure all 24 hours active sites' wastewater is treated before discharge. The treated water is used for wheel washing and other cleaning purposes. The average amount of water treated ranges from 10m³ to 80m³ per hour.



SUSTAINABILITY REPORT

PROMOTING CIRCULARITY IN OUR OPERATIONS THROUGH EFFICIENT WASTE MANAGEMENT

Solid waste is a growing problem in Malaysia. In a whole-life cycle concept, we have committed to reduce our waste to landfills at different stages. During the construction stage, we are adopting a circular construction approach by maximising the efficiency use of raw materials and resources, while reducing wastage throughout our operations with a target to reduce construction waste to landfill at 20 percent. At operational stage, a target of 50 percent reduction in landfill waste is set via the provision of extensive recycling and organic waste composting.

A recycling facility is established at each project site for the recovery of waste and reusing construction waste as landscape elements. This has reduced the overall quantity of waste sent to landfills. However, where unavoidable, waste is given to licensed third-party companies to process or dispose the waste responsibly.

The following tables outline Gamuda’s waste management efforts for FY2021.

Menara Gamuda

Waste Generation	Total Weight	Additional Disposal Information
Non-recycled Waste (scheduled waste)	0.038 tonnes	SW 109 – Used light bulbs, disposed by Department of Environment licensed contractor.
Recycled Waste	1.171 tonnes	Carton boxes and papers, collected by external recycling vendor.

Gamuda Digital IBS

	Steel Bars	Polyfoam	Hazardous Waste
Amount of Waste Generated	55.6 tonnes	6.3 tonnes	4.7 tonnes
Amount of Waste Reused or Recycled	55.6 tonnes (100 percent)	0.9 tonnes (14 percent)	–

Gamuda Digital IBS includes Sepang and Banting factories.

MRT Putrajaya Line



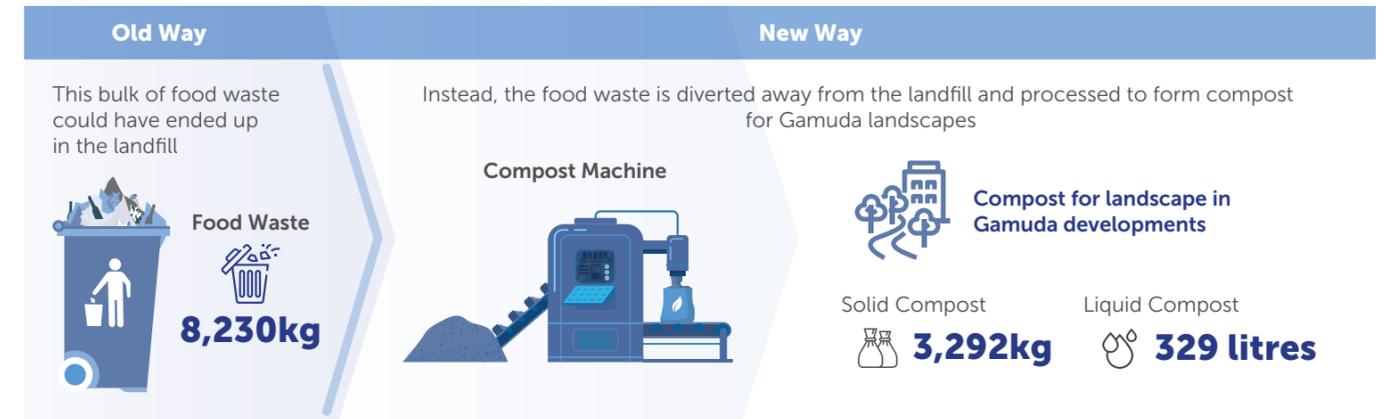
The amount of **scrap metal recycled** from MRT Putrajaya Line was approximately **370 tonnes** in FY2021



Photo: Gamuda Digital IBS operating machineries

Recycling Food Waste with Plate to Plant Programme

In 2020, Gamuda has launched its Plate to Plant Programme to repurpose food waste from Gamuda’s operations and developments. Food composting machines were installed at Menara Gamuda and Jade Hills development including future provision at Quayside Mall and clubhouses. This is supported by collection through composting trucks from our Compost-on-Wheels initiative, driving around Gamuda Land developments to collect food waste from residents and food and beverage establishments. In FY2021, we have collected 8,230kg of food waste to form compost for our landscapes across Gamuda developments.



Creating a Closed-Loop System for Garden Waste

Gamuda’s developments practice garden waste management through the creation of composting yards at Gamuda Land developments – Valencia, Bandar Botanic, Kundang Estates, Horizon Hills, Gamuda Gardens and Jade Hills, which encourages residents to contribute their garden refuse to be processed as compost. Bio-fertilisers are created from dead leaves and plants to fertilise the land, recycling our resources in a closed-loop system to support better soil health and plant growth.

Extending the Lease of Fabrics Life

Gamuda’s commitment to 6R practices as part of Gamuda Parks’ Sustainability Approach and Policy sees the Group setting up six fabric recycling bins at our developments and premises. This has saved 15,600kg of fabric waste from landfills, a 49 percent increase from FY2020, to be repurposed as cloth masks and pouches.



Photo: Compost product



Photo: Food waste compost machine