UNIVERSITAS
MERCU BUANA

GHG EMISSIONS INVENTORY REPORT 2026

www.mercubuana.ac.id

Foreword

We extend our gratitude to the Almighty God for His blessings, which have enabled the successful completion of this Greenhouse Gas (GHG) Emissions Inventory Report for Universitas Mercu Buana (UMB), covering the reporting period from January 1, 2025, to December 31, 2025. This report has been prepared in accordance with the international standard ISO 14064-1:2018 and represents an important first step for UMB in measuring, documenting, and managing its greenhouse gas footprint in a systematic and transparent manner.

As a leading institution of higher education, Universitas Mercu Buana fully recognizes that climate change is a global challenge that requires tangible contributions from all elements of society, including the education sector. Through this GHG inventory, UMB is committed not only to serving as a center for the advancement of science and technology, but also as an institution that is accountable for environmental sustainability. The data and information presented in this report are expected to serve as an accurate baseline for UMB in formulating effective and measurable emission mitigation strategies going forward.

The preparation of this report involved a careful process of data collection, verification, and analysis across various units within UMB. We would like to express our highest appreciation and gratitude to the entire preparation team, related units, and all parties who contributed to the data collection process and the successful completion of this report.

We recognize that this report still has room for improvement in the future, in line with the development of measurement methodologies and the expansion of the data scope to be inventoried. We therefore welcome any constructive criticism and suggestions to enhance the quality of UMB's GHG reporting in subsequent periods.

We hope that this report will be beneficial and serve as a reference for the development of Universitas Mercu Buana's future sustainability programs, in line with UMB's vision to actively contribute to global efforts in addressing climate change.

Jakarta, August 2026

Prof. Rizki Briandana, M.Comm., Ph.D
Vice Rector of Resources
Universitas Mercu Buana

Table of Content

1. General Description of the Organization Goals and Inventory Objectives

The following document presents the greenhouse gas (GHG) emissions inventory for Universitas Mercu Buana (UMB) across all two categories (Categories 1 and 2) in accordance with the International Standards Organization (ISO) 14064-1:2018. The reporting period covers January 1, 2025, to December 31, 2025.

1.1 Statement of Purpose

This report is part of UMB's ongoing commitment to measure and manage its emissions for stakeholders and customers. It is the first GHG measurement for UMB.

1.2 Organization Description

UMB is a leading private university in Jakarta, established on October 22, 1985, under the auspices of the Menara Bhakti Foundation. The campus has achieved an "Excellent" (Unggul) accreditation from the National Accreditation Board for Higher Education (BAN-PT) and ranks as the 2nd best private university in the Jakarta area according to the SCImago Institutions Rankings.

UMB offers educational programs ranging from Diploma (D3), Bachelor's (S1), Master's (S2), to Doctoral (S3) degrees. The main faculties include:

- Faculty of Engineering: Civil Engineering (IABEE internationally accredited), Architecture, Mechanical Engineering, Electrical Engineering, Industrial Engineering.
- Faculty of Economics and Business: Management, Accounting, Corporate Management.
- Faculty of Computer Science: Informatics, Information Systems.
- Faculty of Communication Sciences: Communication Studies (Broadcasting, Public Relations, etc.).
- Faculty of Psychology
- Faculty of Design and Creative Arts

There are some key features and services of UMB:

- Employee Classes: Offers flexible, hybrid learning schedules specifically designed for working professionals who want to pursue higher education while working.
- Modern Facilities: Equipped with multimedia rooms, modern laboratories, a digital library, doctoral centers, sports areas, and spacious parking with 24-hour security.
- Online Portals: New student registration can be completed online via the UMB Registration Portal, and academic services for students can be accessed through the UMB Academic Information System (SIA).

1.3 Reporting Period and Frequency of Reporting

This GHG report covers the calendar year from January 1, 2025 to December 31, 2025. GHG reports are produced annually.

1.4 Reporting Standards, Approach and Verification

This GHG report has been prepared in accordance with ISO 14064-1:2018. However, it has not yet been verified by an accredited Validation and Verification Body.

2. Organizational and Reporting Boundaries

2.1 Organizational Boundaries

The organizational boundaries for this GHG report were established in accordance with the methodology outlined in ISO 14064-1:2018. The standard offers two approaches for consolidating GHG emissions: the equity share approach and the control approach (financial or operational). For this report, we adopted the operational control approach to account for emissions.

UMB operates at several locations across Jakarta:

- **Campus A (Meruya)**: Jl. Meruya Selatan, Kembangan, West Jakarta
- **Campus B (Menteng)**: Jl. Menteng Raya No. 29, Central Jakarta
- **Campus C (Warung Buncit)**: Jl. Buncit Raya No. 98, Pasar Minggu, South Jakarta
- **Campus D (Cipayung)**: Jl. Hwarang, Setu, Cipayung, East Jakarta

Organizational boundary for the 2025 reporting period is only at Campus A (Meruya), which is UMB's main campus. Campuses B and C are not included in this report because UMB is not the only one operating on these two campuses. Campus D, meanwhile, only started operating in 2026 and is therefore not included in the 2025 GHG inventory report.

The process of collecting activity data for GHG emission sources begins with the collection of primary data by the relevant departments and is then submitted to the Person in Charge (PIC) of the GHG inventory project, followed by verification by the management.

2.2 Emissions Categories and Classification

GHG emission sources have been identified and categorized in accordance with the ISO 14064-1:2018 standard. This methodology is categorized into two types of emissions that are direct GHG emissions and removals (Category 1) and indirect GHG emissions (Category 2). UMB will address both direct and indirect GHG emissions, as outlined below:

Category 1: Direct GHG Emissions and Removals

1.1 Direct Emissions from Stationary Combustion

Direct GHG emissions from sources that are owned or controlled by the company that include emissions from fuel stationary combustion in generators using diesel for backup power and cooking process using LPG in the campus canteen. These emissions contribute directly to the company's emission and are considered as significant for UMB.

1.2 Direct Emissions from Mobile Combustion

Direct GHG emissions from sources that are owned or controlled by the company that include emissions from fuel mobile combustion in operations such as buses and light vehicles used for transportation between campus locations or supporting operational activities considered as significant for UMB.

1.3 Direct Process Emissions and Removals arise from Industrial Processes
UMB primarily focus on education services. Unlike manufacturing facilities, UMB does not engage in industrial processes making this category irrelevant to the UMB business process.

1.4 Direct Fugitive Emissions Arise from the Release of Greenhouse Gases in Anthropogenic Systems
Since UMB relied on HVAC systems especially for cooling infrastructure, and chiller units that use refrigerants like HFCs (hydrofluorocarbons), fugitive emissions are considered significant to UMB's direct GHG emissions.

1.5 Direct Emissions and Removals from Land Use, Land Use Change and Forestry (LULUCF)
UMB do not engage in land management (such as deforestation, afforestation, or soil degradation), therefore LULUCF emissions are not directly relevant to UMB operations.

Category 2: Indirect GHG Emissions from Imported Energy
2.1 Indirect Emissions from Imported Electricity
UMB relies on purchased electricity provided by PLN for its operational activities, therefore indirect GHG emissions from the generation of purchased electricity are considered significant and need to be included in the GHG inventory report.

2.2 Indirect Emissions from Imported Energy
In Indonesia, energy consumption predominantly comes from electricity purchased from domestic providers like PLN. There are no imported energy sources commonly utilized within the country, making the category of imported energy emissions irrelevant to UMB's operations.

2.3 Emission Source Inclusion

Table 1 provides an overview of the sources of GHG emissions considered for UMB, including the data source and any relevant methodologies.

Tabel 1. GHG Emission Data Sources included in the Inventory

Category	Emission Source	Data Source	Data Collection Unit	Methodology
Category 1	Stationary Combustion	Annual report of generator set operating hours from the Facility Department	Litre (l)	Referring to the KESDM (2018) guide-line, method 1 provides guidelines on the process for calculating the total CO_2 emissions by fuel type.

Category	Emission Source	Data Source	Data Collection Unit	Methodology
Category 1	Stationary Combustion	Annual report of LPG consumption from Canteen	Kilo Gram (kg)	Referring to the KESDM (2018) guide-line, method 1 provides guidelines on the process for calculating the total CO_2 emissions by fuel type.
Category 1	Mobile Combustion	Monthly invoices from the General Affairs Dept	Litre (l)	Referring to the KESDM (2018) guide-line, method 1 provides guidelines on the process for calculating the total CO_2 emissions by fuel type. The calculation of CO_2 emissions can be carried out using calculation-based approach.
Category 1	Fugitive Emission (Refrigerant)	Annual records from the Facility Department	Kilo Gram (kg)	The calculation involves using the Global Warming Potential (GWP) values from the IPCC's AR6 (Sixth Assessment Report) to convert GHG emissions into CO_2 equivalent
Category 2	Electricity	Monthly invoices from the Accounting Department.	Kilowatt-hour (kWh)	The calculation is based on KESDM (2019) national grid emission factors.

2.4 Emission Source Exclusion

UMB has excluded Category 3 until Category 5 from this year's GHG inventory. This decision is because UMB believes that its direct and indirect emissions, as reported in Categories 1

and 2, adequately capture the majority of its GHG emissions. Thus, the exclusion aligns with the principle of materiality under ISO 14064-1:2018.

However, in the next reporting period, UMB's commitment to gradually broadening its emissions boundary to provide a more comprehensive account of its carbon emissions, aligning with evolving stakeholder expectations.

3. Quantified GHG Emissions Inventory

3.1 Consolidated Statement of GHG Emissions

The GHG activity data (Table 2) in this inventory were identified through UMB's internal workshops and communication with the respective departments or units responsible for the data sources. Emissions were quantified using a calculation methodology that multiplies the activity data for each emissions source by relevant emission factors.

Tabel 2. Consolidated Statement of GHG Emissions

EMISSIONS	CO_2e Total	CO_2	CH_4	N_2O	HFCs
Category 1: Direct GHG emissions and removals in tonnes CO_2e	**1,178.78**	**970.27**	**7.46**	**7.13**	**193.92**
1.1 Direct Emissions from Stationary Combustion	18.92	18.86	0.04	0.01	
1.2 Direct Emissions from Mobile Combustion	965.94	951.40	7.42	7.12	
1.4 Direct Fugitive Emissions Arise from the Release of GHG	193.92				193.92
Category 2: Indirect GHG emissions from imported energy	**2,830.74**				
2.1 Indirect Emissions from Imported Electricity	2,830.74	2,830.74			
Emission Reduction (Biodiesel B40)	**157.66**				
Total Emissions in 2025	**3,851.85 Ton CO_2e**				

The total annual emissions are calculated at 3,851.85 tonnes of CO_2e. Among these, Category 2: Indirect GHG emissions from imported energy is the largest contributor, accounting for 2,830.74 tonnes of CO_2e or 73.5% of the total emissions. This significant contribution is primarily driven by the consumption of imported electricity, reflecting UMB's business model of providing education services, which require a constant and reliable power supply. Direct emissions under Category 1 contribute a relatively smaller share at 26.5% or 1,178.78 tonnes of CO_2e. These are dominated by mobile combustion, which account for 965.94 tonnes, primarily linked to buses dan operational cars.

3.2 Approach to Emission Factors

The emission factors were sourced from the 2023 KESDM National EF and NCV, 2020 Pertamina Specification Product of Fuel Oil (BBM), 2006 IPCC Guidelines for National Greenhouse Gas Inventories, and 2019 KESDM National Grid.

3.3 GWP Calculation and Source

Quantities of GHG emissions are expressed as tonnes of CO_2e (Carbon Dioxide Equivalents) using the GWP from the IPCC's AR6. The time horizon is 100 years. All emissions sources are expressed as both CO_2e and their detailed GHG breakdown, including the GWP value. The most notable GHGs include:

Tabel 3. GHG Types and their respective Global Warming Potential

GHG	Chemical Formula	GWP
Carbon Dioxide	CO_2	1
Methane (Fossil)	CH_4	29.8
Nitrous Oxide	N_2O	273

3.4 Emissions and Absorption of Biogenic CO_2 in GHG Inventory

In this GHG inventory report, biogenic CO_2 emissions from burning B40 biodiesel are treated separately from fossil CO_2 emissions. This is based on the principle that biogenic CO_2 emissions originate from recently living organic matter and are theoretically considered carbon neutral over their lifecycle. For calculating emissions from B40 combustion, the following approach is used:

1. Separation of Fuel Content
   Identify biodiesel (40%) and fossil diesel (60%) content in B40.
   - Calculation of Fossil Emissions: Fossil CO_2 emissions are calculated based on the fossil diesel content in B40, using standard emission factors for diesel.
   - Calculation of Biogenic Emissions: Biogenic CO_2 emissions are calculated based on the biodiesel content in B40, using CO_2 emission factors for biodiesel.
   - Separate Reporting: Fossil and biogenic CO_2 emissions are reported separately in the GHG inventory.
2. Quantification
   Below is the quantification of biogenic and fossil CO_2 emissions from B40 biodiesel combustion during this reporting period:
   - Fossil CO_2 Emissions
     236.49 tonnes of CO_2e (calculated based on 60% fossil diesel content).
     Calculation method: Emission factor for diesel × Amount of diesel burned.
   - Biogenic CO_2 Emissions
     157.66 tonnes of CO_2e (calculated based on 40% biodiesel content).
     Calculation method: Emission factor for biodiesel × Amount of biodiesel burned.
     While biogenic emissions are considered neutral, they are reported separately for transparency and compliance with reporting guidelines.
   - Biogenic CO_2 Absorption
     During this reporting period, no significant biogenic CO_2 absorption directly related to B40 combustion was reported. Carbon absorption by plants used as raw materials for biodiesel occurs outside this reporting boundary.

3.5 Review, Internal Audit, and Improvement

This report covers the year ending December 31, 2025. Primary data has been sought for all significant emissions sources. Where data was unavailable or not comparable, conservative estimation methods were applied to encourage continuous improvement in the ratio of primary data to estimated data.

3.6 Information Management Procedures

The GHG measurement and reporting process has been developed to ensure conformance to the principles of the ISO 14064-1:2018 standard and to be consistent with the intended use of the GHG inventory.

3.7 Assessment of Uncertainty

In the process of preparing the 2025 GHG emissions inventory, UMB applied a qualitative uncertainty assessment to assess the degree of confidence in the activity data, emission factors, and calculation models used. This approach was chosen because there are currently multiple data sources (e.g. internal reports from different work units), calculation methodologies (differences between national emission factors, IPCC, etc.), and limited availability of analytical instruments and tools to conduct a comprehensive quantitative assessment.

1. Activity Data Uncertainty
   Quality of Internal Records: Data on total fuel consumption and refrigerant usage are obtained from the relevant departments/divisions. While data on amount of electricity consumptions are obtained from the accounting team. Although monthly reporting procedures are in place, the potential for recording errors or discrepancies in report formats can still occur.
2. Emission Factor Uncertainty
   - Variety of Emission Factor Sources: UMB uses various references (KESDM 2023 Fuel Emission Factor, IPCC 2006, DJK 2019, etc.). Each reference has its own confidence limits.
   - Selection of AR6 GWPs: The use of the GWP from the IPCC Sixth Assessment Report (AR6) provides the most up-to-date results, but still contains inherent scientific uncertainty, e.g. changes in GWP values in subsequent versions of the report.
3. Future Improvement Plan
   - Improved Data Collection Procedures: UMB plans to cross-check data more systematically between departments and add digital tools to minimize input errors.
   - More Measured Uncertainty Assessment: As data availability improves and analytical models are developed, UMB will include quantitative uncertainty analysis in the future reports, in line with the ISO/IEC Guide 98-3 methodology.

Thus, through this qualitative assessment, UMB has identified potential areas with the highest uncertainty, especially in data that still involves estimation, as well as in emission factors sourced from general databases (references from websites not from institutions such as government or IPCC). Going forward, efforts to improve data validity and availability will be made to make uncertainty assessments more precise and reliable.

4. GHG Emission Reduction Initiatives

In line with UMB's commitment to mitigate climate change and reducing GHG emissions, the organization is embarking on a transformative journey toward sustainability in the future. Below are the outlined initiatives:

1. Utilizing automation to enhance energy efficiency in campus, aiding in the improvement of Specific Energy Consumption (SEC).
2. Deploying solar panels as an alternative energy source at the Meruya campus.
3. Conducting GHG emissions assessments for campus operations in accordance with global standards, covering both direct and indirect GHG emissions.
4. Designing a strategic plan to drive decarbonization efforts and achieve Net-Zero emissions