MISAMIS UNIVERSITY

Ozamiz City

Quality Assurance Office

Institutional Carbon Management and Greenhouse Gas (CO_2) Emissions Reduction Policy and Procedure

1. Policy Statement

Misamis University commits to systematically quantifying, managing, and reducing its institutional carbon footprint and greenhouse gas (GHG) emissions across all campus operations, facilities, and academic activities. The University shall establish a standardized, science-based process for annual GHG inventory accounting across Scope 1, Scope 2, and designated Scope 3 emission sources, execute targeted decarbonization interventions, transition toward clean and renewable energy systems, and enhance on-campus and off-campus carbon sinks.

Unmonitored energy wastage, the operation of poorly maintained combustion equipment, unauthorized open burning of waste, the release of high-Global Warming Potential (GWP) refrigerants, and the procurement of carbon-intensive technologies where low-carbon alternatives are technically and economically viable are strictly prohibited. All University units, facilities, and third-party partners must actively participate in the institutional carbon management cycle—encompassing baseline measurement, target setting, abatement implementation, carbon offsetting, and transparent annual reporting.

2. Purpose

This policy establishes institutional engineering, operational, and administrative controls that systematically track and reduce carbon dioxide (CO_2) and other greenhouse gas emissions; ensure alignment with Philippine climate change mitigation laws, national energy conservation mandates, and international GHG accounting standards; support the University's ISO 21001 Educational Organizations Management System (EOMS); and provide auditable evidence for global sustainability reporting, specifically Times Higher Education (THE) Impact Rankings under SDG 7 (Indicator 7.2.3).

3. Scope

This policy applies to all Misamis University campuses, including academic buildings, colleges, laboratories, libraries, administrative offices, clinics, dormitories, sports complexes, auditoriums, utility plants, vehicle fleets, and University-managed green spaces. It covers all stationary and mobile combustion sources, purchased electricity consumption, refrigerant management, solid waste and wastewater treatment processes, and institutional transport. It binds University administrators, faculty, staff, learners, physical plant and engineering personnel, procurement officers, suppliers, contractors, tenants, and concessionaires operating within the University.

4. Definitions

Term	Definition
Carbon Management	The systematic institutional process of measuring, monitoring, analyzing, reducing, and reporting greenhouse gas (CO2e) emissions generated by University activities.
tCO2e (Tonnes of CO2 Equivalent)	The universal metric unit used to express the climate impact of different greenhouse gases (CO2, CH4, N2O, HFCs) based on their Global Warming Potential (GWP) relative to carbon dioxide.
Scope 1 Emissions (Direct)	Direct GHG emissions occurring from sources owned or controlled by the University, including campus standby diesel generators, University-owned fleet vehicles, LPG/fuel use in laboratories and canteens, and fugitive refrigerant leaks.
Scope 2 Emissions (Indirect Energy)	Indirect GHG emissions resulting from the generation of purchased electricity supplied by the local distribution utility (MOELCI-II / Mindanao Grid) and consumed across University facilities.
Scope 3 Emissions (Other Indirect)	Indirect GHG emissions occurring in the University's value chain, including student and employee commuting, official air and land business travel, solid waste disposal, water supply, and paper/material procurement.
Emission Factor (EF)	A representative coefficient that relates the quantity of a pollutant or GHG released to the atmosphere with an activity associated with the release of that pollutant (e.g., kg CO2e/kWh or kg CO2e/L of fuel).
Carbon Sink / Sequestration	Natural or artificial reservoirs (such as campus urban forests, mangrove rehabilitation sites, and reforestation areas) that absorb and store atmospheric CO2.
Outsourced Entity	Any contractor, supplier, concessionaire, tenant, or service provider operating within or executing services for the University.

5. Responsibilities

Role	Responsibilities
University President or Authorized Official	Approves the carbon management policy, authorizes institutional decarbonization targets, and allocates capital resources for emission-reduction and renewable energy projects.
Physical Plant / Campus Engineering Office & Designated Energy/Carbon Officer	Leads the annual GHG inventory calculation (Scopes 1, 2, and 3); manages smart sub-metering, solar PV/BESS systems, standby generators, and HVAC refrigerant logs; implements engineering abatement projects; and submits statutory energy/emission reports.

Quality Assurance Office	Audits the carbon management process under the ISO 21001 EOMS framework and compiles verified carbon footprint reports for THE Impact Rankings and external disclosures.
Community Extension / Environmental Programs Unit	Manages campus tree-planting, mangrove rehabilitation, and off-campus reforestation programs; tracks survival rates and estimates carbon sequestration offsets.
Deans, Directors, Laboratory Heads, and Unit Heads	Enforce energy and resource conservation protocols within their respective units; provide activity data for GHG accounting; and support unit-level carbon reduction initiatives.
Property, Procurement, and Finance Offices	Enforce low-carbon green procurement; provide fuel, utility, travel, and supply purchase records for GHG accounting; and embed carbon-reduction clauses into vendor and concessionaire contracts.
Motorpool and Security Personnel	Maintain fleet fuel logs, conduct preventive vehicle emissions testing, enforce anti-idling rules on campus, and monitor campus transport traffic.
Employees, Learners, Contractors, and Concessionaires	Adhere to campus energy conservation, waste segregation, low-carbon transport, and anti-idling rules, and report refrigerant or fuel leaks immediately.

6. Procedure

6.1 Organizational and Operational Boundary Establishment

1. The Designated Carbon/Energy Officer shall define the institutional GHG inventory boundary using the Operational Control Approach in accordance with the GHG Protocol Corporate Accounting and Reporting Standard and ISO 14064-1.

2. The operational boundary shall encompass all Scope 1, Scope 2, and quantifiable Scope 3 emission sources across Misamis University campuses.

6.2 Annual Greenhouse Gas (GHG) Inventory and Quantification

At the close of each fiscal/academic year, the Campus Engineering Office and Quality Assurance Office shall collect activity data from all relevant units and compute total institutional emissions using the standard quantification equation:

GHG Emissions (tCO_2e) = Σ [Activity Data_i × EF_i × GWP_i] × 10^{-3}

The following standardized accounting matrix shall govern data collection and emission calculations:

Emission Scope & Category	Activity Data Source	Applicable Standard / Emission Factor (EF)	Responsible Unit
Scope 1: Stationary Combustion (Standby generator diesel, laboratory/canteen LPG)	Fuel purchase invoices and generator run-hour logs (Liters or kg of fuel consumed)	IPCC 2006 / 2019 Guidelines for National GHG Inventories	Campus Engineering / Procurement

Scope 1: Mobile Combustion (University service vehicles, buses, maintenance equipment)	Motorpool fuel logbooks and trip tickets (Liters of diesel/gasoline consumed)	IPCC Guidelines / DENR-EMB mobile emission factors	Motorpool / Property Office
Scope 1: Fugitive Emissions (HVAC and chiller refrigerant top-ups/leaks, CO2 fire extinguishers)	HVAC maintenance and refrigerant recharge logs (kg of refrigerant added by type)	IPCC AR6 Global Warming Potential (GWP) values	Campus Engineering / Maintenance
Scope 2: Purchased Electricity (Grid power imported from MOELCI-II)	Monthly utility billing statements and digital sub-meter logs (Total kWh imported)	Department of Energy (DOE) National Grid Emission Factor (Mindanao Grid tCO2/MWh)	Campus Engineering / Finance Office
Scope 3: Solid Waste & Wastewater (Residual waste sent to landfill, biological waste treatment)	Daily/monthly solid waste weight logs (kg by waste stream) and water consumption (m^3)	IPCC Waste Model / DEFRA GHG Conversion Factors	General Services / EHS Office
Scope 3: Official Business Travel & Commuting (Flights, land travel, staff/student commuting)	Travel orders, flight itineraries (passenger-km), and annual campus commuting surveys	ICAO Carbon Emissions Calculator / DEFRA Transport Factors	HR / Finance / Quality Assurance

6.3 Carbon Reduction Target Setting and Action Planning

1. Based on the verified baseline year inventory, the University shall establish short-term (annual) and medium-term (5-year) science-based CO2e reduction targets, expressed both in absolute emissions (tCO2e/year) and carbon intensity (tCO2e per full-time equivalent student/staff and kgCO2e/m^2 of gross floor area).

2. The Campus Engineering Office shall formulate an annual Carbon Abatement Action Plan prioritizing high-impact emission sources identified via Pareto analysis of the GHG inventory.

6.4 Hierarchy of Decarbonization and Abatement Controls

All campus units shall implement carbon reduction measures strictly following the institutional decarbonization hierarchy:

- **1. Demand Avoidance and Operational Conservation:** Enforce standardized air-conditioning temperature setpoints (24°C to 25°C) across all offices and classrooms; implement automated scheduling and smart sub-metering to eliminate after-hours phantom plug loads and unauthorized HVAC operation; and prioritize digital workflows and cloud document management under the ISO 21001 EOMS to reduce Scope 3 paper consumption.
- **2. Energy Efficiency and Engineering Retrofits (Scope 2 Reduction):** Execute systematic retrofitting of legacy equipment with high-efficiency inverter HVAC systems, 100% LED lighting networks with occupancy/daylight sensors, IE3/IE4 premium efficiency motors, and Automatic Power Factor Correction (APFC) banks in accordance with the Energy-Efficient Building Design, Construction, and Renovation Policy. Maintain feeder voltage drop within $\leq 3\%$ and system power factor ≥ 0.95 to minimize technical line losses (I^2R) across the campus distribution network.

- **3. On-Site Renewable Energy and Microgrid Integration (Scope 2 Displacement):** Maximize clean energy self-generation through the installation and expansion of rooftop Solar Photovoltaic (PV) systems, solar street lighting, and Battery Energy Storage Systems (BESS). Track total solar energy generated (kWh/year) and calculate the corresponding avoided grid CO2 emissions using the prevailing DOE Mindanao Grid Emission Factor.
- **4. Fleet, Fuel, and Refrigerant Decarbonization (Scope 1 Reduction):** Enforce a strict No-Idling Policy (maximum 3 minutes) for all University vehicles, delivery trucks, and private vehicles within campus premises. MU regulates vehicular entry on campus to minimize idle and mobile combustion emissions, while actively encouraging the use of electric scooters and bicycles among students and personnel. Conduct quarterly preventive maintenance and emission testing for University vehicles and standby generators. Phase out high-GWP hydrofluorocarbon (HFC) refrigerants during HVAC replacements in favor of low-GWP, zero-ODP inverter refrigerants (e.g., R-32, R-290), and conduct mandatory leak-tightness inspections.
- **5. Sustainable Waste and Circular Resource Management (Scope 3 Reduction):** Divert biodegradable waste from landfills through on-campus composting and vermiculture to prevent anaerobic methane (CH4) generation, and enforce strict materials recovery, recycling, and single-use plastic reduction across all canteens, offices, and events.

6.5 Carbon Sequestration and Offsetting Programs

To address residual Scope 1, 2, and 3 emissions that cannot be immediately eliminated through engineering controls:

1. The University shall maintain and expand vegetative carbon sinks within campus grounds (urban greening) and off-campus partner communities (upland reforestation and coastal mangrove rehabilitation).

2. The Community Extension Office and environmental researchers shall maintain a registry of planted trees and mangroves, recording species, hectarage, survival rates, and estimated annual carbon sequestration (tCO2e sequestered/year) using DENR-Ecosystems Research and Development Bureau (ERDB) biomass equations.

6.6 Outsourced Services, Concessionaires, and Third-Party Controls

All contracts, leases, and agreements with food concessionaires, construction contractors, transport providers, and waste haulers shall mandate compliance with this policy. At a minimum, outsourced entities shall:

- Use energy-efficient appliances and clean cooking fuels (prohibiting charcoal or wood burning inside campus canteens);
- Comply with campus waste segregation, anti-idling, and single-use plastic reduction rules;
- Submit monthly utility, LPG, or fuel consumption data when operating within campus boundaries to support Scope 1 and Scope 3 accounting; and
- Remedy any environmental or emission noncompliance at their own expense.

7. Competence and Communication

University engineers, designated energy/carbon personnel, and internal auditors shall receive specialized training on ISO 14064-1 (GHG Quantification and Reporting), ISO 50001 (Energy Management), RA 11285 compliance, and renewable energy systems. Awareness campaigns on carbon footprint reduction, energy conservation, and low-carbon commuting shall be integrated into student and employee orientations, campus signage, and annual sustainability events. Annual carbon footprint summaries shall be published on the University's public sustainability portal.

8. Records

The Campus Engineering Office and Quality Assurance Office shall maintain the following controlled and auditable records:

- Approved Policy and Annual Carbon Abatement Action Plans
- Annual Institutional Greenhouse Gas (GHG) Inventory Workbooks and Summary Reports (Scopes 1, 2, and 3)
- Monthly electricity bills, sub-meter logs, and rooftop Solar PV generation logs (kWh)
- Standby generator run-logs, motorpool fuel purchase receipts, and vehicle emission test certificates
- HVAC refrigerant inventory, leak inspection checklists, and recharge/recovery logs
- Solid waste generation, diversion, and composting weight logs
- Reforestation and mangrove planting registries and carbon sequestration calculation sheets
- Internal audit reports and ISO 21001 Management Review minutes

Records shall be protected, retrievable, and retained in accordance with the University Records Retention Policy and sustainability reporting cycles.

9. Monitoring and Evaluation

The Campus Engineering Office and Quality Assurance Office shall monitor the carbon management process through quarterly data reviews, energy audits, and the annual ISO 21001 Management Review. At a minimum, the University shall evaluate:

- **Total Gross and Net Carbon Footprint (tCO2e/year):** Broken down by Scope 1, Scope 2, and Scope 3;
- **Percentage (%) Year-on-Year Reduction:** In institutional CO2e emissions against the established baseline;
- **Carbon Intensity Metrics:** tCO2e per capita (students + employees) and kgCO2e/m² of campus floor area;
- **Avoided Emissions (tCO2e):** Carbon emissions displaced through on-site solar PV generation and energy-efficiency retrofits; and
- **Carbon Sequestration Offset (tCO2e):** Estimated annual carbon uptake from University tree-planting and mangrove rehabilitation programs.

Findings shall directly inform capital expenditure prioritization, renewable energy expansion, operational controls, and continual improvement.

10. Review and Continual Improvement

This policy and the accompanying GHG accounting methodology shall be reviewed at least annually and whenever there are updates to DOE Grid Emission Factors, IPCC assessment reports, ISO 14064 / ISO 50001 standards, Philippine climate and energy laws, or Times Higher Education (THE) Impact Rankings methodology for SDG 7 and SDG 13.

11. Noncompliance

Noncompliance with this policy—including unauthorized open burning, deliberate venting of refrigerants, tampering with energy sub-meters, refusal to submit required activity data, or violation of anti-idling and energy conservation rules—may result in suspension of operations, contract sanctions for concessionaires and contractors, disciplinary action under University rules, and recovery of remediation costs, without prejudice to applicable regulatory liability.

12. Related Documents and Legal References

Reference	Application
GHG Protocol Corporate Standard & ISO 14064-1:2018	International standards for the quantification and reporting of greenhouse gas emissions and removals at the organizational level (Scopes 1, 2, and 3).
Republic Act No. 9729	Climate Change Act of 2009 (as amended by RA 10174); establishes the framework for institutional climate change mitigation and GHG emission reduction in the Philippines.
Republic Act No. 11285	Energy Efficiency and Conservation Act of 2019; mandates designated energy conservation officers, energy consumption reporting, and efficiency measures to reduce carbon emissions.
Republic Act No. 9513	Renewable Energy Act of 2008; governs on-site solar PV generation, net metering, and clean energy transition.
Republic Act No. 8749	Philippine Clean Air Act of 1999; regulates stationary and mobile source emissions, prohibits open burning, and enforces vehicle emission standards.
DOE National Grid Emission Factor (NGEF)	Official Department of Energy emission factors (tCO2/MWh) used to quantify Scope 2 electricity emissions for the Mindanao Grid.
ISO 50001 & ISO 21001	Energy Management Systems and Educational Organizations Management Systems (EOMS); govern energy baseline tracking, operational control, documented information, and continual improvement.
University Documents	EOMS Manual; Energy-Efficient Building Design, Construction, and Renovation Policy; Energy Conservation Policy; Solid Waste Management Policy; Hazardous and Laboratory Waste Management Policy; and Sustainable Procurement Policy.