MISAMIS UNIVERSITY

Ozamiz City

Quality Assurance Office

Institutional Energy Efficiency and Conservation (EE&C) Plan Policy and Procedure

1. Policy Statement

Misamis University commits to continuously reducing its overall institutional energy consumption and improving campus-wide energy use intensity through a structured, measurable, and enforceable Energy Efficiency and Conservation (EE&C) Plan. All University units, facilities, and electrical/mechanical infrastructures shall operate under an ISO 50001-aligned energy management cycle encompassing baseline energy auditing, load scheduling, demand-side management (DSM), power quality optimization, preventive maintenance, high-efficiency equipment retrofitting, and renewable microgrid dispatch.

Unregulated operation of heating, ventilation, and air-conditioning (HVAC) systems, illumination of unoccupied spaces, unauthorized use of high-wattage personal appliances, operation of electrically unbalanced or low-power-factor distribution feeders, and failure to address identified energy conservation opportunities (ECOs) are strictly prohibited. Every academic and administrative unit shall actively contribute to achieving the University's annual and five-year quantitative energy consumption reduction targets.

2. Purpose

This policy establishes the institutional Energy Efficiency and Conservation (EE&C) Plan and operational procedures that systematically reduce overall campus electricity and fuel consumption; ensure strict compliance with the Philippine Energy Efficiency and Conservation Act (Republic Act No. 11285) and the Government Energy Management Program (GEMP) benchmarks; 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 7.2.4).

3. Scope

This policy applies to all Misamis University campuses, including academic buildings, colleges, laboratories, computer centers, libraries, administrative offices, clinics, dormitories, sports complexes, auditoriums, canteens, water pumping stations, electrical substations, standby generator plants, and outdoor lighting networks. It binds all University administrators, faculty, staff, learners, researchers, maintenance personnel, concessionaires, tenants, contractors, and service providers operating within or utilizing energy from University facilities.

4. Definitions

Term	Definition
Energy Efficiency and Conservation (EE&C) Plan	The comprehensive institutional roadmap and multi-year action plan detailing baseline energy consumption, quantitative reduction targets, engineering

	retrofits, operational controls, and monitoring mechanisms.
Energy Baseline (EnB)	The quantitative reference(s) providing a basis for comparison of energy performance before and after the implementation of EE&C interventions, normalized over a specified period.
Energy Performance Indicator (EnPI)	A quantitative value or measure of energy performance defined by the University, such as total annual kWh consumption, kWh per full-time equivalent (FTE) population, or Energy Use Intensity (EUI).
Energy Use Intensity (EUI)	A building's annual energy consumption relative to its gross floor area, expressed in kilowatt-hours per square meter per year (kWh/m²·year).
Significant Energy Use (SEU)	Electrical or thermal systems accounting for substantial energy consumption and/or offering considerable potential for energy performance improvement (e.g., HVAC systems, lighting networks, laboratory equipment, water pumps, and distribution transformers).
Demand-Side Management (DSM)	The modification of campus consumer demand for energy through load shifting, peak shaving, automated scheduling, and behavioral conservation controls.
Certified Energy Conservation Officer (CECO) / CEM	The designated and accredited professional from the Campus Engineering Office responsible for supervising the implementation of the University's EE&C Plan under RA 11285.
Outsourced Entity	Any concessionaire, tenant, contractor, or third-party service provider consuming electrical or thermal energy within University premises.

5. Responsibilities

Role	Responsibilities
University President or Authorized Official	Approves the multi-year Institutional EE&C Plan, authorizes annual kWh reduction targets, and allocates capital and operational budgets for energy efficiency programs.
Physical Plant / Campus Engineering Office & Designated Energy Officer (CECO/CEM)	Develops and executes the EE&C Plan; conducts ASHRAE Level 1 and Level 2 energy audits; monitors smart sub-meters, power factor, and transformer loading; executes retrofits; and submits statutory DOE energy utilization reports.
Quality Assurance Office	Audits compliance with the EE&C Plan under the ISO 21001 EOMS framework and compiles verified energy-reduction data for THE Impact Rankings (SDG 7.2.4).
Deans, Directors, Laboratory Heads, and Unit Heads	Enforce daily operational energy conservation rules within their units; appoint unit Energy Marshals; optimize classroom and laboratory utilization schedules; and report defective fixtures or HVAC units.
Information Technology (IT)	Implements campus-wide power management policies for desktop

Office	computers, servers, and network switches, including automated sleep/hibernation modes and server virtualization.
Property, Procurement, and Finance Offices	Enforce life-cycle cost analysis (LCCA) and DOE 5-Star / IE3+ energy efficiency specifications in all equipment purchases, and track monthly utility billing.
Employees, Learners, Concessionaires, and Tenants	Comply with thermostat setpoints, turn-off protocols, plug-load restrictions, and sub-metering rules across all campus spaces.

6. Procedure

6.1 Energy Baseline (EnB) Establishment and Energy Auditing

1. The Campus Engineering Office shall establish and maintain a rolling 3-year Energy Baseline (EnB) covering total grid electricity imported (kWh), on-site solar photovoltaic (PV) generation (kWh), and standby/fleet fuel consumption (Liters, converted to kWh-equivalent).

2. Comprehensive walk-through energy audits (ASHRAE Level 1) shall be conducted semi-annually across all campus buildings, while detailed engineering audits (ASHRAE Level 2)—including thermal imaging, lux-level mapping, and 7-day power quality logging—shall be performed annually on Significant Energy Uses (SEUs).

3. Building-level performance shall be evaluated using the standardized Energy Use Intensity (EUI) formula:

EUI (kWh/m²·year) = [Total Annual Energy Consumed (kWh/year)] / [Gross Floor Area (m²)]

6.2 Quantitative Energy Reduction Targets and Multi-Year Roadmap

To ensure measurable reductions in overall energy consumption, Misamis University enforces the following institutional targets under its 5-Year EE&C Plan:

Target Category / EnPI	Quantitative Reduction Target	Primary Engineering & Operational Strategy	Evaluation Frequency
1. Overall Campus Grid Energy Consumption (kWh)	Minimum 3% to 5% year-on-year reduction in normalized grid electricity consumption, achieving ≥15% cumulative reduction over a 5-year cycle.	Automated HVAC & lighting controls, load scheduling, behavioral DSM, and solar PV self-consumption.	Monthly / Annual
2. Building Energy Use Intensity (EUI)	Reduce average academic/administrative building EUI by ≥2.5% annually against the baseline year (kWh/m²·year).	Inverter VRF/split HVAC retrofits, 100% LED conversion, envelope shading, and cool roof coatings.	Semi-Annual / Annual
3. Peak Electrical Demand (kW) & Load Factor	Shave campus peak demand (kW) by ≥10% and maintain campus load factor ≥0.70.	Staggered HVAC start-up, BESS peak shaving, PV dispatch during midday peak (10:00 AM – 3:00 PM).	Monthly Billing Cycle

4. Distribution Technical Losses & Power Quality	Maintain system Power Factor ≥0.95 lagging, voltage unbalance ≤2%, and current total harmonic distortion (THDi) within IEEE 519 limits.	Automatic Power Factor Correction (APFC) banks, phase load balancing, and harmonic filters.	Quarterly Audit
5. Standby Generator & Fleet Fuel Consumption	Reduce stationary and mobile fossil fuel consumption (kWh-equivalent) by ≥3% annually.	Preventive engine maintenance, grid reliability coordination, solar-BESS backup, and 3-minute anti-idling.	Quarterly / Annual

6.3 Operational Demand-Side Management (DSM) Controls

All campus units must enforce the following daily operational controls for Significant Energy Uses (SEUs):

- **1. HVAC Systems (50%–60% of Campus Load):** Thermostats in all air-conditioned offices, classrooms, and libraries shall be locked at 24°C to 25°C. Air-conditioning units shall only be switched on 15 minutes prior to scheduled class or office start times and must be switched off 30 minutes before dismissal (coasting mode). Doors and windows must remain closed while cooling is active.
- **2. Lighting and Daylighting Networks (15%–20% of Campus Load):** Natural daylighting shall be utilized as the primary illumination source for perimeter rooms between 8:00 AM and 4:00 PM. Artificial lights must be switched off in unoccupied rooms, during lunch breaks (12:00 NN – 1:00 PM) where practicable, and immediately after class dismissal. Corridor and perimeter security lighting shall operate on automated timers, photocells, or motion sensors.
- **3. IT, Laboratory, and Plug Loads (15%–20% of Campus Load):** All desktop computers, monitors, printers, and laboratory instruments must be configured to enter sleep mode after 10 minutes of inactivity and must be completely powered down and unplugged at the end of each workday to eliminate phantom/vampire loads. Unauthorized personal appliances (electric stoves, space heaters, unapproved coffee makers, personal refrigerators) are prohibited in offices and classrooms.
- **4. Academic Space Consolidation:** The Office of the Vice President for Academic Affairs (VPAA) and Registrar shall consolidate evening, weekend, and summer classes into designated high-efficiency buildings to avoid energizing entire underutilized buildings.

6.4 Preventive Maintenance and Power Distribution Optimization

1. HVAC Preventive Maintenance: Maintenance personnel shall execute quarterly cleaning of air filters, evaporator/condenser coils, and cooling fins, and verify refrigerant charge pressures to prevent compressor overwork (which increases energy consumption by 15% to 30%).

2. Electrical Distribution Efficiency: Campus engineers shall conduct semi-annual infrared thermography inspections of main distribution panels (MDPs), circuit breakers, and busbars to eliminate high-resistance hot spots and I^2R losses. Phase load balancing shall be performed whenever phase current unbalance exceeds 10%.

3. Water Pumping and Mechanical Systems: Water supply tanks and booster pumps shall be operated using Variable Frequency Drives (VFDs) and scheduled outside peak tariff/demand hours where feasible. Pipeline leaks shall be repaired within 24 hours of detection to prevent wasted pumping energy.

6.5 Equipment Retrofitting and Smart Energy Management

1. Phased Replacement Program: Under the EE&C Plan, all remaining legacy non-inverter air-conditioning units, magnetic/electronic ballast fluorescent tubes, and standard-efficiency (IE1/IE2) motors shall be systematically replaced according to an annual capital retrofit schedule.

2. Smart Sub-Metering and EMS: Digital power meters with data-logging capabilities shall be installed across major building feeders to enable real-time load profiling, anomaly detection, and automated energy accounting.

3. Renewable Energy Integration: Rooftop Solar PV arrays and Battery Energy Storage Systems (BESS) shall be dispatched to offset daytime peak HVAC loads, directly reducing net grid energy imports.

6.6 Outsourced Services, Concessionaires, and Tenants

All canteen concessionaires, bookstore/copy-center operators, and campus tenants shall be individually sub-metered and billed for actual electricity consumption. Lease and concession agreements shall mandate the use of DOE-rated energy-efficient appliances, LED lighting, and compliance with campus operational turn-off hours.

7. Competence and Communication

The Designated Energy Officer and engineering staff shall maintain active certification/training as Certified Energy Conservation Officers (CECO) or Certified Energy Managers (CEM) under DOE guidelines and ISO 50001. Unit Energy Marshals, faculty, staff, and students shall undergo annual orientation on the University's EE&C Plan. Point-of-use reminders ('Switch Off When Not in Use' and '24°C Thermostat Standard' stickers) shall be affixed to all light switches and HVAC controls, and quarterly energy performance dashboards shall be shared with the academic community.

8. Records

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

- Approved 5-Year Institutional Energy Efficiency and Conservation (EE&C) Plan and Annual Action Plans
- Monthly electric utility bills (MOELCI-II), digital sub-meter logs, and peak demand (kW) records
- Building Energy Use Intensity (EUI) calculation sheets and Energy Baseline (EnB) workbooks
- Semi-annual ASHRAE Level 1/Level 2 Energy Audit reports and infrared thermography logs
- HVAC preventive maintenance logs, power factor correction logs, and phase-balancing records
- Equipment retrofit inventories and Life-Cycle Cost Analysis (LCCA) procurement records
- Annual Energy Utilization Reports (AEUR) and Annual Energy Efficiency and Conservation Reports (AEECR)
- Internal audit reports and ISO 21001 Management Review minutes

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

9. Monitoring and Evaluation

The Campus Engineering Office and Quality Assurance Office shall track the effectiveness of the EE&C Plan through monthly utility variance analysis, semi-annual energy audits, and the annual ISO 21001 Management Review. At a minimum, the University shall evaluate:

- **Total Annual Energy Consumption (kWh) and Percentage (%) Reduction:** Compared against the 3-year rolling Energy Baseline (EnB);
- **Normalized Energy Performance Indicators (EnPIs):** Campus EUI (kWh/m²·year) and per-capita consumption (kWh/FTE student and employee);
- **Renewable Energy Share (%):** Percentage of total campus electricity demand supplied by on-site Solar PV generation;
- **Distribution System Efficiency:** Average monthly campus Power Factor (target ≥0.95) and peak demand (kW) reduction; and
- **Audit Closure Rate (%):** Percentage of identified Energy Conservation Opportunities (ECOs) and non-conformances resolved within target timelines.

Buildings exhibiting a >5% unexplained increase in monthly kWh consumption shall trigger an immediate targeted engineering audit and corrective action.

10. Review and Continual Improvement

This policy and the multi-year EE&C Plan shall be reviewed annually during the Management Review and updated whenever there are changes in campus floor area (>10% expansion), Significant Energy Uses (SEUs), DOE/RA 11285 regulatory mandates, ISO 50001 / ISO 21001 standards, or Times Higher Education (THE) Impact Rankings criteria for SDG 7.

11. Noncompliance

Noncompliance with the EE&C Plan—including repeated failure to turn off HVAC/lighting systems in unoccupied spaces, unauthorized tampering with thermostat locks or sub-meters, operation of prohibited high-wattage personal appliances, or refusal by concessionaires to adhere to efficiency standards—shall result in written non-conformance notices, confiscation of unauthorized appliances, administrative or disciplinary action under University rules, and financial penalties or contract termination for third-party entities.

12. Related Documents and Legal References

Reference	Application
Republic Act No. 11285	Energy Efficiency and Conservation Act of 2019 and its Implementing Rules and Regulations (IRR); mandates institutional EE&C plans, designated energy conservation officers, and annual energy reporting.
ISO 50001:2018	Energy Management Systems — Requirements with guidance for use; establishes the Plan-Do-Check-Act framework for energy baselines, EnPIs, SEUs, and continual energy performance improvement.
IAEECC Resolutions & GEMP Guidelines	Inter-Agency Energy Efficiency and Conservation Committee guidelines establishing the 24°C thermostat setting, lighting/HVAC operational controls, and minimum 10% energy savings benchmarks.
Philippine Electrical Code (PEC) Part 1 & Part 2	Standards for electrical distribution efficiency, feeder voltage drop limits, power factor correction, harmonic mitigation, and smart metering.
ASHRAE Standard 100 & Procedures for Commercial	International engineering standards for energy efficiency in existing

Building Energy Audits	buildings and Level 1 / Level 2 / Level 3 energy auditing methodologies.
ISO 21001:2018	Educational Organizations Management Systems (EOMS); governs resource allocation, operational control, performance evaluation, and continual improvement.
University Documents	EOMS Manual; Energy-Efficient Building Design, Construction, and Renovation Policy (SDG 7.2.1); Institutional Carbon Management Policy (SDG 7.2.3); Sustainable Procurement Policy; and Records Retention Policy.