MISAMIS UNIVERSITY
Ozamiz City

Quality Assurance Office

Energy-Efficient Building Design, Construction, and Renovation Policy and Procedure

1. Policy Statement

Misamis University commits to reducing institutional energy demand, lowering greenhouse gas emissions, and enhancing indoor environmental quality through mandatory energy efficiency standards across the entire lifecycle of campus infrastructure. All new building constructions, major structural extensions, and facility renovations—whether internally executed or outsourced—shall be planned, designed, constructed, commissioned, and handed over in strict compliance with national green building regulations, electrical and mechanical engineering codes, and international energy efficiency standards.

The procurement and installation of inefficient building envelopes, uncertified high-consumption heating, ventilation, and air-conditioning (HVAC) systems, non-LED lighting fixtures, or unrated electrical distribution equipment are strictly prohibited. All capital projects and refurbishments must incorporate passive solar design, high-efficiency electrical and mechanical systems, smart metering, and renewable energy readiness prior to project approval and occupancy.

2. Purpose

This policy establishes institutional engineering and architectural controls that optimize campus energy performance, reduce operational utility costs, and protect the environment; demonstrate compliance with applicable Philippine legal, building, and energy regulatory requirements; 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 7.2.1).

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, and auxiliary structures. It governs all new building projects, structural expansions, space reconfigurations, building envelope upgrades, and electrical, mechanical, or lighting retrofits. It binds University administrators, physical plant and engineering personnel, procurement officers, external architects, consulting engineers, general contractors, subcontractors, suppliers, tenants, and concessionaires engaged in campus construction or renovation activities.

4. Definitions

Term	Definition
New Build	Any newly constructed standalone building, annex, or structural expansion adding gross floor area to the University campus.
Renovation	Any major refurbishment, retrofit, space reconfiguration, or replacement of building envelope components, lighting networks, HVAC systems, or electrical distribution infrastructure.

Energy Efficiency Standards	Mandatory technical benchmarks, codes, and minimum performance ratings governing building design, thermal envelope, lighting power density, equipment efficiency, and power quality.
OTTV / RTTV	Overall Thermal Transfer Value (walls) and Roof Thermal Transfer Value, measuring heat gain into the building envelope as defined by the Philippine Green Building Code.
LPD	Lighting Power Density, representing the maximum allowable lighting power load per unit area (W/m^2) for a specific functional space.
COP / EER / CSPF	Coefficient of Performance, Energy Efficiency Ratio, and Cooling Seasonal Performance Factor used to verify the minimum efficiency of HVAC and cooling equipment.
Commissioning	The systematic engineering verification process ensuring that all building systems perform interactively according to the design intent and the University's operational efficiency requirements.
Outsourced Entity	Any architectural/engineering firm, general contractor, specialty subcontractor, equipment supplier, or tenant executing construction or renovation works within the University.

5. Responsibilities

Role	Responsibilities
University President or Authorized Official	Approves the policy, enforces institutional accountability, and allocates capital budgets for energy-efficient infrastructure.
Physical Plant / Campus Engineering Office (or Designated Energy Officer)	Establishes technical design specifications; conducts engineering reviews of plans, load schedules, and thermal calculations; inspects ongoing works; leads system commissioning; and maintains compliance records under RA 11285.
Quality Assurance Office	Audits policy compliance under the ISO 21001 EOMS framework and compiles verified documentation for sustainability rankings.
Deans, Directors, and Unit Heads	Align unit space-renovation requests with this policy and disallow unauthorized structural or electrical modifications in their areas.
Property, Procurement, and Finance Offices	Enforce green procurement standards; verify DOE Energy Labels and equipment efficiency ratings prior to purchase; and incorporate mandatory energy-efficiency clauses into bidding documents and construction contracts.
External Architects, Engineers, and Contractors	Design and execute all works in strict conformance with the technical standards specified in this policy; submit engineering calculations, test reports, and as-built drawings; and rectify non-compliant installations at their own cost.

6. Procedure

6.1 Pre-Design Energy Planning and Design Review

Before any new build or renovation project is approved for bidding or implementation, the Physical Plant / Campus Engineering Office and appointed design consultants shall conduct a pre-design energy assessment.

Architectural and engineering plans must prioritize passive cooling strategies, optimal building orientation, natural daylighting, and natural ventilation where practicable.

No construction or renovation work shall commence without an approved Energy Efficiency Design Compliance Checklist verifying adherence to the mandatory standards in Section 6.2.

6.2 Mandatory Technical and Energy Efficiency Standards

All new builds and renovations must strictly satisfy the following minimum engineering standards by system category:

Building System / Component	**Applicable Code / Standard**	**Minimum Technical Compliance Requirement**
Building Envelope & Passive Design	Philippine Green Building Code (PGBC) (Referral Code of PD 1096); ASHRAE Standard 90.1	• Maximum OTTV ≤ 45 W/m^2 and RTTV ≤ 25 W/m^2 for air-conditioned spaces. • Installation of solar shading devices, low-emissivity (Low-E) or double-glazed fenestration where applicable, cool roofs (high Solar Reflectance Index), and thermal roof insulation. • Airtightness controls on conditioned rooms and laboratories to prevent conditioned air leakage.
HVAC & Mechanical Systems	PGBC; DOE Guidelines on Energy Conserving Design of Buildings (GECDB); Philippine Mechanical Engineering Code	• Mandatory use of inverter-driven Variable Refrigerant Flow (VRF) or high-efficiency split/packaged units meeting minimum CSPF / EER / COP thresholds under PGBC and DOE 5-Star energy labeling. • Demand-controlled ventilation and energy recovery ventilators (ERV) for high-occupancy spaces. • Complete thermal insulation on all chilled-water and refrigerant piping. • Zero-ODP (Ozone Depletion Potential) and low-GWP (Global Warming Potential) refrigerants.
Lighting & Daylight Controls	PGBC; PEC Part 1; DOE GECDB; ASHRAE 90.1	• 100% solid-state LED luminaires across all indoor and outdoor installations (minimum luminous efficacy ≥ 100 lm/W). • Maximum Lighting Power Density (LPD): Classrooms/Laboratories ≤ 8.0 W/m^2; Offices/Libraries ≤ 8.0 W/m^2; Corridors/Stairs ≤ 4.0 W/m^2; Exterior/Parking ≤ 2.5 W/m^2. • Mandatory occupancy/motion sensors in washrooms, corridors, and intermittently occupied spaces; daylight-linked dimming or zoned switching along perimeter windows.

Electrical Power Distribution & Metering	Philippine Electrical Code (PEC) Part 1 & Part 2; IEEE Std 519; RA 11285	• High-efficiency distribution transformers meeting DOE/NEMA premium efficiency standards. • Conductor sizing optimized to limit feeder and branch-circuit voltage drop to $\leq 3\%$ (and $\leq 5\%$ total from service entrance to farthest load). • Automatic Power Factor Correction (APFC) banks to maintain system power factor ≥ 0.95 lagging, plus harmonic mitigation where non-linear loads exceed 25%. • Dedicated digital sub-metering separated by load type (HVAC, lighting, plug loads, laboratories) for real-time energy monitoring.
Motors, Pumps & Vertical Transport	IEC 60034-30-1; PGBC	• All new or replacement electric motors for water pumps and fans must meet IE3 (Premium Efficiency) or IE4 (Super Premium Efficiency) standards. • Variable Frequency Drives (VFDs) required on variable-load pumps and air-handling units. • Elevators must utilize AC gearless variable-voltage variable-frequency (VVVF) drives with regenerative braking and automatic cabin lighting/ventilation sleep modes.
Renewable Energy & Microgrid Readiness	RA 9513 (Renewable Energy Act); PEC Article 690 & 706	• All new builds must incorporate structural roof load provisions (> 20 kg/m^2 reserve capacity) and pre-installed electrical raceways/combiner spaces for Rooftop Solar Photovoltaic (PV) systems. • Integration with existing campus PV microgrids, Battery Energy Storage Systems (BESS), or solar street lighting where technically feasible.

6.3 Sustainable Procurement and Material Verification

The Procurement Office and Campus Engineering Office shall verify technical data sheets, third-party laboratory test certificates, and Department of Energy (DOE) Philippine Energy Labeling Program (PELP) ratings before issuing purchase orders or approving contractor material submittals.

Second-hand, rewound, uncertified, or non-inverter air-conditioning units and legacy fluorescent/HID lighting fixtures shall not be procured or accepted as donations for campus renovations.

6.4 Construction Inspection and Quality Control

Campus engineers shall conduct scheduled site inspections at rough-in, pre-closure (above-ceiling/in-wall insulation and wiring), and equipment installation stages to verify compliance with approved plans.

Any unauthorized substitution of specified energy-efficient materials or equipment shall trigger an immediate Work Stoppage Order until corrected by the contractor.

6.5 Testing, Commissioning, and Handover
Prior to issuing a Certificate of Completion or authorizing building occupancy, the contractor and Campus Engineering Office must complete and document:

- Thermal & Envelope Verification: Inspection of roof/wall insulation continuity, glazing specifications, and door/window weather-stripping.

- Photometric & LPD Verification: As-built calculation of installed Lighting Power Density (W/m^2) and lux-level testing across representative rooms.

- HVAC Performance Testing: Measurement of airflow rates, refrigerant charge, thermostat zoning, and coefficient of performance under load.

- Electrical & Power Quality Testing: Insulation resistance, phase balancing, voltage drop verification, power factor measurement, and smart sub-meter calibration.

6.6 Post-Occupancy Energy Performance Evaluation
Within six (6) to twelve (12) months after occupancy of a new build or major renovation, the designated Energy Officer shall evaluate sub-metered consumption data to establish the building's actual Energy Use Intensity (EUI) in $kWh/m^2 \cdot year$ against design projections and implement tuning or operational adjustments as required.

6.7 Outsourced Services and Third-Party Controls
All architectural, engineering, construction, renovation, and lease contracts executed by the University shall mandate strict compliance with this policy. At a minimum, contracts shall require the provider to:

- Employ licensed architects, Professional Electrical Engineers (PEE), and Professional Mechanical Engineers (PME) to sign and seal energy-compliant plans and calculations;

- Submit full equipment submittals, IES photometric files, OTTV/RTTV worksheets, and DOE energy labels for written University approval prior to installation;

- Permit unannounced site inspections, testing verification, and technical audits by the University; and

- Replace non-compliant materials or systems and remedy energy performance deficiencies at no additional cost to the University prior to final billing release.

7. Competence and Communication
Campus engineers, maintenance personnel, and procurement staff shall receive periodic technical training on the Philippine Green Building Code, RA 11285 (Energy Efficiency and Conservation Act), PEC/PMEC updates, energy auditing, and building commissioning. External contractors and project personnel shall

attend a mandatory pre-construction orientation covering the University's energy efficiency requirements before commencing site work.

8. Records

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

- Approved Policy and Energy Efficiency Design Compliance Checklists
- Signed and sealed architectural, electrical, and mechanical plans, including LPD and OTTV/RTTV calculations
- Equipment submittals, technical brochures, and DOE Energy Label certificates
- Procurement contracts and Terms of Reference (TOR) containing energy-efficiency clauses
- Site inspection checklists and non-conformance/corrective action reports
- Testing and commissioning reports (lux levels, power quality, HVAC performance, sub-meter logs)
- As-built drawings and Building Energy Use Intensity (EUI) post-occupancy reports
- Internal audit and ISO 21001 Management Review records
- Records shall be controlled, 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 implementation through project design reviews, site inspections, commissioning audits, and annual energy reviews. At a minimum, the University shall evaluate:

- Percentage (%) of new builds and renovations with completed and approved Energy Efficiency Design Compliance Checklists (Target: 100%);
- Percentage (%) of newly procured HVAC, lighting, and motor equipment meeting PGBC and DOE 5-Star / IE3+ efficiency thresholds (Target: 100%);
- Installed Lighting Power Density (W/m^2) and envelope thermal performance (OTTV/RTTV) versus code limits;
- Post-occupancy Energy Use Intensity ($kWh/m^2 \cdot year$) reduction achieved in renovated facilities compared to pre-renovation baselines; and
- Number of contractor non-conformances and timely closure of corrective actions.

- Results shall be reported during the ISO 21001 Management Review to inform capital planning, campus master planning, and continual energy performance improvement.

10. Review and Continual Improvement

This policy shall be reviewed at least annually and whenever there are updates to the Philippine Green Building Code, Republic Act No. 11285, the Philippine Electrical or Mechanical Engineering Codes, ISO standards, or Times Higher Education (THE) Impact Rankings criteria for SDG 7.

11. Noncompliance

Noncompliance with this policy may result in disapproval of project designs, suspension of construction or renovation works, withholding of contractor progress payments, disqualification from future University bidding, disciplinary action for personnel under University rules, and recovery of rectification costs, without prejudice to applicable legal or regulatory liability.

12. Related Documents and Legal References

Reference	Application
Republic Act No. 11285	*Energy Efficiency and Conservation Act of 2019* and its IRR; mandates energy efficiency standards, designated energy conservation officers, and compliance for buildings and facilities.
Philippine Green Building Code (PGBC)	Referral Code of the *National Building Code of the Philippines (PD 1096)*; establishes mandatory minimum standards for OTTV, RTTV, LPD, HVAC efficiency, and building envelope performance.
DOE Guidelines on Energy Conserving Design of Buildings (GECDB)	Department of Energy technical standards for energy-efficient building envelopes, lighting, air-conditioning, and electrical distribution systems.
Philippine Electrical Code (PEC) Part 1 & Part 2	Standards for safe and efficient electrical installation, conductor sizing, voltage drop limits, power factor correction, sub-metering, and solar PV/BESS integration.
Philippine Mechanical Engineering Code (PMEC)	Standards for HVAC system sizing, ventilation rates, piping insulation, and mechanical equipment efficiency.
Republic Act No. 9513	*Renewable Energy Act of 2008*; governs on-site renewable energy generation, net metering, and solar PV integration in buildings.
ASHRAE Standard 90.1 & ISO 50001	International benchmarks for energy standard for buildings (except low-rise residential) and Energy Management Systems.
ISO 21001	*Educational Organizations Management Systems (EOMS)*; governs resource management, operational control, documented information, and continual improvement.
University Documents	EOMS Manual; Campus Master Development Plan; Sustainable Procurement Policy; Contractor Safety and Compliance Rules; Energy Conservation Policy; and Records Retention Policy.