

STRATEGIC REPORT (2050) :

NORTHERN TECHNICAL UNIVERSITY CLIMATE ACTION & NET ZERO ROADMAP (2050)



1. EXECUTIVE COMMITMENT

Northern Technical University (NTU) leverages its Technical and Engineering DNA to transform its campuses into a regional model for decarbonization. Serving a community of 18,384 students, NTU is transitioning from a traditional energy consumer to a "Prosumer" model, integrating smart technology with environmental stewardship.

2. COMPREHENSIVE GHG INVENTORY (2024-2025)

To ensure absolute transparency, NTU discloses its full-scope carbon footprint:

- Scope 1 (Direct Emissions): 198 tCO₂ (Fleet & Stationary Combustion).
- Scope 2 (Indirect - Energy): 1,200.8 tCO₂ (Purchased Electricity).
- Scope 3 (Value Chain): 9,927.3 tCO₂ (Calculated Student & Staff Commuting).
- Total Institutional Baseline: 11,326.1 tCO₂

3. KEY ACHIEVEMENT: 100% EFFICIENCY MILESTONE (COMPLETED 2025)

As of the 2024-2025 academic cycle, NTU has officially fulfilled its "Infrastructure Modernization Mandate," achieving a 100% transition rate in core energy systems:

- 100% LED Saturation (2025): Full replacement of legacy lighting with high-efficiency LED systems across all academic and administrative facilities.
- 100% Inverter HVAC Transition (2025): Complete upgrade of the university's cooling units to Eco-friendly Inverter Technology, resulting in a verified 45% reduction in peak electricity demand.
- Impact: This efficiency leap allowed the university to scale its operations for its growing student body while maintaining a downward emission trend per capita.

4. THE NET ZERO ROADMAP: STRATEGIC PHASES (2025–2050)

Phase 1: Energy Autonomy & Smart Grids (2025–2030)

- Target: 35% reduction in operational emissions.
- Action: Expanding the Hybrid Solar-Wind Microgrid to cover 40% of daytime energy needs.
- Innovation: Implementing AI-driven Building Management Systems (BMS) in engineering laboratories to optimize real-time power loads.



Phase 2: Disruptive Mobility & Scope 3 Mitigation (2030–2040)

- Target: 45% reduction in commuting emissions.
- Action: Launching the "Green Corridor" initiative, featuring solar-powered EV-charging plazas for students and staff.
- Policy: Formalizing Hybrid Learning Models for theoretical courses to reduce mandatory physical commuting days.

Phase 3: Circular Economy & Nature-Based Solutions (2040–2045)

- Target: 80% total carbon reduction.
- Action: Achieving the 10,000 Tree "Green Shield" milestone for natural carbon sequestration, managed by the Agricultural Technical College.
- Waste-to-Energy: Implementing a closed-loop organic waste system using on-campus anaerobic digesters.

Phase 4: Absolute Net Zero & Climate Positive Status (2045–2050)

- Target: 100% Net Zero Emissions.
- Action: Achieving full energy independence through advanced storage (Green Hydrogen/Solid-state batteries) and technical carbon capture pilots.

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