



Executive Plan

Sustainability, Climate and Energy Center
Misr University for Science and Technology (MUST)

April 2026



Executive Plan for the Sustainability, Climate and Energy Center

Introduction

In light of the growing attention to sustainable development, and in alignment with Egypt Vision 2030, the establishment of the Sustainability, Climate and Energy Center at Misr University for Science and Technology is a strategic initiative that supports research, innovation, and practical applications in environment, energy, and green technology, while strengthening the University's role in community service and achieving the United Nations Sustainable Development Goals. Sustainability does not mean environmental protection only. It means balancing economic development, environmental conservation, and quality of life. The 17 Sustainable Development Goals provide a global framework for a better future by 2030, integrating environment, energy, society, and the economy. These goals can only be achieved through scientific research, innovation, and collaboration among educational, governmental, and industrial institutions. Accordingly, universities act as hubs of knowledge, research, community service, and practical solutions to contemporary challenges. The proposed Center is therefore a platform combining research, implementation, training, and capacity building.

Vision

For Misr University for Science and Technology to become a leader in sustainability, environmental studies, and environmental innovation, and a distinguished regional center for research, training, and capacity development in sustainable development fields.

Mission

The Center seeks to promote sustainability concepts and practices within the University and the community through innovation, capacity building, and cooperation with governmental and industrial sectors to achieve positive and sustainable environmental, economic, and social impact.

Objectives

The Center aims to raise awareness of sustainable development among students and faculty, support applied research in renewable energy and resource management, implement green initiatives inside and outside the University to reduce the carbon footprint, cooperate with engineering and medical industries to achieve the SDGs, and build partnerships with local and international institutions in green innovation fields. It can also play an important role in environmental performance measurement, carbon footprint reduction, sustainable construction, clean energy, and resource management, thereby supporting the University's academic and research reputation, attracting scientific partnerships and research funding, and providing practical training opportunities aligned with future labor market requirements.

Strategy

The Center's strategy is based on integrating sustainability into education, scientific research, and community service through initiatives, periodic reporting on University performance in energy, water, and

waste, and cooperation among faculties, particularly the Faculty of Engineering, to implement practical applications linked to the SDGs.

Center Tasks

Prepare sustainability-related studies and initiatives; organize courses and training workshops in climate, energy, and sustainable environment; monitor the University's environmental performance and develop relevant indicators; support innovation in student sustainability projects; and cooperate with governmental and industrial entities to achieve common goals.

Target Groups

Students from all faculties, faculty members and teaching assistants, administrators and University staff, civil society institutions, and the industrial sector.

Organizational Structure

Board of Directors chaired by the University President and including the Vice President for Community Service and Environmental Development, a General Supervisor, an Executive Director, subunit coordinators, technical and administrative work teams, and an Advisory Board including experts from governmental and industrial sectors.

Subunits

Climate Change, Natural Resources Management and Smart Sustainable Agriculture; Sustainable Construction, Green Building and Smart Cities; New and Renewable Energy and Energy Efficiency; Asset Operations, Water and Waste Management; Capacity Development and Training; Partnerships and Community Service; and Carbon Footprint.

In conclusion, investing in sustainability today is an investment in a more balanced and secure future for generations to come, and it is the path toward genuine development that combines economic progress with environmental protection.

Detailed Executive Plans of the Center Units

Executive Plan for the New and Renewable Energy and Energy Efficiency Unit

This plan was prepared by the Sustainability, Climate and Energy Center at MUST as a practical approach to improving the environmental performance of campus buildings. Instead of complex solutions that may disrupt operations, it focuses on realistic measures implemented gradually without affecting normal University operations. The core concept is to improve the efficiency of existing systems, especially through better utilization of the current 250 kVA solar energy system. Proposed projects aim to reduce unnecessary energy consumption, improve water efficiency, and provide better control over building operations.

Implementation Methodology

The plan will be implemented in phases to ensure smooth and organized implementation. The methodology adopted by the Center ensures that sustainability initiatives are not only implemented efficiently but also maintained and developed over time. It combines infrastructure development, capacity building, and stakeholder engagement so that sustainability becomes embedded in both the physical environment and the institutional culture.

Phase 1 - Pilot implementation (0-3 months): test smart building systems, LED lighting upgrades, and water leak detection within the Student Services building.

Phase 2 - Expansion and monitoring (3-6 months): install energy monitoring systems, implement automated irrigation, gather baseline data, and analyze performance.

Phase 3 - Integration and optimization (6-12 months): implement a BMS, integrate systems into one platform, and connect the BMS to the existing 250 kVA solar system.

Technical Implementation - Infrastructure Projects

The technical aspect focuses on improving building performance using practical and scalable systems that can be installed without major structural modifications and expanded gradually.

Smart building systems for occupancy-based control.

Automated irrigation systems for efficient water use.

Real-time energy monitoring systems.

Water leak detection systems to reduce losses.

LED lighting systems for energy efficiency.

Building Management System (BMS) for centralized control.

Capacity Building and Training Programs

To ensure long-term success, the plan includes faculty development workshops, a certified Green Skills program with beginner, intermediate and advanced levels in energy efficiency, renewable energy and circular economy, and an industry-academia fellowship program that engages students and trainees in real projects with industrial partners.

Community Engagement and Industry Collaboration

Sustainability efforts will extend beyond campus through targeted engagement. The Center will provide technical support and training for SMEs and the local community, focusing on cost reduction through efficient resource use, and will build partnerships with associations, NGOs and industry to raise awareness and implement joint initiatives.

Governance, Performance Monitoring and Future Expansion

The plan will be implemented under the leadership of the Sustainability Center in coordination with the Renewable Energy Unit, Maintenance and Facilities Department, Information Systems and Digital Transformation Department, and Financial Department. Data will be collected through monitoring systems and dashboards, monthly performance reports will be prepared, and key indicators such as

energy and water use will be tracked. After the pilot succeeds, systems will be expanded to additional buildings and advanced analytics can be introduced to improve performance.

Building Management System (BMS) Project Details

Project idea: implement a central building management system to monitor and control building operations including HVAC, lighting, and energy consumption. The central system monitors temperature, occupancy and energy use, adjusts HVAC and lighting automatically, links with the solar system, and provides dashboards and real-time analytics. It is suitable for full buildings or multi-floor applications. Expected impact: 25-40% energy reduction, significant emissions reductions, and improved solar energy efficiency.

Conclusion

This executive plan represents a practical and realistic pathway for enhancing sustainability at MUST. By combining technical upgrades such as smart building systems, energy monitoring and BMS with capacity development and community engagement, it ensures that sustainability becomes a long-term institutional practice. Connecting the plan with the existing solar system allows better alignment between energy production and consumption, improving efficiency and reducing reliance on conventional sources. The plan is flexible, scalable and applicable within the University's current operational framework, supporting MUST's transformation into a leading smart and sustainable university.

Executive Plan for the Capacity Development and Training Unit

This plan serves as an operational roadmap for implementing the strategic plan. The Unit aims to build accredited competencies that enhance the integration of scientific research and practical application.

Executive Programs and Operational Needs

Faculty development and sustainability integration: intensive workshops enabling faculty to integrate sustainability concepts into curricula, within 6-12 months. Needs include specialists and trainers in green instructional design, internal and external training grants, and digitally equipped training rooms.

Certified Green Skills track: progressive training courses at beginner, intermediate and advanced levels covering energy efficiency, solar energy, and circular economy, within 12-18 months. Needs include accredited competency frameworks, tools for carbon footprint and climate risk assessment, and a digital platform for blended learning.

Industry-academia sustainability fellowships: link trainees with real projects in energy companies, factories, and ministries under joint supervision, within 6-12 months. Needs include activation of strategic partnerships, field supervision mechanisms, and targeting nearby industrial clusters.

SME and local community empowerment: technical consultations and subsidized courses on cost reduction through energy efficiency and access to green finance, within 12-18 months. Needs include ESG experts, financing mechanisms for applied training, and field visits to target facilities.

Joint environmental initiatives with community organizations and relevant industry leaders: design initiative content and cooperation protocols to deepen the sustainability ecosystem within the University, within 3-6 months. Needs include engagement with relevant associations, studying funding options for student research, and exploring practical training opportunities.

General Management Requirements

Human resources: form specialized work teams from available staff at the Center. Studies: immediately begin needs-assessment studies for graduates, industry, and civil society to identify skills gaps accurately. Technology: use the available digital infrastructure to support the Unit's objectives.

Conclusion

Disciplined implementation of this plan will consolidate MUST's position as a leading university in sustainability at local and regional levels.

Executive Plan for the Sustainable Construction, Green Building and Smart Cities Unit

Project: Transforming University building facades into smart green environmental systems. Vision: for MUST to become the first campus in Egypt and the Middle East to adopt green facade systems as functional infrastructure rather than decorative elements, reducing carbon footprint and enhancing academic quality of life. Mission: convert 40% of exploitable eastern, western and southern facades into living walls by 2030, while creating a living laboratory for sustainability and climate engineering education.

Why Green Facades?

Case studies in similar climates indicate that facade surface temperature in July noon can fall from 65-70°C to 32-38°C, indoor temperature without AC can drop from 38-42°C to 28-32°C, cooling energy consumption may decline by around 30%, suspended dust may improve by 60%, and reflected facade noise may be reduced by 17 dB.

Advanced Technical Design - Hybrid Smart Facade System

Level A - Low-cost climbing facade: galvanized steel rope nets fixed 30 cm from the wall, with a bottom planter and drainage layer; plants include Boston ivy, star jasmine, and seasonal ornamental gourd. Approximate irrigated load: 30 kg/m² without additional structural support.

Level B - High-performance modular living wall: recycled polypropylene modules with lightweight growth media, drip irrigation with pressure-compensating valves, rainwater tanks, ESP32 controller, soil moisture, facade temperature and rain sensors, and mobile monitoring application. Drought- and salinity-resistant species include Sedum reflexum, Delosperma cooperi, Aptenia cordifolia, Gazania rigens, Campanula poscharskyana, creeping thyme and peppermint.

Level C - Solar-green hybrid system: transparent polycrystalline solar panels installed above the modular living wall at a 15-degree angle to generate about 50 W/m², shade plants and reduce water demand by 20%.

Implementation Plan - Four Phases over Five Years

Phase 1 - Preparation and studies (months 1-4): preliminary budget EGP 200,000; outputs include engineering reports for five nominated buildings, a final plant list with nursery trials, and preliminary design for the central library facade.

Phase 2 - Distinguished pilot project (months 5-12): Faculty of Engineering south-west facade, 200 m²; hybrid system with 80 m² climbing facade and 120 m² modular smart-control facade; budget EGP

450,000; success indicators include a 4°C reduction in south-facing rooms after six months, >95% plant survival, and training 15 students.

Phase 3 - Expansion to four main buildings (years 2-3): central library, Basic Sciences building, Student Center, and student housing, with total budget EGP 1.8 million funded by green loan and optional green student fees subject to student council approval.

Phase 4 - Campus-wide deployment and urban integration (years 4-5): target 10,000 m2 of green facades, create a vertical ecological corridor between faculty buildings, and support financial sustainability by selling generated carbon credits in voluntary carbon markets.

ROI, Maintenance, Academic Integration and Community Engagement

For a typical 500 m2 facade, a smart modular installation may cost EGP 1.2 million with annual savings of EGP 245,000 from lower cooling bills, reduced facade replacement, and improved air quality, leading to a simple payback of about 4.9 years and a 20-year net saving of around EGP 3.7 million without counting educational and intangible benefits. Maintenance follows a participatory model, with weekly sensor/filter checks by trained students, monthly pruning by agricultural maintenance staff, quarterly plant replacement, semiannual structural checks, annual tank and pump cleaning, and an estimated annual cost of EGP 29,000. Academic integration includes new courses in living wall design and implementation, plant physiology under harsh conditions, green IoT irrigation systems, and green infrastructure economics, as well as graduation projects, live QR-code dashboards, weekly sustainability tours, design competitions, the GreenFace mobile app, and an annual planting day. Committee requirements include approving EGP 200,000 for the feasibility study, designating the Faculty of Engineering building as the official pilot site, and assigning a technical team to develop detailed designs within three months.

Executive Plan for the Partnerships and Community Service Unit

Vision: to become an influential link between the University and society for genuine sustainable development. Mission: build effective strategic partnerships and deliver community initiatives that support environmental, economic, and social sustainability.

Strategic Objectives (1-3 years)

Create a network of partnerships with governmental, private-sector and civil-society entities.

Implement community service programs linked to sustainability.

Support the application of sustainability concepts beyond the University.

Attract funding and grants for community projects.

Strengthen the University's role as a development influencer.

Main Workstreams

Strategic partnerships: prepare a database of potential partners from energy, construction and industrial companies, government entities and civil society; sign cooperation protocols; organize annual partnership forums.

Community service: implement environmental, health and energy awareness convoys; campaigns for water and electricity conservation; small local projects such as recycling; examples include Green University - Green Community and solar energy workshops for families.

Training and capacity building: train students in community work; offer programs for partners; and organize workshops in green building, waste management and energy efficiency.

Joint projects: implement applied projects with partners such as small solar stations, waste recycling, and development of informal areas.

Marketing and communication: create a media identity for the unit, manage social media pages, publish sustainability reports, and organize conferences and events.

First-Year Timeline

Q1: establish the Unit, prepare partner database, start outreach.

Q2: sign the first 3-5 protocols and launch the first community initiative.

Q3: implement training programs and start a joint project.

Q4: evaluate performance, issue an annual report, and expand partnerships.

Funding Sources and Evaluation Tools

Corporate sponsorships, international grants, paid projects, and consultancy services.

Monthly reports, KPI dashboard, satisfaction surveys, and impact assessment.

Signatures

Executive Director of the Center

Dr. Wael Bahloul

General Supervisor of the Center
Dean of the Faculty of Engineering

Prof. Maged Ezzat Georgy

