

Sustainability Strategy

Northern Technical University (NTU)



Commitment to Sustainability and Climate Action

Northern Technical University (NTU) is committed to advancing sustainable development and reducing greenhouse gas (GHG) emissions through responsible environmental management and institutional transformation aligned with global sustainability frameworks and national environmental priorities.

The university aims to progressively reduce its carbon footprint and contribute to climate change mitigation by integrating sustainability principles into education, research, campus operations, and community engagement.

NTU's sustainability strategy outlines a comprehensive framework for minimizing the environmental impact of university activities while promoting sustainable lifestyles within society.

Towards a Sustainable University Campus

Recognizing the urgent global challenges posed by climate change, Northern Technical University has prioritized reducing the environmental impacts associated with campus operations and academic activities.

University Vision

NTU aspires to be a leading educational institution that promotes sustainability at regional and international levels by reducing environmental, economic, social, and health impacts resulting from resource consumption. The university integrates sustainability into its core missions of:

- Teaching and learning
- Scientific research
- Community awareness
- Institutional partnerships
- Capacity development and supervision

Universities operate as complex systems involving laboratories, workshops, educational activities, transportation systems, energy consumption, and social engagement. These activities can significantly influence environmental performance; therefore, NTU seeks to systematically identify environmental impacts and implement measures to reduce them.

Campus Sustainability Strategy



Northern Technical University recognizes the importance of minimizing operational impacts on climate and the environment and has adopted proactive institutional measures aimed at enhancing sustainability performance.

Key Sustainability Policies

1. Conducting institutional greenhouse gas emissions inventories to identify emission sources and quantities associated with campus operations.
2. Utilizing emissions data to establish measurable reduction targets and implementation plans.
3. Supporting long-term carbon reduction pathways aligned with international sustainability objectives.
4. Implementing energy and water conservation measures through infrastructure modernization and behavioral awareness programs.
5. Promoting renewable energy adoption within campus facilities.
6. Establishing waste reduction and recycling initiatives.
7. Encouraging sustainable transportation practices among students and staff.
8. Creating institutional committees responsible for monitoring sustainability implementation and progress.
9. Enhancing sustainability awareness through academic and extracurricular engagement.

NTU integrates sustainability considerations into institutional planning processes to ensure environmentally responsible campus development and operations.

Integrated Sustainability Framework

Northern Technical University adopts an integrated approach to campus sustainability through three strategic pillars:

1. **Environmental Management Systems**
Implementing structured environmental monitoring and performance improvement mechanisms.
2. **Community Participation and Social Responsibility**
Encouraging stakeholder engagement and strengthening partnerships supporting sustainable development.
3. **Sustainability in Teaching and Research**
Embedding sustainability concepts within curricula, research activities, and innovation initiatives.

Challenges in Achieving Sustainability Goals



While NTU is committed to sustainability advancement, several challenges remain:

- **Behavioral Transformation:** Encouraging sustainable practices among the university community requires continuous awareness and cultural change.
- **Infrastructure Constraints:** Existing facilities may require upgrades to meet sustainability standards.
- **Institutional Coordination:** Sustainability implementation requires collaboration across departments and external stakeholders.
- **Long-Term Implementation:** Achieving measurable sustainability outcomes demands sustained planning and institutional commitment.

Despite these challenges, NTU continues to strengthen its sustainability framework and enhance institutional resilience.

Action Plan for Carbon Footprint Reduction

Northern Technical University implements a comprehensive action plan aimed at reducing greenhouse gas emissions and improving environmental performance.

Key Initiatives

1. Energy Efficiency Improvements

- Installation of LED lighting systems.
- Upgrading HVAC and energy management systems.
- Improving building insulation and operational efficiency.

2. Renewable Energy Development

- Deployment of solar energy systems on campus.
- Increasing reliance on renewable energy sources to reduce fossil fuel consumption.

3. Sustainable Transportation

- Encouraging walking, cycling, and shared transportation.
- Supporting reduced vehicle emissions through awareness initiatives.

4. Waste Management Programs

- Recycling initiatives.
- Waste reduction and responsible disposal practices.



5. Sustainable Food Practices

- Promoting responsible food consumption.
- Reducing food waste and supporting environmentally responsible sourcing.

6. Education and Awareness

- Sustainability literacy programs.
- Workshops, campaigns, and training activities promoting environmental responsibility.

7. Green Building Principles

- Applying sustainable design standards in new construction and renovation projects.
- Maximizing natural lighting and energy-efficient architecture.

8. Sustainable Procurement

- Prioritizing environmentally friendly materials and energy-efficient equipment.

9. Water Conservation Measures

- Installation of water-saving fixtures.
- Sustainable landscaping practices to reduce water consumption.

10. Community Engagement

- Collaboration with local organizations to promote sustainability initiatives.
- Participation in environmental awareness activities.

11. Research and Innovation

- Supporting interdisciplinary sustainability research.
- Developing solutions addressing environmental and climate challenges.

Commitment to Carbon Neutral University

Climate change poses increasing challenges for energy, water resources, and supply. In response to these challenges, Northern Technical University has implemented a policy that mandates both staff and students to actively participate in efforts to conserve electricity and water

Energy Efficiency: Policies encourage the use of energy-efficient building materials, designs, and technologies to reduce energy consumption during both the construction and operational phases of campus facilities.



- **Sustainable Materials:** The university promotes the use of sustainable and eco-friendly building materials with a lower environmental impact, such as recycled materials and renewable resources, in all construction and renovation projects.
- **Water Conservation:** The university implements policies that require the installation of water-efficient fixtures, rainwater harvesting systems, and landscaping practices that minimize overall water usage across campus.
- **Waste Reduction:** Northern Technical University encourages construction practices that minimize waste generation and promotes the recycling and reuse of construction materials to foster a circular economy on campus.
- **Indoor Air Quality:** Ensuring that university buildings provide a healthy indoor environment is a priority. This includes proper ventilation systems, the use of low-VOC (volatile organic compounds) materials, and effective pollutant control measures.
- **Site Selection:** The university promotes responsible site selection for new developments, aiming to minimize environmental disruption and preserve natural habitats within and around the campus.

Northern Technical University (NTU) is taking significant steps to transition its energy sources from fossil fuels to renewable energy through a comprehensive three-step plan aimed at achieving 100% green energy and zero emissions.

Three-Step Energy Transition Plan

Initial Installation of Photovoltaic (PV) Systems: NTU has begun the installation of photovoltaic panels on university buildings, specifically designed to meet the electrical demand of each building. This step marks the university's commitment to utilizing renewable energy resources effectively.

- ❖ **Expansion of PV Capacity:** By the academic year 2026-2027, NTU plans to install over 8 MW of photovoltaic capacity to fulfill the entire energy demand of the university, including electricity, cooling, and heating. This initiative positions NTU as a pioneering institution in Iraq, aiming to become the first university to achieve 100% renewable energy and zero emissions.
- ❖ **Integration with the National Grid:** By 2027-2028, NTU intends to connect its local electrical grid with the National Grid, allowing the export of surplus energy generated by the photovoltaic systems. This integration aims to reduce the overall emissions associated with electricity production, enhancing sustainability efforts on a larger scale.

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Sustainable Solutions for Lighting and Climate Control



- ❖ One significant source of emissions comes from the street lighting system. As part of its sustainability efforts, NTU is leading the way by transitioning to solar-powered street lighting, which operates entirely on solar energy with zero emissions. This initiative is set to be completed by 2025.
- ❖ Given Iraq's extreme temperatures hot summers and cold winters efficient heating and cooling systems are crucial for NTU. Between 2024 and 2026, the university plans to implement the following actions to reduce energy consumption for heating and cooling:
- ❖ Double-Glazing Windows: Installation of double-glazed windows across all university buildings will reduce energy waste by approximately 70%.
- ❖ High-Efficiency HVAC Systems: NTU will utilize highly efficient Variable Refrigerant Flow (VRF) systems for heating and cooling, which consume less than 20% of the energy used by conventional systems while providing the same level of comfort.
- ❖ LED Lighting: The internal lighting will be upgraded to LED technology to minimize electrical losses and reduce the heat generated by traditional lighting sources, thereby lowering the cooling energy requirements.

Collaborative Efforts for Community Improvement

- ❖ NTU is dedicated to collaborating with national and international organizations to reduce emissions and enhance community well-being. The university is actively supporting projects that leverage new technologies, such as:
- ❖ Photovoltaics for Water Filtration and Desalination: Implementing systems powered by solar energy to provide clean water solutions.
- ❖ Innovative Heating and Cooling Technologies: Developing systems that utilize solar radiation for efficient temperature control.
- ❖ Additionally, NTU aims to support scientists and researchers in innovating new technologies to mitigate greenhouse gas emissions through its Renewable Energy Research Center (RERC).

Research and Community Awareness Initiatives

- ❖ NTU conducts numerous practical experiments in the Renewable Engineering Department's laboratories, supporting researchers in discovering viable solutions for societal challenges. The RERC focuses on advancing research in renewable energy technologies to foster sustainable community practices.

- ❖ Furthermore, NTU is committed to raising awareness about the importance of environmental stewardship, conducting campaigns at both the university and community levels to promote the planting and care of trees essential components in the fight against climate change.



Northern Technical University Established the Renewable Energy Research Center (RERC)

The [Renewable Energy Research Center](#) (RERC) was established in 2023, under the approval of the Ministry of Higher Education and Scientific Research (5223 on 19/6/2023) and the University decree (7/37/7062 on 12/7/2023) issued by the Northern Technical University. The center aims to provide a specialized research center focusing on developing alternative and environmentally friendly energy sources to tackle the challenges of traditional fuel running down. It connects directly with the presidency of the Northern Technical University.

RERC Objectives

The objectives of the Renewable Energy Research Center include but not limited:

1. Developing new techniques for utilizing renewable energy more efficiently.
2. Conducting research involving the study and analysis of climate change impacts and developing sustainable solutions to mitigate them.
3. Raising awareness about the importance of renewable energy and sustainability in Iraqi society.
4. Collaborating with the industrial and governmental sectors to implement new technologies in the field of renewable energy.
5. Providing training and education for engineers and researchers in the field of renewable energy.
6. Encouraging innovation and developing policies that promote the use of renewable energy.
7. Providing consultation and technical support for projects related to renewable energy.
8. Contributing to achieving sustainable energy goals at the local and global levels.

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Northern Technical University Established the Center of Technical Research (CTR)



Vision

The [Technical Research Center](#) was established on 6/1/2022, pursuant to the administrative order issued by the Ministry of Higher Education and Scientific Research for the following reasons:-

1. Due to the need of society and the formations of the Ministry of Higher Education and Scientific Research to complete an applied research line that addresses health and environmental problems
2. Cooperating with institutions affiliated with the Ministry of Health to develop strategies and mechanisms for applied scientific research in the field of bioterapy and early detection of incurable, infectious, chronic and genetic diseases, in addition to developing a mechanism to confront epidemics, communicable diseases and pandemics
3. In addition to providing a work environment for alternative medicine and experimental treatment by separating and purifying non-toxic natural medical products and methods of adopting them in the therapeutic field for many diseases. Given the great importance of the center, its current association is directly with the presidency of the Northern Technical University.
4. Raising the scientific level of researchers, faculty members and university students by supporting graduation projects and completing applied research that is eligible for publication in local and international scientific journals classified within Scopus containers and raising the university's global ranking.
5. To establish a world-class institution at the forefront of scientific and technological innovation, dedicated to advancing human health, sustainability, and societal progress. Our vision is to lead groundbreaking research in cancer and genetics, contributing to the development of life-saving therapies and diagnostic tools. We aim to combat global health challenges by focusing on the prevention and control of communicable diseases through cutting-edge research and collaboration. Additionally, we strive to unlock the potential of natural products, exploring their therapeutic applications and sustainable utilization for the benefit of humanity and the environment.

Objectives:

1. Providing an integrated research work environment that simulates local and international research centers.
2. Developing scientific plans represented by holding conferences, scientific courses, seminars, workshops and developments.
3. Creating a periodic scientific journal for the center that plays a role in publishing solid scientific research.
4. Raising the university's classification level by supporting the publication of research in local and international forums and journals within Scopus and web of science containers.

5. Establishing warehouses for each of the natural products in addition to establishing a plant herbarium in order to classify medicinal plants to benefit from their metabolic products, which are classified as an alternative treatment that does not cause any health damage.



6. Establishing a repository for healthy and transformed cell lines that are globally approved as a first line for testing any new vaccine or treatment.

7. Developing plans to identify rare specializations in postgraduate studies in particular, which are needed by educational and health institutions.

Missions:

1. Effective contribution to activating scientific research and providing a suitable work environment for applied research work within the university formations and the rest of the universities of the Ministry of Higher Education and Scientific Research in addition to the rest of the relevant state institutions and specialization, which includes cancer and hereditary blood diseases in addition to communicable and epidemic diseases and the uses of natural medical products within the field of alternative medicine in light of the emergence of resistance to chemotherapy and radiation doses and their risks to the body in addition to the spread of resistance of pathogenic microorganisms to a wide spectrum of antibiotics.

2. Effective contribution to spreading the culture of early genetic screening of tumors and distinguishing malignant from benign ones in order to contain the disease in its early stages before it develops and spreads in the body's organs, making it difficult to control.

3. Training scientific and practical cadres from permanent staff and students on modern techniques in laboratory diagnosis and early detection of diseases.





Charge parking at NTU campus





Renewable energy that reduces purchased electricity for Heating water, HVAC systems, and lighting



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Adopt healthy and sustainable transportation options (shuttle bus, bicycles, and friendly path-ways)









Programs implemented by Northern Technical University for [wastage recycle](#):





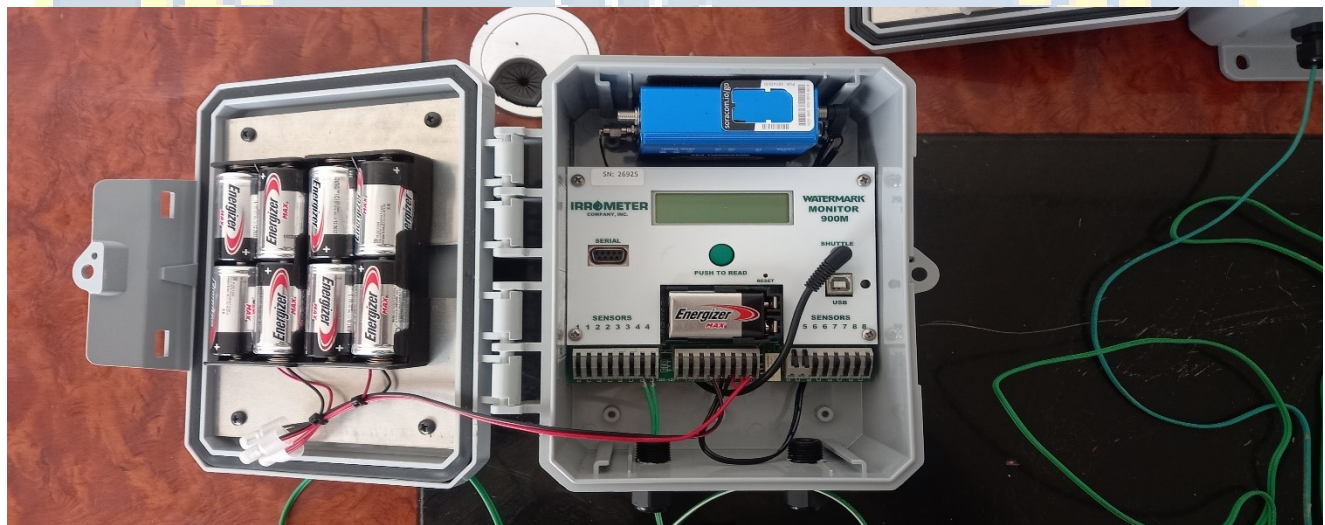




Irrigating plants at the Northern Technical University using Internet of Things technology (IOT) is one of our programs that has been implemented on our campuses for saving water:



The program of water recycling implementation in the main campus of the Northern Technical University consists of recycling waste water to be used for garden sprinkler system along with washing cars, cleaning, and toilet flushing. Moreover, rain water is collected using underground concrete blocks and an artificial lake and several canals that found for the purpose of saving rainwater to be fully-recycled following several stages of water treatment, including sand filtration and UV filtration before flow to tap



<https://drive.google.com/drive/folders/1cEUJqbBG6IFsPAAZCG0kKVfGhGYosJRH?usp=sharing>
<https://ntu.edu.iq/water-conservation-program-implementation/>
<https://ntu.edu.iq/water-recycling-program/>