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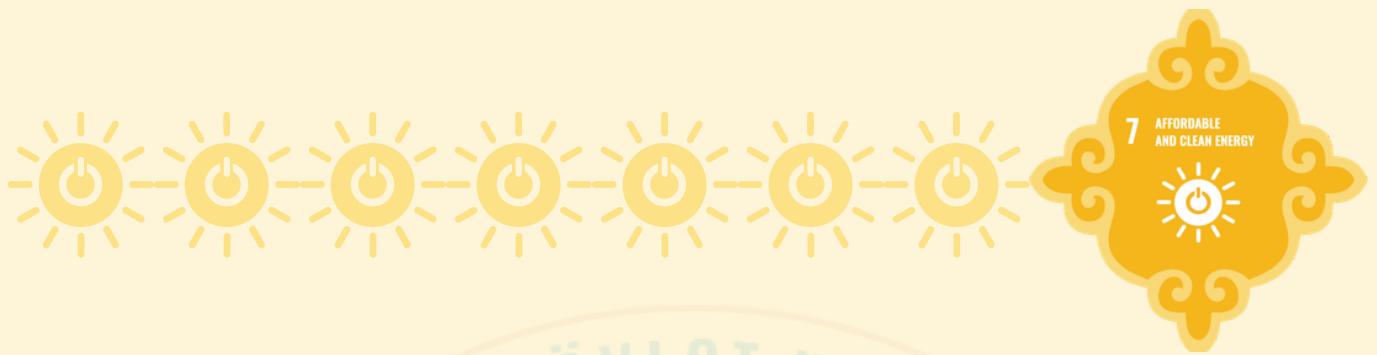
GOALS

**SUSTAINABLE
ENERGY,
SUSTAINABLE
FUTURE**

**7 AFFORDABLE AND
CLEAN ENERGY**



THE GLOBAL GOALS



Introduction

Ensuring access to affordable, reliable, sustainable, and modern energy remains a central objective of Sustainable Development Goal 7 (SDG 7). In 2025, Nakhchivan State University (NSU) strengthened its institutional commitment to clean and efficient energy systems through the continued expansion of renewable energy production, systematic improvements in campus-wide energy efficiency, and enhanced engagement of students and academic staff in energy-related research and innovation.

Building upon the infrastructure, monitoring systems, and educational initiatives established in previous years, NSU further integrated solar and wind technologies into its campus operations while reinforcing awareness, capacity building, and applied learning in sustainable energy. The University's activities are aligned with SDG 7 targets 7.1 (universal access to modern energy services), 7.2 (increased share of renewable energy), and 7.3 (improved energy efficiency).

This 2025 report highlights NSU's measurable progress toward a greener and more sustainable energy model through technical advancements, academic contributions, and student engagement in sustainable energy initiatives.

Energy Infrastructure and Efficiency Improvements

In 2025, NSU continued to modernize its energy infrastructure with a focus on reducing environmental impact, lowering operational costs, and improving system efficiency. Energy efficiency measures were implemented across academic buildings, dormitories, and administrative facilities through smart design, automation, and technology integration.

Solar-powered lighting systems installed in previous years were expanded to additional outdoor areas, further reducing reliance on grid electricity. Motion-sensor LED lighting and automated HVAC controls were extended campus-wide to optimize energy use during non-peak hours and low-occupancy periods.



EXCITING LESSON IDEAS TO TEACH STUDENTS ABOUT SDG 7: AFFORDABLE AND CLEAN ENERGY

Key Achievements in Campus Energy Efficiency (2025)

- Full replacement of indoor lighting systems with LED units across all classrooms, libraries, and laboratories (100% coverage)
- Thermal insulation upgrades completed in three major faculty buildings, resulting in an estimated 16% reduction in winter heating demand
- Deployment of automatic lighting sensors in corridors, restrooms, and low-traffic areas across nine buildings
- HVAC system optimization in administrative and academic blocks, achieving an average energy-use reduction of 13.1%

Energy Monitoring and Management

To support data-driven energy management, NSU expanded its monitoring systems in 2025:

- Real-time electricity monitoring dashboards were installed in six campus buildings, doubling coverage from the previous year
- Smart scheduling systems were refined to minimize unnecessary lighting and equipment operation during evenings and weekends
- Monthly energy performance reviews were institutionalized to evaluate system efficiency and user behavior

These measures strengthened accountability and enabled timely operational adjustments.

Renewable Energy Initiatives

NSU continued to expand its renewable energy portfolio in 2025, further reducing dependence on fossil fuels and supporting the transition toward a low-carbon campus.

Solar Energy Projects

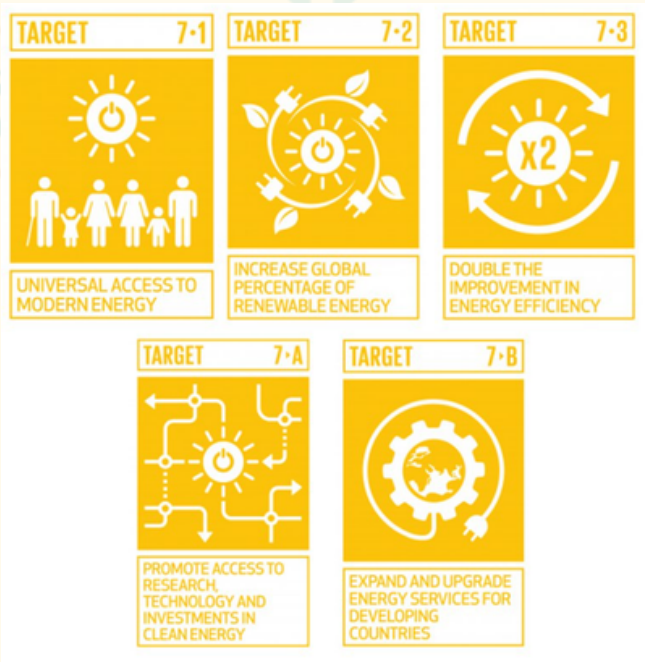
- Total installed solar capacity increased by 25 kW, bringing overall campus capacity to 110 kW
- Rooftop photovoltaic systems across five faculty and administrative buildings supplied approximately 21% of daytime electricity demand
- Technical staff received advanced training in photovoltaic performance monitoring and preventive maintenance

Wind Energy Integration

- The 5 kW wind turbine located near the Faculty of Engineering continued stable operation
- Wind energy contributed an average of 2.6% of monthly electricity consumption, with peak performance during winter months

Hybrid Microgrid Expansion

- The pilot hybrid energy system (solar + wind + battery storage) launched in 2024 was successfully maintained and optimized
- Battery storage capacity was expanded to 15 kWh, reducing evening grid demand for the dormitory block by 15%
- The project involved 18 students and 4 faculty advisors, functioning as a permanent “living laboratory” for applied learning





Impact of Clean Energy Transition (2025)

- Renewable energy sources (solar and wind) supplied approximately 23.8% of NSU's total annual electricity demand
- Estimated CO₂ emissions reduction increased to ~41 tons per year
- Strengthened institutional research capacity and expanded student engagement in renewable energy planning, monitoring, and system optimization

Training Programs and Public Awareness on Energy

Alongside infrastructure development, NSU prioritized education, training, and public engagement related to clean energy in 2025.

Academic Highlights

- The elective “Climate and Energy Systems” module continued for engineering and natural science students, with expanded content on:
 - Renewable energy technologies
 - Energy economics and policy
 - Regional and global energy transition strategies
- 67 students were enrolled during the academic year
- A structured guest lecture series featured experts from:
 - National energy regulatory institutions
 - Regional power utilities
 - Renewable energy companies

Topics included grid integration, smart energy systems, solar architecture, and energy transition governance.

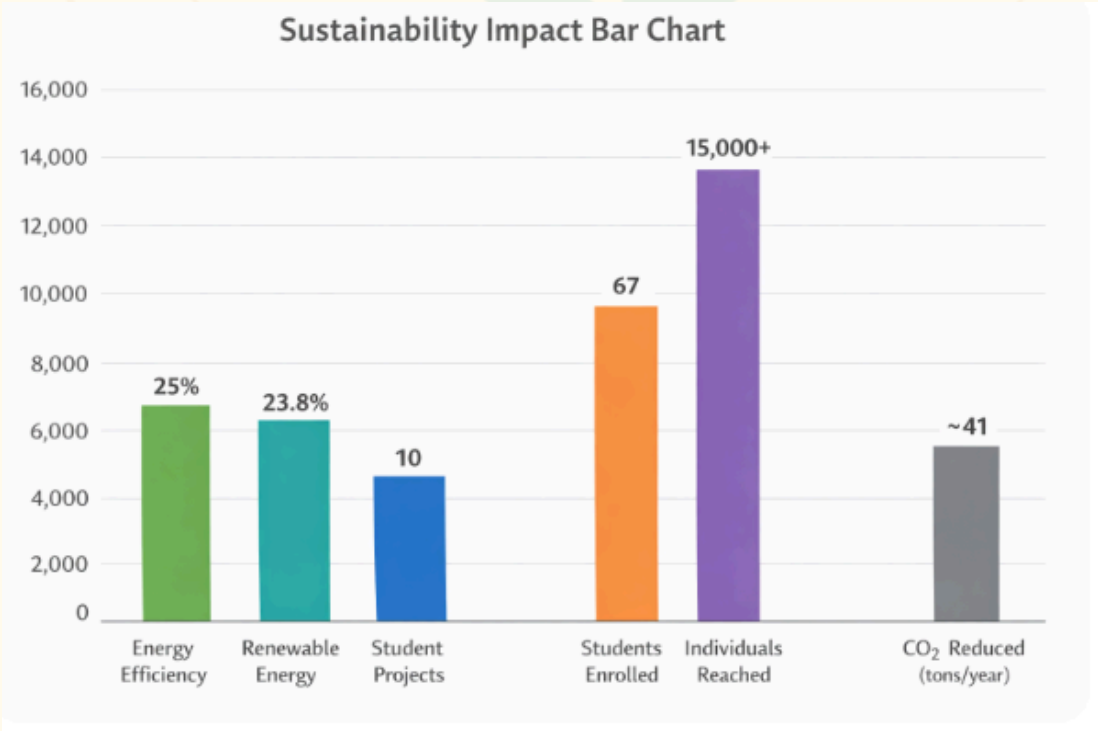
Monitoring and Evaluation

In 2025, NSU consolidated its integrated energy monitoring framework to ensure transparency, accountability, and continuous improvement.

Monitoring Highlights

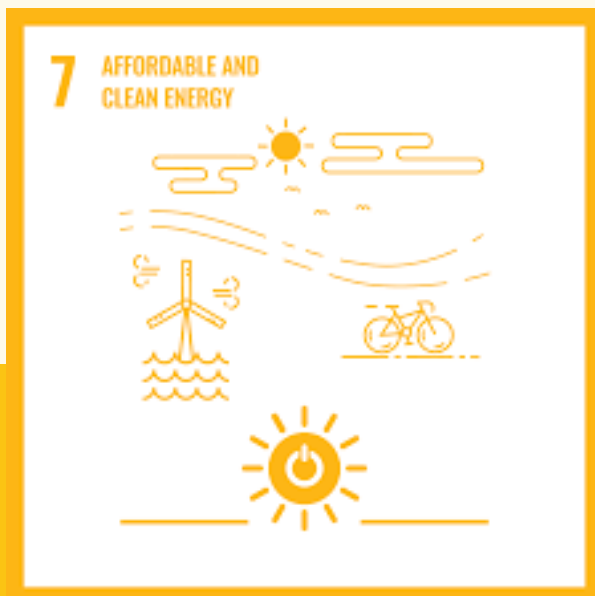
- Six buildings equipped with smart meters transmitting daily consumption data
- Quarterly energy audits conducted to identify inefficiencies and behavioral patterns
- Results indicated a 12.4% year-on-year reduction in total electricity consumption

Key Achievements Summary (2025)	
Area	Progress Highlights
Energy Efficiency	25% reduction through LED, insulation, and HVAC optimization
Renewable Energy	23.8% of energy demand met by solar and wind
Research & Education	10 student projects; 67 students enrolled
Awareness Campaigns	Over 15,000 individuals reached
CO ₂ Emissions	~41 tons reduced annually



For Future (2026–2028)

- Expansion of rooftop solar installations to four additional buildings
- Introduction of AI-based load balancing and predictive maintenance systems
- Launch of a Green Energy Certificate Program for students and staff
- Hosting of an International Sustainable Campus Energy Forum at NSU



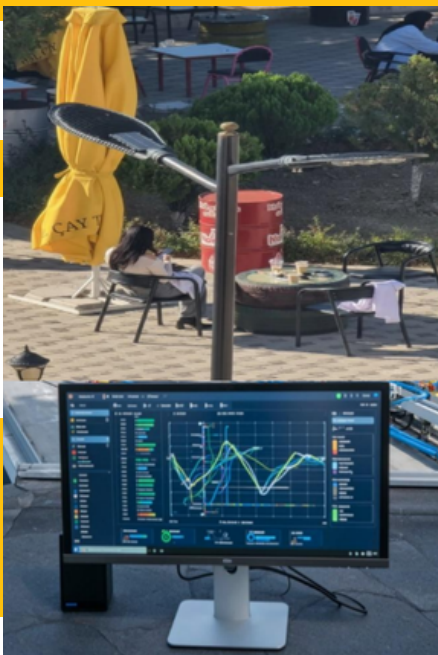
Conclusion

In 2025, Nakhchivan State University has demonstrated a sustained and holistic commitment to Sustainable Development Goal 7, which emphasizes affordable, reliable, sustainable, and modern energy for all. Building on prior achievements, NSU has systematically advanced its renewable energy portfolio, implemented comprehensive energy efficiency measures, and expanded student engagement and research in sustainable energy technologies. These initiatives reflect the University's recognition of energy as a fundamental driver of academic excellence, environmental stewardship, and regional development.

Through the expansion of solar photovoltaic systems, the ongoing operation of campus wind turbines, and the pilot hybrid microgrid program, NSU has made measurable progress in reducing its carbon footprint, diversifying its energy sources, and ensuring operational resilience. The total contribution of clean energy to campus electricity demand has increased significantly, resulting in a notable reduction of CO₂ emissions, while simultaneously fostering applied learning opportunities for students and strengthening institutional research capacity in renewable energy systems.

NSU has also demonstrated leadership in energy efficiency, with extensive upgrades to LED lighting, HVAC systems, thermal insulation, and automated monitoring tools across academic, administrative, and residential buildings. The implementation of real-time energy monitoring dashboards and smart scheduling systems has enabled evidence-based decision-making, enhanced accountability, and encouraged responsible energy use among staff and students. These practices reflect NSU's integration of technological innovation with operational management to achieve sustainable outcomes.

In conclusion, Nakhchivan State University's 2025 SDG 7 accomplishments exemplify a comprehensive and integrated approach to sustainable energy management. By combining infrastructure advancement, technological innovation, rigorous monitoring, research excellence, and educational engagement, NSU positions itself as a regional model for sustainable energy leadership in higher education. The University's commitment to clean energy, operational efficiency, and student empowerment not only contributes to the reduction of environmental impact but also strengthens the institutional capacity to foster a sustainable, equitable, and resilient future. NSU's efforts reaffirm the institution's dedication to the United Nations 2030 Agenda and to the broader pursuit of environmental stewardship, social responsibility, and academic excellence for generations to come.



SDG 7:

Affordable and Clean Energy

7 AFFORDABLE AND CLEAN ENERGY



SDG 7 IS...

about ensuring access to affordable, reliable, sustainable, and modern energy for all, with targets focusing on universal access, increased renewable energy, and improved energy efficiency



THE TARGETS OF SDG 7:

- UNIVERSAL ACCESS TO MODERN ENERGY
- INCREASE GLOBAL PERCENTAGE OF RENEWABLE ENERGY
- DOUBLE THE IMPROVEMENT IN ENERGY EFFICIENCY
- PROMOTE ACCESS TO RESEARCH, TECHNOLOGY, AND INVESTMENTS IN CLEAN ENERGY
- EXPAND AND UPGRADE ENERGY SERVICES FOR DEVELOPING COUNTRIES



THE GLOBAL ENERGY CRISIS

A global energy crisis refers to a significant disruption or shortage in the supply of energy resources that affects a large portion of the world, leading to rising prices, economic instability, and potentially, fuel shortages.



CALL TO ACTION

To end the dilemma around the global energy crisis, fulfilling our duty to our environment is a key factor for improvement. Thus, we must commit to actions such as:

- Supporting Renewable Energy Sources (invest in cleaner alternatives)
- Saving Electricity (simple habits that help reduce energy consumption)
- Speaking Up for Change (push for better energy policies)
- Aiding Far-flung Communities (bring solar energy to remote areas)



"THE ENERGY CRISIS IS A GLOBAL ISSUE THAT DEMANDS COLLECTIVE ACTION."

If we start today, we can save the world. Let us promote sustainability, build our present, and preserve our future, together.