7 AFFORDABLE AND CLEAN ENERGY

Tomorrow runs on energy we choose today.

7 AFFORDABLE AND CLEAN ENERGY

CLEAN ENERGY, RESILIENT SYSTEMS

Enhancing Energy Efficiency, Expanding Renewables, Strengthening Climate Awareness, and Improving Resource Governance

"Universities lead the transition to clean energy by educating minds, innovating solutions, and modeling responsible consumption."

Doston Abdinazarov,
Head of the Economic Department

In 2024, TSUULL advanced its institutional commitment to **Sustainable Development Goal 7 (SDG 7)**: ***Ensure access to affordable, reliable, sustainable, and modern energy for all*** through a series of coordinated technological, infrastructural, and educational initiatives. Recognizing that energy sustainability is essential to environmental stewardship and campus resilience, the university strengthened its clean-energy roadmap with targeted investments, policy development, and evidence-based performance monitoring.

Throughout the year, TSUULL expanded the integration of **clean and energy-efficient technologies**, prioritizing LED-based lighting systems, motion-sensor activation in classrooms and offices, improved insulation in key buildings, and the gradual replacement of outdated electrical equipment with modern, low-consumption alternatives. These measures directly support national energy-saving strategies and align with UI GreenMetric indicators for "Energy and Climate Change."

Beyond infrastructure, TSUULL amplified efforts to build a strong culture of responsible energy consumption across the academic community. Awareness campaigns, student-led sustainability clubs, and digital communication channels encouraged practical behavioural changes, such as reducing unnecessary electricity use, reporting malfunctioning equipment, and observing energy-conscious practices in dormitories, offices, and shared learning spaces.

	Indicator	Point
EC.1	Energy efficient appliances usage	150
EC.2	Smart building implementation	225
EC.3	Number of renewable energy sources on campus	150
EC.4	Total electricity usage divided by total campus' population	225
EC.5	The ratio of renewable energy production divided by total energy usage per year	100
EC.6	Elements of green building implementation as reflected in all construction and renovation policies	200
EC.7	Greenhouse gas emission reduction program	150
EC.8	Total carbon footprint divided by total campus' population	200
EC.9	Number of innovative program(s) in energy and climate change	75
EC.10	Impactful university program(s) on climate change	100

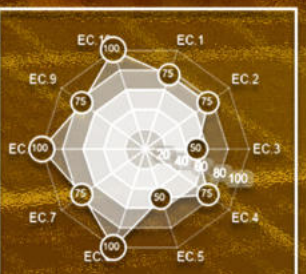
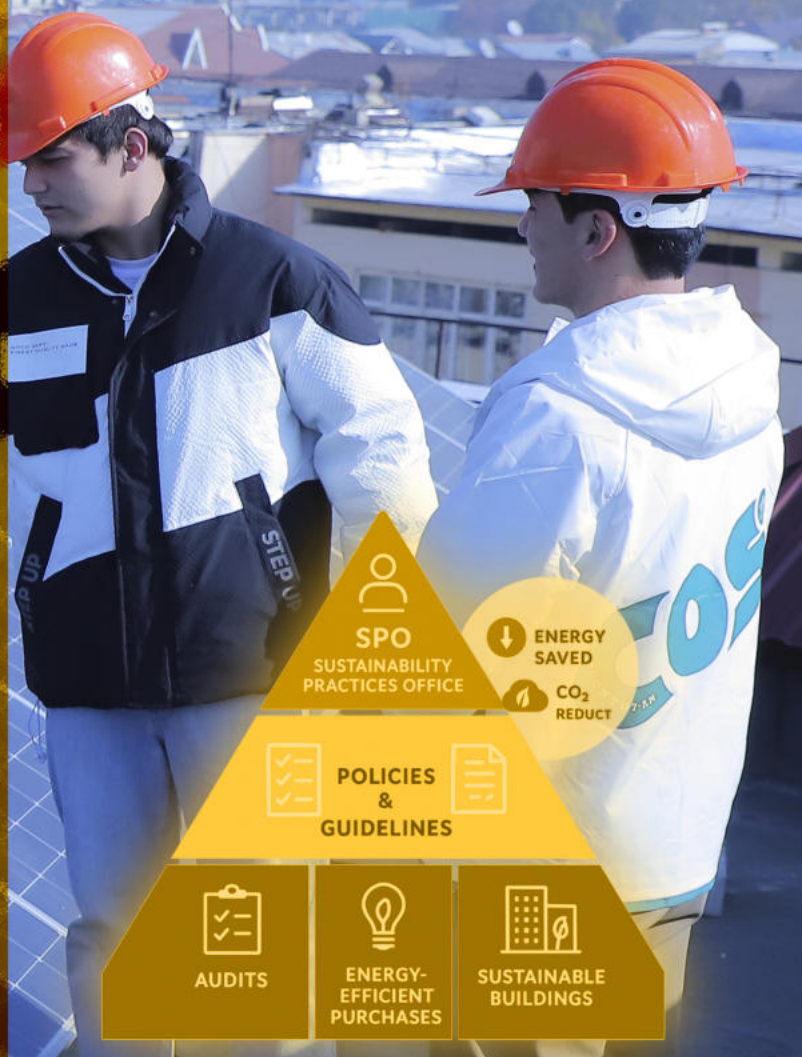


Figure 5.2 Percentage of Score to Maximum Score for Energy and Climate Change

TSUULL ENVIRONMENTAL FOOTPRINT REDUCTION (2021-2024)

Indicator	2021 (Baseline)	2022	2023	2024	Total Reduction 2021-2024
Electricity Consumption	100%	94%	89%	84%	10% ↓
Water Consumption	100%	96%	92%	88%	12% ↓
Carbon Emissions (Scope 1 & 2)	100%	93%	89%	82%	18% ↓
Waste Generation (per capita)	100%	97%	91%	87%	13% ↓
Energy Efficiency Score (Audit-based index)	52/100	69/100	67/100	74/100	+22 points ↑

At TSUULL, the pursuit of sustainable energy practices and the achievement of **SDG 7** are guided by a robust governance and institutional policy framework, carefully coordinated through the **Sustainability Management Office (SMO)**. The SMO plays a central role in planning, implementing, and monitoring all energy-related initiatives, ensuring that the university's approach to clean energy is both strategic and consistent over time. To structure these efforts, TSUULL develops an ***Annual Energy Management Plan*** that clearly identifies priority actions, outlines scheduled upgrades, and sets measurable targets for energy efficiency across all campus operations. This plan serves as a roadmap, providing clarity on both short-term improvements and long-term sustainability goals. Alongside this, the university has established comprehensive Energy Procurement Guidelines designed to prioritize the purchase and use of energy-efficient appliances, lighting systems, and electrical equipment in every department, thereby embedding efficiency into the very foundation of operational decision-making. Beyond day-to-day operations, TSUULL emphasizes sustainable design in its infrastructure through the inclusion of Sustainability Clauses in all construction and major renovation contracts, ensuring that new buildings and facility upgrades adhere to energy-efficient design principles from the outset. Compliance and accountability are further reinforced through rigorous internal audits aligned with GreenMetric standards, which evaluate the performance of all campus units against established energy-saving protocols and provide feedback for continuous improvement. This multi-layered governance structure ensures that energy sustainability is not treated as a separate initiative but is woven into the core of the university's operations, influencing procurement decisions, infrastructural planning, and long-term capital investments.



By integrating these policies and oversight mechanisms into everyday practices, TSUULL demonstrates a strong institutional commitment to reducing its environmental footprint, promoting energy responsibility across the campus community, and fostering a culture of sustainability that extends from administrative leadership to students, faculty, and staff.

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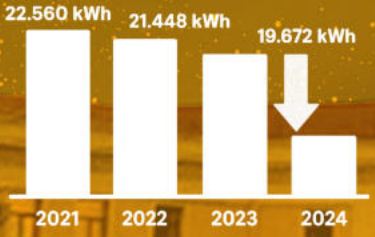
ADVANCING ENERGY EFFICIENCY THROUGH CAMPUS MODERNIZATION

In 2024, TSUULL made significant strides in enhancing campus-wide energy efficiency through a comprehensive modernization of infrastructure. A major focus was the transition to low-consumption LED lighting, with new systems installed across academic buildings, administrative offices, libraries, corridors, and dormitories.

These upgrades were further strengthened by motion-sensor lighting controls in classrooms, hallways, bathrooms, and storage rooms, ensuring energy is used only when necessary.

ELECTRICITY CONSUMPTION



Together, these improvements resulted in a measurable reduction in electricity consumption.

The university also prioritized improving building insulation and heating efficiency, particularly in older structures. Upgrades such as enhanced thermal insulation, sealed windows, and updated door frames reduced heat loss by 12–15%, significantly lowering heating demand during colder seasons. Routine maintenance and optimization of the heating network further minimized operational energy waste.

LED LIGHTING UPGRADES

To support long-term sustainability, TSUULL replaced outdated appliances—pumps, refrigerators, air conditioners, and office devices—with certified energy-efficient equipment.

Additionally, timed shutdown systems were introduced in computer labs and printing zones to prevent unnecessary energy use during inactivity. Overall, these measures underscore TSUULL's commitment to creating a more energy-efficient, environmentally responsible, and cost-effective campus.

Appliances	Total Number	Total Number Energy Efficient	Percentage
LED Lamp	45,000	45,000	100%
Solar Lantern	80	80	100%
Fan	130	115	88%
Air Conditioner with Inverter	180	170	94%

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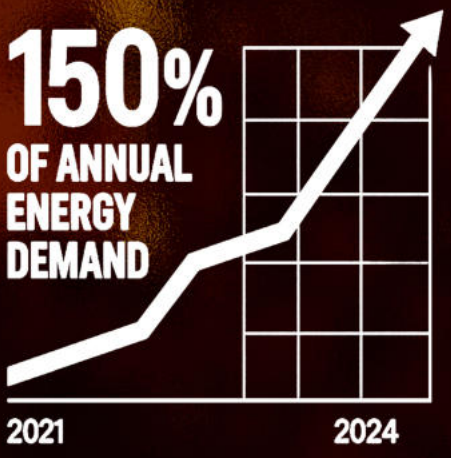
RENEWABLE ENERGY ADOPTION

In line with its long-term sustainability strategy, TSUULL continues to advance its transition toward renewable energy despite the limitations of an urban campus environment. Although rooftop space is limited, the university has successfully implemented several clean-energy technologies that significantly reduce dependence on conventional power sources and support national decarbonization targets.



Since 2021, TSUULL has progressively expanded its renewable energy infrastructure, transitioning from initial pilot installations to a fully integrated clean-energy system that now generates approximately 150% of the university's total annual energy demand, with the surplus supplied to the national grid.

The university's solar energy program—beginning with rooftop panels on the main academic building and subsequently extended to multiple dormitories—currently produces more than 126,000 kWh per year, supporting core functions such as lighting, laboratory operations, and daytime heating while providing a practical instructional platform for academic programs in environmental science and engineering. Complementing its solar capacity, TSUULL employs additional renewable technologies that enhance both energy resilience and environmental performance:

- biodiesel-powered ventilation and heat-recovery system generating roughly 2,300 kW of recoverable heat annually, primarily used for dormitory hot-water supply and winter classroom heating;

- biomass conversion system that processes approximately 12 tons of organic waste each year and yields about 9,500 kWh of heat energy for campus thermal needs;

- ongoing procurement initiatives with national renewable-energy providers, aimed at supplementing on-site generation through certified clean electricity such as solar-farm output.

BIODIESEL-POWERED VENTILATION & HEAT RECOVERY
- generating 2,300 kW of recoverable heat annually

BIOMASS CONVERSION SYSTEM
- processing 12 tons of organic waste per year

PROCUREMENT INITIATIVES
- partnering with renewable-energy providers

Together, these systems allow TSUULL not only to surpass full energy self-sufficiency but also to significantly reduce reliance on non-renewable sources, strengthen institutional resilience to fluctuating energy costs, and achieve substantial reductions in greenhouse-gas emissions in alignment with the United Nations Sustainable Development Goals (SDG 7 and SDG 13). Accordingly, the university's multi-layered renewable energy strategy exemplifies a high-performing, urban sustainability model and demonstrates an advanced level of institutional commitment to long-term decarbonization and responsible resource management.

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13 CLIMATE ACTION

CAMPUS-WIDE AWARENESS AND BEHAVIOURAL CHANGE PROGRAMS

TSUULL recognizes that energy sustainability requires not only technological solutions but also the active involvement and behavioral commitment of the entire university community. To this end, the institution has developed a comprehensive framework of awareness initiatives, training programs, and student engagement activities designed to foster long-term energy-conscious habits across campus. Central to this effort are a series of **Awareness Campaigns**, including student-led movements such as ***"Switch Off"*** and the annual ***"Energy Awareness Week,"*** which promote practical energy-saving habits through digital infographics shared on Telegram channels, campus display screens, and printed posters strategically placed in academic buildings, offices, and dormitories. These campaigns significantly enhance everyday energy mindfulness by keeping sustainability messages visible and accessible to all users.

Complementing these campaigns, TSUULL offers extensive **Workshops and Educational Sessions** tailored for staff, faculty, and dormitory supervisors. These sessions provide training on efficient equipment use, facility management, and seasonal energy optimisation strategies.

In addition, the university regularly hosts guest lectures by national experts in clean energy, environmental governance, and sustainable development, ensuring that the academic community remains informed about evolving global practices. As part of these educational efforts, TSUULL has institutionalised a highly regarded ***Public Talk Series on the Sustainable Development Goals (SDGs).*** This series invites policymakers, researchers, NGO representatives, and technical specialists to discuss topics such as climate action, renewable energy expansion, sustainable cities, and responsible consumption. Sessions are open to the entire campus, often recorded or streamed, and include interactive dialogues that allow students to translate global sustainability frameworks into local campus actions. The Public Talk Series has become a key platform for strengthening sustainability literacy and aligning institutional practices with international standards.

Student participation is further reinforced through targeted **Student Engagement Initiatives** that encourage behavioral change in practical and measurable ways. The Sustainability Club monitors room-level energy use during peak consumption months, providing feedback to residents and identifying opportunities for reductions. Mini-competitions between dormitory blocks motivate students to adopt more efficient routines, with recognition awarded to groups demonstrating exceptional reductions in electricity use. These activities create a culture of collective responsibility and healthy competition, encouraging continuous behavioral improvement.

Overall, these multi-layered programs—spanning awareness, education, and engagement—have produced significant improvements in energy-use behaviour, particularly in dormitories and office spaces where reductions have been most pronounced. TSUULL's behavioural change initiatives effectively complement its technological and infrastructural upgrades, ensuring that the university's transition toward sustainability is supported by an informed, motivated, and actively engaged campus community.

In 2024, TSUULL achieved meaningful progress toward **SDG 7** by integrating modern infrastructure upgrades, effective governance mechanisms, renewable-energy adoption, and strong community participation. These efforts not only improved energy efficiency across campus but also laid a solid foundation for long-term sustainability. Through strategic planning and consistent implementation, the university has shown how an urban academic institution can successfully transition toward cleaner and more reliable energy systems.

TSUULL's initiatives—including **LED retrofits,** improved building-management systems, renewable-energy pilots, and campus-wide awareness campaigns—demonstrate a practical and scalable model for responsible energy management. These advancements contribute to reduced operational costs, lower environmental impact, and a strengthened culture of sustainability among students and staff.

Looking ahead, the university aims to expand its renewable-energy capacity, enhance real-time monitoring and analytics for energy use, and continue promoting behavioral change through education and engagement. These next steps will further align TSUULL with global sustainability standards while reinforcing its commitment to climate resilience and resource efficiency.

With its expanding portfolio of clean-energy achievements, TSUULL is emerging as a national leader in sustainable campus operations—setting a benchmark for ***Uzbekistan's higher education institutions*** and contributing meaningfully to the country's broader clean-energy transition.