2025 / ANNUAL SUSTAINABILITY REPORT

# SDG 11 | Sustainable cities and equalities

*Khazar University · Baku, Azerbaijan*

**REPORTING PERIOD JANUARY–DECEMBER 2025**

## Institutional Approach

Khazar University contributes to more sustainable cities and communities through urban-planning education, protection of cultural heritage, public knowledge resources and collaboration with regional and international partners. In 2025, its activities brought students and researchers together to explore sustainable design, historic places, creative arts and inclusive community life.

| 3 | 5 | 25–26 Sep |
|---|---|---|
| phases of the Sustainable City Project held in 2025 | planning proposals presented at the first workshop | international architectural heritage conference |

## 11.1 Research on sustainable cities and communities

In 2025, Khazar University-affiliated researchers contributed to scientific research relevant to **SDG 11 (Sustainable Cities and Communities)**. Their studies addressed sustainable urban transportation, air pollution, renewable energy integration, waste management, and smart-city development. These contributions reflect the University's interdisciplinary engagement in understanding the environmental, technological, and economic challenges associated with urban sustainability.

**Sustainable urban mobility and transportation**

An important research direction focused on improving urban transportation systems and understanding their environmental and economic implications.

Aliyev (2025), in *Evaluation of the Ecological and Economic Benefits Mobility Policy in Baku*, examined the potential benefits of sustainable mobility policies in Azerbaijan's capital. The study considered challenges associated with traffic congestion, air pollution, and energy consumption, highlighting the importance of public transportation, cycling, walking, and environmentally friendly vehicles.

The research discussed how sustainable mobility strategies can contribute to reducing emissions, improving urban air quality, and supporting economic efficiency through reduced transportation costs and travel delays.

Dinçer et al. (2025), in *Identifying Effective Risk Management Policies for Sustainable Urban Transportation Projects*, investigated financial and operational risks that can affect sustainable transportation investments. Using a fuzzy decision-making model, the researchers identified currency risk as a particularly important consideration, alongside operational and financing risks. The study contributed a decision-support approach for evaluating transportation projects and managing investment uncertainty.

**Urban air quality and environmental monitoring**

Research also addressed the role of advanced technologies in understanding and managing air pollution in urban environments.

Hani et al. (2025), including Khazar University-affiliated researcher Yashar Aryanfar, investigated the prediction of urban air pollutants using artificial neural network models.

Published in *Environmental Engineering and Management Journal*, the study analysed pollutant concentrations, including particulate matter (PM10), carbon monoxide, nitrogen dioxide, and ozone, using environmental and socioeconomic data from three major cities in Jordan.

The research explored how artificial intelligence-based prediction methods can support air quality monitoring and provide information relevant to environmental management and urban public health.

**Renewable energy and sustainable smart cities**

Another research direction examined the transition towards cleaner and more efficient energy systems in urban environments.

Ecer et al. (2025), in *Evaluating Energy Management Investments for Sustainable Transition of Smart Cities Through a New Intuitionistic Fuzzy Consensus-Based CoCoSo Methodology*, investigated how energy management investments can support sustainable urban development.

The study developed a decision-making framework for prioritising investment criteria and policy alternatives. Its findings highlighted the importance of risk assessment and public participation in supporting the sustainable transition of smart cities.

Kou et al. (2025), in *Addressing Hidden Challenges in Urban Renewable Energy Integration via a Hybrid-Decision Model*, explored legal and regulatory barriers affecting the integration of renewable energy into urban development. The researchers developed a hybrid decision-making model to evaluate these obstacles and identify potential strategies for addressing them.

The study emphasised the importance of financial incentives and more efficient regulatory procedures in facilitating renewable energy investments and supporting sustainable urban transformation.

Further research by Castellanos et al. (2025), in *Integrating Solar Energy in Urban Development: Strategies for Sustainable and Smart Cities*, reviewed approaches to incorporating solar energy into urban environments. Drawing on 120 research studies and urban implementation examples, the review examined the relationship between energy technologies, urban design, and policy instruments.

The researchers proposed an integrated framework linking regulatory measures, intelligent technologies, and urban characteristics such as building orientation, density, and shading. This work contributed to understanding how renewable energy systems can be incorporated into more sustainable urban planning.

**Smart waste management and urban technologies**

The application of emerging technologies to urban resource management formed another area of research.

Kou et al. (2025), in *Analyzing Blockchain-Based Waste Management Investments in Smart Cities Using Quantum Picture Fuzzy Rough Modelling*, investigated approaches to evaluating investment alternatives in blockchain-supported waste management systems.

The study combined artificial intelligence and multi-criteria decision-making methods to assess investment priorities under uncertainty. Its findings contributed a methodological framework for selecting waste management technologies that can support resource efficiency and sustainability in smart cities.

**Research participation and knowledge exchange on sustainable urban development**

Alongside scientific publications, Khazar University supported practical learning and international knowledge exchange on sustainable urban planning and environmental challenges.

From 30 May to 3 June 2025, Khazar University hosted the first phase of the Sustainable City Project, bringing together students, academic staff, planning specialists, and institutional partners from Azerbaijan and Türkiye. The multidisciplinary training focused on sustainable urban development and contemporary spatial-planning methods. Participants developed and presented **five planning projects**, combining theoretical learning with practical design activities.

The initiative continued through a second phase in October 2025, during which students worked on concepts for a selected area and a prospective university campus. A third phase, held on 12–16 November 2025 at Ankara Music and Fine Arts University, brought together 40 students from participating institutions to examine sustainable green spaces, campus planning, urban aesthetics, and the integration of art and nature.

On 30 April 2025, the Department of Architecture and Design, together with the SABAH Groups Project, organised a seminar on Environment and Urban Area Improvement. Professor Ebru Çubukçu from Dokuz Eylül University discussed sustainable development, the rehabilitation of urban spaces, and approaches to improving urban environmental quality.

Further scientific exchange took place during the SORG4NOBAL project's final meeting, held on 11–12 March 2025. Its second day, hosted at Khazar University, focused on Nature-Based Solutions and Sustainable Cities. The event brought together international researchers and institutional representatives to discuss environmental sustainability and nature-based approaches.

The University also contributed to urban climate education through a 240-minute instructional unit on Climate Change and Greenhouse Gas Reduction in Urban Environments, developed by Dr. Rovshan Abbasov and taught during the 2024–2025 academic year. The material addressed climate risks, mitigation, and adaptation in urban settings.

Together, these research publications and academic activities demonstrate Khazar University's engagement in addressing challenges associated with sustainable cities and communities. Through interdisciplinary research, international collaboration, and practical urban-planning education, the University contributes knowledge relevant to developing more environmentally sustainable, resilient, and liveable urban environments.

**Selected Research Publications (2025)**

1. **Aliyev, A. (2025).** *Evaluation of the ecological and economic benefits mobility policy in Baku.* Scientific Work, 19(9), 81–84. DOI
2. **Dinçer, H., Yüksel, S., & Eti, S. (2025).** Identifying effective risk management policies for sustainable urban transportation projects. In *Intelligent Urban Mobility: Decision Support Systems for Sustainable Transportation* (pp. 149–161). Elsevier. DOI
3. **Hani, E. B., Haj Assad, M. E., Aryanfar, Y., Hammoodi, K. A., Castellanos, H. G., Keçebaş, A., Ghasemlou, S. M., Alcaraz, J. L. G., & Bouabidi, A. (2025).** Predicting air pollutants in urban environments using artificial neural network models. *Environmental Engineering and Management Journal, 24*(8), 1657–1665. DOI
4. **Ecer, F., Saha, A., Dinçer, H., & Yüksel, S. (2025).** Evaluating energy management investments for sustainable transition of smart cities through a new intuitionistic fuzzy consensus-based CoCoSo methodology. *Renewable Energy, 244*, 122655. DOI
5. **Kou, G., Zavadskas, E. K., Ayata, A., Yüksel, S., Dinçer, H., & Eti, S. (2025).** Addressing hidden challenges in urban renewable energy integration via a hybrid-decision model. *Technological and Economic Development of Economy, 31*(6), 2023–2044. DOI
6. **Castellanos, H. G., Aryanfar, Y., Sadabad, A. N., & Keçebaş, A. (2025).** Integrating solar energy in urban development: Strategies for sustainable and smart cities. *International Transactions on Electrical Energy Systems, 2025*(1), 6096036. DOI
7. **Kou, G., Dinçer, H., Pamucar, D., Yüksel, S., & Simic, V. (2025).** Analyzing blockchain-based waste management investments in smart cities using quantum picture fuzzy rough modelling. *International Journal of Environmental Science and Technology, 22*(8), 6467–6490. DOI



Khazar University connects teaching and research with questions of climate resilience, urban design and sustainable infrastructure. The Sustainable City Project ran in three phases during 2025: a May–June workshop at Khazar University, a second training programme in October and a November programme at Ankara Music and Fine Arts University. Students from Azerbaijan and Türkiye developed design concepts for urban areas and university campuses, including five proposals presented at the first stage. The projects were educational design exercises rather than completed construction.

This work was supported by an April seminar on urban area improvement, a climate-change teaching unit on greenhouse-gas reduction in cities delivered during the 2024–25 academic year, and the SORG4NOBAL meeting on nature-based solutions and sustainable cities in March. These examples show academic engagement with urban sustainability without representing a complete inventory of indexed research outputs.

## 11.2 Support of arts and heritage




The University supports cultural learning and heritage preservation through academic events, historical-site visits, music, visual arts and publications. On 25–26 September 2025, Khazar co-organised the Architectural Heritage of the Turkic World conference, bringing together researchers and cultural partners to discuss historic architecture and urban identity. Staff and students also participated in the Preservation of Ancient Human Settlements conference, the Shusha heritage forum and a UNESCO-chair cultural

heritage meeting. Archaeological heritage was explored through a Gazakh seminar and faculty presentations in December.

Heritage was also part of student learning. Visits included Yanardag and historic castles around Baku, the Zargarpalan Bath, and the Shirvanshahs Palace and archaeology museum. A heritage and tourism session introduced international conservation principles; a House of Tolerance visit explored Albanian-Udi cultural traditions. These activities supported knowledge and appreciation of heritage, rather than university-led restoration projects.

Music and arts formed another part of the 2025 programme. The Khazar Chamber Orchestra performed at the Fikret Amirov Music Festival and accompanied performers at the Fidan Hajiyeva International Opera Festival. The Khazar Music Club concert and the Nowruz celebration brought together musicians and students. Exhibitions included From Memory to Art, Inner Voice, Pearls of the Caspian, the Music and Fine Arts year-end exhibition and Leyla Musayeva's solo exhibition. An instructor also participated in OIC 25 Cultural Fest.

Cultural documentation included Khazar University Press's Korean Folk Tales publication and the Voices of the Far East: Books and Culture event. Beyond dated events, the University's Library and Information Center publishes free visiting arrangements for members of the public at its Neftchilar Campus. This longstanding service connects university learning resources with the wider community.



## 11.3 Expenditure on arts and heritage

Khazar University's libraries, cultural facilities, music activities and heritage events provide a foundation for engagement with the arts and local communities. The University's 2025 programme included concerts, exhibitions, cultural publications and historical education. Financial expenditure figures are not presented in this public activity report.

## 11.4 Sustainable practices




The University also considers liveability in its facilities and long-term planning. Its green-space commitments describe the value of trees and safe outdoor environments, while the Climate Action Plan identifies lower-carbon travel and energy performance as institutional priorities. These are standing commitments rather than verified 2025 reductions in commuting emissions or completed construction work.

Khazar provides student accommodation near Neftchilar Campus and the metro, offering a practical connection to education and urban public transport. In 2025, the Sustainable City Project provided a forum for discussing land use, future campus planning and green public spaces with students, planners and partner organisations. Project concepts are reported as educational results and are not presented as built infrastructure or municipal development approvals.



## Selected Activities in 2025

| 2025 | ACTIVITY |
|---|---|
| 12 Mar | Nature-based solutions and sustainable cities at SORG4NOBAL |
| 30 Apr | Environment and Urban Area Improvement seminar |
| 30 May–3 Jun | Sustainable City Project: first planning workshop |
| 8 Mar / 28 Apr | Chamber Orchestra performances at cultural festivals |
| May–Jul | Museum visits, heritage learning and visual arts exhibitions |
| 25–26 Sep | International Architectural Heritage of the Turkic World conference |
| 27–31 Oct | Second Sustainable City Project training |
| 12–16 Nov | Third Sustainable City Project in Ankara |
| 30 Oct / 18 Dec | Korean Folk Tales publication and Far East literature event |

## 2025 Overview

In 2025, Khazar University strengthened practical education in sustainable urban planning and created opportunities for cultural participation, heritage learning and artistic expression. A three-phase international design project, conferences, music performances, exhibitions and heritage publications are supported by dated university records. Public library services and longer-term campus sustainability commitments complement these activities.