

## UI GreenMetric Questionnaire

University : Baku State University  
Country : Azerbaijan  
Web Address : <http://bsu.edu.az/>  
SDG Focused Web Address: <https://sdg.bsu.edu.az/>

### [2] Energy and Climate Change (EC)

#### [2.5] Renewable Energy Sources in Campus





### **Description:**

Baku State University has established a comprehensive institutional strategy focused on increasing the use of renewable and alternative energy systems as part of its long-term commitment to environmental sustainability, responsible energy consumption, and climate action. Recognizing that higher education institutions play a critical role in reducing environmental impact and promoting sustainable development, the university has gradually diversified its campus energy infrastructure by integrating multiple renewable energy technologies designed to reduce dependence on conventional fossil-fuel-based electricity systems and improve overall campus energy resilience.

As a large academic institution serving thousands of students, faculty members, researchers, and administrative personnel every day, campus operations require substantial amounts of electricity and thermal energy to support teaching facilities, laboratories, administrative offices, student services, research infrastructure, libraries, dormitories, and digital systems. To address growing energy demands while minimizing environmental impact, the university has prioritized the development of a diversified clean energy portfolio that supports both operational efficiency and sustainability objectives.

Currently, the university has implemented six major renewable and low-carbon energy generation systems across campus infrastructure, significantly exceeding the sustainability benchmark requiring more than three renewable energy sources. These systems include solar photovoltaic systems, wind energy systems, biodiesel-based backup energy generation, geothermal-assisted thermal energy systems, hydropower-supported technical infrastructure applications, and Combined Heat and Power (CHP) systems designed to maximize overall energy efficiency through simultaneous electricity and heat generation.

One of the most important components of the university's renewable energy strategy is the implementation of solar power generation systems. Photovoltaic panels have been installed on rooftops of selected academic buildings, administrative facilities, and other campus infrastructure where solar exposure conditions are favorable. These systems convert solar radiation directly into electrical energy that supports lighting systems, administrative operations, digital infrastructure, and selected educational facilities. Solar power has become one of the most visible and scalable renewable energy solutions on campus, generating approximately 186,000 kilowatt-hours of electricity annually while reducing dependence on externally supplied conventional electricity.

To diversify renewable energy production further, the university has introduced small-scale wind energy systems. Wind turbines installed in appropriate open campus areas capture available wind resources and convert kinetic energy into electricity used for supplemental campus power generation. Although wind production levels vary depending on seasonal and weather conditions, these systems contribute approximately 74,000 kilowatt-hours annually, while demonstrating the institution's commitment to diversifying sustainable energy sources beyond solar technology alone.

The university also operates biodiesel-based energy systems that provide environmentally preferable alternatives to traditional fossil-fuel-powered backup generators. Biodiesel, produced from renewable biological sources, is



used during emergency electricity demand periods and operational backup situations where uninterrupted energy supply is essential for maintaining critical campus operations. Compared to conventional diesel systems, biodiesel solutions help reduce greenhouse gas emissions while maintaining operational reliability. These systems contribute approximately 68,000 kilowatt-hours of annual energy generation capacity.

To improve thermal efficiency across buildings, the university has integrated geothermal-assisted heating and cooling technologies into selected campus facilities. These systems utilize stable underground temperatures to support efficient indoor heating and cooling operations, significantly reducing the electricity demand typically associated with conventional HVAC systems. By relying on natural underground thermal resources, geothermal systems reduce operational energy consumption while improving overall building energy performance. Current geothermal-assisted infrastructure contributes approximately 96,000 kilowatt-hours annually through reduced conventional energy demand.

In selected technical infrastructure operations, the university has incorporated small-scale hydropower-supported systems primarily used for water circulation and selected auxiliary infrastructure functions. Although hydropower contributes a smaller share of overall campus renewable energy production, these systems represent an additional source of sustainable energy diversification and contribute approximately 44,000 kilowatt-hours annually to campus operations.

One of the university's most efficient energy systems is the implementation of Combined Heat and Power (CHP) technology, also known as cogeneration systems. Unlike traditional electricity generation systems that lose substantial amounts of heat during power production, CHP systems simultaneously generate electricity and useful thermal energy that can be directly utilized for heating campus buildings, water heating systems, and other operational requirements. By maximizing total energy utilization efficiency, CHP systems significantly reduce wasted energy and improve overall campus energy performance. CHP currently represents the largest contributor to sustainable campus energy production, generating approximately 210,000 kilowatt-hours annually.

Collectively, these renewable and low-carbon energy systems generate approximately 655,000 kilowatt-hours of sustainable energy annually, making a substantial contribution toward reducing overall campus dependence on conventional grid electricity and fossil-fuel-based energy systems. Beyond direct energy production benefits, this diversified renewable energy portfolio strengthens the university's long-term resilience against rising energy costs, improves operational sustainability, and reduces indirect carbon emissions associated with campus activities.

The university's renewable energy strategy extends beyond infrastructure investment alone. Renewable energy implementation also supports educational and research objectives by creating practical learning opportunities for students and researchers working in environmental sciences, engineering, sustainability studies, energy systems management, and climate-related research fields. Campus renewable energy infrastructure increasingly serves as a living laboratory where sustainability principles can be directly integrated into academic activities, research projects, and student engagement initiatives.

The implementation of multiple renewable energy systems produces significant environmental benefits. Reduced dependence on conventional electricity generation lowers greenhouse gas emissions associated with campus operations, decreases long-term energy procurement costs, improves institutional energy security, and supports national and global climate mitigation efforts. Through diversification of energy sources, the university reduces vulnerability to fluctuations in external electricity supply systems while improving operational continuity during peak demand periods or infrastructure disruptions.

This renewable energy initiative directly contributes to several major international sustainability objectives:

- SDG 7 – Affordable and Clean Energy by expanding renewable energy generation capacity and improving clean energy adoption across campus operations.
- SDG 9 – Industry, Innovation and Infrastructure by implementing advanced sustainable energy technologies and modernizing campus infrastructure systems.
- SDG 11 – Sustainable Cities and Communities through environmentally responsible institutional energy management practices.
- SDG 12 – Responsible Consumption and Production by reducing dependence on non-renewable energy resources and improving resource efficiency.
- SDG 13 – Climate Action by lowering institutional carbon emissions and supporting long-term greenhouse gas reduction efforts.



Through the successful implementation of six renewable and alternative energy systems producing approximately 678,000 kilowatt-hours annually, Baku State University demonstrates strong leadership in sustainable campus energy transformation. By continuously expanding clean energy infrastructure and integrating innovative energy technologies into campus operations, the university continues building a low-carbon, energy-resilient, environmentally responsible, and internationally competitive sustainable campus ecosystem aligned with global sustainability standards and long-term climate action commitments

RENEWABLE ENERGY SOURCE	INSTALLED APPLICATION / CAMPUS USE	ANNUAL ENERGY PRODUCED (KWH/YEAR)
<b>SOLAR POWER</b>	Rooftop photovoltaic panels installed on academic and administrative buildings	<b>186,000 kWh</b>
<b>WIND POWER</b>	Small-scale wind turbine systems supporting supplemental electricity generation	<b>74,000 kWh</b>
<b>BIODIESEL</b>	Biodiesel-powered backup generators for emergency and operational energy supply	<b>68,000 kWh</b>
<b>GEOTHERMAL ENERGY</b>	Ground-source thermal systems supporting heating and cooling operations	<b>96,000 kWh</b>
<b>HYDROPOWER (SMALL-SCALE TECHNICAL USE)</b>	Small-scale water-powered circulation systems for selected infrastructure operations	<b>44,000 kWh</b>
<b>COMBINED HEAT AND POWER (CHP)</b>	Cogeneration systems producing both electricity and thermal energy for campus facilities	<b>210,000 kWh</b>
<b>TOTAL RENEWABLE / ALTERNATIVE ENERGY PRODUCTION</b>	Campus-wide integrated sustainable energy generation	<b>678,000 kWh/year</b>

**Additional evidence link (i.e., for videos, more images, or other files that are not included in this file):**

- <https://sdg.bsu.edu.az/> The official SDG portal of BSU showcases the university’s sustainability initiatives, policies, reports, and achievements aligned with the Sustainable Development Goals.
- <https://sdg.bsu.edu.az/allnews> This page provides comprehensive updates on BSU’s sustainability-related news, projects, conferences, and environmental initiatives.
- <https://sdg.bsu.edu.az/university-policies> This section presents BSU’s institutional policies supporting sustainable development and climate responsibility.
- <https://sdg.bsu.edu.az/climate-action-policy> BSU’s Climate Action Policy outlines the university’s commitment to reducing emissions, promoting sustainability, and achieving net-zero targets.
- <https://sdg.bsu.edu.az/uploads/files/Climate%20action%20policy.pdf> This document provides detailed information about BSU’s climate action objectives, sustainability measures, and carbon reduction strategies.
- <https://sdg.bsu.edu.az/sdg-reports> This section contains official sustainability reports demonstrating BSU’s progress toward achieving the Sustainable Development Goals.
- <https://sdg.bsu.edu.az/report-on-sdg-7-affordable-and-clean-energy> This report highlights BSU’s initiatives and achievements related to affordable and clean energy under SDG 7.
- <https://sdg.bsu.edu.az/uploads/files/SDG%207%202025.pdf> This document summarizes BSU’s 2025 activities, projects, and outcomes supporting SDG 7 implementation.
- <https://sdg.bsu.edu.az/report-on-sdg-13-climate-action> This report presents BSU’s activities, educational programs, and research initiatives focused on climate action and sustainability.
- <https://sdg.bsu.edu.az/uploads/files/SDG%2013%202025.pdf> This document details BSU’s climate action achievements, emission reduction efforts, and SDG 13 progress for 2025.



- <https://sdg.bsu.edu.az/climate-action-plan> BSU's Climate Action Plan outlines the university's long-term sustainability goals and carbon neutrality commitments.
- <https://sdg.bsu.edu.az/climate-action-plan-action> This page explains BSU's Climate Action Plan for 2023–2030, including emission reduction strategies and sustainability initiatives.
- <https://sdg.bsu.edu.az/energy-efficiency-plan> BSU's Energy Efficiency Plan aims to reduce energy consumption and improve sustainable campus operations between 2023 and 2028.
- <https://sdg.bsu.edu.az/news/deputy-director-of-the-state-agency-on-renewable-energy-sources-delivers-a-masterclass-at-bsu> A masterclass at BSU focused on renewable energy development and sustainable energy solutions.
- <https://sdg.bsu.edu.az/news/bsu-represented-at-baku-energy-week> BSU participated in Baku Energy Week to showcase its contributions to energy sustainability and innovation.
- <https://sdg.bsu.edu.az/news/bsu-and-kobia-open-ecoenergy-station-on-campus> BSU and KOBIA jointly opened an eco-energy station on campus to promote renewable energy awareness and sustainable practices.
- <https://www.youtube.com/watch?v=Oz3j8mRqjJE> This video highlights BSU's sustainability and climate action initiatives related to energy efficiency and environmental awareness.