



7 AFFORDABLE AND
CLEAN ENERGY



Message From the Rector

In an era when the world faces mounting environmental, social, and economic challenges, the role of universities has become more vital than ever. Institutions of higher education are not only centers of learning but also agents of transformation — shaping knowledge, values, and actions that define the future of our planet and humanity.

At Biruni University, we embrace this global responsibility with determination and vision. Guided by the United Nations Sustainable Development Goals (SDGs), we are committed to advancing sustainability through excellence in education, innovative research, and community-centered impact.

Our mission extends beyond academic achievement; it is about producing knowledge that heals, transforms, and sustains life in all its forms.

As a pioneering health sciences university, we channel our scientific expertise toward creating solutions that enhance well-being and social equity. Our multidisciplinary approach allows us to integrate health, innovation, and sustainability — transforming research into real-world benefits for people and communities. The projects and studies we carry out, particularly in the fields of medicine, health, and technology, stand as concrete reflections of this commitment.

Our understanding of sustainability transcends academic boundaries. It is woven into the fabric of our campuses, hospitals, and community initiatives — from energy efficiency and environmentally friendly infrastructure to nurturing students with the awareness and capacity to become responsible global citizens.

Through the dedication of our academic and administrative teams, and the unwavering support of our partners, Biruni University continues to build a resilient, inclusive, and sustainable future. Together, we reaffirm our pledge to serve humanity through science and compassion — today and for generations to come.



Prof. Dr. Adnan Yüksel
Rector, Biruni University

Message From the Editor

The world is entering an age of profound transformation — one that demands wisdom as much as it demands action. Climate disruption, social fragmentation, and economic imbalance have made it clear that the systems which once defined progress can no longer sustain it. Humanity needs a new compass — one that points toward balance, compassion, and collective renewal.

Universities stand at the very heart of this change. They are not merely institutions of teaching and research; they are the laboratories of humanity's future — places where science, conscience, and purpose must meet.

At Biruni University, we see sustainability not as a goal to be reached, but as a way of being. It is the thread that weaves through our research, our classrooms, our hospitals, and our partnerships. It is how we measure success —

by the difference we make in people's lives and the legacy we leave for the generations to come.

Guided by the **United Nations Sustainable Development Goals**, we are reimagining higher education as a force for healing — for reconnecting human progress with planetary well-being, for bridging innovation with empathy, and for transforming knowledge into impact.

Our mission is both scientific and moral: to cultivate minds that create, question, and care; to generate ideas that build a more equitable, peaceful, and sustainable world. Every discovery, every collaboration, every act of learning becomes part of a larger story — the story of humanity's renewal through knowledge.

This report is more than an evaluation of where we stand; it is a reflection of who we choose to be. Biruni University stands as a living commitment

to the idea that education can heal, science can serve, and together we can build a future worthy of hope.



Aslıhan Güzin ALSAN, P.h.D. FHEA
Director of Institutional Impact,
Visibility and Corporate Reputation



BIRUNI UNIVERSITY COMMITMENT TO AFFORDABLE AND CLEAN ENERGY

Energy is the pulse of modern civilization the invisible current that powers human progress, connects communities, and fuels discovery. Yet the same energy that drives our world also defines its greatest inequalities. Access to clean, affordable, and sustainable energy has become the defining challenge of our era one that demands not only technological innovation, but moral imagination.

At Biruni University, we see Sustainable Development Goal 7: Affordable and Clean Energy as a transformative opportunity to reimagine the relationship between humanity and power both in the literal and symbolic sense. We believe that how we generate, consume, and share energy reflects who we are as a civilization. Clean energy is not only about efficiency; it is about ethics, equity, and the evolution of consciousness.

Our commitment lies in advancing energy literacy, fostering innovation, and building a culture of environmental responsibility. We understand that every watt saved, every system optimized,

and every student educated in sustainability contributes to the collective transition toward a low-carbon future.



As a university grounded in health sciences, we also recognize that energy is inseparable from human well-being. Cleaner energy means cleaner air, healthier communities, and a planet

capable of sustaining life for generations to come. Through our campus operations, research, and partnerships, we integrate renewable energy practices not just as institutional policies, but as expressions of our values.

This report embodies our dedication to transforming awareness into measurable impact to moving from consumption toward consciousness, and from dependence toward stewardship.

Our Approach: From Consumption to Conscious Energy

At Biruni University, energy is treated not as an endless resource, but as a living responsibility. Our approach is guided by three interconnected principles: Efficiency, Transition, and Education.

- **Efficiency:** We continuously optimize energy use across campuses and facilities through smart systems, LED transformations, and behavior-based conservation programs.
- **Transition:** We are committed to increasing our share of renewable energy sources integrating solar, geothermal, and sustainable heating and cooling systems where possible.
- **Education:** We promote awareness about clean energy through curriculum design, research projects, and public events that inspire responsible energy behaviors among students, staff, and the community.

Our aim is to cultivate a mindset of energy awareness where sustainability becomes an instinct, not an obligation.



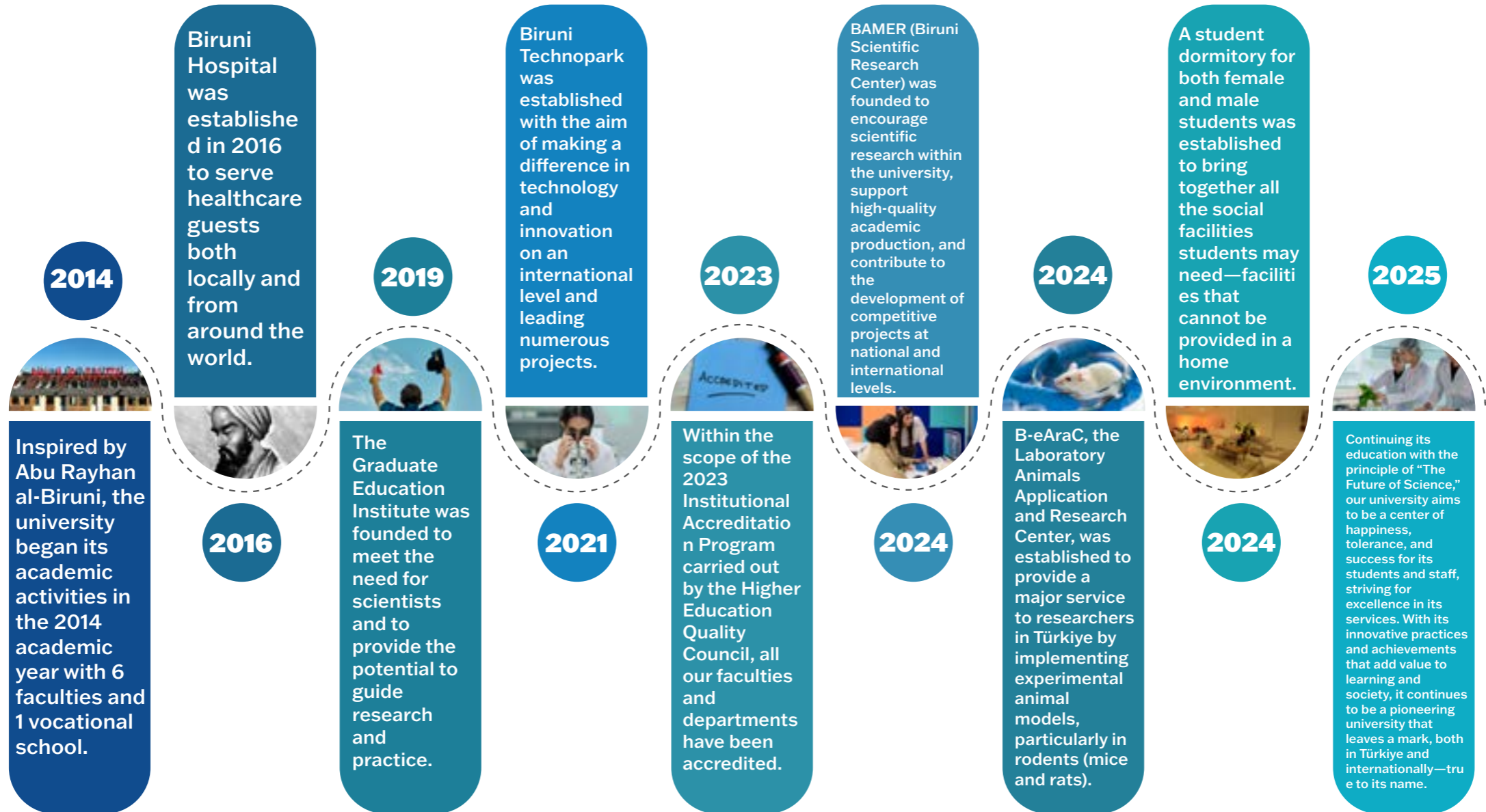
Institutional Framework: Embedding Clean Energy Into Our Operations

Sustainability at Biruni University is not confined to theory; it is embedded in the infrastructure, culture, and governance of the institution.

- **Sustainable Infrastructure:** Energy efficiency is prioritized in every new construction and renovation, supported by audits, monitoring systems, and green procurement standards.
- **Data-Driven Management:** Real-time energy tracking allows us to evaluate consumption patterns and implement timely interventions.
- **Renewable Integration:** Pilot solar installations, hybrid systems, and renewable-based lighting projects reduce the university's carbon footprint while serving as learning platforms for students.
- **Research and Innovation:** Faculty and students engage in projects exploring renewable technologies, energy storage, and sustainable urban systems.
- **Health and Environment Connection:** As a health sciences university, Biruni emphasizes the direct link between clean energy, air quality, and public health integrating this perspective into both research and teaching.

Through this framework, Biruni University is not only reducing its environmental impact but also contributing to the global transition toward a just and sustainable energy future.

O U R S T O R Y



O u r V i s i o n

To be a pioneering university that, true to its name, leaves a lasting mark — leading change through knowledge, innovation, and impact.

O u r M i s s i o n

To be an innovative and leading university that cultivates qualified individuals through transformative education, produces original knowledge at both national and international levels, and contributes to solving societal challenges with scientific and ethical responsibility.

C O R E V A L U E S



K n o w l e d g e

Commitment to learning, discovery, and the pursuit of truth as the foundation of progress.



W i s d o m

Using knowledge with depth, reflection, and ethical judgment to serve humanity.



H u m a n i t y

Placing human dignity, empathy, and compassion at the heart of education, research, and service.



A c a d e m i c F r e e d o m

Protecting the right to think, question, and create freely within an environment of respect and integrity.



P i o n e e r i n g S p i r i t

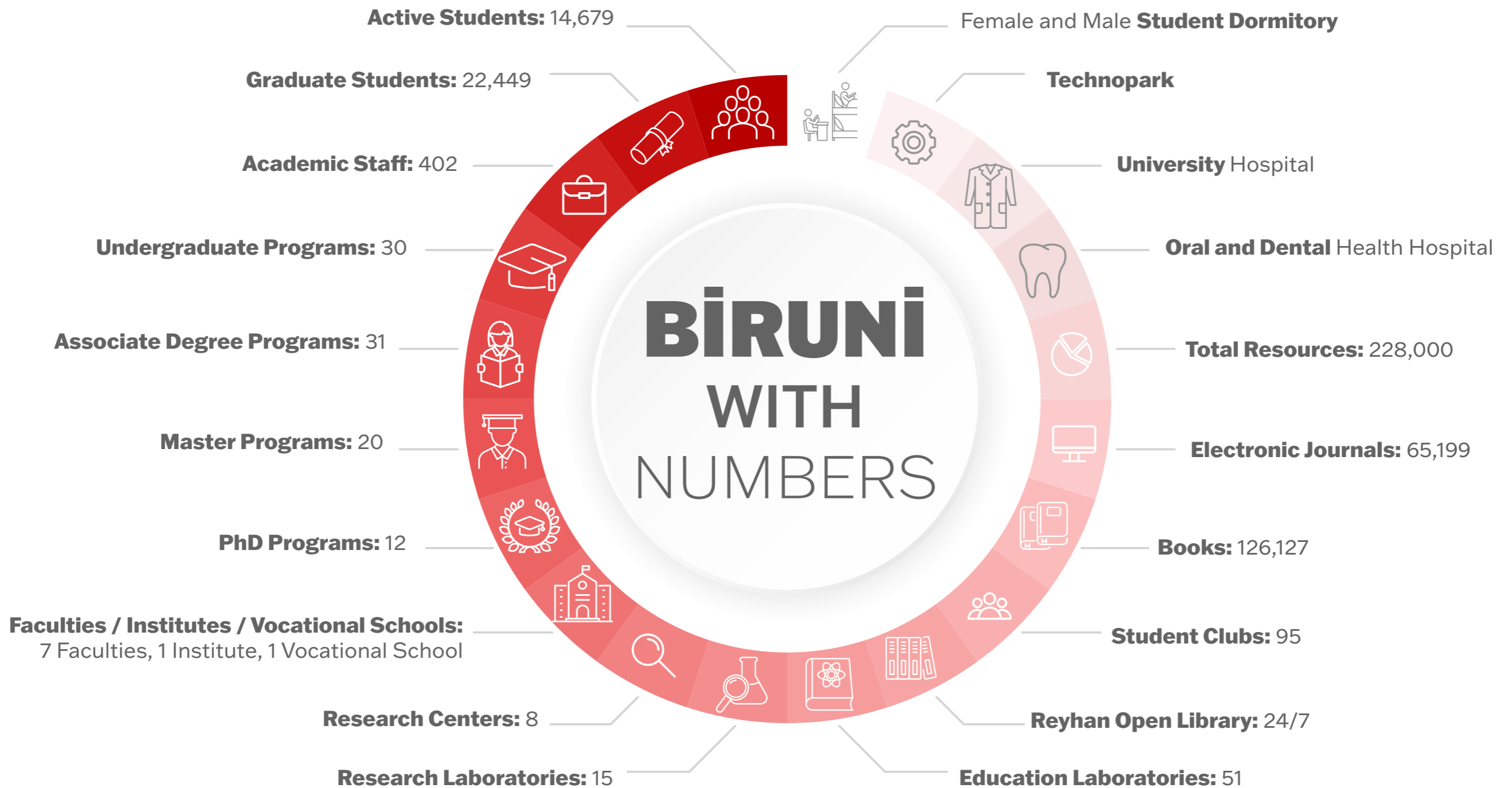
Challenging conventions with creativity and vision; leading transformative change in education and science.



C o u r a g e

Acting with integrity and resilience in the face of uncertainty — daring to stand for what is right and meaningful.

BİRÜNİ WITH NUMBERS



11.364 GJ
Total energy used

2.640 GJ
**Total energy used
from low-carbon sources**

98.000 m²
University floor space

Energy Efficiency Policy

Biruni University views energy efficiency as a fundamental responsibility for a sustainable future. Our university has implemented an energy efficiency policy to encourage the effective and efficient use of energy resources, reduce its carbon footprint, and minimize negative environmental impacts. This policy aims to promote a culture of energy efficiency in both campus operations and educational activities.

Core Values

Biruni University Energy Efficiency Policy is based on the following core values:

1. **Sustainability:** Energy efficiency is at the heart of environmental sustainability. The University is committed to contributing to the conservation of natural resources by reducing energy consumption.

2. **Responsible Sourcing:** Using energy resources effectively and efficiently means preserving them for future generations. Our university integrates energy-saving practices

into all its operations .

3. **Reducing Carbon Emissions:** The University aims to reduce its carbon footprint through energy efficiency policies and contributes to the fight against climate change.

4. **Use of Innovative Technologies:** The use



of innovative technologies and cutting-edge solutions is encouraged in energy efficiency efforts. Renewable energy sources are prioritized.

5. **Awareness and Participation:** Our

university attaches importance to raising awareness of energy efficiency among students, academic and administrative staff, and ensuring the participation of all stakeholders in this process.

Energy Efficiency Policy Strategies

Biruni University implements its energy efficiency policy with the following strategies:

1. **Energy-Efficient Building Design:** All new buildings are constructed with energy-efficient design principles to maximize energy savings. Existing buildings are renovated to improve their energy efficiency. Prioritize green buildings, natural lighting, and thermal insulation.

2. **Renewable Energy Use:** The use of solar, wind, and other renewable energy sources is increasing,

meeting a significant portion of campus energy needs. Renewable energy technologies such as solar panels and energy storage systems are encouraged.

3. **Energy-Saving Projects:** Projects aimed at

reducing energy consumption in lighting, heating, cooling, and electronic devices are continually being developed. Energy-saving technologies such as LED lighting systems, motion-sensor lights, and smart thermostats are being expanded.

4. **Building Energy Management Systems:** Building automation systems (BOS) continuously monitor and optimize energy consumption. These systems regularly analyze energy consumption data to identify savings opportunities and take necessary action.

5. **Awareness and Training Programs:** Regular training programs and awareness campaigns are conducted for students and staff to raise awareness of energy conservation. A culture of energy efficiency is internalized throughout the university's daily life.

6. **Electric and Hybrid Vehicles:** The university encourages the use of electric and hybrid vehicles on campus. Charging stations for electric vehicles are installed to support sustainable transportation solutions.

7. **Energy Consumption Monitoring and Reporting:** The University produces regular reports to monitor and evaluate energy consumption performance. These reports are used to measure the success of energy efficiency strategies and identify new areas for improvement.

8. **Waste Energy Recovery:** Projects are being developed across the campus to recover and reuse waste energy. Heat recovery systems, in particular, aim to prevent energy losses.



Goals

The targets set by Biruni University in line with its energy efficiency policy are as follows:

1. **Reducing Energy Consumption:** To reduce energy consumption across campus by 30%. Achieving this goal through energy efficiency projects and the use of renewable energy sources.

2. **Increasing Renewable Energy Use:** Meeting 50% of campus energy needs from renewable energy sources. Rapidly expanding

projects such as solar panels and wind energy.

3. **Reducing Carbon Emissions:** Reducing carbon emissions by 40% through energy efficiency and renewable energy projects. Minimizing negative environmental impacts by reducing the campus's carbon footprint.

4. **Spreading Energy Awareness:** Raising energy efficiency awareness among students and staff to 90%. Regularly organizing training and awareness campaigns to raise this awareness.

5. **Encourage Electric Vehicle Use:** Increase the use of electric vehicles across campus by 20% and expand electric vehicle charging stations.

6. **Increasing Energy Savings:** Increasing energy savings to 25% through building automation

systems. Minimizing energy losses, particularly in heating and cooling systems.

7. **Supporting Waste Energy Recovery:** Increasing the waste energy recovery rate to 15% and expanding heat recovery systems across campus.

These targets will be regularly monitored, their success will be evaluated, and necessary improvements will be made. Biruni University will continue to contribute to a sustainable future by fulfilling its environmental responsibilities through its energy efficiency policy.

Carbon Emissions And Nature Protection Policy

Biruni University adopts an approach that supports environmental sustainability, emphasizing the reduction of carbon emissions and the protection of nature as one of its core priorities. Our Carbon Emission and Nature Protection Policy aims to minimize the environmental impact of all university activities, reduce our carbon footprint, and contribute to the preservation of the ecosystem. Our university promotes the conservation and sustainable use of natural resources while raising awareness among students and staff about environmentally friendly practices. This policy aims to promote environmental responsibility across the campus for a sustainable future.

Core Values

Biruni University's Carbon Emission and Nature Protection Policy is based on the following core values:

1. **Reducing Carbon Footprint:** Our university encourages the transition to renewable energy sources and implements energy-efficient

practices to reduce carbon emissions.

2. **Conservation of Natural Resources:** Protecting nature and promoting biodiversity are among our university's core responsibilities. All activities ensure the sustainable use of natural resources.



3. **Sustainable Solutions:** Our university plays a leading role in protecting nature and developing environmentally friendly solutions by using environmentally friendly technologies and sustainable designs that reduce environmental

impacts.

4. **Environmental Awareness:** Our university aims to raise community-wide awareness of carbon emissions and environmental protection. Students, faculty, and administrative staff are educated about sustainable lifestyles.

5. **Social Responsibility:** Our university acts with a sense of social responsibility in projects aimed at protecting nature and reducing its carbon footprint, and develops collaborations in this direction.

Carbon Emission and Nature Protection Policy Strategies

Biruni University implements the following strategies to reduce carbon emissions and protect nature:

1. **Renewable Energy Use:** Our university utilizes renewable energy sources such as solar, wind, and geothermal energy to reduce carbon

emissions. Energy efficiency systems are developed throughout the campus, reducing dependence on fossil fuels.

2. **Energy Efficiency and Carbon Monitoring Systems:** Energy management systems

are installed to increase energy efficiency in campus buildings. Carbon footprints are regularly monitored, and plans for reduction are developed.

3. Sustainable Transportation and Low-Carbon Alternatives: Our university encourages alternative transportation methods that provide low carbon emissions on and off campus. We promote bike paths, electric vehicle charging stations, and the use of public transportation.

4. Waste Management and Recycling Programs: Recycling systems are effectively implemented to reduce carbon emissions. Waste reduction and recycling projects ensure the sustainable use of resources and improve waste management.

5. Protecting and Enhancing Natural Areas: Our university aims to increase green spaces and preserve natural habitats across campus. Sustainable landscaping practices are implemented to plant trees and preserve local vegetation.

6. Zero Carbon Target: Our university develops long-term strategies in line with its zero carbon target. Solutions are developed to ensure decarbonization in areas such as energy consumption, transportation, and waste management.

7. Environmental Education and Awareness Programs: Our university regularly organizes educational programs and seminars to raise awareness among students and staff about carbon emissions and environmental protection. These programs aim to promote environmental sustainability.



Goals

Biruni University's Carbon Emission and Nature Protection Policy are:

1. Reducing Carbon Emissions: Reducing carbon emissions by 40% through energy efficiency and renewable energy use across

campus.

2. Expanding Green Areas: Increasing green areas within the campus by 30% and carrying out sustainable landscaping efforts to protect natural habitats.

3. Increasing Waste Management and Recycling Rates: Increasing the rate of waste recycled on campus to 50% by expanding recycling programs.

4. Promoting Sustainable Transportation: Increasing the use of low-carbon transportation alternatives on and around campus by 50%.

5. Achieving the Zero Carbon Target: Developing solutions that will completely eliminate dependence on fossil fuels in energy and transportation, in line with the long-term zero carbon target.

Biruni University aims to take responsibility for reducing carbon emissions and protecting nature, and to foster a sustainable campus culture. Our university is committed

to the implementation and continuous improvement of this policy.

Graphene Oxide–Based Next-Generation Battery for Electric Vehicles

Aim:

To design and develop a high-efficiency, graphene oxide–based battery system for electric vehicles (EVs) that enhances energy density, charging speed, and sustainability while reducing environmental impact and production costs.

Description:

This project focuses on the application of graphene oxide nanomaterials as a core component in next-generation EV batteries. Through the integration of nanotechnology, electrochemical engineering, and materials science, the research aims to produce batteries that deliver superior performance compared to conventional lithium-ion technologies. The graphene oxide structure provides high conductivity, lightweight design, and thermal stability, which collectively extend battery lifespan and improve safety. The project also prioritizes eco-friendly material sourcing and energy-efficient manufacturing processes, contributing to the sustainability of the clean

energy sector.

Impact:

The innovation contributes to the transition toward sustainable transportation by reducing reliance on fossil fuels and improving the efficiency of electric vehicles. Enhanced energy storage technology supports the scalability of renewable energy systems and promotes environmentally responsible industrial production. The project's findings have the potential to accelerate the adoption of clean energy vehicles, strengthen green industry collaboration, and position the university as a pioneer in energy innovation.

SDG 7 Contribution: Aligned with SDG 7: Affordable and Clean Energy, this project advances global efforts to ensure access to reliable, sustainable, and modern energy systems. By enabling high-performance, graphene-based battery technologies, it fosters innovation in renewable energy storage, supports the decarbonization of transport, and contributes to building a cleaner and more energy-efficient future.



Energy Facilities and Systems

Through the Energy Facilities and Systems course, Biruni University directly contributes to Sustainable Development Goal 7 – Affordable and Clean Energy, aiming to promote awareness and expertise in the energy field. Within the scope of the course, students gain both theoretical knowledge and practical learning experiences in areas such as renewable energy technologies, energy efficiency practices, environmental impact analysis, and circular energy systems. In doing so, they enhance their awareness and understanding of sustainable energy management and resource optimization. This course not only addresses the technical aspects of energy production processes but also examines the environmental, economic, and social impacts of energy policies in a multidimensional manner, thereby strengthening students' competencies. Designed in line with Biruni University's innovative and environmentally conscious educational vision, the course aims to cultivate a qualified workforce that contributes to the development of clean, reliable, and universally accessible energy systems within the energy sector.



Energy-Efficient Building Renovation, Modernization Strategies, and the Comprehensive Improvement Plan

Biruni University regards energy management as a fundamental component of its sustainability policies and considers the enhancement of resource efficiency across the campus as an institutional priority. The main purpose of this plan is to reduce energy consumption, minimize environmental impacts, and establish a low-carbon campus structure in the long term.

Accordingly, the University aims to achieve a minimum 25% reduction in energy consumption by 2030, improve resource efficiency, and expand the adoption of sustainable practices at the institutional level.

Strategic Goals

- **Energy Efficiency:** Transition to energy-saving lighting, heating, and cooling systems in all university buildings.
- **Infrastructure Modernization:** Renovation of insulation, mechanical systems, and automation components to enhance building energy performance.
- **Smart Energy Management:** Real-time monitoring and analysis of energy use, supported

by automated control systems.

- **Sustainable Material Use:** Preference for environmentally friendly, durable, and low-carbon materials in all renovation processes.

- **Awareness and Behavioral Change:** Organization of education and awareness



programs to strengthen energy-saving consciousness among students and staff.

Through these goals, Biruni University aims to establish a campus that is environmentally responsible, energy-efficient, and aligned with

long-term sustainability principles.

Current Situation Analysis

Although Biruni University has a modern campus infrastructure, several areas require improvement in terms of energy performance. Some existing buildings operate below current efficiency standards. In particular, outdated façade insulation, window systems, and HVAC infrastructure in older buildings contribute to heat loss and high energy consumption.

1. Infrastructure Status

Inadequate exterior insulation, high heat-transmission windows, and limited roof insulation lead to considerable energy losses. In addition, the manual operation of HVAC systems results in unnecessary energy usage and inefficiency.

2. Energy Consumption Trends

Energy consumption increases significantly

during the academic year's peak periods. Laboratories, cafeterias, computer rooms, and administrative offices represent the highest-consuming areas. Due to limited monitoring and reporting systems, potential energy-saving opportunities cannot be fully identified or utilized.

3. Awareness Level

While awareness of energy conservation has improved among the university community, lasting behavioral change has not yet been fully achieved. Continuous training programs, seminars, and awareness campaigns are required to strengthen this understanding. This analysis reveals that priority actions for improving energy performance should focus on infrastructure modernization, digital energy management, and institutional awareness development.

4. Modernization Strategies

Biruni University will implement a comprehensive modernization plan to enhance energy management and strengthen environmental sustainability. This plan focuses on upgrading technical infrastructure, establishing digital management systems, and improving institutional awareness.



4.1 Building Envelope and Insulation Improvements

To prevent energy losses, insulation improvements will be carried out on façades, roofs, and window systems. Low-emissivity glass, heat-reflective coatings, and high-performance insulation materials will be used to achieve thermal comfort. These upgrades will reduce both heating and cooling loads, leading to lasting energy savings.

4.2 Renewal of Mechanical Systems

HVAC components with low energy efficiency will be replaced. Automated temperature control, time-scheduled operation, and zonal heating/

cooling mechanisms will be implemented, enabling energy use to be optimized according to occupancy and demand.

4.3 Transformation of Lighting Systems

Traditional lighting fixtures will be gradually replaced with LED systems. Motion-sensor lighting will be installed in shared areas, while timer-controlled systems will be used in offices and corridors. This transition will significantly reduce electricity consumption.

4.4 Digital Energy Management and Monitoring Systems

A digital energy-monitoring infrastructure will be established to ensure efficient control of energy use. Consumption data will be analyzed at regular intervals, and unnecessary usage will be identified for immediate corrective action. Energy performance indicators will be reported periodically to support evaluation and improvement processes.

4.5 Sustainable Material Use

All maintenance and renovation projects will prioritize environmentally responsible, long-lasting, and recyclable materials. This approach will reduce waste generation and extend the

service life of campus facilities. Procurement processes will adopt environmental compliance criteria as a standard practice.

4.6 Education and Awareness Programs

To ensure the permanence of technological modernization, human-centered awareness programs will be implemented. Training sessions, seminars, and information campaigns on energy efficiency will be organized for students and staff, encouraging the adoption of responsible consumption behaviors.

5. Comprehensive Improvement Plan

5.1 Energy Efficiency Projects

Biruni University will implement a series of projects aimed at reducing energy consumption and improving the performance of existing systems. Within this framework:

- A complete transition to LED-based lighting systems will be carried out across all campus buildings. LED technology consumes approximately 40–50% less energy compared to traditional lighting and also lowers maintenance costs.
- Heating, ventilation, and air conditioning (HVAC) systems will be modernized with smart thermostats. These systems will automatically

regulate temperature according to occupancy and usage intensity, minimizing energy waste.

- Automatic door and window systems will be installed to prevent heat loss and eliminate unnecessary energy use in open or unoccupied areas.

Through these actions, the University aims to achieve a 20% reduction in total energy consumption by 2028.



5.2 Renewable Energy Integration

To strengthen energy security and reduce carbon emissions, the University plans to expand its renewable energy capacity. Accordingly:

- Between 2025 and 2029, Biruni University

aims to reach a total installed solar power capacity of 1 MW.

- Energy storage systems will be installed to ensure uninterrupted power supply and system stability.
- Feasibility studies will be conducted for potential wind and geothermal energy resources, and hybrid system integration (e.g., solar + wind combinations) will be considered in suitable locations.

These investments will reduce the University's dependence on external energy sources and contribute to building a cleaner, environmentally responsible energy infrastructure.

5.3 Smart Systems and Automation

To ensure sustainable energy management, all campus buildings will be equipped with smart monitoring and control systems.

- Energy consumption, temperature, lighting, and water use will be monitored in real time across all facilities.
- A centralized Energy Management Center (EMC) will be established to analyze consumption data and prepare periodic performance reports.
- Collected data will be processed through digital control panels, enabling automated system optimization.
- The entire system will be designed

in compliance with the ISO 50001 Energy Management Standard, ensuring international operational quality.

This approach will enable transparent energy tracking, early detection of inefficiencies, and data-driven decision-making for continuous improvement.

5.4 Education and Awareness Activities

Technological transformation must be accompanied by behavioral change. For this reason, Biruni University will implement a comprehensive education and communication program to strengthen awareness of energy efficiency.

- At least three energy awareness events will be organized each year, including seminars, workshops, and competitions designed for students and staff.
- Sustainable energy innovation contests will be held to encourage creative ideas and academic engagement.
- “Save Your Energy” information panels will be installed in visible areas throughout the campus to promote conscious energy use in daily routines.

These initiatives will ensure that energy efficiency becomes not only a technical implementation but also a lasting element of the University’s

institutional culture.

5.5 Monitoring, Reporting, and Evaluation

Transparency and accountability are key principles of Biruni University’s energy management approach.

- An annual Energy Performance Report will be prepared and published.
- The report will include core indicators such as energy intensity, renewable energy share, carbon emissions, and cost-saving ratios.
- All findings will be included in the Biruni



University Sustainability Report, providing year-over-year comparisons and measurable progress.

This monitoring framework will facilitate systematic evaluation and contribute to the

continuous improvement of the University’s sustainability performance.

6. Expected Outcomes

The implementation of this plan is expected to yield the following results:

- Reduction in Energy Consumption: A 25% decrease in total energy use by 2030.
- Reduction in Carbon Footprint: Prevention of approximately 2,000 tons of CO₂ emissions per year.
- Financial Savings: Up to 30% reduction in annual energy expenditures.
- Sustainable Campus Model: Establishment of Biruni University as one of Turkey’s leading higher education institutions in energy efficiency and sustainability.

7. Monitoring, Reporting, and Continuous Improvement

All projects will be tracked through the Energy Performance Monitoring System (EPMS).

Annual measurement and analysis results will be used to revise energy policies, allocate additional budgets when necessary, and guide strategic planning decisions.

This structured cycle will enable Biruni University to maintain a continuously

improving, measurable, and transparent energy management model. Through this framework, the University will ensure operational excellence and long-term environmental sustainability.

8. Conclusion

Biruni University perceives sustainability not only as an environmental target but also as an institutional responsibility. Through energy-efficient building renovations, renewable energy investments, and the modernization of smart systems, the University is taking decisive steps toward becoming the green campus of the future.

This plan is directly aligned with the United Nations Sustainable Development Goal 7 (Affordable and Clean Energy) and represents a comprehensive vision of sustainable transformation that creates environmental, economic, and social value simultaneously.



Transition to Renewable Energy, Solar Power Plant Investments, and the Carbon Neutral 2030 Target



Aligned with its Carbon Neutral 2030 Vision, Biruni University is committed to meeting its entire electricity demand from renewable sources. To achieve this, the University is developing two major solar power projects: a rooftop solar power plant and a large-scale ground-mounted system.

These investments support both environmental impact reduction and long-term operational cost efficiency. Project locations have been selected along the Ankara–Istanbul corridor for optimal solar exposure and short commissioning times.

Project Specifications and Capacity:

- Ground-Mounted Solar Plant (10,687 kW): Installed across 15,000 m², this system will produce 1.35–1.7 million kWh of electricity annually and yield 5–7 million TL in savings.

- Investment Model: Both systems are developed through a Build–Operate–Transfer (BOT) model to ensure efficient installation and long-term operational quality.

Through these investments, Biruni University advances in alignment with Türkiye’s Green Deal Action Plan, national renewable energy targets, and global clean energy standards.

Carbon Management, Greenhouse Gas Reduction Strategies, and Institutional Emission Inventory Practices

The University supports its energy transition with a robust, integrated Carbon Management Process, encompassing all direct and indirect sources of greenhouse gas emissions. This process ensures that emission reductions are data-driven, verifiable, and aligned with international standards.

Key components of the carbon management system include:

- **Renewable Energy Integration:** Increasing electricity generation from solar systems to reduce emissions associated with grid-based power consumption.
- **Sustainable Mobility Measures:** Deployment of electric campus vehicles, installation of EV charging stations, and student-centered incentives for public transportation.
- **Digitalization and the Paperless Office:** The Biruni DataHub e-form system saves thousands of pages annually, reducing emissions from printing and administrative logistics.
- **Annual Emission Inventory:** Emissions from electricity, natural gas, transportation, and waste are calculated under Scope 1-2-3 categories according to ISO 14064-1 and GHG Protocol methodologies.

The University targets a 15% reduction in total CO₂ emissions by 2027 and maintains full alignment with the Türkiye Climate Change Action Plan and the European Green Deal.



Energy Efficiency Action Plan, Green Campus Framework, and Integrated Management Model



Biruni University implements the Energy Efficiency Action Plan (2023–2027) and Green Campus Plan concurrently, creating a cohesive strategy that promotes environmental responsibility and sustainable resource use across all campus operations.

Plan objectives include:

- 15% reduction in total energy consumption
- 20% reduction in electricity use
- 10% reduction in natural gas consumption
- Full transition to A-class energy systems
- Completion of the LED lighting transformation

These objectives are supported by smart automation systems, sustainable procurement policies, staff training programs, and continuous awareness initiatives. All processes are managed under the ISO 50001 Energy Management System, ensuring verifiable, auditable, and performance-driven implementation. The Green Campus Plan also prioritizes environmentally responsible landscaping, reduced heat island impact, and the adoption of low-carbon building materials.

Energy Monitoring, Technical Audits, and Continuous Improvement in Operational Management

The University conducts annual, detailed energy audits covering classrooms, laboratories, hospital facilities, HVAC systems, and other high-consumption units. These assessments evaluate:

- Insulation performance
- Lighting efficiency
- Mechanical and electrical equipment energy profiles
- HVAC system optimization

Audit results directly inform annual investment plans, modernization priorities, and budget allocations. All findings are documented in the Energy Monitoring Report and reviewed jointly by Technical Affairs and the Sustainability Office to guide continuous operational improvement.



Public Engagement, Awareness Initiatives, and the Renewable Energy–Focused “Green Energy Talks” Program



Biruni University extends its sustainability commitment beyond the campus by engaging actively with the public through educational, collaborative, and outreach-oriented initiatives. Partnerships are established with municipalities, NGOs, energy institutions, and private sector stakeholders.

Key activities include:

- Renewable energy seminars and technical forums
- Student workshops and youth-led innovation sessions
- Expert panels under the “Green Energy Talks” series

Outputs from these events are shared through the University’s sustainability website, social media platforms, and digital campaigns, expanding public access to clean energy knowledge. These initiatives collectively reinforce the University’s progress toward its Carbon Neutral 2030 commitment.

Low-Carbon Technologies, Entrepreneurship Ecosystem, and Green Innovation Support Programs

Biruni University supports the development of low-carbon technologies through Biruni Technopark and the Entrepreneurship & Innovation Center, offering a wide array of resources to students, startups, and researchers.

Support mechanisms include:

- Academic mentorship and expert consultation
- Access to office and laboratory infrastructure
- Guidance for TÜBİTAK 1512 BIGG, KOSGEB Green Innovation, and technopark funding programs
- R&D prototyping and product development support

Programs delivered within this ecosystem include:

- Biruni Green Innovation Challenge: A competition focusing on circular economy and renewable energy solutions
- Sustainability Acceleration Program: A six-month mentorship and acceleration track
- University Innovation Fund: Micro-grants for student prototypes

These initiatives contribute directly to national

Green Deal objectives and accelerate the transition toward a low-carbon economy.

Carbon Management and Emission Reduction

Biruni University operates a dedicated Carbon Management and Reduction Process ensuring that emissions are measured, reported, and actively reduced.

Key components include:

- Renewable Energy Use: expansion of solar systems and low-carbon energy integration
 - Sustainable Mobility: electric campus vehicles, EV charging points, and public transport incentives
 - Digitalization: “paperless office” workflows through the DataHub e-form system
 - Annual Carbon Inventory: emissions from electricity, natural gas, transportation, and waste are calculated under Scope 1–2–3 using ISO 14064-1 and GHG Protocol
- By 2027, the university aims for a 15% reduction in total CO₂ emissions and continues to align its reporting with Türkiye’s and EU’s climate frameworks.



Governance, Data Integration, and a Transparent Energy Monitoring Ecosystem

Campus energy management is coordinated by the Directorate of Construction and Technical Affairs together with the Sustainability & Data Valuation Office. All energy consumption data are monitored monthly via Biruni DataHub, ensuring precise, consistent, and transparent reporting.

These data streams are integrated into the Annual Energy Efficiency Report, Carbon Management Plan, and long-term sustainability indicators.

Through this integrated governance structure, Biruni University positions its campuses as low-carbon, energy-efficient, and environmentally responsible living environments, fully aligned with SDG 7.

Carbon Management and CO₂ Reduction Process

1. Energy Management and Carbon Reduction Approach

Biruni University implements an institutional process for carbon management in line with SDG 7: Affordable and Clean Energy, aiming to enhance energy efficiency, reduce greenhouse-



gas emissions, and establish a low-carbon energy infrastructure across the campus.

The University views carbon management

not only as a technical necessity for reducing energy consumption but also as an integrated sustainability policy that strengthens environmental responsibility within its institutional culture.

2. Process and Implementation Areas

a. Measurement and Monitoring of Energy Use

Energy consumption data are collected annually, and a carbon footprint assessment is carried out.

Electricity and natural-gas use are analyzed to determine CO₂ emissions, and the results are compared with previous years to track trends in energy intensity and efficiency.

b. Energy-Efficiency Applications

A range of efficiency measures has been implemented across campus buildings:

- LED lighting systems have replaced traditional fixtures.

- Smart thermostats and automated HVAC controls are used to optimize heating and cooling.

- Thermal-insulation improvements have been introduced to prevent heat loss.

These initiatives have reduced overall energy demand and directly contributed to lowering the University's carbon footprint.

c. Transition to Renewable Energy

Biruni University plans to increase the share of renewable energy in its total supply. Feasibility studies for solar-energy systems have been completed, and integration with energy-storage solutions is being prepared to ensure a continuous and clean energy supply for the campus.

3. Institutional Reduction Strategies

The carbon-management process combines technical improvements with behavioral and operational measures:

- Energy-awareness programs are organized to build a culture of conscious energy use among students and staff.
- Waste-reduction and recycling initiatives minimize indirect carbon emissions.
- Sustainable transportation practices, including the promotion of public transit and cycling, help reduce campus-related emissions. These strategies link carbon-reduction efforts directly to the University's sustainable-energy policies.

4. Monitoring and Reporting

CO₂-emission data are reviewed annually through the Energy Performance Report, which tracks energy intensity, renewable-energy share, and carbon-reduction progress.

Findings are incorporated into the Biruni University Sustainability Report, ensuring transparent public communication and measurable accountability.

5. Targets and Expected Outcomes

Biruni University's long-term carbon-management framework is aligned with its sustainable-energy strategy and aims to:

- Achieve a 25% reduction in carbon emissions by 2030,
- Transition to a carbon-neutral campus by 2040, and
- Ensure a 20% decrease in total energy consumption through efficiency and behavioral measures.

These targets demonstrate the University's tangible contribution to SDG 7's objectives energy efficiency, clean-energy adoption, and low-carbon development.

6. Evaluation

Through its carbon-management process, Biruni University not only reduces energy consumption but also embeds sustainable-energy principles into its institutional structure.

With continuous investments in energy efficiency, renewable-energy transition, and emission-reduction strategies, the University is shaping a low-carbon campus model that exemplifies the core values of SDG 7: Affordable and Clean Energy.



Energy Reviews and Identification of Energy Wastage

1. General Approach

Biruni University conducts regular energy reviews to ensure efficient use of resources and to reduce unnecessary consumption across campus facilities. These reviews aim to identify areas where energy wastage is highest, analyze underlying causes, and develop corrective actions that improve the university's overall energy performance.

The process is coordinated by the Directorate of Construction and Technical Affairs in collaboration with the Sustainability and Data Evaluation Office, ensuring that all energy-management practices are continuously monitored and improved.

2. Scope and Methodology

Energy reviews are conducted at least once a year and cover all major operational areas within the campus. Both technical and behavioral aspects of energy use are analyzed to provide a comprehensive understanding of

inefficiencies.

The main focus areas include:

- Building Energy Performance: Evaluation of heating, cooling, ventilation, and insulation



systems to detect energy losses.

- Lighting Systems: Identification of outdated fixtures and transition planning to LED-based systems.

- Electricity and Water Consumption: Analysis of high-consumption zones in shared spaces.

- User Behavior: Observation of energy-use habits among students and staff to encourage responsible energy practices. Data are collected through digital metering systems and on-site inspections, supported by periodic technical measurements to ensure accuracy.

3. Findings and Improvement Actions

The results of each review are compiled in the Annual Energy Evaluation Report, which helps identify key problem areas and prioritize improvement measures.

Based on review findings, the following corrective actions are typically implemented:

- Strengthening building insulation to prevent heat loss,
- Installing motion-sensor lighting and automatic shut-off systems,
- Optimizing HVAC operation schedules according to occupancy patterns,

- Balancing electric load distribution to minimize peak consumption periods. These targeted measures not only reduce energy wastage but also lower long-term operational and maintenance costs.

4. Monitoring and Continuous Improvement

Implemented measures are reassessed in the following review cycle to evaluate their effectiveness. This creates a continuous improvement loop within the university's energy-management system.

The results of these evaluations are published in the Biruni University Sustainability Report, ensuring transparency and accountability.

Energy-review outcomes also inform the Energy Efficiency and Carbon Management Plan, aligning investment priorities, modernization projects, and awareness programs with actual performance data.

5. Conclusion

Through regular and data-driven energy reviews, Biruni University systematically identifies and reduces energy wastage, strengthens operational efficiency, and promotes a culture of conscious energy use.

This process supports the university's commitment to SDG 7 – Affordable and Clean Energy, contributing to the development of a sustainable, energy-efficient campus model.



Policy on Divesting Investments from Carbon-Intensive Energy Industries

1. Institutional Approach

Biruni University manages its financial resources in line with environmental, social, and governance (ESG) principles and the United Nations Sustainable Development Goals.

Within this framework, the University has adopted a formal policy to limit and gradually divest from carbon-intensive energy sectors, particularly coal and oil.

Investment decisions are guided by an environmental-responsibility perspective, prioritizing financial instruments that support the transition to a low-carbon economy.

2. Scope and Core Principles

This policy applies to all direct and indirect investment activities managed by the University. The following key principles define its implementation:

- No direct investment in coal or oil industries.
- Exclusion of shares or funds belonging to companies operating in these sectors.
- Preference for financial institutions

that maintain clear transition policies toward renewable energy.

- Integration of environmental sustainability criteria into all new investment decisions.

Through this approach, Biruni University aims to institutionalize environmental responsibility within its financial structure and align its investment portfolio with its carbon-neutral vision.

3. Implementation Mechanism

The policy is implemented jointly by the Department of Strategy Development and the Sustainability and Data Evaluation Office.

- The University's investment portfolio is reviewed annually.
 - Any exposure to carbon-intensive sectors is identified and gradually reduced.
 - New investment proposals prioritize green finance alternatives, such as renewable-energy funds or sustainable-infrastructure projects.
- Furthermore, the University favors partnerships with financial institutions that actively apply green-finance principles.

4. Monitoring and Reporting

Progress on this policy is reviewed and reported annually within the Biruni University Sustainability Report. The report includes indicators such as the share of carbon-intensive investments, the proportion of green assets, and key financial-sustainability metrics.

This transparent reporting process ensures accountability and strengthens the University's commitment to responsible investment practices.

5. Long-Term Goals

Biruni University aims to completely phase out investments in carbon-intensive energy industries by 2030, redirecting at least 50% of its financial resources toward green and sustainable projects. This long-term financial transition supports the University's broader mission of fostering a sustainable, environmentally responsible institutional model.