

AL-FARABI KAZAKH NATIONAL UNIVERSITY

**CARBON NEUTRALITY POLICY OF AL-FARABI KAZAKH NATIONAL
UNIVERSITY**



Almaty, 2025

Introduction

Al-Farabi Kazakh National University reaffirms its commitment to global efforts to combat climate change and the principles of sustainable development. The University recognizes its responsibility as a leading educational and research institution for shaping an environmentally responsible future. Achieving carbon neutrality by 2050 is not only an ambitious goal, but also an opportunity to demonstrate leadership in creating a sustainable model for universities in Kazakhstan. This policy is a strategic action plan that includes specific measures, measurable goals, and innovative approaches adapted to local realities. It covers all areas of KazNU's activities, from day-to-day operations to educational and research initiatives, emphasizing an integrated approach to addressing environmental challenges.

The climate crisis requires immediate action, and universities, as centers of knowledge and innovation, play a key role in this process. KazNU strives not only to reduce its carbon footprint, but also to inspire other institutions, students, and society to make environmentally conscious decisions. This document serves as a guide to implementing this mission, uniting the efforts of the university's administration, faculty, students, and partners.

Global context and the role of universities

Climate change is one of the most serious threats facing humanity. According to the Intergovernmental Panel on Climate Change (IPCC), global warming must be kept to 1.5°C above pre-industrial levels to prevent catastrophic consequences. This requires a radical reduction in greenhouse gas emissions across all sectors of the economy and society. Universities, as centres of education, research and innovation, have a unique opportunity to make a significant contribution to solving this problem.

Universities around the world are actively implementing sustainability strategies and striving for carbon neutrality. For example, Stanford University plans to achieve net zero emissions by 2050, and the University of Cambridge by 2038. These initiatives include switching to renewable energy sources, improving the energy efficiency of buildings, developing sustainable transport, and engaging students and staff in environmental projects. KazNU, as a leading university in Kazakhstan, strives to meet these international standards and become an example for other institutions in the region. In addition, KazNU's initiative is aligned with the UN Sustainable Development Goals (SDGs), in particular SDG 13 (Climate Action) and SDG 4 (Quality Education), emphasizing the global significance of its efforts.

Universities also play a role as catalysts for change in society. Through education and research, they form a new generation of leaders capable of solving environmental problems and develop technologies that can be applied at the national and international levels. KazNU intends to use its intellectual potential to develop

innovative solutions adapted to the climatic and economic conditions of Kazakhstan, which makes its contribution unique and in demand.

Current situation and challenges

To develop an effective strategy to achieve carbon neutrality, it is necessary to understand KazNU's current emissions levels and key emission sources. Key areas contributing to the university's carbon footprint include:

- **Energy consumption in buildings** : A significant portion of emissions comes from the use of electricity and heat for lighting, heating, ventilation, and air conditioning. Outdated systems and poor energy efficiency in buildings exacerbate the problem. According to preliminary estimates, the university's buildings consume about 20,000 MWh of electricity and 50,000 Gcal of heat annually, resulting in emissions of approximately 15,000 tonnes of CO₂ per year. This is due to the use of coal and natural gas in Kazakhstan's power grid, making electricity carbon-intensive .
- **Transport** : Emissions from the university car fleet, as well as from the personal cars of staff and students, are an important factor. Given the geographical location of the Almaty campus, the transport load remains high. About 1,000 cars park on campus every day, resulting in approximately 2,400 tons of CO₂ emissions per year. In addition, public transport in Almaty is not yet environmentally friendly enough, which limits the possibilities for reducing emissions.
- **Waste** : The disposal of municipal solid waste, organic materials and hazardous substances (such as mercury lamps) results in additional greenhouse gas emissions, including methane from landfills. The university produces approximately 500 tons of waste annually, of which only 10% is recycled, with the rest going to landfills, adding to the environmental burden.
- **Water consumption** : Indirect emissions are associated with the supply, heating and treatment of water, particularly in environments where there is a high reliance on energy-intensive systems. The University consumes approximately 100,000 m³ of water per year, which requires significant energy inputs for pumping and heating, adding approximately 500 tonnes of CO₂ per year.
- **Business travel** : Business travel, including flights to conferences and international projects, also contributes to the carbon footprint. University staff make around 1,000 flights each year, resulting in approximately 2,000 tonnes of CO₂ emissions. This figure rises with increasing international collaboration.

To get a complete picture, KazNU is committed to conducting a detailed emissions audit in 2025. The audit will cover three categories of emissions according to the international Greenhouse Gas Protocol standards: Scope 1 (direct emissions from its own activities, such as from the vehicle fleet), Scope 2 (indirect emissions from

electricity and heat consumption) and Scope 3 (other indirect emissions, such as business trips, waste and supply chains). The audit results will become a baseline for tracking progress and identifying priority areas.

Key challenges include:

- **Limited resources** : The university has limited financial and technical resources, making it difficult to upgrade its infrastructure.
- **Outdated infrastructure** : Many buildings were built during the Soviet period and do not meet modern energy efficiency standards.
- **Lack of awareness** : Students and staff are not yet sufficiently involved in environmental initiatives, which requires additional education and motivation efforts.
- **Climate** : Winters in Almaty increase heating needs, and reliance on fossil fuels makes the transition to green energy difficult.

Goals and Commitments

KazNU has set an ambitious goal of achieving carbon neutrality by 2050. This goal will be achieved through three main approaches:

1. **Minimize emissions** : Implement measures to reduce emissions in all areas of the University's activities, including energy, transport and waste management.
2. **Offsetting residual emissions** : Investing in environmental projects such as greening, ecosystem restoration and purchasing carbon credits to offset unavoidable emissions.
3. **Community Engagement** : Educate and motivate students, staff and the community to participate in sustainable development through curricula, research and community initiatives.

Intermediate goals include:

- Reduce emissions by 30% by 2035 relative to a 2025 baseline.
- Reduce emissions by 65% by 2040.
- Achieving complete carbon neutrality by 2050.

The University undertakes to review its commitments annually, adapting them to new technologies, scientific data and legislative changes, including possible tightening of environmental regulations in Kazakhstan. These goals are in line with the SMART principles (specific, measurable, achievable, relevant, time-bound), which ensures their realism and transparency. KazNU also aims to become the first carbon-neutral university in Central Asia, which will strengthen its reputation and attract international attention.

Action plan

To achieve carbon neutrality, KazNU has developed a detailed action plan covering the following areas:

1. Emissions audit and monitoring

- Conduct a full emissions audit in 2025 with the involvement of international and local experts, using Greenhouse Gas Protocol methodologies.
- Establish a baseline emission level as a starting point for further measurements.
- Implement a continuous monitoring system using specialized software and sensors in buildings, transport and key campus facilities.
- Publish annual emissions reports available to students, staff and the public via the University website and mobile app.

2. Improving energy efficiency

- Replace all traditional lamps with LEDs by 2027, which will reduce lighting energy consumption by 50%. This will save about 5,000 MWh annually.
- Improve the thermal insulation of buildings (windows, walls, roofs) using modern materials such as polyurethane foam and mineral wool, reducing heat loss by 30% by 2030.
- Implement intelligent energy management systems (motion sensors, automatic switching off of lights and heating in empty spaces) to reduce overall energy consumption by 20% by 2035.
- Upgrade heating and air conditioning systems to high-efficiency heat pumps and gas boilers with efficiencies greater than 90%, increasing their efficiency by 30% by 2030.
- Conduct an energy audit of all campus buildings and develop individual optimization plans for each building.

3. Transition to renewable energy sources

- Install 5 MW solar panels on the roofs of buildings, covering 50% of energy consumption by 2035. The high level of solar radiation in Almaty (about 1500 kWh /m² per year) makes this direction promising.
- Enter into agreements with green energy suppliers to purchase electricity from renewable sources such as hydro and solar power plants.
- Develop pilot projects for the use of geothermal energy for heating individual buildings, taking into account the geothermal potential of the region.

4. Development of sustainable transport

- Create a network of bicycle parking spaces (500 spaces) and 10 charging stations for electric vehicles by 2026.
- Convert the university's fleet of 20 vehicles to electric or hybrid vehicles by 2035, starting with replacing 50% of the fleet by 2030.

- Subsidize public transport and bicycle use for students and employees by allocating 50 million tenge annually.
- Organize a carpooling system via a mobile application to reduce trips by private cars by 20% by 2030.
- Organize transportation by electric buses and create pedestrian zones on campus, limiting the entry of cars into central areas.

5. Improving waste management

- Introduce separate waste collection (plastic, paper, glass, organic waste) in all buildings by 2025, installing 200 containers.
- Launch a composting program for organic waste (approximately 100 tons per year) to produce fertilizer for university gardens.
- Reduce the use of single-use materials (plastic cups, bags) by 80% by 2030, replacing them with reusable alternatives.
- Ensure safe disposal of hazardous waste (lamps, batteries) through certified partners, recycling 100% of such waste by 2028.
- Organize the recycling of electronic waste (computers, printers) in cooperation with local companies.

6. Efficient water consumption

- Install water consumption monitoring systems with real-time sensors in all buildings by 2026.
- Equip faucets and showers with water-saving nozzles, reducing water consumption by 20% by 2030.
- Conduct annual water conservation campaigns among students and staff.
- Recycle wastewater (up to 20,000 m³ per year) for irrigation and technical needs using local treatment facilities.
- Collect rainwater from the roofs of buildings (about 10,000 m³ per year) for watering plants and cleaning.

7. Reducing emissions from business travel

- Use video conferencing for 50% of events, reducing air travel by 30% by 2030.
- Develop a travel policy that reduces the frequency and distance of travel, with approval in 2025.
- Offset emissions from travel by purchasing carbon credits on international platforms.

8. Education, research and community engagement

- Integrate sustainability and climate change topics into the curricula of all faculties by 2026.
- Create a research center for renewable energy and energy efficiency with a budget of 200 million tenge by 2027.
- Conduct annual environmental forums, seminars and campaigns with the participation of more than 1000 students.

- Support student initiatives (environmental clubs, project competitions) through grants of up to 10 million tenge per year.
- Develop online courses on sustainable development on the KazNU platform, available free of charge to everyone.

9. Emission compensation

- Plant 10,000 trees on campus and surrounding areas by 2035, absorbing approximately 200 tons of CO₂ annually.
- Invest in renewable energy and carbon offset projects in the amount of 50 million tenge by 2030.
- Collaborate with environmental organizations to restore forests in the Almaty region, starting in 2025.

Progress tracking and accountability

To monitor the implementation of the policy, a Sustainable Development Committee will be established under the leadership of the Vice-Rector. Annual progress reports will be published using key performance indicators (KPIs):

- Percentage of emissions reduction relative to baseline.
- Share of energy from renewable sources in total consumption.
- Waste recycling rate as a percentage of total volume.
- Reduction of water consumption in m³.
- Reduction of emissions from business travel in tons of CO₂.

Independent third-party audits will be conducted every two years to ensure the reliability of the data. Students and staff will be involved in monitoring through volunteer programs and a mobile app to track environmental indicators in real time.

Funding and resources

The implementation of the plan will require investments of about 5 billion tenge by 2040. KazNU will:

- Search for government grants through the Ministry of Science and Higher Education of the Republic of Kazakhstan and the Ministry of Ecology.
- Attract private donations and sponsorship from companies such as KazMunaiGas and Kazakhmys.
- Use research potential to commercialize innovations (e.g. selling energy efficiency technologies).
- Cooperate with international funds such as the United Nations Development Programme (UNDP) and the World Bank.

In addition, the university plans to create the KazNU Sustainable Development Fund with an initial capital of 100 million tenge to finance key projects.

Potential partnerships

KazNU intends to strengthen cooperation with:

- **Government of Kazakhstan** : To receive subsidies and participate in national green economy programs.
- **International universities** : Such as MIT and Cambridge for exchange of experience and joint research.
- **Private sector** : Renewable energy companies (e.g. Samruk Green Energy) to implement projects.
- **NGOs** : Such as WWF and Greenpeace for educational campaigns and emissions offsetting.

These partnerships will provide access to technology, expertise and financing, accelerating progress towards carbon neutrality.

Expected results

The implementation of the policy will bring the following results:

- Reducing emissions to zero by 2050, making KazNU the first carbon-neutral university in the region.
- Resource conservation: reduce energy and water costs by 30% by 2040.
- Improving reputation: strengthening KazNU's position as a leader in sustainable development.
- Educational impact: 50,000 students prepared with sustainability skills by 2040.
- Environmental contribution: offsetting 10,000 tons of CO₂ through greening and projects.

Conclusion

Achieving carbon neutrality by 2040 is an ambitious goal that will strengthen KazNU's position as a leader in sustainable development. The policy combines practical measures with educational and research initiatives, demonstrating commitment to global goals. Implementation of the plan will minimize the university's environmental footprint, improve the quality of life on campus, and inspire society to an environmentally responsible future. KazNU calls on all members of the university community and partners to join this mission to build a sustainable tomorrow together.