Contribution to combating climate change

Management approach

GRI 3-3, GRI 12: Coal Sector: 12.2.1

We recognize our role in shaping the global carbon footprint and are committed to taking decisive measures to reduce both direct and indirect greenhouse gas emissions arising from energy production and use. These efforts to reduce the carbon intensity of production processes and products are synchronized with the developed Development Strategy and energy transition initiatives of Samruk-Energy JSC.

The Board of Directors of Samruk-Energy JSC is actively engaged in defining both short-term and long-term strategic goals, including in the field of climate policy, emphasizing our resolute approach to managing environmental initiatives and adapting to climate change. The Board of Directors approved the Energy Transition Program of Samruk-Energy JSC for 2022-2060 in accordance with the approved Development Strategy of Samruk-Energy JSC for 2022-2031.

The Energy Transition Program defines strategic guidelines for transition to efficient, resource-saving and environmentally friendly technologies aimed at achieving the goal of carbon neutrality by 2060. The objective of the Program is to gradually reduce the company's carbon footprint, and its provisions apply to all subsidiaries of Samruk-Energy. In modeling the scenarios, both external and internal factors affecting the successful fulfillment of the goal were considered, with special attention to socio-economic risks. In the context of global efforts to curb climate change and considering the challenges associated with traditional energy production, we intend to actively reduce our environmental impact while ensuring transformation into a technologically advanced and socially responsible Company by 2060.

Managing the Climate Agenda

GRI 201-2, GRI 12: Coal Sector: 12.2.2, TCFD. Governance | TCFD. Strategy | TCFD. Risk Management

Corporate climate governance

We pay considerable attention to climate risk management to provide reasonable assurance that our strategic objectives will be achieved in the face of adverse impacts. The Company makes a voluntary commitment to take action to reduce greenhouse gas emissions. The Chairman of the Board of Directors is directly responsible for control over strategic management of issues, sustainable development and achievement of the Company's strategic goals, including issues related to the reduction of Samruk-Energy JSC's carbon footprint.

In accordance with the Sustainable Development Guidelines of Samruk-Energy JSC, issues related to climate change are referred to the area of sustainable development and environmental issues.

Samruk-Energy JSC pays considerable attention to climate risk management issues to provide a reasonable guarantee of achieving strategic goals in the conditions of negative impact factors.

The Board of Directors is responsible for setting both short-term and long-term goals, including in the field of climate.

The Board of Directors approved the Energy Transition Program of Samruk-Energy JSC for the period from 2022 to 2060. The long-term goal of this Program is to achieve carbon neutrality by 2060. This objective aligns with the Republic of Kazakhstan's declared goal of achieving carbon neutrality by 2060.

In accordance with the Risk Management Policy of Samruk-Energy JSC, the Board of Directors is the first level in the process of overseeing the corporate risk management system, which includes climate risks defined as strategic risks of the Company.

The Board of Directors annually approves the levels of responsibility for monitoring and controlling risks of Samruk-Energy JSC, the Register and Risk Map, which includes climate risks, as well as key risk indicators (KRIs) and the Key Risk Management Action Plan.

In addition, the competence of the Board of Directors includes the approval of the risk appetite of Samruk-Energy JSC at the consolidated level. The risk report is submitted to the Audit Committee under the Board of Directors on a quarterly basis.

The Chairman of the Board of Directors is directly responsible for control over the strategic management of issues, sustainable development, and the achievement of the Company's strategic goals, including issues related to the reduction of Samruk-Energy JSC's carbon footprint.

Climate change risk assessment is considered when forming the conditions used to develop the strategy of Samruk-Energy JSC, assessing investment projects and formulating short- and medium-term plans.

Considering that climate change issues are one of the components of environmental protection, to facilitate the in-depth consideration of labor protection, industrial safety and environmental protection issues, Samruk-Energy JSC has a Labor Protection, Industrial Safety and Environmental Protection Committee acting under the control of the Board of Directors. The Committee discusses sustainable development issues related to labor safety and health, as well as environmental protection. In addition, it makes recommendations to the Board on policies and procedures to ensure health and safety, environmental protection and climate change issues are addressed in the context of the environment and sustainable development.

Management of the current activity of Samruk-Energy JSC is carried out by a collegial executive body in the form of the Management Board, which cooperates with the Board of Directors and interacts with all stakeholders. The Management Board ensures compliance with Samruk-Energy JSC activities, development strategy, development plan and decisions made by the Sole Shareholder and the Governing Body.

The Chairman of the Management Board, who is also a member of the Board of Directors, is responsible for implementing the established strategic goals and monitoring progress towards achieving them, including climate goals.

The duties of the Chairman of the Management Board related to climate issues include coordinating annual budgets for activities aimed at reducing damage, managing large-scale capital and operational investments supporting low-carbon products and services (including research and development). The duties of the Chairman of the Management Board of Samruk-Energy JSC also include control over the purchase, merger and sale operations that consider climate factors that coincide with the risk map of Samruk-Energy JSC. Climate-related issues are considered when revising the strategy and plans of Samruk-Energy JSC in the context of their compliance with the strategic goals of the Company.

In order to ensure strategic planning, Samruk-Energy JSC has a working group for the development and implementation of the energy transition plan of Samruk-Energy JSC. The Working Group for Development and Implementation of the Energy Transition Plan is a collegial body, which includes employees from all structural subdivisions for comprehensive consideration and management of energy transition issues. The head of the working group is the Chairman of the Management Board of Samruk-Energy JSC.

More about the corporate governance structure of Samruk-Energy JSC can be found on page 244 of the report

Strategy

Given the dynamically changing regulatory requirements and international standards, we are committed to openness and transparency in our operations. We recognize the importance of climate risks, which, among other risks, are becoming increasingly important as we build competence in climate change issues.

We are constantly working to improve the processes of managing, identifying and assessing climate risks that may affect the Company's operations.

Three development scenarios were adopted and applied for the purpose of informing the development of a strategy for achieving the goals set to reduce the net carbon footprint of Samruk-Energy JSC by 2060.

- **Business as usual** — development scenario in the absence of significant technological changes or policy measures aimed at achieving carbon neutrality, considered as a benchmark for comparing the results of scenarios;
- **Deep decarbonization** — the scenario assumes active development of RES and alternative energy with gradual conservation of power units of coal-fired plants while considering the end of their service life. Commissioning of new capacities implies development of alternative reliable energy sources, as well as the study and development of carbon capture and storage technologies at existing coal-fired plants and implementation of a forest-climatic project to compensate for CO_2 emissions;
- **Change of business structure** — provides for the reorganization of Samruk-Energy JSC's assets by creating a subsidiary organization combining the "green" assets of the Group of companies of Samruk-Energy JSC. This scenario provides for the subsequent entry of the "green" company into IPO and application of available "green" financial instruments, which will make it possible to attract the necessary additional funds that can be used for modernization, diversification and decarbonization of production, and introduction of new RES, while ensuring sustainable operation of the UES.

The deep decarbonization scenario was defined as the main development scenario adopted by Samruk-Energy JSC.

As part of the analysis of the Energy Transition Program development scenarios, the following potential climate risks have been identified as the most probable and significant in terms of their possible probability and impact on the Program:

1. Strengthening international climate change policy and regulation.

The introduction in 2023 of CBAM (Carbon Border Adjustment Mechanism), the European Union's cross-border carbon regulation mechanism, which provides for the sale by a specially created authorized body of certificates for carbon-intensive goods imported into the EU according to a set list, could have a significant impact on the Company's operations.

These types of global initiatives will put pressure on the exporting sectors of the economy, which in turn will look for opportunities to reduce their energy intensity, become more environmentally friendly and consume electricity from clean energy sources. The corresponding demands of the economy will potentially be extrapolated to the entire power sector, where there will be an increasing demand for energy sources with a low carbon footprint.

2. Tightening of environmental legislation.

In accordance with the Paris Agreement, Kazakhstan aims to reduce greenhouse gas emissions by 15% by 2030 compared to 1990. In this regard, the Environmental Code of the Republic of Kazakhstan has strengthened the requirements for reducing greenhouse gas emissions in the regulated sectors of the Kazakhstan Emissions Trading System, in which Samruk-Energy participates.

There are also requirements for the implementation of BAT and the phased increase of tax rates of environmental emission fees in case of non-application of BAT, as well as exemption from environmental emission fees in case of implementation of BAT. In this regard, Samruk-Energy JSC plans significant investments for the implementation of the best available technologies.

To update the adopted energy transition strategy of Samruk-Energy JSC and as part of the project initiated in 2023 to improve corporate governance practices regarding climate issues, preliminary work was carried out to assess the potential impact of significant transitional climate risks on the activities of Samruk-Energy JSC. The scenarios and assumptions presented below formed the basis for this potential impact assessment:

Scenarios	Key assumptions
NDC (Nationally determined contribution) — Soft	• National Environmental Code — LRF 1.5%; • Provision of free allowances until 2060 — up to 42% from 2022 onwards; • Moderate CO_2 emission charge up to € 29/tonne of CO_2 in 2060; • Payments related to environmental protection and associated capital costs to achieve BAT; • Lack of investment in RES; • Coal revenue losses — 100% in 2060 compared to 2021.
NDC — Hard	• National Environmental Code — 4% LRF; • Provision of free allowances until 2060 — up to 15% from 2022 onwards; • High payments for CO_2 emissions up to € 222/tonne of CO_2 in 2060; • Environmental payments and associated capital costs to achieve BAT; • Lack of investment in RES; • Coal revenue losses — 100% in 2060 compared to 2021.
Net Zero — Soft	• USAID CN quota reduction trend (50% reduction in 2031 and 60% reduction in 2036); • Provision of free allowances until 2039 — down to 4% starting in 2022; • High payments for CO_2 emissions up to € 200/ton of CO_2 in 2060; • Environmental payments and associated capital costs to achieve BAT; • Investment in RES, ensuring business development; • Coal revenue losses — 100% in 2060 compared to 2021.
Net Zero — Hard	• CBAM trend of free quotas (0% in 2032); • Provision of free allowances until 2031 — up to 24% from 2022 onwards; • High payments for CO_2 emissions up to € 603/tonne of CO_2 in 2060; • Environmental payments and associated capital costs to achieve BAT; • Investment in RES, ensuring business development; • Coal revenue losses — 100% in 2060 compared to 2021.

Based on the results of our analysis of the potential impact of transient climate risks on our operations, the following results were highlighted:

- Samruk-Energy JSC is resilient to NDC Soft and Net Zero Soft scenarios. In the first case, the level of exposure is limited, while in the second case the transition prerequisites provide compensating levers for the burden of transition risks. The 2031 price shock can be offset by earlier implementation of environmental and energy transition programs to ensure sufficient profitability and liquidity. The NDC Soft scenario can be applied by 2020s to support NDC implementation by the Government of Kazakhstan, while the Net Zero Soft scenario can be applied by 2030s and beyond to support energy transition policies and achieve carbon neutrality by 2060;
- Hard versions of NDC and Net Zero scenario demonstrated a significant impact on the Company's operational activities, albeit with low probability. These can be used to assess the sensitivity of Samruk-Energy JSC to the influence of shock scenarios from a financial perspective. Given the fact that the Government of Kazakhstan continuously postpones the introduction of auctions within the existing Kazakhstan Emissions Trading System (KazETS), the carbon prices provided by NGFS are not considered realistic.

Two scenarios, NDC Soft and Net Zero Soft, are the most likely for the Samruk-Energy JSC. The corresponding impact can be assessed as low and medium, respectively, with the presence of management levers to offset them.

According to the preliminary assessment, Samruk-Energy JSC is least exposed to transitional risks under the stringent NDC and Net Zero scenarios and can mitigate these risks through one or more mitigation strategies.

Climate risk has been identified and included in the general risk register of Samruk-Energy JSC. It encompasses a range of external and internal physical and transitional risk factors, which are presented in the table below:

Physical risk factors	Transitional risk factors
Extreme phenomena 1. Changing weather patterns, natural disasters. 2. Increased severity of extreme weather events such as cyclones and floods. Potential consequences: Destruction or failure of a hydroelectric dam. **Chronic phenomena** 1. Global climate warming; 2. Changing weather conditions, natural disasters: Changes in precipitation patterns and variability of weather conditions, Increase in average temperature; 3. Changing weather conditions, natural disasters: Drought, which may result in a shortage of water required for the Company's operations.	**Political and regulatory risks** 1. Reduction of hydrocarbon consumption by major electricity consumers; 2. Tightening of environmental and water legislation requirements, which may lead to violations of relevant legislative acts; 3. Limitation on the volume of additional greenhouse gas emission quotas, introduction of a carbon tax, which may lead to exceeding the carbon quota limit and result in additional financial costs; 4. Regulation of tariffs by the state; 5. Limitation of the volume of additional quotas for greenhouse gas emissions in the National Plan reserve; 6. Restriction by the State Authority on the volumes of water resource extraction and consumption; 7. Ban on the use of water resources from transboundary rivers (international legal agreements on joint use of water resources, lack of agreements on joint management of transboundary rivers); 8. Delayed issuance of environmental protection permits; 9. Violation of deadlines stipulated by environmental legislation for obtaining additional quotas. **Technological risks** 1. Outflow of investments in carbon-intensive technologies; 2. Commissioning of new sources of pollutant emissions, imperfections in the technologies used at production facilities that do not allow them to operate under changing environmental standards; 3. Presence of worn-out equipment that does not meet modern requirements for waste gas and wastewater treatment, preventing optimal operating conditions; 4. Lack of funding for modernization and environmental protection measures; 5. Inability to maintain optimal load on equipment (load determined by KEGOC). **Market risks** 1. Developed countries' transition to a low-carbon economy and reduced demand for traditional products; 2. Lack of funds to buy carbon units/restriction of carbon units for purchase on the exchange. **Reputational risks** 1. Unreliable service providers/contractors; 2. Negative impact on local communities: pollution of water sources (poor quality), excessive pollutants in wastewater.

Currently, work is being conducted to identify and analyze an extended list of climate risks, and the list of climate risks will be updated in subsequent reports.

Samruk-Energy JSC pays significant attention to managing climate risks to ensure a reasonable guarantee of achieving strategic goals amid negative impact factors.

According to the development strategy of Samruk-Energy JSC, achieving strategic goals should consider key priorities in sustainable development, responsible investing, and effective active portfolio management. This approach will allow the most efficient use of available resources and will respond to external and internal challenges and opportunities through the application of appropriate tools and mechanisms.

The Energy Transition Program sets the directions, goals, and objectives for Samruk-Energy JSC on its path to transitioning to efficient, resource-saving, and environmentally friendly technologies to achieve carbon neutrality by 2060. This Program establishes medium-term goals up to 2031 and long-term goals up to 2060.

The goal of achieving carbon neutrality by Samruk-Energy JSC by 2060 aligns with the climate goals of the Republic of Kazakhstan, as outlined in the Strategy for Achieving Carbon Neutrality by 2060.

The Program applies to the entire Samruk-Energy JSC Group of companies. When modeling scenarios, external and internal factors influencing goal achievement were analyzed, and risks, including socio-economic risks, were identified.

Indicators for achieving the strategic goal of reducing the net carbon footprint of Samruk-Energy JSC are reflected in the performance indicators (KPIs) for the members of the Management Board.

By 2031, it is planned to:

- Reduce the net carbon footprint by 10% from the 2021 level, considering ongoing activities and offset carbon units.
- Increase the share of clean energy in the generation structure of Samruk-Energy JSC to 10%.
- Study and implement Carbon Capture & Storage technologies.
- Implement a forest climate project (greening an area of 500 hectares).
- Improve the ESG rating obtained in 2023.

By 2060, it is planned to:

- Reduce the net carbon footprint by 100%, considering ongoing activities and offset carbon units.
- Increase the share of clean electricity (renewable energy sources and hydropower) in the asset structure to 82%.
- Study and implement Carbon Capture & Storage technologies.
- Implement a forest climate project (greening an area of 1,800 hectares).

In forming its strategy, Samruk-Energy JSC adheres to, but is not limited to, the principles of sustainable development outlined in the United Nations Global Compact:

1. Commitment to sustainable development principles at the level of the Board of Directors, the executive body, and employees.
2. Analysis of the internal and external situation in three areas (economy, environment, social issues).
3. Identification of risks to sustainable development in social, economic, and environmental spheres.
4. Building a stakeholder map.
5. Setting goals and KPIs in sustainable development, developing an action plan, and identifying responsible persons.
6. Integrating sustainable development into key processes, including risk management, planning, human resources management, investments, reporting, operational activities, and others, as well as into the Development Strategy and decision-making processes.
7. Enhancing the qualifications of officials and employees in sustainable development.
8. Regular monitoring and evaluation of sustainable development activities, assessing the achievement of goals and KPIs, taking corrective actions, and implementing a culture of continuous improvement.

In the process of identifying climate risks, Samruk-Energy JSC pays significant attention to the opportunities arising for the company due to the use of less carbon-intensive technologies on the path to transitioning to a green economy.

Energy efficiency is considered a key factor in achieving established climate goals. In this regard, new processes and technologies are being developed and implemented to reduce energy intensity, invest in equipment modernization, and adopt technologies to reduce greenhouse gas emissions.

Climate opportunities

Resource efficiency

We see an opportunity in implementing energy efficiency and energy conservation measures, and are committed to the efficient use of resources, including fuel, energy and water. The main measures to improve energy saving and energy efficiency are rational use of FER based on application of innovative technologies, modernization and technical re-equipment of equipment.

Implementation of the planned energy saving and energy efficiency measures will reduce specific fuel consumption per unit of production, thereby reducing specific CO_2 emissions per unit of production.

Application of new technologies

Study and subsequent implementation of new modern technologies for carbon capture, utilization and storage as a key factor in achieving climate goals and meeting the energy needs of society to reduce anthropogenic CO_2 emissions and reduce the carbon intensity of products.

More about the development strategy of Samruk-Energy JSC can be found on page 48 of the report.

Climate risk management

We implement a wide range of measures to manage climate risks and identify opportunities. Climate change risk assessment is taken into account when forming the conditions used to develop our Company's strategy, assessing investment projects and formulating annual and medium-term plans. The corporate risk management system is a key component of the corporate governance system and is aimed at timely identification, assessment, monitoring and mitigation of potential risk events that may adversely affect the achievement of strategic goals.

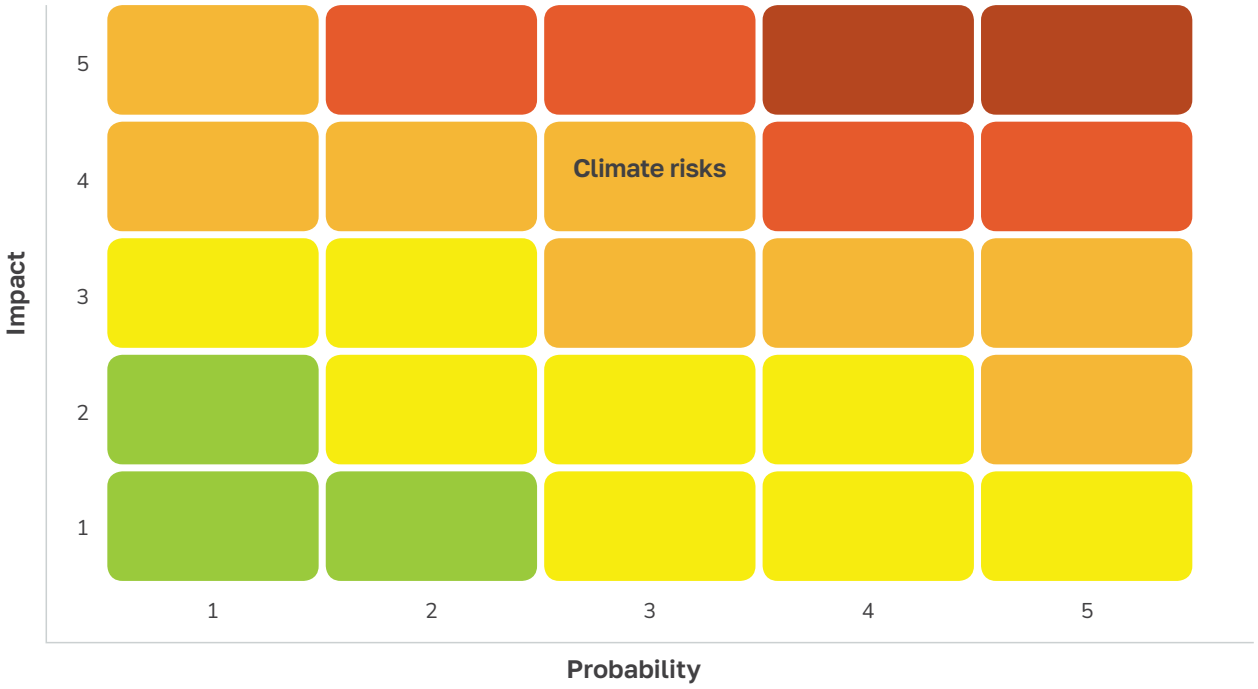
The Company has identified climate risks that are classified as strategic. Potential consequences associated with climate risks have been identified, such as: physical damage to production assets; an increase in tax rates for greenhouse gas emissions; fines for violations of legal restrictions; disruptions in the electricity and coal supply chain; increased cost and time of investment projects; and interruptions in production cycles.

Within the framework of risk assessment and analysis, Samruk-Energy JSC uses qualitative, quantitative analysis or their combination, which creates a methodological basis for the risk management process.

Risk assessment includes consideration of sources and causes for the occurrence of each risk, negative consequences of their realization, and the probability that a certain risk will be realized.

All identified and assessed risks are reflected on the risk map. The Risk map is a graphical and textual description of a limited number of risks of Samruk-Energy JSC, located in a rectangular table, one “axis” of which indicates the strength of impact or significance of the risk, and the other the probability or frequency of its occurrence. On the map the probability or frequency is displayed on the horizontal axis, and the strength of impact or significance — on the vertical axis.

Climate Risk Assessment on the Risk Map for 2023



In order to improve the efficiency of risk monitoring, Samruk-Energy JSC applies KRIs (key risk indicators) using two approaches:

1. Determination of KRIs based on risk factors — risk factors are determined for each key risk. Risk factors can be both external and internal to Samruk-Energy JSC. Risk factors are analyzed for measurability. For each risk factor, appropriate measurement units and the frequency of measurement of the indicator are determined, which can be expressed in the form of coefficients, percentages, numbers, etc.
2. Determination of the KRI based on preventive measures for risk management — the structural subdivision responsible for risk management together with the involved structural subdivisions of Samruk-Energy JSC and/or subsidiaries and affiliates determine the unit of measurement of the level of fulfillment for each preventive measure for risk management, the frequency of measurement of the indicator and the source of information for calculation. The KRI developed on the basis of preventive measures can be expressed in percentage terms or in actual fulfillment of preventive measures.

For more information on general corporate risk management practices, please see page 272 of this report.

As mentioned above, climate risks are divided into external and internal factors, and this terminology refers to the following:

- External risk factors — risk factors arising outside the operating activities of the Group of companies of Samruk-Energy JSC and independent of the activities of the Group of companies of Samruk-Energy JSC;
- Internal risk factors — risk factors related to internal processes, organizational structure, human resources, assets of the Group of companies of Samruk-Energy JSC and arising within the framework of the Group's of companies of Samruk-Energy JSC operating activities.

In order to manage the identified climate risks and adapt to their potential impact, Samruk-Energy JSC has an action plan to manage key climate risks, consisting of the following measures Samruk-Energy JSC has an action plan for managing key climate risks, consisting of the following measures:

- Control over compliance with environmental protection legislation, water resources and deadlines for submitting applications for emission permits and reporting to state regulatory authorities;

- Monitoring of greenhouse gas emission quota limit utilization, adjustment;
- Monitoring of compliance with the plan for modernization and repair of main and auxiliary environmental protection equipment;
- Compliance with technical regulations and rules of operation of buildings and structures;
- Mandatory environmental insurance;
- Liquidation funds;
- Interaction with authorized state bodies in the process of development of environmental regulations;
- Monitoring the implementation of international environmental management standards;
- Monitoring of budget execution under the "Environmental Protection" item;
- Monitoring of the impact of economic activities on aquatic ecosystems, fauna and flora.

To manage the risks associated with greenhouse gases, the key activities that the Company is implementing to mitigate the environmental impact of greenhouse gas emissions are presented. A range of initiatives is discussed, including coal preparation and gasification, carbon dioxide capture and storage, energy efficiency and green transportation. In addition, options for carbon landfills and carbon offsets are being considered.

Measures to manage risks associated with greenhouse gas emissions into the atmosphere and mitigate related environmental impacts:

Alternative energy	• WPP and HPP • Solar energy • Geothermal energy • Hydrogen energy
Conventional energy	• Conversion of CHPPs from coal to gas as one of the measures adopted in line with the country's climate agenda for using gas as a transition fuel
Network infrastructure and regulation	• Grid modernization and Smart Grid implementation • Electricity accumulation and storage systems • Agile generation
Emissions management	• Coal enrichment and gasification as one of the measures adopted in line with the country's climate agenda for using gas as a transition fuel • Carbon Capture and Storage (CCUS) • Energy Efficiency and Resource Conservation • Green Transportation • Carbon landfills and offsets
Supporting activities	• Carbon accounting and digitalization • Changes to the regulatory environment • Green finance • ESG compliance with the criteria

In order to manage another one of the significant risks related to water deficit, Samruk-Energy JSC reflects in the corporate standard on environmental protection management the measures applied to minimize the impact, namely:

- reducing the volume of fresh water consumption;
- increasing in the share of reusable and recycled water;
- reduction of wastewater discharge volumes and concentrations of harmful substances in wastewater; drainage (mine) water — additionally generated by Bogatyr Komir LLP;
- minimization of water use risks;
- improving the quality of discharged wastewater.

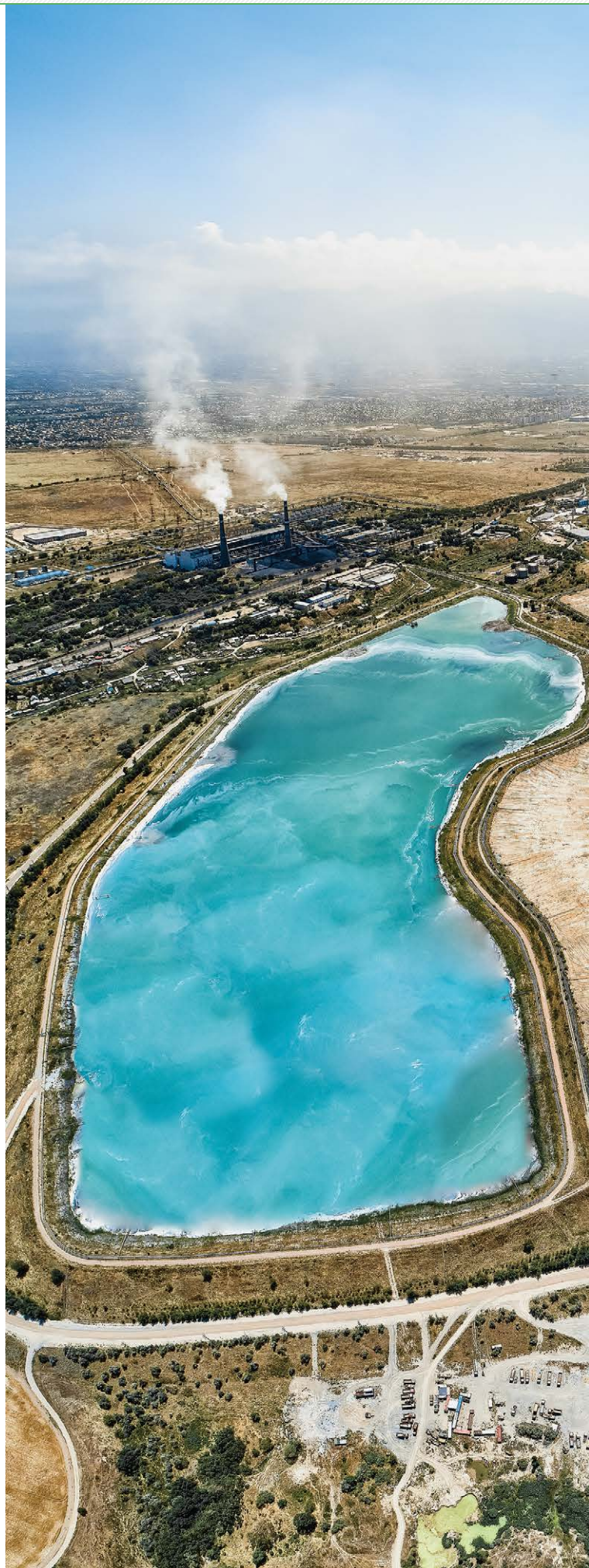
The main tasks in the field of water resources management are:

- defining key water management principles for mandatory use throughout the company;
- ensuring continuous improvement of the water management system;
- ensuring a unified process of water resources management in the company as opposed to the current practice of uncoordinated management of different divisions and use of water for different needs (drinking, production, household and other needs); —
- ensuring stakeholder involvement in the water resources management process.

More information about the risk management system of Samruk-Energy JSC, as well as a full list of risks can be found on page 60 of the report.

Metrics

The table below presents the data used by Samruk-Energy JSC to monitor the impact of climate risks on the activities of the Samruk-Energy JSC Group of companies. The year 2021 has been established as the "baseline year" for these indicators. However, it is important to note that Samruk-Energy JSC conducted its first calculation of Scope 2 emissions in 2022; therefore, the year 2022 will be considered the "baseline year" for Scope 2 indicators.



Indicator	2021	2022	2023	GRI Index
Greenhouse gases				
Scope 1, tons of CO_2-eq.	40,294,370	32,933,413	**33,009,576**	GRI 305–1, GRI 12: Coal Sector: 12.1.5
CO_2	32,951,627	31,978,242	**31,877,469**	
CH_4	7,266,445	940,989	**1,065,127**	
N20	76,298	74,182	**66,980**	
Scope 2, tons of CO_2-eq.				GRI 305-2
CO_2	-	13,333.6861	**11,343.5**	
Electricity generation	-	1,526.71	**1,415**	
Heat generation	-	11,806.98	**9,928**	
Pollutant emissions				GRI 305–7, GRI 12: Coal Sector: 12.4.2
Dynamics of specific air emissions per unit of production, g/kWh	9.68	9.48	**9.5**	
Energy efficiency				
Total energy saving, thousand GJ	15,326	14,271	**10,043**	
Responsible water use				GRI 303-1, 3-3, GRI 12: Coal Sector: 12.7.1, 12.7.2, 12.7.6
Volume of reusable or recycled and recycled water, megaliters	3,552,379	3,534,516	**3,499,210**	
Volume of water withdrawal per unit of output, m^3/kWh	0.259	0.625	**0.667**	
Share of reusable and recycled water, %	17.8%	15.8%	**14.8%**	
Waste management				GRI 306–3, GRI 12: Coal Sector: 12.6.4
Total waste generated, of which:	88,839,711	89,929,927	**98,496,096**	
Hazardous, tons	5,586,889	647	**1,732**	
Non-hazardous, tons	83,252,822	89,928,281	**98,494,364**	
of which by main types of waste, characteristic for the specifics of production, tons	87,472,541	89,912,724	**98,474,212**	
ash and slag waste, tons	7,226,582	7,129,158	**8,853,230**	
overburden, tons	80,245,959	82,783,566	**89,620,982**	
Biodiversity conservation				GRI 304–2, 304–3, GRI 12: Coal Sector: 12.5.3.12.5.4
Investments in biodiversity conservation, million tenge	0.95	0.58	**0.115**	

Goals

On October 29, 2021, the Board of Directors of Samruk-Energy JSC decided to confirm the new Development Strategy of Samruk-Energy JSC for the period of 2022-2031. The Strategy reflects the state policy in the sphere of strategic planning of the national energy security system and development of the electric power sector, as well as corresponds to the key strategic directions, goals and objectives of the Company. To achieve our vision and follow the strategic directions, we will focus on the fulfillment of three strategic goals, such as:

- Reduction of net carbon footprint;
- Increase in productivity;
- Increase in net asset value.

In accordance with this strategy, in 2022, the Board of Directors of Samruk-Energy JSC approved the Energy Transition Program of Samruk-Energy JSC for 2022-2060, which is a document establishing directions, goals and objectives on the company's way to transitioning to the use of efficient, resource-saving, environmentally friendly technologies and achieving carbon neutrality by 2060. According to which Samruk-Energy JSC sets the following goals:

Medium- and long-term goals of the Energy Transition Program of Samruk-Energy JSC

Until 2031	Until 2060
Reduction of net carbon footprint **30%**	**Reduction of net carbon footprint** **100%** inclusive of activities and offset carbon units
Increasing the share of clean energy in the generation structure of Samruk-Energy JSC up to **10%**	**Increasing the share of clean energy in the generation structure of Samruk-Energy JSC up to** **82%** in the asset structure
Forest-climatic project Greening of the territory of 500 hectares	**Forest-climatic project** Greening of the territory of 1,800 hectares
• Obtaining an ESG rating in 2023 and its subsequent improvement • Explore and implement Carbon Capture & Storage technologies	• Explore and implement Carbon Capture & Storage technologies

Progress in achieving the goals of Samruk-Energy JSC, which allow moving towards long-term goals, according to the results of 2023 can be characterized in the following form:

Goals	2021, base year	2022	2023	Target to 2031
Reduction of net carbon footprint, million tons CO_2	32.95	31.98	**31.87**	23.06
Increasing the share of clean energy in the generation structure of Samruk-Energy JSC, %	7	8	**8**	35
Forest-climatic project, hectares	0	0	**0**	500

Greenhouse gas emissions

GRI 305-1, GRI 305-4, GRI 12: Coal Sector: 12.1.5

The Republic of Kazakhstan has demonstrated its commitment to the goal of carbon neutrality by 2060 under the Paris Agreement by declaring its intention to reduce its greenhouse gas emissions by 15% by 2030 relative to 1990 levels under the UN Framework Convention on Climate Change.

To achieve this, Kazakhstan is developing a complex of market mechanisms that includes an emissions trading system, projects for reducing emissions and absorbing greenhouse gases, as well as the development of the green investment market.

We recognize the critical importance of efforts to address climate change and reduce greenhouse gas emissions. We have taken the initiative and voluntarily committed to reducing our emissions, reaffirming our commitment to environmentally responsible business practices.

In accordance with the legislation of the Republic of Kazakhstan, enterprises, including EGRES-1 LLP, EGRES-2 JSC, APP JSC, and Bogatyr Komir LLP which fall under the greenhouse gas emissions quota system, are required to conduct an inventory of these emissions. This process involves the verification of inventory results by an independent accredited organization, ensuring transparency and accuracy of the emissions data.

In 2023, the costs of actions related to climate risk management amounted to about 8.8 million tenge (development and verification of the Report on greenhouse gas inventory for quota plants of Samruk-Energy JSC).

Direct emissions of EGRES-1 LLP, EGRES-2 JSC, and APP JSC, resulting from the combustion of fuel in boiler units to produce electric and thermal energy, as well as from coal mining at Bogatyr Komir LLP, fall under Scope 1 category. Data collection on emissions is carried out based on primary sources, including official technical reports and laboratory journals. The data is processed in accordance with national methodologies and the approach indicated in the GHG Protocol Scope 1 Guidance, after which emission factors and their total volume for each source and for the enterprises EGRES-1 LLP, EGRES-2 JSC, and APP JSC and Bogatyr Komir LLP are calculated. The calculations include analysis of emissions from boiler equipment and coal mining, with verification from independent accredited organizations for each designated source.

In the process of analyzing greenhouse gas emissions, meticulous measurements of raw material consumption and characteristics are applied, including the volume of fuel consumed, its energy value, and components (ash content, moisture, sulfur content), as well as measurements on boiler units to assess energy losses associated with incomplete combustion.

Direct GHG emissions[27] (Scope 1), tons CO_2-eq.[28 29]

	Units	2021*	2022	2023	Δ 2023/2022, %
CO_2	tons CO_2	32,951,527	31,978,242	**31,877,469**	-0.32
CH_4	tons CO_2-eq.	7,266,445	940,989	**1,065,127**	13.19
N_2O	tons CO_2-eq.	90,021	74,182	**66,980**	-9.71

[27] The volume of direct greenhouse gas emissions is given for EGRES-1 LLP, EGRES-2 JSC, APP JSC and Bogatyr Komir LLP.

[28] The Company does not calculate biogenic greenhouse gas emissions.

[29] The Company has chosen a control-based consolidation method. The Company considers 100% of emissions from consolidated facilities controlled by the Company when determining the total amount of greenhouse gases.

In the process of converting methane, nitrous oxide emissions into equivalent tons of carbon dioxide, the actual global warming potential coefficients were applied (for methane — 28, for nitrous oxide — 265), which are determined in accordance with paragraph 4 of Conference of the Parties Decision 6/CP.27 of November 17, 2022. An official letter confirming this information was sent to subsidiaries and affiliates from the Ministry of Environment and Natural Resources.

Specific GHG emissions (Scope 1)

Type of activity	Units	2020	2021	2022	2023	Δ 2023/2022, %
Electricity generation	tons of CO_2-eq/ thousand kWh	0.836	0.862	0.831	**0.838**	0.8
Heat generation	tons of CO_2-eq/ thousand Gcal	441.913	324.485	318.530	**294.127**	-7.7
Coal mining	tons CO_2-eq/ thousand tons	273.942	173.552	33.519	**35.549**	6.1

According to the results of 2023, there is an increase in specific GHG emissions during power generation and coal mining by Samruk-Energy JSC as compared to 2022, which was facilitated by:

- The use in 2023 of another type of coal — Angresor, in the amount of 310.4 thousand tons with carbon content of 0.423% at EGRES-1 LLP;
- The change in the global warming potential coefficient for converting methane emissions to CO_2 equivalent from 25 to 28 in 2023.

The decrease in specific GHG emissions from heat generation by 7.7% in 2023 is due to a decrease in specific consumption of fuel equivalent for heat supply at EGRES-1 LLP from 162.6 kg/Gcal to 160.9 kg/Gcal (1%) and decrease in consumption of fuel equivalent for heat supply at EGRES-2 JSC from 15,067 tons of fuel equivalent to 13,673 tons of fuel equivalent (9.2%).

GRI 305-2

For the second consecutive year, the Company has calculated Scope 2 indirect greenhouse gas emissions, which arise from the consumption of electrical and thermal energy from external power-producing organizations. As a result, 2022 was defined as the baseline year for further calculation and analysis.

In 2024, an update of The Energy Transition Programme is planned in response to internal and external requirements, which will include mandatory monitoring of Scope 2 emissions.

The Company calculates indirect emissions according to the approved Instruction for the Calculation of Greenhouse Gases and Offset Units for the Group of companies of Samruk-Energy JSC, based on the GHG Protocol Scope 2 Guidance, using specific emission factors approved by the order of the Vice Minister of Ecology, Geology, and Natural Resources of the Republic of Kazakhstan.

Due to changes in the energy supply system in the Republic of Kazakhstan, driven by the introduction of the Single electric power system from July 1, 2023 — hereinafter to as FSC, companies have the opportunity to use either the location-based method or the market-based method for calculating indirect energy emissions of GHGs in Scope 2 (GRI 305-2). According to the GHG Protocol, the purchase of electricity from the FSC within the Group of companies of Samruk-Energy JSC is treated as repurchase agreements in terms of consolidation prospects for the group. Therefore, only the market-based method based on direct contracts is used for calculating Scope 2.

Indirect GHG emissions (Scope 2), tons CO_2-eq.[30]

Indicator	2022	2023	Δ 2023/2022, %
Gross indirect greenhouse gas emissions (Scope 2)	13,334	**11,343.5**	-14.9
Gases included in the calculation	CO_2	**CO_2**	

[30] The perimeter of the indicator includes data on purchased external energy of Bogatyr Komir LLP.

In 2023, Scope 2 indirect emissions decreased by 14.9% compared to the previous year, reaching 0.011 million tons of CO_2, due to a reduction in the consumption of purchased thermal energy.

GRI 305-3

Samruk-Energy JSC plans to analyze relevant Scope 3 GHG emission categories in 2024, which consider all indirect GHG emissions not covered by Scope 1 and 2. Currently, Scope 3 GHG emissions are not subject to mandatory reporting under the GHG Protocol standard.

Indirect Scope 3 emissions under the GHG Protocol are divided into 15 different Categories. This multi-channel division is applied to more accurately account for all possible GHG emissions. These Categories are also divided into two types of flows in the supply chain: upstream and downstream flows: Upstream emissions and Downstream emissions, respectively. Upstream flows include emissions from raw materials, goods and services purchased by the organization, excluding those emissions accounted for in Scope 1 and 2. Downstream streams, respectively, include those emissions generated outside the organization from the operation and completion of the life cycle of the products it produces.

After approval of the categorization, Samruk-Energy JSC plans to introduce phased accounting and monitoring of Scope 3 emissions in 2025-2026.

GRI 305-5

In 2023, the implementation of energy efficiency and energy saving measures at the Almaty CHPPs (APP JSC), such as the restoration of thermal insulation of boilers and pipelines at CHPP-1 (saving 1,146 Gcal), manufacturing and replacement of the first stage air preheater for boiler No. 1, 2, and 4 at CHPP-2 (saving 8,066 tons of coal), and the repair and replacement of the end armor of boiler No. 2, 3, 4 and the air preheater of boiler No. 3, 4 at CHPP-3 (saving 657 tons of fuel oil, 210 tons of coal) among other measures, led to a reduction of greenhouse gas emissions at APP JSC by 26.59 thousand tons of CO_2.

On July 25, 2023, a contract was signed between EGRES-1 LLP and AEC Asa LLP for the purchase of a carbon offset amounting to 387.15 thousand tons of CO_2, aimed at reducing greenhouse gas emissions.

Greenhouse gas emission reductions, tons CO_2

Company	Measure	2023
APP JSC	Implementation of energy efficiency and energy saving measures	26,588
EGRES-1 LLP	Purchase of carbon offset	387,150
Total for Samruk-Energy JSC		**413,738**

Plans for 2024 and the medium-term perspective

Samruk-Energy JSC plans to analyze the relevant categories of Scope 3 greenhouse gas emissions, which account for all indirect GHG emissions not covered by Scope 1 and 2. Currently, Scope 3 emissions are not mandatorily included in reporting according to the GHG Protocol standard. Indirect emissions of Scope 3 under the GHG Protocol are divided into 15 different categories. This multi-channel division is applied for a more accurate accounting of all possible GHG emissions. These categories are also divided into two types of streams in the supply chain: upstream and downstream flows. Upstream emissions include emissions from raw materials, goods, and services purchased by the organization, except for those emissions accounted for in Scope 1 and 2. Downstream emissions include those emissions that occur outside the organization from the operation and end-of-life of the products it manufactures. Subsequently, after the categorization is approved, Samruk-Energy JSC plans to introduce phased accounting and monitoring of Scope 3 emissions.

Energy Efficiency

Management approach

GRI 3-3

In 2013, Kazakhstan adopted the Concept of Transition to a 'Green Economy', where a key element was the implementation of energy-saving measures and enhancing energy efficiency. As a leading electricity producer, we take responsibility and commitment to improving energy efficiency, aiming to reduce energy consumption and minimize the environmental impact of our activities, confirming our contribution to creating a sustainable economic development model in Kazakhstan.

The energy management system provides deep analysis and management of energy consumption, facilitating improvements in production operations and efficiency. The system includes assessing and monitoring energy consumption indicators, improving processes, actively searching, and analyzing data to increase energy efficiency, and forming strategic and operational plans to optimize energy supply. This approach not only helps save resources and reduce costs but also strengthens the Company's environmental responsibility, aimed at reducing environmental impact and supporting sustainable development.

The implementation and improvement of systems and procedures aimed at optimizing energy efficiency and reducing energy consumption contribute to decreasing expenses, reducing greenhouse gas emissions, and minimizing environmental impact. This is achieved through conscious and systematic management of energy resources, resulting in not only economic benefits for Samruk-Energy JSC but also improving environmental stability and sustainable development.

The foundational document shaping our principles in this area is the Energy Saving and Energy Efficiency Improvement Programme at Samruk-Energy for 2015-2025 (Programme). This Programme was developed in line with the key aspects of the national strategy for energy saving and improving energy efficiency, securing strategic goals and tasks in this field.

The main tools of the Programme include:

- Establishing key indicators to measure efficiency in energy saving and optimization of energy consumption for each division;
- Conducting continuous monitoring and management to ensure the achievement of set goals, through systematic energy saving analysis that aligns with the developed methodology for calculating key energy efficiency indicators;
- Implementing specific organizational and technical measures to enhance energy efficiency, based on thoroughly developed and approved energy saving plans for subsidiaries and affiliates.

During the reporting year, changes were made in organizational structure and job responsibilities, to reflect the commitment to compliance policy adherence. The Department of Energy Efficiency, Innovation Development, and Environmental Safety and the Managing Director of Production are responsible for the implementation of energy efficiency initiatives at Samruk-Energy JSC. To integrate environmentally sustainable practices into the corporate strategy, this year, changes were made to the organizational structure, expanding its functionality to include environmental issues.

In November 2023, we successfully passed the surveillance audit of our corporate management system and confirmed its compliance with the international standards ISO 9001, ISO 14001, ISO 45001, ISO 50001, ISO 37001, which had been previously certified in December 2022. Highly qualified international specialists from the MS CERT certification body participated in the audit, providing a detailed report on its results.

GRI 302-1, GRI 302-4, GRI 12.1.2

In 2023, we carried out 61 activities aimed at increasing energy efficiency and the rational use of resources, including the construction of new substations, reconstruction, and improvement of power networks, as well as optimization and modernization of energy infrastructures. These actions contributed to a profound transformation of our energy system, demonstrating its commitment to sustainable development and optimization of resource consumption.

Energy efficiency initiatives at Samruk-Energy JSC resulted in savings of 362.9 thousand tons of equivalent fuel, reducing costs by

2.06

KZT billion in 2023

In 2023, the total energy consumption of Samruk-Energy JSC reached 200,194 thousand GJ, which represents a slight decrease of 0.3% compared to 2022. Energy consumption was reduced to 10,043 thousand GJ (for more details, see the Appendix "Resource Consumption and Energy Efficiency").

Key energy indicators, thousand GJ

Energy reduction	2021	2022	2023	Δ 2023/2022, %
Amount of energy savings	15,326	14,271	**10,043**	29.6

Activities that had the most significant impact on improving energy efficiency include:

- Increasing the average unit power of energy blocks;
- Extending the operating time of energy blocks powered by turbine feed pump from the IV turbine extraction;
- Extending the operating time of energy blocks with the high-pressure heater group activated (excluding block No 3 which was dismantled);
- Conducting operational adjustments of equipment;
- Replacement of the main bundle tubes of condenser type 80KCS-1, part of Turbine Generator No2.
- Rational operating regime of power transformers (deactivating and reserving transformers for own needs during plant shutdowns);
- Disconnecting transformers during low load regimes at substations with two 220/110/35/10 kV transformers;
- Balancing phase loads in 0.38 kV electrical networks;
- Automation of lighting control. Phased replacement of incandescent bulbs with modern energy-saving lamps.

Due to the implemented measures aimed at energy efficiency, electricity consumption for own needs by EPO of Samruk-Energy JSC decreased from the planned indicator by

52.9

million kWh (5.89%)

Energy availability

GRI 3-3

A significant step towards improving energy infrastructure was the commissioning of the 110/10 kV Kokozek substation project, synchronized with the 110 kV distribution device of the 220 kV Kaskelen substation (line No. 10A "Zhandos") in the Karasai district of Almaty region. This project provided reliable and stable electricity supply to the region. The new substation facilitated the creation of new productions and the expansion of existing ones, ensuring continuous power supply to the settlements of Almaty region.

With the commissioning of the Kokozek substation on October 7, 2023, which has a capacity of 126 MW, technical conditions were issued for 34 small and medium-sized businesses with a total connected capacity of 96 MW. Among them are large manufacturing enterprises:

- Skif Trade LLP;
- Imd company LLP;
- KT&G Kazakhstan LLP;
- RG BRANDS KAZAKHSTAN LLP, Aksengir branch;
- Karasay Machine-Building Plant LLP.

Additionally, two comfortable schools designed for 1,200 and 1,500 places respectively were connected, which contributes to the development of the social infrastructure of the region.

Another important project was the implementation of a program by Alatau Zharyk Company aimed at reducing electricity losses in networks, improving energy efficiency, and energy saving. Monthly monitoring of loss reduction, technical violations, and reliability coefficients (SAIFI, SAIDI) in electrical networks is conducted.

Losses in electrical networks are calculated as follows:

Absolute value:

Electricity supply to the grid — Useful supply to consumers = Actual electricity losses (thousand kWh);

Relative value:

Actual electricity losses (thousand kWh)/Input of electricity into the grid x 100% = % Losses

The savings achieved from reducing actual losses amounted to KZT 2.282 billion, which represents a 10.90% reduction compared to the loss level in 2020, when actual losses were 12.6%.

Various activities were carried out as part of this program:

- Reconstruction of 0.4 kV overhead lines with a transition to self-supporting insulated wires and installation of external meters;
- Transformation of existing 6 kV networks into 10 kV networks;
- Progressive integration of the automated electricity metering and control system;
- Implementation of advanced high-efficiency equipment, including gas-insulated switchgear and transformers with low no-load losses, among others;
- Optimization of the operational modes of electric networks;
- Replacement of overhead line wires with larger cross-section wires or wires with increased capacity;
- Actions to reduce the overload of cable lines;
- Replacement of underloaded and overloaded transformers;
- Implementation of compensating devices in distribution networks.

A key feature of our approach to energy management system is the active involvement of all employees in the process, which is the basis for achieving the most effective results within the framework of the energy management system implementation. Our strategy includes not only continuous monitoring and analytics but also encouraging the team to find innovative ways to save resources and propose innovative solutions in energy conservation.

In anticipation of International Energy Saving Day, we stimulated innovative thinking among specialists of subsidiary enterprises by holding a competition for the best rationalization proposal in the field of energy saving and energy efficiency, rewarding the winners with generous cash prizes.

As a result of the competition, 30 rationalization proposals were submitted with an economic effect of KZT 219.7 million. One of the most significant proposals was a specially designed and manufactured nozzle for a drying unit at Bogatyr Komir LLP aimed at optimizing the fuel supply system. The implementation of this setup significantly reduced diesel fuel consumption and cut emissions into the atmosphere by 4.226 tons.

Reduction of pollutant emissions, tons

Indicator	2023
Total emissions:	4.226
NO	0.0937
NO_2	0.5769
SO_2	1.0484
CO	2.464
C (soot, black carbon)	0.0446

In 2023, a total of 61 various activities were completed, and the implementation of measures to improve energy efficiency in the Group of companies of Samruk-Energy JSC resulted in savings of 362.9 thousand tons of equivalent fuel, amounting to KZT 2.06 billion.

The company contributes to the formulation of energy policy, demonstrating its commitment to sharing experience and rational use of energy. The company is a member of key industry platforms and associations:

- Electric Power Council of the CIS;
- Kazakhstan Electric Power Association;
- KAZENERGY Association.

In 2023, the Company participated in the development of the Electric Power Industry Development Strategy up to 2035, which outlined initiatives for implementing energy efficiency measures. Within the framework of the strategy, initiatives for enhancing energy efficiency were highlighted, major industry challenges were discussed, an overview of international experience was conducted, and directions for the development of the electric power industry were defined. The main principles and approaches to industry development, considering current trends and market needs, were also identified.

Representatives of the Company took part in the V Energy Saving Forum, where current issues of optimizing energy consumption in key sectors of Kazakhstan's economy were addressed.

Energy saving measures to be implemented

In the field of Alternative Energy:

During the 28th UN Climate Change Conference (COP28), the Chairman of the Board of Samruk-Energy JSC participated in bilateral negotiations. Meetings were held between the President of Kazakhstan, Kassym-Jomart Tokayev, and the UAE Minister of Investments, Managing Director of ADQ Holding, Mohammed Al-Suwaidi, as well as with the Chairman of the Board of Directors of ACWA Power, Mohammed Abunayyan. The parties discussed ways to develop cooperation between Kazakhstan and the UAE and outlined plans for implementing investment projects in the renewable energy sector.

On December 2, 2023, an agreement was signed for the joint development of a 1 GW wind power station with Abu Dhabi Future Energy Company (Masdar), W Solar Investment LLC, and Kazakhstan Investment Development Fund. The agreement laid the foundation for joint project development and coordinated actions for its launch. During the COP28 conference, an intergovernmental agreement between the Republic of Kazakhstan and the UAE was also concluded regarding the implementation of the wind power station.

Additionally, an agreement was signed between Samruk-Energy JSC and Power China Resources Ltd for the joint development of a project to increase the capacity of the recently built wind power station in the Shelek corridor of Almaty region to 810 MW.

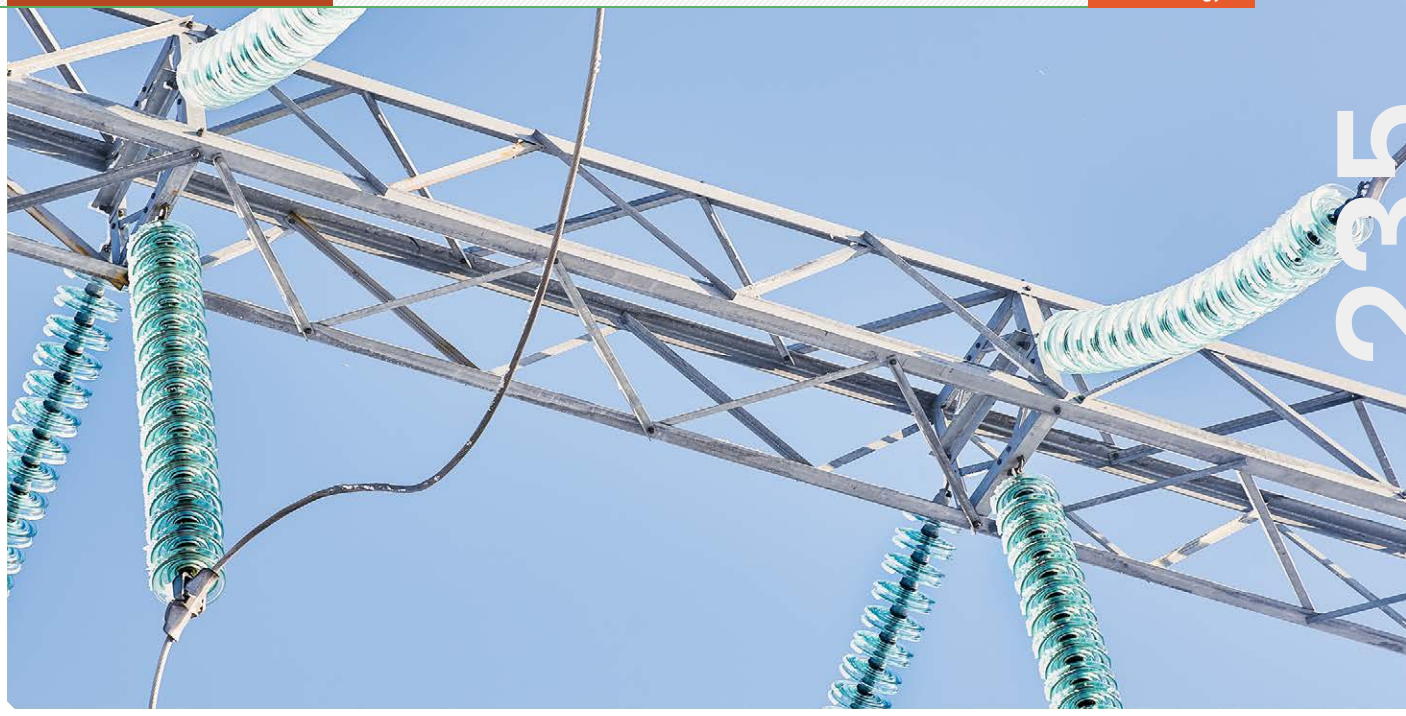
In the field of Traditional Energy:

We are making special efforts in energy conservation and improving energy efficiency, demonstrating our commitment to reducing the consumption of natural resources and minimizing environmental impact. As part of our energy strategy, we are implementing numerous projects aimed at ensuring energy accessibility, which leads to an improvement in the overall quality of life and promotes sustainable development in the regions where we operate:

- Within the project "Expansion and Reconstruction of EGRES-2 with the Installation of Power Unit No. 3", aimed at enhancing the reliability of energy supply for the economy and population, as well as increasing Kazakhstan's export potential, construction of Hangar No. 2 was completed this reporting year. Construction of Hangar No. 1 is also ongoing and is currently 90% complete.
- The "Expansion and Reconstruction of EGRES-2 with the Installation of Power Unit No. 3" project is focused on strengthening the reliability of energy supply systems, which will contribute to the stability of the economy and social sphere, as well as expand Kazakhstan's export potential. In 2023, key equipment was successfully delivered, including a boiler unit, turbo unit, generator, and electrostatic precipitators. Also, the dismantling of the old boiler unit, dust capture systems, gas-air tract, draft fans, turbine, electrostatic precipitators, and fuel supply equipment was completed. Currently, active work is underway on the assembly and installation of pipelines, air ducts, and gas ducts, as well as the repair of the condenser, including the manufacturing of tube plates, and other preparatory activities. To date, the overall volume of work completed on the project is estimated at 42%.
- In 2023, within the "Modernization of Almaty CHPP-2" project aimed at minimizing environmental impact, engineering, survey, and construction work was completed to reduce the ecological impact of the station on the city of Almaty.
- The "Reconstruction of Almaty CHPP-3" project is focused on reducing the deficit of maneuvering capacities in the Southern zone of Kazakhstan and guarantees reliable supply of electric and thermal energy for the city of Almaty and Almaty region. During the reporting year, engineering and survey works, topographic surveying, and drilling operations were conducted.
- The "Reconstruction of CHPP-1 named after B. Orazbayev of APP JSC with the Construction of a SGP Unit of 200-250 MW" project is aimed at ensuring the reliability of heating and electrification of the city of Almaty and the Almaty region. In 2023, during the Investment-Innovation Council for the project, a decision was made to refine financing options.

In the field of Emissions Management:

Samruk-Energy JSC is working on R&D titled "Development of Carbon Capture and Storage (CCUS) Technologies at Existing and Prospective Coal Power Plants of the Company." The purpose of the R&D is to study existing and prospective technologies for capturing CO_2 from thermal power plant flue gases, analyze the possibility of their integration into existing technological schemes, and assess the storage of captured CO_2, evaluating the most promising technologies for conditions in Kazakhstan. The implementation of the R&D is planned for the period 2023-2025.



A priority of the Company's energy policy is a focus on energy conservation and increasing energy efficiency, which contributes to the reduction of energy resource consumption and the level of environmental impact, as also reflected in the Program.

The Company's activities in energy conservation and efficiency are based on the methodology of the international standard ISO 50001 "Energy Management Systems".

The Company has the Energy Saving and Energy Efficiency Improvement Programme at Samruk-Energy for 2015-2025, which serves as a foundational document for planning and conducting activities in energy conservation and efficiency. The programme is developed in accordance with the main directions of state policy in energy conservation and energy efficiency and defines goals and tasks, main program-targeted tools, and mechanisms for the programme's implementation. One of the effective mechanisms for managing energy efficiency is the establishment of targeted indicators and metrics necessary for monitoring, analysis, and evaluation of effectiveness, ensuring sustainable development of Group of companies of Samruk-Energy JSC by reducing the energy intensity of gross merchandise product and, consequently, increasing competitiveness, financial stability, energy, and environmental security.

In 2023, 61 activities were completed, which allowed saving 362.9 thousand tons of equivalent fuel amounting to 2.062 billion tenge.

Plans for 2024 and the medium-term perspective

For 2024, we have planned 59 activities expected to yield an economic effect of 1.5 billion tenge. During this period, there will also be an update to the Energy Transition Program for the years 2022–2060. This decision is based on a number of important initiatives:

- Updating the Development Strategy of Samruk-Energy JSC for 2022-2032;
- Establishment of Qazaq Green Power PLC, an environmentally friendly company;
- Expansion of GRES-2 with the addition of new power units;
- Construction of GRES-3 and revision of plans for gasification of Almaty CHPPs.

Furthermore, as part of the updated Programme, we will closely monitor all greenhouse gas emissions, including carbon dioxide, methane, and nitrous oxide, subjecting them to annual verification. Adding an efficiency indicator for specific emissions to produce electricity and thermal energy will allow for a more accurate assessment of the effectiveness of environmental efforts. We will also implement calculations for Scope 2 and Scope 3 emissions. According to the plan, the key actions of the Program me will be carried out strictly within the set deadlines.