JSC "Samruk-Energy"
Development Strategy for 2024-2033

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Contents

1. Executive summary, purpose, and scope

The Development Strategy of JSC "Samruk-Energy" for 2024–2033 is a foundational document that defines and justifies the Company's mission, vision, strategic directions, goals, and objectives. The need to update the strategy arises from significant changes within the industry and the Company, such as the growing energy deficit in the country, from 2.8 GW in 2024 to 6.24 GW in 2030, necessitating the construction of new base capacities; a shift in focus toward the green agenda, encouraging the expansion of renewable energy capacity (RES) by 6.2 GW by 2030; the resulting need to develop flexible capacities (combined cycle gas turbines, hydropower plants (HPP), energy storage systems, autonomous storage (PSP)); and an expanding list of investment projects that require evaluation of their impact on the key indicators of JSC "Samruk-Energy."

Currently, the global energy sector faces the substantial challenge of finding an optimal balance among the elements of the energy trilemma: reliability, affordability, and sustainable energy supply. In Kazakhstan's electric power sector, an imbalance has emerged due to the need to ensure energy at fair and affordable prices, influenced by the low purchasing power of the population. Kazakhstan’s climatic conditions also impact the design of its energy infrastructure. It should be noted that renewable energy sources cannot provide low-cost and stable heat energy supply. Consequently, energy security is currently a critical challenge for Kazakhstan, shaping the current priorities for the development of the Company as a key quasi-state entity in the energy industry. These priorities are driven by external factors, including the low cost of coal, limited availability of gas, lack of flexible generation, high wear of energy assets, and the deficit and growing demand for electricity. This highlights the current socially oriented role of the Company in strengthening national energy security and the resilience of the country’s energy infrastructure.

In the context of commitments to the green agenda under the "Paris Agreement" and Kazakhstan’s Carbon Neutrality Strategy until 2060, as well as considering the increased investment appeal of renewable energy projects, the Company plans to focus on the energy transition and sustainable development over the next decade. This strategic direction will create conditions for the Company to shift its focus from a social orientation to a more commercial approach, generating value for shareholders.

This Strategy applies to all structural units and officials of JSC "Samruk-Energy" and its subsidiaries and affiliates, where over 51% of shares (participation interest) are owned by JSC "Samruk-Energy" through ownership or trust management.

2. Current state analysis

For a comprehensive analysis of the current situation, aspects of both the external and internal environment were considered, identifying challenges and opportunities at global, national, and corporate levels. At the global level, key world trends were studied, including the energy transition, decarbonization, technological innovation, and regulatory changes. At the national level, attention was given to local trends in Kazakhstan’s energy sector, the dynamics of demand for electricity and coal, and the role of JSC "Samruk-Energy" in the country’s energy balance. At the corporate level, internal resources and processes were analyzed, including corporate governance, environmental, human resource, and social policies, as well as digital development. Additionally, an analysis of the financial and economic situation, benchmarking, and competitive positioning of the Company was conducted.

2.1. External Environment Analysis

According to the World Energy Council's energy trilemma concept, sustainable functioning of a country’s energy system requires balancing security, affordability, and sustainability of energy supply. The elements of the energy trilemma are interconnected and often exert conflicting influences on each other: efforts to ensure reliability and affordability of electricity supply often involve the use of low-cost but harmful sources, which undermines environmental sustainability. At the same time, environmental sustainability can weaken energy reliability due to the instability of renewable sources and the lack of flexible capacity, while the high cost of investments in sustainability may limit affordability from the population's perspective. Balancing these

aspects requires a comprehensive approach and strategic trade-offs. This concept outlines the key challenges countries face in the energy sector and highlights close links with global energy trends. The trilemma reflects not only the current state of energy systems but also the global and local trends and factors influencing energy policy and strategies across nations.

2.1.1 Global Trends in the Electric Power Sector

The global energy system is undergoing fundamental changes driven by various factors, including environmental concerns, technological innovations, market forces, and political interventions. This transformation is essential not only for addressing global issues related to climate change, energy security, and economic development but also for creating new opportunities and benefits for society and the environment.

The following global trends outline key insights into how the energy system may evolve over the next thirty years[1]:

— Carbon budget is rapidly depleting: despite government ambitions to reduce carbon footprints, CO_2 emissions have continued to grow annually since the 2015 Paris Climate Conference (with the exception of 2020). Delaying decisive measures for sustainable emission reductions increases the risk of economic and social costs.

— Disruption of global energy supplies and related deficits: energy shortages due to geopolitical tensions highlight the importance of balancing the three elements of the energy trilemma—security, affordability, and sustainability.

— Long-term impact of geopolitical instability: although demand for traditional energy sources has temporarily increased to ensure energy security, countries are committed to developing alternative energy sources over the long term, thereby accelerating the energy transition.

— Changing fuel balance: fossil fuels are being phased out in favor of an increasing share of RES and low-carbon fuels. The use of biofuels (solid biomass, liquid biofuels, and biogas) is on the rise globally, helping reduce greenhouse gas emissions in sectors like transportation and small-scale heating and power plants. Transitioning to a modern, low-emission energy system requires deploying advanced technologies for various forms of alternative energy.

— Enhancing energy efficiency is one of the main trends in the energy industry. Improving energy efficiency in power and heat generation facilities by using the latest equipment allows for more efficient use of energy resources, reducing greenhouse gas emissions while maintaining energy output. Significant benefits can be achieved by replacing outdated equipment with energy-efficient technologies.

— Carbon capture and storage technologies contribute to reducing greenhouse gas emissions by capturing direct emissions from stationary fossil fuel combustion facilities. Storing CO_2 in geological formations helps prevent its release into the environment, aiding in sector decarbonization. Captured carbon can be used in construction materials, batteries, and other applications, though the profitability of carbon capture projects also depends on the price per ton of carbon on local markets.

The "4D" trends—decarbonization, decentralization, digitalization, and deregulation—shape the energy sector and are aimed at creating a more sustainable, reliable, and efficient energy system for the future. Decarbonization involves transitioning from fossil fuels to renewables such as wind and solar power, supported by regulatory measures and sustainability requirements for businesses and consumers. Decentralized energy supply is becoming more popular, enabling more efficient resource use and reducing electricity costs. Digitalization introduces new ways to manage and control energy networks using data from distributed devices. Deregulation in energy markets fosters competition, driving the development of efficient and sustainable energy supply models.

[1] World Energy Council

2.1.2 Key External Environment Factors

Figure 1. Energy Trilemma

Today, the global energy sector faces the immense challenge of finding an optimal balance among the components of the energy trilemma, with the prioritization of these components generally determined by the level of a country's development. This balance often shifts from economic affordability of electricity in developing countries to environmental sustainability in developed ones.

In Kazakhstan's electric power sector, there is an imbalance focused on the issues of energy affordability at fair and accessible prices. Energy security has become a key challenge for Kazakhstan, which means meeting energy demand through domestic resources. This involves not only ensuring reliable energy supply under stress conditions for the energy system but also reducing dependency on imported energy resources by developing internal potential, including increasing the share of renewable energy sources and improving energy efficiency. These measures aim to strengthen national security and the resilience of the energy infrastructure in the long term.

The development direction of JSC "Samruk-Energy," a key quasi-state company in Kazakhstan's energy sector, is shaped by external factors closely aligned with the trilemma components (Figure 2): security, affordability, and sustainable energy supply (energy transition and sustainable development).

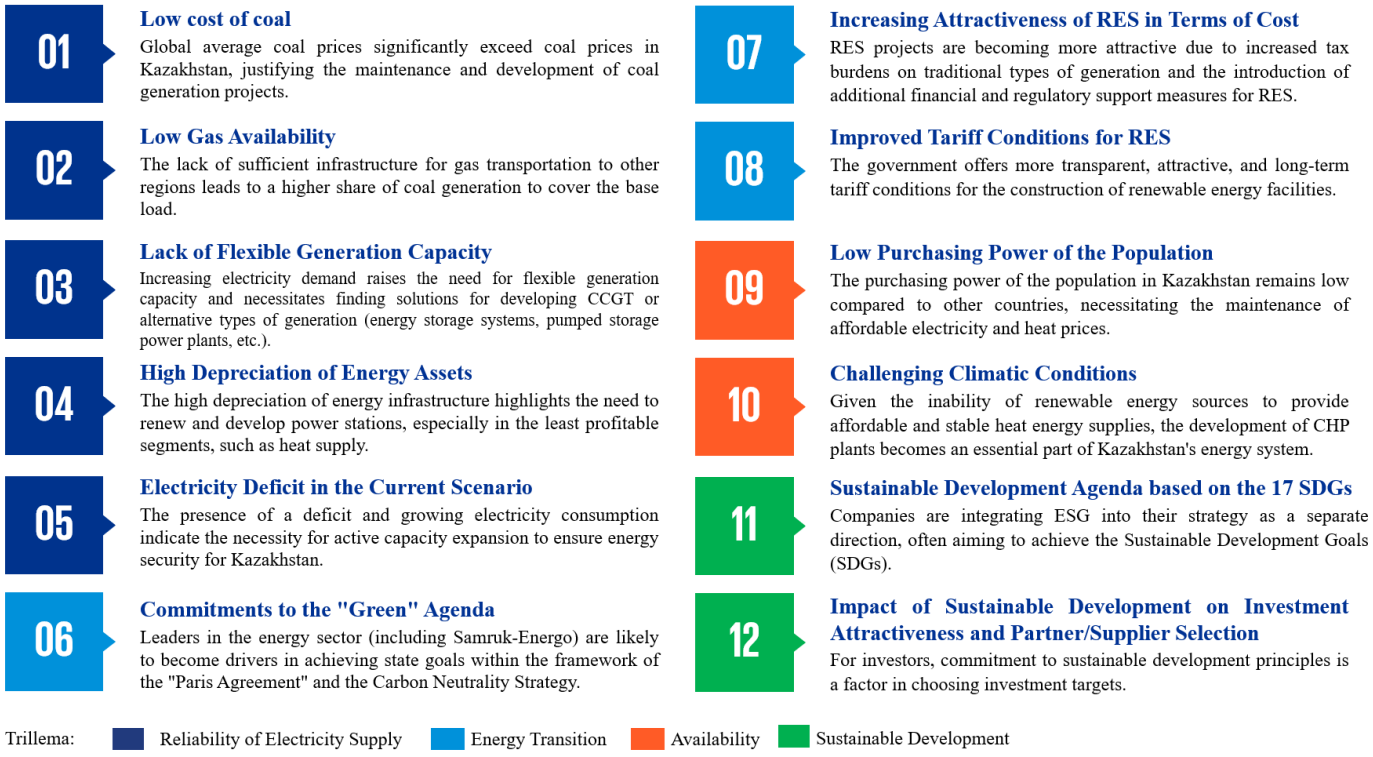

Figure 2. External Factors Shaping the Development Vector of JSC "Samruk-Energy"

2.2. Internal environment analysis

2.2.1 Current activities of the Company

The asset portfolio of JSC "Samruk-Energy" includes enterprises at various stages of the value chain, such as coal mining, electricity, and heat generation (including thermal power plants, hydropower plants, and renewable energy sources), as well as electricity distribution and sales.

Most production assets are located in the northern zone of the Unified Energy System (Pavlodar region (Ekibastuz), Abay region (mouth of the Irtysh River near Semey and Ust-Kamenogorsk), and partially in the Akmola region), as well as in the southern zone (Almaty, Almaty region, and Turkestan region).

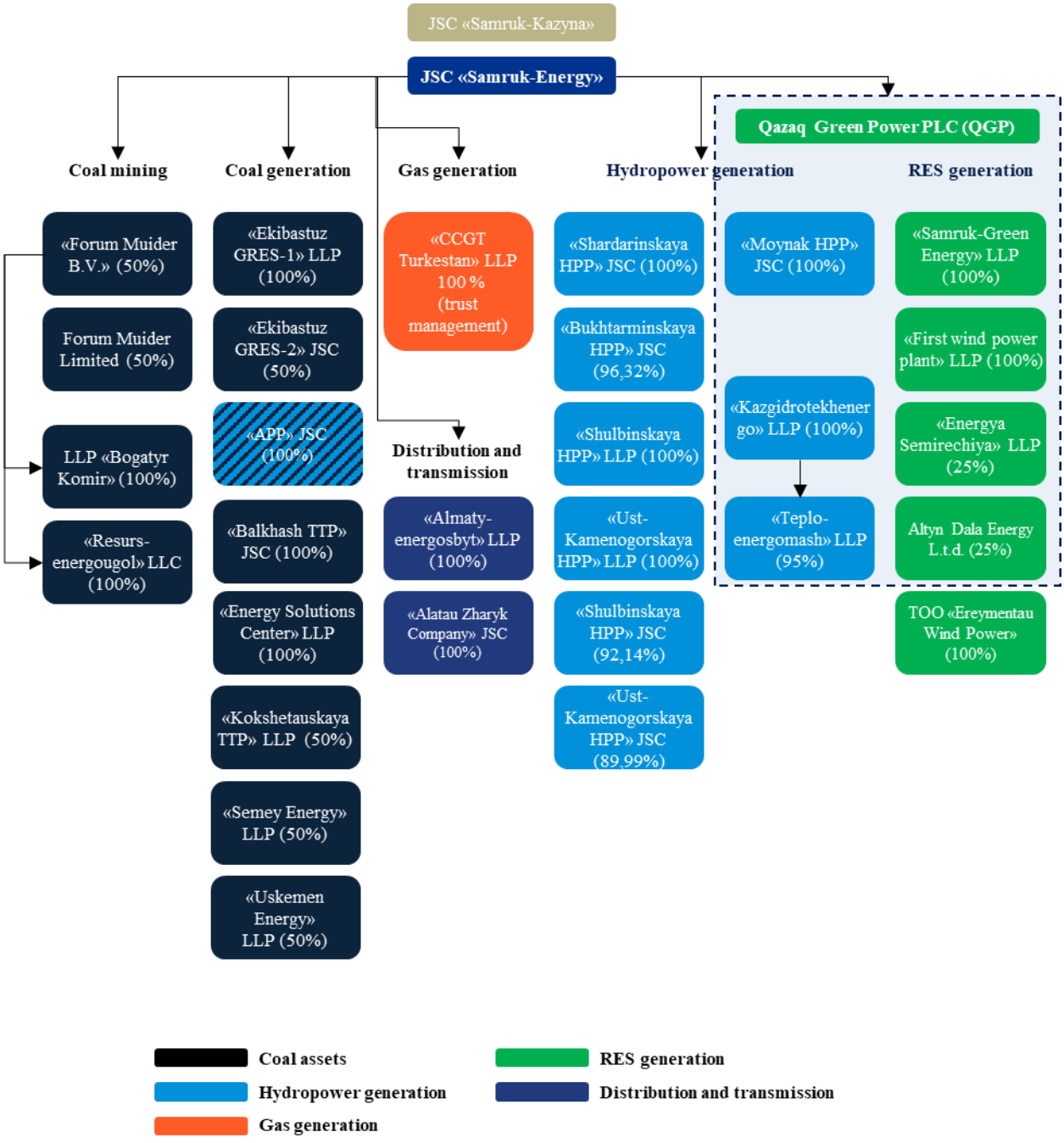

Figure 3. Current asset structure of the Company

In the coal mining segment, key assets include "Forum Muider B.V." (50% share) and its subsidiary LLP "Bogatyr Komir" (100%).

Coal generation is represented by entities such as LLP "Ekibastuz GRES-1" (100%), LLP "Ekibastuz GRES-2" (50%), JSC "APP" (100%), JSC "Balkhash TPP" (100%), LLP "Energy Solutions Center" (100%), LLP "Kokshetauskaya TPP" (50%), LLP "Semey Energy" (50%), and LLP "Uskemen Energy" (50%).

In the electricity distribution and transmission sector, notable companies include LLP "Almatyenergosbyt" (100%) and JSC "Alatau Zharyk Company" (100%).

Hydropower generation includes several companies, such as JSC "Shardarinskaya HPP" (100%), JSC "Moynak HPP" (100%), JSC "Bukhtarminskaya HPP" (96.32%), LLP "Shulbinskaya HPP" (100%), JSC "Shulbinskaya HPP" (92.14%), LLP "Ust-Kamenogorskaya HPP" (100%), and JSC "Ust-Kamenogorskaya HPP" (89.99%).

Gas generation is represented by the developing LLP "CCGT Turkestan" (100%, under trust management).

In the renewable energy generation sector, key assets within the Qazaq Green Power PLC (QGP) perimeter include JSC "Samruk-Green Energy" (100%), LLP "First wind power plant" (100%), LLP "Energya Semirechiya" (25%), and Altyn Dala Energy L.t.d. (25%). Additionally, LLP "Ereymentay Wind Power" (100%) is noteworthy.

The installed capacity of the Company stands at 8,020 MW. Coal generation dominates the capacity structure with 5.2 GW (64.6%), followed by hydropower generation at 2.6 GW (32.2%), gas generation at 0.1 GW (1.8%), and renewable energy facilities at 0.1 GW (1.4%).

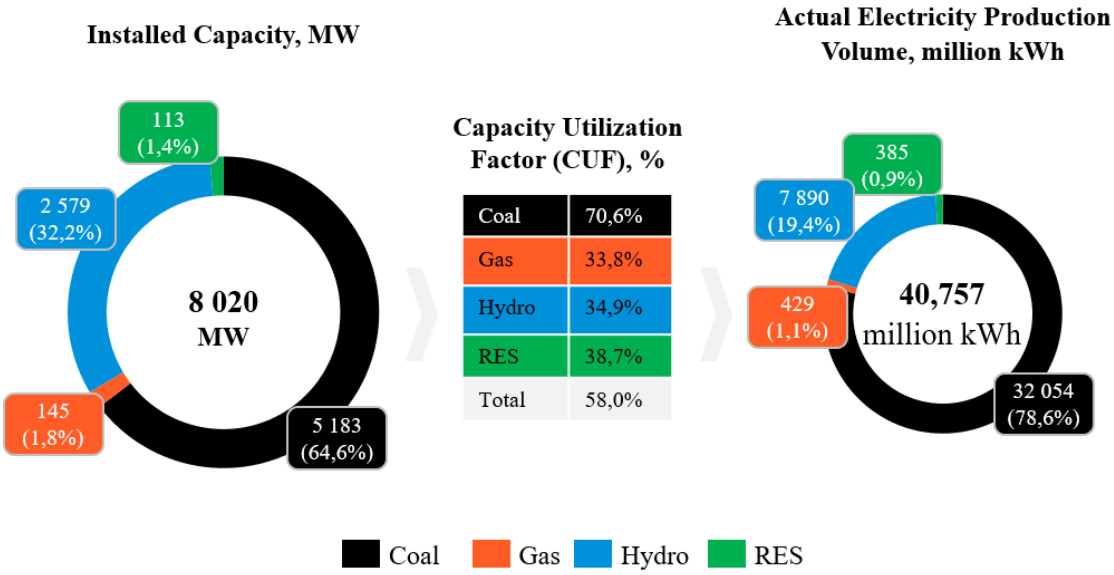

Figure 4. Current Generation Structure of JSC "Samruk-Energy," 2023, MW (as of the beginning of 2024), million kWh (for full year 2023)

The actual electricity production volume in 2023 was 40,757 million kWh. Most of this volume came from coal generation, with 32,054 million kWh (78.6%), followed by hydropower at 7,890 million kWh (19.4%), gas generation at 429 million kWh (1.1%), and renewable energy sources at 385 million kWh (0.9%). The capacity utilization factor (CUF) for coal assets is 70.6%, for hydropower 34.9%, for gas 33.8%, and for renewable energy sources 38.7%. The overall CUF of the Company is 58.0%.

Strengths

— Company scale: significant share in Kazakhstan's generation capacity structure and extensive experience in operating power plants
— Diversified portfolio of current and planned generating assets
— Ability to influence industry development
— Enhanced financing opportunities for investment activities due to its reputation as the largest state-backed generating company
— Cost advantages in coal resources through vertical integration with the coal mining company LLP "Bogatyr Komir"
— International collaboration with leading global energy organizations
— Support from the government and the Fund

Weaknesses

— High debt burden when implementing projects
— Low return on investment due to the social nature of projects
— High wear and tear of power plants
— Limited export potential of LLP "Bogatyr Komir" products outside Kazakhstan due to the technical characteristics of Ekibastuz basin coal
— Environmental policy and ESG reporting compliance are in the early stages
— Limited ability to change or influence tariff setting in the industry due to regulatory constraints

Opportunities

— Growing electricity consumption, providing potential to increase market share
— National climate and environmental commitments
— Increasing investment attractiveness of “green” projects
— Significant untapped climatic potential in Kazakhstan for developing renewable energy projects, particularly solar and wind energy
— Potential for export growth and additional revenue through international energy integrations
— Medium-term growth in gas use as a transitional fuel to reduce environmental impact and provide energy system flexibility
— Availability of alternative solutions for ensuring system flexibility
— Opportunity to implement "clean" coal technologies (CCS)
— Emergence and application of AI and optimization technologies to enhance process efficiency
— Development of hydrogen energy

Threats and Risks

— Potential continuation of electricity and capacity shortages in Kazakhstan in the medium term
— Instability of renewable energy systems and increased dependence on natural conditions as the share of renewables in the generation mix grows
— Lack of flexible generation capacity
— Need to balance reliability, energy security, and energy transition
— Social risks associated with phasing out coal generation
— Limited access to financing for coal projects due to the end of international investments in non-environmentally friendly projects
— Geopolitical instability in neighboring countries, with potential secondary sanctions affecting operational activities

— Risk of insufficient coal supply from Bogatyr Komir to meet the needs of all company power units

— Transition to non-coal generation significantly reduces coal demand

— Potential increase in project costs

3. Mission and vision

The development vector of JSC "Samruk-Energy" is closely aligned with the direction of state policy in the electric power sector. The alignment of goals and development directions is primarily determined by the following factors:

— Current leadership of JSC "Samruk-Energy" in the industry. The Company holds a 36% share in Kazakhstan's electricity generation (the share of its closest competitor is around 17%, half of that).

— Presence of mandatory projects and their importance in the national structure. Key projects are well-developed (including at the intergovernmental level), are critical for the overall energy system, and are officially included in the development plans of the Ministry of Energy of Kazakhstan until 2035. These projects account for 15.6 GW of additional capacity out of the 26.5 GW planned by the Ministry of Energy until 2035 (59%).

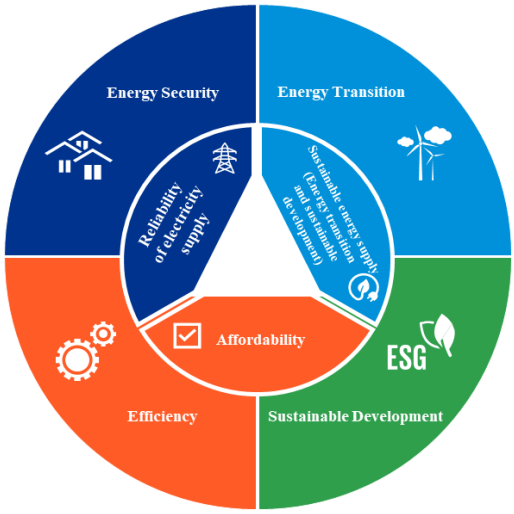

Figure 5. Strategic Directions of JSC "Samruk-Energy"

The mission and vision of JSC "Samruk-Energy" reflect the achievement of the energy trilemma goals, supporting reliable, affordable, and environmentally clean energy as the foundation for the sustainable development of the energy sector.

Mission

We ensure the country's energy security and facilitate an accelerated energy transition, adhering to principles of sustainable development and efficient resource management.

Vision

A highly efficient, innovative leader in the electric power industry, creating a favorable ecosystem for all stakeholders based on principles of reliable partnership, care for people, and respect for the environment.

4. Strategic directions, goals, and objectives

To ensure the sustainable development of JSC "Samruk-Energy" and achieve long-term goals, key strategic directions have been defined based on the Company's mission. These areas represent fields of activity where the Company has the greatest impact on addressing relevant socio-economic challenges.

Energy Security. Acting as a conduit for state policy in the electric power sector, JSC "Samruk-Energy" will continue to guarantee Kazakhstan's energy security. Existing external constraints necessitate the maintenance and expansion of base-load and flexible generation in the near term.

Efficiency. The affordability of electricity and heat at the Company level can be managed by improving operational efficiency. Efficient electricity and heat production is key to reducing overall costs, creating more opportunities to set affordable prices.

Energy Transition. In the long term, the Company will support national energy transition goals (achieving carbon neutrality by 2060) and become a driver of renewable energy development, shifting its focus in alignment with state policy.

Sustainable Development. Systematic management of sustainable development will enable the Company to set strategic-level sustainability priorities.

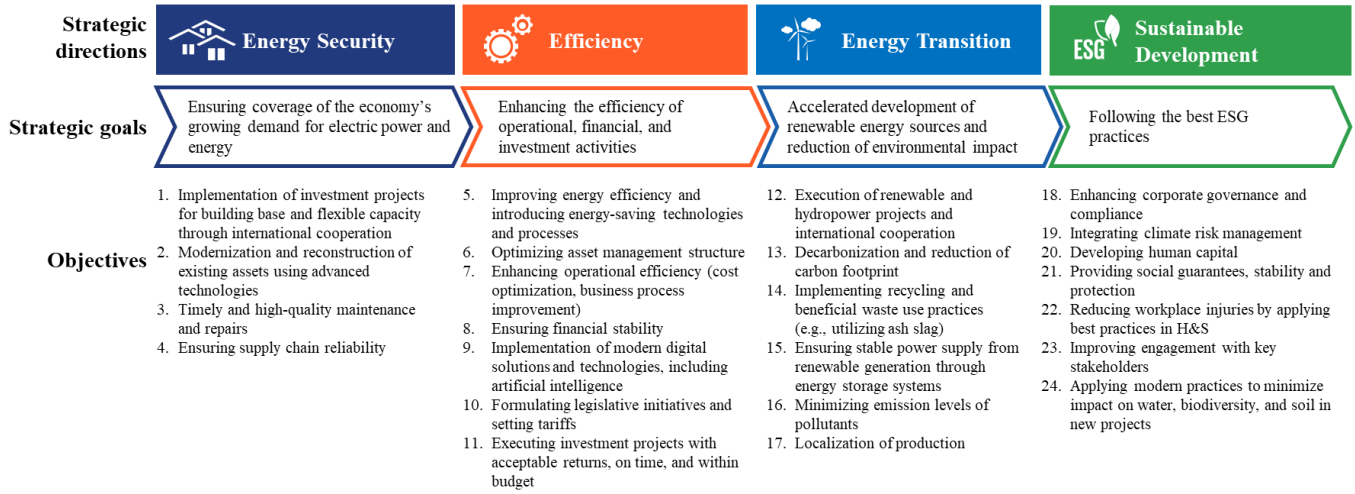

Figure 6. Strategic directions, goals, and objectives of JSC "Samruk-Energy"

4.1. Strategic direction – Energy security

Strategic goal: Ensuring coverage of the economy's growing demand for electric power and energy.

Acting as a conduit for state policy in the electric power sector, JSC "Samruk-Energy" will continue to serve as a guarantor of Kazakhstan's energy security. External factors, such as power deficits in available capacity and production, low coal resource costs, limited gas availability in the northern and southern energy zones, lack of flexible generation capacity, high wear of energy assets, relatively low population purchasing power, and challenging climate conditions, necessitate a focus in Kazakhstan's energy sector—particularly for JSC "Samruk-Energy"—on the expansion, development, and maintenance of base (coal) and flexible (gas) generation in the near term.

4.1.1 Implementation of investment projects for building base and flexible capacity through international cooperation

The construction of new base capacity includes plans to build three CHP plants in Semey, Kokshetau, and Ust-Kamenogorsk, with a total installed capacity of 930 MW, as well as a large coal power station, GRES-3, with an installed capacity of 2,640 MW, and the expansion of Ekibastuz GRES-2 by adding units #3 and #4 (1,100 MW).

The development of these three CHP plants involves intergovernmental agreements and participation from international partners in the electric power sector. Given JSC "Samruk-Energy's" focus on ensuring system reliability, alongside the active commissioning of renewable energy facilities that typically have low stability and predictability, the Company will prioritize the development of flexible generation to mitigate risks associated with production and consumption imbalances.

According to international practices, the share of new flexible capacity should range between 20% and 60% of the capacity of new renewable facilities, depending on their locations, and should constitute about 20% of the total installed capacity. Consequently, JSC "Samruk-Energy" plans to actively develop flexible generation, primarily through the introduction of combined-cycle gas turbines (CCGT), which are the most in-demand solutions for covering peak loads.

The Company plans to commission two new CCGT plants in Kazakhstan's southern energy zone: CCGT "Turkestan" (1,000 MW) and CCGT "Kyzylorda" (1,100 MW).

Beyond addressing energy security issues, new flexible capacity can also provide additional financial benefits for JSC "Samruk-Energy" by enabling electricity sales in the balancing electricity market (BEM) and

utilizing the Automatic load frequency control (ALFC) system. Current regulations allow for electricity sales in the BEM with a premium above the maximum tariff, encouraging wholesale market participants to help resolve imbalances within Kazakhstan's Unified Energy System.

However, there are potential risks associated with BEM participation. Firstly, there is a high likelihood of regulatory changes to the BEM (as the real-time BEM only began operating on July 1, 2023), which could reduce potential benefits. Secondly, benefits from flexible capacity participation in the BEM could be offset by the need to buy or sell negative or positive imbalances, including those arising from renewable assets.

In addition to new gas plant projects, flexible capacity will be supported by modernizing existing CHP plants (converting them to gas), as well as the development and modernization of hydropower plants and energy storage systems (ESS). These measures are discussed in detail in relevant sections.

With project implementation, the ratio of new flexible capacity to new renewable energy capacity at JSC "Samruk-Energy" will exceed 66.3%, aligning with international practices.

4.1.2 Modernization and reconstruction of existing assets using advanced technologies

With increased wear on fixed assets in the industry, rising electricity production requirements, and an overall focus on planned renewal and improvement of existing assets, JSC "Samruk-Energy" will focus on modernizing and reconstructing its current assets alongside building new facilities.

As part of this effort, priority will be given to key coal generation facilities in Ekibastuz and Almaty. In the Ekibastuz area, the following projects are planned:

— Restoration of power unit #1 (500 MW) and modernization of power unit #3 (50 MW) at Ekibastuz GRES-1.

— For the current CHP plants in Almaty, modernization and conversion from coal to gas fuel are planned:

— Reconstruction of Almaty CHP-3 (371 MW) with a shift to flexible operating mode,

— Modernization of Almaty CHP-2 (37 MW),

— Expansion of CHP-1 (80 MW).

— Several HPPs are also slated for modernization:

— Reconstruction and modernization of the HPP Cascade of JSC "Almaty Electric Power Plants" (~40-50 MW),

— Modernization of the Ust-Kamenogorskaya HPP unit (without an increase in installed capacity).

4.1.3 Timely and high-quality maintenance and repair works

To ensure a high level of reliability, predictability, and controllability in electricity production, it is essential to maintain an appropriate level of technical readiness and availability of the Company's generating assets. This primarily involves organizing timely and high-quality maintenance and repairs (M&R).

As part of this goal, JSC "Samruk-Energy" will aim to establish an M&R system focused on optimizing the equipment maintenance cycle.

4.1.4 Ensuring supply chain reliability

Given the high level of vertical integration at JSC "Samruk-Energy" (including the coal asset LLP "Bogatyr Komir" and distribution and sales companies JSC "Alatau Zharyk Company" and LLP "Almatyenergysbyt" within its structure), maintaining supply chain reliability for resources (primarily coal, MRO materials, and electricity) is a key objective.

The Company's supply chain activities will focus on fully meeting the coal needs of base-load capacities, which is particularly critical due to large-scale projects planned over the next 10 years to increase coal generation capacity (with an installed capacity increase of over 5 GW in coal plants).

4.2. Strategic direction – Efficiency

Strategic goal: Enhancing the efficiency of operational, financial, and investment activities.

The affordability of electricity (primarily through tariff setting) at the national level depends on the production costs of key industry producers and the efficiency of their operations. Efficient production of

electricity and heat is a key means to reduce overall cost levels, creating greater opportunities to establish affordable prices.

4.2.1 Improving energy efficiency and implementing energy-saving technologies and processes

JSC "Samruk-Energy" will aim to improve energy efficiency and implement energy-saving technologies and processes by reducing energy losses and enhancing overall resource use efficiency.

Potential work areas in this field include:

— Conducting energy audits: Regular reviews and analysis of energy consumption to identify inefficient areas and savings opportunities.

— Monitoring and control: Implementing energy consumption monitoring and control systems to promptly detect deviations and leaks.

— Improving technological processes: Integrating energy-saving technologies into production processes, such as upgrading cooling and heating systems.

— Implementing energy-efficient equipment: Replacing outdated equipment with new, more energy-efficient options.

Among the most developed measures is the planned construction of a pump station for returning treated water at GRES-2. The construction of a pump station at Lake Karasor and a pipeline for treated water will reduce water consumption for pumping from the cooling reservoir and decrease annual water intake from the Irtysh-Karaganda canal for ash and slag removal by partially returning and reusing water.

4.2.2 Optimization of asset management structure

To enhance the investment attractiveness of JSC "Samruk-Energy," it is necessary to implement measures for asset reorganization, which include transferring RE and HPP assets should be transferred to PLC "Qazaq Green Power." This transfer will facilitate the development of RE and HPP assets, improve management efficiency within a single legal structure, and attract a strategic investor who will secure funding for the investment program and further develop PLC "Qazaq Green Power" as an energy holding focused on green energy.

Attracting a strategic investor will facilitate the joint development of PLC "Qazaq Green Power" and improve operational efficiency by introducing advanced energy holding management practices. With the ongoing implementation of renewable energy projects planned in the investment strategy, a future IPO could also be considered.

T To ensure the even distribution of financial burdens within the framework of the investment program and to make effective use of funding sources, efforts will be made to optimize the asset construction plan. This initiative will establish the priority of implementing the projects reflected in the investment program. Key criteria for determining project priorities will include:

— Social impact of the project,
— Contribution to covering electricity production deficits,
— Impact on the Company’s and country’s environmental goals,
— Project profitability,
— Importance for the stability of the energy system.

The outcome of project prioritization in the investment program should be an optimized project portfolio that ensures JSC "Samruk-Energy" maintains acceptable forecasted debt servicing ratios, such as debt-to-EBITDA ratio or debt coverage ratio, appropriate for the Company.

4.2.3 Improving operational efficiency (cost optimization, business process optimization)

Improving the operational efficiency of JSC "Samruk-Energy" involves optimizing various aspects of the Company's activities to reduce costs, increase productivity, and enhance the quality of services provided. This is achieved by implementing modern technologies, improving resource management, and refining business processes.

4.2.4 Ensuring financial stability

Financial stability control has become a priority for JSC "Samruk-Energy" due to ambitious yet essential plans for building new generating assets. Although maintaining the current level of financial stability is unlikely, the Company will focus on monitoring and adhering to the regulatory financial covenants of creditors, with biannual and annual reporting (excluding new debt and interest expenses under force majeure circumstances, such as quarantine or blackout events).

4.2.5 Implementation of modern digital solutions and technologies, including artificial intelligence

In JSC "Samruk-Energy's" development strategy, particular emphasis is placed on implementing digital solutions and technologies aligned with "mature" IT trends in the energy sector. This approach aims to enhance the efficiency of production and management processes, improve equipment operation control, reduce operating costs, and increase overall productivity. The Company is also reviewing current IT projects and aims to implement centralized initiatives. For the successful implementation of trending digital solutions, it is essential to establish a solid foundation that includes a comprehensive IT architecture, a centralized data storage system, modern infrastructure, and other key components.

4.2.6 Development of legislative initiatives and tariff setting

The development of legislative initiatives and tariff setting are crucial aspects for companies in the electric power sector due to the highly regulated nature of these areas. To balance electricity affordability for the population with the Company’s ability to generate profit, JSC "Samruk-Energy" plans to actively engage with government bodies, draft proposals for legislative changes, and, where possible, participate in the establishment and regulation of electricity tariffs.

4.2.7 Implementation of investment projects with acceptable profitability, within established timeframes and costs

Most projects in JSC "Samruk-Energy's" portfolio are well-developed (including at the intergovernmental level), hold significant importance for the system operator, and are officially included in the RoK Ministry of Energy's development plans through 2035. These projects provide 15.6 GW of additional capacity out of the 26.5 GW planned by the Ministry of Energy through 2035 (59%), highlighting their importance and leaving minimal options for selection, prioritization, or project rejection.

The key objective, therefore, is to achieve efficiency and effectiveness in implementing these projects. Developing high-quality feasibility studies and ensuring effective execution during construction or modernization will help improve the Company’s profitability, especially given the large volume of projects placing pressure on the Company's financial stability.

Given the electricity shortage and the government’s goal to meet demand primarily through JSC "Samruk-Energy's" projects, it is crucial to complete projects within set deadlines, avoiding delays for those with a significant impact on the country’s installed capacity.

Project efficiency and effectiveness will also be evaluated through post-monitoring of completed projects to assess profitability indicators and identify unprofitable projects, with assessments conducted twice yearly, after each half-year and full year.

4.3. Strategic direction – Energy transition

Strategic goal: Accelerated development of renewable energy sources and reduction of environmental impact.

Alongside a focus on energy security and the need to provide affordable energy resources for the economy and population, there is a global trend of increasing concern about climate change and environmental impacts. As a result, alternative energy sources are actively being developed, including the renewable energy sector and other non-fossil fuel generation types (hydropower, hydrogen energy, etc.). The "green economy"

concept aims to increase the share of RES in Kazakhstan's electricity production from 4.5% in 2022 to 15% by 2030 and eventually to 50% by 2050.

JSC "Samruk-Energy" supports the government's efforts to achieve carbon neutrality and, at this stage, sets a goal to minimize its environmental impact by implementing RES projects, applying best available technologies, and developing alternative energy. Currently, JSC "Samruk-Energy" generates 31.3% of all electricity in Kazakhstan (36% when including all companies within its scope). The Company will account for over 70% of all RES capacity in Kazakhstan, with plans to introduce several new and modernized hydropower plants and construct various RES facilities. Some of these projects are planned in collaboration with international strategic partners.

Comparing the capacity growth of RES + hydropower with coal generation, JSC "Samruk-Energy" will progress at an accelerated pace, significantly shifting the generation structure towards more environmentally friendly types. Coal plants will represent 34% of capacity growth, while RES will account for 40%, and hydropower plants for 10%.

As Kazakhstan's largest power-generating organization, JSC "Samruk-Energy" significantly contributes to achieving national targets and drives changes in the volume and structure of generation, especially in the RES sector.

The energy sector in Kazakhstan is responsible for at least 70% of greenhouse gas emissions, making it crucial for implementing decarbonization technologies and reducing the risks associated with climate change.

Understanding the sector's environmental impact motivates the Company to pursue decarbonization of its activities, aiming to reduce greenhouse gas emissions by transitioning from traditional energy sources to cleaner alternatives such as gas or RES. Decarbonization also includes adopting energy-efficient technologies, carbon capture, and green initiatives for carbon absorption.

4.3.1 Implementation of renewable energy and hydropower investment projects and international cooperation

The key and most extensive task of the energy transition is the construction of new RES and hydropower facilities. In terms of capacity growth by generation type, RES projects will contribute the largest increase, adding 6.2 GW of installed capacity (40%). Notable planned RES projects include:

— Construction of a 1 GW wind power plant with an energy storage system in partnership with ACWA Power
— Construction of a 1 GW wind power plant with an energy storage system in partnership with China Power International Holding Ltd.
— Construction of a 1 GW wind power plant with an energy storage system in partnership with Masdar
— Construction of a 1 GW wind power plant with an energy storage system in partnership with Total Eren
— Construction of solar power plants with a total capacity of up to 1 GW with UNIGREEN ENERGY
— Expansion of an RES project in Almaty region (810 MW)
— Construction of a 400 MW wind power plant in Kazakhstan with an energy storage system or use of existing gas turbines

For hydropower development, plans include constructing new stations as well as expanding and modernizing existing assets. The total new capacity will be 1.6 GW or 10% of the increase in installed capacity:

— Construction of Semey HPP (300 MW)
— Construction of the second phase of Shulbinskaya HPP(648 MW)
— Construction of a regulating HPP on the Ili River, with modernization of Kapshagay HPP
— Reconstruction and modernization of the HPP Cascade of JSC "APP"

— Construction of a pumped storage power plant (PSP) (600 MW)
— Modernization of the Ust-Kamenogorskaya HPP unit (without increasing capacity)

4.3.2 Decarbonization and carbon footprint reduction

The Company's operations are environmentally sensitive, and the requirements for clean technologies and sustainable operations are rising both in Kazakhstan and globally. Achieving decarbonization by 2060 will require significant changes to Kazakhstan's energy system. Reducing greenhouse gas emissions in the energy sector will involve not only a shift towards alternative energy sources and RES but also the use of carbon capture and storage technologies, the replacement of coal with lower-carbon fuels (such as natural gas), and the implementation of various climate projects.

Despite the planned gradual reduction in coal generation and an increase in the share of RES and alternative energy, coal-fired CHPs will continue to be built and commissioned until 2035 to meet domestic electricity demand. Coal power will remain significant until large RES projects, scheduled for completion by 2030, come online. Given the predominant share of traditional generation in JSC "Samruk-Energy's" assets, reducing the carbon footprint per unit of electricity generation will be a key focus for the Company. Throughout the Strategy period (until 2033), JSC "Samruk-Energy" will focus on increasing the share of RES in the generation mix and implementing carbon offset and climate projects.

The Company has an Energy Transition Program for 2022-2060, setting decarbonization targets for 2060 and outlining measures such as:

— Implementing energy storage systems
— Developing flexible generation to balance the variability of RES output
— Modernizing power grids and introducing smart metering systems to reduce grid losses, facilitate rapid fault detection, reduce costs, and enhance the energy system’s efficiency
— Enhancing and gasifying coal to reduce greenhouse gas emissions
— Implementing technical measures for carbon capture and storage (CCUS)
— Improving production energy efficiency and implementing energy-saving measures

Additionally, new technologies and climate projects will be introduced to reduce net greenhouse gas emissions. Reducing the carbon footprint involves minimizing direct and indirect emissions throughout the lifecycle of various products (such as emissions from coal extraction, transportation, and use as fuel). Indirect emissions reduction will follow quantitative assessments and the adoption of reduction measures, such as working with environmentally responsible suppliers and optimizing logistics routes.

4.3.3 Implementation of waste recycling and beneficial use practices (utilization of ash slag)

Implementing waste recycling and beneficial use practices in an electric power company is crucial as it reduces negative environmental impact. Recycling waste and its beneficial use allow for the adoption of circular economy principles, thereby decreasing the carbon footprint of products (since using secondary raw materials for production reduces greenhouse gas emissions associated with their extraction and processing). An example of potential secondary use of industrial waste in the energy sector is the transfer of ash and slag waste from generation facilities to produce construction materials. Incorporating ash into concrete allows for the replacement of some raw materials, leading to reduced production costs and conservation of natural resources. The ash and slag waste contains calcium oxide, and adjusting its concentration in the raw material mix enables the production of various grades of heavy and lightweight concrete.

4.3.4 Ensuring stable power supply from renewable energy generation facilities through the use of energy storage systems

Electricity generation from renewable energy facilities is highly dependent on weather conditions (wind speed for wind farms) and time of day (sunlight for solar power plants). Therefore, implementing energy storage systems at RES facilities will enable stable power supply to consumers during periods of high demand

and peak consumption. This approach allows the accumulation of electricity previously generated by RES facilities and its release into the grid over the following hours.

4.3.5 Minimizing pollutant emission levels

Minimizing pollutant emissions involves increasing the share of RES in the electricity generation mix and applying advanced technical methods for desulfurization, reducing nitrogen oxide emissions, and optimizing combustion temperature conditions for coal (such as operating steam generators at supercritical temperatures). This also includes the implementation of new technologies, such as advanced electrostatic filters, membrane technologies, and clean coal methods (e.g., coal gasification before combustion).

Combined with enhanced internal environmental standards and regular monitoring of pollutant concentrations in the vicinity of coal and gas generation facilities, reducing specific pollutant emissions will enable the Company to adapt to stricter national environmental regulations, lessen environmental impact, and adopt best practices for sustainable development.

4.3.6 Localization of production

According to the President's Address to the people of Kazakhstan dated September 1, 2023, titled "The Economic Course of Fair Kazakhstan," the National Action Plan's point 6 outlines measures to:

— Increasing the share of off-take contracts with domestic producers in regulated procurements to at least 10%,

— Ensuring the share of Kazakh content in regulated procurements reaches no less than 60% within three years.

High dependence on imported equipment and materials for production, modernization, and repair leads to significant costs and risks for the energy sector, especially when global supply chains are disrupted. Localizing essential goods for the sector will promote industrial and technological development in the national economy, stabilize energy prices for consumers, and strengthen the country's human resource potential.

The Company continuously implements measures to increase domestic value in accordance with the Program for increasing domestic value in the overall volumes of procurement of goods, works, and services by Samruk-Energy JSC.

4.4. Strategic direction – Sustainable development

Strategic goal: Following the best ESG practices.

Sustainable development is an essential part of modern business strategy, particularly in the energy sector, where significant environmental and social impacts demand special attention. Key factors for JSC "Samruk-Energy's" long-term sustainable development include the well-being of people, environmental balance, and financial stability grounded in advanced business practices and corporate governance principles. Thus, following best ESG practices is a core strategic goal for the Company, where activities should align with environmental (E), social (S), and governance (G) principles, ensuring a balance of interests among all stakeholders. This approach also encourages companies to innovate and seek new solutions to improve their environmental and social impact, contributing to a more sustainable and responsible business environment.

The Company is actively integrating sustainability principles into its operations. JSC "Samruk-Energy" publishes annual sustainability reports, and most of its operations are certified according to ISO international standards. In 2023, the Company's ESG risk rating was 24.1, which corresponds to a Medium Risk level on the Sustainalytics scale.

Progressively improving the ESG rating will help the Company improve its image among potential investors and expand the scale of modern ESG practices, such as carbon offset and climate projects.

4.4.1 Improving corporate governance and compliance efficiency

The trend toward sustainable business practices encourages companies to recognize the need for transparency and accountability across all aspects of their operations for a wide range of stakeholders. Corporate governance quality is one of the main non-financial indicators of a company's value and

competitiveness. A high level of corporate governance ensures effective risk management, a reliable internal control system, facilitates access to external capital, and enhances the Company's reputation.

4.4.2 Implementation of climate risk management

The primary goal of climate risk management is to address risks associated with climate change and the implementation of international climate initiatives. These initiatives are crucial for several reasons:

— To account for the impact of global climate changes on operational activities and the supply chain,

— To leverage international climate initiatives that offer business opportunities for funding from various "green" development funds.

— Key aspects of climate risk management in companies include:

— Expanding knowledge on climate change and gaining access to relevant information,

— Coordinating with other functions such as ESG, insurance, and climate project financing,

— Mitigating physical climate risks and transition risks,

— Implementing insurance practices for high-risk assets and insuring new products and activities,

— Preparing non-financial reporting (such as IFRS S1/S2),

— Adopting biodiversity conservation practices to mitigate the environmental impact of the Company's energy generation sources and associated negative effects.

4.4.3 Human capital development

In the Company, personnel are considered the most valuable asset and a key competitive advantage. With the anticipated growth in generation volumes and active development of RES, it is essential to foster conditions that enhance the sector's human capital. The Company aims to become one of the most prestigious employers in its regions of presence.

4.4.4 Ensuring social guarantees, stability, and security

The Company is committed to continually improving working conditions, safety measures, and other social aspects to enhance employee well-being. A key priority in regions of operation is balancing production approaches with social priorities. Transitioning to low-carbon development requires a comprehensive approach that incorporates social considerations. This involves preparing the workforce for new conditions, including relocation programs and, when necessary, timely retraining. Therefore, JSC "Samruk-Energy" must ensure and integrate socially responsible activities based on the principles of the Sustainable Development Goals.

4.4.5 Reducing workplace injury rates by applying advanced health and safety (H&S) practices

JSC "Samruk-Energy" aims to achieve zero injury and fatality rates. A priority for the Company is to improve personal safety measures and ensure accident-free operations. To this end, it is essential for JSC "Samruk-Energy" to foster active employee engagement in safety culture, apply advanced safety and risk management practices, continuously monitor and analyze production processes to identify and promptly address potential risks, and implement leading practices in health and safety (H&S).

4.4.6 Enhancing engagement efficiency with key stakeholders

Enhancing engagement efficiency with key stakeholders is a critical factor for the sustainable growth and success of the Company. Based on principles of transparency, openness, and a commitment to long-term collaboration, the Company considers the interests and rights of all stakeholders, balancing them with its own interests through three key elements: communication, reporting, and feedback.

4.4.7 Implementation of modern practices to minimize harm to water, biodiversity, and soil in new projects

Conducting thorough analysis and aligning with best international practices in environmental aspects of new projects involves a comprehensive approach: assessing potential environmental impacts of specific projects and developing integrated measures to mitigate potential harm to water, biodiversity, and soil.