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

Public Version

Approved by the decision of the Board of Directors
of JSC "Samruk-Energy"
dated July 19, 2024 (Minutes No. 09/24)

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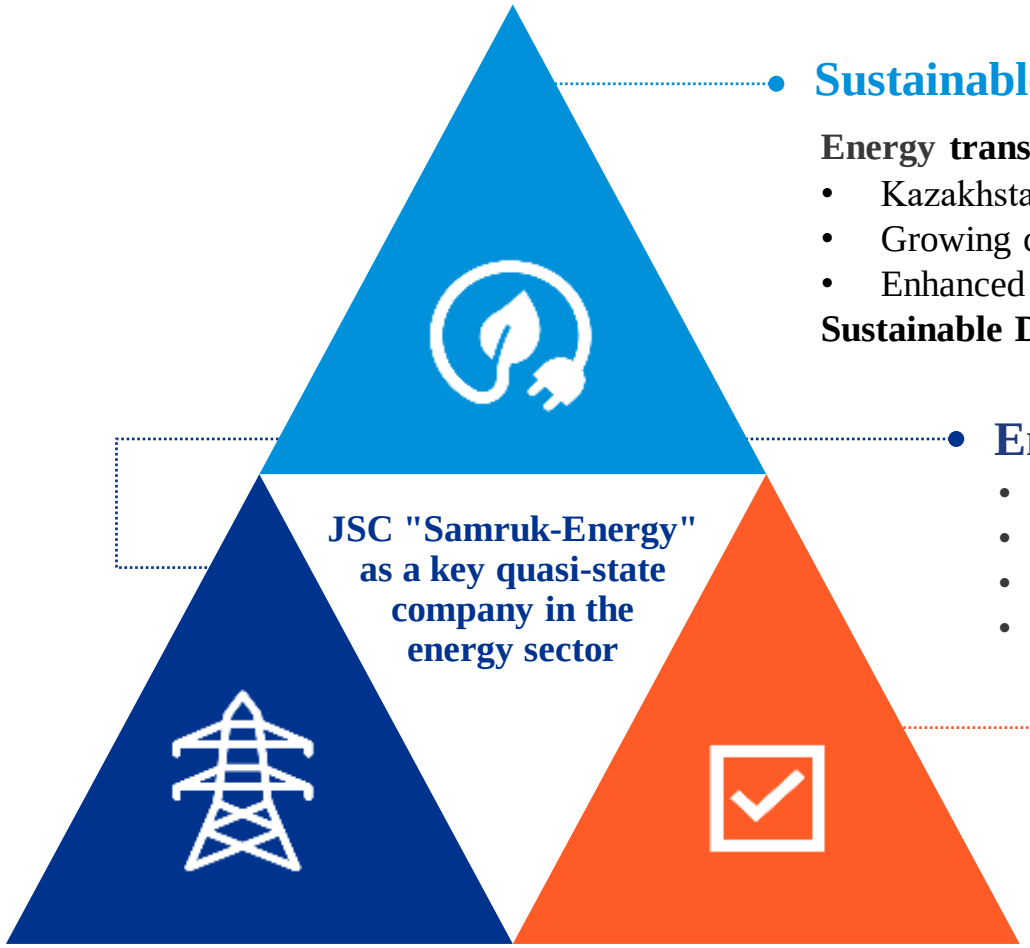
The energy trilemma shapes the external environment and development path of JSC "Samruk-Energy"



Sustainable energy supply

Energy transition

- Kazakhstan's commitments to carbon neutrality
- Growing cost-competitiveness of renewable energy sources (RES)
- Enhanced tariff conditions for RES

Sustainable Development

Energy supply reliability

- Significant low-cost fuel sources (Coal)
- Limited gas reserves and lack of gas infrastructure
- Limited flexible generation capacity
- Aging energy infrastructure

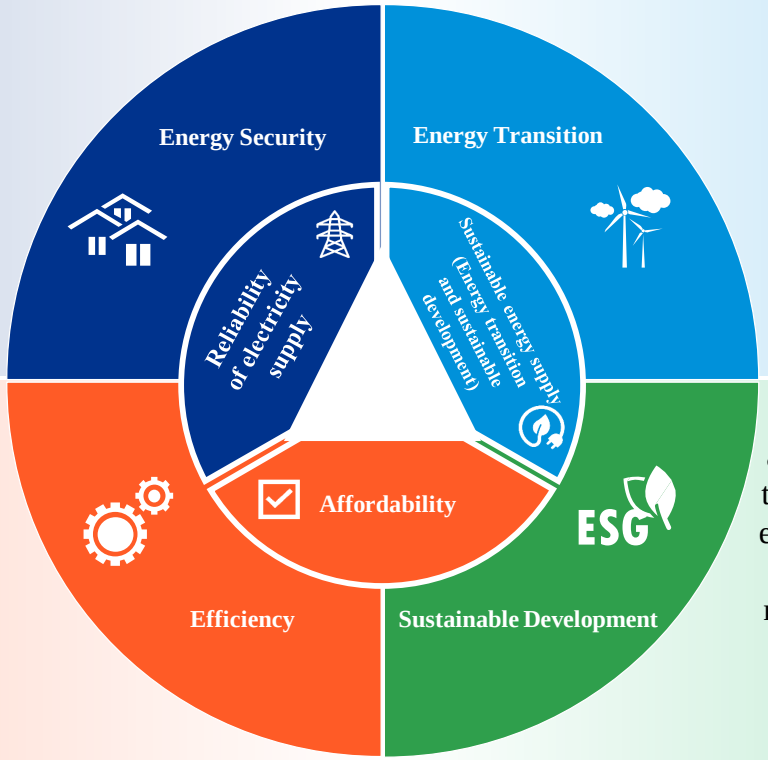
Affordability

- Low purchasing power of the population: limited ability to raise tariffs
- Climatic conditions: need for thermal energy

Priorities of JSC "Samruk-Energy" – Energy security, Energy transition, Sustainable development and Efficiency

Linking the energy sector trilemma to the strategic development directions of JSC "Samruk-Energy"

As an **agent of state policy** in the electric power sector, JSC "Samruk-Energy" will continue to serve **as a guarantor of Kazakhstan's energy security**. External factor constraints lead to the necessity of **maintenance and expansion of both base and flexible generation in the near term**



In the long term, JSC "Samruk-Energy" will **support the national goals of the energy transition** (achieving carbon neutrality by 2060) and will act as a driver for the **development of renewable energy sources**, shifting its focus in alignment with state policy

The affordability of electricity and heat at the level of JSC "Samruk-Energy" can only be managed through the efficiency of its operations. **Efficient production** of electricity and heat is a key approach to **reducing overall costs,** creating greater opportunities to establish affordable pricing

Sustainable development (environmental, social, and corporate governance) is an integral element of the sustainable energy supply component within the energy trilemma and has a comprehensive impact at the national level. At the company level, however, managing sustainable development is extensive and includes a significant range of tasks, necessitating the establishment of ESG as a separate strategic direction

Основные элементы миссии и видения АО «Самрук-Энерго»

Mission and Vision

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

Strategic directions, goals, objectives and KPIs

	Energy Security	Efficiency	Energy Transition	Sustainable Development
Strategic directions				
Strategic goals	Ensuring coverage of the economy's growing demand for electric power and energy	Enhancing the efficiency of operational, financial, and investment activities	Accelerated development of renewable energy sources and reduction of environmental impact	Following the best ESG practices
Objectives	1. Implementation of investment projects for building base and flexible capacity through international cooperation 2. Modernization and reconstruction of existing assets using advanced technologies 3. Timely and high-quality maintenance and repairs 4. Ensuring supply chain reliability	5. Improving energy efficiency and introducing energy-saving technologies and processes 6. Optimizing asset management structure 7. Enhancing operational efficiency (cost optimization, business process improvement) 8. Ensuring financial stability 9. Implementation of modern digital solutions and technologies, including artificial intelligence 10. Formulating legislative initiatives and setting tariffs 11. Executing investment projects with acceptable returns, on time, and within budget	12. Execution of renewable and hydropower projects and international cooperation 13. Decarbonization and reduction of carbon footprint 14. Implementing recycling and beneficial waste use practices (e.g., utilizing ash slag) 15. Ensuring stable power supply from renewable generation through energy storage systems 16. Minimizing emission levels of pollutants 17. Localization of production	18. Enhancing corporate governance and compliance 19. Integrating climate risk management 20. Developing human capital 21. Providing social guarantees, stability and protection 22. Reducing workplace injuries by applying best practices in H&S 23. Improving engagement with key stakeholders 24. Applying modern practices to minimize impact on water, biodiversity, and soil in new projects
KPIs	• Total volume of electricity sales from base and gas generation • Volume of commissioned capacity for base and gas generation • Capacity utilization factor • Fulfillment of coal supply plan	• Debt / EBITDA • Specific fuel consumption (SFC) • Capital investment • Gross inflow of foreign direct investment (FDI) • Net Asset Value (NAV) • EBITDA Margin by business segments	• Reduction of specific CO_2-equivalent emissions (relative to 2021 baseline) across total power generation • Share of installed capacity of renewable energy sources (RES) and hydropower in the generation mix	• Increase in ESG rating • Improvement in social stability rating - SRS index • Achievement of zero injuries and fatalities (reduction in LTIFR, LDR, and FIFR)

Target KPI Values

Goal		KPI	Unit of Measurement	2027	2030	2033
Energy Security						
Ensuring coverage of the economy's growing demand for electric power and energy	1	Total volume of electricity sales from base and gas generation	Coefficient relative to baseline 2023	≥1,0	≥1,5	≥2,0
	2	Volume of commissioned capacity for base and gas generation	GW, cumulative from 2023	≥1,5	≥6,0	≥7,0
	3	Capacity utilization factor	%	≥75%	≥80%	≥80%
	4	Fulfillment of coal supply plan	%	≥90%	≥90%	≥90%
Efficiency						
Enhancing the efficiency of operational, financial, and investment activities	5	Debt / EBITDA	Coefficient	≤5,5	≤5,5	≤3,5
	6	Specific Fuel Consumption (SFC)	Grams per 1 kWh	≤350	≤340	≤330
	7	Capital investment	Trillion KZT, cumulative from 2024	≥2,5	≥3,5	≥4,0
	8	Gross inflow of foreign direct investment (FDI)	Billion USD, cumulative from 2024	≥4,0	≥7,0	≥8,0
	9	Net Asset Value (NAV)	Coefficient relative to baseline 2023	≥1,3	≥1,6	≥2,0
	10	EBITDA Margin by business segments	Coefficient relative to baseline 2023	Coal Production (≥1.05) Electricity Generation (≥1.10) Heat Energy Generation (≥1.00) Electricity Distribution (≥1.00)	Coal Production (≥1.10) Electricity Generation (≥1.20) Heat Energy Generation (≥1.00) Electricity Distribution (≥1.00)	Coal Production (≥1.15) Electricity Generation (≥1.30) Heat Energy Generation (≥1.00) Electricity Distribution (≥1.00)
Energy Transition						
Accelerated development of renewable energy sources and reduction of environmental impact	11	Reduction of specific CO_2-equivalent emissions (relative to 2021 baseline) across total power generation	% relative to baseline 2021	≥30%	≥40%	≥40%
	12	Share of installed capacity of renewable energy sources (RES) and hydropower in the generation mix	%	≥25%	≥35%	≥40%
Sustainable Development						
Following the best ESG practices	13	Increase in ESG rating	Rating	Medium ESG Rating / Medium Risks	High ESG Rating / Low Risks	High ESG Rating / Low Risks
	14	Improvement in social stability rating - SRS index	Rating	Stable	Stable	Favorable
	15	Achievement of zero injuries and fatalities (reduction in LTIFR, LDR, and FIFR)	Coefficient	LTIFR (0,24), FIFR (0,07), LDR (185)	LTIFR (0,21), FIFR (0,04), LDR (170)	LTIFR (0,18) FIFR (0,01) LDR (155)

Renewable Energy Generation

With the implementation of all planned renewable energy projects by 2035, JSC "Samruk-Energy" will outpace national targets for the share of renewables

Opportunities

- **International support for renewable energy projects**
  The "Paris Agreement" and the "Strategy for Achieving Carbon Neutrality by 2060" encourage investments in renewable energy, including financial instruments
- **Kazakhstan's government commitment to renewable energy development**
  Kazakhstan has pledged to reduce environmental impact, with target shares for renewables set at 15% by 2030 and 50% by 2050
- **Integration of energy storage systems with renewable energy solutions**
  The issue of renewable energy instability can be mitigated by implementing energy storage systems (ESS)
- **Favorable climatic conditions for renewable energy**
  Kazakhstan's wind potential exceeds 900 billion kWh per year, and modern wind turbines allow for blade adjustment to adapt to wind direction and speed

Risks

- **Growing need for flexible generation capacity**
  The active deployment of renewables increases the risk of electricity imbalances (deficits), increasing the demand for additional flexible generation capacity
- **Shorter lifespan compared to other generating assets**
  The lifespan of wind and solar stations is approximately 20-30 years, which may impact future generation volumes
- **Lack of suitable recycling facilities**
  The limited lifespan of renewable energy assets also necessitates disposal, recycling, or storage of turbine blades and energy storage systems

Hydropower Generation

The current high share of hydropower generation and ongoing projects will enable JSC "Samruk-Energy" to maintain its leadership in the industry

Opportunities

- **Significant hydropower potential**
  Kazakhstan has a gross hydropower potential of 170 billion kWh, with an economically feasible potential of 30 billion kWh, concentrated in the well-watered Irtysh and Balkhash-Alakol basins
- **Hydropower as a source of flexible capacity**
  Hydropower plants are among the most in-demand sources of flexibility in the energy system
- **Water flow regulation**
  Hydropower facilities play a vital role in irrigation, water supply, and flood prevention
- **Renewable energy source**
  Hydropower remains the primary and most thoroughly researched renewable energy source
- **Government priority**
  According to the electricity sector development plan through 2035 and the updated hydropower development plan, hydropower is prioritized by the government

Risks

- **Environmental, hydrological, and climate risks**
  A lack of well-founded water resource balance and reliable forecasts accounting for all factors ("loss of stationarity"); negative impacts on biodiversity and ecosystem functions; and the effects of climate change on lateral inflow in the Irtysh and Ili rivers
- **Economic risks**
  The investment appeal of hydropower is mixed due to high capital costs, extended construction timelines, and lengthy commissioning periods

Coal Generation

Coal generation will remain an essential component of the industry, gradually being replaced by more environmentally friendly alternatives

Opportunities

- **Low coal prices**
  Kazakhstan has substantial and accessible coal reserves, enabling additional cost savings on resources
- **Opportunity to address heat and power deficits through international cooperation**
  International support in financing and technology availability can help address energy deficits.
- **Participation in Kazakhstan's largest coal asset**
  JSC "Samruk-Energy" owns the country's largest coal asset, increasing reliance on coal generation but enhancing synergies from vertical integration and creating potential for lower raw material costs
- **Emission reduction opportunities through production modernization**
  Implementing carbon capture and storage (CCS) technologies and upgrading power plants can reduce the carbon footprint and extend asset lifespans

Risks

- **Additional funding restrictions for coal plants by certain institutions and countries**
  There is a trend of reduced funding for coal projects by international development banks and countries
- **Social risks of phasing out coal generation**
  Reducing coal generation may lead to social and economic impacts, including job losses and decreased income in coal-dependent regions
- **Characteristics of mined coal**
  The coal from current mining assets has high ash content and low calorific value
- **Need for significant investment in the heating sector**
  JSC "Samruk-Energy" manages the Ekibastuz CHP and plans to build several large CHPs, requiring substantial investments in heating infrastructure.

Gas Generation

Gas generation will play a key role in providing flexibility but will not fully replace coal generation

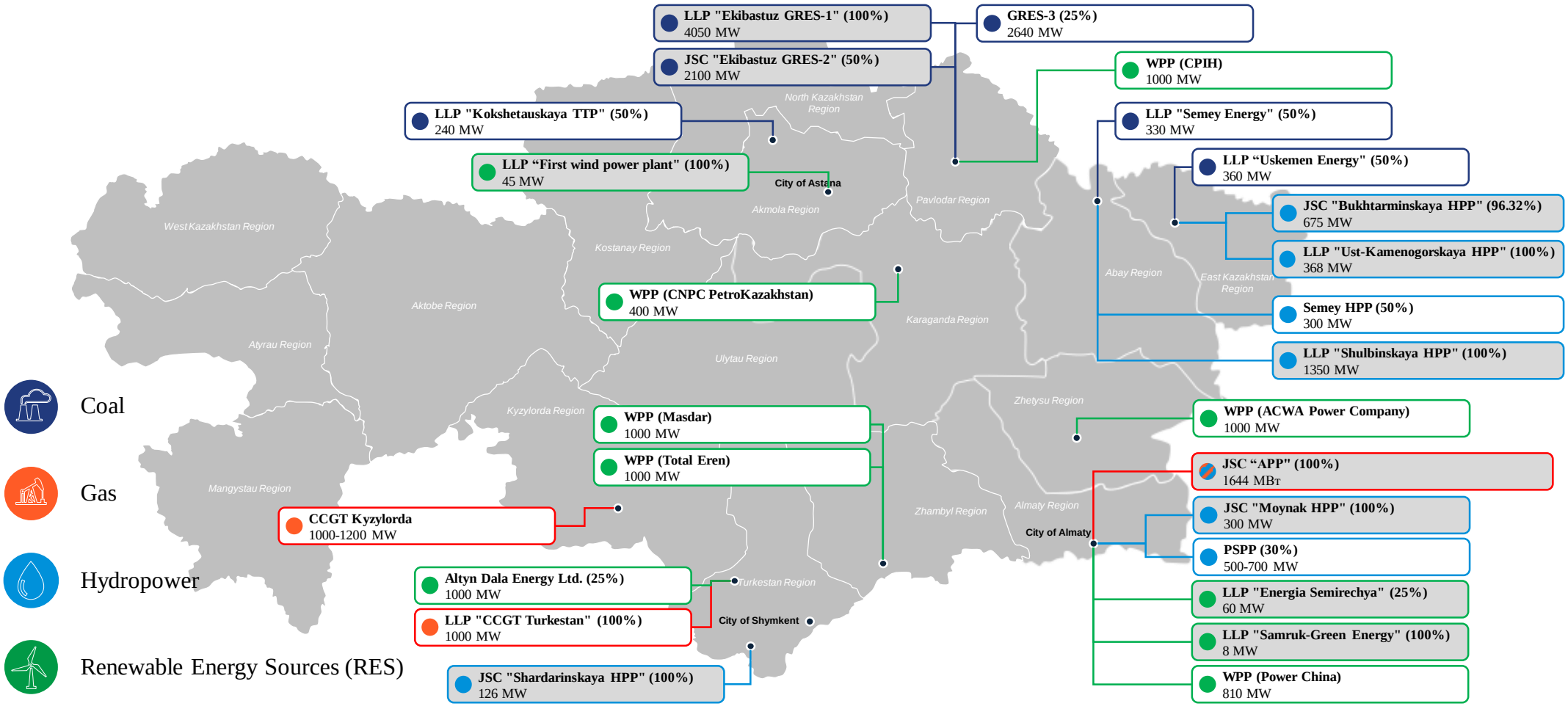
Opportunities

- **Active implementation of renewable energy projects requires development of flexible systems**
  Currently, gas generation is the most in-demand solution for meeting the need for flexible capacity
- **Gas Plants are More Environmentally Friendly than Coal Generation**
  Unlike coal plants, gas plants emit less carbon dioxide, and many countries are promoting the shift from other fossil fuels to gas generation
- **New pipelines increase the potential for gasification in northern and southern regions**
  Supplying gas to the southern and northern regions will create additional flexibility opportunities in these areas
- **Integration of the western zone networks with the unified power system enhances the appeal of combined cycle gas turbines (CCGT)**
  Given the location of gas reserves, synchronizing networks can positively impact the prospects for CCGT development

Risks

- **Geographical presence of current assets**
  Key gas fields and gas power facilities are located in the western part of Kazakhstan, while most of JSC "Samruk-Energy" assets are concentrated in the Pavlodar, Abay, and Almaty regions
- **Greenhouse gas emissions**
  While gas generation emits less CO_2 than coal, it remains a source of greenhouse gases and is a less environmentally friendly option compared to renewable energy sources and hydropower

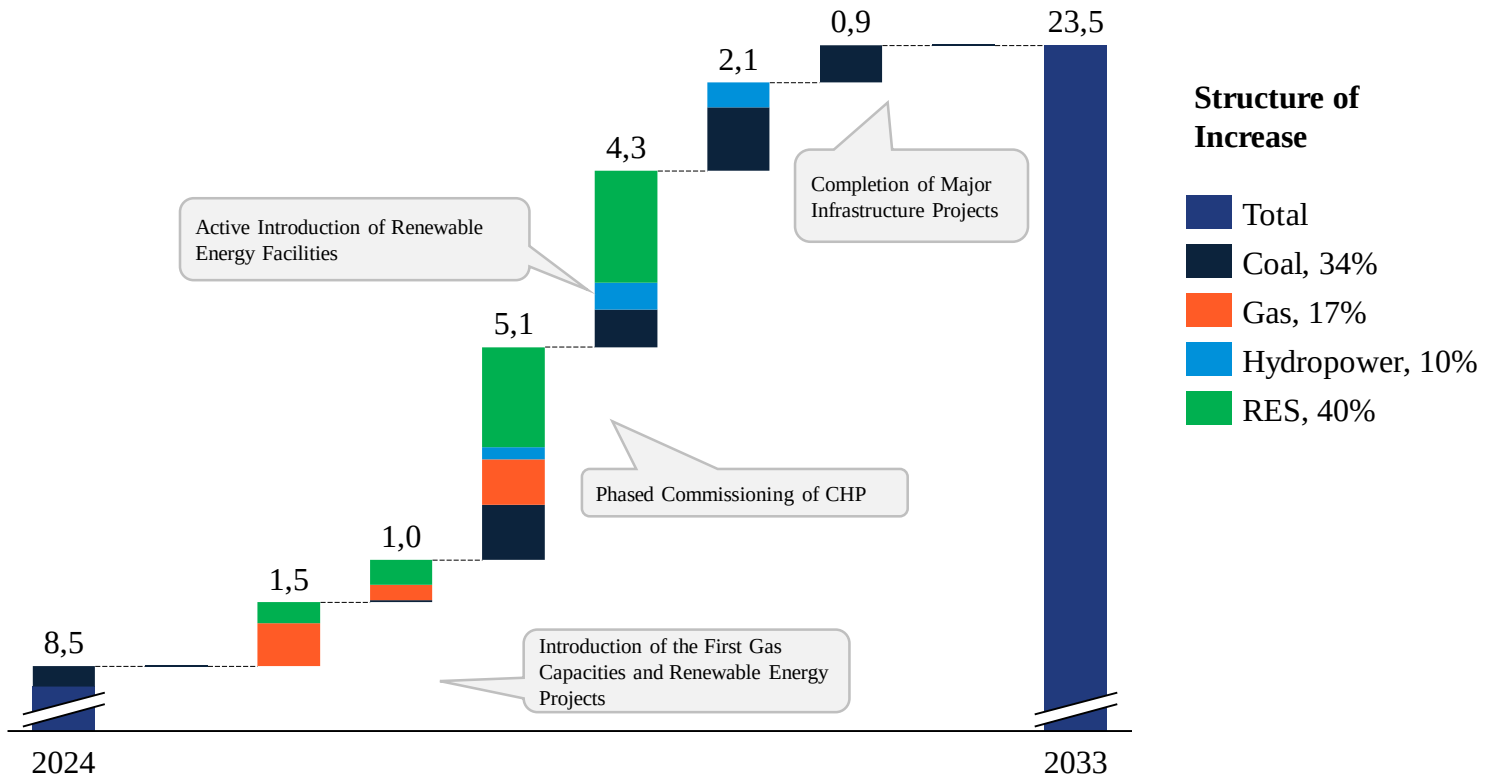
Geography of generating assets and future projects



Note: The parameters of future facilities are preliminary/indicative.

By 2033, the installed capacity of JSC "Samruk-Energy" will increase from 8.5 to 23.5 GW, primarily due to renewable energy sources

Current list of infrastructure projects and their impact on the installed capacity of JSC “Samruk-Energy"
GW, 2024-2033

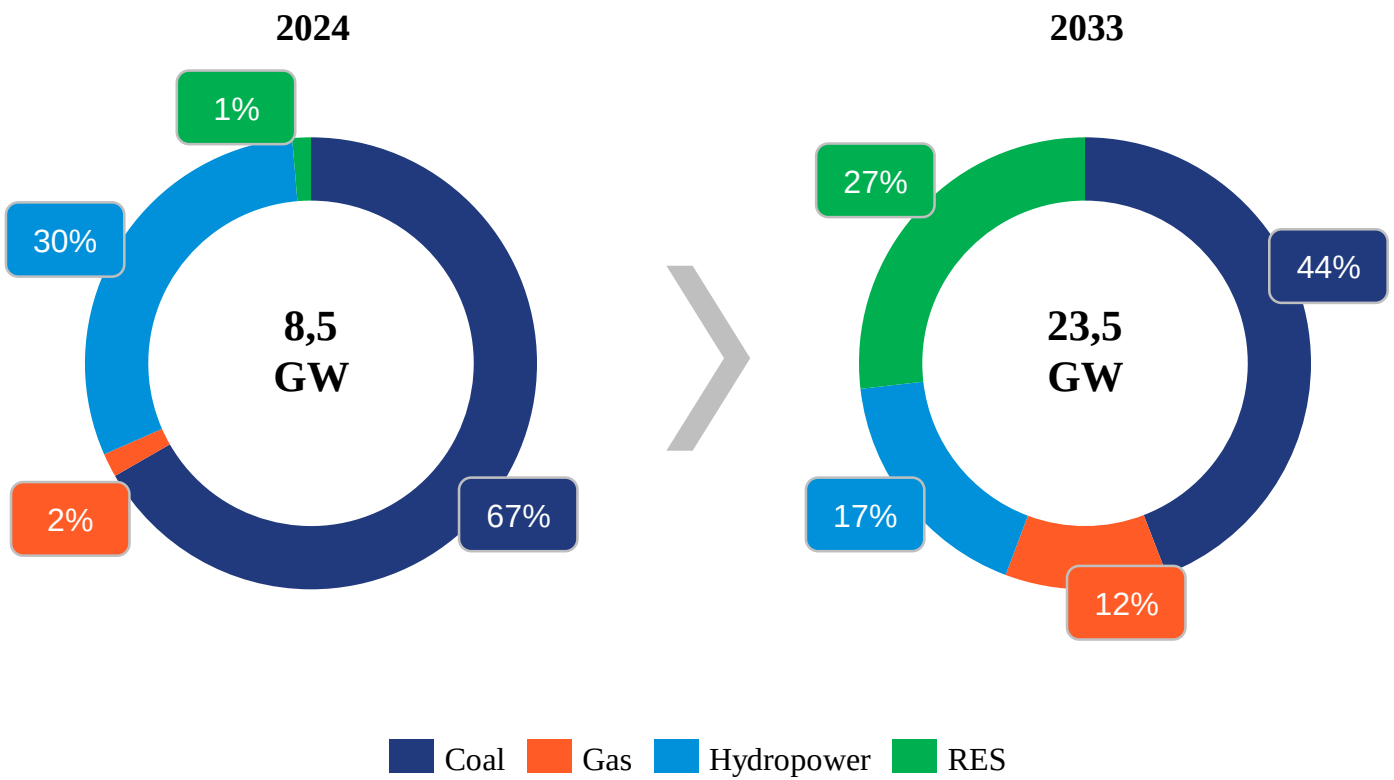


JSC "Samruk-Energy“ has defined a list of infrastructure projects for the next 10 years.

The implementation of these projects will increase the installed capacity of JSC "Samruk-Energy" **by 2.8 times, from 8.5 GW in 2024 to 23.5 GW in 2033**, representing an increase of 15 GW.

JSC "Samruk-Energy" will become a driver of changes in the industry regarding the volume and structure of generation

Structure of installed capacity of JSC "Samruk-Energy"
GW, 2024-2033



The implementation of planned projects will enable JSC "Samruk-Energy" to become a driver of the ecological agenda

Accelerated development of the industry through the implementation of renewable energy projects, gas generation projects, and hydropower projects will allow for a change in the current generation structure and align it with the target structure at the national level