

# ENVIRONMENT

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We recognize our responsibility for complying with environmental regulations in the regions where we operate and for protecting the environment, so we strive to improve our performance every day and are ready to respond to future challenges and opportunities

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## Why is this important to us?

We are committed to improving our environmental performance to minimize the negative impacts of our operations and stand ready to respond to future challenges and opportunities to ensure the well-being of current and future generations.



### Our goals and objectives:

- Share of RES and HPPs in electricity generation 26% by 2032 (from the level of 2021)
- Formation of a portfolio of offset projects of 5.8 million tons of CO<sub>2</sub>-eq by 2032 (from the level of 2021)
- Achievement of zero regular flaring at oil and gas producing assets
- Development at the level of the Fund of unified approaches to managing risks of impact on biodiversity and information disclosure
- Development of Water Resources Management Programs

Material topics	Impact type	Direct impact	Indirect impact
Energy	-	●●●	
Water and Effluence	-	●●●	
Biodiversity	-	●	●●
Emissions	-	●●●	
Local Communities	+-	●●	

**Impact type:** + positive – negative

### Materiality level:

- strong
- average
- low

We acknowledge our responsibility for complying with environmental standards in the regions of our presence and for environmental conservation. Therefore, we strive to improve our performance every day and are prepared to respond to future challenges and opportunities. [GRI 413-1](#)

We engage in systematic efforts to interact with the population on environmental protection matters. We share the core principles of the precautionary approach (Principle 15 of the UN Rio Declaration on Environment and Development, 1992). Before commencing new projects and facilities, we conduct comprehensive Environmental Impact Assessment (EIA) to inform the public about the planned activities and their potential impact. This allows us to identify public opinions and to take them into account during the assessment process. We ensure that all stakeholders have access to draft EIA projects, including the acceptance and registration of comments and suggestions. Information is made available on local government websites and in the media to inform the public about planned measures. [GRI 3-3](#)

## GREENHOUSE GAS EMISSIONS

According to the latest available data, the contribution of the Fund's portfolio companies to direct greenhouse gas emissions nationwide is estimated at 14.7%, with CO<sub>2</sub> (carbon dioxide) emissions accounting for 15.6% of the country's CO<sub>2</sub> emissions.

In 2022, the Fund Group's carbon footprint (direct and indirect greenhouse gas emissions) was 60.9 million tonnes CO<sub>2</sub>-eq.<sup>16</sup> However, the Fund's carbon footprint data does not include installations not covered by the quota system, and indirect emissions data may not be complete due to a lack of reporting requirements for indirect emissions data.<sup>17</sup>

Direct emissions were 50.7 million tonnes CO<sub>2</sub>-eq. [GRI 305-1](#) Indirect emissions were 10.2 million tonnes CO<sub>2</sub>-eq. [GRI 305-2](#) Direct emissions were 10.9 million tonnes CO<sub>2</sub>-eq below the 2021 level, and indirect emissions were 0.3 million tonnes CO<sub>2</sub>-eq below the 2021 figure. [GRI 305-4](#) The greenhouse gas intensity indicator was 108.9 tons of CO<sub>2</sub>-eq. per million tenge of revenue, which is 27.5% lower than in 2021. These changes are related to revision of methodology for calculation of methane emissions in the reporting year.<sup>18</sup>

Direct CO<sub>2</sub> (carbon dioxide) emissions decreased by 1.1% from the 2021 level to 44.9 million tonnes CO<sub>2</sub> (45.4 in 2021), which is a result of a number of initiatives to reduce greenhouse gas emissions. [GRI 305-1](#), [GRI 305-5](#)

The Kazakhstan Emissions Trading System covers 14 subsidiaries and affiliates of JSC NC KazMunayGas group (installation operators), which are included in the National Plan of Allocation of Greenhouse Gas Emissions Quotas. The operators of installations develop annual greenhouse gas inventory reports, which are subject to verification by an accredited independent organization. Quota installations have obligations to reduce greenhouse gas emissions under the national greenhouse gas emission trading system. Quota installations account for 34 million tonnes of CO<sub>2</sub>.

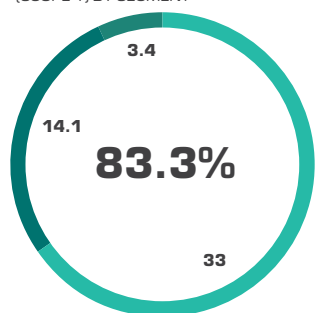
<sup>16</sup> According to the Concept of low-carbon development of the Fund, the carbon footprint in 2021 was 75 million tons of CO<sub>2</sub>-eq, which is associated with a more comprehensive coverage of the Concept of all sources of greenhouse gas emissions, as well as the use of a different methodology for calculating and accounting for methane emissions.

<sup>17</sup> Data presented for 2020, the Strategy for achieving carbon neutrality of the Republic of Kazakhstan by 2060

<sup>18</sup> Significant changes in the volume of greenhouse gas emissions are associated with a revision of the methodology and scope of calculation, in accordance with the Low-Carbon Development Concept of the Fund. According to the Concept of low-carbon development of the Fund, the carbon footprint in 2021 was 75 million tons of CO<sub>2</sub>-eq.

**FIGURE № 8 GREENHOUSE GAS EMISSIONS (CARBON FOOTPRINT AND BREAKDOWN OF DIRECT AND INDIRECT EMISSIONS)**

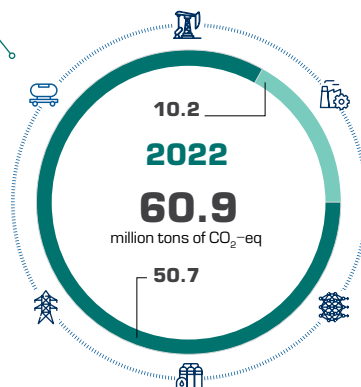
**DIRECT GREENHOUSE GAS EMISSIONS**  
(SCOPE 1) BY SEGMENT



- Electric power sector 33 million tons of CO<sub>2</sub>-eq (40.3 million tons of CO<sub>2</sub>-eq in 2021)
- Oil and gas sector 14.1 million tons of CO<sub>2</sub>-eq (18 million tons of CO<sub>2</sub>-eq in 2021)
- Transport and logistics sector 3.4 million tons of CO<sub>2</sub>-eq (3.1 million tons of CO<sub>2</sub>-eq in 2021)

- 65%** of direct emissions are from the electric power sector
- 83%** of direct emissions are from stationary sources of fossil fuel combustion, including flaring
- 8%** of direct emissions come from emissions from industrial processes

**CARBON FOOTPRINT OF THE FUND**  
MILLION TONS OF CO<sub>2</sub>-EQ.



- Direct greenhouse gas emissions
- Indirect greenhouse gas emissions

**INDIRECT GREENHOUSE GAS EMISSIONS**  
(SCOPE 2) BY SEGMENT



- Oil and gas sector 3.3 million tons of CO<sub>2</sub>-eq (3.4 million tons of CO<sub>2</sub>-eq in 2021)
- Transport and logistics sector 3.2 million tons of CO<sub>2</sub>-eq (3.2 million tons of CO<sub>2</sub>-eq in 2021)
- Electricity sector 2.6 million tons of CO<sub>2</sub>-eq (2.9 million tons of CO<sub>2</sub>-eq in 2021)
- Mining and metallurgical sector 0.86 million tons of CO<sub>2</sub>-eq (0.87 million tons of CO<sub>2</sub>-eq in 2021)
- Telecommunications sector

**100%** of indirect emissions are emissions from purchased electricity (market method) million tons of CO<sub>2</sub>-eq

The largest contribution to indirect emissions is made by oil and gas, transport and logistics and electric power sectors

In accordance with the structure of the Fund activities, international requirements and guidelines for the disclosure of information on greenhouse gas emissions, the emissions are assessed in the following aspects:

- direct greenhouse gas emissions associated with the combustion of hydrocarbon fuels and substances, unavoidable volatile emissions (leaks), the operation of any production facilities and ongoing production processes — Scope 1 emissions (also for reporting purposes in accordance with the guidelines);

- indirect energy emissions related to the consumption of electricity, heat, hot water and steam supplied from outside — Scope 2 emissions;
- Scope 3 emissions – all other greenhouse gas emissions arising in the company's value chain, namely emissions from the use of sold products (category 11 – Use of Sold Products). Portfolio Companies of the Fund, such as JSC NC KazMunayGas and JSC NAC Hazatomprom, are already calculating greenhouse gas emissions under Scope 3. JSC NC KazMunayGas discloses information on category No.11

“Use of Sold Products”. A phased development of Scope 3 reporting is also planned in other subsidiaries of the Fund. [GRI 305-3](#)

Greenhouse gas emissions are calculated according to Order No. 280-n dated November 05, 2010 “On Approval of Some Greenhouse Gas Emissions Calculation Methodologies”, Order No. 9 of the Minister of Ecology and Natural Resources of the Republic of Kazakhstan dated January 17, 2023 “On Approval of Greenhouse Gas Emissions and Absorption

Calculation Methodologies”, Order No.221 of the Minister of Energy of the Republic of Kazakhstan dated March 19, 2015 “On Approval of the Greenhouse Gas Inventory Monitoring and Control Rules”, Order No. 502 of the Acting Minister of Energy of the Republic of Kazakhstan dated July 28, 2015 “On Approval of Greenhouse Gas Inventory Report Forms”, Order No. 371 of the Minister of Ecology, Geology and Natural Resources of the Republic of Kazakhstan “On Approval of Greenhouse Gas Emissions and Absorption Calculation Methodologies” dated September 13, 2021, “Guidelines for IPCC National Greenhouse Gas Inventories”. [GRI305-1](#) [GRI305-2](#)

The main greenhouse gases issuers of the Fund are electricity and heat generation sector (54.2%) and hydrocarbon exploration, extraction, transportation, refining sector (28.6%). The scope of information disclosure on greenhouse gas emissions includes Portfolio Companies under the operational control of the Fund, and which are subject to national regulation in the field of greenhouse gas emissions of the Republic of Kazakhstan. The inventory boundaries did not include foreign assets, as well as Portfolio Companies under the financial control of the Fund. [GRI305-1](#) [GRI305-2](#)

## ATMOSPHERIC AIR QUALITY

As of the end of 2022, the total amount of pollutants in the Fund group amounted to 608.7 thousand tons, 1.1% decrease (615.3 thousand tons) in relation to 2021. [GRI305-7](#)

The electricity and heat production sector accounts for 59% of pollutant emissions (or 358.1 thousand tons), which is 0.08% higher than the level of 2021 (357.7 thousand tons in 2021). The specific emissions of pollutants in this sector are decreasing annually: by the end of 2022, 2% decrease was achieved as compared to the indicator of 2021 due to growth of the share of renewable energy generation and hydroelectric power plants, gas HPP-1 (per unit of electricity generated).

The main share of the consumed electricity of electricity and heat generation sector is produced using fossil fuels. As a result of fuel combustion, greenhouse gases enter the air, affecting climate change. In 2022, the volume of direct CO<sub>2</sub> (carbon dioxide) emissions by the sector amounted to 32 million tons of CO<sub>2</sub>-eq, which is 3% lower than in 2021. The volume of specific emissions also decreased by 0.02 million tons of CO<sub>2</sub>/million kWh as compared to 2021 and amounted to 0.8 million tons of CO<sub>2</sub>/million kWh.

The production activities of hydrocarbon exploration, extraction, transportation, refining sector is also related to the use of fossil fuels. In 2022, the volume of direct CO<sub>2</sub> (carbon dioxide) emissions of the sector amounted to 9.8 million tons of CO<sub>2</sub>-eq. and increased by 3.1% as compared to the indicator of 2021. The specific volume of greenhouse gas emissions by hydrocarbon exploration, extraction, transportation, refining sector amounted to 0.0003 million tons of CO<sub>2</sub> per 1,000 tons of oil equivalent of CHC.

In 2018, JSC NC KazMunayGas announced its participation in the CDP initiative, an international community of investors to

In the oil and gas production and refining sector, at the end of 2022, the total amount of pollutants amounted to 120.6 thousand tons, having increased by 9.4% (110.2 thousand tons) since 2021. The share of this sector from the Fund is 20% in 2022. Increase in pollutant emissions in the oil and gas production and processing sector in 2022 is due to increased energy consumption in view of the entry into the nominal mode of Kalamkas GTPP after major repairs, as well as increase in oil refining by 20% for Petrokazakhstanoil Products LLP.

The gas transportation sector accounts for 20% of the Fund pollutant emissions (in 2021-23%). The volume of pollutants

disclose information about direct and indirect greenhouse gas emissions and risks associated with climate change, including the assessment of the entire carbon footprint of commercial products from the well to its final use. In July 2022, the Climate Questionnaire of JSC NC KazMunayGas for 2021 was published on the CDP site, which includes data on the volumes of direct and indirect greenhouse gas emissions for all the company assets, including subsidiaries in Romania and Georgia. The CDP international climate rating is also in NAC Kazatomprom JSC's plans for 2023.

The share of greenhouse gas emissions of the other subsidiaries is insignificant. The figures for all portfolio companies can be found in Annex 9.

We do not have significant emissions of ozone-depleting substances that affect climate change in our operations; therefore, this indicator is not consolidated at the Fund level. Periodic controls and monitoring are carried out. Climate change issues require risk identification and mitigation measures. [GRI305-6](#)

amounted to 123 thousand tons, having decreased by 11.4% (139 thousand tons) since 2021.

The rail transport sector accounts for 0.8% of the Fund pollutant emissions. By the end of 2022, emissions decreased by 18.7% from 6.4 thousand tons to 5.1 thousand tons as compared to 2021. The annual reduction of emissions is achieved through the introduction of new diesel locomotives, the purchase of new passenger cars with combined heating, the transfer of boiler rooms from solid to gaseous fuel and the connection of heating of industrial buildings to electric heat supply.



**TABLE № 9. TOTAL EXPENSES AND INVESTMENTS IN ENVIRONMENTAL PROTECTION BY TYPE OF ACTIVITIES, KZT MILLION**

Type of activities	2021	2022
Technologies implementation	4 579.8	1 150.7
Energy efficiency	184.4	920.7
Research and development	727.6	890.7
Emissions payments	13 716.6	13 747
Other	36 100.1	39 575

The mining and processing sector accounts for less than 1% of the Fund pollutant emissions. By the end of 2022, the total amount of pollutants in the sector amounted to 1.4 thousand

tons, 5% decrease as compared to the indicator of 2021 (1.5 thousand tons) due to the equipping of emission sources with additional installations for cleaning gaseous substances and improving the efficiency of existing gas cleaning equipment, and a reduction in production volumes.

The share of pollutants in the remaining Portfolio Companies of the Fund is less than 1%. [GRI.305-7](#)

To reduce the impact on the environment, funds are allocated annually for its protection. In 2022, total expenses and investments in environmental protection amounted to KZT56 284 million, which is 1.8% increase in expenditures for 2021.

## Further growth areas

We plan to continue implementing measures aimed at reducing emissions of pollutants: modernization of technological equipment, introduction of energy-saving technologies, optimization of heat generation and consumption, as well as the development of our own low-carbon generation sources, as well as the use of the best available techniques (clean coal technologies, as well as emission capture technologies).



# ENERGY EFFICIENCY MANAGEMENT

One of the key directions in achieving our goals in the field of low-carbon development is the most rational use of fuel and energy resources. In this regard, we pay great attention to improving energy efficiency and energy and resource conservation in all Portfolio Companies. The Fund has adopted an Energy and Resource Conservation Program until 2027, which defines the goals and objectives of the Fund group in the field of energy and resource conservation and energy efficiency improvement, as well as sets priorities and principles for the implementation of energy conservation and energy efficiency measures. [GRI 3-3](#)

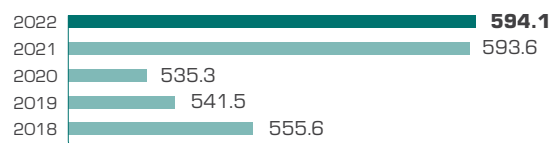
The total energy consumption within the Fund in the reporting year amounted to 594.1<sup>19</sup> million GJ, as compared with 2021 there is a slight increase of 0.08%. Over the period 2018–2022, there was increase in the level of consumption of energy resources by 6.9%, due to growth of electricity production at coal-fired power plants of Samruk-Energy JSC, the launch of the Karabatan gas turbine power plant of Karabatan Utility Solutions LLP, increased consumption of gas for own needs and process losses, resulting in increased consumption of coal and natural gas. [GRI 302-1](#)

In the structure of energy consumption from non-renewable sources according to the Fund in 2022, coal occupies about 55%, gas – 18% (including natural gas – 15%, other types – 3%), liquid fuel – 8% (including diesel fuel – 5%, other types – 3%), refinery gas and electricity from external sources – 7% each. [GRI 302-1](#)

The largest consumption of energy resources falls on the electricity and heat production sector – 57% (340.2 million GJ in 2022), due to the specifics of the company activities. The basis of consumption is coal from the Bogatyr mine, the consumption of which for the production of electric and thermal energy at the Fund coal-fired power plants exceeds

18 million tons of coal per year. The energy intensity of the electricity and heat production sector in the reporting year was 9.5 GJ/thousand kWh. [GRI 302-3](#)

**FIGURE №9. TOTAL ENERGY CONSUMPTION, MILLION GJ**



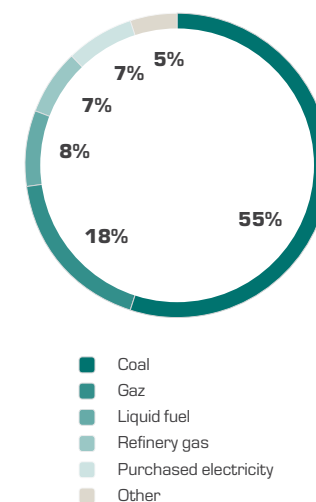
The oil and gas refining sector accounts for 12% (68.6 million GJ in 2022) of the total consumption of the Fund energy resources. The energy intensity of the sector is 3.8 GJ/tonne of refined oil (gas). The oil and gas exploration and production sector consumes about 10% (58.2 million GJ in 2022), the oil and gas transportation sector consume 8% (49.5 million GJ in 2022) of the total consumption of the Fund energy resources. In the oil and gas exploration and production sector, the energy intensity was 2.8 GJ/tonne of produced CPC, in the oil and gas transportation sector – 0.7 GJ/tonne of transported oil (gas). [GRI 302-3](#)

The share of the railway transportation sector is 7% (40.9 million GJ in 2022) of the total consumption of the Fund energy resources. On the balance sheet of JSC NC Kazakhstan Temir Zholy there are more than 16 thousand km of railway tracks and about 1.7 thousand locomotives. Electric power from external sources (29% – 11.8 million GJ in 2022) and diesel fuel (64% – 26.4 million GJ in 2022) are consumed for train traction, which in total is about 93% of the total consumption of the sector. The rest of the sectors account for 7% of total energy consumption.

Energy consumption from renewable sources in 2022 amounted to 96 thousand GJ, of which 43 thousand GJ is purchased one, 53 thousand GJ is own production. [GRI 302-1](#)

As part of the ongoing work on energy and resource conservation and energy efficiency improvement in 2022, the total amount of energy saving amounted to 16.5 million GJ. The sector of electricity and heat production has carried out 58 measures aimed at reducing the consumption of fuel and energy resources, which has saved more than 14.2 million GJ of fuel. By the end of 2022, the consumption of electric energy by the sector decreased by 2% as compared to last year, and the consumption of thermal energy also significantly decreased as compared to last year (by 7%). [GRI 302-4](#)

**FIGURE №10. ENERGY CONSUMPTION FROM NON-RENEWABLE SOURCES IN 2022, %**



<sup>19</sup> This indicator does not include technological losses of gas.



In sectors of refining, exploration and production and transportation of oil and gas, more than 49 measures have been carried out this year under the Low-carbon Development Plan, the estimated annual savings of fuel and energy resources amounted to 2.1 million GJ.

## Further growth areas

Our main objectives in the field of energy conservation until 2027 are:

- reducing the energy intensity of the products of five large companies of the Fund by 10% by 2027 (from the base year 2021), which will ensure the solution of the problem of reducing the energy intensity of the gross domestic product of the Republic of Kazakhstan;
- continuous improvement of the energy efficiency of production processes based on effective process management and the use of innovative technologies and equipment;
- creation of optimal organizational and economic conditions for achieving the Program targets;
- efficient use and reduction of consumption of fuel, energy and water resources;
- implementation of the system of energy efficiency indicators of the energy management system.

In the electricity and heat generation sector, the construction of new coal-fired generation facilities and the modernization of existing stations assumes that the main and auxiliary equipment of the new stations will be installed given the use of the latest energy-efficient technologies in order to reduce the specific costs of conventional fuel, which will subsequently affect the reduction of greenhouse gas emissions.

As part of the implementation of the Energy Transition Program of Samruk-Energy JSC for 2022–2060, the sector is working to increase the share of renewable energy sources in the generation structure. The goal of the Program is to reduce net carbon footprint of Samruk-Energy JSC by 2060.

In order to achieve the target indicator on reducing the carbon footprint and meeting the growing demand for electricity, it will be necessary to implement a number of new wind and hydroelectric power plants with a total capacity of about 6,000 MW. By 2060, Samruk-Energy JSC plans to build about 200 MW of solar generation, as well as the construction of a pilot project of a geothermal power plant with a capacity of 20 MW. Samruk-Energy JSC also plans to study the prospects for the development of hydrogen energy to reduce the carbon footprint as a universal secondary energy carrier.

In sectors of refining, exploration and production and transportation of oil and gas, a Low-carbon Development Program was developed for the period 2022–2031, within the framework of which the following energy saving goals were set, in particular:

- harmonization of the automated energy management system with the production process;
- implementation of an energy efficiency improvement policy with motivation tools for employees of JSC NC KazMunayGas to make rationalization proposals;
- optimization of the regulatory and technical base in the field of energy consumption and resource conservation.

As part of the Low-Carbon Development Program for the period 2022–2031, JSC NC KazMunayGas also plans to develop the use of renewable energy sources.



# CONSERVATION OF BIODIVERSITY

One of the most important challenges to modern humanity is the steady decline of biological diversity on the planet. Among scientists, it is customary to talk about the Sixth extinction of species caused solely by the results of human activity. The 15<sup>th</sup> meeting of the Conference of Parties to the UN Biological Diversity Convention (COP15) held in Canada in 2022, which resulted in the signing of the Kunming-Montreal Framework Program in the field of biodiversity, is considered to be a key event that determined the relevance of biological diversity issues for the world community in the coming years.

The investment market has also demonstrated significant increase in attention to these issues. Thus, the work of the Taskforce on Nature-related Financial Disclosures (TNFD), which unites financial institutions, corporations and market service providers managing a total of USD20 trillion, was intensified. The world's leading rating agencies have also begun to adapt their products to the issues of biodiversity conservation. For example, the rating agency, MSCI, has developed solutions for geoinformation analysis of biodiversity risks.

Having a large volume of production assets and a wide geographical presence in regions of Kazakhstan, the Fund considered it necessary to keep up with global trends and put the conservation of biological diversity among the important priorities. Despite the absence of a unified strategy in the field of biodiversity conservation for the Group of Companies in 2022, this issue is under the close attention of the Fund's management as part of the disclosure processes in the sustainability reporting.

At the same time, we have been paying attention to the issues of biological diversity since 2017. In 2022, some Portfolio Companies of the Fund Group, such as Kazakhtelecom JSC, JSC NAC Hazatomprom, developed and approved guidance documents on managing impacts on biodiversity.

In this report, we begin the practice of disclosing a consolidated position on the impact on biodiversity. In the future, we intend to pay as much attention as possible to the assessment of risks and opportunities associated with the conservation of biodiversity. [GRI 3-3](#)

## POTENTIAL IMPACT IN THE AREAS OF OPERATION AND BY TYPE OF ACTIVITY [GRI 304-1, 304-2](#)

The companies of the Fund Group have different scales, areas of activity and geographical presence. In view of this circumstance, the possible ways of the impact of the Fund Group's activities on biodiversity may vary greatly.

### Significant linear infrastructure

The Fund Group is cumulatively present in all regions of the Republic of Kazakhstan. First of all, this applies to companies with extensive linear infrastructure. In particular, the main oil and gas pipelines of KazTransOil JSC and QazaqGaz JSC, the main overhead power transmission lines of KEGOC JSC, overhead power transmission lines of

electric power distribution companies of Samruk-Energy JSC, railway tracks of JSC NC Kazakhstan Temir Zholy, cable telecommunication networks of Kazakhtelecom JSC are laid along many, and in some cases, in all regions of Kazakhstan. Such infrastructure affects, as a rule, forest-steppe, near-water, steppe, semi-desert and desert biotopes, which are found mainly on shallow, hilly and flat terrain.

The infrastructure of some of these Portfolio Companies and/or their subsidiaries runs near or through significant areas for the conservation of biodiversity: key biodiversity territories, key ornithological territories or specially protected natural territories.

The main aspects of the negative impact of Portfolio Companies with significant linear infrastructure on biodiversity are:

- obstruction of railway tracks, artificial fences, embankment dams, expressways to the migration routes of ungulate mammals;
- death of animals on railway tracks and highways;
- death of birds from electric shock on medium-power overhead power lines and substation equipment under operating voltage;
- death of birds from collisions with overhead power lines, as well as during maintenance work on these lines.

Portfolio Companies of the Fund recognize the listed risks and implement measures aimed at minimizing them.



For example, in order to minimize death of birds from electric shock on overhead lines, Portfolio Companies are working on the installation of bird protection devices, as well as planned retrofitting of 6-10 kV overhead lines with pin insulators on overhead lines made with self-supporting insulated wire (SIW-3).

Also in 2022, the Scientific and Technical Council of the Fund approved the research project of JSC NAC Hazatomprom – Comprehensive Studies on the Bird Protection from the Power Lines Effect at Enterprises of JSC NAC Hazatomprom. This project was the first scientific project in the Fund group of companies, which is aimed at reducing death of birds on overhead lines.

### **Oil and gas production fields**

Oil and gas producing enterprises, as well as enterprises that render them services are included in the separate category of the Fund Group. Oil and gas producing companies included in the Fund group are stationary and located mainly in western regions of Kazakhstan, in desert and semi-desert biotopes. Some deposits are located in the Caspian Sea and represent a special group of risks to biodiversity.

Thus, the water area of the eastern part of the Northern Caspian Sea with its wetlands and deltas of the Volga rivers (within the Republic of Kazakhstan), the Urals and the Emba, as well as the adjacent coast and the water area of the sea itself, are the most important lands on the Eurasian continent and are included in the state protected area in the northern part of the Caspian Sea. These lands ensure the existence of millions

of waterfowl and near-water birds during nesting, molting, seasonal migrations and wintering. One of the largest in Eurasia, the Siberian-Black Sea-Mediterranean Flyway, runs through the Northern Caspian.

The main aspects of the negative impact of oil and gas companies on biodiversity are:

- a concern factor for caspian seals;
- mechanical contamination of birds and seals with oil and petroleum products;
- harm to ichthyofauna and seals as a result of accidental/ unauthorized releases of toxic substances into the Caspian Sea;
- toxic effect of petroleum hydrocarbons on open evaporation fields;
- death of near-water birds sitting on evaporation fields;
- death of birds from electric shock on overhead power lines and substation equipment under operating voltage;
- a concern factor in the construction of new wells and related infrastructure;
- degradation of plant communities as a result of the expansion of the fishing road network.

In addition to measures aimed at minimizing risks to biodiversity, the Fund Group also implements compensatory measures in order to compensate for the damage caused. So, the service company, Zhenis Operating LLP, together with Atyrau Sturgeon Hatchery RSE in 2022 carried out work on the cultivation of juvenile sturgeon fish with a weight of 1.5 grams in the amount of 28 123 pcs. for HZT1 406.2 thousand with their subsequent release into the Ural River.



## Mining companies

The Fund Group includes enterprises of the mining sector. These include the mining enterprises of JSC NAC Kazatomprom and JSC NMC Tau-Hen Samruk.

JSC NAC Kazatomprom, which is a shareholder in several uranium mining enterprises in Kyzylorda, Turkestan, Zhambyl and Akmol regions, as well as an energy transmission company with a significant length of overhead lines, in 2022 continued to implement the roadmap for the implementation of the Environmental and Social Action Plan (ESAP), which provides for periodic research work on assessing the impact on biodiversity.

The technology of mining operations (both in open and closed mining operations, as well as in underground borehole leaching) assumes the presence of a risk of negative impact on the existing ecosystem. Among the main aspects of the negative impact are the following:

- the anxiety factor from blasting and drilling operations, light noise, etc.;
- direct damage to existing plant communities;
- unauthorized and emergency discharges, spills of leaching and productive solutions;
- death of animals on commercial roads;
- death of birds from electric shock on medium-power overhead power lines and substation equipment under operating voltage;
- a concern factor in the construction of new wells and related infrastructure;
- degradation of plant communities as a result of the expansion of the fishing road network.

## Electricity generation

Samruk-Energy JSC owns a group of energy companies, most of which are energy-generating companies. Some power plants of Portfolio Companies are located in the immediate vicinity of significant areas for the conservation of biodiversity.

Hydroelectric power plants, an electric grid company, and wind farms can have the greatest potential impact on biodiversity issues. This is largely due to the climatic and physical features of the location of power plants, as well as their functional role. For example, hydroelectric power plants are usually located in the upper reaches of mountain rivers or on dams of reservoirs, where, as a rule, a very rich variety of biological species, both aquatic plants and animals, and terrestrial. In addition, the regulation of the water level in the dam involves periodic revision of the level in the river downstream, if the capacity of the counterregulator is insufficient to maintain a stable level in the river downstream. The location of wind power stations in places with a large wind load in some cases coincide with bird migrations.

The main aspects of the negative impact of hydroelectric power plants and wind power stations on biodiversity are:

- death of ichthyofauna (eggs), aquatic invertebrates, aquatic plants, some waterfowl and near-water birds with significant changes in the water level in rivers and/or other bodies of water;
- death of birds from collisions with wind turbines;
- death of birds from electric shock on medium-power overhead power lines and substation equipment under operating voltage;
- death of birds from collisions with overhead power lines, as well as during maintenance work on overhaul lines.

## Other activities

The Fund group of companies also includes other companies in the transport, construction and service sectors, whose impact on biodiversity has not been assessed now.

## Further growth areas

- Comprehensive scientific research on the study of biodiversity in large Portfolio Companies (JSC NC KazMunayGas, Samruk Energy JSC, JSC NMC Tau-Hen Samruk)
- Development of unified approaches to risk management of impacts on biodiversity and disclosure of information at the Fund level;
- Public assurance procedure;
- Financing of environmental protection measures (sponsorship of certain types);
- Active involvement of NGOs in improving biodiversity management procedures.

## LIST OF AFFECTED AREAS SIGNIFICANT FOR BIODIVERSITY CONSERVATION

**TABLE 10. IMPORTANT BIRD AREAS (IBA) AFFECTED OR LOCATED NEAR THE TERRITORIES OF PORTFOLIO COMPANIES OF THE FUND<sup>20</sup>**

<b>№</b>	<b>IBA</b>	<b>Name of the legal entity</b>	<b>№</b>	<b>IBA</b>	<b>Name of the legal entity</b>
1	KZO06	Intergas Central Asia JSC (JSC NC QazaqGaz)			1. Karatau LLP (JSC NAC Hazatomprom)
2	KZO08	KazTransOil JSC (JSC NC KazMunayGas)			2. LLP JV Budenovskoye (JSC NAC Hazatomprom)
3	KZO09	KazTransOil JSC (JSC NC KazMunayGas)			3. Uranenergo LLP (JSC NAC Hazatomprom)
4	KZO10	Intergas Central Asia JSC (JSC NC QazaqGaz)	17	HZO69	4. Rusburmash-Kazakhstan LLP (JSC NAC Hazatomprom)
5	KZO11	1. KazTransOil JSC (JSC NC KazMunayGas) 2. Isatai Operating Company LLP (JSC NC KazMunayGas)			1. Hazatomprom-SaUran LLP (JSC NAC Hazatomprom)
6	KZO12	Aktau Sea Northern Terminal LLP (JSC NC Kazakhstan Temir Zholy)	18	HZO70	2. LLP JV Akbastau (JSC NAC Hazatomprom)
7	KZO13	KazTransOil JSC (JSC NC KazMunayGas)			3. Uranenergo LLP (JSC NAC Hazatomprom)
8	KZO16	KazTransOil JSC (JSC NC KazMunayGas)	19	HZO71	4. ShalkiyaZinc LTD JSC (JSC NMC Tau-Ken Samruk)
9	KZO17	KazTransOil JSC (JSC NC KazMunayGas)			5. Intergas Central Asia JSC (JSC NC QazaqGaz)
10	KZO18	Intergas Central Asia JSC (JSC NC QazaqGaz)	20	HZO72	1. LLP JV KATHO LLP (JSC NAC Hazatomprom)
11	KZO49	First Wind Power Station (Samruk-Energy JSC)			2. ShalkiyaZinc LTD JSC (JSC NMC Tau-Ken Samruk)
12	KZO56	Ereymentay Wind Power LLP (Samruk-Energy JSC)	21	HZO73	Intergas Central Asia JSC (JSC NC QazaqGaz)
13	KZO63	Intergas Central Asia JSC (JSC NC QazaqGaz)			1. Shardara HPP JSC (Samruk-Energy JSC)
14	KZO65	Intergas Central Asia JSC (JSC NC QazaqGaz)	22	HZO76	2. Intergas Central Asia JSC (JSC NC QazaqGaz)
15	KZO66	Intergas Central Asia JSC (JSC NC QazaqGaz)	23	HZO84	EWP LLP, FWPS LLP (Samruk-Energy JSC)
16	KZO68	1. Karatau LLP (JSC NAC Hazatomprom) 2. Uranenergo LLP (JSC NAC Hazatomprom)	24	HZ103	U.D. Kantayev Moinak Hydroelectric Power Plant (Samruk-Energy JSC)
			25	HZ105	Bogatyr Komir LLP (Samruk-Energy JSC)
			26	HZ108	1. Shulba HPP JSC (Samruk-Energy JSC) 2. Kazzinc LLP (JSC NMC Tau-Ken Samruk)

<sup>20</sup> <http://datazone.birdlife.org/site/mapsearch>.



**TABLE 11. KEY BIODIVERSITY AREAS (KBA) AFFECTED OR LOCATED NEAR THE TERRITORIES OF PORTFOLIO COMPANIES OF THE FUND<sup>21</sup>**

<b>№</b>	<b>KBA</b>	<b>Name of the legal entity</b>
1	19 944	Shardara HPP JSC (Samruk-Energy JSC)
2	19 955	1. LLP JV KATHO LLP (JSC NAC Hazatomprom) 2. ShalkiyaZinc LTD JSC (JSC NMC Tau-Ken Samruk)
3	20 601	U.D. Kantayev Moinak Hydroelectric Power Plant (Samruk-Energy JSC)
4	20 927	1. Ozenmunaigas JSC (JSC NC HazMunayGas) 2. Aktau Sea Northern Terminal LLP (JSC NC Kazakhstan Temir Zholy)
5	21 811	Ozenmunaigas JSC (JSC NC HazMunayGas)
6	21 947	ShalkiyaZinc LTD JSC (JSC NMC Tau-Ken Samruk)
7	21 969	Samruk-Green Energy LLP (Samruk-Energy JSC)
8	21 980	Embamunaigas JSC (JSC NC HazMunayGas)
9	21 986	EWP LLP, FWPS LLP (Samruk-Energy JSC)
10	22 007	HMG-Harachaganak LLP (JSC NC HazMunayGas)
11	22 284	1. Hazatomprom-SaUran LLP (JSC NAC Hazatomprom) 2. ShalkiyaZinc LTD JSC (JSC NMC Tau-Ken Samruk)
12	46 725	U.D. Kantayev Moinak Hydroelectric Power Plant (Samruk-Energy JSC)

<sup>21</sup> <https://www.keybiodiversityareas.org/sites/search>.

<sup>22</sup> According to the annual reports of Portfolio Companies.

<sup>23</sup> According to the annual reports of Portfolio Companies.

<sup>24</sup> According to the annual reports of Portfolio Companies.

<sup>25</sup> According to the survey of Biodiversity Research & Conservation Center (BRCC) Public Fund.

**TABLE 12. AFFECTED OR NEARBY SPTS TO TERRITORIES OF PORTFOLIO COMPANIES OF THE FUND**

<b>№</b>	<b>Name of the legal entity</b>	<b>SPT</b>
1	JSC NC HazMunayGas <sup>22</sup>	1. State Protected Area in the northern part of the Caspian Sea; 2. Ustyurt State Nature Reserve; 3. Kenderli-Hayasan Protected area of republican significance; 4. 8 nature reserves; 5. 1 natural park of regional significance.
2	Intergas Central Asia JSC (JSC NC QazaqGaz) <sup>23</sup>	Syrdarya-Turkestan State Regional Natural Park
3	Bukhara-Ural main gas pipeline (JSC NC QazaqGaz) <sup>24</sup>	Mikhailovsky State Nature Reserve
4	Kazakhstan-China main gas pipeline (JSC NC QazaqGaz)	South Kazakhstan Protected Area
5	EWP LLP, FWPS LLP, U.D. Kantayev Moinak Hydroelectric Power Plant (Samruk-Energy JSC) <sup>25</sup>	1. Buiratau State National Nature Park 2. Charyn State National Natural Park



**BRCC**

Biodiversity Research & Conservation

We are grateful to the Public Foundation “Biodiversity Research and Conservation Center” for providing information and photo material for this report.

# WATER MANAGEMENT

According to the UN, for more than 40% of the world population, the problem of water shortage is urgent and, according to forecasts, will worsen. Currently, more than 1.7 billion people live in river basins where water consumption exceeds the capacity to replenish water supplies.

According to the forecast of the World Resources Institute, Kazakhstan belongs to the countries with an average or high level of water scarcity (20-40%), and by 2040 it will become one of the countries with an extremely high or high level of water scarcity. [GRI 303-2, GRI 3-3](#)

Since 2017, JSC NC KazMunayGas has implemented a Corporate Water Resources Management Standard, which defines 8 key “water” principles and establishes requirements for the activities of member organizations of the JSC NC KazMunayGas group in the field of water conservation and water consumption. The performance of the JSC NC KazMunayGas Group of companies in terms of the use of water resources are consolidated in the corporate center, where the total impact of the Company on water resources is analyzed. In addition, JSC NC KazMunayGas has been disclosing information about the water footprint as part of the Carbon Disclosure Project Water Safety Questionnaire since 2019.

In 2021, JSC NAC Kazatomprom approved the corporate standard “Guidelines for Monitoring of the Impact of Underground Borehole Leaching of Uranium on Subsoil Water and Groundwater”, and uranium mining enterprises have implemented and are monitoring groundwater. The goal of the standard is to establish uniform requirements for monitoring the state of natural waters in the area of the location of uranium deposits of JSC NAC Kazatomprom during the extraction of uranium by the method of underground borehole leaching and upon completion of this process by uranium mining enterprises.

To control the impact on water bodies, we monitor underground and surface water bodies on a quarterly basis. Observation monitoring wells are used for groundwater. We regularly reduce the volume of water taken and increase the recycling of water for surface water bodies. The results of monitoring the impact on sensitive water bodies are brought to the attention of stakeholders quarterly. Issues of water resources regulation in Portfolio Companies are coordinated by environmental departments. [GRI 303-3](#)

## WATER WITHDRAWAL

In 2022, the water withdrawal of Portfolio Companies of the Fund amounted to 304 143 MI (thousand m<sup>3</sup>), which is 38.4% more than the annual water intake of Astana. [GRI 303-3](#)

Our activities have the most significant impact on the water bodies of the western region of Kazakhstan (the Ural, Higach, Kokzhide sands, Pyatimar reservoir); the Sharyn River and the Bestyubin reservoir (Moinak Hydroelectric Power Plant), the Syrdarya River and the Shardara reservoir, the K. Satpayev Canal, the Shiderty Canal (Big Almaty Lake and the basin of the Bolshaya Almatinka River (Cascade of hydroelectric power plants), the Kapshagai reservoir (Kapshagai hydroelectric power plant), the Shu-Sary basin, which represent a special ecological, economic, historical, cultural and recreational value. [GRI 303-1](#)

In 2022, the Fund companies took 205 073 MI (thousand m<sup>3</sup>) of fresh water, which is 67.4% of the total water withdrawal. The water withdrawal of salt water is 99 070 MI (thousand m<sup>3</sup>), 32.3% of the total water withdrawal of the Fund.

In 2022, 83 707 MI (thousand m<sup>3</sup>) were taken for the purposes of oil and gas production and refining, which is 0.8% less than the level of 2021 (thousand m<sup>3</sup>).

The total volume of water withdrawal in the uranium mining and processing sector amounted to 9 188.9 MI (thousand m<sup>3</sup>), which does not exceed 3% in the total volume of water withdrawal of Portfolio Companies of the Fund.

The main volume of water withdrawal is provided by underground water bodies (93.3%).

In 2022, the heat and power generation sector withdrew 211 247 MI (thousand m<sup>3</sup>), which is 133 MI less than the volume of water withdrawal in 2021.

## WATER CONSUMPTION

The Fund is a large-scale consumer of water resources. The total volume of water consumption in 2022 amounted to 304 143 MI (thousand m<sup>3</sup>). [GRI 303-5](#)

The most significant sectors – consumers of water resources in the technological processes of the Fund are: electricity production (58.8% of the total water consumption of the Fund; Samruk-Energy JSC), oil and gas production and processing (17.1%; JSC NC KazMunayGas), thermal energy production (18.6%; Samruk-Energy JSC), uranium mining and processing (does not exceed 2.8%; JSC NAC Kazatomprom). For the purposes of this report, the water consumption of other sectors of the Fund Group is insignificant (2.7%), as well as the consumption of water resources for household purposes. [GRI 303-5](#)

In 2022, 211 247 MI (thousand m<sup>3</sup>) of water was consumed for the production of heat and electricity, which is 69.5% of the total water consumption of the Fund. The water consumption of the heat and electricity production sector decreased by 133 MI (thousand m<sup>3</sup>) as compared to 2021.

In 2022, water consumption by Portfolio Companies in the oil and gas production and refining sector amounted to 83 707 MI (thousand m<sup>3</sup>), which is 27.5% of the total water consumption of the Fund.

In 2022, the uranium mining and processing sector consumed 9 188.9 MI (thousand m<sup>3</sup>), which is 9.2% less than in 2021. The decrease in water consumption is related to the increase in uranium production in 2022.

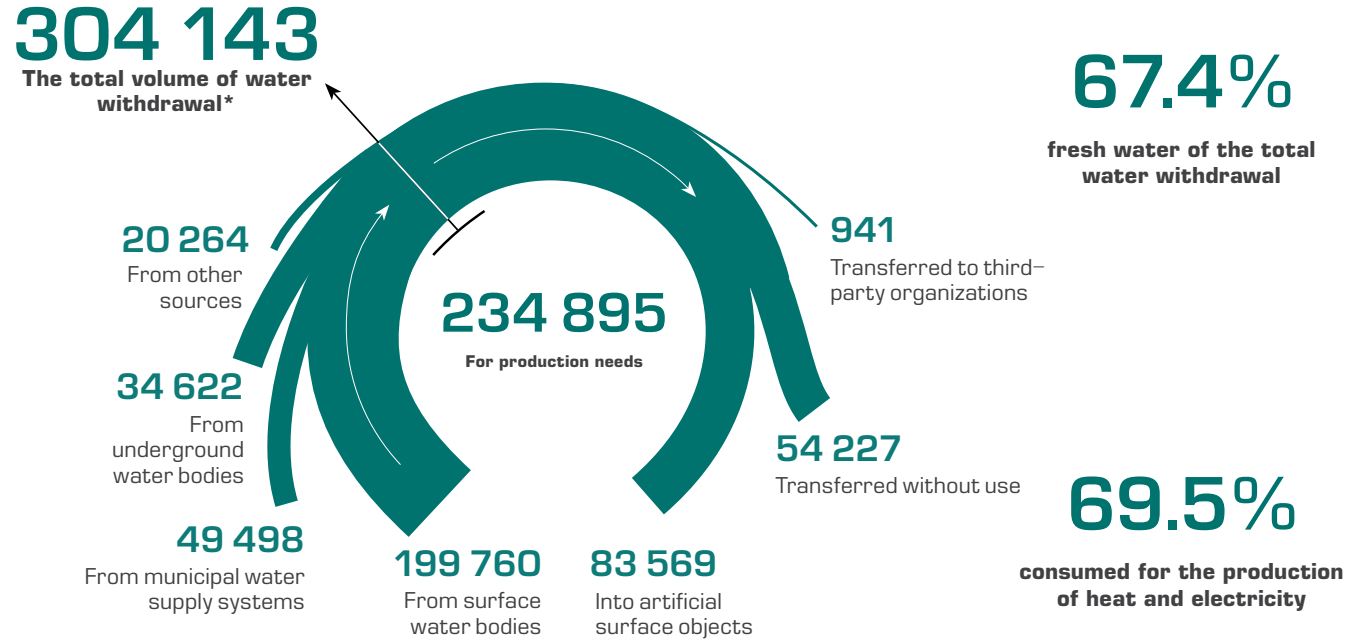
## WATER DISCHARGE

In 2022, 87 926 MI (thousand m<sup>3</sup>) were allocated, which is 1.1% less than in 2021. Of this volume, 83 569 MI (thousand m<sup>3</sup>) was discharge into artificial surface objects (filtration fields, storage pond, evaporation pond, etc.), 941 MI (thousand m<sup>3</sup>) was transferred to third-party organizations. Water is discharged into evaporation ponds; the Fund does not discharge contaminated wastewater into water bodies. Standards of the quality of the diverted water, established by environmental legislation, are achieved using mechanical and biological methods of wastewater treatment. [GRI.303-4](#)

The most significant sources of industrial wastewater generation in the heat and electricity generation sector are the processes of removal and transportation of ash and slag waste to the ash dump through hydraulic ash handling systems, where wastewater is used as an additional transport agent. In 2022, the volume of wastewater discharged amounted to 73 818 MI (thousand m<sup>3</sup>), which is 774 MI (thousand m<sup>3</sup>) and 1% less than in 2021.

The sector of oil and gas production and processing allocated 10 692.3 MI (thousand m<sup>3</sup>) of wastewater. A significant amount of treated wastewater is reused only in the oil and gas refining sector, where 5 522.5 MI was reused in 2022 (6.6% of

**FIGURA № 11. WATER BALANCE OF THE FUND, THOUSAND M<sup>3</sup>**



\* Excluding hydroelectric withdrawal

the total water consumption of Portfolio Companies in the oil and gas production and refining sector; thousand m<sup>3</sup>) of water, which is more by 502.2 MI (thousand m<sup>3</sup>) than in 2021.

The uranium mining and processing sector allocated 3 415.6 MI (thousand m<sup>3</sup>) in 2022, which is 29.2% less than in 2021.

In 2022, the total volume of produced water amounted to 136 519.2 MI (thousand m<sup>3</sup>), 99.2% of which was reinjected for maintaining reservoir pressure. Additionally, small amounts

of water are used to feed fire extinguishing systems, steam generation and household and drinking needs.

The Fund does not return water to natural water bodies. We are focused on the efficient use of water resources, and, as a result, on reducing water withdrawal. For the transparency of this indicator and the possibility of tracking it in the future, we understand that the water withdrawal indicator is equal to water consumption.



## Further growth areas

Water resources management issues are one of the key climate risks for us. In this regard, we have developed an Energy and Resource Conservation Program for 2022–2027, the purpose of which is, among other things, the rational use of water resources. The analysis of Portfolio Companies' data showed a low level of quality of the data obtained by calculation, and not by direct measurements. Therefore, our short-term task is to organize effective technical accounting of energy and water consumption, including automation of data collection and control over water use.

In 2023, it is planned to develop Water Resources Management Programs in JSC NC KazMunayGas and JSC NAC Kazatomprom, the goal of which is to conduct a detailed analysis and identify measures and target indicators to reduce water withdrawal, increase circulating water supply.

In order to find additional opportunities to reduce the loss of water resources, it is also planned to involve personnel in the rational consumption of energy and water resources. [GRI 3-3, GRI 303-1](#)

One of the main environmental measures is the implementation of the TAZALYQ project, within the framework of which the modernization and reconstruction of the mechanical and biological treatment facilities of Atyrau Refinery, as well as the reconstruction of evaporation fields and the channel of normatively treated effluents are carried out.

The desalination plant was commissioned at Karazhanbasmunai JSC in Mangystau region. The plant is designed for processing and utilization of reservoir water and supply of process water in order to increase oil recovery of the Karazhanbas field by steam injection into the reservoir.

Karabatan Utility Solutions LLP produces chemically purified water on the principle of zero liquid discharges for production facilities located in the territory of the National Industrial Petrochemical Technopark in Atyrau Region special economic zone (SEZ). The company provides water treatment and purification of all types of wastewater from technological lines to provide production water, fire water, demineralized water, desalinated water for the technological needs of the Infrastructure of the Integrated Gas Chemical Complex (HPI LLP) and KUS LLP, as well as for the future needs of KLPE LLP, Butadiene LLP.

This process makes it possible to eliminate the discharge of liquid waste into the environment, create a closed water cycle, thereby significantly reducing the need for source river water as a raw material for obtaining desalinated water for the needs of enterprises, and increase the efficiency of the feedstock.



# COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

We are working to identify inconsistencies with the environmental legislation of the Republic of Kazakhstan at production facilities, identify problematic issues and manage risks to take measures to prevent any inconsistencies with legal requirements.

In 2022, the amount of the Fund expenses on environmental protection amounted to HZT 56.3 billion, of which 24% were payments of taxes for emissions, 76% were expenses for environmental protection measures, insurance, compensatory measures in the field of environmental protection, investments to prevent environmental impacts, etc. Investments in the processing of oil waste, since the period of 2015, have increased by 3 times and account for more than a third of all environmental protection expenses in the oil production and refining sector.

The amount of fines paid for violation of environmental legislation amounted to HZT 1 937.2 million. The largest amount of fines in the reporting year falls on the uranium mining and processing sector – HZT1 653.1 million, imposed on LLP JV Inkai due to exceeding the permitted wastewater rate.

The subsidiaries of the oil and gas production and refining sector paid HZT273 million in 2022, including HZT88.4 million for fines imposed in previous years. The subsidiaries carried out work on appealing a number of the orders presented: complaints were partially satisfied, part of the amount of fines was reduced. In the sector, work was also carried out to

identify non-compliance with the environmental legislation of the Republic of Kazakhstan at production facilities, to identify problematic issues and risk management for measures to prevent non-compliance with legal requirements.

In 2022, the main directions of the Fund in the field of compliance with environmental requirements were:

- obtaining or maintaining the validity of all permits required for each project;
- compliance with legal requirements to reduce the risk of potential environmental incidents and sanctions by the competent authorities;
- compliance with the requirements of the Environmental Code of the Republic of Kazakhstan regarding the establishment of automated systems for monitoring emissions of pollutants at 12 facilities that fall under the requirements of item 11 of Chapter 2 “Rules for Maintaining the Automated System for Monitoring Emissions into the Environment during Industrial Environmental Control”. Six facilities owned by Samruk-Energy JSC and six facilities owned by JSC NC KazMunayGas;
- active participation in the work of technical working groups on the development of reference books on Oil and Gas Production, Disposal, Neutralization, and Removal of Waste, including by Thermal Method BATs. Discussions are also being held on the developed manuals on the best available techniques “Oil and Gas Refining” and “Fuel Combustion at Large Plants for Energy Production”.

