



# Environmental

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Environmental management	41
Climate change and energy efficiency	48
Air	71
Water	74
Tailings and waste	78
Soil protection and responsible mining	83
Biodiversity	88

## Nornickel's contribution to the Environment national project

The [Environment national project](#) is aimed at significantly improving the environmental conditions and delivering a positive impact on the health of people in Russia.

### Relevant UN SDGs



### Relevant federal projects:

- Clean Country;
- Clean Air;
- Clean Water;
- Conservation of Unique Water Bodies;
- Biodiversity Conservation and Ecotourism Development;
- Implementing the Best Available Technologies.

## Environmental management priorities

### Waste

#### Key projects

- Clean Norilsk
- Building a crushing unit for construction waste recycling
- Recycling of large tyres and rubber products.

➔ For more details, please see the [Contribution to Combating Contamination with Waste](#) section.

### Water

#### Key projects

- Improving the closed waster circuit
- Preventing pollution from entering rivers
- Cleaning polluted water bodies and their shores.

➔ For more details, please see the [Water](#) section

### Air

#### Key projects

- Sulphur Programme
- Air quality monitoring and forecasting system.

➔ For more details, please see the [Air](#) section

### Biodiversity

#### Key projects

- Big Scientific Expedition
- Cooperation agreements with the Russian Ministry of Natural Resources and Environment.

➔ For more details, please see the [Biodiversity Conservation Efforts](#) section.

### Technology

#### Key projects

Most of Nornickel's projects with a positive environmental effect involve technological advances.

➔ For more details on innovative environmental projects, see the [Research and Development, Digital Technologies](#) section.

### Key results

Waste recovery at Nornickel's sites grew

by **19.5%**  
vs 2021 to **33 mt**

Industrial waste collection in the Norilsk Industrial District

delivered **6.5** X increase  
vs 2021 to **510 kt**

Reuse of waste increased

by **31.8%**  
vs 2021 to **17.8 mt**

### Key results

Total wastewater discharge reduced

by **16.3%**  
vs 2021 to **168.0 mcm**

**13.1** kt  
of wastewater

and **1** kt  
of waste collected  
by trash interceptor vessels

### Key results

**29** stations

installed and put into trial operation  
as part of the air quality monitoring system

### Key results

**Three key regions of operation and a section of the Northern Sea Route** explored during the Big Scientific Expedition

**Aerial survey of polar bears** conducted on Wrangel Island

**Two polar bears rescued from death**

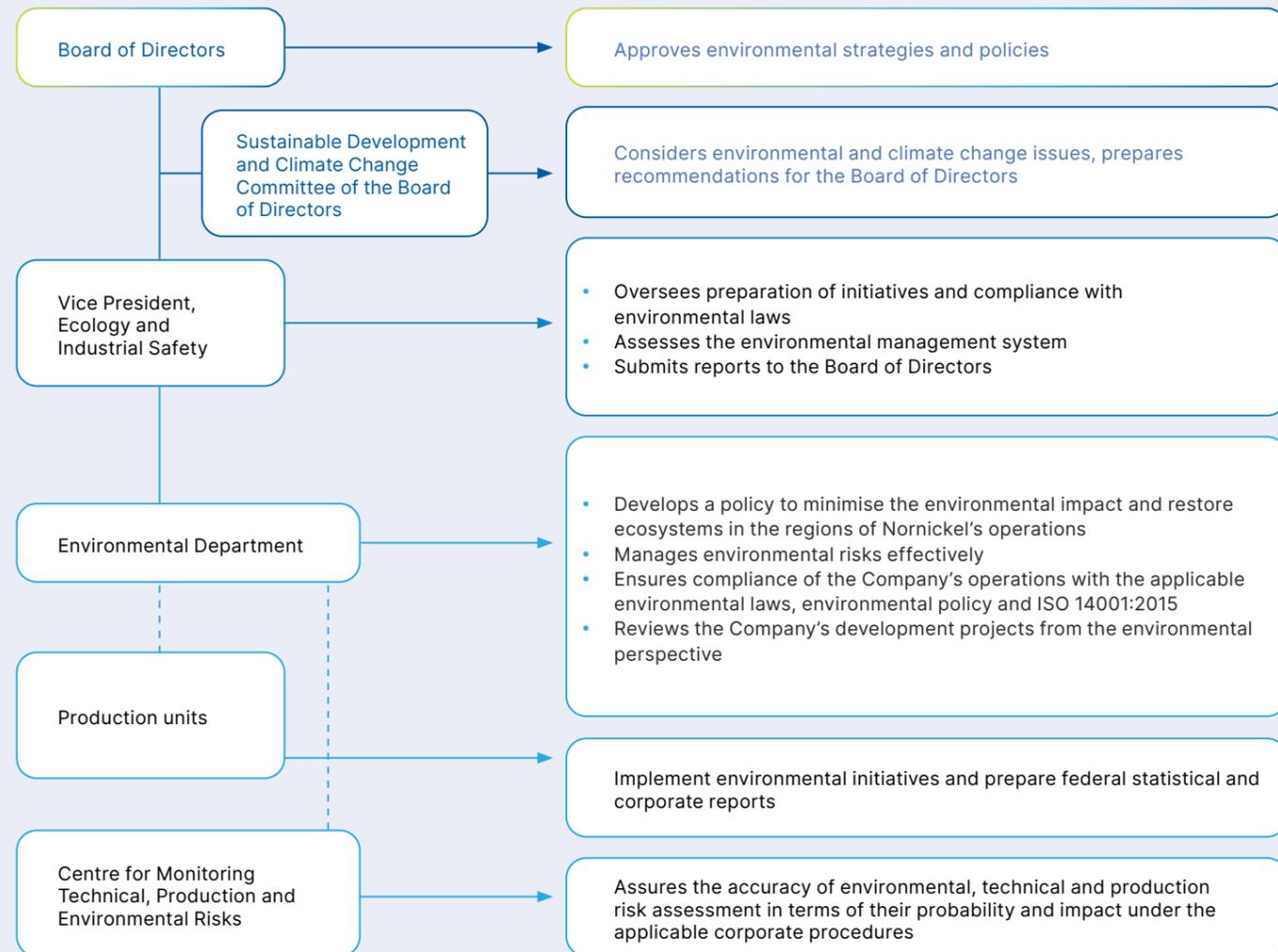
**Gyrfalcon conservation agreement** concluded



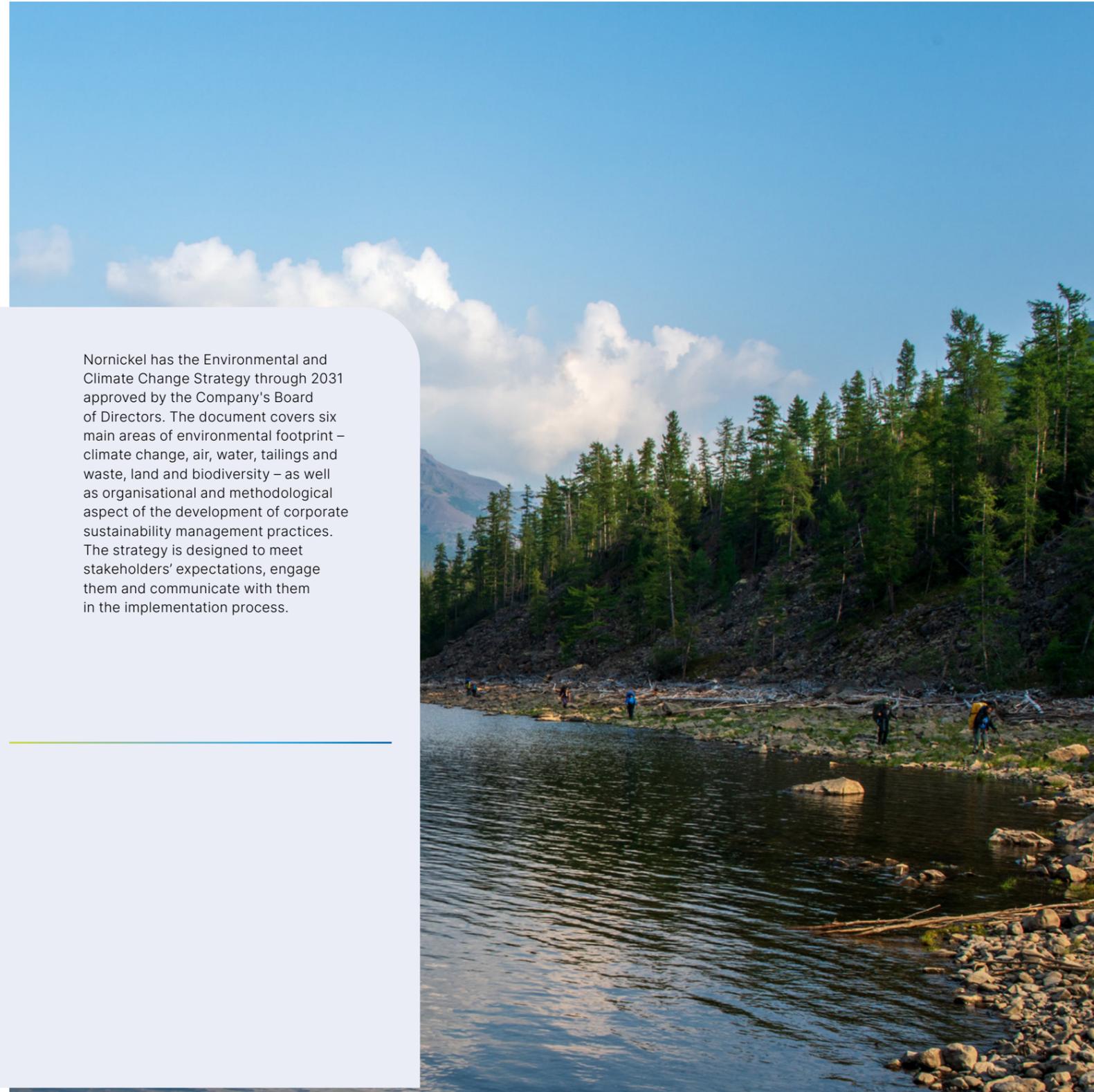
# Environmental management

Nornickel is engaged in ongoing efforts to reduce the negative environmental impact of its operations. Environmental management responsibilities are distributed among different governance bodies of Nornickel in line with their competencies.

GRI 2-12, 2-13, 2-14



Nornickel has the Environmental and Climate Change Strategy through 2031 approved by the Company's Board of Directors. The document covers six main areas of environmental footprint – climate change, air, water, tailings and waste, land and biodiversity – as well as organisational and methodological aspect of the development of corporate sustainability management practices. The strategy is designed to meet stakeholders' expectations, engage them and communicate with them in the implementation process.



Key areas and targets of the Environmental and Climate Change Strategy through 2031

Strategic area	Target indicators	2022 results
Climate change	<ol style="list-style-type: none"> <li>Maintaining absolute GHG emissions from operations (Scope 1 and 2) at around 10 mt of CO<sub>2</sub> equivalent through 2030 while growing production by 30–40% (Ni equivalent vs 2017).</li> <li>Keeping Scope 1 and 2 GHG emissions per tonne of Ni-equivalent in the bottom quartile of global metals and mining industry GHG intensity curve.</li> </ol>	In 2022, absolute Scope 1 and 2 GHG emissions totalled 6.4 mt of CO <sub>2</sub> equivalent, while the Sulphur Programme GHG emissions provision totalled 2.2 mt of CO <sub>2</sub> equivalent <sup>1</sup> .
Air	<ol style="list-style-type: none"> <li>Reducing SO<sub>2</sub> emissions by 85% at Kola Division in 2021 and by 90% at Polar Division in 2025 vs 2015.</li> </ol>	Thanks to the Sulphur Programme implementation, Kola Division's SO <sub>2</sub> emissions declined by 90% vs 2015. Construction and installation continued at Nadezhda Metallurgical Plant and are to be completed by the end of 2023.
Water	<ol style="list-style-type: none"> <li>No interregional or federal emergency situations.</li> <li>Reducing the volume of pollutants discharged by 25% vs 2019 and achieving the maximum permissible emissions rate of 159 kt by 2031.</li> <li>Keeping fresh water withdrawal (excluding mining water) for production needs at the level of 2020 at 120 mcm<sup>3</sup>.</li> <li>Keeping water recycling and reuse rates above 80%.</li> <li>Eliminating the CHP-3 fuel spill consequences and clean-up to normalise the water indicators by the end of 2022.</li> </ol>	<p>In 2022, there were no significant spills. In 2022, there were no interregional or federal emergencies with environmental consequences. Construction was carried out at Nornickel's sites to erect wastewater treatment facilities.</p> <p>The volume of pollutants discharged in 2022 reduced by 12% y-o-y.</p> <p>In 2022, fresh water intake (excluding mining water) for production needs totalled 236.4 mcm<sup>3</sup>.</p> <p>Water recycling and reuse rate was 82% in 2022.</p> <p>The CHP-3 incident clean-up was completed.</p>
Tailings and waste	<ol style="list-style-type: none"> <li>Disposing of 100% of tailings generated by new projects to environmentally safe facilities featuring best-in-class technologies, starting 2025.</li> <li>Eliminating (collection and processing) 100% of accumulated waste.</li> <li>Increasing/maintaining the share of non-mineral waste (other than gypsum) recycling.</li> <li>Increasing/maintaining the share of mineral waste recycling above 30%.</li> <li>Increasing the share of gypsum waste recycling.</li> </ol>	<p>Over the last five years, there have been no environmental incidents at the Company's hydraulic structures.</p> <p>Nornickel collected 510 kt of waste and 32 kt of scrap metal, dismantled 154 facilities, and cleaned more than 1.5 million m<sup>2</sup> of contaminated areas in the Norilsk Industrial District.</p> <p>The technical phase of disturbed land rehabilitation was carried out on an area of 78.8 ha. The project will continue until 2030. Efforts are underway to increase/maintain the share of non-mineral waste recycling.</p>

<sup>1</sup> Excluding GHG emissions from heat and electricity supply to the public.

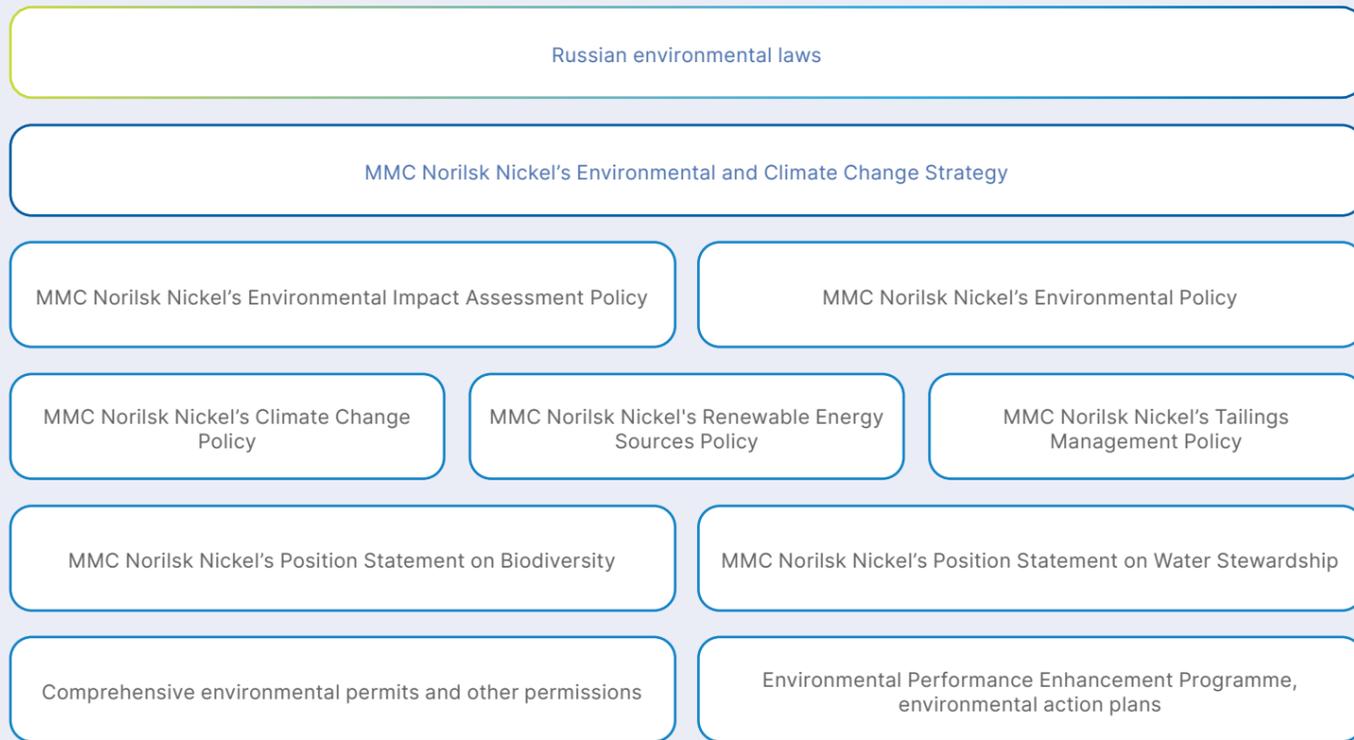
<sup>2</sup> Excluding Energy Division.

<sup>3</sup> Including Energy Division

Strategic area	Target indicators	2022 results
Land	14. Rehabilitation of 117 ha/year of disturbed land and land clean-up in towns and cities near production sites.	In 2022, 362 ha of disturbed land was rehabilitated, including landscaping of 2 ha, reforestation of 285 ha, and reclamation of 75 ha.
Biodiversity	15. Reducing a negative impact on biodiversity, including forest conservation near production sites.	Baseline biodiversity surveys were conducted to collect primary data, and a methodology was developed to determine the target of net zero biodiversity losses as a result of the Company's operations.
Stakeholder expectations, engagement and communications	<ol style="list-style-type: none"> <li>Compliance with the TCFD principles.</li> <li>Compliance with ICM requirements.</li> <li>Compliance with IRMA requirements.</li> </ol>	<ul style="list-style-type: none"> <li>Climate scenarios for the world economy and climate change through 2050 were developed;</li> <li>Scope 3 emissions were measured;</li> <li>methodology to calculate the internal carbon price was developed;</li> <li>rollout of the monitoring solution continued for foundations built on permafrost soils in Norilsk.</li> </ul> <p>Based on the results of the self-assessment, work is underway to develop by-laws and upgrade management practices to meet the requirements.</p> <p>The Company conducted a self-assessment and an independent assessment of its mining assets compliance and readiness for certification.</p>

In addition to the Strategy and divisional programmes, Nornickel relies on a number of environmental regulations.

Key environmental management regulations



Key environmental policies are subject to approval by the Board of Directors, as well as regular review and improvement. Trainings on policies and regulations are held in line with annual (quarterly) training plans of respective units.

When planning its operations and in the course of its production activities, Nornickel complies with the applicable Russian environmental laws and regulations. During a state expert review, design documents and results of engineering surveys for all

the ongoing projects undergo mandatory assessment for compliance with the applicable laws.

Environmental management system

Since 2005, Nornickel has been operating an Environmental Management System. The System enables the Company to harmonise environmental and quality management initiatives with the operations of other functions (such as production management, finance, and safety) and enhance its overall performance along with environmental safety.

The auditors of Bureau Veritas Certification (BVC), an international certification body, conduct surveillance audits once a year and recertification audits once every three years to confirm compliance of the Company's Environmental Management System with ISO 14001:2015. The 2021 recertification audit confirmed the Company's compliance with ISO 14001:2015 and awarded a

certificate for a new (sixth) certification period. The second surveillance audit of the sixth certification period was conducted in November 2022. According to the auditors' conclusions, the Company ensured successful implementation, maintenance, and constant improvement of the Corporate Integrated Management System, and confirmed compliance with ISO 14001:2015.

Precautionary approach

GRI 2-23

Nornickel assesses potential impact of the Company's operations. In accordance with its Investment Project Risk Management Regulations, Nornickel analyses risks and assesses impacts and potential consequences using qualified

expert review during both project planning and implementation. If the analysis identifies any material risks, mitigation initiatives are developed, and a decision may be taken to abandon the project.

Stakeholder engagement on environmental issues

Environmental issues, including efforts to reduce Nornickel's environmental footprint, are constantly on the agenda of the Company and stakeholders. All internal and public events feature environmental discussions.

In 2022, the following items were on the agenda of various forums and platforms:

- implementation of the Environmental and Climate Change Strategy;
- implementation of the Company's environmental programmes and initiatives;
- improvement of environmental laws and regulations;
- decarbonisation and sustainable development;
- sharing of best practices in environmental protection;
- industrial ecology problems;
- results of the Big Scientific Expedition;
- preservation of ecosystems across the footprint of production sites.

In October–December 2022, Nornickel and the Siberian Branch of the Russian Academy of Sciences held a series of public meetings to present the results of biodiversity surveys conducted near the Company's mining, production, energy and logistics facilities. The meetings took the form of a dialogue, with scientists and Nornickel representatives sharing the results of their work and answering all

the questions from those present, while also recording stakeholders' expectations. The public meetings at regional civic chambers were open to all residents and organisations that wished to attend subject to prior registration on the Civic Chamber's platform.

In 2022, Nornickel entered into two agreements with the Russian Ministry of Natural Resources and Environment as part of the federal Biodiversity Conservation and Ecotourism Development project – one to protect the population of an endangered bird species of the Falconidae family, the gyrfalcon, and the other for the conservation and restoration of the polar bear population.

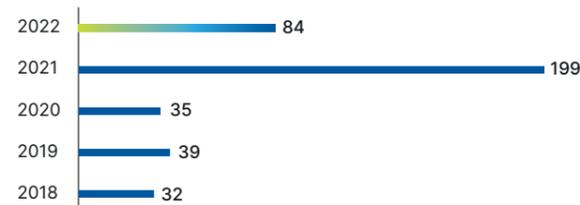
➔ For more details, please see the Biodiversity section.

In the reporting year, Nornickel also signed two agreements with the Federal Service for Supervision of Natural Resources (Rosprirodnadzor) aimed at preserving the environment and ensuring environmental safety. The first agreement provides for the exchange of information and joint implementation of environmental initiatives. The second one relates to a pilot project, first of its kind in Russia, and covers the provision of support and advice by Rosprirodnadzor on Nornickel's high-potential investment projects.

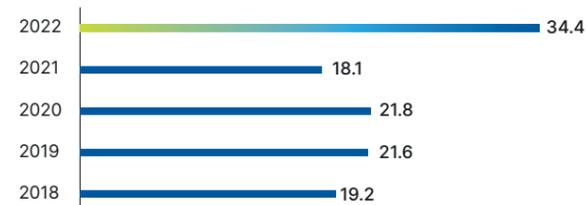


## Environmental protection expenditures

Environmental costs and expenditures, RUB bn

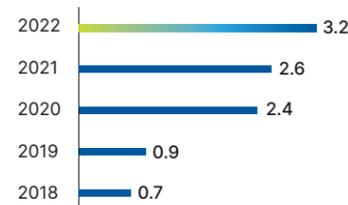


Current environmental expenditures, RUB bn



In 2022, the increase in current environmental expenditures was caused by higher costs of operating the surface backfilling preparation complexes at Polar Division.

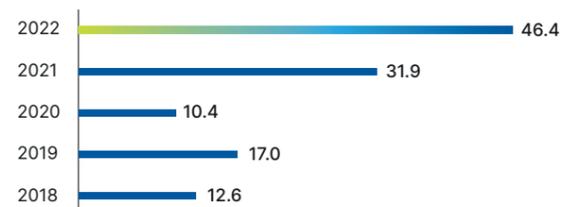
### Charges for permissible and surplus emissions (effluents) and disposal of production and consumption waste, RUB bn



The increase in pollution charges was caused by the recovery of processing volumes of copper and nickel feedstock from Norilsk Division mines after their suspension due to flooding in 2021 and a higher sulphur content in the incoming feedstock.

The charge increase is also due to a greater volume of the disposal of construction and renovation waste generated by the programme on land clean-up

### Capital investments to ensure environmental protection and sustainable use of natural resources, RUB bn



The increase in investments in 2022 is due to the active construction phase at the Sulphur Programme.

### Charges paid by the Company to remedy damages arising from noncompliance with environmental laws (excluding environmental fines)<sup>1</sup>, RUB mln



In 2022, penalties imposed for the damage caused by violation of environmental laws totalled around RUB 236 mln, of which the largest was the charge for damage to water bodies (lakes No. 1 and No. 2 near the Tukhard settlement) resulting from an aviation fuel spill of 2020.

<sup>1</sup> RUB 146 bn paid in 2021 is the fine for the fuel spill at NTEC's CHP-3, which occurred in 2020

# Climate change and energy efficiency

## Approach to climate change

Nornickel realises that climate change is one of the most significant and urgent global issues that poses a high risk to economic activity and society. As a party to the UN Global Compact, the Company fully supports the UN Sustainable Development Goals (SDGs), in particular SDG 13 Climate Action, and actively participates in joint efforts of the international community to combat global warming.

The Company unconditionally shares the principles of the Paris Agreement and supports its implementation in terms of keeping the global average temperature increase below 2 °C and making efforts to limit the increase to 1.5 °C. Nornickel actively engages with the scientific community, supporting and promoting nature and climate studies in the region, creating and expanding the climate monitoring system, and developing and implementing measures to reduce GHG emissions and adapt to climate change.

In developing strategic and regulatory documents and implementing climate change initiatives, Nornickel is guided by recognised international standards for building a corporate governance system and a climate risk management system, as well as standards for climate-related disclosures. These standards and guidelines include:

- TCFD Recommendations;
- GHG Protocol;
- ICMM principles;
- IRMA's Standard for Responsible Mining;
- Global Industry Standard on Tailings Management (GISTM);
- requirements of ESG agencies and ratings (EcoVadis, Sustainalytics, MSCI, CDP);
- recommendations of the Bank of Russia on disclosure by public joint-stock companies of non-financial information related to their operations;
- methodological recommendations and indicators of the Russian Ministry of Economic Development on climate change adaptation.

The Company plans to issue its first public climate change report in 2023. The report will be drafted in accordance with the TCFD Recommendations, and aims to demonstrate the progress made towards achieving the goals of the Paris Agreement. The report will reflect the Company's key projects and initiatives for effective adaptation to climate change and its effects, including a description of physical risk assessment projects and transition risks and opportunities.



## Climate change impact on Nornickel's strategy

In line with its Environmental and Climate Change Strategy, Nornickel has set a number of goals and commitments aimed at improving control over climate change risk management and performance in this area.

### Nornickel's climate change targets

- Take into account climate factors as part of our risk management system
- Continue to work on reducing GHG emissions in the long term
- Promote low carbon transition by supporting R&D to search for and scale up in-novative solutions and encouraging intra and cross-sectoral dialogue on climate change
- Comply with globally recognised climate disclosure standards
- Strive to increase the share of low-carbon energy consumption



## Highlights and results

### Key achievements

#### Key climate change achievements in 2022

- Proprietary global economy and climate change scenarios developed to assess climate change risks and opportunities;
- The project to assess physical risks scaled up: climate change modelling across the Company's footprint through 2050, identifying key climate risk factors and pilot assessment of their impact on the production assets of Norilsk, Kola, Trans-Baikal and Energy Divisions;
- Transition risks and opportunities identified and pilot assessment conducted;
- A methodology developed to calculate the internal carbon price;
- Upstream Scope 3 GHG emissions calculated for the first time;
- The first stage of a building and structure monitoring system (foundations and foundation beds on permafrost soils) deployed in the Norilsk Industrial District.

### Highlights<sup>1</sup>

7.7

mt of CO<sub>2</sub> equivalent  
Actual GHG emissions  
(Scope 1 and 2)

2.2

mt of CO<sub>2</sub> equivalent  
Sulphur Programme  
GHG emissions provision  
(Scope 1)

3.9

mt of CO<sub>2</sub> equivalent  
GHG emissions,  
downstream Scope 3  
(down 3% y-o-y)

1.8

mt of CO<sub>2</sub> equivalent  
GHG emissions, upstream  
Scope 3

### Global Warming Potential (100 years) based on ISO 14044, kg of CO<sub>2</sub> equivalent per kg of metal<sup>2</sup>

Pd

30,412.4

Pt

31,417.5

Rh

31,654.3

### Global Warming Potential (100 years) based on ISO 14044, kg of CO<sub>2</sub> equivalent per kg of metal in the product<sup>2</sup>

9.7

Metallic Ni

10.6

Ni sulphate

24.3

Metallic Co

13.9

Co sulphate

6.8

Cu cathodes

### In the process of implementing the Buildings and Structures Monitoring System project:

automated metering tools were installed

at **165** facilities

a network of more than

**1,200** sensors  
was deployed

comprehensive inspections of

**154** phase 1 facilities  
were carried out

An IT platform titled Polar Division's Information and Diagnostic System was developed and rolled out in Norilsk and Energy divisions.

<sup>1</sup> GHG data is presented for 2022 and includes Norilsk Nickel Harjavalta.

<sup>2</sup> Data is presented for 2021 and includes Norilsk Nickel Harjavalta.

Corporate climate agenda: key results and plans in 2021–2023

2021 – results	2022 – results	2023 – plans
<ul style="list-style-type: none"> <li>✓ Sustainable Development and Climate Change Committee of the Board of Directors set up</li> <li>✓ PJSC MMC Norilsk Nickel's Climate Change Policy developed and approved by the Board of Directors</li> <li>✓ Roadmap to comply with the TCFD Recommendations developed and approved by the Company's management</li> <li>✓ Project to implement organisational changes solidifying functions and roles in climate change across the Company (including divisions) launched</li> <li>✓ Relevant methodology developed and assessment conducted to measure the carbon footprint of the Company's core products</li> <li>✓ First batch of carbon-neutral nickel produced</li> <li>✓ Pilot project to assess physical climate change risks launched at business units of Norilsk and Energy divisions as well as in Polar Transport Division</li> </ul>	<ul style="list-style-type: none"> <li>✓ Approaches to climate change risks and opportunities assessment developed</li> <li>✓ The project to assess physical risks scaled up with the support of climate scientists: climate change modelling across the Company's footprint through 2050, identifying key climate change risk factors and pilot assessment of their impact on the production assets of Norilsk, Kola, Trans-Baikal and Energy Divisions</li> <li>✓ International best practices in climate change risk adaptation studied in various cities and companies</li> <li>✓ Proprietary scenarios for global economy and climate change developed by Nornickel</li> <li>✓ Register of transition risks and opportunities compiled with their pilot assessment</li> <li>✓ Amendments to the Company's guidelines prepared in connection with climate change risk management (including the Risk Management Regulations)</li> <li>✓ Analysis conducted in line with Science Based Targets criteria for the Company</li> <li>✓ Methodology developed to calculate the internal carbon price</li> <li>✓ Upstream Scope 3 GHG emissions calculated for the first time</li> <li>✓ Quality of public climate change disclosure in the Sustainability Report improved</li> <li>✓ Possible options analysed for the development of in-house power generation facilities up to 2050 based on low-carbon technologies</li> <li>✓ Training on climate change and climate change risks provided to more than 200 employees at the Head Office and in the divisions</li> <li>✓ Climate change aspects incorporated into the corporate competence model</li> </ul>	<ul style="list-style-type: none"> <li>• Update the Roadmap to comply with the TCFD recommendations, including the development of the divisions' climate change risk management plans</li> <li>• Publish the first dedicated climate change report</li> <li>• Improve assessment methodologies for climate change risks and opportunities, including with the engagement of researchers</li> <li>• Integrate climate change risks and opportunities into corporate business processes, including by amending corporate risk management documents</li> <li>• Develop adaptation and mitigation approaches and tools for transition risks and for physical risks (for individual production assets as well)</li> <li>• Include GHG emission issues in the scope of the Company's supplier due diligence</li> <li>• Develop a system for assessing climate change aspects in the corporate competence model</li> <li>• Develop cooperation and partnerships and promote the climate agenda in the professional community, in particular participation in climate agenda committees and working group of ESG Alliance</li> </ul>

## Approaches to climate change management

Nornickel is developing a climate change management system, which includes the development and approval of by-laws, allocation of responsibilities between management bodies, and assignment of their functional duties on climate change issues.

### Climate Change Policy

The Company has a [Climate Change Policy](#) setting out the basic principles, commitments and initiatives related to the adaptation to climate change for all business units of the Group.

The Climate Change Policy forms the foundation of the corporate sustainability programme, which creates the conditions for energy efficiency and reliance on renewable energy and green technologies, including carbon dioxide capture and recovery as well as energy storage technology.

The Company has the following key obligations under the Policy:

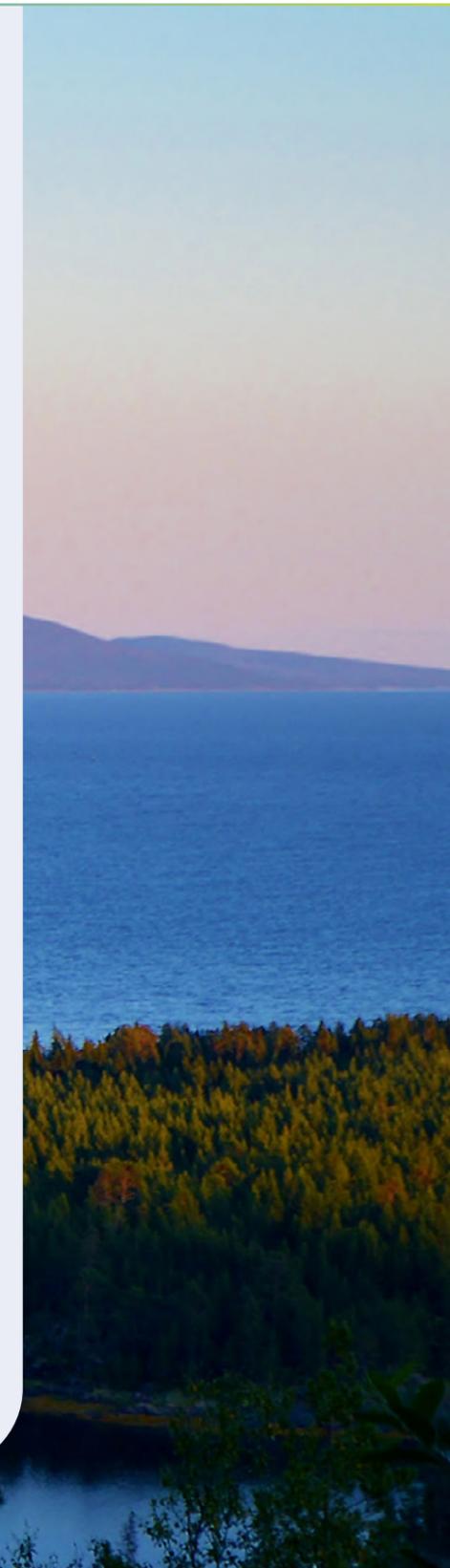
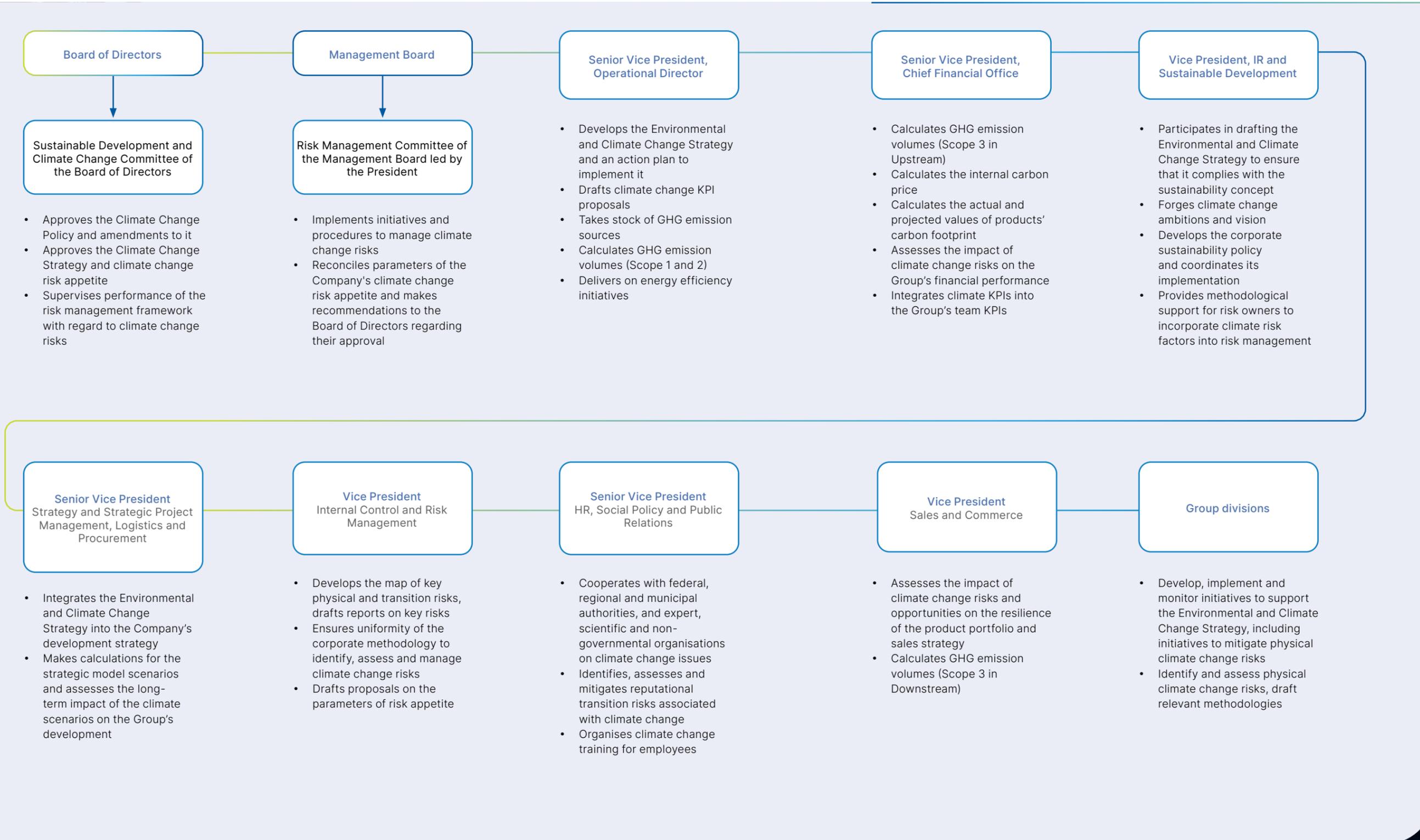
- develop and regularly update its climate change strategy<sup>1</sup>;
- implement management systems and risk management tools to respond to climate change and have them integrated into the risk management system in line with the TCFD requirements;
- organise regular audits of climate change risk management and publicly disclosed climate change indicators;
- identify and measure the contribution of the Company's products to the low-carbon economy in the process of organisational life-cycle assessment;
- review commercially viable opportunities to reduce carbon footprint, including the use of assessment tools for responsible value chain management and the development of green technology partnerships to accelerate the decarbonisation of the Company's operations;

- attract and effectively allocate capital to implement the Company's climate change strategy;
- promote advance practices and innovations;
- apply GHG emission offsetting mechanisms, including natural climate solutions (including conservation and restoration of forests and other ecosystems that absorb carbon dioxide) where the application of these solutions appears to be the most feasible and commercially viable solution;
- adopt key performance indicators (KPIs) related to climate change goals for managers and employees of the Company;
- expand engagement and partnership with stakeholders on climate change agenda;
- ensure transparent and regular disclosure of GHG emission targets and other relevant indicators and aspects in accordance with the Russian laws and best global standards.

<sup>1</sup> Part of the Environmental and Climate Change Strategy

Climate change management framework

GRI 2-9, 2-12, 2-13



### Responsibilities

The Board of Directors reviews and approves our Environmental and Climate Change Strategy and risk appetite and supervises the risk management framework for climate change. In 2021, the Board created the Sustainable Development and Climate Change Committee to ensure a deeper focus on these matters.

The Committee meetings discuss the following matters:

- integration of sustainability principles, including climate change, into the Company's operations;
- development and implementation of a strategy on sustainable development and climate change;
- risk management and internal control in the realm of sustainable development and climate change;
- the Company's internal reporting and disclosures on sustainable development and climate change;
- external audit of the Company's sustainable development and climate change reports and activities.

The implementation of climate change risk management measures and procedures is the responsibility of the Company's Management Board and the Management Board's Risk Management Committee. Members of the Board agree upon parameters of the Company's risk appetite, including those relating to climate change, and make recommendations to the Board of Directors regarding their approval. The key risks, including climate change threats, are reviewed on a quarterly basis.

→ Details of the climate agenda review by the Management Board's Risk Management Committee and the Sustainable Development and Climate Change Committee of the Board of Directors will be disclosed in [the climate change report](#).

The Vice President for Investor Relations and Sustainable Development is responsible for setting ambition and vision for climate change and developing and monitoring the implementation of the Company's Climate Change Policy.

Since 2022, the Sustainable Development Department's functions include methodological support for risk owners to incorporate climate risk factors into risk management. Respective changes have been incorporated into the Regulations on the Sustainable Development Department and the Risk Management Regulations. Dedicated units of the Head Office, branches and Group companies are responsible for certain aspects of the Climate Change Policy and the Environmental and Climate Change Strategy within their scope<sup>1</sup>. The Company's branches, standalone business units and divisions develop proposals regarding the Environmental and Climate Change Strategy implementation, ensure the availability of financial and other resources related to the Environmental and Climate Change Strategy implementation, and identify and assess physical climate change risks.

<sup>1</sup> For full information on responsibilities and functions of the Company's governance bodies and units, please see [PJSC MMC Norilsk Nickel's Climate Change Policy](#).

### Nornickel's Roadmap to comply with the TCFD recommendations

In 2021, Nornickel approved the Roadmap to comply with the TCFD Recommendations for 2022 – Q1 2023. The roadmap includes more than 50 activities aimed at improving strategic and operational management

of climate change issues, including risks and opportunities, achieving TCFD-recommended targets and indicators, and generating quality public reporting.

In 2023, the Company is going to analyse the completeness of implementing the planned activities and update the Roadmap for the medium-term period.

### Core elements of the Roadmap to comply with the TCFD Recommendations

Dimension	Key measures and projects
Corporate governance	<ul style="list-style-type: none"> <li>• Strengthening the role of the Board of Directors and top management to increase the effectiveness of managing climate change-related issues, regular monitoring of climate risks and opportunities, and overseeing the implementation of key actions</li> <li>• Building an organisational structure of climate risk management and improving the Company's regulations and guidelines</li> </ul>
Corporate strategy and financial planning	<ul style="list-style-type: none"> <li>• Developing scenarios to assess climate change risks and opportunities</li> <li>• Analysing the resilience of the Company's strategy when it comes to climate change scenarios, including the less than 2 °C warming by 2050 scenario</li> </ul>
Risk management	<ul style="list-style-type: none"> <li>• Integrating climate change risks into corporate business processes by preparing amendments to regulatory and procedural guidelines. Keeping risk owners abreast of climate change risk factors</li> <li>• Building procedures of and approaches to assessment of physical risks and transition risks and opportunities</li> </ul>
Goals and targets	<ul style="list-style-type: none"> <li>• Calculating and disclosing the carbon footprint generated during production</li> <li>• Calculating and disclosing Scope 1, 2 and 3 GHG emissions</li> <li>• Developing of an internal carbon price calculation approach</li> <li>• Doing analysis against Science Based Targets in climate change for the Company</li> <li>• Regularly updating and disclosing goals and target indicators used by the Company to measure progress in the climate strategy implementation</li> </ul>

## Climate change risks and opportunities

GRI 201-2

In the process of implementing the Roadmap to comply with the TCFD Recommendations and meeting the targets set in the corporate Environmental and Climate Change Strategy, Nornickel is building a framework for managing climate change risks and opportunities. The Company identifies both physical risks associated with the impact of chronic climate change and abnormal weather events, and transition risks and opportunities associated with the changing market, regulatory, technological and political environment during the transition to a low-carbon economy. In this context:

- shared climate change scenarios (pathways) apply<sup>1</sup>;
- the Company is developing approaches to assess the impact of physical risks and transition risks and opportunities on the Company's operations and financial performance;
- mechanisms and plans are being developed to mitigate and adapt to these risks.

Building a framework for managing climate change risks and opportunities based on shared pathways.<sup>2</sup>



### Physical risks

For climate change modelling, the Company chose three shared global climate scenarios (pathways) developed by the Intergovernmental Panel on Climate Change (IPCC) – SSP1-2.6, SSP2-4.5 and SSP5-8.5 and CMIP 6.<sup>1</sup>

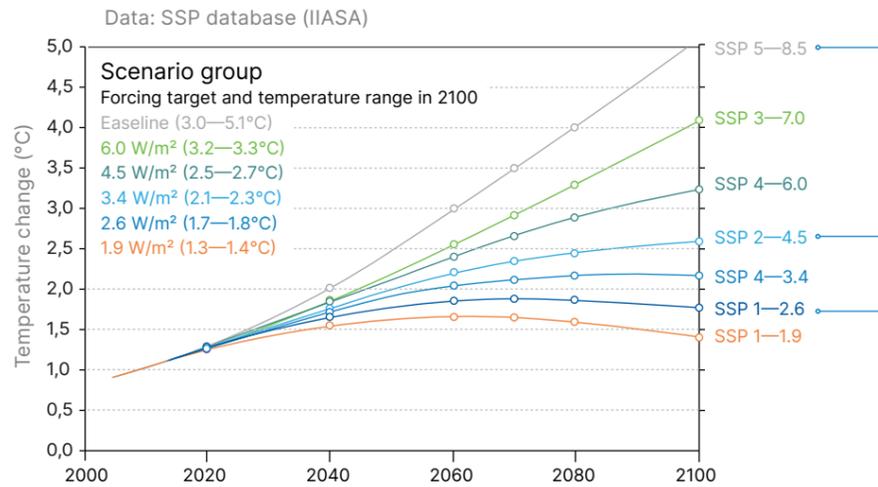


<sup>1</sup> The Company's own scenarios for the assessment of risks and opportunities correspond to the temperature ranges of the SSP used for physical risk assessment.

<sup>2</sup> SSP – Shared Socio-Economic Pathways.

<sup>1</sup> Coupled Model Intercomparison Project

Characteristics of IPCC scenarios<sup>1</sup>



Scenarios used in the analysis:

- SSP 5—8.5
- SSP 2—4.5
- SSP 1—2.6

SSP 1-2.6

SSP1-2.6 is an optimistic scenario: greenhouse gas emissions are expected to decline and reach zero by 2055, with an average annual temperature increase of 1.8 °C by 2100. Society makes the transition to more sustainable practices, with the focus shifting from economic growth to general well-being. Investments in education and health will be growing, and inequality will be declining.

The initial phase of the work involved retrospective analysis of climate change since the 1960s supported by experts from the Institute of Atmospheric Physics of the Russian Academy of Sciences to determine the climate trends already occurring in the Company's regions of operation. Modelling showed an upward trend in the average annual temperature in all divisions of Nornickel. In Norilsk, for example, the temperature rose by 0.6 °C every decade, suggesting that the Paris Agreement milestone had already been passed in the region by 2022.

SSP 2-4.5

SSP2-4.5 is a realistic scenario: the current rate of increase in greenhouse gas emissions will be maintained, with carbon neutrality achieved by 2100. Socio-economic factors are changing in line with historical trends. Progress towards sustainable development is slow, with an even growth of the pace of development and incomes. According to the scenario, the average annual temperature will increase by 2.7 °C by the end of the century.

Retrospective analysis was followed by scenario modelling of possible changes in climate risk factors through 2050: the SSP1-2.6, SSP2-4.5 and SSP5-8.5 global climate scenarios were "localised" to all regions where the Company operates, including Finland. Assessment of climate risk factors was carried out for the Russian divisions – Norilsk, Kola, Trans-Baikal and Energy.

The key climate change risk factors identified for all areas across Nornickel's footprint are the growing average annual temperature,

SSP 5-8.5

SSP5-8.5 is a pessimistic scenario: the current level of GHG emissions will double by 2050. The world economy will demonstrate a rapid growth and development through the extensive use of fossil fuels and increased energy consumption. By 2100, the average annual temperature will increase by 4.4 °C.

thawing of permafrost soils, increase in extreme precipitation and flooding, and greater frequency and intensity of thunderstorms.

Some of the identified climate change risk factors, such as thawing of permafrost soils, may lead to key risks.

→ Detailed information on physical risks will be disclosed in [the climate change report](#).

Permafrost monitoring

In 2021, as a way of adaptation to risks associated with permafrost thawing, Nornickel launched a project to develop and deploy a real-time foundation condition monitoring system for buildings and structures located in permafrost soils in Norilsk using advanced automated observation tools and a specialised IT platform.

The monitoring project is focused on using automatic equipment to keep track of temperatures in permafrost soils around bases, deformation behaviour in foundations, and temperature and humidity levels in crawl spaces. It seeks to help prevent accidents at Nornickel's industrial facilities and, later on, local housing infrastructure and proactively identify any hazardous defects or deviations that might result in damage to the buildings and structures or their elements, with special safety criteria developed for all monitored indicators.

During 2022, an information and diagnostic system was established and put into operation, and comprehensive inspections were conducted at 154 facilities, each with surveillance programmes and safety criteria. For effective data transmission and processing, a control room was deployed and a transparent business process for supervision, monitoring and inspection of buildings and structures was built, including the development of a geotechnical monitoring standard.

As at the end of 2022, 17 assets of the Company were connected to the system and around 700 facilities were being monitored.

Transition risks and opportunities

To assess in its strategic planning the risks and opportunities arising from the global energy transition, Nornickel has developed three proprietary long-term scenarios for the global economy and climate change through 2050.

The global economic and climate change scenarios were drafted in consultation with the Institute of Economic Forecasting of the Russian Academy of Sciences. The estimated changes in global temperature under these scenarios are consistent with the three IPCC scenarios (SSP1-2.6, SSP2-4.5 and SSP5-8.5) that have been adopted by the Company to assess the physical climate change risks. The scenarios were developed based on an analysis of some 190 available public scenarios from leading providers in this area (International Energy Agency, World Energy Council, International Renewable Energy Agency, OPEC, Bloomberg, NGFS, Shell, BP, DNV, etc.).

The first scenario, "Rapid Transformation" (25% probability), is aimed at achieving the Paris Agreement goals, the second, "Sustainable Palladium" (70% probability), focuses on maintaining current social, economic and technological trends, and the third, "Global Growth" (5% probability) involves abandoning efforts to curb climate change, with further economic growth to be supported by hydrocarbons, mainly in developing countries.

Sustainable Palladium became the baseline scenario, which provides for traditional industries to remain centre stage along with the green economy. In particular, ICE vehicles will retain a large market

share, contributing to a steady demand for palladium in the long run. The Company will apply the other two scenarios in stress-testing of risks associated with climate change. In addition, a scenario parameter monitoring tool was developed to record actual deviations from the baseline.

The scenarios were approved by the Risk Management Committee of the Management Board and reviewed and recommended for further risk assessment by the Sustainable Development and Climate Change Committee of the Board of Directors.

→ Detailed information on transition risks and opportunities will be provided in [the climate change report](#).



<sup>1</sup> IPCC — Intergovernmental Panel on Climate Change

## Greenhouse gas emissions

GRI 305-1, 305-2, 305-4, SASB EM-MM-110a.1

The Company regularly assesses greenhouse gas emissions (Scope 1 and Scope 2) in accordance with the GHG Protocol methodology. The calculation of emissions for the Group takes into account the following greenhouse gases: carbon oxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), with no or insignificant emissions of other greenhouse gases. The quantitative assessment of Scope 1 GHG emissions also includes the Company's estimated prospective GHG emissions associated with the implementation of the Sulphur Programme.

Based on the results of 2022, actual direct and indirect GHG emissions (Scope 1 and 2) decreased by 0.5 mt of CO<sub>2</sub> equivalent y-o-y to a total of 7.7 mt of CO<sub>2</sub> equivalent, including the supply of heat and electricity to retail customers. The Sulphur Programme GHG emissions provision totalled 2.2 mt of CO<sub>2</sub> equivalent. The Company's actual direct GHG emissions amounted to 7.2 mt of CO<sub>2</sub> equivalent and indirect energy emissions, to 0.5 mt of CO<sub>2</sub> equivalent. Indirect energy emissions were calculated using the location-based method, taking into account regional coefficients.

Bystrinsky GOK, a key facility in Nornickel's Trans-Baikal Division, entered into a deregulated bilateral power purchase agreement for the supply of 118.3 mln kWh of electricity in order to reduce the climate impact.

In 2022, the inventory of equipment that is a source of GHG emissions was updated for the extended scope of enterprises.

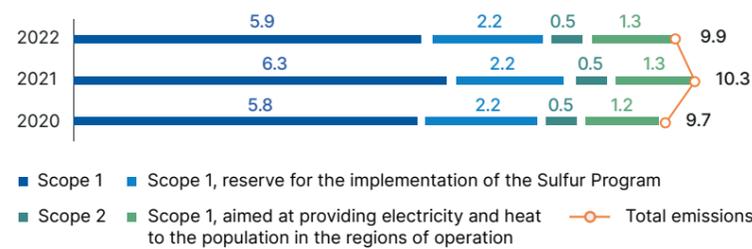
The reduction of GHG emissions (Scope 1 and 2) is due to the following reasons:

- optimisation of in-plant operation of the heat and power plants;
- optimisation of hydropower plant load regimes (increasing the share of electricity output from hydropower plants);
- weather conditions – in 2022, the heating period was shorter and the ambient air temperature during the heating period was higher than in 2021.

The intensity of actual GHG emissions (Scope 1 and 2) was 6.5 t of CO<sub>2</sub> equivalent per RUB 1 mln of consolidated IFRS revenue.

emissions for 2022 totalled 3.9 mt of CO<sub>2</sub> equivalent, down 3% y-o-y. The main drivers of the reduction are lower sales volumes and the geographical and sectoral structure of sales. The volume of downstream Scope 3 emissions is relatively small compared to global metals and mining peers, reflecting the structure and size of the Group's product portfolio.

### GHG emissions (Scope 1 and 2)<sup>1</sup>, mt of CO<sub>2</sub> equivalent

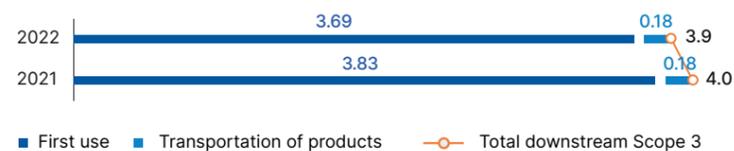


In 2022, the Company continued to quantify indirect GHG emissions (downstream Scope 3) to the extent related to product sales. Under the GHG Protocol, these emissions are associated with transportation from the Company's production assets to the customer and the first stage of product processing.

In line with the principle of continuous improvement of calculations, a number of GHG emission factors was updated based on the best available sources for the production of metals and concentrates sold by the Group. For the purpose of comparison, the data for 2021 was recalculated using emission factors applied in 2022. The Group's downstream Scope 3

### GHG emissions (downstream Scope 3)<sup>2</sup>, mt of CO<sub>2</sub> equivalent

GRI 305-3

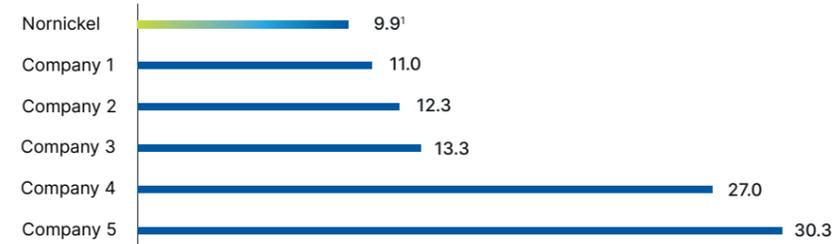


<sup>1</sup> GHG emissions are calculated in line with the GHG Protocol methodology. The Group's GHG emissions include the following greenhouse gases: direct carbon dioxide (CO<sub>2</sub>) emissions of 9.7 mt, nitrogen oxide (N<sub>2</sub>O) emissions of 53.3 t, methane (CH<sub>4</sub>) emissions of 2.5 kt (mainly generated by gas transportation units), including the Sulphur Project and the heat and electricity supply to the public. The calculation includes potential GHG emissions after the completion of the Sulphur Programme. The data includes Norilsk Nickel Harjavalta.

<sup>2</sup> The data for 2021 was recalculated using emission factors applied in 2022. The data includes Norilsk Nickel Harjavalta.

## Comparison with global metals and mining peers

### GHG emissions (Scope 1 and 2), mt of CO<sub>2</sub> equivalent



### GHG emissions (Scope 3), mt of CO<sub>2</sub> equivalent



Source: the Company's analysis based on the most up-to-date available data for 2021–2022. Peers include leading global diversified metals and mining companies: BHP Billiton, Rio Tinto, Vale, Glencore, and Anglo American

<sup>1</sup> Taking into account the reserve for the Sulfur Program (2.2 mln t of CO<sub>2</sub>-eq.)

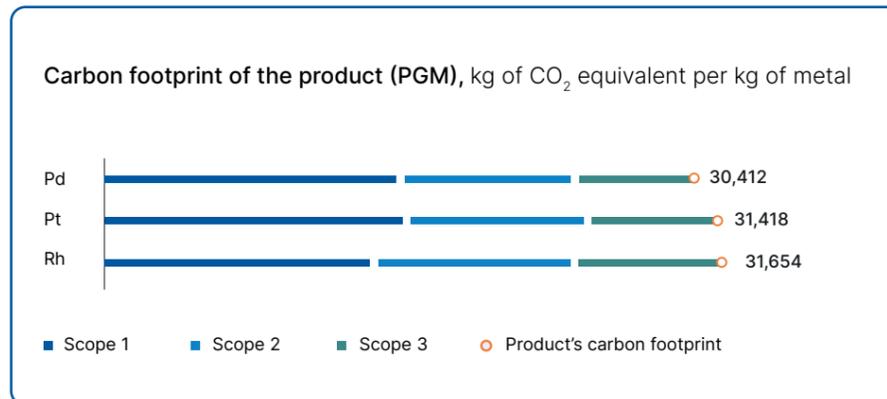
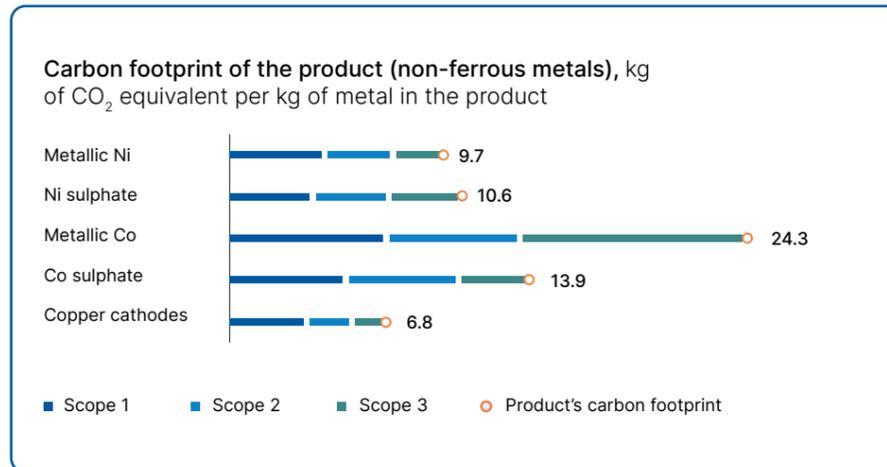
## Upstream Scope 3 GHG emissions

In 2022, the Company made its first public disclosure of a quantitative estimate of upstream Scope 3 GHG emissions, covering all emission categories required by the GHG Protocol. The bulk of the emissions are related to the purchase of goods and equipment from third-party suppliers and to energy and fuel consumption (to the extent not included in Scope 1 and 2).

In 2022, total emissions amounted to 1.8 mt of CO<sub>2</sub> equivalent.

## Carbon footprint of products

### Assessment of products' carbon footprint in 2021<sup>1</sup>



The carbon footprint of MMC Norilsk Nickel's products is calculated in accordance with ISO 14067:2018, ISO 14040:2006, ISO 14044:2006, GHG Protocol Product Life Cycle Accounting and Reporting Standard methodology, and LME passport guidance – Nickel Institute guidance for nickel producers to calculate their GHG emissions.

In 2022, the Company made a number of technical updates to the model for calculating a product's carbon footprint:

- using corporate directories to update significant categories in order to calculate average carbon intensity ratios;
- using the SAP ERP system as a source of information on the allocation of the actual use of resources.

<sup>1</sup> Including the Sulphur Programme provision implemented and Norilsk Nickel Harjavalta.

### Scope of products' carbon footprint calculation

#### End product manufacturers:

- Polar Division
- Kola MMC
- GRK Bystrinskoye
- Norilsk Nickel Harjavalta

#### Manufacturers of raw materials / resources or services

- Medvezhy Ruchey
- NTEC
- Norilsk Production Support Complex
- Norilskgazprom
- Norilsktransgaz
- Murmansk Transport Division
- Norilsknickelremont

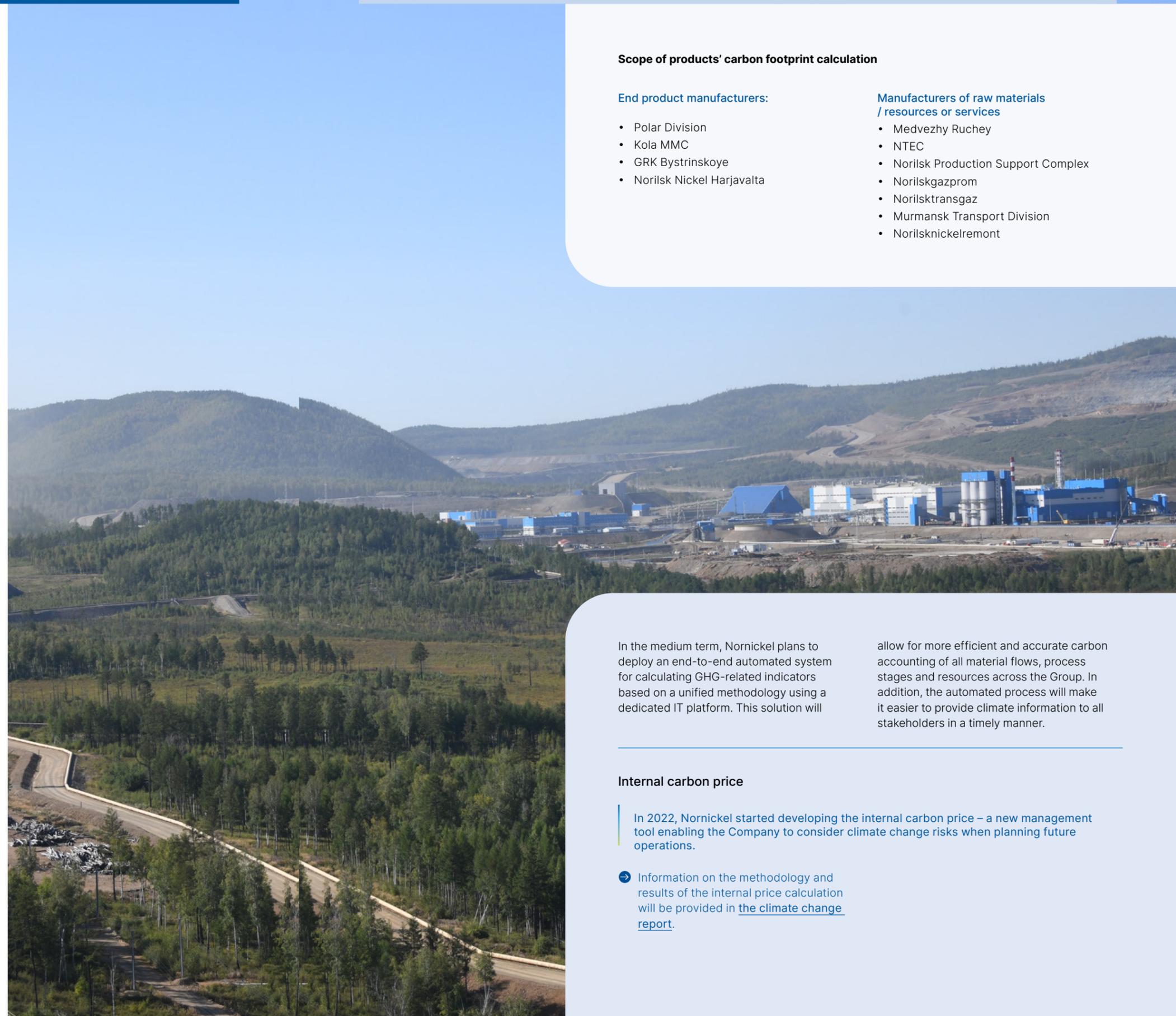
In the medium term, Nornickel plans to deploy an end-to-end automated system for calculating GHG-related indicators based on a unified methodology using a dedicated IT platform. This solution will

allow for more efficient and accurate carbon accounting of all material flows, process stages and resources across the Group. In addition, the automated process will make it easier to provide climate information to all stakeholders in a timely manner.

### Internal carbon price

In 2022, Nornickel started developing the internal carbon price – a new management tool enabling the Company to consider climate change risks when planning future operations.

- ➔ Information on the methodology and results of the internal price calculation will be provided in [the climate change report](#).

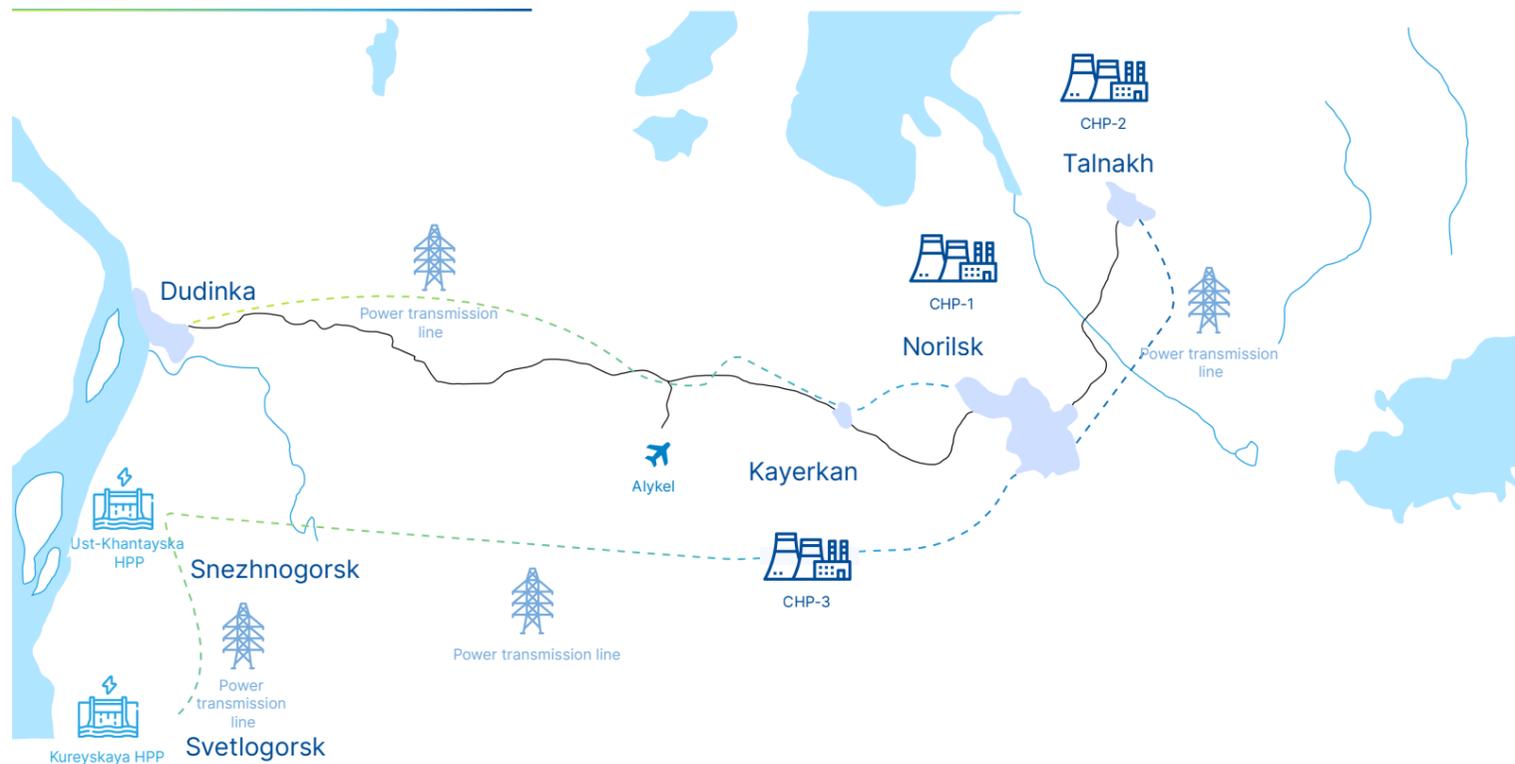


## Energy consumption and efficiency

SASB EM-MM-130a.1

As Nornickel Group's key production facilities operate in the harsh climatic conditions of the Far North, the Company's fuel and energy services are tasked with a critical mission of ensuring a reliable and continuous power supply to households and production facilities.

### Nornickel's main power generation facilities in the Norilsk Industrial District (NID)



#### 51% of electricity consumed came from renewable sources

More than half of the electricity is generated by two hydropower plants with a total capacity of 1,111 MW:

- Ust-Khantayskaya HPP – 511 MW
- Kureyskaya HPP – 600 MW

#### Three gas heat and power plants

The rest of the electricity and heat demand is covered by:

- CHP-1 – 325 MW
- CHP-2 – 350 MW
- CHP-3 – 440 MW

with a total capacity of 1,115 MW.

#### Seven gas boilers

One boiler in each of Talnakh, Kayerkan and Alykel, and four boilers in Dudinka provide the district with heat.

The most essential projects that we are implementing to improve equipment reliability and energy efficiency, as well as to ensure increase in production output, are:

- replacement of main hydroelectric units at Ust-Khantayskaya HPP and power units at CHP-2 and CHP-3 in Norilsk;

- reconstruction of the backup diesel fuel storage facilities at CHP-1, CHP-2 and CHP-3, boiler in Dudinka as well as at Ust-Khantayskaya HPP and Kureyskaya HPP;
- modernisation of the electricity, heat and water supply networks;
- construction of stormwater and industrial waste water treatment facilities;

- modernisation of the gas transmission and gas distribution networks;
- infrastructure modernisation and development in Tukhard;
- building five new gas wells at the Pelyatkinskoye Gas Condensate Deposit;
- comprehensive oil terminal reconstruction programme: Norilsk, Dudinka and Kayerkan oil depots.



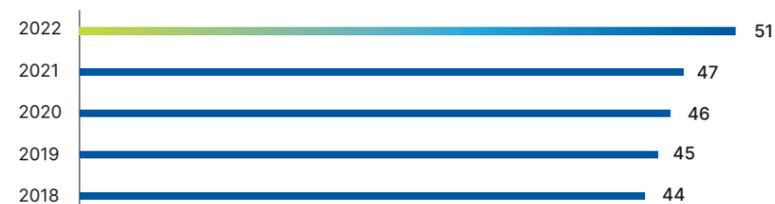
## Utilisation of renewable energy sources

Nornickel takes a comprehensive approach to energy infrastructure development, combining the objectives of improving the reliability of production assets with those

of reducing GHG emissions. Nornickel makes continuous efforts to reduce the consumption of such energy sources as diesel fuel and coal, and develop alternative

energy – hydropower. To that end, Nornickel works consistently to provide its operations with more economical and green energy sources, including in the long term.

Share of renewable energy in total electricity consumption by Nornickel Group, %



In 2022, the total share of electricity consumed by Nornickel's production operations from renewable energy sources

reached **51%**

The use of renewable energy, such as solar, geothermal and wind energy, is limited by harsh climatic conditions, the length of the polar night and a number of other natural features of the regions where the Company operates. Nevertheless, Nornickel keeps looking for alternative solutions to improve its energy efficiency. In 2022, the Company conducted an analysis of opportunities to switch to green energy sources to replace its own conventional gas power generation facilities in the Norilsk District in the long term through 2050.

The analysis, carried out for the Norilsk region, revealed that most of the technologies considered for achieving zero carbon emissions from the Norilsk District's own power generation facilities in the long term to 2050 cannot be implemented under current conditions. Natural and climatic constraints of the Arctic Zone, the requirements of an isolated power system, and the Arctic design of equipment significantly limit the use of direct carbon emission reduction technologies in the Norilsk District.

At the moment, the most economically viable option is the use of carbon capture, transport and storage technologies. However, the Company has yet to confirm the positive experience with such technologies at high-capacity gas heat and power plants.

In addition, Nornickel is exploring the possibility of using ground- or water-based small modular nuclear reactors in Norilsk.

## Total energy consumption by Nornickel Group, TJ

GRI 302-1, 302-3

Indicator	2018	2019	2020	2021	2022
Fuel consumption	148,910	144,772	141,237	151,235	141,909
Energy from renewable sources (HPPs)	14,877	15,058	15,310	14,586	16,152
Electricity and heat procurement from third parties	10,931	11,331	11,200	10,891	11,005
Electricity and heat sales to third parties	18,926	18,766	17,254	19,974	18,968 <sup>1</sup>
Group's total energy consumption (1 + 2 + 3 - 4)	155,792	152,395	150,493	156,738	150,098
Energy intensity, GJ / RUB mln <sup>2</sup>	214	174	135	117	127

## Fuel consumption by Group companies by type of fuel, TJ

GRI 302-1

Indicator	2018	2019	2020	2021	2022
Total fuel consumption	148,910	144,772	141,237	151,235	141,909
Natural gas	129,335	125,329	122,216	130,867	125,934
Coal <sup>3</sup>	1,660	2,087	2,180	1,557	2,027
Diesel fuel and fuel oil	13,788	13,535	13,939 <sup>4</sup>	15,097	13,623
Gasoline and jet fuel	4,127	3,820	2,902	3,715	325

In 2022, total fuel consumption by Group companies decreased by 6.2% compared to 2021 due to a lower gasoline and jet fuel costs because of the sale of NordStar Airlines outside the Group's perimeter in 2022. A 3% increase in

electricity consumption by 2021 was due to an increase in the consumption by the key operations in the Norilsk Industrial District. Due to higher monthly average temperatures

in 2022, there was a 6% reduction in total heat and steam consumption compared to 2021.

<sup>1</sup> Including 4,183 TJ of electricity and 14,785 TJ of heat energy.

<sup>2</sup> RUB mln of consolidated revenue.

<sup>3</sup> The Company uses coal as a chemical element in its production processes, with no coal used for heating purposes.

<sup>4</sup> Taking into account the diesel fuel lost as a result of NTEC's CHP-3 accident on 29 May 2020.

Electric power and heat consumption by the Group companies, TJ

GRI 302-1

Indicator	2020	2021	2022	Including in 2022	
				Electricity	Heating and steam
Electric power and heat consumption by the Group companies	59,996	60,771	60,143	31,546	28,597 <sup>1</sup>
<b>including:</b>					
• Polar Division	30,869	30,727	31,307	14,806	16,501
• NTEC	6,185	6,439	6,045	4,071	1,974
• Kola MMC	11,542	9,393	9,289	6,599	2,690
HPP share in total electric power consumption in the Norilsk Industrial District	55%	52%	56%	-	-
HPP share in total electric power consumption by the Company	46%	47%	51%	-	-
HPP share in total electric power and heat consumption by the Company	25,5%	24%	26,9%	-	-

<sup>1</sup> Including 5,946 TJ of steam energy.

Fuel and energy savings resulting from energy consumption reduction and energy efficiency improvement initiatives in 2022

GRI 302-4

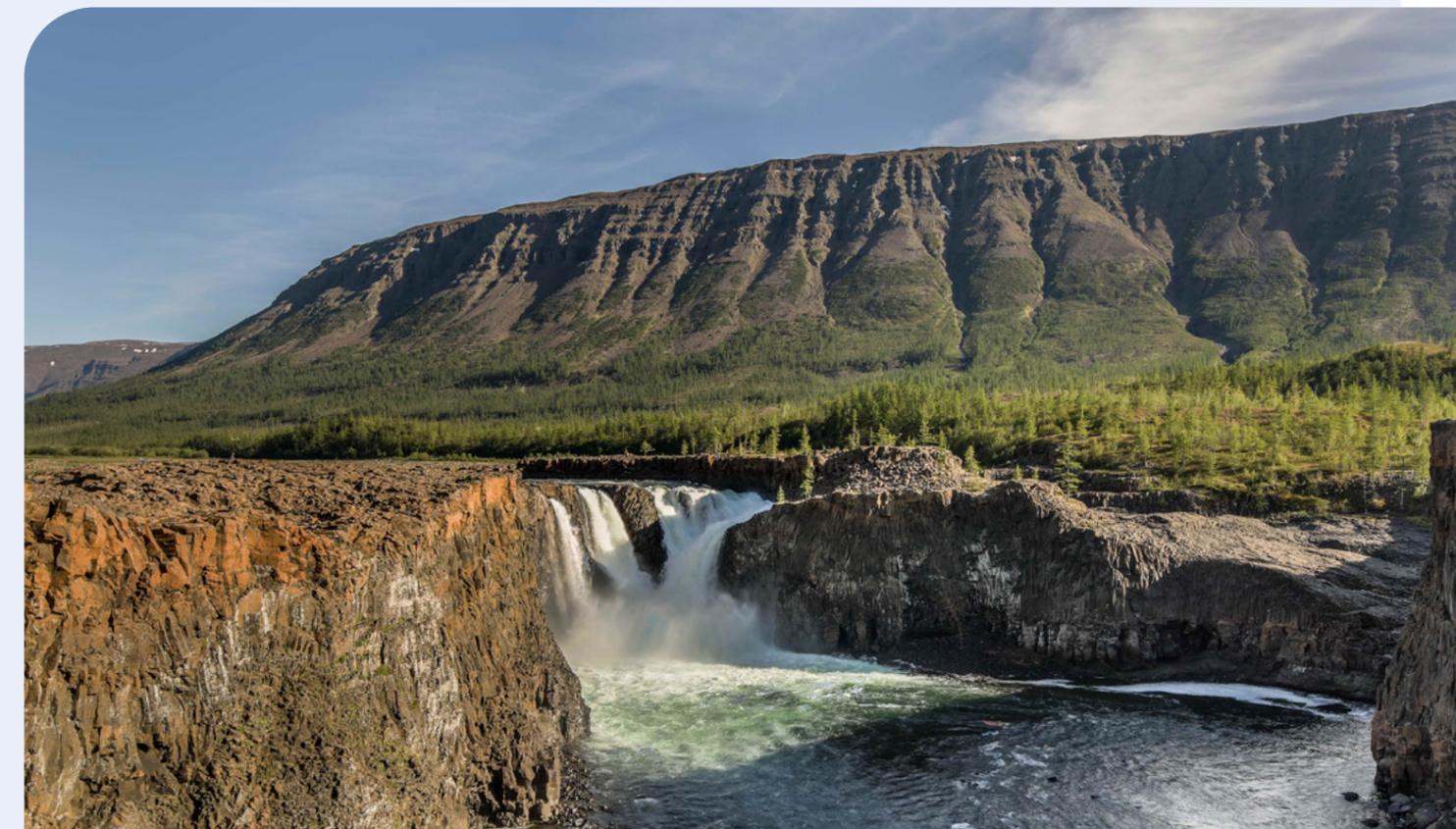
Indicator	Nornickel Group average	Including			
		Polar Division	NTEC	Kola MMC	Medvezhy Ruchey
<b>Total savings, TJ</b>	<b>362.7</b>	<b>128.0</b>	<b>37.8</b>	<b>69.2</b>	<b>61.1</b>
<b>including:</b>					
• electricity	76.6	12.5	-	24.2	9.4
• heat in water and steam	248.3	115.4	-	45.0	51.7
• fuel	37.8	-	37.8	-	-

The Company's divisions annually develop and implement initiatives to save fuel, energy, and water.

In 2022, the implementation of operational and technical measures to reduce energy consumption and improve energy efficiency resulted in savings of 362.7 TJ, with the costs totalling RUB 2,2 bn. The savings were

achieved due to the measures to switch to LED lighting, improving thermal insulation through the use of modern materials for piping, window and door openings, the use of automatic heat control systems based on changes in ambient temperature, and by introducing automated energy accounting systems for plant workshops.

**362.7** TJ  
energy efficiency resulted in savings in 2022



# Air

GRI 413-2

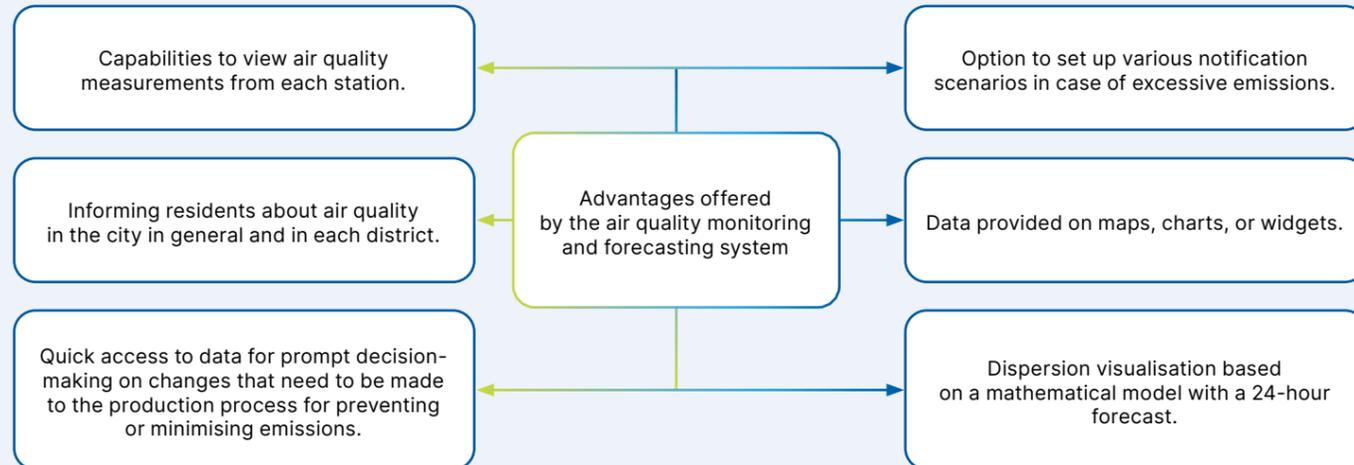
As Nornickel has a significant impact on atmosphere, reduction of pollutant emissions is one of the key objectives pursued by the Company's Environmental Strategy.

With its wide range of operations, Norilsk Division emits more than 60 pollutant substances into the air. Sulphur dioxide accounts for around 98% of those emissions.

Reduction of sulphur dioxide emissions is Nornickel's strategic priority. To that end, it runs the Sulphur Programme, the largest environmental initiative of the Company in terms of scope and financing.

## Air quality monitoring and forecasting system

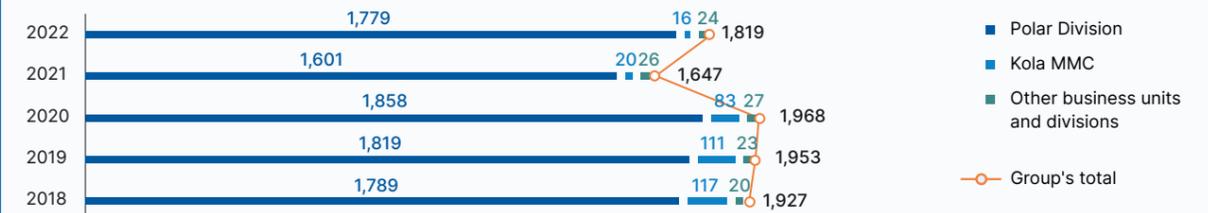
To ensure the high quality of input data and raise awareness of local communities about pollutant emissions, the Company has rolled out an advanced air quality monitoring and forecasting system in Norilsk, Monchegorsk, Nickel and Zapolyarny.



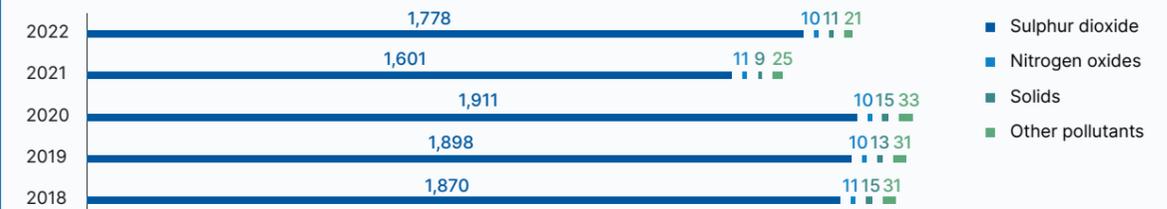
## Air pollutant emissions

GRI 305-7, SASB EM-MM-120a.1

Air pollutant emissions, kt



Air emissions by pollutant, kt



In 2022, the Group's total emissions amounted to 1.8 mt, up 10.5% y-o-y. The growth was driven by the recovery of Norilsk Division's production volumes

after their reduction in 2021 as a result of suspended operations at two mines of Norilsk Concentrator. Kola Division's emissions continued to decrease following

the shutdown of several outdated metallurgical shops: total emissions went down by 18% y-o-y.

## Use of ozone-depleting substances

Nornickel neither produces nor uses ozone-depleting substances (ODS), except for extremely limited amounts used as a chemical agent for laboratory-based chemical analysis as well as for filling and topping compressors in air conditioning units and carbonated water machines

that produce water used as a cooling agent for medium- and low-temperature refrigerating equipment. The Company reports on the use of such substances to the Russian Ministry of Natural Resources and Environment as required.

There were no ODS emissions in 2022.

**Sulphur Programme**

The Sulphur Programme is Nornickel's flagship environmental project on sulphur dioxide (SO<sub>2</sub>) capture and recovery, which is one-of-a-kind globally. The technology makes it possible to capture up to 99% of SO<sub>2</sub>, convert it into sulphuric acid and then into gypsum.

The Sulphur Programme provides for gradual reduction in SO<sub>2</sub> emissions in the Norilsk Industrial District and on the Kola Peninsula as our key geographies. On the Kola Peninsula the programme was completed in 2021, with Kola Division's SO<sub>2</sub> emissions declining by 90% vs 2015.

In 2022, Norilsk Division continued to build off-gas recycling facilities and related infrastructure at Nadezhda Metallurgical Plant.

**Progress against the Sulphur Programme in Norilsk Division**

The first stage of the programme aims to design and introduce new solutions and technology to recycle SO<sub>2</sub> coming from off-gases produced by the key smelting units of Nadezhda Metallurgical Plant. The off-gases will be used to make sulphuric acid, neutralise this acid with natural limestone and obtain gypsum.

In 2022, the Company completed a wide range of procurement and construction works at the key facilities of the integrated project implemented at Nadezhda Metallurgical Plant as part of the Sulphur Programme, while also building a variety of infrastructure and linear facilities for this project. These works included:

- construction and installation (earthworks, concrete works, assembly of metal structures, erection of structural parts of buildings and structures, installation of electrical equipment, overhead power lines, pipelines, gas ducts and technical

infrastructure, cabling, assembly of engineering equipment, road construction, etc.);

- supply of materials and technical resources and installation of process equipment (including large-size equipment);
- construction and furnishing of gypsum storage facilities;
- individual equipment tests.

The second stage of the programme envisages a comprehensive project to design and introduce new solutions and technology at Copper Plant with a view to obtaining sulphuric acid from off-gases of the existing Vanyukov furnaces and the new continuous converting facility, neutralising this acid with natural limestone and producing gypsum.

As a number of technology partners refused to continue cooperation with Nornickel in 2022, the Company began to review some of its design solutions in a bid to minimise the adverse effects of the sanctions on the integrated project implemented as part of the Sulphur Programme at Copper Plant.

**Social and economic impacts of the Sulphur Programme on Russian economy**

In 2022, Nornickel joined forces with the Institute of Economic Forecasting of the Russian Academy of Sciences to assess the social and economic impacts of the sulphur disposal facilities constructed and operated by the Company (Sulphur Programme) on Russian economy.

The total CAPEX for the Sulphur Programme is estimated at around

USD **4.1–4.3** bn<sup>1</sup>

Researchers from the Russian Academy of Sciences found that the Sulphur Programme has a clearly articulated social dimension. Instead of focusing on commercial gains, the Sulphur Programme seeks to create significant social and environmental benefits beyond the scope of its design capacities by boosting the output of enterprises from allied sectors and encouraging the redistribution of additional profits throughout wider economy in the form of salaries for employees, earnings for businesses and taxes paid to the budget of Russia. Eventually, this will trigger an increase in end demand for domestically produced goods and have a positive macroeconomic impact on GDP growth.

Also important is the positive impact the Sulphur Programme will have on the environment, as it will help increase the quality of life in local communities. Fundamental environmental changes will be instrumental in improving public health and reducing excess mortality in Norilsk.

# Water

## Protection of water bodies

GRI 303-1, 303-2, 303-3, 303-4, 303-5, SASB EM-MM-140a.2

Nornickel takes a responsible approach to its use of water resources. The Company withdraws water for production needs strictly in line with the pre-approved limits and consistently ensures compliance with permissible wastewater discharge limits based on the Group companies' corporate environmental reporting and its analysis.

Nornickel uses water from surface and underground sources for drinking and production needs, as well as for recirculating

and recycling water supply. The Company regularly runs observation programmes for water bodies and water protection zones that serve as water sources for Nornickel. In 2022, no major impact of Nornickel's operations on water bodies was identified; water withdrawal was within the pre-approved limits. No water is withdrawn from the bodies included in the Ramsar Convention on Wetlands of International Importance. The Company's areas of operation are not water-scarce<sup>1</sup>.

To decrease withdrawal volumes, the Company continues to improve its closed water circuit, which enables efficient use of water resources. In 2022, 82% of all water used by the Company was recycled and reused.

Nornickel has in place a Position Statement on Water Stewardship, which outlines key relevant principles, commitments, initiatives and targets.

**Key principles of Nornickel's water stewardship:**

Complying with applicable national laws and rules	Enabling information accessibility and transparency as regards water stewardship	Working towards water consumption and discharge targets, efficient water use
Adherence to international best practices and requirements of leading sustainability associations	Liaising with government bodies to participate in drafting environmental responsible water protection regulations	No Company's or its branches' operations in waterscarce areas as they are defined in the World Resources Institute's Aqueduct Water Risk Atlas
Proactively engaging stakeholders on matters of external water resource management to support predictable, consistent and effective regulation	Making sure that the employees of the production facilities belonging to the Company and its branches comply with the 2021 Position Statement on Water Stewardship at all stages of these facilities' life cycle	Fostering employee knowledge and skills in responsible water use at our sites and branches, identifying meaningful incentives to stimulate responsible water use

The Company works to reduce and, where possible, prevent negative impact on water resources caused by production and delivery operations.

<sup>1</sup> CAPEX to be updated in 2023 following the review of certain design solutions.

<sup>1</sup> The methodology to identify water-scarce areas is based on the data of the Aqueduct project of the World Resources Institute and Climate Zoning of the Russian Federation.

### Management of water stewardship risks

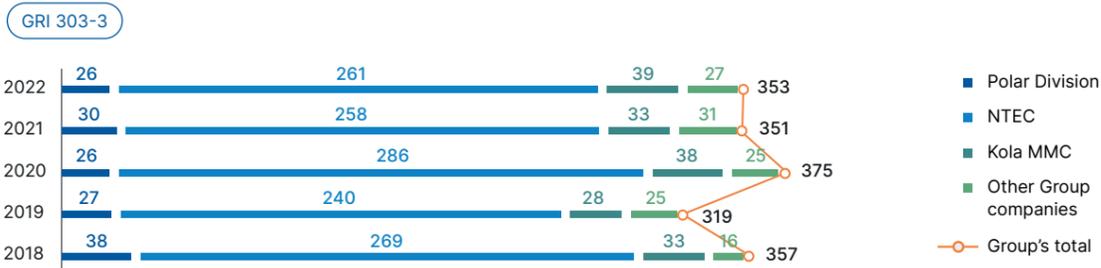
To manage risks, Nornickel regularly assesses its impact on water resources using the following procedures:

- wastewater inventory;
- monitoring of effluent volumes and quality at the discharge locations;

- observations of surface water bodies at control points upstream and downstream of the discharge locations;
- monitoring of wastewater treatment processes at treatment facilities and taking measures to improve treatment efficiency.

The Company continuously invests in improving the efficiency of existing water treatment systems and building new ones.

### Total water withdrawal from external sources<sup>1</sup>, mcm



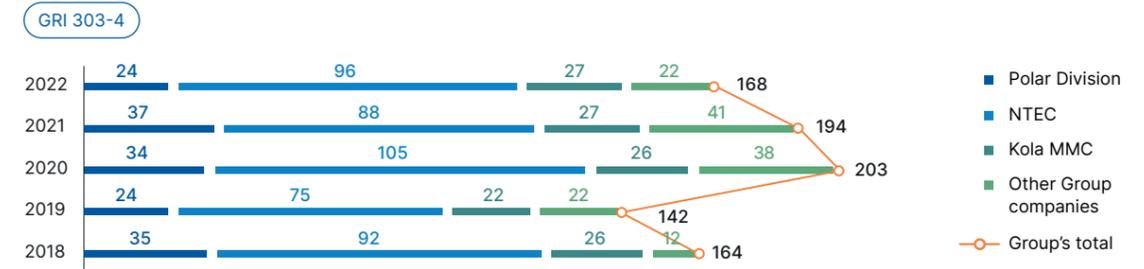
Water withdrawal in 2022 remained broadly flat y-o-y.

### Total water consumption<sup>2</sup>, mcm



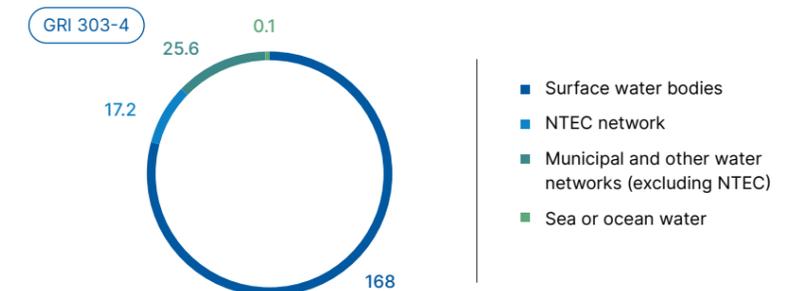
The water consumption for production needs increased due to the launch of new shops at Kola MMC, ramp-up of the Carbonyl Nickel Section, achievement of the designed capacity of the concentrate shipment section of the concentrator, and commissioning of a system for commercial accounting of power consumption at Polar Division.

### Total effluents, mcm



Nornickel's wastewater discharges into water bodies are predominantly in line with the pre-approved limits as required by Russian laws. Effluent discharge in 2022 went down by 13% y-o-y. The discharge of wastewater pollutants in 2022 decreased by 12% y-o-y, mostly due to changes in mine workings' inflow caused by weather conditions.

### Effluents by destination in 2022, mcm



<sup>1</sup> Excluding water reuse from NTEC. Until 2019 (incl.) the water withdrawal of Polar Division also accounted for the water withdrawal of Norilskenergo (MMC Norilsk Nickel's branch); since 2020, the latter has been accounted for as part of NTEC's water withdrawal. Data includes the natural inflow of mine water.

<sup>2</sup> The data in the chart is presented in line with GRI 303 (2018) methodology.



## Impact of transport on water bodies

GRI 303-1

The Company operates water and other modes of transport, which affects the environment. Nornickel's impact on water bodies was analysed during the big scientific expedition.

→ for more details, please see the [Biodiversity section](#).

The environmental impact of water transportation largely arises from:

- use of oil-containing fuel (mainly diesel fuel), which directly contributes to air pollution during combustion and indirectly – to water bodies' contamination;
- noise pollution affecting hydrobionts, marine birds and marine mammals;
- ballast, bilge and wash water sent by the Company to treatment facilities and then discharged into water bodies.

A fuel spill has the most potential adverse impact and is the key hazard for marine mammals.

The Company recognises that there are risks that may potentially lead to adverse environmental impacts. These risks include:

- losses during cargo operations (loading and unloading of oil products, bulk cargo, other substances);
- fuel spills;
- emergencies (leakage of oil products into water bodies);
- dispersal of invasive species by ballast water.

Risks associated with the negative impact of the Company's transport on water bodies are identified and mitigated within the framework of the environmental risk management system.

Nornickel's management of its impact on water bodies includes liaising with a wide range of stakeholders, in particular external experts and employees directly engaged in operations involving the Company's

water transport. Interaction with dedicated professionals helps Nornickel be more effective and efficient in reducing the negative and building up the positive impact on water resources.

In managing its impact on water bodies, the Company regularly carries out:

- pollutant emissions and discharges' review;
- industrial environmental control;
- measurement of the volume of water withdrawn from water bodies, as well as the volume and quality of effluent discharge, including drainage water;
- observations of water bodies (their morphometric features);
- observations of water protection zones;
- development of standards.

To reduce its environmental footprint, the Company also implements environmental protection measures and programmes aimed at reducing fuel consumption and preventing contamination of the Dudinka and Yenisey rivers. To compensate for the estimated damage to aquatic biological resources, Nornickel regularly releases juvenile fish.

Port infrastructure, including water transport with a negative impact on the environment, is operated in accordance with the Russian laws.

In 2022, Yenisey River Shipping Company (part of the Group) spent RUB 301.7 mln on environmental protection, up 65% y-o-y.

The funds were mainly used to support the maintenance and operation of the auxiliary fleet which serves to prevent river water contamination during the operation of vessels. The auxiliary fleet comprises five waste collecting vessels with a carrying capacity of 100–600 t, two vessels for complex waste processing and two treatment plants located at Podtyosovo and Yermolaevo repair and operations bases.

In 2022, Nornickel expanded its environmental fleet with Sborshchik-2, a motor vessel with a capacity of 150 t, which was acquired and put into operation after a repair.

During the navigation period, waste collecting vessels collect oil-contaminated water, sewage and rubbish from motor vessels along the Yenisey River and the Lower Angara River. Yenisey River Shipping Company has a licence to collect, transport, treat, utilise, neutralise, and dispose of waste of hazard classes 1–4. Waste collecting vessels also provide crews with drinking water. The company also renders these services to third parties lacking such a licence and auxiliary fleet.

In the 2022 navigation period, the collecting vessels collected a total of

**13.1** kt

of wastewater, including

**4.3** kt

of oil-containing water, and approximately

**1** kt of rubbish,

while also delivering

**3.5** kt of drinking water.

# Tailings and waste

## Sustainable waste management

GRI 306-1, 306-2, SASB EM-MM-150a.10, EM-MM-540a.2

In accordance with the Russian laws, the Company maintains records of waste generated, treated, recovered, neutralised, transferred to or received from third parties, and disposed of; these records are aggregated on a quarterly and annual basis. The Company aims to monitor waste management throughout its entire life cycle, including the management of waste by third parties. Contracts for further waste management are made with third parties possessing all necessary permits, licences, state expert conclusions, technical regulations and specifications.

More than 99% of waste generated by the Company is associated with mining and concentration and is not hazardous as this is overburden and host rock (hazard class 5), and tailings (hazard classes 4 and 5)<sup>1</sup>.

All other waste not associated with mining and concentration is a result of various production or other economic activities,

or comes from materials and products that have lost their consumer properties after having been used according to their intended purpose.

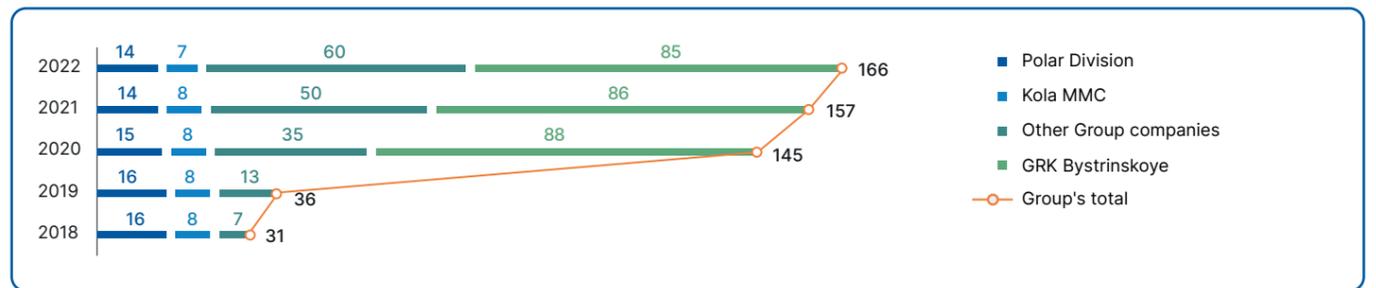
The most hazardous waste generated by the Company is hazard class 1 (extremely hazardous) and hazard class 2 (highly hazardous) waste. The majority of this waste is mercury lamps and thermometers, batteries, acids and alkalis used in batteries, uninterruptible power supplies, and oils.

Hazard classes 1 and 2 waste is below 0.001% of the total waste generated. In 2022, hazard classes 1 and 2 waste amounted to 57 t.

In compliance with the new legal requirements, in March 2022 Nornickel switched to a new procedure for managing hazard classes 1 and 2 waste, which includes the use of the dedicated state information system. As a result, in 2022:

- the Group companies generating hazard classes 1 and 2 waste entered into contracts with the Russian Environmental Operator for hazard classes 1 and 2 waste management;
- a series of meetings on the management of hazard classes 1 and 2 waste and on the performance of the federal state information system were held jointly with the Russian Environmental Operator;
- the business process target map for using the Federal State Information System for the Accounting and Monitoring of Hazard Class 1 and Hazard Class 2 Waste was developed from the moment of registering with the system to signing the primary accounting documents.

### Waste generation, mt



The total amount of waste generated in 2022 increased due to the expansion of production activities (mining and

concentration), as well as implementation of a programme on land clean-up and dismantling of unused buildings

and structures, which resulted in the generation of construction waste in the Norilsk Industrial District.

<sup>1</sup> Hereinafter hazard classes are as per the waste hazard classification adopted in Russia.

**Contribution to combating contamination with waste**

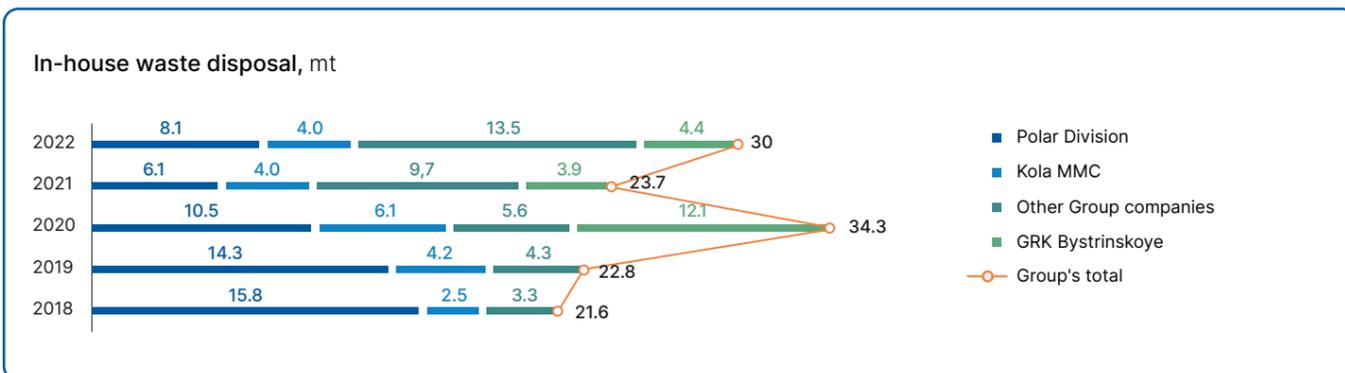
GRI 306-2, 306-4

Nornickel strives to foster non-waste production by developing and implementing waste recovery approaches, making efforts to clean up existing pollution. Waste generated by the Company is used by third parties and Nornickel itself for backfilling

of mined-out areas and pits, road filling, building of tailing dumps, and placement in waste dumps. Recovery provides for the economic utilisation of waste and reduction of landfill disposal, which helps minimise adverse environmental impact.

**Key projects and initiatives contributing to increased waste recycling and treatment**

Initiatives	Expected effect
Building a crushing unit for processing construction waste into certified crushed stone	15% of waste generated by the Company will be recovered
Constructing a ferrous scrap recycling shop	Ferrous scrap metal processing capacity will be 100 ktpa
Building a non-ferrous scrap recycling shop	Non-ferrous scrap metal processing capacity will reach 2 ktpa
Launching a pilot project for waste sorting in Monchegorsk	80% of waste generated by the Company will be sorted
Processing large tyres and rubber products into crumb rubber / pyrolysis fuel	All of the Company's rubber products waste will be recycled
Developing a technology to recycle sludge	-



An increase in waste disposal in 2022 was due to the use of overburden in own operations (road backfilling, strengthening of tailing dumps, site levelling).

In 2022, the Company continued implementing the Clean Norilsk Project to clean up industrial and construction waste.

To implement the Project, in 2020 the Company's Polar Division established dedicated units tasked with:

- dismantling of unused and dilapidated buildings and structures;
- clean-up of production waste and scrap metal;
- removal of waste and scrap metal to special landfills and processing sites;
- clean-up of waste and scrap metal in hard-to-reach locations of the forest-tundra area;
- implementation of land rehabilitation measures;
- processing of collected scrap into charge for further transportation.

Since the start of the Clean Norilsk programme in 2021, 262 dilapidated buildings have been dismantled, 71 kt of scrap metal and 814 kt of waste collected and removed, and an area of 2.6 million m<sup>2</sup> cleaned. The technical phase of disturbed land rehabilitation was carried out on an area of 78.8 ha. Total costs since Clean Norilsk was implemented have exceeded RUB 11 bn.

**By 2030, Nornickel plans**

Remove up to **2** mt of waste

> **600** kt of scrap metal

Clean an area of up to **24** million m<sup>2</sup>

Dismantle **over 500** abandoned structures

Taking into account the scope of work, seasonality factor, and a large distance between the to-be cleaned areas and waste disposal sites, the programme will be carried out in stages

over the next **10** years

According to preliminary estimates, the programme's cost will exceed

RUB **40** bn



## Waste disposal

### Tailing dumps

SASB EM-MM-540a.1, EM-MM-540a.2

Nornickel takes a responsible approach to tailings management, paying particular attention to their physical and technological safety.

In 2021, the Company put in place a Tailings Management Policy, which is fundamental for managerial decision-making.



The Company currently operates six tailing dumps.

Division/subsidiary	Number of tailing dumps	User
Polar Division	2	<ul style="list-style-type: none"> <li>Talnakh Concentrator,</li> <li>Nadezhda Metallurgical Plant</li> </ul>
Medvezhy Ruchey	2	<ul style="list-style-type: none"> <li>Norilsk Concentrator</li> </ul>
Kola MMC	1	<ul style="list-style-type: none"> <li>Zapolyarny Concentrator</li> </ul>
GRK Bystrinskoye	1	<ul style="list-style-type: none"> <li>Bystrinsky Concentrator</li> </ul>

A gypsum storage facility is also under construction in Norilsk.

The Company regularly monitors the condition of hydraulic structures of tailing dumps and conducts environmental monitoring in the adjacent areas.

Nornickel complies with the Russian laws associated with tailings management. Additionally, we developed mandatory safety criteria to operate each tailing dump and had them approved by regulators. The Company regularly reviews the time frames for decommissioning of tailing dumps and determines the future closure and land rehabilitation costs. Based on the results, the Company calculates the

present value of future costs, recognising its environmental provision with respect to the tailing dumps.

Nornickel takes a risk-based approach to tailings management. To address tailing dump-related risks, the Company has organisational units and officers providing regular reports to the management. Such units engage qualified and experienced staff. The hydraulic structures are constantly monitored by the operating personnel and a dedicated environmental team.

In addition to the Company's initiatives, Rostekhnadzor carries out annual pre-flood inspections of hydraulic structures together

with Nornickel employees. Every five years, the hydraulic structures are subject to detailed inspections by a Rostekhnadzor-certified agency that issues an industrial safety declaration upon which Rostekhnadzor carries out a comprehensive audit.

Over the last five years, there have been no environmental incidents at the Company's hydraulic structures.

SASB EM-MM-540a.3

There are two processes in place to assess the Company's tailing dump-related risks:

- estimates of potential damage to life and health of individuals, and to property of individuals and legal entities as a result of an emergency at a hydraulic structure. Estimates of potential damage serve to identify possible emergency scenarios and assess emergency risks and the negative impact on communities, ecosystems and critical infrastructure;
- assessment of technical and production risks carried out in line with Nornickel's Regulations on Technical and Production Risk Management.

Potential damage estimates show minimum risks for local communities, ecosystems and critical infrastructure in case of an emergency, as all of the tailing dumps operated by Nornickel are located away from production facilities and residential areas.

Nevertheless, the Company develops emergency preparedness and response plans for worst-case scenarios, as required by the Russian laws. The plans determine roles, responsibilities, and communication procedures.

The emergency preparedness and response plans as well as the public warning system are subject to periodically testing. At least once every five years, when developing a safety declaration Nornickel runs comprehensive drills to verify its preparedness for containing and eliminating emergencies at hydraulic structures. These drills are attended by experts from EMERCOM. If successful, an opinion is issued on the company's readiness to contain an emergency at a hydraulic structure and protect local residents.

Nornickel has all necessary material and financial resources required to respond to an emergency at its tailing dumps and promptly repair any damage, including a sufficient fleet of excavators, dump trucks and other special vehicles (as outlined in contingency plans). Employees operating the tailing dumps undergo regular dedicated training and knowledge tests mandated by Rostekhnadzor.

# Soil protection and responsible mining

## Land protection

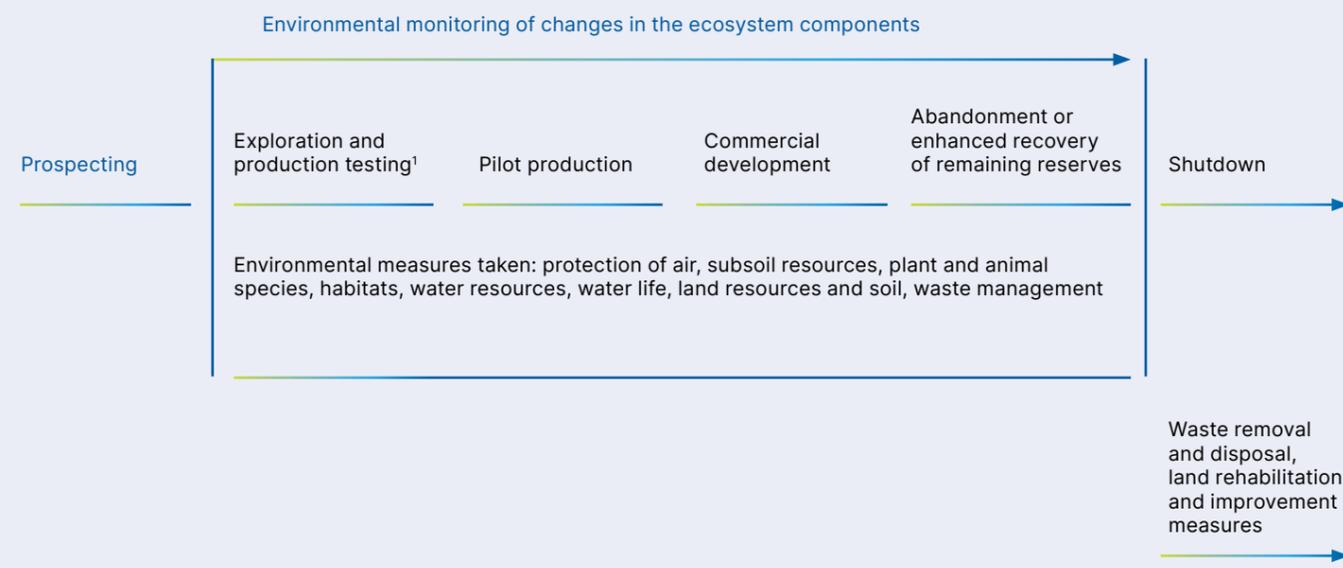
Nornickel seeks to reduce the negative impact on soils resulting from the Company's operations. To this end, Nornickel focuses on the rehabilitation of all land affected by construction and mining, as well as otherwise affected by our operations.

Nornickel is developing the Oktyabrskoye, Talnakhskoye and Norilsk-1 deposits on the Taimyr Peninsula, Zhdanovskoye, Zapolyarnoye, Kotselvaara and Semiletka deposits on the Kola Peninsula, and the Bystrinskoye deposit in the Trans-Baikal Territory.

For each deposit, the Company has built and is continuously updating a list of measures to prevent or mitigate potential negative effects on the environment while ensuring sustainable use of natural resources throughout the deposit life cycle.

The Company conducts an environmental impact assessment, including a negative impact on land, in accordance with the Russian laws.

### Environmental protection and monitoring measures taken during the deposit life cycle



- 1 • State and public environmental review
- Environmental Impact Assessment (EIA):
  - Review of layout options and technology
  - Environment analysis and environmental impact assessment
  - Mitigants
  - Monitoring programmes
  - Public discussions with local community

The Company has field development, mine liquidation and land rehabilitation project documents in place for all of its deposits. Nornickel's deposits are in commercial

development, exploration or production test stages with liquidation or abandonment not expected until 2050 and special provisions set aside for rehabilitation activities.

### Disturbed and rehabilitated land area in 2022, ha

GRI 304-3

Indicator	Total	Including:			
		during mining	during construction	during disposal of solid domestic and industrial waste	during other activities
Total disturbed area, beginning of period	16,694	14,055	1,066	782	791
Total rehabilitated area <sup>1</sup>	75	0	0	0	75
Total disturbed area in the reporting period	317	145	127	45	0
Total disturbed area, end of period	16,936	14,199	1,193	828	716

### Completion of the restoration efforts at CHP-3

In January 2022, NTEC transferred land plots of a total area of 47.5 ha to the Norilsk Administration, with certificates for acceptance and delivery signed; 2021 saw the rehabilitation of these land plots, which were contaminated by the fuel spill and disturbed during clean-up activities.

As for the remaining area of 27.4 ha, the rehabilitation works were completed in full in the reporting year.

The quality of the work performed is confirmed by:

- lab tests of the rehabilitated soils conducted by the Trofimuk Institute of Petroleum Geology and Geophysics of the Siberian Branch of the Russian Academy of Sciences;
- report on the inspection control and evaluation of the work quality submitted by the Institute of Soil Science and Agrochemistry of the Siberian Branch of the Russian Academy of Sciences.

The transfer of the rehabilitated land plots of a total area of 27.4 ha to the Norilsk Administration is scheduled for 2023.

<sup>1</sup> The table does not include data on disturbed and rehabilitated land near CHP-3.

## Responsible exploration and field development

To replenish its resource base, Nornickel focuses closely on exploration, including geophysical and geochemical surveys and drilling at promising subsoil areas across the Company's current operations. Nornickel sees a significant potential for the discovery of new deposits and plan to continue exploration both within and beyond its footprint to unlock it.

The Group's exploration activities are subject to various regulations of the Russian Federation covering subsoil use, environmental protection, occupational health, industrial and fire safety. Furthermore, Nornickel assesses its environmental protection obligations based on the requirements of applicable laws in various jurisdictions, terms of licence

agreements and internal engineering estimates as interpreted by the Company's management.

In order to assess, monitor and predict the environmental situation during exploration, development and operation of deposits to make competent management decisions aimed at preserving habitats and ensuring environmental safety of traditional trades, we conduct environmental monitoring at all stages of exploration and development.

As Nornickel seeks to keep ecosystem intact, it avoids exploration at protected natural areas and world heritage sites, and ensures no negative impact on the traditional industries, cultural heritage, interests and traditional lifestyles of indigenous peoples.

In addition to environmental monitoring, exploration is accompanied by a set of measures to protect the subsoil, topsoil, vegetation and water bodies. Upon completion of reserve exploration, disturbed land is subject to rehabilitation including liquidation of drilling sites, neutralisation of soil contaminated with fuel and lubricants, as well as land levelling. The sites are brought to a condition suitable for further use according to their intended purpose.

### Exploration areas of Nornickel Group in 2022



Environmental impact of exploration activities

Activity	Source of impact	Type of impact	Object of impact	Environmental activities
Preparatory works: <ul style="list-style-type: none"> <li>• Drilling site lay-out</li> <li>• Equipment transportation and storage</li> <li>• Construction of storage facilities for chemicals, fuel and lubri-cants</li> </ul>	<ul style="list-style-type: none"> <li>• Road transport</li> <li>• Exhaust gases of motor vehicles, construction and road machinery</li> <li>• Excavated soil</li> <li>• Materials for site construction and preparation of drilling mud and ce-ment slurries</li> </ul>	<ul style="list-style-type: none"> <li>• Physical disturbance of the fertile soil layer, natural landscapes, thermal abuse, degradation of topsoil layers.</li> <li>• Ecosystem disturbance, changes in the flora and fauna habitats</li> </ul>	<ul style="list-style-type: none"> <li>• Fertile soil layer on drilling equipment sites, routes of linear facilities</li> <li>• Flora and fauna, atmospheric air, soil, ground, sur-face water, land-scape</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with land allotment standards</li> <li>• Land rehabilitation</li> <li>• Construction of trays and platforms at machinery parking lots</li> <li>• Soil protection measures</li> <li>• Fire safety measures</li> </ul>
Well drilling	<ul style="list-style-type: none"> <li>• Mud mixing unit</li> <li>• Drilling waste circulating system</li> <li>• Chemicals used for drilling and plugging</li> <li>• Waste products (mud spills, slime)</li> <li>• Domestic wastewater</li> <li>• Solid domestic waste</li> <li>• Crossflows inside the annulus and damaged casing string</li> </ul>	<ul style="list-style-type: none"> <li>• Ecosystem disturbance and changes in habitats of certain plant and animal species</li> <li>• Machinery-generated noise</li> </ul>	<ul style="list-style-type: none"> <li>• Flora and fauna, soils, subsoil, surface and underground water, snow cover, air</li> <li>• Animal and human habitats</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with the requirements for the completeness of the study and use of subsoil</li> <li>• Planning protective measures based on the results of hydrological, geotechnical and environmental monitoring</li> <li>• Well plugging</li> </ul>
Well abandon-ment and mothballing	<ul style="list-style-type: none"> <li>• Leaks in casing, casing pipes, wellhead equipment, mineralised water</li> </ul>	<ul style="list-style-type: none"> <li>• Ecosystem disturbance and changes in habitats of certain plant and animal species</li> </ul>	<ul style="list-style-type: none"> <li>• Flora and fauna, soils, surface and underground water, air, animal and human habitats</li> </ul>	<ul style="list-style-type: none"> <li>• Plug and abandonment operations</li> <li>• Rehabilitation</li> </ul>

# Biodiversity

## Biodiversity impact management

SASB EM-MM-160a.1

Nornickel recognises the need to protect the environment and seeks to prevent net biodiversity losses caused by the Company's operations.

The Company's activities in this area are guided by the following principles:

- biodiversity impact management;
- sustainable use of natural resources;
- conservation of key biodiversity values;
- recognition of the importance of biodiversity conservation in preventing climate change;
- protection and promotion of the sustainable use of terrestrial ecosystems;
- protection of freshwater and marine ecosystems;
- assistance in preventing the extinction of threatened species;
- transparent operations and open dialogue with local communities on biodiversity impact management;
- prohibition of exploration and mining at World Heritage sites and in all protected natural areas.

In 2021, the Company committed to preserve biodiversity by issuing a Position Statement on Biodiversity<sup>1</sup>. In 2022, Nornickel started to deliver on its commitments, with the first step being a baseline biodiversity research.

The project on the baseline biodiversity research called the Big Scientific Expedition was the jump-off point for the development of the Company's biodiversity impact

### Nornickel's biodiversity goals

- Ensure preservation, recovery and sustainable use of terrestrial ecosystems
- Ensure sustainable management and protection of marine and coastal ecosystems
- Ensure protection and restore biodiversity of water bodies
- Protect, restore and promote sustainable use of terrestrial ecosystems and their biological resources
- Take measures to stem the degradation of habitats, biodiversity loss, and extinction, protect endangered species
- Ensure that the value of ecosystems and their biodiversity is taken into account when planning new and expanding current operations of the Company.

management system. The expedition included a comprehensive study of ecosystems in the areas where the Group companies operate, which helped identify the main aspects necessary to develop a biodiversity impact management system:

- historical data on ecosystems;
- boundaries of areas with a negative impact on ecosystem biodiversity;
- negative factors and threats to biodiversity;
- indicator species reflecting the ecosystem condition;
- key biodiversity values in the negative impact areas;
- reference areas;
- biotic and abiotic indicators of the present state of ecosystems in the identified areas of negative impact and in reference areas.

In 2023, the Company plans to continue its biodiversity research, aiming for continuous monitoring of biodiversity. This approach will help capture changes in the state of ecosystems, while changes in the deviation targets of the impacted areas as opposed to reference areas will help assess the effectiveness of the Company's initiatives.

The data on biodiversity indicators obtained in 2022 following the expedition<sup>2</sup> helped form the basis for determining the Company's biodiversity conservation target.

To effectively manage the negative impact at the Head Office level, a draft corporate standard for ecosystem biodiversity conservation and monitoring was developed and is expected to be finalised in 2023–2024.

<sup>1</sup> Publicly available at Nornickel's website.

<sup>2</sup> For more details, please see [the presentation](#) on the results of the Big Scientific Expedition at Nornickel's website.

In addition, the Company's divisions and some remote assets that have a negative impact on biodiversity are developing and adopting their own local biodiversity conservation programmes.

Nornickel's biodiversity impact management system covers all stages of the project life cycle, from pre-FEED to post-liquidation. The system provides for mandatory pre-project biodiversity research.

**Impact on biodiversity in terms of value chain and life cycle stages**

Nornickel's mining facilities include mines and open pits operated by mining enterprises of the Company. Processing facilities include mills and factories. Logistics facilities comprise marine and river transport companies. Energy facilities consist of fuel and energy enterprises.

Nornickel's mining, processing and energy facilities are interconnected into production clusters that are located in the shared areas and have both an individual and cumulative impact on ecosystems. When it comes to biodiversity monitoring, it is not practical to break down enterprises along the value chain into categories as they are connected in terms of location. For such conglomerates, biodiversity impacts are managed through unified biodiversity conservation and monitoring programmes in unified areas of cumulative impact.

Water transport companies develop separate programmes for biodiversity conservation taking into account their specifics.

Biodiversity conservation issues are also included in the supplier management system as part of the relevant section in the Supplier Code of Conduct, which the contractors are required to follow.

Most of Nornickel's assets are in operation, and they also have the greatest impact on biodiversity. In the reporting year, all existing mining, production, energy and logistics assets saw biodiversity studies, training of specialists, and drafting of biodiversity impact management system documentation.

In 2022, the Company's asset in Nickel was prepared for liquidation. Biodiversity monitoring continues around the shutdown workshop.



**Assessment of Nornickel's impact on biodiversity**

GRI 304-1

The features of the areas affected by the Company's operations for more than 80 years were studied during the 2022 big scientific expedition. The expedition was conducted by Nornickel jointly with the Siberian Branch of the Russian Academy of Sciences to identify the Company's impact area and assess the current state of ecosystem biodiversity within the proposed impact areas. The Siberian

Branch of the Russian Academy of Sciences was selected as an institution capable to attract a large number of experts from relevant scientific institutions in a variety of regions. The expedition also involved experts from specially protected natural areas situated nearby in view of their comprehensive knowledge of the local context.

The research covered three regions: Trans-Baikal Territory, Murmansk Region, Krasnoyarsk Territory (including water transport companies' ports), and a section of the Northern Sea Route.

**Boundaries of impact areas, km**

Division	Impact			Updated impact area
	Significant	Medium	Low	
Trans-Baikal Division	1	1-5	5-10	10
Norilsk and Energy divisions	1-2	1-5	2-10	10
Kola Division	2-3	3-10	10-16	16

The most significant changes manifested in the reduction of most of the recorded biodiversity parameters are observed in the area of significant impact of the Company and have clearly delineated boundaries marked as sanitary protection areas, which

in some cases may extend up to 1–3 km beyond the territory where Nornickel operates. The boundary between medium and low impact areas is conventional as the differences in biodiversity parameters

between these areas are generally insignificant, and a comparative analysis reveals almost no statistically significant differences.

**Main biodiversity threats**

GRI 304-2

The research identified negative factors and threats to biodiversity. The main negative factors affecting biodiversity due to the Group's operations:

- habitat fragmentation caused by withdrawal of territories, including transport and energy infrastructure;
- landscape transformation due to overburden and rocks, and hydraulic facilities (tailing dumps);
- contamination of the environment with emissions and discharges;
- human activities.

The most obvious threats to biodiversity following the expansion or lack of timely upgrade of the production facilities:

- man-induced transformation of habitats of typical and rare animal species;
- fragmentation of species and communities' habitat;
- mediated expansion of certain vector species' distribution;
- introduction of non-native species;
- increased frequency and scale of fires.



**Ecosystems of the Norilsk Industrial District (Norilsk and Energy divisions)**

According to the research results, emissions have a significant impact on ecosystems, getting lower with distance. In some areas, utility effluents from production facilities also affect water bodies. In the surroundings of Norilsk to the south along the Medvezhy Ruchey valley, impact on vegetation cover in the form of chemical burns on leaves can be traced up to 15 km from production facilities, while a reliable decrease in species diversity is observed at a distance of up to 3–4 km. At longer distances, no credible impacts on vegetation biodiversity are observed.

A specific feature of the Norilsk Industrial District is the proximity of production facilities and their common cumulative impact zone. Norilsk Division comprises mining, processing and energy companies, as well as the city of Norilsk and other associated facilities, collectively referred to as the Norilsk Industrial District. Their impact on biodiversity is of a cumulative nature and therefore viewed as a single area of negative impact.

The specially protected natural area located closest to the Company’s facilities is the Putoransky State Nature Reserve, which

is over 50 km away from Norilsk Division’s enterprises and, according to the research, does not suffer a negative impact on biodiversity.

**Ecosystems in the vicinity of Kola Division enterprises**

The soil cover of the Monchegorsk District (Murmansk Region) is dominated by podzols and peat swamp soils of low fertility and high acid content. Due to natural geochemical anomalies associated with the occurrence of ore bodies, there are labile Ni, Cu, Co, Cr, Cd, and As found in more than a 20 cm deep layer of soil, which are most likely to cap biodiversity and productivity of plants and animals. The second major factor limiting biodiversity is man-induced contamination. Nornickel deposits in Zapolyarny and Nickel fall within the natural geochemical anomaly areas.

The results of hydrobiological surveys show that Lake Arvaldemlompolo, which is located in the significant impact area as compared to the Eastern Ore Cluster, is most affected by human impact. According to the results of test catches and collection of ichthyoplankton, there is no ichthyofauna in this water body. A potential

negative factor reducing hydrobiont and ichthyofauna communities’ biodiversity is utility effluents (in addition to industrial sewage) from urban enterprises containing many organic pollutants. It should be noted that the Company is not the only user of this water body cumulatively affected by many facilities.

The bird fauna boasting the largest number of species and specimens can be found in the area of significant impact from production facilities and near residential areas. The high numbers of certain bird species in the significant impact area do not mean it is a low-pressure area; rather, they are driven by the high concentration of wintering birds near human habitation. In this particular case, the increase in the bird number and species diversity is also supported by non-freezing water bodies, and trees and shrubbery.

**Ecosystems in the vicinity of Trans-Baikal Division enterprises**

The most significant decline in species diversity is observed in the significant impact area in the immediate vicinity of the

Company’s facilities. The boundary of the significant impact area runs approximately 1–2 km from Nornickel facilities.

Soils near the Company’s Trans-Baikal Division enterprises are naturally of low fertility, have a subacid or medium acid reaction and high concentrations of arsenic. The main factor potentially limiting biodiversity in the area is low soil fertility. Because of this, plants and animals may experience a lack of biophilic macro- and micronutrients. The second major factor potentially limiting biodiversity is man-induced soil contamination.

The analysis of floristic and coenotic diversity showed that there are two sites suffering from the Company’s operations:

- extensive wetland area (floodplain of the Bystraya River, supported by spurs of the Uryumkansky ridge from the north, west and south). A nearby tailing dump may influence the floristic composition and diversity of plant communities due to groundwater inflow;
- woodland is represented by a variety of larch, birch, and mixed larch and birch forests. The area was heavily influenced during the period of gold mining. Currently, waste dumps are being overgrown with vegetation, with no visible changes in the forest vegetation due to Bystrinsky GOK.

All bird communities in the vicinity of Bystrinsky GOK are very diverse. Species diversity is the lowest in the significant impact area and the highest (over 30

species) in the areas of medium and low impact. All communities are aligned; there are no species with too high an abundance compared to the others. Faunal diversity and bird density have little dependence on the level of impact from the Company’s facilities, but are more related to the diversity of biotopes on a particular reference site.

The Uryumkan Nature Reserve in the Gazimuro-Zavodsky District (Trans-Baikal Division) is located closest to Trans-Baikal Division facilities and its area of impact and is the most important for biodiversity maintenance and restoration. The distance between the Nornickel site and the Uryumkan Nature Reserve is 22 km. Thus, it appears that Trans-Baikal Division enterprises do not have a significant impact on biodiversity and the ecosystem of specially protected natural areas in the region.

**Ecosystems of port areas of river transport enterprises**

The research showed that all three segments of Krasnoyarsk River Port and Lesosibirsk Port are only minor elements of the overall urban agglomeration. Based on a number of facts, it can be said that Nornickel’s enterprises in Krasnoyarsk River Port and Lesosibirsk Port have no specific impact on bird populations and microbiological parameters of water bodies. A biodiversity conservation programme was developed to manage the impacts

on the biodiversity of river transport industry, focusing specifically on preventive measures to minimise the pollution of water bodies during the operation of vessels and port facilities possessed by the Company.

**Specific impacts of branches using the Northern Sea Route**

According to the bird fauna research results, the minimal impact of the ports’ berthing facilities is inseparable from the overall impact of the ports and the urban territory as a whole. Therefore, it is not the operation of the berths that has a significant impact on biodiversity of the ornithocomplexes and marine mammals but the shipping traffic on the Northern Sea Route as a whole. To manage the biodiversity impact from vessel operations, a programme of measures has been developed that include preventing the pollution of the water body from the operation of berths and minimising the negative impacts from shipping. Population monitoring of birds and marine mammals was carried out along the Northern Sea Route in 2022.

## Key biodiversity values identified in the impact areas of Nornickel's operations

GRI 304-1

Key biodiversity values include protected species as well as critical habitats and key biotopes<sup>1</sup>.

For the information on protected species found in the impact areas of the facilities see the [Appendix GRI Quantitative Indicators Disclosure](#).

### Norilsk and Energy divisions

In the Norilsk Industrial District, a habitat critical for the conservation of a rare plant species, northern spikemoss (*Selaginella selaginoides*), was identified. The plant has an extensive Holarctic distribution, but is far from being of universal occurrence. The identified habitats are considered as critical and should be used for multi-year monitoring of the species' local populations.

In addition to rare species' habitats, highly threatened and/or unique ecosystems were identified within Energy Division's footprint, in particular the steppe-tundra habitats on the boulder trains in the Medvezhy Ruchey valley. This steppe-tundra is a relic of the Last Glacial Period – a period of cold and dry climate, when mammoths existed. It is of scientific interest as a living witness of past geological epochs and is a valuable resource for species occupying newly emerging habitats amid global climate change.

Norilsk Division also includes habitats of plant communities with a high level of diversity, specifically, larch forests and alder thickets with an extensive grass cover, as well as the abundance of herbaceous perennial species that are rare or absent in other types of communities.

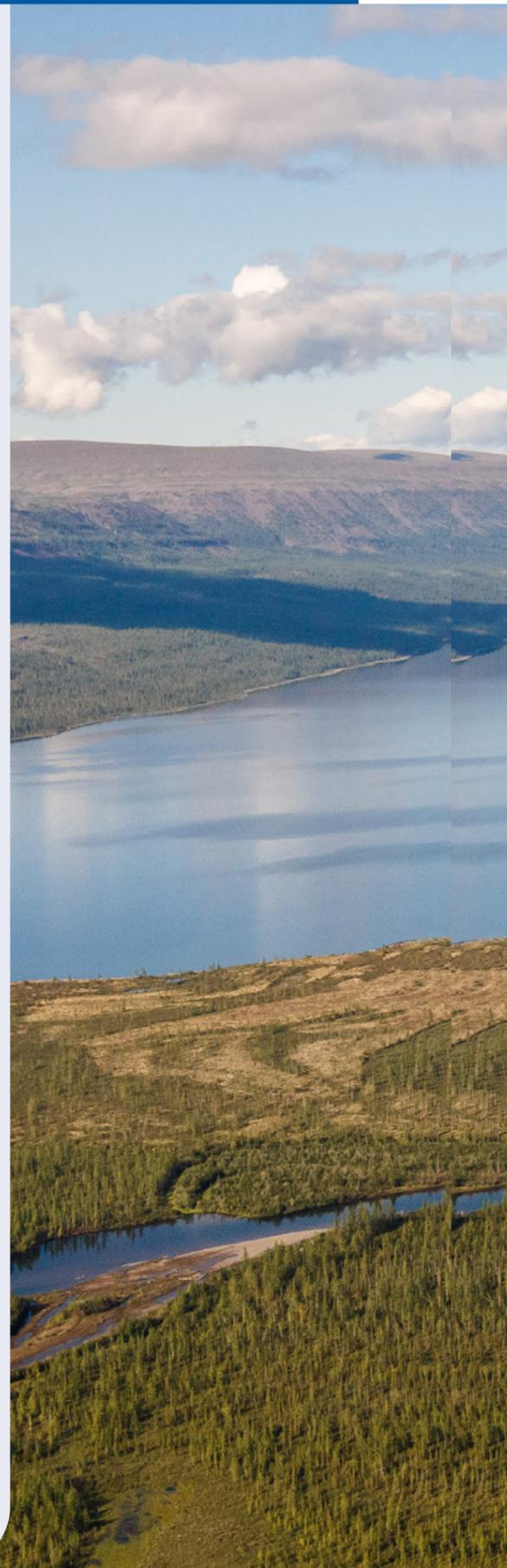
### Kola Division

There are two state nature reserves whose territories and buffer zones are partly located within the identified areas of medium and low impact of Kola Division: Pasvik and Lapland nature reserves. They are home to endemic species and/or species with a limited distribution area as well as critically endangered and/or unique ecosystems.

These reserves can be viewed as critical habitats requiring continuous monitoring. Nornickel will pay particular attention to areas falling within the proposed footprint of the former smelting shop which was decommissioned by 2022.

### Trans-Baikal Division

As far as Trans-Baikal Division is concerned, the research area did not exceed 1% of the protected species' (birds and plants) habitats in the Trans-Baikal Territory. Under IFC Performance Standard 6 dated 1 January 2012, the area of Trans-Baikal Division facilities' operations cannot be classified as critical habitat for any of the protected bird species identified. Based on observations made during the warm season of 2022, it was not possible to identify key biotopes.



## Biodiversity conservation efforts

Nornickel is developing initiatives to reduce the pressure on ecosystems taking into account the mitigation hierarchy, i.e., the **avoid – reduce – restore – compensate** principle. These initiatives seek to:

- avoid direct and indirect negative impacts on ecosystems (e.g., closure of Nickel Plant);
- reduce and minimise direct and indirect negative impacts on ecosystems (e.g., the Sulphur Programme, construction of local wastewater treatment plants, bigger share of water recycling ecosystems);
- restore ecosystems (e.g., disturbed land rehabilitation);
- compensate (e.g. restore fish populations by releasing fish fry).

Nornickel's Environmental and Climate Change Strategy groups the above measures in categories depending on negatively impacted natural environments targeted.

In 2022, Nornickel invested  
**RUB 90 mln**  
in biodiversity conservation.

### Cooperation with the government on biodiversity conservation

In 2022, Nornickel entered into two agreements with the Russian Ministry of Natural Resources and Environment as part of the federal Biodiversity Conservation and Ecotourism Development project.

The first agreement is to protect the population of an endangered bird species of the Falconidae family, the gyrfalcon<sup>1</sup>. The project is expected to be implemented in 2023.

The second one is for the conservation and restoration of the polar bear population<sup>2</sup>. As part of the project to cooperate with the Umka 2022 expedition of the Russian Geographical Society and the Russian Navy Headquarters, a drone survey of polar bears on Wrangel Island was conducted in August and September 2022. The survey also focused on polar bears' food sources, namely walrus, whales, seals, bearded seals, as well as muskoxen and semi-aquatic birds. Data was collected on animal deaths.

In addition to recording the number of polar bears on Wrangel Island, the survey helped clarify their distribution on the island and assess the state of the polar bear and their habitats. 67 samples (sea and river water, snow, soil and biota, including samples of liver, wool and feathers of dead animals and birds) were taken for further analysis to determine heavy metal and persistent organic contaminants.

2022 surveys show that the population of polar bears is currently estimated

at **1,910**

<sup>1</sup> Habitats of rare and endangered plants, fungi, or animal species, or large populations of rare and endangered species; areas of special significance for vertebrate animals' life cycles (reproduction, rearing of the young, fattening, rest, migration, etc.).

<sup>1</sup> Over the past 20 years, the gyrfalcon population in Russia has fallen by almost three times due to poaching. Now it is estimated at 3,500–5,000 breeding pairs.

<sup>2</sup> Polar bear is one of the 13 wildlife species included in the list of rare and endangered animal species that require priority recovery measures.

### Cooperation with specially protected natural areas and tourism development

Cooperation with nature reserves represents one of the ways for Nornickel to help conserve and restore biodiversity.

Our cooperation with nature reserves primarily focuses on developing research and technology and supporting their social, volunteering and environmental awareness programmes.

Following a special request, in 2014–2022 Nornickel provided RUB 9.8 mln to the Joint Directorate of Taimyr Nature Reserves to update infrastructure involved in the directorate’s core activities. Among other things, the funds were used to:

- acquire construction materials;
- buy equipment: a boat, boat motors, and satellite communication sets;

- finance a flight to deliver a prefabricated mountain home to the Kureyka River area;
- carry out facility repairs;
- hold anniversary events.

The Joint Directorate of Taimyr Nature Reserves is an active participant of the Company’s Socially Responsible Initiatives Competition. Between 2013 and 2020, it

won eight grants totalling RUB 26.5 mln. The funds were used to implement socially significant projects.

2022 saw the creation of a roadmap for implementing Nornickel’s Environmental and Climate Change Strategy, which includes fostering systemic work and partnerships with the Joint Directorate of Taimyr Nature Reserves related to biodiversity monitoring

and conservation, development of nature reserves, support for research work, and environmental education. To this end, the Company donated RUB 20 mln to the Joint Directorate of Taimyr Nature Reserves. The research will be carried out by the Directorate in 2023. In 2022, the allocated funds were used for preparatory work and procurement of research equipment.



Biological species living on the territory of the Pasvik Nature Reserve and the Lapland Nature Reserve, listed in the Red Books and the Red List of the International Union for Conservation of Nature<sup>1</sup>

GRI 304-4

Indicator	Pasvik	Lapland
On the IUCN Red List	4	1
On Russia’s Red Data Book	22	24
On the Murmansk Re-gion’s Red Data Book	117	163

<sup>1</sup> The nature reserves are located in a relative proximity to the Kola MMC operations