

# Approaches to climate change management

## Nornickel's approach to climate change



Nornickel recognises and considers the risks associated with the challenge of global climate change and contributes to the implementation of the Paris Agreement's goals to hold the increase in the global average temperature to well below 2 °C and pursue efforts to limit the rise to 1.5 °C above pre-industrial levels by the end of the 21st century. As a signatory to the UN Global Compact, the Company fully supports the UN Sustainable

Development Goals (SDGs), in particular SDG 13: Climate Action. In addition, Nornickel contributes to the achievement of national climate policy goals and objectives as set forth in the [Climate Doctrine of the Russian Federation](#) and the [Strategy of Socio-Economic Development of the Russian Federation with a Low Level of Greenhouse Gas Emissions until 2050](#).

### Practical implementation of the above statements

Nornickel develops innovative technology solutions and implements climate change adaptation projects, including those related to monitoring the condition of permafrost soils in its regions of operations

Nornickel is developing innovative projects focused on expanding renewable energy capacity and enhancing greenhouse gas absorption by waste materials in tailings storage facilities

Nornickel is implementing its 2031 Environmental and Climate Change Strategy. This strategy enables the Company to maintain some of the lowest greenhouse gas emissions and one of the most competitive product carbon footprints among major global industry peers, even as production volumes increase

Nornickel provides financial and organisational support for scientific research and development projects related to climate change, and collaborates with research institutions

Nornickel is pursuing a business strategy aimed at growing the production and sales of metals that are critical for the global transition to a green economy

Nornickel engages with the expert community, professional associations, and public authorities on climate change matters

### Why climate change issues are important to the Company

Global warming issues are of particular relevance to Nornickel, as the Company's core production and energy assets are located within the Arctic zone. Various experts estimate that the average surface temperatures in the Arctic are rising three to four times faster than the global average, posing additional operational risks. The primary threat stems from permafrost thawing, which undermines the stability of building and structure foundations.

The Company's green metals basket is already widely used in transport, infrastructure, renewables, and hydrogen energy sectors. In addition, Nornickel plans to launch new products based on its metals for use in areas such as hydrogen and solar energy as well as aviation fuels.

## Climate change governance

### Allocation of responsibilities

GRI 2-9, 2-12, 2-13 / TCFD Ga, Gb / TNFD Ga, Gb

Nornickel has established a comprehensive system for managing climate change-related matters.

Responsibility is allocated vertically, starting from top – with the Company's key governance bodies: the Board of Directors and the Management Board of MMC Norilsk Nickel.

The Board of Directors reviews and approves the strategic targets set out in the 2031 Environmental and Climate Change Strategy, sets the Company's risk appetite, and oversees the management of climate-related risks.

To ensure deeper consideration of these matters, the Board established the Sustainable Development and Climate Change Committee.

### Matters reviewed by the Sustainable Development and Climate Change Committee

Integrating sustainability principles, including climate change, into Nornickel's activities

Managing risks and internal controls related to sustainable development and climate change

Overseeing the external audit of the Company's sustainable development and climate change reporting

Preparing the Company's internal reports and disclosures on sustainable development and climate change

Developing and implementing the 2031 Sustainable Development and Climate Change Strategy

For a detailed chart of functional responsibilities, please see [Nornickel's 2024 Climate Change Report](#).

The implementation of climate-related risk management process is, among other responsibilities, assigned to the Risk Management Committee under the Management Board of MMC Norilsk Nickel. Members of the Management Board coordinate the parameters of the Company's risk appetite, including those related to climate change (such as greenhouse gas emissions), and provide recommendations to the Board of Directors for approval. Key risks, including those associated with climate change, are reviewed on a quarterly basis.

Executive responsibility for overseeing the development and implementation of the 2031 Environmental and Climate Change Strategy lies with the Vice President for Ecology and Industrial Safety, who also supervises the Sustainable Development Department and the Ecology Department at the Company's Head Office.

### Corporate documents on climate change

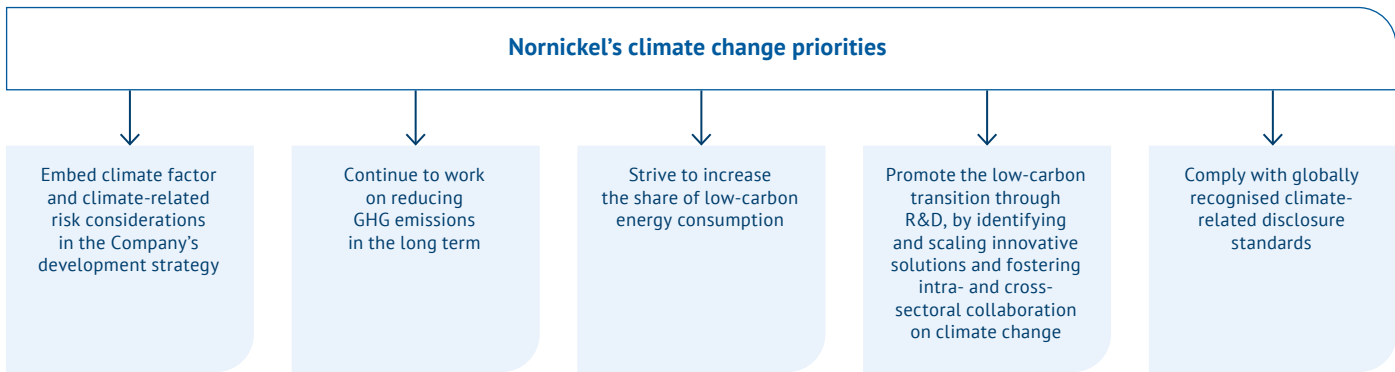
The Company's climate change vision is set out in a number of corporate documents approved by the Board of Directors:

- [PJSC MMC Norilsk Nickel's Climate Change Policy](#)
- [PJSC MMC Norilsk Nickel's Environmental Policy](#)
- [Renewable Energy Sources Policy](#)
- [2031 Environmental and Climate Change Strategy](#)

The fundamental corporate document on climate change is [MMC Norilsk Nickel's Climate Change Policy](#), which sets out the Company's key commitments.

# Nornickel’s climate change strategy and projects

SASB EM-MM-110a.2, TCFD Ma, Mc

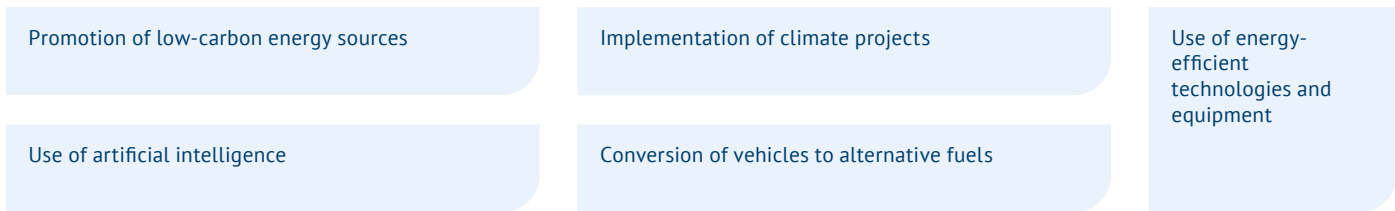


Nornickel’s key climate-related targets are set out in the [2031 Environmental and Climate Change Strategy](#), which was updated in 2024.

In addition, the 2031 Environmental and Climate Change Strategy sets compliance with international standards and methodologies as a formal objective, including: TCFD recommendations, ICMM Principles, and the IRMA Standard for Responsible Mining.

Alongside the updated 2031 Environmental and Climate Change Strategy, the Board of Directors also approved Nornickel’s Key Focus Areas of Carbon Neutrality in the reporting year. This document outlines priority project and programme areas focused on reducing gross GHG emissions and lowering the Company’s carbon footprint – both within the environmental strategy’s implementation horizon and over the longer term.

## Key focus areas of carbon neutrality



The approved focus areas of Nornickel’s carbon neutrality pathway enable the Company to initiate the development and selection of the highest-impact projects within each area. In 2024, the Company started to develop and implement projects across the following focus areas:

- Promotion of low-carbon energy sources (development of a renewable-energy project in the Trans-Baikal Territory)

- Exploring the potential for the conversion of pit machinery to alternative fuels
- Direct absorption of greenhouse gases by waste materials in tailings storage facilities
- Implementation of climate projects
- Use of energy-efficient technologies and equipment

For more details on these projects, please see the [Decarbonisation Projects](#) sub-section.

## Climate change adaptation plan

To support the Company’s strategic objectives in the areas of Climate Change and Compliance with International Standards, Nornickel has developed an action plan for 2024–2025. The tasks scheduled for 2024 have been successfully achieved. For more details on the plan, please see [Nornickel’s 2024 Climate Change Report](#).

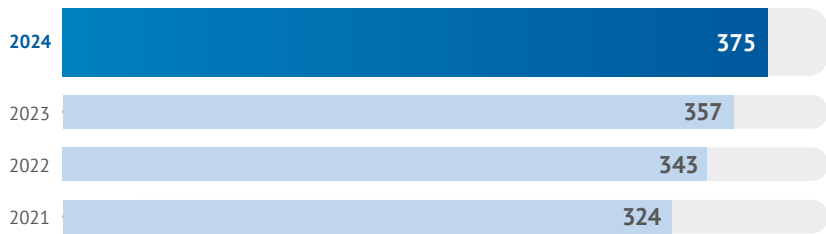
## Decarbonisation projects

### Mineralisation of mining waste

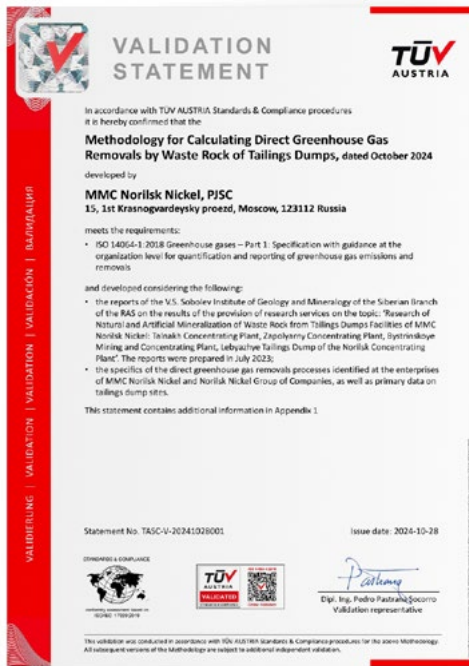
Research into the mineral sequestration of carbon dioxide has been under way since the late 20th century, but has significantly intensified over the past two decades due to the global search for safe, environmentally sound, and long-term solutions for CO<sub>2</sub> disposal. The CO<sub>2</sub> mineralisation process involves the reaction of carbon dioxide with various minerals – such as olivine, serpentine, and other silicates containing calcium, magnesium, and iron – in the presence of water. During the reaction, CO<sub>2</sub> binds with the cations of these elements to form carbonates, thus converting into a solid phase.

In 2024, TÜV AUSTRIA validated Nornickel’s methodology for calculating direct GHG absorption through gangue mineralisation in tailings storage facilities to GOST R ISO 14064-1-2021. The methodology outlines an approach for measuring carbon dioxide absorption through passive (non-anthropogenic) carbonation of certain minerals in the waste rock (tailings) stored at the Company’s tailings storage facilities. The rate of passive carbonation depends on several factors, including the mineralogy of the parent ore and tailings, particle size, climatic conditions, and pore water chemistry. One of the key factors influencing the efficiency of the mineralisation process is the acid–alkaline balance of the solution in which the reaction occurs. To estimate the amount of CO<sub>2</sub> absorbed by tailings, instrumental analytical methods are used, including infrared (IR) spectroscopy, X-ray diffractometry, and CHNS(CN) elemental analysis, which determine the carbon content in the pulp and tailings. Data on actual absorption for 2021–2024 have been verified by an international independent company. The amount of direct GHG absorption depends on the volume of waste rock generated during the reporting period and disposed of at the Group’s tailings storage facilities.

## Direct GHG absorption (kt of CO<sub>2</sub> equivalent)



Nornickel plans to further develop this project, with detailed studies of artificial and active mineralisation in tailings storage facilities scheduled to start as early as 2025. These approaches have greater potential for greenhouse gas capture compared to natural mineralisation.



Use of renewables in energy and transport

Favourable climatic conditions make the Trans-Baikal Territory one of Russia's leading regions in terms of insolation (amount of sunshine). In October 2024, Nornickel signed an EPC contract for the construction of a 518-kW solar power plant at the existing rotation camp of its production site in the Gazimuro-Zavodsky District of the Trans-Baikal Territory. Nornickel plans to commission the facility in the second half of 2025, becoming the first mining company in the region to begin adopting renewable energy technologies.

In addition, the Company is considering the use of electric dump trucks for ore transportation at its production sites in the Trans-Baikal Territory and the Murmansk Region.

Energy efficiency

Fuel and energy savings resulting from energy consumption reduction and energy efficiency initiatives in 2024 (TJ)

GRI 302-4, GRI 305-5

GRI 14.1.9

Indicators	Group's total	Including by division		
		Polar Division	Energy Division	Trans-Baikal Division
Total savings	782.8	556.7	145.2	80.9
Including:				
• electricity	382.6	301.7	–	80.9
• heat in water and steam	255.0	255.0	–	–
• fuel	145.2	0	145.2	–

The implementation of the Energy Efficiency Program is one of the key avenues for achieving the targets set out in Nornickel's 2031 Environmental and Climate Change Strategy. Its activities help reduce actual energy consumption and GHG emissions.

In 2024, as a result of implemented energy efficiency initiatives, the Company saved 782.8 TJ of energy. The total cost of these projects amounted to RUB 4.8 billion. GHG emissions reductions achieved:

- Scope 1 – 79.2 kt of CO<sub>2</sub> equivalent
- Scope 2 – 180.5 kt of CO<sub>2</sub> equivalent (including reductions resulting from direct bilateral power purchase agreements for low-carbon electricity)

Key initiatives and technologies used

Initiative/technology	Impact
Switching to LED lighting	LED lamps consume significantly less energy than traditional lighting, helping to reduce electricity consumption and costs
Improved thermal insulation	Using modern insulation materials for pipelines, windows, and doors minimises heat losses and lowers energy consumption for space heating
Automatic regulation of heat supply	Automated systems adjust heat supply based on ambient temperature, optimising energy use and preventing excessive heating
Installation of frequency converters	Frequency converters regulate equipment speed based on load, reducing energy consumption in core and auxiliary process units
Replacement of transformer fleet	Installation of transformers with the lowest steel losses cuts energy losses in electricity transmission and distribution
Conversion of mine air heaters to alternative energy sources	Switching to cleaner and more energy-efficient heating options for mines contributes to lower GHG emissions
Decentralisation of air supply in mines	Decentralised air supply systems help optimise energy use and reduce transmission losses

Nornickel's climate project in the Russian Register of Carbon Units

[Nornickel's first climate project registered in the Russian Registry of Carbon Units was implemented at the Kola production site in the Murmansk Region.](#) The main ventilation units at Severny Mine were switched from fuel oil to electric heating, enabling the retirement of the onsite oil-fired boiler and resulting in a reduction of 17.5 kt of CO<sub>2</sub> equivalent in GHG emissions. Technical implementation

of the project was completed in 2022, and on 20 November 2024, it successfully passed validation confirming its climate project status. In December, the project was officially registered in the Carbon Register.

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We have implemented many initiatives as part of our climate agenda. For example, we signed Russia's largest-ever deal to purchase carbon units. While the volume might be modest on a global scale, it marked a significant milestone for the Russian market. But we didn't stop there. At the Kola site, when transitioning our mines to electric heaters, we formalised this as a climate project, underwent a complex verification process, and received official confirmation towards the end of last year.

We plan to continue registering all energy efficiency projects with the parallel registration of carbon credits. We would like to see the national carbon market become fully operational, and we are actively contributing to its development, as it can become a valuable tool for carbon credit trading and offsetting. This is another step towards decarbonising our production cycle and manufacturing products aligned with modern environmental trends.

Stanislav Seleznev,  
Vice President for Ecology and Industrial Safety

Integrating climate change into the supply chain

The Company manages a responsible supply chain, which may help reduce indirect GHG emissions in the long term. The first step was the adoption of the [PJSC MMC Norilsk Nickel's Supplier Code of Conduct](#), which sets out Nornickel's expectations for suppliers, including requirements to reduce GHG emissions. Since 2021, questions related to GHG emissions have been included in the scope of the mineral supplier<sup>1</sup> due diligence process; since 2023, they have also been part of the assessment procedure for the sustainability practices of suppliers of goods, works, and services. For more details on supplier engagement on sustainability, please see [Nornickel's 2024 Responsible Supply Chain Report](#).

<sup>1</sup> The Company's mineral suppliers include suppliers of mined minerals (primary processed material which has never been previously refined) and suppliers providing minerals transportation, their processing and loading/unloading services. "Minerals" are minerals containing nickel, cobalt, and copper.