Climate-related risks and opportunities

Approaches to assessing climate-related risks and opportunities

TCFD Rb, TCFD Rc, IFRS S2 25a, IFRS S2 25a (ii), IFRS S2 25 (b)

Guided by the TCFD Recommendations, IFRS S2, COSO ERM Framework, and the Environmental and Climate Change Strategy, Nornickel is building procedures for managing climate-related risks and opportunities.

The Company follows the TCFD and IFRS S2 classification, which identifies two key categories of risks and opportunities:

- Physical risks, associated with extreme weather events (acute risks) or lasting changes in weather patterns (chronic risks)
- Transition risks and opportunities, associated with evolving market, regulatory, technological, and political environment as the global economy transitions to a low-carbon model

To manage climate-related risks, the Company is implementing the following procedures:

Risks	Forecast	Identification	Assessment	Mitigation and adaptation
Physical risks	Forecasting climate risk factors for the Company's regions of operation	Analysing the incorporation of climate risk factors into risk assessments, identifying new risks	Assessing the impact on the Company's financial performance	Developing mitigation and adaptation measures
Transition risks and opportunities	Developing our own scenarios for the global economy and climate change IFRS S2 25a (ii)	Identifying transition risks and opportunities		

Public reporting

IFRS S2 10a, IFRS S2 10b

IFRS S2 10a, IFRS S2 10b

The Company's assets are located in regions that have long been affected by climate change, which is reflected in its current technical and production risks. The Company continues to integrate climate-related risk identification and assessment procedures into the corporate risk management system. This involves improving the rules for managing both operational and longer-horizon risks, as governed by PJSC MMC Norilsk Nickel's Procedure Rules for Risk Management.

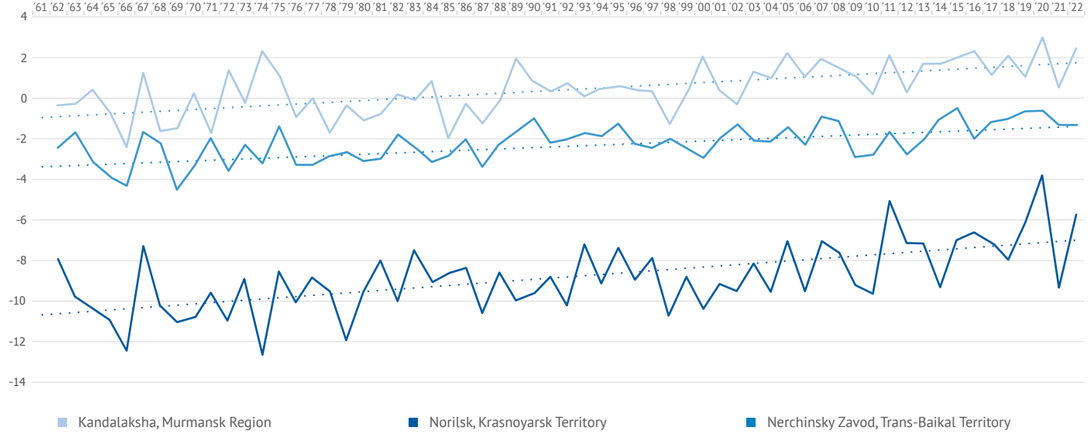
Within the corporate risk management framework, physical risks, as well as transition risks and opportunities, may be treated either as standalone risks and opportunities or as contributing factors to risks already identified.

Physical risks

TCFD Ra

The Obukhov Institute of Atmospheric Physics of the Russian Academy of Sciences analysed Rosgidromet[1] data on various climate factors in the regions where the Company's production sites are located, covering a period from the 1960s to the present. The observations indicate significant changes in certain climatic factors, such as average air temperatures. Changes recorded by the Norilsk weather station support the conclusion that temperatures in the Arctic are rising significantly faster than the global average: +0.6 °C per decade in Norilsk vs +0.18 °C per decade globally.

Average air temperature in 1961–2022, °C

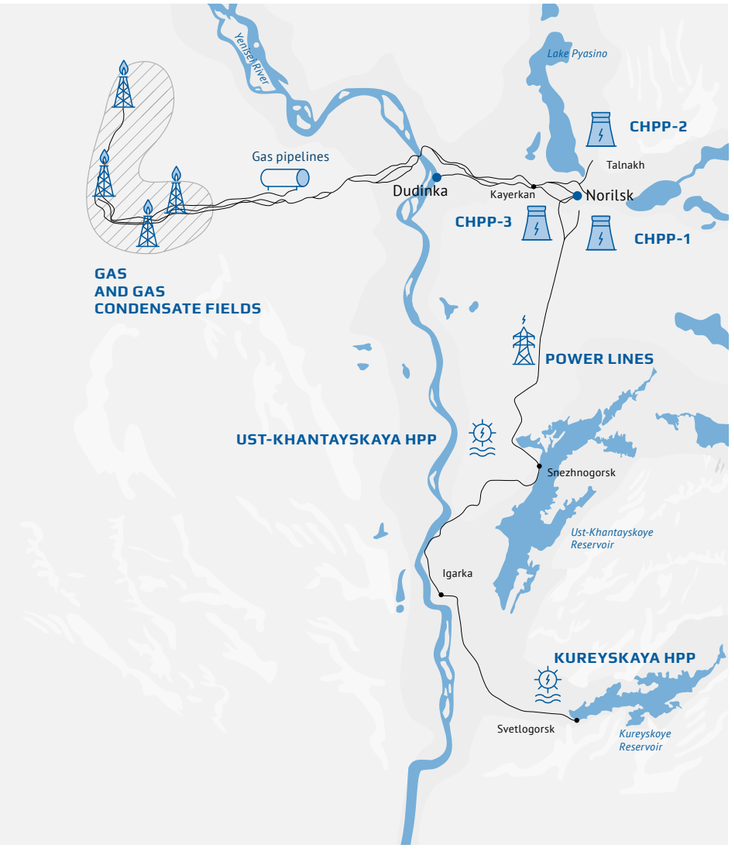


In addition to evaluating the long-term climate trends identified in Nornickel's regions of operation, the Institute of Atmospheric Physics of the Russian Academy of Sciences developed climate projections up to 2050. The regional forecasts are based on three IPCC global scenarios (SSP1-2.6, SSP2-4.5, and SSP5-8.5) and the CMIP6[2] ensemble of climate models. For the SSP2-4.5 climate scenario, which the Company considers the most likely, the following major changes are projected by 2050.

[1] Federal Service for Hydrometeorology and Environmental Monitoring (Rosgidromet).
[2] Coupled Model Intercomparison Project.

Projected climate factor changes by 2050 (vs 2022)

Climate factor	Norilsk Industrial District	Murmansk Region	Trans-Baikal Territory
Average air temperature	+1.5 °C	+1.1 °C	+1 °C
Thickness of the seasonally thawed soil layer The term “permafrost degradation” is used in the context of the assessment. This factor is particularly relevant for evaluating infrastructure risks outside urban areas	+0.8 m	Irrelevant	Irrelevant
Annual precipitation Mainly due to changes in the trajectory of Atlantic cyclones and increased atmospheric moisture content	+58 mm	+4 mm	+23 mm
Number of days with a high risk of severe thunderstorm per year Due to changes in temperature and humidity	+6 days	+2 days	+5 days



Based on forecasting results, the key climate risk factors for Nornickel facilities are permafrost degradation, an increase in total annual precipitation (including more frequent precipitation anomalies), and a higher likelihood of thunderstorms. Most of the changes are expected to occur after 2040.

To improve threat assessment, it is also necessary to model climate-dependent factors such as river basin water availability, flood synchronisation, ice conditions along the Northern Sea Route, and others. For example, low river water levels – an issue the Company already faced in 2013 – may pose a threat due to the potential:

- shortage of water supply for production and social facilities in Norilsk
- increase in natural gas consumption resulting from the additional load on combined heat and power plants due to low reservoir levels and reduced output at the Ust-Khantayskaya and Kureyskaya hydropower plants.

IFRS S2 13b

Most industrial buildings and structures in the Norilsk Industrial District are built on stable (rock) foundations. However, linear infrastructure – including power lines, gas pipelines, water pipelines, and railway infrastructure – as well as certain fuel storage tanks, which are primarily located outside urban areas, are vulnerable to permafrost degradation.

Expected changes in climate factors by 2050 vs 2022

IFRS S2 25a (v)

To mitigate risks associated with the condition of permafrost soils in the Norilsk Industrial District, the Company conducts ongoing monitoring of the technical condition of its assets through expert assessments, inspections, and monitoring of permafrost and foundation stability.

Factors

Factors	Activities				
		Monitoring	Repairs	Reconstruction	Construction
Permafrost degradation	Fuel storage tanks	✓	✓	✓	✓
	Power lines	✓	✓		✓
	Gas pipelines	✓	✓		
	Heat and water supply pipelines	✓	✓	✓	✓
	Railway	✓	✓		
Increased frequency of thunderstorms	Equipping power lines with lightning surge protection systems and monitoring the number of lightning strikes on power grid facilities				
Higher annual precipitation	Maintaining and modernising hydraulic structures to ensure technical reliability				
Higher frequency of heavy precipitation	Monitoring the technical condition of facilities and water levels in the Norilskaya River and water reservoirs				

According to the initial assessment, the impact of climate risk factors in the short- and medium-term horizon until 2028 is mitigated as part of operational activities and through initiatives and investment projects aimed at enhancing the reliability of industrial assets and infrastructure.

Transition risks and opportunities

TCFD Ra, IFRS S2 22b

In 2022, to identify and assess relevant transition risks and opportunities, Nornickel – in collaboration with the Institute for Economic Forecasting of the Russian Academy of Sciences – developed three proprietary long-term scenarios for global economic and climate development through 2050. The projected changes in global temperature under these scenarios are consistent with the three IPCC scenarios (SSP1-2.6, SSP2-4.5, and SSP5-8.5), which the Company also uses for its assessment of physical climate risks.

In 2024, the scenarios were updated to reflect actual data for 2022–2023, the upward revision of projected global GHG emissions across all scenarios, and the extension of the projection period to 2060. The mix of vehicle fleets – one of the key areas of application for the Company’s metals – has also shifted: sales of battery electric vehicles and hybrid vehicles have increased, while sales of internal combustion engine vehicles and hydrogen fuel cell electric vehicles have declined.

The probability of the Rapid Transition scenario was lowered from 25% to 20%. This revision reflects a rise in global emissions of more than 2% over 2021–2023, which further complicates the already challenging task of global economic decarbonisation. The difficulty stems from: (a) the limited financial capacity of the global economy to absorb the specialised costs involved; and (b) the insufficient level of international collaboration and cooperation, which are critically important to tackling global challenges such as climate change. The probability of the Sustainable Palladium scenario was raised to 75% as it aligns most closely with current trends. The probability of the Global Growth scenario remains at a minimal level of 5%, as the high economic growth rates required for this pathway are currently considered unattainable.