

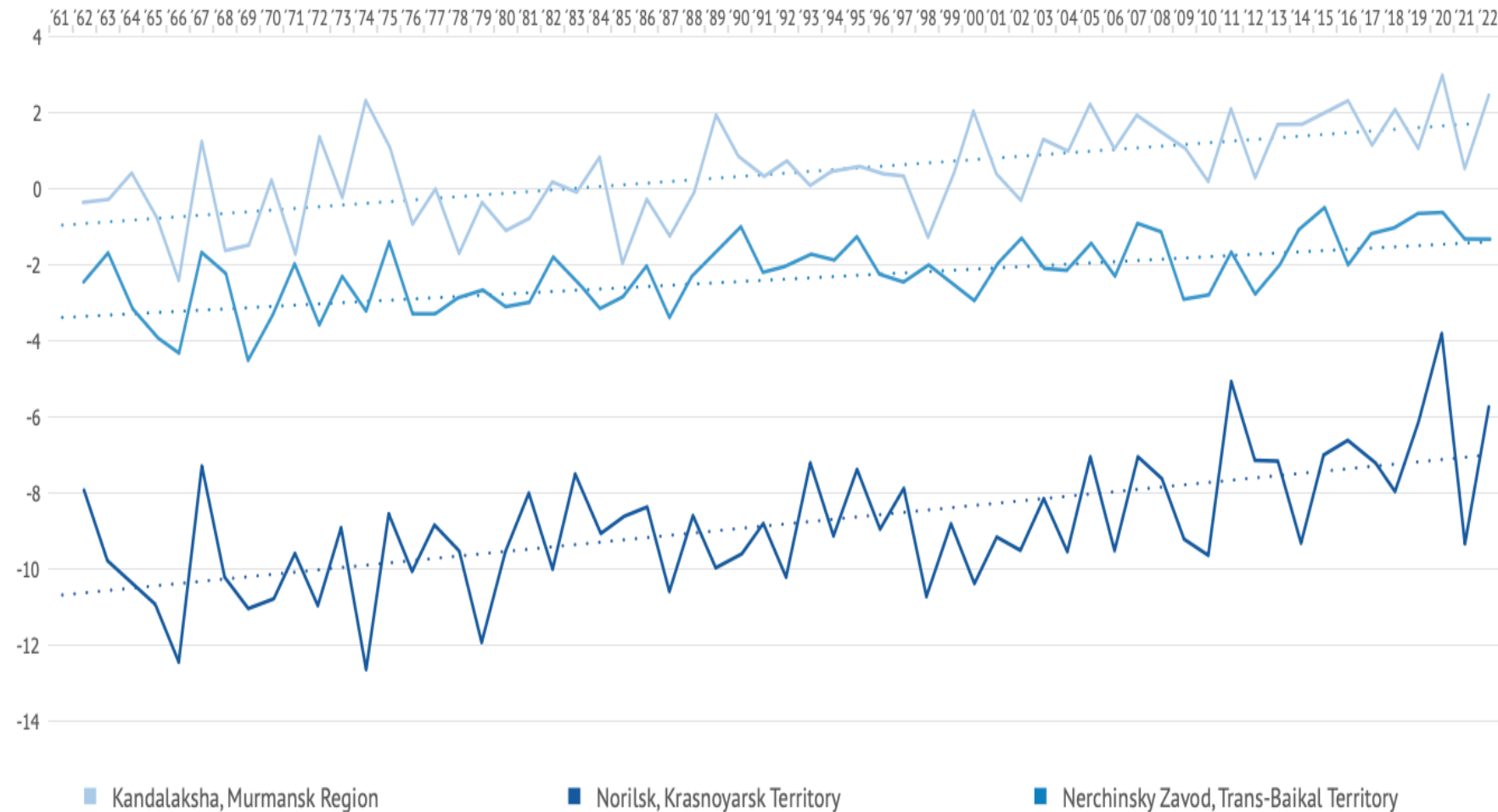


Nornickel's climate research and adaptation

RAEX, 2026

What changes do we see?

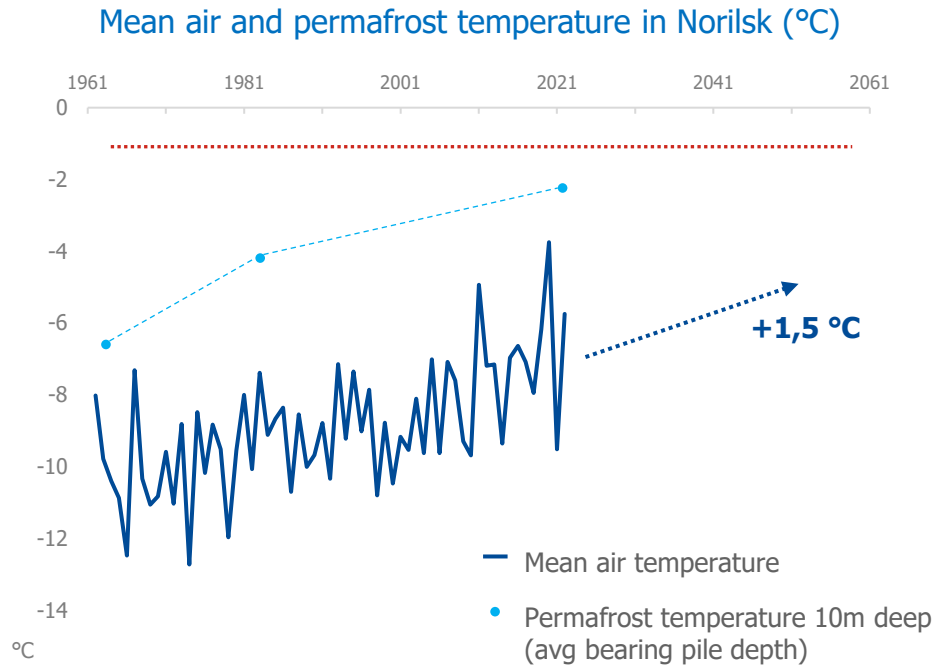
Average air temperature in 1961–2022, °C



Other changes:

- mean values
- seasonal shifts
- anomalies
- etc

Climate change effects on permafrost in urban areas is not that obvious



- Most civil buildings in the town are constructed in 1970s-1980s (50 year standard operation period)
- Buildings on permafrost have ventilated cellars, heat stabilizers and other measures to preserve foundations
- Key factors defining permafrost temperature up to 15m deep: maintenance quality and utility condition



Climate aspects in national policy

Mean temperature rise in Russia 0,51 °C/10y (x2,8 vs global), in Arctic 0,71 °C/10y – x3,9 vs global

National Climate Adaptation Roadmap 2026-2028

1. Methodology & Standards
2. Anti-flooding program
3. Ecosystem program
4. Anti-desertification program
5. Spatial planning program
6. Arctic permafrost program

Arctic adaptation to permafrost degradation roadmap (draft)

1. Permafrost monitoring
2. Methodology & Standards
3. Talent development
4. Adaptation measures: National monitoring center, reporting, best practices, etc..

Regional climate adaptation roadmap of Krasnoyarsk region

1. Anti-flooding measures
2. Monitoring
3. Roads
4. Renewables & EVs
5. Forest protection
6. Agriculture

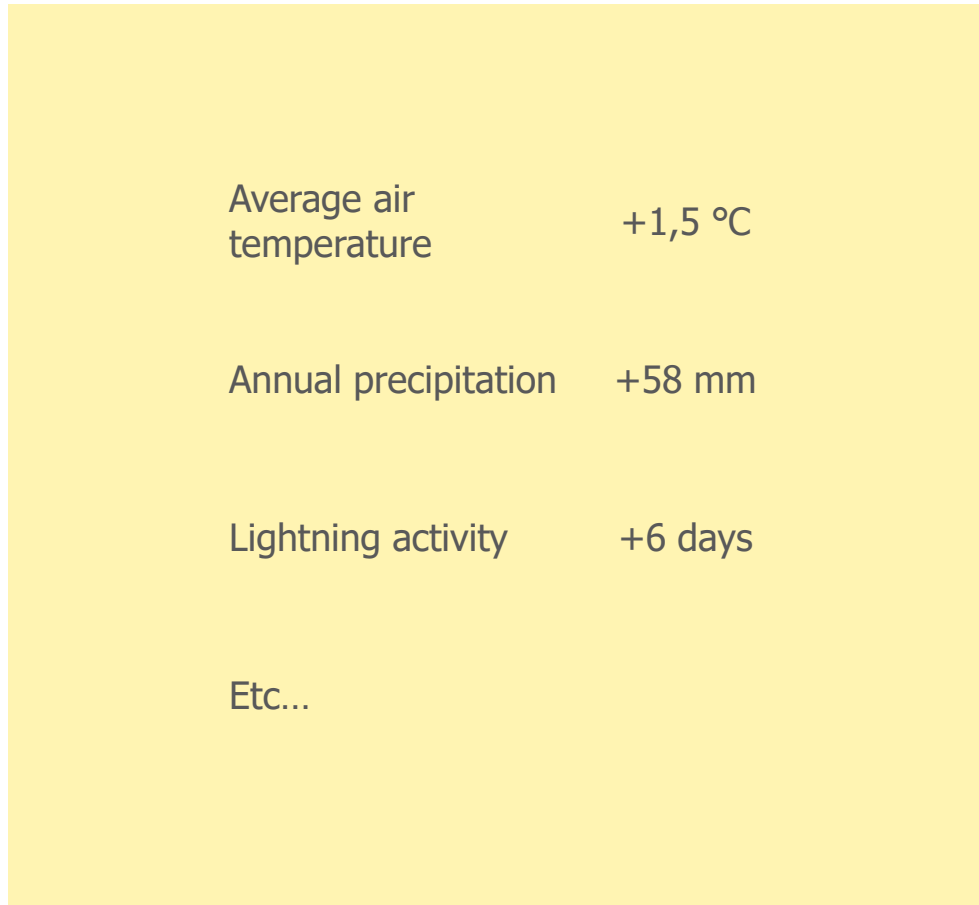
Examples: building regulation – application of climate projections becomes mandatory

Code 25.13330.2020 «Soil bases and foundations on permafrost soils», [mandatory use of CMIP6 temperature projections in thermal calculations](#)

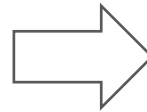
Code 496.1325800.2020 «Soil bases and foundations of buildings and constructions on permafrost soils. Rules for production of works», [in process](#)

What changes to expect? Projections become more specific and practically oriented

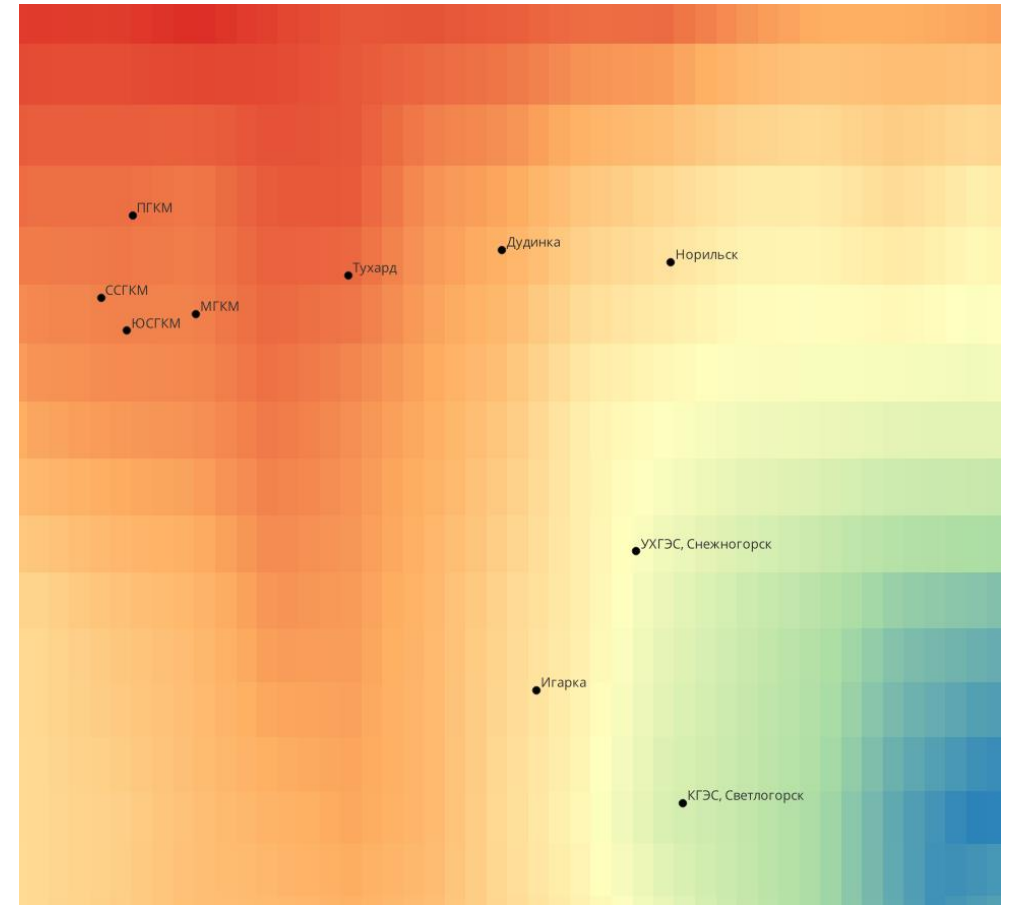
Regional climate projections, 2023



Lack of detail, can be used for risk assessment, but hardly used for engineering



Regional climate projections, 2026



More suitable for risk assessment, can be used in engineering

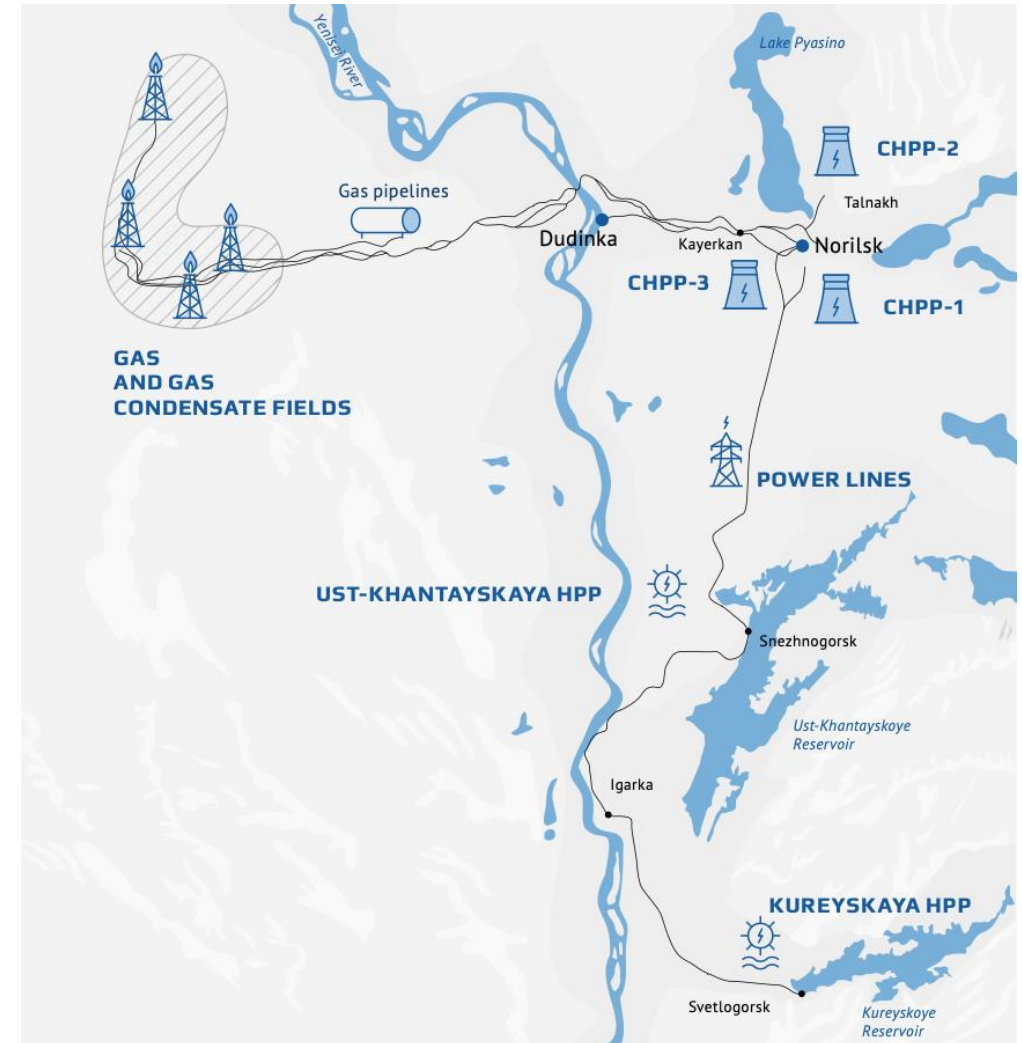
Physical risks. Climate vulnerability assessment

Facilities and infrastructure:

- **>1200** buildings
- **~1200 km** electric grids 110-220 kV
- **~1200 km** gas pipelines
- **>60** petroleum reservoirs
- **>5** dams and tailings
- Other...

Main climate factors:

- Permafrost degradation
- Thunderstorms
- Precipitation and hydrological anomalies



Everything flows, everything changes. Climate as well. Get prepared



Climate change report, 2024



Sustainable development report, 2025