



Thawing permafrost and Russian Arctic infrastructure

Representative Concentration Pathway (RCP) describes the concentration of greenhouse gases in our atmosphere. Our future pathway might be the RCP 4.5 projection, leading to a global temperature rise of between 2°C and 3°C by 2100. This will have a devastating impact on the landscape of the Russian Arctic. It is hoped that progress made at COP26 in Glasgow will lead to RCP 2.6, which might be achieved with enhanced ambition and political action.

Thawing of near-surface permafrost will damage infrastructure. The map below shows future geohazard potential for permafrost in the Russian Arctic. It is a visualisation of where infrastructure may be in danger of damage, from low risk (yellow) to high risk (red).

Permafrost describes water which has become trapped and frozen in soil, sediment, and rock pores for at least two consecutive years. 65% of the Russian Federation is permafrost*.

Thawing permafrost can result in significant impacts to industrial activity and settlements in the Arctic.

Nearly 50% of oil and gas fields in the Russian Arctic are located in areas where permafrost thaw could seriously damage infrastructure by 2050.



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As the frozen layer of permafrost thaws the ground deforms, warping critical infrastructure such as telegraph poles, internet cables, buildings, and oil pipelines.

One solution has been to insert metal pipes along the perimeter of buildings to freeze the soil in the summer and maintain stability.



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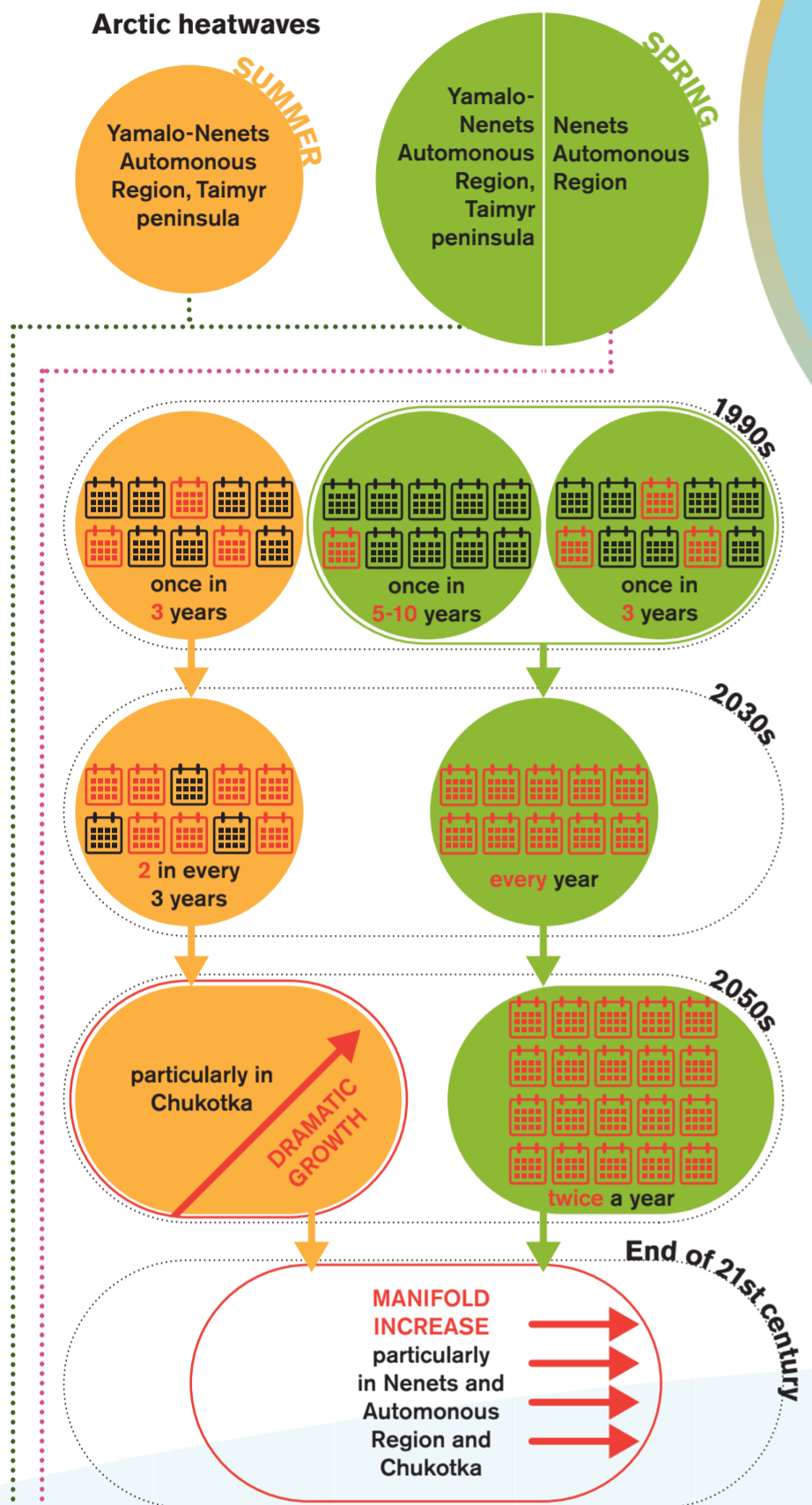
Okrug
An administrative district or region in the Russian Federation

The **Nenets Autonomous Okrug (NAO)** is presenting much earlier signs of global warming** than other central and eastern parts of the Russian Arctic. The coastal region of NAO is considered high risk for infrastructural damage due to thawing permafrost.

In NAO, there has been a marked increase in the incidence of heatwaves. Many now occur much earlier in the year. In the 1990s they were recorded once every 3-5 years in the spring, however between 2006-2015 they increased in frequency to about once every 2 years.

The **Yamalo-Nenets Autonomous Okrug (YaNAO)** is the larger of the two adjacent autonomous areas and has some of the world's largest natural gas fields. In spite of the okrug's rich natural resources it remains hampered by environmental degradation from thawing permafrost, with poor transport infrastructure and dilapidated housing.

Heatwave frequency is projected to increase dramatically. In the 2050s, it is likely that the YaNAO will experience heatwaves twice a year, in spring and summer.



** Research by Alexey Kokorin WWF, Analysis of Climate Change and Impacts on Landscapes and Vegetation

