



# **ARCTIC TRANSMISSION & DISTRIBUTION LINES**

## **MAPS & FAST FACTS**

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## ABOUT CASES

The Community Appropriate Sustainable Energy Security (CASES) Partnership is an international research initiative involving 17 northern and Indigenous communities and public and private sector project partners from Canada, Alaska, Sweden, and Norway.

Hosted by the University of Saskatchewan, the overarching goal of the CASES initiative is to reimagine energy security in northern and Indigenous communities by co-creating and brokering the knowledge, understanding, and capacity to design, implement and manage renewable energy systems that support and enhance social and economic values.

The CASES Partnership facilitates the sharing of experiences so that communities can learn from each other and avoid recreating solutions to common challenges, thereby expediting and accelerating renewable energy innovation.

Visit our website (<https://renewableenergy.usask.ca/index.php>) for more information about CASES initiatives, research products, and events.

Greg Poelzer, PhD  
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Co-directors, CASES Partnership

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# NORWAY

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Northern Norway has a well-connected energy grid and a variety of energy generation plants, specifically wind and hydro. This grid is a separate regional grid that is inter-tied with the main southern continental grid of Norway. Despite significant physical geographical challenges of mountainous terrain and coastal fjords, Norway has built out transmission lines to very remote regions of the country, including the areas north of the Arctic circle, which has contributed to prosperity and advanced economic development in the North.

## Region: Eastern Finnmark

In eastern Finnmark, there are eight hydrogen plants and three wind farms. Kirkenes, which is situated on the Russian border, is the major population center for the region. Just outside the city is a hydroelectric plant, which is one of five that run along the Norwegian-Russian border. Elsewhere in Finnmark, just south of the town of Berlevåg, is the Vaggoridda wind farm, which is the most productive wind farm in Europe. The Vaggoridda wind farm is currently producing a surplus of electricity that is unable to be exported out of the region, so there are plans to create a hydrogen plant and eventually export green ammonia for shipping with the hope of further supporting the towns economy.

### Points of Interest:

#### Berlevåg

- Population: 906 (2022)
- 1 wind farm

#### Kirkenes

- Population: 3529 (2018)
- 1 hydroelectric plant





## Region: Senja Island

Senja Island is Norway's largest island and has one gas, one wind, and 12 hydroelectric power plants. The two major industries on the island are fisheries and smelting, the latter of which is a highly energy intensive industry. Finnsnes is the administrative hub of the island and located near the gas power plant on the island. Just outside of Finnsnes, Finnfjord, a smelting company on the island, is striving to become the most energy efficient producer of ferrosilicon globally.

### Points of Interest:

#### Senja

- Population: 14,738 (2022)
- 1 gas power plant
- 1 wind farm
- 12 hydroelectric power plants

#### Finnsnes

- Population: 4,658 (2017)
- 1 gas power plant





## Region: Lofoten Islands

Just south of Senja are the Lofoten Islands. The Lofoten Archipelago consists of seven main islands and has 13 hydroelectric power plants. The main industries on the islands are fisheries and tourism. In Ballstad, the local shipyard company Ballstad slip AS is participating in a project to develop the first hybrid-electric fishing boat on the island and supporting the transition to hydrogen powered fishing fleets.

### Points of Interest:

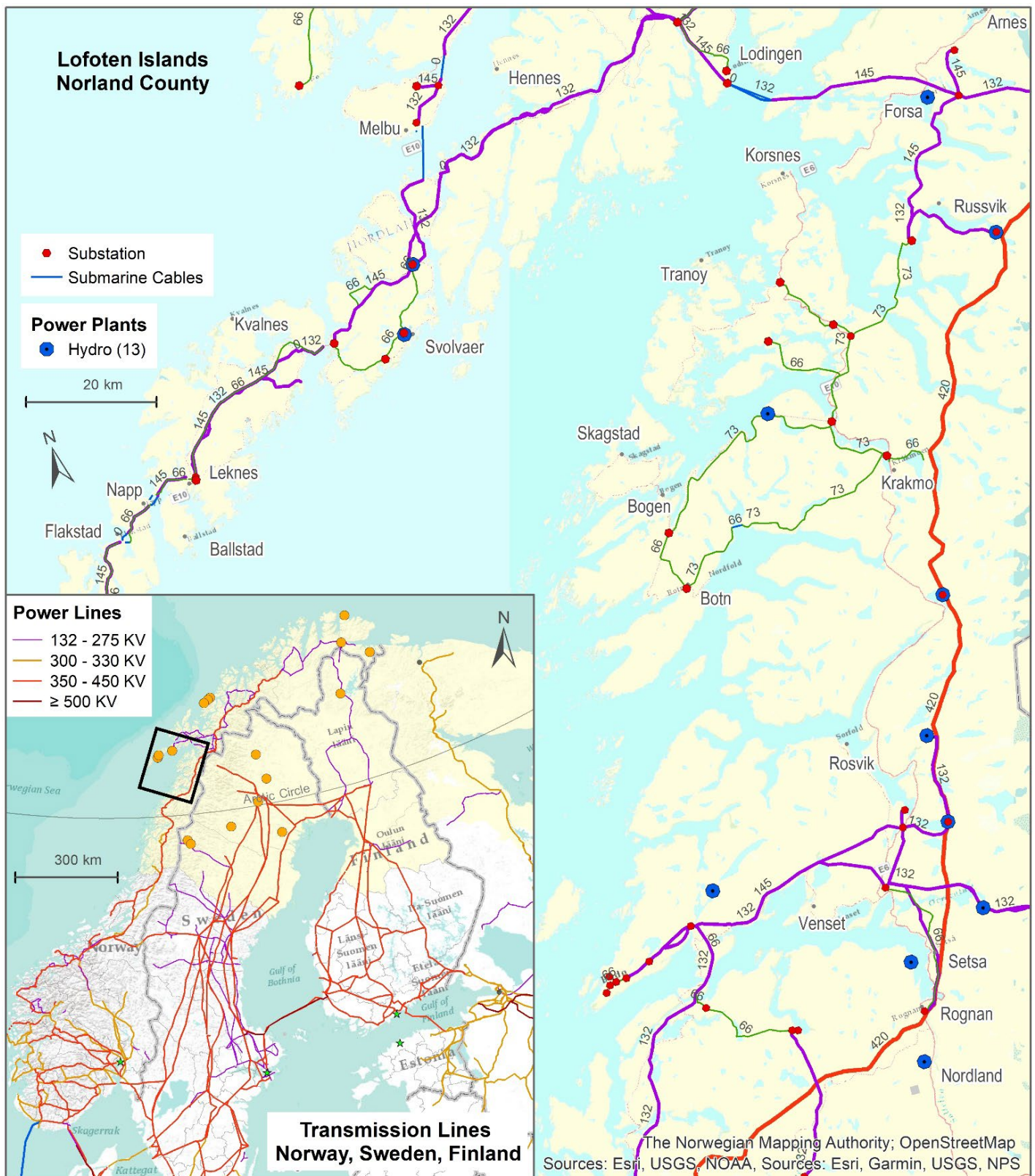
#### Lofoten

- Population: 24,500
- 13 hydroelectric plants

#### Ballstad

- Population: 826 (2018)







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# FINLAND

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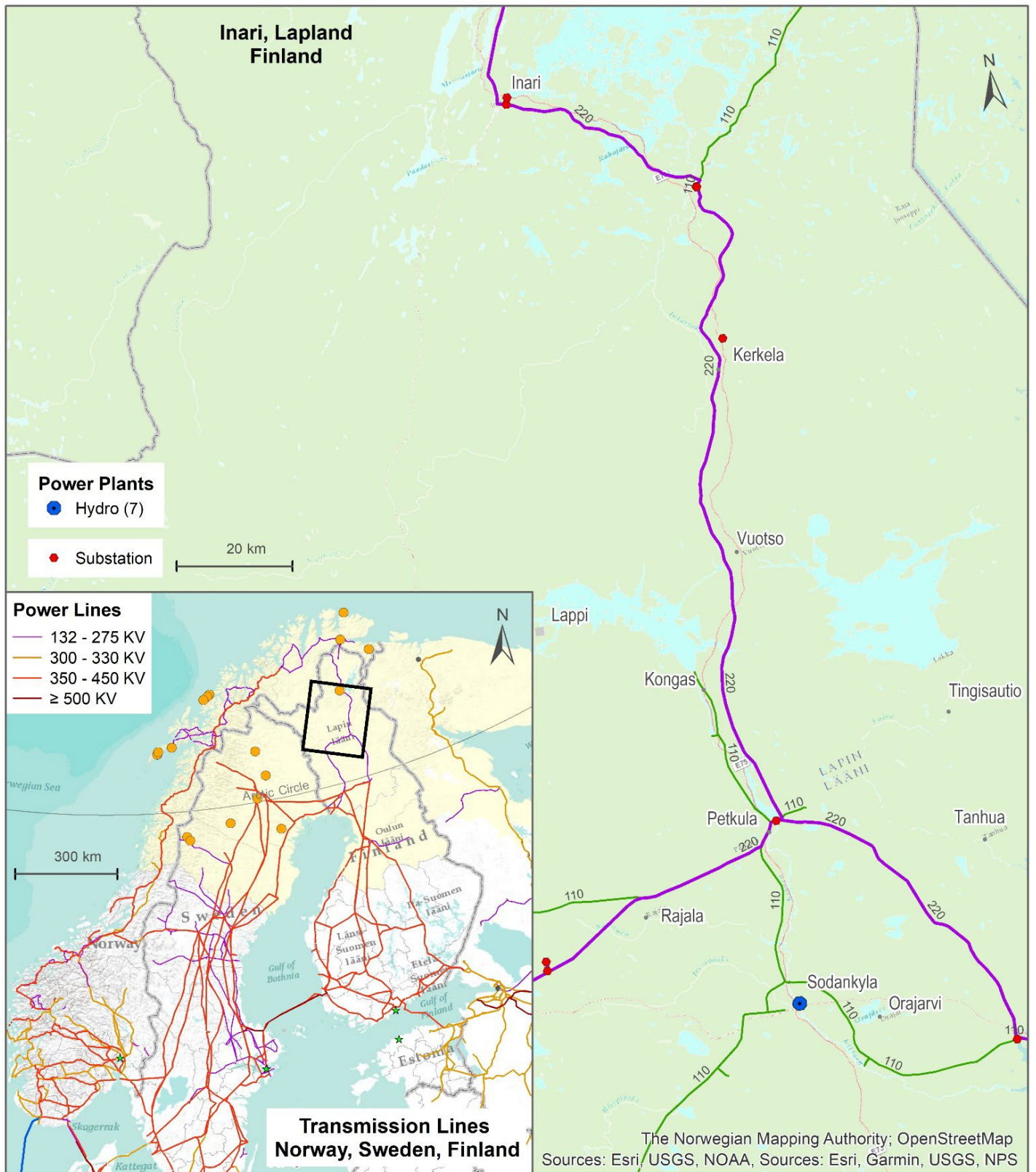
## Region: Northern Lapland

Inari, a municipality in Northern Finland, is located in Sapmi. There are seven hydroelectric power plants in the Inari municipality. The main industries for the region are tourism and mining (copper & nickel exploration) as well as cold weather car and tire testing. Inari is also the name of the main town in the municipality, and it is a Sami community. Inari is also the name of the main town in the municipality, and it is often called the cultural hub of Finnish Sami culture.

### Points of Interest:

#### Inari Municipality

- Population: 6,899 (2019)
- 7 hydroelectric power plants



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# SWEDEN

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There are three areas profiled in Northern Sweden: Western Norbotten, Central Norbotten, and Western Vasterbotten. All regions are remote and in the Arctic region of Sweden and are home to Sami peoples, including active reindeer herding. At the same time, the region has thriving forestry, mining, and tourism industries. Although the region is less geographically challenging than Norway, there are far fewer population centers, making utility services relatively costly on a per community basis. Like Norway, these investments have supported strong private sector economic activities, as well as public services including health care and education.

## Region: Western Norbotten

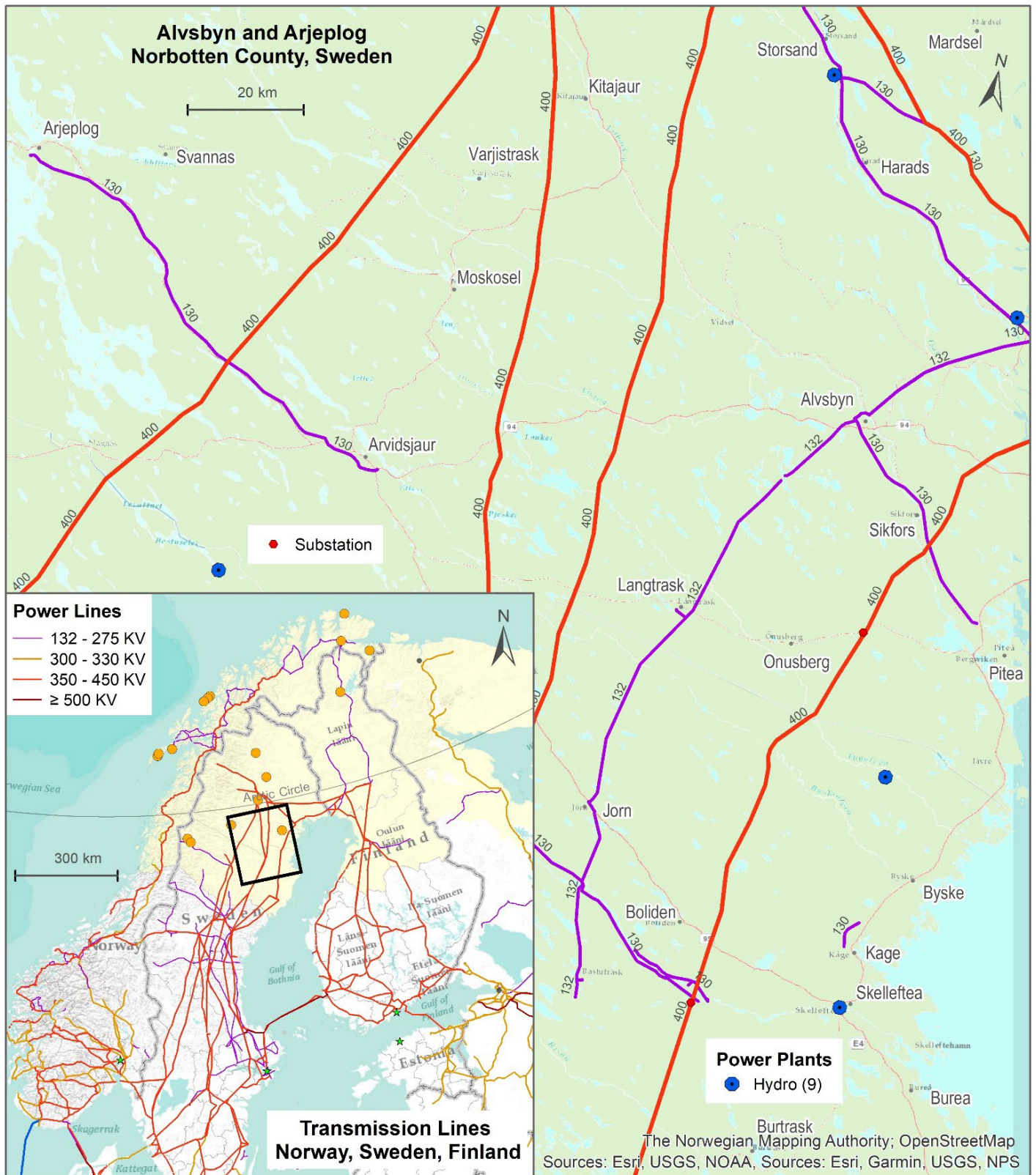
Alvsbyn and Arjeplog are located in Norbotten County, Sweden. Alvsbyn has a population of 8,090 inhabitants and Arjeplog has a population of 2,788. The region has 9 hydroelectric power plants. In Alvsbyn there is a proposed mine that hopes to provide jobs for approximately 700 people. In Arjeplog, the main industry is winter car testing.

### Points of Interest:

#### Western Norbotten

- 9 hydroelectric power plants
- Alvsbyn
  - Population: 8,090
- Arjeplog
  - Population: 2,788





## Region: Central Norbotten

Kiruna, Gällivare and Jokkmokk are located in Norbotten County, Sweden. The region has 9 hydroelectric plants. Mining is a major industry in both Kiruna (population 22,906) and Gällivare (population 8,449). The Kiruna mine is one of the world's largest underground iron ore mines, with copper the focus of mining operations near Gällivare. Jokkmokk (population 4,928), located next to Gällivare, is a central Sami meeting place and hosts a large winter market each year.

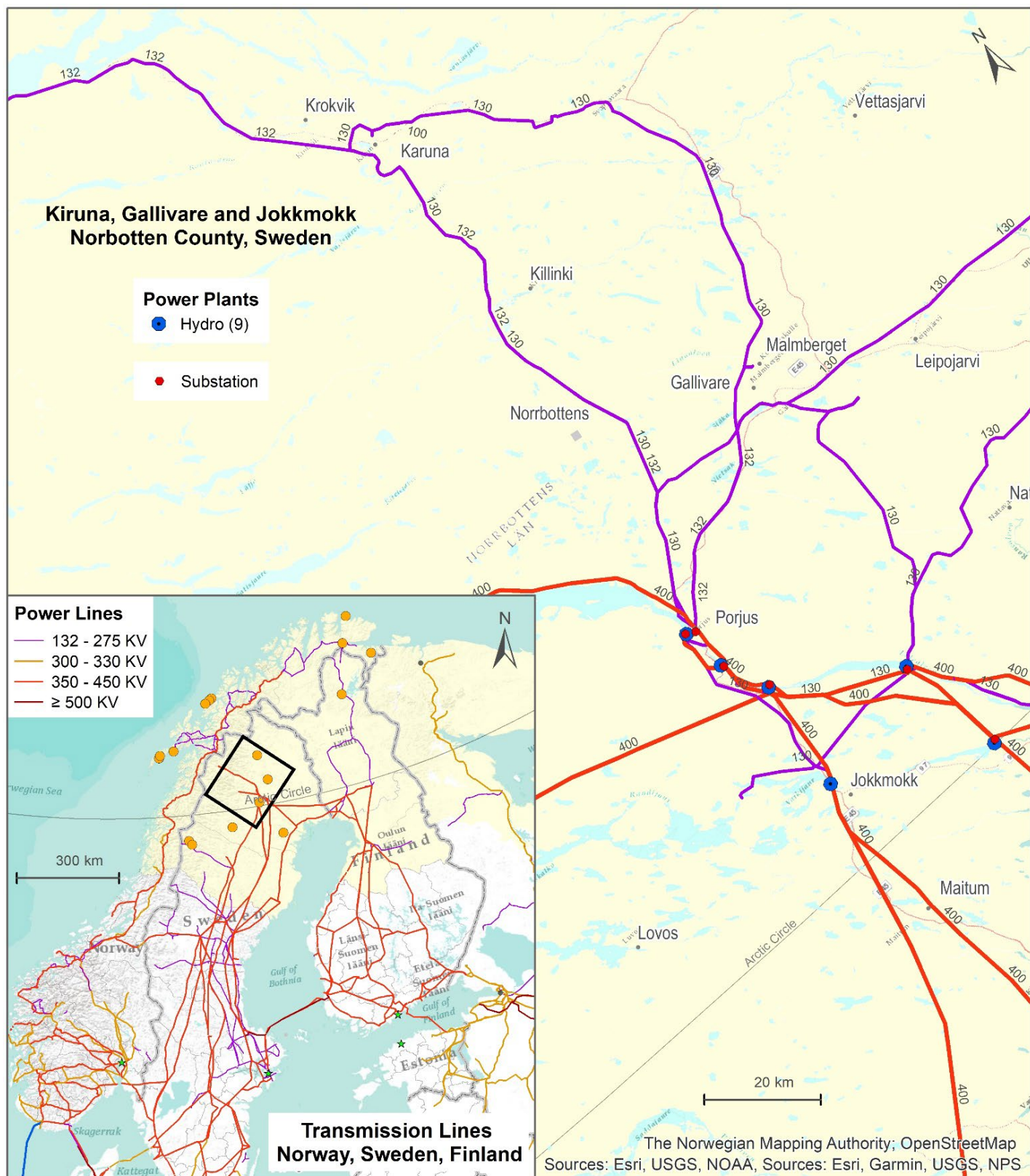
Central Norbotten County is also home to major forestry operations, including logging, sawmills, production of wood pulp, paper and packaging.

### Points of Interest:

#### Central Norbotten

- 9 hydroelectric power plants
- Kiruna
  - Population: 22,906
- Gällivare
  - Population: 8,449
- Jokkmokk
  - Population: 4,928







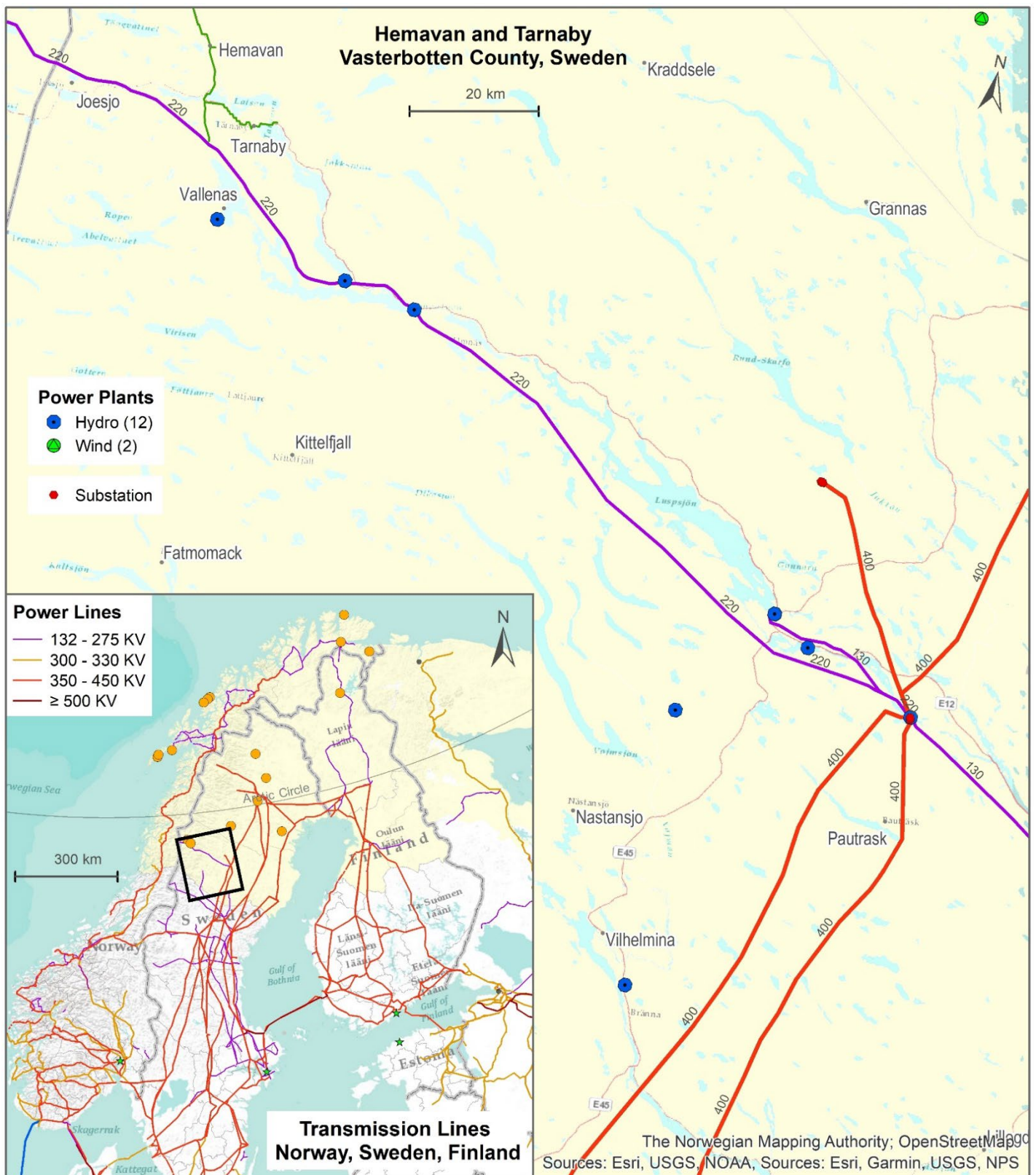
## Region: Western Vasterbotten

Vasterbotten County has 12 hydroelectric power plants and 2 wind farms. It is most known for its ski hills, which are important for the local economy. The region is also the traditional territory of the Sami people. The communities of Hemavan and Tarnaby are located in the Storuman municipality, which has a population of 5,858.

### Points of Interest:

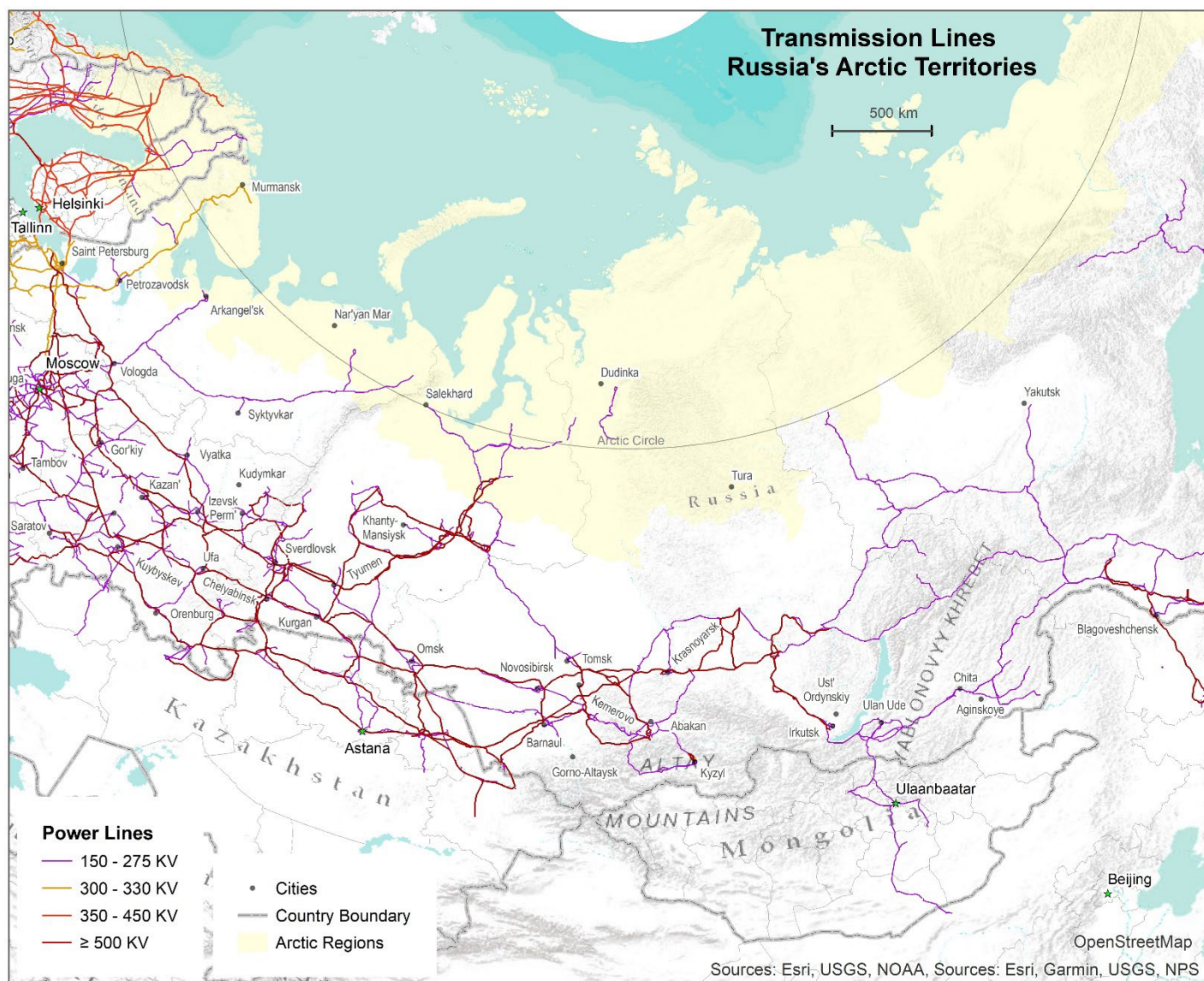
#### Western Vasterbotten

- 12 hydroelectric power plants
- 2 wind Farms
- Storumann municipality
  - Population: 5,858



# RUSSIA

There are three areas profiled in the Russian Arctic: the Sakha Republic (Yakutia), Yamalo-Nenets Autonomous District, and the Komi Republic.





## Region: Sakha Republic (Yakutia)

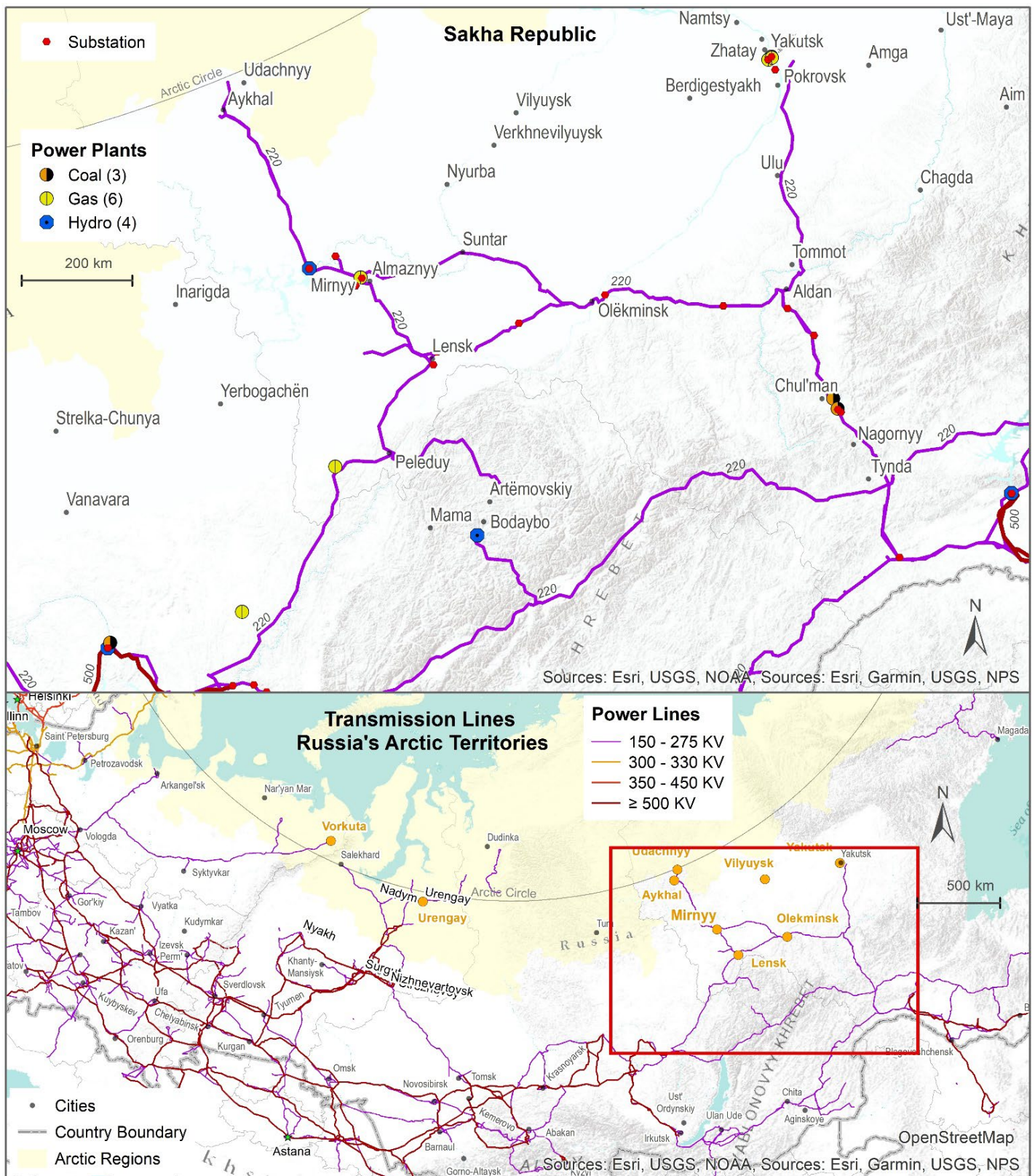
Sakha Republic has a population of 995,686. The area has 3 coal power plants, 6 gas power plants, and 4 hydroelectric power plants. The main economic activity in the region is mining, producing 90% of Russia's diamonds, significant gold and other minerals, and coal in the southern part of the republic. The region is also home to significant Indigenous populations. Yakutsk is the region's largest city with a population of 355,445.

In 2019, formerly isolated grid and electrically islanded districts in the central region of the republic around the capital of Yakutsk and in the diamond mining area of Udachnyy were connect to the Unified Power System of Russia.

### Points of Interest:

#### Sakha Republic

- 3 coal power plants
- 6 gas power plants
- 4 hydroelectric power plants
- Yakutsk
  - Population: 355,445



## Region: Yamalo-Nenets Autonomous District

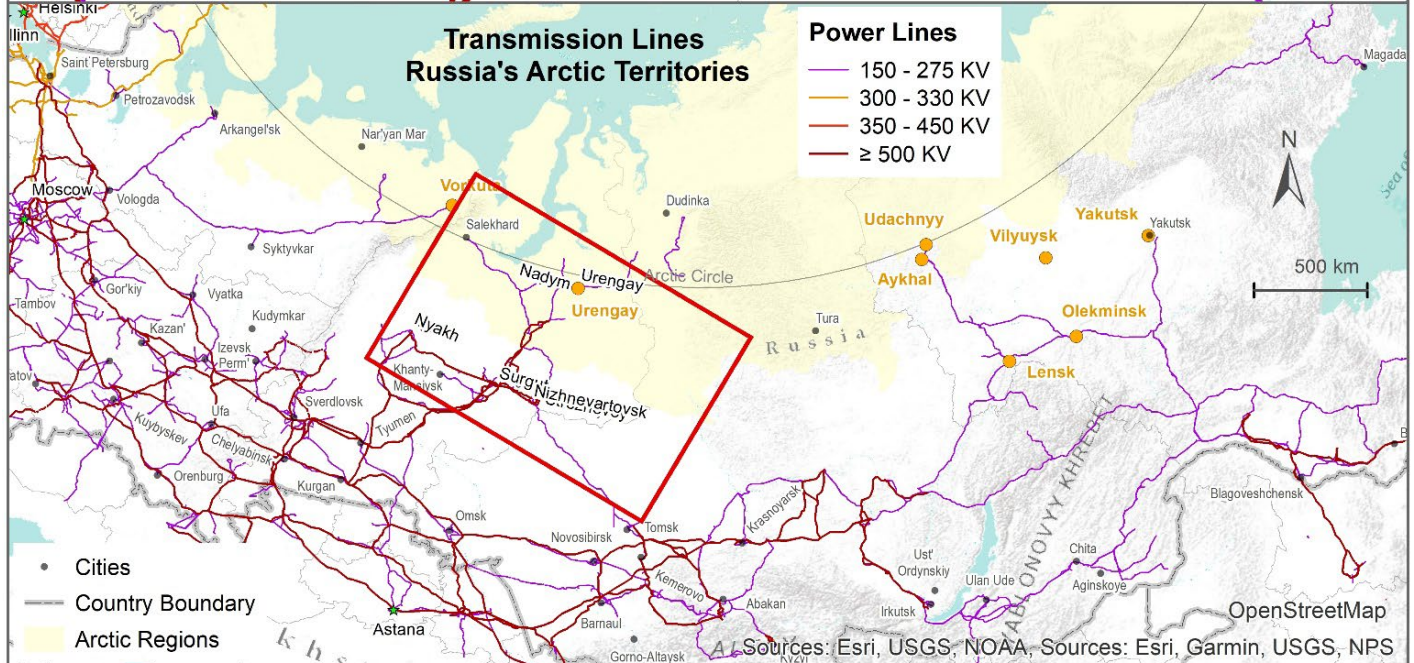
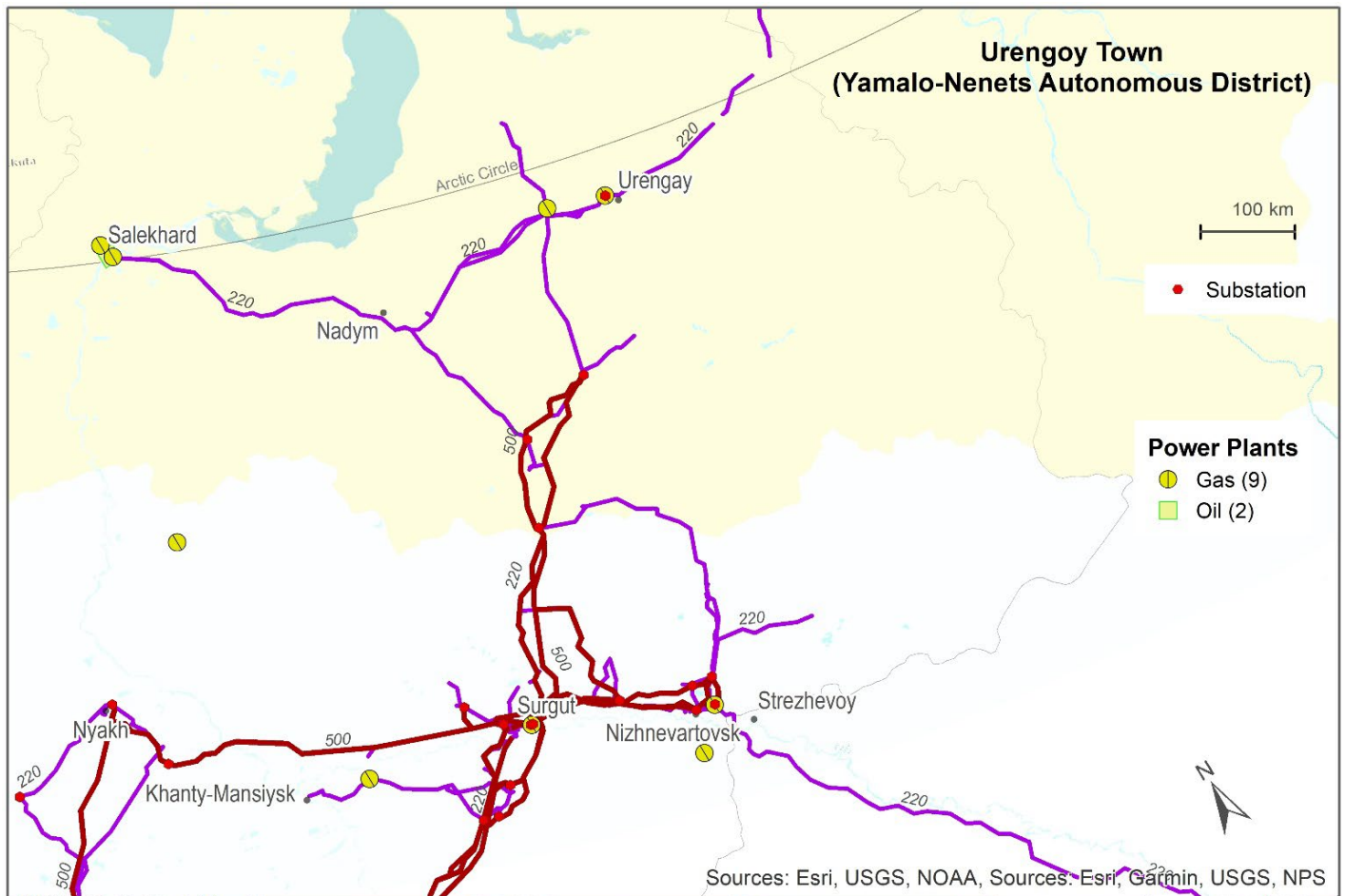
Urengoy Town in the Yamalo-Nenets Autonomous District has 9 gas power plants and 2 oil power plants. The Yamalo-Nenets Autonomous District has a population of 522,904. The largest city is Noyabrsk with a population of 110,620. The main economic activity in the region is oil and gas.

### Points of Interest:

#### Urengoy Town

- 9 gas power plants
- 2 oil power plants
- Noyabrsk
  - Population: 110,620





## Region: Komi Republic

The Vorkuta Municipal District is located in the Komi Republic. The region has 3 biomass power plants, 12 coal power plants, 25 gas power plants, 8 hydroelectric power plants and 3 oil power plants. Vorkuta is the 3<sup>rd</sup> largest city in the Komi Republic with a population of 70,548. The main economic industry in the region is oil and gas, along with forestry and energy production.

### Points of Interest:

#### Vorkuta Municipal District

- 3 biomass power plants
- 12 coal power plants
- 25 gas power plants
- 8 hydroelectric power plants
- 3 oil power plants
- Vorkuta
  - Population: 70,548

