Maritime Traffic and Transportation Infrastructure

along the Northern Sea Route

CHNL CENTRE FOR HIGH NORTH LOGISTICS
BUSINESS INDEX NORTH
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Front page photo: Container vessel near Dudinka port. Photographer: Antonina Tsvetkova

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Executive summary

Cargo transport along the Northern Sea Route (NSR) is increasing rapidly. This development is driven by several factors. First and most important among these are more favourable sea ice conditions, particularly in the last 10-15 years, as a result of a distinct warming trend in the Arctic making navigation in ice easier. Secondly, advances in ship, propeller and icebreaking technology and the introduction of icebreaking cargo vessels (e.g. Arc7) able to operate year-round in Arctic waters have made Arctic navigation possible even without assistance from powerful icebreakers. The third driver is exploitation of the rich Arctic natural resources, where maritime transportation is the only means to transport these commodities to market from remote Arctic locations. Then there are strategic and security issues that have caused Russia to increase its presence in the Arctic, to start rebuilding port infrastructure and to safeguard its Arctic resource base and Arctic resource development projects.

Although the NSR is clearly of major strategic importance to Russia, the Arctic shipping route is also likely to play a major role in the future development of the whole Eurasian Arctic region, and be a catalyst for value-creation and regional socio-economic development. The main advantage of using the NSR as a transit route is the reduction in the transport distance and sailing time between ports in Northern Scandinavia/NW Europe and NE Asia compared to the traditional southern route through the Suez Canal. But the NSR's future significance is also due to its role as a transport corridor along the Eurasian Arctic Coast and between the Eurasian Arctic and port destinations and markets in the Atlantic and Pacific. Here, the NSR could change the Eurasian Arctic from having a distance disadvantage to having a transport advantage to both Europe and the fast-growing markets in NE Asia.

Actors in the BIN area (Northern Scandinavia and NW Russia) are in an ideal position to shape the future development of the NSR towards increased commercial traffic with benefits to socio-economic development in their regions. This includes private and public investments in new transportation and logistics infrastructure with a focus on innovative, environmentally-friendly and cost-effective logistics solutions.

> Actors in the BIN area (Northern Scandinavia and North-West Russia) are in an ideal position to shape the future development of the NSR towards increased commercial traffic with benefits to socio-economic development in their regions.

Venta Maersk container ship on its trial trip from Asia to Europe through the NSR in August-September 2018.
Photo: Maersk

Introduction

In this report the focus is on maritime activity on the Northern Sea Route (NSR), the waters off the north coast of Russia - an area extending from Novaya Zemlya in the west to the Bering Strait in the east and outwards to the limits of Russia's Exclusive Economic Zone (EEZ). Russia regulates all traffic on the NSR, which is an integral part of the Northeast Passage, a shortcut between NW Europe and NE Asia through the Arctic Ocean. This report addresses shipping to and from the NSR and within the NSR Water Area. We provide statistical data on current maritime traffic development on the NSR and also several maps displaying information on available transport infrastructure within the Eurasian Arctic, including ports, terminals and natural resource development projects. In particular, we show that regions of the BIN area (Northern Scandinavia and NW Russia) with their infrastructure, businesses and natural resources are strategically positioned to both influence and benefit from development of the NSR.

Information on current and projected future shipping in the Arctic and the assessment of transport infrastructure needs are important for the BIN area and of significance to local and global businesses, policy-makers and other stakeholders.

MAJOR FINDINGS:

- Vessels operating within the borders of the NSR in 2018 numbered 227, making 2,022 separate voyages. A relatively limited number of vessels are increasingly responsible for the majority of voyages on the NSR.

- The south-western part of the Kara Sea has the highest traffic density on the NSR. Year-round shipping currently only takes place in the westernmost part of the NSR. Sea-ice conditions are much more severe in the eastern part of the NSR during the winter-spring season (7 months; January-June + December).

- In 2018, the general cargo vessel category comprised 66 cargo vessels in total (making 465 voyages), followed by 46 tankers (686 voyages), 12 LNG carriers (225 voyages) and 8 container vessels (mainly transporting nickel and other non-ferrous metals; 107 voyages).

- Internal Russian traffic (cabotage), followed by destination traffic between Russian ports and non-Russian ports are the most common means of transport on the NSR. This is likely to be the case for many years to come.

- The total volume of cargo transported along the NSR in 2016 was 7.5 million tons, 10.7 million tons in 2017 and increased to 20.1 million tons in 2018. Most of the cargo consists of crude oil and liquefied natural gas (LNG).

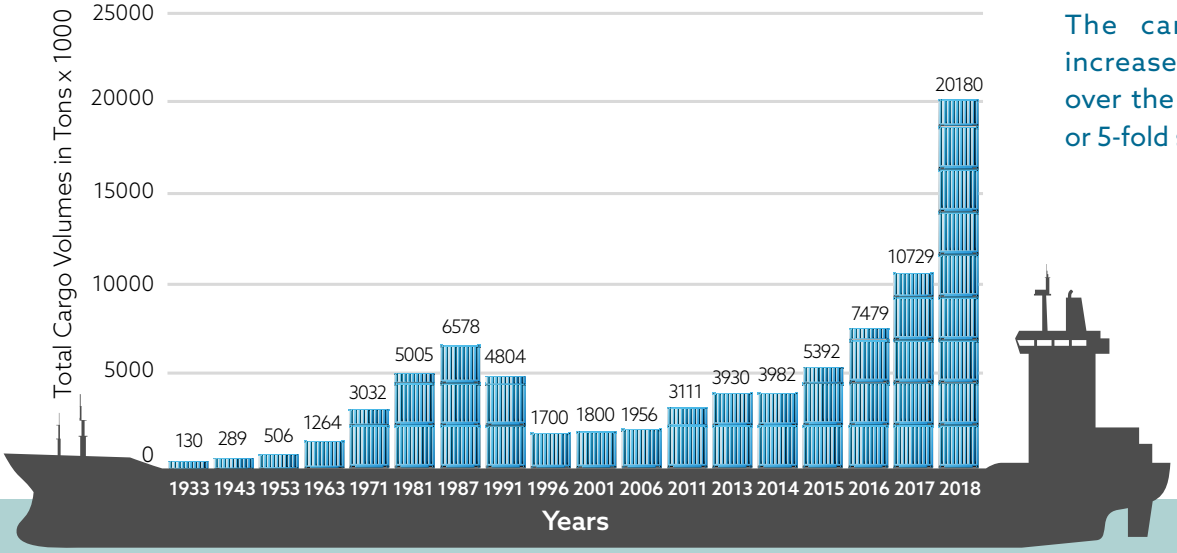
- The main driver of increased cargo transport on the NSR will continue to be exploitation and transport of natural resources out of the Arctic to markets in Europe and NE Asia.

Background Information

The Northern Sea Route (NSR):

Since the early thirties the development of the NSR as a transport route has been linked to the industrialization of Siberia in the Soviet era. The NSR was an important part of the transport system along the northern coast of the Soviet Union, which included inland waterways and the Trans-Siberian Railway. Shipping volumes on the NSR increased and peaked in 1987 (6.6 million tons) but declined sharply with the dissolution of the Soviet Union (about 1.7 million in 1996). The route was opened to non-Russian flagged ships in 1991. Transport volumes on the NSR started to increase again in 2010 due to increasingly favourable sea ice conditions as a result of global warming and reached 7.5 million tons in 2016, 10.7 million tons in 2017 and 20.1 million tons in 2018. Russian government officials predict cargo volumes on the NSR as high as 80 million tons per year by 2024.

Figure 1. Total cargo shipped on the NSR during 1933 - 2018 (x 1000 tons).



The cargo flow has increased dramatically over the last few years, or 5-fold since 2014.

Data source: Northern Sea Route Administration and Rosatomflot.

Significance of the NSR:

Maritime transport via the NSR is the only delivery route for natural resources originating in the remote Arctic regions where there are no pipelines, roadways or railway infrastructure. Cargoes for export from the Arctic will remain the driving force for the development of shipping on the NSR. In the future, oil, gas (LNG), coal, various ores and minerals, fish and timber products will continue to be the main cargos to be transported from the Russian Arctic to markets in NE Europe and NE Asia. The transport of general cargo and construction materials for large-scale Arctic port and energy projects (e.g. the Port of Sabetta and the Yamal LNG in the Ob Bay) is also significant, likewise transport of goods and supplies between Arctic ports. Additionally, cruise tourism is likely to increase in the coming years, particularly on the Barents Sea, the White Sea and the Pechora Sea.

Maritime transport along the NSR will change the Eurasian Arctic from having a distance disadvantage

to having a transport advantage to the fast-growing markets in NE Asia. Future Arctic development will be dependent on efficient and innovative Arctic logistics – largely based on maritime transportation. This implies that Arctic development in general is heavily dependent on the development of the NSR as a reliable transport and trade route. In this capacity the NSR could act as a catalyst for value-creation and innovative industrial development throughout the Eurasian Arctic area.

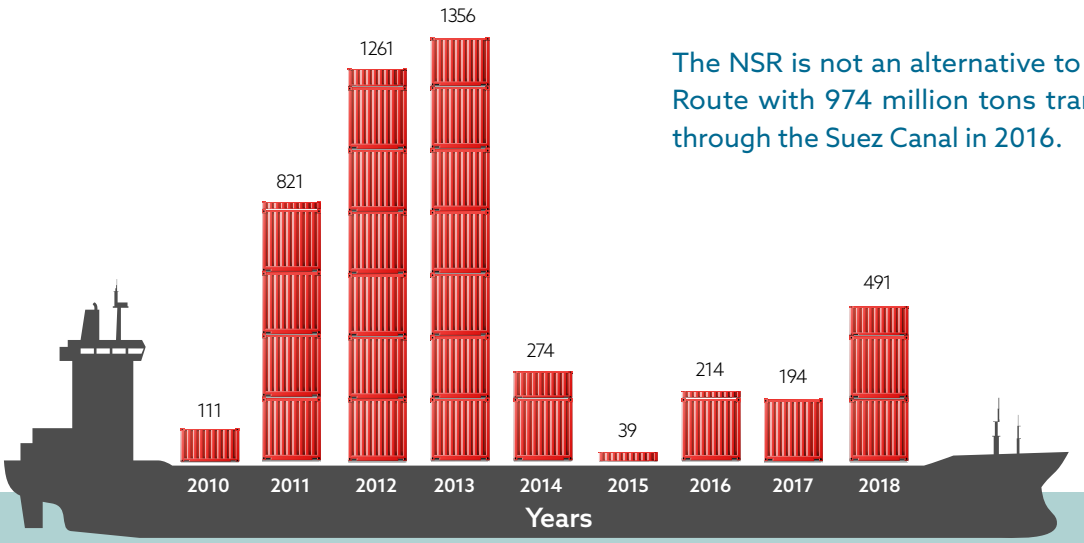
Opportunities and Challenges:

This development is now more realistic than before due to the reduction in sea-ice (in both areal extent and thickness), particularly during the five months of the summer-to-autumn navigational season (July-November), technological developments (high ice-class vessels and innovative icebreaking technologies) and interest on the part of Russia and other Arctic States as well as from countries in NE Asia. However, several challenges remain, not least the presence of sea-ice cover along the entire route during the remaining months of the year and generally difficult ice conditions in the eastern part of the NSR. Other considerations include the need for ice-strengthened vessels, winterization of vessels during the winter months, the need for special crew training to operate vessels under harsh Arctic conditions and the remoteness from developed areas.

Transit Sailings between Europe and Asia via the NSR:

The main advantage of using the NSR as a transit route (sailing through both the western and eastern borders of the NSR) is the reduction in the transport distance (30-50%) and sailing time (14-20 days) between ports in Northern Scandinavia/NW Europe and NE Asia compared to the traditional southern route through the Suez Canal. This can lead to substantial cost savings during the summer-autumn season (July-November) when sea-ice conditions are most favourable on the NSR. This advantage depends on the location of the departure and receiving ports. The more ports are located to the north the greater the distance advantage of the NSR. Besides the reduction in sailing distance, the existence of an additional transport route is also important.

Figure 2. Transit cargo via the NSR in 2010 - 2018 (x 1000 tons).



The NSR is not an alternative to the Suez Route with 974 million tons transported through the Suez Canal in 2016.

Data source: Northern Sea Route Administration and Rosatomflot.

Transit sailings on the NSR during the summer-autumn season increased between 2010 and 2013 from 0.1 million tons in 2010 to 1.35 million tons in 2013 but fell sharply in 2014 to 0.24 million tons. Subsequent transit cargo figures for 2015 were 0.04 million tons, 0.21 million tons in 2016, 0.19 million tons in 2017 and 0.49 million tons in 2018. This decline in transits coincided with a sharp drop in the price of bunker fuel on the world market in 2014; a general economic downturn and unfavourable freight rates; geopolitical tensions and EU-USA sanctions against Russia (during the Ukrainian crisis and the situation with Crimea); and limited icebreaker assistance to escort transiting vessels. The last point was due to Russia's increased focus on the development of new port infrastructure at Sabetta Port on the Ob Bay and new energy projects at Yamal LNG and Arctic Gate Oil Terminal, requiring year-round assistance from Russia's own icebreakers. These events made transit shipping between NE Asia and NW Europe via the NSR less attractive as savings in fuel costs compared to the Suez Route became less significant due the large drop in the price of bunker fuel, exacerbated by diminishing price differences for commodities between Asian and Western markets.

A total of 27 transit voyages were made on the NSR in 2018. Of the total 16 were international transits between two non-Russian ports, which is the highest number ever. The most active shipper was the Chinese shipping company COSCO with 8 international transits. Also in 2018 the first container ship Venta Maersk made international transit on the NSR, between Busan, South Korea, and Bremerhaven in Germany.

However, the NSR is no alternative to the Suez Route and will not significantly affect the existing schemes of general cargo delivery via traditional routes, with 16,833 vessels passing through the Suez Canal in 2016 transporting 974 million tons of cargo. Rather, the NSR's future significance lies in its role as a transport corridor along the Eurasian Arctic Coast and between the Eurasian Arctic and port destinations and markets in the Atlantic and Pacific.

Future Prospects:

For the NSR to realise its full potential, also as a transit route, a number of changes need to take place in the coming years and decades to improve the route's overall safety, reliability, services and attractiveness for ship owners and cargo owners. Further development of essential transportation and logistics infrastructure is needed, including more icebreakers to assist vessels; a fleet of specialized high ice-class Arctic shuttles; improved search and rescue capacity; oil spill preparedness and response; environmental protection measures; communication systems, hydrographic surveying and navigational aids; and better forecasting of sea-ice conditions. These measures together with the modernization of Russian Arctic ports will take time and require large investments.

Continued utilization of Arctic resources through new Arctic energy and mining projects is seen as a prerequisite for future investments in the maritime transport and logistics infrastructure needed along the NSR, at least in the short to medium-term. Likewise important and requiring still further investments is the intermodal connectivity between the NSR and other modes of transport, namely river transport, railways, roadways and aviation facilities. China is keen to secure its interests in future Eurasian Arctic economic development and to diversify its transportation options to Europe by taking an active role in infrastructure development on the NSR through its Belt & Road Initiative. The same applies to South Korea and Japan.

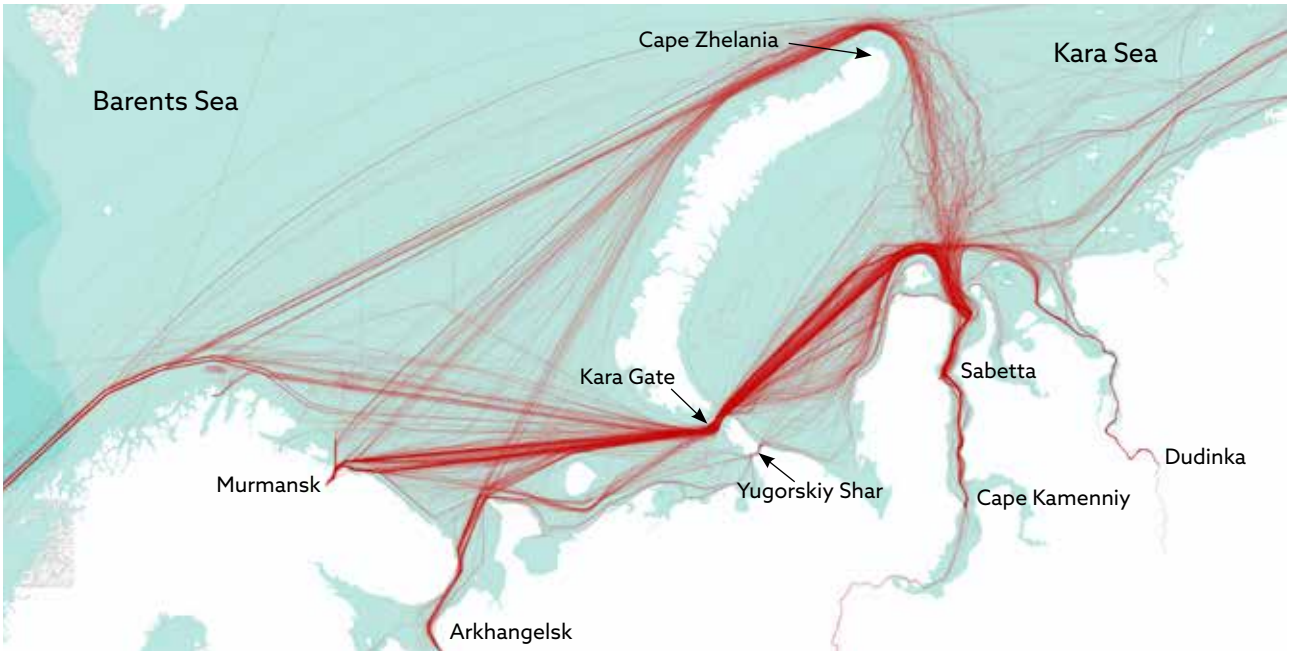
Major findings

Figure 3a. Shipping lanes of vessels on the Northern Sea Route in 2018 mapped from satellite Automatic Identification System (AIS) data.

This map is made by Centre for High North Logistics at Nord University, do not copy without permission.

A total of 227 vessels were operating on the NSR in 2018, making 2,022 separate voyages. Most of the shipping activity is during the summer-autumn season (July-November). Systematic year-round shipping only took place on the Kara Sea. Only very limited shipping activity took place during the winter-spring season (January-June + December) in the eastern part of the NSR (Laptev Sea and East Siberian Sea).

Figure 3b. Shipping lanes of vessels in the SW part of the Kara Sea in 2018 mapped from satellite AIS data.



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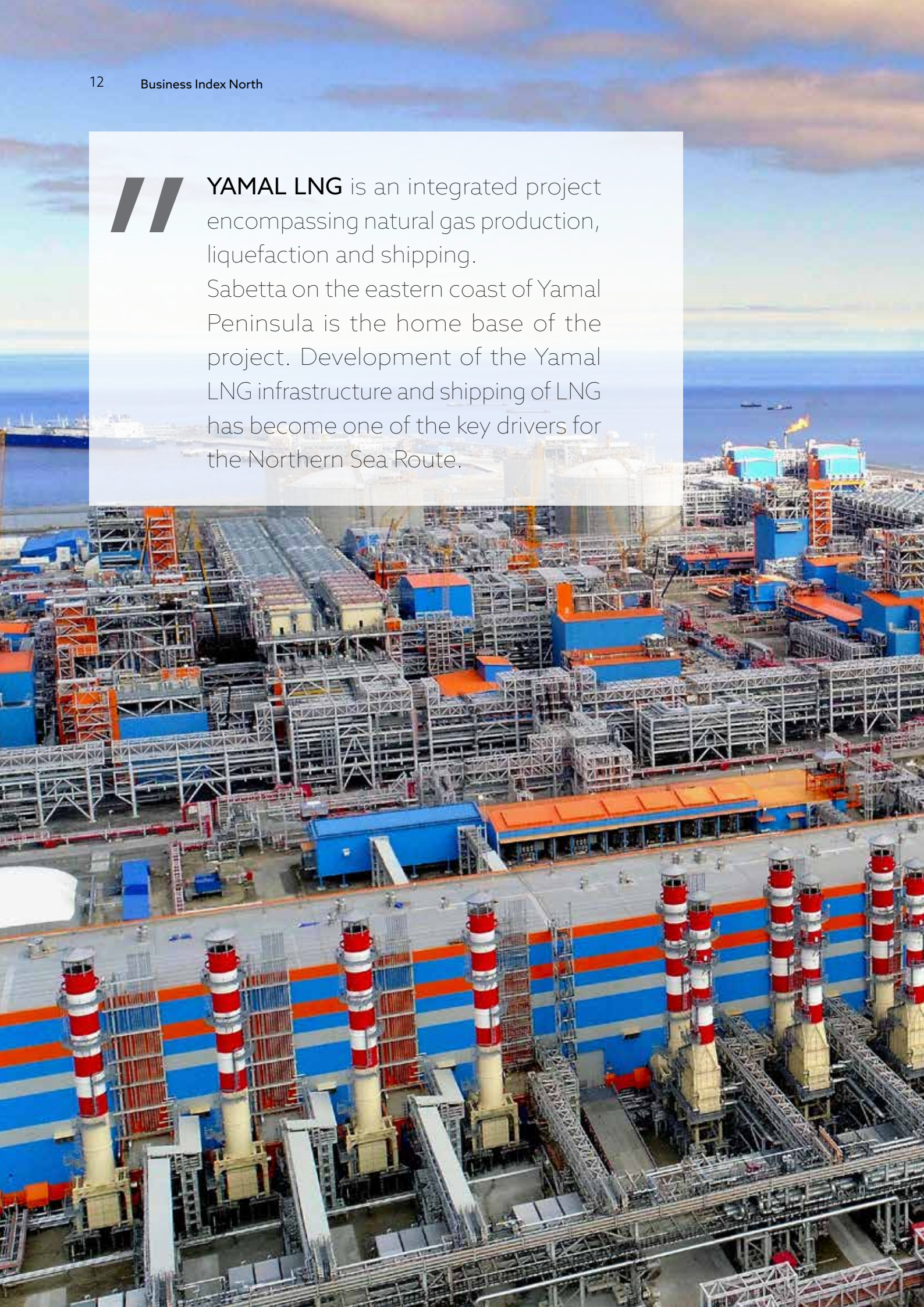
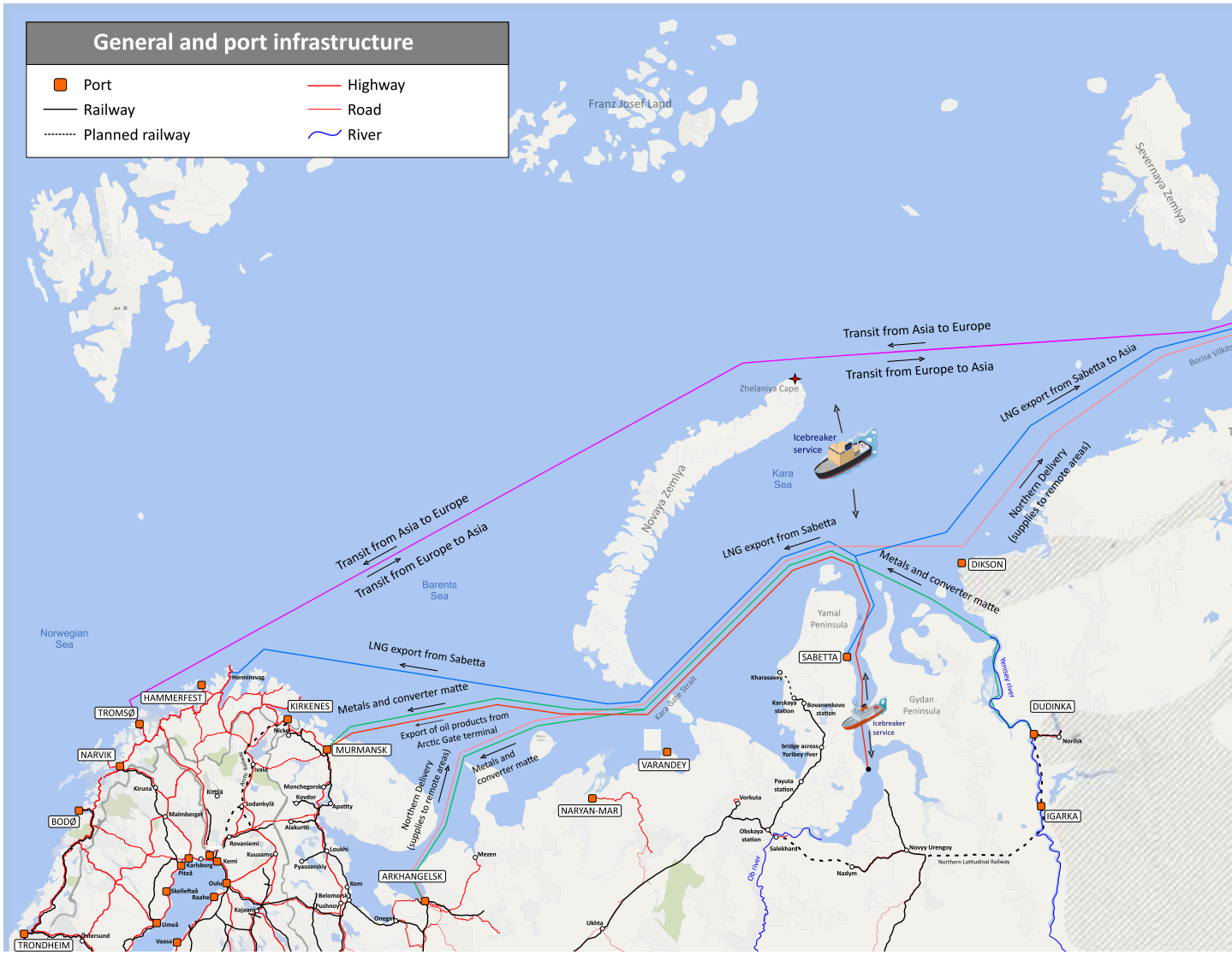
The three busiest areas of navigation within the NSR are Sabetta Port, the Arctic Gate Terminal at Cape Kamenniy on the Ob Bay, and the Port of Dudinka on the Yenisey River. Shipping between these three locations and the ports of Murmansk and Archangelsk stood out as the main traffic routes. Transshipment of LNG from the Port of Sabetta (Yamal LNG Plant) also started in 2018 near Honningsvåg off the coast of northern Norway.

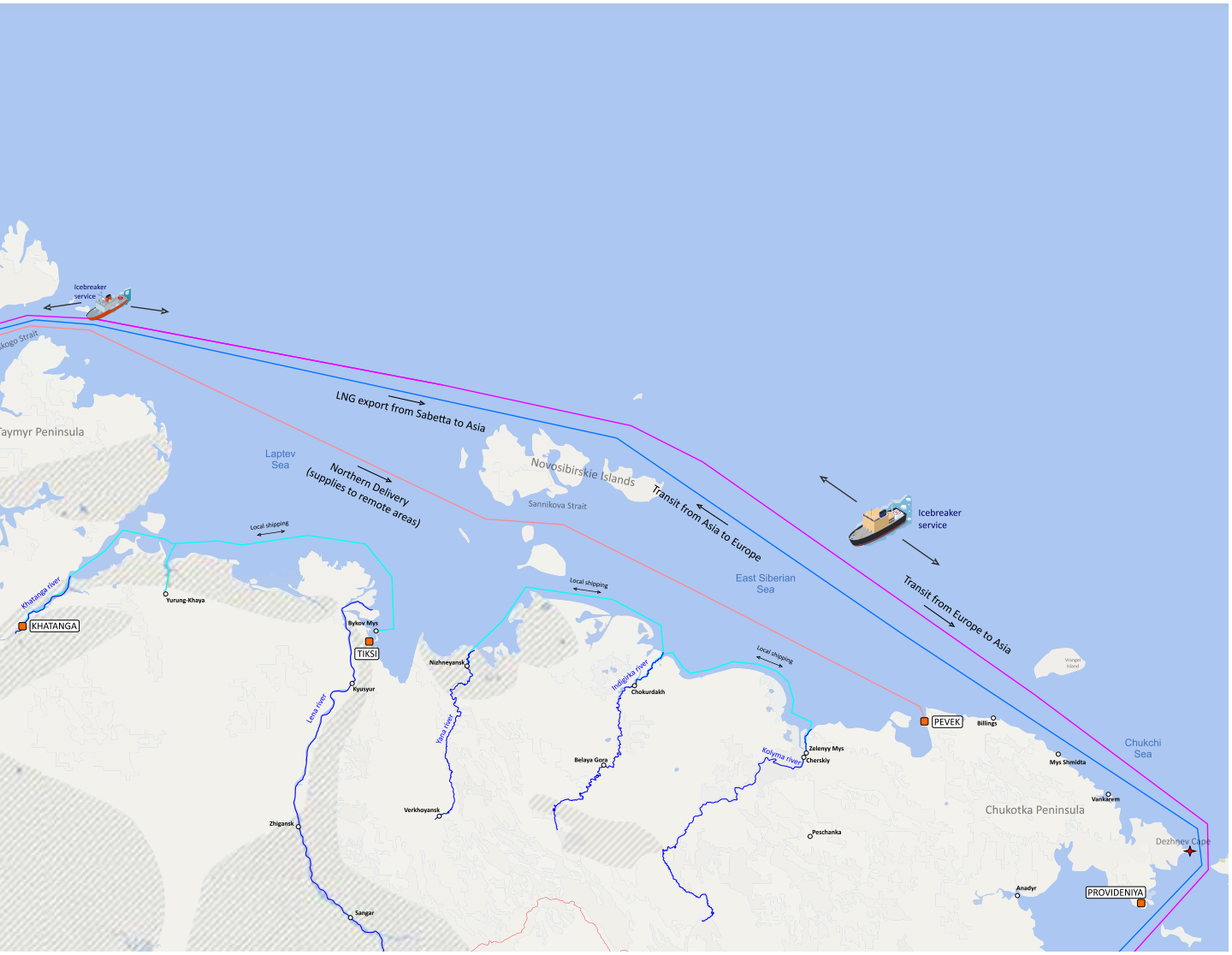
YAMAL LNG is an integrated project encompassing natural gas production, liquefaction and shipping.
Sabetta on the eastern coast of Yamal Peninsula is the home base of the project. Development of the Yamal LNG infrastructure and shipping of LNG has become one of the key drivers for the Northern Sea Route.



Yamal LNG plant.
Photo: Novatek

Infrastructure map 1: Overview of shipping lanes and transport infrastructure along the NSR





The map shows the location of Arctic ports and terminals, roadways, railways and inland waterways as well as the area of main icebreaker support on the NSR. The map clearly shows that existing transport infrastructure is mainly located in the western part of the NSR and in the BIN area (Northern Scandinavia and NW Russia). Several Russian ports along the NSR are serviced by Murmansk and Arkhangelsk each year with food, fuel and other supplies during the summer-autumn season ("northern deliveries").

MURMANSK (~ 60,68 mln t)

Murmansk is the largest city located north of the Arctic Circle. In the water area adjacent to Murmansk, there are berths of the sea commercial port, passenger terminal, fishing port, oil depot, ship repair plants and various other industries. Railways connect Murmansk with more southernly location in Russia. Murmansk is the leading port in the terms of the number of voyages to and from the NSR Water Area.

KIRKENES (~ 132000 t)

The Port of Kirkenes is situated in Northern Norway close to the Russian-Norwegian border and offers good ice-free and deep-water quays and sheltered location. The port handles iron ore, fish, passengers and general cargo. The port also offers supply services to the offshore oil and gas industry. Kirkenes port has the largest indoor dry-dock (KIMEK) north of Trondheim which offers the full range of services to ships and fleets of all sizes.

ARKHANGELSK (~ 2,7 mln t)

The Port of Arkhangelsk is located on the delta of the Northern Dvina River, which flows into the Dvina Bay of the White Sea. In Arkhangelsk are several enterprises dealing with of timber, fish, machinery, and ship repairs. On the river waters adjacent to Arkhangelsk are berths for the commercial sea, river, forest, and fishing ports, oil terminals, sea and river passenger station, as well as timber processing, pulp and paper, ship repair, fishing and other industries. Arkhangelsk is the end point of the federal highway "Kholmogory" M8 Arkhangelsk – Moscow.

TROMSØ (~ 980000 t)

The Port of Tromsø is one of Norway's largest fishing ports and cruise ports. It is also an important logistics hub in the High North. Several transport companies have offices and cargo terminals in the port. There are two freezer/cold storage terminals in Tromsø and offshore base for the storage and transportation of goods and equipment for oil and gas fields. In addition, It offers facilities for repair and maintenance of oil rigs, vessels and subsea equipment.

NARYAN-MAR (~ 120000 t)

Naryan-Mar is a sea and river port town and the administrative center of Nenets Autonomous Okrug. Navigation in the port lasts from mid-June to mid-October, but can be extended until mid-November. The Port of Naryan-Mar has 4 berths with a total length of about 400 meters. The handling of vessels is carried out both at berths and at anchorage. Transshipment and cargo handling is handled by Naryan-Mar Commercial Sea Port (including timber, coal, minerals, construction materials and food, containers, and general cargo).

BODØ (~ 375000 t)

The Port of Bodø is located in Northern Norway. The port has railway terminal, port terminal, ferry terminal, cargo terminals, freezer/cold storage, warehousing and other storage facilities. All together the port owns approximately 70,000 m² of outdoor storage space and buildings covering approximately 17,000 m². Bodo is the northern-most end station for railway in Norway. The Joint Rescue Coordination Centre Northern Norway is also placed in Bodo.

NARVIK (~ 21,2 mln t)

The Port of Narvik is central to the development of Narvik as a transport and logistics center. The port is ice-free and well protected from severe weather conditions. Most of the cargo handled by the port is iron ore from the Swedish mines in Kiruna and Kaunisvaara. From Narvik there are railway connections to South Scandinavia and Central Europe.

HAMMERFEST (~ 5,3 mln t)

The Port of Hammerfest is one of the main nodes in the communication system of Northern Norway, providing up to 30% of sea freight in the north of the country.
The port has mooring front with the length of the more than 1.5 km and anchorage for 12 large-capacity vessels. Hammerfest is connected to the main road network by Norwegian National Road 94 and Hammerfest has third

General and port infrastructure

- Port
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- Planned railway
- Highway
- Road
- River
- Airport
- Small airport
- Airport under construction
- Hospital / Medical facilities
- SAR
- Polar observation station
- Oil/gas project supply terminal
- General cargo terminal
- Temporary LNG transshipment
- Oil terminal
- LNG terminal
- Ore terminal
- Coal terminal
- Container terminal
- Cruise ship terminal
- Fishing terminal
- Ro-Ro terminal
- Ship repair

Industry

- LNG plant
- Steel plant
- Wood/pulp & paper plant
- Shipyard
- Fish processing plant
- Oil-refinery

Natural resources and mines

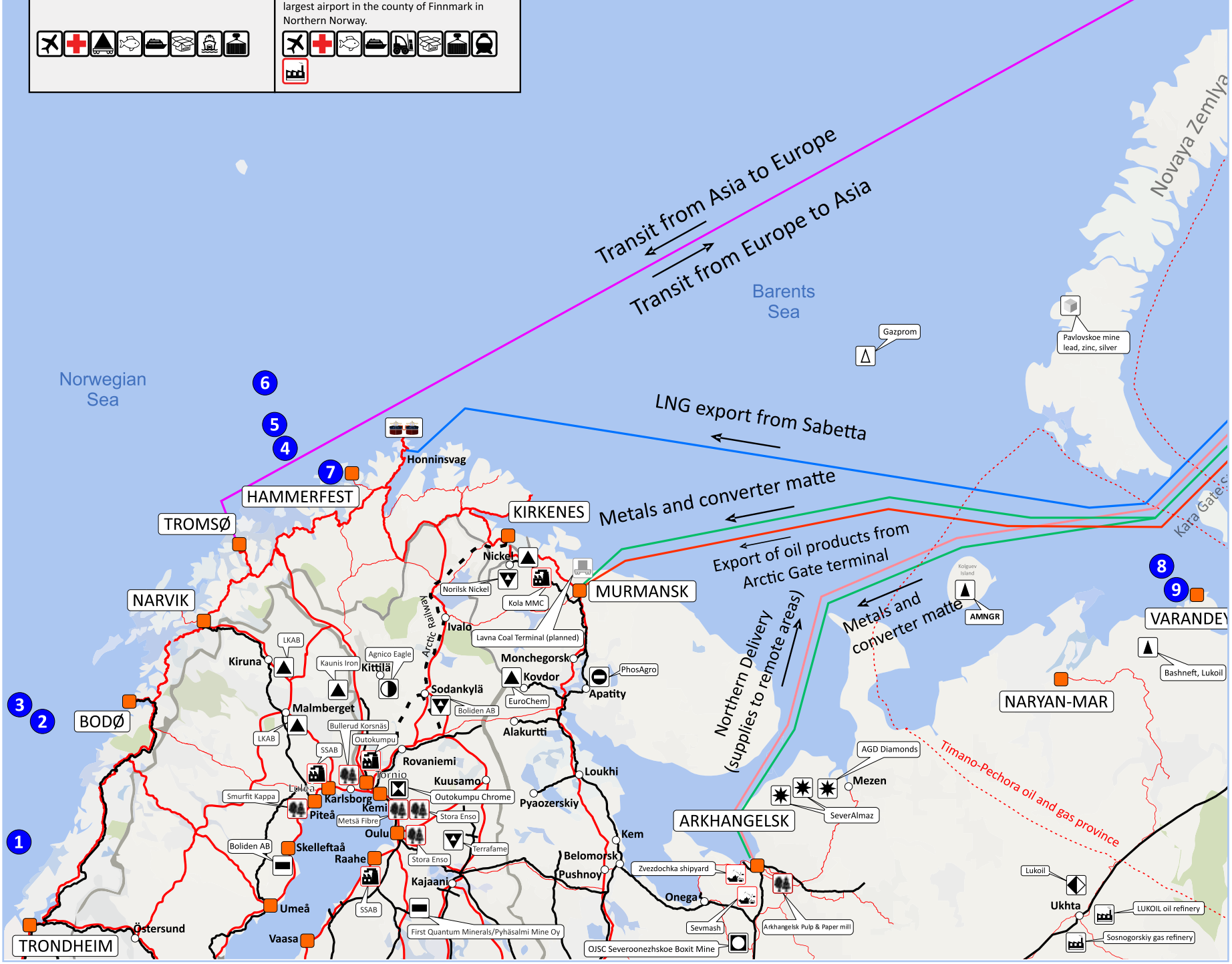
- Oil
- Gas
- Apatite-nepheline
- Aluminium
- Titanium
- Iron Ore
- Nonferrous metal
- Gold
- Coal
- Diamond
- Chrome
- Nickel

1. Skarv oil and gas field
2. Norne oil field
3. Aasta Hansteen gas terminal
4. Goliat oil field
5. Snøhvit gas field
6. Johan Castberg oil field
7. Melkøya LNG terminal
8. Prirazlomnaya oil terminal
9. Varandey oil terminal
10. Yamal LNG terminal
11. Arctic LNG-2 (planned)
12. Arctic Gates oil terminal

Infrastructure map 2:

Shipping lanes, ports and terminals and other transport infrastructure in the Barents Sea.

The map shows the location of main industrial sites dependent on maritime transportation, and location of natural resources and mines. The most intense shipping activity along the Eurasian Arctic coast occurs on the Barents Sea and Norwegian Sea. Similarly, the most sophisticated transport and logistics infrastructure and support services, including emergency services, are located in this area. The main transshipment and service hubs for the NSR are also located here – Murmansk and Arkhangelsk in NW Russia and Kirkenes and Honningsvåg in North Norway.


largest airport in the county of Finnmark in Northern Norway.
Transit from Asia to Europe
Transit from Europe to Asia
Barents Sea
Norwegian Sea
Novaya Zemlya
Gazprom
Pavlovskoe mine lead, zinc, silver
LNG export from Sabetta
Metals and converter matte
Export of oil products from Arctic Gate terminal
Northern Delivery (supplies to remote areas)
Metals and converter matte
Kara Gate
HAMMERFEST
TROMSØ
NARVIK
BODØ
TRONDHEIM
KIRKENES
MURMANSK
ARKHANGELSK
VARANDEY
NARYAN-MAR
Honninsvag
Nickel
Norilsk Nickel
Kola MMC
Lavna Coal Terminal (planned)
Ivalo
Arctic Railway
Kiruna
LKAB
Kaunis Iron
Agnico Eagle
Kittilä
Sodankylä
Boliden AB
Malmberget
Bullerud Korsnäs
Outokumpu
SSAB
Rovaniemi
Tornio
Kuusamo
Outokumpu Chrome
Karlsborg
Kemi
Stora Enso
Metsä Fibre
Piteå
Smurfit Kappa
Oulu
Terrafame
Skellefteå
Raahe
Umeå
Vaasa
Östersund
Kajaani
First Quantum Minerals/Pyhäsalmi Mine Oy
SSAB
Monchegorsk
Kovdor
EuroChem
PhosAgro
Apatity
Alakurtti
Loukhi
Pyaozerskiy
Kem
Belomorsk
Pushnoy
Onega
Sevmash
OJSC Severoonezhskoe Boxit Mine
Zvezdochka shipyard
Arkhangelsk Pulp & Paper mill
AGD Diamonds
Mezen
SeverAlmaz
Timano-Pechora oil and gas province
AMNGR
Bashneft, Lukoil
Lukoil
Ukhta
LUKOIL oil refinery
Sosnogorskiy gas refinery

NARYAN-MAR (~ 120000 t)

Naryan-Mar is a sea and river port town and the administrative center of Nenets Autonomous Okrug. Navigation in the port lasts from mid-June to mid-October, but can be extended until mid-November. The Port of Naryan-Mar has 4 berths with a total length of about 400 meters. The handling of vessels is carried out both at berths and at anchorage. Transshipment and cargo handling is handled by Naryan-Mar Commercial Sea Port (including timber, coal, minerals, construction materials and food, containers, and general cargo).

DIKSON (~ 11500 t)

The Dikson Seaport is located in the south-eastern part of the Kara Sea at the entrance to the Yenisei Gulf. Summer sea navigation is possible from mid-August to the end of September. Winter navigation is possible with icebreaker support. The purpose of the port is to provide for transport of goods and services for the town of Dikson, as well as for Arctic expeditions and for a polar station. The VostokUgol Company is building the northernmost terminal for loading coal, 50 km south from Dikson.

SABETTA (~ 17,5 mln t)

Sabetta is new Arctic port, located on the eastern shore of the Yamal Peninsula in the Ob Bay of the Kara Sea. The Port of Sabetta main role is export of LNG and gas condensate from the Yamal LNG Plant along the Northern Sea Route (NSR) to markets in NW Europe and NE Asia. Rapid development of this port became the key factor for increasing cargo turnover on the NSR and for busing the Russian shipbuilding industry.

IGARKA (~ 12500 t)

The Port of Igarka is accessible for ships from the Yenisei Bay. The period of summer-autumn navigation in the port is between June and September (possibly October). The port has 4 coastal berths (including passenger berth) with a total length of 580 m and 12 offshore moorings with a total length of 1,800 m. Vessels may have a draft of up to 8 m. The airport in Igarka serves flights to Novosibirsk, Krasnoyarsk and Norilsk.

DUDINKA (~ 2 mln t)

The Seaport of Dudinka is located on the right bank of the Yenisei River. The port is connected year-round by sea with Arkhangelsk and Murmansk. There are two stevedoring companies operating at the port location in Dudinka. The first is Norilsk Nickel, which uses berths for shipping finished goods as well as containers and general cargo for local use. The other is Taimyr Fuel Company which transships oil products in the Port of Dudinka. The railway in Dudinka is autonomous and not connected to the main railway system.

VARANDEY (~ 8,28 mln t)

The port of Varandey is situated in the Nenets autonomous area, on the coast of the Pechora Sea. The offshore oil platform which is the part of the port infrastructure can receive vessels all year round. Inner harbor works only in the summer and the autumn period. There are 6 oil depots situated nearby. The terminal capacity is 12 mln t of oil per year. Varandey airport is used for delivery of personnel to Prirazlomnaya platform by helicopters.

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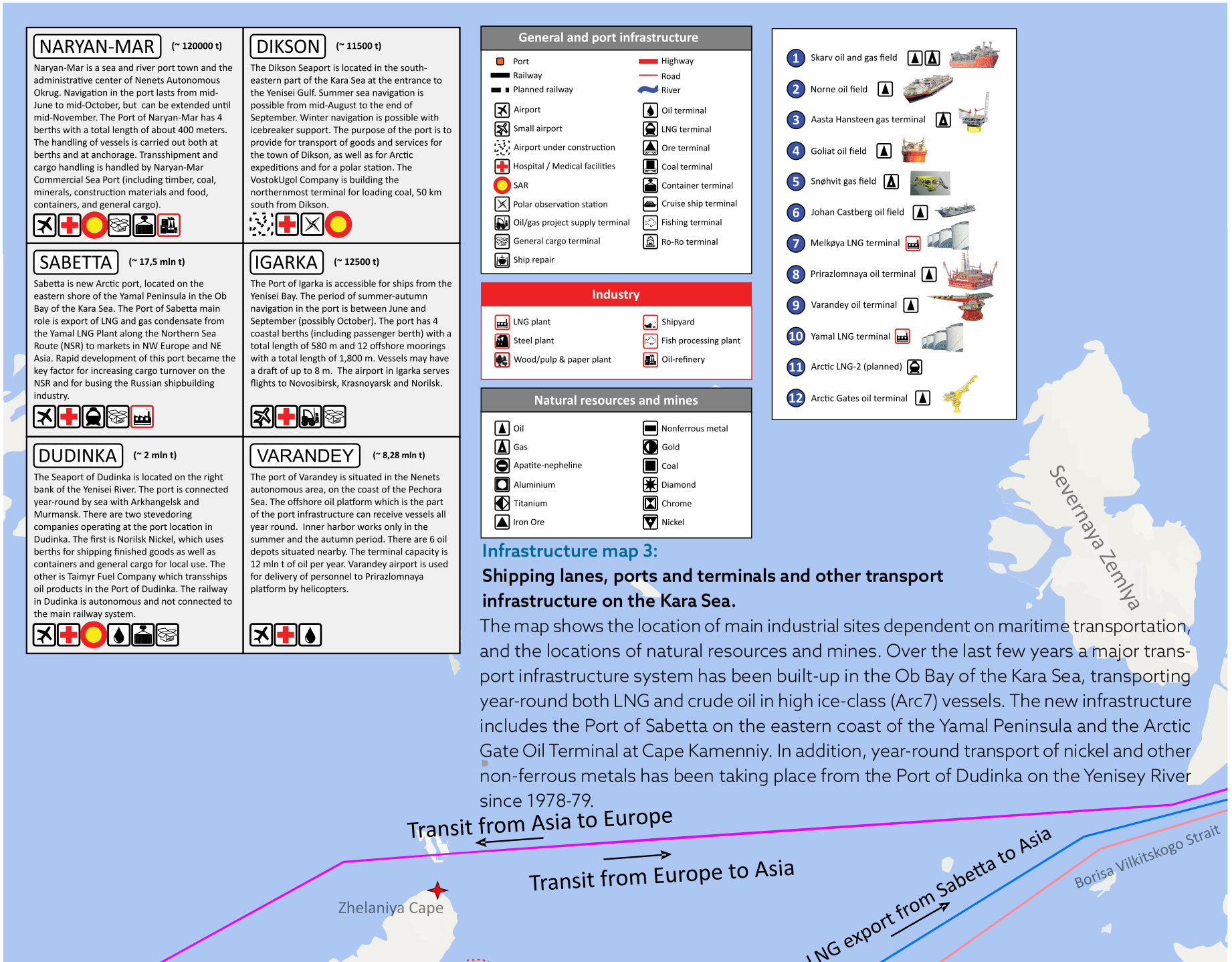
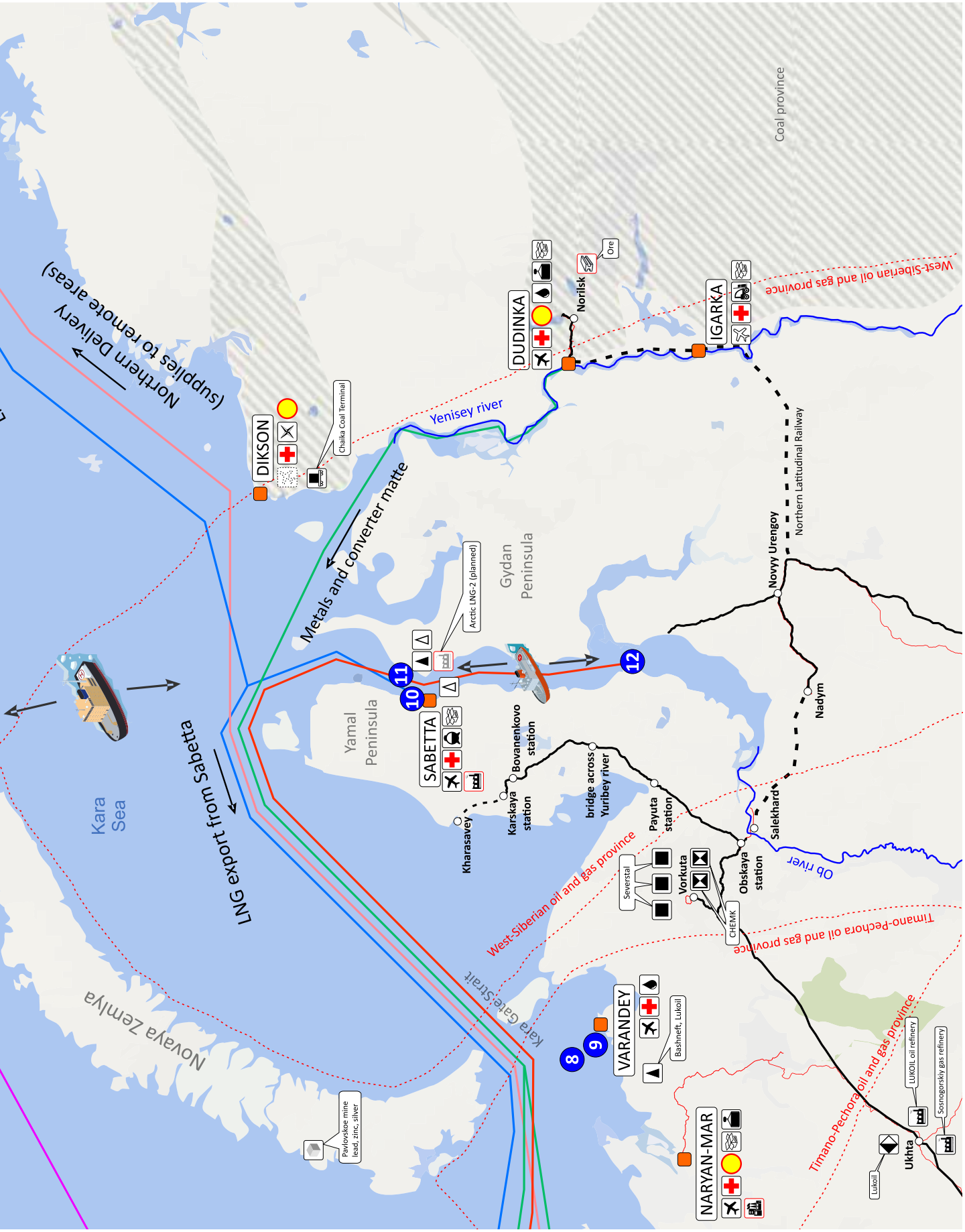
Infrastructure map 3:

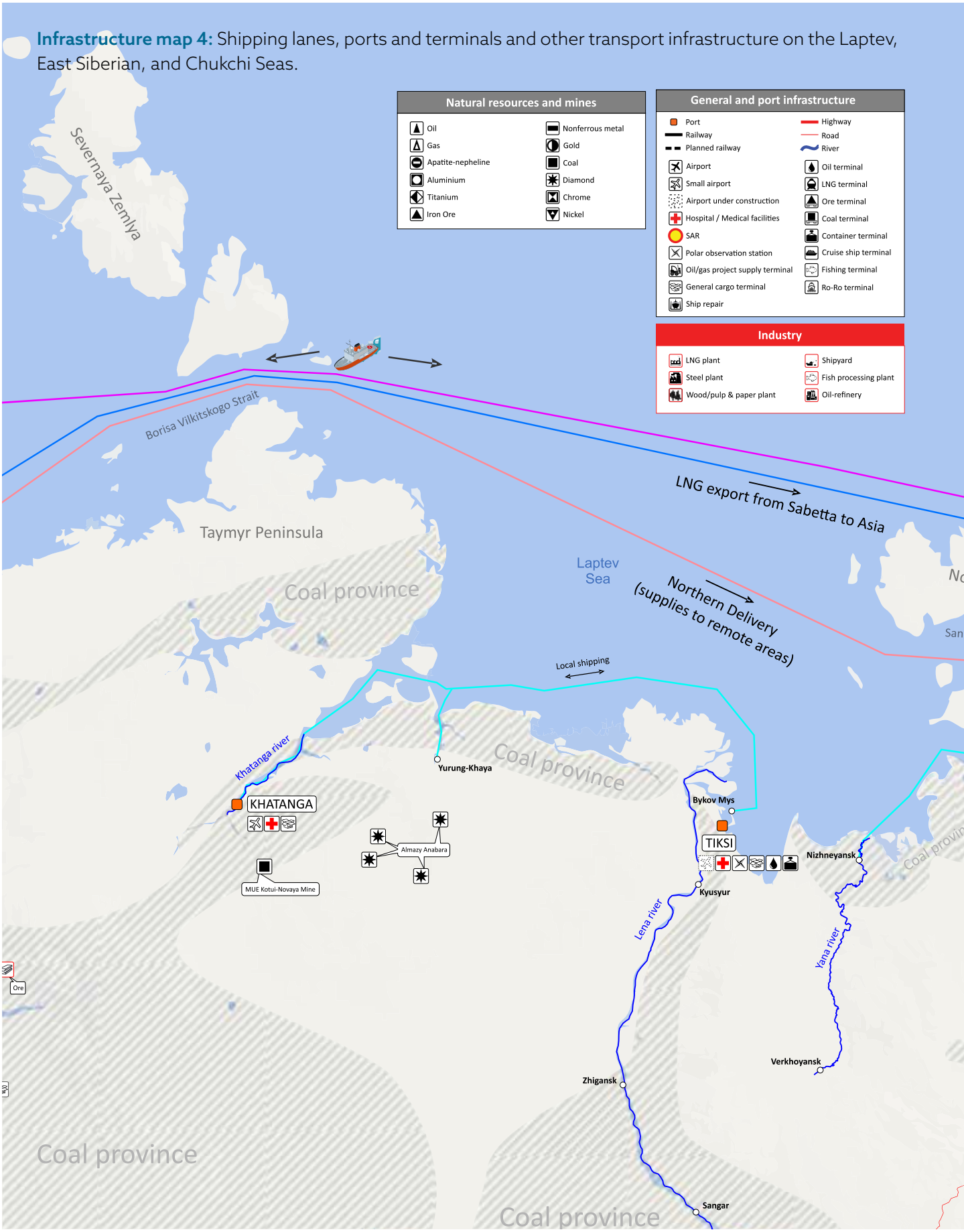
Shipping lanes, ports and terminals and other transport infrastructure on the Kara Sea.

The map shows the location of main industrial sites dependent on maritime transportation, and the locations of natural resources and mines. Over the last few years a major transport infrastructure system has been built-up in the Ob Bay of the Kara Sea, transporting year-round both LNG and crude oil in high ice-class (Arc7) vessels. The new infrastructure includes the Port of Sabetta on the eastern coast of the Yamal Peninsula and the Arctic Gate Oil Terminal at Cape Kamenniy. In addition, year-round transport of nickel and other non-ferrous metals has been taking place from the Port of Dudinka on the Yenisey River since 1978-79.




Northern Delivery
(supplies to remote areas)
LNG export from Sabetta
Metals and converter matte
Yenisey river
Kara Sea
Novaya Zemlya
Kara Gate Strait
Yamal Peninsula
Gydan Peninsula
Coal province
West-Siberian oil and gas province
Timano-Pechora oil and gas province
Ob river
DIKSON
Chaika Coal Terminal
DUDINKA
Norilsk
Ore
IGARKA
SABETTA
Arctic LNG-2 (planned)
VARANDEY
Bashneft, Lukoil
NARYAN-MAR
Pavlovskoe mine
lead, zinc, silver
Kharasavey
Karskaya station
Bovanenkovo station
bridge across Yuribey river
Payuta station
Obskaya station
Salekhard
Novyy Urengoy
Northern Latitudinal Railway
Nadym
Severstal
Vorkuta
CHEMK
Ukhta
LUKOIL oil refinery
Sosnogorskiy gas refinery
Lukoil
8
9
10
11
12

Infrastructure map 4: Shipping lanes, ports and terminals and other transport infrastructure on the Laptev, East Siberian, and Chukchi Seas.



The map shows the location of main industrial sites dependent on maritime transportation and the locations of natural resources and mines. As is apparent, transport infrastructure is here largely lacking, with no roads and railways and limited capacity ports in Khatanga, Tiksi and Pevek. The Siberian Rivers Lena, Yana, Indigirka and Kolyma provide transport options between more southern locations in Siberia and the NSR, but only for three months of the year in summer, before they freeze over.

KHATANGA (~ 75000 t)

Khatanga Sea Port is located on the right bank of the Khatanga River, which flows into the Khatanga Bay of the Laptev Sea. The port operates only during the summer navigation period (from mid-June to the end of September). The port can be visited by vessels with a draft of up to 4.6 m. The total length of the mooring line is about 350 m. The port handles food and refrigerated goods, various general cargoes for Arctic settlements, timber, bulk (coal, sand and gravel), and oil products. Cargo transfer services are provided by Khatanga Sea Trade Port.

TIKSI (~ 17000 t)

Tiksi Sea Port is located on the coast of the Laptev Sea near the Lena River delta, on the shore of Tiksi Bay. The port is open for navigation from mid-July to mid-October, and accepts ships with a draft of up to 5.6 m. The seaport has more than 10 berths with a total length of more than 1.5 km. The company JSC Sea Port Tiski handles goods for the local people, as well as Arctic settlements located in the central sector of the Arctic and the Yakutia region. The cargo is made up of food and general cargo, construction materials, containers, coal, and timber.

PEVEK (~ 266000 t)

Port of Pevek is the biggest port on the Chukchi Peninsula. The port functions only during the summer-autumn navigation period (from the beginning of July to the end of October). The port is a base port on the Northern Sea Route. Pevek Sea Trade Port provides cargo transfer services. The main types of cargoes are containers, industrial equipment, ferrous metals, and timber. The Port of Pevek has three berths with a total length of about 500 meters and an auxiliary pier.

PROVIDENIYA (~ 20000 t)

The main activity of the Port of Provideniya is delivery of coal for Provideniya's residence, various general cargoes from the port of Vladivostok, as well as bulk oil products from other coastal ports for needs of the Chukotka Autonomous District. Foreign passenger ships with tourists on board from Alaska call on the port, and it also serves local passenger traffic Anadyr - Provideniya – Lavrentiya. The port is opened for ships during navigation period from May to the beginning of January.

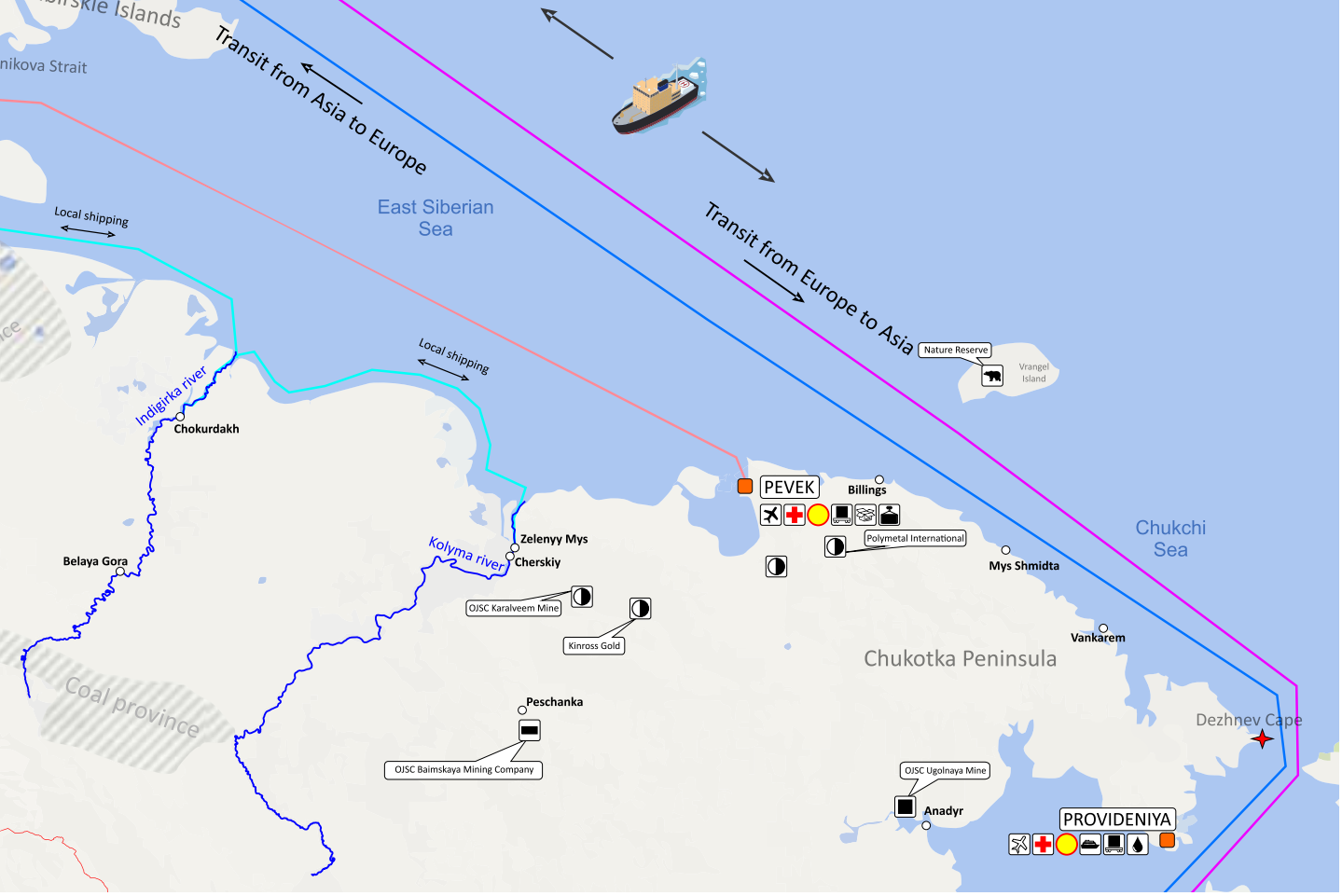


Figure 4: Types of vessels and number of voyages for each vessel type on the NSR in 2017 and 2018.

A total of 283 vessels were operating on the NSR in 2017, making 1,908 separate voyages. The number of vessels declined in 2018 to 227, but the number of voyages increased to 2022. The most common vessel types are general cargo vessels and oil tankers.

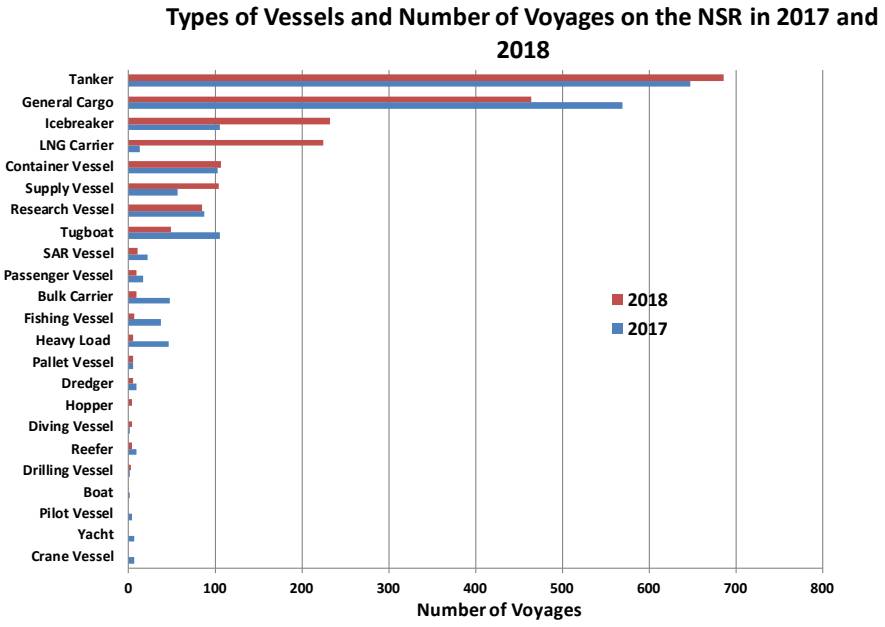
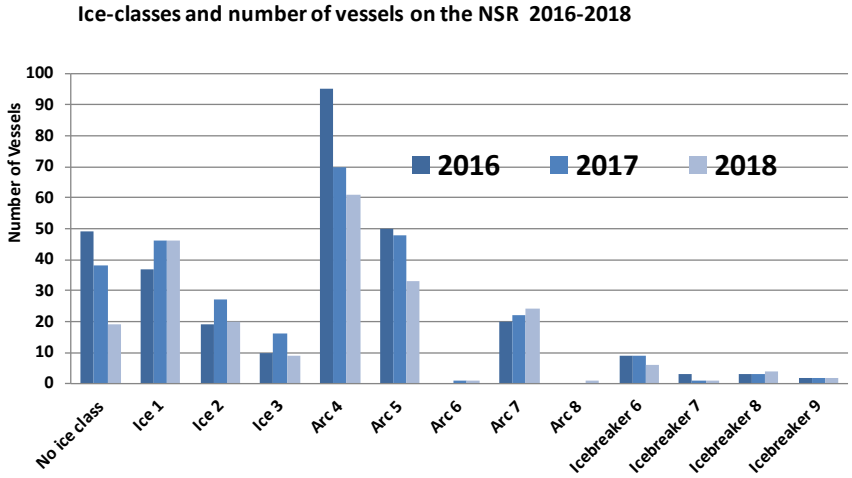


Figure 5: Ice-classes of vessels on the NSR 2016-2018.

The most common ice-class in vessels on the NSR in 2016-2018 was Arc4 (Russian Maritime Register of Shipping). Vessels with weak ice-reinforcement, or ICE 1-3 and vessels with no ice-reinforcement operated only during the summer-autumn navigational season on the NSR (July-November).



Figures 6: Most frequent departure ports and numbers of voyages from each port in 2016 and 2018.

As already shown in Figure 3b the most frequent departure ports for shipping on the NSR in 2018 were the ports of Murmansk, Sabetta, Arkhangelsk and Dudinka, together with the Arctic Gate Oil Terminal at Cape Kamenniy on the Ob Bay.

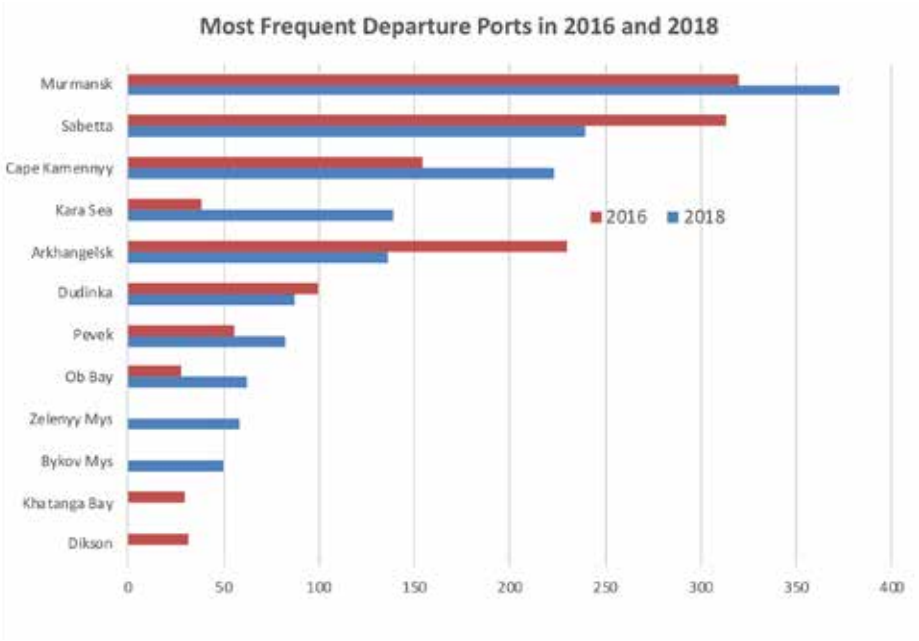


Figure 7: Number of voyages per month on the NSR 2016-2018.

The number of voyages peaks in the month of September, which usually has the most favourable ice conditions. Shipping during the winter-spring season (7 months; January-June + December) is only taking place in the SW part of the Kara Sea.

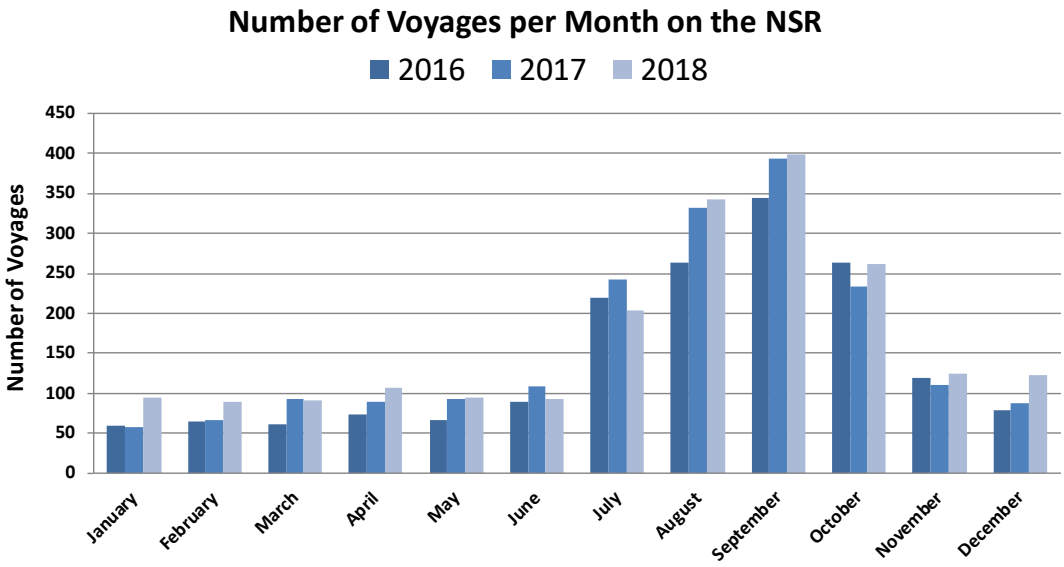
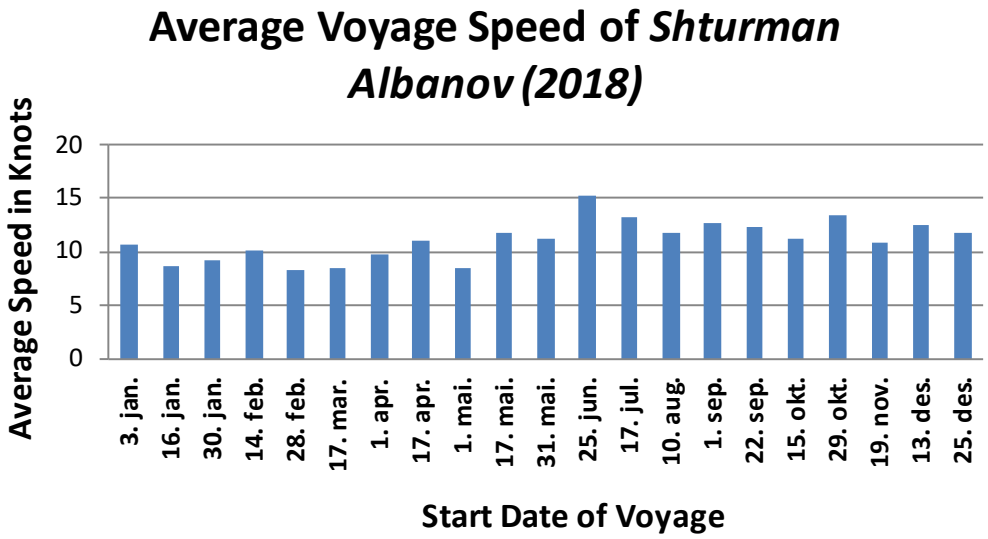


Figure 8: Average voyage speeds of the oil tanker Shturman Albanov in 2018.

The duration of a voyage and a vessel's average speed through the NSR depend on a number of variables including sea-ice conditions, the actual sailing distances, the vessel's engine power, ice-class, visibility, wind strength and wind direction and possible waiting time for icebreaker assistance. The figure shows the average speed of 21 voyages of the new ice-class Arc7 oil tanker Shturman Albanov (44,354 gross tonnage) sailing between the Arctic Gate Oil Terminal at Cape Kamenniy on the Ob Bay of the Kara Sea and the Port of Murmansk.



Ice on the Kara Sea
Photo: Antonina Tsvetkova

Implications for the BIN area and for Euro-Arctic regional development

Increased commercial traffic on the NSR eastward and westward could boost regional socio-economic development in the BIN area (Northern Scandinavia and NW Russia):

• The NSR offers shipping companies and cargo owners the shortest trade route for imports/exports between the BIN area and the North Pacific market (USA, China, Japan and South Korea). The proposed new rail connection between Rovaniemi in Finnish Lapland and the port of Kirkenes in northern Norway would further strengthen those trade routes. The same applies to a proposed rail connection between Arkhangelsk and the southern Urals.

• The NSR offers natural resource industries in the BIN area (oil, LNG, minerals, forestry products and fisheries) the shortest route to transport raw materials or processed natural products to the rapidly growing Asian market. Arctic cruise tourism also has future growth potential.

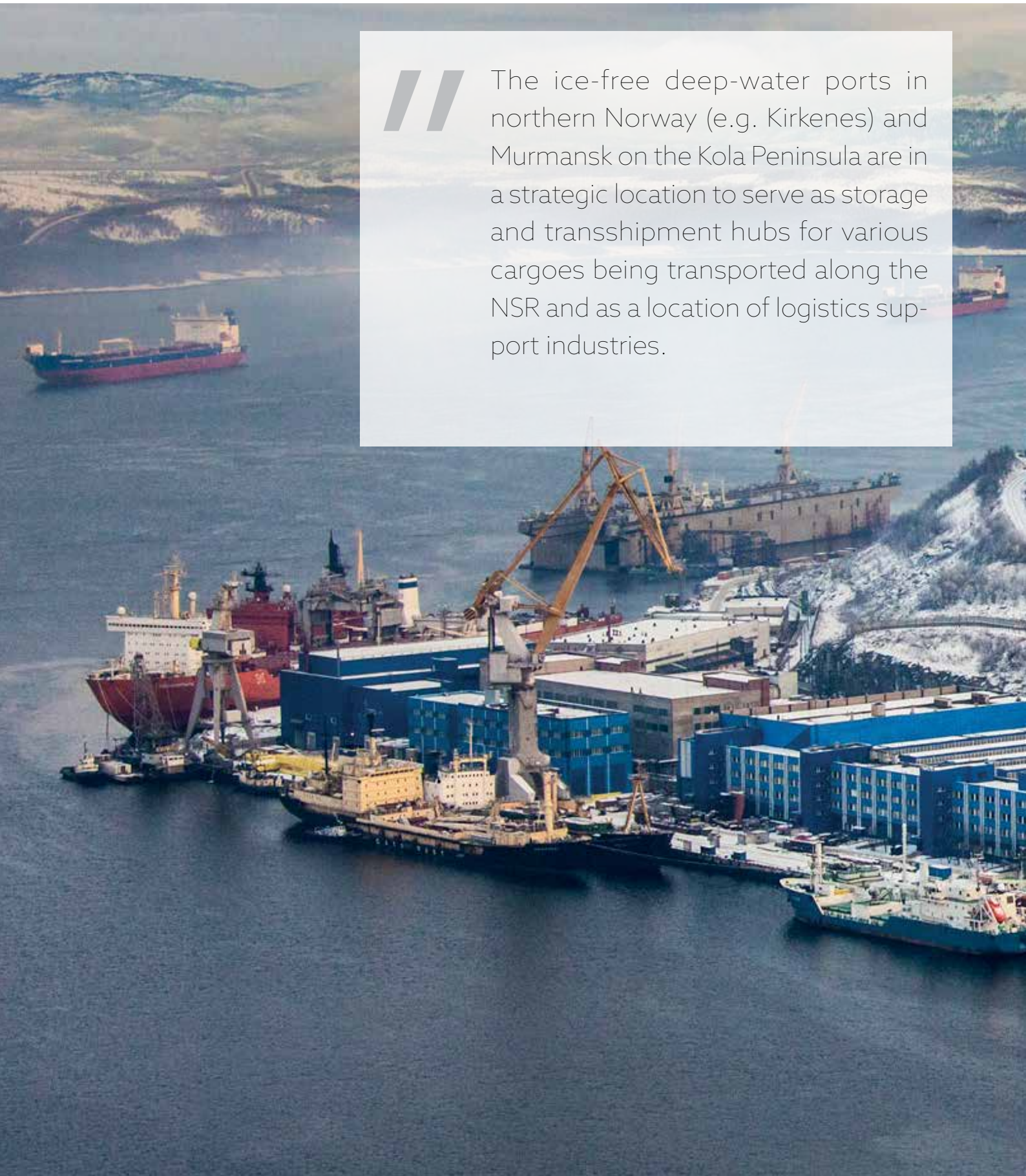
• The ice-free deep-water ports in northern Norway (e.g. Kirkenes) and Murmansk on the Kola Peninsula are in a strategic location to serve as storage and transshipment hubs for various cargoes being transported along the NSR and as a location of logistics support industries. These ports lie at the western gateway of the NSR, midway between the Bering Strait in the North Pacific Ocean and Gibraltar at the entrance to the Mediterranean Sea.

• The shipbuilding and offshore resource extraction industries in the BIN area could further benefit from specializing in the design and construction of innovative and energy-efficient ice-class vessels, icebreaking technologies, mining and offshore equipment and platforms for Arctic operations, including vessel repairs and logistics services.

• Information on ship traffic and traffic density in the Arctic and assessment of current transportation infrastructure and projected future transport infrastructure needs are important for the BIN area, and of significance to local and global businesses, policy-makers and other stakeholders. Ship traffic data is, for example, important in assessing search and rescue needs and emergency services in the Arctic, the environmental impacts of Arctic shipping and for assessing future needs for navigational aids and for maritime support infrastructure development.

• Actors in the BIN area are in an ideal position to shape the future development of the NSR. This includes private and public investments in new transportation and logistics infrastructure with a focus on innovative, environmentally-friendly and cost-effective logistics solutions.

Murmansk, base of Rosatomflot. Photo: Valery Vasilevsky



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РОСАТОМФЛОТ

Business Index North (BIN) is a project that contributes to sustainable development and value creation in the Arctic. The overall goal is to set up a recurring, knowledge-based, systematic information tool for stakeholders. This report is a part of the third issue of the "Business Index North" analytical report that focuses on the BIN area, including northern regions of Norway (Finnmark, Troms, Nordland), Sweden (Norrbotten and Västerbotten), Finland (Lapland, Northern Ostrobothnia and Kainuu), and North-West Russia (Murmansk Region, Arkhangelsk Region, and Nenets Autonomous Okrug). The main implementing partner is the High North Center for Business and Governance at Nord University Business School. Nordland County Council and The Norwegian Ministry of Foreign Affairs provide basic funding for the BIN project.

www.businessindexnorth.com

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