



JOINT BARENTS TRANSPORT PLAN

REVISED DRAFT • MAIN REPORT 2019

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Foreword

In recent years, world-wide attention has increasingly been paid to the High North, because of its growing potential to exploit new and vast sources of natural resources. At the same time, the Region's economic and social development of the areas that form the Barents Euro-Arctic Region must not lag behind that of the rest of the respective states. Ensuing demand for better accessibility, both within the Barents region and between the Barents region and abroad, puts pressure on transport infrastructure investments throughout the Region requiring also more cooperation across the borders. To address these needs the Barents Euro-Arctic Transport Area (BEATA) co-operation was established between the ministers of transport of Norway, Sweden, Finland and Russia in May 1998.

In early 2013, the Steering Committee of the BEATA set up an expert working group to prepare the Joint Barents Transport Plan (JBTP 2013) with the objective of “developing an efficient transport system in the Barents Region with good internal connectivity between the Barents countries and with good external links to world markets. The transport system should facilitate Barents regional development and create new opportunities for important industries. The transport system should be developed in a manner that safeguards the environment and improves safety and accessibility for all”. The proposals were well received by the BEATA Ministers 2013 and regarded as a draft plan and as an ongoing work. As such, the plan was deemed able to serve as input for cooperation on transport issues in the Barents region. They also stated that future transport planning in the Barents region, on national as well as regional level, may consider the recommendations from the Joint Barents Transport Plan. The Joint Barents Transport Plan has since been updated in 2015 during the Finnish chairmanship and in 2016 during the Russian chairmanship of the BEATA. In 2016, the ministers noted the positive development of the transport system in the region since the first draft of Joint Barents Transport Plan in 2013 and welcomed the further activities aimed at creating an effective transport system in BEATA.

Under the Swedish chairmanship, the BEATA Steering committee decided in November 2017 to set up a new expert working group in order to revise the Joint Barents Transport Plan. The Swedish Transport Administration was assigned to lead this working group in their work to revise the plan.

In our revision of the new Draft Joint Barents Transport Plan main emphasis has been to incorporate the issues of the tourism industry and a connected mobility. The report is also updated due to new external conditions and trends and propose new measures presented in the form of a shorter and more summarised main report. Meetings have been held with Barents Regional Working Group on Transport and Logistics (BRWGTL) and the Joint Working Group on Tourism (JWGT) to get their input to the report.

Our gratitude to all of you in the four countries who have contributed to this update.

The expert group on the Joint Barents Transport Plan September 2019

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Summary

General

Under the Swedish chairmanship, the BEATA Steering committee decided in November 2017 to set up a new expert working group in order to revise the Joint Barents Transport Plan (JBTP).

In this revision of the Draft Joint Barents Transport Plan main emphasis have been to present a shorter main report and incorporate issues such as the tourism industry and a connected mobility. The report is also updated due to new external conditions, such as the issues of climate change and trends and propose new measures.

The documents have an advisory nature and do not entail obligations for BEATA member countries in terms of the implementation of infrastructure projects.

The draft Joint Barents Plan is the recommendation of experts of transport authorities of BEATA countries, presented during the Meeting of Ministers of Transport of the BEAC member countries (September 11-12, 2019 in Umeå, Sweden).

The Joint Objective

The effects of climate change are discussed worldwide and in order to address the challenges, the global economy needs to be adapted. For the Barents Region to be competitive in the coming decades also means being competitive in this transition.

The transport system should facilitate the Barents regional development and create new opportunities for the key industries.

Norway, Sweden, Finland and Russia have the ambition to develop an efficient and sustainable transport system in the Barents Region with good internal connectivity between the Barents countries and with good external links to world markets. Apart from the national objectives, the development of the transport system should be in line with the United Nations global sustainable development goals (Agenda 2030) including road safety.

The Barents Region

The total population of the Barents Region is approximately 5.3 million. The surface area of the Barents Region equals the combined area of France, Spain, Germany, Italy and the Netherlands. Average population density is only 3.5 inhabitants/km².

The industrial structure in the Barents Region is dominated by the key industries like, mining and metal industry, forestry, seafood and marine resources and petroleum and gas industry. There are many ongoing and planned industrial investments in the region and the need of efficient and sustainable transport and communication infrastructure is very important.

For many Arctic countries and regions, tourism is an important part of the economy and its development is an effective way to diversify the economy of stagnated areas. Despite the growth and development of the tourism in the Arctic region its full potential is still far from achieved. The main deterrents are as follows: limited access to transportation, special climate conditions, seasonality of tourist offers and the low level of tourist infrastructure in many places. The Barents Region has a significant potential for development of the northern areas and extending humanitarian and cultural ties between residents of the region in the field of tourism.

Transport system and needs

Roads play the role of the most important internal communication channel between highly dispersed settlements in the region, especially for transportation of people and distribution of consumer goods. Cross-border transportation of passengers and goods in the Barents Region is also largely dependent on the road network, with the exception of a few railways with high traffic capacity, serving export flows of raw material. The industry in northern Norway, Sweden, Finland and Russia contributes to large shares to the export volumes of each of these countries, which means very large, southbound transport flows on both rail and sea. Besides, transportation of certain goods from the region, that has to strictly honour delivery dates, largely depends on the highways.

To promote tourism industry it is also essential to develop cross border public transport services between popular tourist destinations in the Barents region. The concept of “fly & drive” needs to be developed, included the cross border problems linked to car hiring.

There is a need to develop parts of the county road network, especially concerning traffic safety.

Deficiencies

The main deficiencies in the transport system have been analysed compared to the proposed ambition to develop an efficient and sustainable transport system in the Barents Region.

The Expert group has identified four key areas:

1. Efficient transport within each mode of transport and remove bottlenecks in the cross corridors to increase the regional competitiveness and reducing greenhouse emissions and increase traffic safety.
2. Create an efficient transport system that enables transfer from road transport to rail and sea and provides conditions for collective travel where possible to increase regional competitiveness and to minimize climate-impacting emissions.
3. Identify what is required for an efficient and sustainable transport system in terms of infrastructure i.e. alternative fuels and electrification (green mobility).
4. Connected mobility, satellite navigation systems and ITS.

Recommendations

The Joint Barents Transport Plan points out important cross-border road, rail, air and sea routes and other important functions in the transport system, describes them and suggests development strategies. Significant industrial potential of the region requires new approaches to planning and creation of infrastructure.

The advisory recommendations are based on the proposed objective for the transport system of the Barents Region but also the transport needs of the industry, tourism and population in the region and to address the identified deficiencies.

The measures the expert group recommends can be summarised in four main areas:

1. Increase the knowledge about the transport flows and transport needs in the Barents region.
2. Create conditions for the transport system users to reduce emissions of greenhouse gases.
3. Increase road safety and safety at sea.
4. Create a more efficient transport system and reduce border crossing obstacles.

The measures are divided into measures for short-term, mid-term and long-term implementation.

The development of further recommendations and measures should be considered in the framework of the Beata Steering Committee.

1 Introduction

1.1 Background and scope

The Barents Euro-Arctic Pan-European Transport Area (BEATA) was established in 1998 as a framework for transport cooperation in the region. BEATA shall contribute to the development of an efficient transport system that facilitates increased mobility across the borders of the Barents Region. Norway, Sweden, Finland, Russia and the EU Commission are the members of BEATA. Sweden has the chairmanship of BEATA for the period from autumn 2017 to autumn 2019.

In light of the greater attention being paid to the High North, and the expected growth in key industries in the Barents Region, the Barents Euro-Arctic Transport Area Steering Committee took the initiative for a Joint Barents Transport Plan (JBTP). Economic and social development in the Barents Region requires better transport connections, and the aim for the work has been a joint approach to look at the future need for transport in the Barents Region.

The cooperation within JBTP has existed since 2012 and updates have been carried out in rounds. In early 2013, the Steering group Committee of the BEATA set up an expert working group to prepare the first draft of Joint Barents Transport Plan (JBTP 2013). As a follow-up, a second draft report, with focus on the Cross-border Road Corridors in the Barents Region, was presented in September 2015. In 2016 the Joint Transport Barents Plan draft was updated with the Russian experts responsible for the work.

The documents which have been elaborated within the framework of BEATA in 2013-2019 do not establish the legal basis for strategic planning, they have an advisory nature and do not entail obligations for BEATA member countries in terms of the implementation of infrastructure projects.

One of the main priorities of the Swedish Chairmanship has been to revise the Joint Barents Transport Plan. BEATA Steering Committee has set up a working group led by the Swedish Transport

The Barents Region includes

In Norway: the territory of the region of Northern Norway, including the counties: Finnmark, Troms and Nordland



In Sweden: the territories of the counties: Norrbotten and Västerbotten



In Finland: territories of the provinces: Lapland, Northern Ostrobothnia, Kainuu and North Karelia



In Russia: territories of the constituent entities of the North-West Federal District: Murmansk region, Arkhangelsk region, including the Nenets Autonomous Okrug, Komi Republic and The Republic of Karelia.



Administration with the assignment to revise the Joint Transport Plan. At the quest of the BEATA chairmanship, all the cooperating countries have nominated their Expert Group members.

Norway, Sweden and Finland have prepared studies on the need for transport infrastructure in the Barents region. Russia has federal plans to develop the infrastructure on its territory in the Barents Region. These studies and plans are mainly focused on national priorities, but also emphasize the need for a Barents approach in planning future transport solutions and interventions in this region. Studies are being carried out and projects are being implemented over various transport issues, but there is an urgent need to form a common state approach to border crossing issues, involving attention to those issues at the highest political level. The studies also revealed the need for an integrated approach to cross-border transport system. Therefore, the BEATA Steering Committee proposed to develop a Joint Barents Transport Plan (JBTP) as a logical step resulting from various national studies and plans to create a joint document, defining the lines of development of the transport system in the Barents Region.

The results of the experts' work form the basis of this document.

Drafting of the JBTP is based on the following priorities:

- The plan should reflect the national priorities.
- The plan should cover all modes of transport, and the main emphasis should be made on cross-border transport routes between Norway, Sweden, Finland and Russia.
- The transport system must be assessed with regard to the relevant sectors of the economy's development forecast.
- The plan should reveal bottlenecks and obstacles to cross-border transportation, both of technical and administrative nature.
- The measures envisaged by the plan is distributed over time for short term (0-5 years), medium term (5-15 years) and long term (15-30 years).

- When proposing measures the so called “four-step principle” will be considered:
 - » Step 1: Measures which affect the demand for transport and the choice of modes of transport.
 - » Step 2: Measures that provide more efficient utilization of the existing transport network.
 - » Step 3: Improvement of infrastructure.
 - » Step 4: New investment and major rebuilding measures.

The Joint Barents Plan is the recommendation of experts of transport authorities of BEATA countries, approved by BEATA Steering committee and presented during the Meeting of Ministers of Transport of the BEAC member countries (September 11-12, 2019 in Umeå, Sweden).

2 Objectives of the Barents Region Transports system

The Draft Joint Barents Transport Plan will be the basis for common policies through identification of efficient measures from the Barents perspective. Those measures should be based on joint objectives for the Barents Region.

Each of the countries involved has its own national objectives for the development of their national transport systems, and they are not broken down to specific objectives for the Barents Region alone. Therefore, the national objectives of the countries involved are the basis for a joint approach for the transport infrastructure development in the Barents Region.

The common effort to develop a joint objective for the plan has revealed that although the national objectives are somewhat differently formulated, they are similar in their key elements. On this basis, the experts offer the following joint goal for all four BEATA member states on the basis of the national objectives:

The joint objective

The effects of climate change are discussed worldwide and in order to address the challenges of climate changes, the global economy needs to be adapted. For the Barents Region to be competitive in the coming decades also means being competitive in this transition.

The transport system should facilitate the Barents regional development and create new opportunities for the key industries.

Norway, Sweden, Finland and Russia have the ambition to develop an efficient and sustainable transport system in the Barents Region with good internal connectivity between the Barents countries and with good external links to world markets. Apart from the national objectives, the development of the transport system should be in line with the United Nations global sustainable development goals (Agenda 2030) including road safety.

3 The Barents Region

3.1 Area and population

The population is sparse in many parts of the Barents Region. There are, however, also relatively densely populated areas, especially along the coast of the Gulf of Bothnia, in Murmansk, Arkhangelsk, Petrozavodsk, Syktyvkar and other regional centres. A continued urbanization is expected.

The total population of the Barents Region is approximately 5.3 million. The surface area of the Barents Region equals the combined area of France, Spain, Germany, Italy and the Netherlands. Average population density is only 3.5 inhabitants/km². It varies from 0.3 in the Nenets Autonomous District to 8 in Oulu. For comparison: France has 106 inhabitants/km².

The Sámi people make their home in all four states within the Barents Region. Two more indigenous peoples are found in Russian part of the Barents Region: the Nenets and the Vepsian.

The largest city in the Barents Region is Arkhangelsk with 357 000 inhabitants, followed by Murmansk with a population of 292 500. The largest Nordic city in the region is Oulu (Finland) with 202 000 inhabitants, followed by Umeå (Sweden) with a population of 125 000. The largest city in Northern Norway is Tromsø (75 000 inhabitants).

Population growth in the past decade has been very positive for the Norwegian, Swedish and Norwegian cities in the Barents Region. However, a few Swedish cities have experienced a reduction in their population, as have the Russian cities Murmansk and Arkhangelsk have.



Figure 3.1:1 Population by administrative entity. Since 2012, the population in the Finnish part of the Barents region has remained on about the same level, while population in the Swedish and Norwegian parts has increased by around two percent each and the population in the Russian part has decreased by around four percent.

3.2 Industrial structure

The industrial structure in the Nordic parts of northern Europe is dominated by the key industries.

The industry in northern Norway is dominated by the extraction of oil and gas, hydro power, seafood and fish processing industry. In Helgeland area in southern Nordland county, there are also major steel, aluminium, and chemical industries. Tourism is increasing and has great potentials for expansion.

The industry in northern Sweden consists to a large degree of mining, metallurgy, mechanical industry, forest-based industries (wood, paper and pulp), hydro power and specialized services. Northern Sweden also has a significant tourism industry with further potential for expansion.

Northern Finland has large shares in the wood, paper and metal industries. Mining extraction is increasing. Tourism has increased dramatically in recent decades and has further potential for expansion.

The Murmansk Oblast (Kola Peninsula and the area immediately south of it) has large resources of ores, minerals, oil and gas. Its industries related to metallurgy, energy, food and chemistry. Some parts of

the Kola Peninsula also have excellent fishing waters, and increasing tourism.

The Republic of Karelia's economy is dominated by forest, paper and energy industries, iron ore mining, extraction of minerals and food production.

The industry in Arkhangelsk Oblast is dominated by forestry, sawmill and pulp industries.

In the Republic of Komi and Nenets Autonomous District industry is dominated by oil and gas production, development of the coal industry and forestry is also particular to Komi.

Key industries

Mining and metal industry

The mining and metal industry of the Barents Region plays an important role in the European economy and that of the world with regard to some types of ores, such as iron ore. Meanwhile, this industry is a great deal susceptible to global economic cycles.

After a decline in iron ore prices 2014-2016, with negative impact on mining companies in the Barents Region, the iron ore price is now back on a more normal level. The largest iron ore companies, such

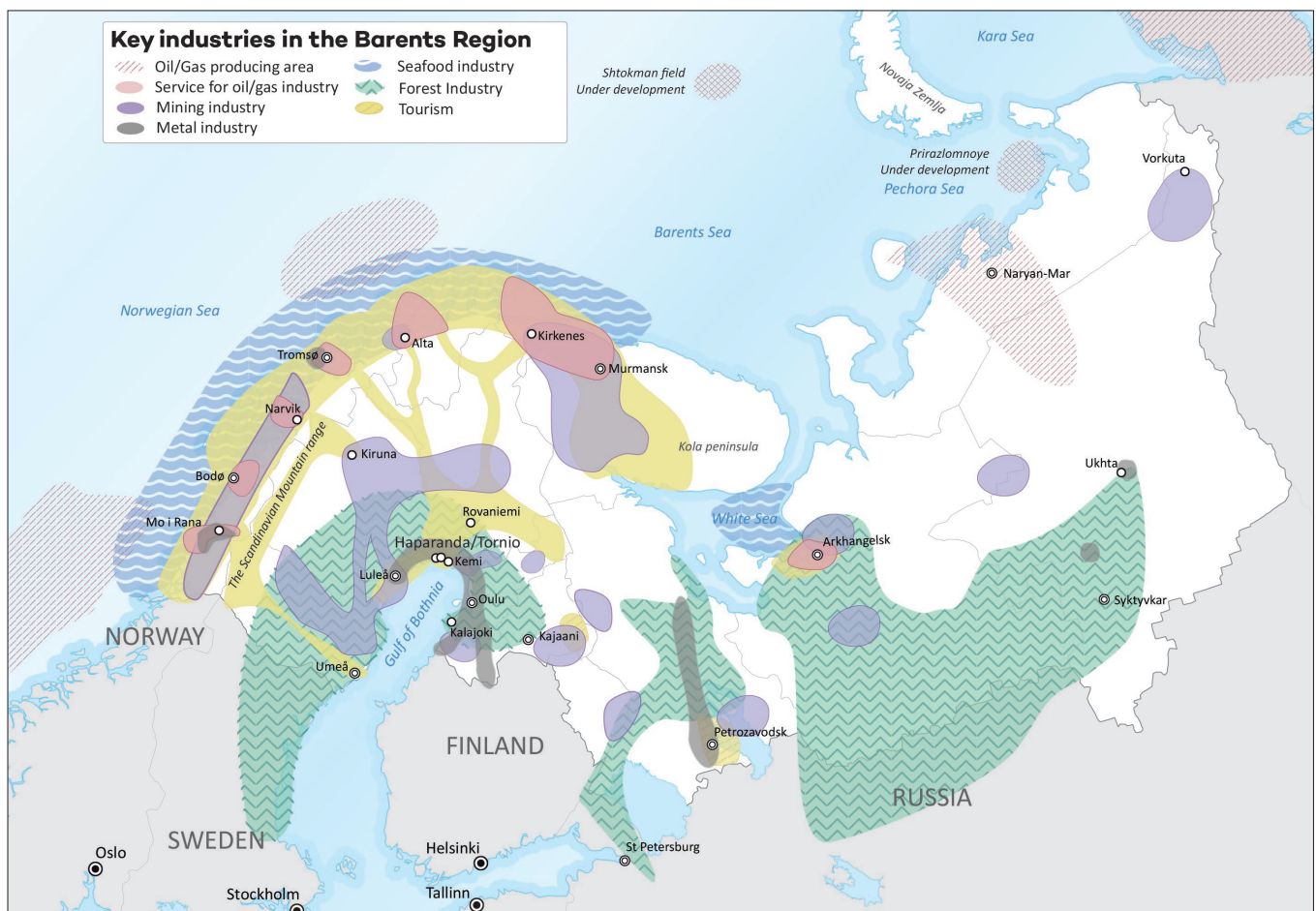


Figure 3.2.1 Key industries of the Barents Region.

as LKAB in Sweden and Kostomuksha GOK in Russia, were able to maintain their production volumes. Smaller businesses suffered largely and some even were closed. However, new applications for exploration permits have been filed in Sweden and Finland in preparation for the economic cycle's turn up.

The mineral industry has a strong footing in parts of northern Norway. Iron ore production takes place at Mo i Rana and Kirkenes. The potential for new mining in Northern Norway is high. On the Norwegian continental shelf, there are metallic minerals that are in demand on the international market. The Norwegian authorities are in the process of mapping the resource potential for subsea minerals and will consider opening parts of the Norwegian shelf for commercial and sustainable extraction of subsea minerals.

The Barents parts of Finland has a strong mine industry with many mines and type of ores. Road transport has increased due to large investments in the industry. Ore exploration is very active at the moment.

Iron ore is the mineral that requires the heaviest means of transports. Minerals are dependent on adequate rail and port infrastructure. The exported goods are sent to international markets on bulk ships.

Forestry

Forest industry is of great economic and sociocultural importance in the Barents Region, especially in Russia, Finland and Sweden. The forest in the north of the Barents Region grows faster than ever, due to climate warming, increase in carbon dioxide levels and logging of old forests. There is a potential for growth, since large forest areas in the eastern part of the Barents Region have not been used due to lack of transport.

Currently, proposals are put forth to construct new, very large pulp and paper mills in central and northern Finland. Right now there is a high demand for long-fibre pulp from northern softwood for production of packaging materials and toilet paper. Besides, pulp and paper mills of new generation produce fibres and basic chemicals for a spectrum of other applications and produce more energy than they consume, - bioenergy.

The forest industry has for over 100 years been an important sector in northern Sweden, with large exports of construction and wood products. In the bio-economy, the forest raw material has great growth potential with higher value added, such as,

for example, bio-based composite production and sustainable bioenergy.

Increased global competition means that companies rarely have their own inventory, which increases dependence on delivery reliability, flexibility and short lead times. The requirements for a functioning transport logistics are therefore very high.

Seafood and marine resources

The fisheries in this ocean region are among the world's richest. The governments of the region pay great attention to the environmental impact issues, related to the existing fishery activity along with the expected increase in shipping traffic and petroleum activity.

Fishery/fish farming continue to be characterized by growth in northern Norway, and amounts to nearly 30 percent of the volume of created value in Norwegian seafood industry, €2.7 billion. Productivity and profitability are high, and the region's contribution to the seafood industry is of growing importance to national economy and welfare. More than 90 percent of the seafood production is exported out of the country.

Farmed salmon in northern Norway shows steady growth in volumes. The seafood industry overall is very important for the regions of the north.

Marine industries have a very large potential for further growth, both within further development of the seafood core areas as we know them today, and within the development of nascent and new marine industries, as well as within the marine service and supply industry. In a national perspective, the turnover in marine industries may increase to more than €52 billion in 2050 if a number of challenges that hinder growth can be solved. A study of the potential for maritime value creation in northern Norway pointed out that value creation may be three to four times larger towards 2030 and 2050 if growth is actively facilitated compared to if today's regime is continued.

In Russia fish farms in the Republic of Karelia and Murmansk Oblast are rapidly increasing production. The aquaculture has a great potential for growth, while commercial fishing shrinks on a global scale.

Petroleum and gas

Production of oil and gas in the Russian part of the Barents Sea, Komi Republic and the Nenets Autonomous District remains stable, with the forecasts to at least little increase in the coming years.

In the northern part of Norway there are still high expectations for future exploration activities, issuance of new permits and production growth in the coming years. Recently, the Norwegian Petroleum Directorate gas upgraded its forecast for the total volume of undiscovered resources from 16.3 to 18.5 billion barrels of oil. Thus, the share of production in the Barents Sea will increase.

The petroleum industry is mainly located in the Barents Sea west and aggregates values for more than €2.6 billion. There is a substantial exploration activity both in Barents Sea west and east. This will be directly connected to future field development. The oil and gas supply industry is a substantial actor scattered around the region. Base activity is mainly connected to Hammerfest and Kirkenes.

In Nordland there are three fields in production – Norne, Skarv and Asta Hansteen. Production in Nordland will increase further in the years to come. Base activity is mainly connected to Helgeland.

The petroleum service and supply industry has a turnover of around €1 million and it is expected to grow in the years to come.

On-going and planned industrial investments

Norway

According to an economic trend forecast for northern Norway (published 12 November 2018 by Konjunkturbarometeret for Nord-Norge), 813 adopted and planned investment objects have been identified, which in combination with housing investments make up a total of €77 billion over the next eight years (2018-2026). In addition to investments of approximately €32 billion in the petroleum sector, these investments are divided between around €16 billion in the public sector and around €29 billion in the private sector.

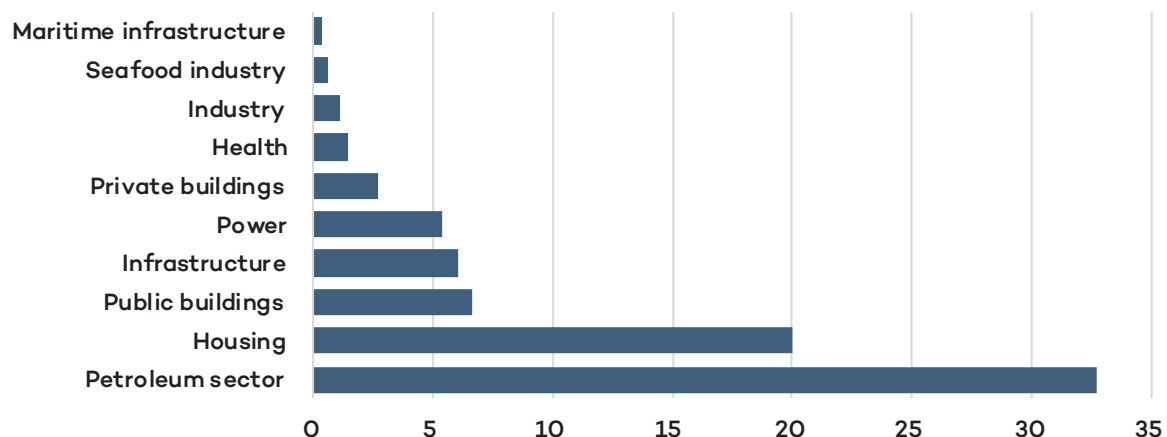


Figure 3.2:2 Investments in Northern Norway divided by industry for the period 2018 – 2026, Billion Euro. Source: Bedriftskompetanse/Menon Economics

There is a great deal of uncertainty with regard to financing of the projects in the private sector, as more than half of the projects are in the study phase.

As mentioned above, there are expected major investments in the petroleum sector in the years to come. The investments are mainly linked to operations, modifications and construction of satellite fields, as well as planned investments in the new fields Johan Castberg, Alta/Gohta, Wisting, in the southeastern Barents Sea and a possible oil terminal at Veidnes near Honningsvåg. Annual investments linked to operation and construction in these projects are estimated to amount to €5.2 billion per year until 2020, increasing to €7.3 billion per year after 2020.

Housing investments are estimated to account for around €20 billion, and are mainly linked to major towns and cities in the region.

An increase in investments up to around €5.2 billion is expected within the energy industry. Investments include wind power stations, hydro power plants and new network lines. Investments in wind power makes up as much as 65 percent of the total. More than 50 percent of the power investments are planned in Finnmark.

Investments in the industry sector are estimated to amount to €1.4 billion. These are mainly linked to the heavy industry in Nordland County.

Sweden

Some major industrial investments in the Swedish part of the Barents region are listed below.

Kaunis Iron AB is a Swedish mining company, which in 2017 took over Northland Resources' former mine near Kaunisvaara in Pajala municipality. Nearly €58 million, was raised for the restart of the mine and the company resumed the mining operation in 2018. The iron ore is transported by truck from Kaunisvaara to

the reloading station Pitkajärvi at the Svappavaara railway line. The truck transports take place 24 hours a day with 25 carriages weighing 90 tonnes. From Pitkajärvi, the iron ore is transported by rail to the port in Narvik.

Facebook is planning the expansion of its Luleå data centre to almost double its current size to be more than 100 000 m² which will make the Luleå site one of the largest data centres in the world. When the new centre will be completed in 2021, Facebook will have invested in total about €900 million in the city of Luleå.

Northvolt “Ett” in Skellefteå is a large-scale battery manufacturing plant including active material preparation, cell assembly, recycling and auxiliaries. The total amount to be invested is estimated at nearly €4 billion, most of which in Skellefteå. The construction of the first of the factory’s four parts started in 2018 and is expected to be completed in 2020 and produce 8 GWh worth of battery capacity per year. The building of the factory will continue at the rate of one stage per year to be fully completed in 2023 and produce 32 GWh of battery capacity per year.

SCA Obbola is a pulp and paper mill located near the port of Umeå. In 2018, SCA Obbola started a project (Aurora) to investigate the possibility of investing in a new paper machine. If the Aurora project has a positive outcome (to be announced in 2019), SCA Obbola will become one of the world’s largest paper mills. The project involves a total investment of €750 million.

Komatsu Forest, the world’s second largest manufacturer of forest machines with headquarters and manufacturing in Umeå, plans a large investment in a new sustainable factory. The location in Umeå enables a proximity to the railway implying an increased share of the company’s goods to be transported by rail. The ambition is that the new factory will further strengthen the region’s position as a leader in the field of forest technology and yield regional, national as well international footprints in several other areas. The construction started in May 2019 and to be completed in 2021.

Large wind power expansion is ongoing/planned in both Norrbotten, like the Markbygden project with 1 100 wind mills, and Västerbotten counties.

Finland

Some of the major, planned industrial investments in the Finnish part of the Barents region are listed below.

New bio factory investments are being planned in Kemijärvi and Kemi. The investment in Kemijärvi would be approximately €1 billion, and in Kemi approximately €1.5 billion. Kemijärvi bio factory has received its environmental permit in summer 2019, and investment decision is being expected. Kemi pulp mill plans to replace the old mill with a new bioproduct mill. The annual production capacity of the new mill would be more than double compared to the old mill. Investment decision is being expected in 2020.

Construction of the new phosphate mine in Sokli is planned to begin in a few years. Its investment is €1 billion. There are other several potential mines which are in the planning process, e.g. Sakatti mine, Sodankylä, which plans to start blasting with capacity of 1.25–1.75 tonnes.

KaiCell Fibers’ biorefinery investment is about €900 million. The company’s goal is to produce 600 000 tonnes of chemical pulp per year, which is sold to growing global demand of bio-products. Applications varieties from existing markets like paper, tissue and cardboard industry to growing demand of evolving bio-product applications. The company sells part of by-products to partners who develop bioproducts at the Paltamo mill site in the upcoming BioFutureFactory™.

Sotkamo Silver AB’s business concept is to exploit mineral deposits in the Nordic countries with positive social and environmental benefits. Sotkamo Silver owns mineral deposits, which contain silver, gold and tungsten in Finland and Sweden as well as zinc and gold in Norway. The Company’s main project is the Silver mine project in the municipality of Sotkamo.

Russian Federation

Complex development of the Murmansk transport hub: €790 million.

Reconstruction of objects of the second cargo area of the Murmansk maritime port: €21 million.

Reconstruction of objects of the third cargo area of the Murmansk maritime port: €13 million.

Implementation of investment projects of PJSC “Murmansk commercial maritime port»: €160 million.

Construction of LNG maritime transshipment complex in the Murmansk region, including Federal property (navigation safety objects): €970 million.

Construction of an auxiliary icebreaker with a capacity of 12–14 MW ice class Icebreaker 7 for the Arkhangelsk maritime port: €92 million.

Reconstruction of infrastructure facilities of the fleet maintenance base of the Northern branch of the Federal State Budgetary Institution “Marine Rescue Service»: €17 million.

Implementation of activities for construction and reconstruction, overhaul and repair, maintenance of federal roads and artificial structures on them in the Barents region (Federal budget funds):

- 2018: €270 million
- 2019: €221 million
- 2020: €131 million
- 2021: €111 million

Reconstruction of the airport complex “Talagi” in Arkhangelsk in 2021-2024: €64 million.

Reconstruction of the airport complex “Murmansk” in Murmansk in 2019-2023: €40 million.

Reconstruction of the airport complex “Solovki” of the Arkhangelsk region in 2018-2020: €39 million.

Reconstruction of the airport complex of Naryan-Mar in 2020-2024: €56 million.

Reconstruction of the airport complex in Amderma, Nenets Autonomous district in 2019-2021: €11 million.

Development of transport complex and automobile road construction of the Republic of Karelia in 2016-2020: €139 million.

3.3 Tourism

For many Arctic countries and regions, tourism is an important part of economy and its development is an effective way to diversify the economy of depressed areas.

The whole Barents Region has rich and untapped resources for tourism development. Northern lights, the midnight sun in summer, the Arctic climate and wildlife are just some of the spectacular beauties of the Barents Region, which attract tourists. Cultural, nature and experience related, educational, environmental, marine, cruise and expeditionary types of tourism belong to the priority areas.

Tourists and tour operators are interested in new directions. The North arouses interest because it is different and exotic. Tourists are attracted by the snow and ice, wilderness, and special Arctic nature with all its phenomena and leisure activities. Popular objects in the Nordic countries are ice hotels, islands, wildlife, undeveloped areas, activity of indigenous peoples, the

Arctic Coast and coastal culture, skiing, ski resorts, kayaks, sea, river and lake fishing, Arctic expeditions, snowmobiling, hiking, etc. Winter tourism gains popularity in the Barents Region.

The number of tourists wishing to visit the Arctic Region grows annually in the world market. According to the research conducted by the World Wildlife Fund (WWF), over 90 percent of tourist traffic in the Arctic come from northern Europe. The analysis of the objective prerequisites and trends in the world tourism development allows us to forecast: Arctic tourism has every chance to become a large sector of the economy of the Russian northern regions, comparable in scale with industry and transport. In this regard, it must be emphasized that the development of tourism in the Northern territories should be sustainable and ensure preservation of the unique nature and the interests of the people living in this territory.

Despite the growth and development of the tourism in the Arctic region its full potential is still far from achieved. The main deterrents are as follows: limited access to transportation, special climatic conditions, and seasonality of tourist offers in many places. The Barents Region has a significant potential for development of the northern areas and extending humanitarian and cultural ties between residents of the Region in the field of tourism.

There are several on-going cross-border cooperation projects between both transport authorities and the municipalities, but also between the tourism industry and the regions in the neighbouring countries.

Joint Working Group on Tourism

The Joint Working Group on Tourism helps to attract the world's attention to the Barents/Euro-Arctic Region, promote economic activity in the Region by increasing the tourist flow, provide assistance in business development, increase employment in the tourism sector, develop cross-border tourist routes; it helps to unite the information and tourist space under the common brand and develop joint tourist routes.

Visit Arctic Europe

Visit Arctic Europe is a cross-border cooperation project (Nor, Swe, Fin). The main purpose is to identify deficiencies and proposing measures to simplify the possibility for visitors to travel between Norway, Sweden and Finland. The purpose has also been to market the Arctic as a separate destination and thus to be able to do more and better business.

The tourism industry in Barents

Norway

In 2017, the tourism industry in northern Norway turned over roughly €2 billion and employed around 16 100 people. The tourism industry accounts for almost seven percent of employment in northern Norway, and this share is higher than for the seafood and petroleum industries respectively.

In 2017, northern Norway had a total of 3.9 million commercial guest nights, which is an increase of 30 percent compared to 2013. Hotels accounted for 70 percent of the total number of commercial guest nights.

In the period from 2013 to 2017, the number of foreign guest nights in northern Norway increased by as much as 52 percent. The winter season has seen a strong growth in recent years.

The summer and winter seasons attract different markets. While the summer season mainly attracts travellers from Europe and neighbouring countries (94 % of guest nights), travellers from Asia, Oceania and the USA account for around 25 percent of foreign guest nights in the winter season. The share of guest nights from neighbouring countries (Russia, Sweden, Finland) is 21 percent in the summer season and only 12 percent in the winter season, with Russian travellers accounting for two percent in both seasons.

The destinations of Lofoten and Tromsø have had the largest growth in number of foreign guest nights over the last five years, while some smaller destinations such as Vesterålen and the Senja region have had a growth of more than 100 percent in the same period. In the same period other areas in Finnmark, such as Alta/Hammerfest, inner Finnmark and Varanger, have had a marked growth in the number of foreign guest nights. The last five years' development within the tourism industry shows that also the minor destinations have growth potential. The countyroads are important to the tourist industry as they enable accessibility to many coastal destinations.

In total, there were 344 cruise-ship calls in Northern Norway in 2017, which is an increase of two percent compared to 2016. In the period from 2013 to 2017, the number of calls reduced by two percent, whereas the number of passengers in port has increased. Lofoten, Tromsø and Nordkapp have for a long time been the major ports of call. The number of cruise calls to Svalbard (Longyearbyen 30 calls in 2017) has declined markedly since 2013, but the number of passengers has increased by 15 percent.

In 2017, the Hurtigruten Coastal Express had a total of 1.25 million guest nights, which is a ten percent increase from the year before, and represents a significant stakeholder within tourism in northern Norway. Hurtigruten works strategically to develop their product into a unique journey defined by active experiences of nature and culture, with an extensive

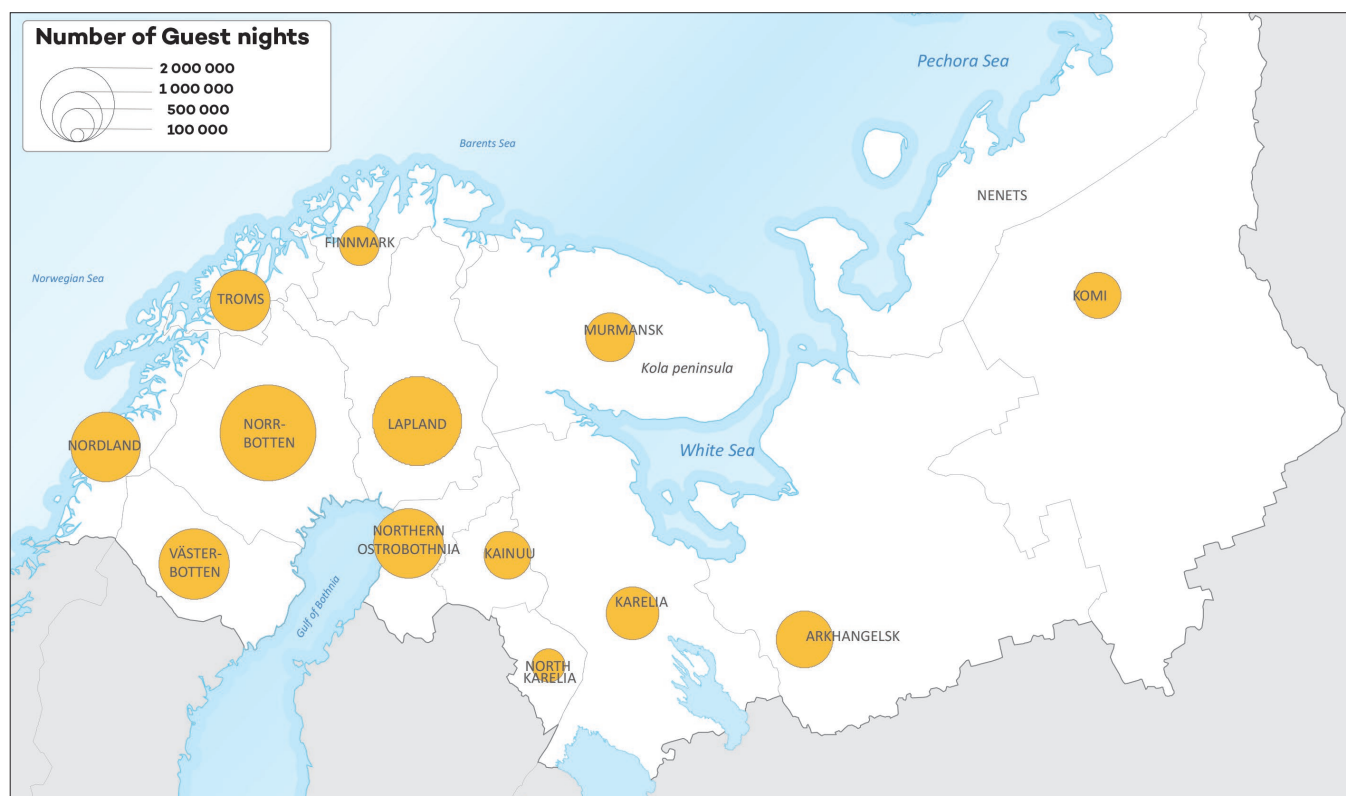


Figure 3.2:3 Tourism is extensive and increasing in many parts of the Barents region.

excursion program and local food sampling in cooperation with local suppliers.

Cross-border corridors are particularly significant with regard to tourists from neighbouring countries, and as routes leading to attractive destinations. Emphasis is placed on developing the range of services along these routes.

The Norwegian Scenic Routes attraction in Northern Norway comprises 6 drives through beautiful nature, fauna and coastal culture. The experience is enhanced by innovative architecture and thought-provoking works of art at designated viewpoints and rest areas. The objective is to make Northern Norway an even more attractive destination, promote local business activities and strengthen rural life. Tourists travelling by road are offered experiences that will entice longer stays and new visits. The Norwegian Scenic Routes in Northern Norway comprises the coastal areas of Varanger, Havøysund, Senja, Andøya, Lofoten, Helgelandskysten.

The registered investment activity within travel and tourism amounts to €500 million and is linked to planned hotel construction and development, as well as some tourist facilities. Public investments such as airports etc. that contribute to development in the industry are not included in the overview.

Sweden

Northern Sweden belong to the areas in Sweden where tourism is growing most rapidly today. The tourism in northern Sweden can be divided into two fragments: a strong and growing global tourism and a traditional basic tourism.

Traditional basic tourism

The major cities on the coast are important visitor destinations but also, the archipelago, the river valleys and the traditional large mountain resorts which have visitors spring, winter summer and autumn.

The Swedish mountains is an attractive destination for both Swedish and foreign visitors. The few mountain roads that exist in the region are important as they enable accessibility to a large part of northern Europe's mountain world. In the region there are large mountain resorts for skiing.

During the summer, the proportion of long-term North Norwegian visitors is very high along the many sea baths at the Swedish Gulf of Bothnia. The roads along the region's many river valleys from coast to mountain are often attractive experience routes. The routes with beautiful views, nature experiences

combined with, for example, farm shops and eateries draw the most traveling during summer.

Events such as trail running in the mountains are steadily increasing and this genre has great growth potential. In the mountain municipalities where the car test industry is active during part of the winter season, there is a large undeveloped potential for the visitor industry. Infrastructure investments on the Norwegian side, digital solutions and new traffic management systems are prerequisites for developing the visitor industry on both sides of the national border.

New fast-growing global tourism

The export value of tourism has increased twice as much as Sweden's total exports since year 2000. Visit Sweden's surveys show that the global traveller is willing to travel to Sweden and demands magnificent nature experiences but also the possibility of being an active part of it .

In recent decades, a completely new and fast-growing nature and cultural tourism has been established. The start of this was the innovation Ice hotel, which was established in Kiruna in the 90's. As the standard of living in the world increases and people become more urban, the demand for nature tourism increases as recreation. The new tourism in the north consists of high-paying visitors from all over the world who come to the region to experience Arctic everyday life such as dog sledding, sauna, midnight sun, silence, and nature's raw materials. Sustainability is a competitive factor and the travel logistics is at the forefront regarding digitization. The region as an attraction competes with attractions such as safari in South Africa or other once in a life time experiences.

This new Arctic tourism is not mass tourism. There are relatively few visitors with exclusive packaging based on winter and outdoor activities. Winter wilderness tourism generates high income without a large amount of tourists. It is available on existing tourist facilities, but also completely new small facilities which are scattered from coast to mountain in the region's various rural areas. Some of these small-scale facilities or experiences can be found along low-traffic roads (with freight flows) and also sometimes along the smallest, capillary road network. In line with increased demands for accessibility to these peripheral sites, the demands on the road's smoothness, bearing capacity and safety increase both for travellers and for unprotected road users. The road environment up to the facilities can sometimes be of great importance to the experience, for example, that views from the road towards water are made visible.

Finland

International tourism to Finnish Lapland has grown very strongly during the past few years. In 2017 there were 2.9 million registered overnight stays with 9 percent growth from the previous year. In 2018 the number was 3 million and the growth 3 percent. Since the official statistics fail to communicate e.g. the demand in all the privately owned cottages or airbnb facilities, it is to be noted that the real numbers are considerably higher. In 2018 the share of international overnight stays reached 52 percent of all the overnight stays in Lapland.

The most important market areas for Lapland tourism are the UK and the Central Europe. However, the demand from Asia (China, Hongkong, Singapore etc.) has developed strongly during the past few years. One factor behind the good development is the direct flight connections that have opened from Europe to Lapland. The largest airport in Finnish Lapland in terms of passengers is Rovaniemi (644 000 passengers, 2018) followed by Kittilä (355 000 passengers, 2018) and Ivalo (242 000 passengers, 2018).

Finnish Lapland is a successful winter destination, but is focusing to develop tourism year-round. Major actions to market summer season have been planned and launched. The goal is to double demand in next five years by developing the summer season to same level as winter is.

The main attractions in Lapland tourism are the nature, nature phenomena and Arctic activities. These combined with the high quality accommodation and experiences like meeting Santa Claus are the key to success.

Positive changes since 2009 in the number of border crossings to/from the Russian territory in the Barents Region are accounted for by the increase in the number of tourists in addition to the increase in passenger and freight traffic. This assumption is supported by data from studies such as studies on the influence of the tourist flow from Russia to Finland. This study shows that about 350 000 Russian tourists spend in Finnish Lapland about €600-700 million annually. The influence of Russian tourism on Northern Norway and Northern Sweden seems to be more moderate, but is growing rapidly.

Russian Federation

The northern Russian territories has unique cultural and tourist sites to visit.

The National Park “Russian Arctic” is one of the youngest and the second largest Arctic area of special protection in Russia. One of the most popular ways

to get to the Park is to go by Arctic liner cruises departing from the city of Murmansk and the Archipelago of Svalbard and calling at the Franz Josef Land.

In 2015, a marine checkpoint across the border of the Russian Federation was opened in a test mode on a remote section of the port of Arkhangelsk, which created an opportunity for the implementation of direct routes Svalbard-Franz Joseph Land. Foreign shopping companies have been very interested in it.

In 2016, the “Russian Arctic” received five applications for cruises, including a direct voyage between Norway and Russia. Three of them are connected with the voyage along the Northern Sea Route. According to the Ministry of Culture of the Arkhangelsk Region, the demand for the National Park “Russian Arctic” is growing, despite the relatively high cost of trip tickets (about €1 200-1 500).

The Murmansk region is the northernmost region of the European part of Russia, the whole area of which is included in the Arctic Zone of the Russian Federation. The Kola Peninsula, the most part of which is located above the Arctic Circle, is one of few corners of the earth that has preserved its original beauty it is the territory of harsh and cold coastal cliffs, vast tundra and Europe’s northernmost pristine forests.

The Port of Murmansk is the northernmost ice-free port of Russia. Taking into account the competitive advantages, such as the existence of ice-free deep-sea bay and developed transport infrastructure of the port, Murmansk can become a centre of marine cruises on the Arctic Islands, the Northern Sea route and to the North Pole.

Cruise ships have been entering the port of Murmansk for more than 20 years (since 1997). The number of ships entering the port varies from three to 13 vessels per year. During the cruise navigation in 2018, seven ships of major cruise companies entered the port (with more than 4 000 tourists). In 2019, eight ships are planning to arrive calling to the port of Murmansk with approximately 3 500 passengers.

In 2016, Murmansk was included in the list of ports through which foreign citizens and stateless persons, arriving for tourist purposes on ferries, are allowed to enter and stay in the territory the Russian Federation for 72 hours without visas. The adoption of this Decree, along with the ongoing modernization of the port’s passenger infrastructure, will increase interest in the tourism potential of the Kola Peninsula, including

the extension of the ferry line from Norway and the tourist flow growth into the region by water.

A sea cruise to the North Pole on an atomic icebreaker is only possible from Murmansk.

The majority of tourists arrives in the region using air connection. There are two airports in Murmansk region: Murmansk airport and Hibirny airport.

Passenger traffic of Murmansk international airport in 2018 amounted to 995 000 people. The Khibiny airport (mountains Apatites) is located 32 kilometres from the city of Kirovsk. This airport is not international, but the proximity to the ski resort in Khibiny provides a significant tourist flow and good dynamics of its growth. In 2018, the airport serviced more than 57 000 people.

The most popular recreational and tourist places in the Murmansk region are ski resorts, fishing bases, recreation centres, excursion and tourist centre «Snow village», the Sami village «Sam syit», the Arctic exhibition centre «Nuclear icebreaker «Lenin»». In recent years, the old village of Teriberka has become a bright tourist destination in the region.

Taking into account the Arctic specialization of the region, the main types of winter tourism are: downhill skiing and cross-country skiing, snowmobile safaris, reindeer and dog sledding, ice fishing and “hunting” for Northern light.

The city of Kirovsk is the centre of ski tourism. It is visited by more than 70 000 tourists every year. The construction of a high-speed gondola-chairlift in 2014 made it possible to increase the flow of tourists to the territory. This project participated in the Federal program which allowed to receive financing and to reconstruct road infrastructure of the city of Kirovsk: a road junction at the entrance to the city.

There are more than 4 350 objects for visiting by tourists only in the territory of the Arkhangelsk region. The largest of them are the city of Arkhangelsk and the Solovetsky archipelago (Solovki). The Solovetsky archipelago is located in the Onega Bay of the White Sea, 164 kilometres from the Polar Circle, is of exceptional interest both for the Russians and foreigners. The only possible way to get to Solovki during winter is by air from Arkhangelsk. In summer, one can use a motor vessel, going through the towns of Kem and Belomorsk. Currently a comprehensive reconstruction of the runway at Solovki airport with a length of 1 500 metres is going on. Works are planned to be completed in 2020.

Unique objects of the Republic of Karelia: the world-famous museum Kizhi, natural and cultural complexes of Valaam island, the first Russian resort «Marcial waters», Europe's largest plain waterfall Kivach, rock carvings petroglyphs and many other attractive tourist sites, including the new tourist dominant of the Republic – a unique Mountain Park «Ruskeala». A comprehensive reconstruction of Petrozavodsk airport was carried out.

“The Blue Highway” is an international tourist route with a length of more than 2 000 kilometres, linking Norway, Sweden, Finland and Russia. The route runs along the banks of the rivers and lakes of historic waterways and starts from the Atlantic coast of Norway (Mo i Rana), passes through the territory of Sweden, Finland, Russia and ends in Pudozh (Karelia, Russia). In Russia, the route runs through the territory of the Republic of Karelia from west to east.

In the Komi Republic, ecological, ethnographic, rural tourism and the “Eco Komi” brand have been selected as priority areas for the development of tourism. In 2019, an all-Russian conference on the development of ecological tourism is planned to be held on the territory of the Komi Republic. The Association for the Development of Rural Tourism of the Republic of Komi created an information resource <http://turizm-komi.ru>, which contains information about all the objects of rural tourism in the territory of the republic.

One of the unique objects is the National Conservation Park “Yugyd Va”, located in the southeast of the Komi Republic. It is special due to the fact, that it is the largest natural area of protection of Russia. There are several recreational centres are located in the Park. One can get to this area by railroad/by train to the town of Inta, where it is necessary to order a transfer before boarding an all-terrain vehicle or a helicopter.

In 2018, the “Ugyd Va” park was visited by 7 300 people, and the Finno-Ugric ethnocultural park was visited by 24 000 people.

The “Silver Necklace of Russia” is the inter-regional tourist project, consisting of a set of routes that combine historical cities, regional centres, large settlements of North-West Russia, which preserved the unique historical and cultural monuments and natural sites, including those from the UNESCO World Heritage list. The “Silver Necklace of Russia” covers eleven constituent entities of the North-West Federal District of the Russian Federation with five of them being within the Barents Region. Different modes of transport (air, car, rail, water et.) are used in drawing up the scheme of routes.

4 Climate and Environment

4.1 A changing climate

The strategy for the development of transport in the Barents region should take into account the ongoing global climate change. In this regard, the JBTP aims to identify and implement measures aimed at:

1. Minimizing the effects of climate change on transport infrastructure and transport operators.
2. Reducing the harmful effects of transport on climate and ecology.

In the framework of the first of the above areas, it is necessary to consider that annual precipitation and temperature across the Barents area are likely to increase. This, in turn, is likely to result in a range of impacts, such as more rain, disappearing of permafrost, a greater frequency of storm events, more frequent freeze-thaw cycles, more frequent and vulnerable floods and landslides, as well as other effects.

Managers of infrastructure should be aware of these threats, and be ready to meet them to mitigate their impacts on the land infrastructure. These will probably lead to new and at times more expensive solutions for both transport infrastructure and rolling stock construction and maintenance.

The Arctic Ocean has for centuries been of interest and explored by polar travellers. The ice-melting process is a huge global problem, however it is leading to increased access to resources in the Northern regions and new opportunities for shipping traffic. This results in an increased interest in exploiting the resources in the Arctic and increased maritime activity. In recent years we have seen the first commercial shipping between Europe and Asia through the Northern Sea Route.

In this regard, it is necessary to strive for:

- increasing the share of used environmentally friendly transport;
- rationalization of transport and economic relations, through improved logistics, the development of intermodal and combined transports;
- creating impetus for improving energy efficiency of transport, both through upgrading the fleet of automobile, railway and air vehicles, the fleet of sea and river vessels, and by improving the transport infrastructure (in order to reduce travel time for passengers, vehicles and cargo). In railway transport, this can also be achieved through electrification of lines, the construction of additional tracks, the transition to heavy weight transportation in a number of heavy traffic lines, etc;
- stimulate the transition to new types of fuels.

4.2 Sustainable ambitions in the Barents Region

The effects of climate change are discussed worldwide and in order to address the challenges of climate change the global economy needs to adapt. In order to be competitive in the coming decades Barents Region should also be competitive in this transition.


The transport system should facilitate the Barents regional development and create new opportunities for the key industries.

Norway, Sweden, Finland and Russia have the ambition to develop an efficient and sustainable transport system in the Barents Region with good internal connectivity between the Barents countries and with good external links to world markets. Apart from national objectives, the development of the transport system should be in line with the international treaties to which the BEATA countries are parties, the United Nations global sustainable development goals (Agenda 2030) including road safety, and the Arctic Councils programs.

Among the Sustainable development goals of Agenda 2030, the following objectives are of particular importance:

- Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation.
- Goal 13: Take urgent action to combat climate change and its impacts.
- Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Norway, Sweden and Finland have ratified the Paris Agreement and in those countries the development of the transport system should also be in line with the agreement.

The background image is a full-page photograph of a rugged, light-colored rock formation jutting out of a frozen body of water. The rock is heavily encrusted with thick, white ice, particularly at its base and along its vertical edges. The frozen water in the foreground is dark blue with a complex network of white, vein-like cracks and patterns. In the distance, more snow-covered land is visible under a clear, bright blue sky.

The Paris Agreement

In December 2015 Norway, Sweden and Finland agreed on a new climate agreement that ties all countries and should start to apply by 2020. The global temperature increase should be kept far below 2 degrees and countries should work to keep it at 1.5 degrees.

The Arctic Council

The Arctic Council is the leading intergovernmental forum promoting cooperation, coordination and interaction among the Arctic States, Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, in particular on issues of sustainable development and environmental protection in the Arctic.

In its Fairbanks Declaration from 2017, the Arctic Council is “noting with concern that the Arctic is warming at more than twice the rate of the global average, resulting in widespread social, environmental, and economic impacts in the Arctic and worldwide, and the pressing and increasing need for mitigation and adaptation actions and to strengthen resilience, noting the entry into force of the Paris Agreement on climate change and its implementation, and reiterating the need for global action to reduce both long-lived greenhouse gases and short-lived climate pollutants, and Reaffirming the United Nations Sustainable Development Goals and the need for their realization by 2030,...”

5 The Transport Needs

5.1 Key industries' transport needs

Mining, oil and gas and forestry industries are distinguished for highly cyclical character and clearly follow the ups and downs – sometimes rather dramatic – in the global markets. The demand for transports in these industries is thus highly affected by changes in the global markets. Meanwhile, transportation of cargo is primarily carried out by rail, sea and pipeline transport. Those activities have secondary effect on the roads. Road transportation, that provides services to those industries including, as a rule, the supply of materials for construction and maintenance of industrial sites.

Seafood and tourism industries are stable enough, but still subject to some fluctuations in demand. Their growth potential in the future is very high, but it depends heavily on the quality and reliability of rail, sea and air transport links with the region. Locally, the passenger and freight traffic in those sectors use mostly road/street network.

Roads play the role of the most important internal communication channels between highly dispersed settlements in the region, especially for transportation of people and distribution of consumer goods. Cross-border transportation of passengers and goods in the Barents Region is also largely dependent on the road network, with the exception of several railways with high traffic capacity, serving export flows of raw material. Besides, transportation of certain goods from the region, that has to strictly honour delivery dates, largely depends on the highways.

The process of concentration of storage facilities, typical of the whole territory of Northern Europe, is also an important factor. Currently, the distribution of consumer goods is carried out from the warehouses, which have greatly reduced in number, though grown in size and become more centrally managed. The development trend stimulates the growth of road freight transportation as a flexible and relatively inexpensive mode of goods delivery.

Reliable and efficient transport links, especially the motorway system, also have other features that widely contribute to regional development.

Currently, local communities and businesses of the four countries in the Barents Region operate in a fairly large isolation from each other. In case of improvement of the region's internal transport communications, they can expand markets, promote cooperation, and even foster unification of various business areas into cross-border clusters, for example, joint marketing of tourism products of two or more countries.

Availability of universities and research centres in the region is a particularly important factor. The data obtained during the recent 20 years show that the metropolitan areas with strong universities and technology-oriented economies are the centres of growing population in the region, namely: Oulu, Rovaniemi in Finland, Tromsø and Bodø in Norway, Arkhangelsk, Murmansk, Petrozavodsk, Syktyvkar in Russia and Umeå and Luleå in Sweden. Closer cooperation of universities and research centres, supported by efficient transport communications, will provide even greater benefits for the region.

The figure 5.1:1 shows the number of vehicles (passenger vehicles and trucks) between the countries.

Flexible transports and reliable road corridors towards the European markets are of vital importance for farmed fish. Especially the regional road system and international road corridors E45, the E8 and E10, in addition to the Malmaban/Ofoten rail line from Kiruna to Narvik.

The bulk of the wild catches of fish is offloaded at the 20 largest fishing ports scattered around the northern part of Norway. Half of the volume uses the same corridors as farmed fish; the rest is loaded onto boats for sea transport.



Figure 5.1:1 Annual traffic capacity at the motorway border crossing points (passenger, cars/trucks). Countries' data may have some differences depending on the countries methods, regarding in particular e.g. Storskog/Borisoglebsk, Vartius/Lyttä och Niirala/Värtsilä.

5.2 The tourism's transport needs

From the tourism point of view, it is important to find means to develop and increase the cross-border transportation in the Barents region in a sustainable way.

To promote tourism industry it is also essential to develop cross border public transport services between popular tourist destinations in the Barents region. The concept of "fly & drive" needs to be developed, included the cross border problems linked to car hiring.

Norway

Developing the availability of air transport services is an essential factor for the tourism industry in northern Norway. In particular, there is a need for more direct flights from abroad or from Oslo, in order to stimulate growth from European and Asian markets.

There is a need to develop parts of the county road network, especially concerning traffic safety.

Sweden

In the sparsely populated regions where the tourism industry is growing rapidly, the transport system, especially in terms of traffic and unprotected road users in rural areas, is not adapted to the needs of the visitor industry.

Public transport is not adapted to the needs of the visitor industry and the concept of flight and drive or expensive transfers from the airports is common for these visitors. There are often minor accidents because car drivers are not accustomed to winter road conditions and a lot of reindeer and game in the traffic environments. Safety is an important quality factor for the tourist contractors and accidents directly lead to that brands are effected negatively and to lost income as a result. The industry also presents a great need for investments to address widespread safety deficiencies in connection with road passages for snowmobiles and dog sleds in the whole region.

The tourism industry wants the guests to use public transports instead of their own car but there is not enough travellers to start commercial traffic and the

public transport authorities are not responsible for the needs of the visitor industry.

The problems described above in this section regarding Sweden largely apply to the Barents region as a whole.

Developing cross-border public transportation is an essential goal in developing the joint Visit Arctic Europe (VAE) destination. Public transportation would connect all three countries as a one destination that could be easily experienced during a one trip. First joint effort to offer a circular bus route in VAE area is opening up through the co-operation of the bus companies.

The commercial and the public should be able to collaborate for new sustainable public transport solutions in rural areas and some development work is underway, also in collaboration with neighbouring countries. Digitalization and test tours are important parameters in these projects.

In order to improve the logistics for travels to the region, better coordination between public transport, transfer and flight arrivals and departures (also trains) is needed based on the visitors /industry's needs. It is also important that travels can be booked well in advance. The increasingly international character of the visitors places demands on a holistic concept, which, in addition to accessibility and decent road maintenance, also includes a well-managed physical environment. Factors such as a non-abandoned road maintenance and a cared for environment also increase future confidence for those who live and work on site. New micro destinations are being developed and people move in to rural areas that previously had a dismantling trend.

The road network in the north is sparse and the road can at the same time constitute freight transport route, work commuting stretch and a small town's only street. Prioritization of the measure planning is today strongly guided by annual average daily traffic. This means that there are limitations in creating good traffic environments in small towns that are also major tourist destinations. One of the region's most common customer wishes comes from residents in small towns in the county's rural areas, where the state road is a local street, is about calling for safety and security for their children or the elderly. Due to the fact that the traffic authorities do not have priority criteria that

benefit these users of the transport system and that there is no money for this type of measures in the county plans, there are many places in the region with these shortcomings.

The greater proportion of Sweden's national parks is located in the region and here are unique environments for skiing in the mountains. The small traditional mountain resorts grows and investments are made. The establishment of cottages in the mountains increases. Increased number of permanent residents and/or holiday residents provides increasing demands for functioning walking and cycling routes and public transport to schools, shops and other forms of service. Traffic safety at exit roads and crossing points is getting worse with increasing traffic.

In some places, the coordination between the municipality, the Swedish Transport Administration and the developers is deficient. The region has places where there is traffic chaos during high season. In other places, there is good collaboration and good planning.

The mountain roads are usually the only way to get to the mountain area besides the night train that goes to the Kiruna mountains. Traveling by night train is increasing and the trend shows that more Swedish and international guests are hiking in the national parks.

The smaller municipal airports in the mountain area with procured traffic that are not intended to meet more than basic accessibility, do not carry larger entry streams to the mountain area. The travel times from the larger airports at the coast by bus or car to the mountains are long. This means that mountain tourism is sensitive to deficiencies in standards that mean speed reductions on the way from coast to mountain, for example on road E12. During spring winter, the traffic intensities are high on the region's mountain roads.

Finland

Tourism development in Finnish Lapland depends mainly on air traffic and flight connections.

The road network requires smaller and bigger investments to improve traffic safety. Level of winter maintenance has been raised recently which has a positive effect on traffic safety. There are needs to improve public transport to better serve tourism.

Murmansk region (Russia)

For further development of the ski resort in Khibiny, it is necessary to attract federal funds for the construction of linear facilities (engineering infrastructure).

It is still interesting to cooperate on the extension of the Norwegian cruise line Hurtigruten to Murmansk, as well as other international cruise lines. The government of the Murmansk region is considering the possibility of extending the ferry service on the route Kirkenes–Murmansk–Kirkenes. The first cruise on the route Tromsø–Murmansk–Franz-Josef land is planned to be held on August 29–September 12.

In January 2015, the reconstruction of the pier of the long-distance lines of the sea station and the shore protection of the passenger area of the sea port of Murmansk for servicing modern sea ferries and cruise ships was completed. The length of the pier after reconstruction increased by 59 metres to 207 metres, the width was 19.6 metres, which is 6 metres wider than the previous one. Passengers vessels with a length of more than 180.5 meters, width - 25.5 metres and a draught - 5.9 metres can be moored to the pier now.

Taking into account the growing popularity of cruise tourism with which use ships with a large number of passengers and large displacement, the additional reconstruction and modernization of the port infrastructure will be required in the near future.

Murmansk airport

A lot of tourists from Asia have been coming to Murmansk in recent years comes quite. Basically, they fly through Moscow and St. Petersburg, because there are no direct flights to Murmansk. Increasing demand from Asian tourists encourages the tourist community to think about launching direct charter flights from Asia, which will require further development of infrastructure.

A full-scale reconstruction of the airport's parking area has been started. There are also plans to build a new terminal. At the same time, it is planned to reconstruct the area around airport, where car entrances and parking are located.

Khibiny airport

It is expected to modernize the airport systems in 2019. In the future, it is planned to reconstruct the terminal: redevelopment and increase of existing areas, as well as renovation of the facade of the building.

Arkhangelsk region (Russia)

Arkhangelsk is the largest transport hub and the starting point for traveling in the Arkhangelsk region. The city has a developed transport infrastructure.

The region does not have direct regular transport links with foreign countries. In the summer there are charter flight programs from Arkhangelsk to Turkey, Bulgaria, Tunisia.

The region has a developed network of regional roads along which the main tourist routes pass. Interregional tourist routes to Veliky Ustyug run from Severodvinsk and Kotlas.

Every year from 4 to 6 of foreign cruise ships arrive to the Arkhangelsk region.

For the strengthening of tourism, including popular tourist destinations (Onega and Pinega districts), it is necessary to develop regional and local road infrastructure along the main automobile routes (gas stations, café, hotels, etc.). There is an importance also to improve and support infrastructure for keeping and maintenance of the ships as well as organize cruises from Arkhangelsk to the Solovetsky Islands.

Republic of Karelia

Most of the tourists visiting the region, use the road transport due to the geographical location of the Republic of Karelia.

To ensure transport accessibility of tourist facilities of the Republic of Karelia, the creation of multifunctional road service zones (car campings) is being carried out on the main transport routes and in the tourist centres of Karelia. The construction and repair works on the roads are also underway.

Another perspective direction for self-driving tourists is to travel along latitudinal roads in the North of Karelia. They are stretching from the border (multilateral automobile crossing point «Lyuttya») through Kostomuksha on Kalevala-Kem and Kochkoma-Belomorsk, then to the Arkhangelsk region. The other way is through multilateral automobile crossing point «Suoperya» in the village Pyaozerskiy - the village of Loukhi, with further access to the track «Kola» and the Chupa bay, White Sea.

The development of the cross-border tourism cooperation by trains through the railway points Svetogorsk-Imatra rail is also an actual.

The most convenient way for tourists to visit the South and Middle Karelia (the island of Kizhi, Marcial Waters, monuments of Prionezhye and Obonezhye etc.) is to take express trains «Karelia» (Nr 18/19 Moscow – Petrozavodsk) or «Kalevala» (Nr 656/657, St. Petersburg – Petrozavodsk). The Western Karelia can be reached by the passenger train “St. Petersburg-Kostomuksha”.

Republic of Komi

To develop the tourism in the region it is necessary to improve the quality of regional roads, infrastructure near natural objects and emergency communication system.

The role of water transport in the Republic of Komi is determined by the geographical location of waterways. Currently, the transport network of the Republic of Komi includes 4 100 km of inland waterways. Operating on the rivers Pechora and Vychegda shipping situation allows in municipal areas (Vuktyl, Izhma, Ust-tsilemsky) and cities (Pechora, Usinsk, Syktyvkar) of the Komi Republic to carry out river transport.

The Barents region and the Arctic

The report “Barents Tourism Action Plan” emphasizes some main issues to be improved. The lack of a good level of inter-regional air traffic is one of the most important challenges in the region. The Barents Joint Working Group on Tourism indicated the issue of developing the east-west flight connections as an important one. High-quality inter-regional flight connection would improve tourism in the whole region by enabling better cooperation and building joint tourism products. With a qualitative air traffic the Barents Region would become even more attractive destination for international tourists. Combining the tourism products from several countries through inter-regional flight connection would attract new customer segments, especially from Asia.

Transport costs in the Barents Region are high and road conditions vary considerably within the region. Infrastructure needs improvement, especially in the Russian municipalities. There is a lack of rest areas, petrol stations and other roadside facilities along

many roads, and very few of them meet the needs of travellers with physical limitations and disabilities.

There is a need to boost the development of tourist cooperation between Russian and the Nordic countries and to simplify visa regime between Russia and the Schengen area of the Barents Region. There are common interests in developing the tourist industry in the Barents Region. In this context it is important to maintain and intensify bilateral and multilateral framework for business cooperation at the regional level.

The competent authorities of the Barents Region countries should seek the ways for developing the transport routes to increase the accessibility of tourist sites.

The development of tourism will ensure the accessibility of the regions, development of humanitarian and cultural ties between the inhabitants of the Barents Region and an increase in the tourists flow to the Barents Region.

Visit Arctic Europe's input

The project “Visit Arctic Europe” shows that one of the jointly identified shortcomings experienced in the Northern hemisphere is that it is currently a substandard public transport within the countries as well as across national borders. Many tourists have to use car or chartered traffic to reach their destination. The fact that tourists themselves have to get around by car is neither sustainable or safe. Proposed measures are higher frequency of buses and a train connection east-west-north.

Local transport within the regions of northern Europe is considered the most critical point in order to create better cooperation between the companies in the different countries. There are also no international air connections to Arctic Europe and there is a demand for opportunities to fly between different airports within the region. The problem with different vehicle rules and taxes in different countries makes it difficult to rent a car in one country and return it in another.

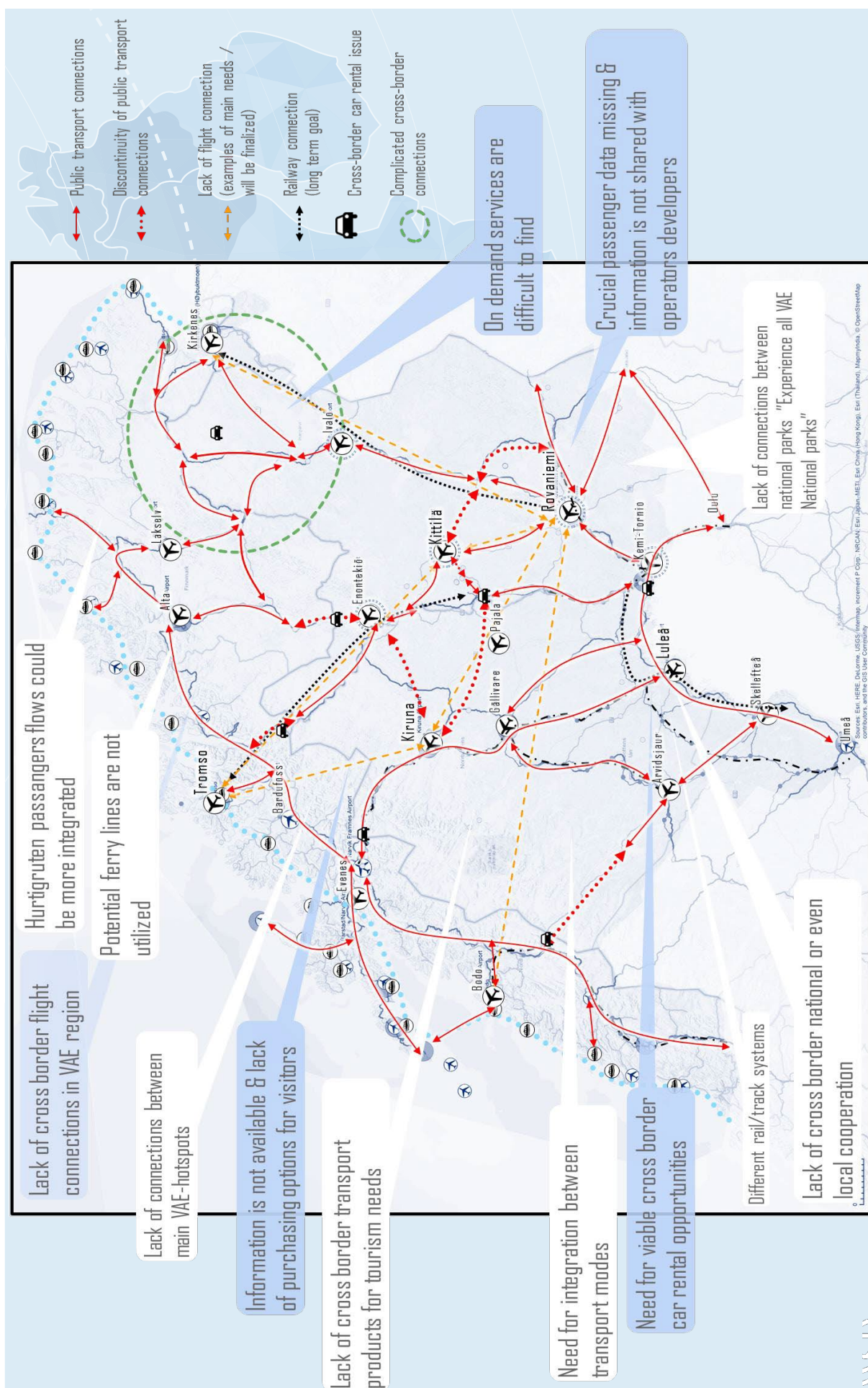


Figure 5.2:1 Visit Arctic Europe has pointed out some transport related needs in the Arctic Europe part of the Barents Region. Visit Arctic Europe, Interreg Nord.

6 Status of the Transport Systems

6.1 An overview

Northern Europe is peripheral in relation to the large markets and its transport infrastructure is to a large extent divided along the national boundaries of the area. The population and commodity-based industry of the region is separated in clusters that are relatively far apart and inaccessible from each other. The general situation for industries and firms is that the markets are far away and that long distances result in high transport costs. These conditions are amplified by the operation of the transport infrastructure in mainly separate, national transport systems.

Today, the transport systems function relatively well within each country, however, mainly in the north-south direction. Freight flows are dominated by raw materials and refined products transported in

the north-south direction, primarily by sea and rail. The north-south transportation routes are therefore the most developed, but particularly in the case of the railway, major bottleneck problems have arisen due to the gradual increase of flows to the densely populated parts of the EU. The cross-ways and cross-border transportation are currently limited, first of all, because of the historically established structure of trade, as well as deficiencies in the infrastructure and because of some administrative obstacles.

New transport routes, commodity resources, sensitive environment and the current security policy make the Arctic region highly politically important. EU policy for the Arctic adopted in 2016 particularly highlights the importance of the following three areas: environment and climate, sustainable regional development and increased international cooperation.

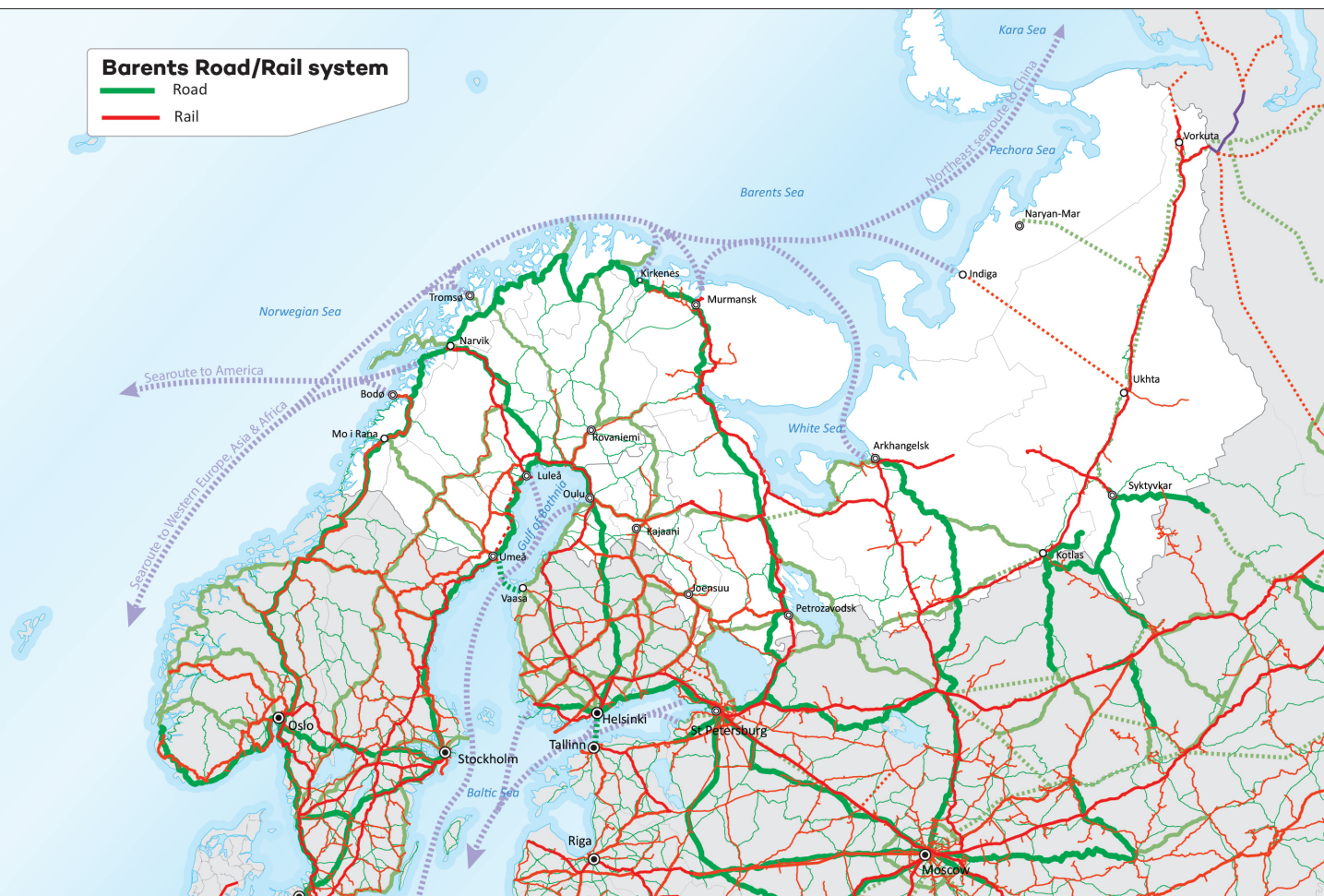


Figure 6.1:1 Overview of the main road, rail and sea routes in the Barents Region. The TEN-T network is essential in linking the countries of the Barents region and the Barents region to external markets.

6.2 Roads

The road system is crucial for transports in the region, especially for the rural parts, due to the role of automobile transport as a “last mile” transport, linking all settlements in the Barents region with railways, maritime ports and airports. Partly due to system shortages in the rail network, partly due to the fact that the air system does not allow desirable connections within the region.

To give an overview of the road system, the most important road routes are briefly described below. In appendix 1 the roads in the cross-border corridors are described more in detail.

- The **E4, E8 and E75**. The E4 is Sweden’s most important road, connecting the whole country from North to South. It follows the coastline from Stockholm through the main cities up to Haparanda, a distance of 1 020 km. The road E4 has the same designation as it continues across the border to Finland, then as the E8 between Tornio and Kemi and finally as the E75 from Kemi via Oulu to Helsinki. Since the E4 is of both national and international importance its standard is quite high. In Sweden, most of it has been upgraded to at least 13 metres with a central barrier for higher traffic safety and accessibility, but there are still some parts, especially in the north, that are only 9 metres wide. In Finland most of the road is 10 metres wide and lack central barrier. There are construction works ongoing to improve E75 in Oulu region into six-lane highway and between Oulu and Kemi into highway with bypass lanes. The E8 runs northwards from Haparanda/Tornio, through the Tornedalen to the bordercrossing at Kilpisjärvi and further to Tromsø. From Kemi, the E75 continues via Rovaniemi, Sodankylä and Ivalo to the northernmost part of Finland, crossing the border to Norway at Utsjoki.
- The **E10** is one of Sweden’s, Northern Norway’s and the Barents Region’s main cross-border routes for long-distance passenger and freight transport. The road follows the route Luleå-Töre-Överkalix-Gällivare-Kiruna-Riksgränsen-Narvik. The length is 520 km. The E10 functions as an important artery for passengers and freight to industries, workplaces, municipal and regional centres.
- The **E45** is the Swedish inland corridor from Gothenburg to Karesuando. The E45 continues via Palojoensuu in Finland to Alta in Norway where it connects to the E6. The section between Gällivare and Gothenburg is included in the EU comprehensive road network. South of Gothenburg the E45 continues to Gela, Italy. The northern part of the route is important to export of fish and transport of general cargo. The border-crossing at Kivilompolo is important to long distance transport in and out of Northern Norway. The E45 in Norway is not open to modular vehicle combinations of 25.25 metres and total weight of 60 tonnes due to bottlenecks.
- The **E105** is a major motorway, in the Barents region. It is located mainly on Russian territory (1 131 km of 1 148 km), connecting Petrozavodsk and Murmansk with cities of federal jurisdiction – Moscow and St Petersburg. Significant volumes of cargo between the central part of Russia and foreign countries go through the port of Murmansk. As of January 1, 2019, the share of the length of public roads of Federal jurisdiction, corresponding to the regulatory requirements for transport and operational status in the Murmansk region is 99.6 percent and in the Republic of Karelia 99.3 percent, which is significantly higher than the average level in the Russian Federation (83.1 percent). In the North, E105 connects with Kirkenes (Norway). The route passes through the border crossing between Russia and Norway – automobile crossing point Borisoglebsk/Storskog. The route plays an important role for the regional cooperation in this part of the Barents region, in the northern political cooperation and in the growth of business and industry in the border area and in Northern Norway in general. South of Petrozavodsk, the E105 continues to the Black Sea and has access to transport systems of several countries. The main types of goods transported over the Norwegian-Russian border crossing point Storskog/Borisoglebsk are timber products, products for the mining industry and maritime equipment. Russian road transport in the route is primarily general cargo, food products and passenger transport between the cities in the region. The route is important for passenger cross-border transportation between Kirkenes, Murmansk and other towns on the Russian and Norwegian side. Several Russian companies offer bus transports between Murmansk and Kirkenes.

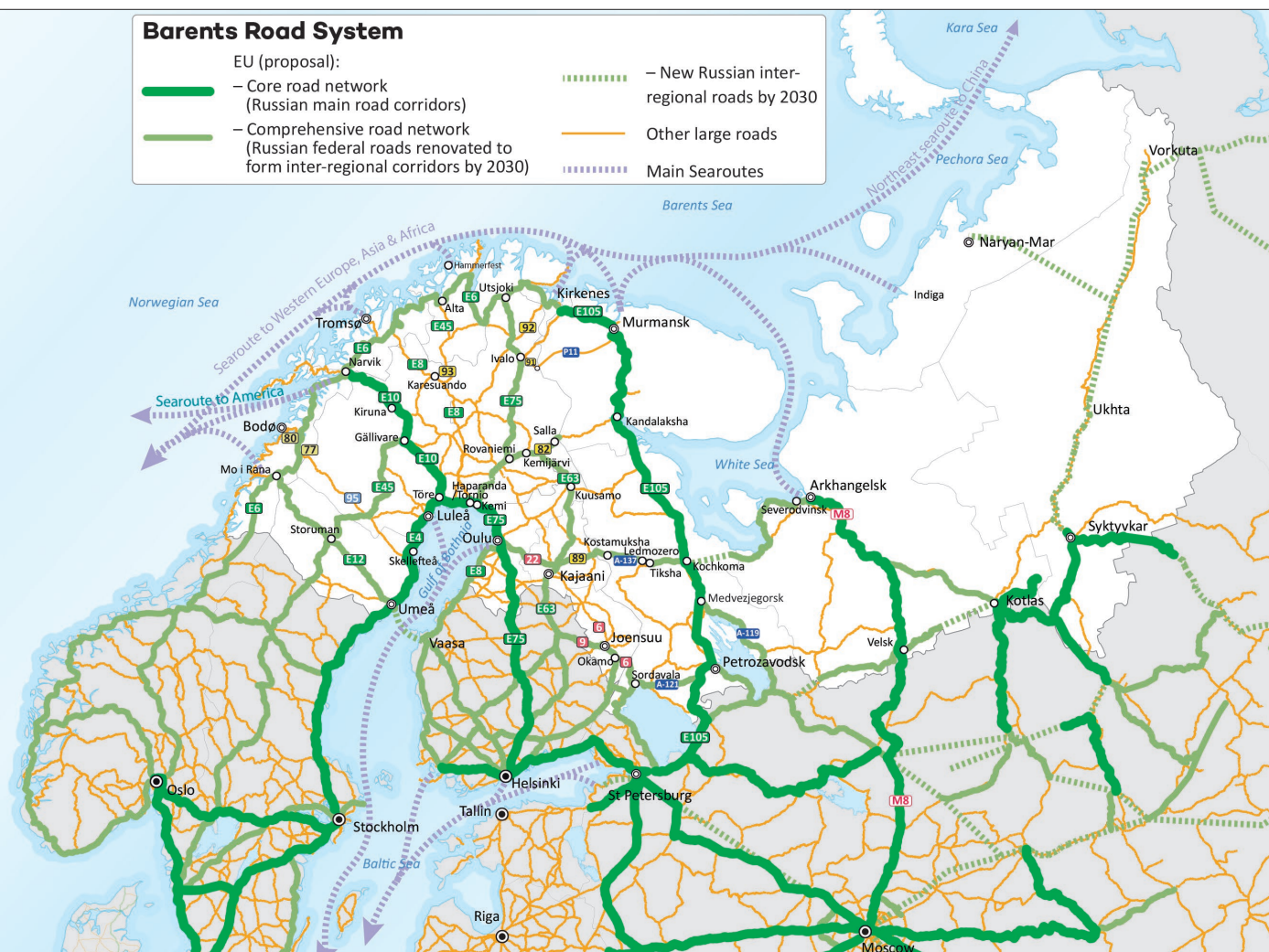


Figure 6.2:1 Overview of the road system in the Barents region.

- **The Russian route M8** is a major trunk road in direction from north-south. It links Moscow with the Russian North in general and with the marine port of Arkhangelsk in particular. The road runs along the route Moscow-Yaroslavl-Vologda-Arkhangelsk (with entrances to Kostroma, Severodvinsk, Arkhangelsk international airport (Talagi), passes through Pereslavl-Zalessky). The length: 1 160 km, the length with entrances: 1 290 km.
- The **E6** is the only national freight transport route between Northern and Southern Norway and it is very important for regional and local traffic. The road connections from neighbouring countries link to this national road route, which thus has a distribution effect. The E6 has low traffic volumes with the exception of traffic through cities and towns, such as Mosjøen, Mo i Rana, Narvik and Alta.
- The **E12** is an important route from west to east connection, starting in Mo i Rana in Norway and ending in Helsinki, Finland. The length of the road is about 910 km long, 460 km of which is in

Sweden where it is called the Blue Road. There is a ferry connection between Umeå in Sweden and Vaasa in Finland. The ports of Umeå and Vaasa are operated by a joint port company and a new ferry is ordered (€140 million). The main goods traffic on this route of the Barents Region is the transit of goods from Norway to Sweden and Europe. Mainly the freight of fish and steel reinforcement bars is carried out. There is a small proportion of transportation of industrial items from Sweden to Norway. The route is very important for tourism. From Helsinki, the route continues on E18 to St. Petersburg.

- The road **95/77** is a strategic road between Skellefteå and Bodø/E6. The new Tjernfjell tunnel will be finished in 2019 and will make the border crossing reliable all year around. This is expected to make an increase in transport of goods in the corridor.
- The route of National **Road 22** and National **Road 89** in Finland connects to the Russian federal road **A-137**, passing Kostamuksha, Ledmozero, Tiksha and connecting to E105 near Kochkoma.

Road maintenance in winter period

The Barents Region and its road routes are located in the High North, often in the highlands of fjelds. This creates significant problems for road traffic and road maintenance in winter time. Roads may be frequently closed during snowstorms and snowfalls in the mountainous part the area. For several routes this problem is particularly serious.

While studying costs and disadvantages connected with low mobility and regularity of traffic in winter time on mountain passes of the Northern Norway, the estimated cost of time lost linked to closed roads and poor driving conditions amounts to a total of €10 million. Around 30 percent of this is time costs for heavy vehicles. However, there is reason to assume that the real costs for goods transports are significantly higher. This applies in particular to transports of fresh fish that requires fast and reliable transports and is very sensitive to delays that result in value loss. It has not been possible to obtain data on the extent of this value loss and on other disadvantages that entail costs. The E10 over Bjørnfjell stands out as the mountain pass with the highest estimated time costs (approx. €2.2 million per year) as a consequence of poor mobility and traffic flow. It is followed by a number of mountain passes on the E6: Sennalandet, Kvænangen and Saltfjellet (a total of €2.6 million).

The additional costs and disadvantages inflicted on businesses and transport operators are significant.

It is therefore considered important to implement measures to improve regularity on both sides of the border-crossing mountain passes and on the E6.

Slippery road surfaces due to frost are common problems at the beginning of winter. Furthermore, the need to save roads maintenance costs is likely to reduce the maintenance level of roads with low traffic intensity during the winter period.

Road safety

Norway, Sweden, Finland and Russia¹ approved the aspiration of zero mortality (Vision Zero) for all public roads. This makes the Barents Region road routes face a serious challenge, as there are many road sections in the network that do not exactly meet the accepted standards. Driving on some roads is a particularly difficult mission for foreign truck drivers, who do not have driving skills in the northern conditions. Every year in winter several accidents take place.

Arrangement of high quality recreation areas for commercial carriers is a necessary measure to improve safety on the roads in the Barents Region. The distances between population centres in the Region are great, and the traditional recreation areas, for example, at gas stations, are few. Besides, now the control over the time of rest of commercial vehicle drivers has been tightened.

Road closures, average yearly 2010-2018

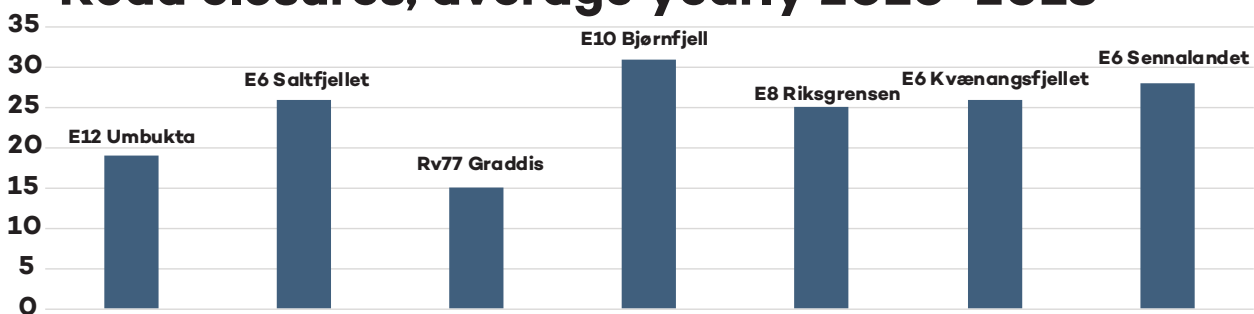


Figure 6.2:2 The table applies to closures varying between 2 and 24 hours. The number of closures and convoys varies from winter to winter due to varying weather conditions.

¹ The road safety strategy in the Russian Federation 2018 – 2024, as a cross-sectoral strategic planning document, sets its goals to improve automobile road safety, as well as the desire for zero mortality in automobile road accidents by 2030. As a target for 2024, the indicator of social risk is established, which is no more than 4 fatalities per 100 thousand population.

6.3 Railways/Terminals

The railway system is of high importance for the export intense industries in the Northern Europe.

The key railway routes are briefly described below.

- The Nordland railway runs between Bodø and Trondheim and may carry both cargo and passengers. In Trondheim, the Nordland line connects to the Meråker line, which goes in east-west direction and connects to the Swedish rail network.
- The Ofoten/Iron Ore line. The Ofoten line stretches from Narvik to Riksgränsen, where it connects to the Iron Ore line, which runs between Riksgränsen and Luleå in Sweden. The Ofoten line has no other connection to the Norwegian rail network. Transports on the Ofoten/Iron Ore line are primarily iron ore pellets on the routes Kiruna-
- Narvik port (a separate pellets unloading terminal) and Malmberget-Luleå. In addition there is transport of copper on the section Gällivare-Skellefteå. The Ore line and the Swedish main line are essential to transport of seafood and general cargo in transit to/from northern Norway.
- Passenger trains also run on the line.
- The Swedish main line in north-south direction from Luleå/Boden, together with the planned North Bothnia line Umeå-Luleå, belong to “the Bothnian Corridor”. Very large amounts of cargo, mainly steel, copper materials, forest-based products and fresh fish (from northern Norway) are transported on the line. There are also passenger trains Umeå/Vännäs-Boden/Luleå.
- The Haparanda line runs between Boden and Haparanda at the national border between Sweden and Finland. The line is a part of the Bothnian



Figure 6.3:1 Overview of the railway system in the Barents region and its connections to international markets. With the proposed amendments of the TEN-T Core corridors (Scan-Med and North Sea-Baltic) through northern Sweden and Finland the Barents region will get even stronger connection with central Europe.

Corridor. The Haparanda line is used exclusively by freight trains. There is a three kilometre long section from Haparanda to Tornio, on the Finnish side of the Finnish-Swedish border. Passenger trains are planned between Luleå/Boden and Haparanda with start during 2021. The ambition is that Finnish will meet up in Tornio.

- The Finnish main line, which is also a part of the Bothnian Corridor, provides the major ports and industries with rail transport, and connects the coastal towns of Tornio, Kemi, Oulu, Raahе and Kokkola with southern Finland. The section between Oulu and Ylivieska is currently only a single track line. Construction of the double track line is currently one of the major infrastructure development priority in the north. Freight trains operate Tornio-Kemi-Oulu and further south. Passenger trains operate between Kemi and Oulu, but not between Tornio and Kemi. The section Tornio-Kemi is not electrified, but there are diesel trains which take passengers to Kolari.
- There is a 280 km long railway connection from Kemi to Kellosoelkä, near the Russian border at Salla. The railway is electrified from Kemi to Kemijärvi. Freight trains with mainly round timber go regularly from Kemijärvi and Rovaniemi to the paper mills in Kemi and Oulu. There are also passenger trains between Rovaniemi and Kemijärvi.
- The section of the October Railway between Murmansk and St. Petersburg is 1 140 km long. The 850 km long part between Murmansk and Petrozavodsk is electrified, single-track with double-track inserts. The line provides transportation of goods to/from the sea port of Murmansk, as well as raw and container cargo between the central and north-western regions of Russia. There is a developed network of passenger traffic, connecting Murmansk, Petrozavodsk and other cities in the region with the largest cities of the Russian Federation.
- Line from Vorkuta to Russian-Finnish national border (Lytta, near Vartius): Chum-Synya-Sosnogorsk-Ukhta-Mikun-Kotlas-Konosha-Obozerskaya-Kochkoma-Ledmozero-Kostomuksha line. Branch roads from Obozerskaya to Arkhangelsk; from Mikun to Syktyvkar. There is a developed network of passenger traffic, connecting Arkhangelsk, Syktyvkar, Vorkuta and other cities in the region with the largest cities of the Russian Federation. Single-track lines with double-track inserts. The railway is not electrified except for the

section Konosha-Belomorskaya-Kochkoma. In Kostomuksha located 30 km from the Russian-Finnish border, iron ore is produced and processed into pellets. Pellets are transported by rail, mainly to Russian consumers. Furthermore, oil, coal, ferrous metals, timber, construction materials, fertilizers, and paper are transported on the route.

- On the Finnish side, the line Vartius-Kontiomäki-Oulu is 260 km long and electrified. The line has extensive freight traffic. Several passenger trains operate between Kontiomäki and Oulu.

Terminals

The main railway terminals for passengers and freight in Northern Norway are Mosjøen, Mo i Rana, Fauske, Bodø and Narvik. There is a continuous ongoing effort to upgrade the terminals according to the development of transport and user demand. At Fauske and Narvik there are major investment plans to increase capacity and efficiency.

Main railway terminals in the Swedish part of the Barents region are Umeå, Luleå and Kiruna (for passenger and freight transport) and Boden (only for passenger transports). The main railway terminals in the Finnish part of the region are Kemi, Tornio, Rovaniemi, Kemijärvi, Kolari, Oulu, Kajaani and Kontiomäki.



6.4 Shipping, sea routes and ports

Northern Maritime Corridor & Barents Sea

The maritime activity in the Northern Maritime Corridor and the Barents sea can be relatively divided into five main segments; Coastal sea traffic, intercontinental transport, fisheries, petroleum and maritime tourism.

In general there is an increase in internal destination traffic which stands for all types of shipping between ports in the Barents region. The coastal sea traffic includes passenger and cargo/bulk transport along the coast and routes to/from Svalbard, oil and gas tankers from Norway (Hammerfest), vessels from Russian sea ports, travelling along the Norwegian coast and offshore supply shipping. The Norwegian Coastal Administration's Vessel Traffic Service (VTS) in Vardø coordinates the traffic separation system off the coast.

Intercontinental transport along the Northern Maritime Corridor is primarily related to the Northern Sea Route (NSR)/Northeast Passage (NEP). It is used for transportation of various types of cargo. The maritime transportation of goods is dominated by transit traffic. Shipping across the Arctic areas is expanding but very slowly because of major constraints of natural environment and technology, high risks and low profitability to use these routes. Tanker ships from Russia in transit along the Norwegian coast are to be expected to increase. The changing climate is resulting in increased accessibility and a longer shipping season for intercontinental shipping, which will affect the activity level in the future.

Programmes for the development of the Arctic region are being implemented in Russia including the development of shipping the Northern Sea Route. The transport strategy of Russia until 2030 implies a growth of cargo turnover within Russian seaports in Arctic and an increase in the volume of goods transporting along the Northern Sea Route.

Fisheries is a key industry in the Arctic. The fishing fleet consist of different types of trawlers and coastal fishing vessels. In the Northern Norway sea areas the fishing fleet stand for about 58 percent of the total transport distance.

Petroleum activity represents a significant increase in activity in the High North in terms of exploration and production. The oil and gas activity moves into areas where natural conditions are a major challenge not only for operators, but also for the whole preparedness system. New oil and gas fields and additional exploration with drilling rigs will represent an increased traffic of offshore service vessels and oil and gas tankers.

Within maritime tourism, approx. 50 cruise vessels are visiting Norwegian main land harbours during the main season from May to October. There is a few vessels coming in the winter months, and the number may increase. At Svalbard the season is from June till September. The number of cruise vessels and the average size is expected to increase. The most important cruise ports in Northern Norway are Lofoten, Tromsø and the North Cape, in Russia Murmansk and Arkhangelsk.

The AIS map (figure 6.4:1) shows the sea transports in the Northern Maritime Corridor divided by cargo type, August 2018.

Motorway of the Baltic Sea

The sea corridor in the Gulf of Bothnia is essential for transports of raw materials and especially the products of the industries situated along the Bothnian Corridor. The Baltic Sea offers a direct connection southward to the rest of Europe.

The traffic volumes in the Bothnian Corridor transport network include mining products, timber, oil products, chemicals and other commodities produced in the area. The main transport in the corridor is cargo.

A general problem for navigation in the region is that the Gulf of Bothnia is very shallow. The fairways and ports must be dredged regularly to keep them navigable. In addition to the shallow waters, a key challenges for navigation, is winter ice. Icebreakers have to be used to keep the fairways open during the winter season. The ice-breaking service is delivered by Swedish and Finnish authorities as equal counterparts and under one command.

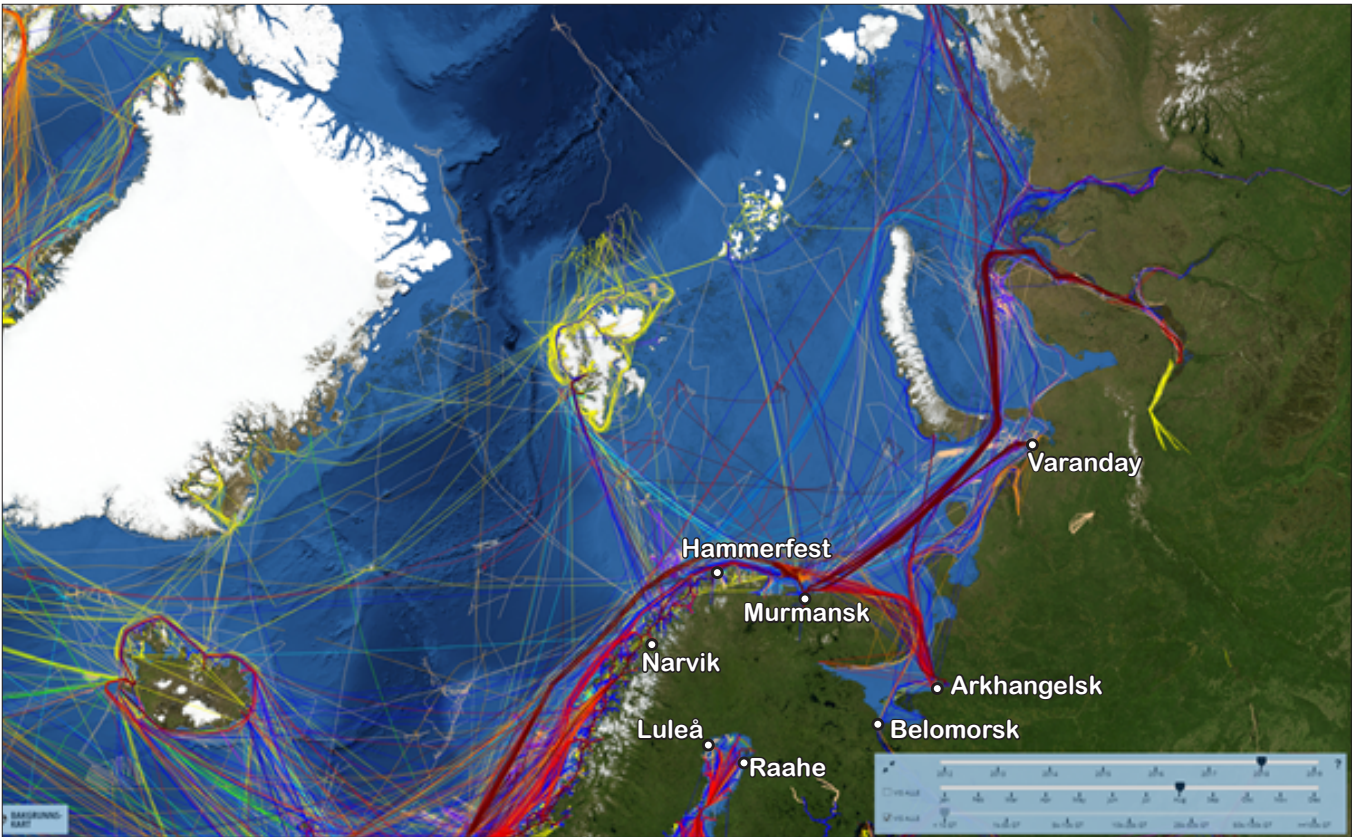


Figure 6.4:1 Sea transports divided by cargo type. Fishing vessels are excluded in the map.

		Ro/Ro ship	
Oil tanker	dark red	Reefers	blue
Chemical tanker	red	Passenger ship	cyan
Gas tanker	light red	Offshore supply ship	dark blue
Bulk carrier	orange	Other Offshore	light blue
Containership	yellow	Other activities	pink
General cargo	green		

Sea safety and rescue

Cooperation in the International Maritime Organization (IMO) on maritime safety and the sustainable development of shipping in the Arctic is vital for ensuring a high level of maritime safety in Arctic sea areas.

In Arctic Norway's and Russia's waters, traffic separation schemes, maritime traffic surveillance and the government emergency tugboat service all help reduce the risk of incidents. The Norwegian-Russian ship reporting system, Barents SRS, and the maritime surveillance and information system BarentsWatch help to provide an overview of high-risk traffic in these sea areas and a more effective response in the event of accidents. Satellite-based infrastructure is important for managing the specific challenges associated with maritime activity in the north. The Norwegian Government is assessing the need for, and possible models for, a new satellite-based communications system in the Arctic that would also provide coverage north of 72°N.

To enhance maritime traffic surveillance, the Government of Norway also intends to establish new land-based AIS (Automatic Identification System) base stations along the west coast of Svalbard, and will consider further developing the AIS network in Svalbard.

The increase in traffic in Arctic waters, combined with long distances and limited search and rescue resources, makes closer international cooperation on search and rescue essential. Norway and Russia attaches great importance to the regular Norwegian-Russian search and rescue exercises that are carried out under the Barents cooperation.

Acute pollution and oil spill preparedness and response

Acute pollution incidents can require very extensive response operations that, in some cases, extend across borders. Norway and Russia had signed a number of international agreements on acute pollution preparedness and response in Arctic waters. There is ongoing cooperation on notification of incidents, preparedness and response, and exercises, both under

the bilateral agreements on oil spill preparedness and response in the Barents Sea and under the Arctic Council's Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic.

Green shipping

IMO has decided that emissions shall be halved by 2050. This means that the international markets for green technologies and solutions will soon can become a reality.

The Norwegian government and the maritime industry have established a joint programme to create a more effective and environmentally friendly maritime industry. «The Green Shipping Programme» aims to find scalable solutions for efficient and environmentally friendly shipping. The results are expected to be cost-effective emission cuts, economic growth, increased competitiveness, and new jobs. Both authorities and industry actors participate in the programme and are working together to achieve these goals. The studies and pilots in the Green Shipping Programme are crucial for the phasing in of zero and low-emission solutions in shipping towards 2030, with significant climate, environmental and public health benefits. The programme has been established as a formal project to promote the UN Sustainable Development Goals.

«The Green Shipping Programme» has made several studies and established pilots to test new and future technical solutions, ranging from new types of fuel on different shiptypes, green smart vessels to autonomous sea drones/ships, green port projects and financing solutions

Main Ports in the Barents Region

Figure 6.4:2 shows the main ports in the Barents region.

The ports of Narvik and Luleå are the only TEN-T Core Network ports in the Barents region. The ports of Kirkenes, Hammerfest, Mo i Rana, Umeå, Raahe, Oulu and Kemi have the status of comprehensive ports in the Trans-European Transport Network

There are eight seaports in the Russian parts of the Barents Region: Murmansk, Arkhangelsk, Kandalaksha, Vitino, Varandey, Naryan-Mar, Onega and Mezen. The cargo turnover of all ports in the region in 2018 amounted to about 73 million tonnes. For the first half of 2019, the cargo turnover of these ports increased by 7.3 percent compared to the same period in 2018 and amounted to about 37 million tonnes. The main cargoes handled at these ports are coal, oil and oil products.

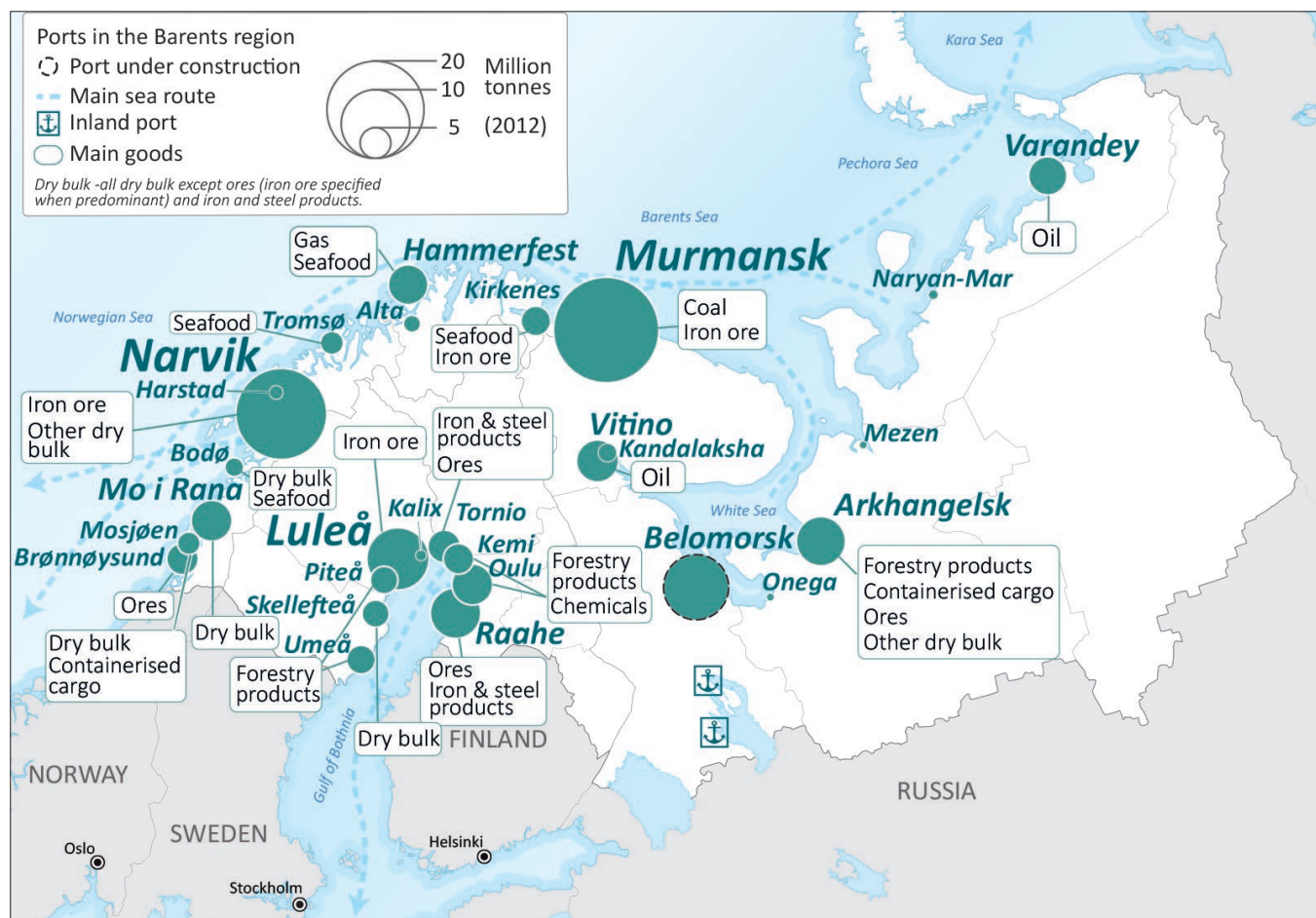


Figure 6.4:2 Overview of the main ports in the Barents region. These are described further in Appendix 1.



6.5 Flights/Airports

As the Barents region is far from the main markets, long distance flight connections are of key importance for ensuring accessibility. There are no inter-regional flight connections within the Barents region and all flights must be operated through a hub airport.

There have been several initiatives to establish such services. The latest “The Arctic Airlink”, Tromsø–Luleå–Oulu was opened in January 2015 and closed in May 2018. During this period 9 700 passengers were carried to/from Tromsø. The average load-factor on the Saab 340 operation was 20 percent.

In 1993 the route Tromsø–Murmansk was opened. Braathens S.A.F.E. and Aeroflot both had one weekly flight. Braathens closed the route in 2000 but the Russian airlines continued operations. The last operating airline was Pskovavia, who closed the route in 2014.

Widerøe Flyveselskap started operations between Kirkenes and Murmansk in 1994, but the route was later closed down.

Norway has a well developed route network in the Arctic Region. The Avinor airports in Tromsø, Bodø, Longyearbyen, Alta, Harstad/Narvik, Kirkenes and Bardufoss serve tourists and business travellers to northern Norway, with 50 direct daily flights from Oslo.

During the winter season there are direct “Finnair” flights from UK and Central Europe to Lapland. The number of passengers to Finnish Lapland has grown by seven percent in 2018. Rovaniemi Airport is growing in importance as a hub. In 2018, the airport served more than 644 000 passengers. The number of routes available through Rovaniemi Airport keeps increasing. In October 2019, EasyJet and Norwegian are both launching direct routes between Rovaniemi and London Gatwick Airport, which is expected to bring more British travellers directly to Finnish Lapland. From December 2019, Turkish Airlines will operate a direct route between Rovaniemi and Istanbul.

Russian airlines fly from Murmansk and Arkhangelsk to Turkey (Antalya, Bodrum, Gazipasha).

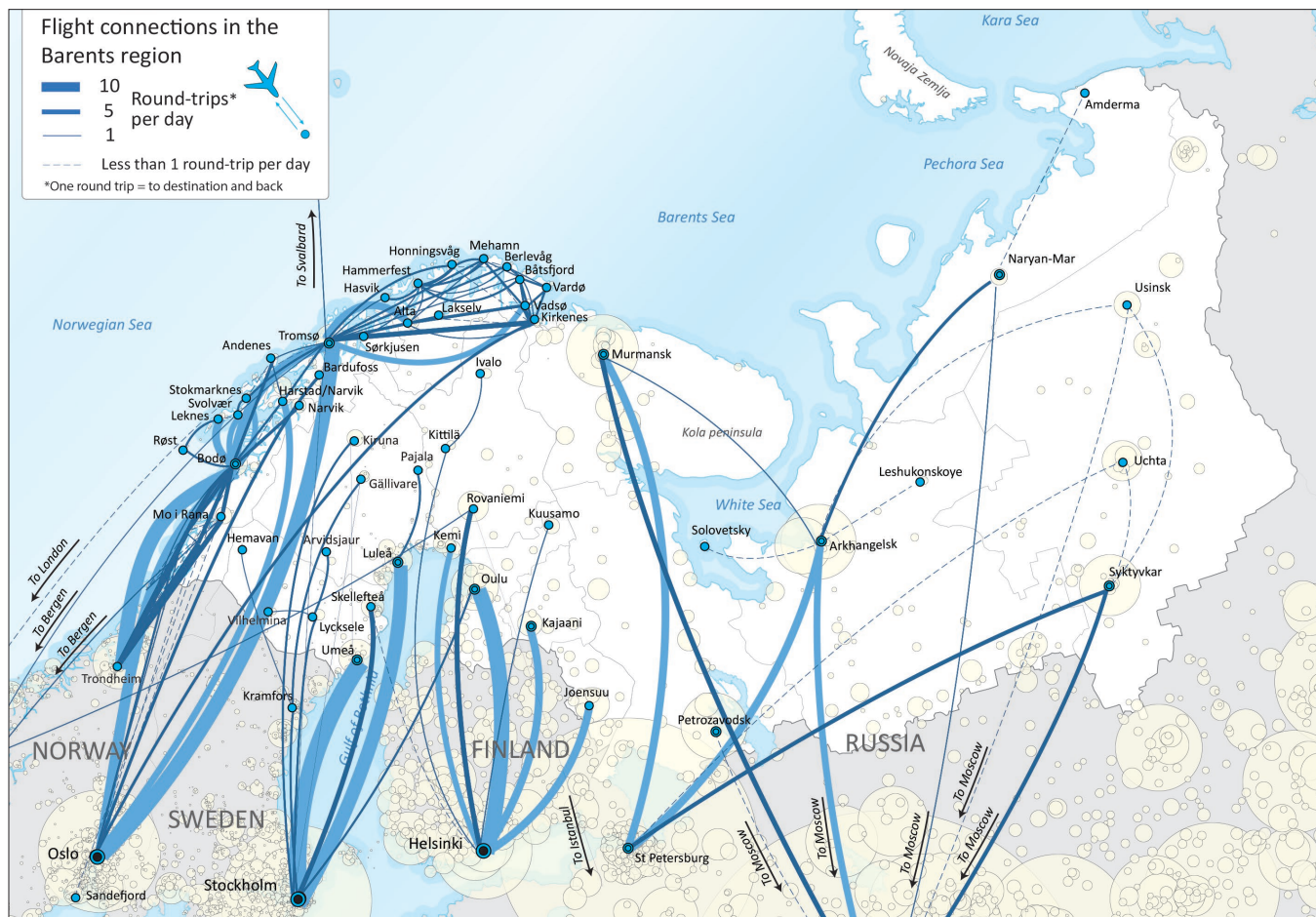


Figure 6.5:1 Overview of the flight connections in the Barents region.

Cross-border connections from Norway to Sweden, Finland and/or Russia could provide efficient travel. The Arctic region is scarcely populated and potential markets will be small. On domestic routes within the EU region funding of unprofitable routes is done via the PSO (Public Service Obligation) arrangement, but there is no such instrument for international routes.

6.6 Transports in the Barents Region

Public

Cross-border public transport connections

The possibilities to travel across the borders with public transports are limited to a couple of routes.

There is a daily bus service between Kirkenes and Murmansk which is operated by Russian companies. There is also a daily bus service between Rovaniemi in Finland and Varangerbotn/Vadsø in Norway. During summertime, there are bus services from Oulo/Lapland to cities in northern Norway; Tromsø, Honningsvåg and Vadsø. These services are operated by the Finnish company Eskelisen Lapin linjat.

The HaparandaTornio Travel Centre, inaugurated in 2014, is the hub of bus traffic between Sweden and Finland. The common travel centre contributes to good connections along the coast between Sweden and Finland.

There is a daily train service between Narvik and Luleå. This service is operated by the Swedish company SJ. In 2017 approximately 50 000 passengers travelled across the border.

In 2021 regional trains will start to operate along the Haparanda line between Luleå-Boden-Kalix-Haparanda.

There are no direct public transport routes by air or sea between the countries in the Barents region. There is, however, a ferry connection between Umeå and Vaasa in Finland (situated just south of the Barents region).

In particular, it is important to study the most effective and promising cross-border land routes, as well as to develop better mobility of the population and promote the development of tourism services.

Visit Arctic Europe has pointed out cross-border corridors with needs of better public transport service. For example E12, E8/E45, E75/road 92.

“Barents on time”

From 2014 to 2016, Murmansk Oblast (Russia), Lapland Province (Finland), and Finnmark County (Norway) implemented a preliminary project called the Barents Triangle with the main goal to create an interregional cooperation platform and to focus on cross-border public transport. The main project, Barents on Time, will follow up the preliminary project and implement tangible measures to improve the cross-border transport. The main goal is to provide the public with a better choice of public transport, eventually leading to an increase in cross-border public transport traffic.

First priority goals are to develop a joint publishing platform for cross-border public transport; study opportunities for booking and selling tickets and install information screens at central stops to better inform the public about departures. Further on, in cooperation with border authorities, focus on facilitating cross-border travel for public transport passengers and make a joint emergency plan in cooperation with the bus operators.

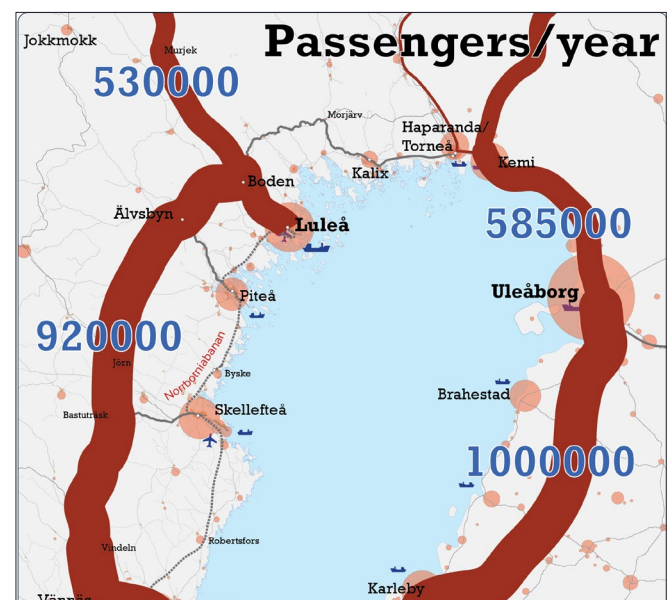


Figure 6.5:2 Example of cross-border discontinuity/potential for developed cross-border public transport service. Sources: Swedish figures: Swedish transport administration, Bansek, year 2009, Finnish figures: Banförvaltningscentralen, RHK, Railway statistics, year 2007.

Freight

Large volumes of goods are currently being transported on the rail and road network and through ports in the Barents region. The transport flows are predominantly in the north-south direction, and the infrastructure has been developed accordingly. The low demand for east-west transportation depends on administrative, cultural, linguistic and infrastructural factors, which have gradually improved during the last two decades.

The main product groups for transports are:

- raw materials like ore, forestry, oil/gas and fishery products exported from the Barents region
- goods that are produced and further processed in the Barents region (steel, paper products, sawn timber, etc)
- consumer goods that are imported into the Barents region

As the industry in northern Norway, Sweden, Finland and Russia contributes to large shares to the export volumes of each of these countries, which means very large, southbound transport flows for both rail and sea transports.

The Finnish and Swedish road networks are of major significance to freight transports in transit between the Southern and Northern parts Norway. The main corridors are the E45, the E8, the E10 and the E12.

Northern Norway has seen an increase in the transport of general cargo and fish. This is due to the demand for quality, reliable and fast delivery of goods. This causes increased traffic on the regional road network, border crossings and international road corridors and have influence on the rail corridors from Narvik to Sweden.

Transport security

The objectives of the transport security include stable and safe functioning of the transport system, protection of interests of individuals, society and state in the sphere of transport system against unlawful interference, including terrorism.

Transport security is provided by the entities of the transport infrastructure and carriers through the implementation of the system of legal, economic, organizational and other measures in the sphere of transport industry, determined by each state, that correspond to threats of committing acts of unlawful interference.

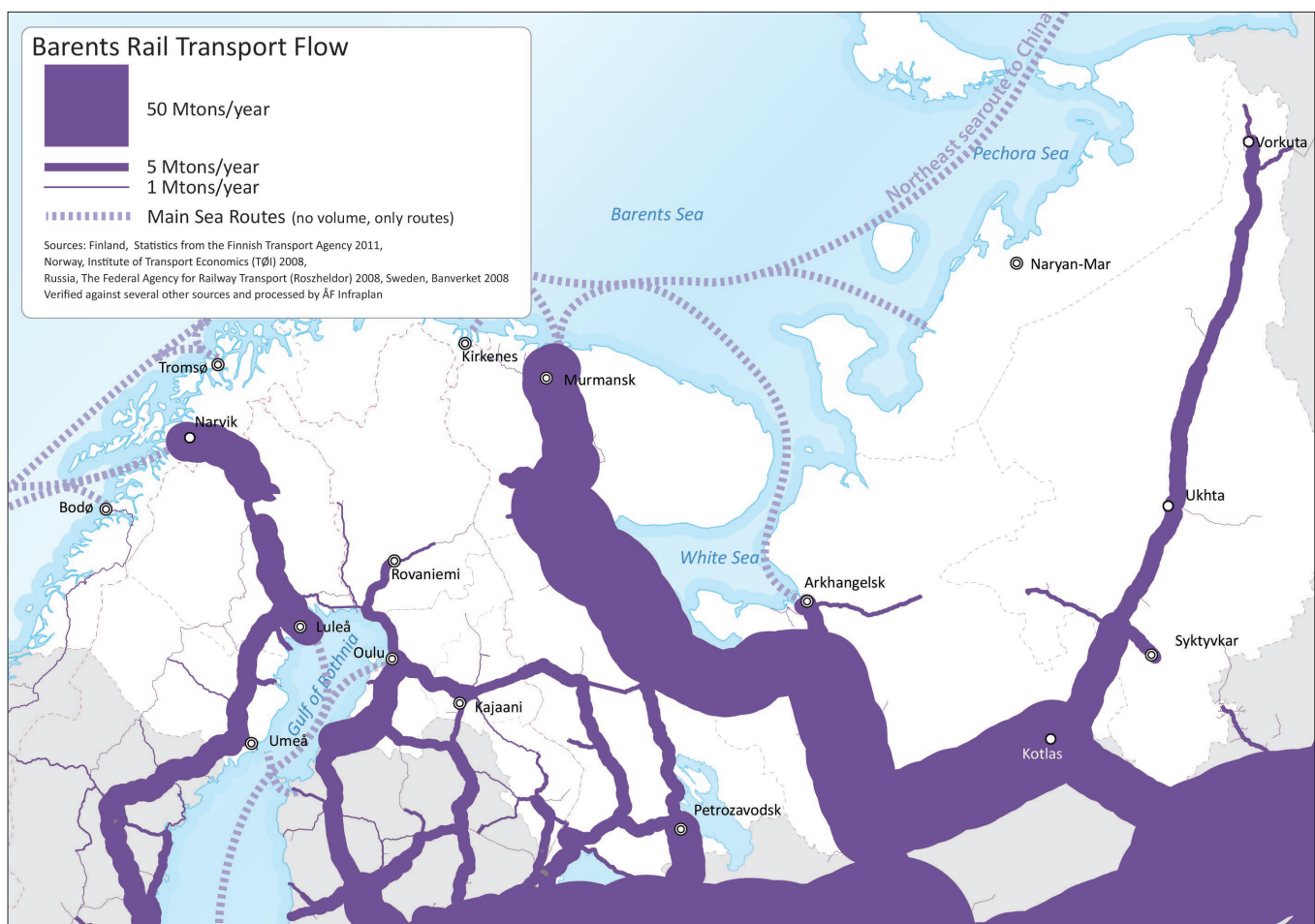


Figure 6.5.3 Illustration of rail transport flows in the Barents region.

In connection with the growing threats of terrorism, the Barents Region countries may decide to establish a joint expert group to coordinate the work to be carried out in the area of transport security in the air, rail, sea and road transportation.

HORIZON 2020 (EU program) allocated €3.5 million over a 5-year period to the project ARCSAR – search and rescue, and oil spill protection in Arctic waters. The main objective of this project is to establish an international network of representatives from authorities, organizations and front line staff to better meet the challenges associated with security and risk threats such as the increased commercial activity in the Arctic and the North Atlantic region, among others, cruise traffic and the oil and gas industry entails. Nord University in Bodø is the coordinator and the Main rescue centre North are project manager. They also have eighteen partners from Europe and the United States, Canada, Russia and New Zealand.

Safety in transport

The countries of the Barents Region carry out measures in the field of road safety, flight and navigation in accordance with the standards and recommended practices which are established in international agreements and conventions of the UN, ICAO and IMO.

6.7 A connected mobility, Digitalization and Intelligent Transport System (ITS)

There are major trends and technological advancements taking place globally in transport. The Barents region is utterly dependent on logistics and the region cannot be left behind or neglect these major advancements. However, the region lacks

practical insight and fluent knowledge transfer in this area. More cooperation in the Barents region is needed to develop its intelligent transport systems.

What is important from the Barents perspective is that the ITS systems that are introduced are seamless in their design and Barents crossover as far as possible. Countries should strive for common systems. The systems should also be adapted to the Arctic climate (information).

ITS and communication systems

Converting data into digital form is an area that allows you to take advantage of the solutions developed for the purpose of direct or indirect acceleration of various transport-related processes. A good example is the exchange of documents and data contained in the permit and authorizations, between the authorities and transport operators. Those procedures may include, for example, dispatch of documents for vehicles and export documentation in electronic format to the border crossings.

Meanwhile, conversion of data to digital form cannot take place without the efficient operation of the telecommunication system. Some remote sections of roads in the region lack reliable mobile telephony, which prevents the use of advanced technologies. Besides, the lack of communication creates risks for road safety.

The Barents Region and its transport network is located in the High North. This creates significant problems for road traffic and road maintenance in during winter. On some routes, the problem of road closures due to snowstorms and snowfalls is crucial. Use of ITS can help to optimize traffic, improving its reliability and safety in any conditions.

Digitalization and ITS is an important and promising area of cooperation. In recent years a number of leading projects are being implemented, while some are in the application phase.

Implemented projects - examples

Datex II

A European Datex II standard for presentation and exchange of information on road conditions and real time traffic has been developed. It allows to provide language-independent traffic information across the borders of the European states. The Datex II data are also available to providers of road conditions and traffic information, allowing access to same information for the end users through car navigation systems and mobile phones.

Norwegian Public Roads

Administration (NPRA) have been closely collaborating with the Swedish Transport Administration on Datex II implementation, and currently effective exchange of information between the two countries is established. It is important for traffic control hubs to ensure easy and fast access to information on the roads network including that of the neighbouring countries. This is crucial in cases when the main road is closed due to weather conditions or accident and the roads networks of the adjacent countries are used for a bypass purposes.

Reindeer Warning Bell

Another example is the use of mobile communication – reindeer warning system, which is carried out in Northern Finland. Within the system professional drivers and other registered users can create warnings. There is also free mobile app for everyone, which is designed only for receiving reindeer warnings. Registered drivers have to simply press a button when they see a deer beside the road. The app registers the deer's location and warns other car drivers approaching him, provided the app has been installed on their mobile phone. The warning is visible during a certain period of time after the animal has been spotted.

The so called "Reindeer Warning Bell" project in Finnish Lapland has been very efficient and reduced the accidents by approx. 40 percent. The system could be interesting to scale up, and adjusted to various local problems.

Traction control

The traction control systems, which modern cars are equipped with, track differences in wheel speeds. During winter time, those differences often indicate the slippery road surfacing. Such data, in all probability, can be collected and used to warn other road users, as well as be relayed to the road management authorities in order to ensure slipperiness control. The automotive industry is already working on that.

ERA GLONASS

ITS is used in the Russian part of the Barents region, its main task to improve the road safety (state system of emergency response in case of accidents, "ERA GLONASS", which is technologically compatible with the common European system "eCall"), as well as the safety of the roads ("Platon", the system of charging freight vehicles on federal highways).

International Intellectual Transport Corridor

The interaction within the Working Sub-Group on logistics and intelligent transport systems under the auspices of the Working Group on Transport of the Intergovernmental Russian-Finnish Commission on Economic Cooperation, can be given as an example of interstate cooperation in the development of intelligent transport systems.

Within the framework of the Memorandum on cooperation in the exchange of information signed in 2014 by the Federal Road Agency, subordinated to the Ministry of Transport of Russia and the Finnish Transport Agency, a pilot project to establish an international intellectual transport corridor "Helsinki–St Petersburg" is being actively implemented.

The pilot project includes among other things:

- creation of an interface to exchange data on weather and road conditions (cross-border) in Russia and Finland (contractor on behalf of the Russian side: the Federal Road Agency);
 - ensuring cooperation of the emergency call systems in an accident (service support by third-party providers); creation of a joint solution to make purchases or replenish phone account via the Internet; "InTrans" passenger information system on traffic routes.
- » In the future, intelligent transport corridor "Helsinki - St. Petersburg" can be extended to Stockholm (Sweden) and other countries in Scandinavia and Europe – northwards.

Current Pilot Projects on ITS - examples

Aurora-Borealis

The E8 from Skibotn to Kilpisjärvi is one of five Norwegian road sections selected as pilots for the development and testing of ITS solutions in Norway, called Borealis. Finland has a corresponding project, named Aurora, for the roadway section running from Kilpisjärvi to Kolari.

With the research and development programme Borealis, a 40-kilometre-long stretch of the E8 in Skibotndalen is becoming a national test laboratory for new technology. This is where the Norwegian Public Roads Administration (NPRA) tests and develops Intelligent Transport Systems (ITS). ITS is an umbrella term covering technology and computer systems in the transport sector. In an ITS system, communication can flow from one vehicle to another, from the vehicle to the roadway or from the roadway to the vehicle.

Examples of ITS technology that are being tested include real-time information about the weather, road surface conditions and traffic accidents, automatic scanning of the vehicle's brakes, and warnings of wildlife or other obstacles on the roadway. Platooning has also been tested.

Interaction of the JSC "GLONASS" and the Transport Security Agency in Finland (Trafi)

In 2017, the parties signed a Memorandum of cooperation to ensure the integration of the State automated system «ERA-GLONASS» and the European emergency response system eCall (Finland), in accordance of which, work and technical studies are carrying out. According to the results of joint testing, necessary adjustments have been done to the operation of

the systems and the test plan, after the elimination of the identified problems with the participation of automakers to control the results with the use of commercially available call devices, installed on vehicles.

It is planned to conduct again tests of the new platform "eCall" on the basis of real cases of road accidents, for cooperation on the cross-border exchange of information of emergency calls, as well as cross-border exchange of information between "eCall" and "ERA-GLONASS".

ITS testing in Finnmark

The counties in Northern Norway have developed a joint strategy for commercial transport in the region, "From coast to market". The main goal is to improve regularity for fish transports from the fish landing centres along the coast to the border crossings. The ITS-testing pilot project aims to improve winter regularity for fish transports from Båtsfjord, the fishing capital of Finnmark, and all the way to the border. The project will test the transfer of real-time data about weather, snow clearing and other road conditions, and is based on the use of mobile telephones to send positions and real-time data from the snow plough. Test users (transporters) receive access to updated information through a website that provides real-time data and times for when the snow plough will be clearing the mountain route. A potential next step will be to make the pilot publicly accessible to all road users on the route from the winter of 2019-2020.

Barents Region Transport and Logistics

The Kolarctic CBC project «Barents Region Transport and Logistics 2019-2022» includes a section on ICT. The objectives are firstly to get a better understanding of current/planned public and private ICT projects relevant to the Barents region, secondly to implement ICT-based tools supporting the cross-border co-operation.

Positioning project

This project involves partners such as Finnish Geospatial Institute, Kartverket Norway, Asfinag Austria, private companies and other stakeholders.

It is planned to deal with how accurate positioning in different kind of conditions can be utilized effectively for road winter maintenance, renovation information, re-routing, ad hock situations on the road etc. Furthermore, it is planned to address what possibilities space industry linked with CAD can offer for end-users and transport and how the accurate GPS positioning can be guaranteed in Arctic areas.

7 Related Plans, Projects and Initiatives

7.1 Norway

The National Transport Plan for 2018-2029 and the proposal to the revised transport plan for 2022-2033 contain the following planned investments in corridors that have priority in the Joint Barents Transport Plan.

Road transport

Several major road construction projects on the E6 (E6 National Route through Northern Norway, Mosjøen-Kirkenes) are or will be completed in the period 2018-2023; the Helgeland package, the Hålogaland Bridge, Nord-Troms and Alta vest. These projects will make travel time shorter as well as open long road sections to modular vehicle combinations. In addition, the National Transport Plan proposes funding for minor projects so that more national roads can be opened to modular vehicle combinations.

On the border-crossing routes, the tunnel projects on the Road 77/95 Tjernfjellet (Nordland) and the E45 Kløfta (Finnmark) may have great significance for border-crossing freight transport and allow access for modular vehicle combinations. The Road 77/95 Tjernfjellet will be completed in 2019, whereas the E45 Kløfta is planned for the period 2024-29.

The National Transport Plan for 2022-2033 is in progress and is scheduled for parliamentary debate in the spring of 2021. In the development of the road network that is linked to the corridors in the JBTP, emphasis is placed on continuing the construction of the E6 through Northern Norway as well as on improving the National Road 80 between Fauske and Bodø.

The plan also includes a package of measures ("impact package") to improve regularity on the most exposed mountain passes; the E10 Bjørnfjell, the E6 Saltfjellet and the E6 Sennalandet

Rail transport

Nordlandsbanen - the Nordland Line:

In order to strengthen freight transport by rail, there are plans to build a number of passing loops and minor terminal projects by 2022. The line will be upgraded through the ERTMS signalling project.

According to the renewal plan, Nordlandsbanen from Bodø to Mosjøen, will be completed in 2022. The southern part of Nordlandsbanen from Mosjøen to Trondheim will be completed in 2027.

Ofofbanen/Malmbanan - the Ofoten Line / the Iron Ore Line

Ofofbanen will be upgraded through the ERTMS signalling project in 2027.

Sweden and Norway have a joint development project where test transports with 32.5-tonnes axle load will be conducted during 2019. The objectives are to investigate the effects of iron ore transports with increased axle load on the infrastructure and to identify necessary measures for a permanent increase. It is essential to have a mutual agreement on the increase and on the financing of the measures for the next revision of national transport plans in both countries for 2022-2033.

There is ongoing planning for a sectionally development of double track from Narvik (Norway) to Kiruna (Sweden). This is undertaken through a cooperation between the Norwegian Railway Directorate and the Swedish Transport Administration.

Nord-Norge banen - The Northern line

In connection with revision of the National Transport Plan for 2022-2033, a study and report has been made on the potential construction of a new railway line from Fauske to Narvik and onwards to Tromsø, the Northern Line. The line will connect to the Ofoten Line in Narvik. The study is to re-calculate demand for passengers and freight, as well as investment costs and the social economics.

Sea transport

In the period 2018-2023 there are plans to improve the port structure at Longyearbyen, Svalbard. Developing the port will lead to increased capacity and improved facilities for small and medium-sized ships (passenger ships/research ships), and thus support existing businesses and industries as well as future developments. The project has an estimated cost of about €30 million.

For the period 2024-29 there are plans to deepen the seaward approach to the port of Mo i Rana, as well as the area in front of the trunk network terminal of Toraneskaia. The port will then be able to serve larger vessels and develop an efficient terminal with access to large business areas.

The transport plan also includes improving important fishing ports and the seaward approaches to these ports.

In connection with the National Transport Plan for 2022-2033, studies are being made of several coastal corridors with a view to reducing travel time as well as removing bottlenecks for large vessels.

Air transport

Based on traffic forecasts for future air traffic in Northern Norway, Avinor estimates that investments in the order of €1-2 billion should be made in new airports in Northern Norway within a period of 40 years. The projects below are important investments that are being explored in connection with the revision of the National Transport Plan for 2022-2033.

There are plans for the construction of a new airport at Mo i Rana within the period 2024-2029. A new and larger airport will be of great significance for business and industry at Helgeland. The project will be financed partly by the government and partly by private investors, and has an estimated cost of about €0,21 billion. The project is not fully financed.

It has been decided to relocate the current Bodø Airport. Construction of the new airport is in the planning phase, and the need for investments is currently estimated to be about €0.5 billion. Completion is expected to take place in 2025. The project is not fully financed.

Work is currently being done to study potential solutions for the future airport structure in Lofoten/Vesterålen as well as an airport solution for Hammerfest. These studies will form part of the decision basis for the National Transport Plan for 2022-2033.

7.2 Sweden

The Swedish Government has adopted a national plan for infrastructure for the period 2018-2029. It is a total investment of €70 billion in Sweden as a whole and the largest railway investment in modern times. The plan covers major investments in both new construction and restoration and modernization of existing infrastructure. The decision also covers

significant investments in maritime transport infrastructure and roads. This is made possible due to the Government investing €10 billion more than in the previous plan period.

The Swedish government has developed a National Freight Strategy with the aim to create prerequisites for efficient, high capacity and sustainable freight transport. Against this background, the government has commissioned a number of authorities with tasks with the aim of achieving the transport policy goals, strengthen competitiveness of trade and enterprise and promoting a transfer of freight transport by road to rail and sea. The assignments will provide analyses and basis for decisions on an ongoing basis in the coming years.

Rail transport

Iron Ore Line and Main Line through upper Norrland

The capacity of the railway system will be increased in the latter half of the period with investments for 750 meter long trains on the Iron Ore Line and the Main Line through upper Norrland as well as the first half of the North Bothnia Line between Umeå and Skellefteå. On the Iron Ore Line the new signalling system, ERTMS (European Rail Traffic Management System), will be built 2020-2023. There will also be large rehabilitation of the infrastructure on the Iron Ore Line and on the Main Line through upper Norrland.

Sea transport

Port of Luleå, enhanced capacity in the fairway 2024-2029. Will allow for up to 160 000 dwt ships and greatly increase the capacity in the harbour. This will create a better transport economy, reduce emissions and increase the redundancy mainly for the Iron ore shipments.

Road transport

The main investments during the period 2018-2029 on the road system is median barrier and 2+1 lanes on several sections of the E4 between Umeå-Skellefteå and Kalix-Haparanda and E10 Töre-Kiruna that will increase capacity and traffic safety and reduce travel times. On the road E10 between Gällivare and Kiruna an extra lane for passing slow trucks and a new road section passing steep hills will be built to improve the availability. In 2018, Sweden implemented a road network for 74 tonnes vehicles. This network will be enhanced during the coming years as weak bridges and road sections are being strengthened or replaced.

7.3 Finland

Road transport

A first national plan will be prepared 2019 and will be completed 2020. Although in Finland there is a new decree which determines a new highest national classification of the road standards. Now the most important highways of the main highways network has been determined as arterial roads.

In Northern Finland the following roads will be in the arterial road network from January 2019:

- highway 21=E8 between Tornio and Kilpisjärvi (border),
- highway 29=E8 between Tornio and Keminmaa,
- highway 4=E75 between Helsinki-Inari,
- highways 8=E8 between Turku and Oulu (along the coast)

On the arterial routes, high-level year-round maintenance is prioritized.

Rail transport

Electrification of the railway section Tornio-Laurila is mentioned in the program of the current Finnish government. At the moment the project is being investigated. The decision to begin designing and construction is still missing.

The Arctic Railway

A study of the Arctic Railway has been undertaken by the Finnish transport authorities, and with the conclusion that the demand for freight and passenger transport for the time being is not economic viable. There are also capacity challenges in the rail network serving the Arctic Railway as well as consequences for the Sami people, their revenue base (reindeer) and culture.

Air transport

Rovaniemi Airport

Rovaniemi is one of five airports in Lapland. In response to the rapid growth in passenger numbers, the airport in Rovaniemi is undergoing significant expansions. The passenger terminal is to be expanded by over 75 percent and a new and faster passenger boarding bridge will be installed. Modern passenger facilities will be added to the baggage reclaim area and the hourly capacity of the airport will increase from the current three airplanes to five airplanes. The expansion project is to be completed by the Christmas season of 2019.

Major investments have been made also to Kittilä and Ivalo airports.

7.4 Russian Federation

The development of the transport system of the Russian part of the Barents region is carried out according to the strategic documents, which are specified in the list of sources of the Plan and in paragraph 3 in Appendix 2 “Key studies, works and projects of strategic importance”.

Port of Murmansk

Approved in 2018, the Integrated Plan for the modernization and expansion of main line infrastructure for the period up to 2024 provides the implementation of the Federal project “Sea ports of Russia”, where the projects of integrated development of the Murmansk transport hub are planned:

- construction of the “Lavna” coal terminal, which will increase the processing capacity of the port infrastructure by 18 million tonnes. Term of realization: 2018-2021.
- construction of a marine transshipment complex of liquefied natural gas in the Murmansk region with a capacity of 20.9 million tonnes per year for the shipment of cargoes from Arctic gas fields. Term of realization: 2019-2023.
- reconstruction of port infrastructure facilities of the second cargo area of the Murmansk sea port in order to change the technology of coal transshipment in the second cargo area of the port by expanding the areas of work and increasing the front of unloading cars. Implementation period: 2013-2019.
- reconstruction of the objects of the third cargo area of the Murmansk sea port in order to increase the volume of transshipment of iron ore concentrate, apatite and mineral fertilizers, as well as changes in the technology of storage and transshipment of goods in the third cargo area of the port. Predicted capacity growth: 2.3 million tonnes per year. Term of realization: 2013-2021.
- realization of investment projects of JSC “Murmansk commercial sea port” for the reconstruction of the existing infrastructure for coal transshipment of the first and second cargo areas of the Murmansk sea port.

According to the Federal project “Northern Sea Route” in order to improve the safety of navigation, it is supposed to carry out the construction of a base and a berth for the parking of rescue vessels in the port of Murmansk is supposed to be carried out

Roads

In the framework of the National project “Safe and High-Quality Roads”, by 2024, it is planned to reduce by half the number of places of concentration of road accidents (accident-hazardous sections) on the road network of the Russian Federation compared to 2017, as well as reducing the death rate as a result of road accidents by 3.5 times compared with 2017 - to a level not exceeding 4 people per 100 thousand people (by 2030 - the desire for a zero mortality rate).

Airports

The Federal project “Development of regional airports and routes” provides funding from the Federal budget to the following objects:

- Reconstruction of the runway of the airport complex “Talagi” in Arkhangelsk with artificial turf length of 2 500 metres in 2020-2024.
- Reconstruction of the airport complex “Murmansk” in Murmansk in 2019-2023: reconstruction of a network of taxiways, apron, aircraft Parking lots, rescue station, construction of perimeter fencing and patrol road.
- Reconstruction of the runway with artificial turf, taxiways, apron of the airport complex in Amderma, Nenets Autonomous district in 2019-2021.
- The reconstruction of the airport complex in Naryan-Mar in 2020-2024.
- Construction of capital artificial constructions instead of the existing wooden bridges on a network of regional or intermunicipal public highways of the Republic of Karelia (eight objects of 200 metres).
- Reconstruction of buildings and structures of the railway station complex, reconstruction of the railway infrastructure in Petrozavodsk, its capacity of 420 passengers/day.
- Construction of passenger infrastructure at the airport “Petrozavodsk”, there are at least 300 passengers per hour.
- Reconstruction of the quay wall in the village Novosteklyannoe Shal'skiy area, Pudozhsky municipal district.
- Construction and reconstruction of roads and artificial structures on the existing network of regional intermunicipal and local public roads of the Republic of Karelia (7.8 km/26.8 m).
- The construction of the road Medvezhyegorsk – Tolvuya- Velikaya Guba, 106 km- Bolnichniy, 6.5 km.

The State Programme of the Russian Federation “Development of the transport system” provides for the reconstruction of the airport complex “Solovki” in Arkhangelsk region runway airport “Solovki” 1 500 metres long with artificial turf and the construction of a new service passenger building in 2018-2020.

Federal target program “Development of the Republic of Karelia”

In accordance with the Federal target program “Development of the Republic of Karelia for the period until 2020”, the development of the transport complex and road construction of the Republic of Karelia in 2016-2020 is carried out:

- Complex development of transport infrastructure of the city Kem (Commercial marine port “Kem”).
- Reconstruction of the bus station in Petrozavodsk and the support network of bus stations of the Republic of Karelia.
- Reconstruction of the network of landing sites, ensuring the functioning of air transport.
- The State program “Development of the transport system”

The State program “Development of the transport system”

The implementation of construction and reconstruction projects within the existing network of public roads of Federal importance in the Barents region is provided at the expense of the Federal budget within the framework of the enlarged investment projects of the State programme of the Russian Federation “Development of the transport system.

In 2019-2024, as part of the Complex plan, the implementation of the following newly launched facilities is envisaged in the Barents region:

- in the Murmansk region, on the road R-21/E105 Saint-Petersburg–Petrozavodsk–Murmansk–Pechenga–the Norwegian border:
- Reconstruction of the entrance to Murmansk,
- Reconstruction of the bridge across the river Tuloma – on the territory of the Arkhangelsk region “Construction and reconstruction of the road M8 “Kholmogory” from Moscow through Yaroslavl, Vologda to Arkhangelsk.
- entrance to Severodvinsk, Arkhangelsk region.

7.5 Cross-border cooperation projects

TEN-T Regulation (CEF 2)

The Connecting Europe Facility (CEF) is a key EU funding instrument developed specifically to direct investment into European transport, energy and digital infrastructures to address identified missing links and bottlenecks.

At a joint meeting between the Committees on Industry, Research and Energy and Transport and Tourism, the negotiated agreement on the next CEF Regulation, CEF 2, was adopted. The agreement means that the committees responsible for the issues also support the proposed Core-corridor extension where two (Scandinavian-Mediterranean and North Sea-Baltic) of the EU's nine Core Network Corridors are extended to include the Bothnian Corridor in Sweden and Finland.

Inclusion in the EU's core network corridors marks the importance of the Bothnian Corridor for the entire EU development. The corridors must be completed by 2030, which is well in line with Northern Sweden's priorities for completing, among other things, the North Bothnia Line.

In addition to opening up for northern Sweden to actively participate in the EU's work to convert into a sustainable common transport system, this means that Sweden and Finland still have the opportunity to seek co-financing for the measures planned seek co-financing for the measures planned.

The Bothnian Corridor

The Bothnian corridor is a collaboration between all regions in the north of Sweden together with Örebro and Dalarna counties. The corridors strength comes from its support from local and regional stakeholders and its function as a cross border connection linking south to north, west to east.

Since 2014 the Bothnian Corridor at both sides of the Bothnian Gulf is included in the TEN-T Core Network, and in the CEF Annex I.3. Other Sections on the Core Network, because of its importance for the industry in northern Sweden and Finland and for the rest of Europe.

There are continuous developments of the Bothnian Corridor, for all modes of transports, and there have been a number of TEN-T and CEF funded studies and investments, e.g. for railway planning and investments in ERTMS at several of the lines. In addition, there have been numerous planning,



Figure 7.5:1 The Bothnian Corridor is an extension of the TEN-T Core corridors Scan-Med and North Sea-Baltic.

development and investments projects with co-funding from European Regional Development Fund and Interreg programmes. Some of these projects have included collaboration with Norway and Finland and other EU member states.

Midway alignment of the Bothnian Corridor

Midway Alignment of the Bothnian Corridor is an EU-project designed to expand the connections between strong, fast growing, internationally important regions that are in need of a ferry (e.g. Ostrobothnia and Västerbotten county). In other words, the Midway Alignment project will result in a secure, environmentally and economically sustainable transport system for goods and passengers traveling through the Bothnian Corridor.

Midway Alignment aims to build a modern ship that meets the needs of both passengers and transport companies. New, innovative materials and technologies allow for a light, strong, energy efficient vessel that can run on alternative, environmentally friendly fuel.

Kolarctic

The Kolarctic is the finance program for cooperation between Norway, Sweden, Finland and Russia, co-financed by the European Union. There are several project going on, for example:

The project “Arctic Railway Infrastructure in Kolarctic (ARINKA)”, which aims to develop a cross-border railway research and development collaboration between parties from different countries in the Kolarctic region. The project also aims to exchange railway technical know-how and best-practice solutions with the goal of making the Kolarctic railway more reliable through robust rail infrastructure solutions, more cost-effective maintenance and repair operations, and railway infrastructure monitoring through advanced sensor technology solutions.

The project “Barents On Time” (BoT) has an objective to provide cross-border travellers with up-to-date tools and services: website with timetable and route search, mobile ticket application and information screens on bus stops. The project will facilitate bus priority at cross-border checkpoints, produce emergency plan to increase safety and efficient timetable.

The project “Barents Region Transport and Logistics” (BRTL) has an objective to improve the accessibility to the regions, development of sustainable and climate-proof transport and communication networks and systems.

E12 Atlantica Transport

The project is based on cross-border cooperation between partners in Finland, Sweden and Norway along the E12.

The project produces strategies and guidelines for cross-border transport planning and sustainable development of the route and conducts pilot activities in cooperation with companies to highlight deficiencies and opportunities in the transport system.

The project aims to:

- reduce border barriers and continue the development of the E12 that runs from Finland through Sweden and further on to Norway and the Atlantic coast.
- create favourable conditions for strengthening the corridor’s attractiveness and development possibilities. A more developed cooperation with trade and industry is formalized, which creates better understanding of the trade and industry’s transport demands.
- strengthen cooperation between Kvarken Council, MidtSkandia and Blå Vägen, as well as their partners.

NDPTL

Northern Dimension Partnership on Transport and Logistics (NDPTL). The participants of the Partnership are Belarus, Denmark, Germany, Latvia, Lithuania, Norway, Poland, Russia, Finland, Sweden, Estonia, the European Commission. NDPTL activities are aimed at improving transportation and logistics in Northern Europe, in order to facilitate sustainable economic growth in the region. The partnership has defined the NDPTL Regional transport network based on Russian and Belorussian proposals, as well as the EU Trans-European transport network (TEN-T).

Karelia cross-border cooperation programme

In addition, there is a Karelia cross-border cooperation programme, jointly funded by the Russian Federation and Norway.

8 Deficiencies in the Transport System

The main deficiencies in the transport system have been analysed compared to the proposed ambition to develop an efficient and sustainable transport system in the Barents Region with good internal connectivity between the Barents countries and with good external links to world markets. The transport system should facilitate the Barents regional development and create new opportunities for the key industries. Apart from national objectives, the development of the transport system should be in line with the international treaties to which the BEATA countries are parties, the United Nations global sustainable development goals (Agenda 2030) including traffic safety.

The Expert group has identified four key areas:

1. Efficient transport within each mode of transport and remove bottlenecks in the cross corridors to increase the regional competitiveness and reducing greenhouse emissions and increase traffic safety.
2. Create an efficient transport system that enables transfer from road transport to rail and sea and provides conditions for collective travel where possible to increase regional competitiveness and to minimize climate-impacting emissions.
3. Identify what is required for an efficient and sustainable transport system in terms of infrastructure i.e. alternative fuels and electrification (green mobility).
4. Connected mobility, satellite navigation and ITS.



Figure 8.1:1 The rail bridge at Haparanda-Tornio.

8.1 Road transports

Different standards for road transports

Different standards for road transports in different countries affects the efficiency of cross-border transports.

The following maximum threshold values apply to vehicles in different countries:

Total weight

Norway	50 tonnes (in some routes 60 tonnes)
Sweden	64 tonnes (in designated road network 74 tonnes & 90 tonnes dispensation in some routes)
Finland	76 tonnes (in some routes up to 100 tonnes with special permits)
Russia	44 tonnes for tractor-trailer with more than six axles, with special permissions - over 44 tonnes, with the exception of divisible goods

Total length

Norway	19.50 m and 25.25 m
Sweden	25.25 m (in one route 30 m is admitted for timber transports)
Finland	34.50 m (in some routes more)
Russia	12.00 m for single vehicle (20.00 m for tractor-trailer)

Maximum possible vehicle height on existing roads

Norway	4.5 m (on some older roads or road sections reduced to 4.0 or 4.2 m)
Sweden	4.5 m (on some roads or road sections reduced)
Finland	4.4 m
Russia	4.0 m

Norway has increased the maximum total vehicle weight from 50 to 60 tonnes on several of the roads in the routes. It is essential to open larger parts of the national road network to modular vehicle combinations. All border crossing corridors in northern Norway are open for modular vehicles except the E45 Kivilompolo - Alta.

Sweden has increased the maximum total vehicle weight from 64 to 74 tonnes on a prioritized road network with higher bearing capacity. This network will be expanded the years to come. Also 90 tonnes with dispensation on selected sections of roads are used by iron ore and forest companies.

Finland increased the maximum total vehicle weight from 60 to 76 tonnes from October 2013. In addition, even heavier vehicles up to 100 tonnes will be tested on several routes.

Sweden and Finland are cooperating to harmonize rules when crossing the borders with 74/76 tonne vehicles. Also trying to harmonize rules and standards for future longer and heavier vehicles. This will make it easier for import and export over the borders.

In the Russian Federation, the value of the valid weight for six-axle and more tractor-trailers in 2015 was increased from 40 tonnes to 44 tonnes.

In addition to the above, there are also differences between the countries regarding standards/regulations for winter tyres on heavy vehicles.

Definition of bottlenecks on roads

The experts suggest the following basic definition of bottlenecks:

Road width

- Sections with an asphalted road width of less than six metres.
- Sections with an asphalted road width of less than seven meters in combination with other conditions that impair the traffic flow quality.

Horizontal geometry

- Sections with a horizontal radius of less than 50 metres.
- Sections with a horizontal radius of less than 150 metres in combination with other conditions that impair the traffic flow quality.

Vertical geometry

- Sections with a gradient of more than six percent over a length of more than 500 metres.
- Sections the height restriction causes problems for the cargo traffic in the border-crossing routes.

Speed limit

- 60 km/h or less for a distance of more than four km (this is seen in areas with so-called "ribbon development" where houses are built in a continuous row along a main road).

Problems regarding regularity

High regularity on the road network is particularly important for industrial freight haulage. It is expected that freight should be delivered in accordance with the calculated driving time and the agreements entered into.

The Barents Region faces the greatest challenges in winter due to snow and ice conditions. The problems can be classified as follows:

- Problematic mountain passes with drifting snow; road closure or convoy traffic.
- Avalanche or falling ice; road closure due to avalanche or risk of avalanche.
- Slippery road surface; reduced speed, or traffic flow on the road stops due to problems with other vehicles.
- Irregularities (load limitations); the weakening of the bearing capacity of the roads caused by uneven thawing of frozen soil at the base of the road.

In recent years, greater problems of traffic regularity on the roads have been recorded due to the increased precipitation and flooding.

A general problem with the road network in the Barents Region is that the roads are far apart from each other and there are few alternative routes in the vicinity. Road closure consequently entails long detours.

In this regard, it is necessary to consider the possibility of including alternative routes as branches of the main routes into the Joint Barents Transport Plan.

Avalanche and falling ice is a challenge that is particularly associated with the Norwegian road network. Improvement of sections with avalanche problems is a high priority.

Slippery road surfaces lead to traffic flow problems. The experts have identified the following measures:

- The maintenance standard of winter roads must be improved.
- Even if the maintenance standard of winter roads is improved, it will be still necessary to install and remove tyre chains. New and better areas along the roads should be provided where these operations can be safely carried out.

Deficiencies in road safety

Improvement of bottlenecks will have a positive effect on road safety. Run-off-road collisions represent a significant proportion of the accidents on the lightly trafficked road network in the Barents Region.

Relevant measures to reduce the extent of injury caused by run-off-road collisions will be soft design of ditches and verges or erection of barriers.

On roads with higher traffic flows, other safety problems become more frequent, such as head-to-head collisions. On these roads there is a need for mid-barriers.

There are different rules concerning the use of winter tyres in the countries. Also problems with foreign trucks using bad winter tyres causes regularity problems, especially when crossing mountain areas in harsh winter conditions. The bad tyres also increases the traffic safety risk. Norway and Sweden will implement stricter rules on winter tyres for heavier vehicles in winter 2019/2020.

Well-rested drivers are important for road safety. Provisions for driving and rest periods stipulate that drivers of heavy goods vehicles should regularly take short or longer breaks. There is a need for continuous control over observance of the driving and rest regulations. Cooperation can be considered to exercise control along border roads.

Wildlife collisions are a challenge shared by all countries. Exchange of best practices on how to avoid such accidents would be useful.

A common program is in place aimed at training and exchanging expertise on rescue operations on roads (accidents in tunnels, avalanches, etc.) within the "Barents Rescue" exercise that is undertaken every second year. The main focus of the international exercise is sea transport, but all modes are included.

8.2 Rail transports

Due to an increase in the ore traffic over the past decades there is capacity challenges for the Iron Ore Line and the Ofoten line. The Iron Ore Line, is old and in needs quite a few repairs such as signalling system, rail and sleepers and catenary system. This also affects the punctuality situation for the train services. There is ongoing planning for increased bearing capacity and a sectional development of double track from Narvik (Norway) to Kiruna (Sweden). This is undertaken through a cooperation between the Norwegian Railway Directorate and the Swedish Transport Administration.

Haparanda/Tornio is the only direct railway connection between Sweden/Norway and Finland. However, there is a difference in gauge between railways in Sweden/Norway and railways in Finland/Russia (1520/1435), a number of projects provide for various devices, but so far the issue remains unresolved.

The border crossing corridor also lack electrification from Haparanda/Tornio to Laurila. This causes a bottleneck both for passenger and freight transport, which has caused the transports on railway over the border to decline to almost nothing for the past 15 years. Haparanda-Tornio is a major bottleneck in the proposed amendments of North-Sea-Baltic and Scandinavian-Mediterranean TEN-T Core corridors.

In Sweden, the northern part of the Bothnia railway route plays an important role in ensuring reliable communications in the direction of “North-South”, mainly for the industry, but also for passenger traffic. The existing link is susceptible to traffic disturbances, and studies performed have outlined measures to increase reliability and traffic capacity. In the event of a serious failure on the main line that goes along the northern part of Sweden, north of Vännäs, alternative by-pass options will be needed.

8.3 Sea transports

Sea Safety

Commercial activity level in the Barents sea is growing and moves to the areas with severe conditions. There is a risk of ice, icing in the sea and extremely cold weather in the winter months. The variation of maritime activity is to a great extent related to the petroleum industry, which moves progressively farther north from the coast of mainland. There are also seasonal variations for fishing fleets and cruise vessels that get farther to ice areas. Combined with long distances this require better safety measures and an improved system for search and rescue resources.

Green shipping

Shipping is a key industry in the high North and emissions from ship traffic are substantial in the climate and environmental accounts, also in the Barents region. Green shipping from Norway's perspective will contribute to substantial emission reductions. Internationally, there is an increasing interest to develop and use new environmental technology and green transport services in shipping including the ports. State- and regional authorities and the shipping and ports in the Barents region are recommended to follow up this development

8.4 Air transports

The area of the Barents region is a very large area and the distances between the cities are very long. The flight connections to each country's hub airport are relatively good, but there are no cross-connections.

The lack of interregional flight connections within the Barents region places significant limitations particularly on the development of tourism within the region.

9 Recommendations

9.1 General

The Joint Barents Transport Plan identifies important cross-border road, rail, air and sea routes and other important functions in the transport system describing them and suggesting development strategies. New approaches to planning, financing, cooperation and creation of infrastructure for the development of a significant industrial potential of the region are required. All export-oriented industries require need an efficient transport system and the neighbouring countries can help to create a strong and sustainable transport network both within the region and with access to international markets. Cross-border thinking, will bring results, open up new opportunities and ideas and show new solutions for the next generation of stakeholders. To succeed in it, a collaboration of transport control authorities of various countries in terms of sharing of knowledge and development of joint strategies of the Barents cooperation is required.

In chapter 7 and 8 of the main report and in the descriptions of each route in Appendix 1, the experts have pointed out key challenges, planned development and further potential. Planned improvements should be implemented without delay and, where possible, with the establishment of bilateral contacts for further discussions regarding joint planning and future strategies.

Implementation of the current plans of the countries will improve the efficiency of the transport system, while the countries have broad opportunities for further cooperation in the region.

The above noted work includes further research and planning on some of the routes. Each state should become aware of its involvement in the Joint Barents Transport Plan.

This chapter presents the advisory recommendations proposed by the experts. The recommendations are

based on the proposed objective for the transport system of the Barents Region but also the transport needs of the industry, tourism and population in the region and to address the identified deficiencies from chapter 8.

The measures the expert group recommends can be summarised in four main areas:

1. Increase the knowledge about the transport flows and transport needs in the Barents region.
2. Create conditions for the transport system users to reduce emissions of greenhouse gases.
3. Increase road safety and safety at sea.
4. Create a more efficient transport system and reduce border crossing obstacles.

The measures are divided into measures for short-term, mid-term and long-term implementation. The Joint Barents Transport Plan is seen as the start of the process, and it would be reasonable to prepare more detailed and action oriented recommendations later on.

Each project has its own characteristics, and planning of works in border areas should be carried out with extra awareness about plans and standards on the other side of the border. A possibility of joint planning should always be considered. A first step to a possible joint planning for development of a particular route could be a bilateral agreement on a joint development strategy.

Besides, the proposed feasibility studies should be done in the immediate future.

The long-term measures proposed by the experts mainly deal with rail transports. Nevertheless, the further work on harmonization of all transport modes in all four countries should continue on a long term basis.

9.2 All transport modes

In earlier JBTP the cargo flows were described within the Barents corridors. The data, maps and figures are getting out of date. There is therefore a need to update the knowledge, especially over the borders. This forms an important basis for planning possible measures for cross-border flows.

Short-term Measure:

- The experts propose that a survey will be carried out to get reliable and updated knowledge concerning the cargo flows connected to Barents Region. *Responsible: Barents Regional Working Group on Transports and Logistics – (BRWGTL) in cooperation with BEATA*



9.3 Road transport

As described in chapter 8, both Finland and Sweden uses 76 and 74 tons vehicles in the JBTP-cross border corridors.

Short-term Measure:

- The experts propose that Norway investigates the industries needs and the possibility to use 74/76 ton vehicles in JBTP cross-border corridors. *Responsible: Coordinator Statens Vegvesen, Norway*

As described in chapter 6, there are problems with regularity in wintertime, when crossing the borders in mountain areas between Sweden/Norway and Finland/Norway. This deficiency is expensive for the industries.

Short-term Measure:

- The expert group proposes a survey/investigation to highlight the cost of the road closures and suggests measures to get better regularity. *Responsible: Coordinator Statens Vegvesen, Norway*

As mentioned in chapter 8, both Norway and Sweden will implement stricter rules on winter tyres for heavier vehicles in winter 2019/2020. In Sweden, all axles must be equipped with winter tyre standard M+S. Norway will implement even higher tyre standard on all axles, called “Three Peak Mountain Snowflake - 3PMSF”.

Short-term Measure:

- The expert group proposes that all countries should strive for implementation of M+S or 3PMSF standard on winter tyres and on all axles. *Responsible: Each Government*

As described in chapter 8 there is a need for new and better areas along the roads to handle equipment, such as snow chains in a convenient and safe way, especially in mountain areas between Norway and Sweden.

Short-term Measure:

- The expert group proposes that an investigation between Sweden and Norway is carried out to highlight the need of these areas. *Responsible: Swedish Transport Administration*

The availability of rest areas for lorry drivers (for both shorter breaks and overnight breaks) increases traffic safety and promotes efficiency of the transport system.

Short-term Measure:

- The experts propose that each country investigate the need of rest areas on the prioritized corridors described in Appendix 1, both to increase safety and to improve the efficiency of the transport system. *Responsible: The road administration in each country.*

The Barents region is striving towards an efficient and sustainable transport system.

Short-term Measure:

- The experts propose that a survey will be carried out of how Green Transports can be developed in a Barents perspective. *Responsible: BEATA*

Digitalization and ITS solutions are important tools to increase traffic safety, improve road maintenance and in general get better traffic information to road users. Reliable information on driving conditions on different road sections in the corridors, is important for international transport and makes it possible for companies and drivers to plan their transports in a safe way

Short-term Measure:

- The expert group proposes that a survey will be carried with the possibility of using ITS solutions, such as telecommunication coverage and access to electricity on the cross-border corridors.

Responsible: Each Government

Mid-term Measure:

- The experts propose that a common system should be established for real-time information on driving conditions on the international roads in the Barents Region.
- Consideration should also be given to the harmonization of standards related to the use of GLONASS/GPS technologies in intelligent transportation systems, and systems of transport monitoring on the roads of the Barents Region.
- The experts propose to consider the possibility of concluding bilateral agreements on the receiving of emergency calls, their processing and ensuring response to them. This includes harmonization of requirements for emergency response systems in case of accidents using GLONASS /GPS technologies, so as to actualize road safety rights of road users and timely aid in road traffic accidents and other emergency situations on roads.
- *Responsible: Each Government/BEATA*

As described in chapter 8, there are different standards on maximum total vehicle weight and length, road width and road vertical geometry. This causes problems on a daily basis for international cargo transports in the Barents Region. Since the standards are national, the experts suggest considering these issues at the national level in each country.

Mid-term Measure:

- The experts propose that the countries should jointly carry out an assessment of the possibilities to increase harmonization in this area. *Responsible: Each Government*

9.4 Rail transport

Rail connection between Finland and Sweden in Haparanda/Tornio

There is a difference in gauge between railways in Sweden/Norway and railways in Finland/Russia and the border crossing corridor lack electrification from Haparanda/Tornio to Laurila. This causes a bottleneck both for passenger and freight transport. Several studies have been conducted during the past 20 years and test with some technical equipment such as automatic gauge change have been made. In 2015 there was a strategic choice of measure study made in cooperation between the Swedish Transport Administration and the Finish Transport Agency that proposed some measures to partially solve the problem. However, the issues regarding responsibility of the proposed measures and the lack of agreement of the desired function and role of the cross border corridor have left the suggested measures without financial funding from either country.

Short-term Measures:

- The experts propose that further efforts must be made to find solutions for efficient transshipment of both freight and passenger to improve connectivity between Sweden and Finland. This should be done two steps:
 - » The Swedish and the Finnish Government should come to a bilateral understanding about what function the cross border corridor should have, and an agreement to solve the problem together.
 - » The Swedish and the Finnish Governments should give the Swedish Transport administration and Väylävirasto Finland, an assignment to come up with proposals for measures and financing to solve the border obstacle due to different gauge width.
- *Responsible: Swedish and Finnish Governments.*

The Iron Ore line/the Ofoten line

The railway is included in the TEN-T core network.

There are significant challenges with regard to capacity on the section of railway between Kiruna and Narvik. In addition to the possibility to run more trains on the line, the current situation also affects train punctuality and the possibility of carrying out maintenance work on the line.

Swedish and Norwegian authorities have jointly carried out an assessment to evaluate necessary measures in the short, medium and long term. The experts support the recommendations made in the assessment. However, these measures will only allow increasing the traffic capacity to 40 trains per day

Short-term Measures:

- The experts propose that the following measures must be implemented as rapidly as possible:
 - » Technical measures with regard to maintenance and renewal of the track bed.
 - » Increasing the capacity by extending the existing crossing sections and constructing new crossing sections.
 - » Increase the axle load to 32.5 ton (depending on the result of the ongoing project).
- *Responsible: Swedish Transport Administration and Norwegian Railway Directorate/BaneNOR*

In the long term capacity may still be insufficient. Therefore, the transport authorities in Norway and Sweden are considering construction of a second track along the entire length of that railway line as one of the possible measures. Both the Swedish Transport Administration and the Norwegian Railway Directorate has started the investigations of the prioritized double track sections where Sweden prioritize to start from Kiruna and Norway prioritize the section from Katterat (Norway) to Vassijaure (Sweden). In Sweden the Railroad plans of a double track on the sections Kiruna-Bergfors and Kopparåsen-Vassijaure will be completed in 2019 and on the Ofoten line have been completed.

So far there is no final agreement between the Swedish and Norwegian governments about the investments.

The experts are aware that the Swedish government stated the following in their decision of the National plan for the transport system 2018-2029: "The Swedish and Norwegian government have agreed upon that the development of the border crossing transport infrastructure shall be done in dialogue

between the ministries in both countries and between the authorities responsible for the transport system in respective country. The government's intention is to initiate a dialogue with the Norwegian government of the development of the border crossing corridor that the Swedish transport administration describes Stockholm-Oslo, Gothenburg-Oslo and Iron Ore Line/Ofoten Line."

Long-term Measure:

- The experts can only concur of this assessment and suggests that this dialogue, should aim for an agreement upon the investment and financing of double track sections on the Iron Ore Line and Ofoten Line, in the national transport plans for 2022-2033 in both Sweden and Norway.

Responsible: Swedish and Norwegian governments

Bothnia railway route: improving reliability and traffic capacity of the northern sector

In Sweden, the northern part of the Bothnia railway route plays an important role in ensuring reliable communications in the direction of "North-South", mainly for the industry, but also for passenger traffic. The existing link is susceptible to traffic disturbances, and studies performed have outlined measures to increase reliability and traffic capacity. In the event of a serious failure on the main line that goes along the northern part of Sweden, north of Vännäs, alternative by-pass options will be needed. Presently, marine transport and internal line are used as alternative routes. Several studies have been conducted with respect to construction of a new railway, 270 km long along the coast between Umeå and Luleå (the North Bothnia line). For the part between Umeå and Skellefteå there is a decision in the Swedish long term plan that the North Bothnia line will be built but will not be done until about 2033. As for the northern part, Skellefteå-Luleå there is still lack of funding. That railway will increase traffic capacity, improve reliability and enhance quality of passenger services, complementing the existing single-track railway that runs along the inland areas.

Long-term Measure:

- The experts suggest that the need to improve reliability and increase capacity is to be taken into account when developing long-term plans for development of transport infrastructure in Sweden. *Responsible: Swedish Ministry of Infrastructure*

Arctic Railway, Rovaniemi - Sodankylä - Kirkenes

The main argument in favor of building a new railway is to provide access for the Finnish mining industry to the Barents Sea ice-free port as well as developing a Norwegian cargo hub in Kirkenes. Finland has recently assessed the possibility of construction of a new railway Rovaniemi - Sodankylä - Kirkenes for transportation of ores and minerals from Pajala/ Kolari - Sodankylä - Savukoski belt via the port of Kirkenes. Creating such a railway section would mean the construction of approximately 460 - 470 km new railway. There has been a Finnish-Norwegian task force to study prospects of the railway between Rovaniemi and Kirkenes. The final report does not present any further measures for promoting the railway project. Arctic railway is a part of the bigger concept including Rail Baltica and Helsinki-Tallinn tunnel.

The major part of the cargo transportation to be carried out by that railway will fall within the ores and minerals. Transportation of these goods has been envisaged by the potential construction of a new section of the Iron Ore line. Therefore, the possibility of implementing only one of these options will be considered. Whereas construction of the railway will have an impact on the port of Kirkenes development.

Short-term Measure:

- The experts suggest further research to identify the prospects of a new railway between Rovaniemi and Kirkenes through Sodankylä. *Responsible: Finnish and Norwegian governments*

9.5 Sea transport

Ports and services

As described in the route descriptions (Appendix 1), several ports in the Barents Region play an important role in international sea transportation today, or they have such potential in the future.

Mid-term Measure:

- The experts propose that development of key ports should be seen as a relevant measure to create new opportunities for industries in the Barents Region. The experts propose that particular attention should be paid to developing the ports of Murmansk, Kirkenes and Narvik and the ports in the Gulf of Bothnia. *Responsible: Each government*

There are a number of other measures that can have a positive effect on the efficiency of sea transportation in the Barents Region. These include measures, related to customs and visas.

Mid-term Measure:

- The experts propose that relevant bodies continue to develop more efficient administrative routines, visa procedures and customs clearance routines. *Responsible: Each government*

Safety at sea

Increased mining in the Barents Region and increased petroleum activity in the Barents Sea require better safety measures. Several measures are described in Appendix 1.

Mid-term Measure:

- The need to develop a functioning system of communication (broadband satellite communications) in polar waters
- The need for more hydro-graphical surveys and development of complete charts, improvement of infrastructure for navigation and improved forecasts related to weather, waves and ice conditions.
- The need for a joint traffic monitoring system. The establishment of a joint Barents VTMIS (Vessel Traffic Monitoring and Information System), including seamless sharing of traffic data from AIS, Satellite AIS and other relevant sources.
- Harmonization of national rules, regulations and procedures in the area, to achieve greater predictability and lessen the administrative burden on mariners.



- Extension of the newly established Barents Ship Reporting System (Barents SRS) to cover the entire Barents Sea Region
- The need for an improved system for search and rescue to ensure:
 - » Early warning
 - » Efficient detection equipment
 - » Efficient mobilization and availability of rescue resources
 - » Efficient coordination and execution of rescue operations
 - » Efficient personal rescue equipment
 - » Efficient use of non-governmental (non-SAR) ships being in the area of any emergency situation

To solve the problems encountered in those waters, the experts propose to introduce maritime safety system designed specifically for the Barents Region.
Responsible: Each government

9.6 Air transport

As described in chapter 5, international air transportation in the Barents Region is carried out in a very limited scope. Improving inter-regional air traffic in the Barents Region can considerably facilitate transportation of passengers between the main agglomerations in the Region. It can promote the development of trade, industry, tourism and cultural exchange in the entire Region. Responsibility for the offer of the air transport services rests with the market economy and airlines. However, public authorities should promote the establishment of new routes.

Mid-term Measure:

- The experts propose that a survey is carried out to examine the possibilities and the needs of establishing inter-regional flight connections in Barents. *Responsible: Each government*



JOINT BARENTS TRANSPORT PLAN

REVISED DRAFT MAIN REPORT 2019

