

5 Challenges

Long distance transports to supply the EU with raw materials mean challenges for transport and environmental policy

The industry in northern Europe is primarily organized around key raw materials for the EU's industrial system. The region's relatively remote geographical location in Europe is a challenge which demands an efficient, climate- and environmentally friendly transport system. Efficient transport infrastructure is critical for the competitiveness of natural resource-based industries in the refinement chain as a whole.

Northern Europe is also interesting for transnational freight transports between east and west. One example is the NEW-corridor⁷² between North America, northern Europe and China. With this route, the narrow and time-consuming transport systems in central Europe and North America's east coast could become less important.

Increased supply of energy from renewable sources and optimized energy use requires development of technologies and production processes. Tougher environmental and climate requirements for the transport system lead to increased demand for efficient rail transport.

The challenge of increasing transport capacity

The capacity deficiencies of the railway system threatens to significantly inhibit the realisation of the potential for increased freight and passenger transport on rail from and to the Barents region. The dramatically increased demand for natural resources and the huge potential for extended production in the Barents region will require improved transport capacity. Bottlenecks in the rail system require considerable measures to improve reliability and reduce lead times for the transportation of goods. This is particularly important for the continuous supply of raw material and step by step value added products to the EU's densely populated areas.

⁷² Container traffic between north America and Asia, via northern Europe has been carried out in an Interreg II-project The Northern East West Freight Corridor Crossing Haparanda/Tornio and UIC-project East-West Transports Northern Alternative

Cargo traffic by rail has increasingly become an integral part of industrial production processes. Transportation functions either as part of a processing chain between production units within a company or as link between companies. This applies particularly to base industries, whose processing chains often start with the natural resources available in northern Europe, followed by several value added stages with intermediate transports.

Intermodality is essential in many of the transportation-chains. Intermodal terminals are built to some extent for example, a new terminal for road-railway-sea transport is currently under construction in Umeå. However, more and upgraded, more efficient terminals would strengthen the transport system in general.

The railway gauge is 1.520 mm in Russia and Finland, but 1.435 mm in Sweden, Norway and most of Europe. This obstacle has to be overcome by new techniques that can also cope with the harsh climate.

The challenge of improving labour market interaction

Well functioning labour markets are an important basis for sustainable society as well as for sustainable industry.

However, most part of the labour markets in the Barents region are quite small and lack diversity. Therefore it is an important challenge to achieve increased interaction between the labour markets of the region.

One administrative action of importance is the agreement between Norway and Russia on inserting a visa-free zone. 40,000 Russians have permission to travel to an area in Norway, and 9,000 Norwegians into Russia.

Improving the standard of railway connections is important to facilitate commuting and thus creating larger and more differentiated labour markets as well as greater access to higher education. Reasonable daily commuting times help to counteract imbalances in the economic and the population structure. This will strengthen the conditions for dynamic growth and helps the industry to develop and maintain competitiveness.

Challenges for innovation, research and education

Innovation, research and higher education is of great importance for the region's competitiveness. Many of the industrial towns in northern Europe however have insufficient access to higher education, which hampers development of a good knowledge base within the existing industries.

Therefore it is a challenge to improve the conditions for daily commuting to higher education as well as improving access to research institutes.

Extended cooperation with and within high-level education, research and innovation could contribute to strengthening the knowledge base and competitiveness of the region.

Research will be increasingly important for sustainable growth and development. Good innovation climate in the Nordic countries is of great importance for innovation and Europe's long-term competitiveness.

Challenges for the tourism industry

Good and climate friendly communications are a prerequisite for the tourism industry in the Barents and Baltic Sea regions. The regional centres of tourism rely on a well-functioning system of inter-modal transportation.

Many tourists are currently too dependent on cars. Therefore, rail, air and road transport need to be developed in a way that takes into account both economic, environmental and climate sustainability. At the same time automotive transport needs to be developed with cars powered by bioenergy, electricity, and combinations thereof.

A developed aviation system, with both direct flights to and from the European nodes and destinations, and flights through national nodes would allow for development of tourism even in more remote parts of the Barents region. Tromsø, Kiruna, Arvidsjaur and especially Rovaniemi and Kittilä, are examples of airports which have developed direct charter flights. Swedish Pajala may be envisaged for chartering in tourists to Ylläs in a close nearby region in Finland. A future opening of an airline route Pajala - Kemi (Finland) - Stockholm is discussed. This would be beneficial for cross-border tourism and industrial exchange.

Challenges for maritime transport

Sea transports in the Barents region still provide a cost-efficient and environmentally sound alternative, especially for large freight volumes. The Atlantic harbours have a strategic position for access to the north American markets and an extensive net of feeder traffic connecting them with the big logistic nodes in Britain, Germany and the Netherlands.

There is a large potential for increasing traffic by letting a greater proportion of the transport from Russia take the Baltic or Atlantic routes; this would in turn provide sufficient volumes to increase frequency and improve timetables.

The western and northern sides of the Barents region have direct access to the Atlantic ocean. The Norwegian coast, as well as the Russian harbour of Murmansk, offer ice-free conditions all year round. The Russian authorities have given high priority to the harbour of Murmansk and the Northern Sea Route and a new oil terminal at the harbour. The rest of the Russian coast is frozen during the long winter period. Research and development in the field of ice-breaking has a high international standard in the area and much progress has been made in recent years. Equipment needed to exploit the large gas-fields in Barents sea will be a driving force for further development in this area.

The Baltic Sea offers a straight connection southwards to the rest of Europe and between Sweden and Finland ice-breaking assistance is needed.

Scheduled feeder-traffic to logistic hubs in Europe can be a useful alternative to land-based transport.

Containerisation provides sea-transport with a better intermodal functionality and shorter lead-time in harbours. This will, for instance, make sea-transport useful for new categories of goods.

Challenges to benefit of the potential for renewable energy

The region has unique opportunities to increase renewable energy production. The surplus energy can be exported to parts of Europe with poorer opportunities to meet sustainable energy and climate goals. The environmentally sustainable growth potential is great.

Planned wind power can provide about 60 TWh of new sustainable electricity production. The total potential of the Barents region is much higher than that. Economics and regulatory options / storage capacity are critical for how the potential can be exploited.

Bioenergy is already produced on a large scale and the prospects for further development are good.

Hydro power is already very important in Sweden and Norway and existing plants can be made more efficient.

The region has a partial surplus of electrical energy and good potential for expansion of for example wind power. There is a considerable lack of capacity in the grid system that has to be handled with priority to avoid wastage of the potential. Only the Swedish renewable energy potential requires around four 400 kV-lines.

The establishment of electricity-intensive industry in the region is interesting from this perspective. Location of electricity intensive industry in the northern Europe partly reduces the need for new investment in transmission lines for long transfers. This also results in less transmission losses between electricity production and end consumer. The environment also benefits from having industries developed near the climate safe electricity production.

Environmental challenges

It is important to reduce the carbon footprint and emissions of air pollutants from transports. When the bottlenecks in the rail system have been removed, a much larger share of the freight and passenger transport can be carried out on rail. The rising carbon dioxide emissions of the transport sector can be sharply reduced through more efficient rail transport and better opportunities to transfer between road and rail.

Electrification of the railway will, with the current expansion of wind power in the region, have a very positive impact on the climate (correspond to use of not renewable energy sources). Rail is generally the most energy efficient land transport mode. The benefits are particularly high in the Barents region where there is a surplus of sustainable electricity generation in the form of increasingly interacting hydro and wind power.

Environmental profiling

The region is well placed to maintain a high environmental profile, for example by the proximity of renewable electricity generation.

The supply of wood, together with the expertise in wood technology is an advantage to the Barents region. Construction using wood, which is preferable from both energy and climate perspectives. Houses built of wood have a lifetime of around 100 years, and therefore act as a carbon sink where carbon is kept out of circulation during this time.

Potential for industry development in a cold climate

There are some big advantages of the cold climate, for instance for different types of test facilities. Already today, extensive car testing takes place in northern Sweden.

A cold climate can also be a resource for industries where the cost of cooling is a large part of their total costs. One such example is server installations that can benefit from being located in cold climates.

Furthermore, in the north the electrical energy comes in large part from climate friendly and renewable electricity production.

The advantage of large unpopulated areas

An important reason why the Esrange base is located in the Kiruna area is that there is virtually no "light pollution" from nearby cities in this area. It is therefore possible to study the northern lights (Aurora Borealis). Research at Esrange has increased the understanding of the northern lights and why and how they arise. The space station area covers 20 square kilometres of land area in a very sparsely populated area.

Challenges concerning administrative obstacles

Export duties and other economic barriers

An important administrative challenge is to reduce economic barriers for border crossing flows of raw material and products. Well functioning export and import flows are of mutual importance to strengthen the important northern regions of Europe.

Custom rules

Cumbersome procedures and long waiting times at border crossings are unwanted barriers, which reduce the region's competitiveness and ability to attract new investment.

Restrictions regarding ship transport emissions

Higher environmental restrictions regarding emissions from ship transports in the Baltic Sea than elsewhere tend to make the Barents region more remote. It is therefore important to have the same requirements for the level of sulphur oxide in fuel used in seaborne transport in all European waters.

Also fees can make the transports less profitable and lead to sub-optimization and less synergies between Swedish and Finnish sea transports.

Demographic obstacles

The workforce of the Barents region is likely to be inadequate for processing the regions rich natural resources. Population projections show a decrease in the workforce, especially the number of young people and women are decreasing, while the number of elderly is increasing. The aging of the population implies that care for the elderly will become an increasingly larger share of the regional budgets. The workforce available for industry and transport will thus be even smaller than the projections indicate.

Northernmost Sweden and northernmost Finland have lost relatively high shares of population, whereas northern Norway has had a better population development. However, now even the population structure in northern Norway, is converging towards that of northern Sweden and Finland, see figure 5.1:1.

The population decline in northern Europe is a challenge for the economic and social sustainability. It is mostly women and men in early working ages who migrate from the Barents region.

Population projections of northern Norway (Nordland, Troms, Finnmark)

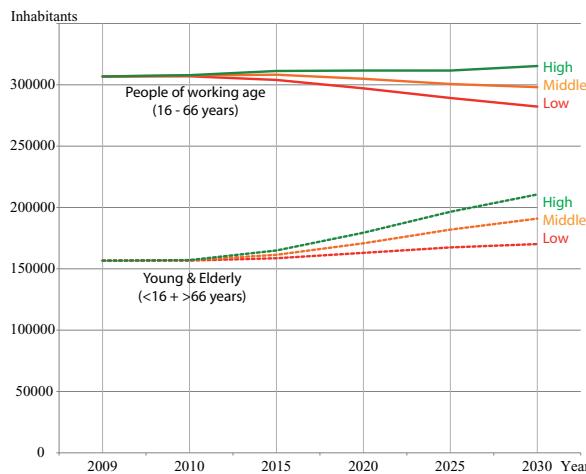


Figure 5.1:1 *Less people working and higher demands. A difficult equation to solve.*

Source: SSB Norway

This increases the challenge to achieve a long term supply of skills, business development and regional development.

Improved and balanced population growth requires good interaction between cities and that the region can offer its citizens a high quality of life in a broad sense.

The population structure in the northern regions of Russia is also problematic, with inter alia too few young people in the population. The workforce and their families moved to these areas when mining of the rich mineral deposits started during a concentrated period between 1930 and 1960. Until recently, workers were attracted by significantly higher wages than in similar jobs in other parts of the country. These benefits have now ceased and the area will have to attract their workforce in new ways.

An ongoing urbanization in the Barents region erodes the attractiveness of rural and small communities. Increasingly higher demands on workforce skills stimulate more young people to study longer. The range of higher education makes more young people move to larger towns where many of them also establish

themselves. This in turn means that university cities are attractive for businesses that require skilled labour while the important peripheral raw material based regions and towns have to deal with complicated challenges.

The Business Tendency Survey for Northern Norway has previously indicated that the biggest challenge in northern Norway is not to create new jobs but rather a labour shortage due to demographic changes and competition for workers with appropriate skills.

In some areas, other factors can compensate for these conditions. The Norwegian oil and gas industry will shift its focus and its activities to the north as the southernmore oil and gas-fields will empty. Skilled workers might well be heading north to follow the companies and establish themselves in northern Norway.

New mineral deposits, in particular in northern Sweden and northern Finland, may attract skilled workers to the mines and refining industries.

However, internal migration may not suffice, but labour and skills may have to be imported into the region. A long-term strategy to provide the business community in the region with access to relevant labour will have to consist of increased investment in education, skills, improved passenger transports and regional attractiveness.

6 Challenges require actions

If the EU as a whole is to meet the economic and environmental challenges it is faced with, it is essential that action is taken to improve the transport system from the northern parts of the EU and the neighbouring countries which are abundant in vital raw materials and natural resources.

Key challenges for northern Europe are to link the existing nationally separated transportation and communication systems and to develop functional and efficient transportation and communications.

- Production is set to increase in the existing mines in Kiruna, Malmberget, Aitik, Kajaani, Sotkoma, and in some other smaller mines. New mines will be opened in Svappavaara southeast of Kiruna, Tapulivuoma, Pellivuoma and Sahaavaara northwest of Pajala, Hannukainen northeast of Kolari, Talvivaara south of Kajaani. The growing flows will together with the opening of new mines create a substantial increase in demand for freight by rail. This will require improved capacity to cope with the increasing transport flows, in particular within the railway system.
- The gradual transition to a more environmentally sustainable transport system will also demand an increase in rail freight transport. The capacity needs to be improved and more and better intermodal solutions need to be developed.
- The significant output growth in new and existing mines, will require well-functioning transport systems in order to transport goods throughout the different stages of the processing chain; from raw material to finished products and on to the final customer.
- The capacity improvements, in particular the railway system, will have to have a broader focus than just ensuring the efficient transportation of raw materials. Short lead times for freights with higher value added, efficient commuting to improve access to labour markets and educational opportunities in a greater geographical area will be crucial for ensuring a sustainable development for the EU as a whole.
- Due to heavy loads being transported, efficient transport logistics, in particular efficient rail transport, is crucial for competitiveness and development of the mining industry and its many subsequent processing steps. This challenge makes it economically important to reduce gradients on railway.
- There is great potential for increasing railway transportation from Russia (mainly iron ore and forest raw materials), provided the technical barriers (including different railway gauges in Sweden and Finland) and administrative barriers can be overcome.
- There are further potentials to expand transports from northwestern Russia and the northern parts of Finland and Norway both through Sweden and through Finland/the Baltic states to reach the large markets in continental Europe.
- The markets and demand for goods in Russia and Asia are growing rapidly. The strong economic growth in Asia means that the east-west flows have increased substantially in both directions. This implies that the trans-national corridor "Northern Axis" with further connections to Helsinki-Moscow and Baltic countries and trans-Siberian railway to/from will be of increasing importance.
- East-West freight Asia - Russia - Nordkalotten - Narvik port - North America is increasing gradually, to a considerable extent due to the removal of infrastructural bottlenecks (capacity/new links, gauge switching, signal system etc.).
- The industry in Norrbotten is expected to be a major customer of the planned reception facility for natural gas in Narvik. This will also serve to increase the volumes being transported by rail in the region.
- Development of the Bothnian Corridor, especially the North Bothnia line, the Bothnia line, the Ådal line and an upgraded East Coast line, is crucial to step by step better link the Barents region to central and southern Sweden and onwards to the heavily populated parts of the EU. The Finnish part of the Bothnian Corridor has mainly the same function and requirements as the Swedish part.
- The Swedish part of the Bothnian Corridor will lead to a modal shift in the transport of goods from sea to rail in particular by enabling increased processing in the region. The Bothnian Corridor also creates greater transport capacity, thus strengthening the conditions for ongoing expansion, primarily in the mining industry.
- The Finnish part of the Bothnian Corridor (the Finnish Main Line), which is the most important railway route in central and northern Finland, provides the major ports and industries with rail transport and link the northern coastal towns of Tornio-Kemi-Oulu-Raahe with southern Finland.
- Improved regional train traffic is needed to improve the functioning of regional labour markets and to strengthen access to higher education.
- The opening mines in Pajala and Kolari need a sustainable transport solution. Thus a 17 km long railway is planned from the Swedish mines to the existing Kolari railway, which will be upgraded.
- A complement to railway transportation via Tornio/Kemi (if more ore volumes are found) would be to construct a new railway from Kolari/Pajala to Svappavaara southeast of Kiruna, in order to connect to the Malmbanan line. This would relieve the route Tornio-Kolari and provide access to the ice-free port of Narvik.

To meet the raw material demand of European industry, to take advantage of the potential for increased processing rates in the industry and to cater to the growing demand for tourism, it is necessary that the transport system's efficiency is assured.

The following measures are needed both in the transport system of the Barents region and in the major transport corridors to the major markets, see figure 6:1:

- The Bothnian Corridor needs extensive new routes, restoration, capacity enhancement and an effective gauge changeover system to meet the demands of European industry.
- The capacity of the Malmaban line is currently upgraded, and further upgrading is planned in order to cope with both increasing freight and passenger traffic. In Kiruna the railway will be moved to ensure continued mining.
- The planned new mines in Sweden and Finland require development of both the railway and the road system.
- Capacity needs to be ensured between Kajaani and Vartius (at the Russian border).
- Ports and land-based connections for improved intermodality need to be developed.
- The signal system on the Ledmozero-Kotskoma line within Russia needs to be developed.
- Bottlenecks need to be dealt with on the Belomorsk-Archangelsk line.

Besides the demands of freight transport, sustainable industrial, tourism and regional development requires a well-functioning passenger transport system. However, this can be

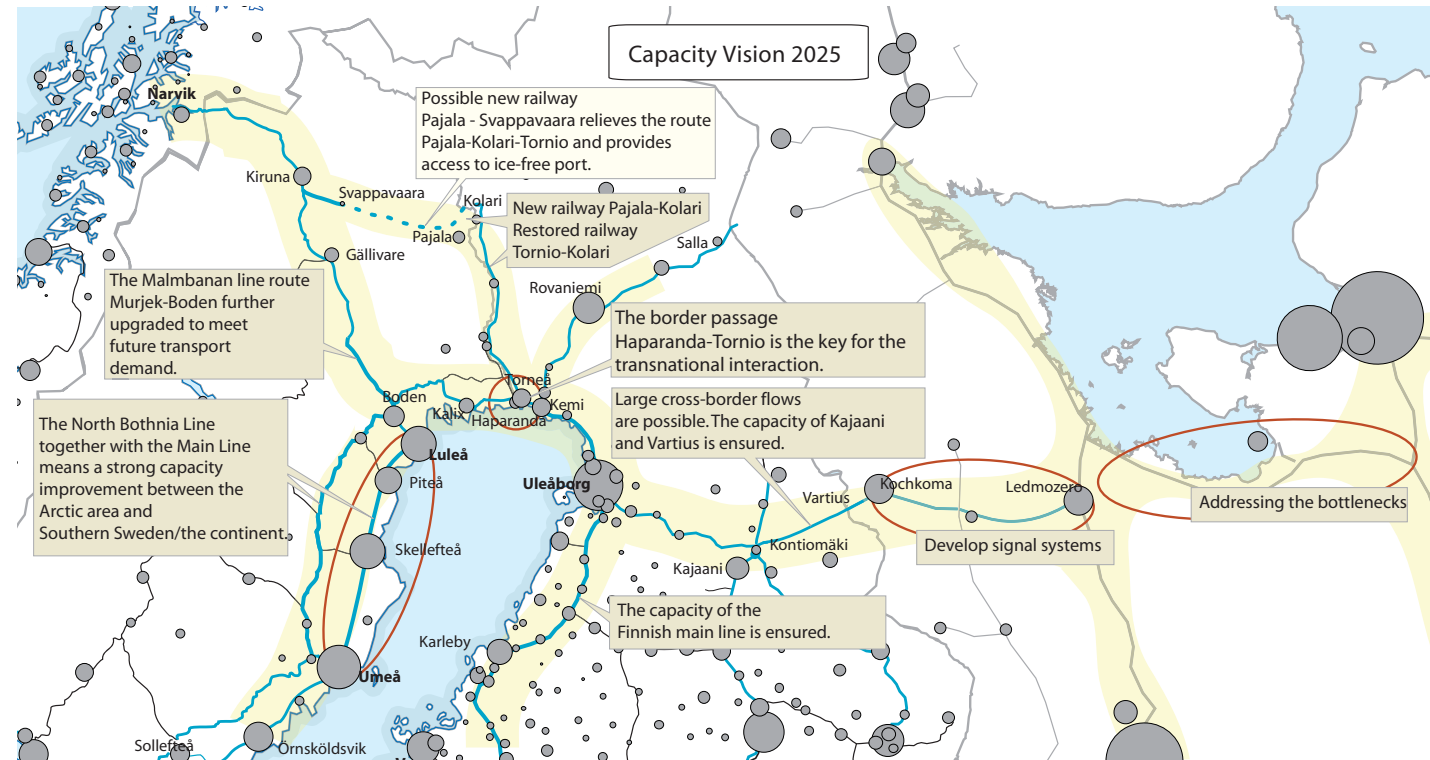


Figure 6:1 The railway system in the Barents region needs extensive measures to manage the existing capacity problems and bottlenecks.

achieved by making use of the same railway system as for freight transports if capacity is increased accordingly.

In order to make use of the Barents region's raw material reserves and to increase value added, improvements in both transport infrastructure and transport systems are called for.⁷² As to freight transport, primarily transport capacity and delivery accuracy need to be improved. Furthermore, transport times have to be shortened in order to reduce lead times for the industry. Development of the railway system is justified, not only because of the increasing flows of goods, but also because of the need for passenger transports for business, working, commuting and tourism travels.

Because of the large volume and heavy weight of the type of goods transported, an effective rail solution is of particular importance⁷³.

Moreover, an improved road system is crucial to the handling of the feeding flows to the railway and commuter travel, and the sea transports must be improved, in particular concerning efficient intermodal terminals in the ports

⁷² Barents Railway Network needs study, STBR Publication 5/2005, Norrbottenbanan Godstrafikstudie, 2005, Länsstyrelsen i Norrbotten, Järnvägstrafik på Nordkalotten, 2009.

⁷³ The Bothnian Corridor - brief, preliminary study of conditions and economics, 2008

Opportunities for the European Union

The development of a well-functioning transport system in northern Europe would be of EU-wide benefits leading to:

- Improved access for European industry to key ore and ore-related products.
- Securing the supply of forest-based products.
- Enhanced opportunities for production of renewable energy.
- Enhanced skills supply, research and development in the strategically important commodity-based Barents region.
- Improved conditions for sustainable development of the tourism industry, which can lead to a broad and attractive labour market even for young people and women, thus improving the demographic balance in the Barents region.

Opportunities for the industry in northern Europe

Improved transport systems and in particular further improvement of the railway system are very important measures to achieve sustainable development in the Barents region as well as in EU as a whole:

- Improved line capacity, load-bearing capacity and allowable axle loads are important, in particular for the heavy and frequent ore and slab shipments. This creates more cost efficient transport solutions and improved competitiveness to the industries in northern Europe.
- Improved transportation makes it easier for existing and new companies to develop and for new companies to establish themselves in order to facilitate sustainable exploitation of the natural resources in northern Europe. Their corporate markets will hereby be expanding geographically to include Norway, Sweden, Finland and Russia.
- Efficient passenger transport and freight on rail enhances the interaction within/between business clusters.
- Production and export values are maintained/developed through improved transport systems, thereby allowing higher processing rates.

- The labour market becomes more dynamic and the recruitment of labour becomes easier.
- Enhanced and efficient passenger transport, both within and across borders, contributes to an improved skills supply within the different economic sectors and strengthens the region's collective, internationally prominent mining and forestry skills.
- Improved transports will strengthen the tourism industry.
- There will be a shift in the industries in northern Europe towards using renewable energy



Figure 6:2 *The Bothnian Corridor, existing main transport corridors and potential new and connecting corridors.*
Source: AF Infraplan/Bothnian Corridor

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Supply of Raw Materials, Transport Needs and Economic Potential in Northern Europe

Contact information:
Stellan Lundberg
Phone: +46 (0)10 505 61 91
e-mail: stellan.lundberg@afconsult.com



Address: Långviksvallen 20, 922 66,
Tavelsjö, Sweden