Overview of results of INTERREG III B projects in the field of accessibility

Report for WG2

Project: East West Window

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Content

Foreword

This study is conducted as a part of Working Package 2 (Working Group on accessibility and development zones) within the frame of the East West Window project executed from 16th June 2007 till 15th December 2008 and supported by the European Union Grant - BSR INTERREG III B Neighbourhood programme - TACIS strand. East West Window project has been initiated by VASAB i.e. co-operation of Ministers on spatial planning in the Baltic Sea Region (BSR). The main aim of the East West Window project is to accelerate the Baltic Sea Region (BSR) development through better connecting of the existing potentials within the Region.

It is expected that the project will:

- promote territorial integration of the North-West Russia and Kaliningrad into the Baltic Sea Region through joint spatial planning and development actions in the priority fields such as business development, transport and ICT development as well as in the sea use planning and Integrated Coastal Zone Management,
- diminish knowledge gaps within the Region on the character of development potential, its synergies and complementarities with potentials of other countries of the region, and on methods how this potential can be efficiently connected with the potentials of the regional partners,
- serve VASAB as a useful tool for its main goal to prepare the Long Term Perspective for spatial development of the BSR till 2030, in line with the encouragement of the Council of the Baltic Sea States.

The expected outputs of the East West Window project:

- Assessment of unused innovation potential in NW Russia and recommendations on policy improvements for innovations in NW Russia from the BSR perspective;
- Identification of spatial problems generated by innovation and in/out sourcing in NW Russia and assessment of their potential for the BSR integration;
- Assessment of accessibility and trade flow perspective of NW Russia;
- Policy recommendations on contribution of NW Russia to the joint efforts to improve connectivity and accessibility of the BSR;
- Recommendations for improvement of the transnational planning methodologies in the field of transport and ICT development in the BSR;
- Assessment of legal framework for co-operation of NW Russia in transnational sea use planning and ICZM;
- Sea use register in Russia with relevant maps/GIS application;
- Policy recommendations on legislative changes leading to involvement of Russian institutions in the management system for sea use planning and ICZM at the BSR level;
- Recommendations on upgrading the instruments and tools for transnational sea use planning and ICZM accumulated at the BSR level based on the completed pilot activities;
- Develop proposals for future investments in NW Russia in the fields of knowledge-based economy, transport and ICT;
- Acknowledgment of the results at the political level (e.g. Northern Dimension, BDF, Baltic 21, VASAB, CBSS summits);
- Institutional framework for co-operation with other BSR countries in the transnational sea use planning and ICZM.

The outcome of the work of Working Group on accessibility and development zones contains both a long term vision and concrete implementation proposals aimed to rise competitiveness of the Baltic Sea Region and its territorial cohesion. WG will concentrate on national, cross-border and transnational strategies, obstacles for co-operation, real and feasible accessibility perspectives as well as development clusters and zones. WG2 thematic scope for the accessibility shall include not only hard infrastructure issues but also soft measures and will be extend by the issues related with technological networks.

The task of WP2 is explore technical, organisational and political options for better internal and external accessibility of NW Russia, especially in the fields of
(a) international freight transport (rail / shipping / pipelines),
(b) passenger transport (rail / aviation), and
(c) information + communication technologies (ICT).

The Working Group 2 performing following lines of actions:

A. Screening of the national accessibility polices and other efforts of similar importance (i.e. outcomes of the BSR strategic projects) in order to find synergy, missing links and to propose necessary recommendations for national policies change. This will encompass among other feasibility assessment of connecting TEN-T with the pan-European corridors based mainly on a findings of INTERREG projects and relevant documents of pan-Baltic organisations BDF, BSCA, BSSSC etc.)
B. Indicator based analysis of different accessibility dimensions in order to have a more objective perspective for suggested policy changes.
C. Preparation of recommendations

   The following types of recommendations will be prepared

   - Recommendations concerning improvement of BSR external and internal (transport) accessibility, creation of new transport links and improvement of existing ones,
   - Recommendations concerning improvement of energy accessibility,
   - Recommendations for energy production and supply to exploit existing potentials,
   - Recommendations for ICT infrastructure development, as well development of e-services and e-commerce especially for less developed and rural regions.

As a part of above mentioned actions is the analysis of INTERREG projects and the main tasks of this study are:

- To analyse results of relevant INTERREG III B projects (table 1)
- On the basis of those analysis to show:
  - the overall BSR transport picture i.e. what new transport links and corridors are emerging, and what are the missing links in BSR transport network and what VASAB should do in order to promote the most important corridors and to encourage building of the most important missing links, what type of the system of motorways of the sea should be applied in the BSR,
  - the overall BSR picture with regard to e- accessibility and energy consumption and production with focus on main problems and barriers (and proposed solutions) perceived and addressed in the analysed documents,
  - good practices on intelligent transport, multimodality, creation of motorways of the sea, ITC use energy savings both in production and consumption and in other fields of the WG2 interest.
- To prepare feasibility assessment of connecting TEN-T with the pan-European corridors based on findings from analysis conducted.
- To propose input to WG2 recommendations based on the analysis conducted.

Table 1. List of analysed INTERREG III projects

Acronym	Title of project	Lead partner	Lead partner country	Duration
STBR	SUSTAINABLE TRANSPORT IN THE BARENTS REGION (STBR)	County Administration of Norrbotten	SE	10.03.2003 - 09.01.2006
BALTIC GATEWAY	Integrating the Seaways of the Southern Baltic Sea into the PanEuropean Transport System	Region Blekinge, development partner	SE	12.03.2003 - 11.06.2006

INTRASEA	INland TRAnsports on SEA routes	Swedish Maritime Administration	SE	01.07.2003 - 28.02.2006
BaSIM	BALTIC SEA INFORMATION MOTORWAYS	Technology Centre Lübeck	DE	01.09.2004 - 31.12.2007
Baltic Tangent	Baltic Tangent	The Regional Council in Kalmar County	SE	04.01.2005 - 03.05.2007
BalticBroadband	Baltic Rural Broadband Project	ProArbeit (CPC) Communal Public Corporation	DE	24.06.2005 - 30.04.2008
RAIL BALTICA	RAIL BALTICA - Transnational Integration through Coordinated Infrastructure and Regional Development	Riga Region Development Agency	LV	30.06.2005 - 29.01.2008
LogOn Baltic	Developing Regions through Spatial Planning and Logistics & ICT Competence (LogOn Baltic)	Turku School of Economics and Business Administration	FI	10.12.2005 - 31.12.2007
STBR II	SUSTAINABLE TRANSPORT IN THE BARENTS REGION - PHASE II	County Administrative Board of Norrbotten	SE	11.01.2006 - 10.12.2007
InterBaltic	Intermodality and Interoperability in the Baltic Sea Region - InterBaltic	Klaipėda science and Technology Park (KSTP)	LT	28.12.2005 - 31.12.2007
SEBTrans-Link	South East Baltic Transport Link	Municipality of Växjö	SE	29.08.2002 - 28.11.2005
NEW HANSA	NEW HANSA OF SUSTAINABLE PORTS AND CITIES	Stadtwerke Lübeck (Public Utility in Hanseatic City of Lübeck)	DE	16.06.2003 - 15.12.2005
NECL	North East Cargo Link	County Administrative Board of Vasternorrland	SE	04.09.2003 - 03.12.2006
InLoC	Integrating Logistics Centre Networks in the Baltic Sea Region	University of Turku, Centre for Maritime Studies	FI	01.08.2004 - 31.03.2007
COINCO	Corridor of Innovation and Cooperation	City of Copenhagen	DK	10.03.2005 - 09.07.2007
EAST-WEST	East-West Transnational Transport Corridor in the S-BSR	Region Blekinge	SE	01.01.2006 - 31.12.2007

Green – top priority; Black - less important projects to be screened in a second turn only with regard to BSR strategic results

BSR transport network development

This chapter aims at investigating development of existing transport networks in BSR within the frame of analysed projects and diving the answers to following questions: what new transport links and corridors are emerging, and what are the missing links in BSR transport network and what VASAB should do in order to promote the most important corridors and to encourage building of the most important missing links, what type of the system of motorways of the sea should be applied in the BSR.

Road, railway and aviation network in the Barents Sea region

Development of road transport network in the Barents Sea Region

According to STBR project there is generally enough capacity in the road infrastructure including the terminal network in the Barents Sea region part of BSR. Still, there is strong potential for joint projects and plans inside tourism, bus services, traffic safety, etc. Focus should shift more to developing the user-friendliness, accessibility and applicability of services – which as such generally aren't directly under the jurisdiction of the road administrations. This fact obviously calls for a wider range of participants in the dialogue leading to development design. Preferably, the development design should start from the road users' point of perspective. Another example of potential activity is the unification of the road data and it being made accessible over the Internet.

The standard of the road network rarely poses any severe problems in reaching the main tourism destinations in the Barents Region. In Russia the entire road infrastructure needs upgrading in order to meet Nordic standards. In Russia many potential tourism destinations are also inaccessible by road. The growth of tourism is hampered by the Russian road infrastructure. [1]

Tourism roads

International tourism is a growing industry in the Barents Region. It is important to provide it with good conditions for sustainable development. Tourists in the Barents Region are mostly domestic. Getting more international tourists from outside the Barents countries is a challenge. Another big challenge is to level off the differences between the peak seasons. Russia is a potential tourism destination of the future as its tourism and traffic infrastructure improves. Russian citizens are also a potential group of travelers.

Road-based tourism growth is highly dependent on a good road network. There is a risk that if the degeneration of roads is allowed to continue, the lower standard of roads will decrease tourism growth in the future. Also, for example, in Norway ferries cause traffic bottlenecks during the peak tourism season and border formalities and their unexpected changes in Russia cause delays and hamper tourism growth. International cross-border public transport connections should be developed and car rental services also need to become more international. All the Russian transfer connections need to be developed. [2]

The current vertical international tourism flows between countries are weak. Most of the border-crossing trips are short shopping or commuting trips just across the border. Border formalities and procedures on the Russian border slow down the tourist flows. In order to get more international public transport services, more demand is needed. This is to be achieved by cross-border marketing and co-operation. Offering and promoting experiences in different countries and surroundings will increase the value of the whole region as a tourism destination.

When it comes to the extent and coverage of the road network and technical quality of the associated infrastructure, the Road Administrations are doing what they can with the funding they are provided with. The money goes mainly to the maintenance of the existing road network. New road connections have not been included in the future programs – and on a large scale, are unlikely to be included either. What the Road Administrations can do to promote tourism can basically be restricted to three main things: 1) to provide information and guidance (information about road conditions, traffic volumes, speed limits, road side services, weather conditions, border crossings and border formalities) by using conventional information distribution channels combined with increasingly using ITS, 2) to provide good and safe road connections to the tourism destinations throughout the year and 3) develop the international co-operation of Road Administrations, local authorities and tourism industry further. [1]

Heavy traffic safety

The common problem in counties of Barents Region is the combination of large surface area, few bigger cities and long distances between the cities. Long distances, heavy reliance on road transport and long winter causes problems in road traffic safety. Traffic safety of heavy traffic is a problem in all Nordic countries, but it is emphasized especially in Northern parts of the countries. There are also problems with surcharge loading. The heavy traffic and surcharge loads are the biggest cause to deterioration of the road network and the sustainability of the roads are threatened.

In the Barents Region, the aim of traffic safety is to decrease continually the number of deaths on roads despite an increasing traffic volume. In order to achieve the national aims and the common goals for the region, co-operation between the authorities in the different Barents Countries has to be developed. Traffic safety on roads will be increased by a high standard of control on the roads, homogenized between the different countries, good winter maintenance and sufficient information to the drivers. [1]

A high standard of control on roads, which is homogenised between the different countries, good winter maintenance and enough information to the drivers will increase the traffic safety on roads. Here is a summary of measures that would help improve heavy traffic safety in the Barents region:

- Developing heavy vehicle control on the roads (homogenisation of regulations, inspection methods and penalties)
- Improvement of information to heavy vehicle drivers (guide book, implementing telematics and mobile services to give accurate information to drivers)
- Planning a teaching program for drivers. This could be a joint course in economical and safe driving for all the Barents countries.
- Including traffic safety in the quality systems of transport companies
- Keeping up a good maintenance standard [2]

Transport of dangerous goods

The part of all dangerous goods is transported by road in, out and within the Barents region. An accident with these transports involved can have big consequences for environment and health.

The largest group of dangerous goods in road transport are inflammable liquids. They cover over 50% of dangerous goods transported. Petroleum products are transported to the Barents Region by sea. From oil depots located on the coast petroleum products are distributed by road and rail to various customers (industry, gas stations, houses). The largest road transport flows of dangerous goods are located along shores and from harbours to lager cities.[2]

By combining risk classification, development of telematics, mobile data transfer and GPS positioning of transports, an integrated risk management, emergency and transport information system could be developed: in an accident situation the emergency response centre is in immediate possession of the exact location of the accident, details of the vehicle, the goods being transported, the risk class of the area and the rescue actions required. Such a system would minimize the impacts of dangerous goods transport accidents on the environment, the public and society.

Dangerous goods transport improvement measures in the Barents Region are recommended to include: 1) Applying dangerous goods risk classification to the Barents Region – at least on the part of the road network that has the greatest volumes of dangerous goods transport on them, and 2) development of transport telematics, mobile data transfer solutions and GPS positioning of dangerous goods. [2]

Terminals

Freight terminals and distribution centers are very important nodes in a logistic chain from producers to consumers. The knowledge of functions and their importance are not enough known on a strategic and planning level today; their capacity and type of goods and carrier type is not very well known. Handling costs and transfer time divided on different commodities are missing in the statistics. This is also a fact regarding warehousing. Lack of information makes planning and developing of logistics difficult. (More accurately put, the difficulty arises from lack of access to information, since all the information is in existence at the hands of the private sector, namely the producers and the logistics service providers.) However, environmental and safe freight transports with as low transport costs as possible are necessary for a sustainable and sound development in the Barents Region.

The international co-operation of the Barents region has paid remarkable attention on regions infrastructure and traffic, especially East-West corridors. Sufficient infrastructure is, of course, needed but the regional development could emphasize more East-West business networks within the Barents region. Main industries of the region have started East-West co-operation. However, the business networks are still in developing phase. New East-West supply chains require of course infrastructure but also high class logistics services in all counties of the region. Industries are not always able to find proper logistics service providers for East-West business activities. Regional developers could offer their assistance and support logistics and business networking over the borders. This would increase economic co-operation between the countries. Active role in the business networking process could also provide valuable information concerning emerging corridors to the regional planners. This information could be used as an input in the regional planning process. [1]

As it was concluded in STBRII project, the current road infrastructure was mainly seen to be sufficiently extensive. The main problems related to the infrastructure were seen to be the poor shape of road condition on the Russian side of the Barents area. However, missing latitudinal links were also seen to exist in Russia. Improving the poor shape of the road network was seen to be the top development priority. The lack of cell phone network coverage in Russia on the corridor to Murmansk was also seen to pose an operational problem of road transport. This has to be noted when designing e.g. information systems. [3]

Development of railway transport network in the Barents Sea Region

STBR project has as one of its goals to develop the possibilities for an increased border crossing co-operation within the Barents region. An increased industrial co-operation in sectors as forestry, mining/mineral and energy would strengthen the regions international competitiveness and economical growth. Crucial for this co-operation is an effective transportation structure to make it possibly for heavy goods, equipment and manufactured products. An efficient railroad that connects different parts of the Barents region is in this perspective of special interest.

The railroad-project N.E.W. (The Northern East-West freight corridor) deals with the possibilities to develop the railroad-path from the Pacific Ocean to the Norwegian coast of the Atlantic Ocean. This goes well together with the interests of the Barents region. [1]

Several railway transport - and infrastructure related improvements have taken place in the Nordic and Russian parts of the Barents Region in recent years, as well as for the industries accessibility to Central Europe, capital areas, northern America and Central/East Asian markets by railway and through ports.

Figure 1. Current infrastructural/administrative improvements and trial transports [4]

Current infrastructural/administrative improvements, and trial transports with importance for the Nordic sub region (numbers referring to figure 1):
I. A comprehensive development of the coastal railway corridor in the north east part of Sweden will radically improve accessibility between the Barents Region and the heavy markets in Central Europe:

1A North Bothnia Line Umea-Haparanda (constructed from 2010)
1B Bothnia line Kramfors-Umdi (currently constructed)
1C Adalline Sundsvall-Ull1gsele (currently upgraded)
1D East Coast Line Stockholm-Sundsvall (currently upgraded)

2. The gauge switch system is under development Haparanda - Tornio. Trial full-scale transports with wagons with sideways adjustable wheels took place in October 2005.
3. Reconstruction of the border-crossing Haparanda Line, a low standard part of the Swedish railway network, is in final decision-making stage.

4. As a complement to the gauge switch system development, improved effectivity of the Haparanda/Tornio terminals is under development.
5. In 2005 - 2006, trial transports in the N.E.W. corridor via Narvik and Vainikkala took place. These are important pilot transports for development of the N.E.W.-concept, for which the Barents Link and Belkomur railway would mean a 600 km short cut as well as improved capacity. The N.E.W. -corridor development will improve accessibility to/from Asian and northern American markets.
6. Electrification of the Finnish part of the railway Narvik - Archangelsk is finished in 2006.
7. The heavy trafficked Iron Ore/Ofoten line Lulea - Narvik has been upgraded to 30 tonnes axle weight limit, in order to solve capacity problems primarily based on comprehensive ore transports from Kiruna and Gallivare. The improvements also improve the conditions for transcontinental flows within the N.E.W.concept.
8. Improvements in ports of Oulu (new combi terminal in 2004), Kemi (enlargements of container and storing facilities 2004-2006), Raahe (10 m deep 2006-2008), Kokkola (recent improvements to 13 n1 deep and all weather terminal AWT), and Narvik (almost 3-fold container storing capacity planned).
9. The Ledmozero - Kochkoma line is used for border-crossing timber transports NW Russia - northern Finland (by Russian speditors) and for ore transports Kostamus - Russian market. An important and comprehensive investment has been carried out, but still minor but strategical components are missing (see also 13). [4]

Infrastructure and administrative improvements in the Russian sub regions
10. The Belomorsk - Obozerskaya railway has been electrified. Archangelsk-Obozerskaya is electrified by 2008/9.
11. The Murrnansk line electrification will be finalized in 2006.
12. The western part of the future Belkomur railway is fully planned and supported by many Russian national authorities, but the financing is not solved.
13. An important and comprehensive investment has been carried out when building the Ledmozero - Kochkoma line, although the completion of the line is interrupted for several reasons. Potential, regular border-crossing transports are still hampered by the line not being in commercial use.
14. A development plan for the Kivijarvi terminal to meet transport needs is made within the North Link project. Reconstructions are planned to start after reconstruction of the Vartsila terminal, but the terminal in current shape is not available at least to Finnish and Swedish forest refining companies operating in Karelia for procurement.
15. Tariffs on land borders and Russian ports are gradually being homogenised, although still great differences exist. WTO (World Trade Organisation) membership negotiations go on and membership would contribute to homogenisation as well as other free trade improvements. [4]

Main lines in the Russian part of Barents are Murmansk- Petrozavodsk - St. Petersburg (October railway), Archangelsk - Vologda – Moskva and Syktyvkar - Kotlas - Konosha. Railways are missing between Karpogory and Vendinga in Archangelsk Oblast (215 km) and likewise between Syktyvkar and Perm in the Republic of Komi (579 km). The 171km line between Salla and Kandalaksha via Kelloselka and Alakurtti did once connect the railways of northern Finland with the Oclober Railway. The railway line is however deconstructed or strongly decayed on the part Kelloselka - Alakurtti. Vartius - Kostamuksha is currently the northernmost link between the Finnish and Russian railway systems. Since 2003, there exists a 126km long, new connection between Ledmozero and Kochkoma, resulting in a new connection between Finnish railways and the Murmansk line. [5]

In the Finnish part of the Barents Region, the main lines go north from Oulu via Kemi to Rovaniemi, Kemijarvi and Kolari, and to the east to the Vartius border station. The Oulu - Helsinki line is the most important north - south railway line in the Finnish railway system. Connection to the Swedish railway system is in Haparanda/Tornio. In northern Sweden, the Northern Main Line is the main line (with Boden/Lulea as end point), while the Haparanda line and Iron Ore Line meets the main line in Boden.

The railway along the Norwegian coast ends in Bodo/Fauske. The Ofoten line connects Narvik on the Swedish border to the Swedish Iron Ore Line. The nearest Norwegian-Swedish

border-crossing railway is the Meraker line connecting Trondheim to the line Storlien-Ostersund and further to the main lines.

The railway infrastructure in the Russian part of the Barents Region has suffered from neglected maintenance in the last decade which has increased transportation costs in the region. The entire Murmansk Line is in relatively good condition. The newly built Ledmozero - Kochkoma railway is of high standard. The railway from Oulu to the border station of Vartius via Kontiomaki is of relatively good standard. In the Swedish part of the Barents Region, the railways are of high standard. The Iron Ore Line has newly gone through a substantial upgrade for the heavier trains MTAB (subsidiary of LKAB). The Haparanda line lacks both central traffic management and electrification and is in poor condition on the section between Morjarv and Haparanda. The Norwegian railway network is being upgraded to the end station of Bodo/Fauske. [5]

Infrastructural bottle-necks are summarised in the map below (figure 2). A clear bottle-neck is also the diverse railway standards in the sub regions.

- Norway and Sweden has an electrical power system with 15kV voltage at 16 2/3 Hz. Finland has 25 kV voltage at 50 Hz. Russian Federation has two different electrical standards, the original and still dominating standard is the direct current system of 3 kV and the new standard is 25 kV at 50 Hz, i.e. the same as in Finland.
- In the long term the signal system and the traffic rules will be harmonised through the various EU directives which are gradually implemented in the member states.
- The railway tracks in Norway, Sweden and China is of standard gauge (1435 mm), while the tracks in Finland, Russian Federation and the CIS countries is of wide gauge (1520/1524 mm). The Russian gauge is 4 mm more narrow than the Finnish one, an insignificant difference for freight trains with low speed. A number of optional solutions exist to bridge between the differing track gauges. Of the different technical solutions for gauge switching of freight transports, TALGO is currently being tested in Haparanda and Rafil is tested in Tornio, to see how the systems work under winter conditions.

Administrative and market-related barriers stand out as important barriers for exchange east - west in the Barents Region.

- The tariffs for transports on railway to national ports have been two times lower than tariffs through land border crossings, which makes transports via foreign ports less profitable than before the current politics. The export-serving infrastructure in the Russian ports St. Petersburg, Murmansk and Archangelsk are/risk to become congested. An important reason is the tariff system. This is also the view of many Russian actors. The tariffs were somewhat changed from beginning of 2005 (as explained below), but this has not solved the situation. The current price picture makes transports on railway of exports (e.g. from Kostamuksha to Ruukki Oyj in Raahe) and transit transports less feasible compared to road transports across the border and sea transports via Russian ports. Transports through Ledmozero - Kochkoma and Finland would be hindered by the double tariff system also after the track has been taken in commercial use.
- Other projects than finalization of the Ledmozero - Kochkoma track have been prioritized in NW Russian Federation, e.g. improvement of infrastructure from and to Russian ports in the Finnish Gulf. Electrification of the Murmansk railway section has taken many resources. Thus, October railways (and later the Russian Railways, that October railways now belongs to), has had to concentrate on other tasks than the Ledmozero - Kochkoma finalisation. However, there is real interest in using the new route, both on the Finnish and Russian sides.
- Only Russian rolling stock is allowed on Russian railways, requiring reloading at the border if the goods arrive in non-Russian wagons. The reason for the rules is that only Russian brake systems are accepted.
- The customs routines and the document handling on the Russian side of the Finnish-Russian border are time-consuming and regulations are often changed with very short notice.

- A bottle-neck for transports from to the European continent is the large variation in track tariffs. The same problem exists for direct transports on railway between the Nordic countries.
- Concerning wood-based products, the north-south directed transport patterns of producers are hard to change both for railway or road, due to:
  - Long-term co-operation relations and large investments made in the logistic system.
  - The Swedish (and partly also the Finnish) transport subvention system
  - Pricing system

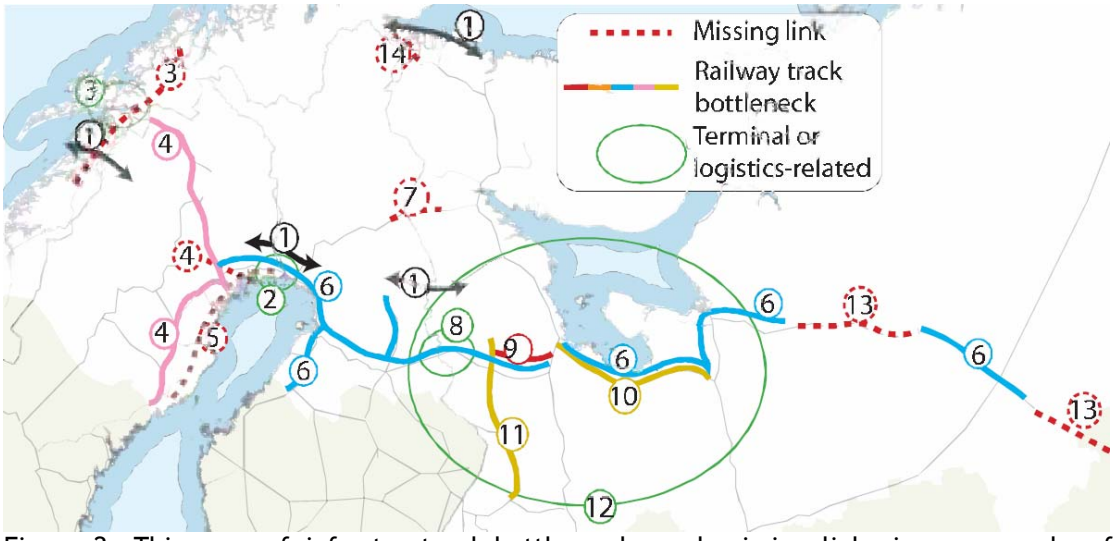


Figure 2. This map of infrastructural bottle-necks and missing links is an example of integrated and structured information from various sources. [5]

1. Technical system differences 2. Gauge switch system and terminal upgrading needed. 3. Narvik port/terminal: More capacity and container infrastructure needed. 4. Missing triangle connection Ore Line - Haparanda line. 5. Coastal railway missing (Bothnia Line ready 2010 up to Umea) 6. Axle weight limit too low and partly non-electrified (many sections). 7. Salla-Alakurtti track missing. Alakurtti-Kandalaksha needs upgrading. 8. Kivijarvi terminal upgrading needed for increased flows and containers. 9. Ledmozero - Kochkoma: steering, comm. equipment and electrification missing. 10. Belomorsk - Obozerskaya section needs upgrading. 11. Suojarvi line needs upgrading. 12. Timber terminals and upgrading/construction of roads needed. 13. Missing links Karpogory - Vendinga and Syktyvkar - Perm. [5]

Step-by-step development scenario for railway infrastructure development in the Barents Region.

Existing, improved and new railway lines connect sub regions in a good way with Kola Peninsula, southern Sweden, southern Russia and southern Finland both for transports of raw material and refined products (figure 3).

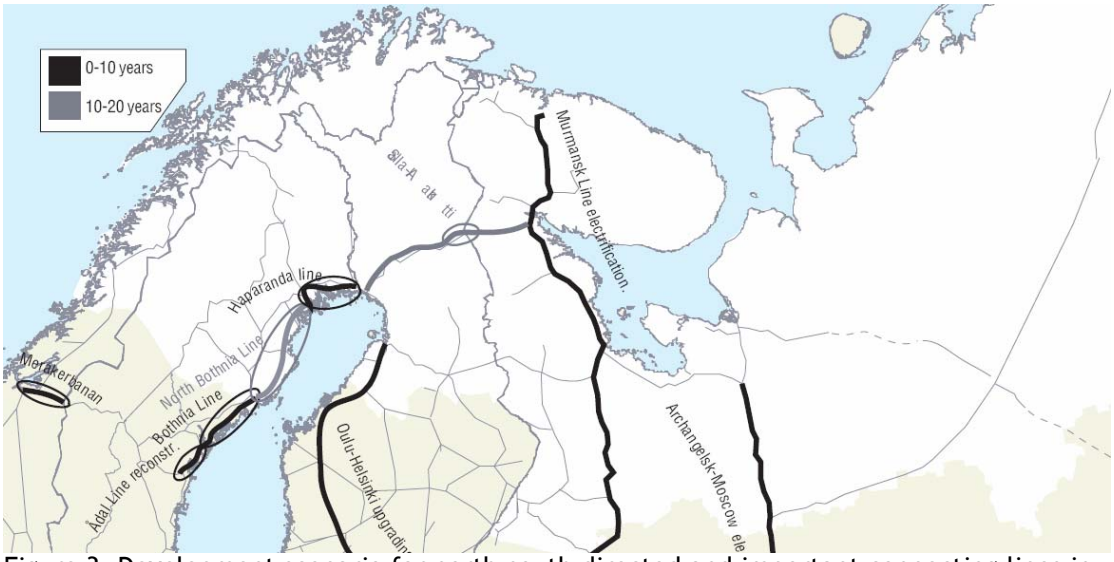


Figure 3. Development scenario for north-south directed and important connecting lines in two steps. [4]

Scenario within 0 – 10 years:

1. The Swedish coastal lines Haparanda Line, Bothnia Une and Adal Line are finalized/constructed. North Bothnia Line is under construction from 2010. These improve accessibility for northern Swedish, Norwegian, Finnish and Russian industries to Central Europe. Haparanda Line reconstruction also radically improves conditions for east-west transports within the region and for transit transports between northern America and Asia/Russia (see scenario 8).
2. The Murmansk and Archangelsk - Moscow lines are electrified, improving transport economy of industries in the Russian part of the region when exporting to heavy markets.
3. Congestion problems on railway Oulu - Helsinki are solved. This improves transport economy of refining industries in northern Finland (mainly paper and metal producing industries).
4. The line Merakerbanan is upgraded to same standard as the rest of the railway network, and electrified. This enables Swedish trains to continue to the Norwegian coast.

Scenario within 10-20 years

5. Building of the Salla - Kandalaksha line connects the industrial regions of the Kola Pensinsula and northern Finland, Sweden and Norway with each other. Transports from Murmansk Oblast via ports of the Gulf of Bothnia are enabled.
6. The Swedish coastal North Bothnia Line is built, which further improves connectivity from the region to Central Europe (see also scenario 1)

A continuous network is established by complementing and connecting national and important connecting lines by a continuous, efficient railway from Narvik to Archangelsk, Komi, Perm and Central/East Asia (Barents Link).

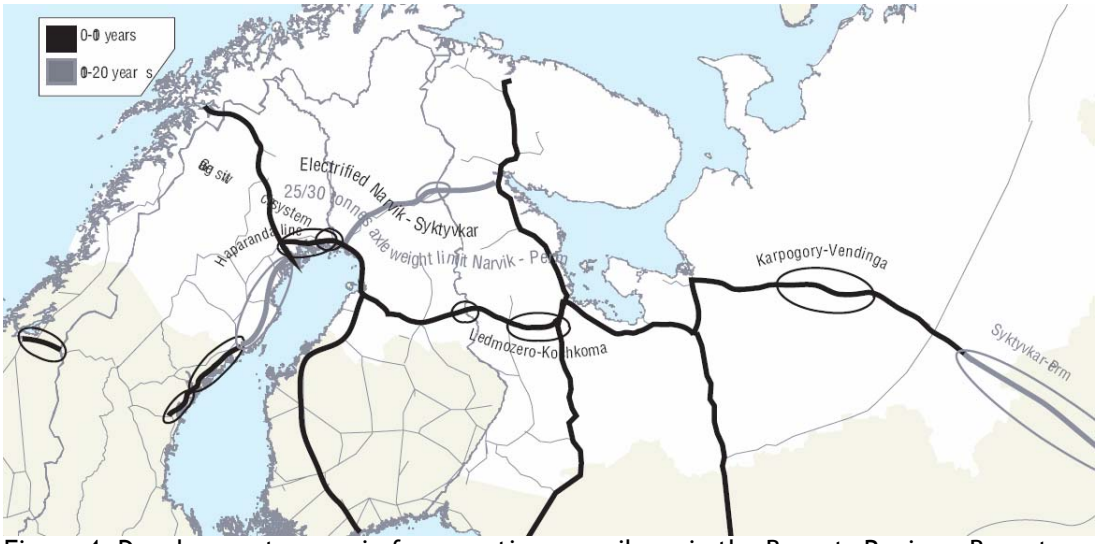


Figure 4. Development scenario for a continuous railway in the Barents Region – Barents Link in two steps. [4]

7. Ledmozero - Kochkoma is finalized and in commercial traffic 2005/2006. Will improve transport conditions of all cargo types to/from areas east of Ledmozero, e.g. transit transports and raw material based transports.
8. The Haparanda Line is built starting in 2006. The line will affect transport economy between Swedish/Norwegian and Finnish/Russian industrial regions as well as N.E.W.-corridor container transport conditions.
9. The Barents Link is fully electrified, improving possible train weight, enabling decreased rolling stock to maintain, and decreasing time losses caused by changes of locomotive. Improves transport economy for all transports that traverse the currently unelectrified sections (Ledmozero - Kochkoma, Oulu-Vartius, Haparanda Line).
10. There is a functioning gauge switch system in either Haparanda or Tornio, spanish TALGO system or German Rafil system. Enables further development of the rolling stock and continuous transports with wagons with sideways adjustable wheels between Finland/Russia and Sweden/Norway.
11. The western part of the Belkomur railway is built, enabling exchange between parts of the Komi Republic and the Nordic part of the region, e.g. coal from Vorkuta mine and timber transports from surroundings of Syktyvkar. This is the first step towards realization of the whole Belkomur railway project (see scenario nr. 12).

Scenario within 10-20 years:
12. The eastern part of the Belkomur railway is built, enabling a 600 km short cut for transit transports in the N.E.W.-corridor, prioritized by the High Level Group II as a long-term corridor connecting the EU with neighbouring areas. This enables a further development of the N. corridor concept.
13. The Barents Link has 25 or 30 tonnes maximum axle weight, enabling large transports, needed for transport economy on long distances and/or of goods of low value, e.g. between Russian and Swedish/Norwegian parts of the region. [4]

Summarizing figure on infrastructural development scenario [4]

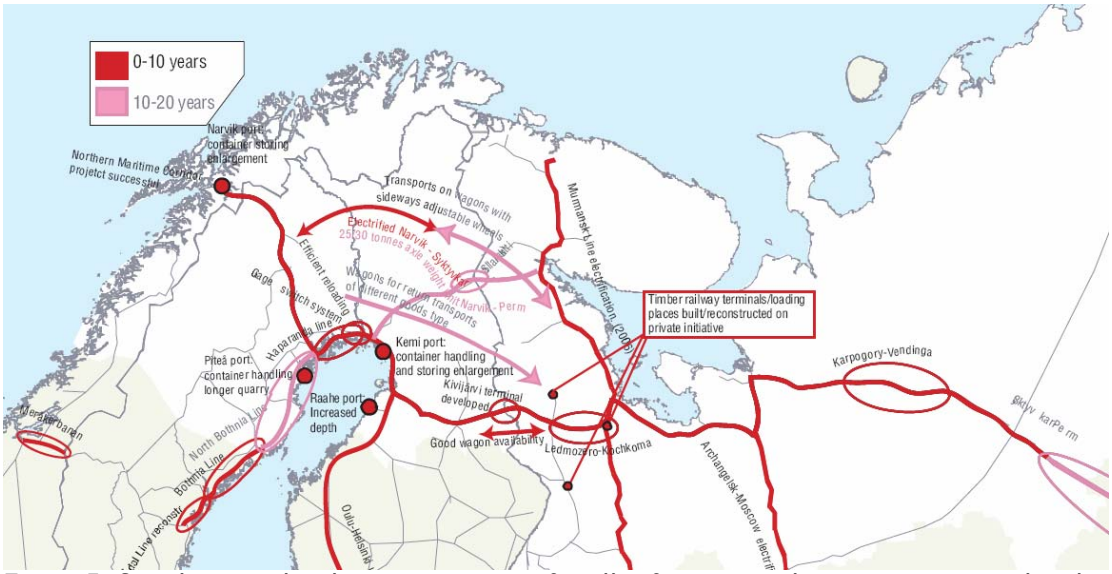


Figure 5. Step by step development scenario for all infrastructural improvements realized in two steps.[4]

The target picture for infrastructural and administrative improvements in railway network within the Barents Sea Region includes:

- a continuous functional railway corridor connecting existing and improved national railway networks
- effective terminal functions in important nodes
- improved availability of appropriate rolling stock
- simple border formalities between Russia and Finland
- homogenous railway tariffs in the Russian part of the Barents region

Short-term measures to reach the target picture are:

- increased co-operation with N.E.W. corridor parties regarding common interests
- support of completion of national construction works (e.g. the Haparanda line and the Ledmozero- Kochkoma line)
- regular discussions with decision makers in Russia concerning improvements within Russia, e.g. the Ledmozero-Kochkoma completion, tariff homogenisation, and Kivijärvi terminal improvement and reconstruction
- technical development of equipment, train cars, and trial/regular transport with gauge switch systems Finland-Sweden-Norway, Russian-produced and Finnish-owned rolling stock and the Haparanda-Tornio terminal
- identification of Nordic, EU and N.E.W. projects further contributing to realising the two sections of the Belkomur railway

Long term measures to help reach the presented target picture are:

- Inclusion of the Salla-Kandalaksha construction in the Barents co-operation discussions
- Presentation of arguments for 25 to 30 tonne axle loads on the entire Barents Link
- Development of multifunctional rolling stock with gauge switch technology for the entire Barents Link Russia-Finland-Sweden-Norway [4]

The study within the STBRII project has demonstrated the width of the east-west railway-related projects that are pursued within the Barents Region. It has also evinced their different geographic designs. The map (figure 6), shown below, outlines ongoing projects in relation to the northern branch of the Northern Axis.

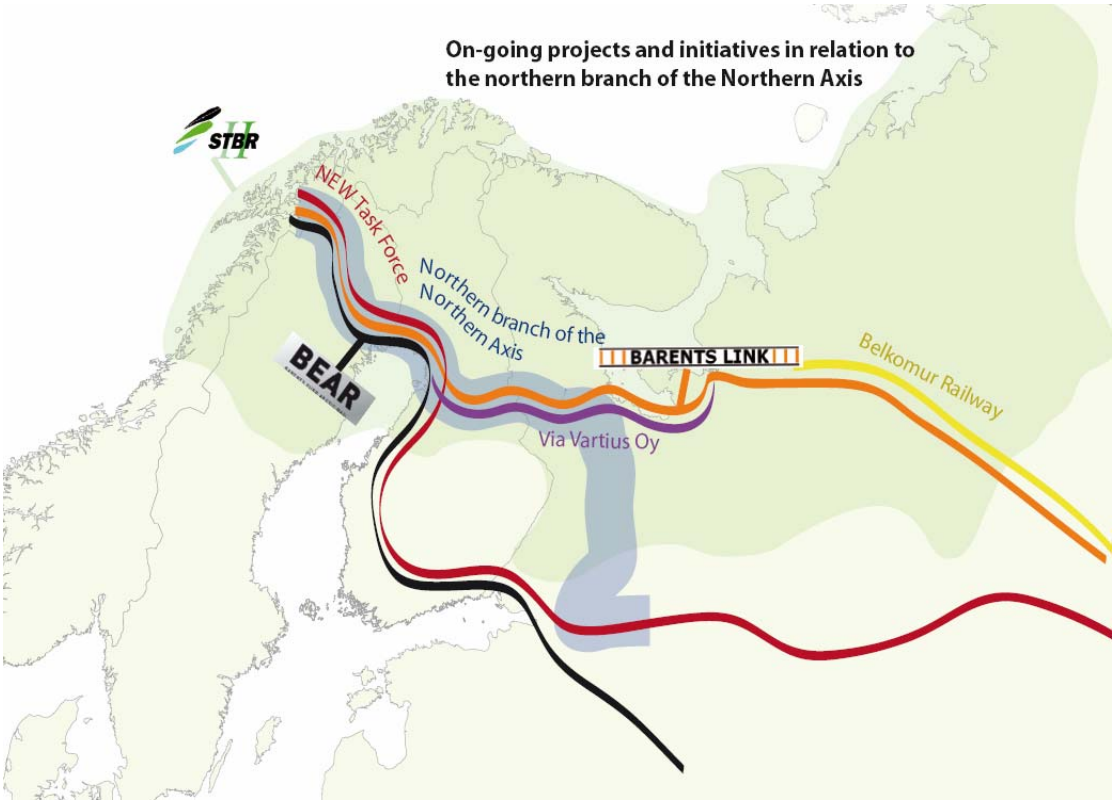


Figure 6. On-going projects and initiatives in relation to the northern branch of the Northern Axis. [4]

Projects also differ concerning the emphasis they put on non-physical issues or infrastructure planning and construction. Non-physical problems that have been explored concerns, for instance, the status of the Kivijärvi/Vartius railway station in the Finnish-Russian Border Transport Agreement; Russian railway transport tariffs; facilitated border crossing and customs formalities; border crossing contacts between trade and industry as the source of railway transports.

Infrastructure issues that have attracted attention among the projects studied in this report concern, among others, traffic steering systems and electrification of the Ledmozero-Kochkoma railway line; the Belkomur railway; development of Kivijärvi and Kostamuksha railway stations; development of the Vartius terminal area; development of the Tornio-Haparanda terminal; technical solutions for wagons enabling seamless crossing of the Russian-Finnish border.

A comprehensive description of these identified bottlenecks and missing links was made in 2005, and reported in the STBR I report 'Barents Railway Network, Needs Study'.[6]

NEW corridor has a great potential as an important alternative to the traditional shipping route from China to USA mainly because of:

- Shorter route for some destinations.
- Reduced transit time due to faster land transport and shorter travel distance.
- A reduction of the congestion problem within the densely populated areas of coastal China and the constrained ports of the west coast of USA. As the corridors route within NEW goes through sparsely populated areas, it is relatively easy and cheap to increase capacity.
- Most of the infrastructure is already in place. The main needs are to expand ports and to make train shifts at borders more efficient.
- The port of Narvik in Northern Norway has an all-year ice-free port and railway connection to Russia through Sweden and Finland.

- The route avoids six bottlenecks of global shipping; the Panama Canal, the Suez Canal, the Straits of Gibraltar, the Bosporus, the Straits of Hormuz and the Straits of Malacca, which 60% of all shipping passes through.
- The route is a backup solution in case of terror or traffic incidents, conflict in South China Ocean or labour strikes on the Pacific shipping route. The west coast port strike showed how important and crucial ports are for the US economy.

Development of aviation network in the Barents Sea Region

Each country in the Barents Region has a well-developed national aviation network. However, today there are only few cross-border flight connections in the region. Therefore, it can be concluded that a well-developed network of flight connections between the countries is practically missing. [1]

In many quarters a wish has been voiced that flight corridors need to be developed in the North (Barents Sea region), which are capable of attracting business or tourism trip makers. At present, it is believed that some of this traffic is using different modes of transport or does not take place at all, because of lacking or insufficient flight services. For example, businessmen and other travellers today are forced to use costly and time consuming routes via St. Petersburg and Oslo, Stockholm or Helsinki in order to reach destinations in the very North of neighbouring countries.

A regional air connection (in the Barents Sea Region) between Luleå and Tromsø via Kiruna has been opened to traffic October 2004 providing an important example for the aviation co-operation in the Barents Region. This route is based on a marketing test within Interreg IIIA aiming at finding out whether there is a chance to establish commercial traffic in the future. The marketing test will end late 2006.

Other existing routes are those between Luleå and Archangelsk via Rovaniemi and Murmansk, and between Tromsø and Murmansk. Examples of flight connections, considered necessary by some parties, but which have not yet been developed, include the routes Luleå-Oulu-Kajaani-Kostamuksha-Archangelsk and Bodø-Hemavan-Umeå-Vaasa-Joensuu-Petrozavodsk.

The Nordic Countries, as well as Russia, have developed and support each their own aviation networks with the main, and often the only, hub located in the national capitals. As the routes are connected with the capital city hub only, routing of all traffic between the countries takes place through these hubs.

It is quite conceivable that a similar linking of national networks could be achieved also in the North, namely between the main northern population, business and administrative centres of each country. Furthermore, it is increasingly important that an air traffic network develops in the geographically large Barents region so that the total accessibility within the region is improved. Naturally the Barents network must be coupled with the national air traffic networks either through direct flights or schedule integration. [1]

Demand for cross-border air connection is fairly low. Russians dominate the routes to/from Russia. Two thirds of the passengers are Russian citizens. Two thirds of the trips to/from Russia are related to work. The composition of current flows is illustrated in Figure 7.

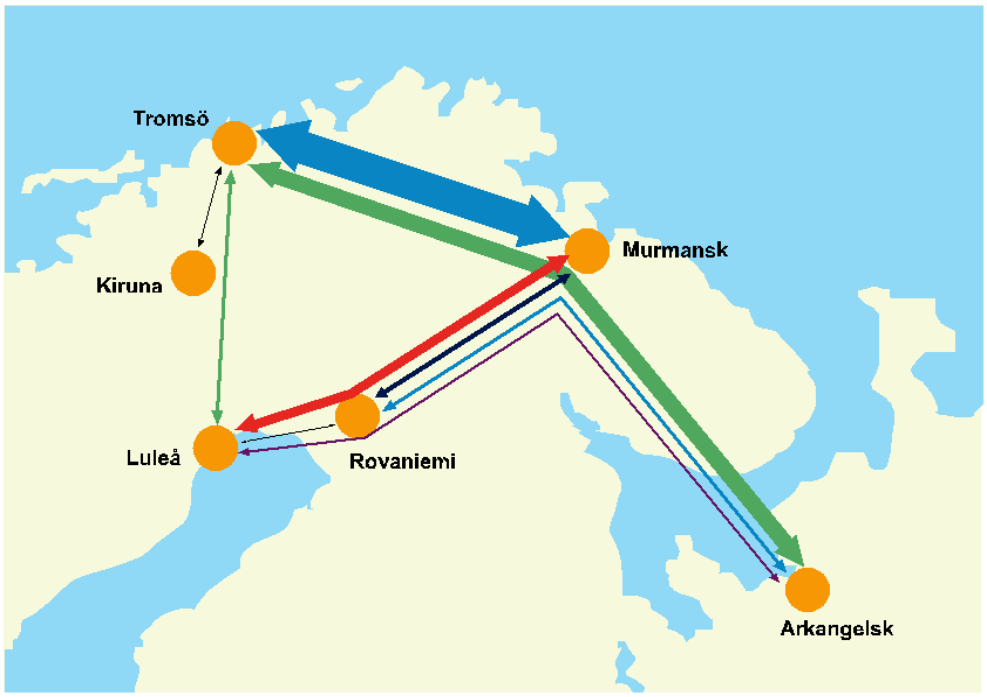


Figure 7: Passenger flows on cross-border aviation routes in the Barents Region in 2004 [1]

As in other remote regions, demand for cross-border air connections in the Barents Sea Region is very low.

Since there is no "market solution" some sort of subsidies is needed in order to secure a sustainable supply of cross-border flights. This is a common solution for domestic flights in some remote regions in Europe. Some of the present cross-border flights in BSR are already subsidised.

Public service obligations exist for domestic routes in the Nordic countries. EU-rules and national rules regulate such subventions. However, no examples of subsidies for routes going between EU-countries exist. The Barents problem is even more complicated involving a country standing outside EU/EEA. Therefore special arrangements have to be provided in order to create a PSO-solution for BSR cross-border routes. There are – at least – two problems involved here. The first one is the judicial question of how to find a solution that complies with national and international (EU) laws. This is a problem that has to be solved in co-operation not only with the BSR countries but also with representatives of the EU. The second problem concerns the distribution of costs for the subsidies between the four countries. There are considerable difficulties involved in calculations of costs and benefits of international transport routes. These problems are both principal and practical and require some further research.[1]

Supply of aircraft and airport facilities are sufficient as regards the Nordic countries. As shown by tenders to PSO-routes, Nordic airlines show a good willingness to fly remote routes. The airports in the Nordic countries have modern equipment. In Russia the situation is different: There is a significant shortage of modern aircraft in Russia, which is partly due to heavy duties on carriers imported from other countries. There are also severe deficiencies in modern equipment on Russian airports, which has repercussions for the international traffic.

In further development of aviation network within the Barents Sea region the focus should be concentrated on maintaining the existing cross-border services. Regularity and reliability of the service supply are key issues in securing a constant and developing demand. An unreliable service has a considerable negative effect on trip makers' willingness to book flights on such a service. New service and route initiatives are also to be supported at the

same time acknowledging that the strongest driver for starting new services should be a sustainable profitability and the business potential of a service. [1]

Development of transport system in South Baltic Sea area

Transportation of passengers and goods increases dramatically in the South Baltic Sea area. However, existing infrastructure and transport solutions are not enough equipped to manage the growth in an efficient and sustainable way. The work package 2 of the Baltic Gateway project focused on cohesion in the area through improved accessibility. Selected corridors and bottlenecks were investigated and concrete investments prepared.

The following maps (figure 8,9, 10) provide an overview of the physical network concerned, main shortcomings and investments to be expected according to current plans.

Figure 8: The map shows the Trans European Network including roads and rail links, and ports (category A), which provide for maritime related transport services in the SBSa today.

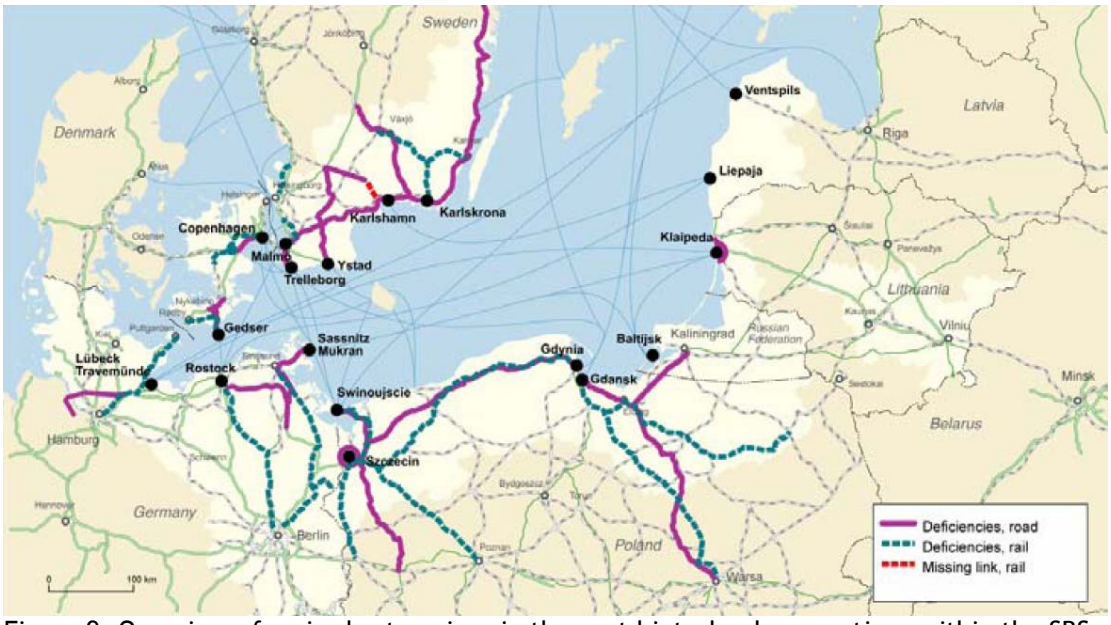


Figure 9: Overview of main shortcomings in the port hinterland connections within the SBSa today. [7]

Figure 10: The map shows road and rail links, which are expected to be improved or constructed before 2015 according to European and national investment plans. [7]

Improved transport services in the SBSa will provide alternatives to rapidly growing transport in east-west direction via congested land routes in Poland and Germany, including those related to Trans-Siberian connections and Russian trade.

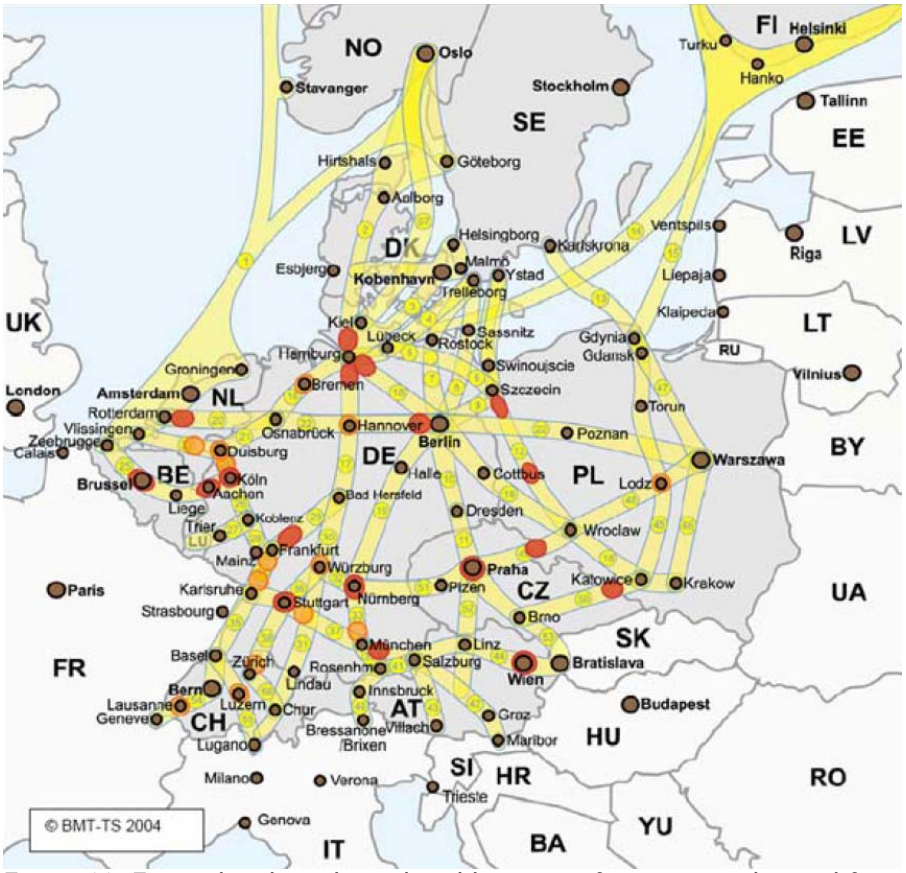


Figure 11: Future bottlenecks and problematic infrastructure demand for rail corridors and intermodal terminals. Critical terminal locations are indicated as red dots, critical rail corridors are indicated in red. [7]

Development of Via Hanseatica Transport Corridor

Within the Baltic Gateway Plus project a specific report highlighted the development potential in the Via Hanseatica Transport Corridor (figure 12). The main aim was to find proposed investments in the Via Hanseatica Corridor included in the Polish national investment plans for 2007–2013. The belt of accelerated growth of international significance extends from the West, thereby connecting two European centers of polarization–Szczecin and Gdansk, and further to the east through Elblag towards Olsztyn and Elk. In this belt Koszalin is a national centre of sustainable development and Slupsk a regional centre of sustainable development.

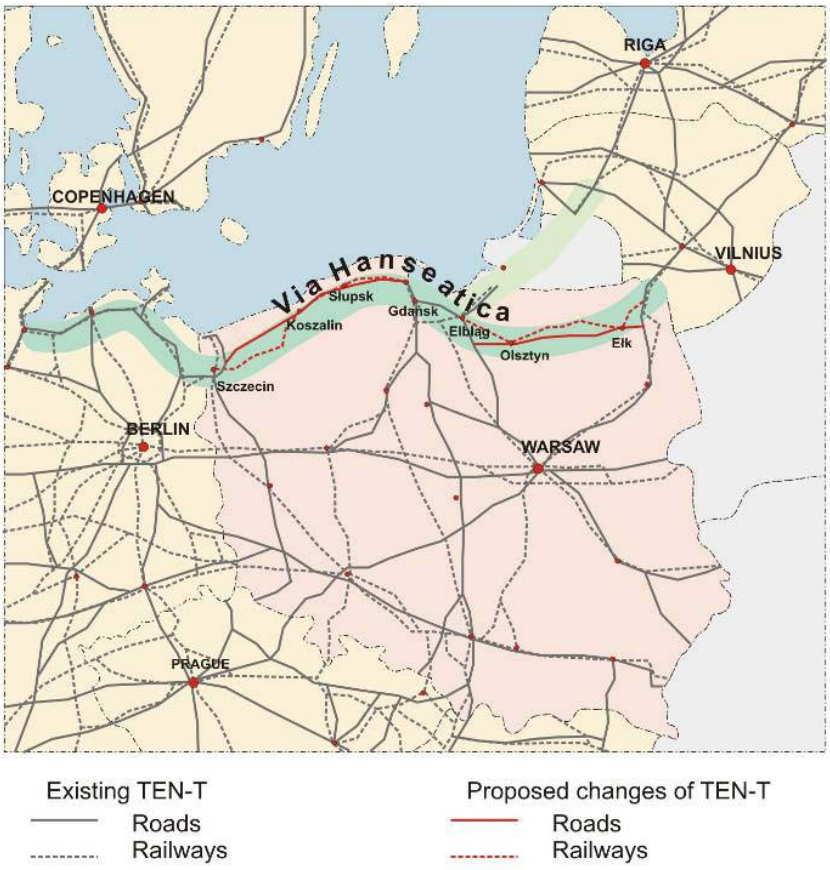


Figure 12. Via Hanseatica and the TEN-T road and rail network in Poland.[8]

A Sustainable Development Model was presented as part of the latest concept of spatial development in Poland. In this concept the model of sustainable development was supplemented with a map of stability bringing elements, which shows, among others, an expressway and modernized rail line along the main route in Pomerania, from Szczecin, through Koszalin to Gdansk, and the road from Gdansk, through Tczew and Elblag to Kaliningrad. Here Olsztyn is linked to Elblag with a rail and road link and with Via Baltica through Elk as a possible fast road. The main transport belt crossing Pomerania from the Western border through Szczecin, Koszalin, and Slupsk to Gdansk has been the main transport axis of the region in almost all concepts presented in the recent 60 years. Improving and developing the Via Hanseatica corridor along this route may contribute to better transport accessibility of the area, and help to counteract the ongoing marginalization process of Pomerania, especially its central part. Good transport links may not only stimulate economic growth in the area, but also support the inclusion of this region in the network of links and nodes which contribute to the integration of Europe, especially the Baltic Sea Region. Representatives of three Polish northern voivodeships Zachodniopomorskie, Pomorskie and Warminsko- Mazurskie prepared and signed an official

statement, "Common statement of the Polish Northern Regions concerning including of the Northern Transport Corridor in the modified TEN-T network in Poland", where they call for the National Government to include road E28 (Szczecin–Gdansk) and road no.16 (Ostroda–Olsztyn–Augustow) as well as the railways Szczecin– Gdansk and Gdansk–Elblag–Olsztyn–Elk. [8]

Rail Baltica

A strategic study of the Rail Baltica railways has been conducted in the period November 2005 - December 2006 on the request of the European Commission, Directorate-General Regional Policy by COWI company. The objective of the pre-feasibility study has been to assess strategically the overall need and potential for developing Rail Baltica and to provide recommendations for project implementation of the most suitable development option in terms of alignment, technical standards and organisation. Three main investment packages were selected for economic and financial analysis (figure 13) [9].

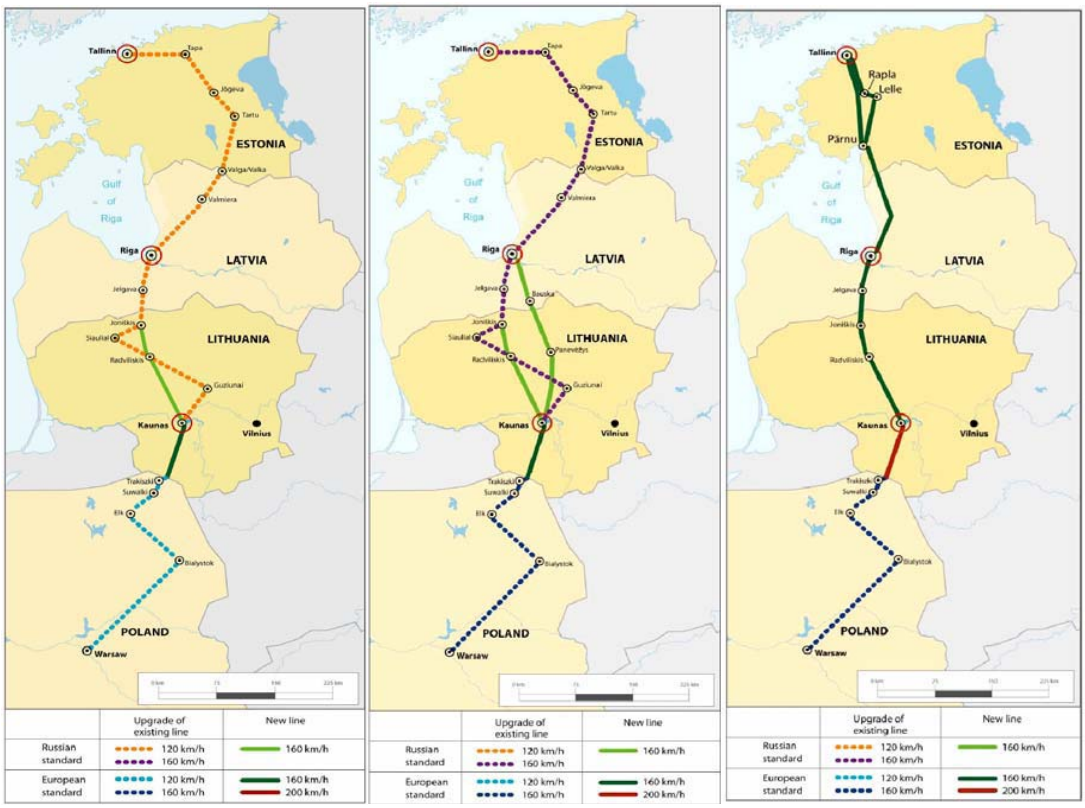


Figure 13. Alternatives 1, 2, 3 (from left to right) as defined by COWI report. [9]

Package 1: Design speed of minimum 120 km/h. Package 1 represents a solution, which secures a minimum design speed of 120 km/h from Tallinn to Warsaw. The package describes a situation where Russian standards are maintained in Estonia, Latvia and Lithuania -except from the section from Kaunas to the Lithuanian/Polish border where a new line with European standards (not electrified) is constructed according to already agreed standards. The package includes the construction of a 185 km partly new and more direct line from Joniskis via Radviliskis to Kaunas. Alternatively, the existing line could be upgraded/ extended. This option is considered a sub-variant in Package 1. This package requires that a re-loading station or logistics centre be established in the Kaunas region.

Package 2: Design speed of minimum 160 km/h. The second package reflects a rather ambitious plan for implementing Rail Baltica. It includes a north-south connection providing a design speed of at least 160 km/h. The package also includes the construction of a new

line from Kaunas to the Lithuanian/Polish border based on European standards (not electrified). It requires that a re-loading station or logistics centre be established in the Kaunas region. The main option includes the construction of a new and more direct line from Joniskis via Radviliskis to Kaunas, but as for Package 1, a sub-variant is considered, based on upgrading of the existing line between these cities. Another sub-variant is also considered where a new line is constructed from Riga -via Bauska and Panevezys to Kaunas.

Package 3: European gauge standard. The third package reflects the most ambitious plan for implementing Rail Baltica. The package is based on the European gauge standard on all north-south sections. The alignment between Tallinn and Riga will run via Pärnu (the shortest route), while the section between Riga and Kaunas will run via Radvilikis (the shortest route). From Kaunas to the Lithuanian/Polish border a new line is constructed with a design speed of 200 km/h. The Polish part of the link (via Elk) is upgraded to 160 km/h and the section from Bialystok to the Lithuanian/Polish border is electrified. Investment package 3 includes 2 sub-variants. One variant is to construct a new line via Lelle/Pärnu instead of a direct link from Tallinn to Pärnu, while the second sub-variant considers the consequences of no further electrification. [9]

The objective of the study to assess the most favorable alignment of the Rail Baltica railway corridor has been achieved by analyzing the four groups of criteria:

- Economic and regional development;
- Social;
- Spatial planning;
- Environmental.

The indicators for the study were chosen based on their relevance to the objective, as well as based on the availability of data and compatibility and comparability of data among countries. According to the data analysis and the results that are summarized in the Section 8 of this report, the most favorable route for the Rail Baltica corridor is the Alternative 1 that plans on upgrading the existing railroad in all three Baltic countries and Poland. The Alternative 1 follows the route along the larger cities and towns in all the 3 Baltic countries. It can be concluded that the stronger the region's performance is currently in all aspects of the indicators analyzed, the more favorable the placement of the railway corridor through this region is. The more population is served and the more business units are located in the region, the greater impact of the corridor can be predicted for that region and the country and corridor overall. Analyzing the results of the study it becomes clear that existing rail infrastructure is already built based on the number of economic, social and spatial planning aspects. The "shortcuts" that are provided by some alternatives produce some travel time savings. However these time savings are at the expense that important economic and regional centers are not included in the Rail Baltica corridor. In such a scenario the Rail Baltica would bear more of a transit nature, than would serve the economic, regional development, social and other needs of the countries and regions it crosses. [10]

Inland waterways network

The inland waterways in the Baltic Sea wider region together with the short navigation distance over the Baltic Sea constitute a substantial resource of future traffic capacity. The studies carried out within the Intransea project show that investments in inland waterways are needed to establish the quality needed to become a viable modern transport mode. The need for better control of rivers, canalised rivers and canals as regards flooding is also identified in the studies. [11]

Figure 14. The map of the Baltic Sea Region encompassed by the INTRASEA project. [11]

Recommendations for future actions are to promote the integration of inland navigation in a trans-Baltic multimodal transport strategy. This concerns a better integration of inland shipping into multimodal trans-national transport chains and the general use of inland navigation in a national and trans-national context.

It will also include the combination of inland waterways and short sea shipping. To encourage a trans-national work in the Baltic Sea Region where administrators, stakeholders, users and the industry participate to promote and develop the use of inland shipping in a multi-modal environment would increase the viability. By doing so the realistic potential of this mode is employed to meet future challenges for the transport sector. [11]

Intermodal network in the SBS

The Baltic Gateway project concluded that intermodal terminals in the South Baltic Sea area are all connected to the main rail networks, but there is an urgent need for upgrading due to the rapidly increasing demand for rail capacity, especially in the new Member States.

The Baltic Gateway project identified several transport corridors, which connect ports in the partner region (see figure 15). However, also other main transport routes cross the

South Baltic Sea, including transport to and from ports along the coasts of the Bay of Finland and the Bothnian Bay. [7]

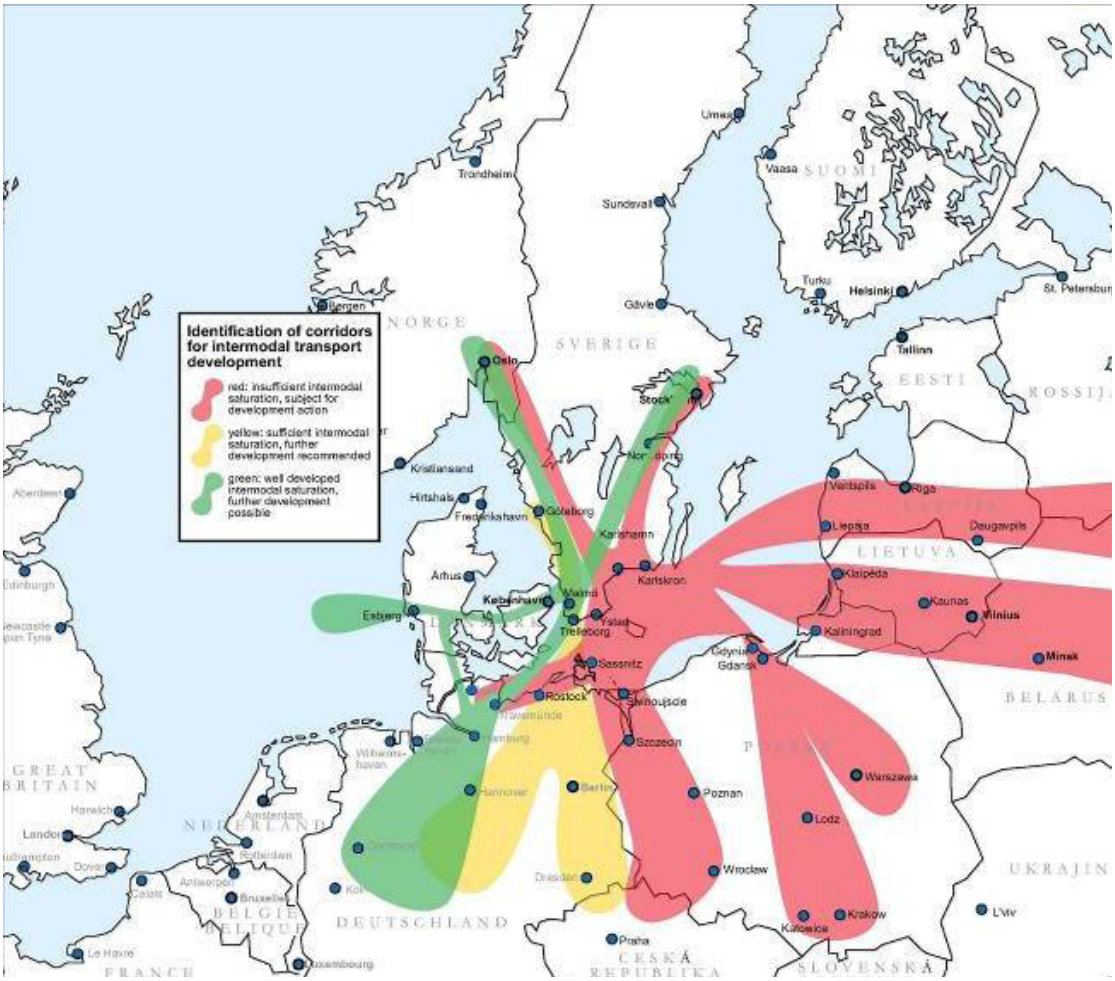


Figure 15. Intermodal corridors assessed in the Baltic Gateway project (Please note that the map does not show all corridors, e.g. Finland – Germany) [8]

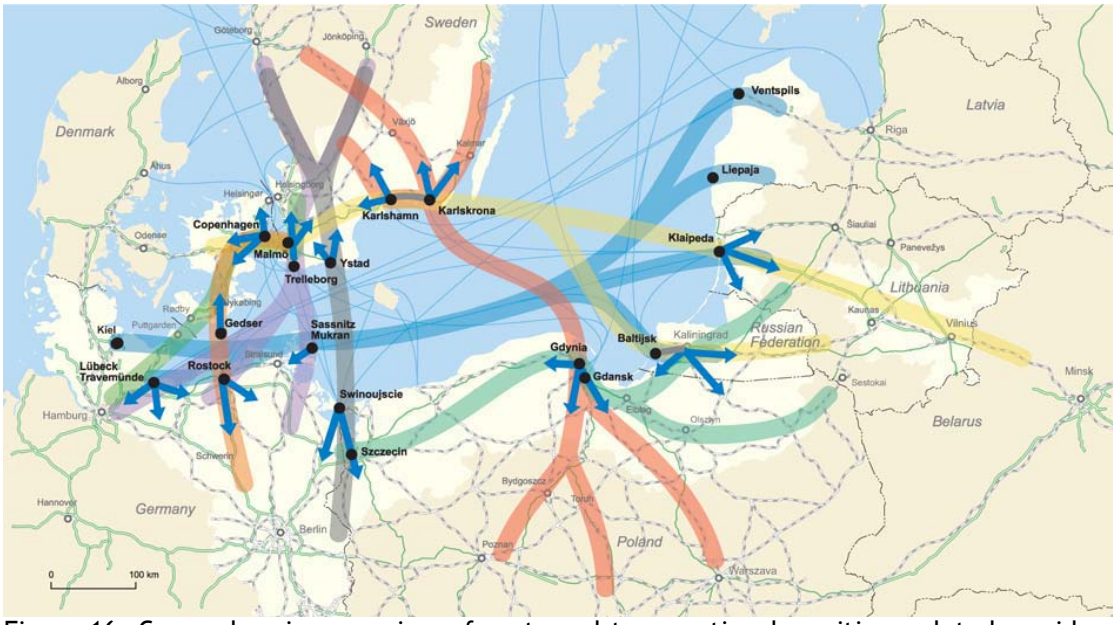


Figure 16: Comprehensive overview of ports and trans-national maritime-related corridors in the South Baltic Sea area. Please note that this map does not give an overall picture of all maritime related corridors. There are also other corridors and ports serving other markets including connections to Finland, northern Sweden, St Petersburg, and the North Sea Region. [7]

TEN-A ports in the South Baltic Sea area (figure 16)

- Gedser
- Copenhagen-Malmö Port
- Trelleborg
- Ystad
- Karlshamn
- Karlskrona
- Kiel
- Lübeck/Travemünde
- Rostock
- Sassnitz/Neu Mukran
- Szczecin, Swinoujscie
- Gdansk, Gdynia
- Klaipeda
- Liepaja
- Kaliningrad/Baltijsk

Trans-national maritime-related corridors in the South Baltic Sea area (figure 16)

- String, Hamburg – Öresund Region
- Trelleborg – Travemünde/Rostock
- Germany – Lithuania/Latvia maritime corridor
- Copenhagen-Berlin
- Central European Transport Corridor
- Baltic Link
- East-West Corridor
- Via Hanseatica

Baltic link

Studies in the SEBtranslink project show that there is potential to structurally and systematically steering demand for various transportation solutions to the Baltic Link

corridor (figure 17). The corridor has the ability to meet various communication demands at the same time.

Baltic Link can be an important transportation route that, using the same infrastructure, can meet the demands for:

- International connections between Scandinavia, Continental Russia and Asia
- Alternatives to congested routes and rails in Western Europe
- Linking of TEN corridors in Scandinavia and the Baltic Sea Region
- Interregional connections linking Vilnius, Warszawa and southern Poland with the coast and south eastern Sweden with the Gothenburg area
- Fast connections to other regions via ports, airports, major railway stations and traffic junctions to crossing routes
- Regional and local connections within and between expanding local labour market areas

Figure 17. Baltic Link connects continents, countries and regions [12]

Improved conditions for transit traffic would improve accessibility and the environment from international, regional and local perspectives. The prerequisites to meet the demand for alternative transport modes using the same infrastructure are good in the corridor. [12]

East-West Transport Corridor

The East-West Transport Corridor (EWTC) is a growing transport corridor with the potential to serve the increasing needs of east-west transport capacity across the Baltic Sea. The

corridor is already an important part of the regional transport system between Denmark, Sweden and Lithuania, and it forms a part of the global trade corridor that links to Russia, the Black Sea Region and the Far East (figure 18).

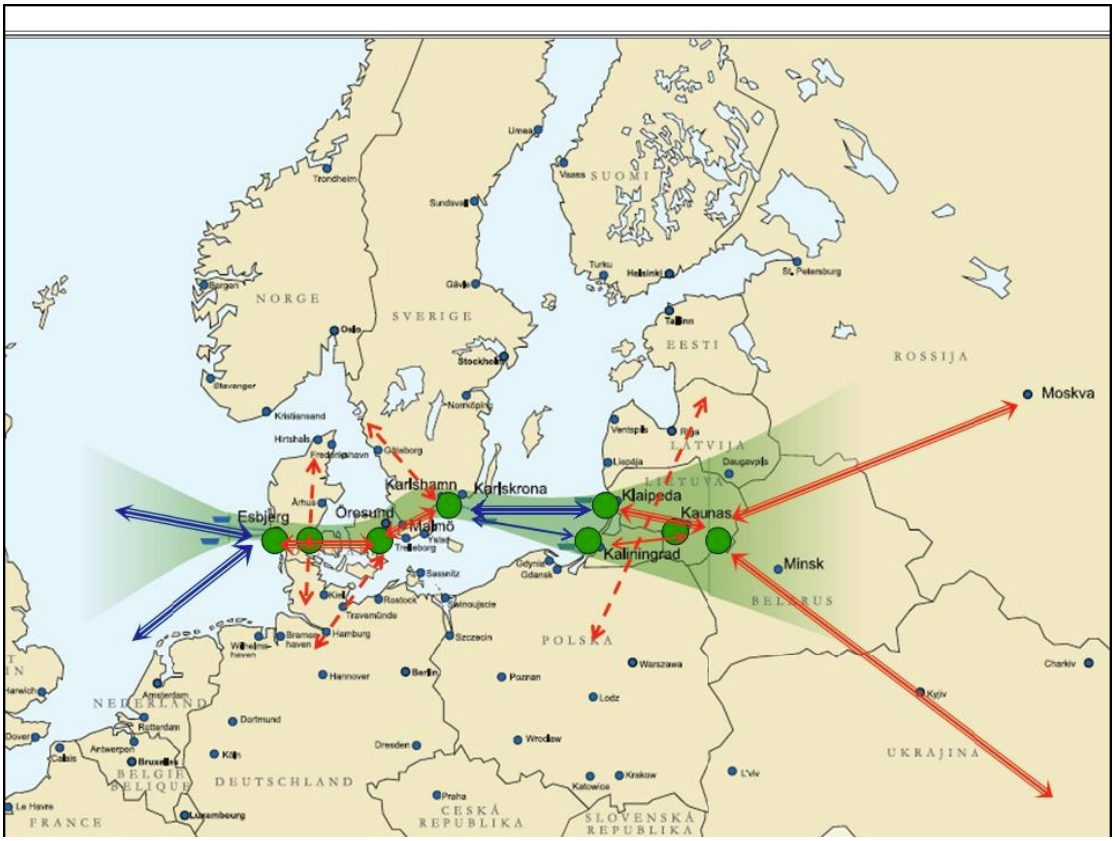


Figure 18. The East-West Transport Corridor in Perspective [13]

The EWTC is an important transport corridor, which is a network of transport links, connected to the main route from Esbjerg in Denmark to Vilnius in Lithuania, connects the two capital regions Copenhagen and Vilnius, and combines a number of important transport nodes, such as Esbjerg, Malmö, Karlshamn, Klaipeda, and Kaunas, links-up with other important transport nodes and destinations in the Baltic Sea Region such as Kaliningrad, Gdynia-Gdansk, Gothenburg and Oslo, has a large area of influence though it's hubs, which are of strategic importance for goods and transport in their respective country, the Baltic Sea and also for European trade with Russia, the Black Sea Region and the Far East, consists of an inter-modal transport system with each of the different transport modes being links in the national and European transport system (including TEN ports and national priority railways and motorways), experiences higher growth figures in transportation than many other official European transport corridors within the TEN system, is an important transport corridor within the EU with the potential to become part of the European TEN system, and is committed to sustainable development and Europe's transport needs and to contribute to mastering Europe's transport challenges in a more environmentally friendly manner. [13]

Motorways of the Baltic Sea

The solutions for the Motorway of the Baltic Sea stand as a non-exclusive list of possible options built upon the generic concept laid down by the European Commission. Their selection is determined by already observed tendencies and regulatory processes, with a trend line attributed to Option 1, prospective leverage effect of EU Structural Funds to Option 2, bottom-up initiatives of port clusters to Option 3, and finally – policies of North Sea transhipment ports to Option 4. [14]

Option no. 1: **A transit route connecting the Gulf of Finland with the North Sea**
Trunk axis linking the ports on the Gulf of Finland (e.g. Helsinki, Turku and Kotka) and Bay of Bothnia with the German ports on the North Sea and in the vicinity of Kiel Canal (figure 19).

Figure 19. Hub-and spoke system for Finland, with possible extension to Russia [14]

Development consequences for the South Baltic Sea area

- Public infrastructure investments located in the ports and port-adjacent areas of Kiel, Rostock and Lübeck/Travemünde
- Better opportunities of the two German regions in attracting cargo flows from north-eastern part of BSR
- New transport chains exploiting an enhanced gateway function of regions of Schleswig-Holstein and Mecklenburg-Vorpommern
- Prolonged feeder role of south-eastern Baltic ports in ro-ro/lo-lo traffic [14]

Option no. 2: **A transit route connecting the Gulf of Finland with the Polish ports**
Trunk axis linking the ports on the Gulf of Finland (e.g. Helsinki, Turku and Kotka) and Bay of Bothnia with the Polish ports of Gdansk, Gdynia and Szczecin- Swinoujscie (figure 20, 21)

Figure 20. Diagonal motorway of the Baltic Sea prospectively developed in consequence of public investments in and around the Polish port Gdynia/Gdansk perspective. [14]

Figure 21. Diagonal motorway of the Baltic Sea prospectively developed in consequence of public investments in and around the Polish port Szczecin-Swinoujscie perspective [14]

Development consequences for the South Baltic Sea area

- Diversion of volumes to Poland as a transit country for Baltic Sea cargo
- Changes on the Polish container market, induced by better share of directly delivered units at the cost of the share of units transported from German ports by rail and road
- Redefinition of hinterland areas between eastern ports of Germany and Szczecin-Swinoujscie
- Opportunities on the demand side to set up a transport corridor linking the Baltic Sea with the Mediterranean area (traced along the A1 motorway corridor or along now non-existent CETC)

Option no. 3: **A network of short sea connections across South Baltic Sea area**
Polycentric sea motorway structure connecting landside outlets of the TEN-T in the South Baltic Sea area (figure 22)

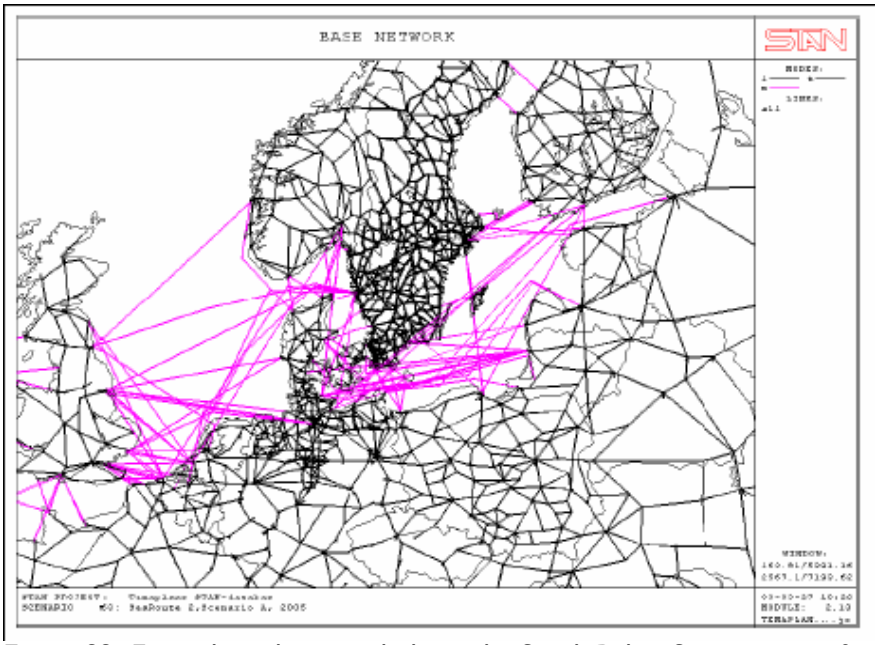


Figure 22. Exemplary short sea links in the South Baltic Sea area as a framework for the polycentric MoS structure [14]

Development consequences for the South Baltic Sea area

- Magnification of volumes to Baltic States as a transit area for cargo dispatched to/from former CIS countries
- Demonstration of applicability of MoS to the objective of the territorial cohesion (e.g. through links to southern Sweden)

Option no. 4: **Extension routes for the land bridge container transports from the North Sea**
Landbridge connection(s) linking the local structure of the sea motorways to the North Sea motorways.

Figure 23. SEBTrans rail and road transport corridor allowing for setting a North Sea-Baltic Sea landbridge through access points of Gothenburg and Karlskrona [14]

Development consequences for the South Baltic Sea area

- Increase of volumes to Baltic States and Poland as a transit area for cargo dispatched to/from former CIS countries
- Demonstration of applicability of MoS to strengthening territorial cohesion (e.g. through links to southern Sweden)
- Contribution to territorial cohesion over the limits of the Baltic Sea Region

Taking in consideration the studied options for MoS in Baltic Sea the following conclusions and recommendations for further work are given:

- The elaborated options for the Motorways of the Baltic Sea do not contradict one another and may operate simultaneously
- Successful lunching of the sea motorways is dependant on several factors related with a competition between public authorities and territories for customer's appreciation
- Further work with the concept shall be regarded in a short- and long-term perspective

The team of BaSIM project has concluded on the main transport corridors. This stimulated awareness of Motorways of the Sea solutions and possibilities and gives ground to move further. Received proposals from the joint Baltic Call for Motorways of the Sea proposals are presented on the map below (figure 24). [15]

Figure 24. MoS proposals in BaSIM project

Transport infrastructure bottlenecks in the Baltic Tangent area

As a result of the Baltic Tangent project five major transport infrastructure bottlenecks in the BT area were identified (figure 25):
- Border crossing Latvia-Russia and Estonia- Russia
- Riga Ports, Rail and Motorways
- Railway capacity in Lithuania, Latvia and Estonia
- Infrastructure in south-eastern Sweden
- Ports at the southeast coast of Sweden. [16]

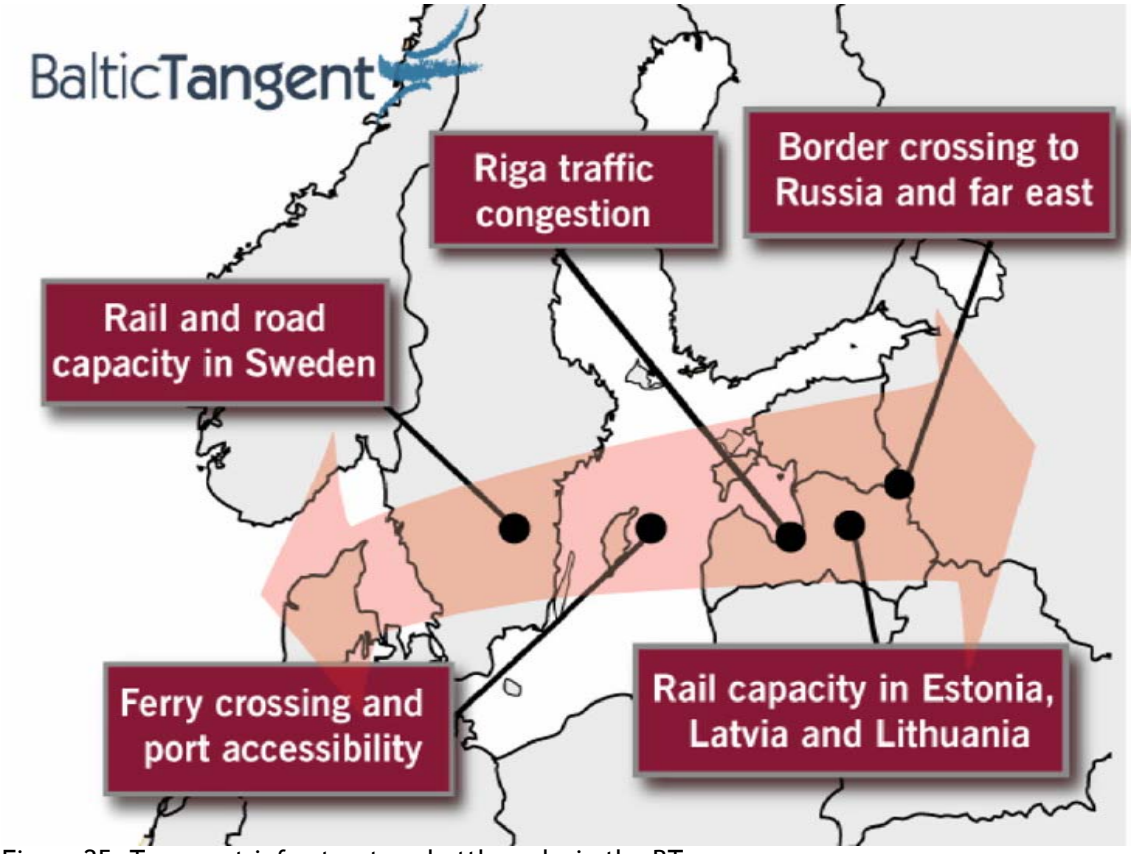


Figure 25. Transport infrastructure bottlenecks in the BT area

1. Border crossing Latvia-Russia and Estonia-Russia

One of the main bottlenecks severely restricting the possibilities of transport development is the congestion on the Latvian - Russian border crossing points. As the border control on the Russian side does not work efficient enough, trucks, including the one working under TIR carnet, have to wait long - often ten or more - hours to cross the border. That results in less competitive transit corridor via Latvia, shifting Ro-Ro traffic and containers to other Baltic Sea eastern coast ports. Frequently changed requirements with regard to control documents on the Russian side, especially regarding sanitary and veterinary controls, are the next serious problem on the eastern boarders.

Border crossing bottlenecks in the Russian border bypasses is identified as a major problem also in Estonia. This problem relates both to old and outworn technical equipment and facilities at railway border stations as to ineffective administrative procedures affecting railway cargo traffic very negative.

One of the main transport infrastructure projects in the Valga region addresses the present border crossing problems. The objective of the Koidula project is to:

- ease the increased workload (due to the result of the increase in transit capacity) of the
- Narva Border Station by dispersing the transit capacity;
- establish a border station between the European Union and the third country;
- ensure fast reaction in case of possible danger (threats) deriving from cargoes and transportation means;
- develop a possible international transportation centre.

As the result of this project a border station answering all modern requirements together with facilities enabling border crossing, customs and sanitary control procedures will be built in the South-East Estonia. [16]

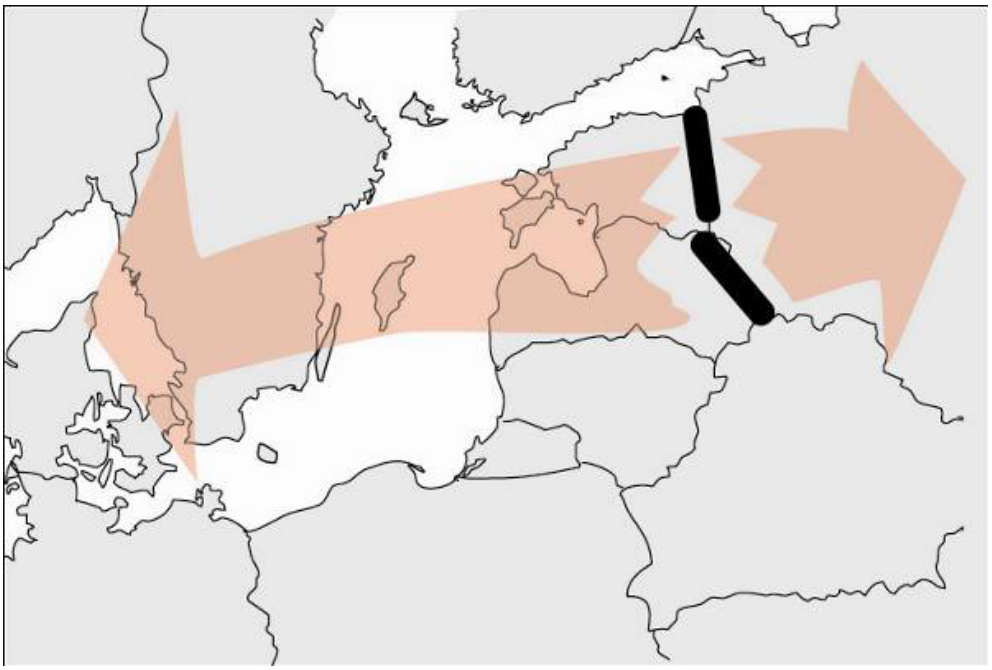


Figure 26. Identified and well known bottlenecks are the border crossing points between Latvia-Russian and Estonia-Russia, both for railway and road cargo. [17]

2. Riga Motorways

A specific bottleneck is the lack of high-speed transit main roads in the Riga region. The regional road system is also of poor quality and there is no junction (branches) between East- West and "Via Baltica" corridor with most significant populated areas in the region. The lack of arched railway junctions constitutes also a bottleneck in the road infrastructure, as does the absence of a by-pass road of Riga to be used for freight transport. Conflicts occur accordingly between transit operators and individual drivers on the roads.

During last years the intensity of cargo and passenger traffic and accordingly the territory needed for transport infrastructure (roads, parking places, logistic centers, repairs shops, and gas filling stations) have increased rapidly, while the development of infrastructure is insufficient in relation to this increase of traffic load. A significant weak point is that the development of transport modes is not balanced and coordinated within the region. There is no coordination in the planning of the transport system between Riga and other part of Riga region.

The quality of the road net in the region is not satisfactory and is continuously worsened. The technical condition of carriageways and roads is unsatisfactory and there is an incompliance regarding dimensions (for the roads of the respective category) of the most

significant carriageways. Almost half of the asphalt roads are in a bad or even critical condition, one third of gravel roads is in a bad condition as well. Critical situation takes place with bridges; just some of them are in a satisfactory technical condition. The condition of the roads is damaged by overloaded transport mostly. The Riga region does not differ in this respect from the general Latvian picture: Despite slight improvements, however, the road network still does not meet the growing requirements, with only around 600 km of highway throughout the Baltic countries.

Because of the insufficient financing of the road sector there is furthermore an amount of undone reconstruction works within the road net. The financing for road maintenance and development is not sufficient to prevent road destruction when transport intensity and proportion of trucks increases. [16]

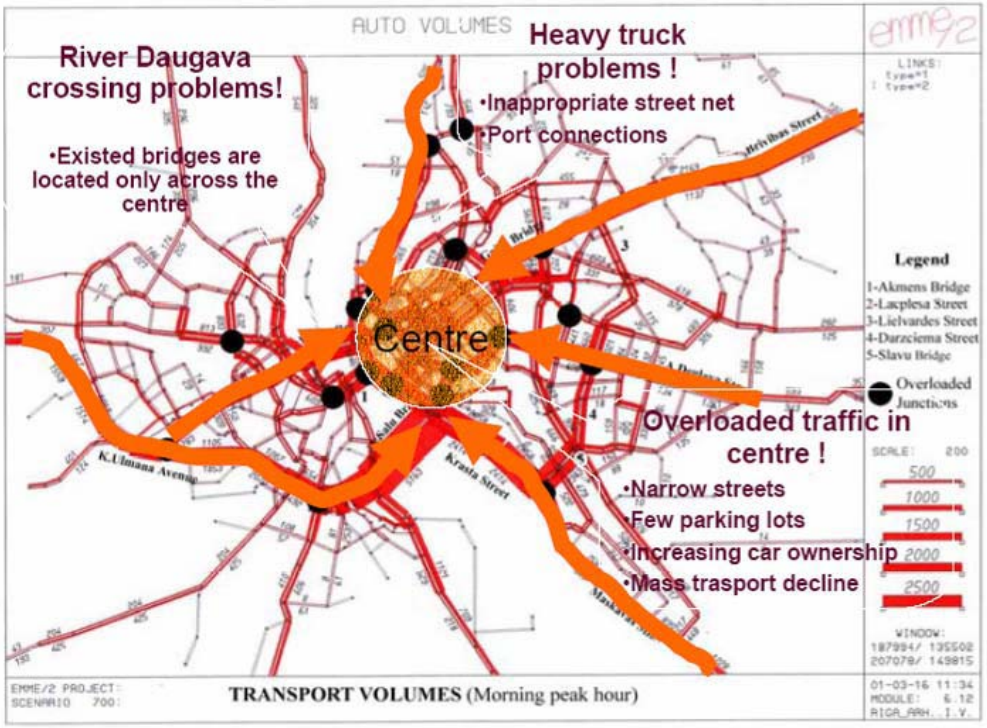


Figure 27. Transport volumes in morning peak hour in Riga city [17]

3. Railway capacity in Lithuania, Latvia and Estonia

The Baltic Sea Region is seen as one of the most interesting areas in the world regarding economic growth. One important transport flow direction is the East West axis through the Baltic Tangent area. In 2004 about 125 million tons of cargo with origins in Third Countries was transported by rail to ports in Estonia, Latvia and Lithuania. For each of these new EU Member States it is forecasted in the TEN-STAC study that rail freight flows will increase substantially until 2020 with 80 -150 %. To meet needs of long distance freight a well developed railway system is necessary. Railway traffic has been underinvested during the last 50 years, even though 22 of 30 prioritized projects are rail related (CER).

About 90 % of all the rail freight between EU and Third countries in the North East Europe region flows from the East to the West. These flows follow basically four East-West routes (The Trans-Siberian railway (transsib) via Perm passing North of Moscow to St-Petersburg, the transsib via Moscow, Riga-Samara passing South of Moscow and Lvov/Kiev to Kazakhstan/China). Pan-European Corridor-III connects Poland via Lvov/Kiev to Kazakhstan/China. Pan-European Corridor-II forms the shortest connection between Moscow and Warsaw/Berlin and crosses the route Riga-Samara. Pan-European Corridor-IX crosses and interconnects the four East-West routes.

The importance of Transsib can already be seen in the increase in volume and in 2004 international container traffic from Asia to Europe along Transsib beat the 1983 record. As many as 155,400 twenty-foot containers were delivered from Primorye ports along the Asia-Europe-Asia route on this railway. A recent study also shows that the Russian Northwest Federal District can double or triple the international flows on links between Europe – Asia and Europe - Asia - America.[17]

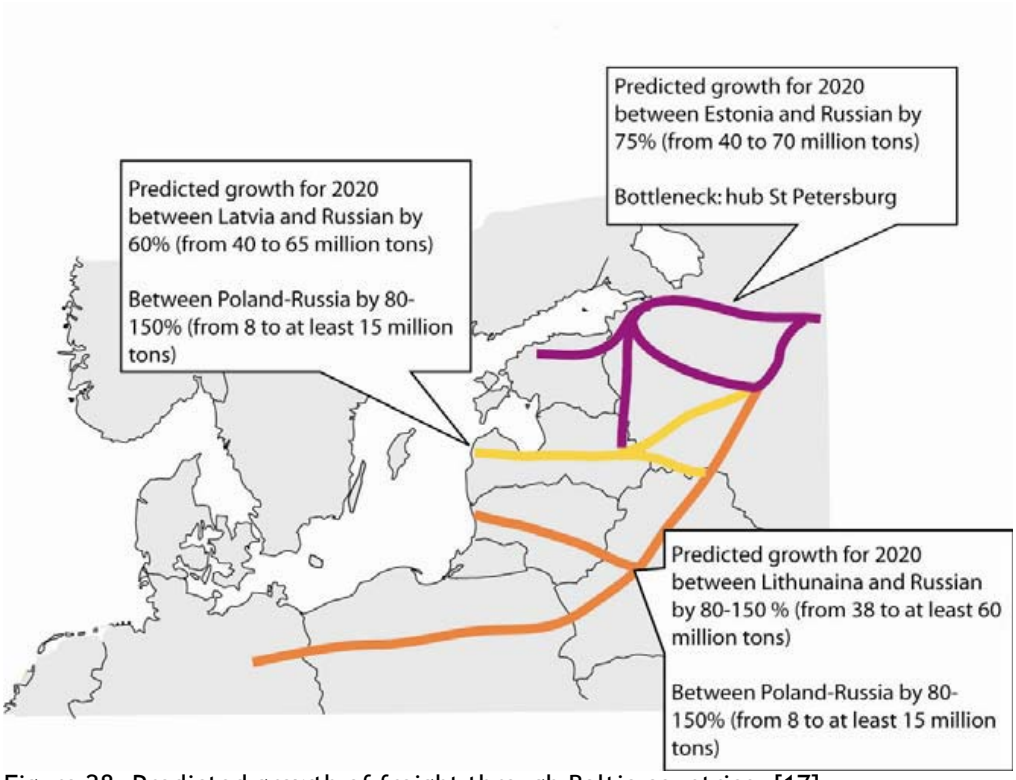
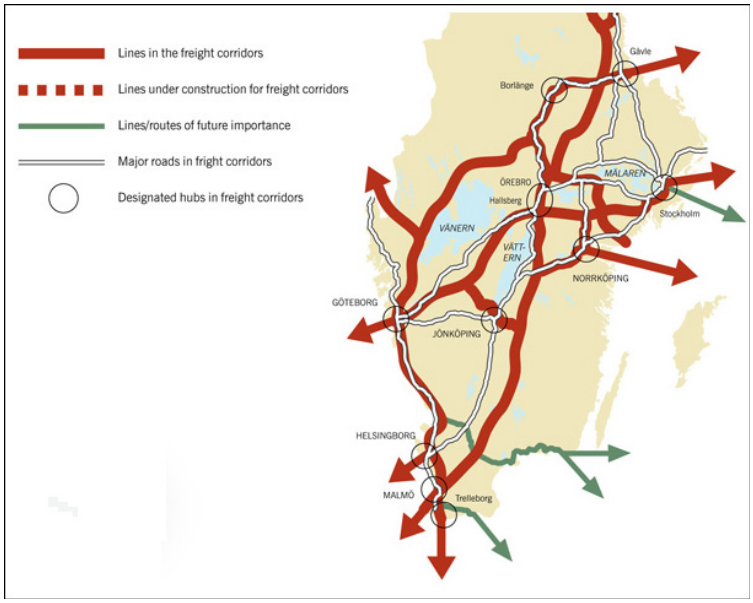


Figure 28. Predicted growth of freight through Baltic countries. [17]

4. Infrastructure in south-eastern Sweden

The standard of transportation in this part of the country is very poor. The railway system has serious shortcomings with respect to networks, track standards and train services.



The shortcomings in the railway system are accentuated by the fact that the road system also has many imperfections and people in large parts of the region have no easy access to an airport. The travel times along the county lines are about twice as long as with modern train services on modern tracks. The Coast-to-Coast Line also needs to be improved.

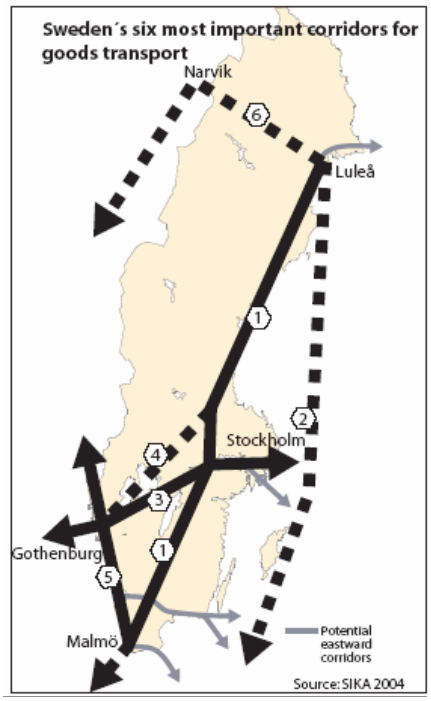
Here you also have some of the most obvious road bottlenecks in east-west direction in the whole Swedish BT area, namely parts of the roads Oskarshamn-Jonkoping and Vastervik-Jonkoping In order to benefit from and contribute to the dynamic developments in the Baltic region, south-east Sweden not only needs an advanced ferry and flight route network, but also improved infrastructure for ground transportation. There also needs to be a marked improvement in communications within the region and to and from neighbouring ones. [17]

5. Ports at the southeast coast of Sweden

In a Baltic Tangent perspective the ports at the southeast coast of Sweden constitute a crucial bottleneck. The main reason for this is of course the absence of a ferry line to the other side of the Baltic Sea. There have been two trials to establish a line from Vastervik, but both have shut down.

Another reason is the general standard of transport infrastructure in this region. As described above both railway and road standard is very poor and it leads among other things to a nonsatisfactory access to the ports.

Yet another reason is the fact that the five ports, who are relatively small in a national view, have not succeeded in accomplishing the necessary coordination and specialisation to be able to meet the competition from other port regions. This could be described as a political bottleneck. [17]



North East Cargo Link

The North East Cargo Link (NECL) cooperation started in 1996. It was initiated by the private industry but the interaction with regional and local authorities has gradually increased. In June 2003 the project was granted financing from INTERREG IIIB BSR for a period of three years.

Objective of NECL is to develop and promote a west/east transport corridor through the Mid Nordic Region with connections to, in the first place, the UK, continental Europe, Russia and Asia (figure 29). This corridor can be an alternative for a part of the north/south goods transports to avoid the congestion in the northern part of Continental Europe and thus avoiding long transport times, delays, higher costs and environmental pollution. [18]

Figure 29. North East Cargo Link

The Mid Nordic transport corridor runs through the middle parts of Norway, Sweden and Finland from the Trondheim fjord in the west to Karelia at the Finnish – Russian boarder in the east. It contains railroads, roads, harbours and shipping. The corridor connects to the west from harbours in the Trondheim fjord to the UK and to Continental Europe. To the east there are several boarder crossing points to Russia for both rail and road (figure 30).

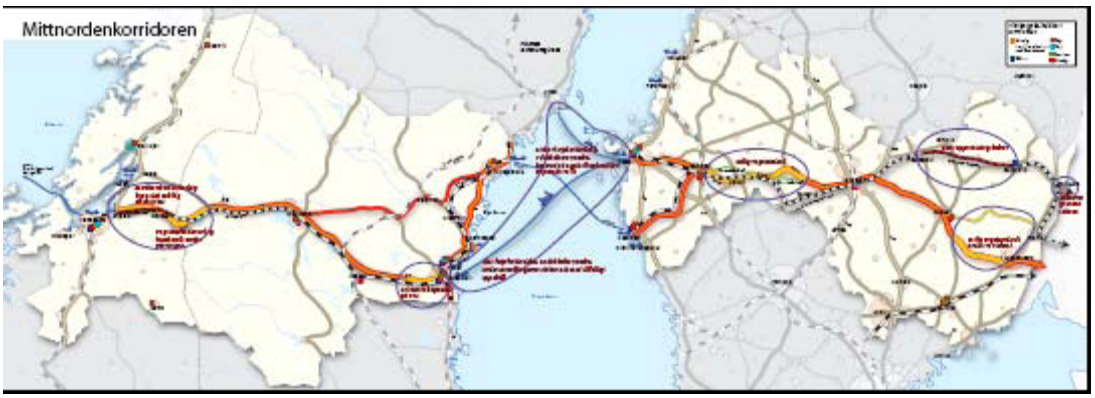


Figure 30. Transport infrastructure in an east-west direction through the Mid Nordic Region. [18]

As far as the eastbound connections from the Mid Nordic area are concerned the project has made a pre-study that illustrates the goods flows from the area to Asia. Primarily it is the wood processing companies that show a strong increase in exports to Asian markets. NECL has, based on the results from the pre-study investigated the possibilities to use the Trans Siberian railway for exports to and from Asia. This could be an alternative to cut time and cost for industries in the Mid Nordic area compared to the present use of Ocean shipping.(figure 31). [19]

Figure 31. Test delivery of cargo from Sweden to Akita Japan 50 40'' container using Transsib railway in second half of 2004. [19]

In order to attain a well-developed, sustainable and intermodal east-west transport corridor for goods through the Mid Nordic region some bottlenecks and missing links will have to be removed. In order to improve the intermodular aspect in the corridor, i.e. coordination of modes of transport, the establishment of kombi-terminals is proposed. The following measures are proposed in order of priority;

*Priority 1 - Ferry link for goods transport over the Baltic Sea.*Establishing of a ferry link for goods over the Baltic Sea between Västernorrland in Sweden and Österbotten in Finland. The project has produced information about present and potential goods volumes between Sweden and Finland suitable for a ferry link. This has been achieved through direct contacts with a number of producing industries and forwarders in the region. On a yearly basis a volume of 490000 tons were found. A ferry of suitable size needs a base of about 260000 tons to run on a commercially viable basis. A couple of ship owners are now investigating the prerequisites for establishing a ferry line based on available volumes on the market, a suitable ferry, tariffs, shipping lane fees and port call rates.

Priority 2 – The Meråker railway in Norway. The Meråker railway is one of the weakest links in the corridor. An upgrading and electrification of the railway would increase capacity and substantially improve the prerequisites for transports of goods over the national boarder between Norway and Sweden. A substantial part of the present road transports could be moved over to rail. The Norwegian government has decided on a renewal plan for the Meråker railway for the period 2006-2009 at a cost of close to 120 million NOK. In a first step, the axle weight limit will be increased from 18,5 tons 22,5 tons by 2007. These decisions have been taken partly as a result of the pressure mobilised by the NECL project over the country boarders in the Mid Nordic corridor. Further measures are necessary in order to bring the Meråker railroad up to its full potential i.e. electrification.

Priority 3 - Establishing kombi-terminals in the corridor. Intermodality, i.e. coordination of modes of transport, is of central importance for NECL as the corridor crosses land as well as sea. To improve the intermodality the NECL project proposes six combi-terminals with

location in Trondheim in Norway, Östersund, Ånge and Sundsvall in Sweden and Sinäjoki and Jyväskylä in Finland. These locations have been selected by their geographical location as well as from the interest shown from regional/local parties for such an establishment. The decision and planning situation for those locations span from idea to finalised prospecting. NECL has contributed to pre-studies of the prerequisites for the establishing of kombi-terminals.

Priority 4 – Trunk road 18/13 in Finland. Trunk road 18/Trunk road 13 in Finland makes up the main road in west-east direction in the Mid Nordic Region from Vasa via Jyväskylä, St Mikkeli, Villmanstrand and on towards Nuijamaa at the Finnish/Russian boarder (figure 32). Parts of the passage have many troublesome bottlenecks for goods as well as passenger traffic which inhibit regional and interregional cooperation between Vasa – Seinäjoki - Jyväskylä, within the Mid Nordic Region. The worst bottleneck is the road between Multia and Etsäri (60 km) that will need both to be widened and stretched out. Detailed calculations are done by the concerned road authorities but decisions on investments are not taken by the higher authorities for several of the bottlenecks.

Figure 32. Possible alternatives for new stretches on road 18, Jyväskylä–Seinäjoki.[18]

Priority 5 - E 14 through Norway and Sweden. E14 has deficiencies in Norway as we ll as in Sweden. The part Hell - Storlien on the Norwegian side is a considerable bottleneck due to its low standard. This has been stressed by representatives from industry as well as transport operators in the NECL network. Measures are necessary to make the corridor effective also for road transports. On the Swedish side the part Storlien – Duved can be problematic for trucks in the winter period due to some steep slops. Moreover there are two parts with low standard hampering the passability, Brunflo – Pilgrimstad in Jämtland and Matfors – Nacksta in Västernorrland.(figure 33)

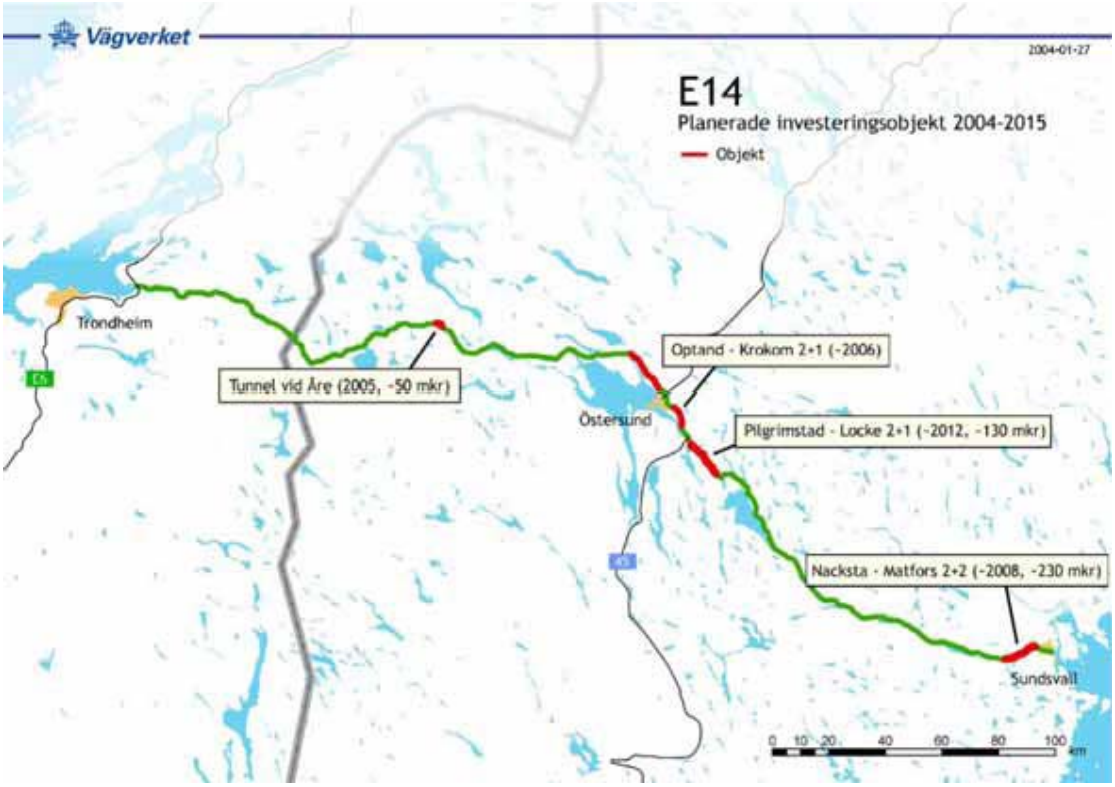


Figure 33. Planned investment objects in E14 during 2004-2015.[18]

Priority 6 - Finnish Lakes Line. The Finnish Lakes Line is a railroad in west/east direction through the Mid Nordic region from Vasa over Seinäjoki-Jyväskylä- Pieksimäki-Nyslott-Parikkala and further to the Russian boarder at the boarder crossing in Imatrakoski. This railroad has a low standard and is partly not electrified. For this reason the traffic is limited for goods as well as for passengers (The rail goods that is at present moved from Vasa eastward through Finland to Russia, for example to St. Petersburg is taken, to advantage, by a more southerly route via Seinäjoki, Tammerfors, Riihinäki and on eastwards towards Kouvola to Vainikkala on the Russian border.). An upgraded Finnish Lakes Line would offer a connection for the Mid Nordic transport corridor to the northern parts of Russia and a shorter distance to St Petersburg.(figure 34) In the spirit of NECL the Finnish Lakes Line could in a longer perspective be an alternative transport link easing the congestion on the heavily strained railroads and boarder crossings further south. This may not be a topic of today but may be in the future and we therefore regard the Finnish Lakes Line as a project for more long-term planning.[18]

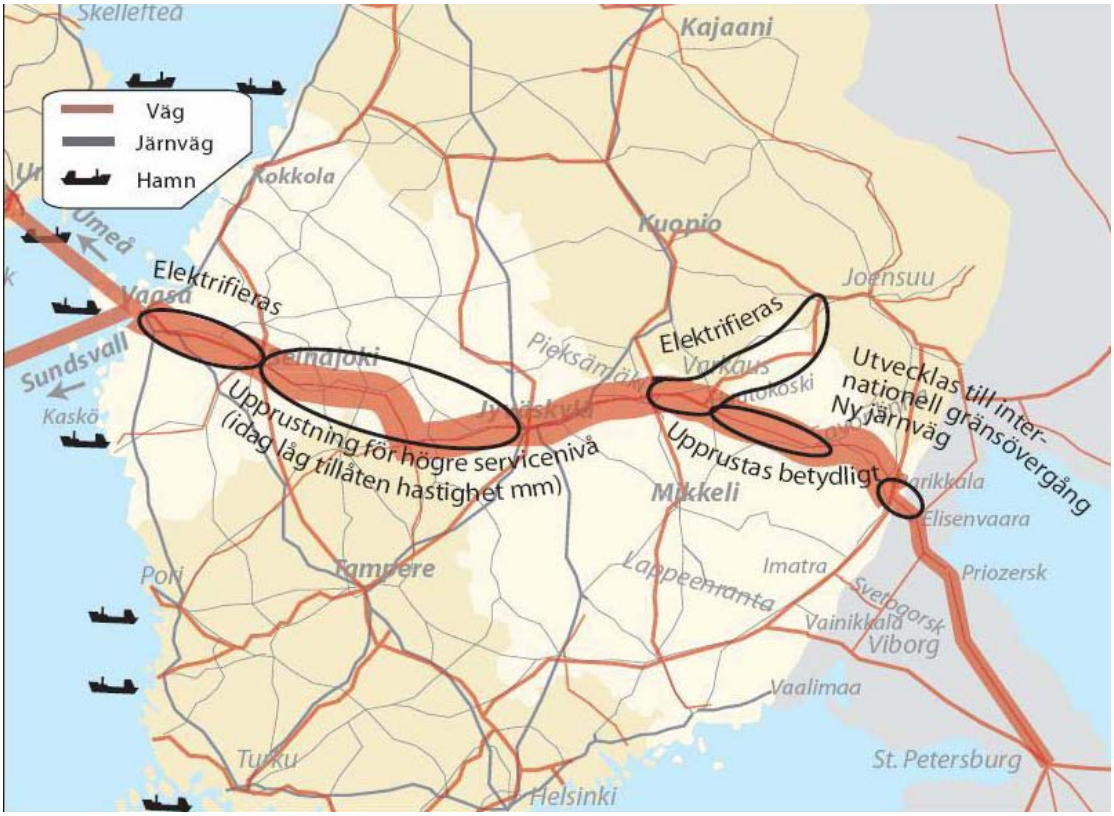


Figure 34. Infrastructural improvements necessary for Finnish Lakes Line.[18]

West/East- goods connections to the Mid Nordic Corridor. The contacts NECL had earlier have been strengthened and further developed during the Interreg period. The number of ship lines from the Trondheim fjord has been extended with regular lines to the USA, Island and Germany. NECL has had frequent negotiations with enterprises, organisations and authorities within the transport sector in Russia. The purpose is to connect the Mid Nordic Transport corridor to the Trans Siberian Railroad (TSR). Test transports for products from the chemical and forest industries are on going. Cooperation Agreements have been signed and long-term forms of cooperation have been formalized, among others a Letter of Intent with the organisation Euro Asia Transport Union (EATU). Representatives of NECL were invited to inform about NECL and the Mid Nordic Transport Corridor at the annual meeting of the organisation Coordinating Council on Transsiberian Transportation (CCTT).

E-accessibility in Baltic Sea Region

There are two projects dealing with e-accessibility issues Baltic Sea Region - the Baltic Rural Broadband project and LogOn Baltic project.

The Baltic Rural Broadband Project contributes to improvement of broadband access in selected rural areas of all BSR EU member states and Norway by identification and dissemination of best practice examples, the (further) development of local or sub regional broadband strategies and awareness rising and encouragement of local stakeholders to promote the further development of broadband as a key element of future regional development strategies.

An overview study on the state of broadband access in rural areas within the BSR based on surveys in all participating regions and reflecting each partner country's national context are carried out as a joint work of all partners.

Finland (represented by Åboland region)[20]
ICT access and use. Already in an early stage the municipalities put much interest in IT-development, in order to use IT to produce public services in a cost effective way. Due to the low number of inhabitants and a general lack of market no commercial ISP-services are available in some parts of the rural areas in the region. To cope with this problem the regional network has been put into broadband use with 100 Mbps internet connection and it is today serving companies and private households, primarily where no other broadband option from commercial ISP-operators are available.
Households in Finland:

- GSM 96.4%
- Computer 72.2%
- Internet 67%
- Broadband 56.5%
- Fixed phone 47.9%
- WAP/GPRS/3G 42.7%
- VoIP 28.6%
- Laptop 27 %

In Finland broadband is defined as a two way communications medium with a bandwidth of at least 256 kbps.
Availability of broadband access. In the eight municipalities of Åboland there are five broadband access providers. Of these providers two are local, Pargas Telefon (Pargas and Nagu) and Kimito Telefon (Kimito, Västanfjärd and Dragsfjärd), and three are regional, Skärgårdsnäten, TeliaSonera and Tietokartano. Of the five providers three are telephone companies, Pargas Telefon, Kimito Telefon and TeliaSonera, and they provide traditional wire line and GSM services. In addition Pargas Telefon offers Fixed Wireless Broadband in parts of Pargas and Nagu. Kimito Telefon also offers Wimax in parts of Dragsfjärd. Skärgårdsnäten offers broadband access in all eight municipalities. In Nagu, Korpo, Houtskär and Iniö Skärgårdsnäten offers fibre, Wimax, WLAN and ADSL access. In Pargas, Kimito, Västanfjärd and Dragsfjärd fibre and WLAN is offered. Skärgårdsnäten offers broadband access also in very remote areas and is building out coverage to all areas in the archipelago. Tietokartano offers satellite broadband services, both-one way and two-way, and is the only broadband access provider that can offer 100% coverage in the whole region. In addition Elisa has installed a single 3G base station in the harbour of Nagu. Other areas are provided with GSM/GPRS/EDGE connectivity only.
73% of businesses with five or more employees use broadband and 50% of private households use broadband. All schools in Åboland have broadband.
Available Technologies. In the eight municipalities of Åboland there are five broadband access providers. Of these providers two are local, Pargas Telefon (Pargas and Nagu) and

Kimito Telefon (Kimito, Västanfjärd and Dragsfjärd), and three are regional, Skärgårdsnäten, TeliaSonera and Tietokartano.
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Skärgårdsnäten offers broadband access in all eight municipalities. In Nagu, Korpo, Houtskär and Iniö Skärgårdsnäten offers fibre, Wimax, WLAN and ADSL access. In Pargas, Kimito, Västanfjärd and Dragsfjärd fibre and WLAN is offered. Skärgårdsnäten offers broadband access also in very remote areas and is building out coverage to all areas in the archipelago.
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As the rate of growth of broadband has peaked in Finland, development efforts focus on upgrading facilities, adding coverage and leveraging ICT in businesses, government and households.

Broadband strategy objectives. One of the next steps in Åboland is to extend the regional fiberoptic backbone infrastructure with advanced wireless backbones, to develop mobile services with regional roming based on wimax/wlan, and to develop new applications and services that require broadband connections.

Broadband strategy measures. Concerning the technical solutions for broadband backbones they tested and deployed hybrid broadband technologies: Wimax/ADSL, Wimax/WLAN and Wimax/satellite. They also tested Wimax in rural and remote areas. Furthermore (concerning implementation of webbased applications and services) they tried broadband access in areas without existing infrastructure. In 2006 they developed and installed a record system for home and residential care in most of Åboland municipalities. In two schools of the region a distance learning course were implemented, every student got an own e-mail address and they offered free email and space for homepage for companies. They are also planning a Youth Forum on internet. In the range of local e-community activities they offered ICT-courses.

Denmark (represented by Djursland region)[21]
ICT-use by population in Denmark.
Access of ICT at home:

87 pct. of the population has access to PC in their homes.
79 pct. has access to the Internet.
12 pct. of the families has Internet payed by their employer.
21 pct. of the families has access to employers network.

Computer use at home:

79 pct. of the population has a stationary PC.
36 pct. has a laptop.
9 pct. of the population owns a handheld computer.

Internet use at home:

70 pct. of the population uses Internet at home monthly. Most of them uses Internet at home and work/education no matter which group of employes they belong to.

ICT - use by enterprises.
The figures for all of Denmark are following:

- IT use in businesses = 98%
- Internet access = 97%
- Broadband connections= 82%

- Own homepage = 83%
- Orders via the internet = 59%
- Automatized data exchange = 55%
- IT Remote work = 54%
- Orders received via the internet = 35%

The definition of Broadband in Denmark is given by the National IT and Telecom Agency, who is using the definition given by the EU: Broadband is a bandwidth that exceeds the bandwidth of ISDN. That is 144 Kbit in up and downstream.

Available Technologies. In the Djursland region the following broadband technologies are available and actually used to the percentage of the households and businesses as mentioned. Modem and ISDN is possible everywhere while ADSL is not available in the utmost rural areas, and cable access only is possible for people in the biggest town Grenaa. The wireless access is soon possible everywhere.

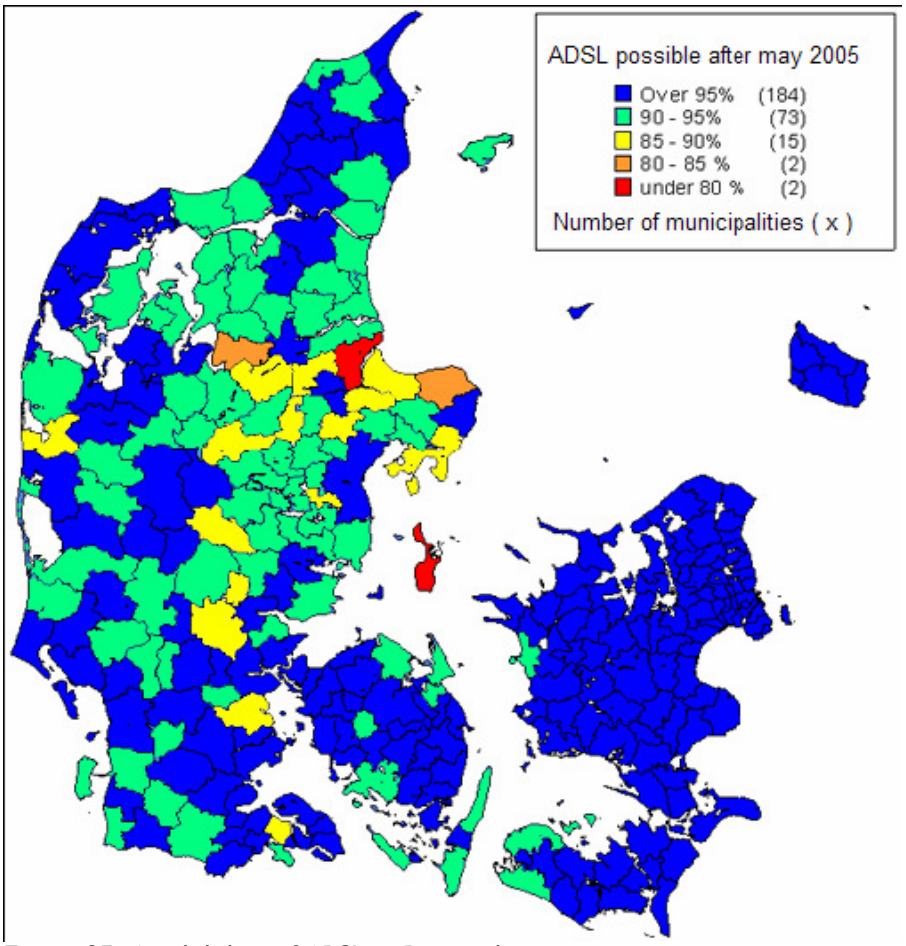

Figure 35. Availability of ADSL in Denmark.

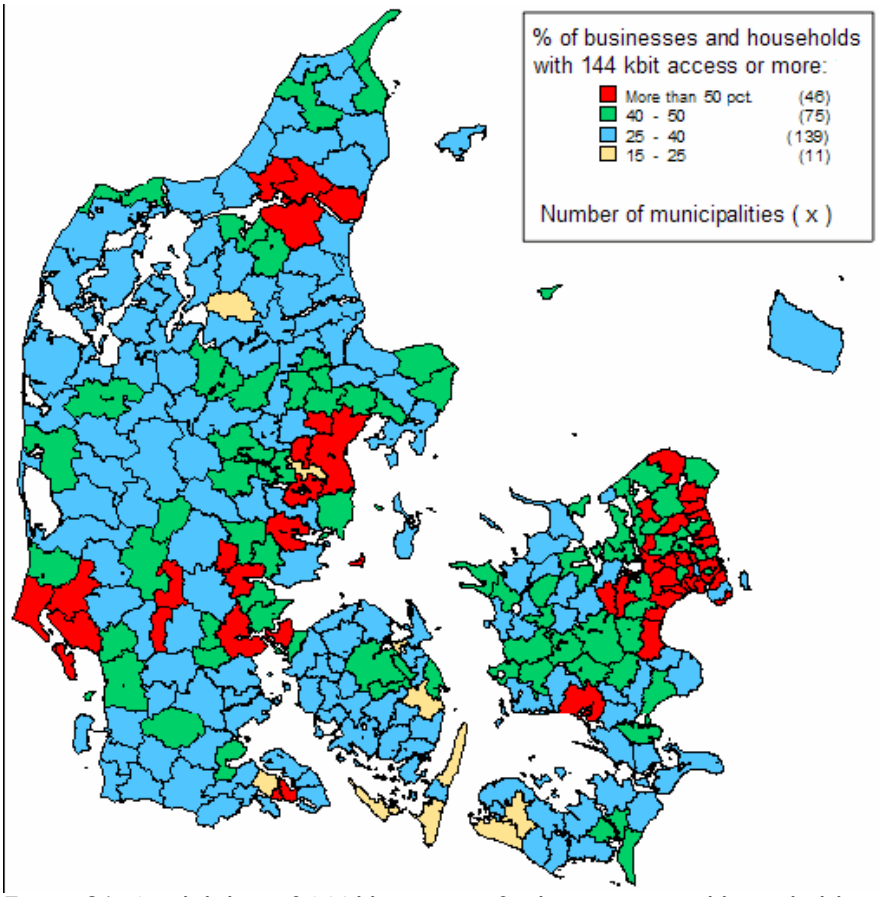

Figure 36. Availability of 144 kbit access for businesses and households.

Broadband strategies objective is establishing access to broadband for everyone at Djursland, on reasonable conditions and as soon as possible, were as follows.

Germany (represented by region of Stralsund and district Osterholz in Lower Saxony)[22, 25]

In 2004 about a fourth of private households dispose of a broadband-access at home. In about 30 per cent of households at a minimum one person had the possibility to use a broadband-access.
At the end of 2004 there were about 6,9 mio. broadband-accesses in Germany.
Therewith about 18 per cent of all households in Germany dispose of an own broadband-internet-access via DSL, cable or comparable technique.
55 percent of population over fourteen years use the Internet at least occasionally.
According to an Online-study by ARD and ZDF in 2004 about 40 % of the population in the age of 14 till 49 use the internet daily.
The demography of Internet-user approaches to the average of population more and more.

ICT-use by population
Overview of residential ICT-Access in region of Stralsund per 100 households:

- Computer 92,1
- Internet Access 53,4
- ISDN-Access 15,1
- phone 231,4
- answering machine 46
- fax 15,5

Internet access: 78% of companies have an Internet access: 44% - ISDN, 44% - Broadband.

Definition of Broadband. "Broadband" is the modern way of being connected at a high performance with all important services like data, voice over IP or video featured telephony in future. For broadband the very minimal bandwidth is 128 kBit/s download and 128 kBit/s upload. But usually a bandwidth of 1 MBit/s download and at least 128 kBit/s upload should be provided.

Available Technologies. In the county of Osterholz are altogether allocated 42 Broadband-Access- with different technology. The actual availability is keenly depending on location : DSL, satellite, UMTS.
Available technologies in region of Stralsund: DSL, radio, cable, UMTS, WLAN Hotspots.

Lithuania (represented by Ignalina and Zarasai district)[23]

ICT-use by population. Significant differences in IT usage among the inhabitants of cities and villages are dominant. In 2005, 36 per cent of households had computers at homes in the towns and cities, in rural areas only 14 per cent. In the five biggest cities of the country, 42 per cent of households had computers at home. According the data of the department of the statistics of the Republic of Lithuania, 14.4 per cent of the households were using Internet at home in quarter 1, 2005. 20 per cent of households in the cities had access to the Internet at home and only 4 per cent in villages.

ICT-use by enterprises. Internet services were used by 82.7 per cent of industry companies and 85.3 per cent of services suppliers. Among them there was 100 per cent of big companies, 97.7 per cent of medium sized and 81.1 per cent of small enterprises.

Definition of broadband. A term "broadband network" is usually used for description of continuous and faster speed than telephone modem internet link. Descriptions of broadband network are very different. As to ITU recommendation I113 broadband network means a possibility to transfer data faster than using one level ISDN line. FCC broadband network have a possibility to transfer data faster than 200 kbit/s and OECD requires sending capacity not less than 256 kbit/s.

Available technologies.
Users and technologies used for broadband access in Lithuania, 2005:

Broadband access technology	%
xDSL	44.78
LAN	20.22
Cable TV	21.20
Wireless	7.66
Optic fibre	5.53
Skirtoji line	0.61

Broadband strategy objective. The plan is to create a broadband data network for the „last mile" subscribers' connection and rent it for the network operators who would offer services for the ultimate consumers: natural persons, business and private companies. After the implementation of the project data transmission network will cover 85 per cent of Zarasai and Ignalina district territory with approx. 95 per cent of the region dwellers.

Poland (represented by Kwidzyn County) [24]

Only 29% of the population in Poland used the Internet. Among people falling into the 16-24 years age group, 75% used the Internet during that period.
In Poland, the Internet is most commonly used at home (64.7%).

Definition of broadband. Broadband is high-speed PC cable service, DSL service delivered by incumbent and competitive telcos, wideband wireless internet connections, digital

broadcast delivered enhanced services, streaming media offerings and two-way satellite internet connectivity.

Available Technologies. There are several technologies: analog/ISDN, DSL, cable internet, UMTS, WiMAX. The most popular method of Internet access in Poland is broadband, which is used by 51% of Internet users, while only 11.4% use dial-up.

Norway (represented by Rogaland County) [26]
ICT-use by population
Different ICT use by different households is showed in figures 37 and 38.

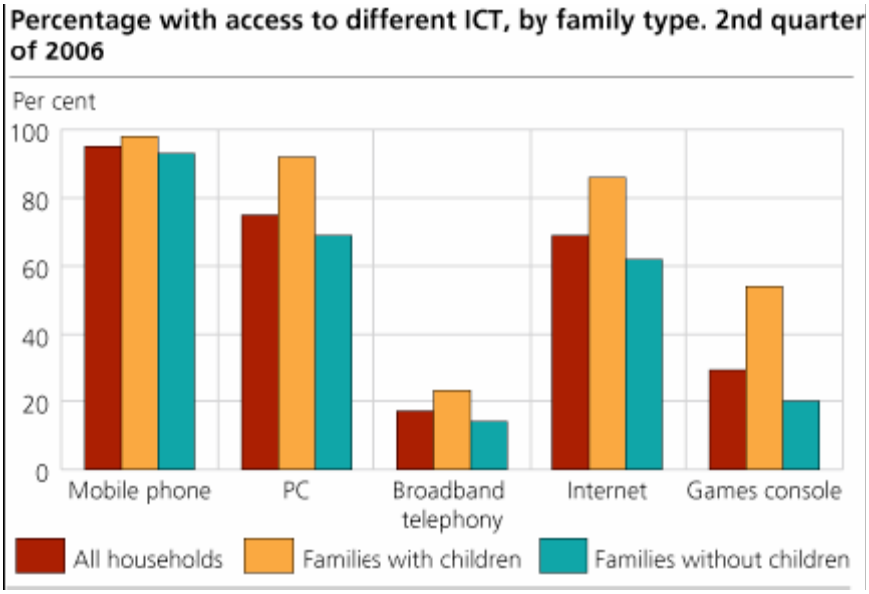

Figure 37. Percentage with access to different ICT, by family type.

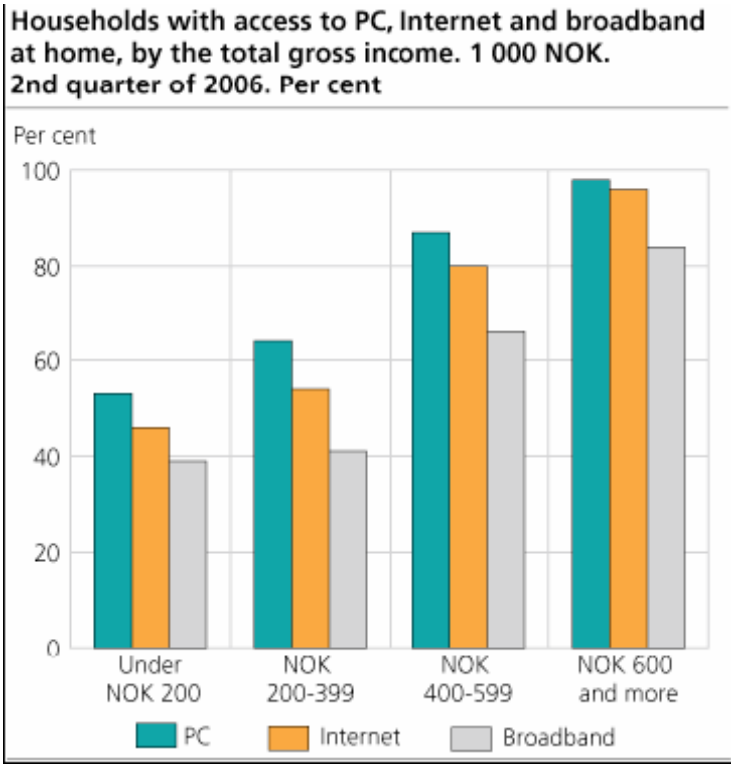

Figure 38. Households with access to different ICT, by the total gross income.

ICT-use in schools
All schools at all levels in Rogaland use ICT as a tool both in class and as communication between home and school, and between university and students.

ICT-use by enterprises
Broadband use by enterprises in Norway is given in the table bellow.

2 Business broadband subscriptions. Subscription by transmission capacity and county. 1st quarter of 2007

	Broadband subscriptions (larger than 128 kbit/s)	Transmission capacity						
		> 128 kbit/s = < 384 kbit/s	> 384 kbit/s = < 512 kbit/s	> 512 kbit/s = < 704 kbit/s	> 704 kbit/s = < 1 Mbit/s	> 1 Mbit/s = < 2 Mbit/s	> 2 Mbit/s = < 8 Mbit/s	> 8 Mbit/s
The whole country	**133 915**	**11 148**	**7 558**	**1 887**	**16 662**	**28 894**	**64 862**	**2 904**
01 Østfold	6 458	446	542	71	788	967	3 615	29
02 Akershus	16 476	657	764	209	1 960	3 788	8 885	213
03 Oslo	30 899	5 871	1 269	286	3 685	6 786	12 396	606
04 Hedmark	3 981	109	332	20	473	773	2 229	45
05 Oppland	3 823	77	224	42	358	915	2 144	63
06 Buskerud	5 873	165	331	111	637	917	3 635	77
07 Vestfold	5 593	323	387	56	689	965	3 110	63
08 Telemark	3 578	119	230	87	412	665	1 973	92
09 Aust-Agder	1 906	82	180	26	216	375	994	33
10 Vest-Agder	3 352	96	239	27	637	705	1 565	83
11 Rogaland	10 925	756	454	355	1 767	3 281	4 047	265
12 Hordaland	10 875	560	532	81	1 622	2 316	5 536	228
14 Sogn og Fjordane	2 531	59	135	33	234	668	1 273	129
15 Møre og Romsdal	6 548	423	363	85	513	1 635	3 179	350
16 Sør-Trøndelag	5 804	197	353	88	896	1 181	2 996	93
17 Nord-Trøndelag	2 359	66	156	34	220	466	1 233	184
18 Nordland	7 177	792	553	186	727	1 390	3 252	277
19 Troms Romsa	3 175	182	275	70	312	538	1 751	47
20 Finnmark Finnmárku	2 139	160	181	18	264	485	1 014	17
Unspecified	443	8	58	2	252	78	35	10

Explanation of symbols

Definition of broadband. Most broadband providers in Rogaland deliver 6 Mbit/s in 2007 for basic users.

Overview of broadband users
The number of broadband subscriptions was 1,336,000 at the end of the first quarter of 2007, an increase of 267,000 since the end of the first quarter of 2006. Nine out of ten subscribers have a transmission capacity larger than 1Mbit/s. Only two municipalities have less than 20 private broadband subscriptions per 100 households. At the end of the first quarter of 2007, Norway had 1,202,000 private broadband subscriptions, a 25 per cent increase since the first quarter of 2006. In the same period, the number of business broadband subscriptions increased by 27 per cent to 134,000. 87 per cent of the private broadband subscriptions have a transmission capacity larger than 1 Mbit/s. 54 per cent exceed 2 Mbit/s.

The most central municipalities have the highest number of broadband subscriptions relative to the number of households (64 per cent), while this figure is 48 per cent in the remote municipalities. Only two municipalities have less than 20 private broadband subscriptions per 100 households. One year ago, 30 municipalities were in this situation. In the first quarter of 2007, 32 municipalities had between 20 and 35 private broadband subscriptions per 100 households, compared with 163 municipalities last year.

Available Technologies
The majority of broadband connections in Norway are DSL. The initial DSL take-up was relatively slow but now it has been completely overtaken by cable broadband. In March 2005, the broadband penetration rate stood at 34.8 per cent and the broadband subscribers increased by 62 per cent from March 2004.

Norway's topography is more suitable for wireless access and is the leader in EU, with a wireless broadband market share of 1-2 per cent. It is estimated that around 45 percent households in Norway will have a broadband connection by 2008. Some operators launched VoIP trials in Norway in the first quarter of 2004.

According to the recent 'OECD broadband report 2006', the share of xDSL services is around 81 per cent with number of operators providing broadband services, reaching 18 as of March 2006. Norway also crossed the 21 per cent mark for overall population accessing broadband services where the average for 20 OECD countries is 13.6 per cent only. Fixed-line penetration was around 73 per cent as of March 2006 with a subscriber base of around 3.36 million.

Broadband strategy objectives.
The public national documents referred to shows that it is a stated priority to invest approximate 500 million Norwegian kroner to implement Broadband to all households in 2007 in Norway. Estimates of present status vary from 80 - 95 per cent. It is reasonable to assume that this effort will provide infrastructure to more than 98 per cent within the year. The remaining houses and farm can be assumed to be so remote from common infrastructures that GSM or satellite will be more beneficiary in the near future.

Latvia [27]
ICT-use by population
The usage of Internet by the population increases a bit faster than the general usage of computers. The percentage of persons in Latvia who ever used Internet was 44% in 2004 and 49% 2005. Again the usage is high in the age interval 16-24 years (94% in 2005) and very low for the persons aged 65-74 years (6% in 2005).
The percentage of regular Internet users is also smaller – 27% in 2004 and 36% in 2005, and the growth rate for this category is higher.
The regular usage of Internet by regions in general is similar (figure 39).

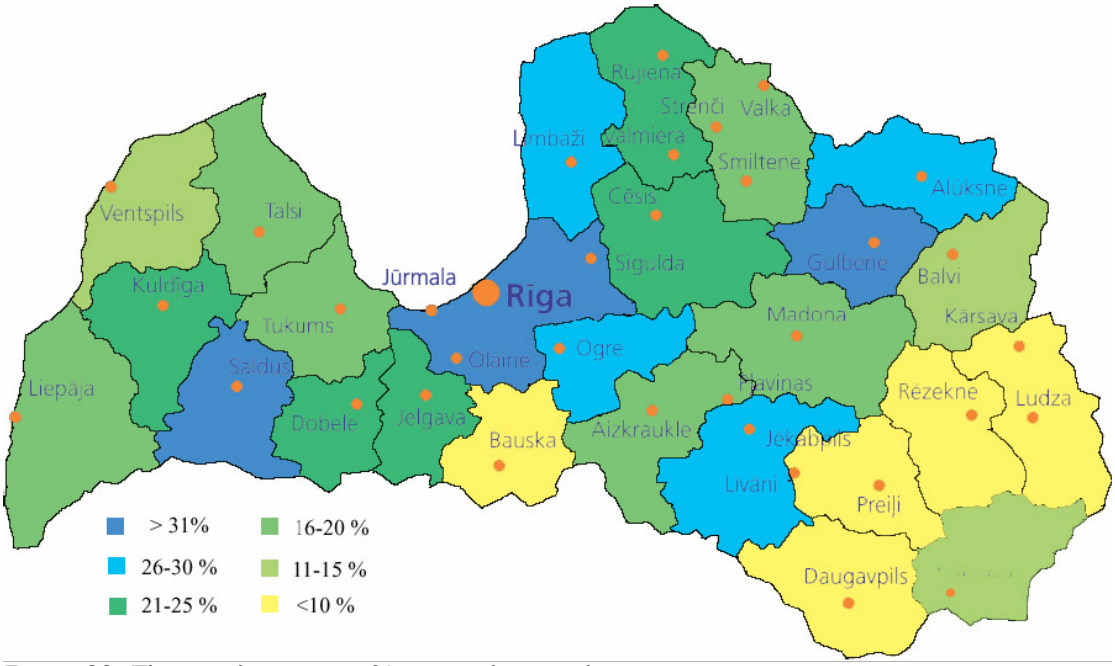

Figure 39. The regular usage of Internet by population.

The regular users of Internet in Riga form 36%, which again is comparable with the best developed regions. Usage is the lowest in the less developed regions, i.e. Latgale. The general conclusion can be made that the eastern regions of the country are the best candidates for broadband connections.

ICT in schools

Internet connections of schools from technological viewpoint in Latvia are very different. Information about them is presented in Figure 40.

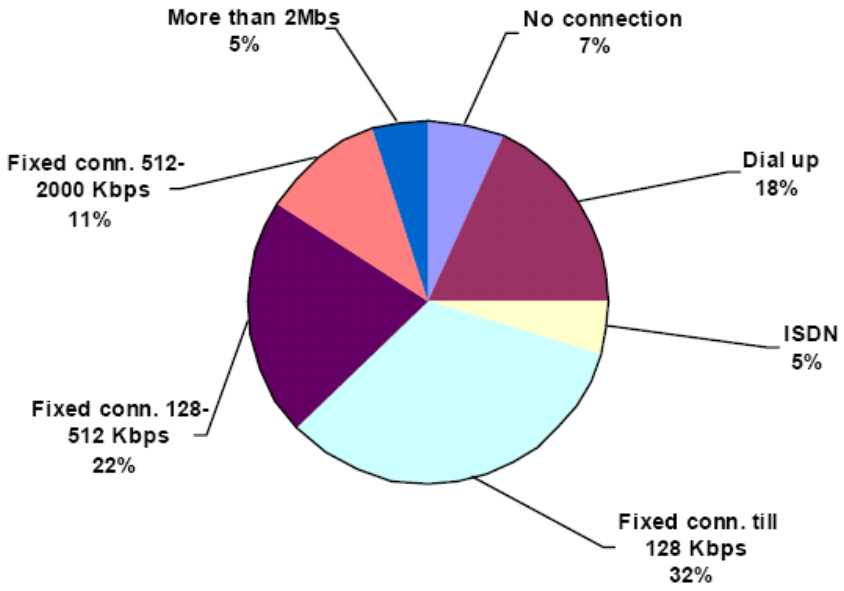

Figure 40. Internet connection speed of schools in Latvia.

The results show that practically about 38% of schools have broadband connections.

ICT in enterprises

The Internet connection of enterprises with more than 10 employees is on a relatively high level – 75% of enterprises have Internet connection. The highest level is at the same branches of business - hotel business (89%) and real estate business (86%), the lowest level at manufacturing (70%).

Rather important is the dependence of Internet usage on the size of an enterprise. This is shown on the Figure 41 that pictures the connection to Internet for enterprises with various numbers of employees:

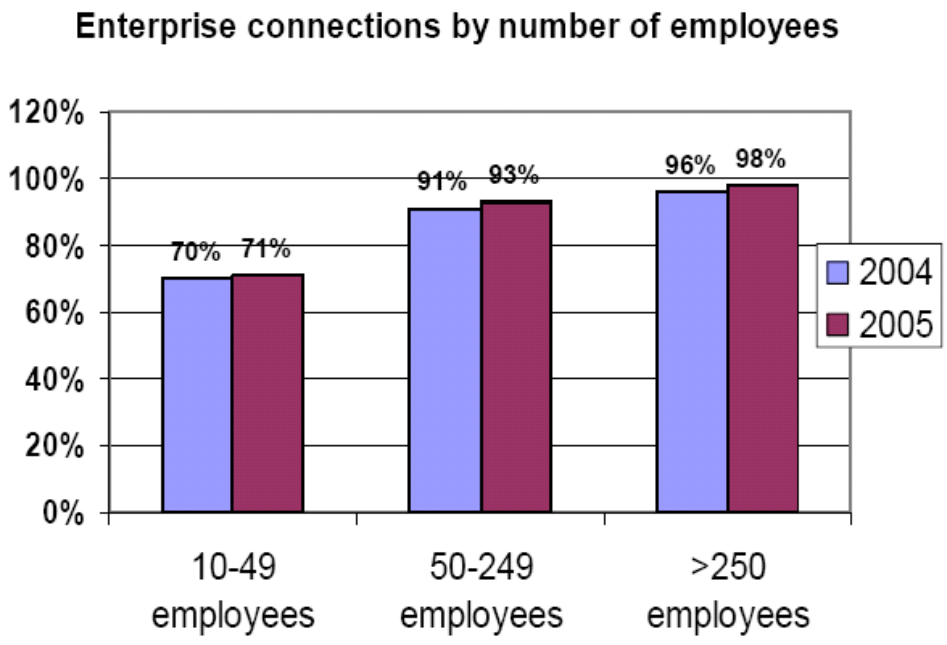

Figure 41: Enterprise connections by number of employees.

The chart clearly shows that practically all larger enterprises are connected to the Internet. Since the larger enterprises are rarely situated in rural or in less developed regions, it follows that these regions have great potential in developing the Internet.

According to the statistical data, 48% of all enterprises at the beginning of 2005 had broadband Internet connections. However also in this case the broadband Internet supply depends seriously on the enterprise size, which is shown in Figure 42:

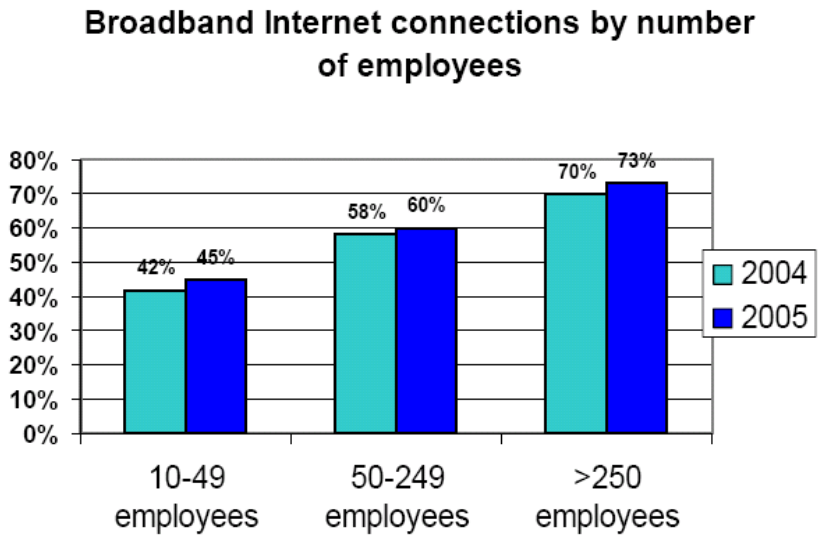

Figure 42: Broadband Internet connections by number of employees

The chart proves that smaller enterprises have some difficulties in arranging broadband Internet connections. The types of Internet connections of enterprises are very different. The following table shows the percentage of all Internet users by the type of Internet connection:

Available Technologies
Type of connection 2005: Dial up - 14%, ISDN - 23%; Wireless connection (satellite, radio link etc.) - 12%; xDSL - 37%, Other fixed connections (leased line etc.) - 31%

Broadband Strategies
The ICT gap between the EU countries and Latvia is clearly visible, and the broadband connections are considered in EC as a tool to liquidate this gap. It should be stressed, however, that some additional ICT gaps exist in Latvia and evidently also in the whole world.
Some of them can be easily mentioned:

- The gap between various regions of the country. Latvia's Eastern regions are less developed economically and in these regions also the Internet is less accessible. Of course, the development of the Internet in these regions as the single measure cannot boost the economics of the region, but no doubt this development is necessary.
- The gap between the people of average income, who have good Internet connections, and the people of no or small income, who cannot afford such a luxury as the Internet. To some extent this gap is similar to the regional gap because the people of good income usually live in the capital or in bigger towns. One may suspect additionally that this gap may become wider and wider, because presumably people with good Internet connection have better possibilities for profit.
- The gap between older and younger generation. This gap creates serious changes in the social environment, and nobody can assert these changes are positive.

Goals to bring broadband access forward are defined in the National Programme. The main goal is to provide qualitative Internet connection in the geographically remote places to increase computer literacy of the population and to provide all inhabitants with equal opportunities to access information resources and to improve their ability of using available information.
It seems that the most effective strategy of providing the Internet to remote places is creating of radio network connections. The connections of this type do not need serious investments in infrastructure and can be installed in short time. Of course, they cannot be created without allocation of some financing.

Sweden (represented by County of Värmland)[28]

ICT-use by population
The percentage of persons in Sweden who have used a computer at least once a week was 94% in 2005 by age 16-24. The usage is lower for persons aged 55-74 years (64% in 2005). The most common purpose for Internet use is to find information about goods and service (74%) and to send/receive e-mails (70 %).

Proportion of persons aged 16-74 who have used the Internet by age and gender, percent (First quarter 2005):

Age	Women	Men
16-24	96 %	98 %
25-34	94 %	97 %
35-44	92 %	93%
45-54	84 %	85 %
55-74	48 %	64 %

ICT-use in schools
Access to ICT tools in school is very high. 99 % of teachers have access to computers on the Internet, 98 % have access to e-mail and 93 % have access to CD-ROM/DVD players in computers in school.

ICT-use by enterprises
Share of enterprises with access to Internet by size industry

Year 2005, 10 employees or more:	
10-19 employees	93 %
20-49 employees	95 %
50-99 employees	100 %
100-199 employees	99 %
200-499 employees	100 %
500 employees or more	100 %

In January 2005, 82% of Swedish enterprises (10 employees or more) had a high speed Internet connection (High speed connections are defined as DSL connections and other fixed connections, such as fibre or radio link)

Definition of broadband
There is no officially accepted definition on Broadband, not even in the IT Bill. In official contexts, however, the Government uses the formula "capacity to transmit multimedia services with good technical quality" to denote broadband capacity.

Available Technologies
Available Technologies in Sweden are: Copper (xDSL), cable TV, fibre, radio (WiMAX), Satellite, and Power Line Communication. The prices diversify. 90% of the region is covered today (2006), mostly by ADSL.

Broadband strategies objectives.
The goal for IT policy in Sweden is that "Sweden must be a sustainable information society for all". This implies an accessible information society with a modern infrastructure and IT services of public benefit, so as to simplify everyday life and give women and men, young people and old in every part of the country a better quality of life.

In Värmland the main goals for bringing broadband access forward could be divided into five areas; inter-municipal e-collaboration, e-government, e-education/e-learning, e-solutions for business, and e-health. The municipalities in Värmland have, in recent years, actively worked at taking advantage of the opportunities afforded by broadband technology, and by starting the joint project "IT Värmland" whose goal is to contribute to economic growth, development of business and increase in jobs.
Objective/Vision: - 100 % broadband coverage in Värmland; - All inhabitants should have access to same e-services for the same price.

Estonia (represented by Võru County) [29]

ICT-use by population
According to the Office of Estonian Statistics 200 200 households, that is 38,7 % of all the households, had access to the Internet at the first half of 2006. The households with three or more adults and children had the best access to the internet – 59,2 %. The households with one adult and no children had the lowest access percentage to the Internet: about 20%. 48 500 households uses broadband connection, 73 100 households different DSL connections, 29 400 households dial-up modems and 84 500 households other connection types.

ICT-use in Schools
Computer and internet access in various environments is presented in the table below:

	PC		Internet	
Students who can access (%)	2000	2004	2000	2004
Somewhere in neighbourhood	92	97	93	94
At school	85*	82*	78	88
At home	44	74	26	62
Teachers who can access (%)				
At school	78	94	n/v	n/v
At home	41	80	18	54

* Data on actual use per week; n/v – no valid data

ICT-use by enterprises
The same inquiry shows us the types of Internet connections in enterprises, broadband connection is the most common and the percentage has grown rapidly from 74 % to 82% (of enterprises with computer). The percentage of the dial-up connection has dropped from 23% to 8 %.

ICT sector development and outlook in BSR from the LogOnBaltic project [30]

Information and communication technology (ICT) forms the backbone of many business activities. Its use has gained in importance because the implementation of ICT has sped up business processes and facilitated them. In modern management environments a high quality ICT system is a "sine qua non" for any kind of business success. The use of the internet e.g. has made a range of information available at very low cost and at high speed. Customers can use it to compare prices and to make selections whereas business people can find new partners, customers or other areas of opportunity. Paperless and therefore very fast and safe communication is possible by sending emails not only internally but also to customers or suppliers. Hence transaction costs can be kept much lower.

ICT use has developed from simple storage and retrieval functions to interactive, global tools that allow businesses to save money and time when they use these tools correctly. Nowadays, finance, accountancy, marketing and sales are the main business areas which

use ICT systems. In business areas like production, production planning and logistics, ICT systems are often applied as well and their usage is increasing.

Although there are big discrepancies in IT infrastructures and in the use of ICT, there is a trend towards the rising use of information and communication technologies in the BSR. All regions show an increasing demand for and supply of electronic handling. Furthermore, ICT is not only common in private households as reflected by the increased penetration rate of the internet and the increase in internet users, but also in public institutions. Egovernment has become more and more integrated into services and is therefore a strategic orientation of public authorities and companies. In brief, the use of ICT has become ubiquitous.

Logistics companies are thus forced to join in this trend as its use becomes even more important and serves as a precondition for remaining competitive. Many logistics companies have realised that the implementation of efficient ICT systems has sped up business processes.

In order for information technologies to be utilised, the users must have confidence in the information and the technical information processing systems that are involved. Therefore, regional development organisations are focused on organising different kinds of projects that support the ICT development of country specific regions. Simultaneously, through these projects, the awareness of logistics companies is being broadened and it is being implemented as a supportive management instrument. Logistics companies consequently see that the implementation of new technologies in their daily business can add value to their business.

The task of public institutions is to broaden and to reinforce the awareness of ICT as a supportive and efficient management instrument. Regional development projects aim at supporting logistics companies by implementing new IT systems and by creating platforms.

Furthermore, by offering workshops and congresses experiences can be exchanged and networking can be reinforced.

Unfortunately, these strategies for implementing ICT into a daily routine have not been implemented in all the BSR yet. Thus, this ought to be a task for regional development agencies and a regional policy as well as a challenge for companies and should be looked upon as a problem that needs to be solved in order to raise the BSR's overall competitiveness.

Results from the ICT survey within the LogonBaltic project [30]

Email and the internet have a great impact on the competitiveness and performance of a company by increasing information flow. The internet makes a range of information available at very low cost and at high speed. Paperless and therefore very fast and safe communication is possible by sending emails not only internally but also externally. Hence, transaction costs can be kept very low. The closer a company gets to the manufacturing industry, the less internet and email are normally used by employees. For service providers, however, internet and email have become more and more important in ensuring seamless and smooth communication with customers.

Both email and the internet are widely used in the surveyed companies, as Figure 43 shows. However, when it comes to the analysis of the amount of employees that have a company email account and/or internet access many differences appear among the regions.

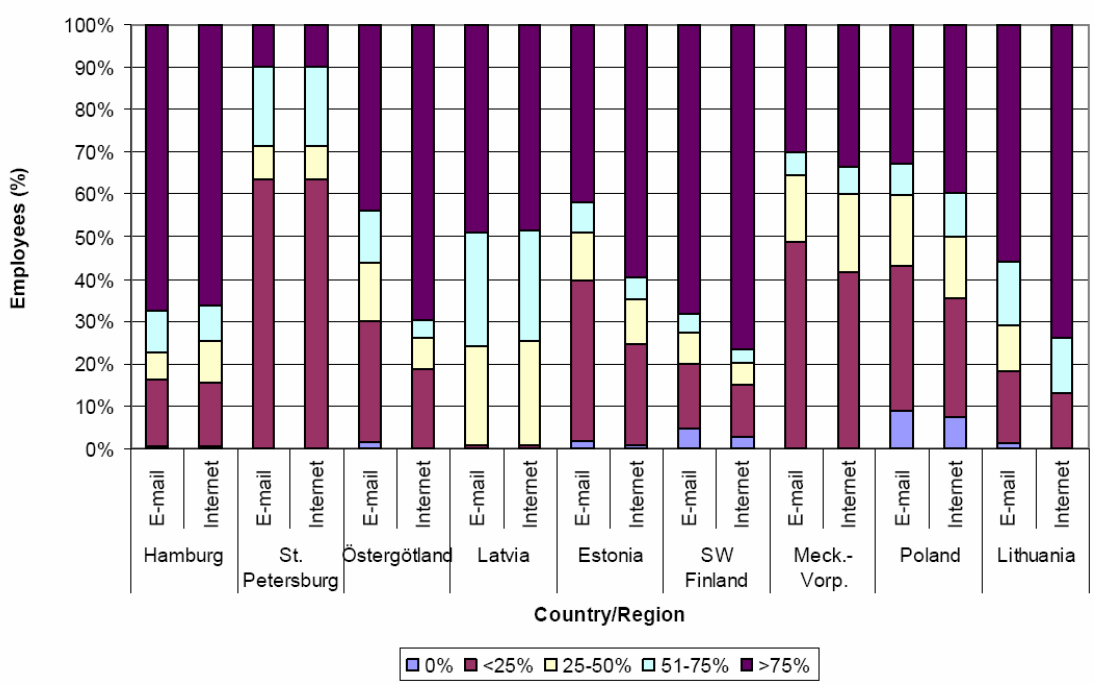

Figure 43 Percentage of employees having access to email and the internet. [30]

In Hamburg, one of the most important logistics hubs in Germany, around two thirds of the companies stated that over 75% of their employees have internet access and even more companies stated that their staff also had a company email account. Businesses often have to be transparent in their activities and therefore all of the business activities need to be thoroughly administered and documented. Consequently, every employee keeping track of these business activities needs the necessary equipment such as email and internet access etc.

Similar results can be found in Southwest Finland. Here, many of the SMEs can be characterised as service providers, where a major part of the work is done using a computer.

Latvia, for example, has a very important financial sector, therefore it is not surprising to find a more even distribution of the access rates. Thus, there are only few companies where less than 25% of the employees have access to email and internet at the same time.

The relatively low access rates in MecklenburgVorpommern, Poland and Estonia can be explained by the amount of manufacturing and trading companies that took part in this survey as well as by the size of the companies. The distribution of these companies within their regions according to size shows that most of them belong to the micro and small companies i.e. mainly shops, stores, consulting firms etc. In these cases one computer is more than enough to manage the business activity and there is no need for every employee to have email and internet access.

All the results described above are very different to those of St. Petersburg. Here, only 10% of the companies state that over 75% of their employees have email and internet access and up to 60 % mentioned that less than 25% of their employees have these possibilities. Those companies that are connected to the internet have email access. The larger the number of personnel involved in production operation and manual work is, the smaller the number of those with connection to the internet is. The larger the number of white collar workers in the company is, the larger the number of the personnel connected to the internet is. [30]

Good practices and innovative solutions for transportation in BSR

There are also few examples of good practice and innovative solutions of rising transport efficiency presented within the projects screened in this study.

Karlshamn Göteborg railway shuttle

One of the Baltic Gateway PLUS project case studies focused on preconditions for commercially viable rail shuttle services between the ports in Karlshamn and Göteborg. The overall objective was to provide for sustainable and intermodal cargo transport service on sea and rail, by facilitating cooperation between actors in the ports and along the railroad. The railway link would be adapted to support and strengthen the ferry connections between Karlshamn– Klaipeda, Karlshamn–Ventspils and Karlskrona– Gdynia. The vision was to develop a cargo transport corridor characterised by speed, frequency, reliability, cost efficiency, full service in the hubs, and less congestion than road alternatives.

Since the project's chances for success seemed good, study of funding opportunities was launched. The ports in Karlshamn and Gothenburg invested in a "Reachstacker" in each port to handle the cargo, and new staff was employed. Areas for container/trailer depots were prepared in Karlshamn. Appointed operator started negotiations with potential customers in order to obtain support for the shuttle from the start. A brochure was made to promote the new service. A survey was performed, covering all target segments and seminars with potential customers were performed. The rail cargo shuttle between Karlshamn and Gothenburg was introduced successfully and resulted in a shift of cargo from road to rail. As expected, the environmental disturbances were reduced and the capacity on the ferries was better utilized. However, after a couple of weeks the service was closed due to weak market reasons. [8]

Innovative concept for rapid travels

"Ground effect vehicles" have been developed and tested for military and civil use during several decades. Their cruising speed lies between car and airplane, their flight altitude is usually several meters above a flat surface, and their energy consumption is remarkably low. Very recently, a Hydrowing prototype called "SeaFalconTM", with the ability to transport around 9 passengers at a cruising speed of ca 150 km/h, was developed and tested by a Rostock-based team of engineers.

Figure 44. The SeaFalconTM (www.seafalcon.info)[8]

Recommendations for the introduction of SeaFalconTM traffic connections were based on the conclusion that several ports and harbours in the SBSa fulfil the general requirements of landing, starting and berthing of Hydrowings. A joint venture is currently negotiated.

Baltic Gateway project team concluded that the Sea FalconTM concept is a promising passenger travel concept for medium distance. Advantages compared with air transport include short travel time, low energy consumption and low cost. Additional development of the concept is needed. This new type of passenger travel service would improve accessibility within the SBSa considerably. [8]

Good practice on IT solutions in BaSIM project. [31]

The amendments to SOLAS (International Convention for the Safety of Life at Sea), the ISPS Code, were decided 12.12.2002 and entered into force in July 2004. The overall aim of this code is to establish a new international framework of measures to enhance maritime security, through which ships and port facilities can co-operate to detect and deter acts, which threaten security in the maritime transport sector.

The regulations, which require changes and improvements in processes within the companies and ports as also perhaps constructional changes and enhancements in IT systems, are mainly concentrated within the security plan.

In general the implementation of all these requirements meant and still means changes and enhancements to existing processes and facilities, in all meanings, as organisational changes, structural changes and enhancements and technical improvements or implementation of IT support.

In order to find out the general but also the individual impact of the new regulations number of questionnaires and also meetings between different level responsible persons were organized.

On basis of the given answers to the questionnaires and from single meetings and talks with Port Facility Security Officers (PFSO) and Company Security Officers (CSO), the following main fields were decided as important in the sense of the BaSIM Project, work package 2, meaning possible IT support.

These were in general:
- Alarm and Communication Management
- Area Monitoring
- Hinterland and Chain Security
- Employee Training via E-Learning

Alarm and Communication Management focuses on the necessary steps for notifying any involved persons and initiating necessary actions in consideration of the security plans in the cases of level changes or other dangerous situations.

Area Monitoring focuses on the necessary functionality for controlling the area by managing patrols, checkpoints and related status information and on all managing activities related.

Hinterland and Chain Security focuses on the transport activities from sender to port acting with new technologies like sensors, GPS, GPRS and RFID in order to enhance security along the chain and with this in ports and on ships.

Employee Training focuses on the training of the personnel, to sensitise them for security issues and to teach them the necessary security guidelines, derived from the security plan.

Looking on these points, there were several possible approaches where modern IT solutions may support the existing and new processes. The solutions were discussed with the partners and had been defined as follows.

The concepts and the concrete solutions were first discussed with the partners. During implementation prototyping meetings were arranged with the future users in order to involve them from a very early stage of work. This way of implementation ensured that the envisaged solutions and also the final products get a very high level of acceptance, which leads to a great sustainability.

Alarm and Communication Management [31]

With the "Alarm Management System (AMS)" implemented during the BaSIM Project the local communication and activity processes, starting with the information from the Designated Authority to the PFSO or CSO and ending up with defined activities, are handled in a most extensive automatic way. These processes happen within a port region in case of any alert. The activities which have to follow up can be divided in two categories:
• The notification of all involved persons, as so called "communication branch"
• The initiating of security activities depending on the security level, as "activity branch".

In case of level change or alert the following general procedure is followed: The Designated Authority gives information to the PFSO, SSO or CSO. The decisionmakers then meet and start several the necessary activities according level and security plan. The kind of alert, the reached security level will make it necessary to notify different groups of people and to initiate different types of activities. This all will differ from situation to situation, from terminal to terminal, from ship to ship. All these activities are done in a more or less manual way and using papers to a great extent.

The security plan used is individually harmonised with each port, ship or company. It should contain the phone numbers of people who might be notified, it should contain a definition of who has to be informed in which case, it has to contain all possible activity instructions for the different kind of security levels and situations.

The AMS will not only ease up the different tasks, but also will make them safer in the sense of avoiding mistakes. The system mirrors the workflow in case of calamity as described above. It gives the future users a wide range of administrational functionality in order to prepare real time usage. Is gives the possibility of the usage of automatic and technical solutions when starting and monitoring processes according ISPS code and security plan.

AMS allows adopting the security plan individually for each port, its terminals, ship or company. It integrates communication lines for notification and an integrated functionality to combine persons, processes and activities.

It can provide the user (decision-maker) with automated notifications and can show the necessary steps in that specifically given situation, which was entered by the user before and it helps the user to monitor them or to give him final status information.

Features are:

- Adopting the workflow of the internal security plan
- Differentiation between e.g. terminals in one port
- Entering and editing of basic data (people, alarm, activities…)
- Grouping of contact persons, alerts, activities…
- Association of different persons to groups or different groups to a board
- Entering of different types of alarm
- Choosing automatically the persons to be notified or processes to be started
- Sending email, fax, sms automatically, with appropriate content difined beforehand
- Providing an appropriate list of activities, selected automatically from the security plan in an appropriate order according to the workflow given
- Initiating activities on mouse click, if electronically possible (e.g. increase illumination of specific areas)
- Gathering and showing current status of activities provided by connected systems as port information systems, area access control systems, staff patrol mechanisms, …

AMS is implemented on basis of Service Oriented Architecture (SOA) and with this follows the newest technology. It has open interfaces and possibilities for creating own, individual procedures within the framework of the security plan.

Area Monitoring [31]

In any of the three possible security levels it is necessary to have control on relevant and important areas. This overview needs to be intensified when increasing the security level. Therefore e.g. in port areas patrolling security staff controls fences, gates, doors and security relevant places, video equipment monitors specific gates and areas, and illumination is used in specific places.

In higher security level, the period between patrol rounds and monitoring increases. In which way this has to be done is fixed in the security plan. The necessary checkpoints are listed there, and also the necessary steps for the further monitoring.

Possible is would be a system that has a wireless interface to the electronic security plan, to other existing systems and to communication lines, that helps coordinating the patrols.

Features could be:

- generating random routes for patrols by changing the order of checkpoints to avoid traceable behaviour
- sending route info to data handhelds used by patrolling guards
- logging patrolled route by receiving the controlled checkpoints from the data handheld terminals
- providing last status information about checkpoints in case at last visit there was something unusual
- giving information of problems automatically to the PFSO or CSO for starting further activities
- controlling the adjustment of noticed and reported problems

After the project break several discussions with the partners took place and after restarting work it was decided to drop the planned activities according “Area Monitoring”. The necessity did not exist anymore because time has overcome the envisaged solution.

It was decided to have new technologies (SoA and sensors) in the fields “Alarm and Communication Management” and “Hinterland and Chain Security” instead.

Hinterland and Chain Security [31]

Port security is tightly connected with the traffic and cargo coming from sea or from the hinterland. Sea traffic has either been controlled already in the counter port or the level of security is upgraded. Hinterland transportations are the main issues for the processes of security in the port or port terminals. The problems which occur are:

- Assurance of the security of the incoming trucks and trailers, meaning no risky cargo has been placed into the trailer during the voyage or meaning the truck or trailer has not been manipulated itself etc.
- Identify of the incoming trucks and trailers to a high level, meaning the truck or trailer is that which has been booked.
- Avoidance of bottlenecks in gate control and the port traffic while checking the truck or trailer as intensive as possible, meaning to have equivalent information as quick as possible and in an easy accessible and clear readable way.

In addition to the problems mentioned the fact of the different players (forwarder, trucking company, stevedore, shipping line) involved in the chain does not ease up the possible solution.

It was decides to use modern telematic technologies to try to solve the mentioned problems to a high extent. These are:

- RFID (Radio Frequency Identification) tags and readers
- GPS/GPRS transponders together with intelligent server software
- Sensors for different purposes

The used sensors were especially developed for the BaSIM Project. The used sensors are able to communicate with each other. They build up a small local area network and with one sensor being the so called “head sensor” they are also able to communicate to the outside.

By using these innovative technologies the work package 2 of BaSIM project stepped into new area of mobile techniques, especially by using all features together in one “security package”.

The whole scenario was built up as follows:

- The company “Mobile Objects” provided the work package with two GPS transponder including the necessary equipment. A manual and electronic access to the monitoring server was installed by the company. The transponder should monitor truck and trailer along the route from address “end loading until the gate of the port.
- TraDaV ordered sensors especially built for the demonstrator scenario.

These sensors had the functionality

- Electronic seal for doors
- Measurement of distance between truck and trailer
- Measurement of movements inside the trailer

In addition to the mentioned functionality the sensors were able to build up an internal small network in order to communicate with each other. The head sensor was able to send data via the GPS transponder to the GPS server. The sensors were paid by TraDaV.

- The company “Securitas” provided the work package with one RFID Reader, one RFID handheld reader and ten RFID tags. This equipment was installed to assure 100% identification.
- TraDaV and Lübecker Hafen-Gesellschaft (Port of Lübeck) implemented an application which in case of event accesses the GPS server and reads the data according the read RFID tagnumber, interprets them and displays the results in an online application for the gate personnel. These applications were installed at the Lübecker Hafen-Gesellschaft (Port of Lübeck) at in the system of the Port of Turku.
- In Germany a truck of “BTL NORD GmbH” (a 100% daughter of Schenker) was equipped with a GPS transponder. At the back of the cabin of the truck one sensor was installed in order to measure the distance between truck and trailer. The sense was to recognize if the trailer was disconnected from the truck.
- The truck driver was provided with the other sensors. At the status “end loading” the driver installed the seal sensors at the back doors of the trailer and the movement sensor inside the trailer.
- At status “end loading” the personnel of BTL typed in the planned route in order to build up “route fencing”. The transponder and the server always will give alarm as soon the truck left the planned route.
- During the voyage transponder and sensors send data to the server. The sensors only in case of abnormal status, the transponder in decided intervals. The server was comparing route and GPS data and with this checks the “route fencing”.
- Arrived at the port gate the RFID reader reads the RFID tag at the trailer, proves it according the booking lists, and builds up a connection via Internet to the GPS server. The data according the identified transport are collected, interpreted and the result is displayed to the gate personnel.
- If any of the results shows “red” the gate personnel have to check truck and trailer, the entrance to the port is denied.

The described hardware, scenarios and activities were installed and done parallel in Finland, also organised by TraDaV and supported by the Port of Turku and "Schenker Finland Oy".

Parallel to the tests data have been exchanged between Lübeck and Turku in order to follow and identify the oncoming transports. These data were, besides normal travel data, in special the RFID tag ID, the access data for the GPS server etc. With this requirements came up to enhance data exchange, better to say special massages, as handled in work package 1 has to be enhanced. This was discussed and it was found that after these data will be fixed an enhancement could easily be done, meaning an adjustment of existing messages.

The whole scenario for the first time shows the possibility of the interaction of different innovative technologies like RFID, sensors, GPS, GPRS and different inhouse-systems. It was tested in Germany and Finland during the last months in 2007. The main focus was to show the practicability and not only the feasibility.

E-Learning (Employee Training) [31]

According the ISPS regulations the staff has to be trained regularly to know about the security plan and to be sensitised about security issues within the relevant area. To replace the standard training, which is expensive and brings a lot of organizational work, an electronic training system can be used instead.

It was discussed that a possible system should have the functionalities as listed below:

- Flexible according different types of content (html, .ppt, etc.).
- The necessary topics will easily to adapt changes.
- Tests will prove the gathered knowledge.
- Types of questions and answers vary.
- The answers will be electronically stored.
- Current status per user is stored.
- The training can be made at work with storing and verifying the answers automatically, providing / registering the user as certificated.
- The training can be made at home, delivering the answers later, stored at floppy or sent by email.

It was decided to develop a system which is based on the SCORM standard. This standard is accepted and used as international standard and gives the opportunities of having different types of data as input and of having the possibility defining own content, questions, test etc.

Such system provides the necessary flexibility to avoid organisational work and also fixed and unwanted breaks in daily working routine, because the training can be done when working processes allow it.

Examples of Good Practices from the NEW HANSA project [32]

Below are presented the good practices that have been identified in the New Hansa project. These practices are examples of available technical and non-technical solutions and they represent the best solutions introduced currently in the New Hansa partner ports. However, as techniques for environmental management are rapidly developing, new solutions will emerge in the near future. All these practices may not be practical solutions for every port due to the different characteristics of ports and visiting vessels. Thus, the ports and cities should make the decision about implementing different solutions after considering and defining the suitability and profitability of the practices from their point of view.

Management of Air Quality

Major air pollutants related to port activities are particulate matter (PM), nitrogen oxides (NOx), sulphur oxides (SOx), carbon oxides (COx), ozone, heavy metals and hydrocarbons including volatile organic compounds (HC and VOCs). Most of these pollutants are originated from burning of diesel fuels in engine operations.

There are special technical solutions to diminish the amount of pollution from a combustion process. Beside technical apparatus, there are also other methods to diminish the emissions of shipping. Some methods strive to make shipping more efficient and adjust the operations on an environmentally favorable level. This is where the regulations, recommendations, limit values and economic incentives are efficient methods.

Different technical and non-technical methods are developed to reduce the atmospheric load of shipping: e.g. techniques and technologies to reduce CO2, optimizing the speed, low sulphur fuels, biodiesel, seawater scrubbing, diesel engine and engine design, common rail, fuel water emulsion, humid air motor, direct water injection, exhaust gas recirculation, CASS, auxiliary gas injection, selective catalytic reduction, NO_X traps, selective non-catalytic reduction, non-thermal plasma, dual fuel engine, gas turbines and fuel cells.

Ports, cities, communities and other authorities can encourage shipping companies to adopt an abatement technology. One example is the Swedish Maritime Administration giving economic incentives for ships purchasing and installing SCR systems in a form of quittance from fairway dues. h e ports and cities participating in the New Hansa project have found the shore-to-ship energy connection and environmentally differentiated harbor and fairway dues to be especially useful in improving the environmental management of shipping.

Solid Waste Management

Waste Stations in Ports

It has been recommended in the feasibility study to have permanent waste disposal stations in quays to ease the procedure for waste disposal from ships. This practice allows some flexibility regarding, for example, working hours in ports. However, permanent waste stations may be problematic in quays where space is needed for port operations. Thus, the location of permanent waste stations should be chosen carefully.

Movable facilities of waste collection are still often needed. Waste stations should include containers for all the waste fractions delivered from ships.

Due to local provisions and instructions on waste collection, the ports have different colours and methods to label the waste containers. In addition, the containers are different type and size depending on the manufacturer. Containers should be designed for each waste fraction collected, and they should be marked properly to prevent unnecessary mix-up. Containers for food and other similar waste need to be well sealed to prevent birds and other animals from spreading garbage around. Special waste, e.g., food, that possesses risk due to its foreign origin, should be collected separately in containers that are well marked. Food waste containers must be emptied more frequently in hot and warm weather. It is also recommended to use markings for dry garbage only when containers are not suitable for wet substances.

General Guidelines for Harmonizing Waste Collection in Ports

Harmonizing the collection of waste fractions would simplify and ease the use of reception facilities in ports. To increase the amount of recycling, in particular household waste from ships needs standards for sorting. Port communities' waste treatment methods are different concerning the sorted waste, for example, incinerators for garbage are not always available

in reasonable distances. This is why many interest groups should be heard when agreeing on the fractions to be sorted.

Colourings used in waste containers vary, and similarities could not be found between ports. This is why it is not possible to recommend the most used colours to be used in all ports. Standardisation of colouring of waste containers in stationary collection points at quays would ease the use of waste stations.

Wastewater Management

Sewage installations in ports should be built regarding national and local regulations. A municipal sewage system is often used when discharging black and grey waters produced in ships ashore. From the municipal sewage system, the wastewater is further directed to the local wastewater treatment plant.

Ships with large crews or passengers numbers sailing mostly in coastal waters have more need than other types of vessels to discharge sewage in the ports' reception facilities because of the larger amounts of wastewater produced and restrictions of discharging into the sea. Permanent sewage reception points for such ships are generally used in many ports, because these ships are mostly liners. Also tank trucks are used with suction pumps, if ship's own pumps are not able to discharge sewage within reasonable time.

Ships calling any of the ports studied in this survey can discharge their wastewater ashore. In the ports studied, the common practice is to pipe the received waste black and grey waters directly to a municipal sewage system and further on to municipal treatment plant. Tanks for storing of wastewaters are generally not needed in ports.

In the Ports of Mariehamn, Szczecin and Swinoujscie the wastewater is piped or barged directly to treatment plants. The quality of wastewater treatment plants and the municipal wastewater management has considerably improved in the recent decades, making a generally used system a good practice for handling of ship-generated wastewater.

A modern sewage treatment plant has been constructed in the Port of Szczecin to provide proper treatment of wastewaters from ships because inability of treatment through a municipal sewage system. The mechanical biological plant with a treatment capacity of 3200 m3/day can handle sewage from ships calling the Port of Szczecin and sewage from the area of the Szczecin Port. The wastewater plant also includes facilities to treat oily wastewater and wastewater from washing of holds of ships. Wastewaters from ships are barged to the treatment plant. All processes are highly automated. [32]

Feasibility assessment of connecting TEN-T with the pan-European corridors

The revised guidelines of 884/2004/EC incorporated the TINA network into TEN-T network and identified priority axes and projects (figure 45).

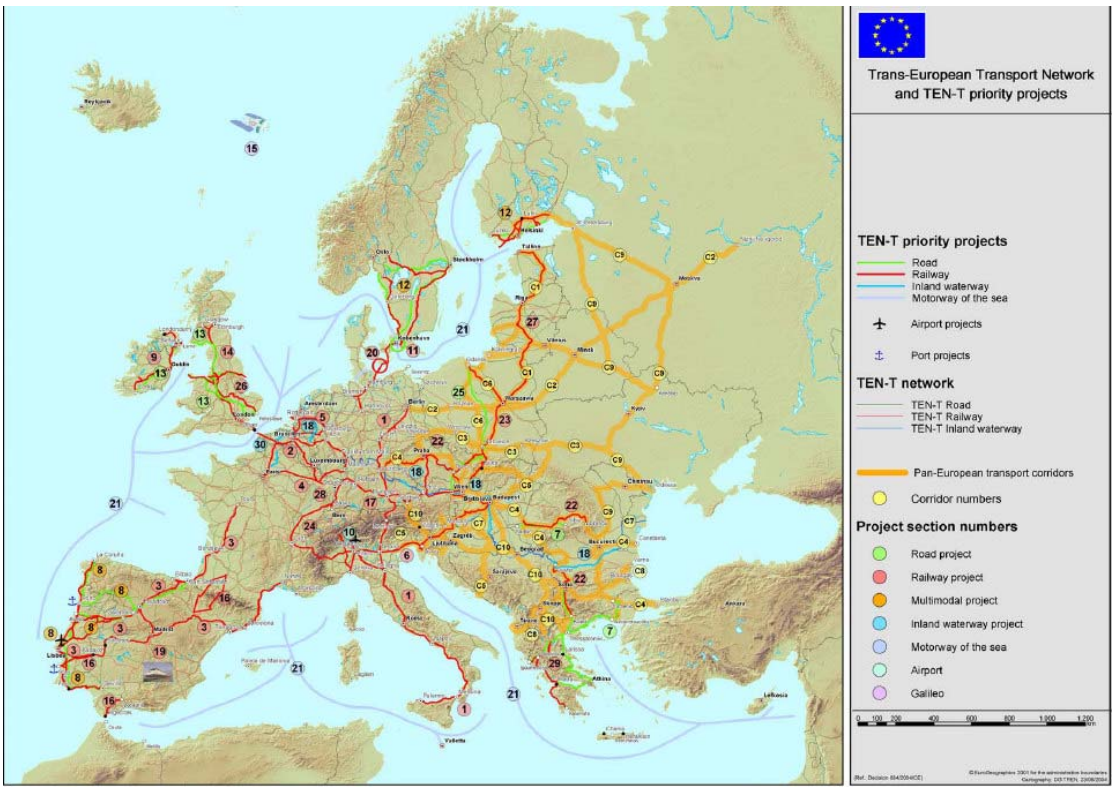

Figure 45: Trans-European Transport Network and TEN-T priority projects.

After the revision of guidelines and accompanying network schemes to include Central and Eastern European Countries, the majority of the Pan-European transport corridors have become TEN-T and as the EU moved eastwards (see TINA maps above), the need to develop transport links with new neighbors has become a priority. To this end, a High Level Group was established on 29 September 2004 on the extension of the major trans-European axes to the neighboring countries and regions to better connect the EU with its neighbors. Former Commission Vice-President Loyola de Palacio was appointed Chair of the Group which consisted of one representative from each of the 26 countries neighboring the EU and one observer from the European Investment Bank, the European Bank for Reconstruction and Development and the World Bank ad also the Member States representatives. According to the final report of the Group3, better connections between the EU and the neighbors and other third countries and the promotion of efficient, safe and secure transport systems globally are important elements in facilitating trade and economic development of the EU and its neighbors.

TEN-T priority projects in the Baltic Sea Region, incl. Motorways of the sea

The trans-European transport network (TEN) policy, revised in 2004, focuses investments on 30 priority transnational axes and projects. The policy has a strong focus on the integration of the networks of the new Member States.

The TEN-T priority axes and projects in the BSR are (figure 46):

11. *Öresund fixed link.* The link extends the St. Petersburg - Helsinki – Stockholm – Copenhagen corridor. Completed 2000

12. *Nordic Triangle railway/road axis.* Better rail, road and maritime infrastructure for freight and passengers between Öresund fixed link, Stockholm, Oslo, Turku, Helsinki and the Finnish-Russian border. To be completed 1995 - 2015

20. *Fehmarn belt railway bridge/tunnel* extends the Öresund crossing and the Nordic Triangle links to connect the North - South route connecting Central Europe and the Nordic Countries. To be completed by 2015.

21. *Motorways of the Sea (MOS)*, is intended to concentrate freight flows on sea-based logistical routes with the objectives of reducing road congestion and/or improve access to peripheral and island regions and States. Four motorways of the sea corridors, one of them for the Baltic Sea have been designated.

23. *Railway Axis Gdansk - Warsaw - Brno/Bratislava - Vienna.* The aim is faster freight transport services and to remove traffic from the saturated north-south road axis. The axis complements no. 27 - Rail Baltica. To be completed 2005 – 2015.

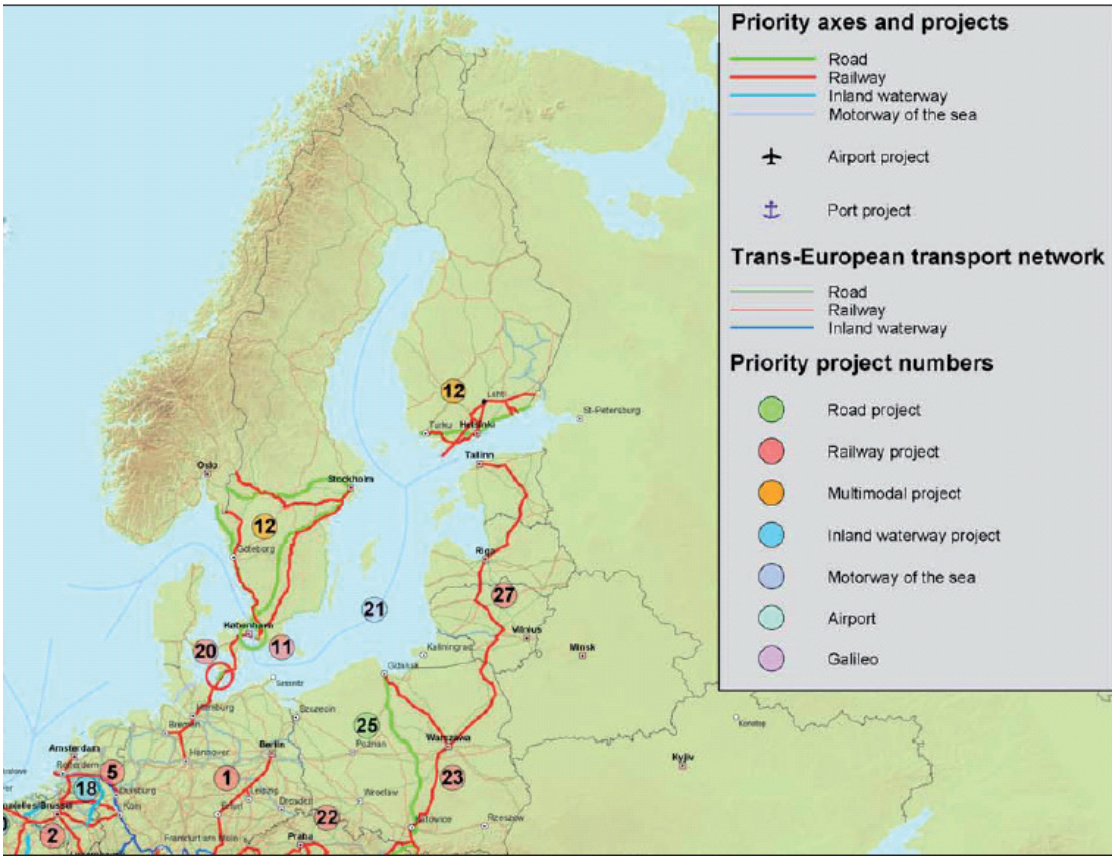

Figure 46. Priority axes and the projects of the TEN-T in the BSR. [34]

27. *"Rail Baltica" axis Warsaw - Kaunas – Riga - Tallinn - Helsinki.* The aim is to upgrade and renew the Estonian, Latvian, Lithuanian and Polish parts of the railway and making the railway more interoperable with the rest of the European network. Completion not specified, tentatively till 2018.

High Level group report on extension of TEN-T

A group under the leadership of former Transport Commissioner Loyoloa de Palacio delivered in December 2005 a report on the extension of the TEN-T to neighbouring countries and regions(figure 47).

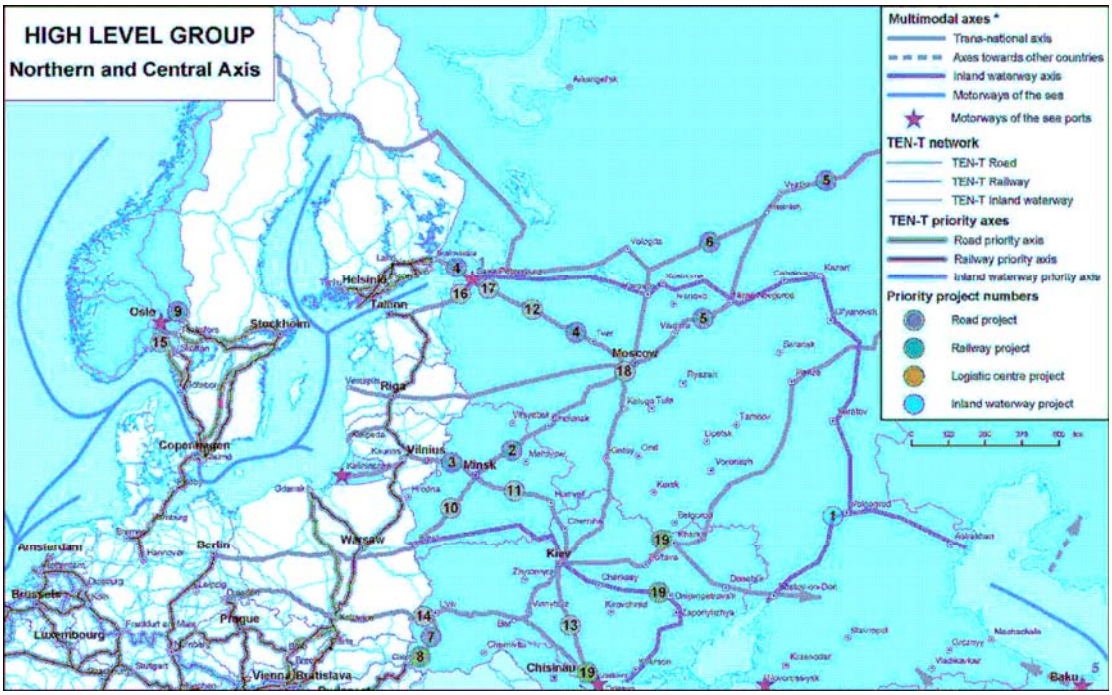

Figure 47. Priority axes and the projects of the TEN-T. [34]

Two transnational axes are of major importance for the Baltic Sea Region:

- Northern Axis - connecting the north of EU to Norway and to Belarus and Russia and Beyond. A connection to the Barents region linking Norway through Sweden and Finland with Russia is also foreseen.
- Motorways of the Sea (MOS) linking the Baltic, Barents, Atlantic, Mediterranean, Black and Caspian Sea areas and their littoral countries.

Alignments of the Northern axis connections

- Multimodal connection Finnish border - St Petersburg-Moscow
- Rail freight connection St. Petersburg - Vologda - Moscow/trans-Siberian
- Multimodal connections from relevant Baltic ports to Minsk/Moscow: - Ventspils-Riga-Moscow
- Multimodal connection in Norway of the TEN the Nordic Triangle
- Multimodal connection St Petersburg - Vartius - Tornio - Haparanda - Narvik

European Commission endorsement of the High Level Group Report

On 31 January 2007, the European Commission issued a Communication recommending to the Council and to the European Parliament to take note of the High Level Group's report and accept the proposal to revise the concept of the Pan-European Corridors/Areas (PEC). This implies the adoption of the five transnational axes proposed by the High Level Group, of which the Northern and Central axes are most important for the BSR (figure 48).

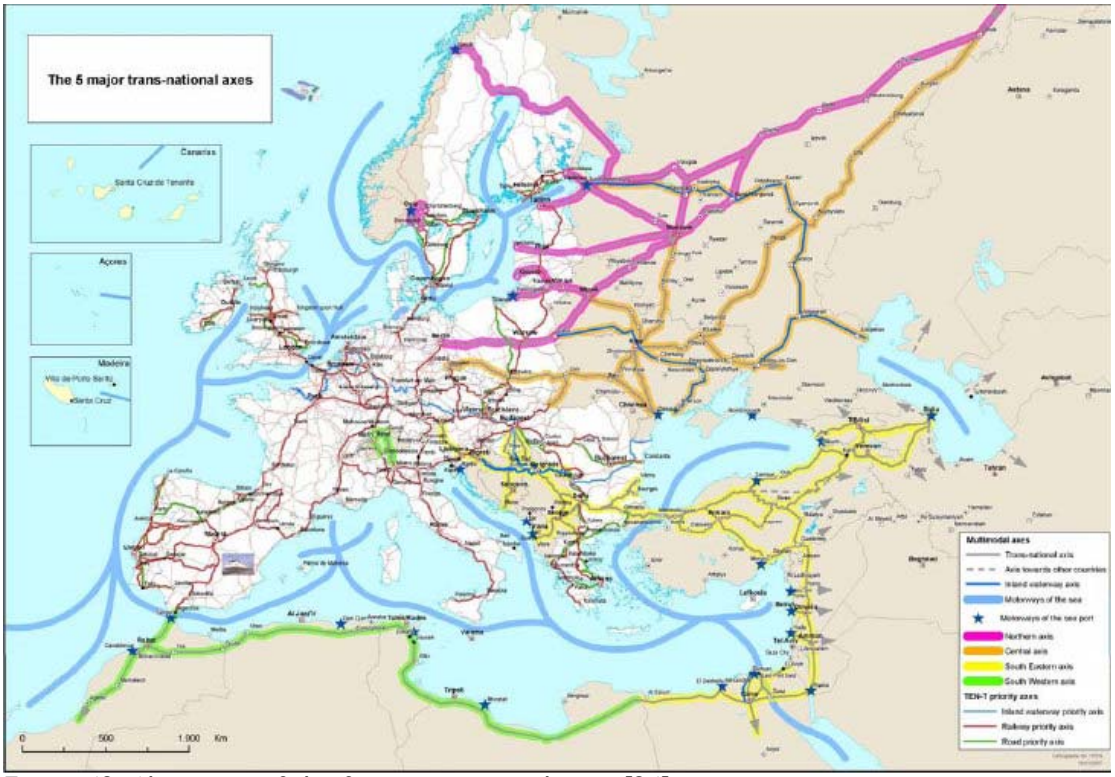

Figure 48. Alignment of the five transnational axis. [34]

The Commission proposes to consider the infrastructure projects put forward by the High Level Group as indicative and underlines the importance of developing master plans for the different axes. These master plans should be subject to strategic economic, environmental and social impact assessment in line with best international practice and when relevant with EU legislation.

The Commission furthermore proposes to endorse the horizontal measures proposed by the High Level Group as the basis for cooperation in view of making transport along the axes more rapid and effective. These measures aim at gradually approximating the neighbouring countries. [34]

Development of the Northern Axis in the Barents Region [35]

The so-called Northern Axis is of interest to Baltic Sea Region and Barents Sea Region, as it aims to connect the northern EU with Norway to the north and with Belarus and Russia to the east. Within the Northern Axis, the alignment Narvik - Haparanda/Tornio – Vartius - St. Petersburg concerns the Barents Region, and is referred to as the northern branch of the Northern Axis.

Based on the report from the High Level Group, the Commission issued a 'Communication on the extension of the major trans-European transport axes to the neighboring countries and regions' in January 2007 (COM 2007:32 final). The Commission recommends the Council and the European Parliament that implementation of improvements along the selected axes are to be supervised by economically efficient institutions, among others, regional steering groups, ministerial meetings and secretariats. Secretariats and steering groups are recommended to be created in connection with already existing similar structures on the regional level.

Concerning the Barents Region, focus is on the EU-Russia Partnership and Co-operation Agreement and the related concept of four 'Common Spaces'. Within this framework, transport questions, including the Northern Axis, are addressed under the Common Economic Space. The so-called Road maps act as instruments for making the Common

Spaces a reality on medium and short term and will be implemented through the Northern Dimension co-operation framework.

The Northern Dimension co-operation is co-ordinated through a secretariat at the Ministry of Foreign Affairs of Finland, which also deals with tasks of the Barents Euro-Arctic Council, BEAC. Within the Council, transport issues are addressed through the working group Barents Euro-Arctic Transport Area, BEATA, where the transport ministries of the member countries and the EU Commission are represented. The aim of Barents Euro-Arctic Transport Area is to promote international co-operation in the development of transport infrastructure in the Barents region. The objective of the co-operation is to create an efficient and integrated transport system in the region. The BEATA steering committee also acts as an advisory board for STBR.

In addition, the Helsinki secretariat for the Northern Dimension also manages tasks of a few other regional councils, which are important for the regional co-operation within the Northern Dimension. It is thus likely that the secretariat would be suitable as location for an office for a regional secretariat for the Northern Axis as well.

So far, the Northern Dimension does not include a partnership on logistics and transport questions. In the Northern Axis area, transport sector development so far takes place within regional councils and bilaterally between countries, although the Northern Dimension second action plan includes focal points and goals for transport development. Thus, these are seen as important actors for Common Spaces implementation and thus also for the Northern Axis.

Returning to the present work with the Trans-European Transport Axes, the Northern Axis has been identified as one of the most important transport axes between EU and its neighboring countries. Thus, the EU transport policies will be concentrated on the development of these axes.

Nevertheless, within the Northern Axis, the Barents Region section or the northern branch of the axis, is included in a somewhat restrictive manner. The high level group made a preliminary list of projects to be implemented for the axes, and no project was identified for this part of the Northern Axis. This indicates that this part of the axis is not seen for the moment to be one of the most urgent ones to implement in practice. The alignment also deviates somewhat from e.g. the Barents Link alignment, as it follows the October Railway, also called the the Murmansk Line, from Kochkoma to St. Petersburg region and to the Trans-Siberian Railway. According to the Commission, focus should be on connections with neighboring countries, not on contacts beyond. This affects, for instance, the possibilities to include the N.E.W. concept in the Northern Axis activities.

Still, the list of projects is preliminary and still under development. In order to include projects for the northern branch of the Northern Axis, a lot of regional and national support will be needed. [35]

Motorways of the Sea in the BSR [34]

The Baltic Sea Region is well ahead in developing the MoS concept compared to the other MoS corridors in Europe. A Task Force was established in 2004 to coordinate the development of MoS in the BSR and to initiate actions and projects. The MoS approach in the BSR is focusing on infrastructure, improved accessibility and cohesion, horizontal projects of wider benefit and the development of transnational intermodal transport corridors. The Task Force is currently implementing a Master Plan Study project with funding from the TEN-T budget.

The European Commission is putting strong emphasis on the modal shift objective in the actual application of the guidelines, apparently ignoring that cohesion is an objective of equal importance under art. 12A of the TEN-T regulations. The strategy should thus encourage the development of MoS projects in the Northern parts of the BSR, characterised

by weaker flows and longer distances, based upon a polycentric structure whereby smaller ports & routes are feeding into the main MoS routes.

In light of the many intermodal freight routes between the two sea regions it is important to develop a coherent MoS framework. The MoS Task Forces in the two regions are assumed to be natural platforms for Baltic – North Sea cooperation (also facilitated by partly overlapping membership for Sweden, Denmark and Norway). In this context, it is also important to ensure that the MoS network is effectively extended to non-EU member countries like Norway and Russia based on the same principles as apply for the EU part of the network.

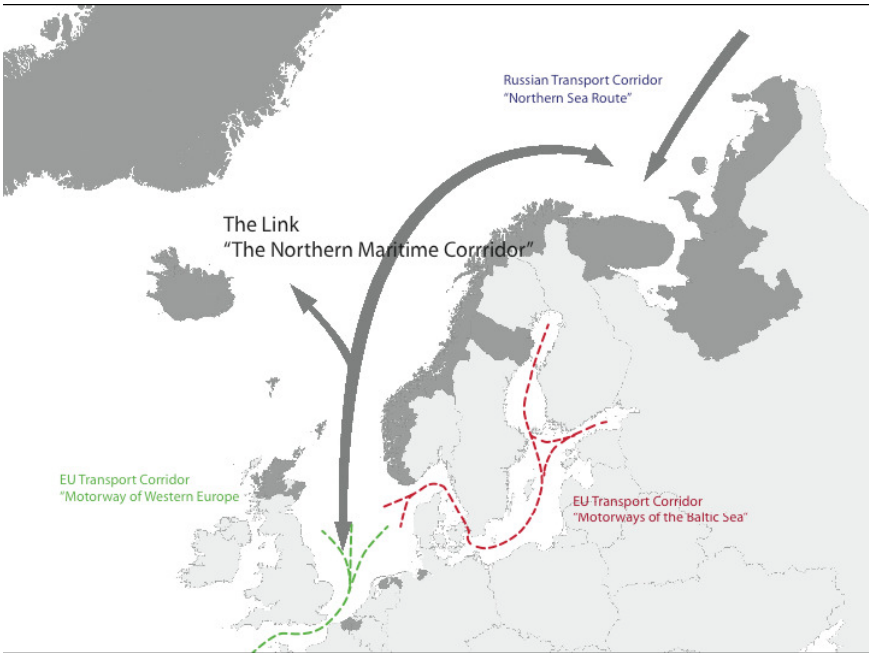

Figure 49. The Northern Maritime Corridor [34]

The map above shows that the Northern Maritime Corridor (also developed in a project under the Interreg IIIB North Sea Programme) could be a relevant framework for extending tbe MoS network further north along the Norwegian Sea up to the Barents Region in line with the recommendations of the EU High Level Group report. It may also be seen that this corridor is having several east-west alignments – linking up to various parts of the BSR.

Transport network development in South Baltic Sea Area [8]

The Baltic Gateway Quick Start programme includes investments in several key areas of action as identified in the mid-term review including:

- services aiming at promoting co-modality in order to provide for an optimal and sustainable utilisation of resources,
- corridors that are particularly suitable for rail and waterborne transport as created by extended main TransEuropean network in the extended Europe and Neighbouring countries,
- diversity of differentiated solutions leaving room for local, regional and national solutions, whilst ensuring a European-wide internal transport market,
- the strengthening of international competitiveness of European multimodal industries and on offering integrated solutions across modes, focused on tackling bottlenecks and weak links in the logistics chain,
- innovative intelligent transport systems,
- stimulate improved energy efficiency, diversified supply solutions and policies to affect demand,
- policy towards partners in the European neighbourhood emphasising the gradual extension of the internal transport market to those countries, and the

increased demand from international transport services to and from the emerging economies.

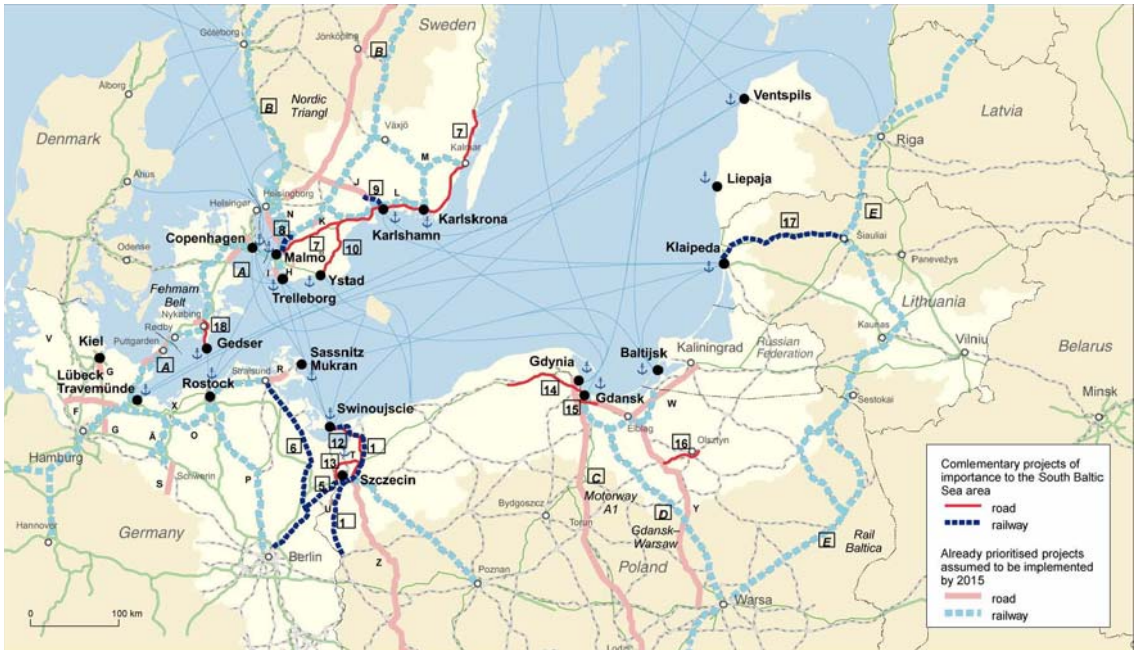

Figure 50: The map shows projects already prioritised within European and National plans in light colors (Group A-projects). It is of crucial importance that these projects are implemented. However, also complementary projects are needed (Group B-projects). The Baltic Gateway Quick Start Programme includes both the already prioritised projects and the most important complements to already prioritised projects of relevance for intermodal transport services in the South Baltic Sea area. These projects are marked in the map with strong colours and are described more in detail on the following pages. [8]

List of the projects implemented before 2015 according to current European and national plans.

Group A: Already prioritised projects assumed to be implemented by 2015.

TEN-T Priority projects and axis

A - Fehmarn Belt railway axis including
- capacity improvement and electrification of rail link Hamburg – Lübeck – Travemünde Puttgarden
- capacity improvement and electrification of rail link Rødby – Copenhagen
- capacity improvement for road network round Copenhagen
- motorway project Oldenburg – Heiligenhafen on the Puttgarden – Hamburg link (A1) and Køge Bugt Motorway
- København Ringsted railway

B - The Nordic Triangle railway/road axis including
- the southern and western trunk railway
- the roads E4, E6 north of the Øresund fixed link

C - Construction of Motorway A1: Gdansk – Lodz – Katowice - Brno/Bratislava-Vienna

D - Railway axis Gdansk-Warsaw- Katowice - Brno/Bratislava-Vienna

E - Rail Baltica axis Warsaw-Kaunas-Riga-Tallinn-Helsinki

Other National Priority Projects

F - A20 from Lübeck (A1) to Itzehoe (A23) – Elbe Crossing – Lower Saxony

G - A21 from Kiel to Schwarzenbeck (A24)

H - Improvement of the railway Trelleborg – Malmö

I - Motorway extension Vellinge – Trelleborg

J - New construction of the Crossroad Markaryd – Osby – Olofström – Karlshamn

K - Upgrading of road 23, Höör east and Ekeröd - Sandåkra

L - Electrification of the Coastal Railway Kristianstad – Karlskrona

M - Improvement of the Coast to Coast railway (Kalmar/Karlskrona – Emmaboda – Alvesta)
N - Improvement of the goods track in Skåne (Malmö – Arlöv – Kävlinge – Teckomatorp – Åstorp – Ängelholm)
O - Improvement of the railway Lübeck – Wismar – Rostock – Stralsund
P - Improvement of the railway Rostock – Berlin
R - Reconstruction of B96 from Stralsund to Bergen including the crossing of Stralsund
S - Construction of the motorway A14 from Schwerin to Magdeburg
T - Berlin – Schwedt – Szczecin inland waterway
U - Schwedt bypass
V - Extension and deepening of the Kiel canal
W - Improvement of the Elblag – Kaliningrad road
X - Improvement of the Elbe – Trave Canal
Y - Construction of expressway S7 (E77): Gdansk – Elblag – Warsaw
Z - Construction of expressway S3 (E65): Szczecin – Gorzów –Legnica
Ä - Rail connections to Wismar

Group B: Complementary projects of importance to the South Baltic Sea area

Capacity building projects
1 - Development of Intermodal Promotion Centers (IPCs) in the South Baltic Sea area
2 - Promotion of interoperable IT-solutions through port co-operation
3 - Development and implementation of an educational programme in transport and logistics

Improvements of intermodal hubs
4 - Promote the following TEN-A ports as intermodal hubs, through development of infrastructure and services jointly by private and public stakeholders: Gedser, Kiel, Lübeck/Travemünde, Rostock, Sassnitz/Neu Mukran, Szczecin/Swinoujscie, Gdansk and Gdynia, Kaliningrad/Baltijsk, Klaipeda, Liepaja, Ventspils, Copenhagen-Malmö, Trelleborg, Ystad, Karlshamn, Karlskrona.

Hinterland connections
5 - Angermünde – Szczecin, railway upgrading
6 - Berlin – Stralsund via Angermünde, railway upgrading
7 - E22, Malmö – Oskarshamn, road upgrading
8 - Lund bypass, new railway
9 - Olofström – Karlshamn, new railway
10 - National road No 19, Ystad –Kristianstad, road upgrading
11 - Swinoujscie – Kostrzyn, railway upgrading
12 - S3 (E65) Swinoujscie - Szczecin new road and partly road upgrading
13 - S6 (E28) Szczecin, Northern bypass, new road
14 - S6 (E28) Gdansk – Lebork - Słupsk, new road and partly road upgrading
15 - S7 (E77) Gdansk Southern bypass and main access to Gdansk Port (Sucharski route), new road
16 - S16 Ostroda – Olsztyn, road upgrading including Olsztyn bypass.
17 - Lithuania Corridor IXB Road and railway upgrading
18 - Nykøbing Ring Road, Højmølle – Gedser, new construction and upgrading of road. [8]

Conclusions and recommendations

Large differences in transport infrastructure exist within the BSR. There are still exist missing links in the inland transport system of the BSR, lack of interoperability between various national rail systems due to different technical systems (e.g. railway gauge, signalling system or rail electricity mode) and administrative barriers, lack of coherent inland waterway network easing traffic from the road arteries, lack of operational system of the Baltic Sea Motorways able to concentrate freight flows on sea-based logistical routes. There is also great number of bottlenecks and shortcomings reveled in the screened INTERREG III projects. Probably most important bottlenecks and shortcomings exist along East-West axis (old iron curtain divide), where at the same time is experienced and expected the strongest growth in good flows. There is a need to remove existing bottlenecks, shortcomings and lack of interoperability in order to develop a coherent, unified transport system, for the BSR, because the whole system is not stronger than the weakest links. Also missing links, bottlenecks, lack of interoperability in some parts of the transport network would have a negative effect on the more developed parts of the network.

It is very important to collect correct and unified information of all modes of traffic to be able to see the transport system in the entire region as one system. A generally updateable and region-wide database would assist transport authorities to plan and develop the region's transport infrastructure and services jointly and more effectively.

It looks that many of the individual projects inside BSR concentrating mainly on selected part or area of BSR or one single transport mode. In some ways the realisation of these projects can include synergy effects: increasing rail transports may also mean extra transports for seaports along the associated rail transport corridor. In other instances the ambitions can be exclusive, counterproductive and even competitive: shifting transport modes can mean less transport for one mode and more transport for the other. It looks that at the moment the system view of the BSR transports is missing. It is recommended that in the future this system view needs to be formulated and looked into more closely.

One of the recommendation for future actions is to promote the integration of inland navigation in a trans-Baltic multimodal transport strategy. This concerns a better integration of inland shipping into multimodal trans-national transport chains and the general use of inland navigation in a national and trans-national context.

There was not any project from the list dedicated to energy production and supply therefore there was not possible to draw any conclusions concerning energy accessibility.

Due to lack of comprehensive information about ICT infrastructure and e-services in geographical dimension there is difficult to draw valuable and correct conclusions concerning e-accesibility.

To promote solutions contributing to more coherent transport network in the Baltic Sea region the motorways of the sea should constitute an integral part of the TEN-T and link its landside sections over the sea. Full setting of the MoS concept in the Baltic Sea region requires provision of adequate road and rail infrastructure unlocking potential of the ports in Sweden, Poland, Kaliningrad oblast, Lithuania, Latvia, Estonia and Finland.

There is a number of bottlenecks on improving transport/communication flows within the BSR area and between NW Russia and the rest of the BSR presented in this report:

- still existent missing links in the inland transport system of the BSR (e.g. secondary links providing access to TEN-T network, connections between TEN-T axes across the sea, extensions of the TEN-T axes eastwards),

- border crossing bottlenecks in the Russian border bypasses (inefficient border control, long waiting times)
- low quality and capacity of existing road and rail infrastructure providing access to ports in new EC and East Countries,
- lack of interoperability between various national rail systems due to different technical systems (e.g. different electrical standarts, signal system and traffic rules, track gauges) and administrative and market-related barriers (e.g. tariff differences, restrictions to use rolling stock of different origin, time consuming customs routines etc.),
- lack of coherent inland waterway network easing traffic from the road arteries
- lack of operational system of the Baltic Sea Motorways able to concentrate freight flows on sea-based logistical routes, to reduce road congestion and to improve access to peripheral areas of the BSR
- lack of networking of electronic networks (e.g. missing direct port communication, need for real time data exchange)
- lack of the logistics and distribution centres in new EC and East Countries The performance of supply chains / transport corridors can be improved through co-operation and communication between logistics centres.

Important projects and corridors for BSR integration and for better integration between NW Russia and the rest of BSR:

- the TEN-T priority axes and projects in the BSR: Nordic Triangle railway/road axis, Fehmarn belt railway bridge/tunnel, railway Axis Gdansk - Warsaw - Brno/Bratislava – Vienna, "Rail Baltica" axis Warsaw - Kaunas – Riga - Tallinn – Helsinki;
- Motorway of the Baltic Sea network which should absorb a significant part of the expected increase in road freight traffic, improve the accessibility of peripheral and island regions and states and reduce road congestion.
- Norther Axis / N.E.W. Multimodal Corridor: Narvik- Haparanda-Tornio-Vartius-St.Petersburg (the corridor connects the EU with Norway and Russia in the Barents region and is the part of a longer transport corridor between Asia and northern America);
- Barents Link: Narvik-Haaparanta-Tornio-Vartius-Archangelsk–Perm (the corridor connects Nordic countries with the North-West Russian regions of Karelia, Archangelsk, Komi and eventually Perm);
- Bothnian Corridor: Stockholm-Haparanda-Tornio-Helsinki (the corridor connects the Barents region to the capitals of Finland, Sweden and Norway);
- Baltic-Link: connects the Swedish west coast and Norway with the southeast coast (the port of Gothenburg is linked to the port of Karlskrona, the Baltic Sea, the ports of northeastern Poland, Kaliningrad and Lithuania and the corridors towards Central Europe, the Balkans, Mediterranean and the EU's new neighbouring countries);
- Mid Nordic transport corridor: runs through the middle parts of Norway, Sweden and Finland from the Trondheim fjord in the west to Karelia at the Finnish – Russian boarder in the east (the corridor connects to the west from harbours in the Trondheim fjord to the UK and to Continental Europe; to the east there are several boarder crossing points to Russia for both rail and road);
- East-West Transport Corridor: running from Esbjerg in Denmark to Vilnius in Lithuania (via the Öresund region, includes several TEN-T ports, road and railways links, parts of the Nordic triangle and Corridor IX B/D in Lithuania /Kaliningrad), has the potential to serve the increasing needs of east-west transport capacity across the Baltic Sea and further onwards to the Far East and the Black Sea Region.

In order to promote further BSR integration (including integration between NW Russia and the rest of BSR) VASAB could initiate or support the establishment of a permanent High Level Group for transport strategy development in the Baltic Sea Region with a broad representation of representatives around the region and which continues the work on a Master Plan initiated in InterBaltic project in compliance with a long term perspective of the spatial development of the Baltic Sea Region.

References

1. Petri Mononen, Kati Kiiskilä. STBR - Sustainable Transport in the Barents Region: General Summary Report. 2005;
2. Petri Mononen. Road transport corridors in the Barents region. Summary report. 2005;
3. Björn Silfverberg, Mette Granberg, Rolv Lea, Jennie Thalenius, Ari Kalliokoski, Jussi Kiuru, Svetlana Vorontsova, Inna Tikhomirova, Galina Nerekina, Alexander Solodkiy. STBR II: Road Corridors – perspectives of industries and hauliers. 2007;
4. ÅF-Infraplan AB. Barents Railway Network – Case Studies. 2005;
5. ÅF-Infraplan AB, JICL Johnsson AB. Barents Railroad Network-Needs studies. 2005;
6. ÅF Infraplan Nord. Northern Axis Development in the Barents Region: Status Report. 2007;
7. Baltic Gateway project secretariat. Final Report: Baltic Gateway Quick Start Programme. Promoting Maritime Related Intermodal Transport in the South Baltic Sea area. 2006;
8. Baltic Gateway project secretariat. Final Report: Baltic Gateway PLUS Implementing the Baltic Gateway Quick Start Programme. 2007;
9. Igor Kabashkin. Feasibility study on Rail Baltica railways Expert Conclusion on Selected Questions of "COWI A/S" report. Riga. 2007;
10. SIA "NK konsultāciju birojs", Ministry of Regional Development and Local Government of the Republic of Latvia. Rail Baltica Corridor Study. Assessment of the Rail Baltica railway corridor alternatives. Assessing the impacts of spatial planning, regional development and social and economic factors. Final Report. Riga 2008;
11. Swedish Maritime Administration. Intrasea - INland TRAnsport on SEA routes – Final report. 2006;
12. Susanne Ingo, Mattias Frithiof, Sirje Pädam, Anna Vindelman, Inregia AB. Baltic Link. Final Report. SEBTrans–Link. 2005;
13. East West Transport Corridor. Strategy and Action Plan. Final Draft. 2007;
14. Wiktor Szydarowski. The South Baltic Sea Concept of the Sea Motorways. First Consolidated Draft 2006;
15. Kent Bentzen, Caroline Logeais. BaSIM- Baltic Sea Information Motorways. Results and perspectives from the WP3 work. 2008;
16. Igor Kabashkin. Baltic Tangent. Summary report. 2007;
17. Report on general infrastructure bottlenecks in the Baltic Tangent. Input to WP 2 from the Regional Council in Kalmar County. 2006;
18. Strategy for North East Cargo Link. Final Version. 2006;
19. North East Cargo Link. A project for the development of an intermodal transport corridor in the Mid Nordic Region. 2005;
20. Baltic Rural Broadband Project. Baseline Study. Åboland. 2006;
21. Baltic Rural Broadband Project. Baseline Paper. Djursland/DENMARK. 2006;
22. Simon Oellrich, Tatjana Possen, Anastasia Schiller. Baltic Rural Broadband Project. Baseline Situation – UAS Stralsund. 2007;
23. Baltic Rural Broadband Project. Baseline Paper. Ignalina and Zarasai. 2006;
24. Baltic Rural Broadband Project. Synopsis Baseline Papers. Kwidzyn County / Poland. 2006;
25. Baltic Rural Broadband Project. Baseline Situation. County of Osterholz. Germany. 2006;
26. Baltic Rural Broadband Project. Baseline Situation. Rogaland / Norway. 2007;
27. Baltic Rural Broadband Project. Baseline Situation. Latvia. 2007;
28. Baltic Rural Broadband Project. Baseline Situation. Värmland / Sweden. 2006;
29. Baltic Rural Broadband Project. Baseline Situation. Võru County, Estonia. 2006;
30. Wolfgang Kersten, Mareike Böger, Meike Schröder, Carolin Singer. Developing Regions Through Spatial Planning, Logistics & ICT Competence – Final Report. LogOnBaltic Project. 2007;
31. Baltic Sea Information Motorways. Final Report. Work Package 2. 2007;
32. Memorandum of Understanding on Sustainable Port and Maritime Policy in the Baltic Sea Region. New Hansa of Sustainable Ports and Cities. 2005;

33. http://ec.europa.eu/ten/transport/maps/schema_fr.htm;
34. Draft framework for a pan-Baltic Transport Strategy/Master Plan. InterBaltic. 2008;
35. ÅF Infraplan Nord. Northern Axis Development in the Barents Region: Status Report. 2007.