North Sea – Baltic

Core Network Corridor Study

Final Report

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Transport

Mandatory disclaimer

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Final Report

of the PROXIMARE Consortium to the European Commission on the

The Study of the North Sea – Baltic Core Network Corridor

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With input by the following subcontractors:

- University of Turku, Brahea Centre
- Tallinn University, Estonian Institute for Future Studies
- STS-Consulting
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- ILiM
- MINT

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PROXIMARE Consortium

The Proximare consortium led by Pan-Baltic Law Firm TRINITI (Estonia) together with Malla Paajanen Consulting (Finland), Norton Rose Fulbright LLP (United Kingdom), IPG Infrastruktur- und Projektentwicklungsgesellschaft mbH (Germany) and Goudappel Coffeng BV (The Netherlands) has been commissioned by the Directorate-General for Mobility and Transport of the European Commission (DG-MOVE) with carrying out a study on the North Sea-Baltic core network corridor.

TRINITI, lead partner represented by Mr. Tõnis Tamme. Triniti is a Pan-Baltic commercial law firm which has cross-border practice groups and a combined team of 50 people serves clients in the capitals of EE, LV and LT. TRINITI has a large international record projects in transport, infrastructure and logistics including, e.g. the Rail Baltic Joint Venture Study for the governments of EE, LV and LT (2013), drafting legislative acts required for the development of Riga International Airport, representing a major LT road construction company in a tender for a PPP project for the Palanga bypass, and continued advice for the re-structuring of the Estonian Air.

Malla Paajanen Consulting, project manager, specializes in the planning, management and implementation of major international projects in the fields of transport, logistics, place branding and tourism. Ms. Paajanen has worked in transnational development and research projects in Europe and Russia funded by various funding programmes of the EU. She has also participated as an expert in business education in global development programmes. The Consultancy specializes in projects of multi-level governance and partnerships in demanding triple helix environment that combine interests of the private, public and research sectors.

Norton Rose Fulbright LLP, represented by Mr. Jürgen Werner is a global legal practice providing the world's pre-eminent corporations and financial institutions with a full business law service. NRF has over 3800 lawyers based in over 50 cities all over the world. Norton Rose Fulbright LLP has a dedicated rail group, including 60 partners and 86 associates. Key features of this practice group are a broad client base, and expertise in all sectors of the rail industry. The firm is consistently highly ranked for rail by Legal 500, Chambers and other international legal directories.

Goudappel Coffeng, represented by Mr. Gerard Bruil, is the biggest (approximately 260 employees) and the oldest (founded in 1963) company for mobility planning in the Netherlands. The company has offices in Amsterdam, The Hague, Eindhoven, Leeuwarden and Deventer. Goudappel Group is fully owned by its employees. Over 85% of the staff holds shares in the company. The firm's key competence areas are advisory services, software solutions and process outsourcing. Goudappel Coffeng has thorough experience and knowledge in data collection, analyzing, and transport modelling including knowledge of the European TransTools transport model.

IPG Infrastruktur- und Projektentwicklungsgesellschaft mbH, represented by Mr. Martin Heiland, has a strong competence base of 20 employees. IPG's services focus on a broad range of infrastructure and transport development including the reconstruction of railway stations via the revitalization and conversion of industrial contaminated areas up to the development of modern logistics centres and freight villages. Based on numerous project developments IPG disposes of well-developed networks and cooperation with important institutions like ministries, banks, research institutions and partners from the transport industry.

PROXIMARE enjoys the support of the following Associate Partners: • City of Helsinki • Port of Helsinki • Port of Hamburg • City of Berlin • City of Kaunas • Corridor2, EUREGIO • Aalto University School of Business, Centre for Markets in Transition • LogisticsNet Berlin-Brandenburg • Brandenburg Economic Development Board (ZAB) • VDV Association of German Transport Companies • Deutsche GVZ-Gesellschaft (DGG)

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Outlook by the European Coordinator

This Final Study on the North Sea – Baltic core network corridor that you have before you represents the culmination of a year of detailed work and research. While Proximare - the consultants selected by the European Commission following an open tender - have produced this final study it has been far from a "top-down" exercise. Much of the material has come from you the Stakeholders – the eight Member States, the 13 maritime ports, the 18 inland ports, the 44 regions, the 16 airports and the various infrastructure managers - all have contributed vital information during the work of four Corridor Fora and two Working Groups organised during 2014. The study now attempts to provide a global inventory of all the multimodal transport assets along the 3200 km long North Sea – Baltic Corridor from Helsinki to Antwerp. But it is more than an inventory – it attempts also to highlight the main weaknesses and structural problems that exist and to provide a blueprint for further action. Combined with the information input into the TEN-Tec data system both by the consultants and the Member States during 2014 I now have a much clearer idea of the challenge that confronts us as I prepare the draft work plan for the Corridor - namely to create a true multimodal transport corridor linking the North Sea with the Baltic by rail, road, air and water in the interests of developing the Single Market and increasing growth in this vital area of the European Union.

Finally I would like to pay tribute to the work of my predecessor as European Coordinator Pavel Telička, who worked first on the Rail Baltic Priority Project from 2005 until 2013 and then became the first Coordinator of the North Sea – Baltic core network corridor in 2014. Thanks to Pavel's dedication and efforts we now have the basis for the Corridor concept to move forward and we also have a Joint Venture established to create the Rail Baltic.

Catherine Trautmann

European Coordinator

North Sea – Baltic core network corridor

Chapter 1

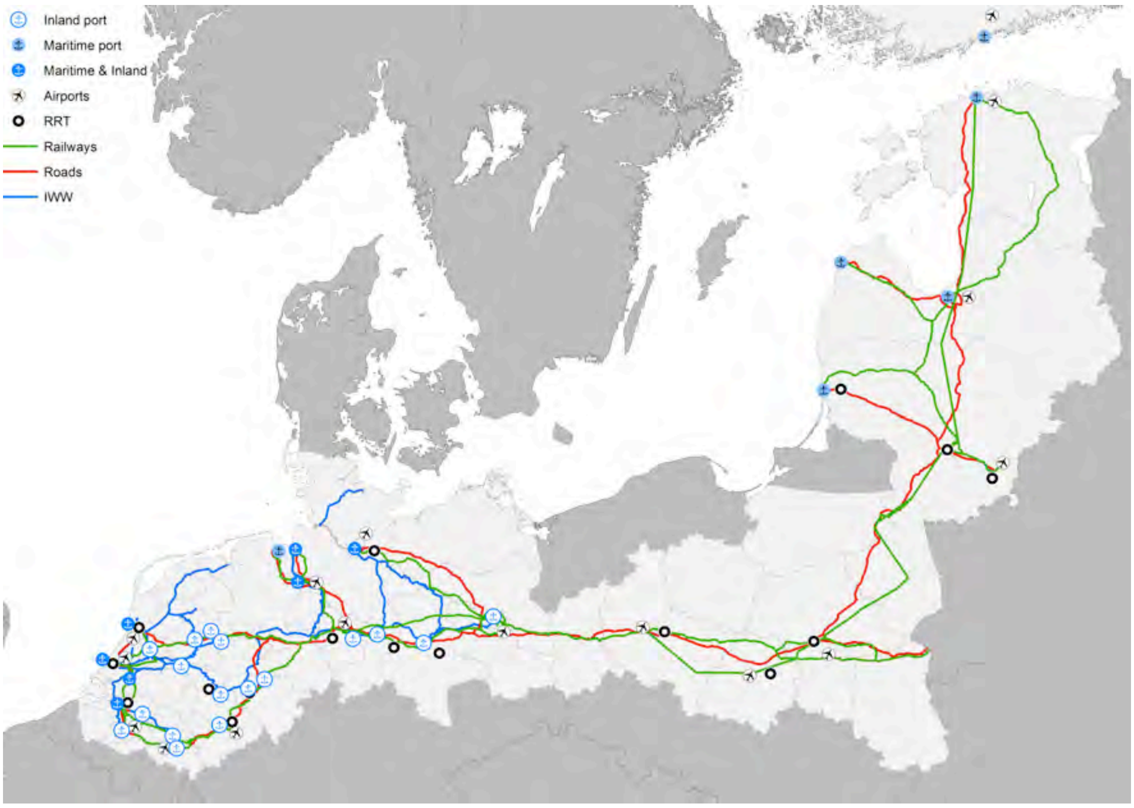
Executive Summary

Overview

Linking the Baltic Sea Region with the main ports of the North Sea

Among all the core network corridors (CNC) the 3.200 km long North Sea – Baltic has the potential of becoming one of the most economically diverse Corridors in the European Union. **The North Sea – Baltic Corridor has 16 core network airports, 13 core network seaports, 18 core network inland ports, and 17 core network rail-road terminals.** The Corridor connects the capitals of all eight countries concerned namely: Helsinki, Tallinn, Riga, Vilnius, Warsaw, Berlin, Brussels and Amsterdam.

The Corridor connects Europe's leading seaports in the west to the fastest developing region in the EU – the Baltic Sea Macro Region in the north-east. The Corridor has an effective inland waterways network stretching from the North Sea ports to Berlin and includes several of the leading logistics hot spots in Europe. The Corridor is characterized by large volumes of freight and passengers at the western and northern ends meaning Finland, Germany, the Netherlands, Belgium and the western part of Poland. However, the long section from Warsaw to Tallinn is marked by insufficient transport infrastructure, lack of international railway services and over-dependence on road transport. These deficiencies are undermining the positive development of economic cohesion, especially in the Baltic States, which are less connected to the European transport flows than the other countries along the Corridor. This fundamental imbalance of transport infrastructure and service constitutes the foremost challenge of the Corridor. Urgent political and investment measures are needed to build up an international rail service through the Baltic States, i.e. the Rail Baltic/Rail Baltica project.



Map: Alignment of the North Sea – Baltic core network corridor

In the western part of the Corridor the challenges are often not in the quality of infrastructure but in the conditions that would enable it to be more efficiently used. Serious actions are also needed to improve cross border connections and to facilitate the growing flows in maritime and inland waterways transport in the light of stricter environmental requirements resulting from international and EU regulations.

Even with a relatively good quality of rail infrastructure the share of railways in transportation is small. To increase the share of rail in freight transportation is a major challenge for the Corridor in both, eastern, central and western part of the Corridor.

This Corridor has intersections with five other Corridors. It crosses with the North - Mediterranean and Rhine - Alpine Corridors in The Netherlands and Belgium: with the Rhine - Alpine, Scandinavian - Mediterranean and Orient/East-Med Corridors in Germany; with the Scandinavian - Mediterranean Corridor in Finland; and with the Baltic - Adriatic Corridor in Poland.

The corridor study is prepared by the Proximare international consortium. This comprises the following partners: Triniti (EE), Malla Paajanen Consulting (FI), IPG-Potsdam (DE), Goudappel Coffeng (NL) and Norton Rose Fulbright (UK).

Key definitions

The Regulation (EU, 1315/2013, article 3) states the key definitions that form the framework of the corridor study. The following list is of the most used definitions needed in the inventory of infrastructure and operations:

'European added value' means the value of a project which, in addition to the potential value for the respective Member State alone, leads to a significant improvement of either transport connections or transport flows between the Member States which can be demonstrated by reference to improvements in efficiency, sustainability, competitiveness or cohesion.

'Infrastructure manager' means any body or undertaking that is responsible, in particular, for establishing or maintaining transport infrastructure. This may also include the management of infrastructure control and safety systems.

'Cross-border section' means the section which ensures the continuity of a project of common interest between the nearest urban nodes on both sides of the border of two Member States or between a Member State and a neighbouring country.

'Multimodal transport' means the carriage of passengers or freight, or both, using two or more modes of transport.

'Interoperability' means the ability, including all the regulatory, technical and operational conditions, of the infrastructure in a transport mode to allow safe and uninterrupted traffic flows which achieve the required levels of performance for that infrastructure or mode.

'Urban node' means an urban area where the transport infrastructure of the trans-European transport network, such as ports including passenger terminals, airports, railway stations, logistic platforms and freight terminals located in and around an urban area, is connected with other parts of that infrastructure and with the infrastructure for regional and local traffic.

'Bottleneck' means a physical, technical or functional barrier which leads to a system break affecting the continuity of long-distance or cross-border flows and which can be surmounted by creating new infrastructure or substantially upgrading existing infrastructure that could bring significant improvements which will solve the bottleneck constraints.

'Logistic platform' means an area which is directly linked to the transport infrastructure of the trans-European transport network including at least one freight terminal, and which enables logistics activities to be carried out;

'Freight terminal' means a structure equipped for transhipment between at least two transport modes or between two different rail systems, and for temporary storage of freight, such as ports, inland ports, airports and rail-road terminals;

'Alternative clean fuels' means fuels such as electricity, hydrogen, biofuels (liquids), synthetic fuels, methane (natural gas (CNG and LNG) and biomethane) and liquefied petroleum gas (LPG) which serve, at least partly, as a substitute for fossil oil sources in the supply of energy to transport, contribute to its decarbonisation and enhance the environmental performance of the transport sector.

Characteristics of the Core Network Corridor

The alignment of the North Sea – Baltic core network corridor is defined in the Regulation (EU) 1315-1316/2013 (L 348 p. 152) as follows:

Helsinki – Tallinn – Rīga

Ventspils – Rīga

Rīga– Kaunas

Klaipėda – Kaunas – Vilnius

Kaunas – Warszawa

BY border – Warszawa – Poznań – Frankfurt/Oder – Berlin – Hamburg

Berlin – Magdeburg – Braunschweig – Hannover

Hannover – Bremen – Bremerhaven/Wilhelmshaven

Hannover – Osnabrück – Hengelo – Almelo – Deventer – Utrecht

Utrecht – Amsterdam

Utrecht – Rotterdam – Antwerpen

Hannover – Köln – Antwerpen

Inventory of the North Sea – Baltic core network corridor

The following lists make an inventory of the Core Network urban nodes, nodes, airports, maritime ports, inland waterway ports, rail-road terminals and regions.

Core Network Urban Nodes: (17)

1. Antwerp
2. Brussels
3. Berlin
4. Bielefeld
5. Bremen
6. Hamburg
7. Hannover
8. Cologne
9. Tallinn
10. Rīga
11. Vilnius
12. Amsterdam
13. Rotterdam
14. Łódź
15. Poznań
16. Warsaw
17. Helsinki

Core Network Nodes: (20)

1. Antwerp
2. Brussels
3. Liege
4. Berlin
5. Bremen
6. Dortmund
7. Hamburg
8. Hannover
9. Cologne
10. Tallinn
11. Rīga
12. Ventspils
13. Kaunas
14. Vilnius
15. Amsterdam
16. Rotterdam
17. Łódź
18. Poznań
19. Warsaw
20. Helsinki

Core Network Airports: (16)

1. Brussels
2. Liege
3. Berlin
4. Hamburg
5. Bremen
6. Hannover
7. Cologne
8. Tallinn
9. Rīga
10. Vilnius
11. Amsterdam
12. Rotterdam
13. Łódź
14. Poznań
15. Warsaw
16. Helsinki

Core Network Maritime Ports: (13)

1. Antwerp
2. Hamburg
3. Bremen
4. Bremerhaven
5. Wilhelmshaven
6. Tallinn
7. Rīga
8. Ventspils
9. Klaipėda
10. Amsterdam
11. Moerdijk
12. Rotterdam
13. Helsinki

Core Network Inland Ports: (18)

1. Berlin
2. Braunschweig
3. Bremen
4. Bremerhaven
5. Dortmund
6. Hamburg
7. Hamm
8. Hannover
9. Cologne
10. Magdeburg
11. Almelo
12. Amsterdam
13. Deventer
14. Hengelo
15. Moerdijk
16. Nijmegen
17. Rotterdam
18. Utrecht

Core Network Rail-Road Terminals: (17)

1. Antwerp
2. Berlin-Grossbeeren
3. Braunschweig
4. Bremen
5. Dortmund
6. Hamburg
7. Hannover
8. Cologne
9. Magdeburg
10. Kaunas
11. Klaipėda
12. Vilnius
13. Amsterdam
14. Rotterdam
15. Łódź
16. Poznań
17. Warsaw

Core Network Regions (44)

Belgium (3)

1. Flanders
2. Walloonia
3. Brussels-Capital Region

Netherlands (10)

1. Flevoland
2. Gelderland
3. Noord-Holland
4. Overijssel
5. Zeeland
6. Zuid-Holland
7. Utrecht
8. Groningen
9. Friesland
10. Drenthe

Germany (9)

1. Berlin
2. Brandenburg
3. Bremen
4. Hamburg
5. Mecklenburg-Vorpommern
6. Niedersachsen
7. Nordrhein-Westfalen
8. Sachsen-Anhalt
9. Schleswig-Holstein

Poland (8)

1. Kujawsko-Pomorskie
2. Łodzkie
3. Lubuskie
4. Lubelskie
5. Mazowieckie
6. Podlaskie
7. Warminsko-Mazurskie
8. Wielkopolskie

Lithuania (7)

1. Kaunas
2. Šiauliai
3. Klaipėda

4. Marijampole
5. Panevezys
6. Taurage
7. Vilnius

Latvia (3)

1. Kurzeme
2. Riga
3. Zemgale

Estonia (3)

1. Harjumaa
2. Pärnumaa
3. Raplamaa

Finland (1)

1. Helsinki Uusimaa

Critical issues on the Corridor

The North Sea – Baltic Corridor seeks a better balance of economic development with greater competitiveness and accessibility.

Twenty-five years after the fall of the Berlin Wall there is a need for ideas and projects that can connect the citizens of the European Union to the future. Transport has a major role to play in this connectivity and growth. In fact modern transport is all about services and logistics.

Regions along the corridor can benefit from the proximity of their neighbours, not only because of the objective of European integration but also because of the demands placed on logistics by globalization and the need to connect with new markets. Regions and countries are looking for international relations to increase their competitiveness.

One of the key aspects of the North Sea – Baltic core network corridor is the attempt to reinforce the transport network of the single market along this axis. This involves improving the transport connections between neighbouring Regions and Member States. Gradually this process from local to regional and national builds up to transnational connections to the wider Europe.

Cross border sections

There are eight international border involved in this Corridor. One of them is maritime and the others terrestrial. There is also a border crossing between PL and BY, which is unique point of direct land connection of North Sea – Baltic Corridor with the transport infrastructure of a third country.

What is exceptional for the North Sea – Baltic Corridor, is that there are **long sections where the core network railway infrastructure (1435 mm gauge) is completely missing.** These sections will use the existing infrastructure (1520 mm) of the Comprehensive Network as an interim solution until the Core Network infrastructure is built.

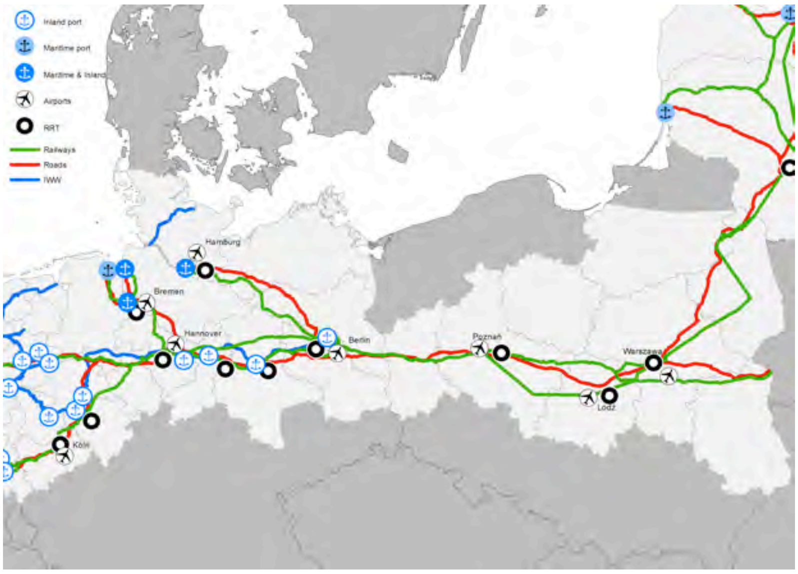
Map: Alignment in FI, LV and LT (TENtec).

The maritime border between **Finland** and **Estonia** is highly developed. The ferry links provide the possibility for inter-city commuting and business development, which is unique on the Corridor. However, there are multimodal hinterland connections which are partly missing. In Helsinki, the new Ring Rail connection to airport will be completed in July 2015. In Tallinn, an urban rail connection is currently missing to the airport. However, the 1435 mm gauge Rail Baltic is planned to have its passenger terminus station at Ülemiste which will be connected to Tallinn airport (for passengers by urban rail) and the ports of Tallinn (passengers by urban rail and freight through an intermodal terminal at the main cargo port of Muuga).

Between **Estonia** and **Latvia** international rail connections are limited for passengers and freight. Air connections exist between Tallinn and Riga, but are less used due to the short distance (350 km) and the fluency and low cost of the bus services. The infrastructure improvements on the 1520 mm railway network have been completed in EE but are partially still on-going in LV. Rail Baltic is being planned to connect EE to LV (and further south) on a double track electrified 1435 mm gauge railway. The (urban) rail connection of Riga Airport to Riga City and the international rail network is also being planned by the Latvian authorities.

Between **Latvia** and **Lithuania** the main connections are by road. International rail connections are lacking for passengers while the service for freight exists. In Lithuania, the reconstruction still has to be completed in the section towards the Latvian border (part of the TEN-T PP 27).

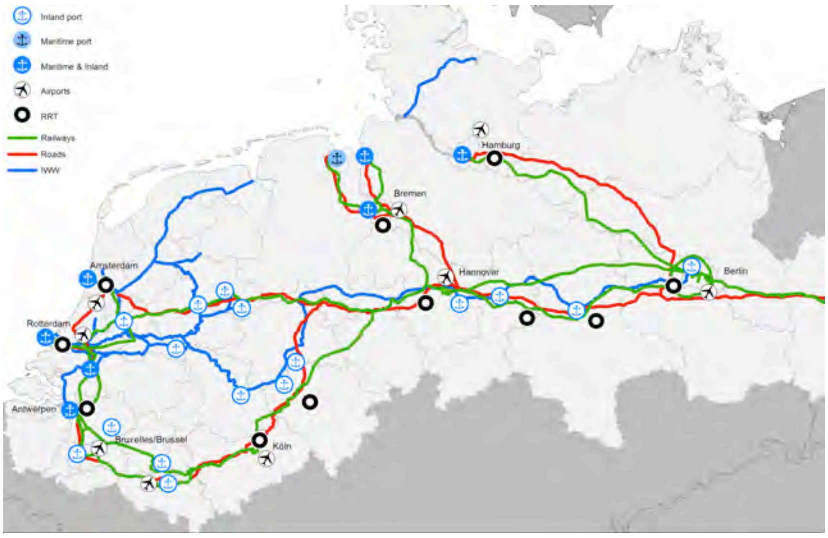
On October 28th 2014, the governments of Estonia, Latvia and Lithuania represented by the transport ministers signed an agreement to create a joint venture company, RB Rail, to implement the project to build a new 1435 mm gauge railway from LT/PL border to Tallinn.



Map: Alignment in PL and DE (TENtec).

Between **Lithuania** and **Poland** the main connections are by road. Currently the Lithuanian authorities are completing the new dual gauge alignment between the PL border and Kaunas. On certain sections of this track there is a separate European gauge (1435 mm). In LT the infrastructure improvements on 1520 mm railways have been completed from LT/PL border with a dual gauge 1435/1520 mm connection to Šeštokai. The completion of a 1435 mm line within the dual gauge track to Kaunas by the end of 2015 is planned. The railway infrastructure in PL on the section Warsaw-Białystok-LT-border requires considerable improvements. Supporting tools such as economic analysis may be considered in decision-making on the scope of works on particular sections of infrastructure.

Between **Poland** and **Germany**, Warsaw - Poznań - Frankfurt (Oder) - Berlin is one of the most important transport connections in Europe, in particular for the Rhine/Ruhr area and the North Sea ports. Rail lies are mostly double-tracked and electrified. The Berlin, Hamburg and Hannover nodes are crossing points between three CNCs: the North Sea – Baltic, Scandinavian - Mediterranean and Orient – East/Med. Poznań, Łódź and Warsaw nodes are a crossing points between North Sea ‐ Baltic and Baltic ‐ Adriatic CNC. From Warsaw there a rail bypass connection exists for freight to the PL/BY border.



Map: Alignment in DE, NL and BE (TENtec).

Between **Germany**, the **Netherlands** and **Belgium**, the border crossings use high-speed railway services and motorways that are mostly six to eight lanes wide. However, the infrastructure is constantly under pressure from increasing volumes in all the transport modes, which entails constant upgrading.

Bottlenecks and missing links

The most severe missing link along the Corridor is the lack of the 1435 mm gauge railway from the LT/PL border to Tallinn. In IWW, the missing links concern the Elbe and Oder rivers, Twentekanaal and Mittellandkanal.

The comprehensive list of bottlenecks is as follows:

Rail

- The railway network of the Helsinki node and the connection between two core network corridors in Finland forms a bottleneck.
- The Rail Baltic 1435 mm gauge railway infrastructure from LT/PL border to Tallinn. The 1435 mm European gauge railway infrastructure within the dual gauge alignment is under construction from LT/PL border to Kaunas and will be completed by the end of 2015. The significant part of European gauge infrastructure as well as international rail services to Tallinn (EE) are missing.
- There is a need to upgrade the section Ventspils-Rīga concerning electrification.
- There is a need to release the city centre of Riga from traffic, create better links between the right and left bank of the Daugava river, and thereby promote better connections between North-South and East-West railway corridors.
- The section between Ełk - PL/LT border will be upgraded by the reconstruction and realignment of certain sections of the line. This includes a new alignment between Ełk and Suwałki.
- The existing railway infrastructure (particularly Warsaw – Białystok – Ełk, Lowicz – Skierniewice – Lukow – Terespol) in eastern PL requires improvements (increase of speed and electrification, station modernization). The railway lines E20/C-E20 are fully

electrified. The railway line E/C-E 20 on the section Warsaw – Terespol has sufficient route class - axle load 22,5 t.

- The upgraded main lines Warsaw – Kunowice, Warsaw – Siedlce (- Terespol) do not have a completely sufficient route class (D-classes – axle load 22.5 t).
- There is a need for bigger terminals in PL (rail tracks, higher capacity, more cranes).
- High-speed line Warsaw – Łódź – Poznań is missing.
- The upgrade of the Oldenburg – Wilhelmshaven line (electrification).
- In the Netherlands the extension of the freight only Betuwelijn towards the Twente region is a missing link.
- There is a need to upgrade the freight connection between Rotterdam and Antwerp. This connection is part of RFC2 however and will be covered by other CNC's.
- In Belgium plans for the improvement of the very important Brussels – Antwerp rail axis including the Mechelen bypass have been prepared.
- The increase in future rail capacity to guarantee the access to the port of Antwerp has led to several rail projects which aim to achieve this objective.
- The so-called Iron Rhine project is a capacity issue for the port of Antwerp and the Belgian hinterland, and although not strictly part of the CNC, has to be taken into consideration.
- The rail connection to the Brussels international airport (the Diabolo project) has already been improved but the rail and road connections need further improvement in the northerly direction.
- A rail connection for Liège international airport and the Carex-terminal is under consideration.
- Modernization of marshalling yards in the Walloon region is necessary to improve operability.
- The removal of level crossings on the Belgium rail network is important for increased safety and operability.
- Differences in signalizing systems and traction systems between countries could be improved to ensure smoother operational handling. The introduction of ERTMS will play an important role in this matter.
- There is a shortage of rail capacity near terminals to ensure better marshalling of wagons and locomotives.

Road

- Extensions and improvement of the road network in Poland and the Baltic countries in order to better meet road transport volumes (Via Baltica) as well Ventspils-Riga section.
- Extension and improvement of the accessibility to the port terminals (Freeport of Riga, Freeport of Ventspils) – the realization of 'last mile' principle at sea ports.
- Extension of the road network in eastern Poland, in particular the express highway S8 Warszawa – Białystok (until Ostrów Mazowiecki) and the long-term planned express

highway S61 from Ostrów Mazowiecki via Lomza, Ełk, Suwałki to the Lithuanian border as well as the extended motorway A2 to the Belarus border.

- Elimination of bottlenecks on the German motorway network (A 12 AD Spreeau – AS Fürstenwalde West, A 7 AK Hannover – Ost, A 1 AS Münster-N – AK Lotte/Osnabrück, A 1/A3 Umbau AK Leverkusen).
- Widening of several heavily used existing road sections in the Netherlands, Belgium and Germany (A 10 AD Havelland).
- There is a need to build rest areas on motorways approximately every 100 km in line with the needs of society, of the market and of the environment.
- Alternative clean fuels should be made available adequately on the road network.
- Implementation of ITS road infrastructure and services is needed to provide safe and smooth traffic.

Ports and Inland Waterways (IWW)

- The ports of Helsinki and Tallinn require further development and infrastructure because of increasing volumes of freight and passengers resulting from the economic and social development of the twin cities.
- Accessibility of ports in the Baltic Sea in winter needs to be improved with a concentration and management of icebreaking capacity.
- There is a need for appropriate improvements for multimodal sustainable accessibility to the Riga Freeport terminals.
- In the Freeport of Ventspils there is a need for maintenance of navigational channels (dredging).
- Improvements are needed for the nautical accessibility of the terminal of the port of Helsinki as well as improvements of the overland accessibility.
- Improvements of the overland accessibility are needed for the terminal of the port of Tallinn, including the connection of passenger ports, city centre and the airport by urban rail.
- Maintenance and repairs of IWW infrastructure in DE in needed.
- In the Netherlands there is a need for traffic management measures to improve the usage of IWW by container transports.
- The future sea accessibility of the port of Amsterdam depends on the realization of the extension of the Ijmuiden sea locks in the Noordzee canal. The IWW-connections between the ports of Antwerp/Rotterdam and Amsterdam depend on the well-functioning of the Beatrix locks system in the Amsterdam-Rijn Canal. The upgrade of the Twente Canal including the Eefde locks is important to reach the envisaged modal shift in freight transport towards IWW. All of these measures are identified as pre-identified projects.

- An increased use of the IWW-connection from Amsterdam to northern parts of the Netherlands including the Delfzijl seaport depend on the upgrade of the Lemmer locks as an entrance to the Prinses Margriet Canal.
- To improve the direct road accessibility of the port of Rotterdam the need for a new river crossing west of Rotterdam has been signalized.
- In the port of Antwerp the need for a better rail and road accessibility has been signalized through new Schelde crossings and city by-passes.
- Intermodal terminals should have spare capacity for future extensions and also to limit the environmental impact.
- There is a need for an ICT system for improving the communication between terminal operators and other stakeholders.
- The implementation of ITS is needed in Short Sea Shipping (single window, coordination with other modalities).
- Realization of LNG fuelling infrastructure in ports for Short Sea Shipping and inland waterways is important for improving sustainability and reducing environmental impact.
- Even though the Kiel Canal is not strictly on the Corridor given its crucial importance to the linking of two European Union seas, it will require special consideration both within the Motorways of the Sea and the Core Network policies.

Interoperability

The key interoperability issue is that the Corridor uses **two international railway gauges** the 1520 mm broad (or Russian gauge) and the 1435 mm UIC standard gauge. The installation of the **ERTMS signalling system** varies considerably along the Corridor. Although all countries have made their ERTMS plans, currently the system is only in operation on parts of the rail Corridors in Belgium and the Netherlands. Implementation plans in DE and PL exist but the Baltic States will implement the ERTMS with the development of the European gauge railway. To apply ERTMS along the whole Corridor by 2030 is a vast challenge. Installing ERTMS is cheaper on new railway lines compared to upgraded lines, which makes the installation even more challenging.

There are **differences in standards** for maximum axle loads on railways and maximum train length between countries. Most of the relevant lines are not designed to accommodate the required train length of 740 meters (in 2030).

ERTMS

The European Rail Traffic Management System (ERTMS) has been acknowledged and confirmed by the Member States and the rail sector as the universal signalling system in Europe. In general, it is agreed that all corridor lines should be equipped with ERTMS. Currently the ERTMS system uses the railway-specific radio communication system Global System for Mobile Communication Rail (GSM-R) for both voice and the European Train Control System (ETCS) data transmission. Decision 2012/88/EU provides that new (or upgraded) high-speed lines have to be equipped with ERTMS and some key railway freight lines ('ERTMS corridors of the European Deployment Plan') have to be equipped by 2015 or 2020. Other parts of the network have to be equipped with ERTMS once the national signalling and train control has been upgraded. New rolling stock placed into service after 01/01/2015 must also be equipped with ERTMS.

In April 2012 the corridor countries Belgium and the Netherlands (among other countries) confirmed that these countries were committed to implementing ERTMS Baseline 3 as a more comprehensive version of the ETCS standard. Baseline 3 was developed with the aim to guarantee backward compatibility allowing equipped vehicles to operate over Baseline 2 and Baseline 3 infrastructure. Both, Baseline 2 and 3 are now legal versions of the ETCS system.

The current state of implementation and the deployment plans of ERTMS have been described by country in the next sections. The figure below shows a map of the latest state of play in the deployment of ERTMS along all CNC NSB rail sections

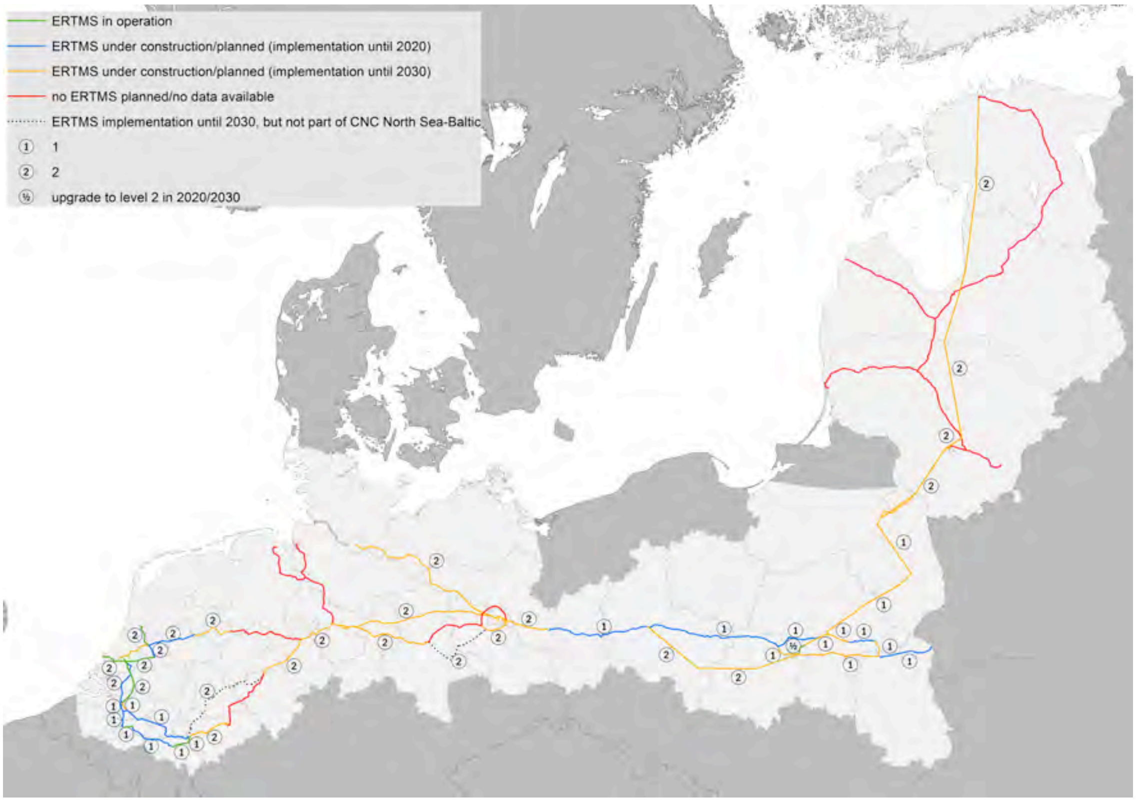


Figure: ERTMS deployment status and plans along all rail sections of CNC North Sea Baltic

EE / LV / LT

Estonia, Latvia and Lithuania are committed to the implementation of ERTMS in ways that are feasible and economic for the existing railway network that uses the 1520 mm gauge infrastructure and it is not planned for high-speed trains (>160 km/h). The full implementation of modern ERTMS is linked to the construction of the Rail Baltic 1435 mm gauge project by the mid 2020’s. The implementation of ERTMS on the existing railway network consists only of measures to improve the GSM-R system. Analysis shows that the deployment of the ETCS on the 1520 mm gauge railway network is economically inefficient, since it results in high investments unjustifiable by the costs involved. The Baltic States railway network of 1520 mm gauge is connected to the wide gauge railway networks of the neighbouring third countries, which do not plan deployment of the analogous signalling system in the near future. Thus it is more cost effective only to renew and modernize the existing signalling systems of the 1520 mm railway network.

PL

The Polish ERTMS deployment plan dates back from 2007. Since then GSM-R has been implemented on many rail sections in Poland. ETCS level 1 has been implemented on a small section of CNC NBS near Grodzisk Mazowiecki, west of Warszawa. Poland has announced the implementation of ERTMS until 2020 for several parts of the CNC NSB, and for some remaining parts until 2030. If built any high speed lines between Warszawa-Łodz-Poznan would have to be provided with the new ERTMS level 2 system. It is also expected that that there would be full implementation of ERTMS on the planned section between Ełk and the LT-border, as well as on the reconstructed line from Ełk-Białystok. Both sections are part of the Rail Baltica project.

DE

Germany has announced 2027 as the date to equip its rail freight corridors and all high speed rail sections with ERTMS, starting with the rail freight corridor Rotterdam-Genoa in 2018. However, high investment costs are currently seen as a factor hindering rapid implementation. For this reason, general policy is that ERTMS level 2 will only be installed on the busiest line sections to enhance capacity or if the respective interlocking already meets the requirements for ERTMS level 2. Less used line sections will be provided with ERTMS level 1. Germany adopted in 2012 ETCS Baseline 3 standards as an essential prerequisite for equipping ERTMS. GSM-R has been implemented on all CNC NSB sections in Germany already.

A small section on which ERTMS has already been deployed is from the BE border at Hergenrath to Aachen (level 1). Plans for further implementation on the NSB CNC concern the sections Hamm-Minden-Hannover-Magdeburg, Berlin-Stendal-Wolfsburg-Hannover and Berlin-Frankfurt/Oder.

For several rail sections (which are part of the CNC NSB) no implementation of ERTMS has been notified up to now:

- Magdeburg-Potsdam-Berlin (instead on the parallel Magdeburg-Dessau-Berlin line ERTMS is planned to be implemented)
- Bremerhaven-Bremen
- Wilhelmshaven-Bremen
- Bremen-Hannover
- Hamm-Cologne
- Minden-Osnabrück-NL border (connects with Oldenzaal in NL)

NL

For migration to ERTMS, the Netherlands have developed four scenarios in line with a phased introduction starting in 2016. The base case scenario foresees roll-out of ERTMS only when and where this is required by European legislation, in addition to the existing ERTMS lines. This roll-out relates to routes from Rotterdam to Germany via the Betuwe line (2015) and from Rotterdam to Antwerp (2020). By 2030, the Netherlands plan a full implementation of ERTMS level 2 with Baseline 3 standard on all sections of the corridor[1].

Currently ERTMS operated lines which are part of the NSB CNC in The Netherlands are:

- Europoort-Rotterdam–Geldermalsen(-Zevenaar), part of the freight-only Betuweline (level 2);
- Amsterdam Bijlmer–Utrecht (level 2);
- Barendrecht–BE border passenger-only high speed line (level 2).

The implementation schedule of ERTMS (level 2) for remaining corridor sections in the Netherlands is:

- Utrecht-Geldermalsen: 2020
- Rotterdam-Dordrecht-Roosendaal-BE border: 2020
- Utrecht-Amersfoort-Apeldoorn: 2020
- Apeldoorn-Deventer-Hengelo-DE border: 2030
- Utrecht-Rotterdam: 2030

BE

The Belgian network manager Infrabel has developed a Master Plan for ERTMS implementation on the whole conventional rail network in which they announced the implementation of the ERTMS technology on the entire rail network by 2022[2]. The progress is considered to be on time so far, with several high speed sections belonging to the NSB CNC already equipped with ERTMS. By 2016, Infrabel expects to have the line via Liège between Brussels and the German border to be fully operational with ERTMS and by 2025 it is planned to make the entire network only accessible for ERTMS-equipped trains. ERTMS will be installed first on new and upgraded lines.

ERTMS has already been realised on these sections:

- Schaerbeek-Leuven, part of the high speed line Brussels-Liège (Level 1);
- Chênée-Hergenrath, part of the high speed line Liège-Aachen (Level 2);
- Antwerpen-NL border high speed passenger only line (Level 2).

For other sections, part of NSB CNC the deployment is already planned for:

- Antwerpen Noord – Antwerpen Berchem (level 1): 2015;
- Liège-Leuven High Speed line (level 1): 2015;
- Antwerpen Berchem - Lier-Hasselt (level 1): 2015;
- Hasselt – Visé – German border (level 2): 2020;
- Antwerpen-Liefkenshoek port connection (level 1): 2014
- Antwerpen-Lier (2nd rail connection) (level 1): 2025
- Antwerpen Berchem – Mechelen – Brussels (level 1): 2014

Cross-border interoperability issues concerning ERTMS

The following cross-border interoperability issues concerning ERTMS are noticed:

[1] ERTMS railway map 3.0, status April 2014

[2] Railway Gazette International, PP. 33

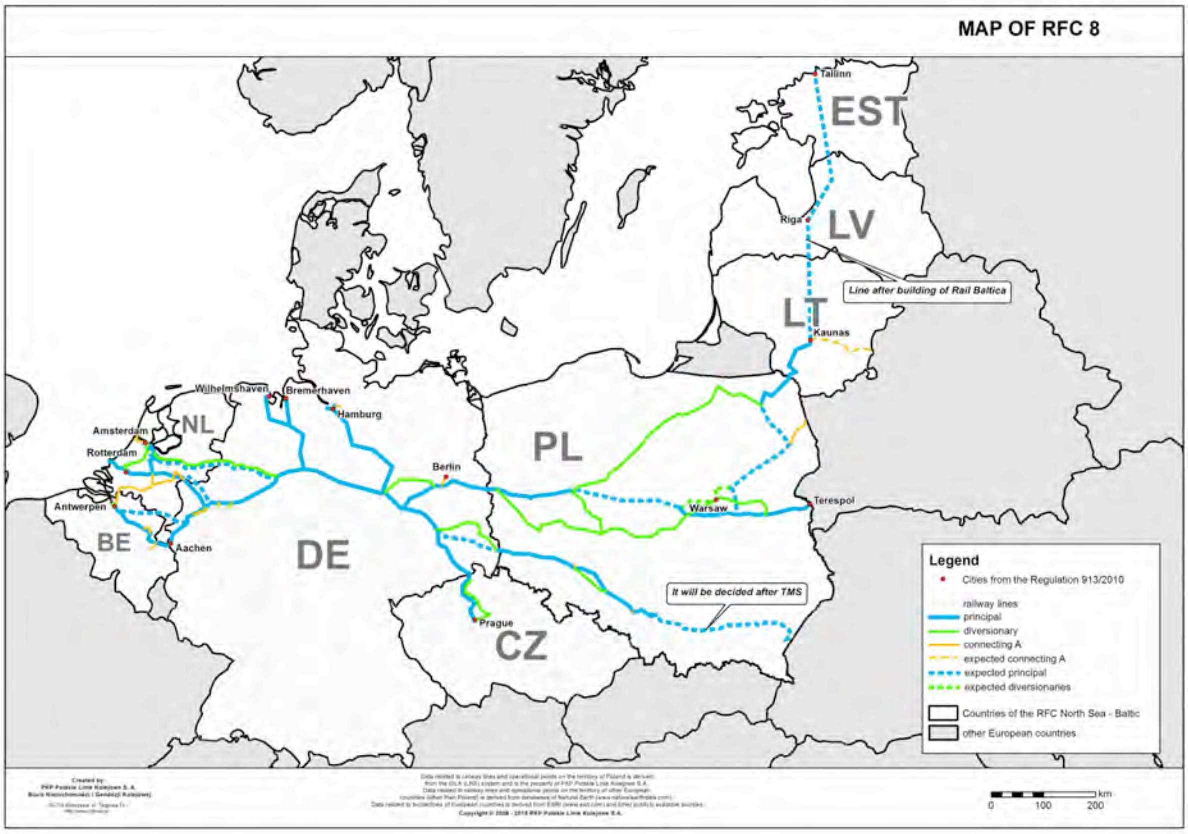
- NL-DE: no implementation of ERTMS on the German sections Bad Bentheim-Osnabrück-Minden is planned, where ERTMS is the Netherlands on sections up to the border is planned before 2030.
- BE-DE: timely continuation of ERTMS on the Aachen-Cologne section is not possible as ERTMS implementation on this section is planned only after 2020.
- DE-PL: timely continuation of ERTMS on the Berlin-Frankfurt/Oder section is not possible as ERTMS implementation on this section is planned also only after 2020.

Intermodality

The easy shift from one mode of transport to another is one of the key principles of the Regulation. Ideally, the customer should be able to choose from several modes of transport and decide the most timely and cost effective mode for the purpose. There are currently several missing links:

- The Ring Rail connection to the Helsinki airport, planned to be completed in 2015. Additional projects are needed to complete the rail connection both to urban transport and long-distance trains.
- (Urban) rail connection between the City Centre, passenger ports and the airport in Tallinn are to be built in connection with the Rail Baltic.
- Riga International Airport has no rail connection until the Rail Baltic/Rail Baltica will be built.
- Kaunas International Airport has no rail connection until the Rail Baltic/Rail Baltica will be built.
- The airports of Łódź and Poznań need rail connections.
- The airport of Bremen has only a tram stop right in front of the airport terminal.
- Interoperability in freight: a chain of logistics centres that offer services of similar quality along the Corridor has been planned. NL, DE and FI operate as benchmark countries for freight villages.

Rail Freight Corridor Nr 8



Upper map: The alignment of RFC8 North Sea – Baltic: planned situation in November 2015.

Lower map: Alignment in BE, NL and DE

(Source: RFC8)

Following the EU policy on the organization of the TEN-T, the Rail Freight Corridors ("RFC", created on the basis of the Regulation of the European Parliament and of the Council (EU) No 913/ 2010 concerning a European rail network for competitive freight) are part of the core network corridor structure. The representatives of Proximare have collaborated with the Rail Freight Corridor Nr 8 North Sea – Baltic Office in Warsaw and the Management Board in order to achieve a good exchange of information and coordination between their respective activities. The RFC8 (1435 mm standard gauge) runs from the North Sea (Amsterdam /Bremerhaven /Rotterdam /Antwerp – Aachen) to Berlin, Warsaw and continues east to Terespol (PL/BY border) and north to Kaunas. RFC8 will be made operational in November 2015. The RFC8 will be extended to Amsterdam, Wilhelmshaven and Hamburg in 2015 and an extension will also be made to Prague. In the Baltic States, the RFC8 will be extended temporarily using the existing 1520 mm gauge railway network from Kaunas to Tallinn via Riga until the 1435 mm UIC gauge Rail Baltic enters into operation when the new alignment will be used.

In April, July and November 2014, Proximare and RFC8 representatives have met in Warsaw and Frankfurt. The meetings have sought successfully for points of mutual interest, such as the identification of bottlenecks. Importantly, the project lists of RFC8 have been cross-referenced with the project lists that have been worked together with the MS. The market study of RFC8 has been delivered to Proximare and its results have been incorporated into the Multimodal Transport Market Study, which form part of the present Report. The active cooperation with RFC8 continues in the form of exchanges of information and joint meetings. RFC8 has significant experience to share in questions that are relevant to the development of the CNC concept concerning, for instance, the estimation of future freight volumes, the 'corridor one-stop-shop' concept, modal shift and the effective use of capacity.

Horizontal topics

Motorways of the Sea

Motorways of the Sea (MoS) form an important collaboration platform because of the importance of the ports on the North Sea – Baltic Corridor. Short Sea Shipping plays an important role for all eight MS (for Poland this is elaborated in other Corridor Studies). Ports on the North Sea and Baltic Sea are equally dependent on well-functioning sea connections. MoS are crucial to intra-Corridor transport as well as to external connections.

Several MoS projects are on-going between ports on the NSB CNC and other Corridors. The projects include e.g. port development (Helsinki-Tallinn Twin-Port), LNG development (e.g. Rotterdam – Gothenburg; and a further project connecting seven Baltic sea ports) and winter navigation (project between FI, EE and SE).

In the context of the 3rd Corridor Forum the representatives of the sea ports and inland waterway ports met at a working group for an exchange of views. The list of topics of mutual interest include for instance, the need to define roles and responsibilities among authorities, the need to provide ports with adequate ship-building facilities, the provision of dredging equipment, KPIs (physical vs. performance) and the importance of the so-called 'last-mile' connection into the port, which often forms a bottleneck.

Icebreaking

Icebreaking in Finland, Estonia and Latvia aims to secure safe and fluent winter navigation. Because of the high cost of icebreakers as well as their maintenance and operation the winter navigation authorities collaborate by sharing resources and information. Finland, Estonia and Latvia all participate in the Baltic Icebreaking Management internet service. International cooperation projects on icebreaking include ICEWIN (Innovative Icebreaking Concepts for Winter Navigation), which focuses on technical and administrative measures, and WINMOS (Winter Navigation Motorways of the Sea). As the flagship project of the priority area maritime safety and security WINMOS aims to improve efficiency, sustainability, safety and environmental performance of winter navigation in the Baltic Sea.

Regulatory requirements for Inland Waterways (IWW)

Compliance of characteristics with the Regulation for year 2030

The analysis is only considered for the inland waterway sections in Belgium, the Netherlands and Germany which are part of the alignment of CNC North Sea Baltic, although some data appears in the maps for other sections as well (Weser, Elbe and Elbe-Seitenkanal). The Polish inland waterway sections are not part of the analysis.

Good navigation status of waterways

<u>CEMT IV (1000-1500t vessel)</u>

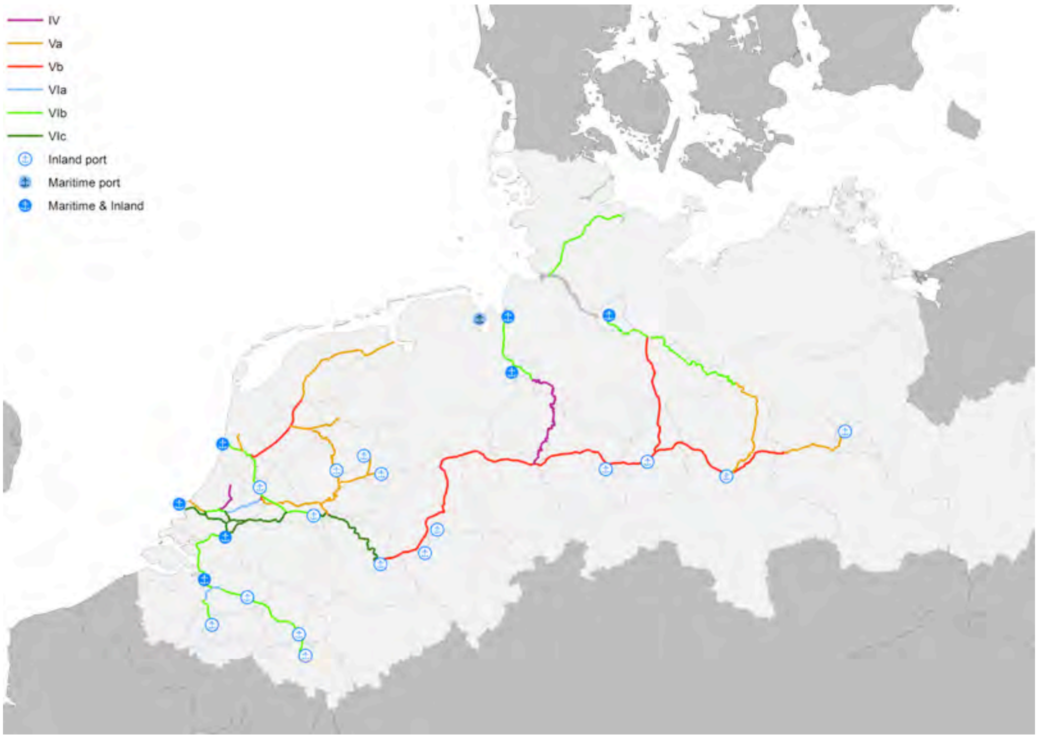


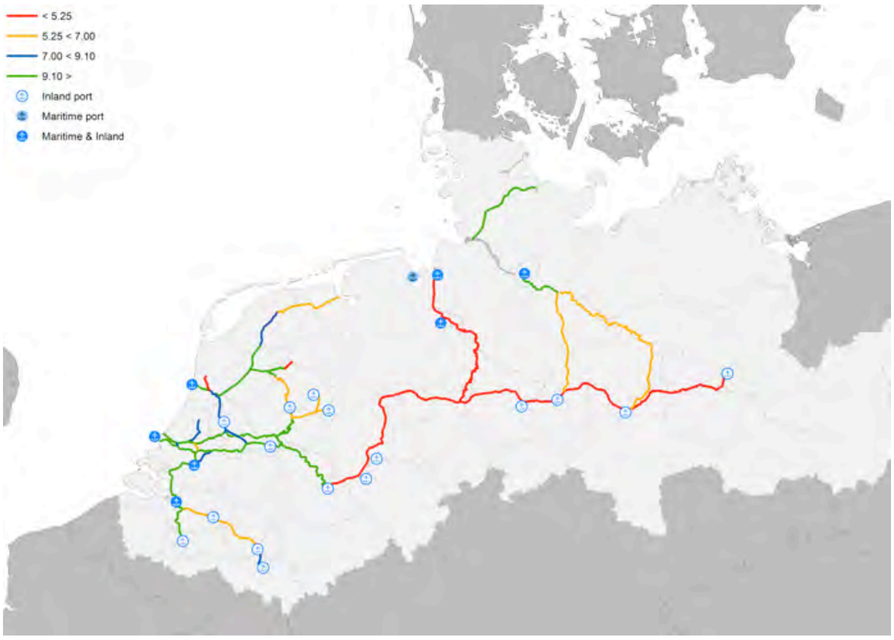
Figure: CEMT classes in 2030

As the Figure above shows all inland waterways in the Belgium, Netherlands and Germany comply in 2030 with the minimum required standard of CEMT IV. In Belgium the Wijnegem-Antwerp section of the Albertkanaal needs upgrading from currently class V to class VIb. In Germany over the past years various sections of the Mittellandkanal have already been upgraded to class Va and Vb, however some sections still need to be upgraded. In the Netherlands the Twente kanaal will be upgraded to class Va.

Minimum draught (minimum 2.5m)

All rivers and canals meet with the minimum draught requirement, except the Havel Kanal near Berlin. However, many canals in Germany meet only the minimum requirement. Also, the canals branching off the Mittellandkanal have low fairway depth.

Minimum height under bridges



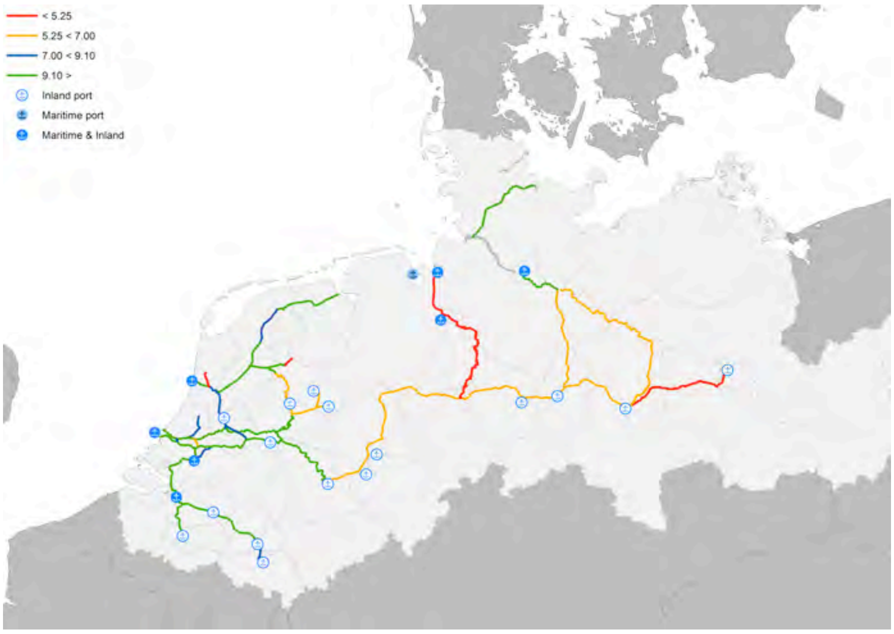


Figure: Available height under bridges in 2014 (upper map) and 2030 (lower map)

The requirements are:

- Minimum 5.25 m. for vessels with two layers of containers

- Minimum 7.00 m for vessels with 3 layers of containers
- Minimum 9.10 m for vessels with 4 layers of containers

As the two Figures above show the requirement of minimum 5.25m height under bridges is in the current situation not met on several canals in Germany. In 2030 the Mittellandkanal is expected to meet the requirement. Sections of the Havel Kanal system still do not meet the requirement in 2030. In the Netherlands and Belgium almost all waterways meet the requirement. In Belgium the Albertkanaal will be upgraded to increase the height under bridges to cope with expected future transport flows.

Extreme low or high water levels

Extreme low water levels may affect parts of the Rhine river system in The Netherlands and Germany.

River Information Services (RIS)

Notices to Skippers (NtS):

Standardised messages for skippers containing fairway information allowing traffic management as well as voyage planning.

BE: Implementation is according the NtS standard 3.0. Two different systems available for Flanders and Wallonia.

NL: NtS in the Netherlands is in accordance with the current EU technical regulation.

DE: NtS in Germany covers the mandatory information services.

AIS:

Vessel Tracking and Tracing (Inland AIS) which is similar to maritime navigation inland automatic identification system (AIS) on board of inland vessels allows for vessel tracking and tracing on inland waterways. Through AIS transponders data concerning tactical traffic information can be broadcast and received.

BE: Onboard AIS equipment is obligatory since the end of 2013 in Belgium. Shore-side AIS infrastructure is fully operational in Flanders. Wallonia currently has no AIS shore infrastructure.

NL: Implementation of AIS in the Netherlands was finalised at the end of 2013. In the Netherlands almost the entire fleet is using the AIS transponders.

DE: AIS in Germany is currently limited to the communication ship-ship, which requires on-board equipment and only a few repeaters as shore based infrastructure. Installation of shore based AIS infrastructure stations and additional repeaters would be required for AIS communication ship-shore and shore-ship. The installation of landside infrastructure at selected German inland waterways is under preparation.

Electronic Ship Reporting

Electronic Ship Reporting consists of standardised electronic data exchange between skippers and waterway authorities (Ship to authority and authority to authority) concerning relevant cargo, traffic and transport information.

BE: Electronic Ship Reporting is fully implemented in Flanders and for Brussels and Wallonia, this will be implemented in the near future.

NL: Electronic reporting in the Netherlands is in accordance with the EU technical regulation.

DE: Electronic reporting according to the ERINOT standard 1.2 can be carried out with the free software application BICS.

ENC

Inland ECDIS: with Electronic Navigational Charts (ENCs) and inland electronic chart display and information systems for inland navigation (inland ECDIS) skippers are able to plan their voyage ahead.

BE: Electronic charts are available for all Flemish Class IV waterways. In Wallonia and Brussels a different format 5 is used.

NL: ENCs are available for all main waterways in the Netherlands (waterway class IV and above).

DE: The requirement to provide electronic navigational charts for all inland waterways of CEMT-class V and higher is almost fulfilled by German authorities.

Overall conclusions concerning RIS

BE: The Flemish RIS authorities have undertaken serious steps in recent years to implement RIS elements as notices to skippers, vessel tracking and tracing (AIS), electronic ship reporting and electronic and navigational charts. The Brussels RIS authority will start using the RIS system developed by the Flemish waterway infrastructure managers in 2013. The Walloon RIS authority appears to lag behind, but intend to implement AIS infrastructure and ERI data in the coming years.

NL: The Netherlands has transposed the RIS Directive on time. All technical RIS applications are in place. International data exchange for electronic reporting with Germany and Belgium is possible, however data exchange with Belgium on the Maas does not seem to exist.

DE: Germany has implemented a wide range of RIS applications. Implemented services are in general of high quality. However, Germany has been reluctant to progress with the implementation of a few applications or its roll-out to the complete waterway network. All requirements deriving from RIS legislation have been fulfilled in due time for German Waterways.

The connectivity to IWT in seaports and inland ports

Quick connections to the motorway network

All inland ports in Belgium, the Netherlands and Germany are connected to the motorway network.

Connected to rail infrastructure

In Belgium all relevant inland ports are connected to rail. In the Netherlands the inland port of Deventer has no rail connection. In Germany a connection to rail infrastructure is available to all inland ports except Hannover-Nordhafen (source: http://www.intermodal-terminals.eu/database/).

Alternative clean fuels

Of the alternative clean fuels mentioned in the TEN-T Regulation (EU) No 1315/2013 article 3 (w), LNG is considered the most interesting option for IWT. The requirement is that a sufficient number of LNG refuelling points at TEN-T inland ports should be available on strategic points of the core network at least by the end of 2030.

Currently on-going projects or plans to construct LNG bunkering stations for IWT

LNG is available as IWT fuel at the nodes of Antwerp, Rotterdam, Amsterdam, Bremen, Bremerhaven and Hamburg and more nodes are planned/expected in the future. An overlapping supply chain or fuel infrastructure is not present today and is under study in Belgium, The Netherlands and Germany. In 2015 a mobile LNG-tank vessel will be available in the Rhine River system. Vessels need time and funding to convert to dual fuel engines.

Types of bottlenecks

(Source: The UNECE Blue Book 2012)

Basic bottlenecks:

(Sections of relevant E waterways whose parameters at the present time are not in conformity with the requirements applicable to inland waterways of international importance, i.e. inland waterways of class IV).

BE: none

NL: none

DE:

- Mittellandkanal sections which have not yet been modernized are being upgraded to class Vb. The project is under way.
- Elbe-Havel Kanal upgrading from class IV to class Vb is under way.
- Berlin region waterways (various sections) upgrading to classes IV and Va is under way.

Strategic bottlenecks:

Other sections that meet the basic requirements of the class IV but which, nevertheless, ought to be modernized in order to improve the structure of the network or to increase the economic capacity of inland navigation traffic.

BE:

- Albertkanaal capacity constraints caused by limitation on height under the bridges, lock capacity (Wijnegem) and CEMT class gauge.
- Sea canal from Antwerpen to Brussels (Willebroek-Bornem) presents a bottleneck in Willebroek-Bornem as this section doesn't allow 10 000 tons class VIb vessels to navigate.

NL:

- IJssel from Arnhem to Zutphen upgrading to class Va is envisaged.
- Upgrading of the Zwartsluis at Meppel-Ramspol is under way.
- Upgrading of the Lemmer-Delfzijl section to class Va enabling 4-layer container transport is under way.

- Twente Canal upgrading to class Va is under way and an increase of the capacity of the Eefde lock to be carried out.
- Lekkanaal upgrading of the Beatrix lock.
- Increasing the capacity of the Kreekrak locks.
- Increasing the capacity of the Volkerak locks is under study.
- IJsselmeer - Meppel insufficient fairway depth and/or width, the project is under study.
- Amsterdam - Rijnkanaal removing bottlenecks at the Zeeburg locks (upgrading to class VIb).
- Zaan adaptation to class Va with regard to fairway depth and/or width, height under the bridges and lock capacity is required.

DE:

- Dortmund – Ems Kanal south of Mittelland Kanal upgrading to class Vb is under way on sections which have not yet been modernized.
- Rhine - Herne Kanal upgrading to class Vb is under way on sections which have not yet been modernized.

ITS

Intelligent Transport Systems (ITS) can help to achieve better efficiency of the road network and enhance road safety. They offer a unique opportunity to foster the integration of the European transport system of the future which would be multimodal, sustainable and accessible, for both passengers and freight. ITS should be an important component of road network development from the outset and during its operation and maintenance. Moreover, the performance of ITS can be significant with relatively moderate investments[3], making such solutions particularly cost-effective. While being faster to implement they also generate quick return on investment.

Notably, ITS can enhance capacity[4] and support the optimal use of road infrastructure and its interfaces with the other modes of transport, building upon the pan-European corridors and in connection with its feeder networks, reduce time loss by congestion or incidents, as well as accidents occurrence[5] and severity as well as alleviating the environmental impact of traffic[6]. ITS can also facilitate traffic operations and enforcement[7] while offering information services to users which help them to make better informed decisions on their trips or optimize their logistics services.

In the Member States of the NSB CNC, ITS applications are gradually becoming common not only in road transport but increasingly also in multimodal transport. ITS can have a crucial role for instance in removing operational bottlenecks linked to the loading of trucks onto ro-ro ships, which is a great asset in urban ports. Multimodal ITS applications are also being developed for cross-border regions which support the development of the "twin-cities" concept. Multimodal ITS also has a crucial role in the promotion of public transport for long-

[3] ITS investments typically represent 6 to 8% of road infrastructure cost
[4] Increase of road capacity in congested situations by up to 30% and truck parking spaces by up to 30%
[5] Reduce accidents by up to 50 %
[6] Lower noise pollution and exhaust to remain within legal limits under increased traffic conditions
[7] Support speed enforcement at above 99% of compliance

distance commuters who need up-to-date travel information and ticketing in both urban and rural transport.

Cooperation with other core network corridors

The representatives of Proximare cooperate with the teams of the five other core network corridors that have shared nodes and sections with the North Sea – Baltic Corridor. These include the Scandinavian – Mediterranean, Baltic – Adriatic, Orient /East-Med, Rhine-Alpine and North Sea – Mediterranean Corridors. The collaboration has covered the exchange of reports and materials and joint efforts with the TENtec database.

European added value

The corridor study points out the transnational bottlenecks and other major needs for development in all transport modes and along the whole Corridor. The highest European added value is gained from projects that improve connectivity on cross-border regions, as these projects often receive less attention in national transport strategies, and from projects that build completely new international connections. The need to reach common technical standards in all modes of transport is also acknowledged. In the corridor study, the need for transport development is elaborated from the transnational Corridor perspective – the Corridor is as strong as its weakest link – and from the national and local perspective. The Study makes an inventory of the infrastructure, its quality and current use and also presents estimation of the need for transport in the future towards year 2030.

Objectives of the core network corridor

On the basis of a detailed analysis of the legal framework (Regulation (EU) 1315/2013) previous studies, Priority Projects and feedback from stakeholders, the following objectives have been identified:

General objectives

The Corridor should seek to ensure a seamless national and international transport by all transport modes, to minimise environmental impact increase competitiveness, encourage investment, use new technologies and make use of innovation wherever possible.

The North Sea - Baltic core network corridor aims to improve the internal economic and social cohesion between the north-eastern Baltic Sea Region, especially the new Member States (EE, LV, LT, PL) and the major economic centres of the western EU. The Corridor will also form an important trade connection between the EU and Third Countries in eastern Europe and further afield in Asia.

Detailed objectives

- Removal of bottlenecks and bridging of missing links particularly at border-crossing sections; the addition of the European standard gauge railway is of utmost importance in the Baltic States.
- Regions along the Corridor shall be adequately supplied with transport infrastructure. Several infrastructure investments are needed in railway, ports and inland waterways. The use of ITS should be increased.

- To shape the core network to such an extent that at all border crossing points a seamless traffic flow, border checks, border surveillance and other border control procedures proceed as smoothly and efficiently as possible for all transport modes; while some efficient border crossings already exist along the Corridor, some intermodality and administrative issues still remain.
- The core network shall guarantee an optimal integration of all transport modes (multimodality) and interoperability shall be ensured for national and trans-European transport networks by removing technical and administrative barriers;
- Promotion of maritime transport and motorways of the sea by the Union; The North Sea - Baltic is highly dependent on short sea shipping and inland waterways. The emergence of increasingly tougher environmental requirements must lead towards more efficient multimodality and a search for new multimodal trade routes.
- Significant support needs to be given to the implementation and deployment of telematics applications and promotion of innovative technological development. The Corridor needs to establish itself as a leader in ITS and should strive to hold this position.
- Environmental protection measures by using alternative clean fuels and propulsion systems as well as promoting low-carbon transport should result in the relevant Union CO2 reduction. Effective measures will be required in order to ensure the availability of clean fuel.

Projects on the Corridor and implementation plan

The list of pre-identified projects along the Corridor is as follows (from Regulation (EU) 1315/2013 with additional comments):

Helsinki - Tallinn	Ports, MoS	• Port interconnections; (further) development of multimodal platforms and their interconnections; icebreaking capacity; MoS; • Twin-Port project on-going between Helsinki and Tallinn, 11,3 million € from TEN-T (20% of total costs), increases capacity and services in both ports. (MoS).
Tallinn - Rīga - Kaunas - Warszawa	Rail	• (Detailed) studies for new UIC gauge fully inter-operable line (Rail Baltic); works for new line to start before 2020; upgrading and new line on PL territory; rail – airports/ports interconnections, rail-road terminals, MoS . • Governments of the Baltic States agreed to include Vilnius as a part of the project. • Exact alignment in EE (1435 mm) is debated internally. • Alignment to connect Riga city, ports and airport is debated internally (1435 mm). • The alignment of Rail Baltic in LT is debated. • EE/LV and LV/LT border crossing points are not yet agreed. The LV/LT border agreement has not been signed which may complicate the agreement on the border crossing point. • UIC gauge is under construction from LT/PL border to Kaunas (LT), planned to complete by the end of 2015. • Works on the existing lines, studies for works on existing lines.
Ventspils – Rīga	Rail	• Upgrading, port interconnections, MoS • Includes maintenance of navigational channel in the Freeport of Ventspils (dredging)

		• Upgrading concerns 1520 mm gauge railways
Klaipėda – Kaunas	Rail	• Upgrading, port interconnections, MoS • Upgrading concerns 1520 mm gauge railways
Kaunas – Vilnius	Rail	• Upgrading, airports interconnections, rail-road terminals • Upgrading concerns 1520 mm gauge railways
Via Baltica Corridor	Road	• Works for cross-border sections (EE, LV, LT, PL) • Works for cross-border sections (EE, LV, LT, PL) and other important improvements
BY border - Warszawa - Poznań - DE border	Rail	• Works on the existing line, studies for high-speed rail • The so-called Y-project and its implementation is in preparation on political level.
PL Border - Berlin - Hannover - Amsterdam/Rotterdam	Rail	Studies and upgrading of several sections (Amsterdam – Utrecht – Arnhem; Hannover – Berlin)
Wilhelmshaven - Bremerhaven - Bremen	Rail	Studies and works
Berlin - Magdeburg – Hannover, Mittellandkanal, western German canals, Rhine, Waal, Noordzeekanaal, IJssel, Twentekanaal	IWW	• Studies, works for better navigability and upgrading waterways and locks • Of major importance because of the central role of IWW at the western end of the Corridor.
Amsterdam lock & Amsterdam - Rijnkanaal	IWW	• Lock studies on-going; port: interconnections (studies and works, including Beatrix lock upgrade) • Of major importance because of the high volumes from the port to its hinterland.

Project Summary

Finland, Estonia, Latvia, Lithuania, Poland, Germany, the Netherlands and Belgium present in total 291 projects in the North Sea Baltic corridor study.

The distribution of projects by country and by transport mode is as follows:

Transport Mode/ Member State	Rail	Road	Port and Inland waterway	Airport	**Total**
Finland	18	3	4	1	**26**
Estonia	5	4	10	2	**21**
Latvia	9	21	9	2	**41**
Lithuania	21	5	5	14	**45**
Poland	13	6	0	0	**19**
Germany	24	23	27	1	**75**
The Netherlands	12	5	27	0	**44**
Belgium	20	0	0	0	**20**
Total	**122**	**67**	**82**	**20**	**291**

Chapter 2
Review of Studies and Identification of Stakeholders

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Introduction

This chapter elaborates on the studies and other relevant documents in three parts. The Corridor has been divided into the north-eastern (FI, EE, LV, LT), central (PL, DE) and western sections (NL, BE). This is because of the fact that in academia and the relevant literature the 'corridor perspective' has not yet been considered. There are macro-regional studies which include transport issues (for instance in the EU Strategy for the Baltic Sea Region (BSR)) but no studies currently exist that would genuinely cover the Corridor from end to end, let alone such studies from a transport development point of view. In rail freight transport, the Transport Market Study (TMS) prepared by Rail Freight Corridor 8 – North Sea – Baltic (2014) is an important yardstick as it studies the demand patterns and potential of rail freight along the corridor from the major ports at the North Sea to Kaunas (LT).

The forthcoming SECA regulation in 2015 and other environmental regulations as well as changes in the pattern of international trade are causing pressure on the business sector (both supply and demand sides) to look for alternative transport routes and to seek more than ever for cost-efficiency. The potential of multimodal transport solutions along the Corridor has yet not been fully investigated. Furthermore, the position of the Corridor in global transport routes (e.g. Northern Sea Route, routes to Asia) forms a strategically important question. Currently these topics have been elaborated by business operators, e.g. major Finnish exporting companies for whom a cost-efficient land connection to Central Europe may form an alternative to short sea shipping. However, these studies are usually confidential and they tend to serve the company's viewpoint only. A public research programme to study these questions is needed to support and sustain the corridor perspective. Gradually, this could build into a 'transport market paradigm of a core network corridor'.

The Chapter closes with a summary of the identification of stakeholders that are relevant for the corridor study. The list of studies and other relevant documents is presented as Annex.

North-Eastern part of the Corridor: FI, EE, LV, LT

This review covers the studies and other relevant documents that focus on the north-eastern part of the Corridor, i.e. Finland, Estonia, Latvia and Lithuania. The body of literature, which forms the frame of reference for the corridor study, can be divided into four major categories:

1. Macro-regional documents for the planning and development of transport
2. Feasibility studies and planning documents of major transport infrastructure projects
3. Studies of transport development and future scenarios in selected topics/areas
4. Governance studies and strategy papers

The full list of studies and other relevant documents is annexed to the Review. The four categories, each highlighted by a number of key publications, are summarised below:

Macro-regional documents for the planning and development of transport

EU Strategy for the Baltic Sea Region

Finland, Estonia, Latvia and Lithuania are part of the Baltic Sea Region, which is the first macro-region to have a dedicated EU Strategy processed and prepared for (EUSBSR 2009, 2013). Transport forms one of the Priority Areas of the Strategy and its Action Plan in three specific targets: 1) to increase cooperation in joint planning and implementation of infrastructure, 2) to improve external links of the region and 3) to invent smarter transport solutions. The suggested actions include the following (p. 146):

- Cooperate on national transport policies and infrastructure investments, and this includes the Rail Baltic/Rail Baltica as a flagship project, as well as Via Baltica and Rail Freight Corridor No 8 from the North Sea to Kaunas as another important project
- Improve connections to Russia and other neighbouring countries
- Facilitate efficient and sustainable Baltic passenger and freight transport solutions
- Increase the role of the Baltic Sea in the transport systems of the region, including the Motorways of the Seas as a flagship project.

Baltic Transport Outlook

The final report of the Baltic Transport Outlook project (BTO 2011, part-financed by TEN-T) forms a comprehensive study and proposition for a shared vision of transport planning in the Baltic Sea Region for 2010-2030. The project aimed at improving the accessibility and competitiveness of the region and it operated in a wide stakeholder cooperation environment. The BTO study as the final output (executive report and six annexes) includes viewpoints to support infrastructure investments, stakeholder cooperation, activities to improve border crossings by removing administrative, fiscal and other bottlenecks.

The BTO final report proposes to form a multimodal Strategic Network of transport nodes and sections for the Baltic Sea Region (BTO 2011, p. 6). The proposed Strategic Network supports the demographic and economic diversity of the Region, its increasing import and export volumes, and growing economic life. The Eastern shore of the Baltic Sea Region is analysed as the strongest silo of economic growth in the region with steadily increasing volumes of maritime transport and land transport because of several upgrades of the rail and road infrastructure. However, the BTO study does not focus on the impacts of the forthcoming SECA regulation (2015). The BTO report presents a SWOT analysis of the region (strengths, weaknesses, opportunities, threats) and lists a number of recommendations for transport development authorities and decision-makers, and these recommendations include, for instance the following:

- joint infrastructure planning between countries
- transport model building (besides TRANS-TOOLS)
- improvement of cross-border connections by removal of administrative and other barriers

- BTO Forum for increased cooperation and interaction between the different stakeholders in the BSR, with annual or bi-annual meetings, discussing updates on the issues stemming from the BTO2030 study

Feasibility studies and planning documents of major transport infrastructure projects

Rail Baltic/Rail Baltica, the planned modern 1435 mm gauge railways from Tallinn to the PL border via Riga and Kaunas, has been identified as the primary solution to overcome the most important missing link and bottleneck of 1000 km on the Corridor. While the TEN-T Priority Project No: 27 Rail Baltica has focused upgrading the existing 1520 mm railway infrastructure, the forthcoming 1435 mm railway infrastructure is seen as a way to radically improve both the accessibility of the region and to increase its internal and external cohesion. The Rail Baltic/Rail Baltica project is planned to have the large part of its funding from the Connecting Europe Facility (up to 85%).

<u>COWI report (2007), AECOM study (2011)</u>

The COWI report (2007) was the first in-depth study on the economic and commercial possibilities of a new north/south Baltic rail link. A few years later, as the idea of Rail Baltic/Rail Baltica gained momentum, the AECOM study (2011) looked exclusively into the aspects of a new 1435mm double track electrified line connecting Helsinki/Tallinn with Riga and Kaunas. The AECOM study presents the economic feasibility of the railway line and suggests its ideal alignment. Due to its comprehensive approach, the AECOM study has been approved as the primary document for the planning of the Rail Baltic/Rail Baltica infrastructure project, which will be the largest transnational infrastructure project in the history of the Baltic States.

<u>TRINITI Rail Baltic Joint Venture Study (2013)</u>

The legal, managerial and organisational aspects of the Rail Baltic/Rail Baltica project (1435 mm railway) have been considered in the study by Triniti pan-Baltic law firm (2013). The report focuses on various alternative structures for a Rail Baltic/Rail Baltica Joint Venture that could be formed between the three Baltic States. The study considers joint venture models that have been used previously in similar international infrastructure projects and proposes a structure for the implementation of the project.

The Joint Venture is proposed to act as an infrastructure manager and carry out preparatory works. Supporting structures (a task force) are suggested for the planning, design and construction of the new railways. The analysis takes into consideration the various legal, tax, corporate and regulatory issues that are associated with the establishment of a cross-border railway infrastructure manager. The report suggests the two best possible alternatives for the corporate structure and the most suitable legal environment for the Joint Venture.

The analysis outlines the optimal tax and corporate environments for the Joint Venture and proposes workable solutions that can be used for decision-making. Attention is also paid to the options available under the EU funding and other sources of financing, also from semi-private or private investors.

On October 28 2014 the governments of Estonia, Latvia, and Lithuania signed an agreement to create a joint venture company, RB Rail, to implement the project.

AECOM Rail Baltica study on Vilnius extension (2014)

AECOM Rail Baltica study on the Vilnius extension was initiated in relation to the agreement between the three Baltic countries to include Kaunas – Vilnius section as integral part of 1435 mm gauge Rail Baltica route (expressed by the Prime Ministers of Lithuania, Latvia and Estonia in Tallinn on 21 June 2014). The study concludes that integration of Vilnius into Rail Baltica Project raises EIRR and BCR of the whole Rail Baltica project. The study states that approximately 2 passenger trains per hour on the Kaunas- Vilnius section is optimal from the perspective of revenue/operational cost. The alignment would serve both Vilnius and Kaunas airports and benefiting the whole Rail Baltica project.

Pre-feasibility study of the Helsinki - Tallinn fixed link (forthcoming 2015)

The North Sea - Baltic core network corridor includes the section between the two capitals, Helsinki and Tallinn, which together form a twin-city concept. The current definition of the Corridor consists of a ferry connection between the cities. However, there is an active movement in both cities and countries concerned that promotes the vision of the building of a railway tunnel. Provided by the EUSBSR Seed Money Facility, the decision-making authorities have recently made an initiative to carry out a pre-feasibility study that will constitute the first serious elaboration on the vision of the tunnel. Although the idea of the tunnel is largely burdened by the small sizes of the national economies, which makes the cost-benefit analysis a most challenging task, the pre-feasibility study will constitute a most interesting and welcome factual contribution to the debate.

Studies of transport development and future scenarios in selected topics/areas

Helsinki - Tallinn twin cities

The list of studies that focus on transport development questions and future scenarios is large and diversified by quality and content. There is a robust body of literature that concentrates on the transport development between the twin cities of Helsinki (FI) and Tallinn (EE) (e.g. Tapaninen 2012; Sundberg et al 2011). The studies document the tremendous growth of passenger and cargo volumes between the cities, despite the relatively long distance between them, (80 km) and despite the lack of land connection. Since the regaining independence of Estonia and its EU membership after Finland the twin cities have actively sought for an intensive interaction of people and business. More than seven million trips are made between the cities every year, which includes a considerable amount of regular commuters. For several service sectors, e.g. laundries, the crossing of the Finnish Gulf has become an attractive distance to carry out business operations on a daily basis.

SECA regulation

The forthcoming SECA regulation (2015) concerns all eight countries on the Corridor that have a strong dependence on short sea shipping. However, in countries like Finland and the Baltic States, where the largest share of the international trade and transit transport is based on maritime transport, the regulation is feared to have a dramatically negative impact on economic competitiveness. The study by Notteboom *et al.* (2010) constitutes an important analysis that offers an objective approach to the question that has severe business consequences. In fact, the SECA regulation is expected to be investigated by several business organisations but since they are prepared from a private business perspective, neither the studies nor the results have been made public. This makes the contribution by Notteboom *et al.* even more important. Their study elaborates on the three key questions related to the regulation:

1. What is the expected impact of the new requirements of IMO on costs and prices of short sea traffic in the ECAs?
2. What is the expected impact of the new requirements of IMO on the modal split in the ECAs?
3. What is the expected impact of the new requirements of IMO on external costs?

The study reveals that the forthcoming SECA regulation is expected to have severe impact on various business sectors in the form of increased transport costs in order to meet the regulation that allows a maximum of 0,1% of sulphur in fuel. The regulation is expected to have a major impact on the freight rates and thus cause a notable modal shift from shipping to land transport. Also, shipping is expected to shift from medium and long distance to shorter shipping distances. The expected modal shift would in turn cause negative environmental impacts. On the other hand, the adaptation process of the shipping sector is expected to induce an increase in innovation investments, when cost advantages are sought from more ships that are more efficient in their fuel consumption, and in other technologies.

Governance studies and strategy papers

The question of multi-level governance is strongly present in the Baltic Transport Outlook study (2010). Based on the project's activities, which were carried out in a large stakeholder cooperation, the report proposes to the BTO Forum the elaboration of transport development questions from the transnational, national and local perspectives.

A similar project approach, although in a smaller geographical area, has been used in the Rail Baltica Growth Corridor project (RBGC, part-financed by the Baltic Sea Region Programme). The RBGC project's final report 'Rail Baltica Growth Strategy' (Keinänen & Paajanen 2013) proposes a multi-level governance model that is based on the project's bottom-up activities. The RBGC model (p. 39) underlines the importance of grass-root level activities (e.g. logistics service development and the publication of a travel planner) in which actors from the public and private sectors as well as universities and research institutions participate (a so-called *triple helix* environment). These concrete achievements are then presented and discussed in various stakeholder fora in order to make them better known and available for organisations and decision-makers. In the RBGC governance model, cities and regions have a central position as coordinators of transport development and as decision-makers of local and regional planning. On the other hand the Member States together with the EU form the highest decision-making level in transnational and national contexts, which represents a top-down approach to transport policies. In the RBGC model these two levels - local and national and national and EU - are brought together in a shared cooperation platform.

Other Studies

Additionally, interesting studies have been written describing the connections of the north-eastern part of the Baltic Sea Region towards the north, for instance in the framework of the

Partnership on Transport and Logistics of the Northern Dimension (e.g. NORDIM study). The study provides proposals for defining the NDPTL Regional Transport network, it analyses existing infrastructure, cargo and passenger flows, it also provides estimates for cargo and passenger flows up to 2030 and many other trends that influence transport and logistics in the region.

Central part of the Corridor: DE, PL

This review covers the studies and other relevant documents that focus on the central part of the corridor, i. e. Poland and Germany. Infrastructure development in both countries is a strategic topic and therefore based on general decisions of the government or parliament. In Germany, in addition to the Federal Government, the individual states have their own rights and duties in the field of regional development, including infrastructure. That is why the review includes several studies and relevant documents with this regional view.

The body of literature, which forms the frame of reference for the Corridor Study, can be divided into four main categories:

1. Macro-regional documents on social and transport development and infrastructure planning
2. Feasibility studies and planning documents for major infrastructure projects
3. Studies of transport and infrastructure development in selected areas and/or on selected topics
4. Governance studies and strategy papers

The full list of studies and other relevant documents is annexed to the review. The four categories, each highlighted by some key publications, are summarised below.

Macro-regional documents on social and transport development and infrastructure planning

Poland

Podlaskie Region Development Strategy to 2020 (2006, 2013)

The current Podlaskie Voivodeship Development Strategy to 2020 (SRWP) was passed by the Parliament of the Province of Podlaskie in 2006. Proposed strategy solutions are compatible with the horizontal rules in force in European Union sustainable development, including road and rail infrastructure.

The Strategy of Socio-Economic Development of the Warmińsko-Mazurskie Voivodeship until 2020 (2005)

The “Strategy of Socio-Economic Development of the Warmińsko-Mazurskie Voivodeship” identified objectives and measures for years 2000-2015, and it referred to Poland’s future membership in the European Union. However, in the autumn of 2004 in the Warmińsko-Mazurskie Voivodeship (as in the other Polish regions) a process of strategy revision started (Warmińsko-Mazurskie Voivodeship Sejmik’s Resolution No XXVI/361/04 of October 26, 2004).

Updated Development Strategy of the Mazowieckie Voivodeship by 2020 (2006)

The "Strategy of Socio-Economic Development of the Mazowieckie Voivodeship" identified objectives and measures for years 2000-2015, and referred to Poland's future.

Lublin Region Development Strategy to 2020 (2013)

Lublin Region Development Strategy for 2014-2020 (with an outlook for 2030) This is the most important programme document defining the vision and objectives of the directions of development of the province of Lublin, including road and rail infrastructure.

Lodz Region Development Strategy to 2020 (2006)

The strategic policy development of the Lodz Region is indicated for the period up to 2020. Development Strategy 2020 is a response to the challenges of the coming years and will allow the development of a modern and attractive region in a manner that is economically sound and agreeable for its inhabitants. Discounting will affect regional development potentials and contribute to the growth and competitiveness of the region in the international arena.

Wielkopolska Region Development Strategy to 2020 (2012)

In the Wielkopolska voivodeship the development strategy sets out the key objectives faced by local government authorities in order to improve the lives of residents and the state of spatial and economic provincial planning, including the infrastructure.

Regional Development Strategy of the Voivoideship of Lubuskie until 2020

The Regional Development Strategy is the most important document of the Voivodeship setting out mid-term policy directions. The current Strategy replaces the former 2005 Strategy. The need to revise the Strategy stems from the changes in the legal framework related to the regional policy and recent socio-economic trends. One of the four strategic objectives set out by the Strategy concerns the improvement of competitiveness and innovativeness of regional economy.

Germany

Infrastructure benchmarking Europe

The study compares the current provision of the infrastructure in several European countries, reveals bottlenecks in the infrastructure system based on several criteria, and points out special problems in using the infrastructure (safety). The main topics are the current situation in various countries, and current and planned investments in comparison with the transport forecast. In conclusion it outlines a way of dealing with some of the problems and points out best practices.

Federal transport infrastructure plan

The Federal Republic of Germany is the majority owner of the transport infrastructure. It is the direct owner of the roads and inland waterways, and as the owner of the rail company it is the indirect owner of the rail network. The development of the infrastructure is therefore one of the important topics for the Federal Government and the Parliament. Based on several studies of trends and needs of the transport sector, on the forecast of transport development, the Government elaborates an infrastructure investment plan. This plan is the basis for future investment and has to be passed by the Parliament.

East – West freight transport 2030 – analysis and prognosis

The study looks at the development of freight transport in several European countries. It analyses the current situation in terms of east-west comparison and the modal split, and identifies, based on the prognosis for 2030, the challenges concerning transport policies and infrastructure development.

Spatial development plan of Berlin Brandenburg

The spatial development plan defines the ideas of two German states (Berlin and Brandenburg) for the social, economic and infrastructural development of the region surrounding the German capital. It is a joint plan and defines the main aims of developing the two states. It contains several decisions and tasks concerning the transport development, the development of mobility.

European transport corridors and spatial planning

The discussions of the trans-European transport network and, in connection with this, the creation of a system of European transport corridors, provided important input for the discussions of spatial planning in the Berlin-Brandenburg region. This study tries to combine the challenges arising from developing transport corridors with the process of spatial planning.

Feasibility studies and planning documents for major infrastructure projects

Poland

Pre Investment study of the passenger information system for the airport POZNAŃ-ŁAWICA SP. Z O.O. (2012)

The document describes all the main features of the project for a railway connection to the Ławica airport in Poznan. The document includes the advantages and disadvantages, the costs and effects of that project.

Pre Investment Study of the model link of the regional airport with the regional rail (2012)

The document presents the increasing role of airlines in Poland since its accession to the EU and thus connected stations to the airports in the framework of the TEN-T. The document was compiled at the request of the Marshal Office in Poznan.

The concept of a rail link between the Main Railway Station and the Airport Poznan (2012)

The study at the concept stage is intended to identify the technical possibility of a rail link from Ławica airport to Poznan train station. The work was performed for the Marshal Office of the Wielkopolska Region under contract No. 86 / DT / V / 07 of 11 September 2007. The document describes advantages, disadvantages, costs, and route design.

What next for the ramps at the airport in Lodz? (2010)

This article in the professional magazine *Kurier Kolejowy* presents information on the interchange station to Łódź Airport. In this article justifications are given.

Modernization of the railway line E 75 Rail Baltica Warszawa – Białystok – Lithuanian border, Phase I Warszawa Rembertów – Zielonka – Tłuszcz (Sadowne) (2011)

This study offers some detailed information about several route variants, technical parameters and the environmental compatibility of the variants.

Germany

Rail network 2025 / 2030 – Expansion concept for an efficient rail freight service in Germany

Germany has a well-developed rail infrastructure, but the main lines carry heavy traffic. Therefore there are a lot of bottlenecks, especially in freight transport. The study analyses the current situation and tries to show the challenges and needs in infrastructure development with a special focus on freight transport. It identifies some special problems and necessary investments, and points out the demands placed on an efficient transport policy.

Interoperability of rail systems

One of the main bottlenecks for rail transport is the fact that different countries operate several different systems. The study looks at these systems and tries to identify how to remove the problems efficiently. It highlights the most urgent problems and defines the challenges for European and national transport policy.

Economic effects of the airport Berlin Brandenburg International (BER)

Building the new Berlin Brandenburg airport is one of the most important infrastructure projects in the region. But it is not only an infrastructure project, it is an important project for the general development of the region. The study looks at the possible economic development and defines the tasks for municipal and regional policy.

Forecast of the development of transport in Germany 2025 / 2030

The Federal Ministry of Transport and Digital Infrastructure has commissioned a current transport integration forecast. A reliable long-term forecast of the passenger and freight transport which relates to transport integration within Germany at district level and with foreign countries for all transport carriers has been prepared for the planned Bundesverkehrswegeplan (BVWP) in 2015. This has been used to forecast the greenhouse gas emissions (particularly the CO_2 emissions) from traffic.

Studies of transport and infrastructure development in selected areas and/or selected topics

Poland / Germany

Transport Market Study for Rail Freight Corridor 8 (2014)

The main objective of the Transport Market Study is to provide the infrastructure managers in Rail Freight Corridor 8 with specific information and advice regarding the freight market development and future customer demand along the corridor. Thus the study will become an important prerequisite for the development of an implementation plan for Rail Freight Corridor 8. In order to achieve these goals the study focuses on the following major aspects:

- Analysis and evaluation of the present transport market situation covering all modes of transport

- Forecast of the transport market development based on an analysis of the socio-economic development trends
- Analysis of the strengths, weaknesses, opportunities and threats of rail freight traffic in the corridor
- Deduction of requirements for the railway infrastructure and operational and organizational improvements in railway freight traffic in order to improve the competitiveness of the railway sector, and to adequately meet the market demand
- Assistance for the infrastructure managers and the allocation body to define parameters for train path allocation

Study of Development and Modernization of rail transport technology in Mazovia (2009)

The aim of the "Study of the development and technological modernization of rail transport on Outsourcing in the context of transport policy Mazowieckie voivodeship" is to develop a plan of action that leads to the creation of a modern and coherent system of rail transport for Mazovia for 2035.

EU investment in Mazovian Railways (2011)

The document presents all four EU investments realized so far and what will be done next.

Railway infrastructure in Poland in the context of North Sea-Baltic Rail Freight Corridor 8 (2014)

The presentation collects issues, such as latest changes in corridor routes, corridors' offices in Poland, the preliminary route of RFC 5 as well as cooperation between rail freight corridors and core network corridors. Furthermore, it presents the advantages of implementing the North Sea-Baltic Corridor from the viewpoint of PKP PLK S.A.

Investments in the North Sea-Baltic Corridor (2014)

The presentation of PKP PLK S.A. shows an overview of the most important data concerning the PKP PLK S.A. network, general objectives for the period from 2014 to 2020, the current state of various sections of the rail infrastructure, detailed priorities for the near future, aims related to improving North Sea-Baltic Corridor accessibility, and the main investments for improving access to the North Sea-Baltic Corridor infrastructure.

Integrated transport concept for the European region "Pro Europa Viadrina"

The European region Pro Europa Viadrina is a small border crossing region within the European corridor. Covering all means of transport, it defines the aims of infrastructure and transport development, with a special view to the passenger transport within the region and the connections to the metropolitan areas and transport hubs.

Alternative Fuels in Heavy Goods Vehicle Transport - Corridor of liquefied biomethane in road transportation

What should we do in "greening transport"? This question is one of the starting points of the study. It checks the possibilities in road transport, shows the best practices and the need for new infrastructure. It figures out the necessary investments and shows the challenges facing general and regional transport policy.

Medium and Long Term Perspectives of IWT in the European Union (2011)

The study provides estimates of the transport flows for four corridors for 2020 and 2040.

Inland water transport in the Baltic Sea Region (BSR) Transportation System

The report provides a detailed interview of the seaports, inland ports and the navigable Inland Waterways within the Baltic Area (Dariusz Milewski and others, Baltic Sea Region Programme 2007 – 2013).

Governance studies and strategy papers

Poland

Transport Development Strategy up to 2020, and with a view to 2030 (2012, 2013)

This document presents the main goals and objectives to be achieved over the coming years in order to improve transport infrastructure in by 2020. Transport Development Strategy (SRT) is a medium-term planning document, hereinafter "Act on the principles of policy development". The essence of the SRT is to identify objectives and outline directions of development of transport, so that by 2030 it will be possible to achieve the goals set in the Long-term National Development Strategy (DSRK) and the Medium-Term National Development Strategy.

The main goal of the Transport Development Strategy: The increasing of transport's accessibility and improvement of safety of transport users and efficiency of transport sector through creating coherent, balanced and user friendly transport system in national, European and global levels.

Implementation Document for Transport Development Strategy for 2020 (2014)

Very important is the Implementation Document for Transport Development Strategy to 2020, with a view to 2030. While detailing the Transport Strategy up to 2020, the document defines the operational objectives to be realized in the years 2014 to 2020 in the field of road transport, rail, sea and inland waterways, using EU funds. In the wake of the operational objectives, the value of the expected results of actions taken has been identified and estimated.

Master Plan for Rail Transport in Poland to 2030

Master Plan for Rail Transport in Poland until 2030 is a key government strategy document in the railway sector and is intended for public administrative bodies and members of the rail market in Poland. The Council of Ministers, by adopting the Master Plan, created a new framework for long-term development programming and planning of the railway sector in Poland. In carrying out its international obligations, the government outlined the main lines of action in the sector, thus creating a stable and predictable national railway policy.

Multiannual Programme of Railway Investments till 2015

In November 2013 the Polish Government agreed a new Multi-Annual Rail Investments Programme covering the period until 2015. Projects will focus mainly on feasibility studies and pre-project documentation, modernisation and regeneration of railway lines, including construction of new local control centres, station renewals, power upgrades and deployment of GSM-R, investments in new rolling stock, improvements of security standards and improvements of quality service, including asset management, railway crossings and switches as well as modernisation of railway crossings.

National Road Construction Program 2011-2015 (2011)

This paper presents a programme of building roads by 2015. The problems with major national roads are presented, along with plans for their modernization and repairs and maintenance costs.

GDDKiA Information Service (2013/2014)

The website service of the General Directorate for National Roads and Motorways (GDDKiA) presents current information and data including map illustrations, such as the state of construction works on motorways, express roads and national roads. Moreover, the comprehensive news archive and the user friendly information panel can be used.

Long-term National Development Strategy, Poland 2030

The document "Poland 2030 - Long-term National Development Strategy 2030 - Third Wave of Modernity (LTNDS)" establishing the main trends, challenges, and concept of development of the country in a long-term perspective, accepted by the Council of Ministers on 5 February 2013.

National Development Strategy 2020 – Active Society, Competitive Economy, Efficient State

The National Development Strategy 2020 (NDS) is a part of the new national development management system. Due to the need to adjust the National Development Strategy 2007-2015 to the new socio-economic conditions and to the internal and external challenges, as well as to the requirements of the introduced development policy management system, it was decided to update it and to extend its time horizon until 2020. The efforts to update the strategy were correlated with the work on other strategic documents under development, such as the Long-term National Development Strategy and the Integrated Strategies.

National Spatial Development Concept 2030 (NSDC 2030)

The document presents a vision of the country's spatial development in 20 years perspective, specifies objectives and directions of the national spatial development policy that serve the purpose of its delivery as well as indicates the rules and mechanisms of coordination and implementation of public development policies having a significant territorial impact. Hence, NSDC 2030 has many characteristics of development strategy, combining spatial development components with the factors of socio-economic development. A crucial role in the NSDC 2030 play functional areas such as urban (FUA), requiring support of development processes, low accessibility areas and land-sea continuum areas. Voivodeships are obliged to delimit some of them in their spatial development plans.

Memorandum of Understanding and Intentions in the field of ITS among Lithuanian, Latvian, Polish and Estonian road authorities

The objective of the co-operation will be the automatic exchange of traffic, road weather, road work, e-tolling, freight and parking data with the aim to support sustainable mobility, traffic safety and traveller information services.

Germany

Joint development concept for the Berlin Brandenburg airport region

Based on the aim – of building a new airport – this concept is a result of an extensive discussion of the aims, ideas and problems, with all the partners involved. It is a joint concept. The two German states (Berlin and Brandenburg), the district and the municipalities involved elaborated it together. It shows the development opportunities for transport infrastructure, industrial and commercial enterprises and housing. It has become the development plan for this area, the area surrounding the airport.

Airport concept of the Federal Government / air transport concepts of several German states

Germany has a decentralized airport system with two main hubs – Frankfurt and Munich. The concept defines the most important locations in Germany, including Berlin Brandenburg International, Hamburg, Bremen, Hannover and Cologne/Bonn. It defines the aims for airport development and the conditions of this development. It defines the challenges facing the airport policy of the German states, the quality of the rail and road links to the airports, and the safety/security policy.

Integrated transport concept of Brandenburg

This is an official policy document of Brandenburg, one of the German states, concerning transport and mobility. Based on the social and economic development of Brandenburg, the concept describes the aims in transport policy, the current infrastructure and the expected development and further demands. The main topic is the passenger transport connected with the development of the “Verkehrsverbund Berlin Brandenburg GmbH”. But it also describes the demands for infrastructure development for freight transport, especially the development of the freight villages in Brandenburg. The concept was decided in 2002. It has to be revised. The Brandenburg Ministry for Infrastructure and Agriculture has started this revision. It should be finished at the end of 2014/beginning of 2015.

Development of the regional transport infrastructure of the region “Oderpartnerschaft”

The “Oderpartnerschaft” is a cross-border region. It contains the western parts of Poland and the eastern German states. It shows on a map the existing transport infrastructure, the deficits and the necessary supplements. All partners in the “Oderpartnerschaft” – in coordination with the Polish Government / the Federal Government – have agreed to the aims and the defined measures. This concept looks at the transport infrastructure mostly from the viewpoint of passenger transport. Freight transport is only a secondary topic. The partners have agreed to discuss the special questions of freight transport and complete the concept in future.

Middle Period Prognosis Winter 2013/14 for Germany

In the context of the flexible middle period forecast for freight and passenger transport, Team Intraplan Consult / Ralf Ratzenberger (on behalf of the Federal Ministry of Transport and Digital Infrastructure, BMVI) prepared the "Middle Period Prognosis Winter 2013/14". The forecast covers the years from 2014 to 2017 and gives an overview of the development in 2013. Regarding the national economic development, the basis is the projection as of February 2014 represented in the Annual Economic Report of the Federal Ministry for Economic Affairs and Energy.

Western part of the Corridor: NL, BE

This review covers the studies and other relevant documents that focus on the western part of the Corridor, i.e. the Netherlands and Belgium. The body of literature, which forms the frame of reference for the corridor study, can be divided into four main categories:

1. Macro-regional documents on transport planning and development
2. Feasibility studies and planning documents regarding major transport infrastructure projects
3. Studies of transport development and future scenarios for selected topics/areas
4. Governance studies and strategy papers

The full list of studies and other relevant documents is annexed to this Review. The four categories, each highlighted by a number of key publications, are summarised below:

Macro-regional documents on transport planning and development

Infrastructure and Spatial Planning Structure Plan (NL)

The Infrastructure and Spatial Planning Structure Plan (*Structuurvisie Infrastructuur en Ruimte*, *SVIR*) sets out the Dutch government's plans on spatial development and mobility. It provides a list of infrastructure projects that will be invested in over the next few decades. The Structure Plan shows what the Netherlands should look like in 2040: competitive, accessible, liveable, and safe. Central government focuses on national interests, such as creating a favourable environment for the establishment of businesses, a high-quality road network, and water safety. The Structure Plan defines three objectives: to increase the country's competitive strength by improving its economic and spatial structure, improve its accessibility, and ensure a safe and liveable environment.

Mobility Plan Flanders 2030 (BE)

The Mobility Plan Flanders is the official policy document of the region of Flanders concerning transport and mobility. The document describes the planning for measures aiming to guarantee the availability of transport options, and to increase the accessibility for transport modes in a sustainable way for the medium and long term (2020 and 2030 respectively).

Scheme for Development of Regional Space in the Walloon Region (BE)

The Scheme for the Development of Regional Space (SDER) is the official policy document as referred to in the Walloon Code of Land Management, Urban Planning and Heritage and which "expresses the management and sustainable development options for the entire territory of the Walloon Region. The policy document describes the Walloon territory as transversal and evolutionary and serves as a framework for decisions regarding habitat, lifestyle, travel, location of economic activities, urban development, and conservation of natural habitats. The original document was approved by the Walloon Government in 1999, but is currently being reviewed.

MIRT Book of Projects 2014 (NL)

The MIRT Book of Projects contains a list of all spatial projects and programmes currently being implemented by the Dutch government in collaboration with provincial and municipal authorities. It describes the progress made on these projects and programmes, and their current status, and reflects central government policy.

National Market and Capacity Analysis (NL)

The NMCA is a multi-modal analysis of accessibility in 2020 and 2028. It shows the relationships between the different transport modes. The NMCA compares market demand for mobility, on the hand, and capacity (supply), on the other, for the transport modes road, rail, regional public transport, and waterways. It presents the challenges ahead on a national level, but does not recommend solutions.

Feasibility studies and planning documents regarding major transport infrastructure projects

Studies on the accessibility of the Port of Amsterdam from the North Sea (NL)

The North Sea locks at IJmuiden give access to an economically highly important area along the North Sea Canal: Amsterdam Seaports. However, the latest generation of cargo vessels can only use the 4th lock, which is the Northern Lock. The other locks are too narrow for cargo vessels and cruise liners. The current system dates from 1929. In 2004 the decision was made to investigate possible solutions to improving accessibility via the IJmuiden locks. Central and local government are backing plans to develop a 500-metre lock which will allow bigger freight and cruise ships to reach the capital city. The new sea locks will increase the port capacity substantially and will as a consequence fuel economic development, not only for the Amsterdam region itself but for a long stretch of the corridor beyond. The European added value of the upgrade of the Amsterdam Lock has recently been addressed in a study carried out by the Erasmus University Rotterdam. The new Amsterdam Lock will have a width of 65-70m. Current capacity is 95 million tonnes per year and will increase to 125 million tonnes per year after renewal.

Studies on the extension of the Beatrix locks (NL)

The 3rd lock chamber project at the Princess Beatrix locks is intended to expand current capacity at this bottleneck on the waterway connecting Amsterdam to Rotterdam/Antwerp. The Lek Canal constitutes the main link in the North-South transport axis between Amsterdam/Northern Netherlands and Rotterdam/Antwerp. With a length of 3.5 km, it is one of the shortest and, at the same, one of the busiest canals in the Netherlands. Ships en route between Amsterdam and Rotterdam have to lock through only once, which is at the Princess Beatrix locks on the Lek Canal.

Studies on the widening of the Twente Canal and extension of the Eefde locks (NL)

In view of the economic importance of the Twente Canal for the region of Twente and, to a lesser extent, North Gelderland and the province of Drenthe, it is vital that plans are made to anticipate and respond to developments in the shipping industry and the impact these are likely to have on the functionality of the Twente Canal. The Twente Canal needs to be widened to ensure smooth and safe shipping The Eefde locks are the only way for inland shipping to access the Twente Canal. Capacity expansion is crucial to be able to process the supply of vessels smoothly.

Quick Scan of Economic Feasibility of Twente-Mittelland Canal (NL)

When looking at a map of the inland waterways network, there seems to be a link missing between the Twente Canal and Mittelland Canal. This missing link is the proposed Twente-Mittelland Canal. The link would offer ports and industrial centres in the Netherlands and Belgium a shorter connection to northern Germany and the northern German ports and vice versa. Including the necessary extensions in Germany, it would also eventually connect to Poland and the Czech Republic. The Twente-Mittelland Canal would create an alternative waterway in addition to the existing route via the river Rhine. Against the background of renewed interest in the Twente-Mittelland Canal, a Quick Scan Cost-Benefit Analysis (CBA) has been performed to quantify the most significant cost and benefit flows. Based on the analysis findings, the Twente-Mittelland Canal appears not to be a feasible infrastructure project. As the Quick Scan shows, alternative routes are available and the benefits from a route shift do not justify its construction. However, the Canal would provide an economic boost to the Euregion and beyond.

Studies on the freight rail link between the Betuwe Railway and Twente (NL)

In 2007, the East-West Betuwe railway line opened, connecting the Port of Rotterdam to the German border near Arnhem. It is a freight-only railway line. The port of Amsterdam is connected to it via Utrecht. However, rail transport bound for the northern part of Germany and northern Central Europe in many cases still use the ‘old’ rail link via Utrecht-Amersfoort-Deventer-Hengelo-German border. Studies are underway to reroute this freight via the Betuwe Railway. Some of these studies have already been completed. Several alternatives to connect the Betuwe Railway with the region of Twente are also being discussed.

Studies on the implementation of ERTMS/ETCS (NL/BE)

Several studies are underway to look at the implementation of ERTMS as the future signalling system. The main reasons for implementing ERTMS are punctuality, safety (reduces the incidence and consequences of Signals Passed At Danger), interoperability (greater mobility for trains across Europe), capacity, and performance. The introduction of ERTMS has already enabled cross-border movements of freight trains in Europe and has improved the reliability, quality and competitiveness of freight train operators’ services.

In Belgium the Belgian ECTS Masterplan – 2010-2025 is an important document in this respect. This document describes the long-term vision of Infrabel regarding the implementation of ETCS on the Belgian railway network as well as the migration path towards this long-term vision that will continue to systematically increase safety on the Belgian railway network through the ongoing, simultaneous rollout of TBL1+ and the implementation of ETCS.

Strategic plan Level crossings 2008-2015 (BE)

Belgian rail infrastructure manager Infrabel drew up a strategic plan in response to the Belgian government’s desire to reduce the number of accidents at level crossings. The aim of this plan is to structurally improve safety at level crossings and to reduce the number of injuries and deaths resulting from accidents at level crossings in 2015 by 25% compared to 2007.

National railway improvement scheme (NL)

This programme is a Dutch action similar to Belgium's removal of level crossings. The Ministry of Transport has an objective to improve safety and efficiency at level crossings in a cost-effective manner. Project planning starts in 2014.

Implementation Plan RFC1 Zeebrugge-Antwerp/Rotterdam-Duisburg-[Basel]-Milan-Genoa (NL/BE)

The Implementation Plan describes the corridor routing/terminals and contains the essential elements from the transport market study. It deals with the coordinated information on infrastructure works, inauguration of a one-stop-shop, authorised applicants and traffic management. The document also contains an "Investment Plan" listing projects planned for the following years on the Corridor.

RFC2 Rotterdam-Antwerp-Lyon/Basel, Corridor Information Document and Implementation Plan, Timetable 2015 (NL/BE)

The Implementation plan includes, among other subjects, a description of the characteristics of the corridor, a summary of the transport market study, an investment plan and the list of objectives set by the corridor in terms of quality of service and capacity.

Studies on container terminals in the hinterland (NL)

Various regions in the Netherlands currently have limited access to existing container transhipment terminals. Plans are in place for constructing new terminals in these places. If this expansion is realised, the country will have a large and adequate nationwide network of regional container terminals. At present, regional container transhipment capacity in the Netherlands is sufficient to satisfy demand, and this will remain the case in the future, taking into account the planned expansions in 2020 and 2030. However, in the event of high economic growth and a large-scale shift from road transport to transport via railways and inland waterways, transhipment capacity will be insufficient in many regions, despite the new terminals.

Studies on the Incentive for Dynamic Inland Waterway Transport Management (NL)

Management and maintenance, construction, and traffic management are the three pillars of Dutch government policy on the main waterways. Management and maintenance have the highest priority. The waterways must be passable and safe in all cases, and journey times by water must be reliable. The Dutch IDVV programme (Incentive to Dynamic Inland Waterway Transport Management) is aimed at increasing the usage of inland waterways, focusing on container transport. Innovative traffic management and measures will be implemented to improve communication and contacts between shippers and carriers.

Schiphol Railway Station: MIRT study into the development of the station terminal (NL)

The railway station at Schiphol Airport opened in 1978, and has since seen continued growth in the number of passengers using the station. In 1995, an extension was added – Schiphol Plaza – which led to a considerable increase in the railway station's capacity and substantially improved quality for passengers. Schiphol railway station is a multi-modal terminal. It combines the transport modes air, rail, bus, and taxi. Schiphol is a European and global mainport, as well as a hub within the European, national and local railway networks. Ensuring excellent access to Schiphol by railway and road is therefore a national government objective. Because the hub is nearing its capacity, it is important to investigate what measures need to be taken to ensure adequate capacity and quality by 2010 and in the long term.

Study on the transport connection between Antwerp and Rotterdam (NL)

In this study the Dutch national government, in cooperation with the provinces of South-Holland, Zeeland, North-Brabant, as well as several regional and urban authorities developped a vision on the future spatial and economic structure of the Rhine-Maas-Scheldt delta area. The region of Flanders was represented in the study advisory board.

Studies on the recommissioning of the Iron Rhine Railway (BE, NL, DE)

The Iron Rhine is a railway line connecting the Port of Antwerp with the German Ruhr area. In 1998, Belgium asked the Netherlands to re-open the Iron Rhine Railway aiming at increasing freight transport from Antwerp to the Ruhr area. The current route to Germany, the Montzen route, is about 50 km longer than the Iron Rhine Railway for some destinations and contains some fairly steep grades which make it difficult to drive heavy trains. Currently the use of the Iron Rhine connection is not allowed as a result of Natura 2000 regulations.

Studies on the expected usage and bottlenecks of the Montzenline (BE, DE)

In a recent study (Aktualisiertes Stufenkonzept, 2014) at the request of Antwerp Port Authority, after a detailed investigation of the actual and future use of the Montzenroute, expected future bottlenecks on the German rail sections Aachen-Köln and Aachen-Mönchengladbach-Duisburg have been determined.

Studies on a second rail link for the Port of Antwerp (BE)

The Port of Antwerp is continuing to expand. Moreover, the Belgian government wants to increase the share of freight rail as a percentage of total transport. These developments will lead to a doubling of trains services. Today, all trains from the Port of Antwerp use a single railway link to access inland Europe. This rail link is used for both freight and passenger trains. The proposed new freight-only railway line will connect the Antwerp-North marshalling yard with the Lier – Aarschot line, thus improving the accessibility of the Port of Antwerp by rail.

Feasibility studies into a rail cargo link connecting Liège airport to the Hi-speed rail network

In the documents, established in 2007 and 2010, the feasibility of a rail cargo connection from the Liège airport Carex terminal to the existing Hi-speed rail Brussels-Liège-Aachen has been studied. Market research, technical and organizational aspects, and the financial profitability for several scenarios are part of the study. The financial scenarios considered showed a positive outcome.

Studies of transport development and future scenarios for selected topics/areas

High-frequency rail transport (NL)

The High-Frequency Rail Transport Programme (*Programma Hoogfrequent Spoorvervoer*, *PHS*) launched by the Dutch Ministry of Infrastructure and the Environment aims to free up space on the railway network to accommodate the growing volume of passenger and freight traffic. This way, the country's economic centres will remain accessible by rail. The PHS programme intends to create extra capacity on the four busiest passenger routes and strengthen freight traffic within a coherent national rail network. Accordingly, the programme will have different effects and implications at national, regional and local level. The programme will be fleshed out in the Long-Term Rail Agenda and by reviewing railway timetables and projects. The High-Frequency Rail Transport Programme is based on four pillars:

- high-frequency rail transport on the busiest lines in the Randstad conurbation;
- coherent regional public transport systems, with the railway network forming the backbone;
- good-quality journey times nationwide;
- future-proof rail freight route strategy.

The programme looks at the period up until 2028. Six corridors have been identified as part of the programme.

Dutch policy framework for rail freight transport (NL)

The policy framework for rail freight hubs is designed to achieve two objectives. Firstly, it looks at the developments in rail freight traffic, the opportunities they offer for rail freight hubs, and the implications for government policy. Secondly, it defines the roles and responsibilities of the stakeholders involved in rail freight hubs. These are mainly rail terminals, but also private rail links, and public loading and unloading platforms.

Studies on a Rail Freight Corridor between Poland and the Netherlands (NL)

To improve the quality of rail freight transport in the corridor between the Netherlands and Poland, the Polish and Dutch Ministries responsible for rail freight transport are working closely together. Both have set up bilateral international working groups to analyse and resolve rail freight transport challenges in this corridor. This cooperative effort has led to a request from the Ministries for a “Corridor Study on the Netherlands-Poland Rail Freight Corridor”. The study will explore the potential for further development, identify barriers to developing this market, and propose specific measures to improve conditions in the rail freight market.

Governance studies and strategy papers

Multi-modal inland hubs in the Netherlands (NL)

Freight transport hubs connect the Rotterdam and Amsterdam seaports to the hinterland and increasingly operate as seaport “extensions”. Multi-modal inland hubs may encourage a larger percentage of freight traffic to be carried by rail and the inland waterways. The Dutch Knowledge Centre for Mobility Policy (*KiM*) has conducted studies into inland hubs, addressing the question whether new terminals are needed and where, how existing terminals are doing, and whether some of these terminals can be developed into 'hubs'.

Project Plan for Development of Railway System in Wallonia 2013 – 2025 (BE)

The Walloon Government has adopted a development plan for the railway system in Wallonia for the period 2013-2025 . The Project Plan provides a coherent framework for action by the Walloon Government and its administration in the field of railways, especially in relationship to the Belgian federal government. It has developed an integrated vision of the railway development, translated into concrete rail projects. The Project Plan defines 6 key objectives: to guarantee fundamental safety, punctuality and maintenance of the network and rolling stock, enhance the attractiveness of the service, increase network capacity, develop stations and stopping points, enhance access to the network for freight carriers, and improve governance.

Rail Road Strategy for Flanders (BE)

This strategic document defines the priorities for all rail road projects in Flanders. This strategy is an integral part of the Flanders Mobility Plan. All defined plans and projects have a medium-term (2025) and long-term (2040) horizon. The most relevant plans provide for an increase in capacity on selected links, safety improvements, elimination of crossings, strengthening of technical interoperability, and the development of regional express networks

Belgian railway multi-annual investment plan 2013-2025 (BE)

This investment scheme of the SNCB group contains all the relevant information relating to Belgian railway projects (budget, planning, description) for the period 2013 to 2025.

Hinterland congestion and the role of freight traffic by sea and inland waterways for the Mainport of Rotterdam (NL)

Container transhipment in the Port of Rotterdam is expected to increase substantially in the period until 2040, despite the economic crisis. In order to prevent the roads around Rotterdam from becoming congested, inland waterways and short sea shipping need to account for a larger percentage of container transport. To achieve this transition, market participants have already taken initiatives, some of which will increase hinterland transport capacity. However, it is not clear whether these measures will also strengthen the role of the inland waterways and short sea shipping. The Dutch government's main tasks are to reduce the red tape and administrative burden and to streamline spatial planning procedures. It is also important that the government should take on a coordinating role and bring together the parties involved in container transhipment.

Masterplan for inland waterway transport on Flemish waterways – Horizon 2020

The Infrastructure Masterplan presents and explains the unavoidable and recommended investments in the transport related infrastructure of the Flemish waterways up to 2020, including measures to limit their environmental impact.

Quick Scan of Bottlenecks in International Corridors (NL)

This study, commissioned by the Dutch Ministry of Infrastructure and the Environment, has identified existing bottlenecks along the TEN-T corridors, including the North Sea – Baltic corridor, from the perspective of the interests of the Dutch seaports.

Quick Scan of Euregio East-West Corridor (NL)

Euregional study into the current and future use and capacity usage of roads, railways and inland waterways in the Dutch-German EUREGION, which is part of the European East-West Corridor. The aim of the study is to identify bottlenecks and overuse at an early stage so as to allow remedial measures to be taken in a timely fashion.

Identification of Stakeholders

One of the fundamental elements of the Proximare work plan has been intensive stakeholder cooperation in all eight countries with decision- and policy-makers: Member States, infrastructure managers (railway and road networks, seaports, inland waterways ports, airports, rail-road terminals), cities and regions. The summarizing list of stakeholder as has been compiled for the Corridor Fora is presented as Annex.

Chapter 3

Multimodal Transport Market Study

Prepared by Goudappel Coffeng

Introduction

The Transport Market Study for the CNC North Sea – Baltic (TMS NSB) assesses transport demand and the resulting traffic flows as well as the capacity of the respective parts of the infrastructure. The analysis takes into account the existing flows and their likely evolution until 2030. As regards capacity, the analysis indicates whether the existing infrastructure is able to cope with the current and expected traffic flows. The analysis takes into account possible shifts from one mode of transport to another and improvements to existing infrastructure capacity.

Objectives, methodology and alignment

Objectives

The objectives of the TMS NSB are to analyse traffic and transport flows including, in particular:

- a multimodal analysis of the shares accounted for by each transport mode (Road, Rail, IWW, Short Sea shipping, Air);
- the relative share of different transport modes on the different sections;
- the types of freight;
- the entry and exit points of freight within the corridor,
- passenger numbers on the corridor by mode of transport,
- an analysis of the strengths and weaknesses of the different transport modes along the corridor.

The analysis covers the current situation and takes a long-term perspective until 2030. The analysis of the strengths and weaknesses of the different transport modes along the corridor has not been included in this 3rd progress report, but will be part of the final report.

Methodology

As the Transport Market Study for Rail Freight Corridor 8 (TMS RFC8) was completed in June 2014, the findings presented in the final report were an obvious starting point for the MS NSB. The results were made available to Proximare on 5 June 2014 and have been an important source for the TMS NSB.

There are, however, important differences between the two studies in terms of their objectives and alignment:

- the TMS NSB includes freight and passenger transport, whereas TMS RFC8, of course, focuses on freight transport;
- the TMS NSB includes a full analysis of all transport modes without focusing on one mode in particular, whereas the TMS RFC8 describes all modes as well but focuses obviously on rail transport;

- some key differences in alignment:
  - TMS NSB includes an additional Baltic branch north of Kaunas;
  - TMS NSB includes no Silesia-Czech branch;
  - The Hamburg branch is in TMS RFC8 studied as part of the Czech extension option;
  - TMS NSB includes no Zevenaar-Oberhausen rail link;
  - There are differences in the Aachen-Minden rail link in Germany;
  - TMS NSB does not include the Iron Rhine link.

Differences in methodology between both studies are therefore inevitable. The TMS NSB does not offer the operational level of detail provided by the TMS RFC8, e.g. the number of trains on rail sections. Instead, the TMS NSB compares modes on a level basis, i.e. freight volumes (tons/year) and passenger numbers (pax/year). This has been done on five different levels for freight transport and four different levels for passenger transport:

- On a country level, to show trends in transport volumes and mode shares over time, and to analyse the specific differences between countries along the corridor.
- On a corridor level, to analyse the specific corridor-related origins and destinations of freight and passenger numbers by mode. For freight transport, different commodity groups have been analysed.
- For freight transport only, an analysis of freight types per mode for corridor-related international transport.
- An analysis of the transport flows across corridor entry and exit points.
- On a section level, to obtain an insight into the volumes and shares of different modes on sections along the corridor.

<u>Analyses on a country (national) level</u>

Trends in freight transport volumes and freight mode shares for 2008-2012 and the future social and economic framework set out in the TMS RFC8 were used to conduct the TMS NSB. The main data source is Eurostat. Additional information has been added to the TMS RFC8 data to also cover Latvia, Estonia, and Finland. Similarly, passenger transport data has been sourced from Eurostat.

<u>Analysis of corridor-related international transport flows</u>

On a corridor level, an analysis of the origins and destinations by mode has been performed using ETISplus data 2010. The ETISplus source was also used in other CNCs, such as the TMS for CNC Rhine-Alpine. Using ETISplus was recommended to CNC NSB in the PLATINA information package received in July 2014.

Distribution patterns have only been analysed for international transport flows that potentially use the corridor infrastructure. International transport is defined as transport that crosses at least one international border. This means that domestic (national) transport flows have not been included in the analysis. National transport flows have been included, though, in the corridor section level analyses. To determine the potential use of the corridor, we have defined its geographical coverage or catchment area, as explained later in this report. To analyse the distribution patterns of freight and passenger volumes, we have used NUTS2 area statistics.

Analysis of the corridor-related international freight types by mode

The analysis of freight types was been performed using the NST07 commodity group classification into10 main types of freight. ETISplus2010 was used as the main input for the analysis. The analysis only covers corridor-related international transport, based on the catchment area as defined.

Analysis of transport flows across corridor entry and exit points

Eurostat data 2012 and additional statistical data on ports and airports have been used to analyse transport volumes across key entry and exit points of the corridor.

Section level analyses of transport volumes

This analysis focuses on the transport volumes on the different sections for the modes Road, Rail, and Inland Waterways (IWW), covering both domestic and international transport.

Data on current transport volumes by corridor section have been collected by all partners involved in Proximare, using all the information available as part of the TENtec data collection task. Information is available from databases for almost all sections. For some sections, estimates have been made, using the data on adjacent sections. Where possible, we have used the data available for 2012 or estimates based on prior years. In other cases, more recent data have been incorporated (e.g. 2013 instead of 2012).

To enable a comparison of freight transport modes (tons/year) and passenger transport modes (pax/year), estimates were inevitable because this information is available only to a very limited extent and if it is available, there are in many cases publication restrictions. For freight transport, we made estimates using information on the mean number of tons transported per freight train and per lorry. IWW tonnages for each section were in most cases readily available. For passenger transport, we estimated the number of passengers by train and road so as to calculate section totals. Estimates were delivered by all Proximare partners, paying special attention to country-specific differences. Also, the data available for working days or weekdays was used to estimate annual totals.

The forecasts for 2030 as included in the TMS NSB only cover transport volumes by corridor section. ETISplus does not provide for any forecasts and the Transtools model does not take into account many recent national developments. Forecasts on section volumes were collected by all Proximare partners on a national level as part of the TENtec data collection task. The information used has been documented for each country in this report. Because the national representatives and rail infrastructure managers of the countries involved are expected to be fully committed to the TMS RFC8, the long-term forecast for 2025 from TMS RFC8 was used as a benchmark for the 2030 rail freight forecast.

The Rail Baltica project was not included in the regular rail freight forecast for 2030. Because this project will have a far-reaching impact on several Baltic countries along the corridor, the impact on rail freight volumes has been assessed. To do so, we used the Rail Baltica study reports.

Alignment and catchment area

Figure 1 shows the alignment of the corridor for Road, Rail and the Inland Waterways (IWW). The alignment of the infrastructure was discussed and determined in earlier phases of the study and during Corridor Forums.

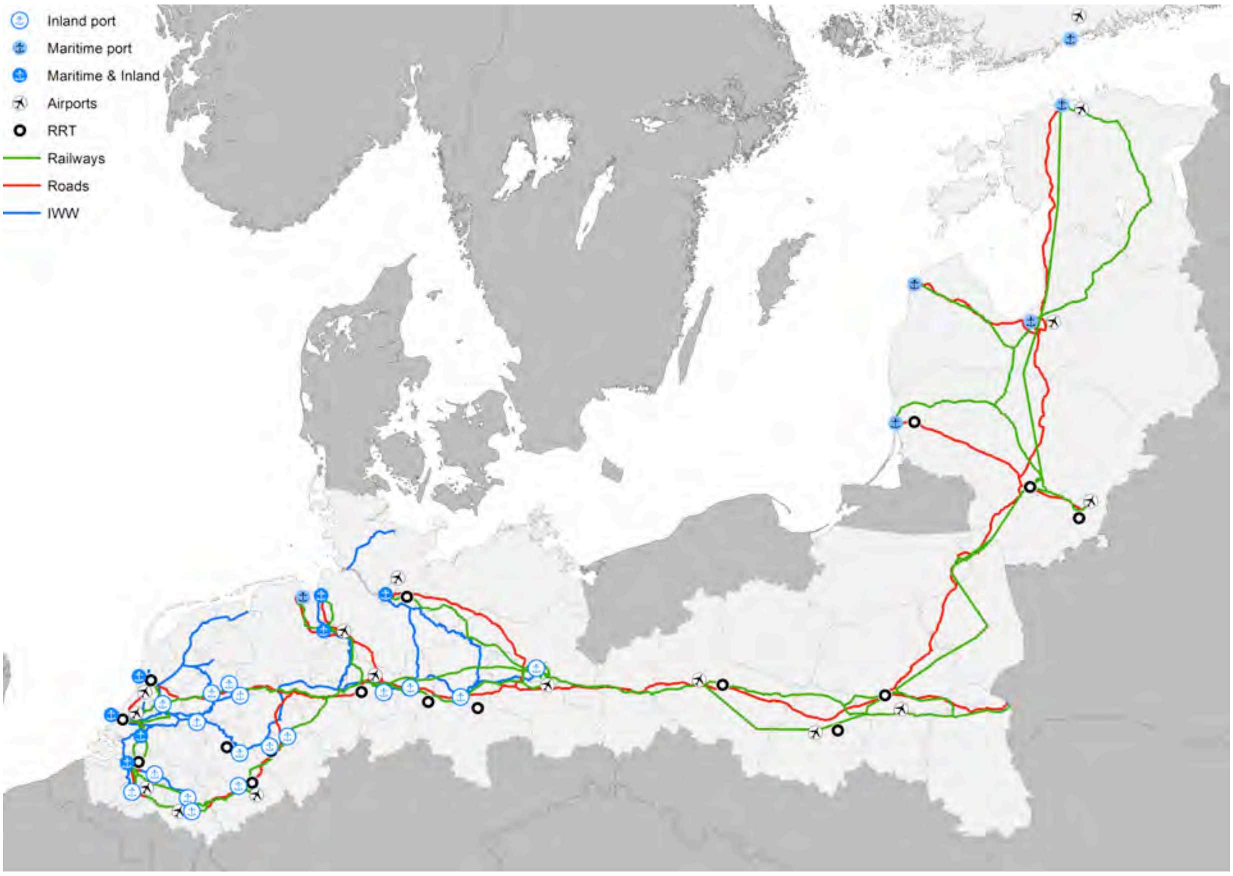


Figure 1: Alignment of CNC North Sea – Baltic infrastructure and NUTS2 areas within the catchment area (light shaded) to enable analyses of corridor-related transport flows

To analyse corridor-related transport flows, a geographical coverage or "catchment area" was defined, comprising the areas in which international transport flows that potentially use the corridor infrastructure have their origins or destinations. The catchment area is presented in a NUTS2 classification scheme and involves all the regions with core nodes and sections on the North Sea Baltic Corridor, based on Regulation (EU) No. 1315/2013. A total of 48 NUTS2 regions were identified: 12 in the Netherlands, 7 in Belgium, 17 in Germany, 8 in Poland, 1 in Lithuania, 1 in Latvia, 1 in Estonia and 1 in Finland. The size of the NUTS2 areas differs considerably. In the Netherlands and Belgium, the NUTS2 area schemes are very detailed. Estonia, Latvia and Lithuania each have one NUTS2 area. Figure 1 shows the catchment area for the corridor as a whole. The catchment area defined above was used to conduct the freight and passenger transport analyses set out in sections 3.1.2 and 3.2.2.

Analysis of current demand

Freight transport

Country level

Trends in total transport volumes 2008-2012 and modal shares, both on a national level, were reported in the TMS RFC8 using Eurostat data. Eurostat data have been added for Latvia, Estonia and Finland, which were not involved in the TMS RFC8. Table 1 shows the trends for all countries.

Loading Country	Year				
	2008	2009	2010	2011	2012
FI	563,349	462,472	524,812	447,301	422,707
EE	117,971	98,617	102,350	112,531	101,509
LV	159,703	140,271	142,944	166,753	174,200
LT	143,031	112,792	121,065	130,513	130,205
PL	1,356,423	1,387,760	1,441,732	1,598,404	1,506,304
DE	3,885,987	3,441,875	3,478,468	3,752,649	3,652,427
NL	1,262,448	1,170,276	1,227,737	1,188,922	1,182,097
BE	637,777	559,177	640,464	635,218	650,832

Remarks:

Unit	Freight in 1,000 tons
Source	Eurostat unless indicated otherwise below
NL	Includes rail data estimates by ProRail, based on own data (similar to RFC8 TMS)
BE, PL	Includes rail data from RFC8 TMS, which is different from Eurostat
BE	No 2012 rail data available from Eurostat, 45,000 tons (x 1,000) estimated in order to calculate total for all modes

Table 1: Annual freight transport country totals by mode (Road, Rail, IWW, Short Sea Shipping, and Air) from 2008 to 2012, including domestic flows

The modal share of each transport mode for 2012 has been determined on a national level. Table 2 shows the total freight tonnage by mode.

Loading Country	Mode					
	Total	Rail	Road	Inland Waterways	Short Sea Shipping	Air Intra-EU
FI	422,707	35,267	299,397		87.984	59
EE	101,509	44,725	31,321		25.459	4
LV	174,200	60,601	52,622		60.969	8
LT	130,205	49,377	48,428		32.391	9
PL	1,506,304	209,867	1,245,053	2.574	48.747	63
DE	3,652,427	366,140	2,891,837	223.170	170.372	908
NL	1,182,097	40,000	538,475	350.069	253.472	81
BE	650,832	45,000	291,380	190.288	123.928	236
Total for 8 countries	7,820,281	850,977	5,398,513	766.101	803.322	1.368

Remarks:

Unit	Freight in 1,000 tons
Source	Eurostat unless indicated otherwise below
NL	Rail estimates by ProRail, based on own data
PL	Rail data from RFC8 TMS, different to Eurostat
BE	No 2012 rail data available, 45,000 tons (x 1,000) estimated in order to calculate modal split

Table 2: Freight transport flows (x 1,000 tons) by mode by country in 2012

Table 3 shows the relative share of each mode. The main finding on a national level, based on these tables, is that there are important differences in trends and modal shares between the countries along the corridor. Some countries have suffered a remarkable decline in total freight transport, most probably related to the economic recession in 2008-2012. Other countries have shown a steady increase, despite the economic recession.

Loading Country	Mode					
	Total	Rail	Road	Inland Water-ways	Short Sea Shipping	Air Intra-EU
FI	100%	8%	71%	0%	21%	0%
EE	100%	44%	31%	0%	25%	0%
LV	100%	35%	30%	0%	35%	0%
LT	100%	38%	37%	0%	25%	0%
PL	100%	14%	83%	0%	3%	0%
DE	100%	10%	79%	6%	5%	0%
NL	100%	3%	46%	30%	21%	0%
BE	100%	7%	45%	29%	19%	0%
Total for 8 countries	100%	11%	69%	10%	10%	0%

Remarks: see table 2

Table 3: Modal split of freight transport flows by country in 2012

Table 3 illustrates the dominance of road transport as a percentage of total freight in the countries analysed. However, there are substantial differences in the modal shares for freight transport in the corridor countries, mainly caused by their geographical position. Air cargo has a very small share of total tonnage in all countries. IWW is only relevant in Germany, Belgium and the Netherlands. Other transport modes (Road, Rail, Short Sea Shipping) feature in all countries along the corridor to a greater or lesser extent. As regards rail, the TMS RFC8 concludes that rail freight transport has seen a general decline in market share in Europe in recent years, although in absolute terms rail freight volumes have increased.

The main findings on freight transport trends and mode shares for each country are set out below.

Finland

There has been a substantial decline in total freight transport between 2008 and 2012. Road transport is the dominant domestic mode, although in Finland, because of its geographical position, Short Sea Shipping is the most important international mode of transport.

Estonia

Estonia has also shown a decline in total freight transport, although less markedly than Finland, bouncing back temporarily in 2011. Rail transport has the biggest share of freight tonnage, followed by road transport. Short Sea Shipping is important for Estonia as well.

Latvia

Latvia has seen an increase in total freight transport, after a decline in 2009. Rail transport has a slightly greater share than road transport. Short Sea Shipping has a similar share of total freight tonnage to rail transport.

Lithuania

In Lithuania, total freight transport volumes have recovered after a substantial decline in 2009. The shares of rail transport and road transport are balanced. Short Sea Shipping is important for Lithuania as well.

Poland

Poland is the only country to show a steady increase in total freight transport during the period 2008-2012. Road transport has a very dominant share, with rail transport having a limited share and Short Sea Shipping having a very small share of total freight. IWW is virtually non-existent.

Germany

In Germany, total freight transport volumes have stabilized after a temporary dip in 2009, followed by increases in 2010 and 2011. Road transport has a very dominant share. Rail transport, IWW and Short Sea Shipping all have a limited share of total transport volumes.

Netherlands

Since 2008 the Netherlands has seen a slight decrease in total freight, although volumes have stabilized in the years for which data is available. Road transport has the largest share, but IWW and Short Sea Shipping are important as well. Rail transport has a relatively small share of total freight transport.

Belgium

After a substantial decline in 2009, Belgium has seen an increase in total freight transport volumes. Road transport has the largest share, although like the Netherlands, IWW and Short Sea Shipping are also important modes in Belgium. Rail transport has a bigger share in Belgium than in the Netherlands.

Corridor-related international transport flows

This section analyses the corridor-related cross-border freight transport flows. The analysis only takes into account transport that potentially uses the infrastructure along the corridor, which means that it only includes transport to and from the catchment area that cross at least one inter-national border. The methodology underlying the analyses and the definition of the catchment area has been explained earlier in this chapter. All transport modes are included, except air freight. As indicated earlier the volume of air freight is very limited.

Corridor-related demand and mode shares

Table 4 presents the corridor-related international freight transport flows in a way similar to earlier analysis for all transport modes and countries. The shares of the different modes are shown in table 5.

Loading Country	Mode				
	Total	Rail	Road	Inland Waterways	Short Sea Shipping
FI	13,710	0	260	0	13,450
EE	11,529	439	1,183	0	9,908
LV	25,350	1,416	2,748	0	21,186
LT	12,713	1,693	2,384	11	7,301
PL	10,416	1,157	9,239	20	0
DE	85,118	4,689	42,842	25,231	12,356
NL	144,280	5,783	42,465	84,253	11,778
BE	60,638	2,264	23,531	29,870	4,974
Corridor area	363,754	18,765	124,653	139,386	80,951

Source ETISplus 2010

Table 4: Corridor-related international freight transport flows (x 1,000 tons) by mode by loading country in 2010

Loading Country	Mode				
	Total	Rail	Road	Inland Waterways	Short Sea Shipping
FI	100%	0%	2%	0%	98%
EE	100%	4%	10%	0%	86%
LV	100%	6%	11%	0%	84%
LT	100%	24%	19%	0%	57%
PL	100%	11%	89%	0%	0%
DE	100%	6%	50%	30%	15%
NL	100%	4%	29%	58%	8%
BE	100%	4%	39%	49%	8%
Corridor area	100%	6%	34%	38%	22%

Source ETISplus 2010

Table 5: Modal split of corridor-related international freight transport flows by country in 2010

Total demand for international freight tonnage in the corridor catchment area in 2010 is estimated at over 360 million tons, comprising 12% of the total estimated demand (which includes domestic as well as international flows) in the area defined. IWW has the highest share, followed by Road, Short Sea Shipping, and Rail, in that order.

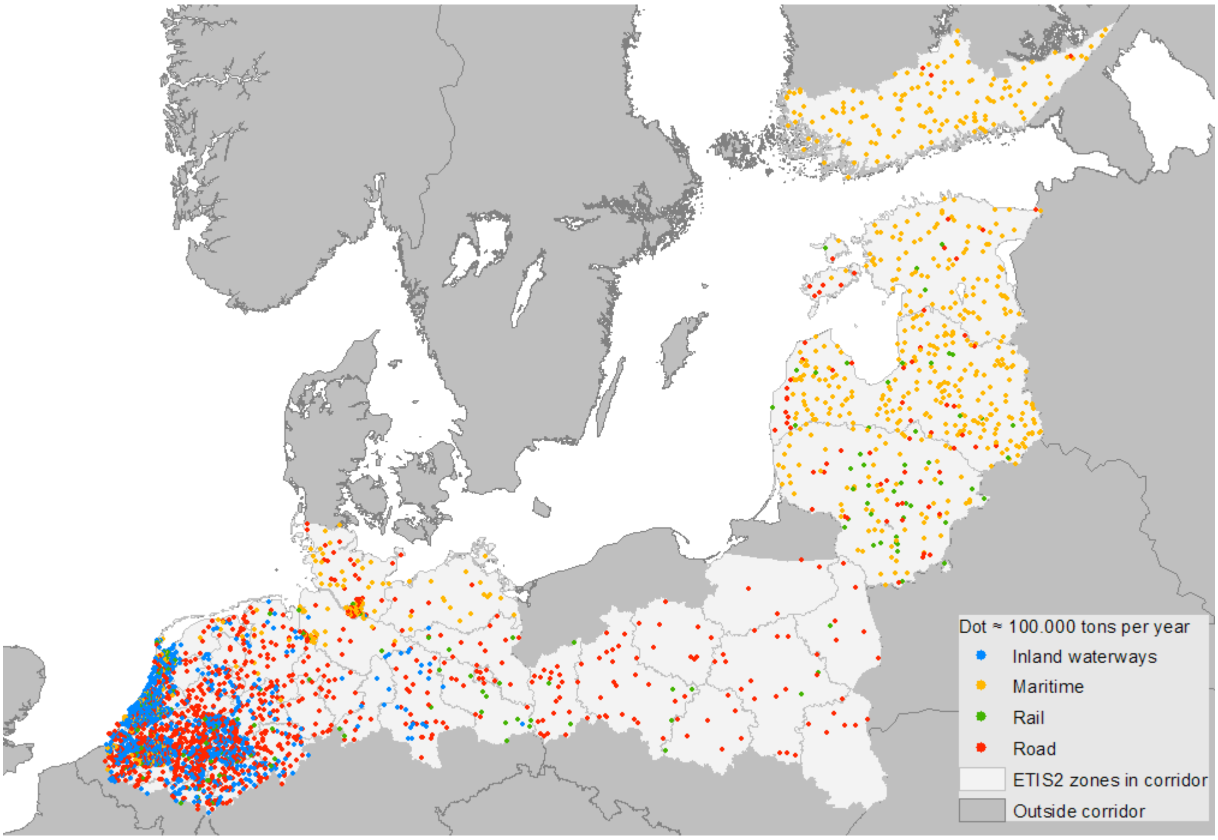
Origins and destinations

The origins and destinations of international freight within the corridor are presented in table 6, which shows the international country-to-country flows in a two-dimensional table.

To / From	FI	EE	LV	LT	PL	DE	NL	BE	Total
FI		1,906	341	88	28	6,223	3,070	2,053	13,710
EE	2,125		1,166	396	71	1,341	6,121	308	11,529
LV	1,351	3,021		1,496	228	5,478	11,045	2,731	25,350
LT	200	2,306	2,103		748	3,109	3,355	892	12,713
PL	50	158	200	1,074		7,418	1,001	515	10,416
DE	4,338	853	1,417	1,765	8,138		50,673	17,935	85,118
NL	1,622	967	726	541	1,564	83,286		55,574	144,280
BE	976	34	91	528	717	17,859	40,433		60,638
Total	10,663	9,244	6,044	5,889	11,494	124,714	115,698	80,008	363,754

Table 6: Corridor level country-to-country total international freight matrix for Road, Rail, IWW, and Short Sea Shipping (x 1,000 net tons in 2010); Source: ETISplus 2010

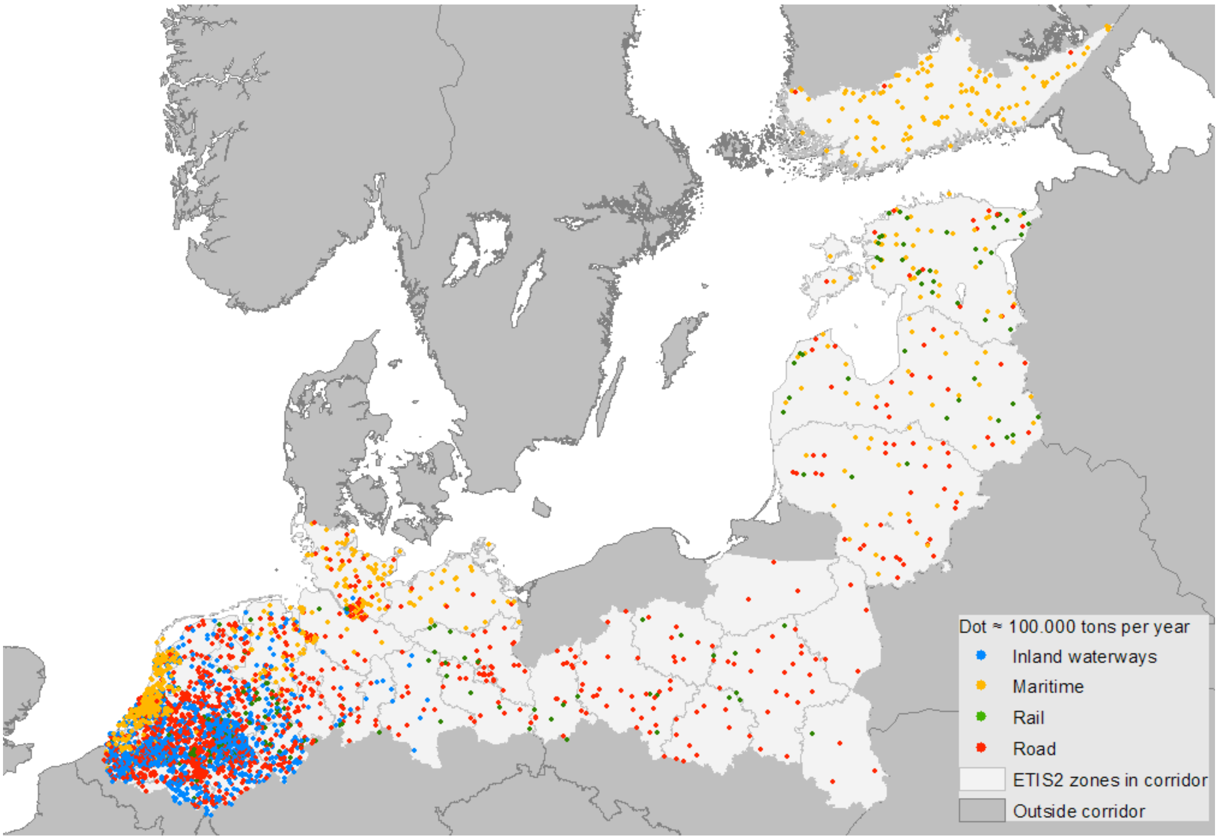
Table 6 shows clearly that international freight flows on the corridor are the most substantial in the western part of the corridor between Germany, the Netherlands and Belgium. International freight flows between the western part (BE, NL, DE) and eastern part (LT, LV, EE, FI) of the corridor are also substantial, however, exceeding the international freight transport volumes within the eastern part of the corridor. Situated in the centre of the corridor, Poland has substantial international transport flows using sections of the corridor to and from Germany.



Remarks: Source: ETISplus2010

Dots are randomly spread within each NUTS2 area and do not necessarily represent actual origins within the area, e.g. maritime transport of course only departs from ports; in the western part of the corridor, dots for different modes may overlap.

Figure 2: Origins of international freight transport flows within the corridor catchment area by transport mode



Remarks:

Source: ETISplus2010

Dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. maritime transport of course only arrives at ports; in the western part of the corridor, dots of different modes may overlap.

Figure 3: Destinations of international freight transport flows within the corridor catchment area by transport mode

Regional distribution along the corridor and analysis by mode

To gain a better insight into the locations of the origins and destinations along the corridor, a breakdown into NUTS2 area-to-area international transport flows was performed. Figures 2 and 3 show the freight origins and destinations along the corridor by mode. These figures provide an important visual insight into the international transport flows along the corridor, confirming the main findings for each country as set out in section 3.1.1. A more detailed insight into each separate country is given in Annex 1 to this report. Annex 1 shows for each country of origin the destinations of international transport flows within the catchment area of the corridor, again by transport mode.

This visualized insight, coupled with the findings from the TMS RFC8, has led to the following key findings by country:

Finland

The dominance of Short Sea Shipping in international freight transport is confirmed. The origins/destinations mainly comprise the ports in Germany (North Sea and Baltic Sea), the Nether-lands, and Belgium.

Estonia

The importance of Short Sea Shipping is confirmed. However, Estonia is also an important destination of rail transport originating from Latvia and Lithuania. Main maritime destinations are the ports in Finland and the Netherlands.

Latvia

Short Sea Shipping is an important mode for freight transport flows to and from Eastern Europe (Russia) and Asia. As a destination, Latvia also accommodates other modes of transport. Similar to Finland, maritime connections are mainly with the ports in Germany (North Sea and Baltic Sea), the Netherlands, and Belgium.

Lithuania

In Lithuania, maritime transport is less dominant than in Finland, Estonia and Latvia, although similar to these countries, there are important maritime links with the ports in Germany (North Sea and Baltic Sea), the Netherlands, and Belgium. Rail transport is important for Lithuania, especially in east-west transit. Road transport to/from PL is intensive while railway volumes between the two countries are low.

Poland

The dominance of road transport is confirmed. There are important freight transport links within the catchment area connecting Poland with all parts of Germany, the Netherlands, Belgium, and Lithuania. Rail destinations are located mainly in the eastern part of Germany. IWW freight transport between Poland and Germany plays a fairly insignificant role.

Germany

Freight transport origins and destinations are located in all parts of the German part of the catchment area, providing a denser picture in the western part of the country. Road, IWW and Short Sea Shipping are the dominant modes. Rail is less important and, according the TMS RFC8, rail freight exports from Germany have declined compared to previous years. Germany has very important freight transport links with the Netherlands and Belgium, with road and IWW being the dominant modes. However, as TMS RFC8 concludes road transport volumes between Germany and the Netherlands have declined in the past few years. Freight transport links to Poland are also important, mainly using road and to a lesser extent rail. Road freight transport between Germany and Poland has increased steadily in recent years. For transport to and from the countries along the Baltic Sea, Short Sea Shipping is, of course, the dominant mode.

Netherlands

The Netherlands has significant freight transport volumes with Germany and Belgium, with IWW and road being the most important modes. Rail transport has a more limited share. The TMS RFC8 concludes however, that rail freight exports from the Netherlands to the other corridor countries have increased steadily since 2009. All statistics presented underline the importance of maritime transport, with the ports of Rotterdam and Amsterdam occupying a dominant position.

Belgium

The findings for Belgium are similar to those for the Netherlands. Rail transport to Germany is more important, although the TMS RFC8 concludes that transport volumes have remained more or less stable since 2005. Transport volumes to Poland have seen a gradual decline during this period. There are, of course, also substantial freight transport links between Belgium and the Netherlands, mainly by road and IWW.

Corridor-related analysis of freight types and shares by mode

The analysis of corridor-related international freight types has been conducted using the NST07 commodity group classification into 10 main types of cargo:

NST07 code	*Description*
0	Agricultural products and live animals
1	Foodstuffs and animal fodder
2	Solid mineral fuels
3	Petroleum products
4	Ores and metal waste
5	Metal products
6	Crude and manufactured minerals, building materials
7	Fertilizers
8	Chemicals
9	Machinery, transport equipment, manufactured articles and miscellaneous articles

Table 7 shows the freight tonnage by commodity type and transport mode. These freight volumes are expressed as percentages in table 8. Tables 7 and 8 have led to a number of important findings:

NST07	IWW	Maritime	Rail	Road	Total
0	2,466	4,683	1,854	12,887	21,890
1	5,841	5,084	426	19,596	30,948
2	13,141	8,672	1,273	982	24,068
3	15,796	24,854	1,518	2,205	44,374
4	19,897	1,924	1,945	2,922	26,689
5	4,215	2,168	1,310	9,510	17,202
6	26,037	2,520	6,618	16,390	51,565
7	1,400	719	1,862	1,589	5,571
8	9,883	11,078	642	18,845	40,448
9	40,710	19,262	1,315	39,726	101,014
Total	139,386	80,965	18,765	124,653	363,768

Source: ETISplus 2010

Table 7: Corridor-related country-to-country international freight transport by commodity group (NST07) and transport mode (x 1,000 tons in 2010)

Expressed in freight tonnage, IWW accounts for the highest volume of international corridor-related freight transport, with road transport following closely. However, as stated earlier, IWW is only relevant for Germany, the Netherlands, and Belgium. Maritime (Short Sea Shipping) transport is also an important mode, which confirms earlier findings in this report.

NST07	IWW	Maritime	Rail	Road	Total
0	11%	21%	8%	59%	100%
1	19%	16%	1%	63%	100%
2	55%	36%	5%	4%	100%
3	36%	56%	3%	5%	100%
4	75%	7%	7%	11%	100%
5	25%	13%	8%	55%	100%
6	50%	5%	13%	32%	100%
7	25%	13%	33%	29%	100%
8	24%	27%	2%	47%	100%
9	40%	19%	1%	39%	100%
Total	38%	22%	6%	34%	100%

Source: ETISplus 2010

Table 8: Share of transport modes in corridor-related country-to-country international freight transport in 2010 by commodity group (NST07)

As regards freight types, it is clear that some transport modes account for a large percentage of transport of certain commodity groups. IWW has a dominant share in the commodity groups 2, 4, and 6. Maritime transport has a dominant share in group 3, with rail transport dominating group 7. Road transport dominates groups 0, 1, and 5. Commodity group 9 comprises dominant shares of IWW and road transport.

This is due to the high degree of specialisation, suitability and efficiency of transport modes in moving particular freight types.

Corridor entry and exit points

Airports and sea ports play a crucially important part as corridor entry and exit points. Many land connections by rail and road crossing the catchment area boundary do as well. However, as it is the only boundary crossing connection being part of the alignment, and the only connection connecting to a non-EU country, the PL-BY Terespol-Brest rail and road border connection is treated as an entry and exit point as well.

Airports

Table 9 shows the total freight volumes and shares of intra-EU freight for the core TEN-T airports along the corridor. Airports are entry and exit points for intercontinental freight and are therefore important for other modes of transport, such as rail and road. Air transport is also an alternative to specific types of intra-EU transport. Intra-EU freight volumes are also shown in table 9. As explained, the share of air freight as a percentage of total freight is very limited.

Country – Airport (Core TEN-T)	**Total freight**	**Of which Intra-EU**
FI - Helsinki-Vantaa	189	64
EE – Tallinn-Lennart Meri	24	8
LV - Riga Intl.	31	10
LT – Vilnius Intl.	14	10
PL – Warsaw-Chopina	63	33
PL – Łódź/Lublinek	0	0
PL – Poznań/Lawica	1	1
DE - Berlin-Tegel/Tempelhof/Schönefeld	31	6
DE – Hannover	16	1
DE - Hamburg	28	3
DE – Bremen	1	0
DE - Cologne-Bonn	730	391
NL - Amsterdam-Schiphol	1,511	100
NL – Rotterdam-The Hague	0	0
BE – Brussels-National	405	123
BE – Liège	510	184

Source: Eurostat 2012

Table 9: Total freight (2012) and total intra-EU freight (2013) originating from core TEN-T airports along the corridor (x 1,000 tons)

Sea ports

Sea ports are crucially important entry and exit points for freight transport from all over the world. They enable hinterland transport by all other modes, including short sea shipping.

Table 10 shows total freight transshipments and the number of containers handled by all core TEN-T ports along the corridor. The table also shows the modal split of hinterland container transport for the major ports.

The North Sea ports of Hamburg, Rotterdam and Antwerp and, to lesser extent, the ports of Amsterdam and Bremen/Bremerhaven handle significant freight volumes. Rotterdam has a dominant position among these ports, although container volumes are more evenly distributed among the ports.

The Baltic Sea ports in Finland, Estonia, Latvia and Lithuania handle less freight, but as noted earlier they play an important role in Short Sea Shipping, which is the dominant mode in international freight transport in these countries.

For the majority of ports, container hinterland transport is mostly by road. In the port of Amsterdam, IWW accounts for the largest share. In Antwerp and Rotterdam, IWW has a large share as well. Rail transport has an important share of container transport handled by the German ports of Hamburg and Bremen/Bremerhaven.

Country – Port (Core TEN-T)	**Total freight (x 1,000 tons)**	**Total containers (x 1,000 TEU)**	**Modal share hinterland container transport**		
			Rail	**Road**	**IWW**
FI - Helsinki	10,800	405			
EE – Tallinn	29,500	650			
LV - Riga	36,000	303			
LV - Ventspils	28,500	-			
LT - Klaipeda	35,000	314			
DE - Hamburg	131,000	8,900	36%	62%	2%
DE – Bremen/Bremerhaven	84,000	6,100	47%	49%	4%
DE - Wilhelmshaven	26,242	26			
NL - Amsterdam	94,300	43	4%	43%	53%
NL - Rotterdam	442,000	11,900	11%	54%	35%
NL - Moerdijk	6,900	1			
BE – Antwerp	184,000	8,600	9%	56%	35%

Sources: port statistics and RFC8 TMS; modal share Amsterdam 2011

Table 10: Freight transhipments (2012) and modal shares of container hinterland transport (2012) at the major core TEN-T ports along the corridor (excluding IWW transhipments)

Land side exit- and entry point: PL-BY Terespol-Brest border

The PL-BY Terespol-Brest border is an important border connection serving transport to and from Belarus and Russia. Refreshed information for the TENtec OMC information system shows that in 2012 9.300.000 tons freight crossed the rail border yearly. The road border crossing at Terespol served around 6.900.000 tons yearly.

Section level volume analysis

This analysis focuses on the transport volumes on sections of the corridor for non-air modes, i.e. Road, Rail and Inland Waterways (IWW). Because no sections were identified for these transport modes along the corridor in Finland, this country is not included in the analysis. The volumes presented are the total transport volumes on the corridor sections, including – contrary to earlier analyses – both domestic and international transport.

The volumes are expressed in annual freight tons for 2012. As stated, this is the best way to compare transport modes on sections along the corridor. Details of the method used to calculate these volumes are given in an earlier section of this chapter. The data sources and the procedure followed to calculate annual freight tonnage by section are set out by country in Annex 2.

The resulting freight tonnages by section are shown for the whole of the corridor and all transport modes in figure 4. More detailed maps of volumes on specific sections of the corridor are included in Annex 3.

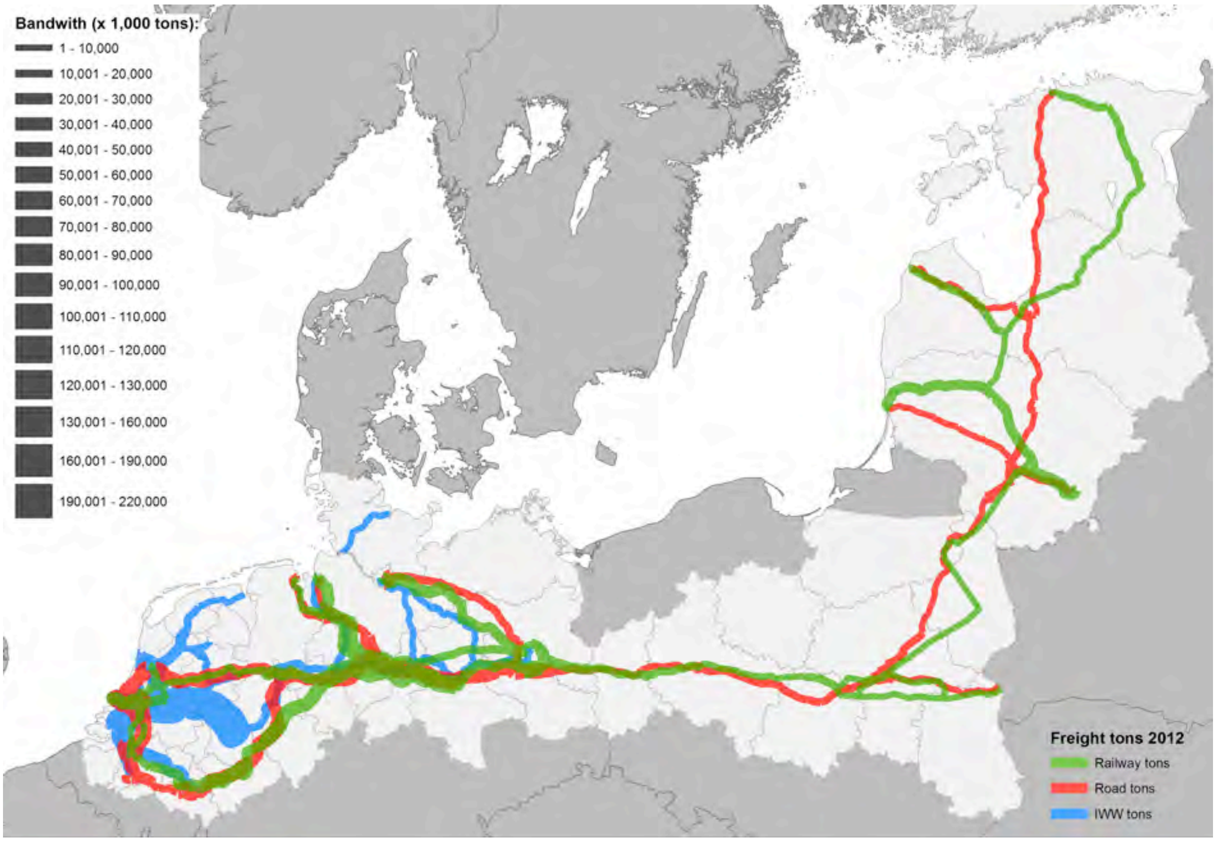


Figure 4: Estimated annual freight volumes (tons/year in 2012) for Road, Rail and IWW.

The analysis of freight tonnage on the different sections in each country have led the following main findings:

Estonia

Compared to other parts of the corridor, volumes are rather low. The rail sections between Tallinn and Tartu show the highest volumes.

Latvia

Compared to other parts of the corridor, the volumes are rather low. The rail sections between Ventspils and Jelgava show the highest volumes.

Lithuania

Higher volumes for both road and rail than in Latvia and Estonia. The Klaipeda-Siauliai-Vilnius rail sections show the highest volumes. As regards road transport, the sections around Kaunas show the highest volumes.

Poland

Low rail volumes between Warsaw and the Lithuanian border. Higher rail volumes between War-saw and the German border. High road volumes in and around Warsaw and between Warsaw and Poznan. Lower road volumes again between Poznan and the German border.

Germany

Generally high volumes for both rail and road. Rail and road have the highest volumes in and around Hannover. The Hamburg and Bremen sections both have higher volumes for rail than for road. In the western part of Germany, the rail sections show slightly higher volumes than the road sections. IWW sections have huge volumes on the Rhine sections, but far lower volumes on other sections.

Netherlands

Significant freight volumes on many IWW sections, with the highest volumes found on the Rhine river branches and the Amsterdam-Rhine Canal. High road volumes are reported for all corridor sections. Rail volumes are considerably lower than road volumes, except for sections of the Betuwe rail freight link. Some important road and rail sections in the eastern part of the Netherlands, i.e. the continuation of the freight-only Betuweline and the A12 and A15 motorways including their continuation in Germany to Duisburg, are not part of the CNC North Sea Baltic but of the CNC Rhine-Alpine. As a consequence volumes on these section have not been included in figure 4 and Annex 3. These sections do however play an important role for transport on the CNC North Sea Baltic as well.

Belgium

High rail volumes on the rail link between Antwerp and the German border. High road volumes near and between Antwerp and Brussels, and around Liège.

Passenger transport

Country level

Trends in total transport volumes 2008-2012 and modal shares, both on a national level, have been determined using Eurostat data. Table 11 shows the trends for all countries.

Country of departure	Year				
	2008	2009	2010	2011	2012
FI	1,295.130	1,324,608	1,325,962	1,367,520	1,308,132
EE	251,667	244,700	239,950	237,900	245,056
LV	513,500	457,532	442,638	417,286	410,563
LT	444,700	424,333	542,143	515,875	531,375
PL	4,400,952	4,803,218	4,653,385	4,980,292	5,194,688
DE	23,530,864	24,151,899	24,375,000	24,158,537	21,844,444
NL	3,684,783	3,772,727	3,560,440	3,609,195	3,965,909
BE	2,971,306	3,022,764	2,972,973	3,016,189	3,225,352

Source Eurostat

Table 11: Total annual passenger transport flows in pax (x 1,000) by country from 2008 to 2012

Based on table 11, the main finding on a national level is that there are key differences in trends and modal shares between the countries along the corridor. Latvia has shown a remarkably steady decline in total passenger numbers, most probably related to the economic recession during the period 2008-2012. In contrast, Poland and Lithuania have reported steady increases. Other countries have shown either a slight increase or decline or a fairly stable trend.

Country of departure	Mode				
	Total	Rail	Road	Air Intra- EU	Bus/Coach/ Tram/Underground
FI	1,308,132	69,331	1,110,604	5,049	128,197
EE	245,056	4,411	204,866	872	35,778
LV	410,563	19,707	315,723	1,669	75,133
LT	531,375	4,251	483,551	1,348	43,573
PL	5,194,688	249,345	4,394,706	7,727	555,832
DE	21,844,444	1,966,000	18,655,156	44,933	1,245,133
NL	3,965,909	349,000	3,497,932	16,343	118,977
BE	3,225,352	229,000	2,593,183	8,760	399,944
Total for 8 countries	36,725,519	2,891,045	31,255,721	86,701	2,602,567

Source: Eurostat

Table 12: Passenger transport flows (pax/year x 1,000) by mode and by country in 2012 (not including pedestrian traffic and cycling)

The modal share of each transport mode has been determined on a national level for 2012. Table 12 shows the total number of passengers by mode. Table 13 shows the relative share of each mode. These tables do not include pedestrian traffic and cycling, because they obviously offer no feasible alternative in international passenger transport. The same argument applies to Tram and Under-ground. However, non-rail public transport modes have in Eurostat been reported including these modes.

Country of departure	Mode				
	Total	Rail	Road	Air Intra-EU	Bus/Coach/ Tram/Underground
FI	100%	5%	85%	0%	10%
EE	100%	2%	84%	0%	15%
LV	100%	5%	77%	0%	18%
LT	100%	1%	91%	0%	8%
PL	100%	5%	85%	0%	11%
DE	100%	9%	85%	0%	6%
NL	100%	9%	88%	0%	3%
BE	100%	7%	80%	0%	12%
Total for 8 countries	100%	8%	85%	0%	7%

Source: Eurostat

Table 13: Modal split of passenger transport flows by mode and by country in 2012 (not including pedestrian traffic and cycling)

Table 13 shows very clearly that, on a national level, road transport is the dominant mode for passenger transport. The share of other modes differs substantially between the countries analysed. Latvia and Estonia have a high share of bus transport. Rail transport accounts for substantial shares in Germany and the Netherlands. Expressed in passenger numbers, passenger transport by air has no relevant share.

Corridor-related international passenger transport flows

This section analyses corridor-related cross-border passenger transport flows. The analysis only takes into account transport that potentially uses the infrastructure along the corridor, which means that it only includes transport within the catchment area that cross at least one international border. The methodology underlying the analyses and the definition of the catchment area are explained in earlier sections of this chapter.

Corridor-related demand and mode shares

Table 14 shows the corridor-related international passenger transport flows in a way similar to earlier analyses on a national level and by country (including domestic flows). The shares of modes are shown in table 15.

Loading Country	Mode				
	Total	Rail	Road	Air	Bus/Coach
FI	1,281	2	739	539	0
EE	620	12	288	148	172
LV	1,460	39	582	318	521
LT	1,635	109	780	194	552
PL	1,620	96	766	482	276
DE	18,157	1,422	15,557	1,054	124
NL	15,492	947	13,734	767	44
BE	9,278	478	8,358	401	41
Corridor area	49,543	3,106	40,804	3,903	1,730

Source ETISplus 2010

Table 14: Corridor-related international passenger transport flows (pax x 1,000) by mode and by country in 2010

The total number of international passengers within the corridor catchment area in 2010 is estimated at over 49 million passengers, which is less than 1% of the total estimated demand in the catchment area (including domestic flows). In line with the analysis findings on a national level, road has the highest share of passenger transport, followed by Air, Rail and Bus/Coach. However, in countries situated in the central and eastern parts of the corridor, Air and Bus/Coach have a significant share of international passenger transport.

Country of departure	Mode				
	Total	Rail	Road	Air	Bus/Coach
FI	100%	0%	58%	42%	0%
EE	100%	2%	46%	24%	28%
LV	100%	3%	40%	22%	36%
LT	100%	7%	48%	12%	34%
PL	100%	6%	47%	30%	17%
DE	100%	8%	86%	6%	1%
NL	100%	6%	89%	5%	0%
BE	100%	5%	90%	4%	0%
Corridor area	100%	6%	82%	8%	3%

Source ETISplus 2010

Table 15: Modal split of corridor-related international passenger transport flows by country in 2010

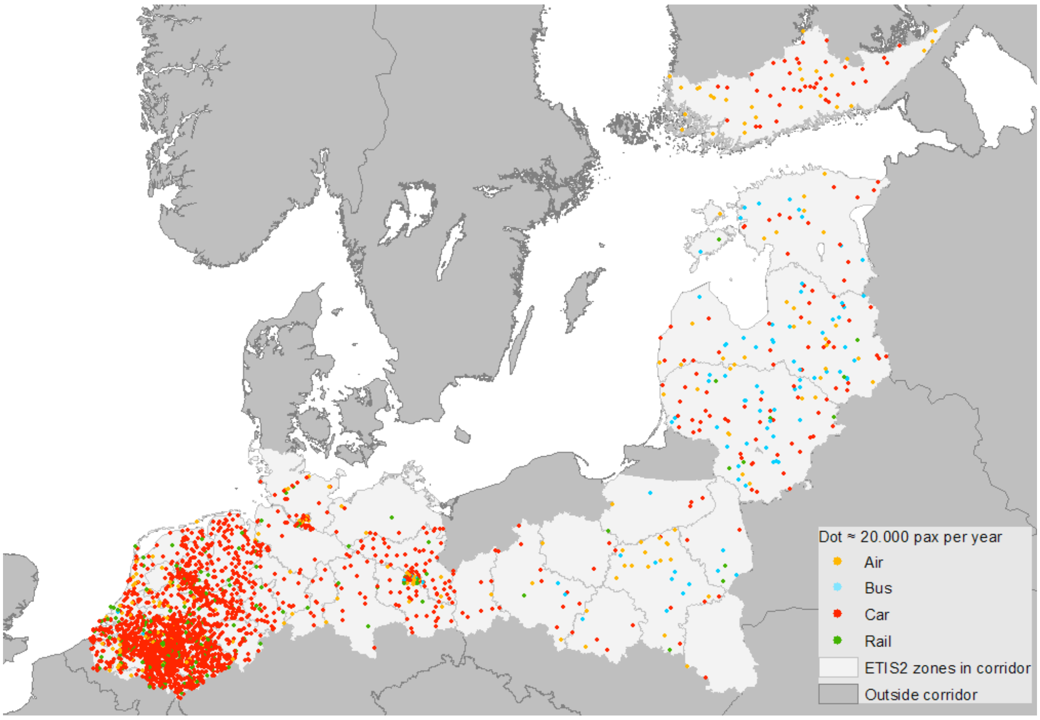


Figure 5: Origins of international passenger transport flows within the corridor catchment area by transport mode (2010)

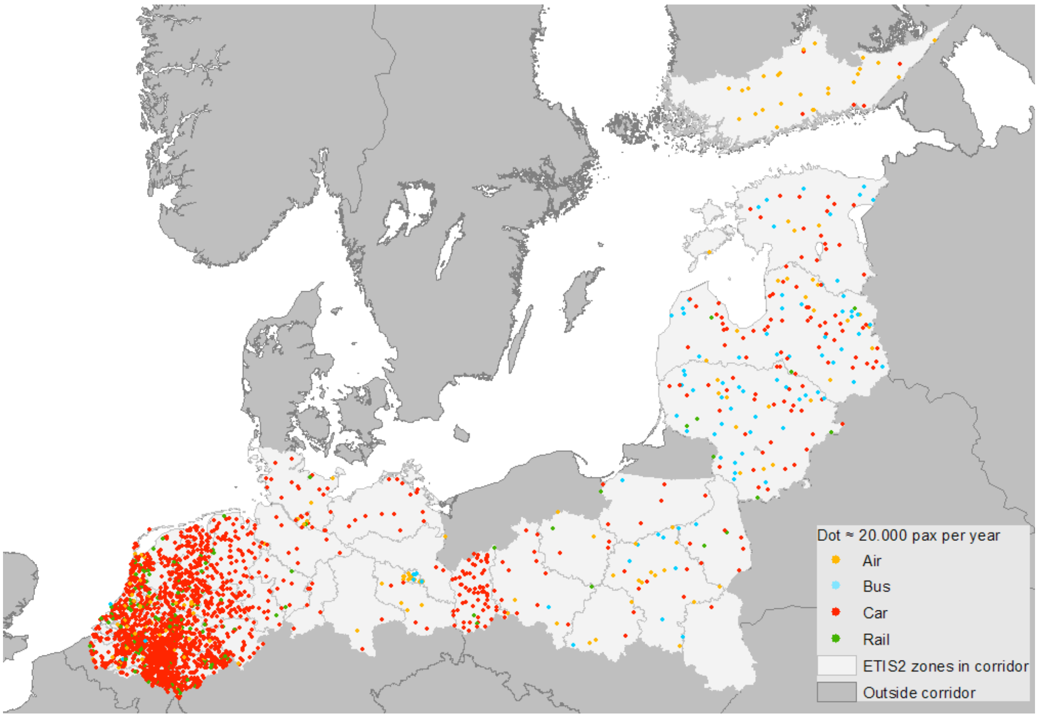


Figure 6: Destinations of international passenger transport flows within the corridor catchment area by transport mode (2010)

Remarks, both maps Source: ETISplus2010; Dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. air transport of course only arrives at airports; in the western part of the corridor, dots of different modes may overlap.

Origins and destinations

The origins and destinations of international passenger flows within the corridor are presented in table 16, which shows international country-to-country flows (excluding domestic flows) in a two-dimensional table.

Table 16 shows that corridor-related passenger transport volumes are the highest between Germany, the Netherlands and Belgium. As can be expected, countries will have the strongest passenger transport links with neighbouring countries.

To / From	FI	EE	LV	LT	PL	DE	NL	BE	Total
FI		304	281	94	106	272	146	78	1.281
EE	119		324	74	33	36	25	8	620
LV	74	212		876	99	102	60	36	1.460
LT	34	76	995		392	92	27	20	1.635
PL	33	14	57	286		800	268	161	1.620
DE	188	29	102	84	2.066		12.296	3.393	18.157
NL	105	17	59	24	215	7.105		7.966	15.492
BE	65	8	44	19	152	3.116	5.873		9.278
Total	620	660	1,863	1,458	3.064	11.522	18.695	11.662	49.543

Source: ETISplus 2010

Table 16: Total corridor-related country-to-country international passenger transport flows for Road, Rail, Air and Bus/Coach (pax/year x 1,000 in 2010)

Regional distribution along the corridor and analysis by transport mode

To gain a better insight into the locations of origins and destinations along the corridor, a break-down into NUTS2 area-to-area international transport flows has been performed. Figures 5 and 6 show the passenger origins and destinations, respectively, along the corridor by mode. More de-tailed information for each separate country is given in Annex 4 to this report. The annex shows for each country of origin the destinations of international transport flows within the catchment area of the corridor, again by transport mode.

Corridor entry and exit points

Airports are important corridor entry and exit points. Table 17 presents the total passenger numbers and intra-EU passenger numbers for core TEN-T airports along the corridor. Airports are the entry and exit points of intercontinental freight and are therefore important feeders for other modes, such as rail and road. Air transport also offers an alternative to particular intra-EU links.

Amsterdam Schiphol International airport is the largest airport within the corridor area. However, as stated, airports in the eastern and central parts of the corridor, in particular, have a significant share of total international passenger numbers in these countries.

Country – Airport (Core TEN-T)	Passenger numbers	Of which Intra-EU
FI - Helsinki-Vantaa	14,874	8,563
EE – Tallinn-Lennart Meri	2,203	1,710
LV - Riga Intl.	4,777	3,311
LT – Vilnius Intl.	2,213	1,802
PL – Warsaw-Chopina	9,606	5,506
PL – Łódź/Lublinek	463	399
PL – Poznań/Lawica	1,560	1,105
DE - Berlin-Tegel/Tempelhof/Schönefeld	25,282	11,699
DE – Hannover	5,311	2,557
DE - Hamburg	13,716	5,417
DE – Bremen	2,453	1,322
DE - Cologne-Bonn	9,300	4,001
NL - Amsterdam-Schiphol	51,108	28,393
NL – Rotterdam-The Hague	1,265	1,138
BE – Brussels-National	19,071	11,510
BE – Liège	296	128

Source: Eurostat 2012

Table 17: Total number of passengers (2012) and total number of intra-EU passengers (2013) departing from core TEN-T airports along the corridor (pax/year x1,000)

Land side exit- and entry point: PL-BY Terespol-Brest border

The PL-BY Terespol-Brest border is an important border connection serving transport to and from Belarus and Russia. Refreshed information for the TENtec OMC information system shows that in 2012 3.000.000 passengers crossed the rail border yearly. The road border crossing at Terespol served around 1.400.000 passengers yearly.

Section level volume analysis

This analysis focuses on passenger numbers in corridor sections for land-related modes, i.e. Road and Rail. No specific section volumes are available for Bus/Coach. These are, to a certain extent, included in the passenger numbers by road, based on total car traffic volumes.

Because no sections were identified for these transport modes along the corridor in Finland, this country is not included in the analysis. The volumes presented comprise the total number of passengers on the corridor sections, including – contrary to earlier analyses – both domestic and international transport.

The volumes are expressed as annual passenger numbers (pax) in 2012. As stated, this is the best way to compare transport modes on certain sections of the corridor. The method used to calculate the volumes is explained in an earlier section of this chapter. The data sources and the procedure followed to calculate passenger numbers are set out by country in Annex 2.

The resulting passenger numbers by section are shown for the entire corridor and for all transport modes in figure 7. More detailed maps of passenger numbers by section for particular parts of the corridor are included in Annex 5.

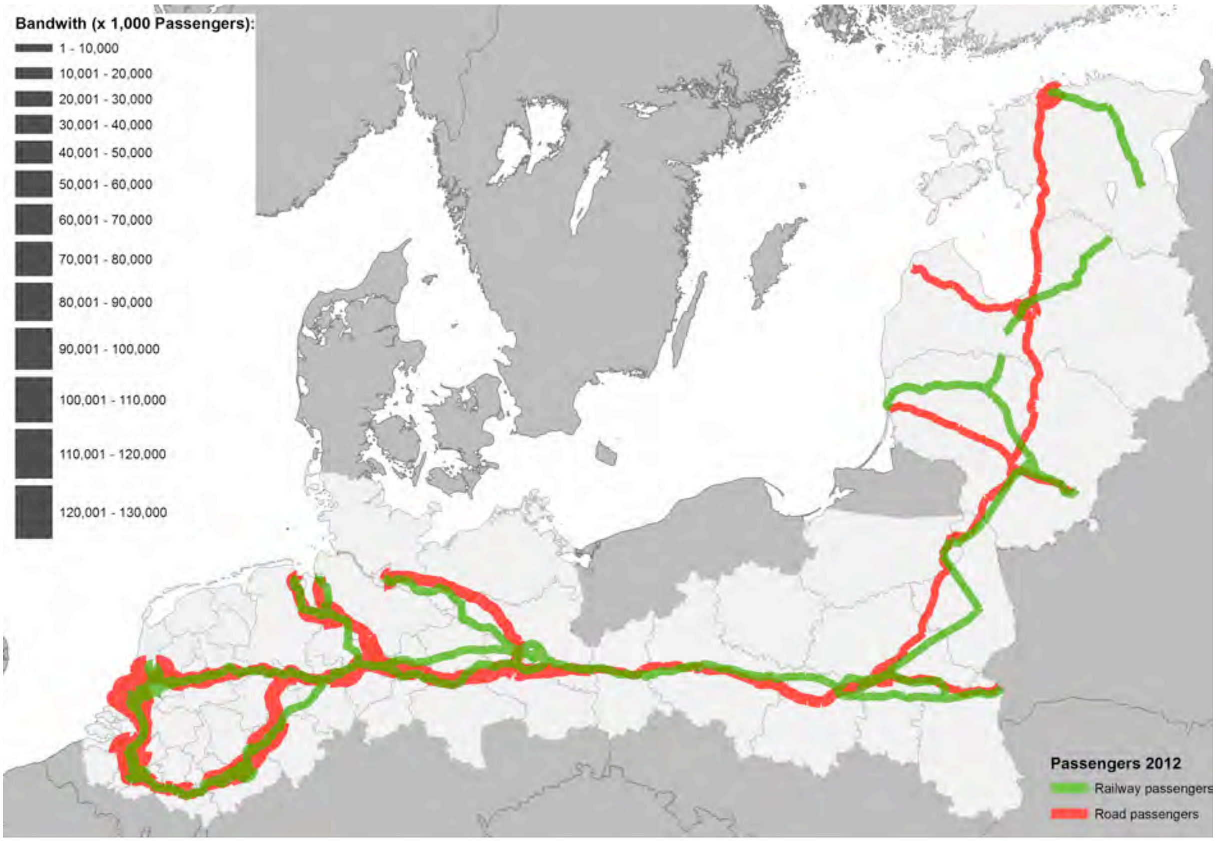


Figure 7: Estimated passenger numbers (pax/year 2012) by section for Road and Rail

The main findings of the analysis of passenger numbers by section for each country are as follows:

- In all parts of the corridor, road passenger numbers are considerably higher than on parallel rail sections.
- Border crossings have significantly lower passenger numbers than sections further inland. This is true for all border sections within the corridor.
- In the eastern part of the corridor, passenger numbers are relatively low. Passenger numbers are higher on the road sections around the cities of Tallinn, Riga, and Kaunas. Rail passenger numbers are rather low.
- In the central Polish part of the corridor, passenger numbers tend to be higher, especially between Warsaw and Poznan. Road passenger numbers are higher around both cities. Rail passenger numbers are still relatively low compared to the western part of the corridor.
- Road passenger numbers are high around Berlin and further west on all road sections that are part of the corridor. Rail passenger numbers are much lower, but there are several

intensively used sections, notably in the western part of the Netherlands and around other major Dutch cities.

Analysis of future demand

Introduction

This chapter looks at the future demand for freight and passenger transport. Only long-term forecasts for 2030 have been performed for rail, road (both freight and passenger transport) and IWW (only freight transport) sections along the corridor. All Proximare partners have collected section forecasts, which were made available or estimated on a national level taking into account the construction of future infrastructure projects that have already been decided on, and national policies on individual transport modes. As for the analysis of current demand, forecasts were made available in terms of freight volumes (tons/year/section) and passenger numbers (pax/year/section). We have made as much use as possible of the forecast data available on a national level. Because no forecasts for 2030 were available in some countries, these forecasts are based in part on historical trends. The data sources used and the procedure followed are set out for each country and each mode in Annex 2, for both the freight and passenger transport forecasts. Conflicting volumes on border sections have been smoothed out on one or either side of the border so as to ensure a continuous and justifiable forecast. In most cases, however, the national forecasts for border sections already provided a relatively continuous view.

In some cases, the findings in this phase of the study may lead to the conclusion that further re-search is required to be able to confirm the plausibility of these forecasts. In some cases, we have already identified this need in the forecast analysis for each country separately.

Freight transport

Socio-economic outlook

Because socio-economic factors are basic indicators for the future development of overall freight transport demand, trends in modal split, and traffic distribution across adjacent transport corridors, this section specifically focuses on these factors and will refer to findings in TMS RFC8, which is based on extensive research. However, these findings have been supplemented with our own research findings for the countries that were no part of the TMS RFC8, i.e. Latvia, Estonia and Fin-land.

GDP growth over the forecast period has been analysed for all countries within the corridor area, based on forecasts from international economic and financial organisations and relevant national sources. TMS RFC8 used different sources (EU, IMF, UNECE). We also tapped other sources, such as the OECD and the website tradingeconomics.com.

All of these sources point to virtually similar trends for the coming five-year period. After stagnating or even declining in 2012/2013, annual real GDP growth rates are expected to increase only moderately. Expected growth rates in the eastern part of the corridor are higher than those in the west. As concluded in TMS RFC8, from a long-term perspective, differences in expected GDP growth and population growth between the corridor countries do exist, as shown in Table 18.

	Potential GDP	Population
FI	+2.0%	+0.3%
EE	+2.8%	+0.0%
LV	+3.4%	-0.6%
LT	+2.9%	-0.1%
PL	+2.2%	+0.0%
DE	+1.1%	-0.6%
NL	+2.1%	+0.2%
BE	+2.0%	+0.4%

Table 18: Expected average annual percentage change 2014-2030 in total economy potential output. Sources: OECD Economic Outlook, Volume 2014/1, Chapter 4; for Latvia and Lithuania, http://www.tradingeconomics.com

TMS RFC8 concludes from a literature review that many studies predict a moderate increase in freight transport by 2020. Most projections foresee higher growth in rail freight transport, driven by a reduction in transport costs and lower capacity constraints compared with road haulage. Furthermore, bulk freight transport will increase at higher rates than high-value goods transport. Also, international rail freight transport will increase faster than national freight flows. Based on these assumptions and forecasts, rail transport as a percentage of freight modal split is expected to increase over the next few years. Based on the literature review, TMS RFC8 states the following general (not specifically corridor-related) growth rates for freight transport between 2012 and 2020: Road 14%, Rail 27%, IWW 22% and Maritime 28%.

Most of the studies also expect higher growth rates in Central and East European countries.

The considerations set out above were not used directly in the section level volume forecasts. However, the TMS RFC8 long-term predictions on the number of freight trains in 2025 were used as a benchmark for the rail section forecasts of tons transported in 2030, and economic parameters for future growth were included in the different national forecasts used.

Section volume forecasts

This analysis looks at the volumes of transport on corridor sections by non-air transport modes, i.e. Road, Rail and Inland Waterways (IWW), in 2030. A similar analysis for 2012 is set out in an earlier section of this chapter. These volumes represent total freight transport flows on corridor sections, and include both domestic and international transport.

The forecast volumes are expressed in freight tonnage per year. The methodology, which has been followed to establish the volumes, is explained in an earlier section of this chapter. The data sources used and the procedure followed to establish the 2030 freight tonnage forecast by section are explained in Annex 2.

The freight tonnages by section for 2030 for the whole of the corridor and all transport modes are shown in Figure 8. More detailed maps of section volumes for 2030 and estimated changes for 2012-2030 for parts of the corridor are included in Annex 3.

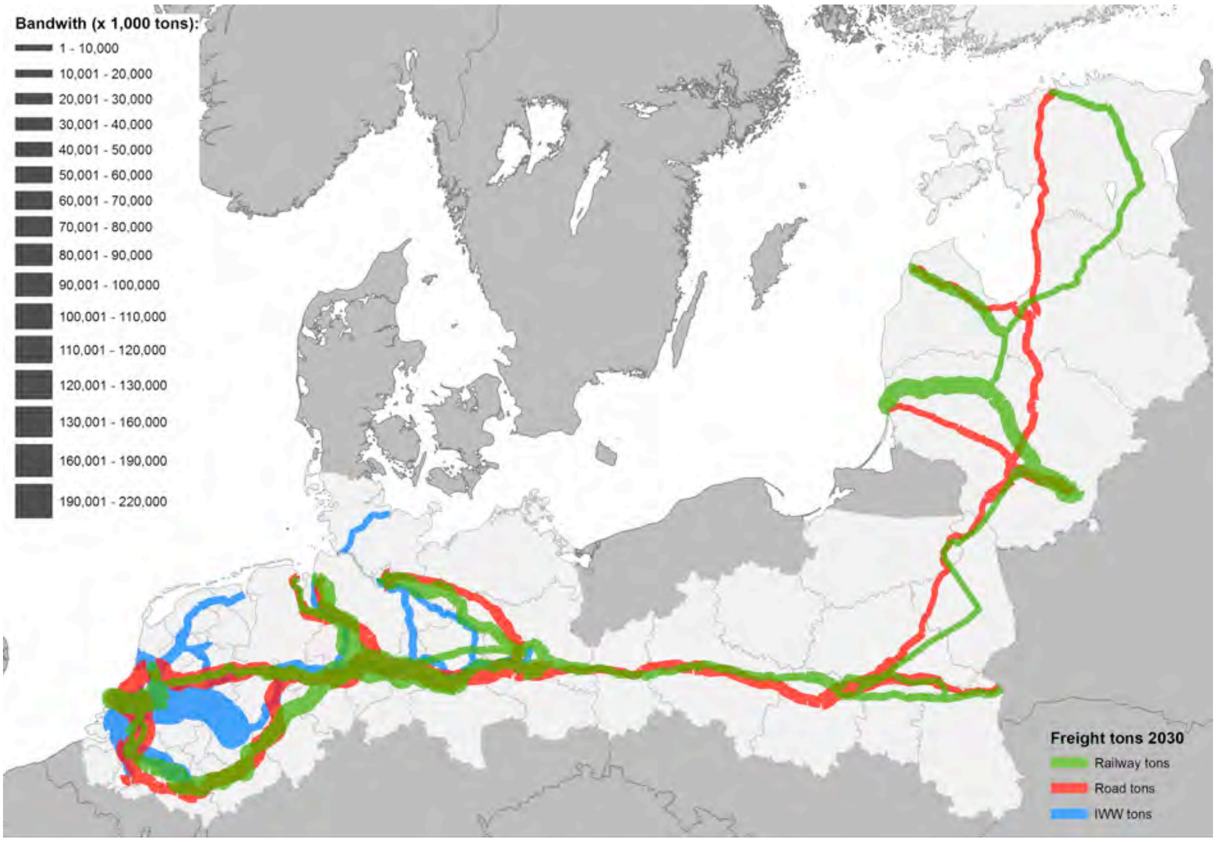


Figure 8: Estimated freight transport volumes by section (tons/year in 2030) for Road, Rail, and IWW.

The 2012 and 2030 freight tonnages by section have been used to estimate freight transport development as expressed in the number of tonkilometres. The results are presented in Table 19.

	2012			2030			Change 2012-2030		
	Road	Rail	IWW	Road	Rail	IWW	Road	Rail	IWW
EE	836	1,163		1,218	1,422		+46%	+22%	
LV	1,443	1,139		2,466	1,512		+71%	+33%	
LT	6,600	4,043		8,256	8,389		+25%	+108%	
PL	9,193	5,530		16,765	7,048		+82%	+27%	
DE	39,116	92,934	19,536	53,953	112,965	23,273	+38%	+22%	+19%
NL	14,080	6,101	39,112	20,587	11,672	45,969	+46%	+91%	+18%
BE	8,475	7,467	4,982	9,903	18,417	8,196	+17%	+147%	+64%
Corridor	79,744	118,376	63,630	113,149	161,426	77,438	+42%	+36%	+22%

Table 19: Total usage of corridor sections for freight transport by mode (Road, Rail, IWW) in 2012 and 2030 (tonkilometres/year x 1,000,000)

As illustrated in Table 19, growth in the use of the corridor infrastructure between 2012 and 2030 varies substantially between countries and between transport modes. For the corridor as a whole, the share of rail in total tonkilometres is highest, both in 2012 and 2030. However, the highest growth rate is expected for road haulage. Rail and IWW have lower expected growth rates. Growth rates in the central and eastern parts of the corridor are generally higher for road than for the other modes. Rail transport and IWW show different growth rates across the corridor.

The main findings of the analysis of freight volumes in 2030 compared with the volumes in 2012 for each country are as follows:

Estonia

Outside Tallinn, high freight growth rates are expected for road corridor sections in southward direction. Rates are lower around Tallinn, where freight tonnage is already at a high level today. Compared to road sections lower freight growth rates are expected for rail corridor sections.

Latvia

High freight growth rates are expected for road corridor sections, in particular around Riga and southward to Lithuania. Lower freight growth rates are expected for rail corridor sections. The Ventspils-Riga rail connection shows highest expected growth volumes.

Lithuania

Medium freight growth rates are expected for road and high growth rates for rail corridor sections. Highest growth for road transport is expected around Kaunas, Vilnius and from Kaunas to the Polish border. Concerning rail sections the Klaipeda-Siauliai-Vilnius rail connection shows highest growth volumes. The operationalisation of Rail Baltica could increase rail volumes between LT and PL and at the same time decrease high road transport volumes.

Poland

In Poland, medium freight growth rates are expected for many rail sections. Growth in volumes on rail sections is expected highest in central and eastern parts of Poland and lower towards the German border. Some rail sections show declines in volumes which needs further research for explanations. High growth rates are expected for most corridor road sections.

Germany

In Germany, compared with eastern parts of the corridor, lower freight growth rates are expected for both rail and road corridor sections. However, road and rail were already extensively used in 2012 and as a result the total expected growth will be substantial for both road and rail. Expected growth rates for IWW on corridor sections are lower but total growth will still be substantial.

The Netherlands

In the Netherlands, expected freight growth rates for corridor road sections are lower compared to the eastern parts of the corridor. As road sections are already extensively used in 2012 the total ex expected growth will still be substantial. Some sections show declining freight volumes. This is partly due to the expected construction of a new section of the A4 motorway between Delft and Rotterdam, which although not part of the corridor alignment, will reduce traffic on the parallel A13 motorway which is a part of the corridor alignment. Expected growth rates for rail freight transport are higher than for road. Although lower IWW growth is expected the total growth of IWW transport will be substantial as IWW has a significant share in freight transport in 2012 already.

Belgium

In Belgium, compared with eastern parts of the corridor, relatively lower freight growth rates are expected for road corridor sections. As concluded for Germany and the Netherlands road sections are already extensively used in 2012 the total expected growth will still be substantial. Some sections show declining volumes which needs further research for explanations. The expected number of rail freight tonkilometres is expected to show very high growth rates, as the TMS RFC8 expects a very substantial increase until 2025 in the number of freight trains using the Montzen line connecting Antwerp with Aachen. The Port of Antwerp (Stufenkonzept Study, 2014) expects the number of freight trains to be in 2030 even higher. High growth rates are expected for the Belgium IWW corridor sections as well.

Impact of Rail Baltica

Given that the Rail Baltica project is not included in the regular rail freight forecast for 2030, and the project is expected to have a far-reaching impact on several Baltic countries along the corridor, its impact on rail freight volumes has also been assessed. To do so, we used the expected number of freight trains as stated in the Rail Baltica study reports. The ‘red’ Option 1 with a complete new alignment was analysed for this purpose because this option will have the greatest impact in terms of expected freight tonnage.

Freight tonnage on new Rail Baltica sections is expected to exceed 13 million tons/year on many sections of the new connection. Existing parallel rail sections will, of course, have lower volumes as a result.

Passenger transport

Section volume forecasts

This analysis looks at the passenger transport volumes on corridor sections for non-air transport modes, i.e. Road and Rail, in 2030. A similar analysis for 2012 is set out in an earlier section of this chapter. These volumes represent total passenger transport flows on corridor sections, and include both domestic and international transport.

The forecast volumes are expressed as passenger numbers per year per section. The methodology used to establish the volumes is explained in an earlier section of this chapter. The data sources used and the procedure followed to establish the passenger numbers by section forecast for 2030 are explained in Annex 2.

The resulting passenger numbers by section for 2030 for the whole of the corridor and for both modes are shown in Figure 9. More detailed maps of section volumes in 2030 and the estimated changes in 2012-2030 for parts of the corridor are included in Annex 3.

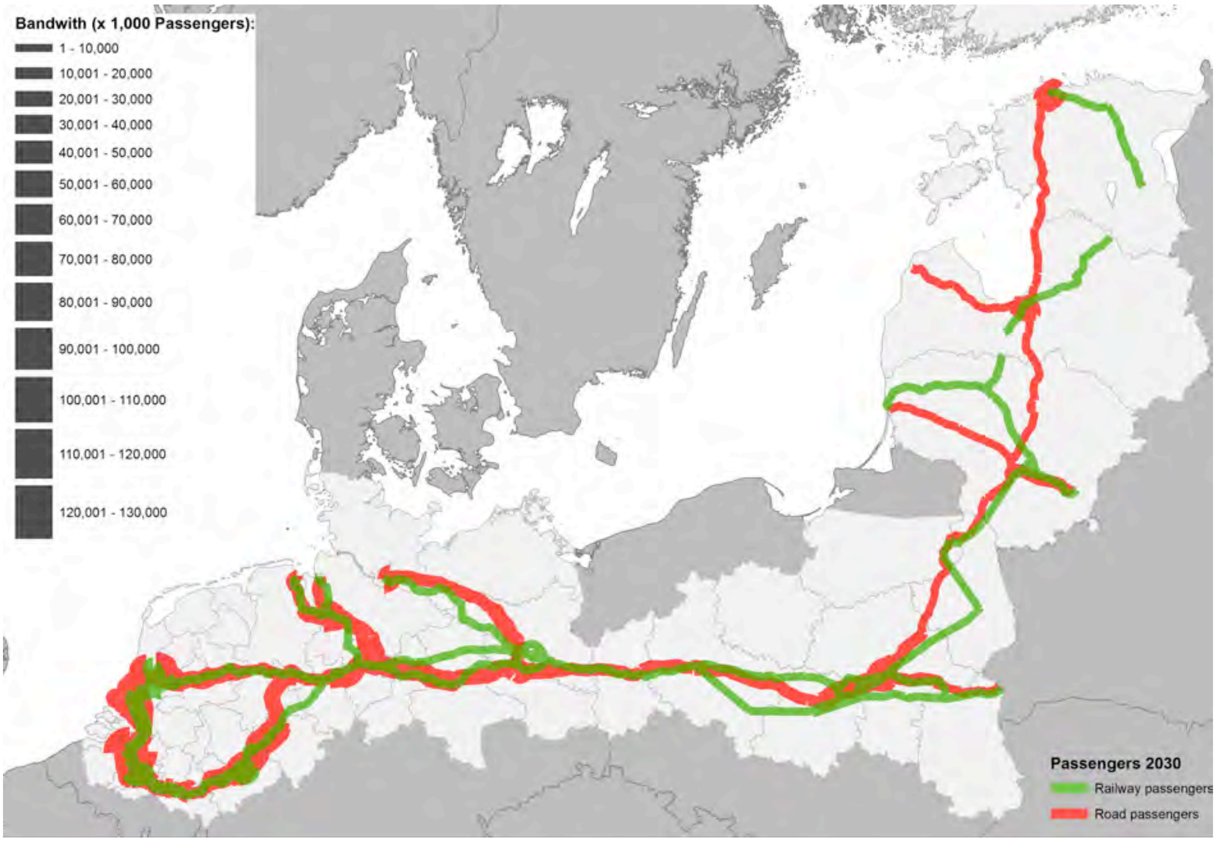


Figure 9: Estimated passenger transport volumes by section (pax/year in 2030) for Road, Rail, and IWW.

The passenger numbers in 2012 and expected passenger numbers in 2030 have been used to estimate the development of passenger transport as expressed in the total number of passengerkilometres on corridor sections. The results are presented in Table 20.

	2012		2030		Change 2012-2030	
	Road	Rail	Road	Rail	Road	Rail
EE	1,690	11	2,232	42	+32%	+264%
LV	955	117	1,575	144	+65%	+24%
LT	2,685	133	3,042	236	+13%	+77%
PL	7,488	2,014	14,809	2,808	+98%	+39%
DE	33,613	9,332	38,120	10,750	+13%	+15%
NL	11,446	5,488	12,300	7,315	+7%	+33%
BE	6,431	4,560	7,995	7,621	+24%	+67%
Corridor	64,309	21,656	80,073	28,917	+25%	+34%

Table 20: Total usage of corridor sections for passenger transport by mode (Road, Rail) in 2012 and 2030 (passengerkilometres/year x 1,000,000);

Similar to freight transport, the growth rates found vary substantially between countries and between the two modes. For the corridor as a whole, the growth rate for rail exceeds the growth rate for road. However, total number of passengerkilometres is substantially lower for rail. As can be expected, road growth rates are higher in the central and eastern parts of the corridor. As for the use of rail, higher rates are also expected for passenger transport in the western part of the corridor.

The main findings of the analysis of passenger volumes in 2030 compared with those in 2012 for each country are as follows:

Estonia

In Estonia, very high passenger growth rates are expected on sections of the Tallinn-Tartu railway line. However, volumes on this line are currently relatively low and total growth volumes will still be limited to other corridor parts. Medium-high growth in passenger numbers are expected on road sections. Growth on road sections is expected to be highest around Tallinn.

Latvia

In Latvia, expected growth rates of passenger numbers on road sections are higher than in Estonia. Highest growth is expected near around Riga. Growth rates for rail passenger transport are lower than in Estonia.

Lithuania

In Lithuania, expected growth rates for road are lower than in Latvia and Estonia. Highest growth rates on road sections are around Kaunas. Rail sections show high growth rates with limited growth in volumes on the rail connection to Poland. However, as applies to all three Baltic States, the operationalisation of Rail Baltica could gradually induce a strong modal shift from road to rail. Other external factors, e.g. SECA regulation, could even support the development.

Poland

In Poland, expected growth rates of passenger numbers on corridor sections are high for road, but moderate for rail. Highest growth of road volumes are expected to occur around Warszawa and to a lesser extent around Poznan.

Germany

In Germany, the existing high volumes of passengers on both road and rail sections of the corridor are expected to increase slowly and relatively low growth rates are expected for both modes. Growth will be highest on road sections around Hannover, Berlin, Bremen and Cologne.

The Netherlands

In the Netherlands, relatively low growth rates are expected for corridor road sections. This is partly due to the expected construction of a new section of the A4 motorway between Delft and Rotterdam, which although not part of the corridor alignment will reduce traffic on the parallel A13 motorway, which is a part of the corridor alignment. Total growth of road passenger volumes will be highest around Amsterdam and Rotterdam. Expected growth rates for rail passenger transport are higher than for road with highest total growth to be expected on the Amsterdam-Utrecht and Rotterdam-Breda-Antwerp rail sections.

Belgium

In Belgium, growth rates for passenger transport are expected to be higher than in the Netherlands, for both road and rail. Highest total growth of road passenger volumes is expected to occur around Brussels and between Brussels and Antwerp. Highest growth of rail volumes occur on sections around Brussels and from Antwerp to the Netherlands.

Impact of Rail Baltica

Given that the Rail Baltica project is not included in the regular rail passenger forecast for 2030 and the project is expected to have a far-reaching impact on several Baltic countries along the corridor, its impact on rail freight volumes has also been assessed. To do so, we used the expected number of passenger trains as stated in the Rail Baltica study reports so as to estimate passenger numbers per section. The 'red' Option 1 with a complete new alignment was chosen for this purpose because this option will have the greatest impact in terms of expected passenger volumes.

Passenger numbers on some sections of the new Rail Baltica rail link are expected to exceed 2 million pax/year. Existing parallel rail sections will, of course, have lower volumes as a result.

Analysis of current and future supply

Introduction

In general, infrastructure capacity can be defined as the maximum amount of traffic that the infrastructure is able to manage or handle. This implies that technical conditions will determine the maximum capacity. However, in freight transport, maximum capacity in reality may also depend on qualitative infrastructure conditions and administrative bottlenecks. A lack of infrastructure or the existence of bottlenecks will certainly influence freight transport flows.

In passenger transport, modal choice is predominantly determined by journey times. The cost of transport is a secondary argument as the price differences between transport modes are smaller and there is less difference in the judgement of the value of time between passengers. This is why the supply-side analysis of passenger transport focuses purely on current travel times per mode. This provides an insight into the most favourable and less favourable transport modes within the corridor catchment area.

Freight transport

Road

The supply analysis for road transport addresses two main issues: congestion and missing links. Congestion is the main issue in the western part of the corridor even though the Regulation's technical requirements are met. Congestion is also a daily phenomenon near major cities in other parts of the corridor, due in part to the fact that the infrastructure requirements are still not met.

Lower growth rates for road transport are expected in the western part of the corridor for the period up to 2030. However, as volumes have already reached high levels here and many sections are already full to capacity, a further increase in congestion is to be expected.

In the central and eastern parts of the corridor, expected growth rates are substantially higher and the need to remove bottlenecks has been identified so as to meet the Regulation's requirements. A major bottleneck is the Via Baltica, which should connect Poland with Finland via Lithuania, Latvia and Estonia.

Rail

We have reviewed several studies that examined existing capacity and identified potential network capacity issues:

- RFC8 (BE/NL/DE/PL/LT)
- National Market and Capacity Analysis (*Nationale Markt en Capaciteitsanalyse* (NMCA Rail, NL)
- Flemish and Wallonian strategic rail documents (BE)
- Aktualiziertes Stufenkonzept (BE/DE)
- Bundesverkehrswegeplan (BVWP, DE)
- Rail Baltica (PL/LT/LV/EE/FI)
- Baltic Transport Outlook 2030 (PL/LT/LV/EE/FI)

TMS RFC8 has identified the following major obstacles to and opportunities for rail transport:

- The further integration of EU legislation into national legislation, which is still an obstacle in certain countries, will help increase rail freight traffic along the corridor.
- The introduction of a Corridor One-Stop-Shop for Rail Freight Corridor 8 may contribute to improving the competitiveness of rail freight traffic in the corridor.
- Differences in the pricing structures for rail freight traffic along the corridor are currently seen as a barrier. Harmonising the infrastructure access fee structures will promote rail traffic in the future. However, the charging structure does not depend on the Infrastructure Managers, but on the cost coverage level in the Member States.
- Harmonising national environmental policies and legislation, for example with regard to noise or the transport of hazardous substances, will offer a further opportunity.
- The removal of existing technical barriers, such as differences in implementation of the ERTMS. ERTMS should be implemented as soon as possible at least for the most important connections, i.e. Netherlands – Germany and Germany – Poland.
- Standardisation and harmonisation of existing rail infrastructure throughout the network (e.g. for 740m trains, 22.5 t axle load).

- Extension of sidings along Rail Freight Corridor 8 (with the aim of establishing a uniform train length of 740m).
- Extension of storage capacity in collaboration with the terminal operators.
- Increase in terminal capacities incl. 7/24.
- Provision of tracking and tracing information on trains.
- Up-to-date Information on performance of trains (delays, location, etc.).
- Advance information on delays, maintenance and repair works.

Specific sections and nodes identified as potential major capacity bottlenecks or missing links by the studies reviewed include:

- FI: several bottlenecks near the node of Helsinki, the need to improve the Helsinki marshalling yard and construct the missing rail link to Tallinn (EE)
- EE: the Rail Baltica project as a missing link, and the missing rail link to Tallinn (EE)
- LV: the Rail Baltica project as a missing link, rail connections to the Port of Riga
- LT: the Rail Baltica project as a missing link, electrification and capacity upgrades of the Kaunas-Klaipeda line, and the electrification of the Vilnius-BY connection, as well as additional required extensions of tracks in railway yards.
- PL: the Poznań-Warsaw-Terespol link and the Warsaw-Białystok-LT link, for which upgrades of lines (including bypasses of Poznań and Warsaw) are planned.
- DE: the Hannover-Bremen, Cologne-Hagen, Wilhelmshaven-Oldenburg and Minden-Wunstorf links as capacity bottlenecks. The Wilhelmshaven-Oldenburg link partly lacks electrification as well.
- NL: the Rotterdam–Utrecht-Amersfoort link, and several sections near the rail nodes of Amsterdam, Rotterdam, Amersfoort, and Barneveld.
- BE: rail access to the Port of Antwerp and the hinterland connections to Germany.

Inland waterways (IWW)

The Platform for the Implementation of Naiades II (PLATINA2) has, in preparation of the working plan by the consortia, published useful documents regarding the supply side of Inland Waterway transport. Inland waterway transport provides the following intrinsic merits:

- very low direct costs of transport;
- low energy consumption, low noise, and low carbon footprint;
- safe and secure transport services;
- spare capacity on the network to accommodate growth, negligible congestion on the waterways;
- high transport capacity and reliability.

Given these major benefits, the European Commission (EC) aims to promote and strengthen the competitive position of IWW transport within the transport system, and to enable its integration into the intermodal logistics chain. The fully liberalised IWW sector in Europe has a highly fragmented market structure on the supply side. Approximately 80% of the fleet is operated by owner-operators who work and live with their families on the vessels. This is especially the case for companies in Western Europe. Roughly speaking, the IWW fleet can be divided into two main categories:

- dry cargo ships: used to transport metal ores, sand and gravel, grain, scrap, containers, etc.;
- tanker ships: used to transport oil, liquid chemical products and other liquid and semi-liquid cargo.

During the last 25 years, there has been a strong decline in the number of Western European vessels. However, the average loading capacity per vessel has strongly increased. IWW transport plays an important role in transporting goods across Europe, where high quality ports and waterway connections are available, combined with high transport demand and industrial activities. For many industries, the inland waterways are their backbone for the supply and distribution of raw materials. Furthermore, inland waterways are becoming more and more important for the hinterland transport of maritime containers from the seaports. The biggest seaports in the western part of the corridor are connected to the inland waterways and IWW transport plays a significant role in the transport between EU's busiest major seaports.

In the IWW transport sector, there are so-called 'captive markets', such as the transport of bulk commodities (e.g. aggregates and construction materials, coal, ores, metal and petroleum products) between the seaports and industrial areas or between large industrial areas and mining locations. For industries located along the waterways, it is very difficult for other modes of transport to provide competitive services (even over short distances). The required infrastructure and dedicated supply chains are in place for these cargo flows, in which IWW transport plays a vital role. In the future, new captive cargoes for IWW transport may develop. Examples may include the transport of biomass, biofuels, LNG and waste. The hinterland container transport segment is expected to show strong growth rates in the coming years, which will increase the demand for IWW transport services. Currently, the size of container transport by barge is still relatively small on a European scale (expressed as volumes in tonnes). Not all the origins and destinations of maritime containers are located in the proximity of waterways, and they therefore require transhipment, which increases costs. Nevertheless, for the seaports of Amsterdam, Rotterdam and Antwerp, the contribution by container barge transport is quite substantial.

Article 16 of Regulation (EU) No 1315/2013 on the guidelines for the development of TEN-T sets specific priorities for inland waterway infrastructure development:

- for existing inland waterways: implementing measures necessary to reach the standards of the inland waterways class IV;
- where appropriate, achieving higher standards in terms of modernising existing waterways and constructing new waterways in accordance with the ECMT's technical infrastructure aspects;
- implementing telematics applications, including RIS;
- connecting inland port infrastructure to rail freight and road transport infrastructure;

- modernising and expanding the infrastructure capacity necessary for transport operations within port areas.

In order to reduce air pollutants and the impact of IWW transport on climate change, it is important to develop LNG bunkering infrastructure. Furthermore, improving the waterway infrastructure quality may reduce air pollutants and greenhouse gas emissions, because removing infrastructural bottlenecks and maintaining waterways (e.g. dredging) will increase the possible load rate of vessels and allow larger vessels to sail and to benefit from economies of scale. By increasing the load factor and transporting cargo more efficiently, fuel consumption and emissions per loading unit will also be reduced . In addition to the physical infrastructure, improved information systems (River Information Services, RIS) will also contribute. Providing information on the depth of waterways will enable the barge operators to optimise the load factor. Also, information on waiting times at locks and providing slot reservations for passing locks and bridges, barge operators can optimise their sailing speed (so called “Smart Steaming”) and so avoid waiting times by arriving “just in time” at locks, bridges and ports.

In order to increase the share of IWW transport, the Platina2 reports make the following recommendations regarding the supply side:

- Eliminate inland waterway bottlenecks and support development plans to construct missing links in the inland waterway network.
- Develop high-quality network of inland ports, including logistics sites near the waterways.
- Provide support for the development and implementation of transport logistics information services (RIS and its integration into e-Freight; moving towards paperless transport, and integration into the e-Maritime Single Window concept).
- Provide neutral logistics advice to potential IWW transport customers to raise level of knowledge and awareness of IWW transport opportunities.
- Encourage cooperation between IWW transport operators and between IWW transport operators and operators using other modes.

Physical infrastructure restrictions within the waterway network include:

- Missing links in the waterway network;
- Limited fairway depths and dimensions;
- Limited bridge clearances;
- Limited lock capacities/ dimensions;
- Bottlenecks at terminals and inland ports

Administrative and regulatory barriers may raise operating costs and prevent new services and market initiatives from being undertaken. Platina2 recognizes the following main bottlenecks:

- Financing problems/differences: different national state guarantees, different national tax systems, reluctance of local banks;
- Lack of harmonisation of waste transport by IWT;

- Long delays in obtaining vessel certificates, long duration of ship inspections, lack of harmonisation;
- International regulations for vessels versus landside regulations;

The following major issues concerning IWW infrastructure in the CNC North Sea Baltic have been identified:

- NL: The Twente Canal, including the Eefde locks, needs upgrading, and has been recognized as a pre-identified project. Many other locks, including the pre-identified Beatrix locks, need upgrades as well in order to cope with future transport volumes. There are expansion plans for several inland ports;
- BE: The Albert Canal (height limitations), including the Wijnegem locks, needs upgrading. The Brussels-Scheldt Sea Canal partly needs upgrading. The RIS system requires further developing, mainly in the Brussels region and Wallonia;
- DE: Many east-west oriented canals ultimately connecting the Rhine and Oder rivers have capacity limitations (height, depth, locks) and need upgrading so as to enable the IWW transport sector to increase its share of hinterland transport. The Weser and Elbe rivers need a deepening of the fairway. The Nord-Ostsee Canal is an important connecting link between the North Sea and the Baltic Sea and needs urgent upgrading.

Ports

Most of the ports in the corridor have access to rail and road hinterland connections. Many ports along the North Sea also have access to inland waterway links. Bottlenecks at many ports in all parts of the corridor mostly concern last mile issues and hinterland issues, both for rail and road access. In some ports, access to the sea is also an issue, for example in Amsterdam and Helsinki. Maritime investments in infrastructure mainly focus on expanding port capacities. At some ports, including Amsterdam, there is a capacity issue in terms of future container terminal handling, which may potentially lead to congestion at the ports. Sea access problems have been identified at the ports in the Northern Baltic Sea (e.g. Helsinki and Tallinn), which should be equipped with additional icebreaking capacities in order to remain accessible all year round.

Passenger transport

In order to gain a clear corridor-wide picture of the supply side of passenger transport in the CNC North Sea Baltic, we have analysed travel times of all the relevant modes. To perform this analysis, we used the ETISplus 'Netter' database, which provides travel times including access times to airports and railway stations for the different modes (car, rail, air) between all NUTS3 areas in the corridor catchment area. These travel times were recalculated to weighted travel times on a NUTS2 area level. In order to perform the analysis, we made assumptions concerning handling times at airports (check in/out, baggage handling, waiting times, etc.), because this travel time component was not included in the database. As a result, an extra handling time of 2.5 hours has been taken into account for air travel.

Figure 10 shows the modes that offer fastest travel times from Belgium to other NUTS2 catchment areas within the corridor. Figure 11 presents the same information on travelling from Estonia to other NUTS2 areas. Belgium and Estonia have been chosen for illustration purposes, because they are on the extreme ends of the CNC North Sea Baltic. Because Finland is not connected directly to other parts of the corridor catchment area over land, air travel has a greater dominance compared with all the other areas in the catchment area.

figures 10 and 11 illustrate the dominance of car transport for short-distance international trips, and air transport for longer-distance international trips. International rail passenger transport is currently only competitive in terms of travel times on the sections between parts of Belgium, the Netherlands and Germany. These competitive rail travel relations reflect the current high-speed railway links for passenger transport.

Figure 12 shows that, in contrast to some other CNCs in Europe, there is currently no coherent system of high-speed rail services on the entire main east-west route within the CNC North Sea Baltic. On several sections of the corridor, alignment high-speed services are available with different maximum speeds, i.e. Brussels-Cologne, Hamm-Minden-Hannover-Berlin, Hamburg-Berlin, and Brussels-Amsterdam. Some sections are under construction or still in the planning stage, such as Poznań/Wrocław-Łódź-Warsaw. On other sections of the corridor, conventional upgrades or new lines have been constructed or planned. For example, Berlin-Frankfurt/Oder has been upgraded and sections are being planned in Poland, Lithuania, Latvia and Estonia as part of the Rail Baltica project. No plans to construct high-speed services or other upgrades have been identified for the sections between Amsterdam-Hannover, Cologne-Hamm, and Frankfurt/Oder-Poznań.

Lacking or inadequate rail connections at many airports do exist in the corridor area, i.e. in Helsinki, Tallinn, Rīga, Łodz, Poznań, Rotterdam and Liège.

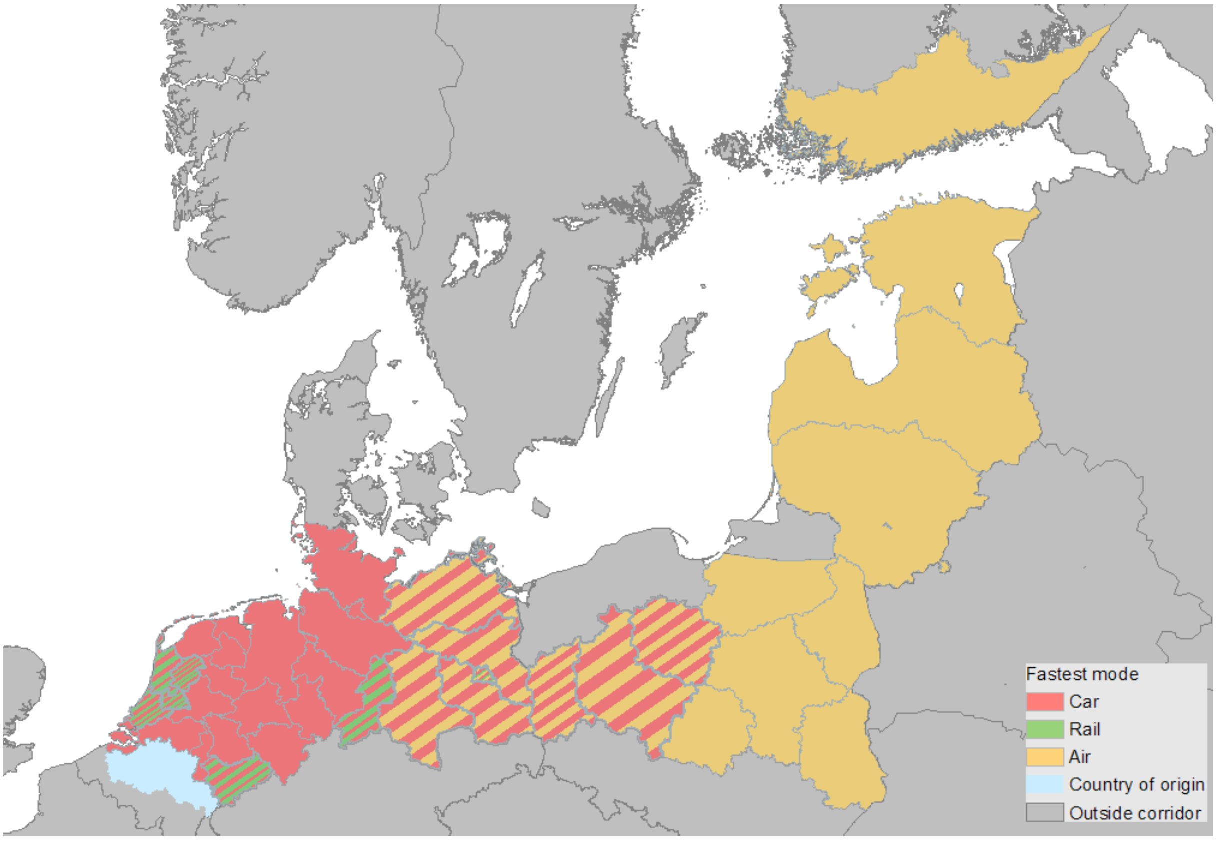


Figure 10: Indication of fastest mode(s) for passenger transport from Belgium to other areas within the catchment area; current situation with 20% travel time difference acceptance; Source: ETISplus Netter

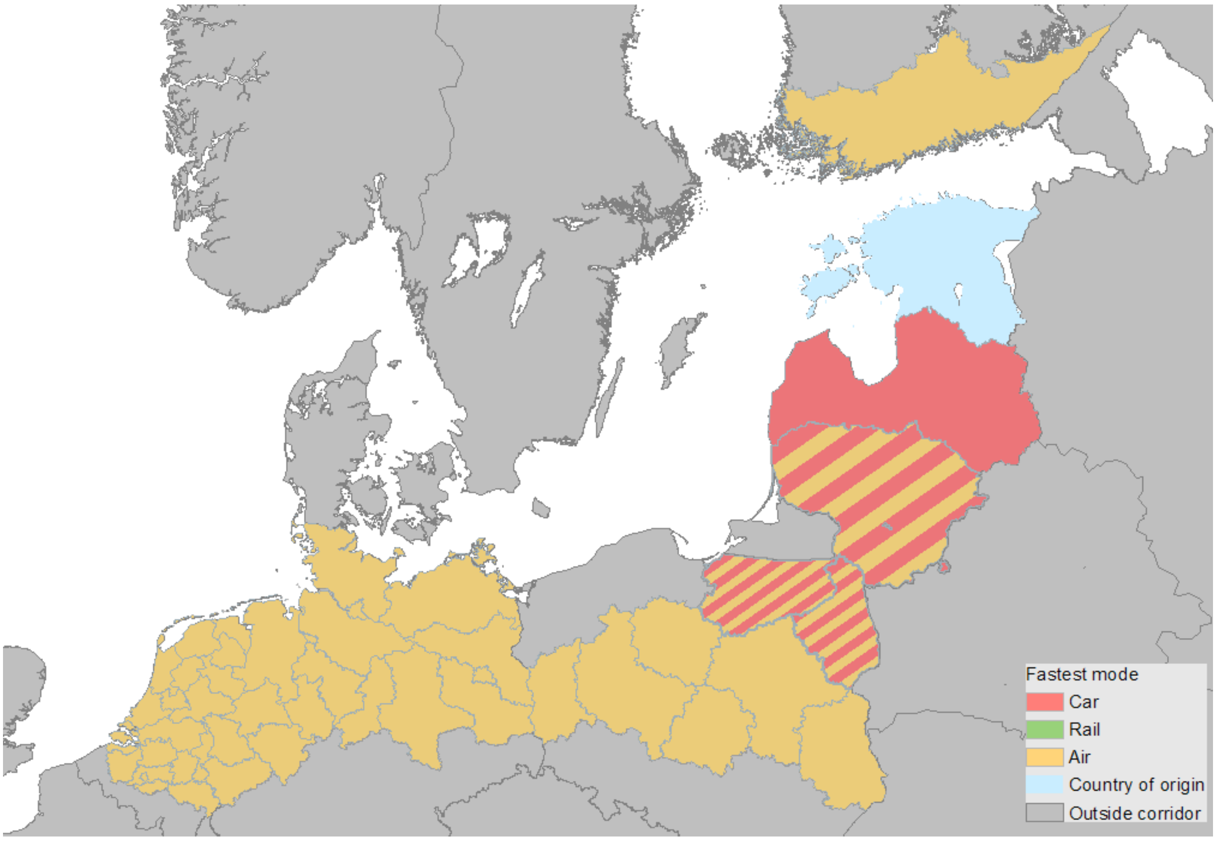


Figure 11: Indication of fastest mode(s) for passenger transport from Estonia to other areas within the catchment area, current situation with 20% travel time difference acceptance; Source: ETISplus Netter

Figure 12: System of high-speed passenger rail services in Europe according to planned investments until 2025; Source: UIC

Overall conclusions of the TMS

The aim of the MTMS is to provide a general view of the present and future situations on the transport market for the CNC North Sea Baltic. To achieve this aim, we have presented a comprehensive overview of all relevant transport modes and infrastructure, based on an extensive review of a large number of studies, reports and forecasts that focused on particular market sections and nodes within the corridor. We gathered this data from existing databases available to our team and also used additional data provided by the infrastructure managers, Ministries in the different Members States, and other stakeholders. This produced a comprehensive amount of data, which we then edited and combined into a large-scale view of traffic developments in the CNC North Sea Baltic area.

The key findings of the TMS North Sea Baltic include:

- As expected, the recession has had a strong impact on freight demand. This has significantly affected corridor flows;
- The volumes from recent port reports show that there has been an increase in demand over the last two years, implying that freight has entered the recovery phase;
- The main international cross-border corridor flows are currently between Germany, the Netherlands and Belgium. As future economic growth is expected to be higher in the central and eastern parts of the corridor, transport flows will grow rapidly in these areas as well;
- Traffic within the corridor is multimodal (6% rail, 34% road, 38% inland waterways, 22% short-sea shipping – this is only looking at the cross-border flows);
- For the period up to 2030, relative growth in rail and road freight transport within the corridor is expected to range from modest to high, with IWW showing modest growth. There are, however, big differences between parts of the corridor;
- The relatively strong current position of IWW is due to strong flows between the Netherlands, Belgium and Germany. The Platina2 forum has identified major bottlenecks, both in terms of infrastructure and organisation;
- The least utilised freight mode is rail. The reason for this is not only the existing infrastructure bottlenecks, as pointed out by TMS RFC8. There are also administrative and organisational challenges. The competition with road and IWW transport in the western part of the corridor is also an important factor. In the eastern part of the corridor, there is currently no efficient north-south rail infrastructure and demand for high-volume rail transport is lacking. Constructing Rail Baltica may make a difference in the future;
- Air cargo accounts for only a small part of EU-related demand;
- Shorts-sea shipping has an important share of freight transport, occupying a strong position in transport flows between the western part and eastern part of the corridor;
- Ports are important entry and exit points within the corridor, offering multimodal facilities and hinterland connections. Ports therefore have an important feeder role to play for other modes as well, with many ports encouraging a future shift from road to rail and IWW transport. Another priority is to implement information systems for

better services. Many ports also emphasise the environmental aspect, providing waste management and LNG-friendly services;

- As for international passenger transport within the corridor, short-distance flows are dominated by car traffic, with air travel dominating longer-distance journeys. High-speed rail services are being constructed or planned for parts of the corridor alignment, but a coherent system is lacking.

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Annex 1: Data sources and procedures

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- Data sources used and procedures followed to calculate passenger volumes by section for 2012 (as referred to in section 3.2.4 of the report)
- Data sources used and procedures followed to forecast freight tonnage by section for 2030 (as referred to in section 4.2.2 of the report)

- Data sources used and procedures followed to forecast passenger volumes by section for 2030 (as referred to in section 4.2.2 of the report)

Annex 3: 9 figures in total, 6 figures of which representing freight volumes in the western, central and eastern parts of the corridor, all separately for 2012 and 2030. Remaining 3 figures showing the differences between 2012 and 2030 for the modes Road, Rail and IWW;

Estimated freight tonnages for Road, Rail and IWW by section in 2012 in parts of the corridor

Annex 4: 9 figures in total; 1 for each corridor country

International passenger transport (in pax/year 2010) by country of origin within the catchment area to NUTS2 destinations

Annex 5: 8 figures in total of which 6 representing passenger volumes in the western, central and eastern parts of the corridor, all separately for 2012, 2030. Remaining 2 figures representing the differences between 2012 and 2030 for Road and Rail separately;

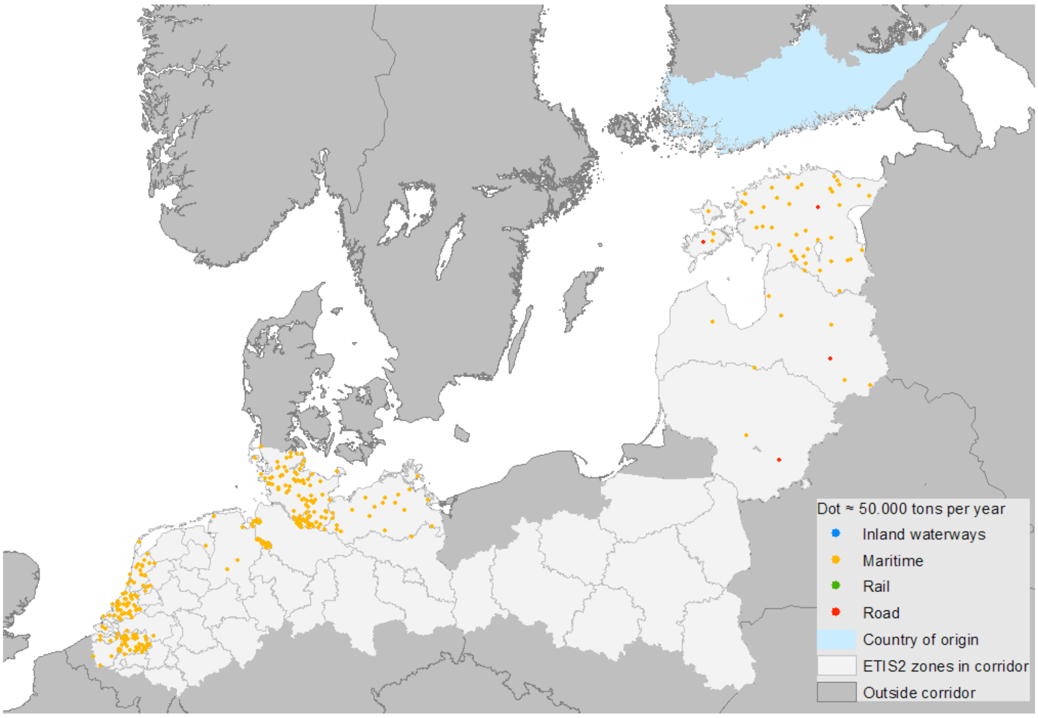
Estimated passenger volumes for Road and Rail by section in 2012 in parts of the corridor

Annex 1.

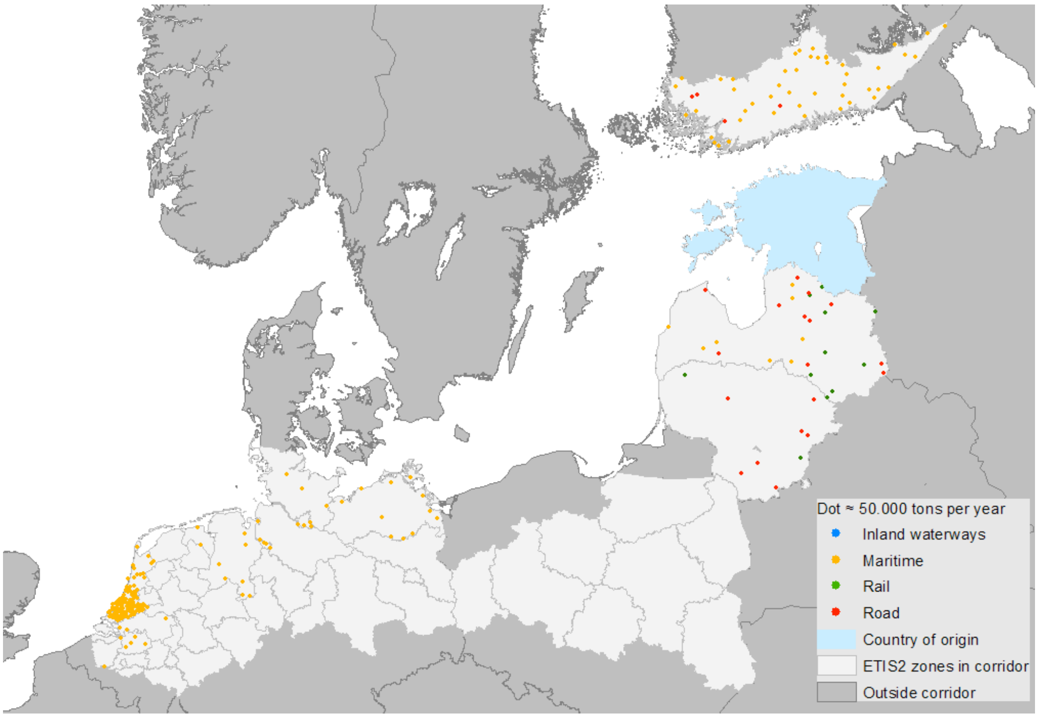
International freight transport (in tons) by country of origin within the catchment area to NUTS2 destinations.

Remarks: Source: ETISplus2010; Dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. maritime transport of course only arrives at ports; in the western part of the corridor, dots of different modes may overlap.

Finland:



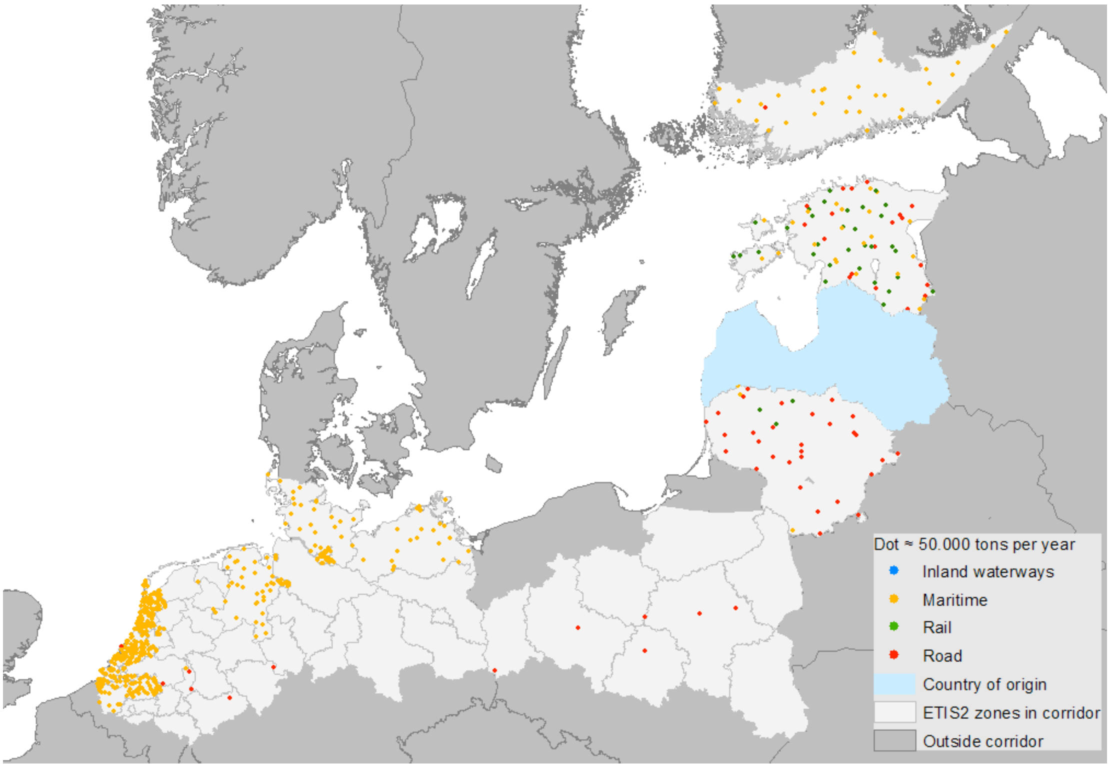
Estonia:



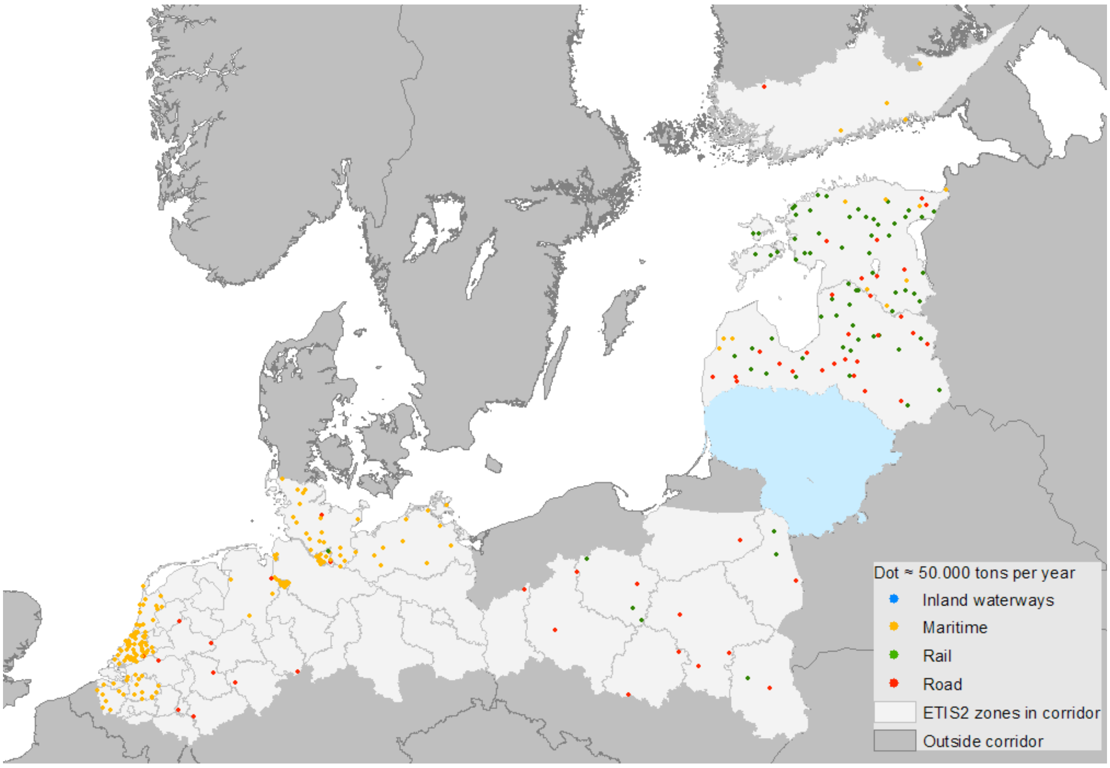
International freight transport (in tons) by country of origin within the catchment area to NUTS2 destinations

Remarks: Source: ETISplus2010; Dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. maritime transport of course only arrives at ports; in the western part of the corridor, dots of different modes may overlap.

Latvia:



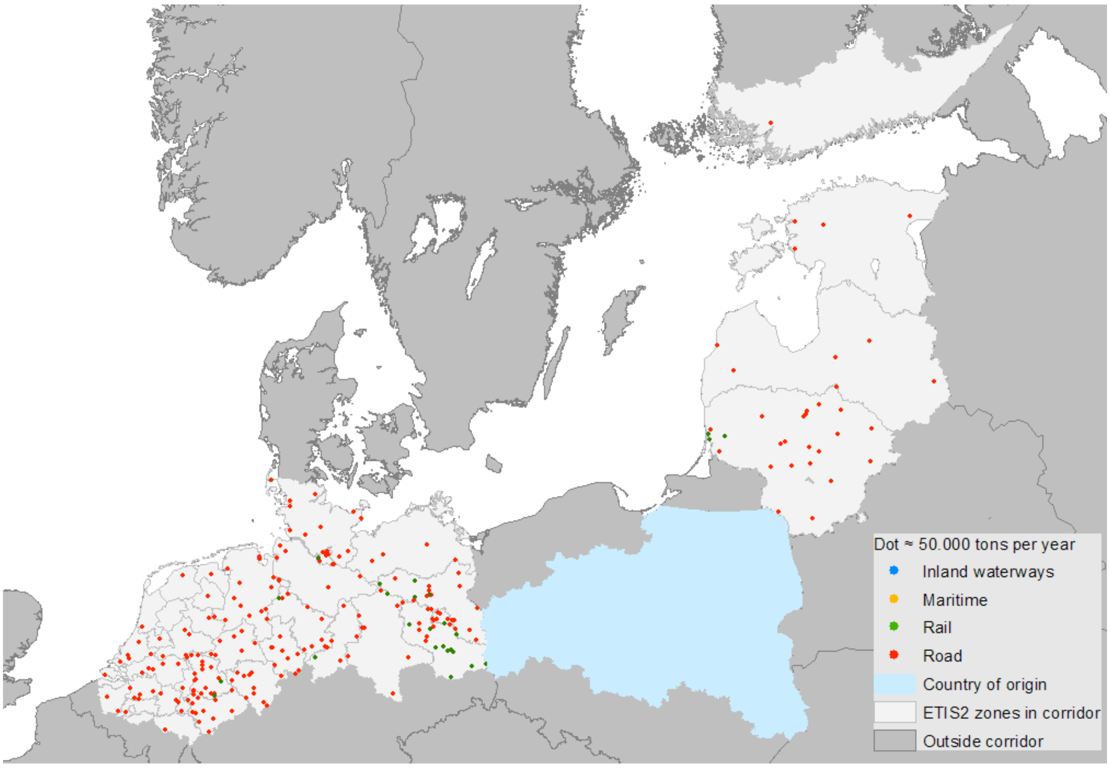
Lithuania:



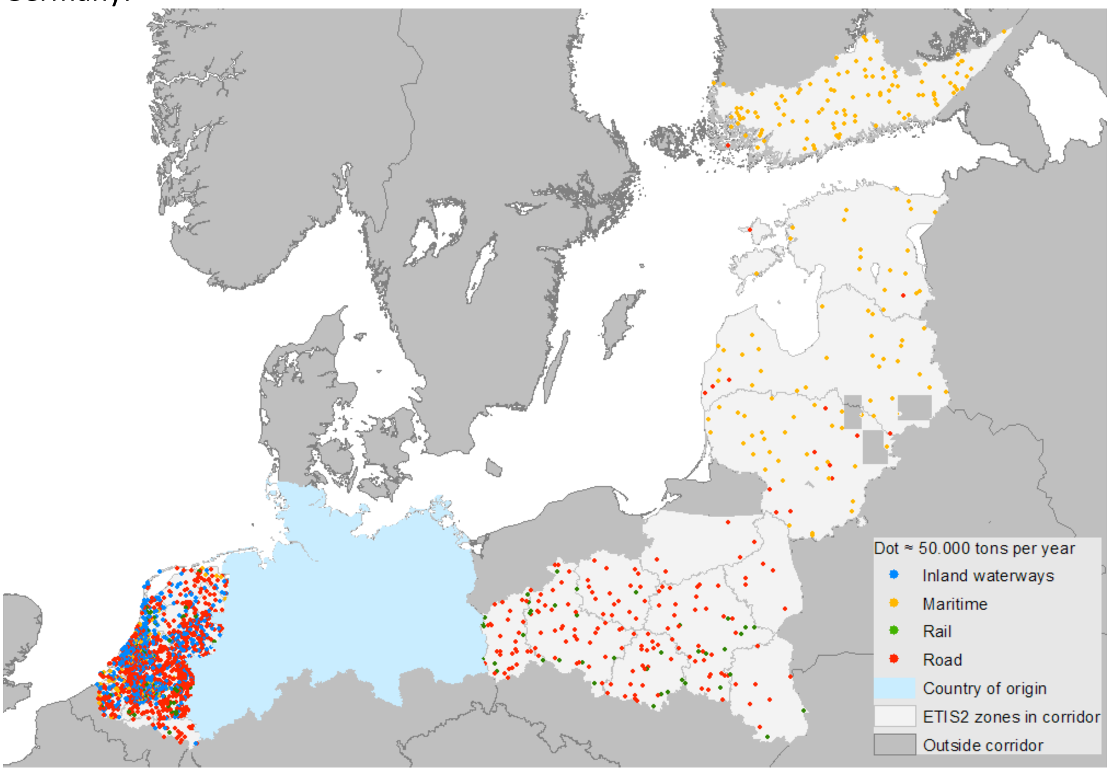
International freight transport (in tons) by country of origin within the catchment area to NUTS2 destinations

Remarks: Source: ETISplus2010; Dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. maritime transport of course only arrives at ports; in the western part of the corridor, dots of different modes may overlap

Poland:



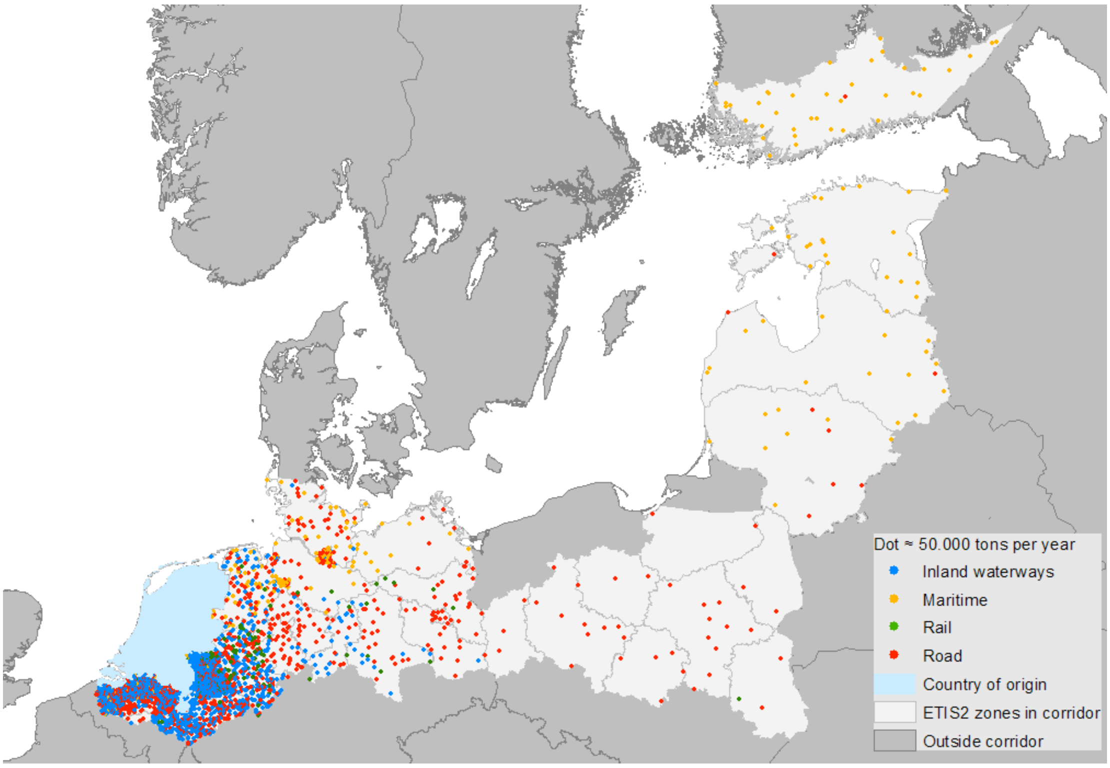
Germany:



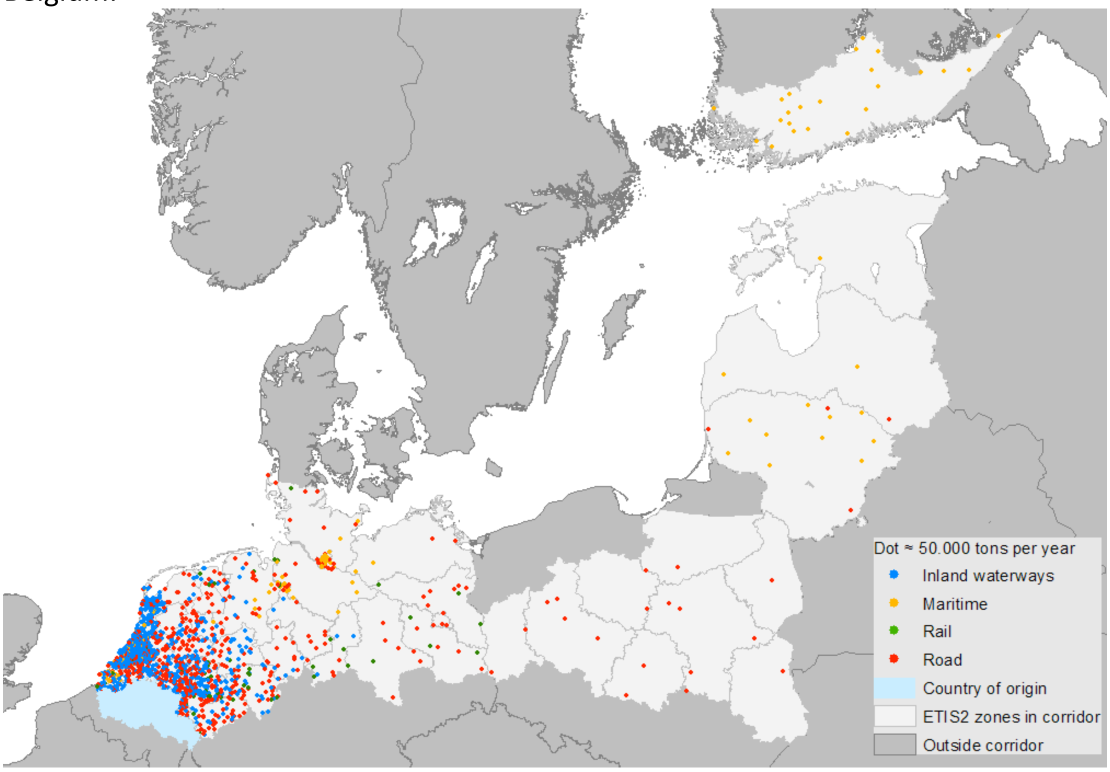
International freight transport (in tons) by country of origin within the catchment area to NUTS2 destinations

Remarks: Source: ETISplus2010; Dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. maritime transport of course only arrives at ports; in the western part of the corridor, dots of different modes may overlap

Netherlands:



Belgium:



Annex 2.

Data sources and procedures

Country/ (data collected by)	**Data sources used and procedures followed to calculate freight tonnage by section for 2012**		
	IWW	**Road**	**Rail**
EE (TLU EIFS – Tallinn, Malla Paajanen Consulting – Helsinki)	No relevance	Estimated number of lorries/year and mean load per vehicle. Source: http://m.mnt.ee/public/Lisad_6-8.pdf; Day-to-year factor of 365 applied to weekday flows . Mean load per vehicle 10.27 tons; source: Stanislav Metlitski (Teede Tehnokeskus, Head of Intelligent Transport Systems Department)	2013 data collected from two freight transport companies that use the infrastructure of Estonian Railways, AS EVR Cargo and E.R.S. Ltd
LV (SIA STS-Consulting – Babīte, Malla Paajanen Consulting – Helsinki)	No relevance	SJSC “Latvian State Roads” is responsible for calculating traffic volumes and the share of freight transport. Day-to-year factor of 365 applied to weekday flows. Dutch number of 8 tons/lorry used in the absence of official Latvian data.	Source: SJSC “Latvian Railway” statistical information
LT (NPR / Ademo grupė – Vilnius, Malla Paajanen Consulting – Helsinki)	Not part of the CNC North Sea – Baltic	Based on annual reports from LT authorities on annual average daily traffic AADT (veh./day) on the road network. Day-to-year factor of 365 applied to weekday flows . Mean load per vehicle 12 tons; source: weighing posts on highways.	Source: Provided by LT authorities
PL (IPG-Potsdam, ILIM -Poznan)	Not part of the CNC North Sea – Baltic	Estimated number of lorries/year and mean load per vehicle. 2013 data used based on 2010 data. Data source lorries/year 2010: GDDKiA – General Traffic Measurement Report 2010. Day-to-year factor of 365 applied to weekday flows. Mean load per lorry 7 tons (source: General Office for Statistics (GUS Report 2012), but adjusted to 10 tons because of high level of international heavy goods vehicles on corridor sections.	2014 data used. Source: PLK annual report. Freight tonnage estimated on basis of number of trains and mean tonnage per train of 1,500 tons. Estimate by ILIM Poznan based on regular freight train capacity and average capacity usage
DE (IPG – Potsdam)	2013 data used instead of 2012 data. Source: Güterverkehrsstatistik der Binnenschifffahrt (Freight traffic statistics on inland waterway transport) by Statistisches Bundesamt (Federal Office for Statistics).	Estimated number of lorries/year and mean load per vehicle. 2013 data used instead of 2012 data. Source of number of lorries: traffic survey by the Federal Highway Research Institute (BASt). Day-to-year factor of 365 applied to weekday flows. Dutch number of 8 tons/lorry used as this is seen as a reasonable number in the absence of official German data.	No public sources on number of tons per section available. 2007 data taken from ‘Umweltbundesamt: Schienennetz 2025 / 2030 - Ausbaukonzeption für einen leistungsfähigen Schienengüterverkehr in Deutschland’ (Federal Environment Agency, Rail network 2025/2030 – Development concept for effective rail freight transport in Germany). Freight tonnage

			estimated on basis of mean tonnage per train of 1,483 tons, and day-to-year factor of 310 (both of which are Dutch data; no German data available)
NL (Goudappel Coffeng - Deventer)	Sources: TENtec data updated and other data sources added 'Goederenvolumes WVL North Sea-Baltic.xlsx'/'Scheepvaartinformatie Hoofdvaarwegen, Editie 2009, tabel 4.2 Totaal'.	Estimated number of lorries/year and mean load per vehicle. Sources Rijkswaterstaat INWEVA 2006 and 2011 / Atlas hoofdwegennet 2012 / Goudappel Coffeng's National Model 2008. Day-to-year factor of 310 applied (general workday/weekday volume * 365). Mean load per vehicle 8 tons (excluding vans), based on assumptions in KIM document "Verkenning beladingsgraad goederenvervoer van 45 naar 65%", May 2013	No public sources on number of tons per section available. Number of trains based on PHS impact reports (Program for high-frequency passenger trains) on rail freight, data on use of Betuwe rail freight link and study on northeastern rail freight link extension. Freight tonnage estimated on basis of number of trains and mean tonnage per train of 1,483 tons (source: study on northeastern extension of Betuwe rail freight link and Internet research). Day-to-year factor of 310 applied (internet research).
BE (MINT - Mechelen)	Provided by BE authorities	2012 data derived from 2004-2020 interpolation. Source: tonnages taken from 'Vlaams strategisch vrachtmodel versie 1.6' (Flemish strategic freight transport model version 1.6)	2010 data used instead of 2012 data. Source: tonnages taken from 'Vlaams strategisch vrachtmodel versie 1.6' (Flemish strategic freight transport model version 1.6)

Country/ (data collected by)	**Data sources used and procedures followed to calculate passenger volumes by section for 2012**	
	Road	**Rail**
EE (TLU EIFS – Tallinn, Malla Paajanen Consulting – Helsinki)	2013 data used for car numbers and day-to-year factor of 365 applied to weekday data. Source: http://m.mnt.ee/public/Lisad_6-8.pdf; Factor of 2.0 (Tallinn 1.3) applied to number of passengers per car in order to estimate passenger volumes.	Source of passenger numbers: "Tallinna-Tartu-Riia ja Tallinna-Peterburi rongiliikluse avamise tasuvusanalüüs / "Cost-benefit analysis of opening Tallinn-Tartu-Riga and Tallinn-St. Petersburg lines"(published by Positium LBS in 2012). 2012 data estimated on basis of available 2015 forecast and Rail Baltica study reports (2011).
LV (SIA STS-Consulting – Babīte, Malla Paajanen Consulting – Helsinki)	SJSC „Latvian State Roads" is responsible for calculating traffic volumes. Day-to-year factor of 365 applied to weekday flows. Factor of 1.7 applied to number of passengers per car in order to estimate passenger volumes. Source: own in-depth research.	Data source is is the Latvian Railways, which supplied statistical information on domestic and international passenger volumes
LT (NPR / Ademo grupė – Vilnius, Malla Paajanen Consulting – Helsinki,)	Based on annual reports from LT authorities on annual average daily passenger car traffic AADT (veh./day) on the road network. Day-to-year factor of 365 applied to weekday flows. Factor of 1.3 applied to number of passengers per car in order to estimate passenger volumes. Source: Roadside counts on individual road sections.	Source: provided by LT authorities

PL (IPG-Potsdam, ILIM -Poznan)	Sources: GDDKiA – General Traffic Measurement Report 2010. Factor of 1.3 applied to number of passengers per car in order to estimate passenger volumes. Source: Institute of Road Transport Report 2011.	Sources used for number of train services by section: PLK annual report (maps), Strategic Transport Plans - Marshall office, Internal ILIM Poznan Institute market research reports. Mean pax of 240 per train used to calculate number of pax by section, based on regular train capacity and average capacity usage.
DE (IPG - Potsdam)	Passenger car numbers for 2013 taken from the traffic survey by the Federal Highway Research Institute (BASt). Weekday counts have been used, with a day-to-year factor of 365. Factor of 1.2 applied to number of passengers per car in order to estimate passenger volumes. Source: Verkehrsverflechtungsprognose (Traffic Integration Forecast) 2030 published by BMVI (Federal Ministry of Transport and Digital Infrastructure).	Working day volumes taken from various sources: Kompetenz-Center ITF NRW (North Rhine-Westphalia), Deutsche Bahn AG (Berlin-Brandenburg), SPNV-Konzept 2013+ of LNVG (Lower Saxony), ÖPNV-Plan 2010-2015/2025, Ministerium für Landesentwicklung und Verkehr (Saxony-Anhalt), Landesnahverkehrsplan 2017 of LVS (Schleswig-Holstein). In the absence of official data, the same day-to-year factor was applied as for the Netherlands.
NL (Goudappel Coffeng - Deventer)	Source: Goudappel Coffeng's National Model as previously used in Dutch central government's NMCA analyses. 2012 data derived from interpolation of 2008 and 2020 data. Day-to-year factor of 310 applied to observed weekday/working day differences. Factor of 1.2 applied to number of passengers per car in order to estimate passenger volumes.	No public sources on passenger numbers by section available. Instead, use was made of Goudappel Coffeng's National Model previously used in Dutch central government's NMCA analyses. 2012 data derived from interpolation of 2008 and 2020 data. Day-to-year factor of 300 applied. Additional data used for passenger numbers on high-speed services.
BE (MINT - Mechelen)	Estimated on basis of volumes taken from Flemish provincial transport models. 2012 data derived from interpolation of 2009 and 2020 data.	No public sources on number of passengers by section available. Estimated on basis of volumes taken from Flemish provincial transport models. 2012 data derived from interpolation of 2009 and 2020 data.

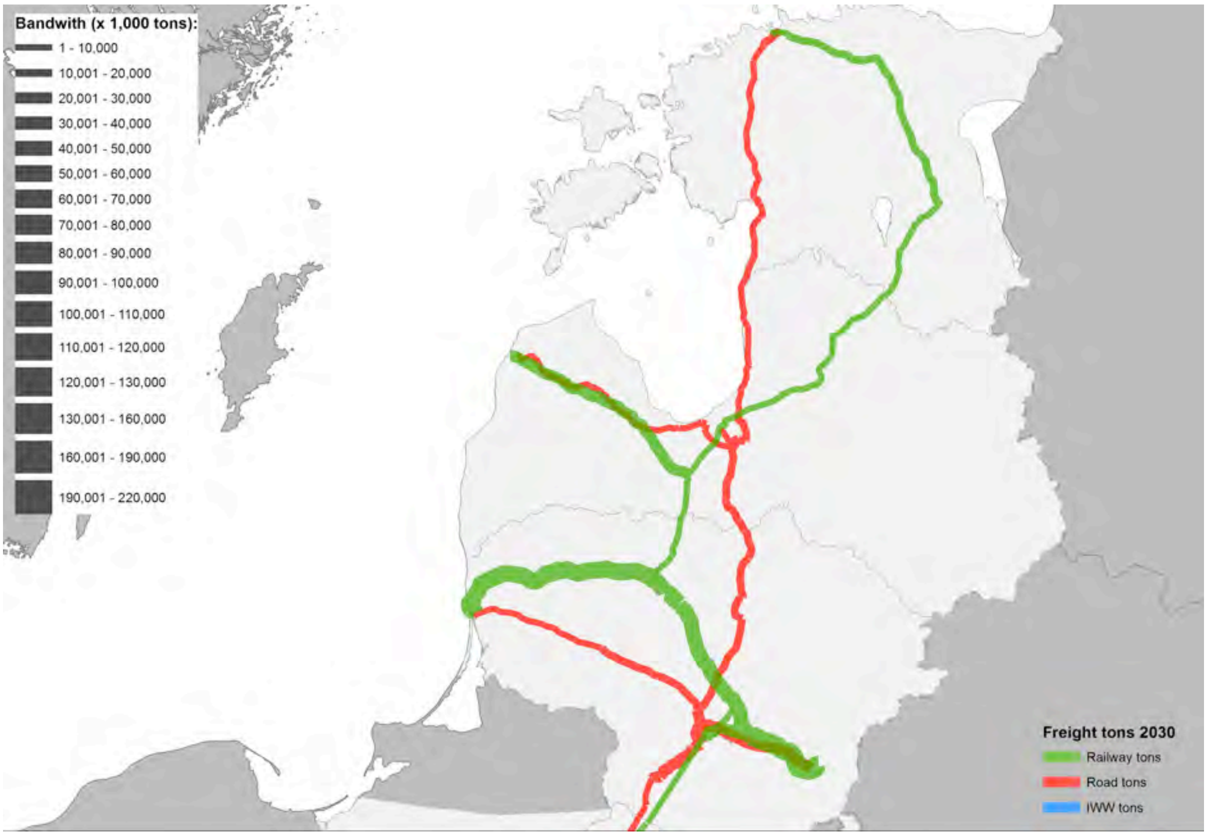
Country/ (data collected by)	**Data sources used and procedures followed to forecast freight tonnage by section for 2030**		
	IWW	**Road**	**Rail**
EE (TLU EIFS – Tallinn, Malla Paajanen Consulting – Helsinki)	No relevance	Forecast 2014/2030 based on existing forecasst. Annual growth rate is 2.8% in 2010-2020 and 1.3% in 2020-2030	No data available. Growth in tonnage of 22% assumed to be realistic based on Latvian and Lithuanian forecasts.
LV (SIA STS-Consulting – Babīte, Malla Paajanen Consulting – Helsinki)	No relevance	SJSC „Latvian State Roads" has developed 3 traffic growth scenarios – low, medium and high. The the high-growth scenario was used in this study. Aannual traffic growth will be 3.5% in the period 2014-2016 , 2.5% in the period 2017-2024, and 2% annually from 2025 onwards.	Source: SJSC "Latvian Railway" statistical information
LT (NPR / Ademo	Not part of the CNC North Sea – Baltic	Source: provided by LT authorities	Source: provided by LT authorities

grupė – Vilnius, Malla Paajanen Consulting – Helsinki,)			
PL (IPG-Potsdam, ILIM -Poznan)	Not part of the CNC North Sea – Baltic	Source: Forecasts 2020, section/specific estimates by ILIM-institute Poznan (average expected annual growth of 2.2% in 2014-2020; extrapolated to estimate 2030 figures using half of the section/specific annual growth rate for 2012-2020.	For RFC8 sections, the TMS RFC8 forecast number of trains in 2025 were used for 2030. For other sections: no data available; estimates from ILIM-institute Poznan. Benchmark check: number of trains in 2015 according to TMS RFC8.
DE (IPG - Potsdam)	Forecast 2030: +20% general growth expected in 2012-2030; Source: Bundesverkehrswegeplan BVWP 2014 2010-2030 period	According to BMVI´s Gleitende Mittelfristprognose Winter 2013/2014: 2014 +3.0%, 2015-2017 +2.8% annually, 2018-2020 +2.0% annually, 2020-2030 +1.5% annually, 2025-2030 +1.0% annually.	Annual growth of 1.1% 2010-2030; Source: Verkehrsverflechtungsprognose 2030 by BMVI; Extra compensation for crisis decrease in 2013 (approx.) Source: BMVI's Gleitende Mittelfristprognose - Winter 2013/14. Benchmark check: number of trains in 2015 according toTMS RFC8.
NL (Goudappel Coffeng - Deventer)	For sections with available measured, data trends in available range (max 5 years) were extrapolated. For remaining sections, general growth of 15% has been assumed. Source: Recent expectations of IWW market demand until 2020 (Panteia 2013), and expected policy measures to encourage IWW transport.	Goudappel Coffeng's National Model forecast for 2020 (GE scenario). Extrapolated to 2030, taking into account projects to be constructed in 2020-2030. National projects under the MIRT scheme have been included according to Rijkswaterstaat's NRM models.	Sources: number of trains in 2030 taken from "Herijkte goederenprognoses PHS, scenario hv2030v12 excl.PHS Oost-NL" (Revised forecast). Betuwe freight link forecast: maximised use from railway operator Keyrail 2012. Numbers for 2020 and 2030 taken from "Hengelo-Oldenzaal Actualisatie Trajectnota MER NE Rail Link (High Scenario). Benchmark check: number of trains in 2025 according to TMS RFC8.
BE (MINT - Mechelen)	Provided by BE authorities	Source 2020: Vlaams strategisch vrachtmodel version 1.6 (Flemish strategic freight transport model); Extrapolation to 2030 using annual growth rate of 1.2%. Oosterweel Scheldt river crossing anticipated on.	Source 2020: Vlaams strategisch vrachtmodel version 1.6 (Flemish strategic freight transport model); Extrapolation 2020 to 2030 using expected growth of 34.5%. No Iron Rhine and no 2nd rail acces connection anticipated. Benchmark check: number of trains in 2015 according toTMS RFC8.

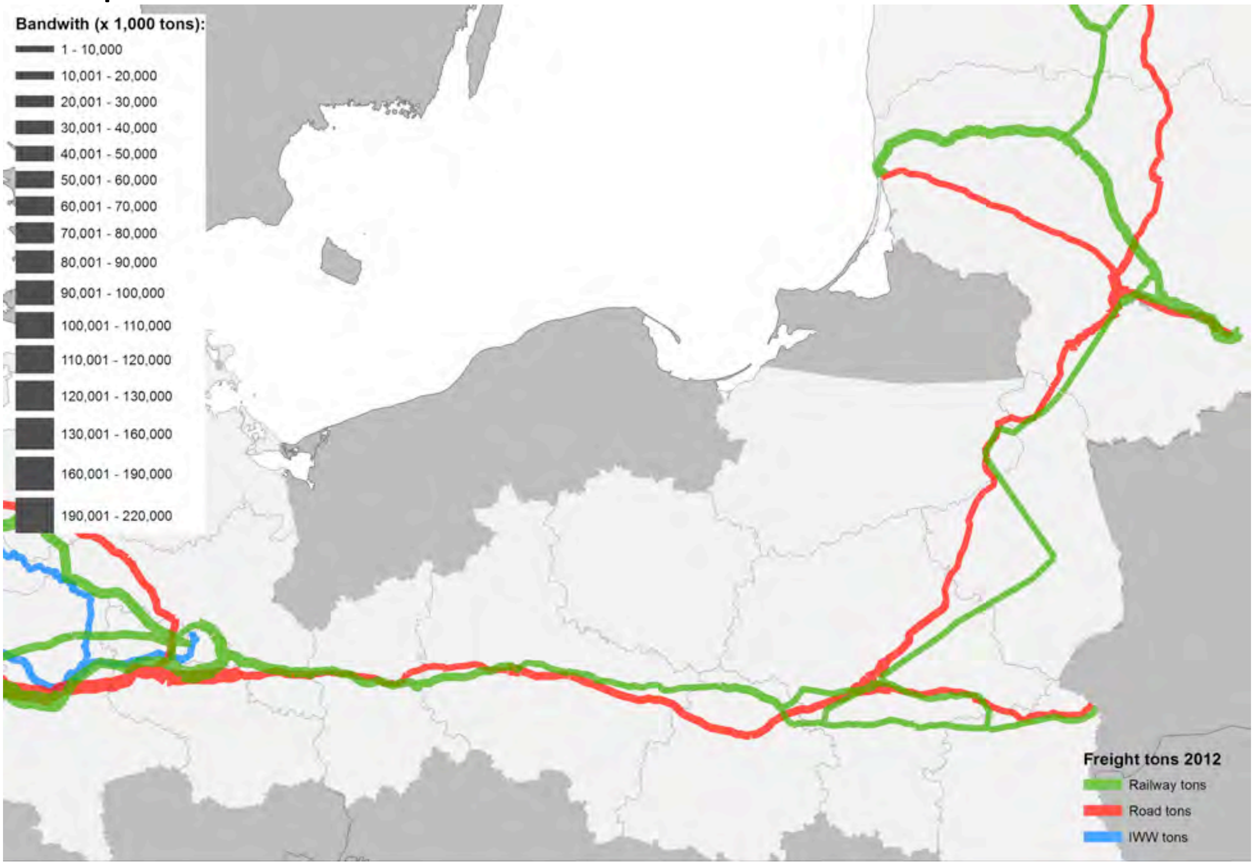
Country/ (data collected by)	**Data sources used and procedures followed to forecast passenger volumes by section for 2030**	
	Road	**Rail**
EE (TLU EIFS – Tallinn, Malla Paajanen Consulting – Helsinki)	Forecast 2014-2030 based on existing forecast; Annual growth rate 3.1% in 2010-2020 and 1.7% in 2020-2030	Source of passenger numbers: "Tallinna-Tartu-Riia ja Tallinna-Peterburi rongiliikluse avamise tasuvusanalüüs / "Cost-benefit analysis of opening Tallinn-Tartu-Riga and Tallinn-St. Petersburg lines" (published by Positium LBS in 2012).
LV (SIA STS-Consulting – Babīte, Malla Paajanen Consulting – Helsinki)	SJSC „Latvian State Roads" has developed 3 traffic growth scenarios – low, medium and high. The high-growth scenario was used in this study. Annual traffic growth will be 3.5% in 2014-2016 , 2/5% in 2017-2024 and 2% annually from 2025 onwards.	Data soures are railway operators – Ltd "LDz Cargo" (International passengers) and JSC "Pasažieru vilciens" ("Passenger trains"). Domestic passenger traffic is expected to grow on electrified rail links, taking into account the impact of new trains. International passenger traffic is expected to increase gradually, reaching +20% in 2030.
LT (NPR / Ademo grupė – Vilnius, Malla Paajanen Consulting – Helsinki,)	Source: Provided by LT authorities	Source: Provided by LT authorities
PL (IPG-Potsdam, ILIM -Poznan)	Source: Section-specific forecasts 2020 from ILIM-institute Poznan (average expected annual growth of 2.5% in 2014-2020; extrapolated to estimate 2030 figures using half of the section-specific annual growth rate for 2012-2020.	Estimate based on number of trains reported by ILIM-institute Poznan. For other sections. Expected growth in passenger numbers by 27% based on the mean growth of the number of trains on Polish sections.
DE (IPG - Potsdam)	According to BMVI's Gleitende Mittelfristprognose Winter 2013/2014: 2014 +3.0%, 2015-2017 +2.8% annually, 2018-2020 +2.0% annually , 2020-2025 +1.5% annually, 2025-2030 +1.0% annually.	According to BMVI's Gleitende Mittelfristprognose Winter 2013/2014: 2014 +2.0%, 2015-2017 +1.5% annually, 2018-2020 +1.0% annually, 2020-2025 +0.5% annually, 2025-2030 +0.0% annually.
NL (Goudappel Coffeng - Deventer)	Goudappel Coffeng's National Model forecast for 2020 (GE scenario). Extrapolated to 2030. National projects under the MIRT scheme have been included according to Rijkswaterstaat's NRM models.	Sources: Goudappel Coffeng's National Model 2020 (GE-scenario), based on LMS, previously also used in NMCA analysis for Dutch national government; 2030 extrapolated from section-specific annual growth 2008-2020; Forecast for high-speed rail link between Amsterdam-Schiphol-Rotterdam-Antwerp based on publicly available 2017 expectations, extrapolated to 2030.
BE (MINT - Mechelen)	Source: the 2020 volumes taken from Flemish provincial transport models; Forecast 2020 extrapolated to 2030 using an annual growth factor of 1.16%. Oosterweel Scheldt river crossing anticipated on.	Estimated on basis of 2020 volumes taken from Flemish provincial transport models. Extrapolation 2020 to 2030 using expected growth of 34.5%

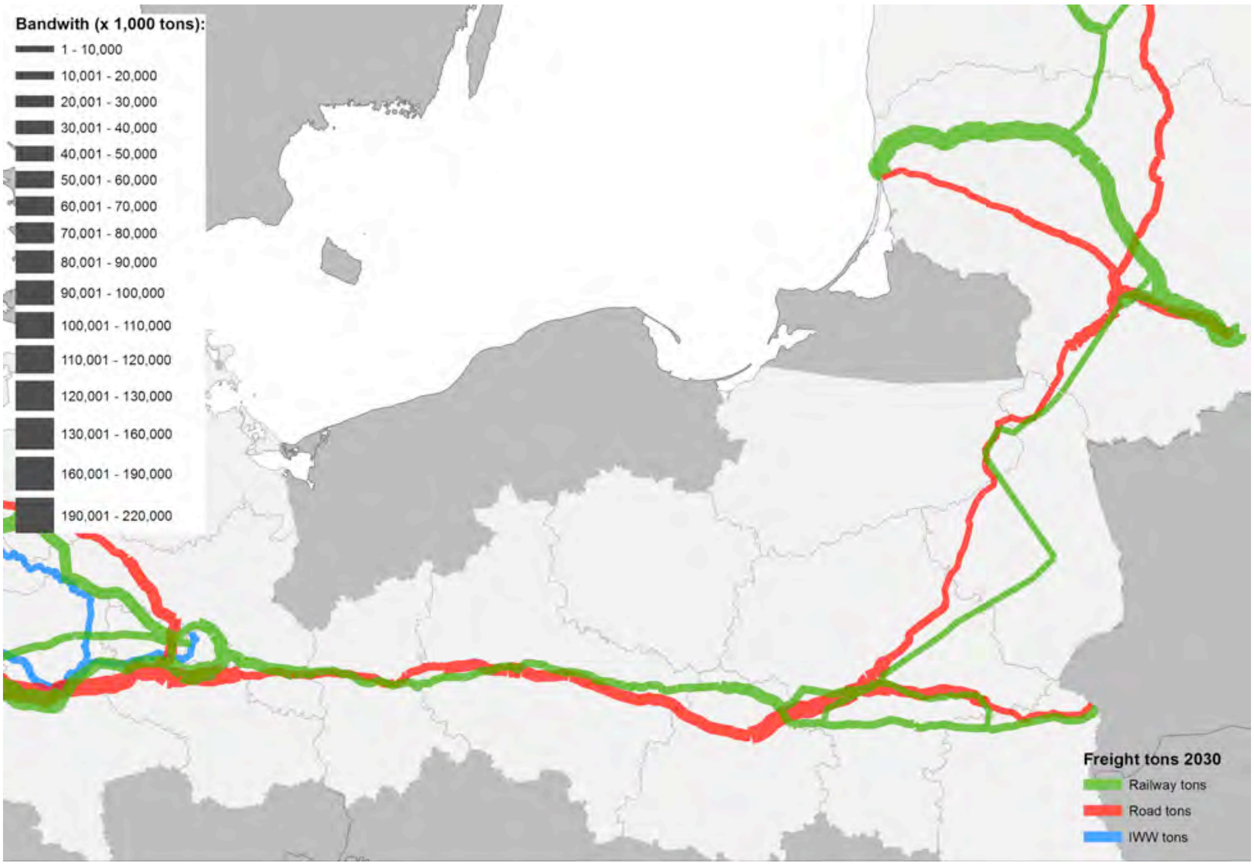
Annex 3.

Estimated freight tonnages for Road, Rail and IWW by section in 2012 and 2030 in the eastern part of the corridor:

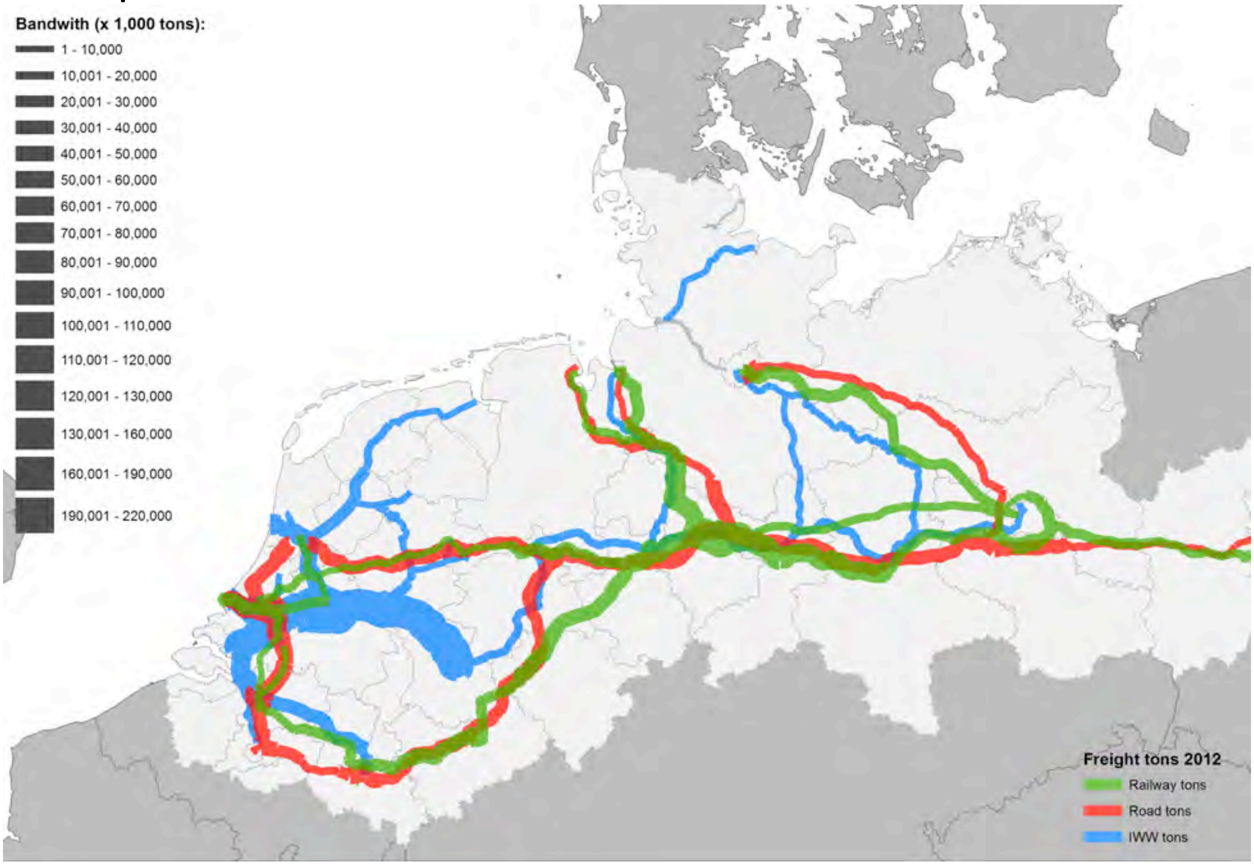


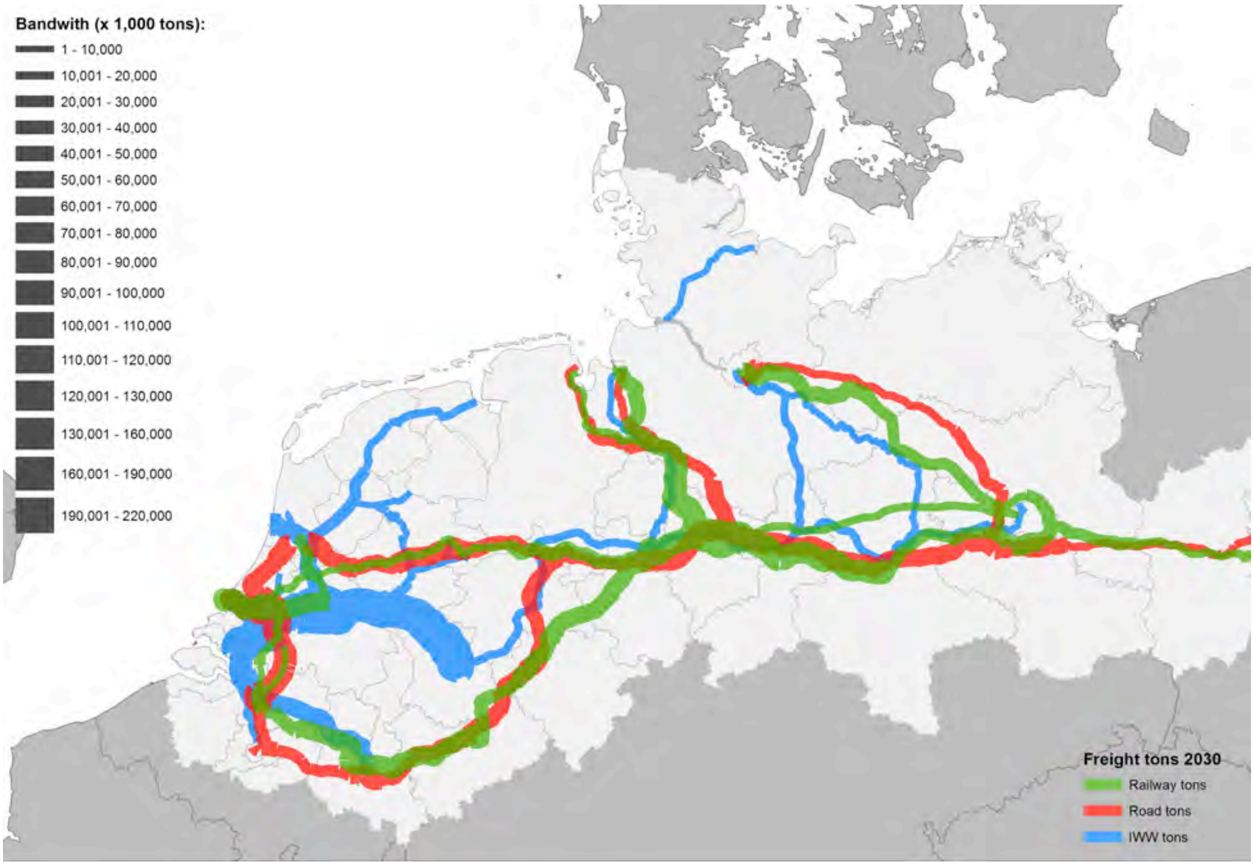
Estimated freight tonnages for Road, Rail and IWW by section in 2012 and 2030 in the central part of the corridor:



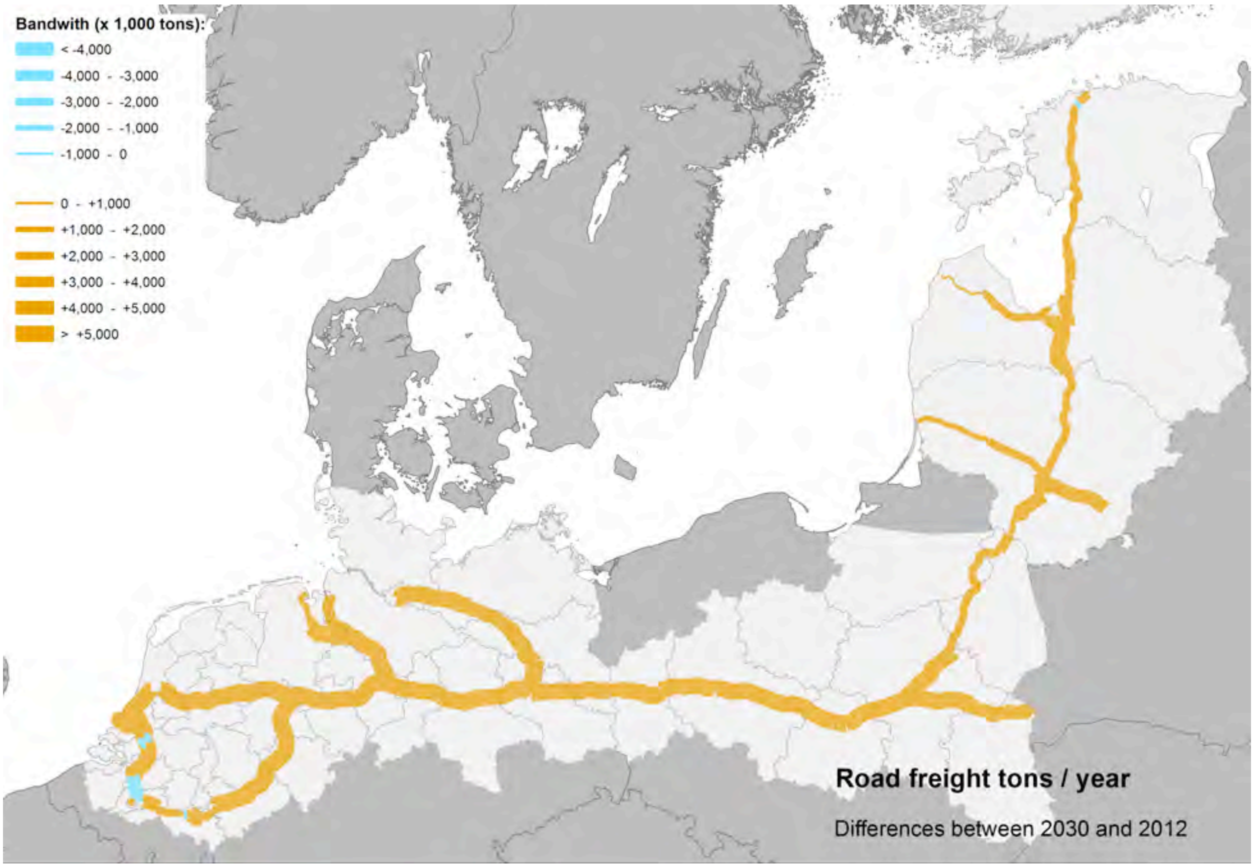


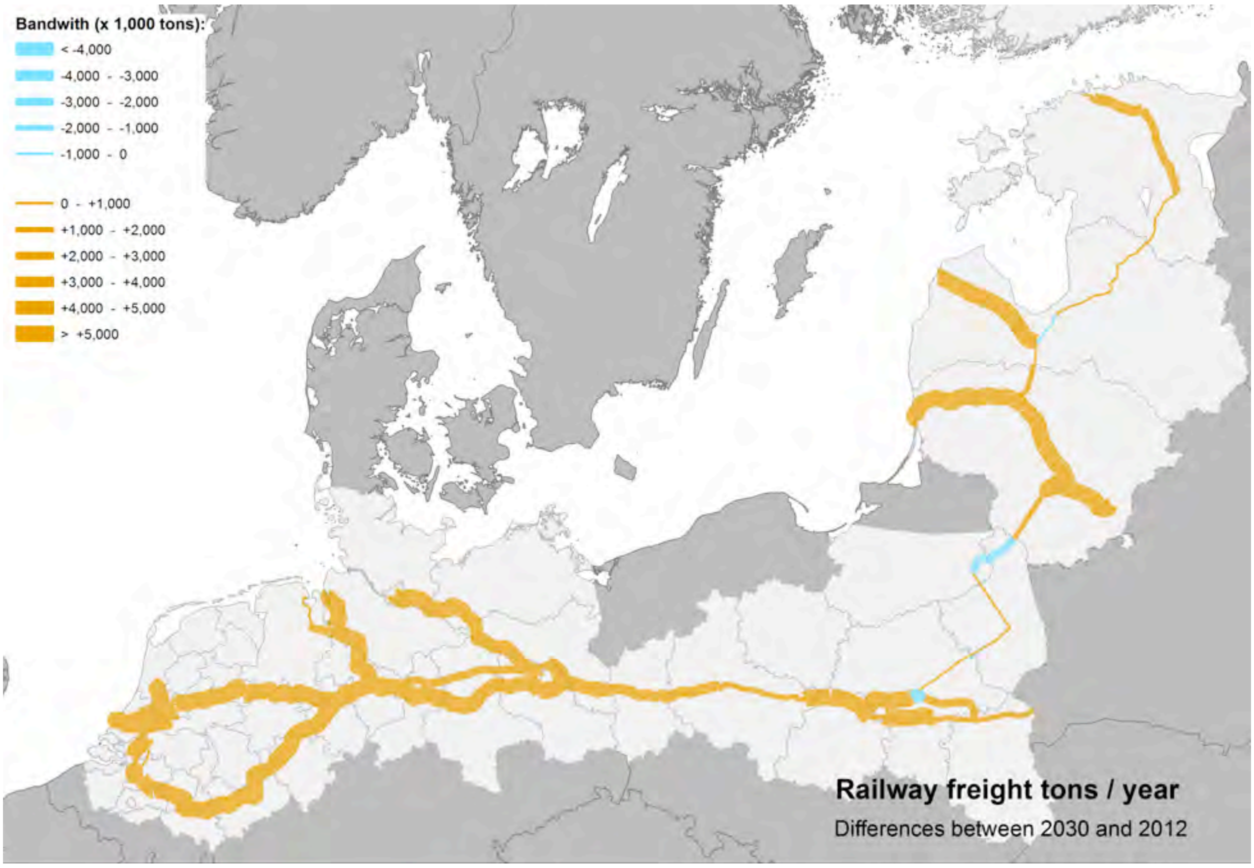
Estimated freight tonnages for Road, Rail and IWW by section in 2012 and 2030 in the western part of the corridor



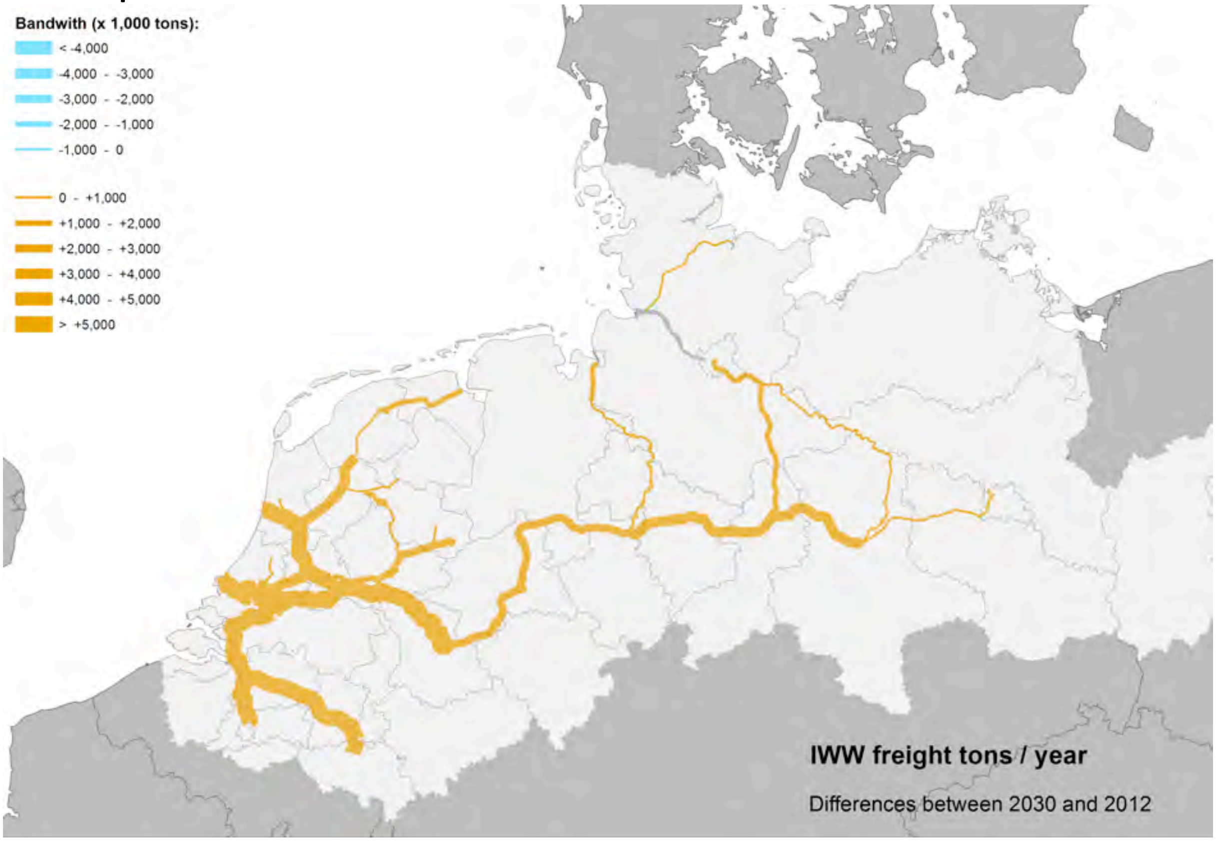


Estimated changes in freight tonnages for Road and Rail by section between 2012 and 2030 in the whole corridor.





Estimated changes in freight tonnages for IWW by section between 2012 and 2030 in the western part of the corridor.

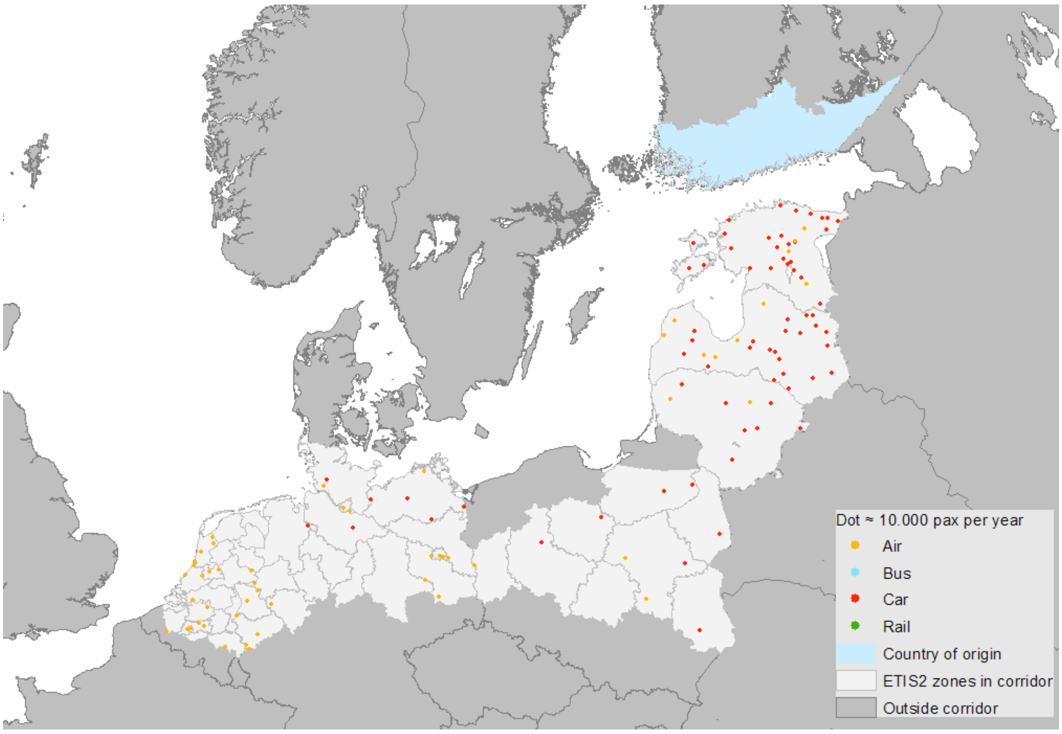


Annex 4.

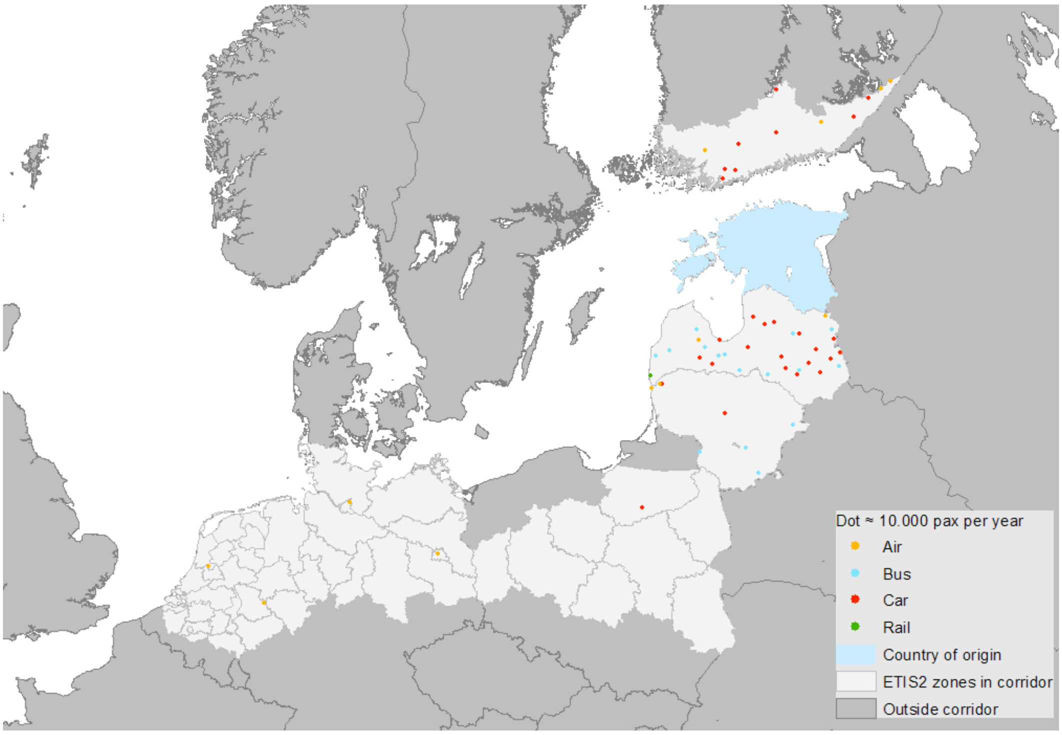
International passenger transport by country of origin within the catchment area to NUTS2 destinations

Remarks: Source: ETISplus2010; dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. air transport of course only arrives at airports; in the western part of the corridor, dots of different modes may overlap.

Finland:



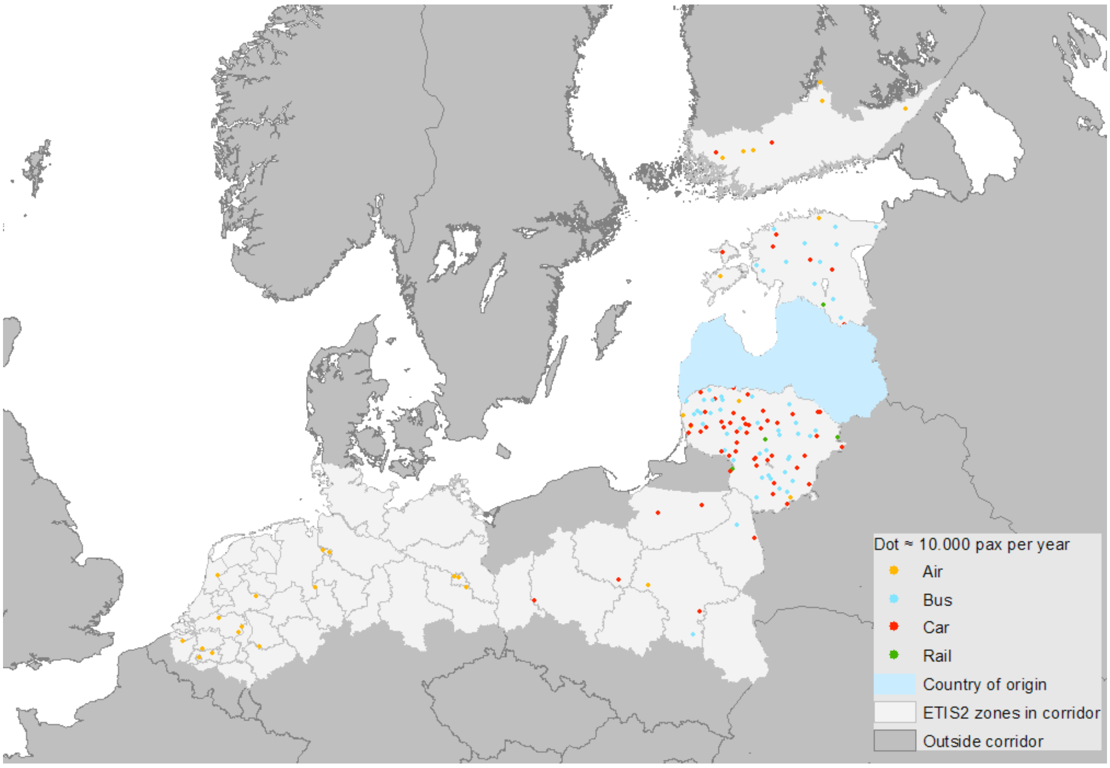
Estonia:



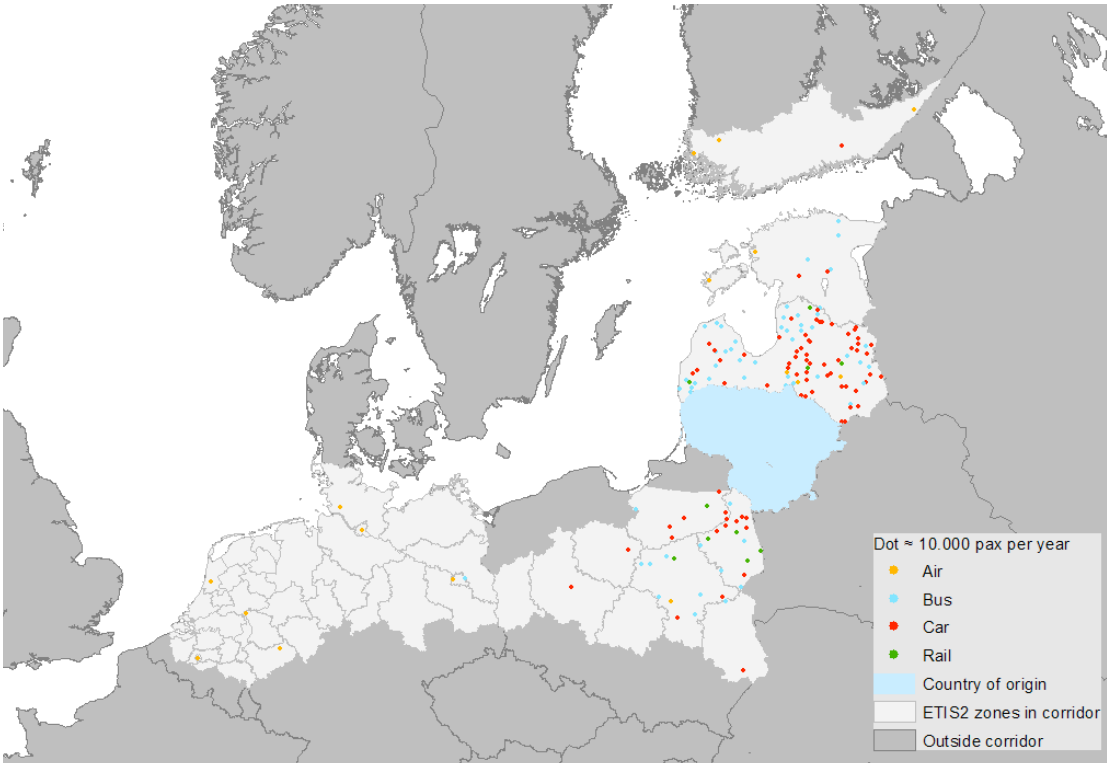
International passenger transport by country of origin within the catchment area to NUTS2 destinations

Remarks: Source: ETISplus2010; dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. air transport of course only arrives at airports; in the western part of the corridor, dots of different modes may overlap.

Latvia:



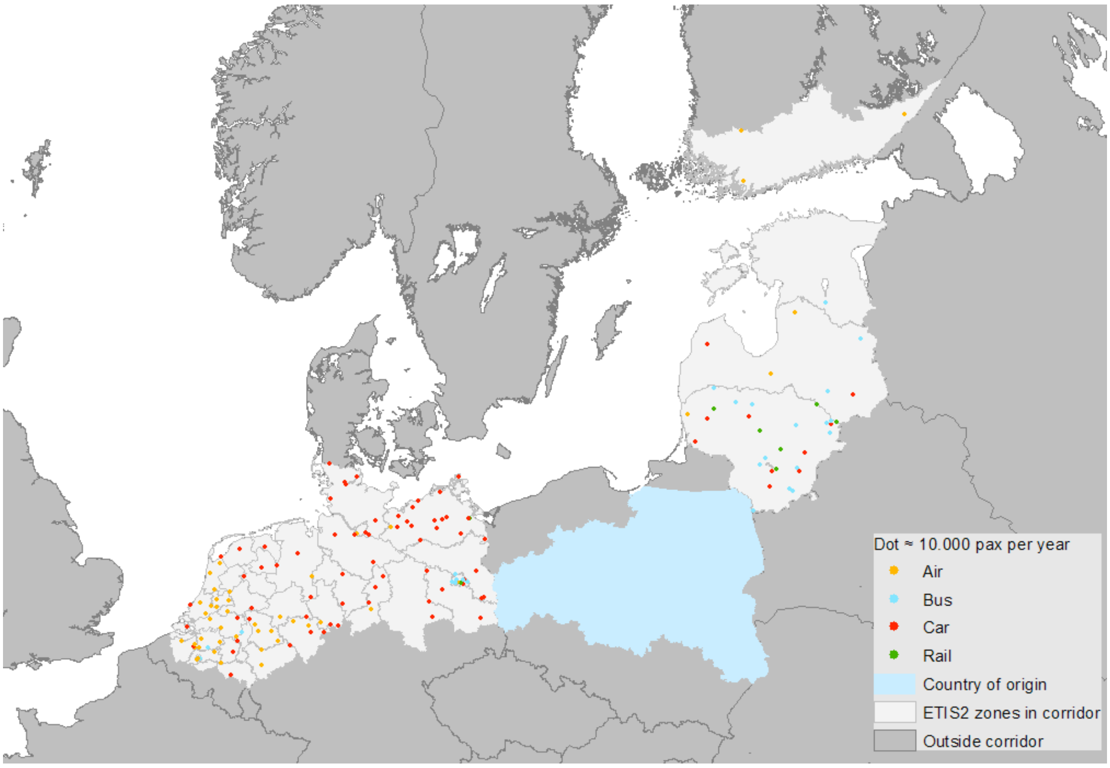
Lithuania:



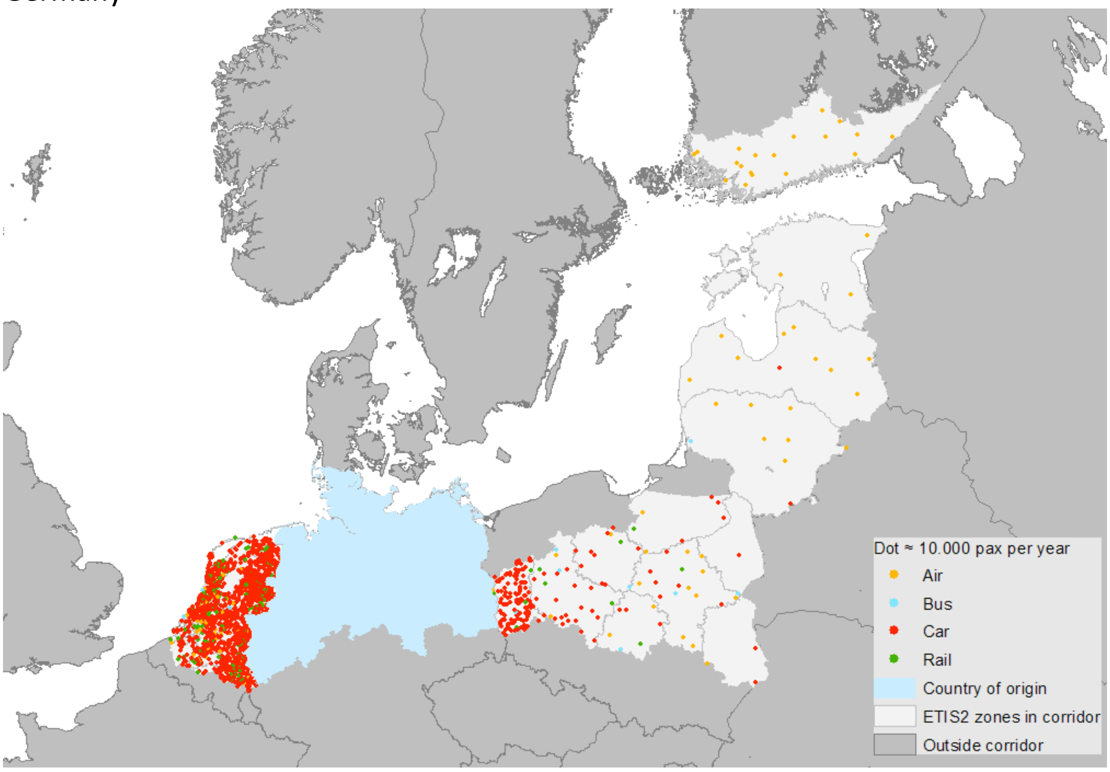
International passenger transport by country of origin within the catchment area to NUTS2 destinations

Remarks: Source: ETISplus2010; dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. air transport of course only arrives at airports; in the western part of the corridor, dots of different modes may overlap.

Poland



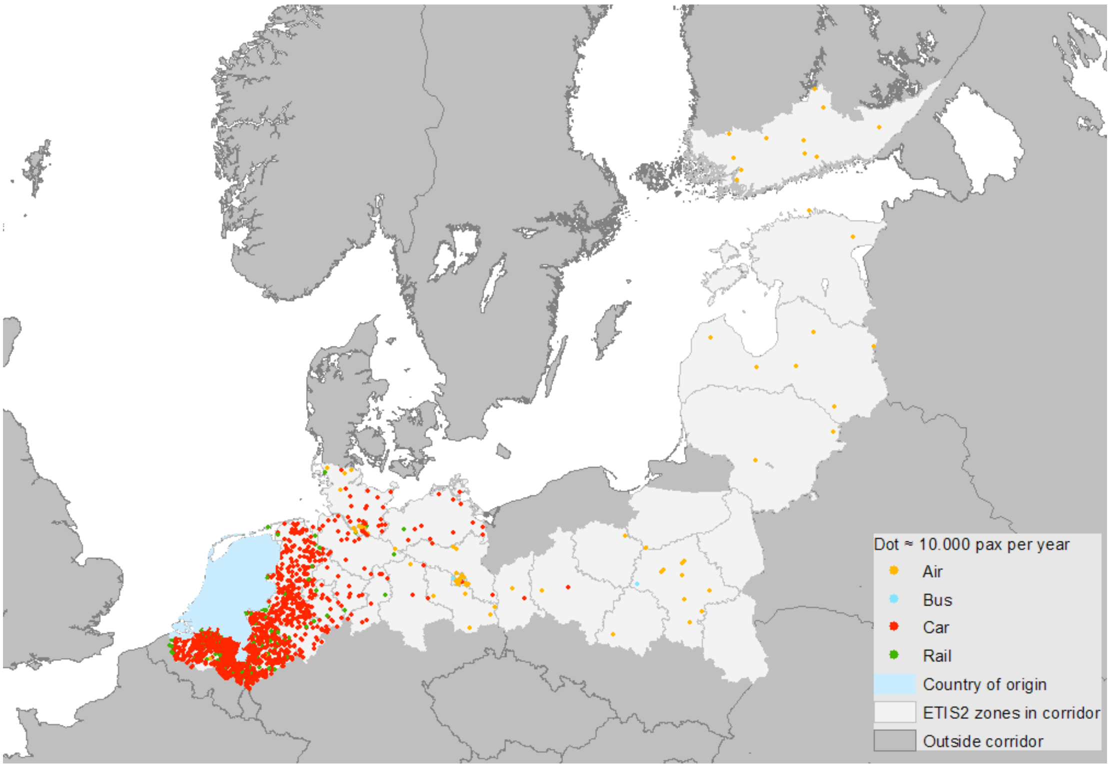
Germany



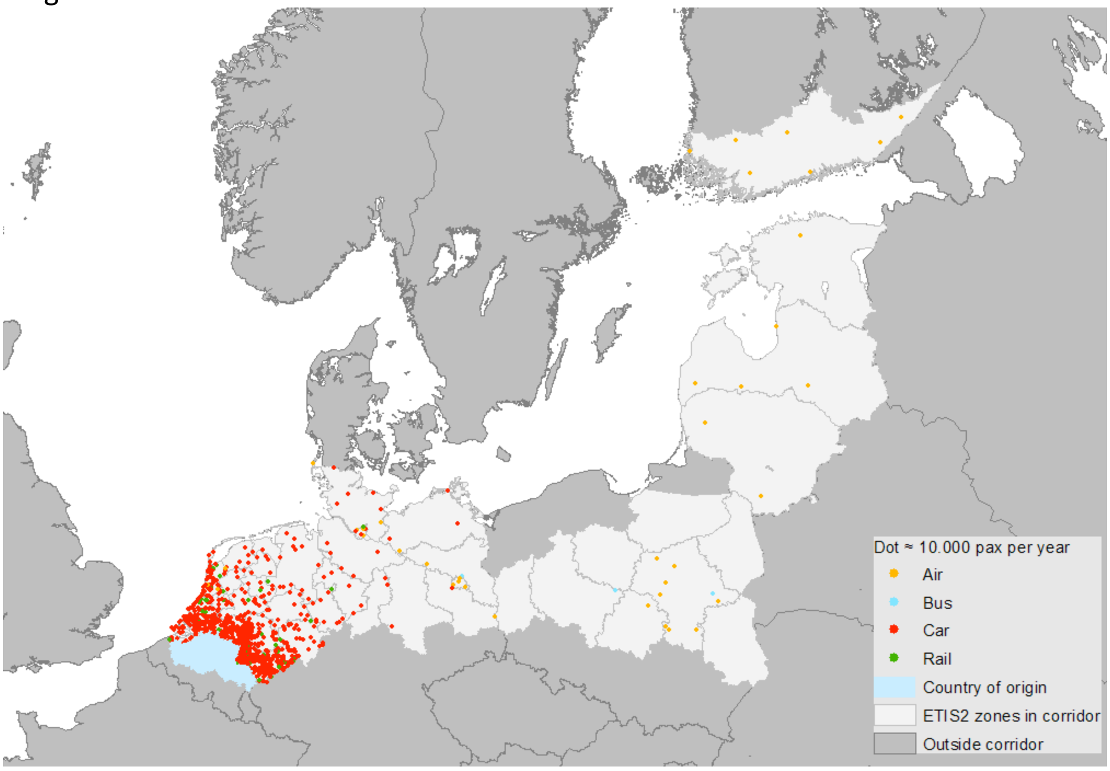
International passenger transport by country of origin within the catchment area to NUTS2 destinations

Remarks: Source: ETISplus2010; dots are randomly spread within each NUTS2 area and do not necessarily represent actual destinations within the area, e.g. air transport of course only arrives at airports; in the western part of the corridor, dots of different modes may overlap.

Netherlands:



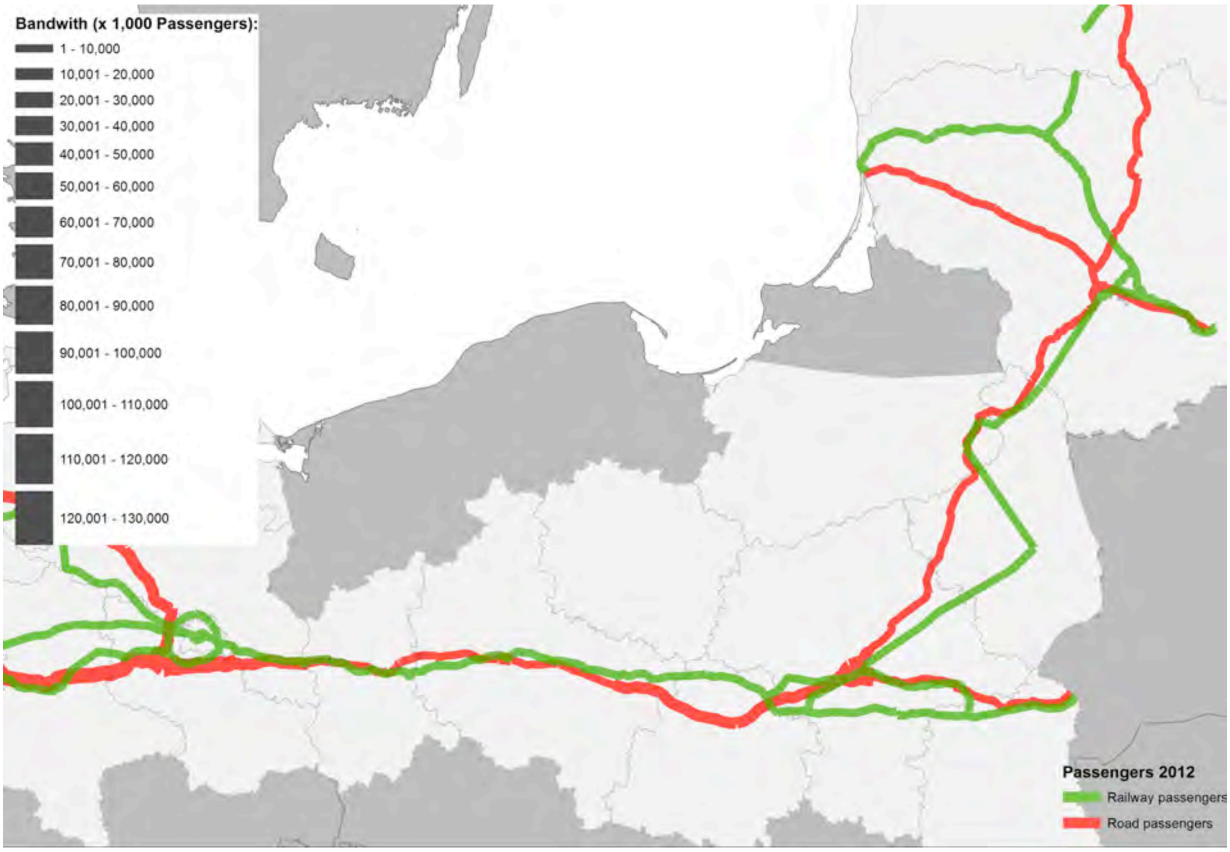
Belgium:



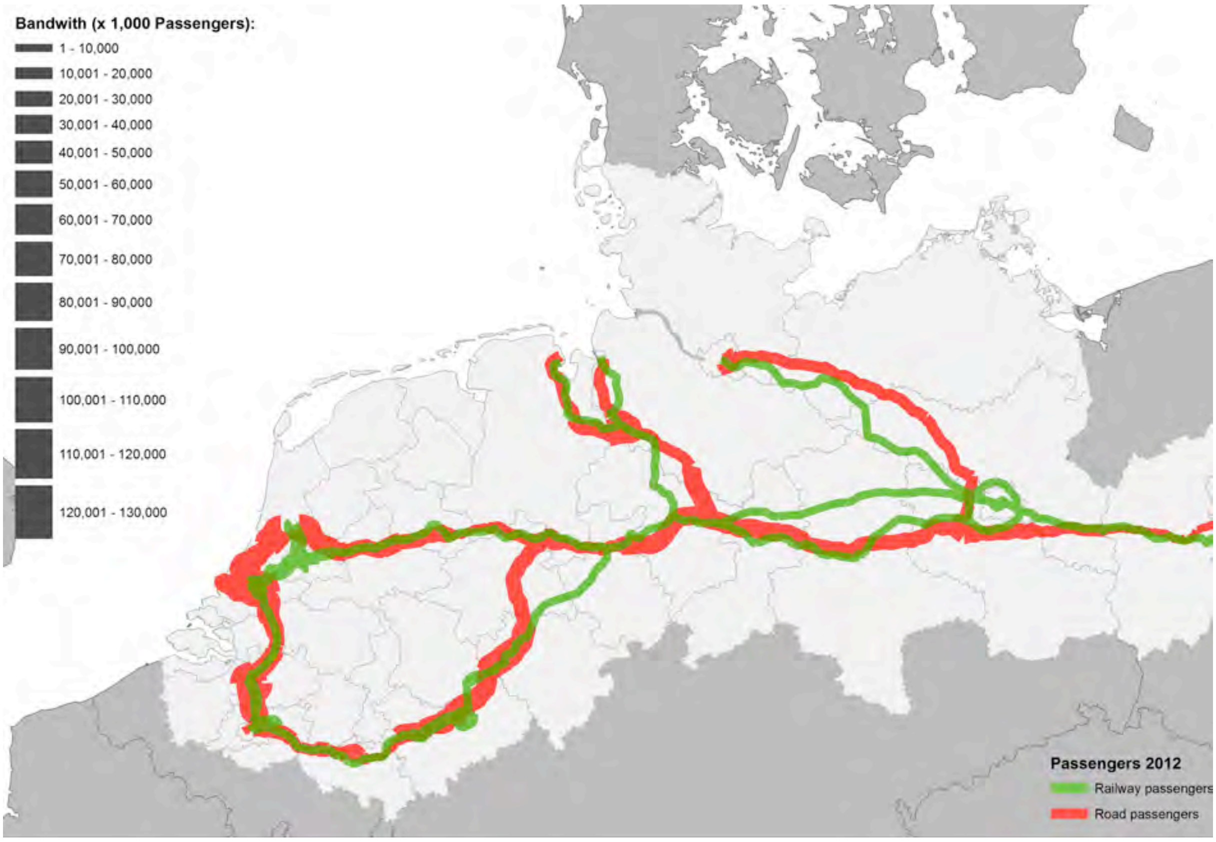
Annex 5.

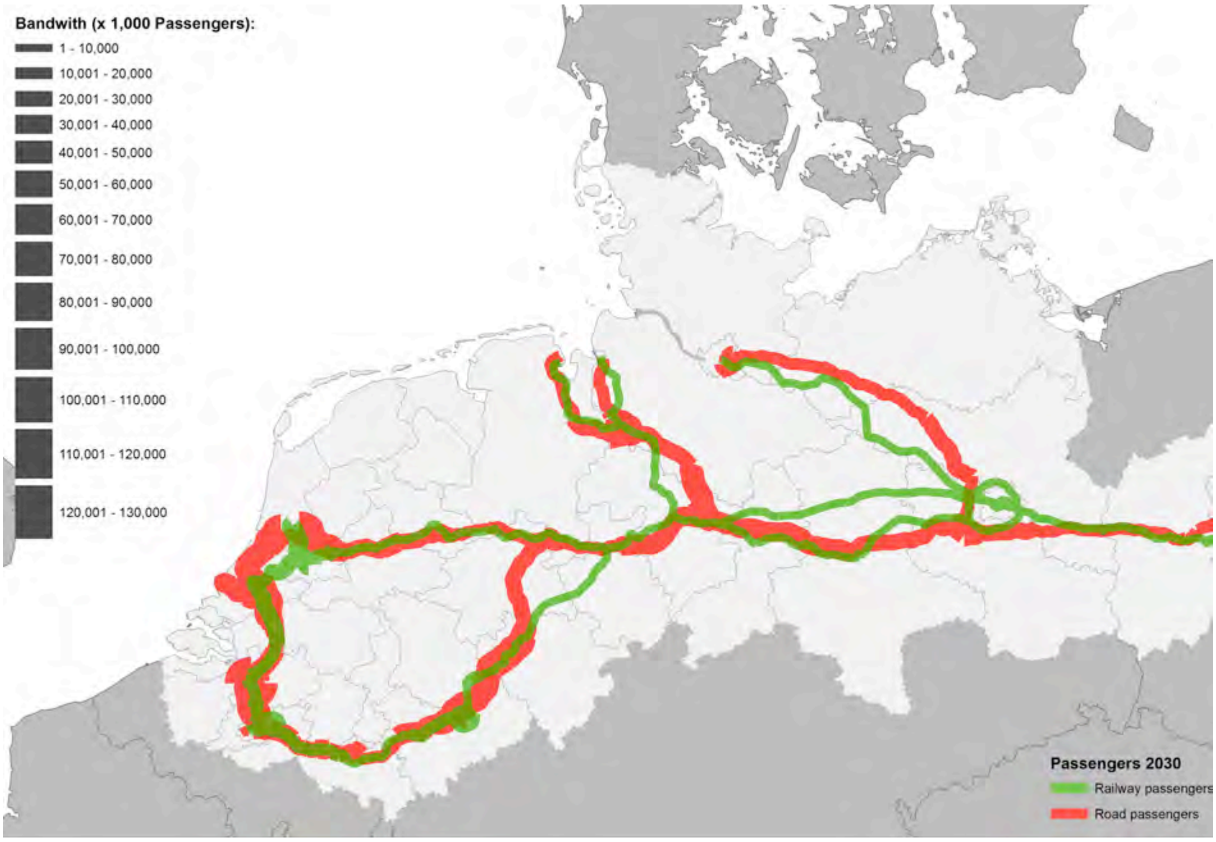
Estimated passenger volumes for Road and Rail by section in 2012 in the eastern part of the corridor.

Estimated passenger volumes for Road and Rail by section in 2012 in the central part of the corridor.

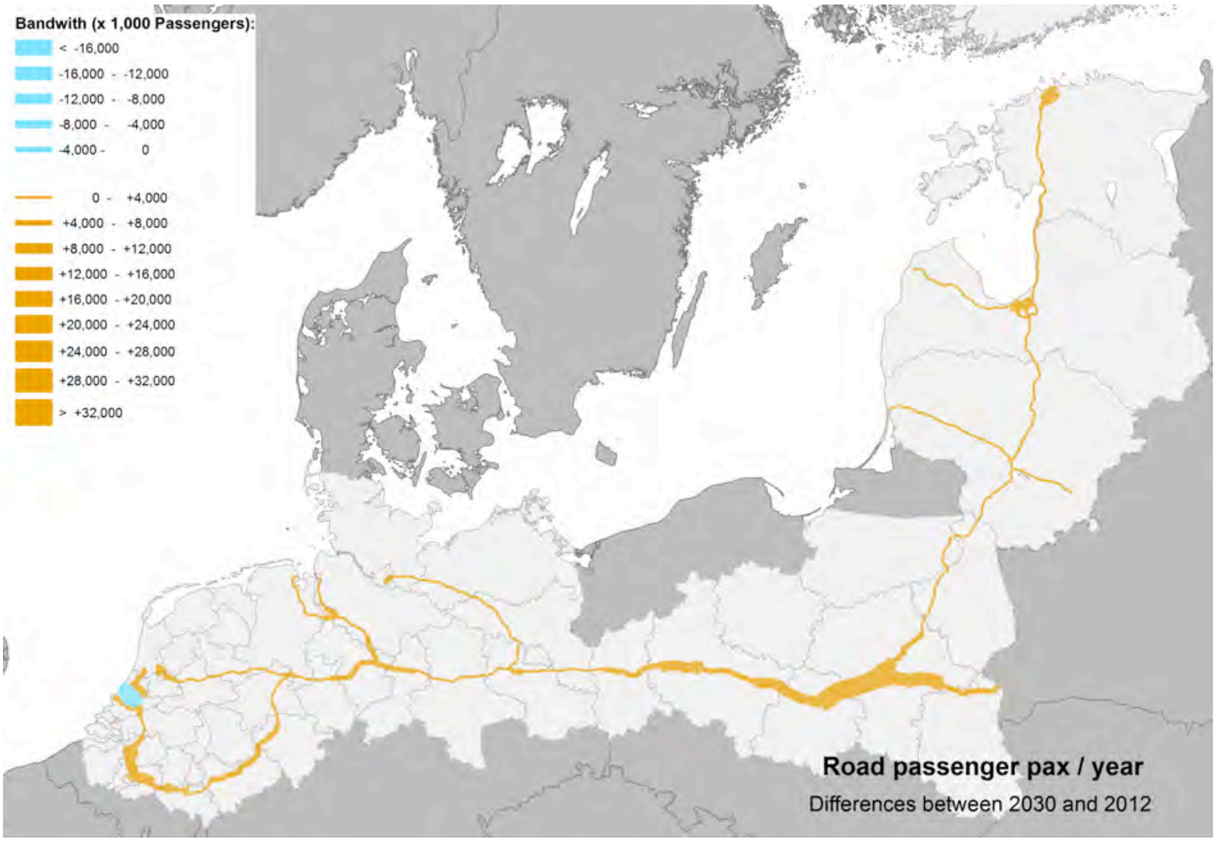


Estimated passenger volumes for Road and Rail by section in 2012 in the western part of the corridor.





Estimated changes in passenger volumes for Road and Rail by section between 2012 and 2030 in the whole corridor.



Chapter 4

Elements of the Work Plan: Helsinki Node

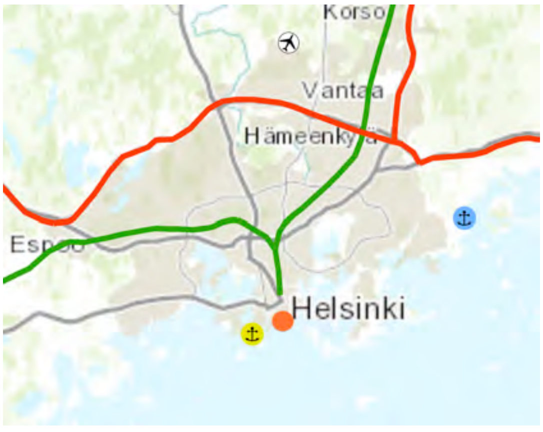
Technical infrastructure parameters for each transport mode

The Helsinki node is part of two Core Network Corridors: the North Sea – Baltic and Scandinavian – Mediterranean.

In Finland, 88% of transport for export and 80% for import use sea transport (2012). The role of railways is 10% in import (mainly Russia) and only 2% in export. Road transport is used 5% in import and 9% in export. The statistics prove clearly the case that Finland – often metaphorically called "an island" – is heavily dependent on sea connections in transport of both people and freight. Also air transportation is strategically important because the long distances and because of an attractive geographical position between Europe and Asia, which has made the Helsinki airport an international air traffic hub.

In the Finnish export and import markets the largest group of cargo is dry bulk products (30%) followed by liquid bulk and forest products (20% each), unitized good (16%) and other products (4%). The biggest imports are from Russia followed by Germany and Sweden. The largest trade partner in the export sector is Sweden, followed by Russia and Germany. Finland is highly dependent on foreign trade. In crisis Finnish oil reserves would last 2-3 days without international energy transport, 2-3 without food transport, and 2-9 days without chemical product deliveries. For the forest sector to continue in operation the threshold is shorter, only 12 hours – 2 days.

In the domestic transport sector (1990-2011) road transport dominates with 25 million tonnes transported per km; 10 million tonnes are carried by rail, while short sea shipping accounts for 5 million tonnes out of the total freight transported internally in Finland of 40 million tonne km (1990-2011). In a geographically large country the size of Finland, the principle of green transport would entail more rail use, whilst Finland is overly dependent on road transport with the connected negative environmental consequences. By way of example, Oulu (the southernmost point and economic capital of northern Finland) is 600 km from Helsinki. There are road security issues related to these long distances, as well as emissions and the costs of extensive road maintenance partly due to the harsh climatic conditions. However, experts in the fields of transport and logistics as well as politicians agree that the existing domestic transport structure can only be changed where there is the political will and economic conditions to shift freight from road to rail. This however would require the internalization of external costs.



Map: The Helsinki Node connects to the FI core network (green – railway, road – red). Helsinki Airport locates in the City of Vantaa (north of Helsinki). The Port of Helsinki has three harbours: the West Harbour (yellow) is the main connection to Tallinn for passengers and freight (ropax); the South Harbour at the city centre is the main connection to Stockholm (orange, ropax); Vuosaari Harbour (blue) is the main harbour for freight. There is currently no rail-road terminal in the Helsinki node. (TENtec)

Helsinki is the northernmost node on the North Sea – Baltic Core Network Corridor and it is also a crossing point for the Scandinavian – Mediterranean Corridor. The cross-border connection between Helsinki and Tallinn consist of a ferry service and air service.

Accessibility is considered as a primary value in competitiveness in all directions: towards the west along the Scandinavian-Mediterranean CNC to Turku and towards the south by short sea shipping to Tallinn, to the north along the FI sections of the core network /Lahti, Tampere, Oulu, and towards east/St. Petersburg.

Helsinki Airport is currently lacking a rail connection to the city centre. This bottleneck will finally be overcome in 2015 when the first phase of the airport railway connection – Ring Rail – will be completed. To further improve the airport connection and other urban transport a second railway project is being planned – City Rail Loop. The project has received TEN-T funding for planning. The vision is to have the planning phase completed by the end of year 2016 and the railway fully constructed by year 2026. The City Rail Loop project has the Government's positive decision in principle. However, the economic sustainability of the City Rail Loop project is yet not fully investigated. If both these projects will be successfully completed the Helsinki Airport will be connected to the city centre and other cities of the Helsinki metropolitan region as well as to the long distance railway line. A figure illustrates:

Figure: The transport model of the Helsinki urban node that consists of the main railway (red) and urban train connections (green). Ring Rail will connect (in 2015) Helsinki Airport to the main railway (red) and city centre by urban rail. City Rail Loop will extend the urban railway around the city centre (estim. 2026). This will allow trains to go across the Helsinki urban node, while currently the city centre is a railway end station. The urban train network will also be connected to the metro system (not shown in the figure). The Espoo city rail project will be completed by 2025 (estimation). (Source Finnish Transport Agency)

A well-functioning multimodal public transport system is of high strategic importance to the cities and regions of the Helsinki metropolitan region. The public transport project for a fast tram connection (Raide-Jokeri – The Joker Line) aims to connect the eastern urban sub-centre (Itäkeskus) across the Helsinki city region to the western urban sub-centre of the metropolitan region Otaniemi in Espoo by metro. The West Metro line will reach Matinkylä in Espoo in 2016 after which it will continue further to Kivenlahti.

Based on the existing transport development plans, the Finnish Transport Agency has estimated that the overall improvement of the Core Network will cost 5 billion € including 1,1 billion € in on-going projects. Most of the investments will be directed to the improvement of the railway network.

Projects by regions and cities

Local transport planning strives to develop services for the local business community, public sector, and commuters and to increase attractiveness of the region for foreign talent and companies. The cities, regions as well as universities and research/project organizations have participated actively in several transnational transport development EU-funded projects including Rail Baltic Growth Corridor, RBGC Russia, Rail Baltic Branding, BSR Inno Ship, Helsinki-Tallinn Transplan.

Regions and cities have initiated several major transport visions: Fly Rail, ESA Rail and Helsinki-Tallinn Fixed Link. The Fly Rail project's vision connects the Helsinki airport efficiently to the long distance railway network and connects the airport to the city centre with a faster railway connection than what urban rail (Ring Rail, City Rail Loop) can offer. The ESA Rail vision connects the Helsinki node on the Scandinavian – Mediterranean CNC to Turku with a high-speed railway that decreases the travel time from current two hours closer to one hour. Helsinki and Tallinn (EE), because of the fast growing transport across the Gulf of Finland, have an initial vision of the Helsinki-Tallinn Fixed Link. A pre-feasibility study is being carried out during 2014 (completed early 2015) in order to determine whether the vision has economic potential to proceed into a transport planning and building project.

Rail network

Rail in Finland dates back to the period of industrialization in 1850-1900 when the Grand Duchy of Finland started an intensive construction of railways. During this time the existing layout of the railway network was set. The railway system of Finland (1524 mm) is technically and operationally independent from the Russian and 1520 mm railway system. There are differences between track gauge, energy supply systems, wagon coupling system etc. Furthermore, Finnish technical requirements are based on the EU technical specifications for interoperability, EN-standards and UIC leaflets. However, there is certain scale compatibility, which allows the running of the Russian standards wagons on the Finnish network, with some conditions. (The small difference between the Finnish and Russian gauge is due to the IS standardization carried out by the Soviet Union in the 1950's whereas Finland maintained the original Tsarist Russian railway standard of exactly five feet, 1524 mm).

The length of the railway network maintained by the Finnish Transport Agency is 5.944 km (01/2013) of which 3.073 is electrified. In 1982, the total network was 6.041 km. By 1996 a total of 381 km of rail had been closed. This decision resulted from increased use of road transport and the high cost of a rail network apart from those of the highest strategic importance. Later this strategy has been questioned as the cost of road transport has increased because of increasing oil prices affecting both road transport and road maintenance and because of the greening strategy within European transport policy.

The Core Network includes two railway sections in Finland. The east-west section runs Naantali/Turku – Helsinki – Kouvola – Vainikkala (and Kouvola – KotkaHamina Harbour) which is the only Core Network Corridor border crossing from the EU to Russia. This section is part of the Scandinavian – Mediterranean Core Network Corridor. The north-south section runs Helsinki – Tampere – Oulu – towards the FI/SE border, but the section is not part of any Core Network Corridor excepting the Helsinki node.

The Helsinki main railway station is the terminus for all long distance and commuter trains that depart/arrive in Helsinki. All trains stop in Pasila station. There are 35 million entries/exits to trains in Helsinki and 45 million in Pasila, but during the rush hour the railway capacity between the two stations is fully utilized. The City Rail Loop, combined with the construction of an additional rail link west from Pasila and the improvement of the marshalling yard at Helsinki station will reduce this bottleneck.

The major improvement of the Helsinki marshaling yard is an integral part of the railway development plan (60 million € in 2016-20 with approved national framework funding, and 85 million € in 2020-30 for new shunting system). Additionally, a new railway line in Keski-Pasila will improve the capacity bottlenecks (40 million € in 2014-20 with approved national funding).

The City Rail Loop, if implemented, will be a double gauge, electrified rail system constructed under Helsinki city centre for commuter trains and covering the major urban areas of Helsinki centre, Pasila, Töölö and Hakaniemi. The City Rail Loop will be of benefit to the whole country as the transport system needs to serve a continuously growing number of rail passengers and the infrastructure in Helsinki region serves intensive commuter train traffic as well as long distance trains. It is estimated that the population of the Helsinki region will increase by 400.000 by year 2035. The City Rail Loop will increase the intensity of rail use because it will provide an alternative access avoiding the existing bottleneck of the existing marshalling yards and it will also lower the cost of public transport in the area as well as reducing travel times for public users. The Finnish Parliament is expected to make a decision about the City Rail Loop before the end of year 2014. Its construction will last 4-5 years and it should enter service in 2018-2020.

A mega vision – Helsinki-Tallinn fixed link

The Helsinki-Tallinn twin cities concept is the fastest growing cross-border economic region on the North Sea – Baltic CNC. The economic interaction between the two cities has grown so large and intensive that both of the cities' economic prosperity, labour market and trade have become largely dependent on it.

Outside the current national transport strategy but because of the intensive interaction between the two cities, the possibility to build a fixed link (tunnel) between Helsinki and Tallinn has been actively debated in Finland and Estonia for some time and has attracted international media attention. In 2014 Harju County (EE) in cooperation with the City of Helsinki and part-financed by the EU Strategy for the Baltic Sea Region Seed Money Facility are carrying out a pre-feasibility study for a Helsinki-Tallinn fixed link (TALSINKIFIX). This study will be completed by January/February 2015 and will conclude whether there are justified socio-economic reasons to proceed towards a full feasibility study of a fixed link. The Helsinki and Tallinn regions together have a population of 1.500.000, and the two countries together a population of 6.700.000 million. The technical alternatives for the TALSINKIFIX project, if ever implemented, are a railway tunnel or a combination of a railway tunnel and bridge(s).

Road network

The Finnish Transport Agency (FTA) has overall responsibility for the development and maintenance of the road network. FTA operates under the supervision of the Ministry of Transport and Communications. The regional execution of road maintenance belongs to the regional Centres for Economic Development, Transport and the Environment (Uusimaa ELY Centre for the North Sea – Baltic CNC). Although the ELY Centres are run by the Ministry of Employment and the Economy, they also deal with tasks coming under the administrative branches of the Ministry of the Environment, Ministry of Transport and Communications, Ministry of Agriculture and Forestry, Ministry of Education and Culture and Ministry of the Interior.

The Core Network includes two road connections in Finland. The east-west road (including the E18 motorway) runs from Naantali/Turku – Helsinki – Hamina/Kotka – Vaalimaa (which is the CNC border crossing point to Russia). This is part of the Scandinavian – Mediterranean Core Network Corridor. In the south – north direction E75 European Route runs Helsinki – Jyväskylä – Oulu –north to FI/SE border, but it is not part of any Core Network Corridor except for the Helsinki node. European Route E12 (including the Helsinki – Tampere section) is not part of the Core Network, although it is one of the busiest passenger and freight roads in southern Finland.

The road network in the Helsinki node meets the requirements of the Regulation but the increasing traffic volumes cause new bottlenecks. FTA is implementing the Ring Road III project (2013-16) in order to improve the situation relating to traffic congestion in the region of Helsinki airport and along the section towards Porvoo (E18 Road No 4 Lahdenväylä – Road No 7 Porvoonväylä). The Ring III works are also part of the improvement of intermodal connections from the Vuosaari Harbour to its hinterland. Further needs for improvement on Ring Road III exist to improve efficient connections to the logistics hubs, improve road safety and decrease travel times and for noise reduction.

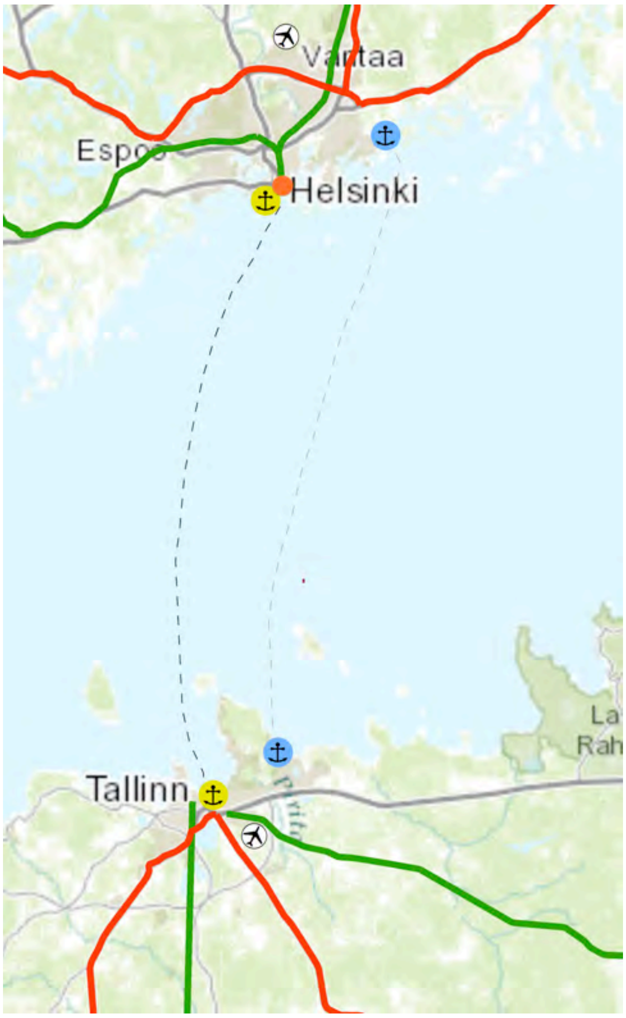
Helsinki-Tallinn Baltic C-ITS (and Helsinki-Tallinn hub) is a project that promotes the use of ITS for the benefit of passenger and freight transport. Mobility as a Service (MaaS) development strives to bring ITS services both to public users and citizens and to encourage multimodality. The promoters of the project include the Cities and Ports of Helsinki and Tallinn, road network managers and transport service providers. The Finnish Transport Agency supports the project initiative.

Port

The connection between Finland and Estonia

For the Helsinki node the Regulation’s list of pre-identified sections includes the development of port interconnections to Tallinn, further development of multimodal platforms and their interconnections, icebreaking capacity and Motorways of the Sea. In the Helsinki-Tallinn Twin-Port project, € 11,3 million of TEN-T funding has been awarded to increase and facilitate the ship and ferry traffic capacity between the two ports. TEN-T funding covers 20% of the total costs of € 56,3 million. Self-financing accounts for 76% for the Port of Helsinki and 24% for the Port of Tallinn.

Helsinki is the second biggest port in Finland after Kotka-Hamina with a specialization on unitized cargo services for Finnish companies engaged in foreign trade. The Port of Helsinki offers regular and frequent ship traffic combined with efficient stevedoring operations.



Map: Vuosaari Harbour (blue, part of Port of Helsinki) and Muuga Harbour (blue, part of Port of Tallinn) are the main freight harbours of Helsinki and Tallinn. The long-term goal is to shift as much as possible of the freight transport away from the central harbours (yellow, West Harbour HKI and Old City Harbour TLN) to concentrate on the link between Vuosaari and Muuga in order to lower traffic density in the city centres. This entails efficient multimodal connections at Vuosaari and Muuga, e.g. implementation of the Rail Baltic project. (TENtec)

There is no intermodal logistics center (rail road terminal) in the Helsinki node. The two existing rail road terminals on the Core Network are in Kouvola (Scan-Med CNC) and Tampere.

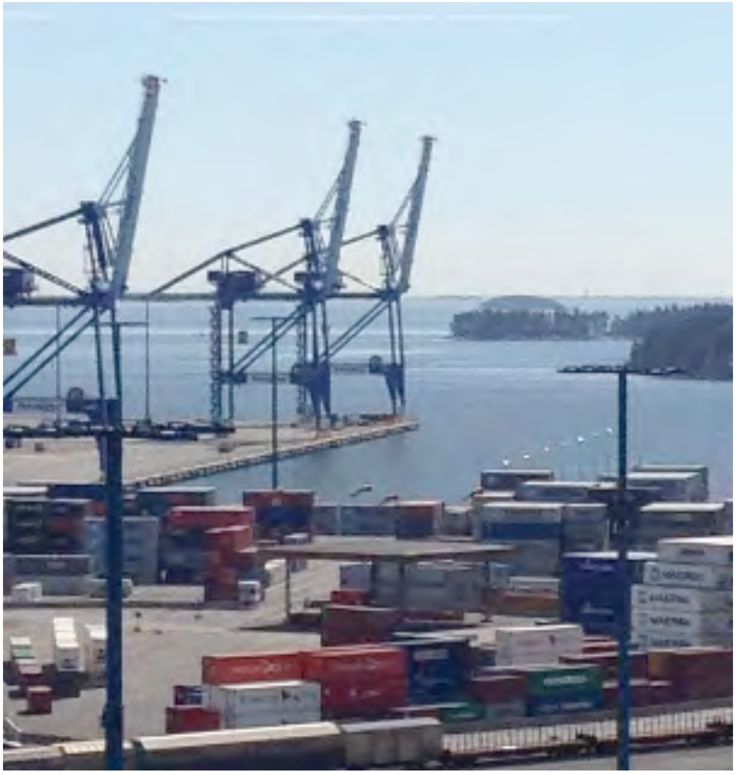
The terminals of the Port of Helsinki consist of the Hansa Terminal in Vuosaari which serves passenger carrying cargo vessels. In pure cargo traffic, Vuosaari Harbour has container and Ro-Ro facilities. Private operators have several terminals (e.g. Finnsteve: 3 terminals/50.000 m^2.) Vuosaari was opened for traffic in 2008. Storage capacity in terminal and warehouse buildings' is approximately 200,000 m^2. It is capable of handling annually up to 1.2 million TEUs, and 800.000 trucks and trailers. The Vuosaari Harbour area covers approximately 122 hectares of open dock and some four hectares of heated storage.

Vuosaari Harbour is connected to the road and rail networks. Ring Road III which connects the major Helsinki region is the primary road connection to Vuosaari. There are also fluent train connections: the port railway (which joins the main railway line in Kerava) runs directly to Vuosaari Harbour quays and terminals. There are direct vessel connections to various ports in Europe, Russia, Asia, the Middle-East and North-America.

On the Baltic Sea (excluding Russian ports) in 2010 (trucks and trailers) the Port of Helsinki was the third largest port after Lübeck and Trelleborg. Among all Finnish ports, the Port of Helsinki has the leading position in freight transport with 10,7 million tonnes of the total 32,3 million tonnes. In all freight operated at the ports, the ratio between export and import is 48%/52%. The largest cargo volumes consist of dry cargo (other than bulk).

The biggest passenger harbours in Finland are also in Helsinki – the West harbour and South harbour – with connections to Tallinn, Stockholm, Travemünde, Rostock and St. Petersburg are also part of the Port of Helsinki. The West and South harbours are connected only to the local road network and the inner city tram network. Since both passenger harbours have a central location (whereas Vuosaari is east of the city) and road freight is an important part of their business model, this also causes traffic congestion.

The Port of Helsinki together with six other ports (Århus, Helsingborg, Malmö-Copenhagen, Tallinn, Turku and Stockholm) have formed the LNG in Baltic Sea Ports project which aims to build a joint implementation strategy for LNG service for vessels in the Baltic Sea.



Picture: Port of Helsinki, Vuosaari Harbour (photo BrandPerfect)

Icebreaking in Finland

Icebreaking is needed to secure the safety of commercial vessels and guarantee the fluency of Finland's import and export in winter. Icebreaking concerns the whole coastline of Finland from the Gulf of Finland to the Gulf of Bothnia. There are currently eight Finnish icebreakers, three of which are modern multi-purpose icebreakers. Five traditional icebreakers have been built (or last modernised) in the 1970's and 1980's. Three multi-purpose icebreakers have been built in the 1990's.

Ice-breaking for the Helsinki node is organised by the Finnish Transport Agency /Winter Navigation, Helsinki VTS (vessel traffic service), GOFREP centre (mandatory ship reporting system) and ice-breaking service providers. The collaboration agreement on icebreaking between the Estonian National Maritime Board (ENMB) and Finnish Maritime Administration (FMA) dates back to 1995.

The icebreaker fleet consists of Voima (Arctia Shipping Oy), Zeus (Alfond Håkans AS) and a multi-purpose icebreaker Nordica /Fennica (Arctia Shipping Oy). Every year in November-December the fleet starts its season on the Gulf of Finland. The need for icebreaking may change greatly from year to year and reliable estimations about the resistance of ice cannot be made until mid-January.

The Finnish Transport Agency is planning on an acquisition of a new basic icebreaker that can be used also for year-round oil destruction and emergency tows in demanding high sea conditions. The vessel has been especially designed for the conditions of the Baltic Sea. The ownership and operationalization of the vessel are currently in political discussion.

Airport

Trafi (Finnish Transport Safety Agency) is the air traffic authority in Finland. Helsinki airport (formally called Helsinki-Vantaa airport) (IATA: HEL, ICAO: EFHK) is the largest airport in Finland and also a leading transport hub between Europe and Asia. Approximately 90% of Finland's international air traffic goes through Helsinki airport. There are over 500 departures and arrivals daily and the annual number of passengers is 15 million. Helsinki airport is the fourth largest airport in the Nordic countries after Copenhagen, Oslo and Stockholm (Arlanda).

The airport (1.700 hectares) is located in Vantaa which is a neighbouring city 18 km from central Helsinki. The airport and navigation systems are operated by Finavia which employs 3.500 people and the airport has a working population of 20.000 in total. The airport has three runways and the two terminals, which are 250 m from each other, are connected by a passage way. Helsinki airport operates scheduled flights of approximately 30 airline companies, 10 charter airlines, 10 freight airlines and 3 business jet airlines. Finnair (IATA: AY, ICAO: FIN, est. 1923) has scheduled and charter flights all over the world and is the 21st largest airline company in Europe by scheduled passengers carried. Helsinki airport has several shopping areas and has been selected several times among the best service airports in Europe.

Currently, Helsinki airport is connected to the city only by the road network. However, the plan to connect the airport to the city centre by rail is part of the so-called Ring Rail project (Kehärata) which is part-funded by the TEN-T. The Ring Rail project will connect the airport to the existing rail network in two directions: the city centre will be reached through Tikkurila in the east (the shorter route) and Vantaankoski to the west. The Ring Rail will better connect major suburbs of Helsinki and Vantaa by rail. It is estimated that the project will open in July 2015.

The City Rail Loop project (7,5 km, Pisararata in Finnish), if it proceeds to implementation, will further improve the railway connection to Helsinki Airport. The project is currently in its planning stage supported by TEN-T funding (2012-14). While Ring Rail will connect the airport to the railway network that serves the wider Helsinki metropolitan region, the City Rail Loop (Pisararata) would connect the airport to the central city region and the major sub-centres and to the tram and bus network. The cost estimate of the City Rail Loop is 1 billion €.

In addition to the Ring Rail there are several on-going transport and business development projects. They aim at increasing the economic base of the Helsinki-Vantaa agglomeration including the Aviapolis business district and support the development of green transport (e.g. SYÖKSY project of electrified connecting transport to railway stations) for passengers and commuters.

Airport Rail

The Airport Rail project is an initiative outside the national transport strategy but part of regional planning (Lentorata in Finnish, cost estimate 1 billion €). Airport Rail aims to better connect the Helsinki region and airport to fast long-distance train connections to Tampere, Turku and St. Petersburg (via the Allegro train).

Logistics hotspots

There is no rail-road terminal at the Helsinki node on the Corridor. The Port of Helsinki has initiated a project idea to develop intermodal terminal services around the Helsinki node and the plan includes also the development of dryports.

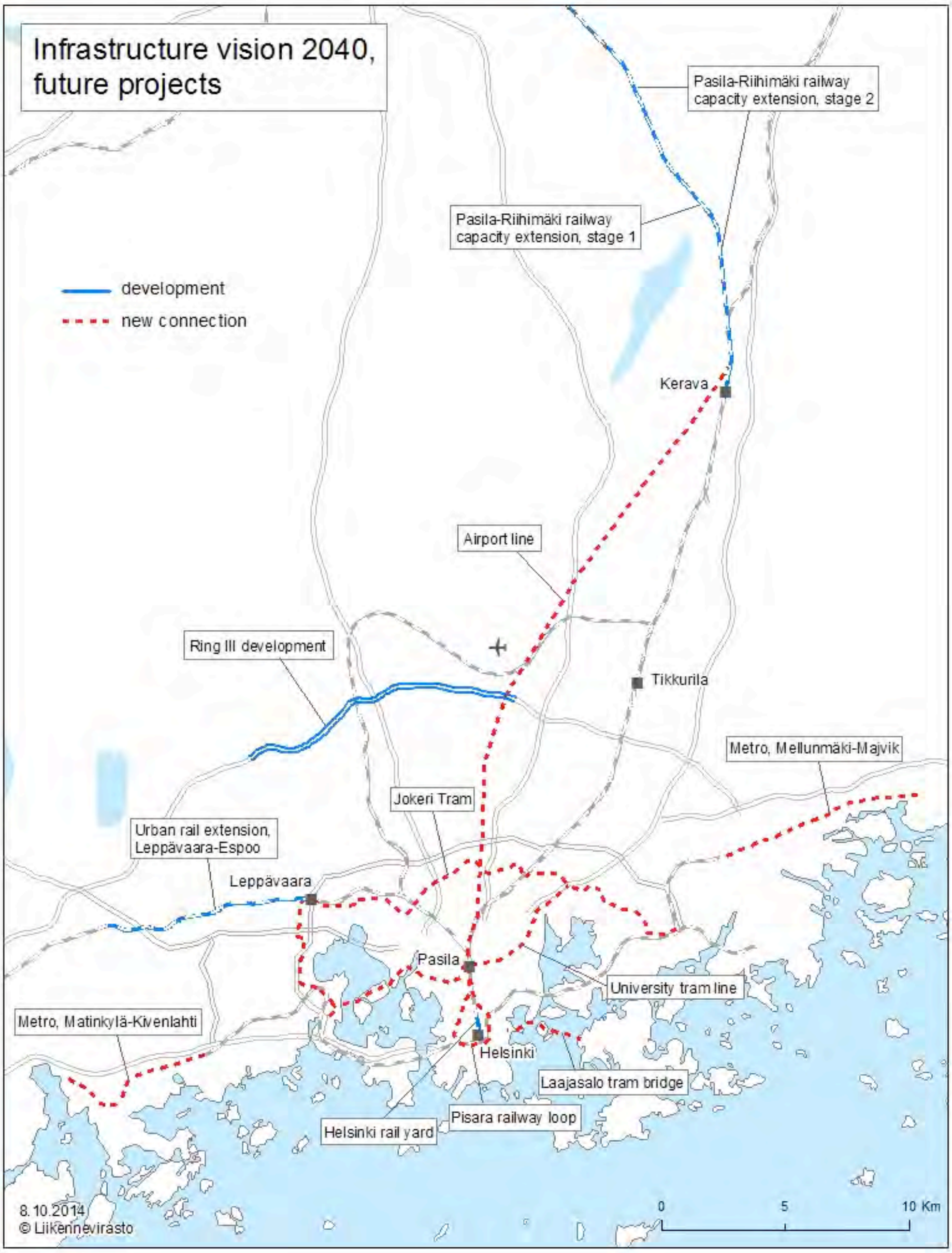
The Helsinki node consists of the Vantaa-Uusimaa logistics region and the following logistics centres: Pressi (in Vantaa, SRV), K3 (Vantaa, YIT), Rasti (Vantaa, EKE), Aviapolis (Vantaa), Viinikkala (Vantaa, south of the airport), Focus (Tuusula), Kerca (Kerava), Freeway (Sipoo), Kytömaantie (Kerava), Ilvesvuori (Nurmijärvi). The LIMOWA logistics cluster is a stakeholder group of logistics centres and operators which collaborates with spatial planning authorities at the city and regional level.

Vision of Transport System in the Helsinki Node

From the Corridor perspective, summing up both the national transport strategy and on-going regional planning the long-term vision of the transport system in the Helsinki node consists of the following elements (NB. The list includes both projects that are well underway in implementation and new emerging project ideas):

- Long-distance trains from city centre to west and east (Scan-Med CNC), north (FI Core Network). This element of the vision includes the existing Allegro train to St. Petersburg and the tentatively planned (by regions' initiative) ESA Rail and Airport line.
- Urban rail efficiently within the region and connecting the airport. This element of the vision includes the Ring Rail (completed 2015) and City Rail Loop (in planning).
- Tram lines in the city centre and additional speed trams lines that add to the urban train network. This element of the vision includes the Joker Tram project in three development phases.
- Metro line from east to city centre (existing) and its forthcoming continuation towards west to Espoo.
- The two passenger harbours of the Port of Helsinki are connected to the passenger transport network by tram and bus network.
- While Vuosaari harbor continues to develop as the main freight harbor the West harbour continues to have both passenger and freight transport. One alternative to decrease heavy traffic through the city centre to West harbour is to build a road tunnel (below Mechelin street; the vision not yet initiated into a project idea).
- The Helsinki-Tallinn cross-border region is expected to continue its economic growth and it forms a unique economic zone on the CNC. The cooperation in transport development between the twin cities and with the EU continues actively. Development projects that combine both transport and regional development goals are initiated.

The vision of the freight transport system at the Helsinki node is largely based on the key role of Port of Helsinki because of the crucial role of short sea shipping. Improvements in the road network and especially in the Ring Road connection (requires several projects, including E 18 section between Lahti and Porvoo crossings, 48 million € in 2014-16) are important to connect Vuosaari harbor efficiently and smoothly to its catchment area. Additionally, the aim to shift more freight from West and South Harbour to Vuosaari entails improvements in the Vuosaari harbor facilities. The overall increase of passenger traffic by sea between Helsinki and Tallinn supports this goal. The development of logistics hotspots and dryport concept are part of the development plan are part of the freight transport vision in which the major freight port is efficiently connected to logistics services.



Map: The vision of the Helsinki Region infrastructure projects towards 2040 (Source: Finnish Transport Agency)

Chapter 5

Elements of the Work Plan: Estonia

Technical infrastructure parameters for each transport mode

Estonia (population 1.320.000) joined the EU in May 2004 and the Monetary Union at the beginning of 2011. The economic development of Estonia and conversion with the rest of the EU was rapid in 2000-06 but the financial crisis affected the economy severely in 2008. Due to promptly implemented severity measures, structural reforms and the relative stability of its main export markets the Estonian economy has been recovering slowly but steadily since 2009. The public debt remains one of the lowest in Europe but in 2011-13 the inflation rate was one of the highest in the EU. The biggest cities are the capital Tallinn (>400.000 inhabitants) and Tartu (>100.000). Narva, Pärnu and Kohtla-Järve are cities with a population of over 30.000 inhabitants.

Figure: The existing 1520 mm gauge railway infrastructure shows in the map as green line via Tartu in eastern Estonia. The planned 1435 mm European standard gauge railway would run south from Tallinn the shortest way to the Latvian border (green line) in parallel to Via Baltica. (TENtec)

Estonia has a sea connection to Finland over the Finnish Gulf with a distance of only 80 km. Between Tallinn and Helsinki which are often called twin cities because of their active interaction in commuting citizens, trade and tourism. There is a multitude of short sea ferry connections between the two cities, and the fastest connection is less than two hours. Annually there are 7,5 million passengers and 1,3 million vehicles crossing the gulf between the two countries.

Estonia is well connected also to Sweden as there are regular passenger and cargo ferries operating between Tallinn and Stockholm as well as between Paldiski and Kapellskär.

Estonia is connected to Russia with a road and rail connection through the Narva border crossing point in the north-east. From the second biggest city of Tartu there is a road and rail connection to Pskov in Russia (distance 170 km) with two international border crossing points on the south-east border for trucks, cars and passengers and a recently commissioned international railway border station at Koidula connecting Estonia with the Russian Federation.

The southern neighbour of Estonia is Latvia. The countries are connected by Via Baltica through the Ikla border crossing point and at the twin cities of Valga (EE) and Valka (LV) which also is an international railway junction and with multiple road connections of international, regional and local importance.

The overall transport structure of Estonia is marked by an over-dependence on road transport and the absence of railway connections using the UIC gauge, as all Estonian public railways are built using the 1520 mm gauge and associated technical standards. All three Baltic States have national railway companies but none of them operates an international connection that covers the three countries. The international railway connections serve mostly the transit transport to Russia, Belarus, the Ukraine and to the eastern markets beyond (Kazakhstan, China, etc). Although the distances to the largest cities of the other Baltic States are short, there is no competitive transport connection between them except for roads. The time distance to Riga (LV, 308 km) is 3:56 hrs by car whereas by rail it is currently 8:08 hrs (minimum).

In Estonia, the capital Tallinn is the only urban node in the TEN-T Core Network. However, Tartu in the south and Narva in the north-east can be regarded as other strategic transport hubs because of their important role in the national economy and transport systems.

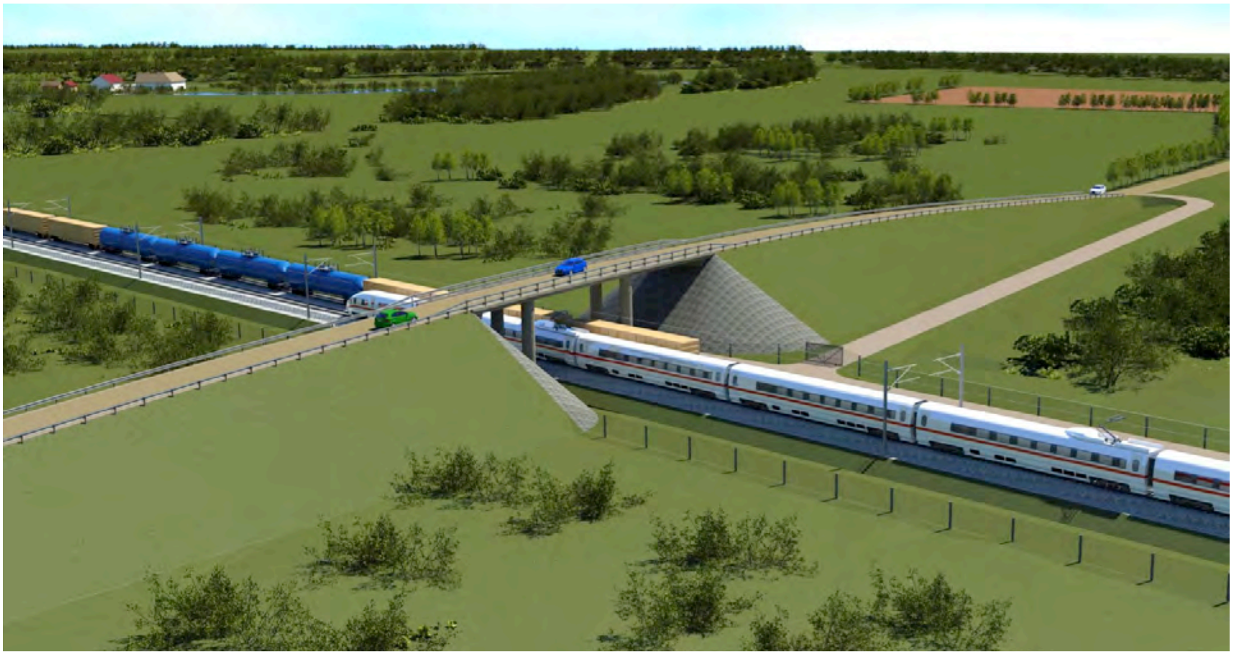
Railway network

Figure: Railway infrastructure in Estonia: Estonian Railways and Edelaraudtee.

The Estonian railway network covers the mainland part of the country. Most of the network belongs to the state-owned Estonian Railways (AS Eesti Raudtee) whereas the regional lines in the South-West are owned by a private company Edelaraudtee Infrastruktuuri AS. These railway network infrastructure managers provide all railway network services for railway operators that run freight and passenger services. The state-owned AS Eesti Raudtee owns and manages approximately 800 kilometres of track, of which 107 kilometres is double track and 132 kilometres is electrified. Edelaraudtee Infrastruktuuri AS maintains 298 kilometres of track which consists of 219 kilometres of main line and 79 kilometres of station line. The railway network connects Tallinn to the other bigger cities (Pärnu, Viljandi, Tartu, Narva) and to the smaller ports of Kunda, Sillamäe and Paldiski. The rest of the network stretches to the inland and border crossing points. Although the railway network is not very intensive, it covers the majority of the country.

Financed by the European Union the TEN-T Priority Project Nr 27 Rail Baltica has carried out reconstructions on the existing Russian gauge (1520 mm) lines in Estonia, Latvia and Lithuania. The reconstruction works on the Estonian railway from Tallinn through Tartu and Valga to the EE/LV border crossing have been completed.

The European 1435 mm gauge railway 'Rail Baltic/Rail Baltica' which is planned to be built by the mid-2020's has as its optimal route on the geographically shortest alignment from Tallinn to Pärnu to the EE/LV border crossing on the Baltic western coastline. The planning phase of the new Rail Baltic railway in Estonia has been progressing expediently and by now most of the alignment has been agreed and fixed at the county and local level. The remaining few sections where disagreements continue regarding the final alignment of the tracks are south of Tallinn and nearby Pärnu. There the alignment will have to be clarified and set forth by summer 2015.



Picture: Illustration of a road bridge and Rail Baltic 1435 mm railway (Source: Hendrikson&Ko)

Passenger railway connections

The railway network in Estonia serves mostly domestic traffic. There are 4,3 million (2013) passengers on the railways annually, which divided by the number of the population (1.300.000) gives an index of 3,2 (in comparison with Finland at 13,2). The low volumes of passengers on railways are largely explained by the very limited international rail service and the fact that there were not enough investments into the modernization of railway infrastructure and services until the country's membership in the EU. The very recent introduction of new and modern electric and diesel-powered regional passenger trains to the whole rail network is already reflected in the significant rise in passenger numbers on local commuter routes and the switch of passengers from traditionally popular bus services to rail on longer regional destinations (e.g. Tartu, Viljandi and Narva).

Picture: The winning architecture design of the Ülemiste station.

From Tallinn there is a railway connection to all other major Estonian cities including Narva, Paldiski, Tartu, Pärnu, Viljandi and Valga. The Estonian private passenger railway operator AS GoRail has connections from the capital Tallinn to Moscow and St. Petersburg in Russia.

Freight railway connections

The vast majority of the rail freight in international trade is transported in the east-west direction utilizing the favourable geographical position of modern Estonian (nearly ice-free) commercial ports to export Russian oil and chemical products, coal, timber, grain and fertilizers. The share of inbound container traffic has seen a healthy growth during the last decade facilitated also by the launch of regular container rail shuttle services to Moscow, Kazakhstan and China.

The share of rail of the total freight on the north-south freight axis was only 6% in 2008 whereas the largest volumes of rail freight were transported domestically and with Latvia. International north-south freight transport by railways is small because of the complicated administrative process of crossing multiple state borders on the relatively short travel distance. Different countries and railway infrastructure managers en route impose their own rules and regulations for the rolling stock, locomotives and the train drivers making a cross-border North-South railway connection slow, expensive and ineffective. In addition all north-south trains need to change track gauge, currently at Sestokai (LT) near the Lithuanian-Polish border.

The role of north-south rail freight has been intensively discussed in the context of the Rail Baltic/Rail Baltica plan, especially because of the forthcoming sulphur regulation (2015). The sulphur regulation is estimated to increase the cost of short sea shipping considerably which will create pressure to shift freight from maritime transport to railways. On the North-South direction traffic is estimated to increase on the Via Baltica road because of the existing railway having very limited capabilities and services. The situation will change after Rail Baltic/Rail

Baltica will be operational. This vision is especially critical for the Finnish exports which are marked by high volumes of paper and pulp exports and heavy dependence on sea transport (up to 90% in certain sectors). At the same time the overall pressure to support green transport creates additional pressure to shift road transport to railways. Under these development scenarios the need to improve international railway operations is urgent even with the existing 1520 mm railway network in the north-south direction.

Road network

There are three major motorways in Estonia: E20 (Tallinn-Narva), E67 (Tallinn towards Pärnu, also known as Via Baltica) and E77 (a short section of Riga-Pskov road). These motorways are part of the main road network which has the highest road standard and has a length of 1.600 km in the national road network. The second highest road standard is the basic road (2.390 km), and the third standard is the secondary road 12.425 km. Most of the Estonian main roads have only two lanes (one in both directions). Starting from Tallinn the first 70 km of E20 to the Narva direction has four lanes, the first 30 km of E263 towards Tartu has four lanes and the first 20 km of E67 towards Pärnu also has four lanes (two lanes in both directions).

Via Baltica starts from Helsinki via ferry connection to Tallinn, runs through Latvia, Lithuania and Poland to the Czech Republic with Prague as its final point. Via Baltica has distinct touristic value for domestic, intra-regional and international tourism. It also serves the heavy volumes of road transport in the north-south direction.

Estonia is the first country in the EU and the world to introduce a nation-wide, publicly available charging system of batteries for electric vehicles. In the network that covers the whole country including the larger islands there are 165 fast charging stations that are equipped with connectors of the CHAdeMO standard. The maximum distance between the charging stations is 40–60 km. The charging stations can be navigated using a smartphone application. The relatively dense network and 30 minute quick charges are built to enable an electric vehicle network that covers the whole country. Until the middle of 2014 Estonia also subsidized the purchase of electric cars (incl. plug-in hybrids) by its citizens.

Intelligent Transport Systems (ITS)

The development of intelligent transport systems (ITS) has been topical in Estonia for years and the importance of ITS is continually growing. In order to improve traffic safety situation and ensure smooth traffic, Estonia has invested into different automated traffic supervision solutions, including speed cameras (the plan for 2017 is for 100 camera cabins and 50 cameras). In Tallinn the automated enforcement system is being introduced to identify red light violation and prohibited use of public transport lanes. The use of electronic information boards on roads is also increasing: electronic information boards which display information about weather and road conditions or information about driver's speed to enforce speed control.

In 2014 a system for the identification of caller's location (person in need of assistance) and common mapping system were launched to allow the rescue service and emergency vehicles to respond quicker.

The effective online travel planning system has also been introduced, but the development of new options and apps is ongoing. One of the goals for 2017 is to display real time information of all the subsidized lines all over Estonia. The development of IT solutions for road users focuses on elaborating online location-based information for all platforms including operative information about roads' conditions, weather and forecasts, warnings, traffic restrictions and volumes, accidents, etc.

LPG network in Estonia

LPG (Liquefied Petroleum Gas) is used for powering cars as well as in applications like a generator. LPG is ecologically friendly and more economical than petrol. In Estonia, like in the neighbouring countries Latvia and Lithuania the LPG filling stations network covers the major roads and develops rapidly. The Port of Tallinn has set a goal to penetrate the LNG and/or LPG logistics market by creating a suitable environment in the Muuga Port for the construction of gas terminals and bunkering facilities.

Ports

The state owned Port of Tallinn has five harbours: Old City harbour (passenger harbour and recreational vessels) in the Tallinn city centre; the main cargo port of Muuga (20 km from Tallinn city centre;, an ice-free Paldiski South harbour (50 km) in the north-west of Estonia; the Paljassaare harbour near the Tallinn city centre for general cargo, coal and oil products and a harbour for seasonal cruise ships on the largest Estonian island of Saaremaa.

Figure: The map shows the Tallinn Old Harbour in the city centre (yellow anchor) and the main freight harbor, Muuga (blue). (TENtec)

The Twin-Port project (TEN-T) focuses on the development of West Harbour in Helsinki and Old Harbour in Tallinn. Under the project, the Port of Helsinki will develop a new passenger terminal, traffic and parking areas and quays in West Harbour while the Port of Tallinn will focus in improving the traffic system in Tallinn Old Harbour. In addition, the two ports aim to develop joint systems for automated check-in of vehicles. An automatic vehicle check-in system is also part of the development plan (by 2015). The objective is to develop an IT solution that can be applied in the ports to organize traffic on the port territory, reduce the time of ships' arrival and unloading, and generate an optimum traffic arrangement in case of at least four partly overlapping ship arrivals and departures. The cost of the Twin-Port project is EUR 11,2 million. The ports of Tallinn and Helsinki are also carrying out joint research to study the traffic in both Tallinn and Helsinki ports and study traffic of ro-ro vessels between Muuga Harbour (EE) and Vuosaari (FI). In May, 2014 during the Estonian president Toomas Hendrik Ilves' visit to Finland, the Ports of Helsinki and Tallinn signed a Memorandum of Understanding in order to develop a cargo route between Vuosaari and Muuga harbours in the near future.

Muuga is the biggest and most important freight harbour with 29 berths and 18 m of maximum depth. The Old City passenger harbour is connected to the road network and the public transportation system. In Muuga, railways are integrated into the network of Estonian rail and it has a good access to the main roads (incl E-20). The ports of Paldiski and Paljassaare have good access to the main roads and both have a railway connection. The total volume of freight through the Port of Tallinn is approximately 30 million tons annually.

For the Old City passenger harbour, the emphasis is on establishing an integrated multifunctional city district in the harbour area. For Muuga, the development plan includes an extension to the eastern part (approx. 1.7 km quay line and up to 67 ha of terminal area). Long term development plans include building a breakwater. Also plans are in preparation to increase the liquid bulk storage capacity, building a LNG terminal and a LPG terminal. Paldiski harbour's ongoing developments include construction of new quays, enlargement of car terminal areas, an Industrial Park for companies whose operations assume direct closeness of a port and a new entrance gate. The long term development plans include building a breakwater and a new berth (length 260 m and 10 ha of new added territory).

Picture: The Old City Harbour of Tallinn, and Tallinn Old Town in the front of the picture.

There are several other privately owned cargo ports in the Tallinn area (Bekkeri, Miiduranna), Paldiski North Port handling mainly petro-chemical products, as well as private ports of Kunda and Sillamäe in the North-East of the country and a regional passenger and cargo port in Pärnu which is in the South-West of Estonia. There are regular passenger ferry connections with multiple departures daily from Tallinn to Helsinki, a daily ferry connection to Stockholm and currently twice a week to St. Petersburg.

In connection to the construction plan of Rail Baltic/Rail Baltica by the mid-2020's, the primary aim of the port development is to build intermodal connections between sea transport at the Muuga Harbour, railways (1435 mm gauge), Tallinn international airport and the road network.

Cruise shipping

The Baltic Sea region has a reputation of a rapidly developing area and the fastest growing region of the world's cruise tourism. In 2006 the Port of Tallinn opened a cruise harbor on the largest Estonian island, Saaremaa. In 2013 Tallinn had 330 calls by cruise ships and for the first time, the number of cruise passengers in Port of Tallinn exceeded half a million amounting to 526 thousand passengers. Tallinn is listed among the Top-3 Baltic Sea ports by the number of cruise calls and cruise tourists and has developed with the highest growth rate.

Starting from 2011 Port of Tallinn in co-operation with the Tallinn Airport offers a roundtrip service, which means being the origin and destination port of cruises. In May 2014 the Port of Tallinn opened a new 9.34 million euro cruise ship quay which allows larger cruise ships than before to be docked and thus increases Tallinn's attractiveness for cruise operators. In 2006 Port of Tallinn opened the newest cruise harbour in Saaremaa.

The summer cruise season calls lasts from May to September but during the last years cruise ships are also visiting Tallinn in October and December.

Icebreakers

At the present time Estonia has two icebreakers operating in the Gulf of Finland: the Botnica (built in 1998) and the Tarmo (built in 1963). The third ice breaker EVA-316 (built in 1980) is a multi-purpose vessel and operating mostly in Pärnu Bay.

The ice conditions vary from year to year and in some years very little ice has formed at all but in order to offer efficient icebreaking service and keep the Estonian ports in the Gulf of Finland free from ice in winter, Estonia needs at least two icebreakers.

The icebreaker Tarmo is more than 50 years old and has to be replaced within next 5 years. To guarantee the required icebreaking capacity the new icebreaker needs to be built in 2018/2019. Estonia collaborates with the neighbouring countries Finland and Latvia in winter navigation, which is a necessity especially in hard winters when two icebreakers are not enough to secure the safety and efficiency of winter navigation. The purchase of a new icebreaker will give the opportunity to deliver icebreaking services also fo the ports of neighbouring countries. The authority responsible for the icebreaking is the Estonian Maritime Administration.

Vessel Traffic Services (VTS)

Vessel traffic in the Gulf of Finland has been growing steadily. In 2008 the Estonian Maritime Administration (MA) opened the new Vessel Traffic Service centre in Tallinn. The centre accommodates the VTS system, the GOFREP (Gulf of Finland Mandatory Ship Reporting system) system, Co-ordination Centre, Ice Information Centre, Winter Navigation Department and Foreign Programmes Department of the MA, and the crisis unit of the Ministry of Economic Affairs and Communications, as well as facilities for training and technical services.

The VTS centre enables to offer internationally acceptable vessel traffic services in the Gulf of Finland. The VTS began operating in 2003 and the GOFREP was launched in 2004. Vessel traffic management includes the following main functions: collecting data about ships, their routes and hazardous cargo; monitoring vessel traffic and its compliance with rules and regulations; transmitting the information necessary to ensure safe manoeuvring and to prevent collisions, accidents and pollution, as well as forwarding information to relevant organisations about vessels in need of search and rescue services.

Inland waterway connections

Estonia has no significant network of inland waterways and none of the inland waterway ports are part of the core TEN-T network.

Airports

Picture: Tallinn international Lennart Meri airport.

The Tallinn international Lennart Meri Airport (or Ülemiste airport) is the biggest airport in Estonia with one runway. It has gone through several renovation projects: modernization in 1997-99, alarge expansion in 2008-09, and the newest renovation in 2012-3 including a business aviation hangar complex. Tallinn airport has four cargo terminals. The airport currently receives passengers from 16 airline companies, 11 charter passenger carriers, and 18 cargo carriers.

Tallinn Airport Ltd is also the owner and operator of several smaller regional and local airports: the airports of Tartu, Pärnu and Kuressaare are capable of receiving also international flights, the airports of Kärdla, Kihnu and Ruhnu are local airports connecting the smaller islands to the mainland.

Passenger traffic has grown intensively over the years and in 2011/2012 Tallinn airport reached the 2 million passengers volume for the first time. In 2012, it processed a total of 2,2 million passengers. The busiest routes are with Finland, Latvia, Sweden, the UK and Denmark. Lennart Meri Airport is the third biggest airport in the Baltic States after Riga and Vilnius.

Tallinn airport is connected to the E263 and E20 motorways. There is a frequent bus service to the city centre and the Old City passenger harbour. The Ülemiste train station is located only 800 m from the airport and serves regional passenger traffic and commuting.

Future plans include the development of the Ülemiste station into an inter-modal urban passenger hub with a direct tram connection to the airport, the city centre and the passenger harbour, relocation of the Tallinn main bus terminal to Ülemiste and the passenger terminus station for the Rail Baltic/Rail Baltica UIC electrified higher speed railway connecting Estonia with the UIC gauge European rail network through Latvia, Lithuania and Poland.

Logistics hotspots

The operators in transport and logistics in Estonia are organized professionally in order to offer a market in high quality and harmonious logistics services that in their part increase the competitiveness of the country in international trade. As the short sea shipping and East-West railway transit are dominant in export and import, the logistics services are typically located close to the ports and inter-modal terminals. Currently, the multimodal services covers a fluent shift between seaport, road and the existing 1520 mm East-West railway connections.

The Narva-Sillamäe region in the North-East of Estonia continues to enjoy growth in transport and logistics due to its strategic location on the EU-Russian border, good transport connections (expansion of Sillamäe seaport, 1520 mm railway and recently improved road), long term industry traditions and a better availability of work-force than in the rest of the country.

The Tallinn area (within a radius of ca 50 km) with an international airport, several seaports, multiple road and railway terminals is the core of the Estonian logistics service industry. The Muuga intermodal terminals and the planned Ülemiste urban passenger terminal (incl. Tallinn International Airport) will gain most from the construction of the new Rail Baltic/Rail Baltica railway on the TEN-T North Sea – Baltic Corridor. Rail Baltic/Rail Baltica will create additional logistical opportunities also for the Pärnu area adding to its present road and seaport connections.

Chapter 6
Elements of the Work Plan: Latvia

Technical infrastructure parameters for each transport mode

Figure: Map of the Core Network Corridor in Latvia.

The North Sea – Baltic Corridor in Latvia runs in north-south direction with a branch to the sea port of Ventspils. The road and railway sections run from the EE/LV border to Riga, which is an urban node. The LV/EE border crossing on the existing 1520 mm railway is in Valka. The forthcoming 1435 mm railway will run from Riga directly to the LV/EE border with a border crossing point in Ainazi. The Riga – Ventspils section consists of road and railway (1520 mm) and forms an important part of the east-west transport corridor in Latvia. The sections from Riga to the LV/LT border consist of a railway connection (1520 mm) via Jelgava, and the forthcoming 1435 mm railway which runs directly from Riga to the LV/LT border. The road connection to the LV/LT border runs via Bauska.

Outside the Core Network Corridor alignment, Liepaja port (on the TEN-T comprehensive network) and Special Economic Zone in the south-west as well as Rezekne (on the TEN-T core network) with a Special Economic Zone in the east near the Russian border are important international logistic centres and play a significant role in serving cross-border cargo flows.

Railway network

The TEN-T Core Network Railways in Latvia are composed of four railway sections, which connect the nodes Ventspils-Jelgava-Riga, Jelgava-Krustpils, Riga-Krustpils-Rezekne-Zilupe (Russian border), Riga-Krustpils-Daugavpils-Indra (Belarussian border). All railway sections have 1520 mm gauge. The section Jelgava-Riga and part of Riga-Krustpils from Riga to Aizkraukle is electrified. All TEN-T Core Network Railways sections in Latvia are marked as upgraded lines, due to the planned electrification of the East-West railway corridor and the Riga suburban passenger lines with 25kV Alternating current and GSM-R communication signalling system implementation. All sections of the TEN-T Core Network are foreseen both for passengers and freight, except for the Jelgava-Krustpils section, which is on the Core Network for freight transport and on the Comprehensive rail network for passengers.

In Estonia, Latvia and Lithuania, the Regulation includes detailed studies for the new UIC gauge fully interoperable line, and the works for the new line are planned to start before 2020. The plan includes upgrading and partly a new line on the Polish territory, rail – airports/ports interconnections, rail-road terminals, and connections to the Motorways of the Sea in all three countries.

The Rail Baltic/ Rail Baltica 1435 mm gauge railway will connect Latvia together with the other Baltic States to the railway network of continental Europe. Largely financed by the European Union, the TEN-T Priority Project Nr 27 Rail Baltic/ Rail Baltica I has carried out reconstruction on the existing Russian gauge (1520 mm) in Estonia, Latvia and Lithuania. The reconstruction works in the Latvian railway are on-going. The sections close to the LV/EE and LV/LT borders are expected to be completed in 2014, while the section north and south of Riga will be completed by the end of 2015.

According to the AECOM study the Rail Baltic/ Rail Baltica railway line should cross the Daugava river to the east of Riga at Salaspils at which point an east west intermodal transfer station should be contemplated. Riga city should be serviced by utilizing the old Ergli alignment through the central station. Trains from central station would use the same route to arrive back at the main north/south section. From this connection point the line proceeds northbound following parallel to the Via Baltica roadway alignment across the LV/EE border to Pärnu and onwards. The Rail Baltic/ Rail Baltica railway line route and its connections are subject of change as a result of the ongoing detailed technical studies.

As for the Riga – Ventspils railway connection the Regulation includes plans for upgrading, port interconnections and Motorways of the Sea.

In 2007-2013 infrastructure modernization was performed at stations and railway sections providing access to terminals operating in the Port of Riga on the left bank of the Daugava river.

Further railway infrastructure development will take place with the aim of increasing current capacity, which, along with other measures taken in relation to railway transport, will allow increasing the volume of transit cargo.

The following projects are to receive investments by 2020:

- Continuous implementation of the ERTMS system (2014-2017).
- Development of the Riga Railway Node, completion of works on connection to the common terminal network in the Port of Riga on the left bank of the Daugava river, beginning of railway construction in the direction to the Salaspils/Saulkalne public terminal (2014-2020).
- Conducting research on a connection with the Riga International Airport in the framework of the Rail Baltic/ Rail Baltica project, taking a decision on a gauge type (a new 1435 mm line or upgrade of an existing railway line and build a new short branch line from the Airport to the existing railway line Riga – Tukums to provide connection with the Riga Central Passenger station), development of technical specifications.

- A new multimodal crossing is envisaged to have a single corridor. The Rail Baltic/ Rail Baltica main line will cross the Daugava river near Salaspils as well as a new railway line of an existing network to join the Daugava west coast in Riga Freeport and a new road track.

In order to manage the Rail Baltic/ Rail Baltica project, a joint venture involving representatives of three countries will be established. In the part "Justification of the Investment" of "The Transport Development Guidelines 2014-2020" Rail Baltic/ Rail Baltica is defined as a corridor aimed at increasing cargo flow through Latvia in the future.

According to the Rail Baltic/ Rail Baltica project for 2014-2024, the following activities are planned: design engineering, vacation of the land, unification with the common project and beginning of construction works. According to the AECOM study the total amount of investments for the whole project is planned 3,68 billion € (1,27 billion € in Latvian territory).

The strategy of Latvian Railway includes provision of a competitive infrastructure for passenger transportation by 2015.

The studies to connect Riga International airport to Rail Baltic/ Rail Baltica are as follows:

1) Rail lines trace detection, including:

1.1. lines trace the variations and their links with the airport planning documents (development plan and land use plan) ;

1.2. lines trace the variations and their association with the previously developed studies on the construction of the railway enters the territory of the airport ;

1.3. lines trace the integration of existing airport infrastructure;

1.4. railway station (or stations) construction options, taking into account the expansion of the airport terminal I and stage II and other infrastructure development prospects;

1.5. economic, financial and legal aspects and risks , as well as the optimal solution is given for the construction of rail within the airport;

1.6. feasibility and technical studies in order to determine the most efficient and feasible railway connection from Riga city centre to the airport including interoperability with the Riga transport system.

2) Factors impacting on passengers at the airport forecasts, connecting the airport with the railway , including the planning of air and rail passenger projections and their interactions with the Trans-European Transport Network Rail Baltic/ Rail Baltica project development.

3) The airport infrastructure necessary for construction of the railway enters the airport area (electricity, water, sewerage , IT communication , changes in traffic schemes , etc.) .

The studies will be completed by the end of 2015.

Road network

The Regulation includes road development for Via Baltica (which includes in Latvia road works for cross-border sections). The Latvian section of Via Baltica runs from the EE/LV border to Riga down to the LV/LT border. This section, (road A1), runs along the Baltic Sea coast. The Via Baltic south from Riga is the A7 road to the LV/LT border. The E22 road runs from Riga to Ventspils.

The European route E67 runs from the EE/LV border (Ainazi) to the LV/LT border (Grenctale).

In 2005-2013 the reconstruction of E67 road sections was carried out. Up until 2013, 80% of the Via Baltica route had been reconstructed, including the building of the Saulkrasti bypass.

In 2014-2020, in the framework of the corridor, the following projects are planned:

- PPP project - Kekava bypass construction (E67);
- PPP project - Riga Bypass rebuilding from 2 to 4 lanes (two carriageways) at the Baltezers-Saulkalne section (E67);
- New Daugava river crossing instead of Riga Hydroelectric Power Station bridge. Construction of Riga bypass in a new location, in the framework of Rail Baltic/ Rail Baltica project (E67);
- Integration of Riga city and the Freeport of Riga into the TEN-T network.

Additionally, there are road pavement reconstruction projects (increasing of load bearing capacity) planned at the 20,5 km section running from EE border in Ainaži to Svētciems (E67), the Riga bypass and the road section Priedaine-Tukums (E22).

Ports

Freeport of Riga

The Freeport of Riga is one of the largest seaports in the Baltic Sea area measured in annual volumes. In the last years many development initiatives have been made in the port area and also some resources have been allocated to improving the level of environmental protection.

In 2014 the Freeport of Riga is 6348 ha in area including land area of 1962 ha. In the future, 260 ha of land will be taken for new terminals (dry bulk and a container terminal). Also 445 ha of land is available for future development projects, mainly for new terminals and logistic centres. The maximum permissible vessel draft by the berth is 14.5 meters, but in the future ship fairways will be deepened to 15.5-17 meters. This means larger ships can visit the port. Currently the maximum vessel size for berths is 235 meters of length and 34 meters of beam.

The Freeport of Riga has a port development strategy, in which the port has made plans on how to reach goals that it has set up for certain time period. The current development strategy reaches up to year 2018. The vision and mission is to become a customer's port. The key elements for achieving this vision are; safe, efficient and competitively priced services for customers. The port's strategy is to respond to the global trends, customers' needs and environmental and social challenges.

The Freeport of Riga is linked to the TEN-T road and rail networks. The Port is a part of the East-West cargo transportation corridor that is linked to the Trans-Siberian Railway. One developing area is to modernize the port's railway network and railway bridges. This modernisation will boost the handling capacity by 25 million tonnes. Also The EU will support with over €1.5 million from the TEN-T Programme a series of studies looking at the connection of the Freeport of Riga in Latvia to the TEN-T road network. In the framework of TEN-T annual support programs the Riga Northern Transport Corridor (Northern Corridor) 1st, 3rd and 4th stages of technical projects are financed in 2012 and 2013. The preparation of the technical projects will be finished by the end of 2015. These studies, (selected under the 2012 TEN-T

Annual Programme), specifically concern the detailed design needed to connect Freeport of Riga to the TEN-T core network via the Riga Northern Transport Corridor (Northern Corridor).

The Northern Corridor is an east-west motorway which will cross the city of Riga for a total length of 30 km. In the east it will join the Freeport of Riga and the E67 "Via Baltica" motorway, while in the west it will connect the Riga bypass and, ultimately, the E22 motorway. The Northern Corridor will create a robust alternative for transit traffic by diverting road traffic from of Riga's old town, improving the local environmental conditions and, by enabling access to the port of Riga, enhancing multimodal transport.

The strategic objective of construction of the Northern Corridor is to connect the Freeport of Riga (principle of last mile) to the Trans European (TEN-T) road network and improve the overall transport infrastructure system in Riga and its metropolitan area in general, raising growth opportunities and international competitiveness of the city, region and country in the long-term perspective. The main benefit of the Northern Corridor is to create robust alternative for transit traffic and divert it from the centre of Riga City (Old Town), improve environmental conditions in the city center and the city's livability in general.

The Northern Corridor according to the Riga and Riga Region Mobility plan is considered as the priority project. Implementation of this project will result in convenient high-speed motorway crossing Riga from the East to the West and bypassing the historic centre of the city. The overall planned length of the road is 30 km. Western part of the Northern Corridor will connect to Riga bypass at Babite and will have easy access to the Riga –Ventspils motorway (motorway indication No E22; part of the TEN–T network). The Eastern part of the Northern Corridor will connect to the Vidzeme motorway at Bergi (motorway indication No E67 or so called VIA BALTICA; part of the TEN–T network). With the help of the Northern Corridor project the arterial street network of Riga city and the Freeport will be logically integrated into the TEN–T road network. The Motorway will also cross the 0.4 km wide Daugava River.

In the development strategy, the port identified the following priority areas that should be develop during the time period up to the year 2018:

- General Management
- Tariff Policy and Financial Management
- Development of Port's Access Infrastructure
- Development of Port Terminals
- Navigation Safety
- Port Safety and Security
- Environmental Protection
- Port as a Socially Responsible Entity and Port's Image
- Marketing Strategy

The Port of Riga has the following terminals: general cargo terminals, container cargo terminals, dry bulk cargo terminals, liquid bulk terminals and a passenger terminal. There are currently 34 stevedoring companies (cargo terminals) operating in the Port of Riga.

The number of vessel calls in 2013 reached 3850 ships.

The development plans of the Port of Riga include the deepening of the fairways up to 15,5-17 m as well as land reclamation and development of new territories for the construction of multifunctional dry bulk terminals on the Krievu Sala, and reconstruction of the Port's breakwaters (moles).

There is also a modernisation plan of the port's railway network and construction of a new railway bridge which will increase the handling capacity of the port by 25 million tonnes. There is another land reservation of 445 ha for new terminal and logistic centre projects.

The following projects will be realized by private companies in the Port of Riga:

- Oil products terminal in Bolderaja;
- Liquefied natural gas (LNG) terminal in Daugavgriva;
- Various terminals (fertilizer, grain, container and logistics park) on the Kundzinsala;
- Terminal for the production and handling of bioethanol in Voleri.

Total investment portfolio of the Port of Riga for years 2010-2020 is € 1.1 billion (€ 300 mln will be invested by the Port Authority and € 845 mln by private companies.) In 2013 the investment of the Port Authority amounted to € 77 mln.

Cargo turnover of the Port of Riga grew from 13.4 mln tonnes in 2000 to 36.1 mln tonnes in 2012. In 2013 the Port of Riga handled 35.5 million tonnes of freight, which is slightly less than the peak cargo turnover achieved a year before, in 2012. Average annual growth rate of cargo turnover from years 2000-2013 is 8.6%.

The emphasis of operations is on export with 31 million tonnes in 2013. Dry bulk, especially coal, is the largest single type of cargo (21 million tonnes in 2013).

The cargo turnover by type and by year are presented in the Diagram below:

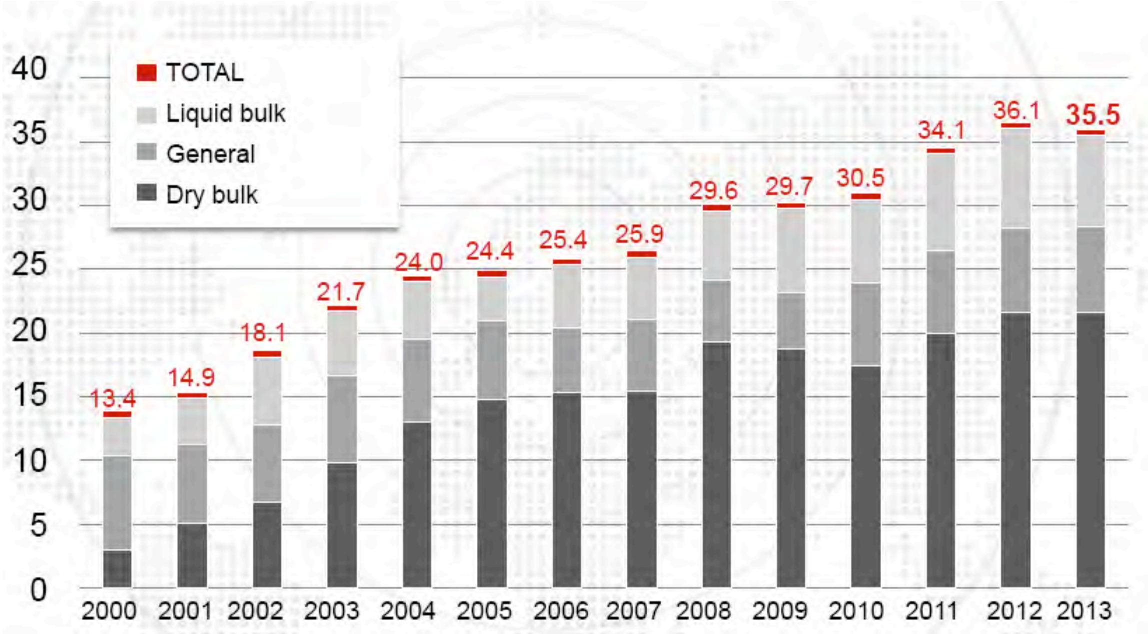


Diagram 1. Cargo turnover of the Port of Riga (million tonnes) (Source Port of Riga)

According to "The Transport Development Guidelines 2014-2020" approved by the government of Latvia, cargo turnover of the Port of Riga is expected to achieve 49 mln tonnes by 2020.

Icebreaking in Latvia

Riga Freeport fleet Ltd and Port of Skulte operate as the icebreaking authorities. For sea winter navigation Latvia has one icebreaker and two icebreaking tugboats. Compared to Finland and Estonia, the number of icebreaking days in Latvia remains small because of warmer climate and therefore icebreaking is usually needed only later in the winter, and on average every five years.

Freeport of Ventspils

The Ventspils Freeport is one of the Core Network ports of the EU handling about 30 million tons of cargo per year.

The Freeport has a special economic zone of more than 700 ha for the development of industrial projects and logistic centres, with infrastructure and special tax incentives. At this moment the Freeport territory is 2.451 ha (including 243 ha water area). The maximum depth of the port is 17.5 meters and it is ice free. Due to the frequently moving sediment it is challenging to maintain the depth inside the port and the access channel. The maximum length for ships is 270 meters and in loading size, 150.000 dwt.

The Freeport has convenient road and railway connections. The East-West railway corridor to Ventspils is one of the most highly utilised links of its type in Eastern Europe. More than 21 million tonnes of cargo is transported via the railway route each year. The oil product pipeline from Novopolotsk to Ventspils has an annual turnover of about six million tonnes.

The Freeport has two development stages. The first stage started in 2010 and the goal was to expand the port between the traffic and rail road bridge, with construction of a new dry cargo terminal and two universal terminals. The second stage is the expansion of the Northern port area where new terminals and new business development are being planned.

FDI Intelligence – (a division of "The Financial Times") has evaluated in its global ranking of free economic zones 2012/2013 that the Freeport of Ventspils is the 7th most economically interesting special economic zone as well as the second best port zone from all special economic zones in the world.

The Freeport of Ventspils has four liquid bulk terminals, five dry bulk terminals and three general cargo terminals.

In 2013 the Freeport of Ventspils handled 28.8 million tonnes of freight, of which export represents approximately 26 million tonnes. Liquid bulk is the largest single type of cargo (16 million tonnes on 2013).

The average annual cargo turnover during years 2003-2013 was 28.4 mln tonnes. The share of export exceeds 90%. Liquid bulk is the largest single type of cargo with average annual share more than 51% during the same period. Total cargo turnover by year is presented in the Diagram below:

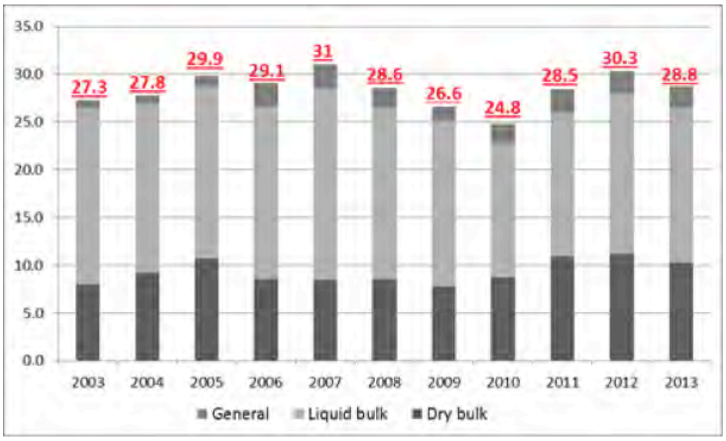


Diagram 2. Cargo turnover of the Port of Ventspils (million tonnes) (Source Port of Ventspils)

According to “The Transport Development Guidelines 2014-2020” approved by the government of Latvia the cargo turnover of the Freeport of Ventspils is expected to achieve 33 mln tonnes by 2020.

Airports

Riga International Airport

RIGA International Airport was completed in October 1974 and is located 13 km south-west from Riga city centre. It is the largest airport in the Baltic States and it is also the home base for the Latvian national airline carrier AirBaltic. Riga International Airport is currently connected to the city centre only by road.

Riga International Airport offers regular passenger, cargo and postal delivery to Europe and other parts of the world. The Airport provides both aviation services (airplane, passenger and cargo support services) and non-aviation services (lease, parking spaces, VIP centre services, etc.). Riga International Airport is one of the few international airports, which feature both full-service and low-cost airlines.

Honouring the 800th anniversary of the founding of Riga, the airport was modernized in 2001 and several renovations have taken place since. In 2001 the new south terminal was opened. The runway was extended to its current length of 3200 m in 2008, which enables larger planes such as the Airbus A340 and Boeing 747, 757, 767 and 777 to land.

Riga International Airport is the leading airport in The Baltic States by passenger movements, aircraft movements and freight. Riga International Airport has received the Emerging Market Airports Award (EMA) in the Best Airport category handling up to five million passengers per year. Riga International Airport is served by 17 airlines operating scheduled service and several airlines operating charter flights. In 2013 Riga Airport was served by 24 airlines, of which 4 carriers were newcomers to the airport.

From Riga International Airport it is possible to travel to 83 destinations (Summer season 2014). The top 5 most popular destinations are Moscow, London, Frankfurt, Oslo and Helsinki. The numbers of transfer and transit passengers accounted for 32% in 2013.

AirBaltic holds the leading position in passenger handling with 59.6% of the total number of passengers handled in 2013.

There was a record growth in cargo handling in 2013 (54 thousand tonnes), which is 38.4% higher than in the previous year.

Diagram 3. Riga International Airport passenger statistics (Source Riga Intl Airport)

Diagram 4. Riga International Airport flights statistics (Source Riga Intl Airport)

Diagram 5. Riga International Airport Cargo turnover (Source Riga Intl Airport)

The development plans aim at reaching 10 million passengers annually, because of the extension of the terminal building.

In May 2013 the construction works in the framework of the project „Development of the Riga International Airport Infrastructure" started. The aim of the project is to ensure an appropriate infrastructure level for the growing number of flights, reduce the influence of the airport's activity on the environment, and enhance flight safety. The project will be finalized in 2015. Total costs of the project amount to € 115 million.

In 2014-2020 it is planned to launch the project „Development of Riga International Airport, Phase II" dedicated to further development of infrastructure: reconstruction of the airport aprons, improvement of the taxiway network and installation of axial lighting, reconstruction of the storm water drainage system, modernisation of the aerodrome equipment, reconstruction, modernisation and construction of other aerodrome infrastructure equipment required for airport development as well as the purchase of energy-efficient machinery, equipment and appliances. The project aims at achieving higher energy efficiency, reducing pollution and greenhouse emissions and improving aviation security and safety. Air Baltic (IATA: BT, ICAO: BTI) is Latvia's national carrier and it was established in 1995. AirBaltic is the 39th largest airline company in Europe by scheduled passengers carried. The business concept of Air Baltic is based on a hybrid airline model with features from traditional full-service to low-cost products. The airline operates to primary city airports rather than secondary airports and offers a business class product. Air Baltic has a network of 60 destinations in 2014 and all routed via its Riga base. Air Baltic offers convenient connections to its network spanning Europe, Scandinavia, Russia, CIS and the Middle East.

In 2013 Air Baltic carried over 2.95 million passengers. The airline's fleet consists of 25 aircraft – five Boeing 737-500, eight Boeing 737-300 and twelve Bombardier Q400 Next Generation.

Logistics hotspots

Being in a centre of the Baltic States, all main transport nodes in Latvia have an excellent position as a logistic hotspot. They constitute integrated logistic system of international importance, which serves mainly cargo flows in the east-west direction connecting European markets with the CIS countries.

The Riga node with an international airport, which has become a hub in the Baltic region, multiple terminals in the Freeport of Riga and other rail and road terminals, including the DB Schenker intermodal terminal “Railport Riga” plays a significant role in the provision of logistics services in Latvia. The Rail Baltic/ Rail Baltica connection to the port and international airport will create additional logistics opportunities. According to the results of a preliminary research for Rail Baltic/ Rail Baltica, the construction of a public Riga Intermodal Terminal is expected to be built in Salaspils (Saulkalne), which should be connected with the railway, both 1520 and 1435 gauges .

The Freeport of Ventspils, with its convenient rail and road connections plays a significant role for cargo turnover in the East-West railway corridor. Ventspils airport is part of TEN-T comprehensive network, which according to Sustainable Development Strategy of Latvia until 2030 should be developed as a regional airport and one of the air traffic nodes in the Baltic Sea Region.

The Port of Liepaja in the south-west of Latvia is a 3rd biggest port and has an important role for logistics operators. Liepaja has the status of a Special Economic Zone.

Rezekne is a well-developed transport infrastructure hub located near the Russian border also with the status of a Special Economic Zone. The Rezekne node is on the crossroads of the main East-West TEN-T Core Network for road and rail and the rail corridor from Warsaw to-St. Petersurg.

Jekabpils, Jelgava and Daugavpils are important transport nodes with well-established road and rail infrastructure and a potential for further logistics and industry development.

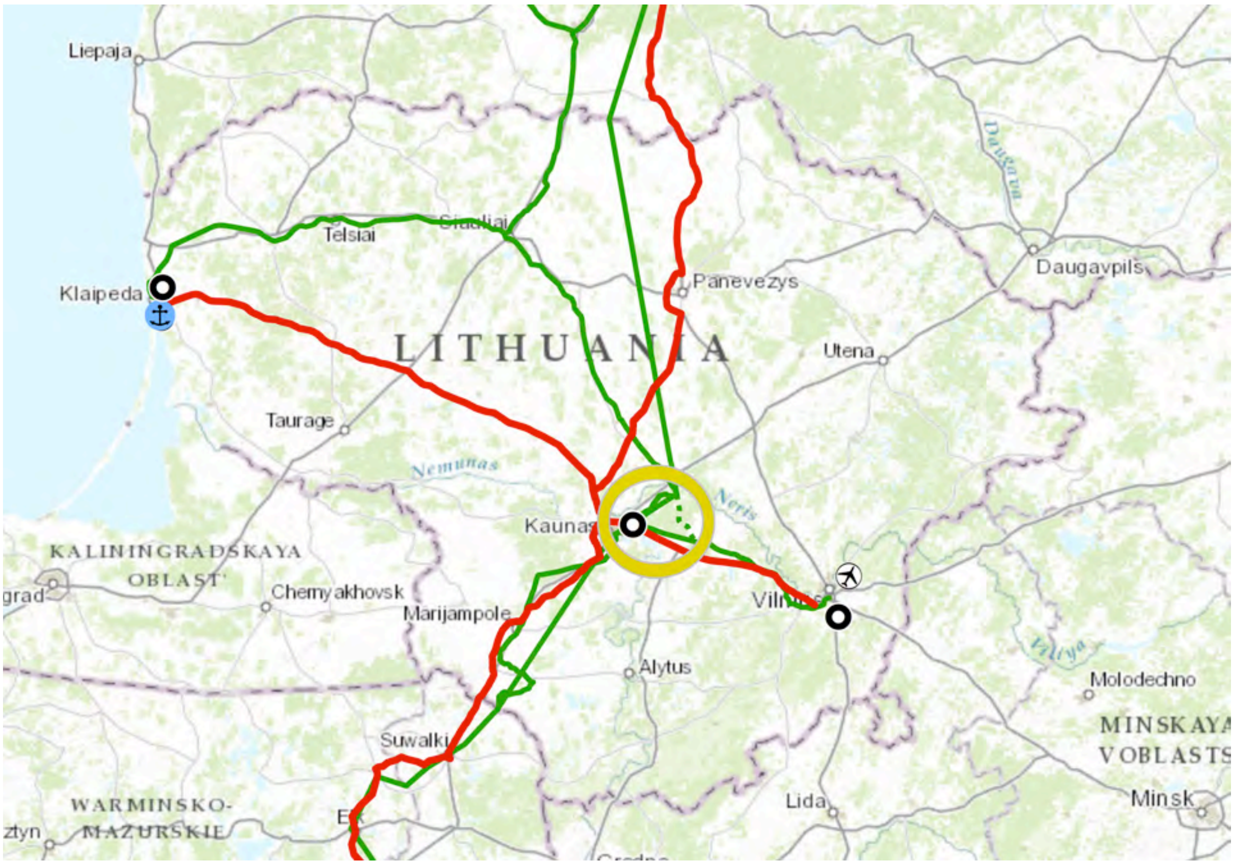
In the places where Rail Baltic/ Rail Baltica main line passes larger cities it is possible to envisage also connections to local logistics nodes and national logistics terminals, including the possibility to provide cargo reloading from 1520 mm to 1435 mm and vice versa.

Chapter 7
Elements of the Work Plan: Lithuania

Technical infrastructure parameters for each transport mode

For LT the priorities in road network development consist of infrastructure projects, road safety and actions of intermodality/co-modality. Via Baltica is regarded of high strategic importance.

On the rail network, Rail Freight Corridor no 8 and Rail Baltic/Rail Baltica (RB) form a promising method for Corridor implementation. As regards the RB project, the Corridor structure is well situated to address the bottlenecks and to provide a harmonized approach for the development of cross-border sections. The railway cross-border section between LT and PL requires special attention. The operating speed of the RB infrastructure also needs to be defined consistently. Currently the plan of the Baltic States for the RB is for a higher speed line (200 km/h), ending at the LT/PL border. The extension of the RB from the LT border into PL territory is, however, not yet planned as a high-speed line, which implies a need for coordination between Lithuania and Poland in defining harmonized technical parameters across the border.



Map: The 1520 mm gauge railway infrastructure runs in a north-south direction and to the Klaipeda State Seaport. The planned 1435 mm gauge railway shows on the map in the north-south direction and it runs from the LV/LT border via Kaunas to the LT/PL border. There are three rail-road terminals: in Klaipeda, Kaunas and Vilnius.

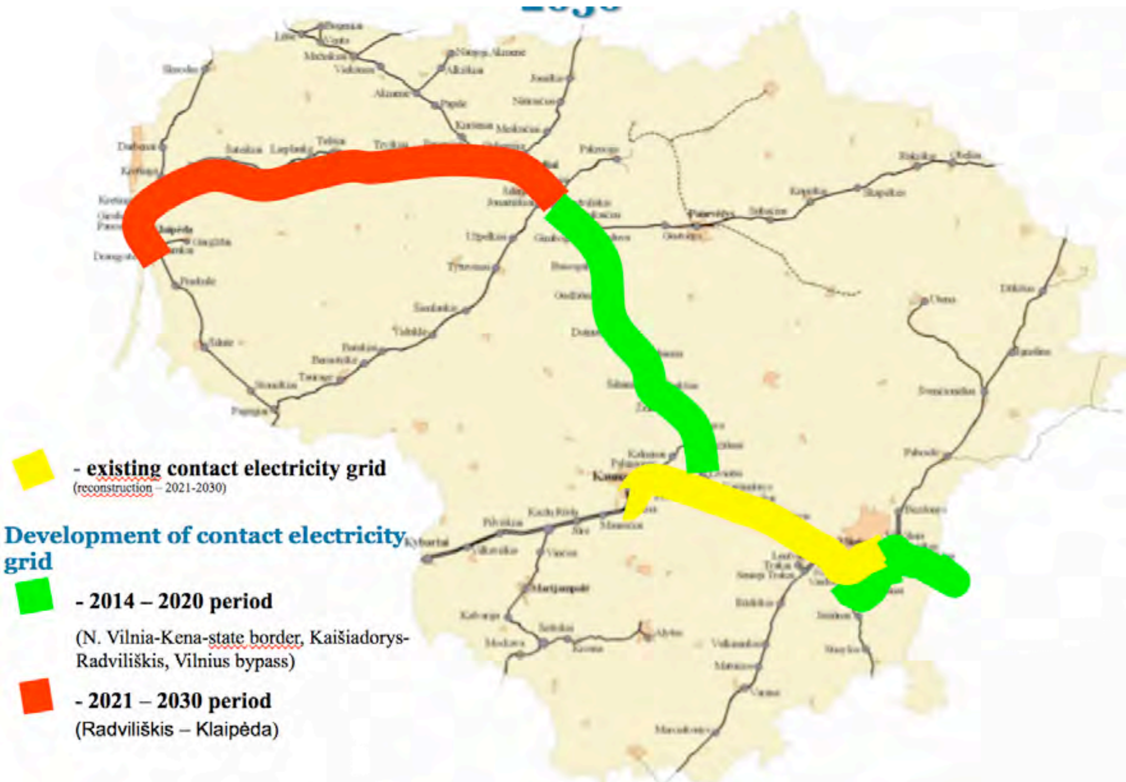
NB. There is a section of the Corridor missing from the TENtec definition of alignment: a short railway section up north-east of Kaunas, connecting the railway line Kaunas-Vilnius directly with the line Kaunas - Siauliai/LV border (illustrated in yellow).

Railway network

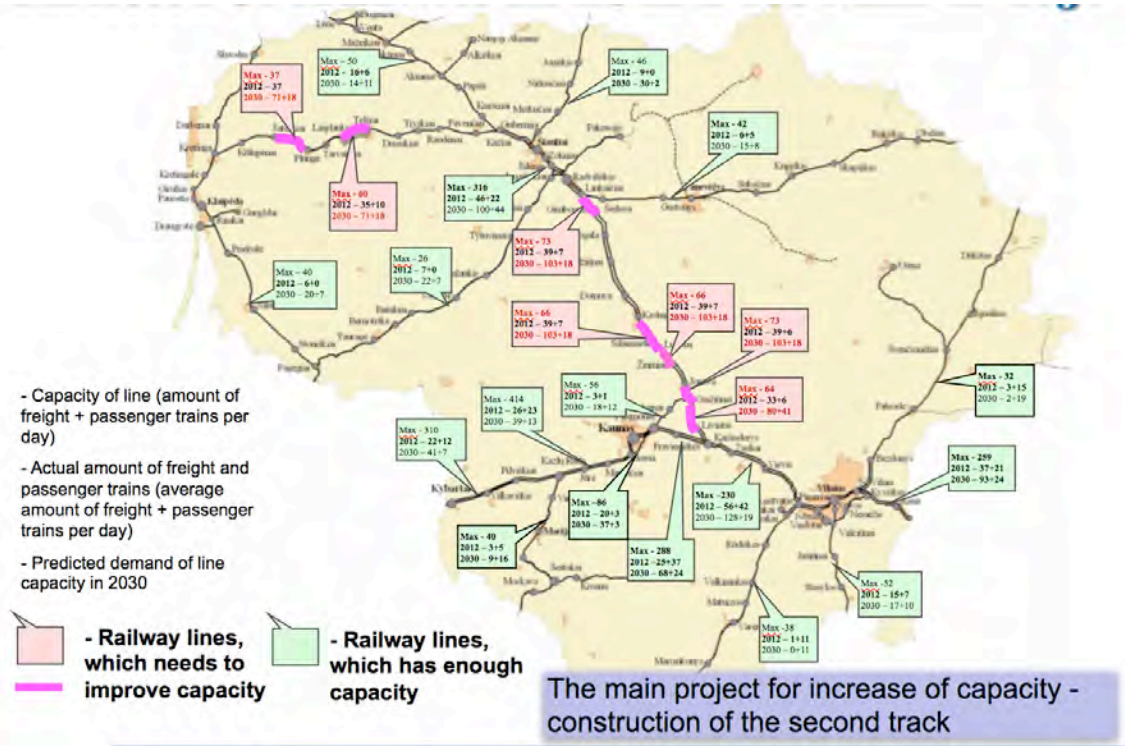
The TEN-T core network in Lithuania territory is composed of four railway sections, which connect the nodes Riga - Kaunas, Vilnius - Kaunas, Kaunas - Klaipeda and Kaunas – PL border. All railway sections have 1520 gauge (with the exception of the section Sestokai – PL border which has dual gauge). Only the section Vilnius - Kaunas is electrified. The main rail freight transport in Lithuania is in the direction of the port of Klaipeda, and Belarus plus the transit traffic to Kaliningrad.

The sections from the Latvian border to Kaunas and Kaunas to the Polish border are part of RB project European standard 1435' gauge. The RB route is a priority project in the TEN-T core network. Lithuanian strategic documents list the plans to modernize the rail infrastructure, integrating TINA networks belonging to the main rail lines to the trans-European transport networks (TEN -T) by building European standard gauge from PL/LT border to Kaunas by the end of 2015.

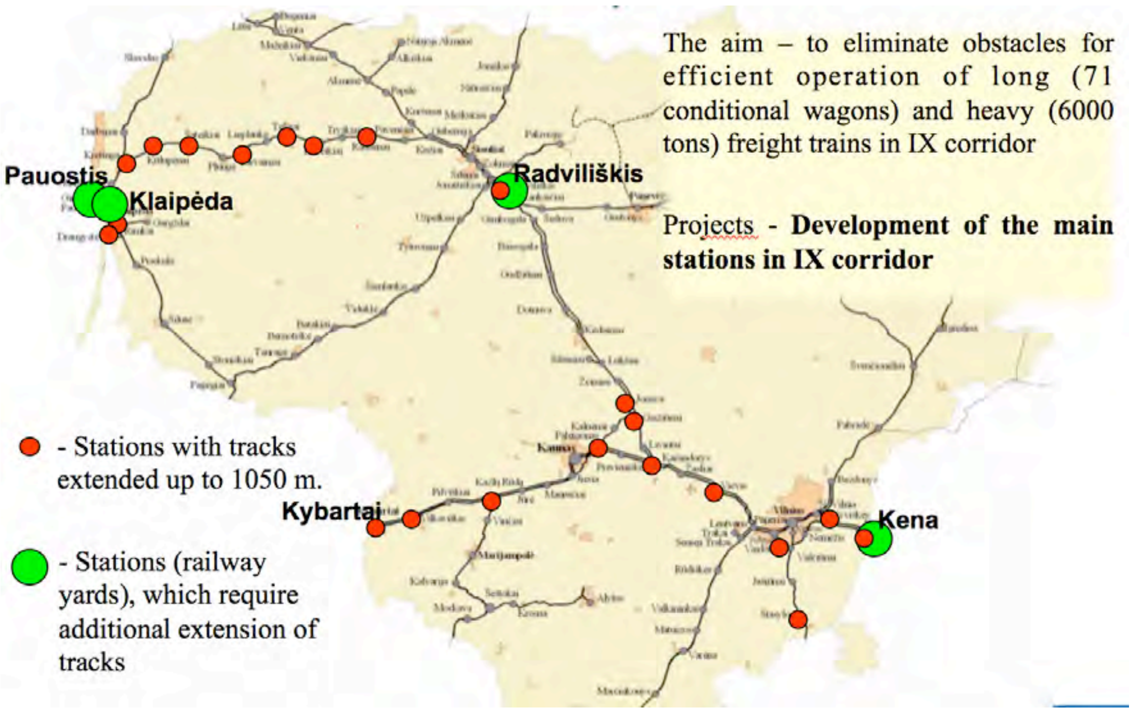
Freight transport



Map: Development of electric catenary network. NB. The green line Vilnius-Kena is not part of the CNC. (Source LG)

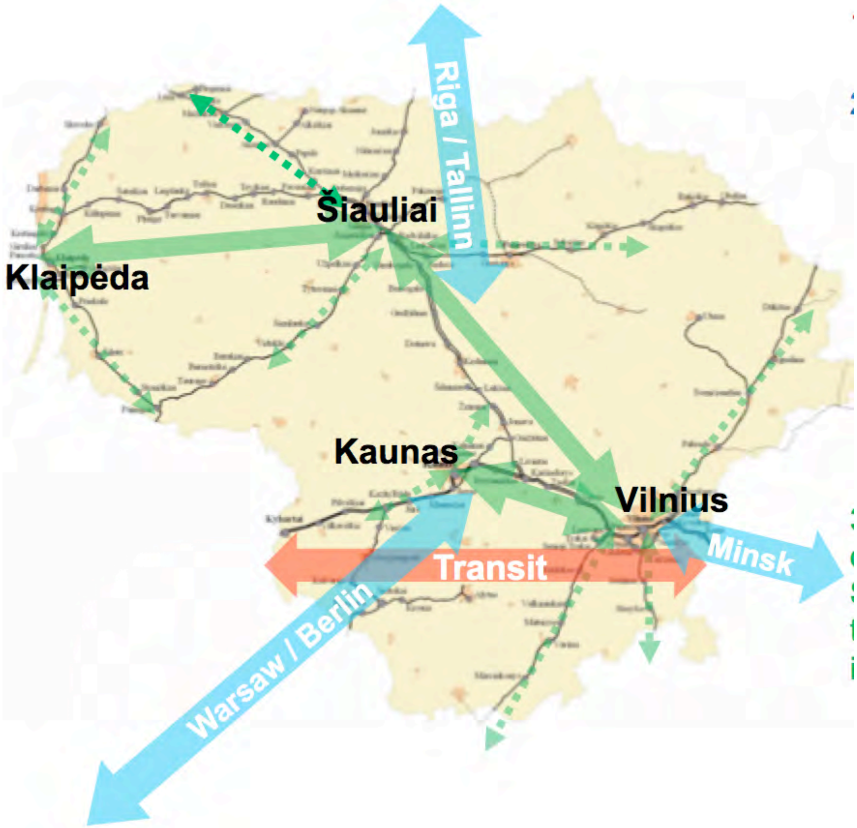


Map: Capacity of railway network by 2030. (Source LG)



Map: Extension of station roads to ensure the traffic of heavy/long trains. (Source LG)

Railway service for passengers



Map: Railway service for passengers (Source LG)

Key to the map:

Red: Servicing of transit passenger trains

Blue: Convenient connection by international routes:

- *Minsk direction (not part of CNC)*
  - *In 2015: Vilnius-Minsk in 2 hours.*
- *Warsaw / Berlin direction*
  - *In 2015: 'Rail Baltica' European gauge to Kaunas.*
- *Riga / Tallinn direction.*

Green: Carriage of passengers on domestic routes depends on the State policy dealing with the public transport organization and financing issues; most promising railway routes:

- *Vilnius-Kaunas*
- *Vilnius-Šiauliai-Klaipėda*

Implementation of the RB Project in Lithuania

Map: Rail Baltic /Rail Baltica route. The dotted line is the Kaunas – Vilnius connection (source: LG).

Based on the Governmental plan of 2009 for Rail Baltic/ Rail Baltica a decision was taken to construct the European standard 1435 mm gauge as a dual gauge line (or in some sections double track line) from the PL border to Kaunas by the end of 2015. This work has been partly financed by TEN-T. In September 2013, all construction contracts were signed (123 km line in total will be constructed). After construction and modernization passenger trains can reach speeds of 120 km/h, freight - up to 80 km/h.

Currently, the works on the line are at its peak in all sections (PL/LT border - Mockava - Šeštokai - Marijampolė - Kazlų Rūda - Kaunas) simultaneously. On average, approximately 60 % of works are completed.

The Strategic Environmental Impact Assessment for the section ‘Kaunas - LV border’ was accomplished, endorsed by Latvia, and adopted by Ministers in March 2014. The chosen route option was identified - via Panevėžys.

In July 2014 a tender for the preparation of a Special Plan (section ‘Kaunas - LV border’) was announced. Technical specifications also foresee reservation of land for the purposes of the Project. After finalization of the Special plan, all documentation of territorial planning in LT will be accomplished, except land acquisition procedures. The Baltic States agreed to implement the plan by the end of 2015.

An additional AECOM study on the integration of Vilnius into the Rail Baltic project was conducted. It concluded that integration of Vilnius into Project raises EIRR (Economic Internal Rate of Return) and BCR (Benefit-Cost Ratio). Vilnius connection is justified for passenger benefits, but east-west freight transport is expected to remain on 1520 mm railway.

On September 13, 2013, political agreement between the transport ministers of EE, LV and LT as well as FI and PL was reached on the RB Joint Venture agreement, and Vilnius was recorded to be connected to the RB Project. Following the signing of the shareholders’ agreement by the Transport Ministers of the three Baltic States on October 28, 2014 the RB Joint Venture was registered in the Latvian Commercial Registry in November 2014. The shareholders agreement of the RB joint venture defines the route of the RB railway from Tallinn through Pärnu-Riga-Panevezys-Kaunas to the Lithuanian-Polish Border on the route as proposed by AECOM study with a connection of Vilnius-Kaunas as a part of the RB railway. The shareholders also agreed that in connection with the eligibility of Kaunas – Vilnius section for

EU funding, the shareholders shall take all necessary steps and will support Lithuania's, Latvia's and Estonia's governments application to EU with the purpose of making the entire RB railway's construction equally eligible of EU funding from CEF.

Road network

The Lithuanian Road Administration, which operates under the Ministry of Transport and Communications and is established by the Government of the Republic of Lithuania, is designated with the following aims:

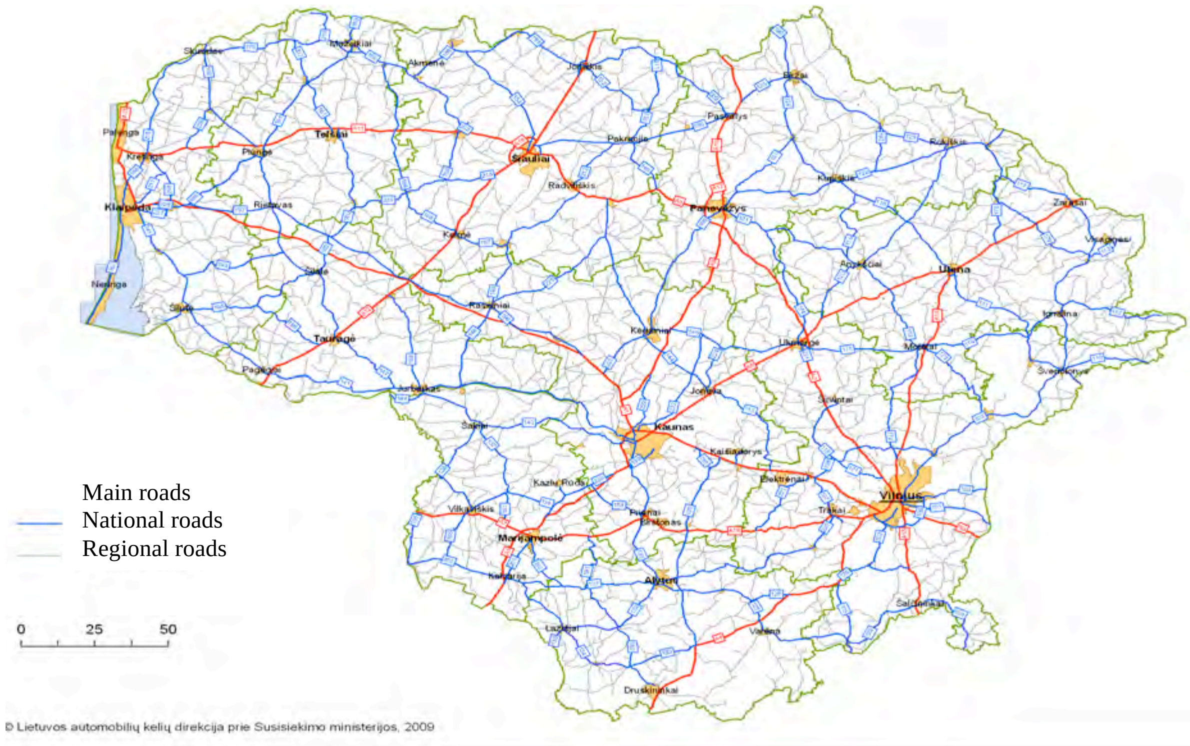
- Ensuring traffic safety is the top priority;
- Satisfaction of the needs of society and road users;
- Working in an economic and efficient manner by creating adequate traffic conditions, so that transport on the roads of state significance is safe, fast, convenient and environment-friendly.

To reach these aims, the Road Administration has the following tasks:

- Implementation of policies of road maintenance and development;
- Implementation of road maintenance and development programmes;
- Ensuring economically sound maintenance and development of roads of state significance;
- Management of the development, modernization and functioning of the network of roads of state significance.

Covering	**State roads**				**Local roads**
	Main roads	**National roads**	**Regional roads**	**Total**	
Asphalt and black coating	1673.4	4,936	7,339.3	13,948.7	62,923
Cement concrete pavement	71.1	-	1.4	72.5	
Gravel	-	-	7,225.3	7,225.3	
Cobbles	0.4	-	7.2	7.6	
Total:	**1,744.9**	**4,936**	**14,573.2**	**21,254.1**	**62,923**

Table: Structure of the national road network in Lithuania (Source: Lithuanian Road Administration)



Map: The LT road network of national significance (Source: Lithuanian Road Administration)

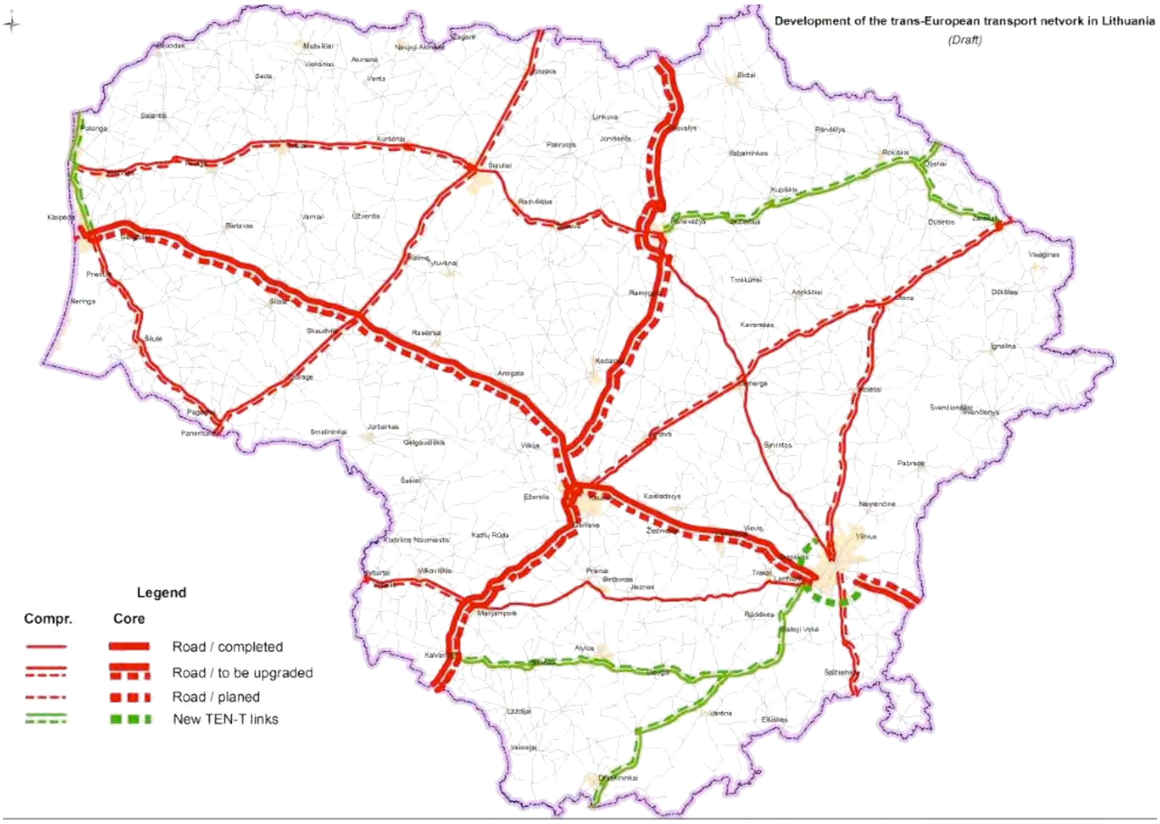
Key: Red line – main roads; Blue line – national roads; Grey line – Regional roads

The number of cars has grown in Lithuania drastically since the early 2000's. The automobilization index (number of cars per 1000 inhabitants) has grown from 382 (in 2004) to 570 (in 2011), which shows an increase of 49%. At the same time, positively, road safety has improved significantly. The number of people killed in road accidents has dropped from 773 in 2005 to 258 in 2013.

The TEN - T core network road corridor North Sea - Baltic in the territory of Lithuania consists of four sections. These are Riga - Kaunas, Vilnius - Kaunas, Kaunas - Klaipeda and Kaunas - Warsaw. All mentioned sections have passenger and cargo transportation. There are public logistics centres next to these sections that connect road and rail networks.

The section Riga - Kaunas extends in a north - south direction and is international highway E 67, which connects Helsinki and Prague and is also called "Via Baltica". Its section from Kaunas to Sitkūnai (about 20 km) of the motorway (Al) has two lanes in both directions and other parts of A8, A17 and A10 have one lane in both directions.

The modal split between rail/road in LT in freight transportation is 37.7/62.3.



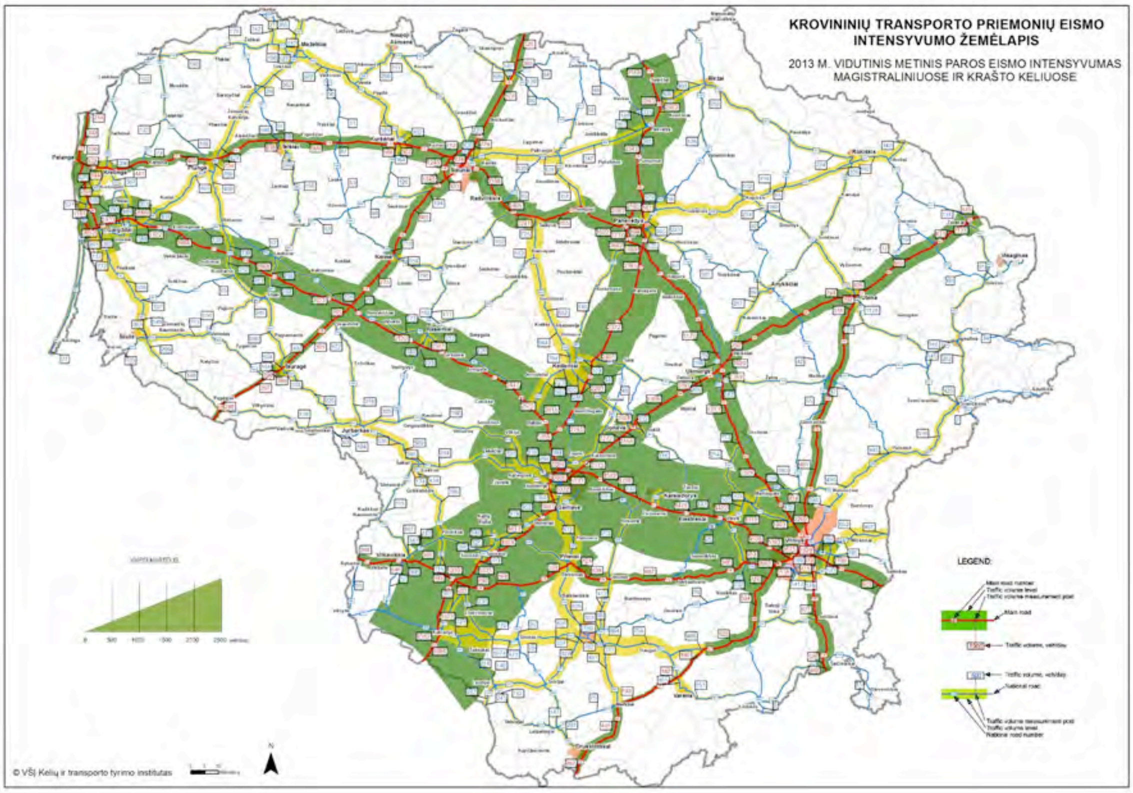
Map: Existing and planned TEN-T road network in LT (Source: Lithuanian Road Administration)

Key: Solid red – road/completed; Solid and dotted red – road/to be upgraded; Dotted red – road/planned; Dotted green – new TEN-T links

The Kaunas - Warsaw section of the Via Baltica is part of the E67 international road. The A5 section from the Polish border to Kaunas is highway A5, with one lane in both directions.

The section Vilnius - Kaunas is part of highway Al Vilnius - Kaunas -Klaipeda and links with European highway E85, the section length is 100 km. Vilnius - Kaunas is a highway with two lanes in both directions. This section does not have motorway status, as local and transit traffic flows are not separated.

The Kaunas - Klaipeda section is a part of highway A1 Vilnius - Kaunas -Klaipeda (also part of E85), section length is 215 km, with two lanes in each direction.



Map: Heavy vehicles traffic volumes (Source: Lithuanian Road Administration)

Via Baltica

Via Baltica (I Transport Corridor) is a very important artery for the EE, LT, LV and PL transport systems. It is major transport route between Helsinki and Warsaw. The total length of Via Baltica is 930 km (274 km of them on the territory of Lithuania).

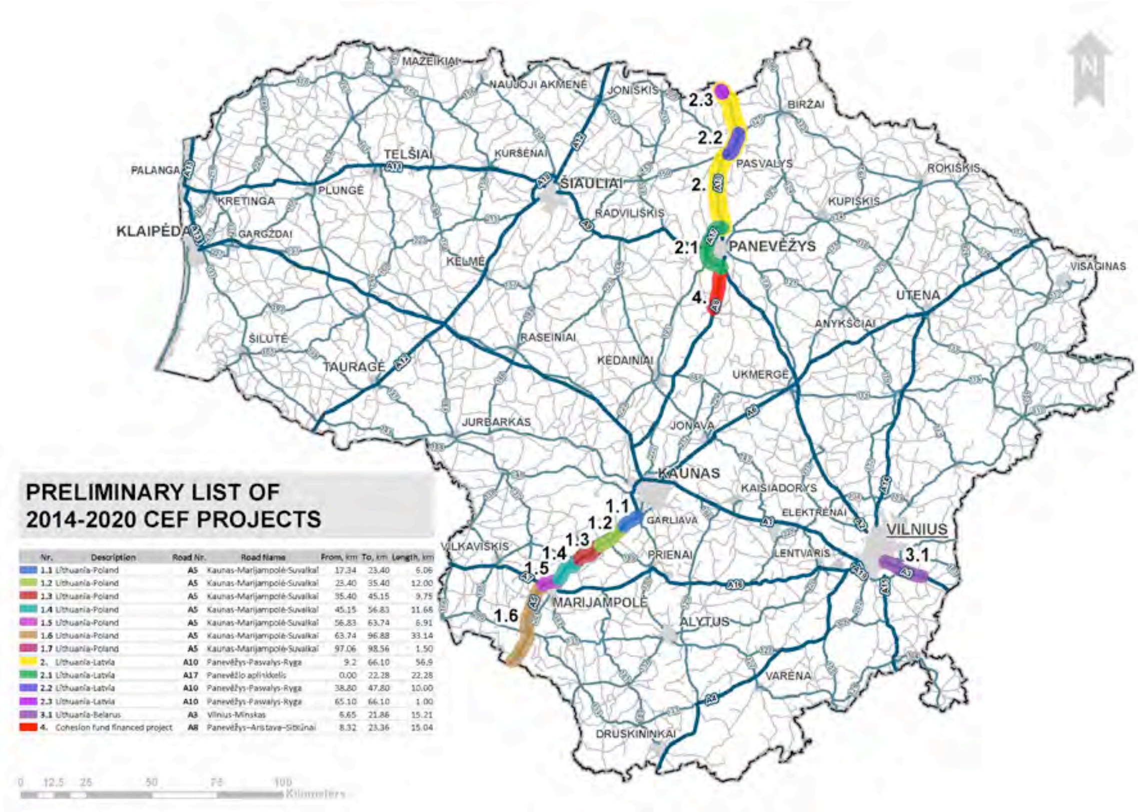
Construction works on Via Baltica road in Lithuania started in 1997, when funds from local and international funding, as well as the European Union assistance have been allocated.

The First Investment Programme 1996-2000, as well as the Second Investment Programme 2001-2006 have been implemented successfully. New road sections have been constructed, existing roads sections have been reconstructed, specific traffic safety measures have been implemented during these periods.

A considerable amount of works on Via Baltica has been successfully carried out by using financing allocated from the Cohesion Fund in the period of 2007-2013. The following list of actions describes years 2010-13:

- Improved or reconstructed 53 dangerous intersections (changed traffic organization system, elevated traffic islands or islands of reflecting poles);
- 41 engineering speed reduction measures (on side roads);
- 5 information speed cameras;
- 14 stationary speed measuring devices;
- ca 4 km of metal guard rails;
- Lighting of ca 2 km of dangerous road sections;

- 2 km of net fencing from pedestrians;
- Other traffic safety improvement measures (walkways and cycle tracks, improved pedestrian road crossing places, lighting supports generated by solar and wind power);
- 1+1 road section constructed on the main road A5 Kaunas-Marijampolė-Suwalki from 57.70 to 64.10 km (in total 6.4 km)



Map: Preliminary list of 2014-2020 projects eligible for CEF application (Source Lithuanian Road Administration)

IXB Transport Corridor

IXB transport corridor is the main transport corridor between East and West. The main part of corridor runs on of the main Lithuanian highway A1 Vilnius – Kaunas – Klaipėda (296.300 km). The remaining part is road A3 Vilnius – Minsk (27.340) and road A13 Klaipėda – Liepaja section from 0.0 km to 4.0 km. Length of IXB transport corridor – 327.6 km.

Development of IXB transport corridor in Lithuania have been started by ISPA funding from 2001, further continued by financing from Cohesion Fund.

Using funding allocated from the Cohesion Fund in the period of 2007-2013 has enabled for significant reconstructions of IXB transport corridor. Road sections of total 118 km length have been reconstructed, environmental and traffic safety measures have been implemented: safety barriers (133 km), road illumination (14 km), separate grade pedestrian crossings (2 constructed and 2 reconstructed), wire net (180 km).

Port

Klaipeda State Seaport is one of the northernmost ice-free ports on the Eastern coast of the Baltic Sea. It is important and the biggest Lithuanian transport node, connecting sea, land and railway routes from East to West.

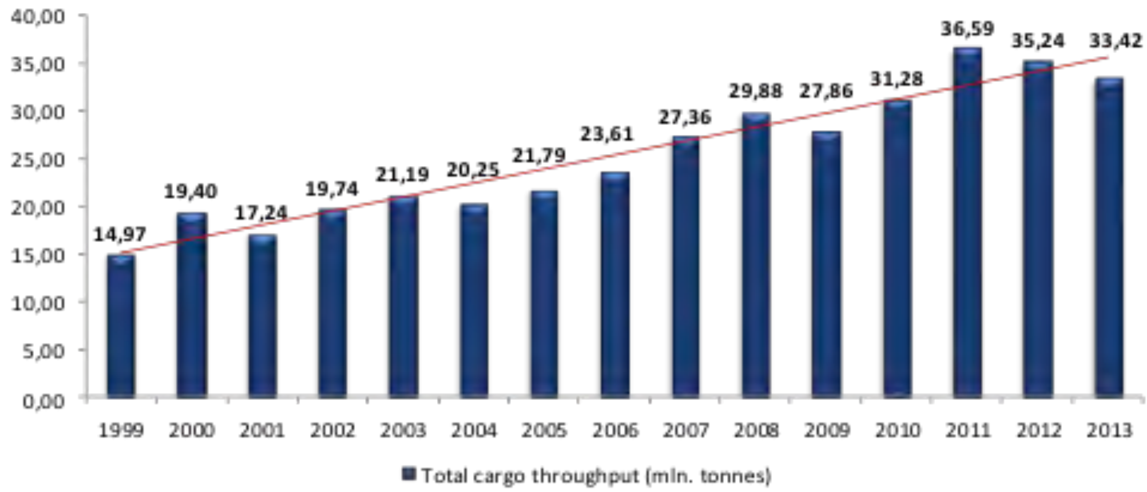


Diagram: Development of freight tonnage at Klaipeda State Seaport (Source Klaipeda State Seaport)

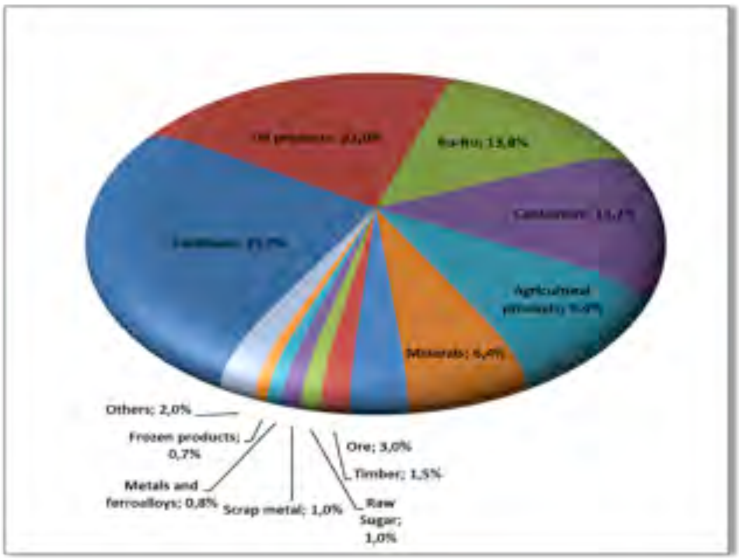


Diagram: Type of freight of Klaipeda State Seaport. Clockwise starting from fertilizers (blue 25,7%), oil products (23,0%), ro-ro (13,8%), containers (13,7%), agricultural products (9,4%) and minerals (orange 6,4%). Other products count for 8,0%. (Source Klaipeda State Seaport)

Klaipeda is a multipurpose, universal, deep-water port, with 17 large stevedoring companies providing services and 38 specialized terminals, which allow it to handle all types of cargo. Over 7,000 ships call at the port annually. It is a deep-water port; the depth of its entrance channel is 15 m, the fairways – 14,5 m. The annual port cargo handling capacity is up to 60 million tons. The port is capable of accepting large–tonnage vessels: dry-cargo vessels up to 100,000 DWT, and tankers up to 160,000 DWT. Requirements of the International Ship and Port Facility Security (ISPS) Code, Regulation No. 725/2004 of the European Parliament and the Council and Directive 2005/65/EC have been implemented in the port terminals, territory and port waters. Klaipeda port is rapidly developing and sets out ambitious plans for further expansion, including port deepening, an MSC container distribution hub in the Baltics, Universal Agribulk Export - Import terminal, Public Logistics Centre, Liquefied Natural Gas Terminal (LNG), Klaipėda Passenger and Cargo Terminal, improving railways and motorways connections and developing the outer harbour.

Growing environmental demands – especially because of the Curonian Lagoon – and the increasing freight volumes form a challenge to port development. The aim is to avoid changes in hydrodynamic conditions that can cause a lowering of the level of the lagoon and the sea water inflow into the bay which would change the lagoon ecosystem.

It is forecasted that the number of the Post Panamax class container ships will increase by 2030 about 27%. Given the observed trends in short sea shipping, the port needs to ensure a 250 m wide and 17.0 to 17.5 m depth in the port entrance channel. The port of Klaipėda aims to receive and handle Post Panamax class vessels with a length - up to 365 m, the width of the sides - up to 52 m draft - to 16.4 m.

The following three figures depict the investment plan of Klaipeda port spatially and over time.

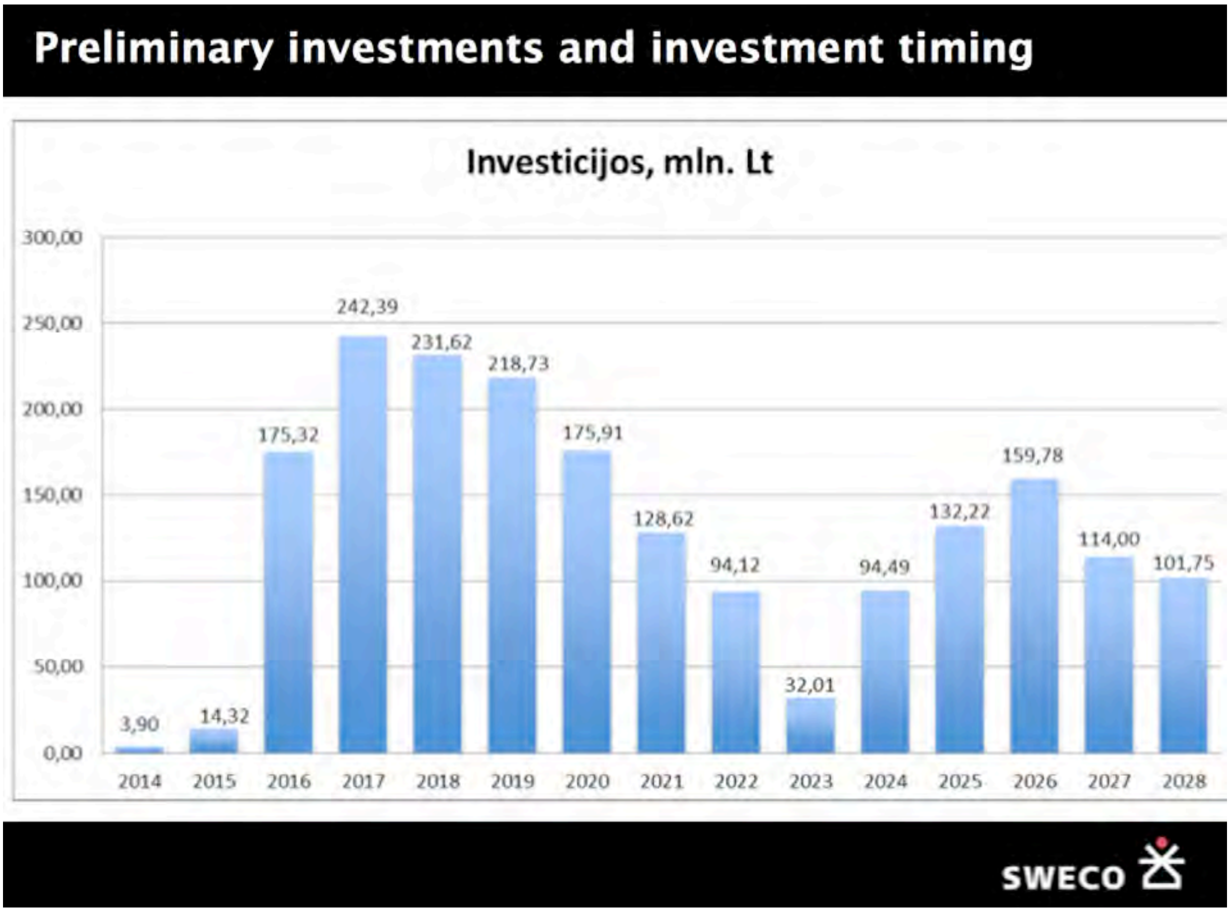


Figure: Preliminary investment plan of Klaipeda port by year (Source Klaipeda State Seaport)

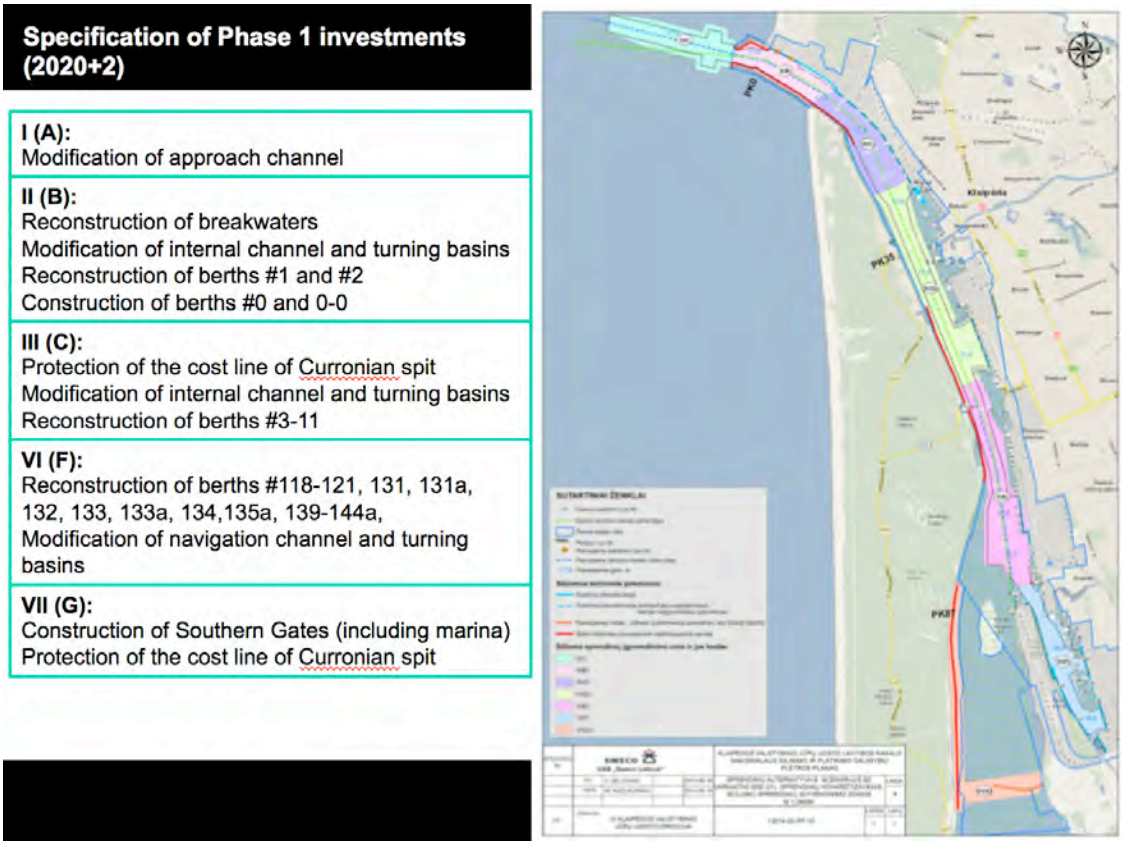


Figure (above): Investment plan of Klaipeda port 1 (Source Klaipeda State Seaport)

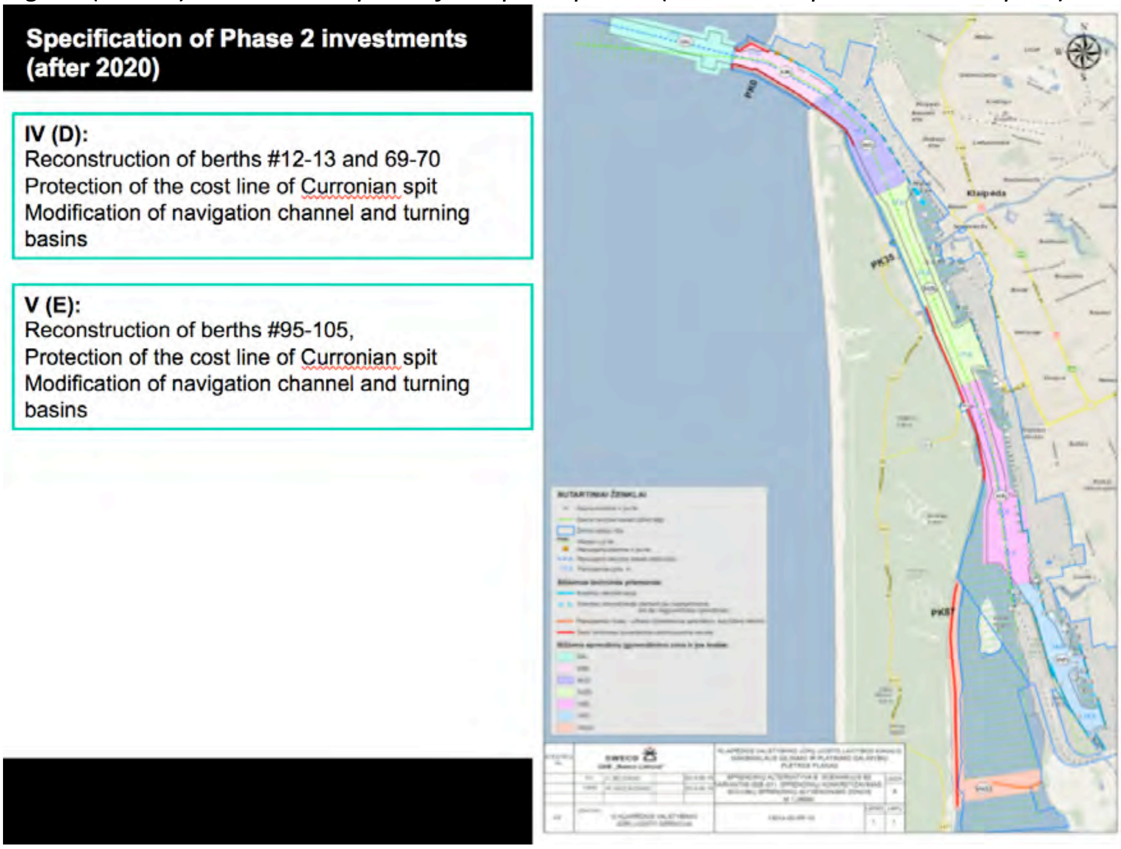


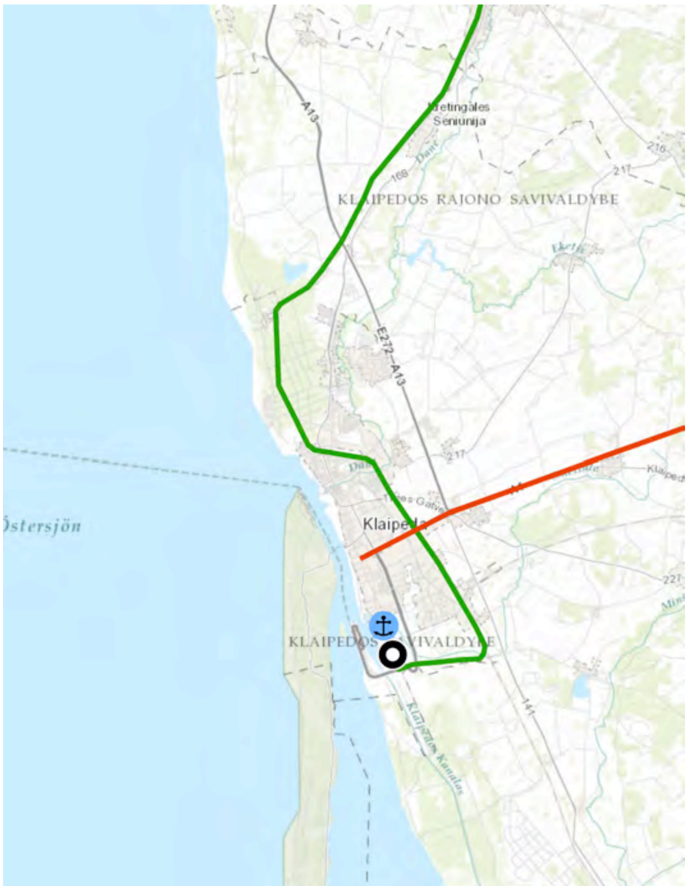
Figure (above): Investment plan of Klaipeda port 2 (Source Klaipeda State Seaport)

Electronic Customs Clearance System

The Information system for the declaration of freight and commodities transported via Klaipėda Port (KIPIS) has been successfully implemented in the port since 2011. Thanks to this system, Customs clearance and exchange among the state institutions and private companies are carried out electronically. The KIPIS system accelerates freight and commodity transportation through Klaipėda port, facilitates agents' and forwarders' work, and increases the competitiveness of the port.

Hinterland connections

As the port of Klaipeda is situated at the crossroad of the two international corridors, it serves as bridge between the markets of the Commonwealth of Independent States and the Asian region on one hand, and the European Union and other markets on the other hand. The Port of Klaipeda lies closest to the ports in the North-West of Europe and southern parts of Scandinavia. Klaipeda Port has well-developed hinterland connections for container delivery to Belarus, Russia and Kazakhstan.



Map: Klaipeda State Seaport is connected to the 1520 mm gauge railway and road networks.

Airport

There are four international airports in Lithuania, which from 1 July 2014 are managed as one enterprise. Vilnius airport is a part of the North Sea – Baltic corridor network corridor. Vilnius International Airport can handle up to 3 million passengers per year. The airport has passenger connection by 1520 mm rail line to Vilnius railway station and is accessible by other means of public transport. Area: 326 ha; Runway: length 2515 m, width 50 m.; Landing Category II (CAT II).

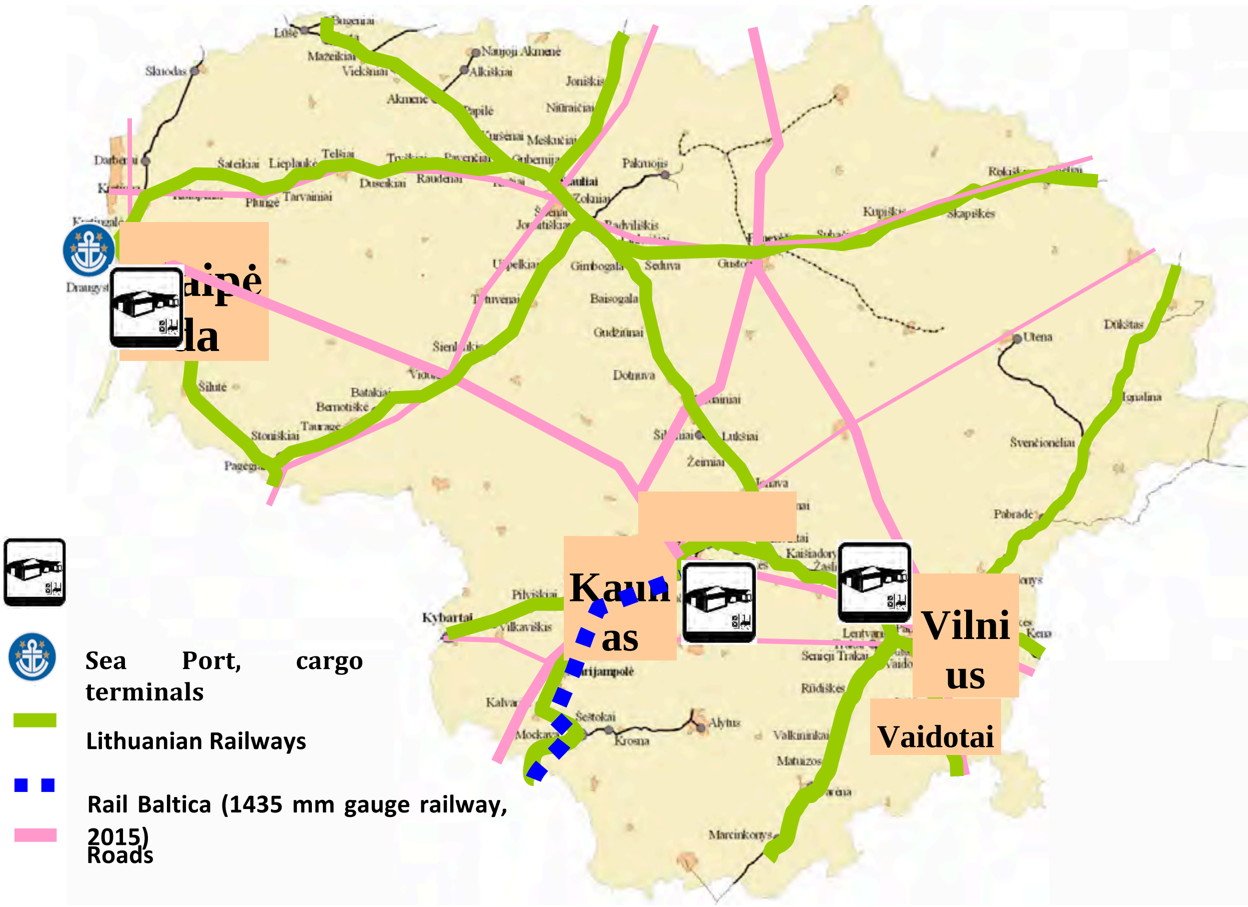
Kaunas International Airport is on the comprehensive network but is worth mentioning because of its close location to the TEN-T core network and as a part of Kaunas node and the Vilnius-Kaunas section. It has the longest runway in Lithuania, which can be operated without any restrictions (Kaunas airport can receive aircraft even in minimum visibility meteorological conditions). The airport can handle up to 1 million passengers per year and 110 thousand tons of cargo, Ryanair opened its base there in 2010. Area: 438 ha; Runway: length 3250 m, width 45 m.; Landing Category II (CAT II). Kaunas airport is near to Palemonas intermodal railway terminal, which is being developed as a part of the RB. There are plans to develop cargo terminal with rail connections to Palemonas intermodal terminal, Kaunas free economic zone and Kaunas public logistics centre.

Logistics hotspots

There are three core network rail-road terminals in LT and they are located in Klaipėda, Vilnius and Kaunas.

Kaunas operates as an important hub for freight transport. In 2013 a study was made by the City of Kaunas on the development of logistics services leading to a joint development strategy for all logistics services in Kaunas (Palemonas, EFZ).

There were significant developments in building Kaunas and Vilnius rail-road terminals, for details see:- www.intermodalcenter.lt



Map: The logistics network in Lithuania (Source LG)

Chapter 8

Elements of the Work Plan: Poland

By IPG-Potsdam and ILiM

Technical infrastructure parameters of each transport mode

Map: Alignment of Road, Rail and IWW sections in Poland of the Corridor North Sea – Baltic (only red sections; solid = road, broken = rail, dotted = IWW); the sections of Corridor Baltic-Adriatic are indicated in blue. (Source: TENtec) Remark: Until now, the section Warsaw – Siedlce – Łuków of the E20 rail line is not illustrated as part of the North Sea – Baltic Corridor in the TENtec maps.

Rail network

The North Sea – Baltic Corridor involves important parts of the more than 18,500 kilometres long Polish railway network. The Corridor's core network consists of the following lines: Warsaw – Koluszki - Łódź (rail lines No. 1, 17), Warsaw – Terespol (rail line No. 2), Kunowice – Poznań – Warsaw (rail line No. 3), Warsaw – Białystok (rail lines No. 6 and 449), Łowicz - Skierniewice (rail line No. 11), Skierniewice – Łuków (rail line No. 12), Białystok – Ełk (rail line No. 38) as well as Ełk – Suwałki – Trakiszki (rail lines No. 39, 41, 51).

The Polish government is coming to a final decision regarding the construction of the high speed line between Warsaw via Łódź to Poznań and Wrocław (the so-called double "Y") byin 2020. The top half of the "Y" - the Warsaw – Łódź – Poznań section is defined as a component of the core network primarily for passenger traffic. At present the line between Warsaw and Poznań is for both passenger and freight traffic. In case the high speed line on this section was constructed then the line E-20 would mainly be aimed at freight.

The alignment of the core network of the North Sea – Baltic TEN-T Core Network Corridor corresponds widely in Poland to the network of Rail Freight Corridor (RFC) No. 8 North Sea - Baltic created on the basis of the Regulation of the European Parliament and of the Council (EU) No 913/ 2010 concerning a European rail network for competitive freight. The RFC No. 8 is being created since 2011, and its management structures are working already. The Management Board commissioned an analysis of the transport market study and is currently creating an investment plan.

As the longest and most important component, the rail route Kunowice – Poznań – Warsaw is very important for transport and is configured with electrified double-tracks and has a current operating speed of 160 km/h because most of the route has been upgraded.

The target for the joint measures of the line upgrade in the last decade was specified within the framework of an agreement between the Federal Ministry for Transport, Building and Housing of the Federal Republic of Germany and the Minister for Infrastructure of the Republic of Poland in June 2003: a maximum speed of 160 km/h, adjustments to the parameters of the agreement AGC and AGTC with regard to route usage and load category, reduction in travelling time from 6 to no more than 5 hours (EC-traffic between Warsaw and Berlin), harmonisation of the technical conditions in railway traffic between the states, improvement of the standards for goods traffic (above all also for combined goods traffic), doubling of the rail market share in this corridor (initial situation: 4 % passenger traffic, 2 % goods traffic). Deviations from the targeted condition will then only exist on the Swarzędz – Sochaczew section (adjustment of stations, elimination of capacity restrictions), on the Warsaw – Kutno section (signalling system, overtaking tracks, engineering structures) as well as in the Poznań and Warsaw railway nodes (track conditions, engineering structures, signalling devices). Depending on the available funding it is planned to complete the work on the entire section of the E/EC 20 by the end of the EU financial perspective (2014 -2020).

Rail alignment: Kunowice – Poznań – Warsaw (near Poznań) (Source: ILiM)

In the direction of the Baltic States, the double tracked and electrified Warsaw - Białystok line is an important part of the corridor´s rail infrastructure. The track conditions enable a primary maximum speed of 120-160 km/h. However, in the future, this will not be sufficient.

Accordingly, as a first step in completely upgrading the line improvement measures have been undertaken on the outskirts of Warsaw during the last five years.

Only two single track routes (via Ełk and Sokółka) exist between Białystok and the Lithuanian border. Because of the improved, existing conditions (electrification of the section Białystok – Ełk) and for reasons of the function and central position of the city of Ełk (60,000 inhabitants), this route is favoured by the Polish government and will consequently form part of the rail corridor. The Polish government is planning a rehabilitation and modernization of the existing railway infrastructure between Warsaw and the PL/LT border. It includes in particular a new short subsection near Olecko (straightening of the line) and the rebuilding of the railway system in the Suwałki Station. In the future, the border-crossing operational systems, such as ERTMS (European Rail Traffic Management System) will be essential. Depending on the available financial funding it is planned to complete the work on the entire section of the E 75 at the end of the EU financial perspective 2014 – 2020.

Not directly related to the Rail Baltic, but part of this corridor is the route from Łowicz via Skierniewice, Pilawa and Łuków to Terespol on the Belarussian border. The section Łowicz – Łuków has acted as a bypass function for freight transport, avoiding the Warsaw agglomeration. The high frequency causes the continual abrasion and limited speed of this section. The route is electrified and widely double- tracked. There are two single-track sections at this moment: Puszcza Mariańska - Mszczonów (12 km, due to track and embankment condition) and Góra Kalwaria – Kępa Gliniecka (3 km, single bridge over Vistula river), moreover the current condition of the entire line is not sufficient.

In this context the project of a high speed route Warsaw – Łódź – Poznań could be significant in the longer term. As a result, additional capacities would be produced as a long-term perspective for the axis Berlin – Poznań – Warsaw. Since the long distance passenger traffic will mainly be relocated to the high speed route it is expected that additional capacities would become available for goods traffic on the existing route Poznań – Warsaw.

In the Polish part of the corridor three rail nodes have been investigated – Poznań, Łódź and Warsaw. Although the Warsaw node, consisting of considerable track and station systems and the rail link Warsaw – Łódź (existing Warsaw – Koluszki – Łódź line, respectively the new Y line section Warsaw – Łódź), were assigned to the portfolio of corridor 1.

Picture: Construction works on the existing main line Warsaw - Łódź near Skierniewice (Source: www.plk-sa.pl)

Road network

The North Sea – Baltic Corridor involves significant sections of the fast-expanding Polish main road network, well-funded with substantial European aid and developed in support of the UEFA European Championship 2012. The corridor's core network consists of the following main roads: DE/PL border (Świecko) - Poznań - Warsaw motorway (A 2), Warsaw – Siedlce – PL/BY border (Kukuryki/Terespol) national road (DK 2, motorway A 2 prospectively) and the planned express road from Warsaw via Ostrów Mazowiecka, Łomża, Ełk and Suwałki to the PL/LT border (Budzisko), consists primarily of two-lane national roads at the present time.

The important border-crossing motorway Berlin - Frankfurt (Oder) – Poznań – Warsaw was completed in 2012 as an infrastructural requirement of the Championship 2012 in Poland and the Ukraine. This road connection is completely configured as a four-lane motorway. Qualitative restrictions have recently emerged only along the German part (A 12) caused by the absence of a hard shoulder at a short section.

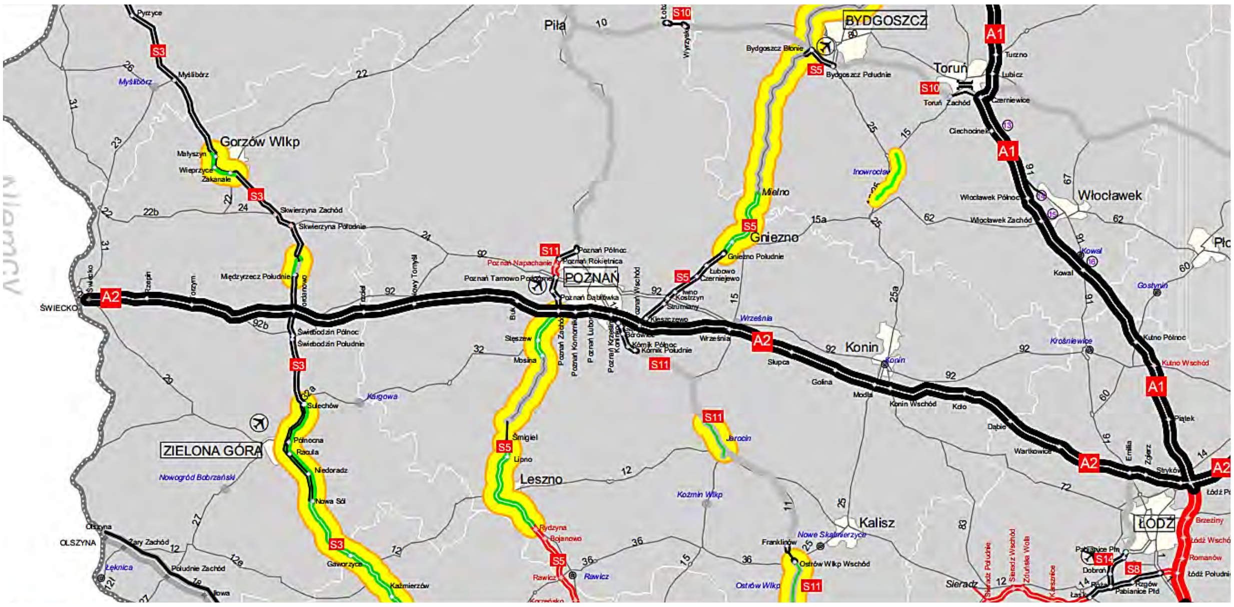
Poland's network of motorways and qualified express highways is increasing. On the territory of Poland the North Sea – Baltic Corridor connects to the Adriatic – Baltic Corridor. It is to be emphasised that substantial subsidies were provided by the European Union (Programmes PHARE, ISPA, SPOT), already before the accession into the EU. The construction of the Polish motorway A 2 (Świecko – Poznań – Warsaw) started approximately in the year 2000. Subsequently sections were built on the sections Poznań Komorniki - Września – Konin, Nowy Tomyśl – Poznań Komorniki, Konin – Stryków (near Łódź), Świecko - Nowy Tomyśl and Stryków – Warsaw. The motorway A2 from Świecko (German border) to Konin was built as a PPP project. It didn't use European funds except for the loans from the EIB.

Pictures: A 2 motorway (near Poznań) and recently built four-lane section of express road S 8 between Zambrów and Wiśniewo (Source: ILiM, www.gddkia.gov.pl)

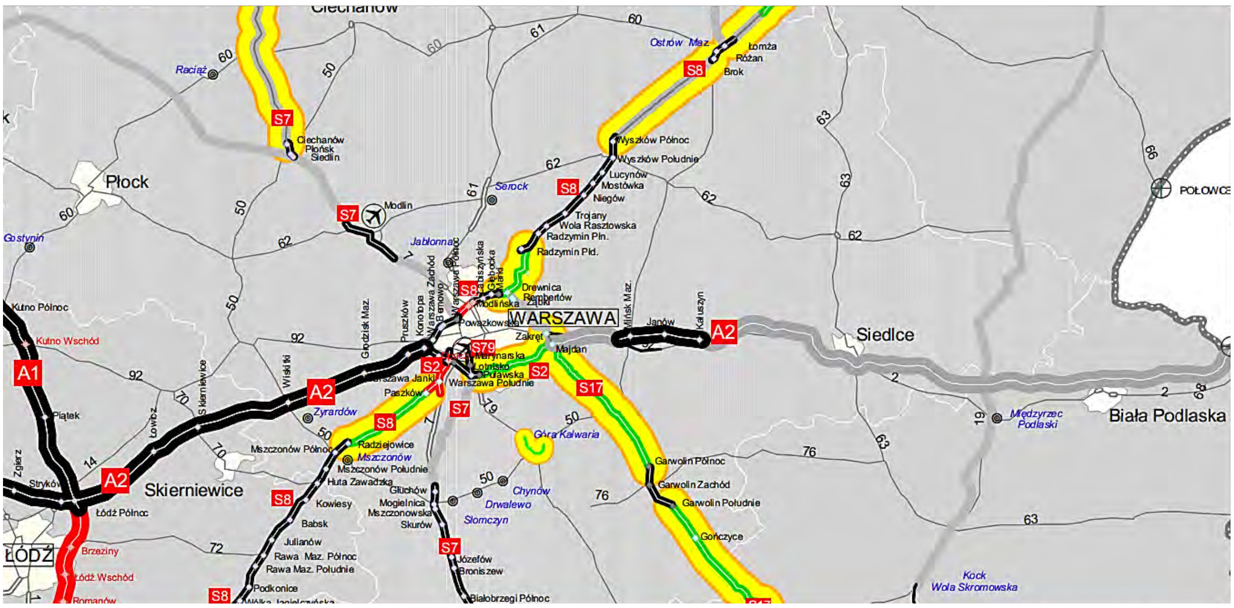
Part of the corridor 2 portfolio is also the further alignment of the motorway A 2 up to the border of Belarus. Only the 21 km long bypass of Minsk Mazowiecki has been built and further short-term measures have not yet been envisaged from the Polish side. There are plans to extend A2 motorway. In the project of the National Road Construction Programme 2020 there is a project of construction of A2 motorway from Warsaw to the Minsk Mazowiecki bypass. Otherwise, the planning and construction works concerning the urban expressway S 2 (Southern part of Warsaw) are in progress, due to the works on the urban expressway S 8 in the Northern part of the capital.

The efficient connection with the Baltic States should secure the express road S 8 Warsaw – Białystok (until Ostrów Mazowiecka) as well as the long-term planned express highway S61 from Ostrów Mazowiecka via Łomża, Ełk and Suwałki up to the Lithuanian border.

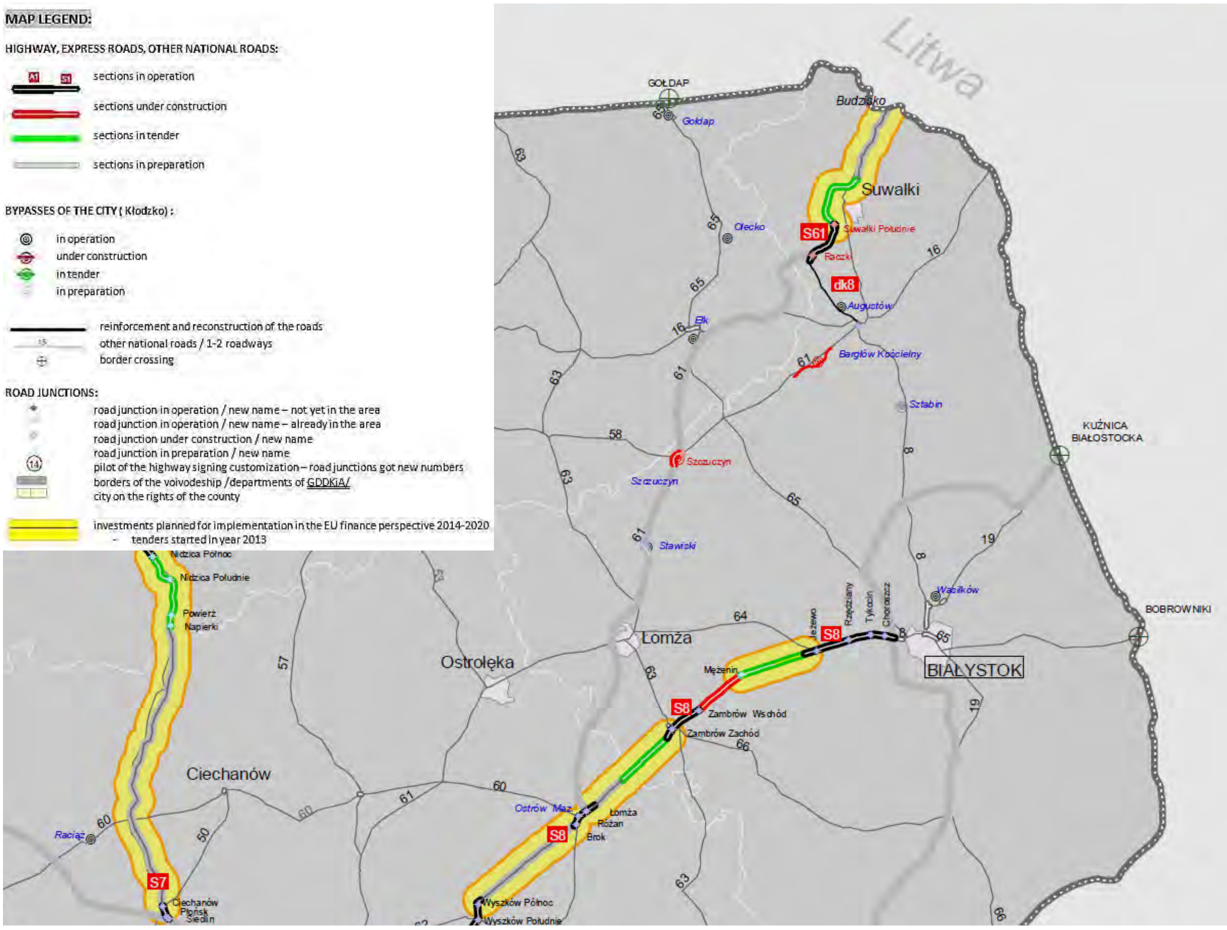
The map below presents the progress of the preparation of highways, express roads and national roads pointed out for the implementation of the National Road Construction Programme 2020 (on date: 14.08.2014). However, this programme has not yet been adopted by the Polish Government. Therefore the National Road Construction Programme for 2011-2015 is valid. In the project of the National Road Construction Programme 2014-2020 there are new projects not indicated on this map: construction of S61 expressway from Ostrów Mazowiecka to Augustów and construction of A2 motorway from Warsaw to the Minsk Mazowiecki by-pass.



Maps: Progress of preparation of highways, express roads and national roads (Source: GDDKiA, see legend on next page)



In view of the increasing problems of traffic jams on highways, the government decided to intervene and tries to ease the situation through a series of changes. The essence is to eliminate toll gates therefore the Ministry of Transport decided to cut all tenders and plans for their construction. The team in GDDKiA was established in order to analyse jointly with the Ministry of Infrastructure and Development all possible tolling systems and work out the optimum shape of a new toll collection system which could replace state toll gates from 2018.This system is quite common and used in other EU countries such as the Czech Republic and works on the principle of buying a, weekly, monthly or annual vignette at a specified price to mitigate the negative effects of everyday traffic.



The National Traffic Management System (NTMS) project involves the use of intelligent transport systems in the area of traffic management on national roads. Objectives of the project include:

- Improving the safety of road users,
- Shortening travel time,
- More efficient use of existing road infrastructure,
- Increasing the comfort of the journey,
- Improving the quality of road maintenance,
- Reducing the impact of road traffic on the environment,
- Improving cooperation with other road administration authorities,
- Improvement of traffic flows in trans-European transport and elimination of so-called bottlenecks.

The NTMS will fully cover the North Sea Baltic Corridor in Poland.

Maritime ports and the inland waterway network including the inland ports

The corridor doesn't involve maritime ports, however the main ports of Szczecin and Świnoujście as well as Gdynia and Gdańsk are part of the Baltic-Adriatic Corridor. The significant requirements for their development will be considered in the work plan for this corridor.

The inland waterway (core) network consists of the Oder river which represents the Polish-German border in the section starting at km 542.4 (Szydłów/Kosarzyn), going up to km 704.1 (Widuchowa). The Oder river offers the CEMT-class Vb from km 697.0 (Ognica) up to its estuary at the Baltic Sea. From km 617.6 (Kostrzyn nad Odrą) the CEMT-class III does exists.

Two canals – the Oder–Havel–Canal via Eberswalde and Schwedt and the Oder–Spree–Canal via Fürstenwalde to Eisenhüttenstadt – provide the link to the German network of inland waterways. Both canals ensure the CEMT-class III, consequently this level is assured, on the river Oder via Cedynia and Ognica in direction of the Baltic Sea.

The importance of the Oder ports in alignment with the North Sea – Baltic Corridor, Kostrzyn and Bielinek (km 677.3), is relatively minor – therefore these ports are not included as corridor components.

Whereas the CEMT-class III predominates in the upper course of the Oder (Gliwice - Brzeg Dolny), the central part offers just the CEMT-class II standard.

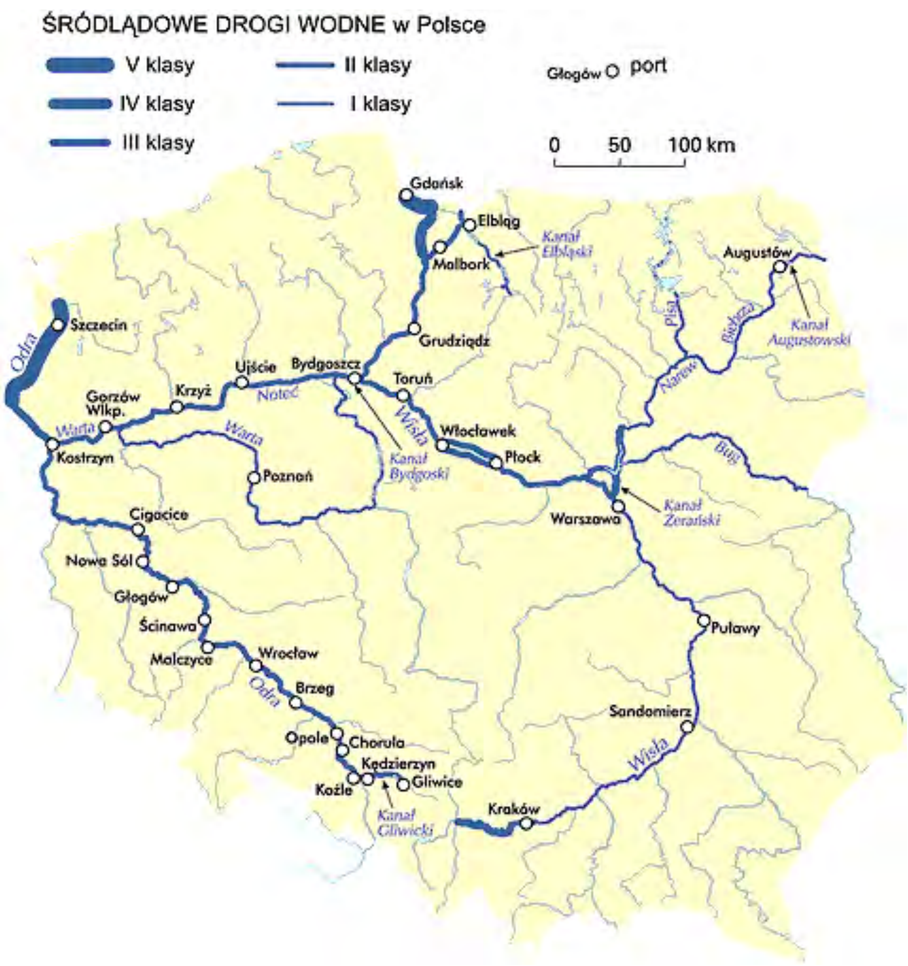
The rivers Warta (flows into the Oder river near Kostrzyn) and Noteć (flows into the Warta river in Santok) are navigable as CEMT-class II, starting from Santok (km 68.2) respectively Krzyż Wielkopolski (km 177.2).

The Noteć river has another short CEMT-class II section where its connecting to the Wisła river (Canal Bydgoski). Also the link between Warta (near Konin) and Canal Bydgoski (near Bydgoszcz) possesses a short CEMT-class II section (Lake Gopło).

Polands most important river Wisła doesn't offer the preconditions for efficient inland waterway transport. The rivers navigability is dominated by CEMT-classes I and II, only short sections near the estuary of Wisła near the Baltic Sea can be used as CEMT-class III respectively Vb waterways.

Furthermore, the rivers Narew (flows into the Wisła), Pisa, Biebrza and Bug (flow into the Narew) in the northeastern part of Poland are not suitable for effective waterway transports, by reason of their small size and strongly meandering alignment. Exceptions are relatively short sections in the north of Warsaw including the Żerański Canal.

Figure: Inland waterways system in Poland including classification (source: National Water Management Authority of Poland, Wikipedia)



Airports

Along the North Sea – Baltic Corridor in Poland there are 4 airports directly connected to the corridor, especially to the important transport nodes of Warsaw, Łódź and Poznań. Three of them are part of the TEN–T core network (Warsaw Chopin Airport, Łódź Wladyslaw Reymont Airport and Poznań – Ławica Airport).

<u>Warsaw Chopin Airport</u>

Warsaw Chopin Airport is an international airport. It is the busiest airport in Poland and main airport of Warsaw, the Polish capital. It is located to the south – west of Warsaw, about 10 km from the city centre. The airport is easily accessible by train, local and - express buses or taxis. A direct rail link connecting the airport to the city centre was built in 2012, enabling passengers to reach the airport in about 25 minutes. By car, the airport can be reached via the express roads S 2 and S 79.

The airport is managed by the Polish Airports State Enterprise. It has two intersecting runways which are 3690 and 2800 metres long. In 2013, the airport had about 10.7 million passengers and almost 124 thousand passenger aircraft movements. This shows a dramatic increase in passenger traffic since 1990. For example, in 1994 the airport served only 2.2 million passengers. This growth caused some problems for the airport capacity. It has to expand and improve to meet future demand.

Pictures: The terminal of Warsaw Chopin Airport (Source: www.lotnisko-chopina.pl)

Warsaw Modlin airport (not part of TEN-T network)

Warsaw Modlin airport is a new civil airport, located 40 km north of the Warsaw city centre, which opened in July 2012 as a low cost airport. Shortly after opening, the runway (2500 m long) had to be repaired. About seven month later, the repair works of the runway had been completed and it was re-opened.

There is no direct rail link to the airport, but passengers are able to use the train to Modlin station and then change to the airport shuttle bus. The bus timetable is coordinated with the arrivals and departures of the trains. The airport can be reached by car, using the express highway S7 and changing to road Nr. 62. There is no link by motor way.

The Modlin airport is constantly developing. It is intended for low cost carriers. In 2012 it served about 860 thousand passengers. In 2013, because of the reconstruction of the runway, only about 350 thousand passengers were recorded.

Łódź Wladyslaw Reymont Airport

The Łódź airport is an important regional airport with a lot of international transport connections, located in central Poland approximately 6 km south – west of Łódź city centre. It is a new, developing airport. The length of the runway is 2500 m.

The number of passengers and amount of freight varies each year, depending on the specific economic conditions. In 2013 the airport served approximately 355 thousand passengers and transported 3.162 t of cargo. The best year for the airport in terms of passenger traffic was in 2012 with almost 463 thousand passengers while the best cargo year was 2013. It shows a strong increase in freight handling compared with 2012 (1.055 t). Several investments have been made at the airport during the last few years. For example in 2012, a new terminal was opened with a passenger handling capacity of about 1.5 - 2 million; there is much spare capacity available for future demand.

However, there is no direct rail link. The airport is linked to the express highways S 14 and S 1. There is no direct link to a motor way.

Poznań – Ławica Airport

Poznań Ławica Airport is an international airport serving Greater Poland and the city of Poznań, one of the fixed transport nodes of the corridor. It is located 5 km west of the Poznań city centre. In order to increase the terminal’s capacity and to develop the airfield infrastructure, a lot of investments have been made during the last few years. This provides great opportunities for the airport to develop further.

In 2013, about 1.36 million Passengers (2012 – about 1.6 million) were served. The airport has developed vastly since 1998. Back then, only about 192 thousand passengers were served and in 2008 more than 1 million for the first time. Poznań Ławica Airport also has a freight operation. In 2012 Poznan – Ławica handled 2 562 t of freight.

There is no direct rail link. On behalf of the Wielkopolska Marshal's Office the concept of rail connections between the main railway station and Poznan Ławica airport was prepared in 2008, which showed that such link is feasible from a technical point of view.

However, the current size of the passenger flow (about 50% lower than expected) has led to that the project has not moved to its implementation phase. By car, the airport can be reached on the national road 307. Access is also by the A 2 motor way via the express highway S 11. However, there is no direct link to the motorway system.

Pictures: The terminal of Poznań Ławica Airport (Source: ILiM)

Rail-road terminals

Although in comparison to the situation in other European countries, the volume of goods carried within the intermodal transport system is still at an unsatisfactory level, in recent years, Poland has maintained an upward trend in terms of the share of intermodal transport in railway transport. In the first half of 2014 the share of intermodal transport in the overall railway transport market measured by the weight of goods reached almost 4.31% and was by 0.6 percentage points higher than in 2013. At the same time, the intermodal transport performance share amounted to 7.03% - an increase by 1 percentage point in comparison to 2013.

According to the forecast prepared by Ocean Shipping Consultants Ltd „Due Diligence Study (October 2012), the market demand for container transport in Poland will increase by 305% in 2025 compared with 2011 – a growth to 4.95m TEU p.a. from 1.6m. The table below presents most important parameters, characterizing rail road terminals located along the North Sea - Baltic transport corridor.

Terminal owner	Location	Legal status	Annual loading capacity [TEU]	Terminal activity
Cargosped Sp. z o.o.	Gądki near Poznań	is part of PKP Cargo S.A.	100 000	active
	Kobylnica near Poznań		–	inactive
	Warszawa		85 000	active
Spedcont Sp. z o.o.	Łódź Olechów	Private	60 000	active
	Warszawa Główna Towarowa		60 000	active
	Poznań Garbary		–	inactive
PKP Cargo S.A.	Poznań Franowo	Stock company	11 782, target 79 000	active
Polzug Intermodal Polska Sp. z o.o.	Gądki near Poznań	Private	385 400	active
	Pruszków near Warsaw		96 000	active
Loconi Intermodal S.A.	Poznań	Private	50 000	active
Clip logistics Sp. z o. o.	Swarzędz near Poznań	Private	75 000	active
PCC Intermodal S.A.	Kutno	Stock company	100 000 (target - 200 000)	active
Erontrans	Stryków	Private	No data	active

Container terminal in Gądki (Polzug)

In September 2011 POLZUG Intermodal Polska SP. z o.o. commenced their activity in the new container terminal in Gądki near Poznań in the immediate vicinity of the existing container terminal, which due to the lack of opportunities for further development was closed by means of the start of the new one. The new terminal designed as a hub for containerized cargo mostly from the port of Hamburg to Poland works as follows: several pairs of trains a day deliver containers to Gądki - containers designated for customers in the Poznań agglomeration and the Wielkopolska region are provided by the terminal in Gądki by road to recipients, and containers for customers in other regions of the country are transferred to trains, operating the scheduled container transport within so called block trains (running without the need for distribution yards) between the terminal in Gądki and terminals belonging to POLZUG in Pruszków near Warsaw, Wrocław and Dąbrowa Górnicza.

In addition, the terminal provides services for other operators organizing intermodal container transport to or from other locations.

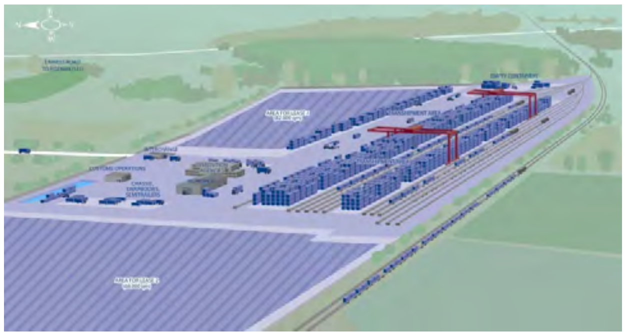
The terminal offers very good local position and technical conditions. Presently there are four tracks for handling containers - each with a length of 610 m. On both sides of the unloading tracks there are two manoeuvring yards with the dimensions of 700 x 26 m each. Ultimately, the terminal will have 12 tracks, including two electrified ones across the entire length and a third yard with the same dimensions as the previous two.

During the first phase of implementation, which has been completed in August 2011, the terminal has six self-propelled cranes with a lifting capacity of Q = 45 t each, and ultimately will have two additional gate cranes of similar capacity. Container storage capacity allows for a storage of 1 700 containers, and finally, 3 400 containers. 135 seats for containers requiring power supply have been prepared for.

Basic data	
Name	POLZUG HUB Terminal Poznań
Owner	POLZUG INTERMODAL POLSKA Sp. z o.o.
Location	Magazynowa 8 street, 62-023 Gądki
Year of construction	2011
Scope of intermodality	rail-road
Total area /sqm/	320 000
Infrastructure	
Total number of tracks	4
Number of tracks for reloading /pcs./	4
Length of individual tracks for reloading /m/	610
Total storage area /sqm/	no data
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	6
Payload /t/	45
Transshipments	
Supported type of logistic units	large containers, swap bodies and semitrailers
Cargo handling capacity	235 ITU / 24 h

The container terminal in Gądki has a capacity for the rapid increase in reloading activity. The second phase of development is already planned, in which the number of tracks used for handling will be increased to 12 and the handling capacity of six cranes will be complemented with two gantry cranes with a lifting capacity of Q = 45 t each. The figure shows the visualization of the container terminal in Gądki according to the last stage of the project.

The access to the container terminal Polzug Intermodal Polska Sp. z o.o in Gądki is convenient. It may be accessed from the Poznań agglomeration by the urban section of the A 2, then from the road junction Krzesiny within the A 2 motorway in the direction of Kórnik via the S 11 express road, and from the intersection-free node to the terminal - the investor built a road section of a length of 320 m and a width of 10 m, which connects the terminal with the road connecting to the S11 express road.



Pictures: Gadki Polzug terminal (Source: POLZUG Intermodal Polska Sp. z o.o.)

<u>Container terminal in Gądki (Cargosped)</u>

In February 2012 a new container terminal was opened in Gądki near Poznań at a site where Polzug conducted business until September 2011. Thus Cargosped currently has three terminals within the Poznań agglomeration – in Poznań, Kobylnica and Gądki. This terminal allows for running trainloads to warehouses and satisfactory customer service in a well distributed traffic. The Poznań Franowo marshalling yard located nearby enables such opportunities.

The terminal equipment includes the track with a length of 750 m, allowing the unloading of the entire trainload. The Transhipment point occupies an area of more than 14 000 sqm with storage area of ca. 4000 sqm ensuring maximum annual handling capacity of around 70 000 TEU and allowing for simultaneous storage of approximately 800 TEU.

Basic data	
Name	Container terminal in Gądki – Cargosped Sp. z o.o.
Owner	Cargosped Sp. z o.o.
Location	62-023 Gądki, Dworzec 32 street
Year of construction	2012
Scope of intermodality	rail-road
Total area /sqm/	14 000
Infrastructure	
Total number of tracks	2
Number of tracks for reloading /pcs./	1
Length of individual tracks for reloading /m/	750 m
Total storage area /sqm/	4 000
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	1
Payload /t/	45
Other	
Transshipments	
Supported type of logistic units	large containers
Cargo handling capacity	190 ITU / 24 h

Container terminal in Swarzędz (CLIP)

The container terminal in Swarzędz is located in areas covered by the Special Economic Zone and is part of Centrum Logistyczno Inwestycyjne Poznań (CLIP). Its attractiveness includes among other available complete logistics - transportation solutions: own railway siding and the location of the terminal on the railway line E 20 Paris - Moscow. This enables efficient and rapid management of container shipments. The terminal occupies 6 500 sqm with capacity of 500 TEU. The container terminal in Swarzędz has a reserve space for further expansion – the total budget for the new terminal is 39 824 169 PLN.

Picture: Rotterdam-Swarzędz train during the discharge of containers from platform wagons (Sources: DVZ, CLIP Group)

Basic data	
Name	CLIP Logistics sp. z o.o.
Owner	Centrum Logistyczno Inwestycyjne Poznań
Location	62-020 Swarzędz – Jasin , Rabowicka 6 street
Year of construction	2008
Scope of intermodality	rail-road
Total area /sqm/	6 500
Infrastructure	
Total number of tracks	1
Number of tracks for reloading /pcs./	1
Length of individual tracks for reloading /m/	1 190
Total storage area /sqm/	2 150
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	1
Payload /t/	45
Transshipments	
Supported type of logistic units	large containers, swap bodies and semitrailers
Cargo handling capacity	190 ITU / 24 h

Container terminal in Poznań Garbary (Spedcont)

The container terminal located in Poznań at the train station Garbary belongs to Spedcont Sp. z o.o. The terminal Poznań - Garbary operates within a network of the other Spedcont terminals (Łódź Olechów, Warszawa Główna Towarowa and Sosnowiec Południowy).

Basic data	
Name	Container Terminal Poznań Garbary
Owner	SPEDCONT Sp. z o.o.
Location	61-758 Poznań , Północna 1 street
Year of construction	The 1970s
Scope of intermodality	rail-road
Total area /sqm/	6 200
Infrastructure	
Total number of tracks	3
Number of tracks for reloading /pcs./	3
Length of individual tracks for reloading /m/	3 × 150
Total storage area /sqm/	5 700
Equipment	
Overhead cranes	NONE
Number	-
Payload	-
Storage height	-
Mobile cranes	NONE
Number	-
Payload /t/	-
Other	
Transshipments	
Supported type of logistic units	large containers, swap bodies and semitrailers
Cargo handling capacity	No data

Due to the location of the terminal in a dense city centre and major problems with accessing it (inner-city roads are not designed for transport by truck traffic and there are many transit limits for trucks) it conducts very few operations and has no further prospect for its development (the development of storage yards, extending the tracks, expanding of the service offer, etc.). These transportation restrictions result in the fact that, despite assurances of Spedcont, employees of service providers of the terminal, we must specify its status as very limited or even closed.

Container terminal in Poznań Franowo (PKP Cargo S.A.)

The terminal was built in December 2013 with the co-financing of the European Union under the Operational Programme Infrastructure and Environment, and it is the first step in the construction of a logistics center at the railway station Poznan Franowo.

The container terminal in Poznan - Franowo covers an area of over 20 000 sqm and currently supports 11 000 but eventually up to 79 000 containers per year. There is a possibility of its further expansion in the future. The established project contains 1570 mb loading and unloading tracks and an area of about 20 000 sqm for the storage of containers. Also built were: a driveway, energy infrastructure, telecommunications, sewerage systems and refueling station for mobile handling equipment.

The project is located on the largest of the freight stations in the region of Wielkopolska, where the intersection of the railway lines cross and serve transportation from Polish seaports to the southern Europe. Franowo is located on the suburb of Poznan, near the Krzesiny junction at the A 2 highway.

Basic data	
Name	Container Terminal Poznań Franowo
Owner	PKP Cargo S.A.
Location	Poznan
Year of construction	30.04.2012
Scope of intermodality	Rail-road
Total area /sqm/	40 112
Infrastructure	
Total number of tracks	2
Number of tracks for reloading /pcs./	2
Length of individual tracks for reloading /m/	Including 1570
Total storage area /sqm/	21 364
Equipment	
Overhead cranes	NONE
Number	=
Payload	=
Storage height	=
Mobile cranes	YES
Number	2
Payload /t/	45
Other	
Transshipments	
Supported type of logistic units	Two reach stackers
Cargo handling capacity	11 782 TEU/year

Loconi terminal in Poznań

Loconi Intermodal S.A. was set up in 2011. Currently, Loconi possesses its two own handling terminals: Terminal Loconi Intermodal S.A. Poznań and Terminal Loconi Intermodal S.A. Radomsko. All terminals are equipped with reach stacker type handling machinery and empty containers handling machinery, a container servicing workshop and electric sockets with possibility to plug in reefer. The terminals are fenced in and provided with 24/7 security and monitoring.

Basic data	
Name	
Owner	Loconi
Location	61-001 Poznan, Nowosolska 40 street
Year of construction	24.04.2012
Scope of intermodality	rail-road
Total area /sqm/	20 000
Infrastructure	
Total number of tracks	3
Number of tracks for reloading /pcs./	3
Length of individual tracks for reloading /m/	3x600
Total storage area /sqm/	1200 TEU
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	2
Payload /t/	45
Transshipments	
Supported type of logistic units	Two reach stackers, container truck
Cargo handling capacity	50 000 TEU/year

Container terminal in Kobylnica (Cargosped)

The container terminal in Kobylnica is located 9 km east of Poznań in the immediate vicinity of the express road no. 5. The logistics operator of the terminal is CARGOPSED Sp. z o.o. with a 100% share of PKP Cargo S.A.

The terminal handles all types of intermodal transport units: 20', 30', 40 'and 45' containers, swap bodies, semi-trailers, refrigerated cargo units and high volume type high cube containers. Total terminal area is 9300 sqm, and the storage area is 1720 sqm. Due to limitations in size and length of track for handling, the terminal does not meet the technical requirements placed on modern container terminals.

Due to the limited length of track for container handling, its handling capacity is limited, and handling container trains require additional manoeuvre work, which increases the maintenance costs and extends the handling time. The location of the terminal is in the immediate vicinity of residential development and a difficult access has caused that the terminal was closed in 2014.

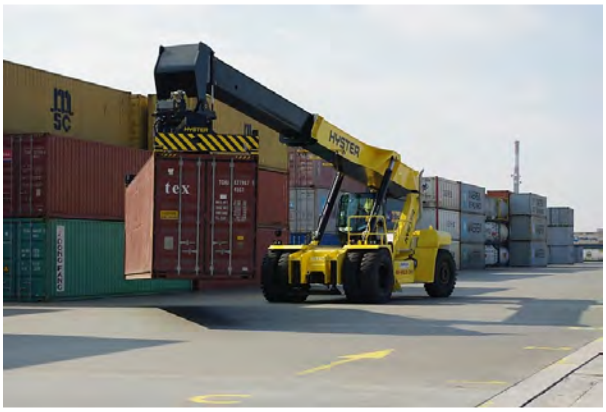
Container terminal in Kutno (PCC Intermodal)

PCC Intermodal S.A. is a leader among private intermodal transport operators. The activity of the company involves above all the organisation transport of containers directly to the customer's door. The firm organises intermodal transport based on regular rail connections both Polish and international between handling terminals as well as road transport synchronised with these. Among its activities PCC Intermodal organizes regular rail connections between inland terminals in Kutno, Brzeg Dolny, Gliwice, Frankfurt (Oder) and Herne, and Polish and foreign seaports. Within a radius of 150 km from an inland terminal the firm provides transport of cargo direct to customer's door.

The Kutno terminal is located directly on the railway line E 20, connecting Berlin with Warsaw and Moscow and further near the main railway line north-south (No. 131), on the Baltic-Adriatic Corridor, and also close to national roads and motorways. Within a radius of 150-200 km from Kutno there are such major cities located: Warsaw, Lodz, Poznan, Bydgoszcz, but also smaller ones as Plock, Wloclawek, Konin, Kalisz and many others, which are easy to be reached for delivery of cargoes directly into the customer’s door.

Basic data	
Name	
Owner	PCC Intermodal S.A.
Location	Kutno 99-300, Intermodalna 5 street
Year of construction	2010
Scope of intermodality	Rail-road
Total area /sqm/	54 000
Infrastructure	
Total number of tracks	-
Number of tracks for reloading /pcs./	-
Length of individual tracks for reloading /m/	2100
Total storage area /sqm/	4000 TEU
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	4
Payload /t/	45
Transshipments	
Supported type of logistic units	Four reach tracker
Cargo handling capacity	100 000 TEU/year

Picture: Container terminal in Kutno (Source: PCC Intermodal)



Container terminal in Łódź Olechów (Spedcont)

The Container terminal Łódź Olechów is operated by SPEDCONT Co. Ltd. - a Polish operator of intermodal transport, dealing with transport of cargo in containers, swap bodies and trailers. These facilities enable Spedcont to operate effectively as one of Poland's leading operating and forwarding agents specialising in multimodal transport.

Basic data	
Name	
Owner	Spedcont
Location	Łódź 93-235, Tomaszowska 60 street
Year of construction	The 1994s
Scope of intermodality	Rail-road
Total area /sqm/	84 000
Infrastructure	
Total number of tracks	2
Number of tracks for reloading /pcs./	2
Length of individual tracks for reloading /m/	2/1400
Total storage area /sqm/	80 000
Equipment	
Overhead cranes	Yes
Number	2
Payload	40
Storage height	15,5 m
Mobile cranes	YES
Number	2
Payload /t/	45
Transshipments	
Supported type of logistic units	Two Container cranes, two reach stackers, forklift container, two semi-trailer trucks
Cargo handling capacity	60 000 TEU/year

Container terminal in Warszawa Główna Towarowa (Spedcont)

The Container terminal Warszawa Główna Towarowa is also operated by SPEDCONT Co. Ltd. From January 1, 1996 the owners of SPEDCONT were: Port of Gdynia SA and PEKAES SA. On December 16, 2013 PEKAES S.A. signed an agreement with the Port of Gdynia SA under which it acquired all the shares of the company.

Basic data	
Name	
Owner	SPEDCONT Sp. z o.o.
Location	Warsaw 01-237 J.Ordona 2a street
Year of construction	1994
Scope of intermodality	Rail-road
Total area /sqm/	18 600
Infrastructure	
Total number of tracks	2
Number of tracks for reloading /pcs./	2
Length of individual tracks for reloading /m/	715
Total storage area /sqm/	17 500
Equipment	
Overhead cranes	YES
Number	2
Payload	32

Storage height	15,5
Mobile cranes	YES
Number	2
Payload /t/	45
Transshipments	
Supported type of logistic units	Two gantries, semi-trailer trucks, two mobile cranes
Cargo handling capacity	60 000 TEU/year

Container terminal in Warszawa Praga (Cargosped)

CARGOSPED is a logistics operator belonging to the PKP CARGO S.A. Group with a network of trans-shipment terminals in Poland (4 specialized intermodal terminals and one terminal near the border in Braniewo handling bulk cargo), one of which is CARGOSPED Terminal Warszawa Praga. It provides freight forwarding and logistics services internationally and in Poland. The terminal specializes in freight transport by rail and the related logistics services.

Basic data	
Name	
Owner	Cargosped Sp. z o.o.
Location	Warszawa 03-228 Marywilska 39 street
Year of construction	1992
Scope of intermodality	Rail-road
Total area /sqm/	24 000
Infrastructure	
Total number of tracks	1
Number of tracks for reloading /pcs./	1
Length of individual tracks for reloading /m/	320
Total storage area /sqm/	1200 TEU
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	3
Payload /t/	42
Transshipments	
Supported type of logistic units	Three mobile cranes, ten slots for refrigerated containers
Cargo handling capacity	85 000 TEU/year

Container terminal in Pruszków (Polzug Intermodal Polska)

POLZUG Intermodal is a rail operator running a container service between the northern European container ports of Hamburg, Bremerhaven and Rotterdam and the hinterland of Poland and Eastern Europe. In Poland, which is a key market, POLZUG Intermodal serves eight terminals, four of them under its own management in the main economic centres. The container terminal in Pruszków is located about 20 km west of Warsaw.

Basic data	
Name	
Owner	POLZUG INTERMODAL POLSKA Sp. z o.o.
Location	Pruszków 05-800 Przytorowa 1 street
Year of construction	1993
Scope of intermodality	Rail-road
Total area /sqm/	44 600
Infrastructure	
Total number of tracks	3
Number of tracks for reloading /pcs./	3
Length of individual tracks for reloading /m/	600 and 300
Total storage area /sqm/	8 600
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	8
Payload /t/	45
Transshipments	
Supported type of logistic units	Eight container cranes, two container stackers, two forklifts, sixty Container semi-trailers, two terminal trucks
Cargo handling capacity	96 000 TEU/year

Container terminal Stryków (Erontrans)

Erontrans is a forwarding company with 25 years of experience in the international market. Since March this year, the company also manages the intermodal terminal in Stryków. The new terminal has a 350 m track length and 6000sqm surface. Presently, the terminal can handle up to 600 TEU. In addition to container handling, the terminal offers also road trailer handling services. Erontrans offers an opportunity of sending cargo 2 times a week to the container terminal in Gdynia (Baltic Container Terminal).

Basic data	
Name	
Owner	ERONTRANS
Location	Stryków
Year of construction	2014
Scope of intermodality	Rail-road
Total area /sqm/	XXX
Infrastructure	
Total number of tracks	1
Number of tracks for reloading /pcs./	1
Length of individual tracks for reloading /m/	350
Total storage area /sqm/	6 000
Equipment	
Overhead cranes	NONE
Mobile cranes	YES
Number	1
Payload /t/	45
Transshipments	
Supported type of logistic units	One container stackers
Cargo handling capacity	No data

Urban and Transport Nodes

The capital of Poland, Warsaw, Poznań and Łódź are defined as urban nodes as well as nodes with transport infrastructure (airport and RRT) within the core network.

Warsaw Node

The Warsaw node consists in particular of comprehensive railway and road systems, an efficient public transport system, rail-road terminals for intermodal cargo handling as well as two airports.

The rail network offers effective main lines in all directions. The main railway station is Warszawa Centralna serving both, domestic traffic to almost every major city in Poland and international connections. There are also five other major railway stations (e.g. Warszawa Wschodnia and Warszawa Zachodnia) and a number of smaller suburban stations.

Public transport in Warsaw includes the ZTM network with metro, tram and bus lines as well the Warsaw commuter railway WKD, the suburban rail network SKM (connecting the Warsaw metropolitan area) and the KM network offers connections within the Mazovian region.

The Warsaw Metro currently consists of a single north–south line linking central Warsaw with its densely populated northern and southern suburbs (22.7 km). The new east-west line is close to completion and will link Dworzec Wileński with Rondo Daszyńskiego and runs for its entire length of 6.5 km completely underground. Both airports are integrated in the SKM and KM (Chopin) respectively the KM rail network (Modlin, bus link between the airport and railway station).

Pictures: Metro station Plac Wilsona, SKM train at Chopin Airport station (source: ZTM)

Rail-road terminals of the Warsaw Node are located at Główna Towarowa, Warszawa Praga and Pruszków (metropolitan area).

The system of express roads which is currently being strongly expanded includes the for-lane roads A 2 / S 2, S 7, S 79 and S 8 as well as the S 17. Regarding the North Sea – Baltic Corridor alignment, the completion of express roads S 2 and S 8 is particularly important.

Poznań Node

The Poznań railway node is composed of the main train station area near the city center, the important Franowo freight yard southeast of the city as well as the rail links to Kunowice, Szczecin, Piła, Bydgoszcz, Toruń, Warsaw, Ostrów Wielkopolski / Chorzów and Wrocław. The Franowo freight yard is connected with Kiekrz (Poznań – Szczecin line) which provides a Northern bypass for freight transports. With access to the main line to Ostrów Wielkopolski / Chorzów, the Poznań-Gadki intermodal terminal is located in the southeast hinterland of Poznań.

Poznań has an extensive public transport system, consisting of trams, urban busses and suburban busses. However, the Ławica Airport can only be reached by bus. Currently, four bus lines run between the airport and the city center, one of which is an express line (L line) to the main train station.

Specific features of the Poznań road network are the successive upgrades of national roads towards Piła (S 11), Bydgoszcz (S 5), Ostrów Wielkopolski / Katowice (S 11) and Wrocław (S 5). Furthermore, the national road No. 92, crossing the city in the East-West direction, possesses for the most part, four lanes. The Poznań-Ławica Airport has a new four-lane access (Bukowska) to the city centre with separate taxi and bus lanes.

Pictures: Bukowska street in Poznań (Source: ILiM)

The Poznań-Gadki rail-road terminal is equally as integrated by efficient access to the express road S 11. The rail-road terminal of Swarzędz features appropriate access to the four-lane constructed section of the national road N 2. The Kobylnica terminal doesn't have a nearby multi-lane access.

Łódź Node

The Łódź railway node is composed of the most important train stations of Łódź Fabryczna, Łódź Kaliska and Łódź Widzew. The first of these stations has been acting as a terminal station for trains in the direction of Warsaw. The actual development of the new Łódź Fabryczna Station is the biggest construction of this type in Poland. The new three-level station will be a key element of the new city center of Łódź - the extension of the railway line to Łódź Kaliska station, via a future cross-city tunnel is possible within the context of the Y-Line project.

Łódź Fabryczna Station (construction works and perspective view, source: PKP)

Current construction works on the motorway A 1 (in direction of Częstochowa / Gliwice) and the express road S 8 (in direction of Wrocław) will cause increased road accessibility. The Spedcont Container Terminal Łódź and the Intermodal Terminal Stryków will also benefit from these measures. Łódź has an extensive public transport system, consisting of trams, urban and suburban buses. However, the Ławica Airport can currently only be reached by bus.

Core Network Corridor nodes in Poland

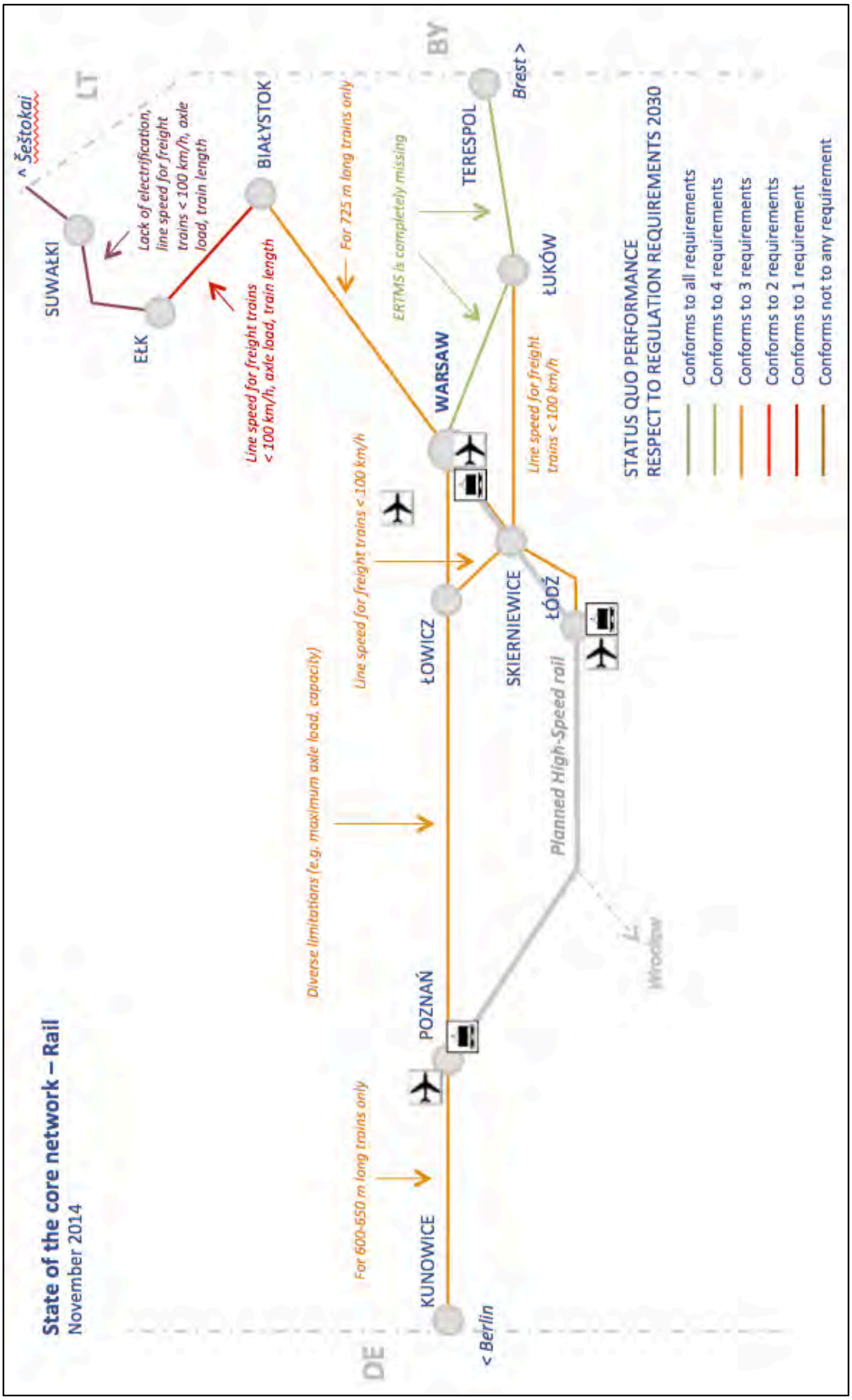
Node	Urban	Airport	Maritime Port	Inland Port	RRT	Shared with Corridor
Warszawa	X	X			X	Baltic-Adriatic
Łódź	X	X			X	Baltic-Adriatic
Poznań	X	X			X	Baltic-Adriatic

Main deficits and bottlenecks on the NSB Corridor

Rail network

- The main lines Warsaw – Terespol, Warsaw – Białystok and Łowicz – Skierniewice – Łuków offer the sufficient route class (axle load 22.5 t). In direction of Lithuania, the lines Białystok – Ełk (20.0 t/axle) and Ełk - Olecko – Suwałki – Trakiszki (21.0 t/axle) are significantly below this requirement. The classification table of the railway infrastructure company PLK shows this weakness.
- The line speed for freight transports on the main axes is generally sufficient, but partly with long sections with speed reductions (range in brackets) :
  Warsaw – Poznań – Kunowice 100 km/h (60 – 100 km/h)
  Warsaw – Łuków – Terespol 120 km/h (40 – 120 km/h)
  Warsaw – Białystok 100 km/h (60 – 100 km/h)
- The Łowicz – Skierniewice – Łuków line functions as Warsaw‘s bypass for freight trains. The inadequate line speed ranges from 30 km/h to 70 km/h (according to the line speed table of PLK).
- From Białystok to Lithuania, there are speed limits (freight trains) ranging from 80 – 100 km/h (Białystok – Ełk) respectively 80 km/h (Ełk – Olecko) and 30 – 60 km/h (Olecko – Suwałki – Trakiszki).
- Trains in the direction of Lithuania have to acknowledge the gauge change. The double gauge track in the first development section Šestokai - Mockawa is not a long-term solution.
- The line from Ełk via Suwałki to the Lithuanian border is currently not electrified and does not have continuous automatic train control. Furthermore, the new section near Olecko is essential for competitive running times.
- The relevant lines of the corridor are not equipped with ERMTS signalling systems.
- Some of the relevant lines respectively line sections are not designed to allow the passage of trains with a length of 740 meters: Poznań – Kunowice (650 m), Kunowice - Border DE/PL (600 m), Białystok – Ełk (625 m), Ełk – Trakiszki (725 m), Pilawa II – Pilawa I (729 m).

Figure: State of the NSB core network (railway) in Poland



Infrastructure parameters as defined by the Regulation (EU) 1315/2013

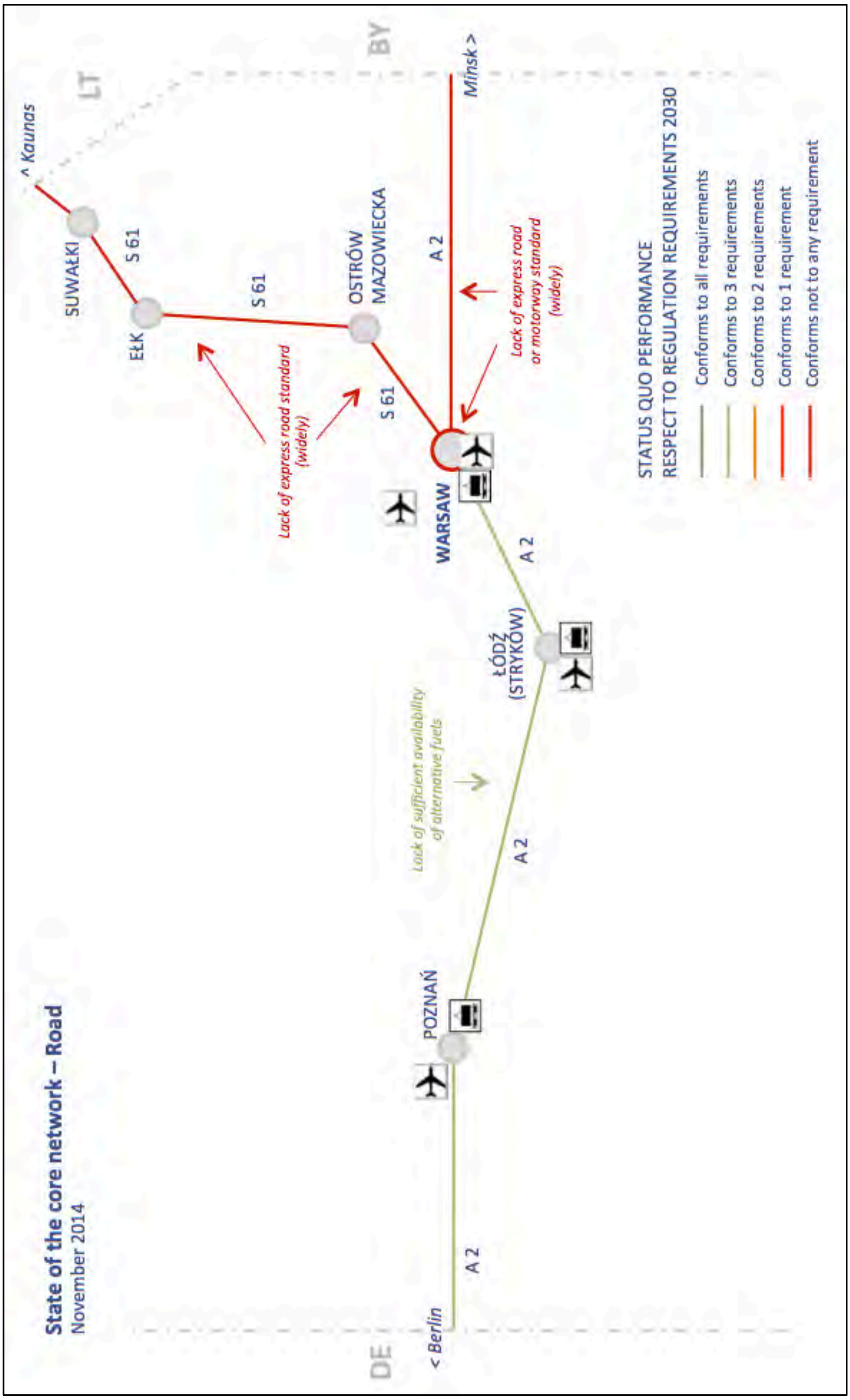
Rail – Indication on the infrastructure parameters per section, with particular highlight on:

- Electrification: Core network to be electrified by 2030 (including sidings where necessary)
- Axle load: Core freight lines 22,5 exle load by 2030
- Line speed: Core freight lines 100 km/h by 2030 (NB. No speed requirement for passenger lines)
- Train length: Core freight lines to allow for 740 m trains by 2030
- ERTMS/signalling system: Core network to be equipped with ERTMS by 2030
- Track gauge: New lines to be built in UIC standard gauge (1435 mm), except in certain circumstances.

Road network

- The planning and construction works, concerning the urban expressways S 2 (along the southern districts of Warsaw) and S 8 (north of the Warsaw city centre) are not yet completed. These expressways will lead to significant traffic reductions within the Warsaw city street network as well as reduced travel times for transit traffic in the corridor.
- Up until now, capable appropriate motorways or express roads, connecting to the Baltic States are not finished yet, with the exception of two sections of express road S 8: the 36.7 km long section between Radzymin and Wyszków and the 7.5 km long Ostrów Mazowiecka bypass as well as the 6.5 km long Stawiski bypass on express road S 61. This should be ensured by the express highway S 8 Warsaw – Białystok (until Ostrów Mazowiecka) as well as the on the long term planned express highway S 61 from Ostrów Mazowiecka via Łomża, Ełk, Suwałki, reaching up to the Lithuanian border.
- No motorway or express road currently exists between Warsaw and the border to Belarus (further alignment of motorway A 2), with the exception of the 20.8 km long section between Choszczówka Stojecka and Kałuszyn (Mińsk Mazowiecki bypass). For reasons of a moderate transport demand, the decision about the road configuration (motorway, four-lane or three-lane (2+1) express road, different configured sections) is necessary.
- In the entire core network, the lack of availability of alternative fuels is significant. It covers more infrastructure for liquid biofuels and gaseous fuels (including LPG, CNG and biogas) and notably charging stations for electric vehicles.
- No ITS services in the corridor (except Konin – Stryków section), ITS services to be deployed in the NTMS program.

Figure: State of the NSB core network (road) in Poland



Infrastructure parameters as defined by the Regulation (EU) 1315/2013

Roads – Indication on the following parameters:

- Whether the road is an (1) ordinary road, (2) express road or (3) a motorway (definitions are contained in Art 17(3) TEN-T Regulation): Roads have to be either an express road or a motorway by 2030
- Parking areas along the roads, including their security level: Sufficient parking areas, at least every 100 km, by 2030
- Availability of alternative clean fuels by 2030
- Use of tolling systems /ITS and their interoperability with other systems.

Maritime ports and the inland waterway network including the inland ports

- With respect to the current transport demand, the lower Oder section offers efficient enough traffic conditions.
- Depending on the future requirements, further expansions could be necessary.

Airports

- Overall, there is enough airport capacity at the nodes along the North Sea – Baltic Corridor today. The airside infrastructure is sufficient for the future. However, the capacities, especially the terminal capacities yet have to be developed – at Warsaw Chopin Airport in the near future, at the other airports in the long term.
- Only Warsaw Chopin Airport has a direct rail link. The possibilities of improving this by linking it with a high speed rail line should be discussed.
- For the other two core network airports in Łódź and Poznań there is a need to create such direct links. Poland plans to build a high speed rail line from Warsaw via Łódź to Poznań. When planning this line, the rail links to the airports should be discussed and considered. The construction of the links can be done in several phases. Because of the low numbers of passengers and freight handled in Łódź it is possible to discuss a light rail link as a first step. But at first, the general plans have to be worked out and have to be discussed.
- There are no EU financed studies known on the development of Poznań or Łódź airport nor are there any studies on rail links between these cities and their airports. However, there are discussions about such a link in Poznań and those should be continued.
- For the moment, all the airports have a sufficient connection to the road infrastructure. But no airport is directly linked to the currently improving Polish motorway system. The airports in Łódź and Poznań have to improve their accessibility by road. As a first step, the links to the express highways and to the national roads should be upgraded.

Rail-Road terminals

- Substantial extensions for capacity have been realized in recent years. Depending on the future requirements, further expansions of the terminals could be necessary.
- The Cargosped Container Terminal Kobylnica has no possibilities for extension and fails to be adequately accessible by motorway or express road. These are the reasons for its closure in 2014.

Chapter 9
Elements of the Work Plan: Germany

By IPG-Potsdam

Technical parameters for all modes of transport

Germany is one of the countries in the central part of the corridor. The corridor crosses Germany from East to West with some junctions to the seaports in the North. On its way through Germany the corridor crosses several other European Corridors.

Germany has in general a well-developed infrastructure. Still there are lots of needs for a further development especially in the border crossing sections of the infrastructure, in preservation of the quality and in facing the future demands.

For This strategic view Germany has a special infrastructure developing plan, the so called “Bundesverkehrswegeplan”. It is in revision actually. The known results of the studies and discussions of this revision are taken into consideration.

Map: Alignment of Road, Rail and IWW sections in the Germany of Corridor North Sea – Baltic (only red sections; solid = road, dashed = rail, dotted =IWW); Other TEN-T corridor sections being indicated by brown (Orient-East Mediterranean) and pink (Scandinavian-Mediterranean) and yellow (Rhine-Alpine) colors. (Source: EC TENtec)

Rail network

The North Sea/Baltic TEN-T core network corridor (NSB) includes many highly-frequented rail lines with significant network importance.

It starts at the cross border station at the Oder-Bridge near Frankfurt (Oder). It was rebuilt in 2008. The rail route Frankfurt (Oder) - Berlin is very important for the transport relations of West Europe (in particular NL, B, L) - Germany (in particular Rhine/Ruhr, North Sea ports) - Eastern Europe (PL, RUS, Baltic States) and is configured with double-tracks. It can currently be driven on by up to 160 km/h because the route is mostly upgraded. Still within Berlin are some parts to be extended. Due to the aforementioned lines, the route is consistently electrified. The overhead contact line systems is fed with a current of 15 kV/ 16.7 Hz up to the vertex of the border goods station of the Oder-Bridge in order to connect the current traction configuration with the 3 kV of the Polish network.

Berlin and Hannover are connected to a 270 km long high speed line (250 km/h, double tracked, electrified, LZB) via Stendal and Wolfsburg. On the same route exists a conventional line (120 km/h single tracked, not electrified). But it has no importance for the TEN-T-network. A second conventional line (160 km/h, upgraded, double tracked, electrified) connects Berlin and Hannover via Potsdam, Magdeburg and Braunschweig.

In the western part there are both double tracked and electrified lines (to Amsterdam) between Löhne and Bad Bentheim, via Rheine and Osnabrück. By comparison, the other route connecting the ARA ports via Aachen, Cologne, Hagen, Hamm and Bielefeld to Hannover possesses stronger frequency and is partly built as a four-track section. Both routes are basically usable for speeds of up to 160 km/h. Negotiations are ongoing to realize in the long term the Iron Rhine connection along the historic route or any other equivalent that connects Flemish ports to Duisburg and the Ruhr area. This connection will offer a faster service via Herentals, Mol and Neerpelt to the Mönchengladbach and Ruhr area in Germany. The Iron Rhine project is not part of this CNC, but it is included in the list of pre-identified projects of the core network in No 3 of part I of annex I of Regulation (EU) No 1316/2013 – CEF), and has been identified as an expected line of RFC Rhine Alpine while a designation as a principal line in RFC North Sea - Baltic is pending. The sections Cologne – Düren (new construction, 250 km/h, four tracked), Minden - Hamm (200 km/h and double tracked for Passenger, additional double tracked for freight) and Hannover – Minden (mainly 200 km/h, double tracked) allow for higher speeds for passenger trains. These sections are protected with the continuous train control system LZB.

The quality of the rail links of the German ports is different. Hamburg has got two main rail links. One of them, the link between Hamburg and the German capital Berlin via Wittenberge has been upgraded during the last two decades (230 km/h, double tracked, electrified, LZB). It is used for freight and high speed passenger transport. The other link leads to Hannover and further via Hamm and Cologne or via Kassel and Fulda to the South. This link is highly frequented by freight and passenger.

Wilhelmshaven, with its new development of the Jade-Weser Port, is connected to Oldenburg by a double tracked non-electrified rail route. For the future, this configuration does not fit the TEN-T-requirements. From Oldenburg the rail line continues up to Bremen where it is combined with the rail links to the ports in Bremen and Bremerhaven. This line has more and better qualified conditions. It leads to Wunstorf near Hannover via Verden (each with a maximum speed of 160 km/h, double tracked, electrified).

Picture: High speed train on the Berlin – Hamburg line near Paulinenaue (Source: www.wikipedia.de)

Road network

Almost all parts of the corridor are part of or connected to the system of federal motorways. The German federal motorway A 30 starts at the Dutch A1 motorway from Amsterdam and ends at the Dutch border between Nordhorn and Bad Bentheim. In its course towards the east, it first crosses the federal motorway A 31 near Schüttorf, offering direct connections towards the Ruhr area (south) and Emden (north). It passes Rheine and near Osnabrück and crosses the A 1 and A 33, offering connections to the north in the direction of Bremen (A 1), to the south in the direction of Münster and Dortmund (A 1) and Bielefeld (A 33).

About 50 km further to the east, the A 30 ends in Bad Oeynhausen. Traffic continues at the federal road B 61 (a 9.5 km extension is currently under construction) and on a short additional section of the A 30 becoming the federal motorway A 2. Apart from this missing link, the motorway represents a four-lane motorway in the complete length.

Coming from the direction of Antwerpen and Liege, the German federal motorway A 4 provides a link between Aachen and the node Cologne (Cologne Ring- A 1, A 3, A 4 - with 8 intersections/junctions and mostly 6-8 lanes). The section Köln West-Köln Nord extension to 6 lanes and extension K-Delbrück – K-Mülheim to 8 lanes are under construction. The section Düren – Kerpen is a 6-lane-upgrade also under construction.

From there, the corridor takes its course to the North, via Wuppertal, Kamener Kreuz, and Münster to Osnabrück along the federal motorway A 1. The A 30 can be reached near Osnabrück.

The federal motorway A 2 connects the Rhine-Ruhr area with the capital Berlin via Hannover. This highly frequented motorway is completely configured as a six-lane motorway. The upgrade has been carried out step-by-step during the last two decades.

From the interchange Werder/Havel, the corridor follows the federal motorway A 10, which is configured as a six-lane motorway. In the section between the junction Potsdam and the junction Nuthetal, an extension of 8 lanes is planned. The route follows the federal motorway A 10 from the south of Berlin and later the federal motorway A 12 from the interchange at Spreeau up to the Polish border with a direct connection to the Polish motorway to Poznan /

Warsaw. A possible upgrade to 6 lanes of A 10 between motorway access Spandau and interchange at Havelland as well as of A 12 between interchange at Spreeau and Frankfurt (Oder)/ PL – border is subject of an analysis within the Federal Infrastructure Planning 2015. The federal motorway A 12 is currently configured as a four-lane motorway and has been redeveloped during the last years. Still, there is a lack of hard shoulders between the motorway interchange at Spreeau and the motorway access at Fürstenwalde West.

Picture: Six-lane federal motorway A 2 near Hannover (Source: www.wikipedia.de)

The ports of Wilhelmshaven (A 29) and Bremerhaven (A 27) are accessed by four-lane motorways and connected via Bremen to Hannover (motorways A 27 and A 7 via Interchange Walsrode). In the course of the motorway A 7, six lanes can be used. The motorway between Hamburg and Berlin (A 24) is just four-lane configured with temporary capacity problems in the section interchange Wittstock/Dosse – Berlin motorway ring (A 10). This is for reasons of shared routing with the motorway Rostock – Wittstock/Dosse (A 19) – Berlin motorway ring. This was one of the reasons to plan and build the new federal motorway from Magdeburg via Schwerin up to Wismar (A 14). Near Schwerin, it crosses the federal motorway A 24 so it can be used as a relief route for the section mentioned above.

Other links from Hamburg to the main corridor line are the federal motorways A 1 and A 7. These motorways are highly frequented and have sometimes capacity problems.

Maritime ports and the inland waterway network including the inland ports

The North Sea-Baltic Corridor includes the following maritime ports (seaports): Hamburg, Bremerhaven, Bremen and Wilhelmshaven on the German shore of the North Sea.

The size of the port's surface area of Hamburg is 7200 hectares. The port is on place three when it comes to sea cargo handling and second in container handling in Europe. At the same time Hamburg´s port is also the third largest of Germany's inland ports and the largest railway port in Europe. 156,000 jobs are directly and indirectly dependent on the port's operations. The port area includes a total road network of 140 km, 304 km of railway and 880 points, 12 km of beach along the Elbe and 49 km of quay walls. Around 10,000 ships a year use the Port of Hamburg. 132.2 million tons of cargo, over 200 freight trains and 29 000 trucks are handled on a day.

Bremerhaven is one of the world's leading container terminals. The roughly five-kilometre long quay on the River Weser has sufficient water depths for seagoing vessels and can accommodate the largest container vessels in the world. The automotive terminal in Bremerhaven has operating areas and parking facilities for up to 120 000 cars.

Bremen is one of the leading logistics locations of continent, a freight village that is respected throughout Europe, a major logistics and distribution centre combined with excellent scientific and training institutes. The logistics sector accounts directly and indirectly for some 75 000 jobs in the region.

The maritime Jade Weser Port Wilhelmshaven, a joint project of Bremen and Lower Saxony, went into operation in September 2012. Germany's only deep-water port has a water depth of 18 metres, offering ideal nautical conditions for container vessels with draughts of up to 16.5 metres, irrespective of the tide. Road and rail hinterland connections link the port to the main European economic centres. The quay can handle four mega-container ships and feeder vessels simultaneously, using up to 8 container gantry cranes. Throughput capacity is approximately 2.7 million TEU per annum. The Jade Weser Port is intended primarily as a transhipment terminal for feeder traffic to Scandinavia, the Baltic region and Russia.

Part of the corridor is one of Central Europe's most important inland waterways. It consists of the Rhine, coming from the Dutch border near Kleve, reaching the inland port with the highest capacity of the European inland ports which is Duisburg. From there, the Western German canals provide the link to the Dortmund-Ems Canal near Henrichenburg. This canal leads the transport via Münster up to an interchange near Bergeshövede (near Rheine) where the 325 km long Mittelland Canal starts. The Mittelland Canal runs north along the Teutoburg Forest. At Minden, the canal crosses the river Weser which is coming from Bremerhaven across two aqueducts and passes Osnabrück and Hannover. Near Wolfsburg, the Elbe Side Canal branches off to Hamburg and goes (via the Elbe-Lübeck Canal) to the Baltic Sea. In Magdeburg the Mittelland Canal crosses the river Elbe by a special canal bridge. The river Elbe as an important inland waterway connect the canal directly with Hamburg and the North sea. The canal route now leads from the Mittelland Canal to the Elbe-Havel-canal up to Brandenburg on the Havel, where it changes to the Lower Havel Waterway. It leads directly to the Berlin node.

Picture: *Mittelland Canal - Braunschweig (Source: www.wikipedia.de)*

Three canals – in the north of Berlin, namely the Oder–Havel–Canal via Eberswalde and Schwedt to Szczecin (TEN-T) and in the south the Teltow Canal and later the Oder–Spree–Canal via Fürstenwalde to Eisenhüttenstadt (not named in TEN-T) – provide the link to the Polish border and the Polish inland waterway system using the German inland waterways.

The IWW-Sections are all in the CEMT-classes IV-Vic (German categories A+B), with a minimum height of 4 m under the bridges, Chamber lock width minimum 9.5 m. Over the past years various sections of the Mitteland Canal have already been upgraded to class Va and Vb, however some sections still need to be upgraded. The canals branching off the Mittelland Canal (E70-02, 70-04 and 70-06), experience low fairway depth and height under bridges and sometimes insufficient dimensions of locks, Dortmund - Ems Kanal (E 13) to the north of the Mittellandkanal: a number of locks have a width of only 10.00 m, Datteln - Hamm Kanal (E 10–01) to the east of the Hamm harbour.

All TEN-T waterways belong to the core network but the Ems, Weser and the Coast Canal, the lower Elbe, Kiel Canal, Elbe-Lübeck-Canal, Elbe-Side-Canal, Oder-Havel Canal are not part of any TEN-T corridor.

In harmony with the provisions of regulation 1316/2013, the following essential connections of the TEN Core Network should be allocated to the North Sea - Baltic Core Network Corridor:

- Rhine (Rotterdam - Wesel) - Wesel-Datteln Canal (Wesel - Datteln)
- Rhine (Rotterdam - Wesel - Duisburg)- Rhine-Herne-Canal (Duisburg - Datteln)
- Dortmund-Ems-Canal (South) (Datteln - Münster - Rheine)
- Dortmund-Ems-Canal (North) (Rheine - Papenburg)
- Outer Weser (Seaward acess to Bremerhaven), Weser (Bremerhaven – Mittelland Canal)
- Under- and Outer Elbe (Seaward acess to Hamburg), Elbe-Side Canal (Hamburg – Braunschweig)
- Mittellandkanal - Elbe-Havel-Canal (Rheine - Hannover - Magdeburg - Berlin) as well as
- Kiel Canal.

In this context a revision of the mapping of the North Sea Baltic corridor is recommended in accordance to the provisions with the Regulation 1316/2013.

Inland core network ports are Berlin (Spandauer Südhafen, Westhafen und Neukölln), Magdeburg, Braunschweig, Hamburg, Hannover, Bremerhaven, Bremen and Duisburg. Further inland core network ports of the corridor are Dortmund and Hamm. They are not directly located on this inland waterway section but connected by branches. Lastly, the Cologne port on the further alignment of Rhine has to be included.

Important elements of the TEN-T Waterways in the Core Network are the ports of the Comprehensive Network (e.g. Osnabrück, Münster, Minden, Herne).

NtS have been made available in time. AIS in Germany is (with a few exemptions) so far limited for facilitation of navigation by display of the tactical traffic information and ship-ship-communication. ERI has been implemented in time. ENCs are covering 95% of the relevant German waterways although there is no legal obligation yet to fulfil in this respect.

Investment priorities

Bearing in mind that the financial need for investments in IWW in Germany significantly exceeds the available medium-term planning and funding capacities, a strict prioritization of investments is inevitable. Here the principle applies that maintenance has priority over replacements and replacements have precedence over investments into capacity enlargement. Basically all projects which have not already started are subject to a budget reservation. Furthermore they are re-evaluated as part of the development of the Federal Transport Infrastructure Plan (FTIP) 2015 and will be prioritized with in the overall context.

Kiel Canal (NOK)

Additional Programme to support the implementation of North Sea - Baltic Core Network Corridor

*So far, the **Kiel Canal (Nord-Ostsee-Kanal-NOK)** is not allocated to a Core Network Corridor, but it is listed in annex I of the Regulation establishing the "Connecting Europe Facility" under paragraph 3 (other sections of the core network) as a "pre-identified project on the Core Network". However, its geographical location and key-transport function with international EU transport consequences require the inclusion of the Kiel Canal into the North Sea - Baltic Core Network Corridor.*

Explanation of pending infrastructure measures on the NOK

The NOK, as the world's busiest artificial maritime waterway and connection between the Baltic and North Seas, is of crucial importance for national and international shipping. It helps to avoid the significantly longer route around the north of Denmark (460 km) and contributes not only to cost savings in sea freight transport, but also to the reduction of CO_2 emissions and air pollution.

The transport volume on the NOK has more than doubled since the late 1990s. At the same time, the share of larger vessels has tripled. The increase in cargo volumes in recent years primarily results from the increase in container transport, which constantly requires the use of larger feeder ships. The transport volume on the NOK in 2012 was around 104 million tons whereas in 2013 about 95 million tons (the decline in 2013 was caused by unforeseen lock and canal closures as well as strikes by lock staff).

Against the background of the traffic importance of the NOK not only for the German but also for the Polish and Baltic Sea ports, the long-term security of the canal infrastructure has high priority for the German Federal Government. Beyond essential maintenance measures to preserve the functionality of the canal, the adjustment of the NOK to take account of the increased traffic demands is a key objective of the Federal Government.

The two measures listed in the work plan under "Supplemental corridor programme NOK" cover only a part of the mid-and long term investments for the canal with a total volume of approximately €820 million. The amounts mentioned in the work plan represent the financial needs in the actual funding period. In addition to the long term costs for investments in extension, upgrading work and restoration costs are estimated at around €800 million.

Map: Kiel Canal (source: http://www.wsa-kiel.wsv.de/Nord-Ostsee-Kanal/index.html)

Nodes of the core network

The nodes of the core network include:

- urban nodes, including their ports and airports;
- maritime ports and inland waterways ports;
- border crossing points to neighbouring countries;
- rail-road terminals (RRT);
- passenger and freight airports.

Corridor nodes per country und location, North Sea Baltic Corridor

Node	Urban	Airport	Maritime Port	Inland Port	RRT	Shared with Corridor
Berlin	X	X		X	X	Scand.-Med., Orient-E.Med.
Magdeburg				X	X	Orient-E.Med.
Braunschweig				X	X	Orient-E.Med.
Hamburg	X	X	X	X	X	Scand.-Med., Orient-E.Med.
Hannover	X	X		X	X	Scand.-Med., Orient-E.Med.
Bremerhaven			X	X		Orient-E.Med.
Bremen	X	X	X	X	X	Scand.-Med., Orient-E.Med.
Wilhelmshaven			X			Orient-E.Med.
Bielefeld	X					
Hamm				X		
Dortmund				X	X	
Duisburg				X	X	Rhine-Alp
Cologne	X	X		X	X	Rhine-Alp

Source: Information IPG/ Proximare

Airports

Along the North Sea – Baltic Corridor in Germany, there are several airports directly connected to the corridor, especially to the important transport nodes of Berlin, Cologne, Bremen, Hannover and Hamburg.

The Berlin Brandenburg International Airport "Willy Brandt"(BER)

The Berlin Brandenburg International Airport is still being built on the site of Berlin-Schönefeld airport. The opening date for the new BER-airport is not known yet. It will start with two runways of 3,600m and 4,000 m in length with a capacity of about 30 million passengers and

600 thousand tons of freight. It still has potential for expansion. The Berlin Brandenburg International Airport will have an extensive infrastructure with a high speed rail connection and a direct link to the federal motorway BAB 13. Up until the opening of this airport, the airports of Berlin-Tegel and Berlin-Schönefeld will be serving the region.

These two airports served about 26.3 million passengers and almost 40 thousand tons of freight and mail in 2013. After the opening of the BER – airport, Berlin-Tegel will be closed.

International Airport Cologne - Bonn

The Cologne – Bonn Airport is an important airport in the German state of North Rhine-Westfalia (NRW), especially for freight transport. It has no general night flight restrictions. In 2013 it served more than 9 million passengers and about 740 thousand tons of freight. It is located between the cities of Cologne and Bonn and has a link to the high speed rail track Cologne – Frankfurt (Main) and a direct connection to the federal motorway. It has no bottlenecks within its airport capacity (Passenger or freight) and there is still a lot of surplus capacity due to the 3 - runway system. The main runway is 3,800 m long.

City Airport Bremen

City Airport Bremen is one of the smaller international airports in Germany. In 2013 it served about 2.6 million passengers and almost 19 000 t of freight including trucking. It is very close to the City of Bremen. It takes only 11 minutes to get from the city to the airport by tram. The tram stops right in front of the airport terminal. There is no additional heavy rail link to the airport. The airport is very close to the federal motorway BAB 281. The upgrade of this motorway is currently under construction.

Hamburg International Airport

Hamburg Airport is the most important airport in the north of Germany. It has 2 runways of 3,600 m and 3,250 m in length. In 2013 it served about 13.5 million passengers. For about ten to twenty years there had been many discussions about moving the airport because of the short distance from the city of Hamburg, the aircraft noise and the environmental problems. From 2012, there was a common agreement to end these discussions with the "Norddeutsches Luftverkehrskonzept (Air Transport Concept of Northern Germany)". The airport will be developed at the existing location. The airport has got a rail link for regional trains (S-Bahn), from Hamburg Central Station there is no direct link to the federal motorway. You have to change from the federal motorway BAB 7 to the federal roads 432 and 433 or take the federal road 433 directly from the city. But all these national roads have 4 lines and almost highway standard. As the airport is located within the city limits there are no plans for an additional direct federal motorway link.

Picture: Hamburg International Airport – Overview (Source: www.wiki-pedia.de)

Hannover Airport

Hannover Airport is a medium-sized international airport with 2 parallel runways for commercial use. The runways are 3800 m and 2340 m long. The Hannover airport has no general night flight restrictions. In 2013 it served about 5.2 million passengers and shifted more than 3 700 t of freight. During the last ten years the traffic has always been at this level. The airport has a surplus terminal capacity. The current capacity of the terminal is about 8 million passengers. The airport has got a rail link for regional trains (S-Bahn) from Hannover Central Station. The airport can be reached directly from the federal motorway BAB A 7 or BAB A 2 via the BAB A 352 airport link.

Rail-road terminals

The rail-road terminals Berlin-South (Grossbeeren), Magdeburg, Braunschweig, Hannover, Hamburg, Bremen incl. Bremerhaven, Dortmund, Duisburg and Cologne, are all included in the corridor.

The logistics competence of the Berlin node is represented by the DUSS Terminal Grossbeeren within Berlin's largest cargo distribution centre GVZ Berlin-South. It offers four tracks at a total length of 2,100 m and excellent rail and road access.

Picture: DUSS Terminal Grossbeeren (Source: IPG Potsdam)

The Magdeburg Hanse Terminal (trimodal) is another RRT core network location.

In Hannover, the Container Terminal Leinetor (trimodal) and the DUSS terminal Linden (rail-road) are included in the corridor.

The leading German port of Hamburg offers six important container terminals: Altenwerder (HHLA-CTA, trimodal), Burchardkai (HHLA-CTB, trimodal), BUSS Hansa (Buss Group, trimodal), Tollerort (HHLA-CTT, trimodal), Waltershof (Euro kombi, trimodal) and Billwerder (DUSS, rail-road).

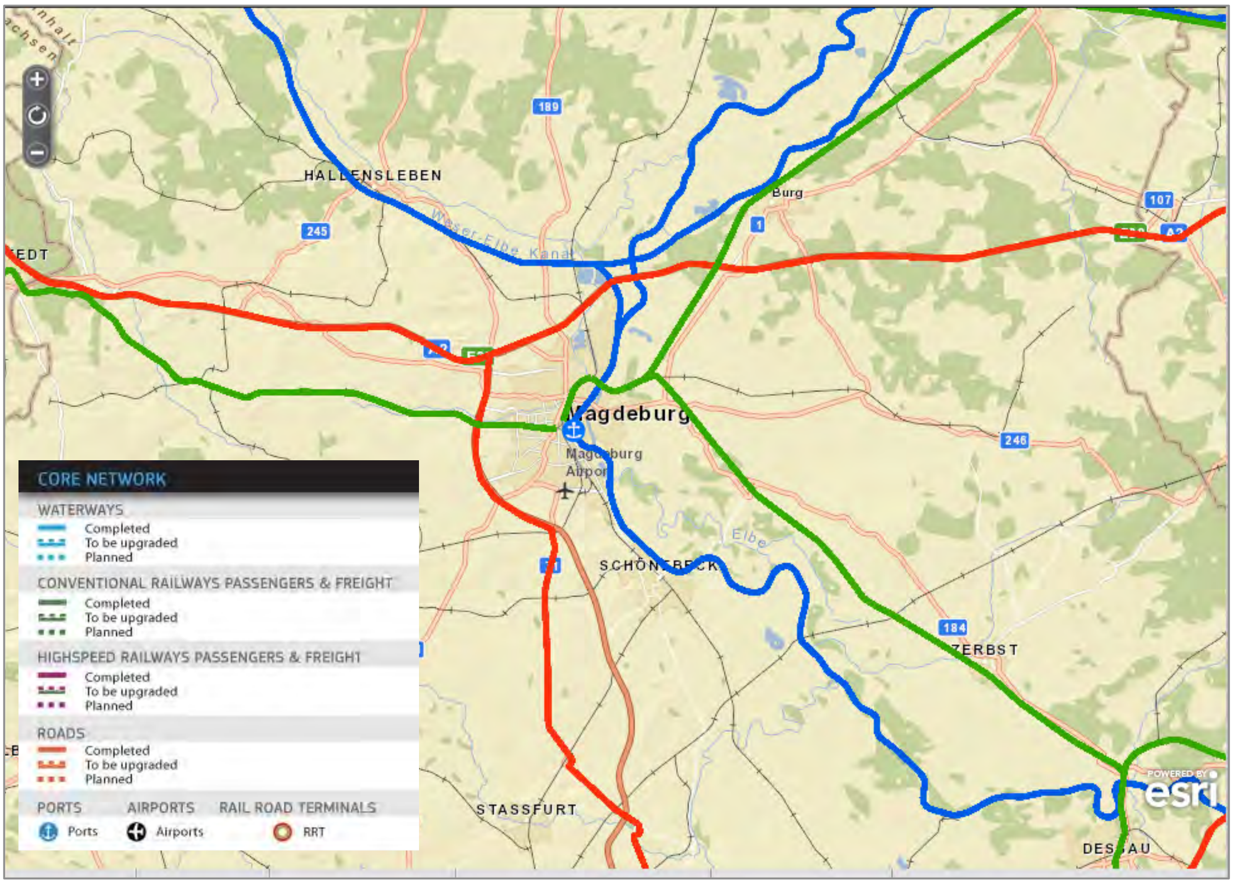
Germany’s largest cargo distribution centre GVZ Bremen (total area of 4.750.000 sqm) features a capable rail-road terminal.

The trimodal Rhine-Ruhr Terminal Duisburg (including Gateway West), situated right on the banks of the River Rhine, offers space to store some 9 000 TEU on a total terminal area of 149,000 sqm as well as excellent motorway links (A 2, A 3, A 40, A 42, A 57, A 59). There are quays with a length of 710 m and 2.050 m long tracks.

As another important trimodal RRT in the Rhine-Ruhr Area, the Container Terminal Dortmund possesses a terminal area of 90 000 sqm, 1 800 m long tracks and 450 m quay length.

The CTS Container-Terminal Cologne performs as the largest trimodal container terminal along the River Rhine. It offers a quay length of 800 m, a track length of 3,000 m and optimum motorway access (A 1, A 3, A 4, A 57, A 59).

Using the example of Magdeburg, the appearance of these nodes is reproduced in the TENTec system.



Map above: Magdeburg node (Core network infrastructure)

Urban Nodes

An 'Urban node' means an urban area where the transport infrastructure of the trans-European transport network (ports including passenger terminals, airports, railway stations, logistic platforms and freight terminals which are located in and around an urban area) is connected with other parts of that infrastructure and the infrastructure for regional and local traffic. The Urban nodes of the North Sea/Baltic TEN-T core network corridor including their ports and airports are Berlin, Hamburg, Hannover, Bremen, Bielefeld and Cologne.

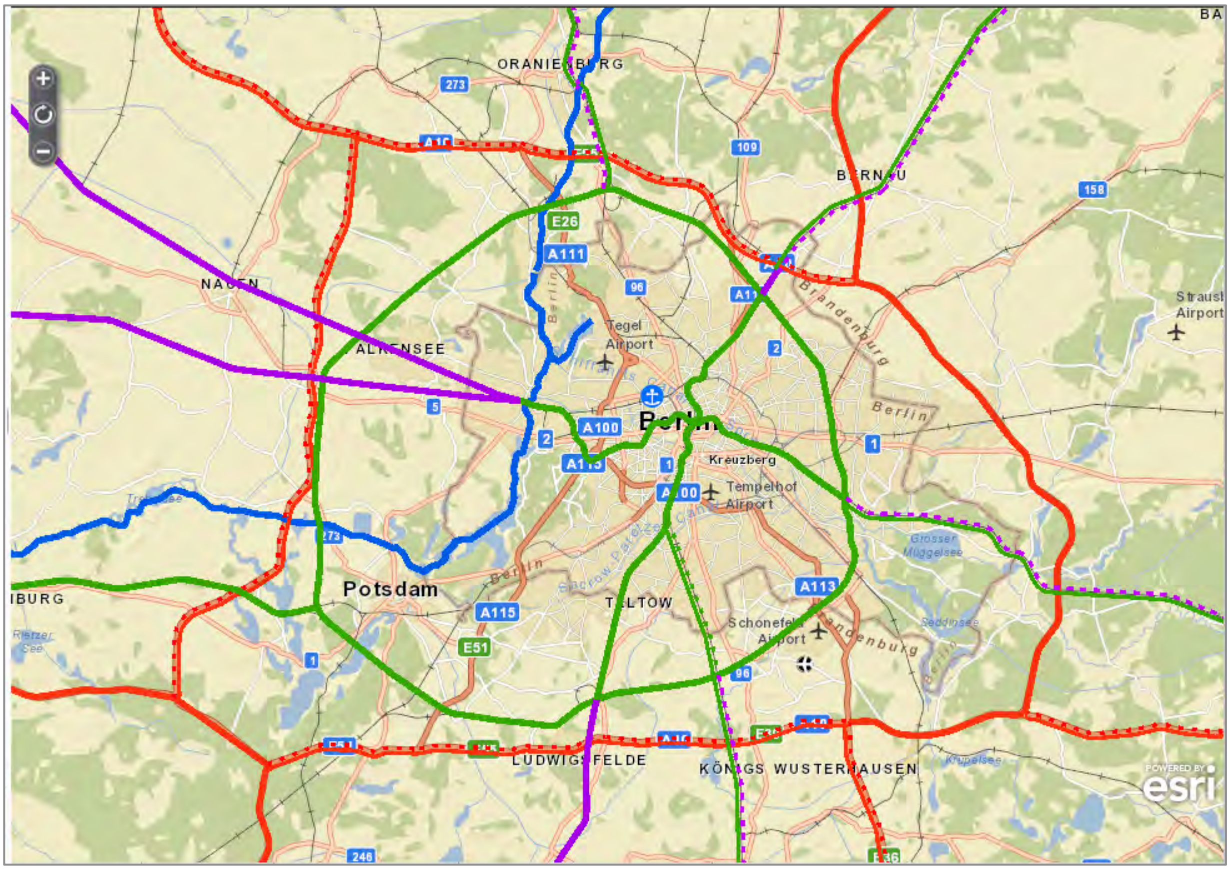
Additional TEN-T core network corridor nodes with a relevant transport infrastructure (airport, maritime port, inland port and RRT) are Magdeburg, Brunswick, Bremerhaven, Wilhelmshaven, Hamm, Dortmund and Duisburg.

Berlin Node

The example of the capital region Berlin-Brandenburg should be examined in greater depth in the studies. The example of the Berlin hub explains the scope of the TENtec-data system and TEN-T structure with three core network corridors. Berlin and Brandenburg, Germany's capital region, presents itself as a geostrategically attractive interface of the East-West and North-

South arteries through Europe and offers excellent conditions for establishing value-added logistics services. Overall, approximately 180,000 persons are instructed with logistical activities, approx. 56,000 of this work directly in the logistics industry.

Map: Berlin node (Core network infrastructure)



The rail node at Berlin consists of the Berlin outer ring which is mainly assigned to heavy freight transports and accessibility of the freight villages in Wustermark (GVZ Berlin West), Grossbeeren (GVZ Berlin South), Freienbrink (GVZ Berlin East) and Frankfurt (Oder), near the Polish border as an important interconnection and hub for container traffic on the NSB and the port of Königs Wusterhausen with access to all four modes rail, road, waterway and air. All main interconnections via Berlin Central Station and the Stadtbahn and the north-south tunnel and connections to the Inner Ring are included within the corridor. The mainline stations are connected to local trains, urban rail and underground lines and the tram network with a length of almost 190 kilometres all in a 1435 mm standard gauge.

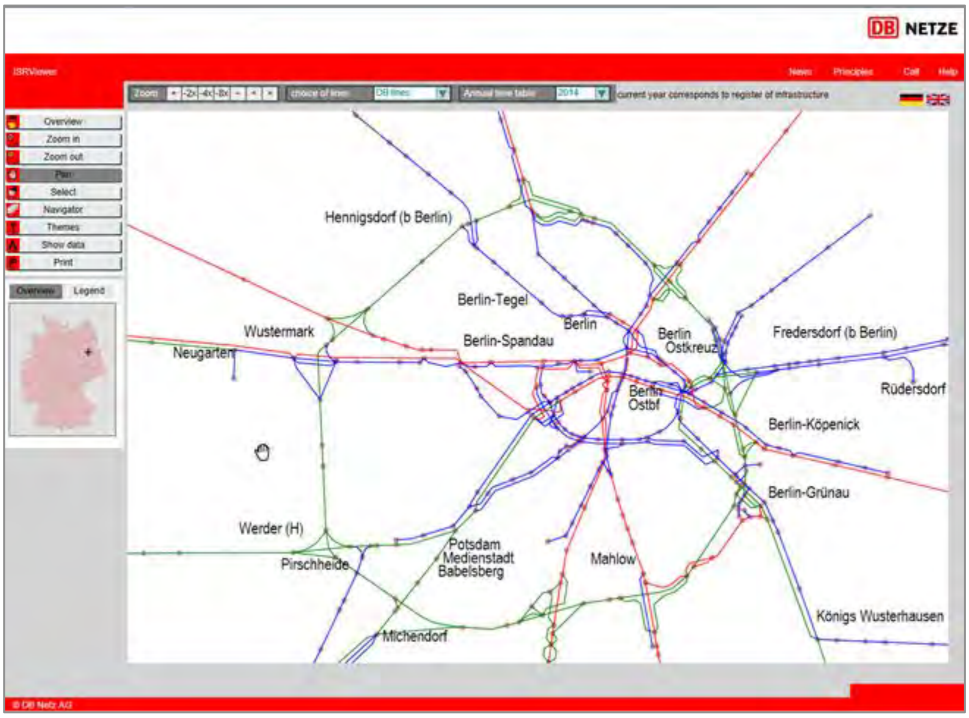
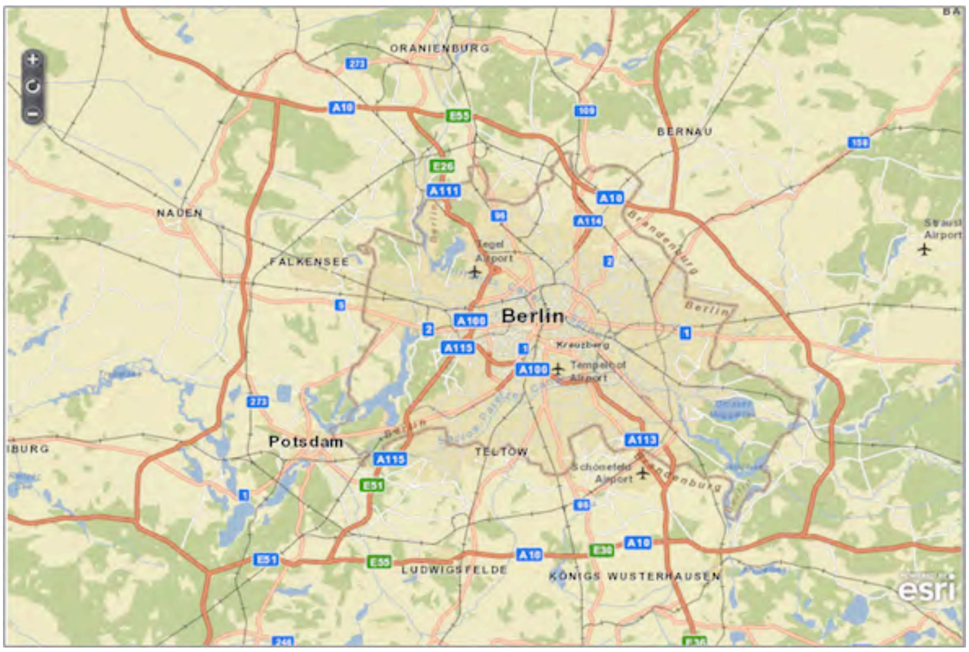


Figure: Chart of the rail infra-structure for passenger and freight of the Berlin node

The road network of the node includes the Berlin motorway ring A 10 and the urban motorway network within the Berlin city area (substantially the A 100, A 111, A 113, A 115). The A 10 was gradually adapted to the high capacity requirements since the mid-1990s. The development of further highly-used sections is reported in the German requirement plan for Federal Motorways (Bedarfsplan für Bundesfernstraßen) marked as 'high priority' (vordringlicher Bedarf). Its realization can therefore be expected within the next years. Connections to the Berlin city zone are ensured by the federal motorways A 111 (the northwest), A 114 (the northeast) as well as the A 115 (the southwest) and the A 113 (the southeast, airport BER) as well as the federal roads B 5 (the west), B 1/5 and B 101 (south), which are all configured as multi-lane roads.



Map: Chart of the federal motorway system of the Berlin node

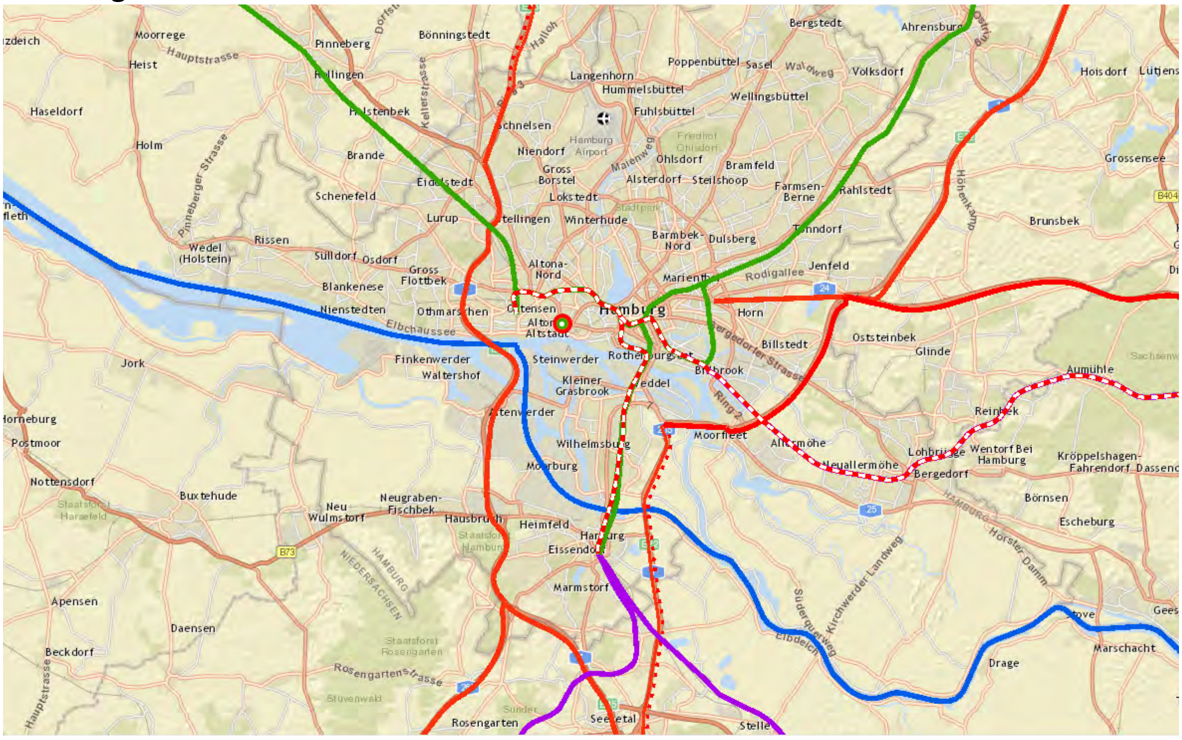
Concerning the inland waterways and ports, the Lower Havel waterway and the Berlin Western port (Westhafen), the Teltow canal and the port of Königs Wusterhausen characterize the Berlin node. The biggest port of Berlin and the biggest container terminal is connected to the waterway by Westhafen Canal and Spandauer Shipping Canal. The port of Königs Wusterhausen can be reached via the Teltow canal. It provides the capital with bulk commodities for several power plants and is developing a road-rail-intermodal terminal.

The inland waterway ranges from the Dahme in the south-east of the capital, Hennigsdorf and Berlin-Tegel in the north via Berlin to the Ketzin Junction Havel canal. Inland ports are found in Berlin Rudow East and West, Britz West, BEWAG HKW Klingenberg, Neukölln, Osthafen, Tempelhof, Lankwitz fuel depot, power plant Reuter, Spandau south port and in Brandenburg there are Rüdersdorf, Königs-Wusterhausen, Oranienburg, Velten, Hennigsdorf, Brieselang, Wustermark und Ketzin. Inland ports and piers for passenger transport and temporary transfer points can be added.

Chart of the system of inland waterways of the Berlin node

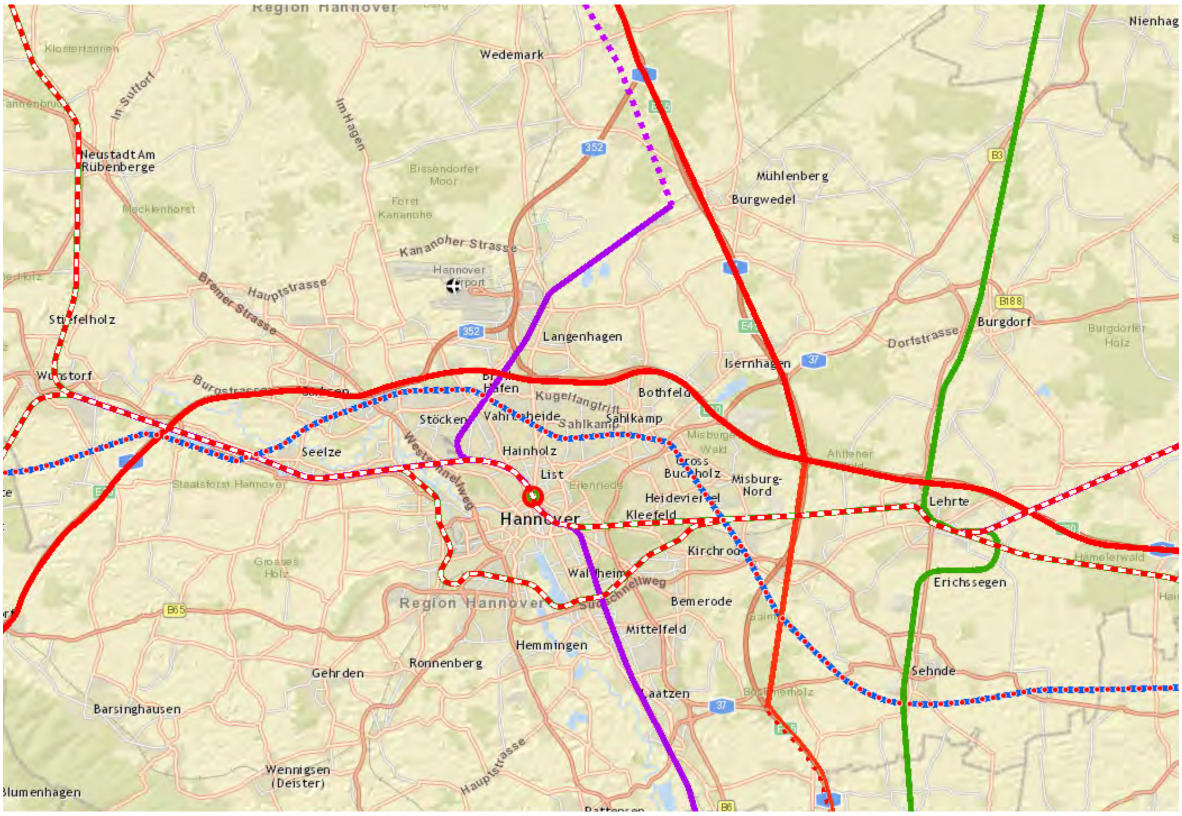
With over 26 million passengers annually, the region is already Germany‘s third largest airport location (Schönefeld and Tegel Airport). The Berlin Brandenburg Airport “Willy Brandt” is an international airport that is currently under construction, located adjacent to the current Berlin Schönefeld Airport. It is intended to replace both Schönefeld and Berlin Tegel Airport and to operate as the single commercial airport serving Berlin and the surrounding state of Brandenburg, an area with a total of about 6 million inhabitants. With a projected annual passenger number of around 30 million, Berlin Brandenburg Airport would become the third busiest airport in Germany.

Hamburg Node



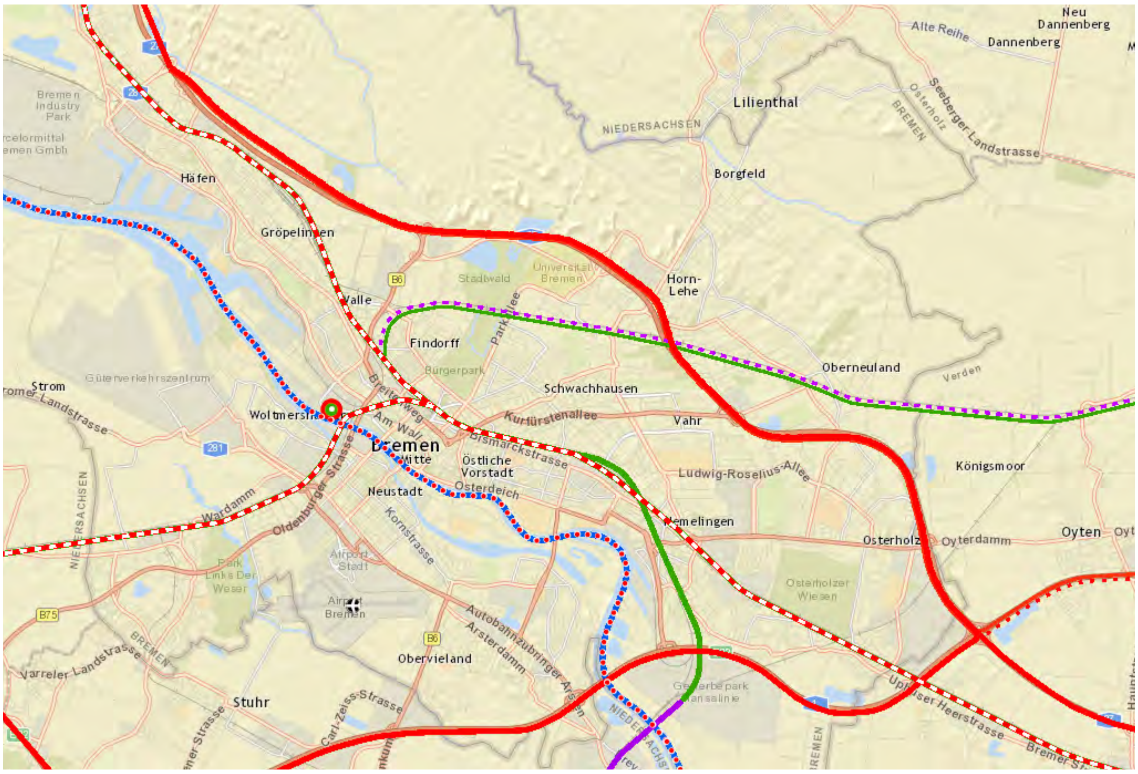
Map above: Node Hamburg

Hannover Node



Map above: Node Hannover

Bremen Node

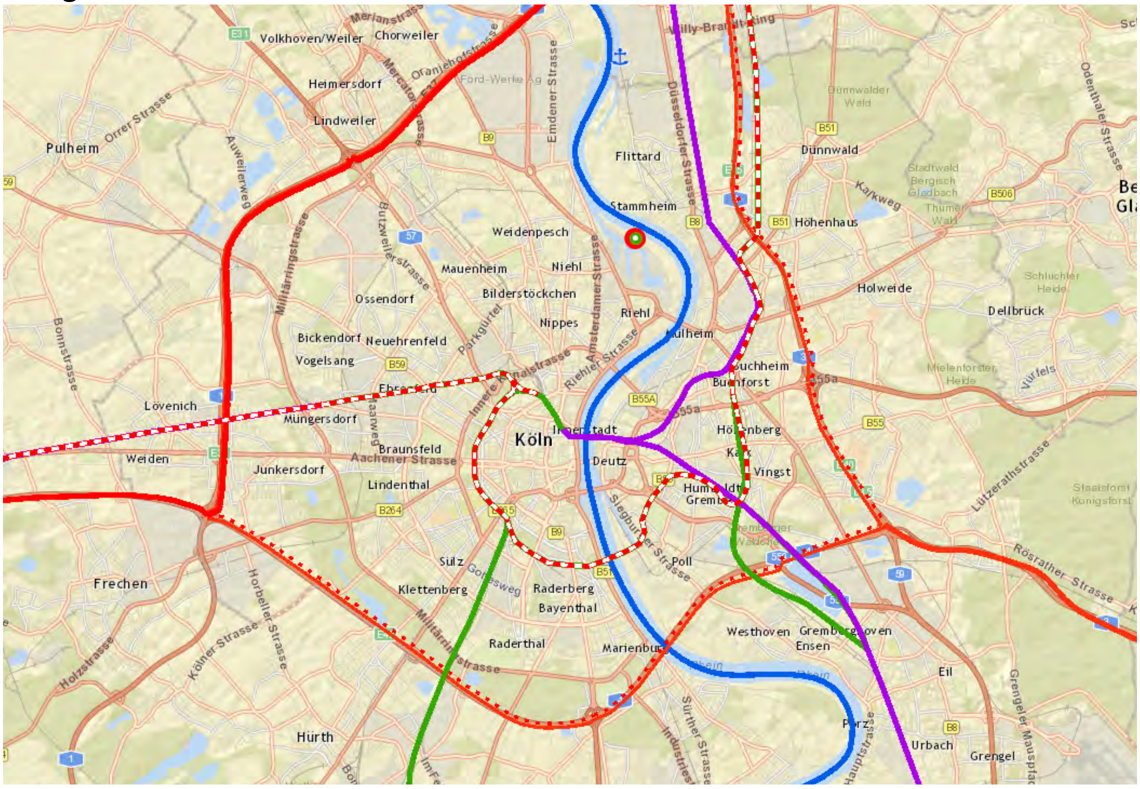


Map above: Node Bremen

Bielefeld Node

Map above: Node Bielefeld, Chart of the federal motorway system of the Bielefeld node

Cologne Node



Map above: Node Cologne

Bottlenecks

A 'bottleneck' means a physical, technical or functional barrier which leads to a system break affecting the continuity of long-distance or cross-border flows. Those can be overcome by bring significant improvements and will solve the bottleneck constraints. creating new infrastructure or by substantially upgrading existing infrastructure which could

Rail network

- The Oldenburg – Wilhelmshaven line is not electrified, the requested line speed for freight transports (100 km/h) is presently not completely guaranteed. However, the design speed for the upgrade (electrification) is only 120 km/h.
- The relevant lines are not equipped with ERMTS signalling systems. Only one technical component - the GSM-R mobile radio network - is installed on the main lines.
- The train length for the German corridor network is in general 740 m. Restrictions due to timetabling constraints and the operational situation can partially influence the actual possible train length.

Road network

- The access of to the motorway A 30 to the motorway A 1 in Bad Oeynhausen (9.5 km long Northern bypass) has not been completed yet. There is a significant bottleneck in the heart of the city.
- The Federal motorway A12 (Berliner Ring – Polish border), configured as a four-lane motorway, is one of the main motorways used for freight transport to Eastern Europe. The prognosis up to 2025 and 2030 shows a strong increase of the number of heavy goods vehicles using this motorway.
- There are significant constraints on the Federal motorways A1 /A3 around Cologne with the important bridge across the river Rhine closed for heavy load trucks.

Maritime transport: ports and motorways of the sea

- The relevant maritime ports are already connected by rail and road. The availability of alternative clean fuels can be expected by 2025. NtS have been made available in time. AIS in Germany is (with a few exemptions) so far limited for facilitation of navigation by display of the tactical traffic information and ship-ship-communication. ERI has been implemented in time. ENCs are covering 95% of the relevant German waterways although there is no legal obligation yet to fulfil in this respect.

Inland waterways

- The relevant sections are in compliance with class IV requirements, according to ECMT. For the inland ports the availability of alternative clean fuels is indicated by 2030.

Chart: State of the core network - rail in Germany

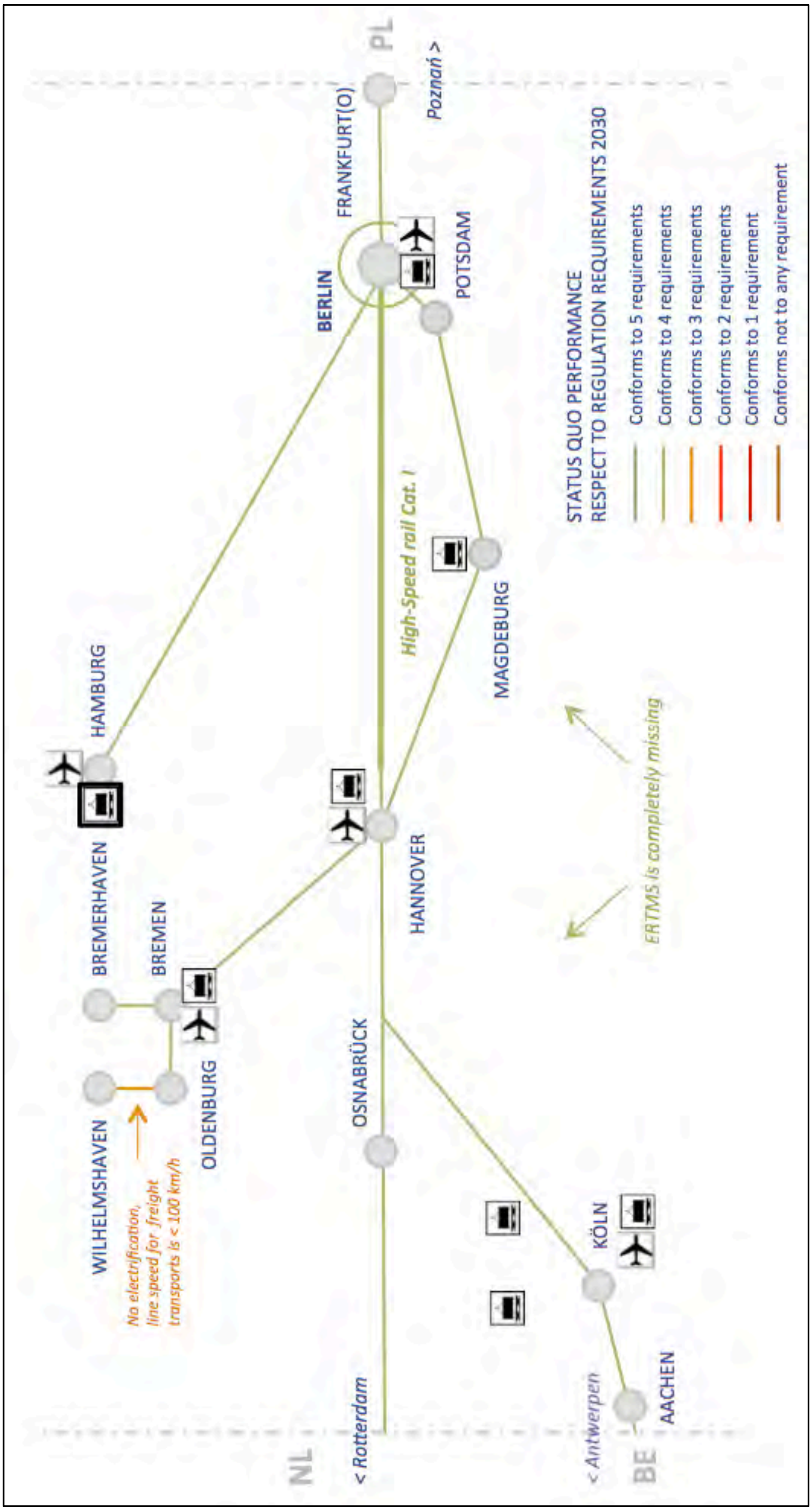


Chart: State of the core network – road in Germany

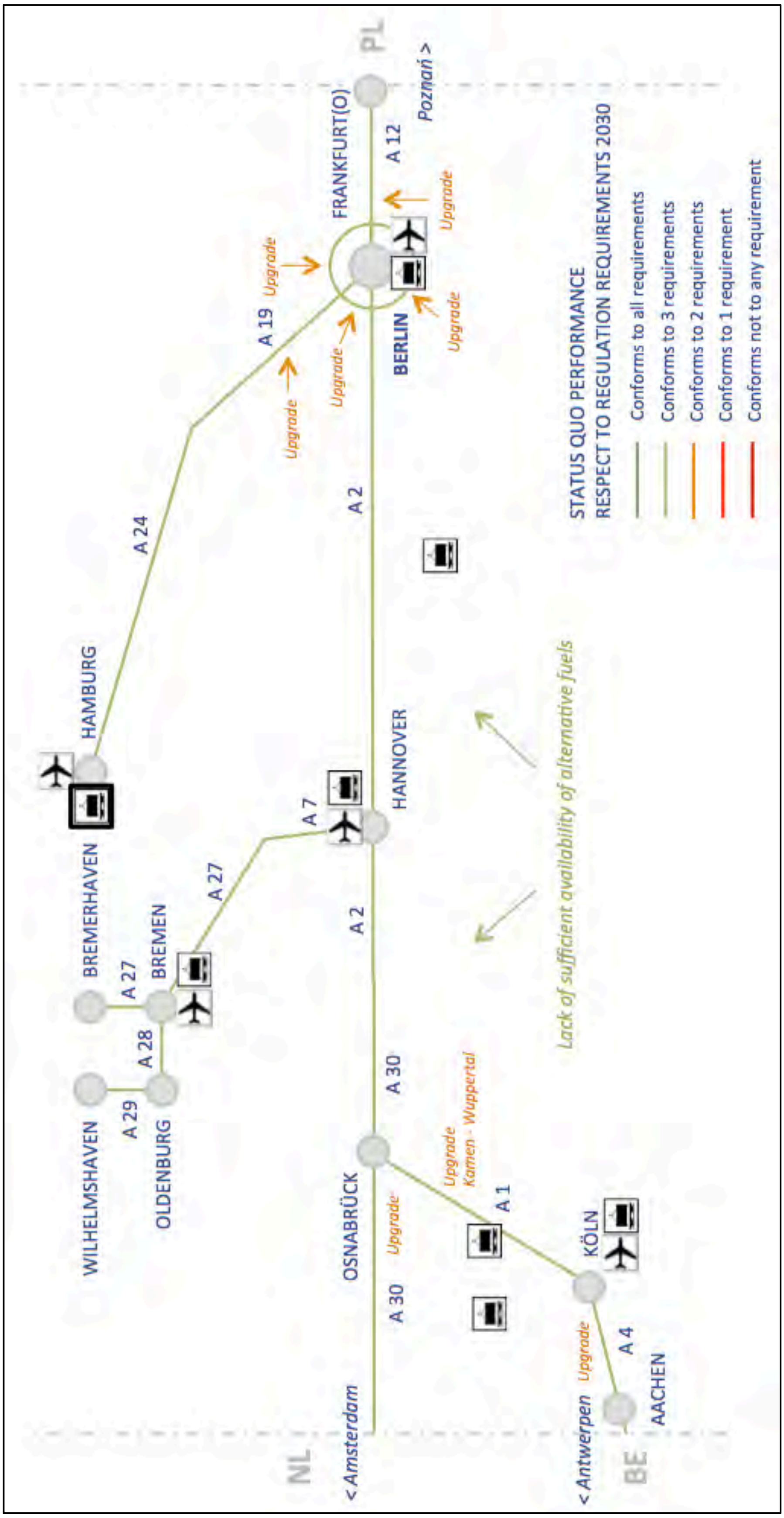
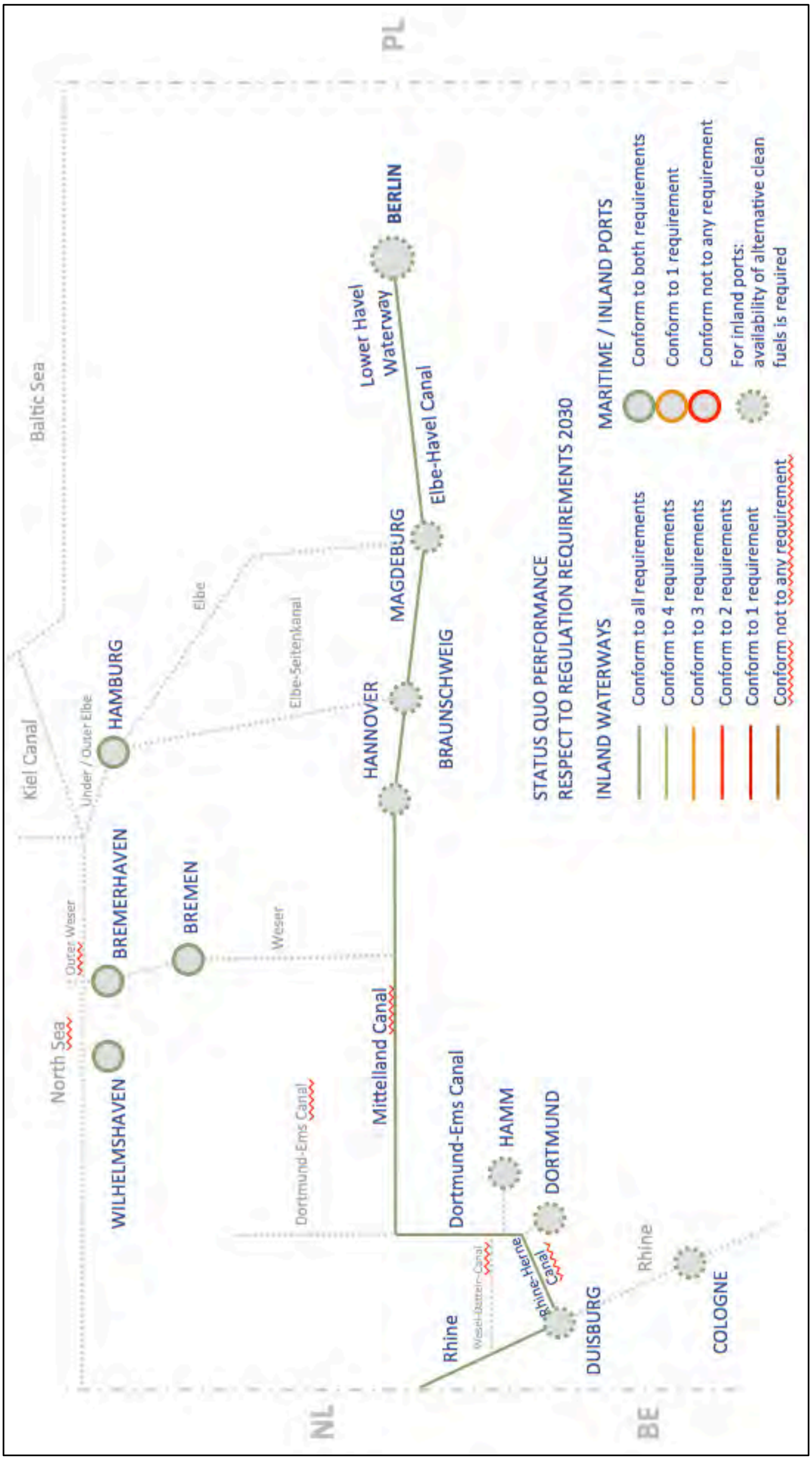


Chart: State of the core network - inland waterways and maritime ports in Germany



Airports

Overall, there are enough airport capacities at the nodes along the North Sea – Baltic Corridor. The airside infrastructure is nearly sufficient for the future.

In Berlin-Brandenburg, a new airport in the south of Berlin is being built. It has potential for expansion and will meet demands for 2030/2050.

In Hamburg, it will be necessary to improve the terminal capacity in future. The studies and plans will have to be worked out.

All airports mentioned have got rail links: Two of them are connected to the high-speed rail (Cologne-Bonn and BER). Two of them are connected with regional trains to the city central station. The possibilities of improving this link should be discussed. Bremen doesn't have such a rail link, but it has an efficient light rail service (Tram). The future requirements and the possibilities of this connection should be worked out.

Almost all airports can be reached by federal motorways.

The Hamburg airport does not have a direct link to such a motorway. It can be reached by federal roads. These roads have to be improved to a higher quality. The possibilities of this upgrade and the necessary measures have to be checked.

In Bremen the planning and building of the federal motorway 281 have to be continued.

Rail-Road terminals

Depending on future requirements, extensions of terminals could be needed.

Urban and Transport Nodes

The main deficits and bottlenecks of the Urban and Transport Nodes will be analysed with the involvement of the regional stakeholders.

Infrastructure parameters as defined by the Regulation (EU) 1315/2013

Rail – Indication on the infrastructure parameters per section, with particular highlight on:

- Electrification: Core network to be electrified by 2030 (including sidings where necessary)
- Axle load: Core freight lines 22,5 axle load by 2030
- Line speed: Core freight lines 100 km/h by 2030 (NB. No speed requirement for passenger lines)
- Train length: Core freight lines to allow for 740 m trains by 2030
- ERTMS/signalling system: Core network to be equipped with ERTMS by 2030
- Track gauge: New lines to be built in UIC standard gauge (1435 mm), except in certain circumstances.

Inland waterways – Indication on the infrastructure parameters per section, verifying the compliance at least with class IV requirements according to ECMT, in particular:

- Length of vessels and barges: from 80-85 m
- Maximum beam: from 9.50 m

- Minimum draught: from 2,5 m
- Tonnage: from 1000-1500 t
- Minimum height under bridges: from 5.25/7.00 m
- Indication on the availability of alternative clean fuels in inland ports by 2030.

Roads – Indication on the following parameters:

- Whether the road is an (1) ordinary road, (2) express road or (3) a motorway (definitions are contained in Art 17(3) TEN-T Regulation): Roads have to be either an express road or a motorway by 2030
- Parking areas along the roads, including their security level: Sufficient parking areas, at least every 100 km, by 2030
- Availability of alternative clean fuels by 2030
- Use of tolling systems /ITS and their interoperability with other systems.

Maritime transport: Ports and Motorways of the Sea

- Indication on the following parameters:
- Connection to rail network, inland waterways and road network: core ports to be connected to rail by 2030.
- Availability of alternative clean fuels by 2030.
- Motorways of the Sea: indication on most important connections.

Airports: Indication on the following:

- Capacity to make available alternative clean fuels by 2030
- Connection to rail network (heavy rail or urban rail system) and road network: certain airorts have to be connected to heavy rail by 2050 (see Annex II).

Rail-road terminals:

- Indication on rail road terminals and their capacity/traffic flows.

Chapter 10

Elements of the Work Plan: The Netherlands

Prepared by Goudappel Coffeng

Technical parameters of the infrastructure for all modes of transport

Figure 1: Alignment of sections (Road, Rail and IWW) and nodes (maritime port, inland port, airport, RRT) in the Netherlands along the North Sea – Baltic Corridor as well as the alignment of sections of other CNC traversing the Netherlands

Alignment

The Netherlands forms a part of the western section of the CNC North Sea – Baltic (CNC NSB), which is one of 9 TEN-T corridors in Europe. Other TEN-T corridors traversing the Netherlands are the Rhine – Alpine (CNC RAL) and the North Sea – Mediterranean (CNC NSM). Many sections (road, rail, inland waterways) and nodes (ports, airports, inland ports, and rail terminals) are part of multiple corridors. Figure 1 shows the alignment of the CNC NSB.

In table 1 four main connections can be distinguished which are part of different CNC's and Rail Freight Corridors (RFC).

	Road	Rail Freight	Rail Passenger	IWW
Rotterdam/Amsterdam-DE border at Oldenzaal	***NSB***	***NSB***, RFC8	***NSB***	***NSB***
Amsterdam/Rotterdam-BE border at Roosendaal/Breda	***NSB***, NSM	***NSB***,NSM, RFC2	***NSB***, NSM	***NSB***,NSM
Rotterdam/Amsterdam-DE border at Zevenaar/Lobith	RAL	RAL, RFC1, RFC8	RAL	RAL
Other IWW connections in NL				***NSB*** (all IWW sections north of Maas river including Antwerp connection) NSM (all western and southern IWW sections)

Table 1: Core TEN-T connections being part of different CNC's North Sea – Baltic (NSB), Rhine Alpine (RAL) and North Sea – Mediterranean (NSM) or part of different Rail Freight Corridors (RFC)

Table 2 includes the core TEN-T nodes and their core TEN-T transport facilities. The urban nodes Amsterdam and Rotterdam are both part of CNC NSB.

	Urban node	Airport	Maritime Port	Inland Port	RRT
Amsterdam	***NSB***, RAL, NSM	***NSB***, RAL, NSM	***NSB***, RAL, NSM	***NSB***, RAL, NSM	***NSB***, RAL, NSM
Rotterdam	***NSB***, RAL, NSM	***NSB***, NSM	***NSB***, RAL, NSM	***NSB***, RAL	***NSB***,RAL, NSM
Almelo				***NSB***	
Deventer				***NSB***	
Hengelo				***NSB***	
Moerdijk			***NSB***, RAL, NSM	***NSB***, RAL, NSM	
Nijmegen				***NSB***, RAL	
Utrecht				***NSB***, RAL	

Table 2: Core TEN-T nodes and their core TEN-T transport facilities assigned to different CNC's.

Passenger rail

Amsterdam, Rotterdam, Antwerp and Brussels are interconnected by direct high-speed railway services, which continue to London and Paris. However, The Hague, which is the seat of the Dutch government and host to various international organisations, has no direct service. Amsterdam has regular direct international services to Berlin. This journey takes more than six hours, though. Recent regional initiatives aim to speed up this connection as part of the Rail Agenda East regional rail development plan (*Spooragenda-Oost*). Feeder lines play an important role in this initiative.

Amsterdam, Rotterdam and The Hague all have frequent direct intercity services to the eastern parts of the Netherlands. The rail network in the Netherlands is used very intensively. The busiest sections between Amsterdam-Utrecht and Gouda-Utrecht are part of the Corridor and handle over 400 passenger trains, carrying more than 80,000 passengers, on a daily basis.

Plans for high-frequency passenger rail services (*PHS* programme) in the western part of the Netherlands have been developed and their implementation is currently under consideration. However, the interaction with freight rail services will lead to capacity issues. Rerouting freight rail transport is being considered to address these issues.

The northern province of Groningen and the German state Niedersachsen are developing plans to improve the Groningen-Bremen rail connection. This 'Wunderline' rail connection is not part of the CNC North Sea Baltic but it cross-border connects the northern part of the Netherlands to the Bremen branch of CNC North Sea Baltic.

All main rail links along the Corridor have at least double-track electrified railway lines. Traction differences between the Netherlands and Germany limit the operability of regular rail services across the NL-German border. There are, however, locomotives in operation that allow multiple types of current.

Only the high-speed rail sections between Amsterdam-Rotterdam-Antwerp and Amsterdam-Utrecht (pilot) are currently equipped with the ERTMS signalling system. There are plans to extend the ERTMS system (level 2), starting in 2016, to include other railway sections in the Netherlands as well. The implementation of ERTMS on sections that are part of the TEN-T core network will be prioritized before 2030 as part of European agreements. Almost all rail connections, except the Hi-speed lines, which are part of CNC North Sea Baltic have many existing level crossings which offer safety issues and limit the rail capacity.

Freight rail

Freight rail services in the Netherlands carried a total of 42 million tons of freight in 2011. The Dutch government aims for a substantial modal shift from road to rail and IWW. Forecasts for 2030 show an increase in transported weight by rail to 71 million tons, most of which will be Dutch-German cross-border transport.

Freight transport by rail is largely related to the ports of Amsterdam, Rotterdam and Antwerp. Both, the ports of Amsterdam and Rotterdam are being confronted with 'last mile' rail issues. In Amsterdam the necessity for eastern bound freight rail transport to pass the Amsterdam Central railway station leads to a capacity issue. In Rotterdam the Caland railway bridge needs upgrading to ensure unimpeded rail access to the port. This is part of the need for upgrading of the Maasvlakte-Dordrecht rail freight connection.

In 2007, the Betuwe Railway's east-west connection opened, connecting the port of Rotterdam to the German border near Arnhem. It is mostly used for cargo destined for or originating from the middle or southern part of Germany. This is an ERMTS-equipped freight-only railway line, only the western section of which forms a part of the Corridor. The port of Amsterdam is connected to the Betuwe Railway via Utrecht at Geldermalsen.

Rail transport bound for the northern part of Germany and northern Central Europe in many cases still uses the rail link via Amersfoort-Deventer-Hengelo to the German border near Oldenzaal. Freight transport to and from the port of Amsterdam will in any case use this direct connection as it offers the shortest route to these destinations. In 2011, the Oldenzaal border rail section was used by around 10 freight trains daily.

Studies are underway to reroute freight from Rotterdam towards the Oldenzaal border via the Betuwe Railway. Several alternatives to connect the Betuwe Railway to Hengelo in the Twente region are being discussed (Northeastern Rail Link). The expected number of trains crossing the border near Oldenzaal is expected to vary between 10 and as many as 50 freight trains in 2013, depending on whether the above-mentioned PHS programme and Northeastern Rail Link will actually be implemented. Mitigating measures could help increasing the freight rail capacity.

Multilateral negotiations are on-going to realize the Iron Rhine that improves the connection of the Flemish ports to Duisburg and the Ruhr area. The project is not part of this CNC. It is included in the list of pre-identified projects on the core network in part 1 of annex 1 of Regulation No 1316/2013 (CEF), and has been identified as an expected line of RFC 1 and an expected principal line in RFC 8.

Freight rail transport between Rotterdam and Antwerp uses the railway link via Roosendaal. This link is also used by passenger rail services. The need to upgrade this rail connection to meet future demand has been recognised, and the implementation of ERMTS isscheduled to be completed by 2020 to align with implementation plans on the Belgian side of the border. In 2011, almost 30 freight trains used the Roosendaal rail link, and the forecasts for 2030 expect an increase to 40-50 freight trains daily.

The requirements of the Regulation concerning the minimum speed of 100 km/h, the minimum axle load of 22.5 tons, and the maximum train length of 740m, is met on all rail lines which facilitate freight transport. Traction differences and differences in signalling systems between countries severely limit the operability of rail freight transport. The Rail Freight Corridor 8 plan (RFC8), which addresses these issues, will ultimately be an integral part of the North Sea Baltic Corridor.

Road

In the Netherlands, the A1 (E231/E30) motorway from Amsterdam to Hengelo forms the backbone of the Corridor, giving access to the central eastern part of the Netherlands (with connection to other CNC's) and northern parts of Germany. Rotterdam and Utrecht are connected to this backbone at junctions near Amersfoort. Most sections of the E231/E30 motorway are four lanes wide. Plans exist to widen some sections of the E231 and E30, specifically those near Amsterdam and between Hilversum-Amersfoort-Barneveld and Apeldoorn-Deventer-Almelo-Azelo. The widening of latter section will be fully realized in 2026 using extra funding of regional partners. For remaining sections of the A1 (E231/E30) motorway between Barneveld and Apeldoorn, and Azelo-German border widening plans have not yet been incorperated into the national MIRT scheme for infrastructure development. After realization of the widening plans for other sections new bottlenecks could arise here.

The Dutch government gives priority to dynamic traffic management and ITS systems as a means to increase road capacity instead of implementing road-widening schemes. The European EasyWay project, which aims to put in place integrated services along transport corridors and to enhance the use of harmonised ITS services and coordinated management of road transport in Europe, is part of this incentive.

The motorways between Amsterdam and Rotterdam and beyond towards Breda are all six or eight lanes wide. Only the 40 km cross-border section of the E19 between Antwerp and Breda is a four-lane motorway. The Corridor's road sections in the Netherlands are part of a dense motorway network. In many cases, there are parallel motorways within a 30 km distance. Some missing sections are under construction or have been planned.

Although existing road categories meet the Regulation and the capacity is relatively high compared to other parts of the Corridor, congestion on the motorways is a major concern, due to high usage levels. Usage levels of over 100,000 vehicles a day are usual, also outside the 'Randstad' conurbation in the western part of the Netherlands. The highest usage levels have been recorded near Rotterdam, reaching 230,000 vehicles a day. There is a strong correlation between congestion levels and economic growth. Because of the economic crisis, usage levels have shown little or no increase in the past few years.

The relative volumes of heavy goods vehicles in total traffic varies between 10% and 25%, mostly depending on the level of international road cargo. Road haulage accounts for more than 60% of total freight transport (tonskilometre).

The establishment of a network of refuelling points for alternative fuels for road transport (electric, LNG, CNG and hydrogen) in accordance with the EU Clean fuels for transport strategy, is part of the policy of the Dutch national government. LPG is available already at almost all refuelling locations.

The availability of parking spaces along corridor roads sections does comply with Regulation 1315/2013. However, lorry ban (e.g. Sunday working) regulations, which differ from one country to another, lead to parking areas congestion at the borders. Tolling systems are not in operation in the Netherlands.

Ports

The Corridor starts and ends in the Dutch ports of Amsterdam and Rotterdam. These ports, which form the central part of the Le Havre – Hamburg port range, are the gateway to north-western Europe and beyond. The ports are of huge importance for future economic growth in many related industrial and logistics sectors.

To illustrate this importance, table 3 shows freight transhipment for Europe's largest ports in 2012 and the expected volume in 2030.

	Rotterdam	Antwerp	Hamburg	Amsterdam
2012	442	184	131	94
2030	700	300	n.a.	144

Table 3: Freight transhipment for Europe's largest ports in 2012 and the expected volume in 2030 (in millions of tons); source: Port authorities

To ensure the functioning of this economic engine, the international/European 'hinterland' connections of the ports have a crucial role to play. All transport modes are important in this respect: roads, railways, inland waterways, and short-sea shipping.

The ports of Amsterdam and Rotterdam provide both over direct road and rail access. Capacity issues do exist however. The ports both have pencilled in new projects in order to ensure future direct port access, improved communication and traffic management. These projects should lead to an increased use of Rail, IWW and pipelines. A quick wins programme to improve Inland port and container terminal facilities has been launched. The ports of Amsterdam and Rotterdam cooperate in the HAMIS Port management information system, which serves both sea and inland waterway transports. Both ports cooperate in the Portbase logistics information system as well which aims at optimizing logistic processes and eventually offering a single counter service for all Dutch ports.

The Dutch government aims to increase the role of rail and IWW substantially by 2030. Because port-related international transport plays a dominant role, the efforts to achieve this modal shift centre on freight transport to and from the ports of Amsterdam and Rotterdam. In Rotterdam and Amsterdam, a substantial shift in cargo from road to rail, IWW, and short-sea shipping is aimed for, the objective being to reduce the share of road cargo to just 35% (now around 50%) by 2030. The share of IWW and rail cargo is expected to increase to 45% and 20%, respectively (now around 35% and 13%, respectively). To reach these goals improvements are also required in organizational matters of hinterland transport by IWW and, to a lesser extent, rail.

Access to the port of Amsterdam for vessels to and from the North Sea is provided by the Amsterdam locks. These locks will undergo a major overhaul in the next few years in order to accommodate larger vessels and increase port capacity which will, as been expected, already been reached in 2019. The locks will replace the existing Noordersluis sea locks as indicated in figure 2. This is a pre-identified TEN-T project in a mature stage.

The port of Moerdijk, halfway Rotterdam and Antwerp is a substantially smaller port. Moerdijk has, like Amsterdam and Rotterdam, a function as IWW port as well.

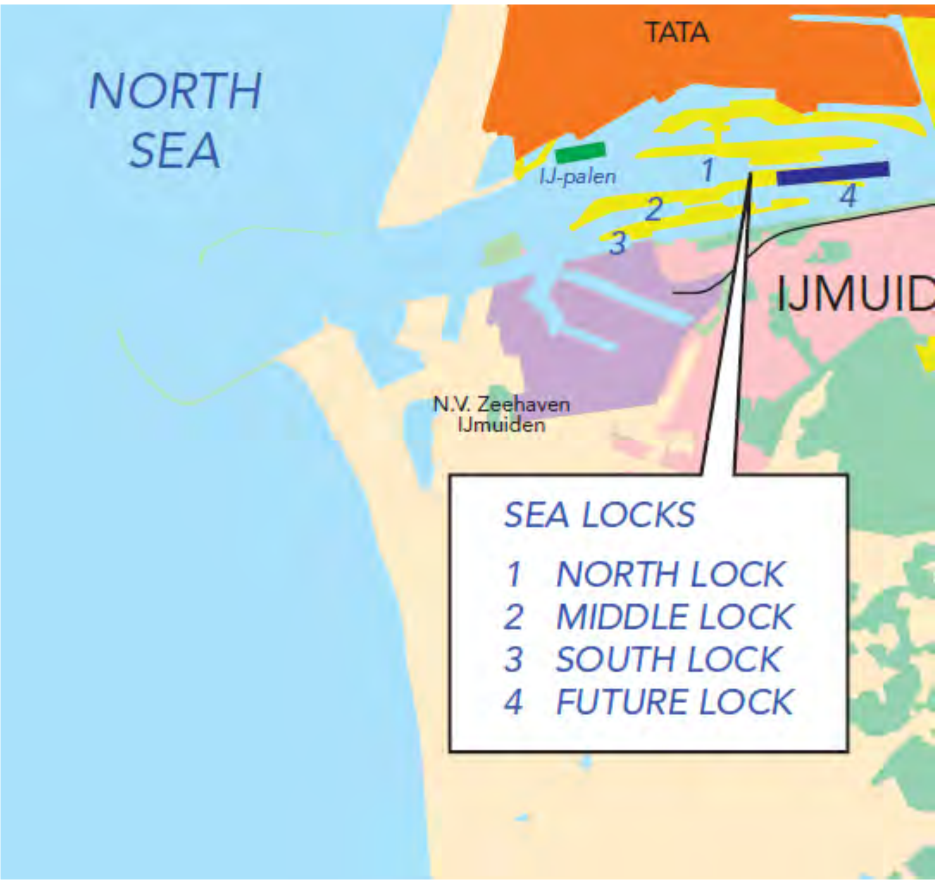


Figure 2: Planned new locks for the Port of Amsterdam

As regards the port of Rotterdam, accessibility by road is a major concern as congestion is a daily phenomenon. There are plans for a new road tunnel under the Nieuwe Waterweg, west of Rotterdam (Blankenburg Tunnel).

Both ports have important short sea shipping connections to other ports along the North Sea and to many ports in the Baltic Sea as well. A considerable share of short sea shipping cargo with destination in the ports of Amsterdam and Rotterdam originates in countries along the CNC NSB as table 4 shows. Latvia is a very important origin country for the port of Amsterdam. Poland, Latvia and Estonia are all important countries of origin for the port of Rotterdam, and Russia is an important origin country for both ports.

In the recently adopted Clean Fuels for Transport package the EU creates the obligation to make available a sufficient amount of LNG refuelling points in maritime ports by 2025. For this purpose a new LNG terminal will be build in the port of Rotterdam. In Amsterdam a LNG bunker station is in operation since 2014. The ports of Amsterdam and Rotterdam provide, in compliance with the Regulation, sufficient facilities for collecting ship's waste and cargo residues.

From / To	DE	PL	LT	LV	EE	FI	RU	Total Freight NSB countries + Russia	Total Freight with destination in ports	Share NSB countries + Russia
Amsterdam	578	613	172	5,215	195	816	3,993	11,582	50,471	23%
Rotterdam	1,732	4,167	2,307	3,849	5,290	2,471	43,533	63,349	307,565	21%

Table 4: Short Sea Shipping cargo tonnage originating in CNC NSB countries and Russia and their share in total cargo tonnage with destination in the ports of Amsterdam and Rotterdam (x 1,000 tons); source: port statistics

Inland waterways (IWW)

The Netherlands has a very dense network of inland waterways, with several inland waterway ports being part of the core TEN-T network (see figure 1). The ports of Amsterdam and Rotterdam are, as part of the Corridor, connected via inland waterways to the core inland waterway ports of Utrecht, Nijmegen, Deventer, Hengelo, and Almelo.

In the Netherlands, there is a high degree of compliance with the TEN-T (CEMT IV) standard. National waterways are now designed (new waterways and upgrades) to CEMT Va specification. On international routes CEMT Vb is required as the European standard. Some important bottlenecks, which are mentioned next in this section and are mostly related to lock capacity, remain however.

Inland waterway freight transport serves around 33% of all transport (in ton/kilometre) in the Netherlands and this share is expected to increase considerably until 2030, reducing CO_2 emission levels.

Main 'hinterland' freight transport in the Netherlands via the inland waterways is oriented towards the River Rhine in Germany, as shown in figure 3. Total IWW freight transport passing the Dutch-German Rhine river border currently amounts to 145 million tons.

Amsterdam is connected to the River Waal (i.e. the main Rhine river branch) by the Amsterdam-Rhine Canal. The Amsterdam-Rhine Canal connects the port of Amsterdam to the River Waal.

The Amsterdam-Rhine Canal currently carries 73 million tons of IWW freight. The planned upgrade of the Beatrix locks on Lek Canal (south of Utrecht), which connects the Amsterdam-Rhine Canal to the Lek River is a pre-identified TEN-T project. These locks offer the important connection of the port of Amsterdam with both, the port of Rotterdam and the port of Antwerp. The locks serve 38 million tons of freight. Proceedings to realize the locks have reached mature stages. Other IWW projects near Amsterdam concern the upgrade of IWW links from Amsterdam towards Zaandam and Utrecht, and the capacity increase of the Zeeburg Passage on the Amsterdam-Rhine canal.

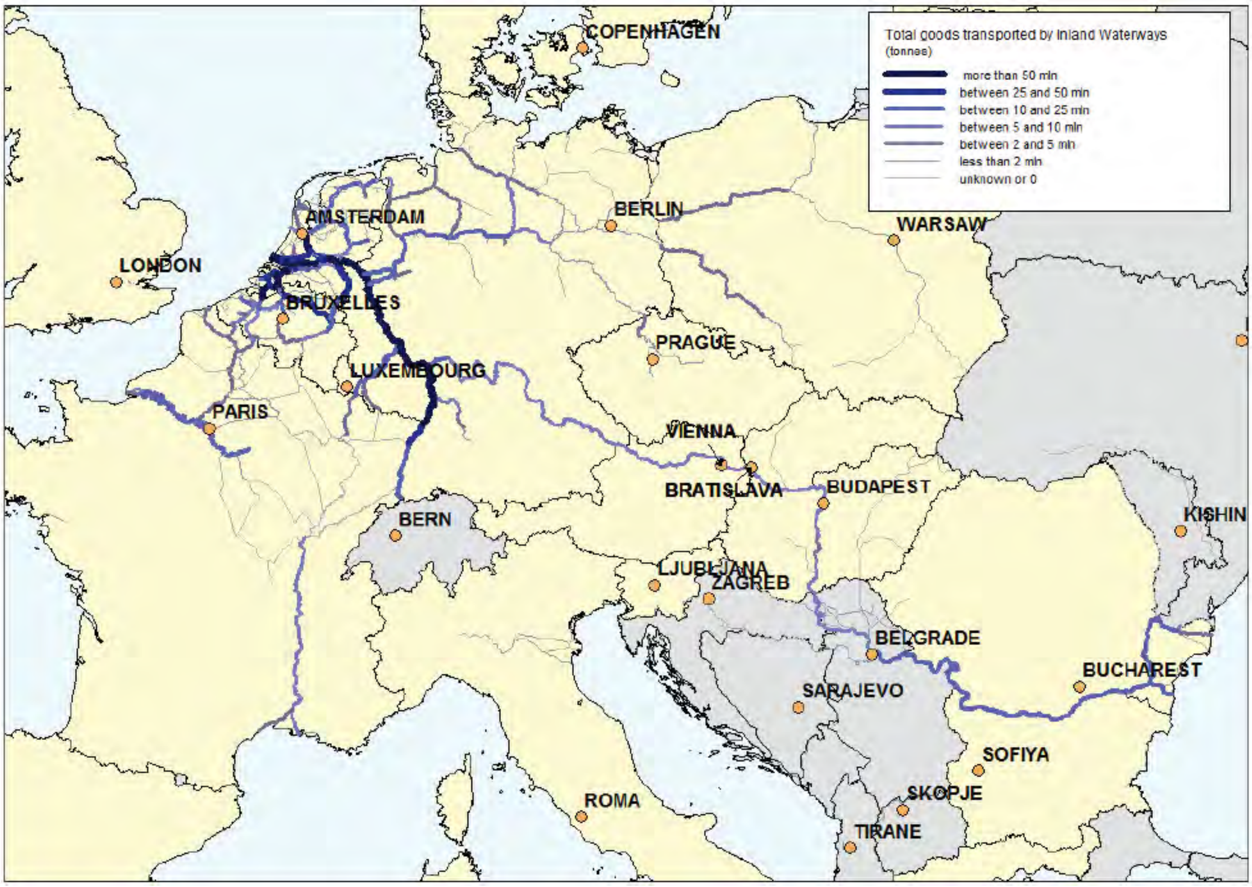


Figure 3: Main freight transport volumes using inland waterways in northwestern Europe. (Source:Panteia)

Figure 3 clearly illustrates the role of IWW transport along the north-south Rhine axes. It also shows that, currently, IWW transport volumes on the east-west connections of the Corridor are nowhere near these volumes. Inland waterway connections to the northern part of Germany and northern Central Europe are possible via the River Rhine, the Lippe Canal and the Mittelland Canal, but the latter sections are time-consuming due to locks and other constraints. Studies to connect the Twente Canal to the Mittelland Canal have so far not shown the required cost-benefit level. However, regional efforts are made to put in place alternative solutions to this cross-border 'missing link' as part of a multi-modal approach to realise a 'virtual'Twente Canal – Mittelland Canal link. The EUREGIO freight corridor aims at facilitating freight transport on the corridor, eliminating cross-border transport limitating issues and to stimulate economic cooperation in the Dutch-German border area in order to develop the Euregio to a strong logistic hotspot on the CNC North Sea Baltic.

As regards the Twente Canal, which can be reached from the Ijssel River, a widening scheme and an upgrade of the important Eefde locks near the entrance to the Canal have been scheduled, both of which are pre-identified TEN-T projects. In 2013, the Twente Canal handled 7 million tons of IWW freight transport. After widening and upgrading the volume of freight transport on the Twente Canal is expected to increase to 10 million tons. The bridges across the Twente Canal need upgrading in order to guarantee access to heavy goods vehicles.

Another route to reach the Twente Canal from Amsterdam is the northern route across the Marker Lake and the northern section of the River IJssel between Kampen and Zutphen. The Marker Lake section serves around 20 million tons of IWW freight transport. After passing the Houtrib locks near Lelystad, ships can sail across the IJssel Lake and the Princess Margriet Canal through the northern provinces of Friesland and Groningen to Delfzijl, which serves as a sea port. Access to the Princess Margriet Canal at Lemmer is provided by the Lemmer locks. An extension of these locks is under consideration because of the continued increase in IWW freight transport volumes, mainly due to the increased activity in the Eemshaven port. In 2013, around 13 million tons passed the Lemmer locks. Direct Sea access from the Ijssel Lake is possible using the Kornwerderzand locks in the Afsluitdijk.

The Dutch IWW system is important as well for freight transports between Antwerp (and beyond) and the Dutch and German hinterland. The Rhine-Scheldt Canal is used for this matter. In total 115 million tons pass this canal. The Volkerak locks are the largest and busiest inland locks in Europe. They are a link in the main Belgium-Netherlands transport axes connecting the Schelde ports to Rotterdam and the Rhine. The Volkerak locks constitute the biggest bottleneck in the waterways of the Scheldt area, as there is no realistic alternative route. Both increased capacity and shorter operations would improve the situation. The Kreekak lock, which is further south in the Rhine-Scheldt Canal, has similar issues related to waiting times.

Sufficient mooring places (or berths) are important for IWW planning and rest regulation compliance. Plans for increased and improved facilities exist in several river and canal sections.

The technical standard for all aspects of the River Information System (RIS) is met in the Netherlands. This includes the implementation of AIS, a geo-positioning system which allows for an optimisation of navigation. The Dutch government recognises the importance of inland shipping. It has launched the IDVV programme (Incentive to Dynamic Inland Waterway Transport Management) so as to increase the use of the inland waterways, focusing on container transport through innovative traffic management measures and measures aimed at improving contacts and communication between shippers and carriers. Further traffic management systems are being upgraded near Amsterdam and Moerdijk to improve operability and safety.

LNG is available as IWT fuel at the nodes of Rotterdam and Amsterdam and more nodes are planned/expected in the future. An overlapping supply chain or fuel infrastructure is not present today and are under study. Also vessels need time and funding to convert to dual fuel engines.

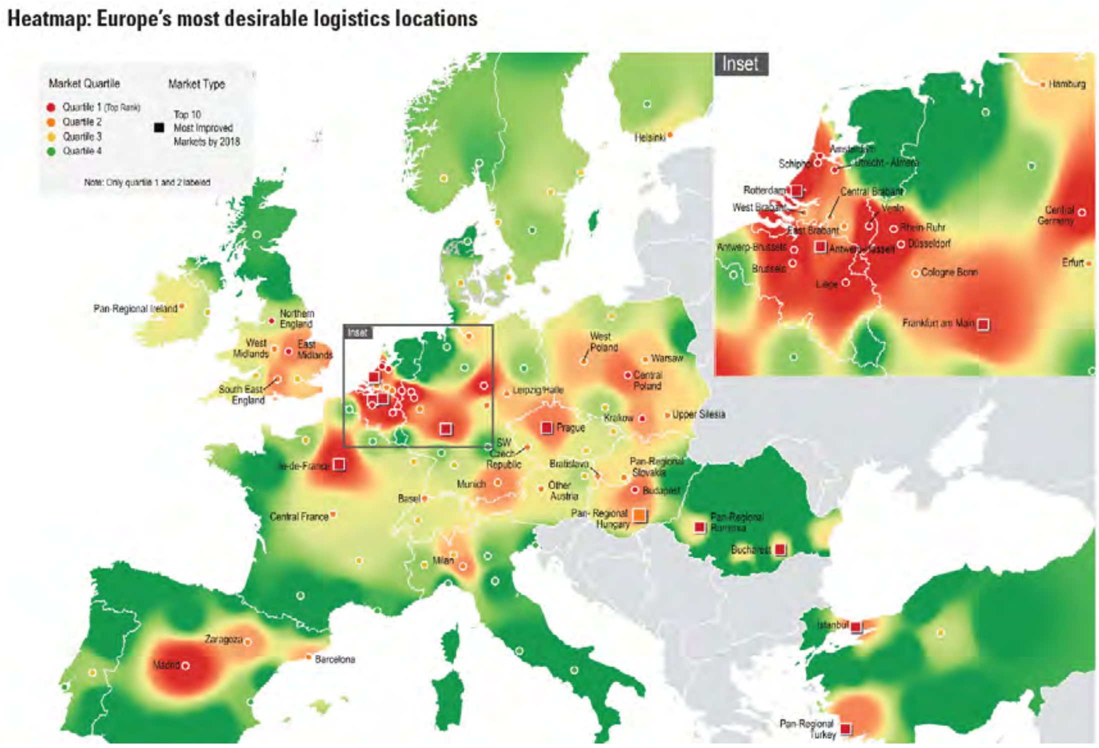


Figure 4: Europe's most desirable logistics locations (Source: Prologis - Europe's most desirable logistics locations; logistics facilities user survey 2013)

Airports

Amsterdam and Rotterdam both have international airports for passenger and freight transport, which are part of the TEN-T core network. The airports are of vital importance to the regional and national economies. Amsterdam Schiphol Airport is the 4th largest airport in Europe for passenger traffic, and the 3rd largest airport for cargo (over 1.5m tons). Around 500 private companies are based in the immediate Schiphol area alone, between them employing 65,000 people. Although substantially smaller, Rotterdam-The Hague airport is important in connection with the port of Rotterdam.

At both airports the existing infrastructure for air traffic management permits the implementation of the Single European Sky (SESAR) in accordance with the Regulations. For passengers, it is crucial that the airports can be accessed by means of an extensive and reliable network of road, public transport, and high-speed rail connections. Amsterdam Schiphol airport is connected to the rail network already, but capacity issues relating to the rail tunnel and railway station offer a bottleneck. A study into the accessibility of Schiphol Amsterdam Airport terminals by all non-air transport modes has recently been completed (Schiphol Railway Station Study, 2013). The Rotterdam-The Hague airport has no railway connection at this moment.

Adequate connections to the 'hinterland' by rail and road are also of great importance for freight traffic.

Rail terminals and inland waterway ports as logistics hotspots

Thanks to their location in a densely populated area and closeness to the major ports of Rotterdam and Amsterdam, many regions in the Netherlands have an excellent position as a logistics hotspot. This is shown very clearly in figure 4.

The regions of Twente, Gelderland and the Dutch-Flemish Delta region have each developed their own plans for the future economic development of the logistics industry. In these plans, a key role is assigned to rail container terminals and inland waterway ports. Along the corridor several initiatives for new rail freight terminals have been noticed e.g. in Barneveld and Valburg. The inland ports of Hengelo and Almelo cooperate in the 'port of Twente' and do anticipate on the widening of the Twente Canal by new extension projects, which offer synchromodal connectivity on the XL Businesspark location.

Inland container terminals, which are part of the core IWW TEN-T network, are present in the eastern region of Twente (Almelo and Hengelo along the Twente Canal), Deventer (River IJssel), Nijmegen (River Waal), and near Utrecht (Amsterdam-Rhine Canal). Inland port extension plans exist for the ports of Almelo, Hengelo, Deventer, and for the inland port of Nijmegen on the River Waal. Other ports along the IWW sections of the corridor have extension plans as well, e.g. the ports of Lelystad (project Flevokust), Urk, Enschede and Hof van Twente.

Core TEN-T Rail-Road terminals do exist in both the ports of Amsterdam and Rotterdam. The extension plans for rail terminals and inland waterway ports in the Netherlands that are a part of the core and comprehensive TEN-T network will, in most regions, offer sufficient capacity until 2030. However, capacity will be insufficient if high economic growth scenarios become reality.

At Coevorden, in the Dutch northern province of Drenthe, a rail cargo container terminal (ETC) exists that accommodates regular rail freight services between the ports of Amsterdam, Rotterdam on the one hand, and Germany, Scandinavia and Poland on the other hand. The need to improve the rail link on the German side of the border in order to connect to the main Corridor rail sections at Bad Bentheim has been recognised. Multimodal cross-border Plans for a new rail terminal in Bad Bentheim (DE) in cooperation with the Coevorden rail terminal and the inland port of Hengelo have been layed out. Operations in Bad Bentheim have started from the 1st of September 2014.

Chapter 11

Elements of the Work Plan: Belgium

Technical parameters of the infrastructure for all modes of transport

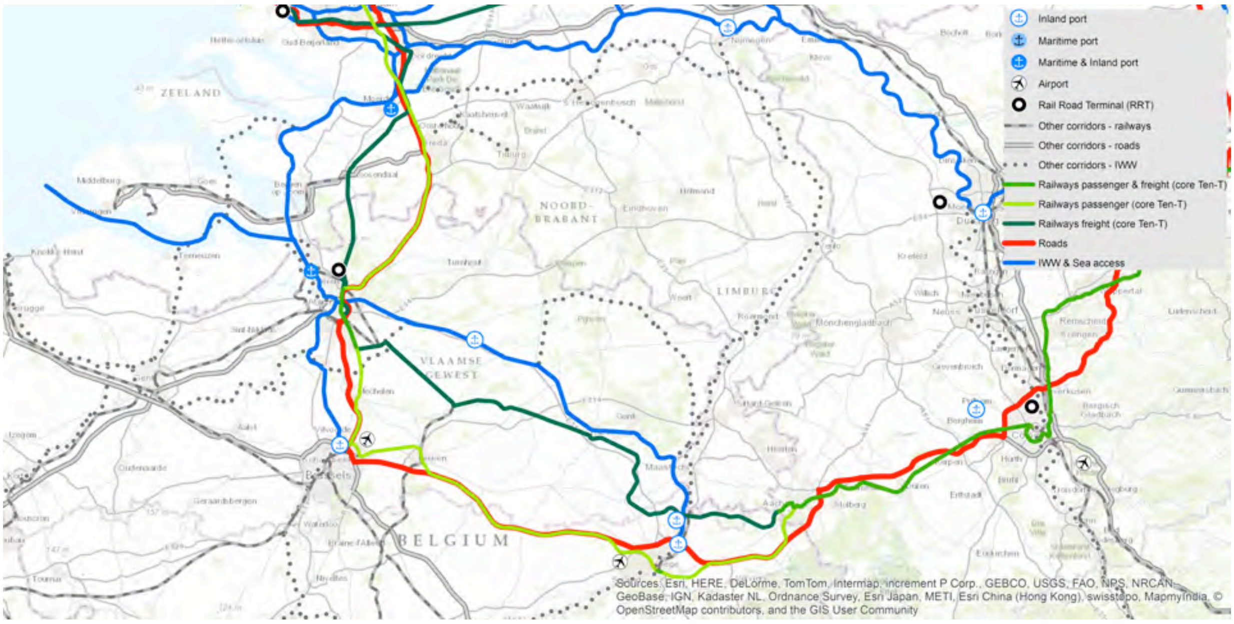


Figure 1: Alignment of sections (Road, Rail and IWW) and nodes (maritime port, inland port, airport, RRT) in Belgium along the North Sea – Baltic Corridor as well as the alignment of sections of other CNC traversing Belgium

Alignment

Belgium forms a part of the western section of the North Sea-Baltic Corridor (CNC NSB), which is one of 9 TEN-T corridors in Europe. Figure 1 shows the alignment of the CNC NSB. Other TEN-T corridors traversing Belgium are the Rhine- Alpine corridor (CNC RAL) and North Sea-Mediterranean corridor (CNC NSM). Many sections (road, rail, inland waterways) and nodes (ports, airports, inland ports, and rail terminals) are part of multiple corridors. The rail freight sections covering the connection from Antwerp towards the DE border are part of the Rail Freight Corridors (RFC's) 1 and 8 as well. The sections between Rotterdam and Antwerp are part of RFC2. In table 1 four main connections have been distinguished which are part of different CNC's and RFC's.

	Road	Rail Freight	Rail Passenger	IWW
Antwerpen-NL border	***NSB***, NSM	***NSB***, NSM, RFC2	***NSB***, NSM	***NSB*** , NSM
Antwerpen-Bruxelles/Brussel	***NSB***, RAL, NSM	NSM	***NSB***, NSM	***NSB*** , NSM
Antwerpen-(Meuse/Maas)-DE border		***NSB***, RAL, RFC1, RFC8		***NSB*** , NSM (to Meuse/Maas)
Bruxelles/Brussel- Liège-DE border	***NSB***		***NSB***, RAL	***NSB*** , NSM (to Meuse/Maas)

Table 1: Core TEN-T connections being part of different CNC's North Sea – Baltic (NSB), Rhine Alpine (RAL) and Nort Sea – Mediterranean (NSM)

Table 2 includes the core TEN-T nodes and their core TEN-T transport facilities.

The urban nodes Bruxelles/Brussel and Antwerpen are part of CNC NSB, but the description of both urban nodes has been assigned to other CNC's.

	Urban node	Airport	Maritime Port	Inland Port	RRT
Antwerpen	***(NSB)***, RAL, NSM		***NSB*** , RAL, NSM	***NSB*** , NSM	***NSB*** , RAL, NSM
Bruxelles/Brussel	***(NSB)***, RAL, NSM	***NSB***, RAL, NSM		***NSB*** , NSM	
Albertkanaal				***NSB*** , NSM	
Liège		***NSB***, RAL, NSM		***NSB*** , NSM	

Table 2: Core TEN-T nodes and their core TEN-T transport facilities assigned to different CNS's.

Passenger rail

Antwerp and Brussels are interconnected by direct high-speed railway services, which continue to London and Paris in the southern direction, and to Rotterdam and Amsterdam in the northern direction. Brussels also has direct high-speed railway services to Liège, Aachen, Köln and Frankfurt am Main. Brussels is connected to Antwerp and Liège by frequent intercity services as well. Plans have been made to upgrade the Brussels-Antwerp rail axis, including the Mechelen bypass. Plans have been made to upgrade the Brussels-Antwerp rail axis, including the Mechelen bypass. The reduced speed and capacity at the Mechelen station and the connection of the new Diabolo line to the existing network south of Mechelen causes delays for high speed trains. The Mechelen bypass will lead to a significant improvement in the connection between Brussels (and its airport), Antwerp and the Netherlands.

The rail sections used for freight transport which cross the borders between Belgium and the Netherlands as well as between Belgium and Germany are also being used by conventional railway passenger services.

All main rail connections are at least double track and have electric traction. Several parts of high-speed railway lines are equipped with ERTMS/ETCS. ETCS has already been implemented on the sections Brussels-Leuven, Schaarbeek-Mechelen, the Diabolo sections and parts of the Mechelen-Leuven section. Plans exist to extend the ETCS system to other sections. The Belgian Masterplan ETCS foresees the complete roll-out of ETCS on the Belgian railway network by 2022.

The Belgian authorities intend to reduce the number of level crossings located on the TEN-T network in order to increase the capacity, the safety and the punctuality of the network. In addition, other measures will be implemented to improve the level of safety of some level crossings which cannot be removed.

Freight rail

Cologne is connected to the port of Antwerp via Aachen and the Montzenline. According a recent study by the port of Antwerp (AktualisiertesStufenkonzept, 2014), the border section of the line is currently being used by 124 freight trains a day. In the study a forecast is reported for 2030 in which the number of freight trains shows an increase to 337 trains daily. The TMS RFC8 report forecasts 200-250 freight trains on the border section for 2025. Bottlenecks on the existing rail connection between Antwerp and Germany exist. In the long term the Belgium is planning to realize the “Iron Rhine”, which offers a faster service via Herentals, Mol and Neerpelt to the Mönchengladbach and the Ruhr area in Germany. This connection passes through the Dutch province of Limburg. The Iron Rhine project is not part of this CNC, but it is identified as a priority project as defined in Annex III of Decision No 661/2010/EU and as such listed under “Other sections of the Core Network” in Annex 1 of the CEF Regulation. The iron Rhine project is included in the list of pre-identified projects on the core network in part 1 of annex 1 of Regulation No 1316/2013 (CEF), and has been identified as an expected line of RFC 1 and an expected principal line in RFC 8. Different Belgian actors are currently initiating a process with German and Dutch partners to investigate all critical aspects of a new rail freight connection linking Antwerp to the Ruhr area via Duisburg.

A new rail freight connection from the port of Antwerp to Lier, to bypass the city of Antwerp, is under study. To guarantee rail access to the port of Antwerp, several other measures to increase capacity have been defined.

Freight rail transport between Antwerp and Rotterdam uses the connection via Essen and Roosendaal. This connection is used by passenger rail services as well. The need to upgrade this rail connection to meet future demand has been recognised and the implementation of ERTMS/ETCS is scheduled for completion by 2020. In 2011, almost 30 freight trains used the Essen-Roosendaal connection, and the forecast for 2030 shows an increase to 40-50 freight trains daily.

Differences in signalling systems between countries severely limit the operability of rail freight transport. From a Belgian perspective the introduction of ERTMS on the freight rail line connecting Antwerpen and the German hinterland is crucial for the competitiveness of the Belgian seaports. The Rail Freight Corridor 8 plan (RFC8), which addresses these issues, will ultimately be an integral part of the North Sea-Baltic Corridor.

The existing train length restrictions of 650m during peak hours of the day do not meet with the Regulation, raise costs for operators, and prevent the optimal use of network capacity. A train length of 740m is in the current situation only possible with timetable restrictions. The requirements of the Regulation concerning the minimum speed of 100 km/h are not met between Berneau and the German border. The minimum axle load of 22.5 tons is met on all rail lines which facilitate freight transport.

Other issues concerning rail freight transport are the urgent need for modernising of several marshalling yards in the Walloon region.

Road

In Belgium, the E40 motorway is the main road connection between Brussels and the German border near Aachen and continues into Germany to Cologne. The E40 motorway has six lanes on all sections. The E314 motorway between Leuven and Aachen, which bisects the Dutch province of Limburg but is not part of the core TEN-T network, serves as a parallel connection to the E40. The 40 km border crossing section of the E19 between Antwerp and the Dutch city of Breda is a four-lane motorway, a part of which is being prepared for hard shoulder running.

Although existing road categories meet the Regulation and the capacity is relatively high compared to other parts of the Corridor, congestion on motorways is a major concern, due to high usage levels. Usage levels of over 160,000 vehicles a day are usual. The highest usage levels are near Antwerp, reaching 270,000 (320,000 passenger vehicle equivalents) vehicles, and near Brussels, reaching 200,000 (235,000 passenger vehicle equivalents) per day.

Heavy goods vehicles as a percentage of total traffic volume varies between 20% and 30%, mostly depending on the level of international road cargo and lower in urban areas. Road haulage accounts for more than 64% of total freight transport (tonskilometre).

Along the corridor currently one clean fuel stations is in operation in Minderhout along the E19 motorway connecting Antwerp to the Netherlands. An LNG refueling station for trucks is in operation at Kallo near Antwerp. Further clean fuels stations are being planned.

Lorry ban (eg Sunday working) regulations which differ from one country to another lead to parking areas congestion at the borders.

Maritime Ports

The Corridor has a start and end in the Belgian port of Antwerp. This port, which forms along with other ports the central part of the Le Havre – Hamburg port range, are the gateway to northwestern Europe and beyond. The ports are of huge importance for future economic growth in many related industrial and logistics sectors.

To illustrate this importance, table 3 shows freight transhipment for Europe's largest ports in 2012 and the expected volume in 2030.

	Rotterdam	**Antwerp**	**Hamburg**	**Amsterdam**
2012	442	184	131	94
2030	700	300	n.a.	160

Table 3: Freight transhipment for Europe's 5 largest ports in 2012 and the expected volume in 2030 (in millions of tons); source: Port authorities

To ensure the functioning of this economic engine, the access from the sea as well as the 'hinterland' connections of the ports have a crucial role to play. All transport modes are available and important in this respect: roads, railways, inland waterways, and short-sea shipping. The port of Antwerp has pencilled in new projects so as to ensure direct port access. An extension of the port of Antwerp, including the new Deurganck sea locks, is now under construction.

As regards the port of Antwerp, accessibility is considered a major problem. A second rail access connection is planned to bypass the city and a new rail link across the River Scheldt (Liefkenshoek rail link) is under construction (on-going). Also, a third Scheldt road crossing is planned, with the completion of the Antwerp Ring Road and the planning of a second ring road (A102 – R11bis).

Antwerp aims to achieve a substantial shift in cargo from road to rail, inland waterways, and short-sea shipping, the objective being to reduce the share of road haulage to 43% by 2020 (in 2012 around 56%). The share of inland waterways and rail cargo is expected to increase to 42% and 15%, respectively (in 2012 around 35% and 9%, respectively). In order to accomplish this modal shift improved communication within and amongst all transport modes servicing the port is crucial for the smooth functioning of the port and is planned to be optimised.

The new port information system APICS2, developed in-house by Antwerp Port Authority, offers extensive planning possibilities that permit continuous improvement in shipping traffic management. The new system became operational on 1 May 2012. As well as affording more planning than before the system makes it possible to follow shipping movements even more closely and provides the same information in real time to all players in the nautical chain. This in turn offers possibilities for improving the exchange of information with other services. In combination with AIS (Automatic Identification System) it permits full coordination of barge movements. The particular efforts being made not only by the barge industry but also by the shipping management operatives will contribute to smooth and safe accessibility of the port in the near future.

In the recently adopted Clean Power for Transport-package the EU creates the obligation to make available a sufficient amount of LNG refuelling points in maritime ports by 2025. These refuelling points do not necessarily have to take the form of a terminal, but can be either a fixed, mobile or offshore installation. The first LNG station in Belgium has recently (2014) been opened in Kallo in the port of Antwerp. The port of Antwerp provides, in compliance with the Regulation, sufficient facilities for collecting ship’s waste and cargo residues.

The hinterland connections by IWW from the Port of Antwerp cover both the Albert Canal and the inland waterway connection to Brussels and Charleroi.

Inland waterways (IWW)

Belgium has a dense network of inland waterways. Figure 2 shows all core TEN-T Belgian IWW sections. As previously stated in the ‘ports’ section, the share of inland waterway transport is expected to increase considerably by 2030, reducing CO_2 emissions.

The Albert Canal is the main IWW arterial connecting Antwerp with the Maas/Meuse River near Liège. Transport volumes along the Albert Canal reach 37.000.000 tons yearly. The Albert Canal can now accommodate vessels with a capacity in excess of 2,000 tons. Brussels is connected to Antwerp via the Brussels-Scheldt Sea Canal which is used for freight transport volumes up to 19.000.000 tons yearly.

On all Belgium IWW section a substantial growth in freight transport volumes is expected and aimed for to reduce the share of road transport. To cope with the expected growth upgrading of IWW connections and facilities are being planned. The main bottleneck for increasing capacity on the Albert Canal is the limited height of several bridges which are now being raised, as well as the expansion of the wet section (width x water depth) of the Albert Canal between Wijnegem and Antwerp up to a minimum of 380 m². Another bottleneck is the lock capacity at Wijnegem. The Brussels-Scheldt Sea Canal is at Willebroek-Bornem a bottleneck as it doesn't allow 10 000 tons class VIb vessels as the rest of the section does.

The Belgian IWW network is connected to other parts of the North Sea-Baltic Corridor via the Dutch IWW network. The Scheldt-Rhine Canal and the River Maas/Meuse are the connecting sections. The cross-border section of the River Maas/Meuse is not part of the alignment of CNC North Sea Baltic. However, it is part of CNC North Sea Mediterranean. The Scheldt-Rhine Canal cross-border section, which is part of CNC North Sea Baltic, is used to transport 70.000.000 tons freight yearly.

A River Information System (RIS) is implemented on a regional level for Brussels, Flanders and Wallonia. A single RIS index for the whole country is lacking as the data collected by the three regional administrations is not consistent and uniform. In Flanders, actions are initiated to comply with European standards. Full coverage of all the Flemish waterways with AIS, a geo-positioning system which allow an optimisation of navigation, has been realized. On the contrary, Wallonia currently has no AIS shore infrastructure. Cross border AIS data exchange with the Netherlands is a topic of discussion. Electronic Ship Reporting is fully implemented in Flanders. In Brussels and Wallonia Electronic Ship Reporting will be implemented in the near future. International data exchange of Electronic Ship Reporting is realized at the Scheldt area. Electronic charts are available for all Flemish Class IV waterways.

LNG and other clean fuel projects are under study or under implementation at the moment.

Figure 2: Inland waterway connections and core ports (marked as a solid blue circle) in Belgium. Source: EC TENtec

Airports

Brussels and Liège both have an international airport for passenger and freight transport, which are part of the TEN-T core network. The airports are of vital importance to the regional and national economies. Brussels international airport serves as the entry and exit point for the European capital. It is the 25th largest airport in Europe for passenger traffic, and the 8th largest airport for cargo. Around 270 private companies are based in the immediate airport area alone, between them employing 20,000 people.

At both airports the existing infrastructure for air traffic management permits the implementation of the Single European Sky (SESAR) in accordance with the Regulations. For passengers, it is crucial that the airports can be accessed by means of an extensive and reliable network of road, public transport, and high-speed rail connections. Adequate connections to the 'hinterland' are also of great importance for freight traffic. In 2012, the main part of the Diabolo rail project was completed, offering rail access to Brussels international airport. Works are still underway to construct the Watermaal-Schuman-Josaphat rail link, which provides for a direct rail connection between the Brussels EU district and the airport. The northern connection of the Diabolo rail link also still has to be constructed.

The airport of Liège is the 2nd largest freight airport in the NSB corridor area in terms of tons processed. For passenger transport the airport is not very significant as it is the smallest passenger airport in the NSB corridor area. To stimulate the intermodal features of the airport of Liège, the realization of a new rail link to the future Cargo Rail Express (Carex) terminal is an important goal.

Rail terminals and inland waterway ports as logistics hotspots

Thanks to their location in a densely populated area and closeness to the major port of Antwerp, many regions in Belgium have an excellent position as a logistics hotspot. This is illustrated in figure 3.

In Belgium, 19 terminals are in operation, six of which are rail terminals, seven are inland port terminals, and six are tri-modal terminals. Most of these terminals are located east or southeast of Antwerp. However, the Antwerp rail road terminal is the only terminal that is part of the core TEN-T network. Several inland waterway ports are part of the core TEN-T network (Antwerp, Brussels, Albert Canal, Liège Canal Albert, and Liège Meuse, see figure 1). The Liège Container terminal currently offers trimodal facilities, and the development of the Trilogiport further North will add to this capacity. The Albert Canal inland port facilities are considered as a cluster of freight facilities along the Albert Canal. Near Brussel there is a tri-modal (road, rail, IWW) terminal with a container port. Rail access is via a single track spur connecting to the Schaerbeek marshalling yard and the main lines towards Mechelen and Antwerp. The Cargovil terminal near Vilvoorde connects IWW and road transport.

Heatmap: Europe's most desirable logistics locations

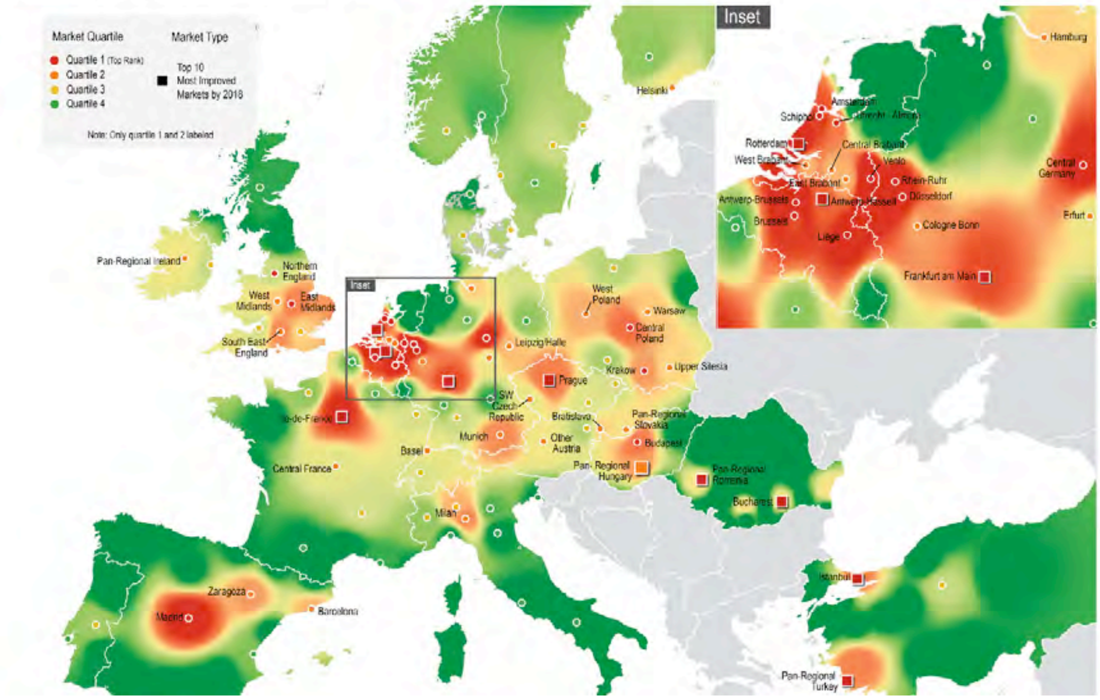


Figure 3: Europe's most desirable logistics locations (Source: Prologis - Europe's most desirable logistics locations; logistics facilities user survey 2013)

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Attila Lüttmerding, Matthias Gather	2013	Level of service on passenger railway connections between European metropolices	Institut Verkehr und Raum
Jarkko Lehtinen, Anu Bask	2012	Analysis of business models for potential 3Mode transport corridor	Journal of Trasport Geography 22(2012) 96-108
Miika Mäkitalo	2011	Why Do Open Rail Freight Markets Fail to Attract Competition? Analysis on Finnish Transport Policy	EJTIR 11(1), p. 1 -19
Jarkko Rantala, Jenni Echhard	2010	Analysis and Classification of Logistics Centre in Global Supply Network	unpublihed
Milewski Dariusz		Inland water transport in the Baltic Sea Region (BSR) Transportation System	TransBaltic
		Corridor I Study FM Final Report 20.06.06	
		Pan-European Transport Corridors and Areas Status Report Final 31.01.06	
		Wider Europe for Transport HLG-2 Final Report 07.12.05	
		TEN-T High level group raport 27.06.03	
		TEN-T High level group raport-annexes. 27.06.03	
		A Study for county plans, detailed plans, strategic environmental assessment, environmental impact assessment and sketch technical designs of the Rail Baltic in Harju, Rapla and Pärnu counties in Estonia	Commissioned by the Estonian Ministry of Economy and Transport
		Connections of Riga City Center and Riga Airport to the Rail Baltic	Commissioned by the Latvian Ministry of Transport

Author(s)	Year	Name of publication	Publisher
Seppo Laakso & Eeva Kostiainen, Tarmo Kalvet & Keio Velström	2013	Economic flows between Helsinki-Uusimaa and Tallinn-Harju regions	Kaupunkitutkimus TA Oy, Ragnar Nurkse School of Innovation and Governance Tallinn University of Technology
Pekka Mustonen	2012	Helsinki, Tallinn and travelling people- a leisure perspective	Helsinki Quarterly, City of Helsinki Urban Facts
Siiri Silm, Rein Ahas, Magus Tiru	2012	Spatial Mobility between Tallinn and Helsinki in Mobile Positioning. Datasets. Statistical Overview	Department of Geography of University of Tartu
Hilmola, Olli-Pekka (ed.)	2012	Competing Transportation Chains in Helsinki-Tallinn Route: Multi-Dimensional Evaluation.	Lappeenranta University of Technology, Department of Industrial Management, Research report 243
Erik Terk	2012	Twin-city in making: integration scenarios for Tallinn and Helsinki capital regions	University of Tallinn
	2012	Tallinn-Helsinki business development report	BDA Consulting OÜ
	2011	Survey of people travelling between Tallinn and Helsinki – air passengers	Turu-uuringute AS
International Association "Coordinating Council on Trans-Siberian Transportation"	2013	CCTT's 20 Years of Experience in Logistics Solutions and Innovations on the TSM	CCTT Secretariat: 125009 Moscow, Russia
Posti, A., Häkkinen, J. & Tapaninen U.	2011	Promoting Information Exchange with a Port Community System - Case Finland.	In: Kersten, W., Blecker, T. & Jahn, C. (eds.): International Supply Chain Management and Collaboration Practices, Proceedings of Hamburg International Conference of Logistics, 8-9.9.2011, pages 455 – 474. Josef Eur Verlag, Köln
The Barents Region Expert Group	2013	Joint Barents Transport Plan: Proposals for development of transport corridors for further studies	The Barents Euro.Arctic Region
Wagner&Herbst; Ernst&Young, IPG	2010	Galimybių studija "Intermodalinio terminalo statyba Kauno viešajame logistikos centre" (Intermodal terminal in Kaunas public logistics centre)	
Scott Wilson	2008	"Rail Baltica" - Pirmojo intermodalinio terminalo ir pereinamosios stoties tarp skirtingų vėžių konceptualaus projektavimo studija ("Rail Baltica" - First Intermodal Terminal and the transition between the different tracks of the station conceptual design study)	
	2000	Šiuolaikinio transportavimo sistemų ir tarptautinio funkcionavimo plėtros koncepcija Kauno logistikos mazgui (Modern transportation systems and the functioning of the international development of the concept of Kaunas logistics unit)	
UAB Vilnius Consult	2009	Panerių, Palemono ir Šeštokų stočių krovinių perkrovai skirtų statinių priešprojektinių pasiūlymų studija (pre-feasibility study for Panerių Palemonas Šeštokai stations cargo facilities)	
VGTU	2008	Lietuvos Logistikos rinkos analizė ir viešųjų logistikos centrų konkurencingumo regione tyrimas (Lithuanian logistics market analysis and logistics centers in the region competitiveness survey)	
VGTU	2008	Lietuvos transporto sistemos modernizavimo ir plėtros galimybės taikant viešojo ir privataus sektorių partnerystės finansavimo modelį (Lithuanian transport system modernization and development opportunities through public-private partnership financing model)	
UAB Vilnius Consult	2007	Viešųjų logistikos centrų išdėstymo plano parengimas (pagrindimas) (Public logistics center layout plan for (justification))	
NELOC	2004	Transporto logistikos centrų tinklo formavimas Baltijos jūros regione (Logistics centers in the network formation in the Baltic Sea Region)	
INLOC		Integrating Logistics centre networks in the Baltic Sea region	
Dr. A. Šakalys		Prospects of the intermodal transport development in the Baltic Sea region based on INTERREG IIIB Project East - West Transport Corridor	
Europraxis		Kauno (Karmėlavos) oro uosto plėtros studija	
LR Ministry of Transport		Nacionalinė susisiekimo plėtros 2014-2020 metų programa (The National Transport Development Programme 2014-2020)	
UAB "PI konsultacijos"	2011	Intelektinių (pažangių) transporto sistemų įgyvendinimo Lietuvojegalimybių studija	
Smart continent, Civitta	2013	Lietuvos civilinių aerodromų infrastruktūros modernizavimo galimybių studija	
VGTU	2008	Rekomendacijos ilgalaikės (iki 2030 metų) Lietuvos susisiekimo sistemos plėtros strategijos gairėms parengti	
VGTU	2004	Intermodalinio transporto plėtros galimybių analizė ir logistikos centrų valdymo principų nustatymas	
NPR	2008	Preparation of technical specifications for Klaipėda public logistic centre feasibility study (with preliminary design)	
NPR	2011	Assurance of proper interface of Klaipėda railway junction with port terminals and balanced development of the capacities of terminals (their infrastructure)"	
KPMG Baltics SIA	2013	Competitive position of the Baltic States Ports	KPMG Baltics SIA
KPMG Baltics SIA	2011	Freight Transport Industry in Latvia	KPMG Baltics SIA
Latvian Ministry of Transport	2014	Main Transport Development guidelines for 2014-2020	Ministry of Transport
Author(s)	Year	Name of publication	Publisher
Poland and Germany			
IPG Potsdam, Infrastruktur&Umwelt Potsdam	2008	Integriertes Verkehrskonzept für die Euroregion Pro Europa Viadrina, DPERON	Euroregion Pro Europa Viadrina
Heiland M., Wolter T., Winter M., Dr. Neumüller J., Reimer U., Reents M.	2010	Expertise for case study on multimodal and multilevel gateway as a hub for the whole corridor, Berlin-Brandenburg international node, SoNorA	Joint State Planning Department of Berlin and Brandenburg
Infrastruktur&Umwelt Potsdam, IPG Potsdam, Sudop Praha a.S., LOB IC	2010	Analysis of Railway Axis Rostock-Berlin-Trieste	Joint State Planning Department of Berlin and Brandenburg
Martin Heiland, Torsten Wolter, Mareen Winter, Simone Fejér, Dr. Jürgen Neumüller, Ulrike Reimer	2010	Berlin-Brandenburg scenario development for freight flow changes	Joint State Planning Department of Berlin and Brandenburg
UNICONSULT Universal Transport Consulting GmbH	2010	Investigation of the logistics chains within the sector of „Renewable Energies" and their allocation within the SoNorA-Area	Federal State of Saxony-Anhalt
ISL-Baltic Consult GmbH, Lübeck	2010	Potential analysis for wood and paper transportations on rail from and to Saxony-Anhalt	Federal State of Saxony-Anhalt
	2011	Business Case for Mecklenburg Service	Ministry for Transport, Building and Regional Development Mecklenburg-Vorpommern

Author(s)	Year	Name of publication	Publisher
Piotr Kiełbowicz, „ZESPÓŁ DORADCÓW GOSPODARCZYCH TOR" sp. z o.o.		The Concept of Technical and Organisational Improvement of Railway Transport in the Port of Gdynia	Port of Gdynia Authority S.A
Martin Heiland, Ulrich Tulatz, Simone Fejér, Dr. Jürgen Neumüller, Sven Friedrich		Integriertes Verkehrskonzept Euroregion Spree-Neiße-Bober	Euroregion Spree-Neiße-Bober
Martin Heiland, Mareen Winter, Dr. Norbert Wagener, Ralf Behrens, Odett Schnegula, Wulfram Overmann	2012	Potentials and Possibilities for the Extension of Freight Transportation on the North-South-Route by Rail – Part B Feasibility Study and Tests for the Development of Block Trains	Joint State Planning Department of Berlin and Brandenburg
Philip Michalk		Optimised connection of intermodal terminals in Berlin-Brandenburg to north-south-transport	TH Wildau
ETC Transport Consultants GmbH	2012	Elimination of infrastructure bottlenecks in the Fehmarnbelt corridor	Joint State Planning Department of Berlin and Brandenburg
Lutz Hübner TSB Innovationsagentur GmbH	2012	Case study: Interoperability of the train systems	Berlin Senate Department for Economics, Technology and Research
Staffan Johannesson, Ecoplan AB	2011	Alternative Fuels in Heavy Goods Vehicle Transport - Corridor of liquefied biomethane in road transportation	Swedish Transport Administration – Ylva Persson
unkown	2011 /2012	Secure parking in the Scandria corridor	Region Sjvelland
Philip Michalk	2012	Strategies for the development of port hinterland transport in the Scandria corridor	Technical University of Applied Sciences Wildau
Jochen Richard	2011	Significance of the HUB 53/12° as part of the SCANDRIA axis	Fontanestadt Neuruppin
Sandrina Lohse, Per Homann Jespersen	2011	Scandria Green Transport Corridor Strategy	Roskilde University
Philip Michalk, Bertram Meimbresse	2010	Basic Description of Corridor Functionality – Potentials of Logistic Transport Systems	TH Wildau
Torsten Wolter, Grit Kämmerer, Simone Féjer, Ulrich Tulatz		Sustainable shift of cargo transport into rail networks between Berlin/Brandenburg and Italy/Slovenia with TRANSITECTS in the Scandinavian-Adriatic Corridor (potentials, routes, recommendations and pilot trains)	Joint State Planning Department of Berlin and Brandenburg
Armin Jordan, Eileen Bahre, Joachim Gollnick, Rüdiger Hage, Martin Heiland	2006	Freight Villages in Brandenburg and Berlin - Traffic and logistical strating point of the railway connection to the Baltics States, potentials and requirements	Ministry for Infrastructure and Spatial Planing of Brandenburg, Berlin Senate Department for Urban Development, GTZ
Torsten Wolter, Marc Kuper, Simone Fejér, Martin Heiland	2007	Cross-border goods traffic – Results, potentials and problems in the Frankfurt (Oder) – Slubice region	Ministry for Infrastructure and Spatial Planing of Brandenburg, Berlin Senate Department for Urban Development, GTZ
	2006/2007	Analysis of the passenger train transport system regarding improvement opportunities of the Rail Baltica – Corridor by organisational, communication and fare arrangements „Fare in the German-Polish border district	Ministry of Transport and Communication of the Republic of Latvia
	2006 /2007	Studies of the border - zone and cross - border infrastructure planning in the area of German - Polish border in the pshere of the traffic corridor of Rail Baltica	Ministry of Transport and Communication of the Republic of Latvia
	2007	Siauliai region's railway infrastructures development. Opportunities analysis and evaluation	UAB "Regiono pletros centras"
	2010	2013+ Konzept zum Schienenpersonenverkehr	Landesnahverkehrsgesellschaft Niedersachsen (LNVG)
Harald Grefe, Hendrik Schrenk	2010	Anschluss halten im Schienenverkehr	IHK Ostwestfalen zu Bielefeld
Michael Holzhey	2010	Schienennetz 2025 / 2030 Ausbaukonzeption für einen leistungsfähigen Schienengüterverkehr in Deutschland	Umweltbundesamtes
dr hab. Marek Kucharczyk, dr hab. Paweł Mickiewicz a.o.	2001	Prognoza oddziaływania na środowisko skutków realizacji Programu Budowy Dróg Krajowych na lata 2011 – 2015 Streszczenie w języku niespecjalistycznym	Generalna Dyrekcja Dróg Krajowych i Autostrad
Ralf Behrens, Dr. Norbert Wagener, Odett Schnegula, Matthias von Popowski, Thomas Kreitsch	2012	Innovative Technologien zur Güterverkehrsverlagerung im Ostsee-Adria-Entwicklungskorridor. Studie im Rahmen des SCANDRIA Add on Projektes "ILOtech"	Gemeinsame Landesplanungsabteilung Berlin-Brandenburg
verschiedene	2012	Europäische Verkehrskorridore und Raumentwicklung. Informationen zur Raumentwicklung Heft 7/8 2012	Bundesinstitut für Bau-, Stadt- und Raumforschung im Bundesamt für Bauwesen und Raumordnung
Dr. Gerhard Bäuerle, Peter Bauch, Dr. Solveigh Janssen, Gerd Würdemann, Dr. Burkhard Gallander	2006	Verbindungsqualitäten zwischen Metropolregionen. Studie und Positionspapier als Beitrag zur Erarbeitung der Raumordnerischen Leitbilder.	Initiativkreis Metropolregionen in Deutschland
Prof. Dr. Hans Joachim Kujath, Robert Knippschild, Dirk Bölitz, Markus Egermann, Alexander Vock, Dr. Michael Arndt, Angelika Pauli, Kai Pflanz	2008	Ermittlung von raumwissenschaftlichen Potenzialen und Handlungsbedarfen der Raumentwicklung in einem zentraleuropäischen Nord-Süd-Raumentwicklungskorridor Skandinavien-Adria/Mittelmeer. Raumwirtschaftliche Studie.	Gemeinsame Landesplanungsabteilung Berlin-Brandenburg
Spatial Foresight: Dr. Sabine Zillmer, Dr. Kai Böhme in Zusammenarbeit mit Spiekermann & Wegener, Stadt- und Regionalforschung (S&W)	2011 /laufend	Umsetzung der territorialen Agenda 2020: Auswirkungen von europäischen Fachpolitiken in ausgewählten Modellregionen - Entwicklung regionaler Potenziale im Zusammenhang mit der Weiterentwicklung der TEN-V	Bundesinstitut für Bau-, Stadt- und Raumforschung im Bundesamt für Bauwesen und Raumordnung
Spatial Foresight: Dr. Sabine Zillmer, Dr. Kai Böhme in Zusammenarbeit mit EURE Consult	2012 /laufend	Potenziale für transnationale und grenzüberschreitende Partnerschaften durch Nutzung des Instruments der EVTZ	Bundesinstitut für Bau-, Stadt- und Raumforschung im Bundesamt für Bauwesen und Raumordnung
Modus Consult: Dr.-Ing. Frank Gericke	2011 /laufend	Erreichbarkeiten und Mobilitätsansprüche innerhalb großräumiger Verantwortungsgemeinschaften	Bundesinstitut für Bau-, Stadt- und Raumforschung im Bundesamt für Bauwesen und Raumordnung
MR Gesellschaft für Regionalberatung: Dr. Michael Ridder, Nils Biermann	2012 /laufend	Wirtschaftsgeographische Studie zur Entwicklung des Scandria®Corridor unter besonderer Berücksichtigung des Kernnetz-Knotens Berlin	Gemeinsame Landesplanungsabteilung Berlin-Brandenburg
ETC Transport Consultants GmbH: Gernot Steinbrink, Torsten Perner	2012	Möglichkeiten zur Revitalisierung des Personenfernverkehrs zwischen Berlin und Skandinavien.	Gemeinsame Landesplanungsabteilung Berlin-Brandenburg
ETC Transport Consultans GmbH, Berlin (Auftragnehmer) Rainer Pohlmann (Leitung), Ingolf Berger		Stärkung der Stadt- und Metropolregionen im deutsch-polnischen Grenzgebiet (MORO-Informationen 8/2)	bundesinstitut für Bau-, Stadt- und Raumforschung im Bundesamt für Bauwesen und Raumordnung
Matthias Gather, Attila Lüttmerding	2013	Level of service on passenger railway connections between European metropolises	Institut Verkehr und Raum, FH Erfurt

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BBSR und Wojewódzkie Biuro Urbanistyczne we Wrocławiu (Wojewodschaftsbüro f. Städtebau - WBU, heute: Instytut Rozwoju Terytalnego - IRT (Institut für Territorialentwicklung)	2010	Karte "„Entwicklung der überregionalen Verkehrsinfrastruktur in der Oder-Partnerschaft"	Authors
Ausschuss für Raumordnung der Deutsch-Polnischen Regierungskommission für regionale und grenznahe Zusammenarbeit		Entwicklung der überregionalen Verkehrsinfrastruktur im Gebiet der Oder-Partnerschaft (8-seitiges Word-Dokument)	Authors
BBSR	2012	Verkehrsinfrastruktur im deutsch-polnischen Grenzraum (BBSR-Berichte KOMPAKT 02/2012)	Authors
Technische Universität Dresden, Institut für Kartographie: Dr. Nikolas Prechtel, Dipl.-Ing. Klaus Habermann	2012	Karte der Investitionsvorhaben im deutschen Teil des deutsch-polnischen Grenzraums	BBSR
Technische Universität Dresden, Institut für Kartographie: Dr. Nikolas Prechtel, Dipl.-Ing. Klaus Habermann	2012	Endbericht(e) zur "Karte der Investitionsvorhaben im deutschen Teil des deutsch-polnischen Grenzraums"	BBSR
Ministerstwo Rozwoju Regionalnego (MRR - Ministerium für Regionalentwickung (Polen)), Marschallämter der Wojewodschaften Westpommern, Lubuskie, Niederschlesien	2013	Studie der räumlichen Integration des polnischen Teils des polnisch-deutschen Grenzraums (Studium integracji przestrzennej polskiej części pogranicza Polski i Niemiec)	Authors
Dr. Zbigniew Mogiła – Wrocławer Agentur für Reginalentwicklung (Wrocławska Agencja Rozwoju Regionalnego - WARR); Prof. dr hab. inż. Janusz Zaleski – IMGW Warszawa & WARR; Dr Maciej Zathey – Marschallamt Niederschlesien	2011	Expertise "Nutzung des westpolnischen Grenzgebiets für die sozio-ökonomische Entwicklung" (Wykorzystanie przygranicznego położenia terenów znajdujących się w zachodniej części Polski dla rozwoju społecznogospodarczego)	Marschallamt Niederschlesien
SenWTF, II C I Ch | Carolin von Chamier	2012	Zusammenfassung der Expertise: Die Nutzung des westpolnischen Grenzgebiets für die sozio-ökonomische Entwicklung	unpublished
SenWTF II C 13 | Thomas Walczak II C 1 Ch | Carolin von Chamier - Gliszczinski II C 1 Ac | Christoph Achtelik	2012	Zusammenfassung des Dokuments „Annahmen für eine Entwicklungsstrategie Westpolens 2014-2020"	unpublished
Jacek Szlachta, Wojciech Dziemianowicz, Paulina Nowicka, in Zusammenarbeit mit den Marschallämtern von Niederschlesien, Lubuskie, Opolskie, Großpolen und Westpommern	2012	Annahmen für eine Entwicklungsstrategie Westpolens 2014-2020 (Założenia Strategii Rozwoju Polski Zachodniej	GEOPROFIT
EUREGIO	2012	EUREGIO 2020, Grenzüberschreitende Zusammenarbeit, Unsere Strategie für morgen | Onze strategie voor morgen	Uitgever
Div.	2013	Business in EUREGIO, Informatie voor ondernemers, Informationen für Unternehmen	EUREGIO
Mathias Krage u.a.	2014	Logistikportal Niedersachsen e.V.	Geschäftsstelle Logistikportal Niedersachsen e.V.
Div.	2014	Marktspiegel Logistik Logistikaffine Investitionen in Niedersachsen 2012/2013	Geschäftsstelle Logistikportal Niedersachsen e.V.
Div.	2013	Neuaufstellung des Bundesverkehrswegeplanes - Teil Straße	Niedersächsischen Ministerium für Wirtschaft, Arbeit und Verkehr
Uwe von Bargen, Iven Krämer	2000	greenports Bremen Bremerhaven, Nachhaltig wirtschaften – erfolgreich handeln	bremenports GmbH & Co. KG
Div.	2012	Hafen in ZAHLEN, die Bremischen Häfen	bremenports GmbH & Co. KG
Div.	2013	FLAVIA - Freight and Logistics Advancement in Central/South-East Europe - Validation of trade and transport processes, Implementation and Application	TH Wildau
Dr. Ernst Brahms Prof. Dr. Jürgen Peters	2012	Landschaftsbild, Erholungsnutzung und Windenergieanlagen in der Planungsregion Magdeburg	Planungsregion Magdeburg
Author(s)	Year	Name of publication	Publisher
The Netherlands and Belgium			
Antea	2015	Plan-MER R11-bis en A102	Wegen en Verkeer
Rebel Advisory	2014	MKBA van een derde Scheldekruising te Antwerpen	Beheersmaatschappij Antwerpen Mobiel
Antea	2014	Plan-MER van een derde Scheldekruising te Antwerpen	Beheersmaatschappij Antwerpen Mobiel
Infrabel	2014	Onderzoeken naar een tweede spoorontsluiting van de Antwerpse haven	Infrabel
Arcadis Belgium	2014	Plan-MER uitbreiding E313	Wegen en Verkeer
RFC2	2014	Rail Freight Corridor 2 – Implementation Plan	RFC2
RFC1	2013	Rail Freight Corridor 1 – Implementation Plan	RFC1
Vlaamse overheid Departement Mobiliteit en openbare werken	2013	Vlaamse Spoorstrategie	Vlaamse overheid Departement Mobiliteit en openbare werken
TRITEL	2012	Le transport ferroviaire : un atout structurant pour la Wallonie	Service public de Wallonie
Wegen en Verkeer	2011	Streefbeeldstudie R11-bis - A103	Wegen en Verkeer
Infrabel	2011	Masterplan ETCS 2010-2025 – Mise en œuvre sur le réseau ferroviaire belge	Infrabel
Tritel	2011	Etude concernant l'évolution territoriale des flux de transports en Belgique et à la disponibilité attendue de l'infrastructure de transport	SPF Mobilité et Transports
NEA	2010	Study exploiting the possibility of creating a rail freight corridor linking Belgium and Poland	Infrabel
Technum Ressource Analysis Tritel	2010	Studie voorwaardenscheppend kader ingebruikname ijzeren rijn voor de kempen	Intercommunale Ontwikkelingsmaatschappij voor de Kempen IOK
ADPI	2010	Etude sur le projet de connexion air-TGV-route	Liège Carex asbl
TMLeuven	2009	Social Cost-Benefit analysis Iron Rhine	European Commision
Infrabel	2009	Plan «Passages à niveau 2008–2015»	Infrabel
Arcadis Belgium	2008	Plan-MER ontwikkeling bedrijventereinen Economisch Netwerk Albertkanaal	Provinciale Ontwikkelingsmaatschappij Antwerpen Provinciale Ontwikkelingsmaatschappij Limburg
TMLeuven	2007	Vervoerprognoses Ijzeren Rijn	Infrabel

Author(s)	Year	Name of publication	Publisher
TNO MOBILITEIT EN LOGISTIEK TRANSPORT & MOBILITY LEUVEN	2007	Vervoersprognose IJzeren Rijn	Infrabel
	2007	Transportprognoses en Capaciteitsplanning IJzeren Rijn - bevinding en advies COD	Ministerie Verkeer en Waterstaat (Nederland), Federale Overheidsdienst Mobiliteit en Vervoer(België)
NEA Universiteit Antwerpen	2007	Vervoersprognoses IJzeren Rijn	Infrabel
Eernst & Young	2007	Aéroport de Liège - Etude de faisabilité d'une intermodalité air/fer à partir de l'axe ferroviaire à grande vitesse	Liège Airport SA
APPM	2014	Lange Termijn Spooragenda Oost	Provincies Overijssel, Gelderland, Regio Twente, Stadsregio Arnhem Nijmegen
APPM	2014	Quick scan Noordtakstudie	Provincies Overijssel, Gelderland, Havenbedrijf Rotterdam
Ministerie van Infrastructuur en Milieu, Provincie Gelderland, Provincie Overijssel, Stadsregio Arnhem Nijmegen, Regio Twente	2013	Gebiedsagenda Oost-Nederland	Ministerie van Infrastructuur en Milieu
Ministerie van Infrastructuur en Milieu	2013	MIRT Projectenboek 2014	Ministerie van Infrastructuur en Milieu
Ubbels en Langerak	2013	MIRT Onderzoek Goederencorridor Oost-Nederland	
provincie Gelderland	2013	Logistiek als Gelderse Motor	provincie Gelderland
Prorail	2013	MER PHS Goederenroute Oost-Nederland; Aanvulling op het MER 1e fase	Ministerie van I&M
Ministerie van I&M	2013	MIRT Projectenboek 2014	Ministerie van I&M
Ministerie van I&M	2013	Nota Reikwijdte en Detailniveau, Verkenning naar de aanpak en implementatie van ERTMS	Ministerie van I&M
Ministerie van I&M	2013	Railmap ERTMS Versie 2.0 - Stand van zaken onderzoeken Verkenningsfase	Ministerie van I&M
Ministerie van I&M	2013	Lange Termijn Spooragenda; Visie, ambities en doelen	Ministerie van I&M
Panteia	2013	Quick Scan Bottlenecks Internationale Corridors	Ministerie van I&M
Panteia	2013	Marktobservatie 2013	Europese Commissie
Prologics	2013	EUROPE'S MOST DESIRABLE LOGISTICS LOCATIONS	Prologics
OECD	2013	The Competitiveness of Global Port-Cities: Synthesis Report	OECD
Schiphol international airport Amsterdam	2013	Studie Schiphol Station, MIRT studie naar de ontwikkeling van de landzijdige terminal	Schiphol international airport Amsterdam
TNO, Tsjitske Groen, Jorrit Harmsen, Jaco van Meijeren, Diederik de Ree, Jaurike Ton	2012	Goederenstromen provincie Overijssel: van spoor naar binnenvaart. Onderzoek naar de mogelijkheden dat spoorgoederenvoer via de Nederlands-Duitse grens uitwijkt naar de binnenvaart	Rijksoverheid
Netwerkstad Twente	2012	Economische Motor Twente	Netwerkstad Twente
Ministerie van Infrastructuur en Milieu	2012	Structuurvisie Infrastructuur en Ruimte	Ministerie van Infrastructuur en Milieu
Rijkswaterstaat	2012	De Nederlandse vaarwegen beter benut; de tussenresultaten van het programma Impuls Dynamisch Verkeersmanagement Vaarwegen (IDVV)	Rijkswaterstaat
Ministerie van I&M	2012	Programma Hoogfrequent Spoorvervoer (PHS): resultaten goederenstudies	Ministerie van I&M
Movares	2012	Actualisatie Trajectnota / MER Noord Oostelijke Verbinding	Ministerie van I&M
KiM	2012	Multimodale achterlandknooppunten in Nederland; Studie naar containeroverslagterminals in het achterland van Nederlandse zeehavens.	Ministerie van I&M
Ministerie van I&M	2012	Structuurvisie Infrastructuur en Ruimte (maart 2012)	Ministerie van I&M
Rijkswaterstaat Noord Holland	2012	Zeetoegang IJmuiden: diverse openbare documenten	Ministerie van I&M
TNO, Panteia, EICB, Abovo	2012	Multimodaal internationaal container netwerk	Ministerie van I&M
Universiteit Utrecht	2012	AMSTERDAM, SMART PORT in GLOBALTRADE	Haven Amsterdam
Regio Twente in opdracht van en samen met partners A1-zone	2011	A1-zone: Logistieke draaischijf Twente, de Regio als Concurrerende Hotspot	Regio Twente
Ministerie van I&M	2011	Nationale Markt- en Capaciteitsanalyse	Ministerie van I&M
Grontmij Nederland B.V.	2011	Onderbouwing Voorkeursalternatief Capaciteitsvergroting sluis Eefde en verruiming Twentekanalen	Rijkswaterstaat Dienst Oost-Nederland
Rijkswaterstaat	2011	Trechteringsnotitie 3e kolk Prinses Beatrixsluis; Alternatievenafweging om te komen tot een beslissing van een voorkeursalternatief ten behoeve MIRT-2 beslissing	Ministerie van I&M
Ministerie van I&M	2011	MIRT Verkenning Antwerpen Rotterdam (VAR)	Ministerie van I&M
KiM	2010	Achterlandcongestie en de rol van vervoer over water voor mainport Roterdam	Ministerie van I&M
Panteia / CNTK	2010	Study - Exploiting the Possibility of Creating a Rail Freight Corridor Linking Poland and the Netherlands	Ministerie van I&M
Buck Consultants International	2010	Beleidskader Spoorgoederenvervoer	Ministerie van I&M
Regio Twente	2009	Kwaliteitsnetwerk goederenvervoer Twente	Regio Twente
Ministeries Economische zaken en Verkeer en waterstaat	2009	Economische visie op de langetermijnontwikkeling van Mainport Rotterdam	Ministeries Economische zaken en Verkeer en waterstaat
TNO	2009	Quick scan: overzicht van netwerk logistieke hot spots in Nederland	Ministerie van Economische Zaken
RIGO Research en Advies BV	2008	Rapport MKBA Verruiming Twentekanalen ten behoeve van de scope van de planstudie Twentekanalen	Rijkswaterstaat Oost-Nederland
Vlaams Nederlandse delta	2011	Ruimtelijk-economische en logistieke analyse: de Vlaams-Nederlandse Delta in 2040	Vlaams Nederlandse delta
Panteia	2013	Economic Feasibility of Twente-Mittelland Canal	Ministerie van Infrastructuur en Milieu
Euregio	2012	TEN-T Corridor 2: Joining Forces for a Competitive Low-Carbon Corridor	Euregio
Prof. Dr. Karl-Hans Hartwig, Dipl.Vw Patrick Baumgarten, Dipl.-Vw Frauke Fischer	2011	Quick Scan Oost-West Corridor Euregio	Straßenbau und Verkehr
LogisticNetwork Consultants	2009	GVZ - Untersuchung Coevorden - Emlichheim	Bentheimer Eisenbahn AG