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North Sea Baltic

Second Work Plan of the European Coordinator

Catherine Trautmann

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This report represents the opinion of the European Coordinator and does not prejudice the official position of the European Commission.

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Acronyms and Abbreviations

BE	Belgium
CAREX	Cargo Rail Express
CEF	Connecting Europe Facility
CNC	Core Network Corridor
DE	Germany
DEK	Dortmund-Ems-Canal
EC	European Commission
EDP	European Deployment Plan
EE	Estonia
EIB	European Investment Bank
EFSI	European Fund for Strategic Investments
ERTMS	European Rail Traffic Management System
ESIF	European Structural and Investment Funds

ETCS	European Train Control System
EU	European Union
FI	Finland
GDP	Gross Domestic Product
INEA	Innovation and Networks Executive Agency
ITS	Intelligent Transportation System
IWT	Inland Waterway Transport
IWW	Inland Waterway
KPI	Key Performance Indicator
LPG	Liquefied Petroleum Gas
LNG	Liquefied Natural Gas
LT	Lithuania
LV	Latvia
MFF	Multiannual Financial Framework
MoS	Motorways of the Sea
MS	Member State
NL	The Netherlands
NSM	North Sea-Mediterranean Corridor
NUTS	Nomenclature of territorial units for statistics
PL	Poland
PPP	Public Private Partnership
RAHA	Rotterdam, Antwerp, Hamburg, Amsterdam
RALP	Rhine-Alpine Corridor
RFC	Rail Freight Corridor
RHK	Rhine-Herne-Canal
RIS	River Information System
RRT	Rail–road Terminal
TEN-T	Transeuropean Transport Network
TENtec	Information system of the European Commission to coordinate and support the TEN-T Policy
UIC	International Union of Railways
WDK	Weser-Datteln-Canal

1. Towards the *North Sea-Baltic* Corridor work plan

Background

Transport is a vital element of European integration and smooth and effective cross border transport is a key element in the effectiveness of the Single Market and the creation of jobs and growth. Moreover, the construction of new transport infrastructure can provide many of those jobs. Similar to the environment, transport is a policy that is easily understood and can find support among the citizens of Europe at a time when the concept of European integration is under heavier criticism than ever before. Transport clearly requires cooperation between the Member States on policies created by the Union to facilitate the smooth transit of goods, services and people throughout the European Union (EU) for the benefit of all its citizens.

In 1994, the EU initiated the trans-European transport network policy. In the first years, the policy concentrated on supporting 30 priority projects across the EU. With the reform of the TEN-T guidelines in the years before 2014, the concept of a dual layer structure was introduced, consisting of a comprehensive network and a core network based on a common and transparent methodology.

Regulation No 1315/2013 of 11 December 2013 established the core network and the concept of core network corridors involving all the Member States and covering the whole of the enlarged EU. Under Article 42.1 of the Regulation the core network corridors are *"an instrument to facilitate the coordinated implementation of the core network [...] contributing to cohesion through improved territorial cooperation"* and *"shall be focused on a) modal integration, b) interoperability and c) a coordinated development of infrastructure, in particular cross-border sections and bottlenecks".*

The core network corridors enable the Member States to achieve a coordinated and synchronised approach with regard to investment in infrastructure, so as to manage capacities in the most efficient way. The network is multimodal; that is to say it includes all transport modes and their connections as well as relevant traffic and information management systems. The concept of core network corridors also serves as basis for the Multiannual Financial Framework negotiations, thus identifying the financial needs for the development of the infrastructure to the required standards.

The new core network corridor concept offers opportunities for stakeholders to contribute to the objectives of the new policy. It also provides a strong means of realising the respective potential of stakeholders and of promoting cooperation between them and of strengthening complementarity with actions by the Member States. The figure below presents all nine core network corridors and the North Sea Baltic corridor is highlighted in red.

Figure 1: Screen shot of the northern network of the core network corridors showing the North Sea-Baltic in red with the main interconnection points with the other corridors

North Sea-Baltic Corridor

The 5,986 km rail and 4,092 km road long North Sea-Baltic Corridor ("Corridor") is one of nine core network corridors and the only one to be situated exclusively in the North of Europe. It joins the Baltic Sea Region with the low countries of the North Sea Region by way of Helsinki, the Baltic States, Poland and Germany.

This Corridor also needs to be looked at in the context of developing global transport routes. Finland and the Baltic States serve as a hub for the terrestrial connections to the eastern and northern markets in China, Russia, Asia and beyond, while the North Sea ports provide maritime access to the Americas and the rest of the global trading network.

While there is a strong traffic in the western end of the Corridor from the four largest ports in Europe (Rotterdam, Antwerp, Hamburg and Amsterdam) to the hinterland of the low countries and Germany up to Berlin, the flow then lessens from Berlin to Warsaw and, for rail at least, the connection with the Baltic States to the North from Poland is underdeveloped, although, the maritime connection between Helsinki and Tallinn works efficiently.

Through the transfer of goods flowing through the Western gateways of the North Sea ports along the land connections and Motorways of the Sea, the Corridor provides possibilities for enhanced competitiveness and better connections with the Member States in the Eastern part of the Corridor. There is also the possibility of connecting in the North to the developing ideas of the Northern Dimension Policy and to the Arctic area, the growing potential of which has been recognised by the recent joint Communication of the High Representative for Foreign Affairs and the Commission on "An integrated European Union policy for the Arctic". The Corridor also provides a direct connection from the Western and Central Europe to Belorussia and Russia.

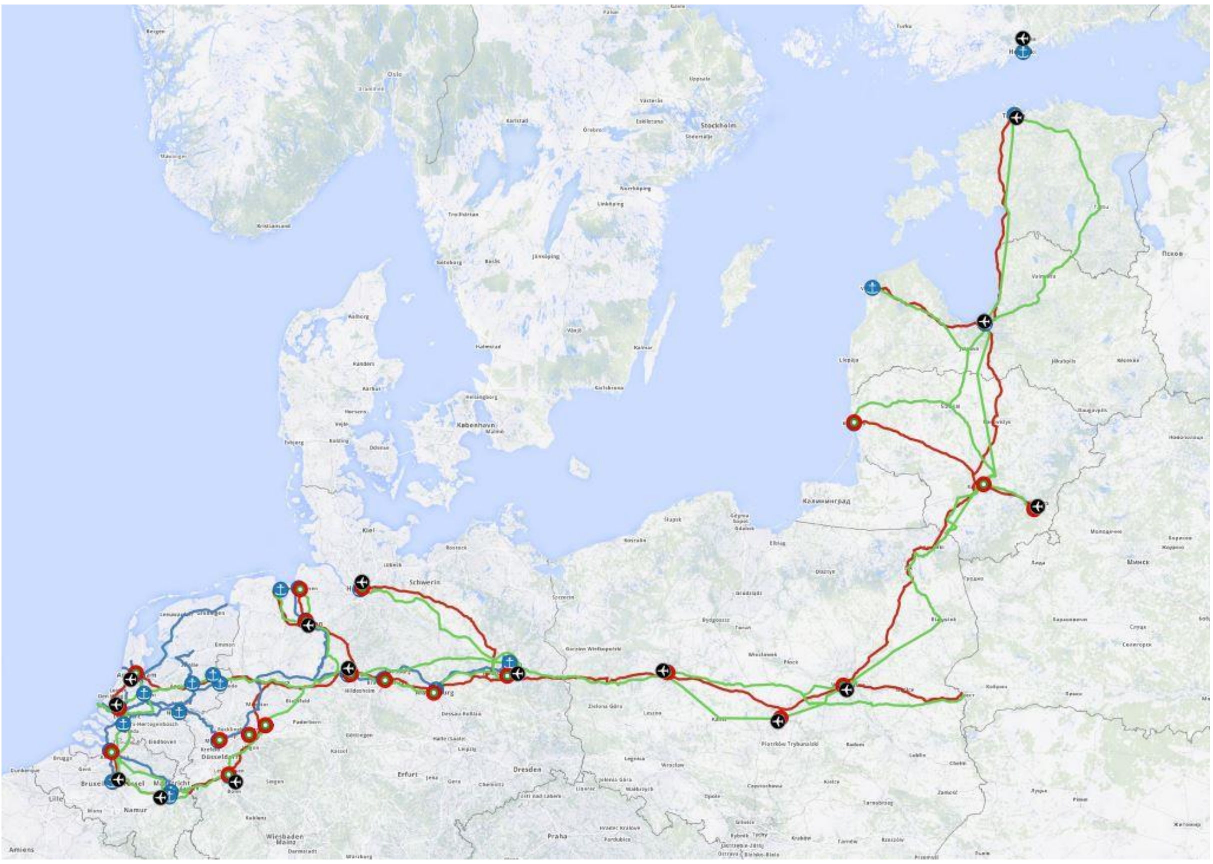
Main Objectives

This Corridor is a clear example of a principal objective of the new TEN-T policy by connecting east with west and improving the accessibility of the eastern Member States.

It is the northern-most Corridor connecting the developed Western markets with the Eastern markets. The Corridor is not there to create competition between countries and regions, but rather to invite cooperation through improved connections. The creation and realisation of this Corridor from Helsinki to the North Sea ports will give a competitive advantage to all the Member States on the Corridor and will be of mutual benefit to all of them.

The figure below presents the North Sea Baltic corridor map including urban nodes and transport interconnections.

Figure 2: North Sea-Baltic Corridor map showing different Urban Nodes and transport interconnections by mode



Bridging missing links in the rail network

The first ideas for improving the terrestrial connections of the Baltic States to the rest of the EU occurred during the negotiations for the accession of the three Baltic States which culminated in the Rail Baltic project for a new 1435 mm standard gauge rail connection from Tallinn to Warsaw thereby linking the new Member States with an interoperable faster direct rail line for the transport of goods and people and offering an alternative to the predominant traffic flows with Russia and Belarus. It is therefore a strong strategic component in the North Sea-Baltic corridor, attempting to create new traffic flows in a North/South direction on the eastern shore of the Baltic Sea and connect them to the well-established West/East flows between the North Sea ports, Berlin and Warsaw. The Rail Baltic project (also referred as Rail Baltica project by different stakeholders) is a missing link to ensure that there is no gauge break between different Member States.

The new 1435 mm standard gauge rail connection from Tallinn to Warsaw is not only an alternative to the predominant traffic flows from Russia and Belorussia but will also support the traffic flows to this direction. North Sea-Baltic Corridor is the only corridor that connects the EU with these countries.

The Baltic States and Poland have already proved that they are highly committed to the development of their infrastructure and will make the best possible use of the EU funding possibilities. The Joint Venture of the three Baltic States, RB Rail AS, has been established in 2014. Since that time substantial CEF grant funding has been awarded to the Rail Baltic project and the feasibility studies and preparatory works are on-going.

Connecting the ports with the hinterland

The North Sea-Baltic corridor is linking some of the most important ports in Europe. The objective of the North Sea-Baltic corridor is to link these ports by all available transport modes - not only by sea, but by rail, roads, inland waterways and air. In other words the links should be multi-modal as well as including relevant traffic and information management systems.

Corridor integration and cross border sections

The North Sea-Baltic corridor links all capitals of the eight Member States part of the Corridor and it crosses eight national borders (1 maritime: FI-EE and seven terrestrial: EE-LV; LV-LT; LT-PL; PL-DE; DE-NL; NL-BE; DE-BE). Cross border sections (as defined) have a high priority in the work to be carried out on the Corridor.

Also, the North Sea-Baltic corridor links four older Member States with four newer Member States. There remain substantial divergences, in terms of transport infrastructure as well as economic and social, between the Eastern and Western parts of the EU. Those divergences need to be tackled in order to achieve a fully integrated European transport infrastructure network. This is another principal task for the North Sea-Baltic corridor.

The North Sea-Baltic corridor needs to cooperate closely and on an equal basis with Rail Freight Corridor North Sea-Baltic (set up under Regulation No 913/2010) which provides a unified system for rail freight organisation and capacity management for international freight trains along the majority of the North Sea-Baltic corridor and which is operational since November 2015, while the extension to Latvia and Estonia is to follow until 2020.

Furthermore, the interests of the 40 regions along the North Sea-Baltic corridor as well as civil society affected by the projects of common interest have to be adequately taken into account during the development of the Corridor.

Compliance with technical requirements for all modes

Another objective of the Corridor (as with all the other nine corridors) is to achieve compliance of the transport infrastructure for all modes with the technical requirements set in the Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 by 2030; the date when the core network should be completed.

Efficient urban nodes

An important characteristic of the North Sea-Baltic corridor is the presence of urban nodes that are the multi-modal connecting points (hubs) with other corridors. Helsinki connects with the Scandinavian-Mediterranean corridor, Warsaw, Łódź and Poznań connect with the Baltic - Adriatic corridor, while Berlin and Hannover connect with both the Orient-East Mediterranean and the Scandinavian-Mediterranean corridors. Further west, Cologne, Nijmegen, Liège intersect with the Rhine-Alpine corridor and at its western end points, Antwerp, Brussels, Rotterdam and Amsterdam connect with the Rhine-Alpine and the North Sea-Mediterranean corridors.

Developing the transport interconnectivity of the key urban nodes is a vital objective for the efficiency of the Corridor. These nodes of high economic importance are recognised as having a crucial importance not only to this Corridor, but also to the rest of the network. Actions taken at the crossing-points of the corridors for improving interoperability, multimodality, decarbonisation and interconnections are of crucial importance due to the complications found in them. Connectivity within these nodes requires special emphasis due to a very high level of congestion. Deployment of new info-technology solutions also is highly relevant here.

New technologies

The North Sea-Baltic corridor should (along with all corridors) provide the basis for the large scale deployment of new technologies and innovation which can help to enhance the overall efficiency of the European transport sector and help to reduce its carbon footprint, for instance, well developed ITS in different parts of the Corridor. New technologies are especially important in the context of ports, Motorways of the Sea and logistics. In particular, given the large water transport component in the Corridor, the provision and use of LNG fuel for seagoing and inland vessels should be highlighted. Digitalisation of the overall logistics chain is a key driver for a modern and efficient transport system. The Corridor already has best practice examples for information technology solutions in the freight sector at both ends of the Corridor e.g. in the Helsinki-Tallinn twin-port and in the Dutch ports.

Economic potential

There exists a lot of untapped economic potential in the northern and eastern parts of the Corridor. For example, Finland, Estonia and The Netherlands are front-runners in using the information technology sector for smart transport solutions and inter-city links. Meanwhile Poland is an industrial frontrunner among the newer Member States and is one of the EU countries which avoided recession during the recent economic crisis. The Corridor can provide a platform for dialogue also with industrial stakeholders.

Work Plan

During 2014 the European Commission designated consultancy *Proximare* prepared a Study ("The 2014 Study") on the Corridor. The second stage of the Corridor Study ("The Study") was continued from September 2015 and led by Consortium involving EY, Hacon, Stratec and Panteia. The progress of the Study research has been discussed in three Corridor Fora held in September and December 2015 and March 2016.

The recent Study has updated the 2014 Study, assessing the technical compliance of the Corridor as of 2014, updating the Project list of the Corridor, analysing the key issues and bottlenecks for the further Corridor development. As of 13.05.2016 altogether 370 projects have been proposed by the Member States and the stakeholders for achieving the Corridor concept along the whole alignment from Helsinki to Antwerp/Rotterdam/Amsterdam.

This Work Plan is based partly on the Study's development since September 2015 and the input received during the Corridor Fora that included participants not only from the eight Member States, but also from the infrastructure managers, regions and other stakeholders. The Corridor Fora proved to be important and constructive gatherings of stakeholders whose support is vital if the policy is to be successfully implemented.

The Work Plan provides a common vision, based on the compilation of the work of all stakeholders towards a final realisation of the Corridor. The common interest of all the Member States on the Corridor is the crucial driving force behind the Work Plan. It is there to provide a framework for the prioritisation of the various steps needed to realise the Corridor.

2. Characteristics of the Corridor

This chapter describes the Corridor alignment and compliance with the technical requirements defined in Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU.

The Corridor has 16 core network airports, 12 maritime ports, 20 inland ports, 17 rail-road terminals and it involves 40 EU Regions. The 5,986 km rail and 4,092 km road long multimodal corridor connects the capitals of all the Member States through which it passes: Helsinki (FI), Tallinn (EE), Riga (LV), Vilnius (LT), Warsaw (PL), Berlin (DE), Brussels (BE) and Amsterdam (NL). Among the 17 urban nodes there are 14 multi-corridor urban nodes: Helsinki (2 Corridors), Warsaw (2), Poznań (2), Łódź (2), Berlin (3), Hamburg (3), Bremen (3), Hannover (3) Cologne (2), Düsseldorf (2), Brussels (3) Antwerp (3) Rotterdam (3) and Amsterdam (3). It has therefore a potential to become one of the most economically diverse Corridors in the European Union.

The Corridor compliance with the technical requirements defined in the Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 is presented below.

Rail

The total railway network of the Corridor is 5,986 km long. The table below presents the summary of technical compliance for rail and detailed analysis is provided for each technical requirement.

Table 1. Compliance with TEN-T requirements (2014): Railways

RAILWAYS		All entries: Share of all sections fulfilling the respective standard								
TEN-T parameters		**BE**	**NL**	**DE**	**PL**	**LT**	**LV**	**EE**	**FI**	***Corridor***
Length of all sections	Km	397	477	1 783	1 442	848	594	442	3	***5 986***
Electrification	Electrified	100%	100%	97%	91%	18%	11%	17%	100%	***75%***
track gauge	1,435mm	100%	100%	100%	100%	13%	0%	0%	0%	***76%***
line speed (core freight lines)	≥100km/h	80%	100%	100%	9%	25%	0%	0%	N/A	***61%***
Axle Load (core freight lines)	22.5t	100%	100%	100%	99%	100%	100%	100%	N/A	***100%***
Train length (core freight lines)	min. 740m	100%	100%	100%	38%	100%	100%	100%	N/A	***85%***
ERTMS/signalling system	YES	32%	43%	0%	0%	0%	0%	0%	0%	***7%***

The main technical complication is that the Corridor is equipped with three different track **gauges**. The Belgian, Dutch, German and Polish networks are all standard UIC gauge (1435 mm). Latvia and Lithuania have the 1520 mm gauge, with the exception of the section between Kaunas and the Polish border (which has 115 km dual gauge/parallel tracking of 1520 mm and 1435 mm). Estonia shares the same technical parameters for its rail network as Latvia and Lithuania meaning 1520 mm gauge. Finland uniquely has the 1524 mm gauge. However, the Baltic States and Finnish networks are isolated networks in the sense of Regulation (EU) 1315/2013, and thus are exempted from the compliance with its technical requirements.

The Netherlands have the highest level of implementation of **ERTMS** with 43% of the Corridor covered. In Belgium 32% of the Corridor is equipped with this interoperable rail traffic management system. There is ERTMS implementation in other Member States and the timeline for deployment of ERTMS along the Corridor will be described in the Work plan for ERTMS 2016 and the revised European Deployment Plan. Based on the notification received from the Member States concerned, the European Commission has confirmed that the 1520 mm gauge railway lines of NSB Core Network Corridor will not be covered by the European Deployment Plan for ERMTS.

The whole Corridor is **electrified** in Belgium, The Netherlands, Germany, Finland and Poland, except for an approximate 60 km link between Oldenburg and Wilhelmshaven in Germany (that should be solved by 2022) and, in Poland, a 100 km section between Białystok and the Polish Lithuanian border. In Lithuania only the Kaunas – Vilnius line (about 105 km) is electrified. It is also foreseen to electrify Vilnius rail node with bypass (about 35 km) till 2019 and Kaišiadorys – Šiauliai line (145 km) till 2020. In Latvia and Estonia sub-regional lines for passenger transport around the capitals are electrified. Cross-border traffic between the Baltic States and Poland can currently run only using diesel traction. There are different voltage systems also across Member States, but this will not pose a cross-border problem if a locomotive is equipped with a relevant converter.

Only very limited sections of the network do not comply with the standard of the maximum 22,5t of **axle load**.

The majority of the Corridor can accommodate the minimum **train length** of 740 m. However, problems remain in Belgium due to the existing train length restrictions of 650m during peak hours. In Germany 740m trains can be operated at certain times in line with the timetable. The Baltic States 1520 mm network meets the requirements, though the Polish network currently does not comply on the E20 railway from Polish/German state border to Poznań, on the Poznań node, on the Warsaw node (partly) and on the Rail Baltica corridor. Such diverging situation in different Member States creates a serious obstacle to seamless international freight traffic flows. In order to increase the train length, a sufficient number of side tracks is a necessary condition.

In The Netherlands, the requirement of the **maximum line speed** of 100 km for freight lines is fulfilled; however, this is not yet the case in Belgium. Parts of the Belgian network receiving freight traffic that are not compliant for train speed are located from Glons to the German border (39 km), from Angleur to Liège Guillemins (3 km) and locally in the railway nodes of Aarschot (0,5 km) and Hasselt (2 km). Finally the section between Lier and Antwerp (10 km) is not compliant for Belgium. In Germany, a small number of sections has been identified which are not compliant because these sections are mainly separate freight lines, links and bypasses in and around urban areas.

In Poland, the line speed compliance along the Corridor is on a low level, caused mostly by low maximum speed on certain sections (especially Warsaw southern rail bypass and Rail Baltica close to border with Lithuania) and several sections with mixed speed allowance resulting in lowered average speed level. Several long sections are very close to meet the requirement: from Polish – German border to Warsaw (average speed in range between 80 km/h to 99 km/h depending on the section), from Zielonka to Białystok (average speed above 80 km/h). Upgrading only these sections would raise the compliance level well above 60%. Between Olecko and Białystok the speed limits are between 80 and 120 km/h and from Olecko until the Lithuanian border the speed is inadequate at 30-60 km/h but will be raised following modernisation. The Warsaw freight bypass also has an inadequate speed of 40 – 70 km/h, but plans are foreseen to solve this problem.

In the Baltic States not all lines are compliant with line speed requirements, but the Rail Baltic project, once completed, will be compliant. In Lithuania, the recently completed standard gauge 1435 mm railway along the existing 1520 mm alignment has a speed limit of 120 km/h (80 km/h for freight transport). However, would the line be upgraded, equipped with ERTMS and electrified, the speed of the line would increase. The isolated networks of 1520 mm gauge are exempt from the maximum line speed requirement.

Rail-road Terminals (RRT)

In Finland, the Corridor features a trimodal terminal in the port of Helsinki. Similarly to Finland, in Estonia, rail-road terminals (RRTs) exist in ports, but not on a stand-alone basis without the port, except a project idea to develop a dry port (RRT) at the outskirts of Tallinn. There are no RRTs in Latvia, but they are planned to be constructed jointly with Rail Baltic project. There were two RRT's completed in Lithuania in 2015 – Vilnius and Kaunas intermodal terminals.

The network of RRTs in Poland is under development, supported by 2007 – 2013 and current programming period Cohesion Funds. Three core areas designated for RRT localisation are the urban nodes of Poznań, Łódź and Warsaw. All are conveniently located at the crossroads of two TEN-T corridors (Baltic-Adriatic corridor and NSB). There are usually several RRTs distributed within each node, which reflects a highly liberalized rail cargo market in Poland. The highest number of RRTs is located in Poznań which capitalizes on its location as gateway to Poland from Germany.

There are both rail-road and tri-modal terminals in the port areas in The Netherlands. For Amsterdam and Rotterdam, there is at least one terminal that is compliant for all parameters.

In Belgium, RRTs are located at the port of Antwerp. In the port area, 24 terminals have rail access on top of truck access. One of these terminals, Combinant, has open access to all operators.

Inland waterways (IWW)

The Corridor has an effective IWW network stretching from the North Sea ports to Berlin. The table below presents an overview of compliance with technical requirements.

Table 2: Compliance with TEN-T requirements (2014): Inland waterways (IWW)

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
CEMT Class	Class IV	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Length of vessels and barges	from 80-85m	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Maximum beam	from 9.50m	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Minimum draught	from 2.50m	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Tonnage	from 1,000-1,500t	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Minimum height under bridges	from 5.25m	100%	100%	70%	N/A	N/A	N/A	N/A	N/A	**86%**
Availability of alternative fuels	Indication of availability by 2030	100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**

Although the IWW network is almost compliant with the technical requirements, it should be noted that climate change has effects on the whole TEN-T network. Due to extreme aridity, low water and high water, navigability can become a problem on the network.

For inland waterways a seamless journey on the Corridor is supported by the following infrastructure:

- Fairways that are wide enough (including the absence of sharp bends). This allows long and wide vessels;
- Fairways that are deep enough. The deeper, the more cargo can be transported per vessel;

- Bridge height that allows multiple stacks of containers to be transported;
- Correct lock dimensions: width, length and depth;
- Bridge or obstacle height at locks;
- Reliable fairways and locks in terms of water levels.

All those elements contribute to the safer inland navigation, optimal loading possibilities and time gains, all in all strengthening the role of inland navigation in the logistic chain and creating solutions for congestion, moreover in combination with the efforts concerning the RIS priority.

One of the criteria for selecting core network sections in The Netherlands was the requirement that the section is a CEMT IV class section. This also implies a minimum height under bridges of 5.25 m and minimum draught of 2.5 m. The Netherlands network is compliant with those technical requirements.

In Belgium, the whole Corridor alignment is CEMT class VI.

The IWW network in Germany is fully compliant on all but one parameter: the minimum height under bridges has not yet been reached on some sections of the Rhein-Herne-Kanal (RHK), the Dortmund-Ems-Kanal (DEK) and the river Weser.

The Netherlands, Belgium and Germany have transposed the **River Information Services (RIS)** Directive. A number of RIS applications have been deployed and the International data exchange for electronic reporting between The Netherlands and Germany is in operation.

Inland Ports

The Corridor has 20 inland ports mainly situated in Belgium, The Netherlands and Germany. The table below presents on overview of compliance with technical requirements.

Table 3. Compliance with TEN-T requirements (2014): Inland Ports

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
CEMT class	Class IV connection	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Connection to rail	Core ports to be connected to rail by 2030	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Availability of clean fuels	Available in by 2025	33%	33%	0%	N/A	N/A	N/A	N/A	N/A	**15%**
Availability of at least one freight terminal open to all operators	in a non-discriminatory way and application of transparent charges	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**

All inland ports are compliant with IWT class IV access. Besides Berlin and Hamm which have a CEMT class IV connection, all inland ports have class V and above waterway connection. They are also compliant with the availability of at least one freight terminal open to all operators but still have to implement clean fuels accessibility.

Seaports and maritime infrastructure

The Corridor has 12 core maritime ports connecting the Baltic Sea ports of Helsinki (FI), Tallinn (EE), Riga, Ventspils (LV) and Klaipeda (LT) with the North Sea ports of Hamburg, Bremen, Wilhelmshaven (DE), Amsterdam, Rotterdam, Moerdijk (NL) and Antwerp (BE). The start and the end points of the Corridor are the Finnish port of Helsinki at the eastern end and the Belgian port of Antwerp and the Dutch ports of Amsterdam and Rotterdam in the West. The table below presents an overview of compliance with technical requirements.

Table 4. Compliance with TEN-T requirements (2014): Seaports and maritime infrastructure

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
Connection to rail network, inland waterways and road network	Core ports to be connected to rail by 2030	100%	100%	100%	N/A	100%	100%	100%	100%	**92%**
Availability of alternative fuels	Available in by 2025	100%	100%	0%	N/A	100%	0%	0%	0%	**42%**

Helsinki has three ports that form the combined Port of Helsinki. Two of them are West Harbour and South Harbour, which are located in the city centre, serve mainly the passenger and *ropax* ferries, and have home freight capacity. The main passenger destinations are Tallinn and Stockholm. The third port is the new Vuosaari cargo port to the East of the city, serving mainly cargo traffic.

Estonia has two ports, which form the combined Port of Tallinn. One of them is the Tallinn Old Port (Vanasadam), which serves mainly the passenger traffic and *ropax* ferries, and has also some freight capacity. The main passenger destinations of the ferries are Helsinki and Stockholm.

The Freeport of Riga in Latvia is the largest port in the Baltic States. The port is connected to the rail network, though there are plans to further modernise the port's railway network. The future plans foresee connecting the port directly into the TEN-T network by road via the Riga Northern Transport Corridor. Another Latvian port on the Corridor is the ice-free Freeport of Ventspils, which has convenient road and rail access.

In Lithuania, the ice-free Klaipeda State Port is the biggest Lithuanian transport node with well-developed hinterland connections on road and rail. Klaipėda seaport currently has a maximum available depth for container vessels of 13.2 m, which is considered insufficient.

Germany has four seaports on the Corridor: Hamburg, Bremerhaven, Bremen and Wilhelmshaven. Hamburg is the third largest German inland port and the largest railway port in Europe. Wilhelmshaven is the only German deep-water port of 18m. The ports have sufficient road and rail connections.

The four North Sea ports, Rotterdam, Antwerp, Hamburg and Amsterdam (RAHA ports), are the four largest ports in Europe and therefore form the vital gateway at the western end of the Corridor. Their hinterland connections, whether they are "last mile", medium connections to the nearest urban node or connections to the main North Sea-Baltic corridor axis to the East are crucial for the efficient functioning of the Corridor.

Amsterdam, Rotterdam and Antwerp ports both have direct road and rail access, inland waterways access to the ports also exists. Inland waterway transport in Rotterdam and Antwerp makes up to 40% and road cargo currently holds 50% of the modal share of the ports' connections. By 2030, the goal is to decrease it substantially and shift cargo to rail, inland waterways and short-sea shipping. There are sufficient hinterland connections by inland waterways.

The Ports of Antwerp, Amsterdam and Rotterdam offer LNG as an **alternative fuel source** and LNG supplies in Antwerp are under construction. In Germany, a first LNG-powered vessel is bound to start operating between the ports of Bremerhaven and Bremen during the course of this year. The general availability of alternative fuels in German ports could be expected by 2025. A floating LNG terminal anchored in Klaipeda port opened in November 2014, and there are plans to start services of providing LNG fuels to ships and shore-to ship LNG bunkering services by 2017. It is also planned to provide alternative fuel source in Latvian ports, expected to be realized as private initiative. In Tallinn, no alternative fuel solutions are provided yet, though LNG and LPG terminals are planned in the Muuga cargo port. LNG bunkering infrastructure and accessibility improvements (but not an LNG terminal) are also planned in the Helsinki's Vuosaari cargo port.

The ports of Antwerp, Amsterdam, and Rotterdam, Helsinki and the Baltic States' ports as well as the German ports have sufficient facilities for collecting **waste and cargo residues**.

Roads

The 4,092 km road long corridor connects the capitals of all the Member States on the Corridor. The table below presents the summary of compliance with technical requirements.

Table 5. Compliance with TEN-T requirements (2014): Roads

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
Road class	Roads have to be either an express road or a motorway by 2030	100%	100%	100%	56%	55%	8%	7%	100%	**70%**
Parking areas along the roads, including their security level	Sufficient parking areas, at least every 100 km, by 2030	N/A	100%	100%	N/A	N/A	N/A	N/A	N/A	**N/A**
Availability of alternative fuels	Available by 2025	100%	100%	100%	100%	100%	100%	100%	100%	**100%**

In Helsinki the 3rd and largest ring road around Helsinki (Kehä III), which connects both the Vuosaari cargo port and the airport, has 2+2 lanes but needs improvements in creating better connections with several roads, including accessibility to the airport and to the Vuosaari port.

The main road for all three Baltic States is Via Baltica and in many parts it is not compliant with technical requirements as it is not expressway or motorway. The Via Baltica highway is the main artery for North-South traffic between Poland and the Baltic

States. At the moment, along the route of the Via Baltica there is a clear shortage of high quality infrastructure which results in congestion and traffic accidents.

In Latvia the Via Baltica is a two lane road with capacity problems between the Riga bypass and Bauska, where some sections require widening the road from two lanes to four (including construction of bypasses). Bearing in mind the deficiencies of the Riga traffic system including lack of capacity, and a highly fragmented character, new traffic infrastructure would be needed in order to have a reliable TEN-T link (last mile) and extend the TEN-T network to Riga port. Except for the Riga ring road, the road to Ventspils port has also two lanes.

In Lithuania, the Via Baltica road has two lanes, except for a section of 20 km north of Kaunas that has four lanes. The East-West connection from Klaipeda port through Kaunas to Vilnius is a four lane express road soon to be upgraded to motorway road.

In Poland, the connection from Warsaw to Lithuania (Via Baltica) is also mainly a two-lane national road. As Via Baltica received recently a high priority, the whole connection is currently either under construction (sections closer to Warsaw) or in tender (sections closer to Lithuania) or in an advanced planning stage (central part).

From Warsaw towards the Belarus border the A2 is a two lane national road with one motorway-class bypass of Mińsk Mazowiecki (close to Warsaw). Except for completing the connection from Warsaw to Mińsk Mazowiecki further extensions are put on hold due to budget constraints.

The Polish road network from the German border to Warsaw is a new four lane motorway, the A2. In Warsaw node the Corridor road alignment is separated in two directions: north-eastern to Baltic States and eastern to Belarus. Warsaw expressway ring road is completed when it comes to traffic towards Lithuania. However, only a first phase of the southern bypass is completed and in order to travel towards Belarus, one has to use the heavily congested internal city road network. The missing section of the ring road is being implemented through design and build contracts (construction should begin in late 2017).

Effective management of a modern road network in Poland will be implemented by innovative advanced technologies, especially in the area of the traffic management via The National Traffic Management System.

Almost all road sections on the Corridor in Germany are part of the German motorway system. There is a short section of around 10km on the A30 near Bad Oeynhausen where the motorway is missing. However the Bad Oeynhausen bypass is under construction; expected opening for traffic is before end of 2018. Another bottleneck on the German motorway system is the Berlin ring with only four lanes, due to temporary capacity problems. These restrictions will be removed with the completion of the ongoing and scheduled construction works: extension to 8 lines between Potsdam and Nuthetal as well as the completion of the Berlin Northern Ring (6 lines).

The Cologne ring has a minimum of six lanes. In addition to the already completed eight lanes on the section Cologne-Heumar-Cologne-Mühlheim construction works have begun on the north site section (Cologne-Mühlheim-Leverkusen-Center) which will be done by end of 2017.

Although the existing road network in Belgium meets the requirements of the TEN-T Regulation and the capacity is quite high, there are congestion issues around the urban nodes of Antwerp and Brussels.

The Netherlands motorway network on the Corridor has four lanes on most sections and plans exist to widen some more congested sections. The motorways on the most used sections between Amsterdam and Rotterdam are six or eight lanes, however, despite the high capacity of the motorway network, congestion is still a major concern. The government of The Netherlands gives a high priority to using more Intelligent Transport Systems.

Related to the **provision of alternative fuel sources** the Corridor has made significant developments and some implementation projects are ongoing for electricity, LPG or LNG refuelling stations.

Airports

There are 16 core network airports on the Corridor. Regulation (EU) 1315/2013 sets an obligation that certain **core network airports need to be connected by rail** (preferably high-speed) by 2050. In the Corridor there are 8 airports which need to comply with this requirement. The table below presents the summary of technical compliance assessment.

Table 6. Compliance with TEN-T requirements (2014): Airports

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
Capacity to make available alternative clean fuels	Available (2014)	0%	0%	0%	0%	0%	0%	0%	0%	**0%**
Connection to transport network	heavy rail or urban rail system and road network, certain airports have to be connected to heavy rail by 2050	100%	100%	100%	100%	N?A	0%	N?A	100%	**88%**

Out of the 8 core network airports along the Corridor with obligation to connect to rail (Helsinki, Riga, Warsaw, Berlin, Brandenburg, Hamburg, Cologne, Brussels, Amsterdam), six meet this obligation by 2014 and Helsinki airport's passenger railway connection to the centre of Helsinki was opened in 2015. In addition, further connections are planned for cargo traffic and for long-distance passenger trains.

Riga does not yet comply with the requirement and there are plans to connect the airport to the railway system in parallel with the developments of the standard gauge Rail Baltic project thus ensuring the rail link to the airport before 2030.

Out of the 8 airports along the Corridor with no obligation to connect to rail (Tallinn, Vilnius, Lodz, Poznań, Bremen, Hannover, Liège and Rotterdam) Vilnius and Hannover have rail connections. Bremen and Rotterdam airports have tram connections from the central train stations. In Tallinn airport, a railway station of the existing core network (and a future passenger terminal for Rail Baltic) is approximately 1.5 km away and a light rail connection to the nearby Ülemiste railway terminal is being foreseen to be built over the next two years. Railway connection to Vilnius airport is in place, however, the utilization of the track is low. For Łódz and Poznań airports, there are no fixed plans for a rail connection at present. A study for the realisation of a new rail link to the future cargo terminal at Liege airport is in progress. This takes place in the framework of the Euro Carex project, with the objective of combining high-speed rail and air cargo for the transport of freight, in collaboration with other European airports and logistics sites.

None of the airports of the Corridor is making **clean fuels available** for airplanes as of 2014.

Urban nodes

The NSB corridor only counts one urban node in Finland – the capital city Helsinki. In general an upgrade of the last-mile connections, long distance connections and improvement within the urban nodes are necessary and already foreseen. The largest and most critical projects in Helsinki relate to the elimination of the rail bottleneck in the centre of Helsinki, improving rail connection to the airport (the first passenger train connection was opened in 2015), enhancing the capacity of the Helsinki airport and improving the accessibility of the Vuosaari cargo harbour in the near vicinity of Helsinki.

The only urban node in Estonia is the capital city Tallinn. Last mile links are required as the node is further developing the Muuga port area. Furthermore, a new port passenger terminal is being developed as well as a new rail terminal that both need to be linked to the corridor network. For road and rail there is a further need for bypasses or ring road/rail networks.

Riga is the urban node in Latvia with three transport modes- a port, an airport and a (main) train station. These nodes are all connected via last mile. There is a road ring around Riga, however the northern section is missing and there is no freight bypass from the port area by rail. Finally, terminal capacity could be improved.

The Vilnius node has an airport, (main) train station and a rail-road terminal. The main railway station is directly connected to the core network with working last mile connections to the terminal and airport. While the railways in Vilnius node have a bypass, only part of the southern motorway ring road is in place with western bypass to be completed as of 2017..

There are three core urban nodes in Poland related to the NSB Corridor along the west-east NSB axis: Poznań, Łódź and Warsaw. They each count an airport, rail passenger stations and several Rail-Road terminals, which are almost all connected directly to the Corridor network. There is a number of projects related to urban nodes of which the most important refer to railways. Poznań and Warsaw shall receive upgrades of existing infrastructure, aimed at capacity increase and improving the mode transfer for passengers in Poznań. In Łódź, the construction of an underground rail tunnel under the city centre will change the city's railway node, offering new ways for metropolitan, regional and national connections.

There are two major road projects along the Corridor situated in the nodes in Poland, including the continuation of Warsaw's' southern expressway bypass and the southern bypass of Poznań along the A2 motorway to address growing capacity issues. In Warsaw there are also four projects aimed at improving the local ring roads inside the urban area. All airports plan investments, but the most significant are planned at Warsaw Chopin Airport, including an air freight terminal and access for passengers by road and by public transport.

In Berlin there are four major passenger stations, two international operating airports (Berlin-Tegel and Berlin-Schönefeld), one shunting yard, two freight terminals and three ports. The last-mile road connections are facing congestion. Rail links are without barriers. Inland waterway is also free-moving in the navigable rivers of Berlin. The rivers in the city centre are used for passenger vessels rather than freight. The last-mile connections to the Berlin-Brandenburg International airport are completed, the airport itself has yet to become operational. The current international airport Berlin-Tegel will be closed once the new airport Berlin-Brandenburg is operational.

The Hamburg node is one of the largest urban nodes on the corridor. The port located in the node is the third largest port in the Corridor in terms of cargo handling. Last mile infrastructure characteristics are not an issue, but a lot of capacity is requested at the node for rail and road.

Hannover urban node is connected to the Corridor via rail, inland waterways and road. The road and rail connections have adequate last-mile connections from the Corridor to the urban node network. The inland waterways last-mile connections are of similar quality as the corridor network itself.

The node of Brussels encompasses rail, road and inland waterway links but the waterway link is not part of the North Sea Baltic corridor. In general, rail and road congestion reduce the quality of the last-mile connections. The rail congestion, especially in the North-South junction, reduces the possibilities for rail passenger transfers and corridor transfers.

Antwerp is a large port node being the second largest port in Europe. The NSB, RALP and NSM corridor meet at Antwerp. The main rail access to the port of Antwerp suffers in particular from cross-overs which limit capacity. Two sites have been targeted to successively remove cross-overs, namely *Oude Landen* and *Krijgsbaan*. Together, they should noticeably increase the port's access capacity, while the construction of a second access to the port of Antwerp is still envisaged as long term solution to support the development of the port.

Amsterdam node contains a port, an airport, rail-road terminals and is connected via waterways, road and rail. The NSB, RALP and NSM corridors meet at Amsterdam and for this Corridor the relevant traffic directions are southbound towards Rotterdam and southeast Utrecht/Twente. The node network is dense and, therefore, there are no specific issues that prevent the urban node from connecting to the core network, other than the local congestion. The Schiphol node is connected via rail to the urban node and from Amsterdam there are high-speed trains going in southern direction from Amsterdam via Schiphol airport and high-speed trains going southeast towards Germany (via the RALP corridor route). Due to the increased traffic flows major adjustments of the railway connection with Schiphol airport and the upgrade of station Schiphol is being prepared (project Schiphol Plaza). In addition, road congestion is present all around the city and multiple road projects are ongoing to increase capacity. These projects range from local solutions (junction based) to pan-regional solutions A1/A6/A9 Schiphol-Amsterdam-Almere.

The urban node Rotterdam contains a port, an airport, rail-road terminals and it is connected via waterways, road and rail. The NSB, RALP and NSM corridor meet at Rotterdam. For this corridor the relevant traffic directions are north-south towards Amsterdam/Antwerp and to the east for rail and IWW. To the west the corridor stretches out towards the port area Maasvlakte. Throughout the entire urban node of Rotterdam there are terminals and sections important for inland freight transport. The passenger rail station was opened recently in 2015 and no major upgrades are needed in the near future. There are high speed rail connections in north-south direction and no last mile connection missing that prohibits access from the core network to the dense urban network of Rotterdam. There are two road projects to improve the last-mile access that is hindered by congestion, the Blankenburg tunnel and A13/A16 bypass.

3. Results of the transport market study

During the 2014 Study a transport market study was carried out for the whole Corridor. It assessed transport demand and the resulting traffic flows as well as the capacity of the infrastructure. The 2014 Study was focused on both freight transport and passenger transport and the main observations are presented below. This chapter provides an overview of main findings and conclusions of the 2014 transport market study.

Freight transport

The current situation for North Sea-Baltic corridor and the forecast for 2030 were estimated for all the countries and transport modes – rail, road, inland waterways and short sea shipping and the main results are presented in the table below.

Figure 3: Modal split of corridor-related international freight transport flows by country in 2010

Loading Country	Transport 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%

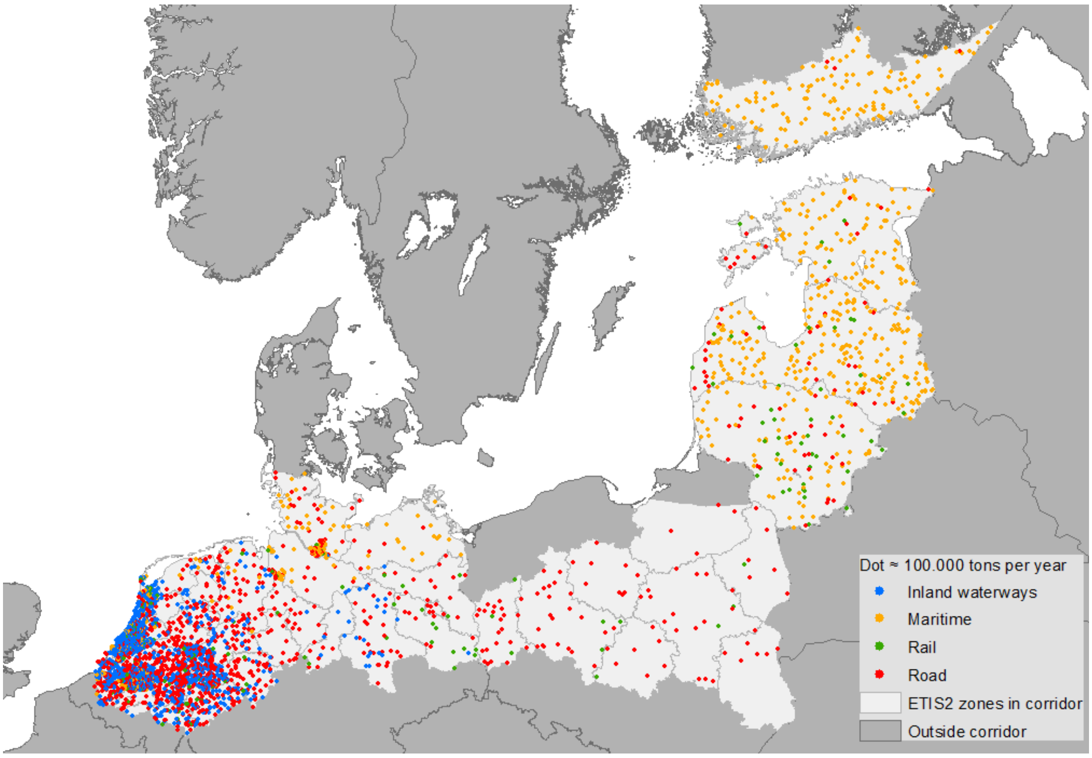
DE	100%	6%	50%	30%	15%
NL	100%	4%	29%	58%	8%
BE	100%	4%	39%	49%	8%
Corridor area	100%	6%	34%	38%	22%

At the national level, there is a very **high dominance of road transport** (69%) in the countries along the Corridor. For the Corridor related freight traffic, the picture is more balanced - expressed in freight tonnage; inland waterways accounts for large volumes, whereas rail traffic is only very limited.

Inland waterways are only relevant in the western part of the Corridor, whereas in the Baltic States and Finland **short-sea-shipping** is by far most important mode of transport. At the national level, rail transport takes the biggest share in the Baltic States and short-sea-shipping is important for Finland, the Baltic States, Belgium and The Netherlands. In Poland, the dominance of road in international traffic is very clear. Rail has a bit bigger share in domestic freight, but also here the dependence on road is very high. Germany has the most balanced modal split for international traffic.

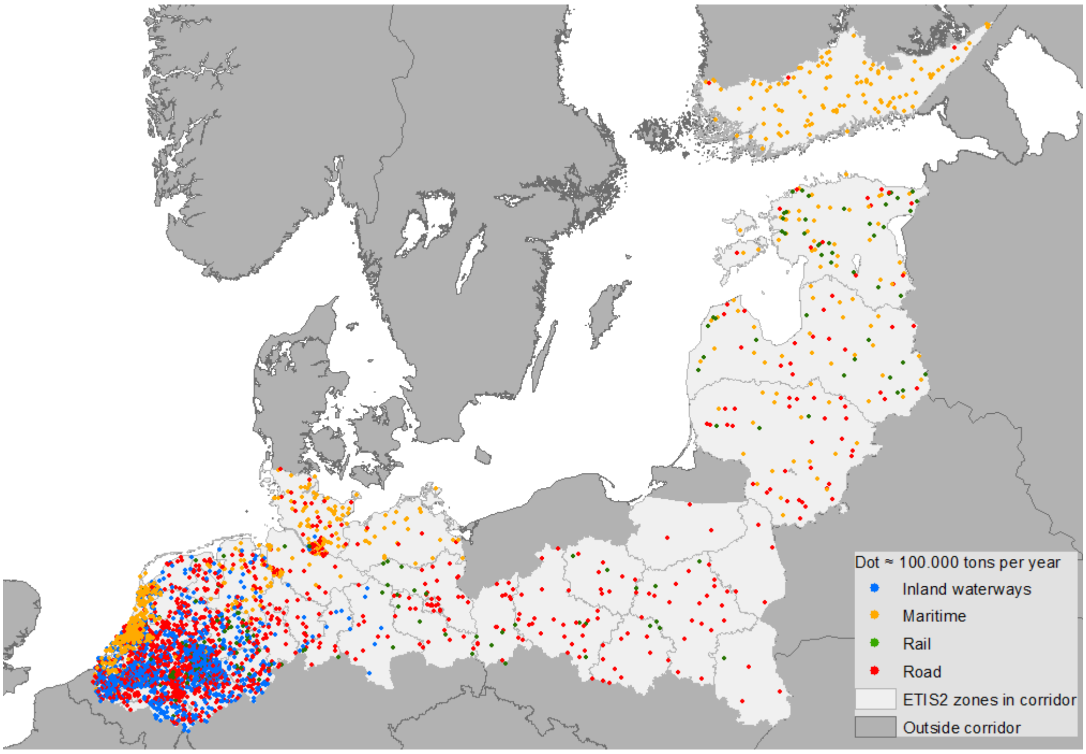
As shown on the map below, the most substantial freight flows (origins) on the Corridor are in the western section between Germany, Belgium and The Netherlands with high level activity in Baltic States and Finland.

Figure 4: Origins of international freight transport flows within the corridor catchment area by transport mode



Destinations for international freight transport flows on the Corridor are in the western section between Germany, Belgium and The Netherlands as indicated in the map below.

Figure 5: Destinations of international freight transport flows within the corridor catchment area by transport mode



The future anticipated requirements for freight traffic in 2030 show substantial variations between the countries and the transport modes**.** For the Corridor as a whole, the highest growth rates are expected to be in road haulage (+42%). This is especially the case in the central and eastern parts of the Corridor. As a result, the modal share balance would be further tilted in favour of road transport if no remediating action would be taken. The 2014 Study also indicates that already today the capacity of the road infrastructure in the western end of the Corridor is limited as congestion is a daily phenomenon. The Via Baltica road between Warsaw and Tallinn is only partially an expressway (not a motorway) and some capacity problems are noted now on the Polish and Baltic States sections.

Rail freight is expected to grow substantially in Lithuania, The Netherlands and Belgium. For the Baltic States and Poland rail freight traffic will be positively influenced by modernisation and reconstruction of railway lines and the completion of the Rail Baltic project.

Inland waterways have the lowest expected growth rate (+22%) but based on the projection the inland waterways vessels and the freight volumes are expected to rise, therefore capacity issues may evolve in terms of lock capacity and bridge height.

Passenger transport

At the national level, road transport is by far the most dominant mode for passenger transport. For all the countries along the Corridor, the share of road transport in 2012 was on average between 77-91% (respective examples being Latvia and Lithuania).

Estonia and Latvia have a relatively high share of bus transport and the highest share of rail transport (9%) is in Germany and The Netherlands.

The total number of international passengers within the Corridor catchment area in 2010 was estimated at over 49 million passengers. In line with the findings at national level, road transport represents the highest share of the corridor-related cross-border passenger transport. Road transport is very high (86-90%) in Germany, Belgium and The Netherlands. In Germany, 8% of flows are on rail and this is the highest share out of all the countries. Bus transport has a high share in the Baltic States (28-36%). The corridor-related passenger volumes are highest between Germany, Belgium and The Netherlands.

Airports are important entry and exit points to the Corridor and therefore important feeders for other modes of transport, such as rail and road. They offer an important alternative for intra-EU links, especially for the eastern and northern parts of the Corridor.

For the Corridor as a whole, the forecast for 2030 shows a higher growth rate for rail passenger transport than for road. Road growth rates are higher in the eastern and central parts of the Corridor. In the western part of the Corridor the growth rates for rail transport are substantially higher.

The market study has shown that there will be quite a substantial growth in both freight and passenger transport along the Corridor, however, rail transport has a very limited share in the cross-border traffic that is not in line with the overall EU policy objectives.

There is a need for greening transport through initiating the modal shift from roads to rail, inland waterways and short-sea-shipping. In this respect, the 2014 Study shows that there is a clear need for actions related to improving the quality and capacity of the railways and the inland waterways to accommodate a future growth in demand. Further actions will need to be considered to make inland waterways and rail more attractive.

4. Capacity issues

This chapter presents capacity issues for the North Sea-Baltic corridor. Currently congested sections on the Corridor are expected to stay busy if no action takes place. It should also be noted that there can be a shifting of bottlenecks when it comes to capacity because a problem which is solved locally can then shift to a nearby section. Since the Corridor commonly focusses on one section and one main route, the capacity bottlenecks can be shifted on and off to the Corridor. This makes capacity issues a very fluid subject, therefore, it needs a comprehensive view in order to provide long-lasting solutions.

Rail

Currently there are capacity issues for rail on the Corridor, both for short sections near busy nodes and long stretches. With the general tendency for rail transport to grow, capacity issues would also increase. One of the complexities for rail capacity projects is the gradual implementation of capacity in short time periods. Rail transport is expected to grow in the period up to 2030, but gradually, therefore potentially leading to unused capacity in the period 2020-2025 for example.

Belgium is working to secure capacity for the port of Antwerp's hinterland connections. Freight transport main issues are the Brussels-Antwerp axis and the rail capacity to access the seaport. In passenger transport, the main issue is the lack of capacity on the North-South junction in Brussels, which, although not strictly in the corridor alignment hampers the international, national and regional traffic flows on the Corridor. In The Netherlands, capacity issues occur at the Rotterdam-Utrecht/Amersfoort link and near the rail nodes of Amersfoort, Barneveld, Amsterdam and Rotterdam.

In Germany, the Federal infrastructure plan 2030 indicates in the forecast that there will be less capacity issues in 2030 because of the projects being implemented. However, the section Hannover-Magdeburg will retain its capacity issues and a new critical capacity section is expected to occur west of Berlin.

Poland is developing new capacity in the form of modernisation and (re-)construction of railway lines, in order to alleviate capacity bottlenecks and attract new rail demand.

In the Baltic States capacity improvement projects are underway, including the Rail Baltic project. Finland has plans to address the congestion in the centre of Helsinki and to build a new underground Rail Loop in the centre as well as new long-distance rail connections to the airport. These Finnish projects have high costs however and due to a lack of budget in the near future the implementation of these capacity projects is uncertain.

Railway capacity for cross-border traffic is often problematic due to technical barriers like a limited deployment of ERTMS or the lack of harmonisation of the infrastructure when it comes to train length. Coordination is also needed in order to be able to use diversionary routes during periods of work.

Inland waterways

Capacity issues for inland waterways are present on the Corridor. Given the nature of IWW transport, there are generally less capacity issues compared to other modes of transport, but some existing and future issues should be noted.

Capacity problems in inland waterways occur mainly at locks, as these can create waiting time if the amount of traffic exceeds the lock capacity. Furthermore, vessels are generally loaded according to waterway depth and under bridge clearance. When less water depth is available, the cargo hold of a vessel cannot be used to its fullest extent. The result is that more ships are needed to transport the same cargo in low water situations, which leads to higher traffic. These issues are further described in the section on inland waterway bottlenecks in Chapter 7.

The Corridor is compliant for waterway depth (measured in guaranteed water levels 300 days a year), therefore this situation does not occur frequently but can have a significant impact nonetheless.

Seaports

At some ports, there is a capacity issue in terms of future container terminal handling, which may lead to future congestion. The port of Antwerp is also aiming for capacity increasing measures of their direct hinterland connections at the Albert Canal. The rail connection toward Leuven is a capacity issue that is foreseen to persist.

Near the ports of Rotterdam and Amsterdam there are projects ongoing to improve the landside capacity for road, rail and IWW, which are described in the corresponding sections of the Work plan.

In Bremen the capacity at the central station is nearing its saturation point while traffic is set to increase. This affects the port freight traffic also that travels from the ports of Bremerhaven, Bremen and Wilhelmshaven to the hinterland. The situation is expected to improve according to the German national forecast, but not enough to relieve that capacity bottleneck in total.

The Old Port in Tallinn has road connection, but there is no rail connection for passengers or cargo. While it is not intended to enable rail connection for cargo traffic to the Old Port, Estonia plans to construct a tram connection from the Old Port to the centre of Tallinn and to the Ülemiste railway terminal, which is to become the final rail-road passenger terminal of Rail Baltic.

The road access for cargo traffic to the Old Port currently faces the issue of having to travel through the centre of Tallinn, but this issue is planned to be solved by constructing a new seaside road that bypasses the city centre. The other port in Tallinn is the Muuga cargo terminal. Muuga has both rail (1520 mm) and road connections, and it will serve as the final cargo port of the Rail Baltic (1435 mm). There is a need to improve navigation safety in Muuga and to expand the capacity of both Muuga and the Tallinn Old Port to solve current or expected future bottlenecks.

Vuosaari port in Helsinki has both road and rail connections to the national networks, while the West and South Harbour passenger ports have tram connections. West and South Harbours can be accessed by road only through the city centre, which is somewhat problematic for cargo, but the only economically feasible solution is seen in better traffic management systems. Vuosaari cargo port's fairway needs to be improved and deepened from 11m to 13m.

Airports

The Schiphol airport has a passenger terminal capacity project on the project list to prevent future capacity issues.

Warsaw Chopin Airport, after completing urban rail connection in 2012, intends to improve its internal road network in order to separate air-traffic-related vehicle flows from common urban traffic congestion.

Tallinn, Riga, Lodz and Poznań airports are currently served only by road access, sufficient for the time being. Road access to Poznań airport might become a problem once traffic volumes increase. A feasibility study for a tram or rail link to Poznań airport has been completed, but due to unsatisfactory results of the feasibility study the project has been put on hold. Riga airport has a requirement to be connected to the rail network by 2050. The solution is foreseen in the context of the Rail Baltic project, whereby the new fast conventional European-gauge rail line shall pass directly through Riga airport with a new rail passenger station to be constructed at the airport. Tallinn airport is planned to be connected to the rail network (including to the future Rail Baltic passenger terminal) by tram connection. Although Vilnius airport currently is connected to 1520 rail network, there are plans through development of the 1435 mm Rail Baltic section "Kaunas – Vilnius" to connect Vilnius airport and main train station.

Helsinki airport's passenger railway connection to the centre of Helsinki was opened in 2015, but further connections are planned for cargo traffic and for long-distance passenger trains.

Road

Road congestion is the main issue around the urban nodes and does not relate too much to cross-border sections. In the western part of the Corridor technological improvements in vehicle technology are expected to improve the capacity situation by 2030 and road pricing is being discussed within the Member States.

Road congestion in The Netherlands is expected to grow moderately in the national scenarios and the capacity improvement projects in place cover the period roughly until 2030.

Road congestion occurs frequently in Belgium especially around Antwerp, Brussels and Liège, and similarly as in The Netherlands planned improvements are expected to have an impact by 2030.

In Germany, an assessment is made of the future 2030 capacity bottlenecks. Compared to the 2010 situation (ETISplus data analysis), the location of the bottlenecks is similar. According to the national forecast, the German project list covers a number of capacity projects. Available capacity is improved moderately at the nodes of Hannover, Hamburg, Bremen and Berlin. The most significant improvement is expected in the Ruhr-Area where there is a comprehensive improvement of capacity visible. Improvements are also visible at the section Köln -Dortmund – Münster- Osnabrück.

Congestion in Poland concerns mainly the urban nodes of Poznań and Warsaw. The southern bypass of Poznań, a dedicated section of A2 motorway is planned to be widened by the concessionaire of the implemented PPP scheme. Warsaw expects its southern bypass to be completed in 2020. However, in peak hours heavy congestion caused by local and regional traffic will remain a problem, especially along the bridges crossing Vistula River.

Sections of the Corridor in north-eastern and eastern Poland which were not upgraded to motorway or expressway status cause problems due to road safety issues and pollution in smaller cities along the corridor (e.g. Łomża, Suwałki).

The National Traffic Management System (KSZR) is a multiannual strategy in Poland to implement Intelligent Transport Systems (ITS) into the national road system with the objectives to raise the level of road traffic safety, to reduce travel time, to optimise the road maintenance management, to improve the environment protection and to increase the travel comfort.

In Lithuania, road congestion is seen around the nodes of Vilnius and Kaunas, which is expected to grow with transit traffic development on Via Baltica and increased demand on Kaunas – Vilnius axis.

In Latvia, road congestion is seen around the node of Riga, which is expected to grow moderately along with transit traffic development on Via Baltica. Capacity enhancement projects on relevant sections of Via Baltica are planned.

5. Planned projects by transport mode

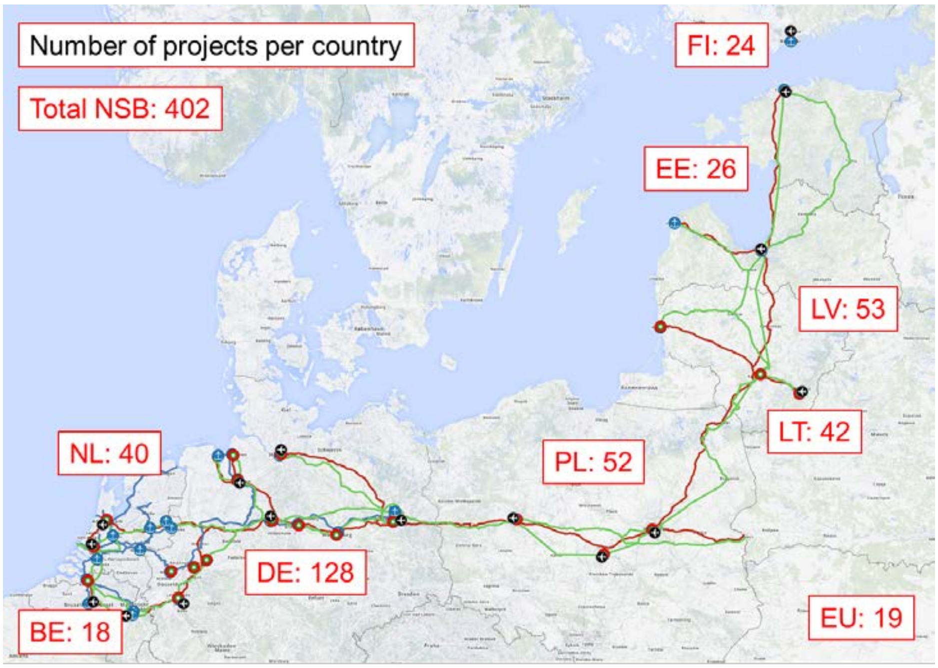
This chapter presents the overview of planned projects on the North Sea-Baltic Corridor by transport mode. During the 2014 Study, numerous projects have been identified mainly by the Member States and the involved stakeholders. Since completion of the 2014 Study many projects have changed significantly, therefore the project list has been updated and new information collected. Furthermore, the project list was enriched by the input from the Connecting Europe Facility (CEF) transport call results, the new national infrastructure plans and the Rail Freight Corridor (RFC) implementation plan. Extensive consultations with the European Commission, Member States and the Corridor Forum stakeholders have been conducted, in order to harmonise the project lists and to ensure the completeness and accuracy of the information gathered.

The information on the project list is preliminary and based on the situation as at 13.05.2016. Further updates in the project list will be reflected in the next version of the Work Plan.

Project list

Altogether 402 projects have been identified for the North Sea-Baltic corridor, and the figure below presents the number of projects per country.

Figure 6: North Sea Baltic corridor project list split by countries



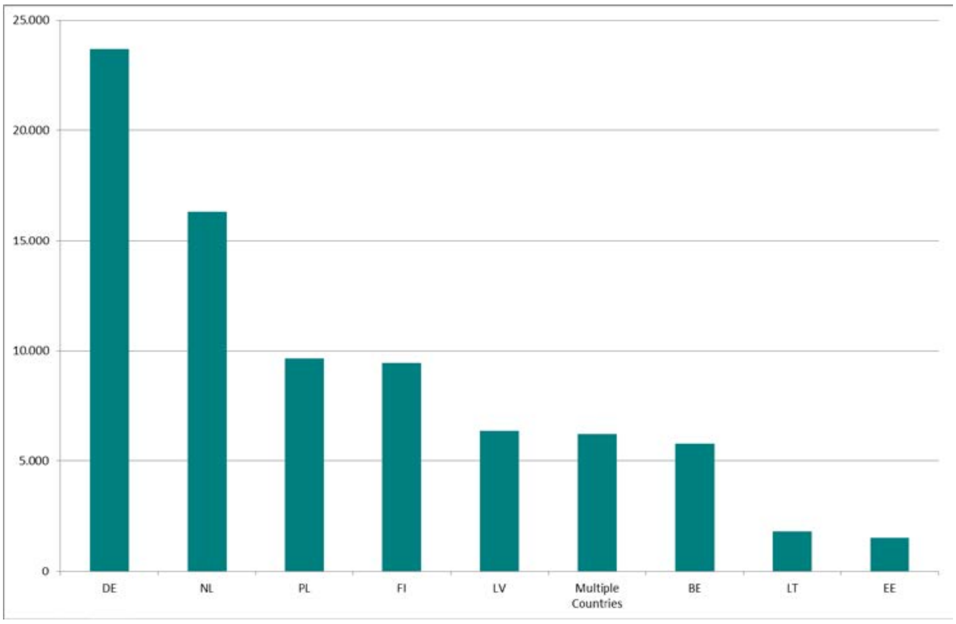
The distribution of projects across the countries located on the Corridor is unbalanced. Finland, Estonia and Belgium have identified less than 30 projects for the ongoing and future development of the Corridor. Latvia, Lithuania, Poland and The Netherlands each add another 40-53 projects while Germany has identified more than 100 projects. 19 projects are cross-border projects or projects involving more than one country on the Corridor.

One reason for this uneven distribution is the length of the respective network for the different modes, for instance, the rail network in Germany accounts for 39% of the total rail network of the Corridor, and inland waterways are only present in Germany, Belgium and The Netherlands.

Investments planned

The figure below presents investments planned per country across the Corridor. The total planned investment amounts to around 80 billion EUR and sources of financing will be very much Member State specific. Rail Baltic project is presented as multiple countries project with approximately 5.9 billion of investments planned (including Kaunas-Vilnius connection).

Figure 7: North Sea Baltic corridor project investment split by countries



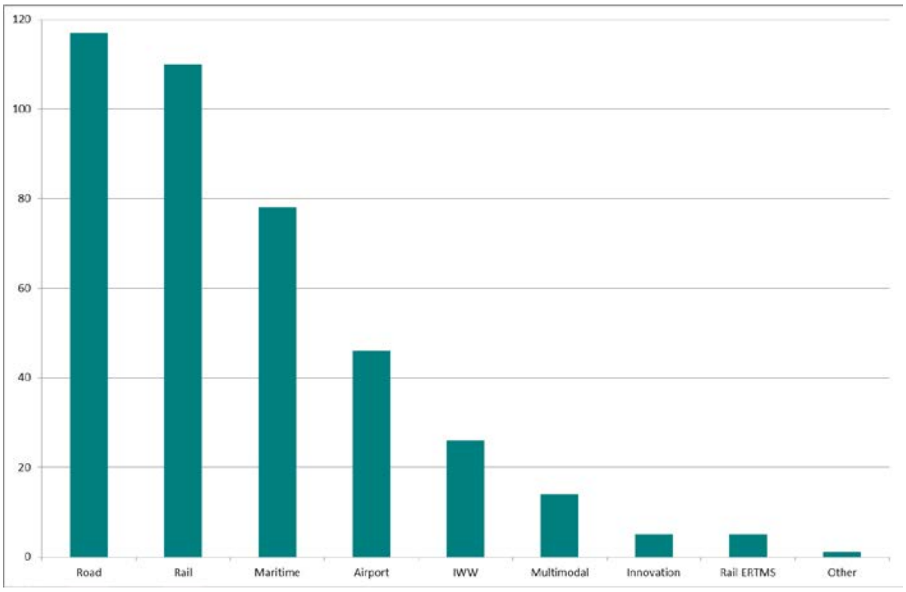
Without reference to the number of projects per country the distribution of the total investment on the Corridor is more balanced. In Estonia and Lithuania, the total investment is less than 5 billion EUR, but for most countries investments between 5 and 10 billion EUR are foreseen. The Netherlands with approximately 16.4 billion EUR and Germany with approximately 23.7 billion EUR are at the top end.

Overall, the quantity and quality of the projects per country reflects the situation of the networks in each country. In Germany, a large number of projects with a comparatively low investment per project correlate with a low number of projects with much higher investments per project in Finland, Belgium and Estonia.

Transport modes

The figure below shows the number of projects per transport mode.

Figure 8: North Sea Baltic corridor projects split by transport mode

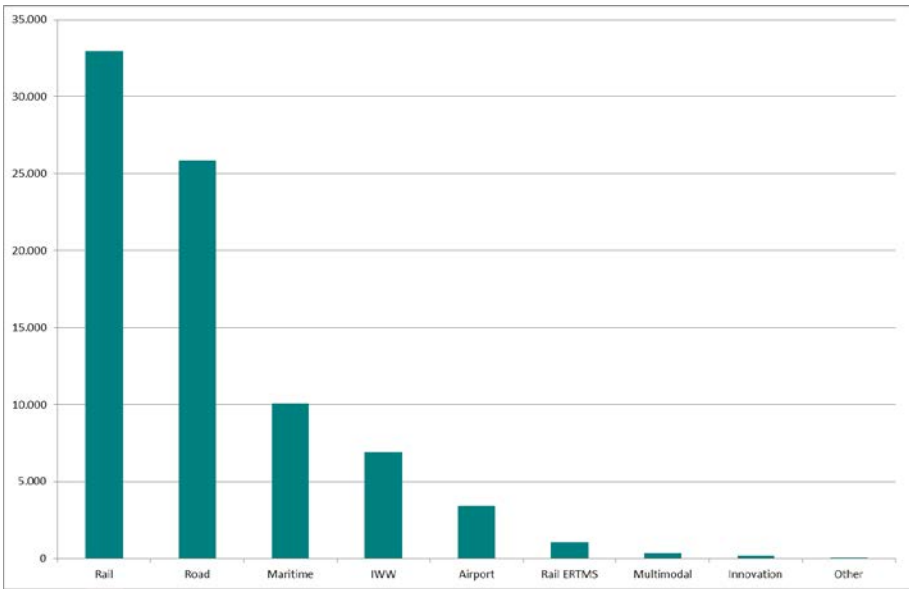


Road, rail and maritime projects play the most important role for the development of the Corridor. Maritime projects also include those road and rail projects located in the vicinity or in a seaport itself. This emphasises the importance of the maritime ports on the Corridor and also the high priority of hinterland connections.

The number of projects related to the categories airport, IWW and multimodal are much lower. This reflects the differences in the size of the networks. Only a small number of projects have been identified so far for the categories innovation and ERTMS.

The figure below shows the investments per transport mode. The highest investments relate to rail and road and per transport mode the amounts exceed 25 billion EUR. Less investments are planned for maritime and IWW projects amounting around or below 10 billion EUR. However, this analysis is still only an intermediate observation, as there is missing information on the investment, as for 64 projects (15.9%) the parameter “total investments” stays “unknown”.

Figure 9: North Sea Baltic corridor projects investments split by transport mode



Investments in rail

The planned investments per transport mode highlight the importance of the railway development on the Corridor. Rail demands for the highest share with 46.3% of planned investments: more than 30 billion EUR are assigned to develop new railway lines and to eliminate the bottlenecks.

The need for such a significant investment is highlighted in the technical compliance map presenting the situation in year 2015 for certain requirements of the TEN-T Regulation. Many lines are identified as non-compliant and significant investments will be planned. Investments relate to the Rail Baltic project (5.9 billion EUR), electrification of lines in the Baltic States (outside Rail Baltic project, close to 1 billion in LV and LT), new and upgraded lines in Poland (8 billion EUR), electrification, speed and capacity issues in Germany (9 billion EUR), speed, interoperability and capacity issues in Belgium (1.7 billion EUR),connection to airport and other projects in Helsinki (6 billion EUR).

There are two missing links identified: Rail Baltic and the high-speed line Poznań-Lodz-Warsaw. The realisation of the Rail Baltic is taking place and is a coordinated action among the countries.

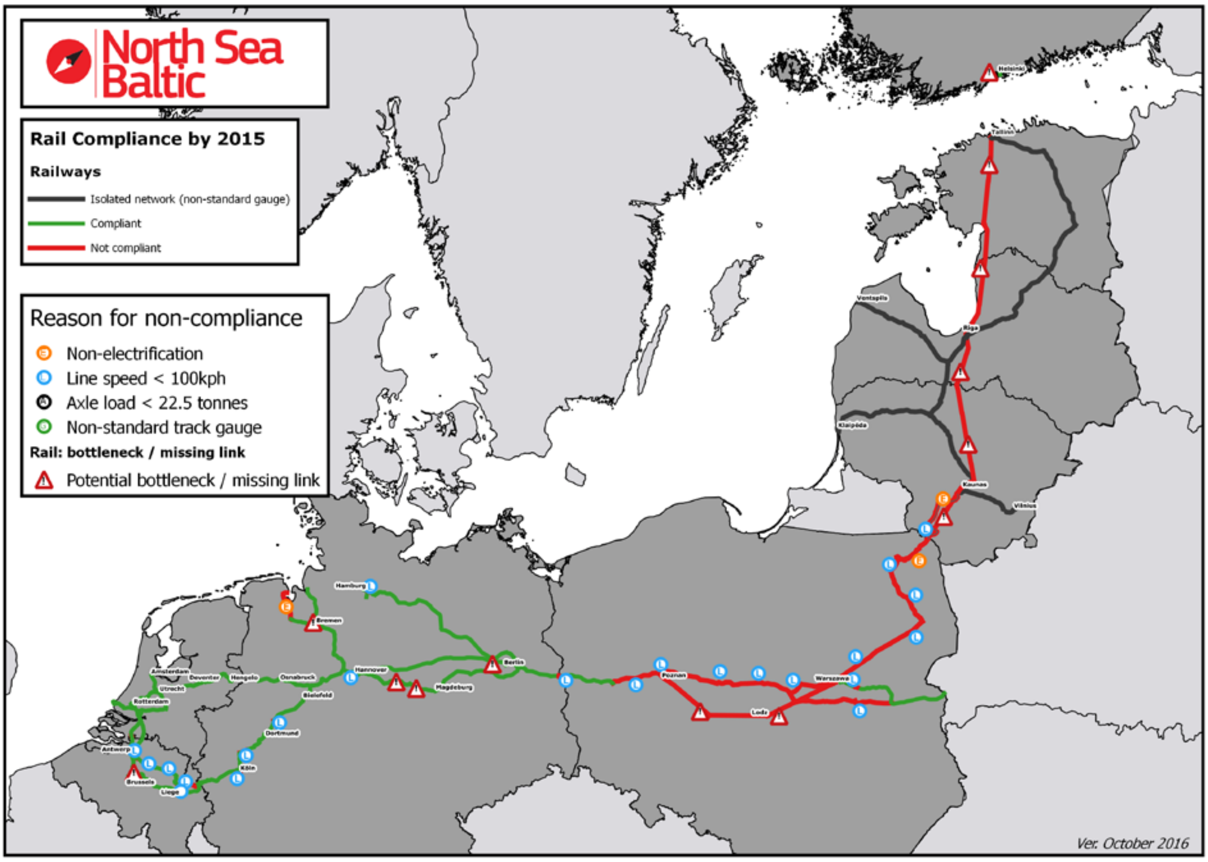
Electrification is ongoing at the port of Wilhelmshaven, in the Bremen region and completion is foreseen by 2022. Electrification projects in the Baltic States (including Rail Baltic) are expected to be finished by 2025.

Line speed is expected to be significantly improved in Poland, for instance at the urban nodes of Warsaw and Poznań. As these are urban areas, it is possible that the design speed of the section will allow high speeds, however the actual speed will be lower.

Capacity issues in Bremen are expected to improve according to the German national forecast, but not enough to relieve that capacity bottleneck in total. Bremen is located at an end point of the corridor. In the German National forecast Hannover-Magdeburg and a section near Berlin are expected to feature persisting capacity issues, taking into account the planned projects. The same is true for the capacity issue at Antwerp-Mechelen.

Train length is not represented on the maps below, although there are some crucial non-compliant sections, as well as restrictions for operational reasons. 11 projects on train length are foreseen on the project list, but not expected to change the situation significantly.

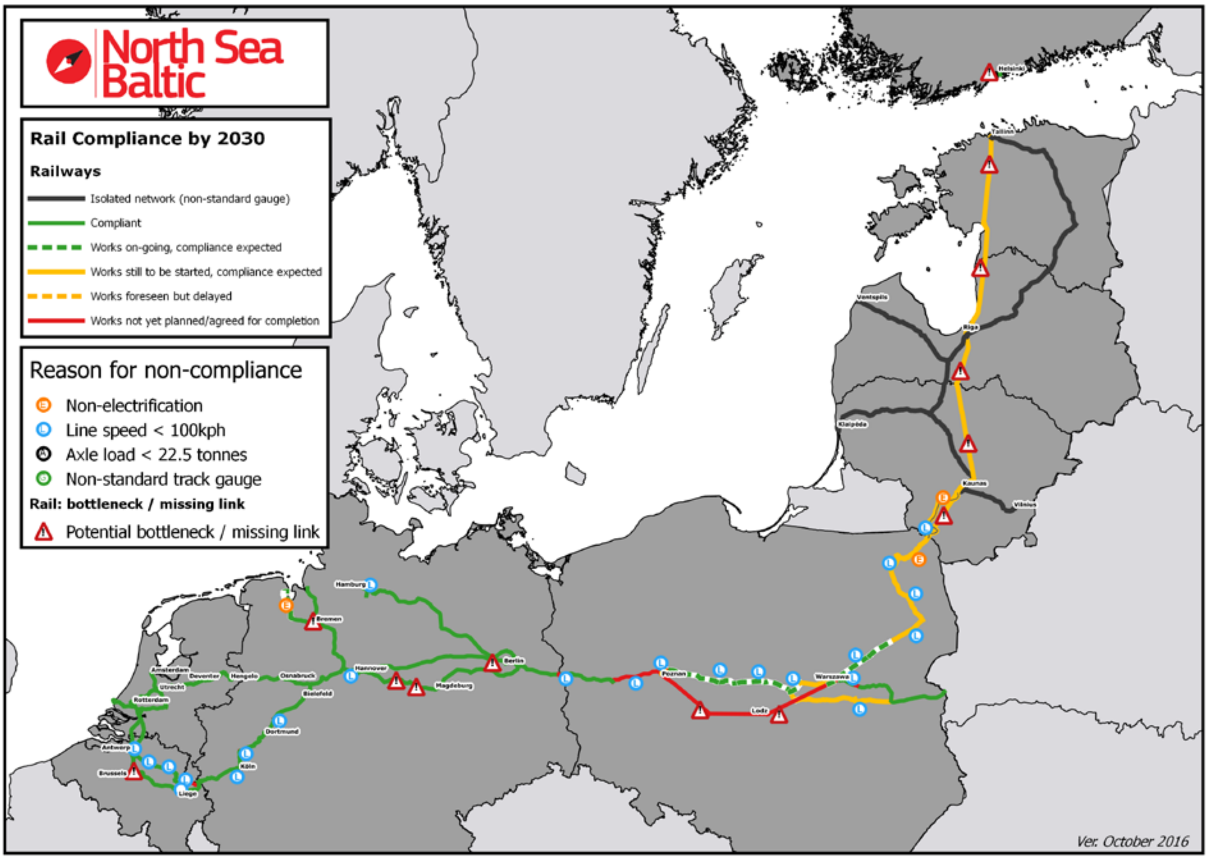
Figure 10. Rail compliance by 2015[1]



Almost 100 projects requiring 30 billion EUR investment will contribute significantly in the improvement of technical compliance issues as it is demonstrated in the map below on the projected compliance situation in 2030, based on the current project list.

1 Line speed < 100kph: In Germany, these sections are mainly separate freight lines, links and bypasses in and around urban areas.

Figure 11. Rail compliance by 2030



Investments in road

Road covers for more than 25 billion EUR or around 30% of the total investments. This is due to the fact that most road projects deal with upgrading the already existing infrastructure, such as adding additional lanes or renewing bridges, which is expensive.

The planned investments will help solving congestion problems in Germany (9 billion EUR), The Netherlands (8 billion EUR), Belgium (3 billion EUR).

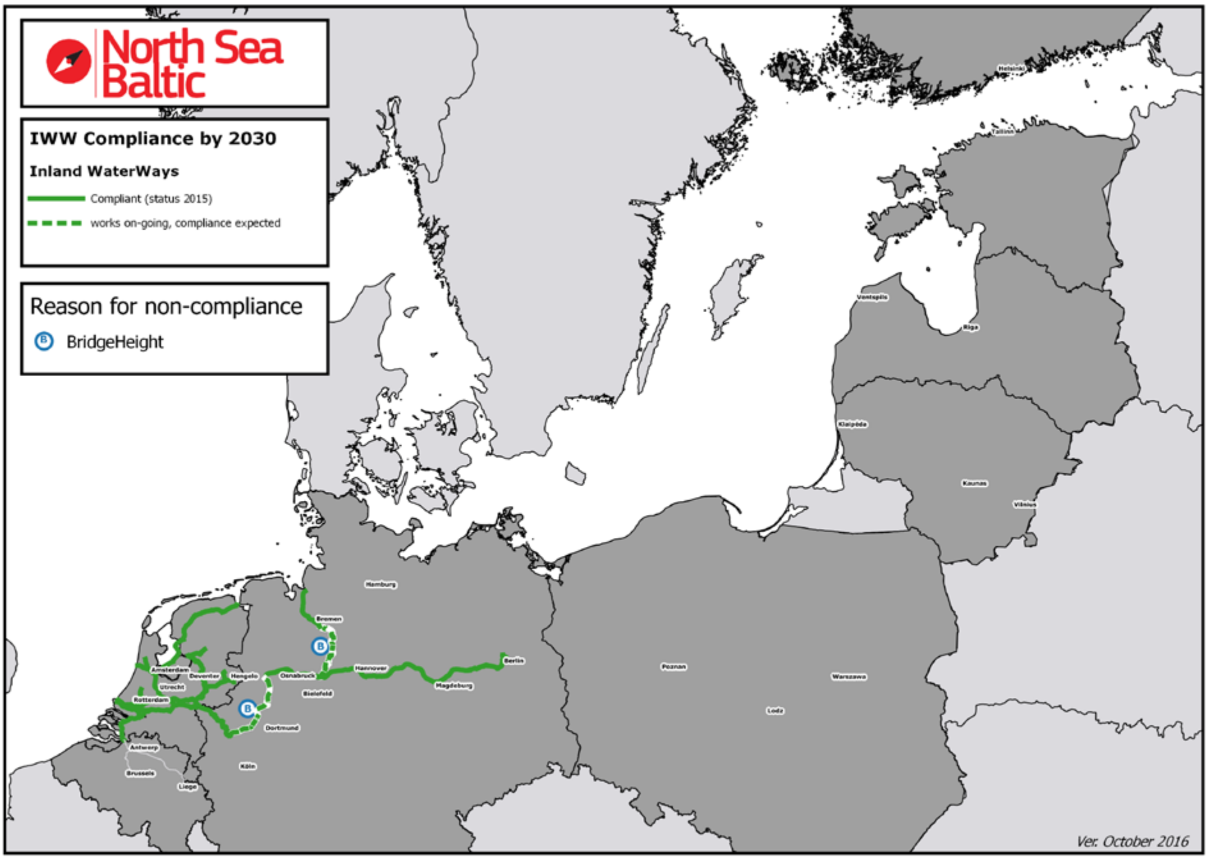
The project list covers the existing gaps in the east of Poland, enabling a connection to the Baltic States via motorway. Significant improvements are also planned in Latvia amounting to 3 billion EUR focusing on the Riga urban node and improvement of Via Baltica in some parts, as well as in Lithuania amounting to 454 million EUR. The works do not coincide time-wise: the Polish sections are expected to be completed by 2020,Lithuanian sections are expected to be completed by 2025 whereas the remaining Baltic States' sections are expected to be completed by possibly 2030. Additional investments would be needed in the Baltic States to reach compliance with the TEN-T standards for expressways by 2030.

Investments in IWW

The largest investments in IWW will be made in Germany (5 billion EUR) mostly addressing compliance issues and in The Netherlands (2 billion EUR). IWW projects for Belgium are included within the North Sea Mediterranean Corridor Work plan.

With the projects already started in Germany to reach compliance in terms of bridge height, the IWW network is projected to be fully compliant with the TEN-T Regulation requirements by 2030 as demonstrated in the map below.

Figure 12. Inland Waterways compliance by 2030



Going beyond compliance, there are eight projects covering a CEMT V upgrade; two of them are at the outer end of the corridor Zaandam and the Twente Canal.

Assuming that the CEMT IV projects are finished by 2022-2024 and taking into consideration the time required to complete the rest of the CEMT Va projects, the soonest the corridor is foreseen - based on the existing project list- to be CEMT Va compliant is 2026-2028. The last project to finish is the IJssel section.

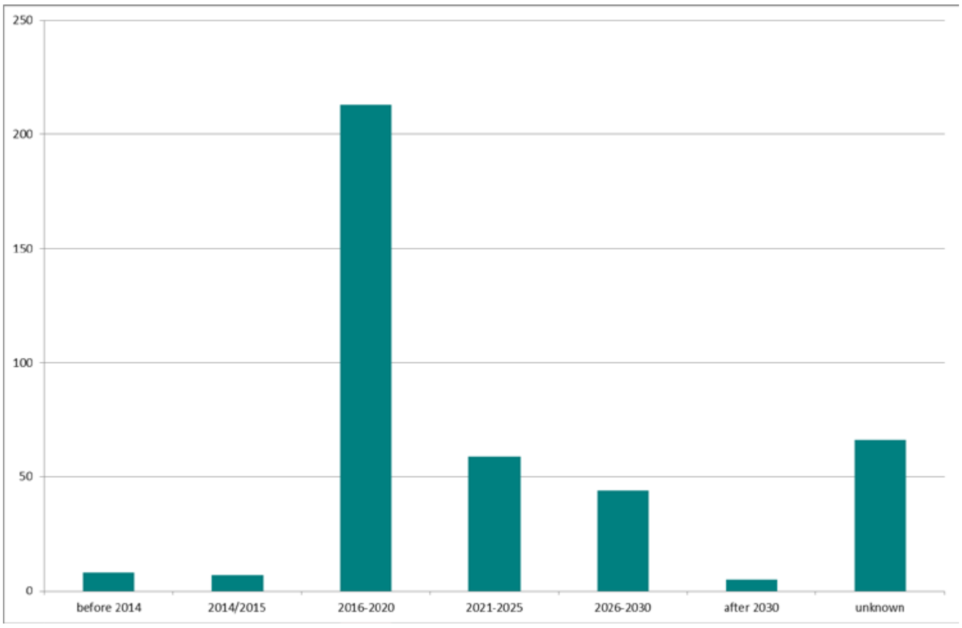
Investments in Maritime

The investments to maritime mostly relates to investments in ports in Estonia (1 billion EUR, port of Tallinn), ports in Latvia (2 billion, ports of Riga and Ventspils), ports in Germany (5 billion EUR) and The Netherlands (1.3 billion EUR).

Implementation timeline

The figure below highlights the projects according to their planned implementation timeline.

Figure 13: North Sea Baltic corridor projects according to completion deadline



More than half of the total number of projects in the project list will be implemented by the end of 2020 (56.7%). This clearly shows that the realisation of a large number of projects is already ongoing. Another 25.6% will be finished by 2030, which is just in time for the fulfilment of the TEN-T technical compliance requirements.

There are, however, 66 projects (16.4%) for which the end-date is not yet known. This is usually due to the fact, that the planning of the project has not been finalised yet.

6. Infrastructure funding and innovative financial instruments

During the first CEF call of 2014, a total of more than 1.8 billion EUR were allocated to projects on the North Sea-Baltic Corridor. The second CEF call of 2015 entailed a further 900 million of co-funding for projects on the Corridor. These projects are fully in line with the priorities of the Corridor Work plan, but obviously far from sufficient to achieve the objectives set for the realisation of the Corridor.

The development of Core Network Corridors requires, inter alia, a critical mass of investment to take place within a short time-framework; therefore, a careful examination of the potential financial sources has to accompany the Corridor planning. Some key criteria to be appraised are reported in this section of the Work Plan.

The projects to be developed can be ranked in three different categories from the point of view of funding and financing needs:

- **For several revenue generating projects "closer to the market"**, in terms of development (technological components, including on large infrastructure of key European Interest, brownfield upgrade) or service provision (terminals for freight / passengers, enhancement of infrastructure capacity / performances), a substantial component of the project funding can come from own resources (e.g. equity) and financing resources gathered by the project promoters on the market (e.g. in the form of equity, loans or bonds). The private investors would need to recover their initial costs of capital and receive a reward for the risk born (the higher the risk the higher the return required).

  The project may look at conventional lending from public and private banks, alternative financing from institutional investors (e.g. bonds) and at financial instruments, for instance, to cope with the unbalances of cash-flow during its construction and ramp-up phase until a sustainable flow of revenues is secured, and to address particular risks and market failures, and to secure lending with long maturity. Financial instruments could be provided in the form of credit enhancing and guarantees (be it a specific legal guarantee or a financial guarantee to ease access to financing).

- **Hard-infrastructure, greenfield, risky, long-term projects** such as the majority of cross-border railway connections as well as inland waterways navigability improvements might require a substantial public support through public funding, even if innovative approaches can apply to project development and/or to specific components of the investment. Public funding can be structured in different ways (also depending on the budgetary constraints of the public authorities) such as lump sum subsidy (grant), fiscal incentives, operational deficit coverage and availability payment schemes.

- In a variety of **intermediate cases** the project will require a more limited funding component in order to reinforce its financial viability – these projects could be supported through a blending of funding (e.g. grants) and financing.

  In this respect, beside the national budget, the funding contribution can effectively come from the EU centrally managed funds, such as the Connecting Europe Facility (CEF) and from decentralized managed funds, such as the European Structural and Investment Funds (ESIF), while the financing resources may came from the EU financial instruments, such as the CEF Debt Instruments and financial products available under the European Fund for Strategic Investments (EFSI).

For these 3 different categories of projects the public intervention with the different degree of intensity is justified on the ground, that these projects of high socio-economic and EU added value substantially address overall the public service obligations, suboptimal investment level, market failures and distortion due to externalities (positive, for the projects supported, including in terms of strategic added-value, and negative for competing modes), and, therefore, calls for the transfer of resources.

When considering the project funding structure in a comprehensive and multimodal setting, earmarking of revenues and cross-financing solutions, applying "polluter-pays" and "user-pays" principles ought to be duly explored.

A project can be fully developed through project financing if the revenue stream (secured by public and/or private funding) exceeds the investment and operational costs. Such an approach calls for a careful risk sharing between the Member States (project management) and private partners.

Notwithstanding the project self-financing potential linked to user fees, a cautious and innovative approach aimed at exploiting the project's life-cycle and define clear responsibilities and risk sharing between project promoters, sponsors and implementing bodies is more and more needed to deliver projects on time, cost and quality and to fully exploit the potential, while minimising future liabilities on public budgets.

A pre-condition for project financing is a conducive regulatory and legal environment, in order to set the incentives right to enhance the public and private sector involvement in the delivery of infrastructure investment.

Within the North Sea-Baltic Corridor, a screening exercise on the projects' list has highlighted the following projects for their future potential development through Innovative Financial Instruments:

- Alternative fuels infrastructure;
- Rail connections to airports and airport capacity expansions;
- Port development projects;
- City ring roads.

Increasing the budgetary support for transport at European level

The investment needs on the North Sea-Baltic Corridor – as well as on all other core network corridors – are extremely high. There is no doubt that the entire budget for transport under the Connecting Europe Facility will be used; indeed the majority of funds has already been committed by mid-2016 within the first two calls for proposals that were both massively oversubscribed. At the same time, high quality projects were submitted which did not even get funding due to the budgetary constraints. In this context, I will do my best to raise my voice during the Multiannual Financial Framework (MFF) midterm review and the budgetary negotiations for the next funding period for an increase of the CEF budget in future.

Considering innovative financial instruments next to grants

Considering the extremely high investment needs on the corridor, they cannot be met by grant financing only – even if a future CEF 2 budget was increased. In addition to the European Funds (European Structural and Investments Funds (ESIF), Connecting Europe

Facility (CEF), it will be in the interest of a timely implementation of the North Sea-Baltic corridor network to look for additional financial means. In this context, we also need to take advantage of the 300 billion investment plan of President Juncker (European Fund for Strategic Investment) and do our utmost to capture its expected growth impulses for our corridor. This is why I strongly recommend considering alternative ways of financing such as the use of innovative financial instruments.

7. Critical issues on the North Sea – Baltic Corridor

This section presents the critical issues of the infrastructure, which currently still hinders the functionality of the Corridor to provide a smooth freight and passenger transport by 2030 and will contribute to the better performance of the Corridor.

An important aspect to keep in mind is the overall European transport policy goal of shifting medium and long-distance freight from road transport to more sustainable modes of transport like railways, inland waterways and short-sea-shipping.

Cross-border links

The most critical cross-border issue on the Corridor is the missing 1435 mm UIC standard gauge railway line from Tallinn to the Polish border through the Baltic States that needs to be addressed via the implementation of the **Rail Baltic project**. The standard gauge is completely lacking across two national borders from Estonia to Latvia and Latvia to Lithuania. Even though Lithuania has completed a dual gauge/parallel 1435/1520 mm track from the Polish border to Kaunas, this line has restricted speed limits of 80 km/h for freight and 120 km/h for passenger. The line is also currently without electrification or ERTMS, which is planned to be installed by 2020 pending the outcome of the joint feasibility study on the upgrade of this section.

It is planned, that construction works for the Rail Baltic project in the different countries will be started until 2020, completed in the three Baltic States by 2025 and the connection with Warsaw to be fully functional before 2030, in respect of the timeline to be agreed by the partners, as stated in the Rotterdam Joint Declaration of June 2016.

Without the full implementation of the Rail Baltic line, the flow of goods and services from the rest of the Single Market cannot pass easily by rail into the Baltic States and on to Finland or vice versa. The Corridor cannot operate at its full potential if the situation of two different gauges would remain in place. The freight and passenger rail traffic is currently low because the infrastructure in the North/South direction is not adequately connected or interoperable, and traffic is dominated by trucks and cars. The Baltic States can highly benefit from the symbiosis of the new Rail Baltic railway and the currently dominant East/West trade flow. The Baltic States also need to become better connected to the rest of the EU for strategic reasons in the current geopolitical realm.

Cooperation has already been engaged between the Baltic States in order to prepare for the project implementation, supported by the European Coordinator whenever required and with substantial financial support from the CEF (85% co-funding rate). To support the Member States holding shares in it, the Joint Venture RB Rail AS is fully responsible for coordination, implementation and facilitation of the Rail Baltic project.

Poland is currently completing upgrading works on the section Warsaw-Sadowne-Czyżew and plans for Czyżew-Białystok are being prepared. Problems still remain on the Białystok- Polish/Lithuanian state border section. Poland is carrying out a new feasibility study that should allow determining how the sections north of Białystok on its territory can be developed in conformity with the TEN-T and CEF Regulations, taking into consideration the environmental issues as well as economic justification for each alternative. The results of the feasibility study shall be fully taken into account by the Member States involved in order to obtain a fully functional Rail Baltic and open the possibility to apply for co-funding from CEF for the detailed design and works in Poland from Białystok to the Polish-Lithuanian state border.

As regards the coherent development of the cross-border section between Lithuania and Poland, an action plan based on a step-wise approach will be deployed following the above mentioned feasibility study in order to ensure that the requirements of the Regulations are fulfilled as well as in line with the Shareholder Agreement of the Joint Venture RB Rail AS. Such close cross-border cooperation is crucial for the interoperability of the line, in particular when it comes to technical parameters of design speed, the deployment of ERTMS and the timeline of their implementation.

Furthermore, within the framework of the Corridor, Vilnius is of course one of the capitals to be connected. In that perspective, a joint agreement has been reached that Vilnius will be connected by a 1435 mm line to the Rail Baltic north/south axis at Kaunas ensuring that all Baltic States capitals and Warsaw are connected in the same network, in line with the Shareholder Agreement of the Joint Venture RB Rail AS.

In the longer term future, Helsinki and Tallinn reflect on the possibility to be connected with a submerged railway tunnel (the FinEst link). However, the project is in early stages and its economic feasibility has not yet been analysed. Currently it is not anticipated that any significant investments relating to the FinEst link will be made before 2030, except for certain feasibility studies.

Rail technical compliance

The rail technical compliance at the Corridor level is highly dependent on implementation of the Rail Baltic project, as it will bring the Corridor's Eastern part to full compliance in terms of speed and electrification parameters. It should be taken into account that the rail technical compliance assessment for the Corridor is influenced by the exemption related to isolated networks in the Baltic States and Finland (1520 mm and 1524 mm networks).

Overall, the rail network of the Corridor features the highest non-compliance in terms of KPIs in comparison with other transport modes. At the Corridor level, only one of the KPIs for rail was fully met in 2014.

ERTMS is only active on 7% of the Corridor's rail network. In some parts of the Corridor, such as the isolated 1520/1524 mm networks in the Baltic States and Finland, ERTMS is not planned or required.

In December 2014, the European ERTMS Coordinator started a consultation with Member States about ERTMS implementation of the Core Network Corridors, with the aim to review the current European Deployment Plan (EDP) of 2009. This activity launched a close dialogue in all TEN-T corridors with the Member States. The Coordinator had numerous bilateral discussions with high-level representatives of the Transport Ministries and Infrastructure Managers. This review process has been closed, and the new EDP will be part of the Work Plan for ERTMS 2016. The reviewed ERTMS deployment plan shall cover all the TEN-T Corridors alignments and will be then subject to a Commission adoption procedure to be finalised by the end of 2016.

The overall **electrification** level is 74% for the Corridor. However, there is no electrification on some short stretches in Poland and the access to Wilhelmshaven in Germany. The Baltic States networks mainly have diesel operations, except for the planned Rail Baltic line and some sub-regional lines for passenger transport around the capitals. All Baltic States are planning electrification for some lines of the isolated network (upgrade existing electrified lines and/or add electrification to some non-electrified lines) but some decisions are yet to be taken.

Non-electrification of the cross-border lines only influences the Baltic States and their connection to Poland. The Corridor has different voltage systems in use, but this problem can be solved having a converter on the locomotive and is not a recognised interoperability problem.

Line speed compliance level for the Corridor is estimated at 61%. After completion of the Rail Baltic project, the Baltic States' network will be compliant. Some speed limits are identified in Poland, Belgium and Germany, mostly around urban areas.

Train length KPI shows the highest compliance level – 85%. Train length limitations are present in Poland, whereas in Belgium there are train length restrictions during peak hours and in Germany 740m trains can be operated at certain times in line with the timetable.

A slight incompliance of 1% with **axle load** requirements was revealed in Poland (compliance level 99%). The axle load is generally not a problem in the isolated networks in the Baltics, which are generally used for East-West cargo flows.

Rail bottlenecks

Rail infrastructure bottlenecks can be observed around the nodes of Helsinki, Warsaw, Poznań, Mechelen, Brussels and the hinterland connections of Hamburg and Bremen. That is closely related to the fact that shared freight and passenger lines within urban areas limit the traffic capacity for passenger transport, but also have environmental consequences.

In the Helsinki node, the congestion relates to the centre of Helsinki. Projects are planned to create an underground Rail Loop in the centre, improve the Helsinki railway yard, marshalling yard and interlocking system, as well as to connect long-distance trains to the airport.

Both Warsaw and Poznań have an internal dedicated city bypass foreseen to separate freight and passenger traffic with an overall goal to increase line capacity for both. It allows better connections for passengers within the urban nodes. However, railway sections close to nodes will still suffer from rail congestion in peak hours (mixed international, national, regional, and metropolitan and cargo traffic). This refers mainly to suburban mainlines around Warsaw metropolitan area (especially western and south-western). The definite solution of rail congestion in peak hours is a proposed high speed line connecting Warsaw, Łódź and Poznań as well as modernisation of Warsaw's southern rail cargo bypass (C-E-20 mainline, sections Łowicz-Skierniewice-Pilawa-Łuków).

Also in Bremen, a freight bypass rail link is needed to divert the freight traffic from Bremerhaven passing through Bremen central station which is reaching saturation point. The last section of the rail line from Oldenburg to Wilhelmshaven port currently has no electrification. Improvement of this hinterland connection could greatly contribute to better freight connections and an increase in traffic.

Antwerp port hinterland connections need improvement. The large quantities of freight between Antwerp and Leuven influence the Mechelen node where traffic should be diverted from the urban area. On top of that, in its actual configuration the route through the city of Mechelen leads to a system break affecting the continuity of long-distance and cross-border high speed rail services. The rail by-pass of Mechelen is necessary in order to allow an increase in the speed, punctuality and capacity of this section. Additionally, although not in the corridor alignment, the North-South junction railway is a major bottleneck for national and international rail traffic on the corridor. Improved freight connections to Germany would be an aspiration for the future. For example the Iron-Rhine axis, even though not part of the technical alignment of the Corridor could provide an improved and quicker connection for freight traffic to the Ruhr area. A study co-funded from CEF is ongoing to study all the options for rail freight capacity improvement.

In addition to good freight connections, smooth, comfortable and efficient rail connections for passengers are important for the functioning of the Corridor and for giving it identity among European citizens. From the West until Warsaw rail connections for international passenger transport is in operation and the train, whether high speed or conventional, provides an acceptable service for travellers and often is more attractive than the air alternative particularly for shorter distances. However, from Warsaw eastwards, the international passenger service does not provide the service to attract many rail passengers. The Corridor could provide an excellent service for long-distance international passenger travel by rail if improvements were carried out. To achieve this more efficient, faster and fully functioning passenger Corridor, all Member States should aspire to further raise the speed of the passenger trains not only on the whole Baltic States – Berlin axis, but also on the Hannover – Amsterdam section. Taking into account the developments of the new Rail Baltic project; due consideration should be given to the continuation of the higher-speed passenger lines. The Rail Baltic project could inspire also other Member States on the Western part of the Corridor.

Seaports technical compliance and bottlenecks

The Corridor has a heavy concentration of maritime ports. For the development of this Corridor, ports have a particular strategic relevance as these are the main gateways between the EU market and its commercial partners in the globalised world beyond.

The bottlenecks for the seaports are determined by the non-existence or the lack of capacity of rail connections, the connections to IWW CEMT IV, as well as non-availability of clean fuels.

The passenger and *ropax* terminals in the centres of Helsinki and Tallinn have limited road access through the city streets. The current terminals were planned mainly for passenger traffic, but the most profitable operations are achieved by combining cargo (ro-ro) and passenger traffic. The project list of Estonia includes the construction of a new seaside road access to the Old Port in the centre of Tallinn, which helps cargo traffic to avoid the centre of Tallinn and improves its connection to Tallinn ring road. In Helsinki, the only economically viable solution is seen in better traffic management systems. However, both Helsinki and Tallinn have separate ports for cargo (Vuosaari and Muuga, respectively), which have both railway (1524 mm and 1520 mm, respectively) and road access. The Muuga port will be connected to the Rail Baltic (1435 mm).

The Old Port in the centre of Tallinn is currently not connected to railway. While it is not intended to enable rail connection for cargo traffic, Estonia plans to construct a tram connection from the Old Port to the centre of Tallinn and to the Ülemiste railway terminal, which is to become the final railroad passenger terminal of Rail Baltic.

The future plans foresee connecting Riga port directly into the TEN-T network via the Riga Northern Transport Corridor for which implementation has already started. Similarly, rail access improvement projects are also planned for Riga port.

The Port of Antwerp lacks rail and road capacities to its hinterland. Projects are being carried to alleviate bottlenecks and ease transportation between the Port and Germany. Amsterdam and Rotterdam ports both have direct road and rail access, though capacity issues do exist. Projects have been planned in both ports to deal with the problem in the future. Access by road to Rotterdam port is a major concern due to congestion.

The availability of clean fuels is problematic in the ports in Finland, Estonia, Latvia and Germany. Helsinki and Tallinn ports currently do not have specific infrastructures for alternative fuels although alternative fuels can be provided with trucks if needed. Nevertheless, Muuga cargo port in Estonia is participating in an LNG terminal development project and Vuosaari cargo port in Finland intends to improve the LNG-related infrastructure. The same relates to Riga and Ventspils ports where both ports do not have alternative fuels available. More alternative fuel terminals are needed within the Motorways of the Seas (MoS) concept and the accompanying problem is a low take-up of vessels being modified to have bi-fuel engines which require cooperative actions by both, the ports and the operators.

The ice-breaking capacity in Helsinki and Riga port is to be considered as a bottleneck. The project list of Finland does not include an additional ice-breaker because the Port of Helsinki expects to rent it instead of owning it. The ice-breaker included in the project list of Estonia is also on the list of MoS projects because the same ice-breaker could be used for Tallinn, Helsinki and potentially also Stockholm (which is in the Scandinavian-Mediterranean Corridor), Riga and Ventspils.

For some of the ports the fairway access needs to be improved by dredging activities, especially in Vuosaari (deepening of the fairway), Ventspils (by improvement of maintenance dredging equipment), Riga (through capital dredging activities) and Klaipeda ports. Klaipeda port considers that procuring services for dredging maintenance in Klaipėda takes too much time, therefore it could be feasible to buy port's dredging equipment.

Several ports (such as Helsinki and Tallinn) have also started cooperating in using the ICT solutions for providing better and more efficient services and streamlining the services across the border. This also requires much more attention, cooperation and further action.

Inland waterways technical compliance

Currently most of the inland waterways networks on the Corridor correspond to the requirements and can largely accommodate current traffic needs, however, the compliance at the Corridor level is not ensured for the permissible draught (min 2.5 m).

There are two sections in Germany that have a minimum bridge height of 4 m which is not compliant with the Regulation requirement - the Weser section (Minden-Bremen) and on parts of the West German Canal network (RHK and DEK). Deventer inland port in The Netherlands is not rail connected, but it should be noted that there is a railway connection near the port within 5 km. This also relates to the ports of Nijmegen and Hengelo. Also alternative fuels/LNG availability is limited in inland ports.

Inland waterways bottlenecks

The most important capacity bottlenecks for the inland waterways network are the Amsterdam Sea Locks, the Beatrix Locks and the Eefde Locks. The future accessibility to Amsterdam port depends on the extension of the Ijmuiden locks. The capacity of the lock is no longer sufficient to accommodate the new generation of seagoing vessels and cannot deal with future traffic demands. The Beatrix Locks capacity needs to be increased to accommodate larger vessels and to enable them to continue further into the Dutch hinterland, especially to support the policy goal of cargo modal shift from roads to inland waterways. The Beatrix locks are the guarantee for good IWW connections between the ports of Antwerp, Rotterdam and Amsterdam.

In addition to these two specific issues, some inland waterways sections in Belgium and several in Germany need to be improved in order to facilitate continuous transport of containers with two layers without restrictions, the height of the bridges needs to be increased.

The capacity of the Albert Canal (part of the alignment of the North Sea-Mediterranean and North Sea-Baltic Corridors) is important. The Albert Canal has a limited height of several bridges and there is a capacity issue of the waterway between Wijnegem and Antwerp.

The availability of alternative fuels for inland waterway barges is starting to become available, but additional action is needed to diversify choices and provide access to the fuel at more diverse locations.

Compliance analysis on Kiel Canal and Albert Canal was not covered as a part of technical compliance assessment, as they are not part of the alignment, but should be mentioned as bottlenecks.

Bottlenecks exist in the form of accommodating larger vessels at the Twente Canals and securing sufficient mooring places for vessels and capacity of locks at IJmuiden, Volkerak and Beatrix locks. The projects to tackle these bottlenecks are ongoing. For all those sections there are projects either already underway or in planning stage. The list of NSB projects in Germany will be further updated in the light of the new national infrastructure plan (Bundesverkehrswegeplan 2030).

It could be acknowledged that problems are bound to arise taking into account future goals. Vessel size is increasing noticeably, setting the bar higher for the technical compliance of the infrastructure for depth, width and bridge height. Wider rivers allow more and longer vessels on a section. Sections of the inland waterways and locks cannot accommodate the size of the new barges and therefore some sections of the network are becoming not compliant when the bar is set higher. This bar can be set higher by European standards, or by to the daily users of the infrastructure of this sustainable transport mode.

Airports technical compliance and bottlenecks

Rail connections to the airports and clean fuel availability are the main critical issues for the airports technical compliance.

Out of the eight core network airports along the Corridor with the obligation to connect to rail by 2050 (Helsinki, Riga, Warsaw, Berlin Brandenburg, Hamburg, Cologne, Brussels, Amsterdam), six meet this obligation since 2014. In Helsinki in 2015 the new local passenger railway line was opened connecting airport and Helsinki city centre. In addition, there are plans to link Helsinki airport with long-distance passenger railway and cargo traffic.

Riga airport shall be linked during implementation of the Rail Baltic project which foresees construction of a railway passenger terminal in the airport.

Brussels Airport, Amsterdam airport, as well as all German airports are well connected to national and international passenger rail services, however upgrading of rail station Schiphol Amsterdam is being prepared.

The availability of **clean fuels** is not being ensured along the Corridor.

Road technical compliance and bottlenecks

At the Corridor level the road network compliance relates to the existence of express roads / motorways, which is not the case along the full alignment of the Corridor. The compliance level for Poland and Lithuania is around 55%, while for Latvia and Estonia it is below 10%. However, compliance issues in the Baltic States are treated as exception due to the lack of economic justification for expressways, therefore most of the issues identified relate to bottlenecks.

Capacity issues for roads could be identified in all countries. At the western side of the Corridor the problems mainly relate to the densely populated and economically dynamic regions. The problems are especially noticeable in and around urban nodes, where city bypasses and ring roads are often very congested. The road accesses of Brussels and Antwerp are heavily congested, causing delays and hindering the access of the Port of Antwerp. Projects are planned to alleviate this problem.

One particular bottleneck is around Bad Oeynhausen on the German motorway network where almost 10 km of the A30 motorway, which is the main road artery of the Corridor, is missing. However the 10 km Bad Oeynhausen bypass is under construction; expected opening for traffic is by end of 2018.

An important road connection between Poland and the Baltic States is the Via Baltica highway. The capacity of Via Baltica highway (road) is also to be considered as bottleneck for the main city bypasses (i.e. around Riga). However, it would be unjustifiable to have the entire Via Baltica as a 2+2 highway because the traffic volumes are not sufficient. Therefore, the NSB projects list in Estonia includes only a minor investment in Via Baltica. The projects list in Latvia also contains investments only in sections where traffic intensity justifies capacity enhancement, such as the Kekava bypass. In Lithuania, Via Baltica section from Polish border to Kaunas is heavily used and 2+2 highway is envisaged. A section from Kaunas to Latvian border, although facing congested traffic, is planned to be upgraded to 2+1 road. A noticeable problem on the Via Baltica road is the safety question due to heavy road use and it is to be highly encouraged that road safety improvements should be undertaken.

There is a need for roads to provide sufficient capacity for freight and passengers, although the solution might not always be a further expansion of the road network, however there are also significant investment needs for improving and maintaining road infrastructure along the Corridor, especially around urban nodes. Deployment of **Intelligent Transport Solutions (ITS)** along the Corridor is to be encouraged. Available real time information on congested road sections can help the users to better plan their movements. At the same time, it would also contribute to increased road safety. In Member States along the corridor ITS-related investments are already ongoing. For instance, Poland will implement a national traffic management System (NTMS) before 2020, deploying ITS traffic management on national roads. The NTMS will fully cover the North Sea-Baltic corridor in Poland.

Another aspect to consider is the overall **modal shift** from road to more environmentally-friendly modes, both for freight and passengers.

The policy goals related to availability of alternative fuels defined in the Alternative Fuels Directive should be taken into account when defining Member States long-term plans.

Urban nodes bottlenecks

Urban nodes bottlenecks on the Corridor mostly relate to last-mile issues and road congestion. Cities are addressing those issues with projects already under implementation or at the planning stage, often by means of construction of rail and road bypasses, improvement of interconnections of the corridor with feeder roads and the local urban transit system, and facilitating interchanges between modes. As traffic is heavily generated and attracted by urban nodes, high performance connectivity between the urban nodes and the axes of the corridor is vital in addition to the improvement of the corridor infrastructure towards the standards set in the Regulation.

In Amsterdam the highest congestion is present at the south of the city which will be addressed by the two passenger rail station upgrades: the central station and the south station Amsterdam-Zuid. Road congestion is present all around the city, and multiple road projects are ongoing to increase capacity. These projects range from local solutions (junction based) to pan-regional solutions, e.g. the project A1/A6/A9 Schiphol-Amsterdam-Almere, that costs around 5 billion euros. In Rotterdam, there are two road projects set to improve the last-mile access, currently hindered by congestion; that is the Blankenburg tunnel and the A13/A16 bypass.

In Antwerp, several rail projects improving the last-mile connections, and the capacity of the shunting yard are expected to be enhanced by 2020.Two sites have been targeted to successively remove cross-overs, namely *Oude Landen* and *Krijgsbaan*. Together, they should noticeably increase the port's access capacity, while the construction of a second access to the port of Antwerp is still envisaged as long term solution to support the development of the port. The Antwerp ring road is also planned to get a capacity upgrade by 2023.

In Brussels, the biggest projects focus on the connection between the corridors and reduction of congestion, for instance, a project set to improve the ring road capacity is planned to be completed by 2022, as well as the project to separate local and long-distance road traffic.

Berlin regional and long-distance rail passenger traffic faces congestion at the Spandau station and on the west-east connection (Stadtbahn, part of the North Sea Baltic corridor). There are four road capacity projects at a total cost of around 1 billion EUR. For Berlin urban node the completion of the airport project and related transport links is an important issue. In Hamburg, road projects are planned to improve the situation on the east motorway. There are rail capacity issues for passengers and freight, as well.

In Warsaw, there are projects constructing bypasses Warsaw-Minsk Mazowiecki and the Pulawska junction-Lubelska junction. There is also a project improving the Lubelska junction. Four projects are aimed at improving the local ring roads inside the urban area. Airport connections are planned to be improved for passengers (road and public transport access). Additionally, an air freight terminal is planned, including the connections to the network. In Poznań, the passenger rail node is expected to undergo an upgrade to improve the mode transfer for passengers and the project will be completed by 2020. Both Poznań and (partially) Warsaw have a bottleneck for train length, restricting train length to a maximum of 600m.

In Vilnius, there is a project to upgrade the air passenger terminal by 2019. Construction of Vilnius western bypass will be completed by 2017, while the southern part of a ring road around the city is expected to be completed by 2025.

Similarly as for other cities, in Riga, there are projects to improve the ring road and the urban road network. In addition, there are two projects for Riga rail junction and the port railway line to the northern port area Kundzinsala.

Tallinn is also characterized by improvements needed for the last mile links. Road-wise, there is the Tallinn Ring road project. Rail-wise, there is a project to the east as well as a railways bypass project to Paldiski City. The terminals necessary to change modes and featuring in the project list are Muuga, the Old harbour, Ülemiste and the Tallinn airport passenger terminal.

As for Helsinki, the current last mile rail connections to the ports, the airport and the urban area are not sufficient. The ring road is lacking capacity and improvements are also needed here. Extra facilities to provide multimodal transport are needed for the maritime port terminals (port of Helsinki West, South and Vuosaari). The quality of the railway lines within the node can be improved for the Helsinki shunting yard.

Solutions to remove existing and future bottlenecks in urban areas and to promote their integration in the core network should, wherever possible, consider the possible impact of soft policy measures to support the modal shift such as transport demand management and promotion of public transport, cycling and walking, in addition to infrastructure capacity expansion. For instance, ITS are expected to play an increasingly important role in order to use infrastructure in urban nodes more efficiently.

8. Recommendations and outlook by the European Coordinator

The Member States and other stakeholders have indicated a total of **402 projects** which are intended to contribute to the realisation of the Corridor. The total cost of realising all the projects presented would be **€80 billion** at current prices. By far the biggest investment portfolio is foreseen for the rail sector with more than 30 billion EUR. Nevertheless, it should be kept in mind that several large railway projects are overlapping with other corridors (for example, in Finland there is an almost 100% overlap with the Scan-Med corridor for the ca €6bln railway projects). As this proposed project portfolio far exceeds the finance available there is a clear need for prioritisation of the investments in favour of those that are not only quickly realisable but also those which will have the most EU added value and benefit the Corridor concept the most for the reasons I have already explained. It is important to indicate which are the most important bottlenecks and critical aspects to be dealt with for the timely implementation of the Corridor in its full length and capacity.

This Work Plan intends to set a framework for the implementation of the North Sea-Baltic Corridor and I expect that it will continue to guide the many discussions which I will have in the future with each of the eight Member States and their Ministers. This Work Plan shall allow every Member State to see how they are concerned by a particular issue. But there are some critical projects which need to be implemented. When prioritising the investments, it is important to think beyond the purely national concept towards true Corridor planning.

The functioning of the EU internal market is fully interdependent with the transport systems due to increased cross-border traffic flows. Therefore, the challenges of the infrastructure do not end at the border. The same is true for the necessary efforts for decarbonisation of transport, where the Corridor perspective can provide useful tools, as highlighted in the different issue papers that we have recently presented as Coordinators. Cooperation and coordination between the Member States are needed for a timely and parallel implementation of this new European Transport Policy. The work in the framework of the Corridor should steer this process.

For the countries with only one corridor passing through their territory, the efficient functioning of the Corridor is even more important because it is the only connection to the rest of the core network and to the EU internal market. The corridor infrastructure will form the main structure for the rest of the connections with which it is linked. For example, for Finland and the Baltic States, efficient Motorways of the Sea connections and port capacity play a crucial role in the connection with the network.

The top priority issues to be addressed for the functioning of the Corridor are in my view, the following:

- **Timely implementation of the missing cross-border link – the Rail Baltic project**;
- **The major bottleneck of the Amsterdam Sea Lock;**
- **The hinterland connection – rail, road and inland waterways – of the main ports;**
- **The interoperability of the railway network in close cooperation with the *"North Sea – Baltic"* Rail Freight Corridor;**
- **The efficiency of the main urban nodes, particularly the multi-corridor nodes.**

The most crucial issue which needs action is removing the missing rail link in the Baltic States and realising a proper interoperable railway from Tallinn to Warsaw. All the Member States concerned by the line need to work together with the same vision and timetable so that this major infrastructure project can be realised by the mid-2020s. Currently the main share of the international freight traffic between Tallinn and Warsaw is by road. Rail Baltic will create a backbone of the multimodal transport system in the Baltic States and will have a very positive effect on modal shift from road to rail.

The Rail Baltic line should be seen as a skeleton for further connections. The Motorways of the Sea link between Helsinki and Tallinn, together with good multimodal solutions and an operating Rail Baltic line will open many more possibilities to connect the freight and passenger traffic of that region with the rest of the European network and other Corridors.

It will also contribute to improved connections from Western and Central Europe to the markets of the neighbouring countries. The Rail Baltic will complete a loop in the Baltic transport chain along with the Scandinavian-Mediterranean Corridor, which can now consist of a rail and maritime connection between the Nordic countries, the Baltic States, Poland and Germany. I will support the so-called Bothnian extension of the North Sea-Baltic Corridor which would make the Corridor join the Scandinavian-Mediterranean Corridor at the border between Finland and Sweden and help in tapping the potential of the Northern Dimension in transport and logistics.

The dominant transport flow by rail in the Baltic States is for the moment still very much the East/West freight traffic to the ports of the Baltic Sea. The East/West flows exist also in Finland and Poland. All these connections can provide substantial feeding for the foreseen North-South Rail Baltic connection. These countries can then be seen as a gateway to the European market in the West. Despite the current geo-political situation, the Eastern and Northern emerging markets have a huge potential for the Corridor. The North-South Rail Baltic connection will be insurance for the Baltic States that they will be truly integrated into the European network and traffic flows.

As European Coordinator, I will therefore pay particular attention to the development and implementation of the Rail Baltic project and would like to assist all the Member States concerned and the Joint Venture based in Riga to ensure a coordinated and timely implementation of this project from Tallinn to Poland. This will in particular concern the interconnection of the nodes to the new Rail Baltic line.

Secondly, this Corridor is hugely dependent on the **ports** at both ends. Efficient connections with the rest of the network, both for passengers and freight, are crucial. The catchment of international traffic is the key factor for the success of the Corridor and the economies of the respective Member States. The major ports at both ends of the Corridor can support an increase of traffic of the whole Corridor, but also its hinterland if they are well connected. The "last-mile" connections to all the ports are therefore of major importance.

More efficient logistics solutions for transferring cargo to the hinterland connections are needed both in the Baltic and the North Sea ports. The aim of an efficient modal shift from road to rail and inland waterways can only then be fully achieved. The issue paper on multimodality brings forward key recommendations in order to achieve these goals.
The **Motorways of the Sea** policy has particular importance for this Corridor. There is a need to encourage the ports to cooperate more closely to improve their interconnectivity and upgrade the relevant infrastructures in order to promote the development of Motorways of the Sea connections. Mobility has been facilitated greatly by the ICT solutions. The Helsinki-Tallinn twin ports have created an efficient cross-border economic connection. This cooperation should serve as a benchmark for other ports as further e-links between ports are encouraged.

When it comes to the ports of this Corridor, an important current physical bottleneck is the access to the European network from the North Sea though the **Amsterdam Sea locks** which is one of the most important doorways to the European network. The capacity of the lock currently hinders the biggest vessels from accessing the port of Amsterdam and therefore limits the possibilities to further increase the cargo flows of the Corridor along the inland waterways and the railway network towards the heart of the Single Market. The project is in the construction phase and has received co-funding from the first CEF call of 2014. It is foreseen to be completed in 2019.

An important element in relation to ports and Motorways of the Sea is the **Kiel Canal**. Even though it is not part of the Corridor, as stated before, it remains a crucial connection in the Motorways of the Sea link on the Corridor. The Kiel Canal should be seen as a common interest to several countries and Corridors. For the North Sea-Baltic Corridor it crucially helps to facilitate the maritime connections of the Corridor - being the most direct connection between the North and Baltic Seas.

As part of the priority to improve hinterland connections of ports, **inland waterways** need to be brought up to the standards when it comes to locks, bridge clearance and canal draught. Actions are needed for example on the Beatrix locks, Twente Canal and on the German canal system. Some of these projects have received co-funding from CEF during the first call of 2014.

The interoperability of the railway network strongly relies on cross-border cooperation of the infrastructure managers as well as coordination of national transport plans. The cooperation within the framework of the Rail Freight Corridor can also help in making sure that works are coordinated in a way as to minimize impact on traffic flows.

As a former mayor of the City of Strasbourg I pay particular attention to the **urban nodes** on the Corridor since they serve as connecting points linking different transport modes. As also expressed in the Urban node Issue paper, there needs to be an excellent connectivity between the network infrastructure and the urban nodes, including the urban and regional traffic, for the Corridor to be fully functional. The multi-corridor urban nodes allow special coordination to achieve greater efficiency and synchronization between the different Corridors. Such effective integration of urban nodes in the Corridors needs strong multilevel governance.

There is a need to address the capacity issues in and around the urban nodes. It often requires solutions to separate freight and passenger traffic on urban railways and also to better manage the capacity limits on the city road bypasses. Sometimes major ports or rail-road terminals are in the very heart of the urban areas. In these cases important attention needs to be given to the "last-mile" connections to these facilities to make sure freight traffic will not cause congestion in city centres and bypasses.

Well-functioning multimodal platforms are crucial for the smooth transfer of freight. The freight villages in Germany and The Netherlands are best-practice examples. The further establishment of the freight villages, especially in border areas, will serve as a good base for cooperation between smaller rail-road terminals. But as a speciality of this Corridor, we should not forget the importance of integrating the inland waterway ports fully into the rail-road terminals. In the Baltic States the development of rail-road terminals and dry-ports is encouraged in parallel to the Rail Baltic project.

International cross-border traffic is the basis of the Corridor approach. This Corridor is already highly technological due to the Motorways of the Sea policy which has encouraged technological solutions for port interconnections. But much more emphasis should be put on the deployment of the new info-technology solutions also for other modes of transport to achieve a more efficient use of the infrastructure and good cross-border performance of the Corridor. At the same time, additional analysis shall be made on administrative and technical issues which hamper the good functioning of the Corridor. The **ITS** issue paper puts forward ideas on how the Corridors can boost the deployment of ITS by serving as a test bed and giving continuity that is needed for interoperability and scaling up of new solutions.

The development of traffic management systems should be pushed forward wherever possible. One of the key issues here is the limited deployment of the **ERTMS signalling system**. The new and upgraded infrastructure needs to be automatically deployed with the ERTMS and the existing infrastructure needs to be brought up to date. A common timetable needs to be respected to avoid future bottlenecks in the system. ERTMS as a European project needs to be a priority for all Member States and the Corridor approach of the European Deployment Plan is a vital step forward.

Planned projects and achievement of Corridor technical compliance

Although for many investments the scope, budget and time-schedule for implementation may be further refined and confirmed, the identified planned projects for the development of the North Sea-Baltic Corridor are overall assumed to allow the development of the corridor towards the achievement of the general objectives and priorities of the TEN-T Regulation by 2030. Investments are foreseen on the corridor rail and road infrastructure and transport nodes not only to develop a continuous infrastructure and reach compliance targets, but also to further improve the corridor capacity and performance beyond the requirements set in the Regulation (EU) 1315/2013. Innovation deployment initiatives and projects aimed at mitigating impacts on the environment are also foreseen to be implemented. It should however be noted that provision of adequate funds and financial resources is not secured yet for all projects identified for the development of the North Sea-Baltic Corridor and may be challenging in a number of cases.

Combining grants with innovative financial instruments

The investment needs on the Corridor are huge and cannot be met by public funding alone be it state or European. It is strongly recommended to look into alternative financing through innovative financial instruments and to take advantage of the European Fund for Strategic Investments. Grants are most relevant for projects where only limited revenues are to be expected. Also I believe that we must have a good pipeline of projects that can as far as is possible complement each other as construction work progresses. What I mean is that projects should not be developed in isolation but as part of a comprehensive "whole Corridor" concept.

On the North Sea-Baltic Corridor, projects identified so far for potential use of financial instruments concern mainly the areas of alternative fuels infrastructure, rail connections to airports and airport capacity expansions, port development projects and city ring roads. In times of scarce public resources, I encourage all project promoters to study the possible options to diversify the funding and financing sources for investments.

Other issues

In the current economic standstill, **creating jobs and growth** needs to be at the top of the agenda. Realisation of the infrastructure can be a job creating process which adds to economic growth. It is especially important to tap the potential of the cross-border job opportunities as the potential for cross-border economic development is much higher than for the rest of the economy. In this context, the cross-border "last-mile" issues are very relevant. I will continue to have regular meetings with industry stakeholders as well as logistics operators in order to exchange on the benefits of the Corridor and expectations towards it.

Other **multi-governance frameworks for cross-border development** like macro-regional strategies (The EU Strategy for the Baltic Sea Region), cross-border, transnational and interregional cooperation projects (such as CoRe) funded by the European Territorial Cooperation programmes, or the EUREGIO cooperations should be closely integrated into the implementation of the Corridor. The existing EUREGIO cooperations could be seen as a benchmark for other cross-border projects for the regions. A bottom-up approach is needed for organising the participation of the regions and the cities,to come to a joint understanding of cross-border issues and to set-up a joint vision for our corridor. The Corridor fora, in which the coordinators of the transport priority area of the EUSBSR now also participate, have proved, in my view, to be the first step in this direction. We should continue to cooperate with regional cooperation mechanisms along the whole Corridor to synchronize the actions for the realisation of the Corridor and for integrating the infrastructure into the regions and cities.
For the good governance and the realisation of the Corridor, there is a need for cooperation and consensus between different partners, within and between the Member States. The responsibility for the management of the Corridor project needs to be taken at all administrative levels. The process for this has started in the right way and there is a good base for the next steps to come.

Finally, I am of the view that **we need a much stronger approach to communication and information** about what we are trying to achieve here for the benefit of all European citizens and I work towards this aim.

Next steps

With this second edition of the North Sea-Baltic Corridor Work plan, we made some important steps forward in deepening the analysis and joint understanding on what is needed to achieve the Corridor's compliance and realisation of its full potential. The next phase of the Corridor study will put a particular emphasis on innovation and decarbonisation.

Work is on-going to appraise the mutual impact of climate change and the corridor, and to characterise its overall contribution of safeguarding the environment from local pollution and noise.

Due attention will therefore be paid from the next Work Plan to
- Assessing the potential contribution to climate change mitigation (reduction of greenhouse gas emissions) of the Corridor through a more effective multimodal transport pattern;
- Mapping specific needs, opportunities and projects linked to the adaptation to climate change (e.g. extreme events risk increase, variability of water level and flows in river basins);
- Identifying the Corridor's and Corridor projects' effects on local environment (including biodiversity) and noise;
- Highlighting best practices along the Corridor that have a potential for cross-fertilisation and replicability for
    - o Climate change mitigation,
    - o Adaptation to climate change,
    - o Reduction of negative environmental impacts / enhancement of the quality of the environment and biodiversity,
    - o Tackling (rail) noise.

In the area of innovation and deployment of alternative fuels, I believe that the North Sea-Baltic Corridor has the potential to become a frontrunner, be it in terms of scaling up deployment of infrastructure for electromobility or the use of LNG, that has been given a boost through the support of a number of projects along the Corridor via the first CEF calls. With the input from the issue paper on innovation, I hope that even more projects will exploit the possibilities offered by the TEN-T policy for large-scale demonstration and deployment.

Now it is important to start implementing the projects to solve the most critical issues on the Corridor. The actions need to be planned on a coherent cross-border timetable and with the mobilisation of all available resources. **As the European Coordinator I take it as my task to act as a facilitator** and to ensure that we maintain the inclusive approach to such an operation that I personally believe is essential to ensure ultimate success.

Contacts:

Catherine Trautmann, European Coordinator

Vera Kissler, Advisor
vera.kissler@ec.europa.eu

Corridor website:
http://ec.europa.eu/transport/themes/infrastructure/ten-t-guidelines/corridors/northsea-baltic_en.htm

More detailed information can be found at:
http://ec.europa.eu/transport/themes/infrastructure/ten-t-guidelines/corridors/corridor-studies_en.htm)

Contact details:
European Commission – Directorate General for Mobility and Transport
Directorate B – European Mobility Network
Unit B1 – Trans European Network
http://ec.europa.eu/transport/index_en.htm
email: move-info@ec.europa.eu

Offices:
Rue Demot 28
1049 Brussels Belgium

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