The Fifth Work Plan of the European Coordinator of the North Sea - Baltic TEN-T Core Network Corridor

July 2022

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Abbreviations

AF	Alternative fuel
AGS	Annual Growth Strategy
bn	billion
CEF	Connecting Europe Facility
CEMT class	Inland waterway classification according to CEMT (European Conference of Ministers of Transport) Resolution No 92/2
CNC	Core Network Corridor
DG MOVE	European Commission – Directorate General for Mobility and Transport
DIP	Detailed Implementation Plan
EC	European Commission
EEAS	European External Action Service
EGD	European Green Deal
EIB	European Investment Bank
EMS	European Maritime Space
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
EU	European Union
GHG	Greenhouse gas
HGV	Heavy good vehicles
ITS	Intelligent Transport Systems
IWW	Inland waterway
km	kilometre
KPI	Key performance indicator
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
m	metre
MFF	Multiannual Financial Framework
mn	million
MoS	Motorway(s) of the Sea
NSB	North Sea - Baltic
NUTS	Nomenclature of Territorial Units for Statistics
p.a.	per year / annual
RFC	Rail Freight Corridor
RFF	The Recovery and Resilience Facility
RIS	River Information System
RRT	Rail and road terminal
SSMS	Sustainable and Smart Mobility Strategy
SUMP	Sustainable Urban Mobility Plan
SSS	Short Sea Shipping
TEN-T	Trans-European Transport Network

Country Codes according to ISO 3166:

BE	Belgium
DE	Germany
EE	Estonia
FI	Finland
LT	Lithuania
LV	Latvia
NL	The Netherlands
PL	Poland
SE	Sweden

1 Towards the North Sea – Baltic 5th Work Plan

1.1. Introduction

The **Fifth Work Plan of the North Sea – Baltic (NSB) CNC** has been prepared based on the work done for the previous Work Plans, several studies, and intense interactions with different Corridor stakeholders during Corridor Forums, joint activities in Working Group meetings, and continuous work on the project list dedicated to the monitoring of the Corridor.

The Work Plan provides a **common vision** for the realisation of the Corridor and a framework to prioritise this task. The common interest and vision of all the Member States on the Corridor is the crucial driving force to implement the Work Plan.

Since the last Work Plan, significant external events took place. The COVID pandemic has strongly impacted all aspects of life, including the transport sector with border closures, movement restrictions, and disruptions of supply chains that led to a temporarily significant reduction of traffic volumes. In response to this shock, the Commission proposed the Green Lanes initiative in March 2020 to ensure EU-wide multimodal connectivity. The Commission also put forward the NextGenerationEU recovery plan to relaunch the economy including investments into the transport sector. In February 2022, Russia started its war of aggression against Ukraine, which changed the geostrategic situation in Europe and of the corridor. Among many other things, it changed the corridor's relevance for military mobility, and the importance of its border crossing point with Ukraine. The Commission has put in place a whole range of measures to respond to the challenges caused by Russia's war against Ukraine and its consequences.

Important strategies and initiatives have been published since the previous Work Plan. The Commission has proposed its European Green Deal which contains the commitment for Europe to become climate neutral by 2050. The European Council has agreed to reduce greenhouse gas emissions by 55% by 2030 and in line with this overarching strategy, the Commission published its Sustainable and Smart Mobility Strategy which contains 82 initiatives that will guide the Commission's work for the next years to make the transport system more sustainable and more digital. One of the important initiatives was the European Year of Rail with the Connecting Europe Express, which travelled for 36 days across 26 countries and visited more than 100 cities and towns. Many regions of the Corridor contributed to the success of this event.

The legislative framework was developed further. In July 2021, the European Union adopted the new Connecting Europe Facility Regulation (CEF2) and the Smart TEN-T Directive. The CEF2 sets out the funding instrument from 2021 to 2027. It also enlarged the NSB Corridor as described in Section 2 of this Work Plan. The Smart TEN-T Directive sets out the streamlining measures aimed at reducing delays encountered in the implementation of TEN-T projects.

The Commission made several legislative proposals to translate the European Green Deal and the Sustainable and Smart Mobility Strategy into legislation. The proposal for an Alternative Fuels Infrastructure Regulation and the revision of the TEN-T Regulation are among them. The proposal for the review of the TEN-T Regulation aims to reinforce the contribution of the TEN-T to the decarbonisation and digitalisation objectives of transport policy.

The revised TEN-T Regulation includes firm incentives to shift transport demand towards more sustainable forms of transport, to increase the number of passengers travelling by rail through the development of a competitive and seamless high speed rail network throughout Europe, and to shift a substantial amount of freight onto rail, inland waterways, and short sea shipping. Sections that are relevant for military

mobility and which are also used for civilian purposes are included in the network to enhance its capacity for dual (civilian and military) use.

The overall objective is to develop and complete a competitive and interoperable TEN-T network at the highest standards. The network is gradually developed in three steps: the core network is to be completed by 2030, the newly defined extended core network by 2040, and the comprehensive network by 2050. To that end, the proposed revised TEN-T Regulation introduces several new or reinforced requirements for rail, road, terminals, airports and urban nodes. Furthermore, the role of the European Coordinators should be strengthened, and the core network corridors merged with the rail freight corridors. The legal text is being negotiated with the European Parliament and the Council and could enter into force in the course of 2023.

1.2. Achievements along the NSB Corridor

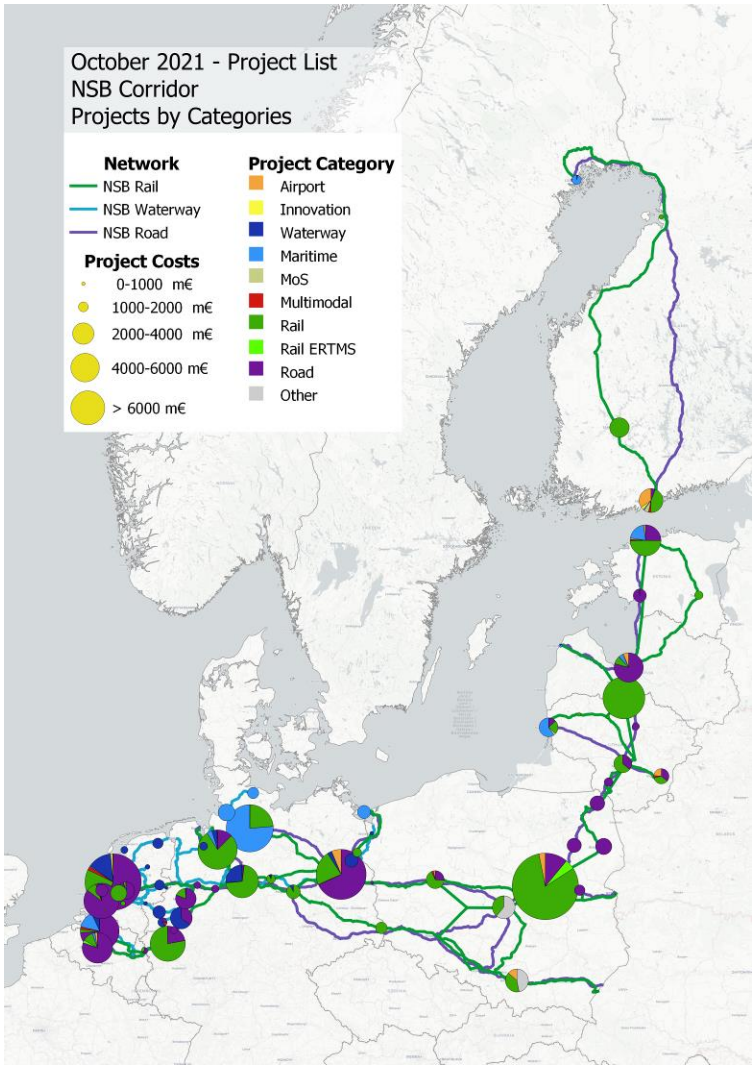
Since the Fourth Work Plan, progress has been made towards the compliance with TEN-T requirements and realising the **economic, social, and territorial cohesion potential** of the NSB Corridor.

Projects were completed for different transport modes. For instance, Twin-Port project in Finland and Estonia improving the traffic between Helsinki West Harbour and Tallinn Old Port; dredging project in port of Klaipeda (Lithuania); rail and road projects in Poland; several road projects in Germany ensuring safe parking spaces and removing bottlenecks; rail projects in Germany; construction of the new IJmuiden Sealock and upgrade of the Eefde locks in The Netherlands, road projects in Belgium. By now 26% of the projects are completed, 36% have a good maturity to be completed by 2025, and around 90% are on track to be completed by 2030.

New projects have been identified and the overall number of projects has increased since the previous Work Plan from 657 to 733. The overall project value increased from €110 bn to €130 bn. €70 bn (63%) of this is likely to be invested between 2026 and 2030.

The figure below shows visually the projects to be completed by geographical alignment, project category and project costs.

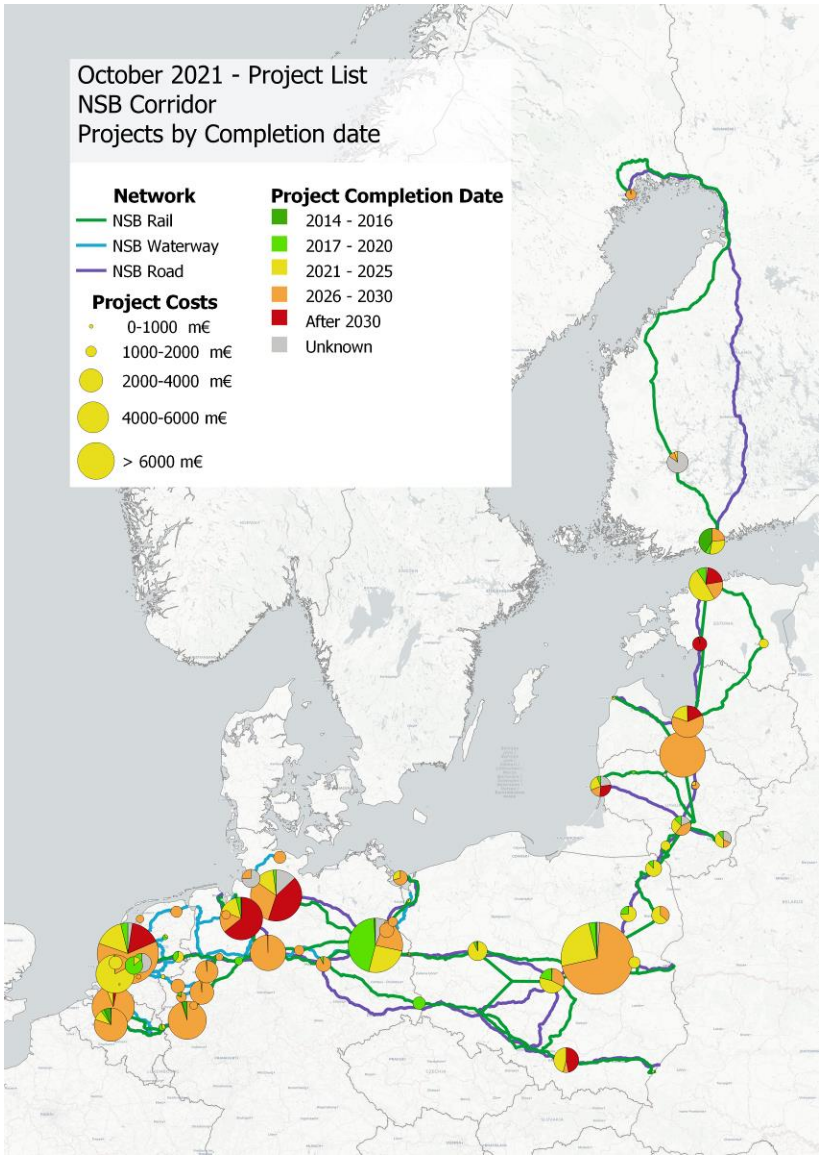
Figure 1: Number of projects by project categories



Data source: own elaboration, the NSB Corridor 2021 project list

The project completion dates can be used to characterise the NSB Corridor. The figure below shows the projects to be completed, their geographical alignment, completion date, and project costs.

Figure 2: Number of projects by project completion date



Data source: own elaboration, the NSB Corridor 2021 project list

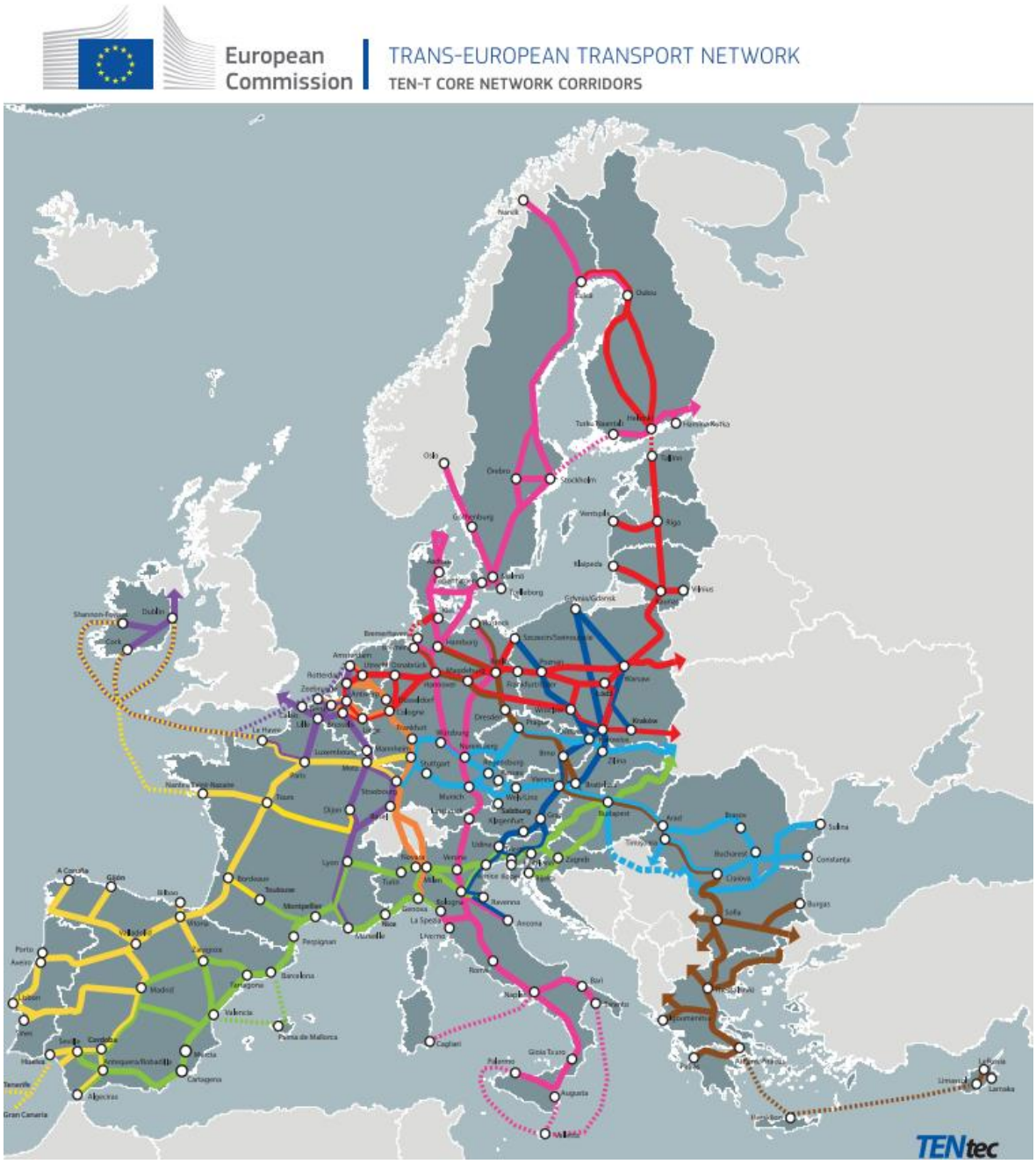
Progress on the NSB Corridor in relation to cross-border project implementation is good, despite the fact that cross border projects are generally more complicated due to different planning procedures and the greater need for coordination. Of the 67 cross-border projects 31% are completed.

2 Characteristics of the NSB Corridor

2.1. The new alignment under CEF2

Regulation (EU) 2021/1153 (CEF2 Regulation) defines the new alignment for the TEN-T Core Network Corridors. The new NSB Corridor alignment provides a better connectivity between the Member States and should enable Member States to make better use of their economic potential. The overview of the new alignment for all TEN-T Core Network Corridors is presented in the figure below. The NSB Corridor is presented in red.

Figure 3: Schematic TEN-T CNC map including the CEF2 extensions

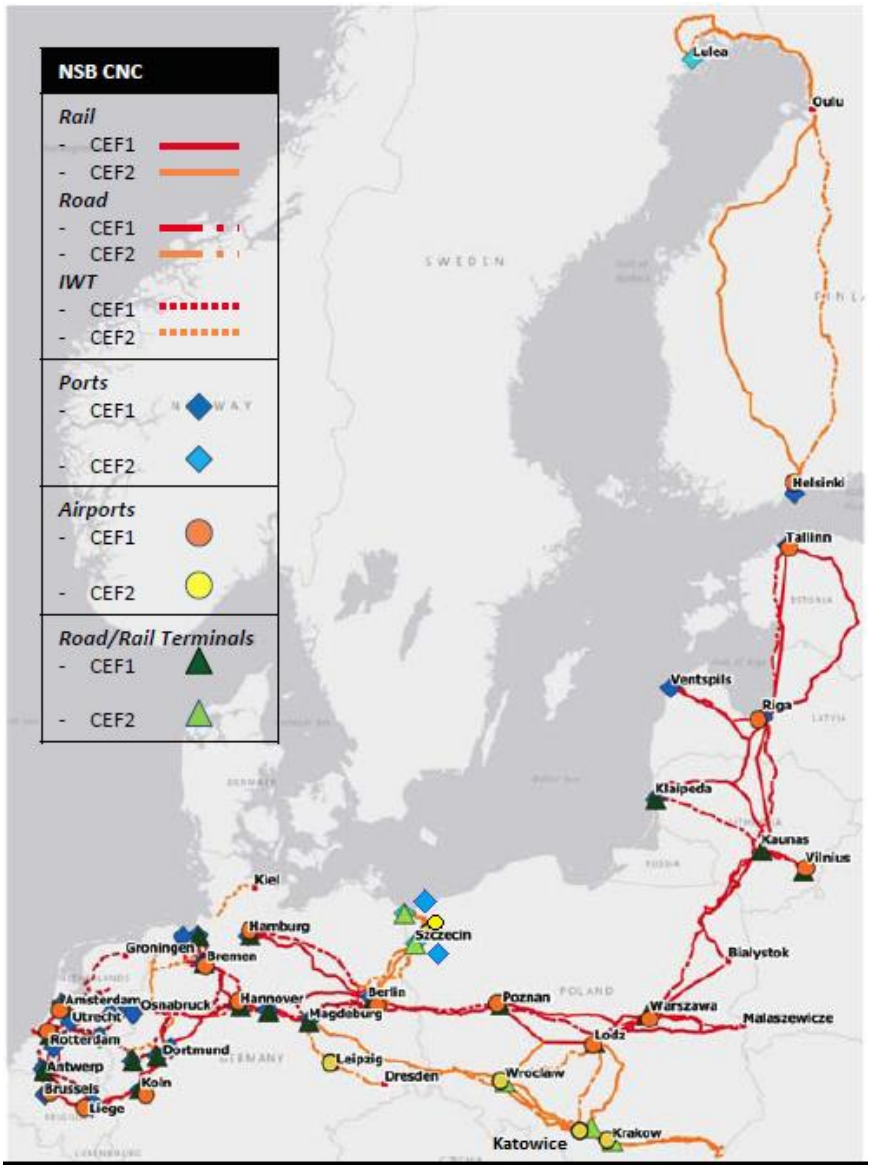


Data source: own elaboration, CEF2

One of the main objectives of the new NSB Corridor alignment is to **use untapped economic potential** in the Northern and Eastern parts of the NSB Corridor and to connect the north of Europe with other parts of Europe. The NSB Corridor allows to develop global transport routes and provides a platform for dialogue with industrial and commercial stakeholders with territories and regions along the new alignment of the NSB Corridor.

The new NSB Corridor alignment is presented in the figure below and includes information on the transport modes.

Figure 4: New Alignment of NSB Corridor



Data source: own elaboration, CEF2

Together with the ScanMed Corridor which it crosses between Oulu and Luleå, the NSB Corridor is the most northern corridor and includes the countries of Estonia, Latvia, Lithuania, Poland, Germany, The Netherlands, Belgium, Helsinki (Finland) and, since the extension, the whole of Finland and the northern part of Sweden. It connects the Baltic Sea Region with the low countries of the North Sea Region, improving the accessibility of the Northern Member States and the connection between western and eastern regions in Europe.

An important characteristic of the NSB Corridor is the **connection with other corridors via multi-modal connecting points** (hubs). Luleå and Helsinki connect with the Scandinavian-Mediterranean corridor, e.g. Warsaw, Łódź and Poznań connect with the Baltic-Adriatic corridor, and Berlin and Hannover connect with both the Orient-East Mediterranean and the Scandinavian-Mediterranean corridor. Further west, Köln, Nijmegen, and 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.

The old alignment comprised 5,986 km of railways, 4,092 km of roads and 2,186 km of inland waterways. The NSB Corridor new alignment includes an additional 2,842 km for rail, 2,610 km for road and 653 km for IWW.

The length of the **rail network** has increased from 6189[1] km to 9031 km. The extensions concern Poland (46% of the new sections length), Finland (29%), Germany (19%) and Sweden (7%). The following sections have been added:

- Extension from Helsinki (FI) to Luleå (SE);
- Extension from Berlin (DE) to Świnoujście (PL) through Szczecin (PL);
- Extension to the Ukrainian border from Magdeburg (DE) and Wrocław (PL) through Łódź (PL), Katowice (PL) and Kraków (PL);
- Missing link added between Dortmund and Osnabrück.

The length of the **road network** has increased from 4045[2] km to 6655 km. The extensions concern Poland (47% of the new sections length), Finland (28%), Germany (19%) and Sweden (5%). The following sections have been added:

- New section from Helsinki (FI) to Luleå (SE);
- Extension from Berlin (DE) to Świnoujście (PL) through Szczecin (PL);
- Extension to the Ukrainian border from Magdeburg (DE) and Wrocław (PL) through Łódź (PL), Katowice (PL) and Kraków (PL).

The length of the **inland waterways** network has increased from 2088[3] km to 2741 km. The extensions concern Germany (90% of the new length) and Poland (10%). The following sections have been added:

- Addition of the section from Berlin (DE) to Szczecin (PL) (Havel-Oder-Waterway);
- New section between Brunsbüttel (DE) and Kiel (DE), which allows to link the North Sea and the Baltic Sea through Germany (missing link of the Kiel Canal);
- Six missing links have been added in north-western Germany.
    - Ruhr
    - Wesel-Datteln Canal
    - Datteln-Hamm Canal
    - Dortmund-Ems Canal (north section)
    - Küstenkanal (between Oldenburg and Dörpen)
    - Ems

The number of **airports** located on the NSB Corridor has increased from 16 to 21. The 5 new core airports are in Poland (Szczecin, Wrocław, Kraków, Katowice) and in Germany (Leipzig-Halle).

[1] Compared to the 4th Work Plan, there are some minor differences in the network lengths for some modes due to changes in TENtec.

[2] [2] Compared to the 4th Work Plan, there are some minor differences in the network lengths for some modes due to changes in TENtec.

[3] [3] Compared to the 4th Work Plan, there are some minor differences in the network lengths for some modes due to changes in TENtec.

The number of core ports located on the NSB Corridor has increased from 28 to 31. 2 new sea ports are located in Poland (Świnoujście and Szczecin) and 1 in Sweden (Luleå).

The number of **rail road terminals** located on the NSB Corridor has increased from 19 to 24, with all the new terminals located in Poland (Kraków, Sławków, Wrocław, Szczecin, Świnoujście).

2.2. Compliance with the technical infrastructure parameters of the TEN-T Regulation

The analysis below includes only those transport modes for which Regulation (EU) No 1315/2013 (TEN-T Regulation) determines technical requirements to be complied by Member States.

Rail compliance

The table below presents the summary of technical compliance for rail. The table includes the Baltic States and Finland, but it should be noted that their 1520 mm and 1524mm networks are exempt because they are **isolated networks** according to the TEN-T Regulation. Rail Baltica will be compliant in the Baltic States when completed.

Table 1 Rail compliance with TEN-T regulation requirements

RAILWAYS		**All entries: Share of all sections fulfilling the respective standard**									
TEN-T parameters		**NL**	**BE**	**DE**	**PL**	**LT**	**LV**	**EE**	**FI**	**SE**	***Corridor***
Length of all sections (in km)		477	395	2.038	2.916	848	594	442	816	195	9.031
Electrification	Electrified	100%	100%	97%	95%	18%	11%	17%	97%	100%	84%
Track gauge	1.435mm	100%	100%	100%	100%	13%	0%	0%	0%	100%	75%
Line speed (core freight lines)	≥100km/h	100%	80%	100%	68%	88%	0%	100%	99%	100%	83%
Axle Load (core freight lines)	22.5t	100%	100%	100%	86%	100%	100%	100%	100%	100%	96%
Train length (core freight lines)	min. 740m	100%	100%	100%	56%	100%	100%	100%	94%	100%	83%

Data source: own elaboration, TENtec database

Compliance for electrification is 84%. The whole NSB Corridor is **electrified** in Belgium, The Netherlands and Sweden. In Germany, Finland and Poland it is almost compliant, except for approximately 60 km between Oldenburg and Wilhelmshaven in Germany (compliance to be reached in 2022), a 94-km section between Ełk and the Polish-Lithuanian border in Poland, and the section between Laurila and Haparanda / Tornio-raja (border between Finland and Sweden) in Finland.

In Lithuania the Kaunas – Vilnius line (about 149 km) is electrified. It is also planned to electrify the bypass around Vilnius (about 42 km) and the Kaišiadorys – Klaipėda line (322 km). In Latvia and Estonia sub-regional lines for passenger transport around the capitals are electrified.

Track gauge is 1435 mm on the western and central parts of the NSB Corridor. The total compliance is 75%, with full compliance in Belgium, The Netherlands, Germany, Poland, and Sweden. In the Baltic States and in Finland the gauge is mostly 1520 mm and 1524 mm, respectively. Rail Baltica will change (will add 1435 mm track gauge in

this area) the track gauge of the NSB Corridor in the Baltic States, but for Finland no changes to the track gauge are planned.

The **minimum line speed** requirement of 100 km/h for freight lines is fulfilled in The Netherlands, Germany, Estonia, and Sweden. In Finland, it is almost fully compliant, with only the section from Tampere to Lielahti not compliant. Parts of the Belgian network receiving freight traffic are not compliant with the line speed requirement; this includes sections from Glons to the German border (39 km), from Angleur to Liège Guillemins (3 km), from Lier to Antwerp (10 km) and locally in the railway nodes of Aarschot (0.5 km) and Hasselt (2 km). In Poland significant parts of the network are not compliant, including the Polish part of the Rail Baltica section of approximately 94 km between Ełk – Suwałki and Trakiszki (LT border) and over 300 km of the section between Łuków and Poznań. In the Baltic States not all lines are compliant with line speed requirements, however, once the Rail Baltica project is completed they will be.

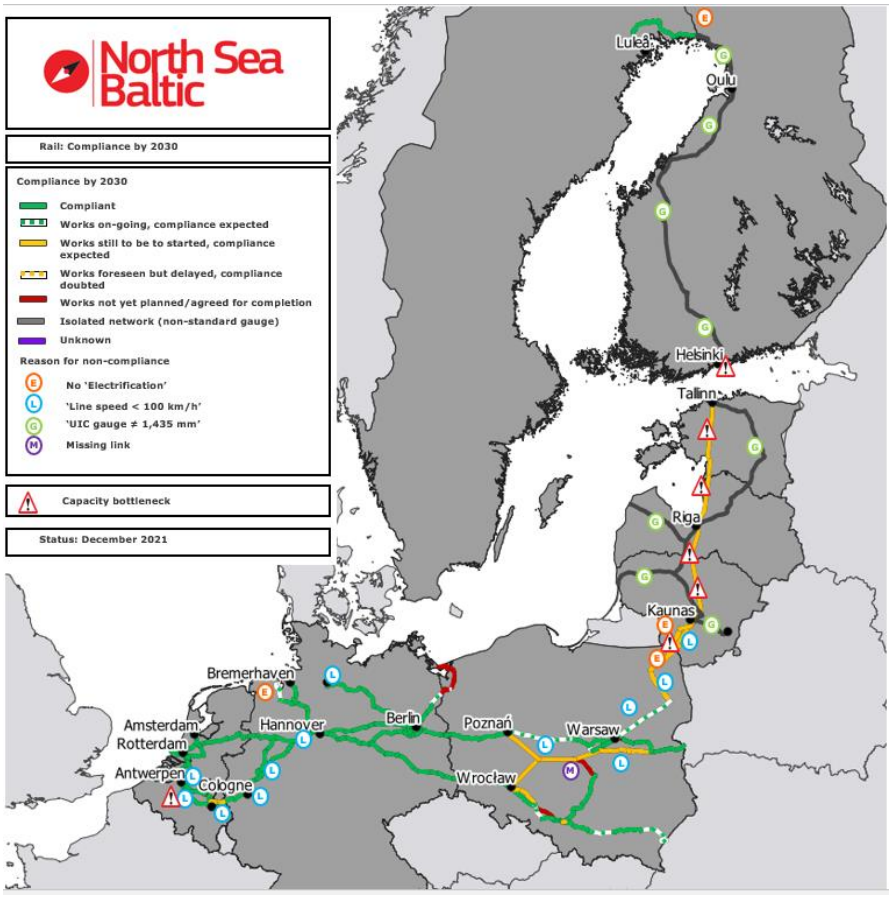
The NSB Corridor is compliant with the **axle load** standard of minimum 22.5 ton except for a limited number of sections in Poland.

The corridor is 83% compliant with **train length** requirements. In Poland trains of 740 m can be accommodated on 56% of the sections. In Belgium, The Netherlands and Germany the score is 100%, but long trains are not possible under all circumstances due to the combined use of lines by freight and passengers trains. In Belgium this is due to the existing train length restrictions of 650 m during peak hours and in Germany due to capacity bottlenecks during peak hours. Bottlenecks at certain times of the day and lacking sidings at certain locations also exist in The Netherlands.

For Finland, almost all sections are fit for 740 m trains, reaching a KPI of 94%.

Figure below presents the planned rail compliance by 2030, based on the planned project completion.

Figure 5: Rail compliance by 2030 overview



Data source: own elaboration, TENtec database, the Corridor 2021 project list

Road compliance

The table below presents the summary of current compliance with technical requirements for roads.

Table 2 Road compliance with TEN-T regulation

Parameter	Requirement	NL	BE	DE	PL	LT	LV	EE	FI	SE	Corridor
Length of all sections (in km)		334	214	1916	2218	550	378	192	723	129	6655
Road class	Roads have to be either an express road or a motorway by 2030	98%	100%	100%	82%	65%	8%	21%	40%	81%	74%
Availability of alternative fuels	Available by 2025	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Data source: own elaboration, TENtec database

Belgium, Germany, and Finland meet the requirements of the TEN-T Regulation regarding **road class**. In The Netherlands there is one section yet to be built, which is the A16 northern bypass at Rotterdam between the A20 and the A13. There are several road sections in Poland that are not compliant. Polish authorities are planning and implementing projects to make some of these sections compliant and will conduct socio-economic analyses for others.

The Via Baltica highway is the main artery for North-South traffic between Poland and the Baltic States and is not compliant with technical requirements in many parts. There are plans to improve the situation for some sections where it is economically feasible. In Lithuania, Marijampole-Kaunas was upgraded to expressway/motorway standard with four lanes in 2018. 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 and the construction of city bypasses. In Estonia compliance is around 14%. Where applicable, the Baltic States could assess the possibility to ask for exemptions from this TEN-T requirement due to lack of economic justification of the required investments.

Road class compliance in Finland is at 40%. In Sweden 81% of the road sections are of a high safety standard with a median barrier and therefore considered compliant.

The NSB Corridor is compliant with the requirement to provide alternative fuel for travel, however there is no single type of fuel available along the whole NSB Corridor and the available fuel types are not coordinated.

The figure below presents the planned road compliance by 2030 based on the projects planned.

Figure 6: Road compliance by 2030 overview

Data source: own elaboration, TENtec database, the Corridor 2021 project list

Inland waterways (IWW) compliance

The NSB Corridor has an effective IWW network which stretches over four NSB Corridor countries – Belgium, The Netherlands, Germany and Poland. The table below presents an overview of compliance with TEN-T technical requirements.

Table 3 IWW compliance with TEN-T regulation

Parameter	Requirement	NL	BE	DE	PL	LT	LV	EE	FI	SE	Corridor
Length of all sections (in km)		995	192	1489	65	0	0	0	0	0	**2741**
CEMT Class	Class IV	100%	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Minimum draught	from 2.50m	100%	100%	92%	100%	N/A	N/A	N/A	N/A	N/A	**95%**
Minimum height under	from 5.25m	100%	100%	65%	11%	N/A	N/A	N/A	N/A	N/A	**79%**

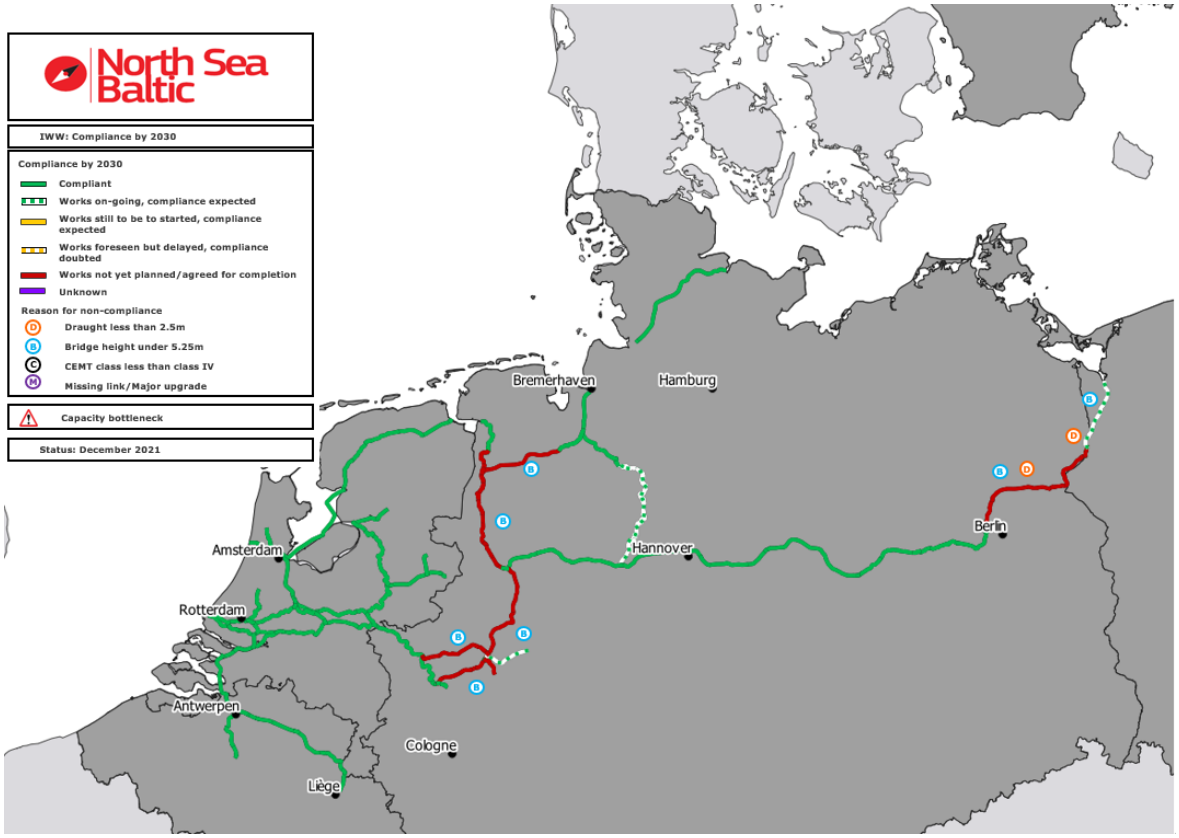
bridges

Data source: own elaboration, TENtec database

Compliance rates are high with 100% for CEMT class, 92% for minimum draught and 74% for bridge height clearance. Over the years, several locks in Belgium and The Netherlands have been upgraded and bridge height has been improved on several sections, leading to a 100% compliance. Most of the sections in Poland are not compliant with the requirement for minimum heights under bridges. In Germany, some sections are not compliant on canals.

Alternative fuel infrastructure is available, allowing to use fuel trucks or fixed facilities for LNG.

Figure 7: IWW (rivers and canals) compliance by 2030 overview



Data source: own elaboration, TENtec database, the Corridor 2021 project list

Ports compliance

The NSB Corridor has **inland ports** in Belgium, The Netherlands, Germany, and Poland. The table below presents on overview of compliance with technical requirements.

Table 4 Inland port compliance with TEN-T regulation

Parameter	Requirement	NL	BE	DE	PL	LT	LV	EE	FI	SE	Corridor
Number of inland ports		8	4	11	2	0	0	0	0	0	25
CEMT class	Class IV connection	100%	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%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Availability of at least one freight terminal open to all operators	in a non-discriminatory way and application of transparent charges	100%	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**

Data source: own elaboration, TENtec database

All **maritime ports** are compliant with TEN-T requirements, except that there is a need to implement alternative fuels accessibility similarly to inland ports. The table below presents on overview of compliance with technical requirements.

Table 5 Maritime port compliance with TEN-T regulations

Parameter	Requirement	NL	BE	DE	PL	LT	LV	EE	FI	SE	Corridor
Number of seaports		3	1	4	2	1	2	1	1	1	**16**
Connection to rail network, inland waterways and road network	Core ports to be connected to rail by 2030	100%	100%	100%	100%	100%	100%	100%	100%	100%	**100%**
Availability of alternative fuels	Available by 2025	100%	100%	100%	100%	100%	0%	100%	100%	100%	**83%**

Data source: own elaboration, TENtec database

The availability of alternative fuels (LNG) is 100% in Belgium, The Netherlands, Germany, Lithuania, Finland, and Sweden. In Poland pilot deliveries of LNG fuel to ships have been carried out (usage of car tankers). Article 32 of the TEN-T regulation has no strict definition of 'availability of alternative fuels', and therefore the requirement is deemed to be met when there is a possibility to provide an alternative fuel in a common and publicly available way. But facilities for other alternative fuels such as ammonia, bio-fuels, hydrogen and hydrogen related fuels might be needed.

Airport compliance

There are 21 Core Network airports on the NSB Corridor. The TEN-T regulation sets an obligation that certain **Core Network airports need to be connected by rail** (preferably high-speed) by 2050. There are 8 airports on the NSB Corridor which need to comply with this requirement: Helsinki, Riga, Warsaw, Berlin-Brandenburg, Hamburg, Köln, Brussels, and Amsterdam. All airports meet the requirement, except Riga International Airport. There are plans to connect Riga International Airport to the railway system as part of the Rail Baltica project, ensuring the rail link to the airport before 2030.

The table below presents the summary of technical compliance assessment with the two TEN-T requirements for airports.

Table 6 Airport compliance with TEN-T regulation

Parameter	Requirement	NL	BE	DE	PL	LT	LV	EE	FI	SE	Corridor
Number of airports		2	2	6	7	1	1	1	1	0	**21**
Capacity to make available alternative clean fuels	Available	0%	0%	0%	0%	0%	0%	0%	0%	N/A	**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%	N/A	**88%**

Data source: own elaboration, TENtec database

None of the airports of the Corridor make **alternative fuels available** for airplanes.

2.3. Evolution over time of the KPIs per Member State

2.3.1. The Netherlands

With its large international network and extensive hinterland infrastructure, The Netherlands occupies a strategically important geographical position in Europe. It is the starting point and ending point of three CNC's: the NSB Corridor, the North Sea-Mediterranean corridor, and the Rhine Alpine corridor. The TEN-T network in The Netherlands is largely compliant, exceeding TEN-T standards for the most part, and remaining issues are being solved.

The NSB Corridor's road network in The Netherlands already fulfilled the TEN-T requirements in 2014, with the exception of one missing link (the North-eastern Rotterdam Bypass (A13/A16)), which is expected to be completed before 2025. Several infrastructure projects have been completed and are underway to address congestion on existing motorways that already fulfil the TEN-T requirements, like the upgrade of the A1-A35 node (Azelo).

In recent years, increasing attention has been paid to smart mobility and the roll-out of alternative fuels. The share of passenger cars on the road using electric propulsion in The Netherlands is among the highest in the EU, for battery electric vehicles. However, the supply of charging infrastructure needs to keep pace with this development. Another development is the need for re-charging infrastructure for heavy duty vehicles. A lot of attention is being paid to safe and secure truck parking, with various ongoing projects for the realisation of truck parking locations along the entire corridor.

The Netherlands has a high density of navigable **waterways** which are heavily used and form an important part of the transport system. The entire NSB Corridor IWW network meets the TEN-T requirements. Various projects are taking place to further improve existing infrastructure. The new IJmuiden Sealock has been commissioned in January. The Netherlands is also initiating a series of climate change adaptation measures to prepare for periods of low water. This drought package is a set of interventions, e.g. along the Rhine and IJssel rivers, meant to improve the existing cross-border waterway connections in terms of robustness, sustainability, and climate adaptation.

The Dutch **railway network** already complies with the TEN-T requirements except for the 'ERTMS' parameter. The projects completed in the past are mainly of an operational nature, or have led to capacity expansions, but have had no impact on the KPI compliance rate of the rail network. With regards to the implementation of ERTMS, an important step has been taken in 2019, with the approval of the ERTMS deployment plan by the Dutch government. ERTMS is currently in place on the following NSB Corridor sections: the Betuwe route, the high-speed line between Schiphol Airport and Antwerp, between Rotterdam and Kijfhoek and between Amsterdam and Utrecht. Several other NSB Corridor sections are planned to be completed between 2026 and 2030. On a few NSB Corridor sections ERTMS is expected to be completed after 2030. Finally, it should be noted that to fully take advantage of ERTMS, adjusting of rolling stock is still necessary.

Although the Dutch network is in principle suitable for running 740-meter trains, sidings of sufficient length are lacking on certain routes. This mainly concerns the route Rotterdam – Venlo (Brabant route) and Rotterdam/Amsterdam – Bad Bentheim (part of the NSB corridor). While some terminals in the port of Rotterdam have the infrastructure to handle 740 meter trains, most of the railway shunting and marshalling yards in the port of Rotterdam do not meet the TEN-T requirements for 740 meter trains.

The provision of **alternative fuels** in seaports has also increased in recent years, with the seaport of Rotterdam offering alternative fuels by truck, ship and tank, and the seaport of Amsterdam by truck and ship. Alternative fuels are not yet available in the Dutch inland ports, but plans for a network for alternative fuels are in preparation.

The rail road terminals in Rotterdam and Amsterdam were already compliant with the TEN-T requirements, but the Port of Amsterdam still faces connectivity issues when it comes to hinterland connections, both on land and maritime.

2.3.2. Belgium

The Netherlands and Belgium are the starting and ending point of three CNC's: the NSB Corridor, the North Sea – Mediterranean Corridor and the Rhine – Alpine Corridor. The TEN-T network in Belgium is largely compliant and the remaining issues are being solved.

All the Belgian road sections are categorized as motorways and meet the TEN-T requirements. However, serious traffic congestion problems occur along many highway sections around urban nodes. A project is ongoing to optimize the Brussels Ring Road to improve its traffic flow and safety. A similar project is ongoing in Antwerp, with the upgrade of Ring of Antwerp and the construction of the Oosterweel connection. Concerning alternative fuels, different projects have been completed (charging infrastructure for electric/LNG/CNG vehicles) and other projects are ongoing.

The Belgian railway network complies with the TEN-T requirements except for the ERTMS and the speed parameters. The ERTMS implementation is ongoing on the entire NSB Corridor in Belgium and will be finished in 2025. For some sections, the line speed criterion is not compliant due to safety reasons (through a city or the Port of Antwerp). The rest of the sections will be compliant thanks to the ERTMS deployment. It should also be noted that in Belgium, 740 meter long trains cannot be operated during peak-hours. However, investments are foreseen or ongoing to facilitate the movement of 740 meter long trains on the Belgian part of the rail freight network in the NSB Corridor, notably in the framework of the Recovery and Resilience Plan. Concerning rail congestion, the port of Antwerp needs a second rail freight access. Currently, all trains starting from the port of Antwerp to European destinations go through a single railway line that will reach its saturation point in the short term. Studies and preliminary works are ongoing for the construction of the second access to the port of Antwerp (€ 165 million).

For the Belgian seaport of Antwerp, there are no compliance issues currently identified. The Deurgangdock is fully developed, and the Port of Antwerp is launching studies and works to implement a new tidal dock on the Left Bank of the Scheldt River.

The airport of Brussels has direct rail connections.

The Belgian inland waterways are compliant but are included in the North Sea Mediterranean Corridor.

In Belgium, the most significant funding concern two road infrastructure projects: the upgrade of the Ring of Antwerp and the construction of the Oosterweel connection (€

4.391 million), and the upgrade of the Ring of Brussels (€ 2.898 million). The maritime and IWW projects in the Port of Antwerp have significant funding related to the construction of a second tidal dock (€ 556 million), the modernisation of the Royers lock (€ 303 million), and the construction of new quay walls at Europaterminal (€ 175 million).

2.3.3. Germany

Germany has a central location in Europe as well as in the NSB Corridor, ensuring the required connectivity and capacity with neighbouring countries and compliance with TEN-T regulation.

The **rail compliance** in Germany for most of parameters is already fulfilled with very few non-compliant sections, listed below:

- Section Oldenburg – Wilhelmshaven where electrification will be completed by end of 2022;
- Section Sande – Wilhelmshaven Jade-Weser-Port where electrification will be completed by end of 2022;
- Non-compliance regarding ERTMS implementation.

There is full **road compliance** in Germany with TEN-T requirements.

In several sections compliance for **Inland waterways** with TEN-T requirements is not met. Projects for the upgrade of IWW sections generally include measures to replace bridges, to enable 5.25 m height for unrestricted two-layer container transport. However, the projects failed to pass the economic evaluation within the framework of the German federal transport infrastructure plan for 2030 (Bundesverkehrswegeplan 2030). The new action plan for Western German canals in North Rhine Westphalia, published in July 2021, describes a strategy and fields of action for the modernisation of the inland waterways in North Rhine Westphalia. All sections mentioned in the action plan are part of the NSB Corridor. The construction of the clearance height of 5.25 m is carried out during necessary replacements of the bridges, or in the course of a planned canal expansion. Due to the large number of structures, the continuous adjustment of the clearance height, especially in the canal network, requires significant time, whereby the quality of the trafficability is continuously improved. Therefore, the criterion will not be met by 2030, as individual measures do not necessarily lead to compliant sections, since other bridges on the same section are not upgraded.

All Core Network airports in Germany are connected to rail. The same applies for rail connections of the **inland ports** in Germany. Availability of alternative fuels however remains an issue to be solved in the upcoming years for airports.

Regarding the market-driven indicators for **rail-road terminals**, especially the accessibility with electric traction and 740-m-long trains needs to be improved.

2.3.4. Poland

Works for the modernisation and upgrading of the NSB Corridor infrastructure have been performed in Poland since the entry into force of the TEN-T Regulation, with progress made in particular with regard to the rail and road infrastructure.

The entire **railway** network is electrified except for an approximately 100 km long section between Ełk and the Polish-Lithuanian border, as well as a short section of the railway line between Szczecin Podjuchy and the border with Germany. The line speed requires further improvements, in particular on the Rail Baltica sections close to the border with Lithuania, between Świnoujście and Szczecin up to the state border with Germany, and on the E30 itinerary Opole – Katowice (in particular the section Jelcz Miłoszyce – Kędzierzyn Koźle). Some speed limitations still occur on the section

between Tarnów and Medyka. Limitations also exist on the Polish network with regards to the axle load standard of minimum 22.5 t, in particular between Ełk and the Polish-Lithuanian border, on the E30 railway line between Wrocław and Opole as well as on the section between Szeligi/Mszczonów and Pilawa. 740 meter long trains are not possible to be operated along the E20 railway line between the Polish-German border and Zbąszynek, on the Rail Baltica itinerary from Warszawa (Zielonka) to the state border with Lithuania, on the E30 itinerary Wrocław – Opole – Katowice and between Świnoujście and Szczecin up to the border with Germany. ERTMS deployment is planned for the section between Wrocław and Opole.

Along the Corridor, stations and junctions are gradually undergoing modernisation and upgrading in Poland, taking into account that speed restrictions exist, particularly in core urban nodes like Warszawa, Łódź, Katowice, Szczecin, Poznań, Wrocław and Kraków. Concerning the axle load parameter, the network is also not at standard in Łódź, and it only partially meets the standard in Warszawa, Wrocław, and Poznań. Construction of the High-Speed Line in Poland is also foreseen, which will interconnect Warsaw – CPK (Solidarity Transport Hub) – Łódź – Poznań/Wrocław, and will in particular run through Łódź as part of the NSB corridor. Speed and axle load limitations currently existing in Łódź are expected to be solved once the High-Speed line is implemented. Preparatory works are currently underway for the construction of sections of this line.

Operation of 740 meter long trains is only possible across the Szczecin urban node. ERTMS is not deployed in any of the core urban nodes in Poland. A number of large scale projects are either in progress or planned for implementation, aiming at solving the compliance bottlenecks.

The Warsaw **airport** is already connected to the railway network. The **ports** of Szczecin and Świnoujście in Poland are connected to the rail and road NSB Corridor infrastructure. However, at both maritime ports last mile connection improvements are required to increase the compliance of the existing dedicated rail links in terms of electrification, axle load, speed, and train length. Works to increase the compliance of the road links are also required at both ports, as well as solutions to mitigate the impact of road transport on the respective urban areas. Facilities for ship-generated waste are available at the ports of Szczecin and Świnoujście, and both ports, which are also classified as inland waterway ports, fulfil the CEMT IV class requirement, as well as the requirement for minimum draught. Minimum height under bridges has not yet been entirely reached on the Widuchowa – Szczecin section of the Odra River. LNG truck to ship bunkering services can be booked and delivered at the Polish ports, whereas strategies to ensure availability of alternative clean fuels at airports are still to be defined. Finally, improvements would still be required at **rail-road terminals** for the promotion of intermodal transport along the NSB Corridor, particularly relating to enhance 740 meter train terminal accessibility.

2.3.5. Lithuania

The main goals for Lithuania's transport sector are to improve transport sector quality and technical parameters, to strengthen intermodality of different transport modes, to increase the cooperation with the transport systems of neighbouring countries, and to be an integral link for the NSB Corridor. Development of the **Rail Baltica project** is a priority for the Baltic States and Lithuania. The project will help to improve connectivity at national and regional level and will contribute to the achievement of Lithuania's transport sector goals.

The electrification of **railways** is at 8%. New electrification projects are planned on the NSB Corridor, including the Vilnius rail node (42 km) and the Kaišiadorys – Klaipėda line (322 km). The new electric passenger trains are acquired for the newly

electrified section between Kena and Klaipėda (23 units). The line speed requires further improvements, for instance, in the sections Žeimiai-Lukšiai, Gimbogala-Linkaičiai, and Šilainiai-Kėdainiai, to increase train speed up to 160 km/h. To achieve axle load at minimum 22.5 t, improvements are planned within the Jonava railway bridge reconstruction project in the section Gaižiūnai-Jonava, and other sections.

The **road** network in Lithuania is 65% compliant in relation to motorways. Several initiatives are planned to improve the road network, including the four lane reconstruction of A5 Kaunas-Marijampole-Suwałki (section 56.83-97.06 km), A14 Vilnius–Utena (74.1 km), construction of a new overpass on the A1 Vilnius-Kaunas-Klaipėda (section 102.9-107.0 km), reconstruction of middle bridge of Kaunas city (section 99.29-100.47 km), and construction of additional safety lane on A1 Vilnius-Kaunas-Klaipėda. The implementation of the Via Baltica project will improve road safety in Lithuania and increase the road transport capacity of the NSB Corridor.

The **Klaipeda seaport** is compliant with TEN-T requirements, but there are several projects ongoing to improve seaport operations, including the improvement of port entrance infrastructure, dredging of Klaipeda seaport's new outer navigation channel to the seabed depth to 16 meters, and the inner navigation channel to the seabed depth up to 15.5 meters. Besides, further projects are planned to increase port capabilities, including improvements of the connection to the rail network, the creation of facilities for military fleet, and port expansion in the Southern part.

The planned projects for **Vilnius International Airport** relate to the modernisation of the passenger terminal and luggage processing systems. The construction of the new two-story passenger departure terminal module in the Northern part of the airport along with the construction of the new terminal are set to be completed by the end of 2024. The reorganisation of transport access in front of Vilnius International Airport is also planned, with the renovation or replacement of engineering networks. This project also will focus on the increase of both energy efficiency and sustainability at the airport facilities. The Vilnius Airport train station connection with the European track gauge railway network (Rail Baltica project) is also under development.

2.3.6. Latvia

The main goals for Latvia's transport sector are to improve mobility, further develop transport and logistics infrastructure, to improve service quality and safety, reduce GHG emission and transport sector impact on environment, and increase the use of innovations in the transport sector.

The main transport sector flagship project for the Baltic States and Latvia is the Rail Baltica project, which will contribute to the achievement of transport sector goals and will allow to integrate the Baltic States and Latvia in the European rail network. It will increase the role of rail in mobility by developing the Rail Baltica regional stations as mobility points with other transport modes. The European standard track gauge requirement (1435 mm) and minimum line speeds of 249 km/h for passenger trains and 120 km/h for freight trains will be reached by implementing the Rail Baltica project with standardized mandatory design guidelines for all three Baltic States. Fast and reliable rail connection with Europe is of particular significance in the current geopolitical environment.

The electrification of the broad-gauge (1520 mm) **railways** is at 11%. The existing 3 kV DC electrification system will be gradually upgraded to a 25 kV AC electrification system, and further extension of the broad-gauge electrified area is planned. The modernisation of railway passenger service infrastructure and renewal of railway rolling stock for passenger operators is planned. The reconstruction of the Riga railway junction, which is part of the TEN-T railway network, is set to be completed by 2030, as several projects have to be aligned with the Rail Baltica.

There is full **road** compliance in Latvia for availability of alternative fuels, but projects are planned to further enhance the network of recharging stations for electric vehicles, and the establishment of CNG stations for CNG vehicles and LNG stations for LNG vehicles.

As road infrastructure compliance with TEN-T requirement for motorways remains very low, a significant number of projects are planned for reconstruction of different road sections, to increase the compliance with TEN-T requirements, reduce bottlenecks, and the impact of transport on the environment. Examples include the diversion of freight transport from the historic city centre of Riga, the integration of Riga and Freeport of Riga into the TEN-T network, and the optimisation of the Riga ring road. An important cross border connection project is the Kekava bypass construction on the European Route E67, which will remove bottlenecks. The project includes the construction of a new 14.4 km long road and the reconstruction of 3.1 km of existing road sections.

It is planned that until 2030 a 20.5 km long section of the Riga bypass A4 (E67) and a 26.5 km long section of the road A5 (E67 and E22) will be rebuilt into high-speed roads. They will also be connected by both 12 km of new roads and a new combined rail and road transport bridge over the Daugava River. This is all within the scope of Rail Baltica. It is also planned that a 60.1 km long section of the road A7 (E67) will be rebuilt into a high-speed road, and it will include the construction of the Iecava and Bauska bypasses.

Several projects are planned to improve the operations of **maritime ports**. In the Freeport of Riga the provision of berths with shore power supply is planned by 2027, as well as the reconstruction of breakwaters, the development of territory beyond the West Breakwater, and reconstruction of the shipping channel. In the Freeport of Ventspils the quality of existing access roads will be improved, and new access roads are planned, and reconstruction of the hydrotechnical structures and acquisition of ships (pilot ship, spilled oil collection vessel and polluted water collection vessel) are planned. There is no availability of alternative fuels in the Latvian maritime ports.

Riga International Airport is not connected to rail, but the required connection will be achieved as part of the Rail Baltica project implementation. The Rail Baltica line will pass through the Riga International Airport, where a railway station for international service and shuttle service will be constructed. There are plans to improve the use of technologies, including the modernisation of LGS's Air Traffic Management system, system wide information management concept, and remote-control technology implementation. Riga International Airport infrastructure will be developed with a new passenger terminal, technology improvements, and a connection to the railway station including air-to-rail integration infrastructure for baggage exchange between airlines and railway companies. Riga International Airport can improve availability of clean fuels, as for now it can only offer blended fuels (SAF), which do not require specific infrastructure.

2.3.7. Estonia

Similarly to Lithuania and Latvia, the main flagship project for Estonia is **the Rail Baltica project**, which will provide efficient cross border travel and will improve regional connectivity via regional stations.

17% of the entire **railway** network is electrified, and further electrification of most of the existing network is planned and foreseen in the state budget for the next years. By end of 2028 2/3rd of the existing 1520 mm gauge network will be electrified. There is no compliance with the 1435 mm gauge requirement, which will be achieved with the completion of the Rail Baltica project. The minimum line speed of 100 km/h for freight lines is fulfilled, but further improvements are planned with the reconstruction of the Tapa–Tartu railway line. Improvements to digital signalling and the traffic

management system improvement on the Tallinn-Tapa–Tartu-Valga railway are planned. Estonia is compliant with the train length requirement.

Investments are planned in Tallinn to improve connectivity and transport flow. For instance, in relation to the Rail Baltica project, by building a tram connection from the new Rail Baltic Ülemiste multimodal passenger terminal to the city centre and Old Port. Other interventions in pre-planning phase are related to the construction of a railroad bypass around Tallinn in the direction of Paldiski and to Paldiski South Harbour, to avoid dangerous goods transport through city centre.

There is full **road** compliance in Estonia regarding the availability of alternative fuels, but additional electric vehicle charging points close to public buildings, business districts, and apartment building areas are planned. Current compliance of the E67 Tallinn-Pärnu-Ikla road with TEN-T requirements is only 21% (covering 39 km of 2+1 and 2+2 lane express road sections within a total road length of 179 km). By the end of 2030, 72% of the Tallinn-Pärnu-Ikla road is planned to be reconstructed to be an express road, according to TEN-T requirements. The Via Baltica 49 km cross-border section Uulu-Ikla is expected to be reconstructed according to TEN-T requirements after 2031. On the E265 Tallinn ring road current TEN-T compliance is 78%, and full compliance is expected to be achieved by 2027. Dynamic traffic and truck parking management is planned to be established by 2023.

The **maritime port** of Tallinn is compliant with TEN-T requirements, both regarding the connection to the rail network and availability of alternative fuels. The planned projects include onshore electricity supply for passenger ships at the Old City Harbour in Tallinn and on-shore regional LNG terminal located in the Port of Muuga, combining the commercial LNG business (bunkering, break-bulk, on-grid and off-grid land transportation) and security of supply for the region.

To improve the ports operations, a twin-port project in Finland and Estonia is planned, which is related to the improvement of mobility management between Helsinki West Harbour and Tallinn Old Port. Other projects relate to the upgrade of a maritime link between the core maritime ports of Helsinki and Tallinn, connecting the NSB Corridor with the Scandinavian-Mediterranean corridor. These projects will lead to maximum efficiency and competiveness for this short sea line by optimising port operations and the use of infrastructure. The projects will provide efficiency in a "door to door" approach, minimising environmental impacts, and increasing cooperation and reliability of the service between Tallinn and Helsinki.

Tallinn Airport together with fuel suppliers has not yet made alternative fuels available for airplanes. There are planned projects for airside area development, improvement of environmental protection and flight safety measures, and extension of the passenger terminal.

2.3.8. Finland

In Finland a new national transport system has been developed and infrastructure investment plans aim to increase sustainable mobility.

In Finland almost the whole CNC **railway** network is electrified with a 97% rate achieved, and there is an electrification project ongoing for the last un-electrified section. The minimum line speed requirement of 100 km/h is almost fully compliant, achieving a 99% rate. Almost all sections are fit for 740 meter trains, reaching a KPI of 94%. Planned projects include the development of the main railway section Helsinki-Riihimäki, improvement of the Oulu and Tampere rail yards, development of the railway sections Helsinki-Tampere and Tampere-Oulu, the Airport rail line, signalling of Oulu railyard and new traffic operating points of Oulu-Kemi, electrification of the Laurila–Tornio-Haparanda railway, and improvement of safety devices in railway section Tampere-Seinäjoki. Finland's digital rail project responds to the ERTMS requirements. The ERTMS will be built on the NSB in stages in the years 2030-2038.

Finland does not meet the requirements of the TEN-T Regulation regarding **road** class, as only 30% of roads are either an express road or a motorway. There are planned improvements to make the main road 2+2 lanes between Helsinki and Jyväskylä, Jyväskylä and Oulu, and Oulu and Kemi, with the construction of additional lanes on these motorways. Finland is compliant for the road alternative fuels requirement.

The **ports** in Finland are 100% compliant regarding the availability of alternative fuels. To improve the ports operations a twin-port project in Finland and Estonia is planned related to the improvement of mobility management between Helsinki West Harbour and Tallinn Old Port. Other projects relate to the upgrade of a maritime link between the core maritime ports of Helsinki and Tallinn, connecting the NSB Corridor with the Scandinavian-Mediterranean corridor. These projects will lead to maximum efficiency and competiveness for this short sea line by optimising port operations and the use of infrastructure. The projects will provide efficiency in a "door to door" approach, minimising environmental impacts, and increasing cooperation and reliability of the service between Tallinn and Helsinki.

Helsinki Airport meets the requirements regarding connectivity to railway. Electricity supply to stationary aircrafts is available in the Helsinki Airport and it is possible to deliver biodiesel by tank truck to the airport.

2.3.9. Sweden

The Swedish network has been added with the new alignment of the NSB Corridor. The new alignment is located near the Finnish border, and it includes 129 km of road, 195 km of rail and 1 seaport in Luleå.

Between Luleå and Haparanda 81% of the road section are of high safety standard with median barrier and therefore considered compliant.

The NSB Corridor railway section, the Haparanda line, between Haparanda and Boden is operational with ERTMS since 2013. The section Luleå - Boden is included in the ongoing ERTMS Malmbanan project and is planned to be in operation by 2030. The seaport of Luleå will increase its capacity by 2030. The project will improve safety and the maritime access to the port by increased maximum allowed draught of the fairway.

3 Inventory what has still to be realised until 2030

3.1. The planned NSB Corridor evolution

The main instrument to implement the NSB Corridor objectives – to achieve the **compliance** with TEN-T requirements and to use the **full potential** of the NSB Corridor – are **transport infrastructure projects**. The 1st Work Plan included the necessary projects to achieve the NSB Corridor compliance and since then this indicative list has been updated on a regular basis regarding progress made and new projects identified as contributing to the achievement of the NSB Corridor objectives.

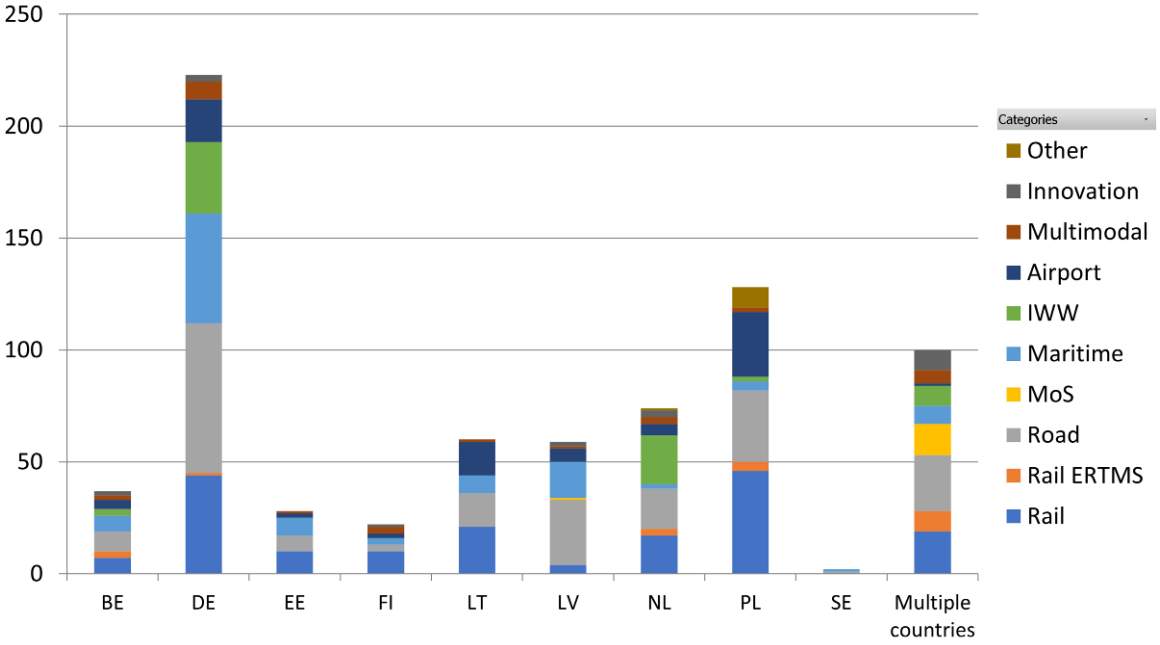
Furthermore, the indicative **project list was enriched** with the input from the results of the CEF transport calls, new or updated national or regional infrastructure plans, and the Rail Freight Corridor (RFC) implementation plan. Extensive consultations with the Commission, Member States and the Corridor Forum stakeholders were conducted. Coordination with other CNCs allowed to harmonise the project list and ensure the completeness and accuracy of the information gathered. As a result of the common vision and work, **733 projects amounting to € 130 bn** have been identified (according to official cost figures agreed with the Member States and stakeholders).

There are in total 81 "additional projects" amounting to an estimated €1.2 bn **proposed by the Corridor consultants** to achieve compliance with TEN-T KPIs on

the NSB Corridor. The list should be considered as a basis for discussion between the European Coordinator and involved stakeholders. The additional projects relate to the requirements on clean fuels, bridge height, train length 740 m and 100 km/h line speed for trains. The "additional projects" are not included in the Corridor project analysis provided below.

The figure below provides information on the number of projects per Member State and per transport mode. The largest number of projects is planned in Germany, followed by Poland and there is a significant number of cross-border and multi-countries projects. Major planned projects are provided below.

Figure 8: NSB Corridor number of projects by country and category



Data Source: own elaboration, the NSB Corridor 2021 project list

In Sweden, the project to enhance the capacity of the fairway of the Port of Luleå (€ 337 million) and the development of ERTMS on the section Luleå-Boden.

In Finland, the development of the main railway section Helsinki-Riihimäki 2nd phase (€ 273 million); the development of the main railway section Helsinki-Riihimäki 3rd phase (€ 260 million); improvement of Tampere rail yard (€ 150 million). The speeding up of the rail section between Helsinki and Tampere (including airport line connection) will also be examined (project company project), and a project aimed at the implementation of ERTMS has been launched.

For the Baltic States the most important project is the Rail Baltica flagship project (€ 5 788 million) and different projects are linked with the Rail Baltica flagship project implementation.

In Poland many transport infrastructure development projects are under implementation, including railway projects: modernisation of the Łódź Railway node (funding needed unknown); modernisation of railway line E 30 in section Zabrze – Katowice – Kraków, phase IIb (€ 418 million); works on the railway line no E30, Kraków Główny Towarowy – Rudzice section, along with the construction of metropolitan line tracks (€ 240 million). Projects are planned to improve urban transport, for instance, improvement of the integration of the passenger railway transport with the local urban transport in the area of Łódź core TEN-T node (€ 449

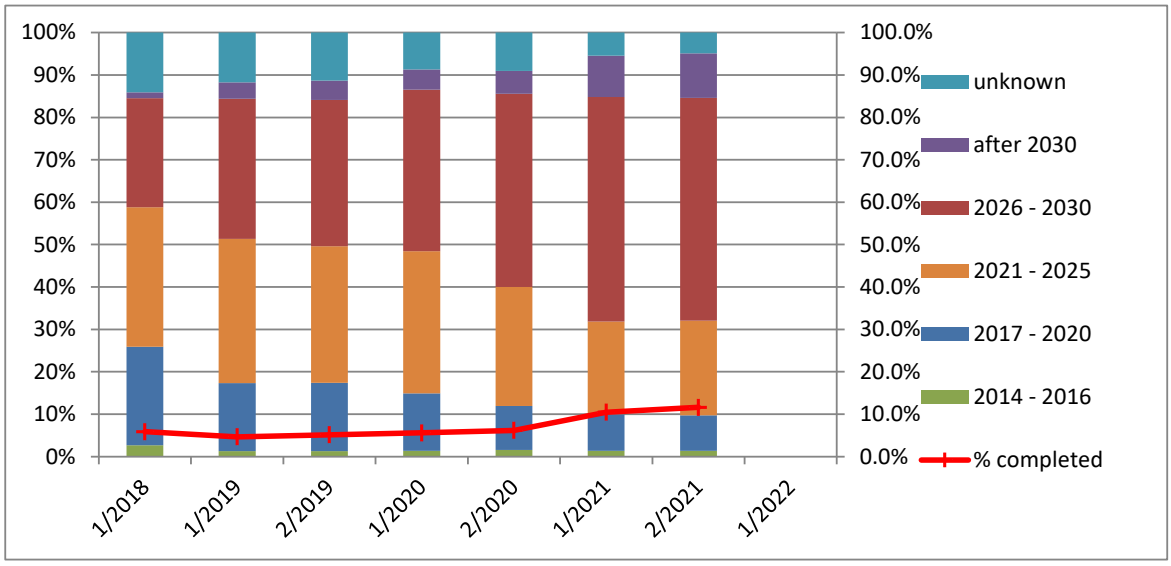
million) and development programme for the urban transport of Łódź (€ 213 million); construction of the Kraków tramway/light-rail system (€ 972 million).

In Germany a number of projects is planned to improve IWW, for instance, the lock on the Kiel Canal in Brunsbüttel; upgrade of Havel-Oder Waterway; upgrade of Dortmund-Ems Canal; upgrade of Wesel-Datteln Canal until Marl. The rail infrastructure projects will contribute to increase of rail line speed on section Berlin – Angermünde – Stralsund to 160 km/h; rail infrastructure development ABS (Ausbaustrecke) Hoyerswerda – Horka – Border DE/PL; rail infrastructure development section ABS Münster – Lünen and ABS Angermünde – Border DE/PL.

In the Netherlands significant national funding is planned for ERTMS implementation (€ 2 424 million). The road infrastructure improvement projects relate to upgrade of A4 motorway Amsterdam-The Hague and its underlying (comprehensive) network (including access routes to the NSB Corridor): A4 Haaglanden-N14 (€ 676 million), A4 Rijnlandroute (€ 581 million) and A4 Burgerveen-N14 (€ 231 million). In Belgium the realisation of a second tidal dock (€ 556 million) the modernisation of the Royers lock (€ 303 million) and quay walls at the Europaterminal (€ 175 million) are planned.

An important parameter for the NSB Corridor evolution measurement is the timing planned for project completion. The majority of projects is to be completed between 2021 and 2030. The overview of the NSB Corridor projects by time cluster is presented in figure below.

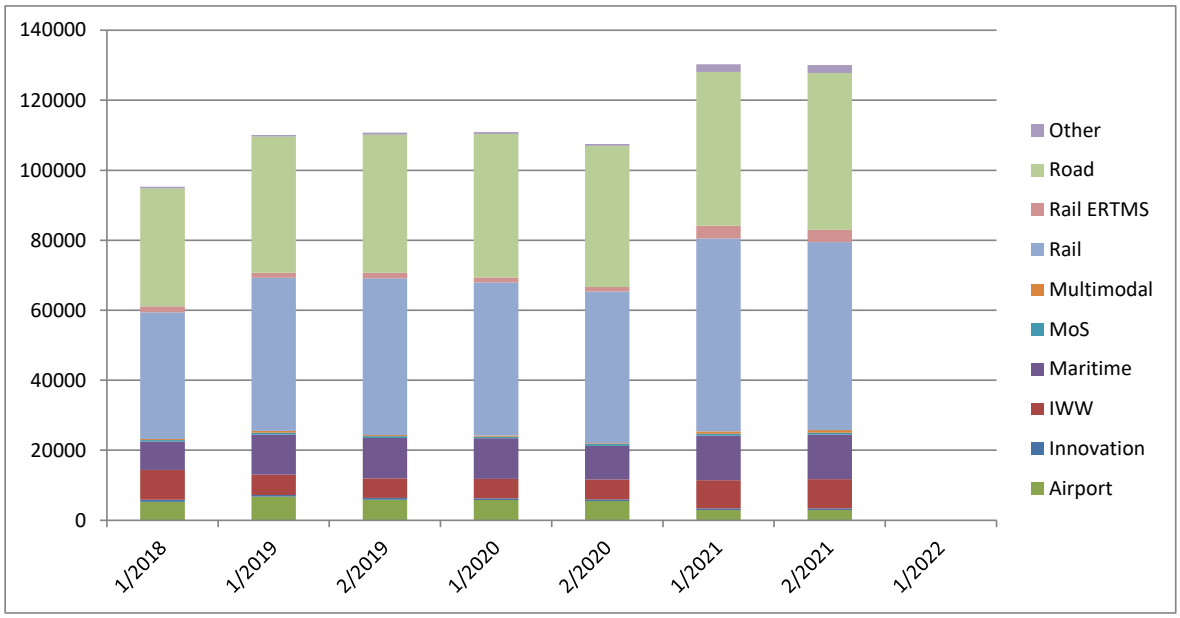
Figure 9: NSB Corridor projects by time cluster



Source: own elaboration, the NSB Corridor 2021 project list Network

The largest planned investments relate to rail and road infrastructure improvement. The overview of the planned investments by transport mode is presented in the figure below.

Figure 10: NSB Corridor project costs by transport mode

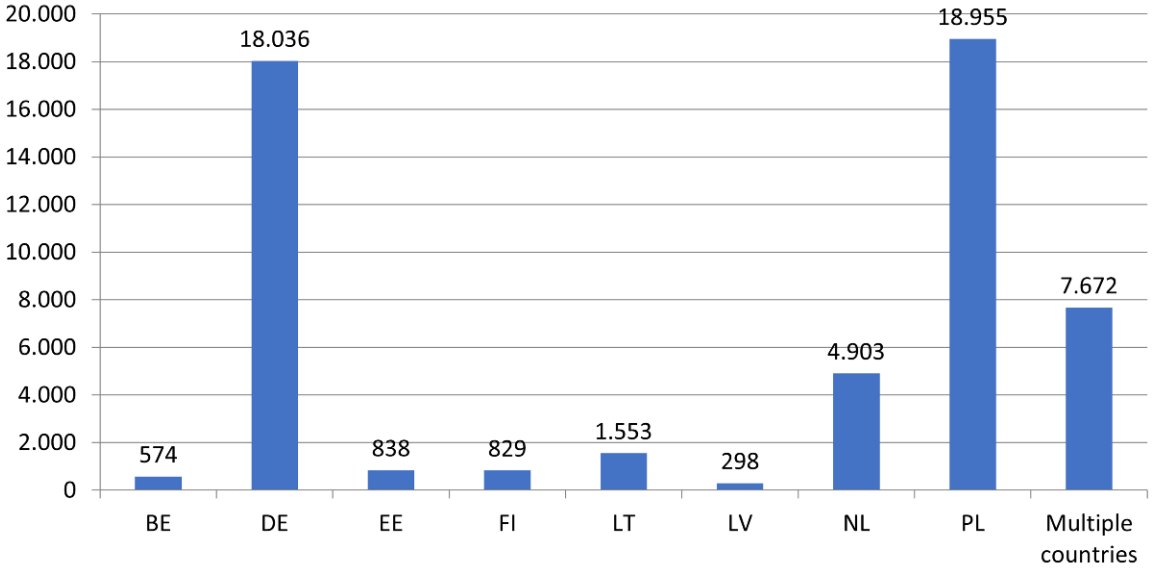


Source: own elaboration, the NSB Corridor 2021 project list

3.1.1. Rail & RRT

The rail category refers to rail projects and not to ERTMS projects, however, some of the rail projects, especially large-scale upgrades and new constructions, often include ERMTS implementation as well. There are significant investments planned in rail and multimodal terminals.

Figure 11: NSB Corridor projects - category "Rail"



Source: own elaboration, the NSB Corridor 2021 project list

There are 178 rail projects and the costs of the **projects add up to €53.6 bn**. The largest investments are planned in Germany (ABS (Amsterdam –) border DE/NL – Emmerich – Oberhausen, Knoten Köln, Rhein-Ruhr-Express (RRX): Köln – Düsseldorf

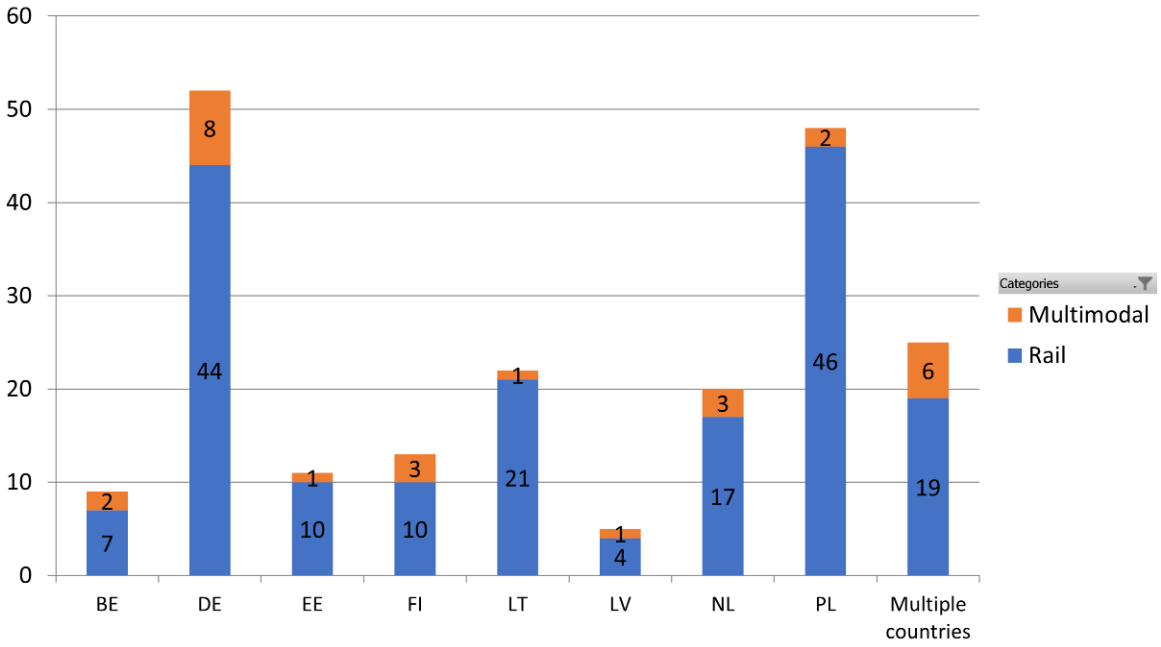
– Dortmund/Münster, ABS/NBS Hannover – Bielefeld, Hamburg – Hannover line ("Optimiertes Alpha-E + Bremen"), ABS Oldenburg – Wilhelmshaven, ABS Hannover – Berlin, ABS Berlin – Frankfurt/Oder – border DE/PL) and Poland (high-speed line Warsaw – Lodz). Both countries also cover the largest shares on the Corridor's rail network. In addition, there are important multiple-country projects, such as Rail Baltica.

The rail projects on the NSB Corridor contribute to the **achievement of one or more of the following KPIs**: electrification (10 projects), track gauge 1435 (1 project), structure gauge (8 projects), intermodal gauge (6 projects), ERTMS (1 project), line speed (21 projects), axle load (11 projects). Furthermore, these projects will help meet needs of the transport market and **make intermodal transport more competitive**.

Out of the 27 multimodal projects amounting to € 764 million**, there are RRT upgrade** or development projects, with high number of projects in Germany, for instance, Hamburg, Hannover, Köln; the multimodal node at Schiphol Airport in The Netherlands; the modernisation of public logistic centres in Vilnius and Kaunas in Lithuania.

The **number of RRT projects and rail projects** is presented in the figure below.

Figure 12: NSB Corridor projects – categories "Rail" and "Multimodal"



Source: own elaboration, the NSB Corridor 2021 project list

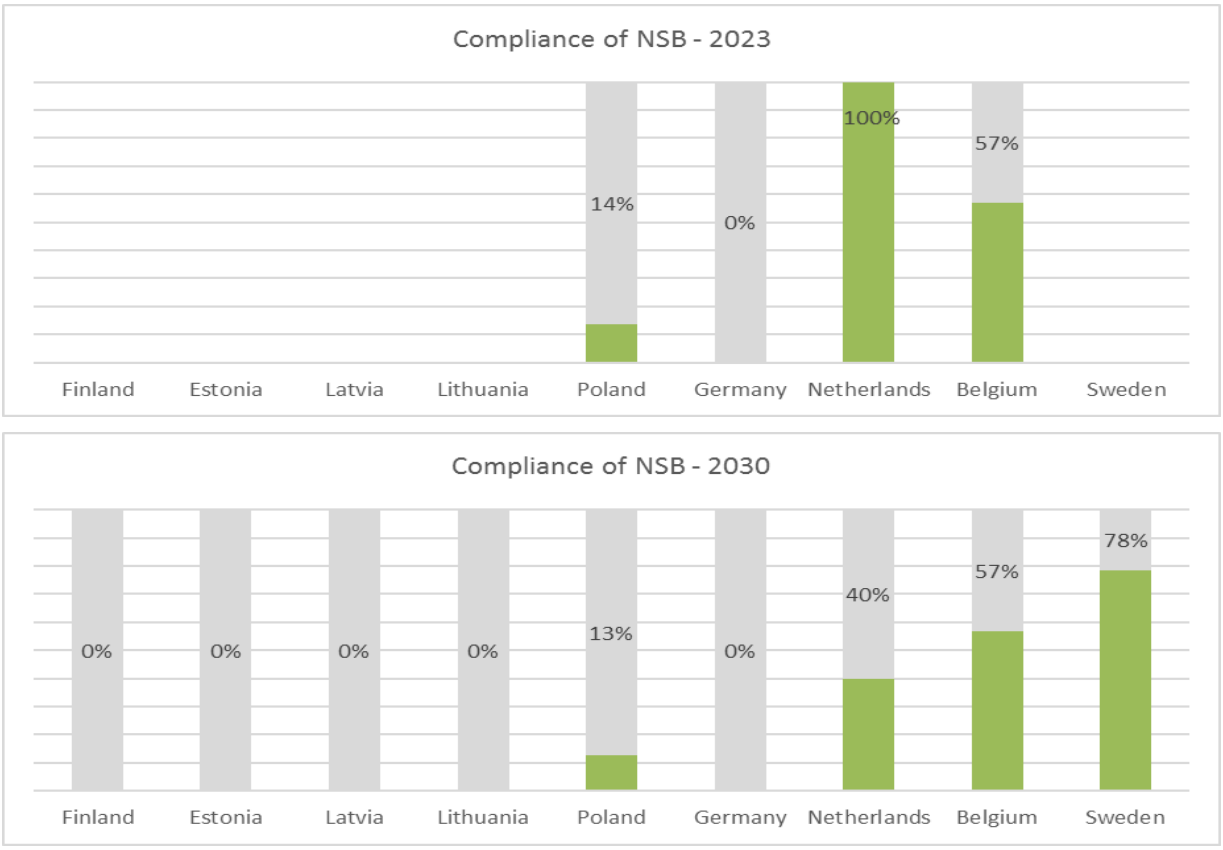
Special attention is still needed for rail interoperability and operational barriers at border crossings.

3.1.2. ERTMS deployment

The total length of the NSB corridor is 9 030 km, including the CEF 2 extension. According to the EDP, 755 km and 1 775 km are expected to be operational by 2021 and 2023. Overall, ETCS is in operation on 11% of NSB, while GSM-R is in operation on 58% of the corridor. In June 2022, 32% of the NSB length planned in the EDP by 2023 was in operation with ETCS. Given the current deployment figures and considering that some Member States have already notified delays in implementation, it will not be possible to meet the EDP deadlines in this corridor by 2023. The following

graphs show the status of ETCS deployment by the Member States on the NSB as a percentage of the 2023 and 2030 targets.

Figure 13 ETCS deployment by Member States on the North Sea-Baltic Corridor



Sections in Latvia, Lithuania and Estonia with a track gauge that is different from the European standard nominal track gauge (i.e., sections outside the Rail Baltic) are exempt from the obligation to deploy ERTMS.

The main bottlenecks threatening compliance with the 2030 targets are the following:

- NSB sections will be equipped beyond 2030 according to the Finnish plan.
- The commissioning of the planned high-speed lines between Poznań/Wrocław – Łódź – Warszawa are not included in the Polish deployment plan for 2030.
- The German plan does not indicate a specific deadline for the NSB lines planned in the EDP beyond 2023. German authorities envisage full network equipment with ETCS by 2040, but there is no confirmation if NSB will be equipped by 2030.
- According to the Dutch plan, the line from Rotterdam to the German border (Hengelo) will be deployed beyond 2030.

The following scheme shows the deadlines and the state of play for the ERTMS deployment in the NSB corridor:

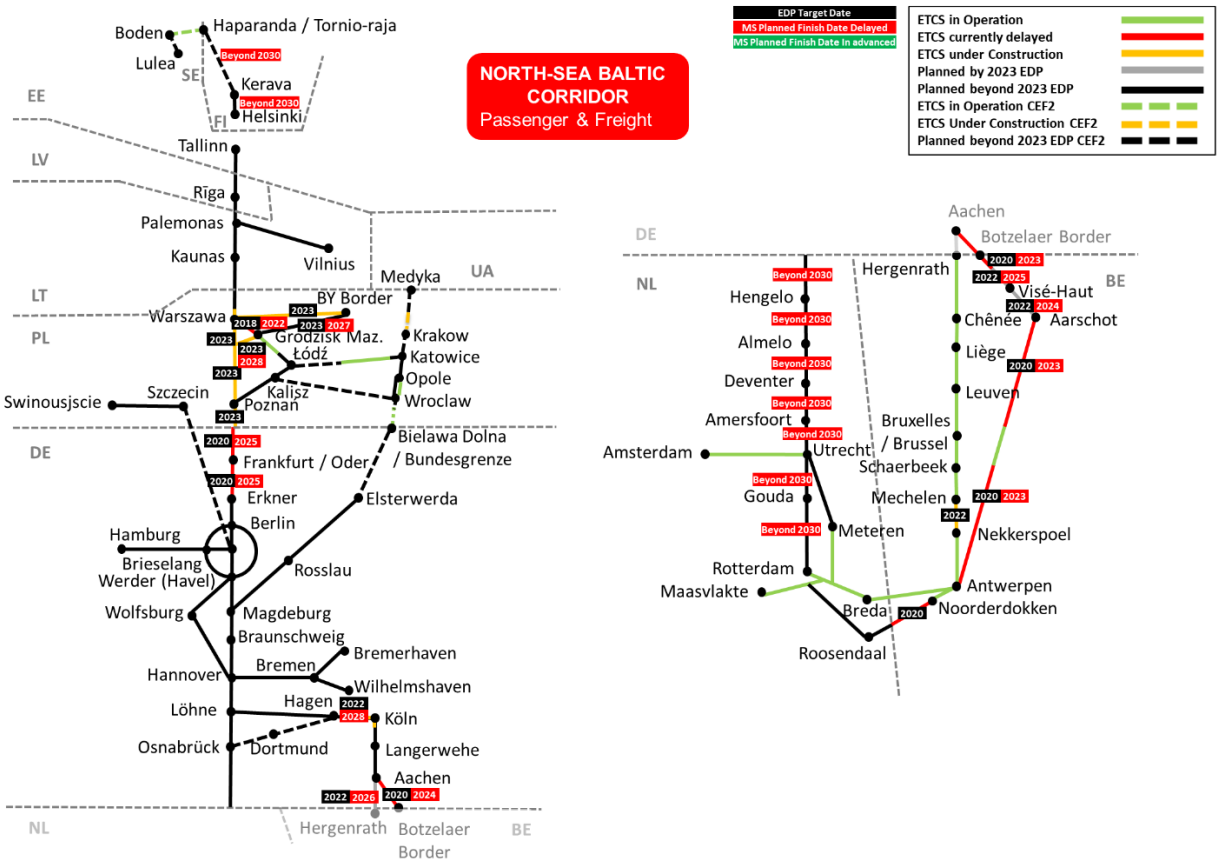


Figure 14 North Sea-Baltic Corridor ERTMS deployment plan

In Sweden, there are two sections of the NSB corridor. One is already operational, and the other is expected to be commissioned by 2027.

According to the Finnish plan, the NSB sections in Finland will be equipped beyond 2030 from 2030 to 2036.

The Rail Baltica, that is to connect Estonia with Poland through Latvia and Lithuania, will be operational by 2030 according to the official plan. Sections in Latvia, Lithuania and Estonia with a track gauge different from the European standard nominal track gauge (i.e. sections outside the Rail Baltica) are exempt from the deployment of ERTMS.

Polish authorities have reported delays on sections planned in the EDP by 2023. According to the Polish plan, all NSB sections are expected to be commissioned by 2030 except for the planned high-speed lines between Poznań/Wrocław – Łódź – Warszawa, for which there are no specific deadlines for NSB sections in the Polish plan.

According to the German plans, German sections planned in the EDP by 2023 will be delayed, and their commissioning is expected between 2024 and 2028. Regarding German sections planned in the EDP beyond 2023, although the entire German network will be equipped by 2040, there are no specific deadlines for NSB sections in the German plan.

The lines currently in operation in The Netherlands had been already commissioned when the EDP was published in 2017. According to the Dutch plans, most of the

remaining NSB Dutch sections (i.e., Rotterdam – Utrecht – Hengelo – German border line) are expected to be operational beyond 2030.

In Belgium, most of the NSB sections are already operational, including one cross-border section with the Netherlands and another one with Germany. Although some sections planned in the EDP by 2023 will be delayed, the Belgian authorities still plan the entire Belgian network to be equipped by 2025.

CNC corridors were extended in 2021. The CEF 2 extension added to the NSB corridor new sections in Finland, Germany, Poland and Sweden that in the framework of CEF 1 did not belong to any CNC. Considering this extension, the total NSB corridor length has been increased to 9 030 km.

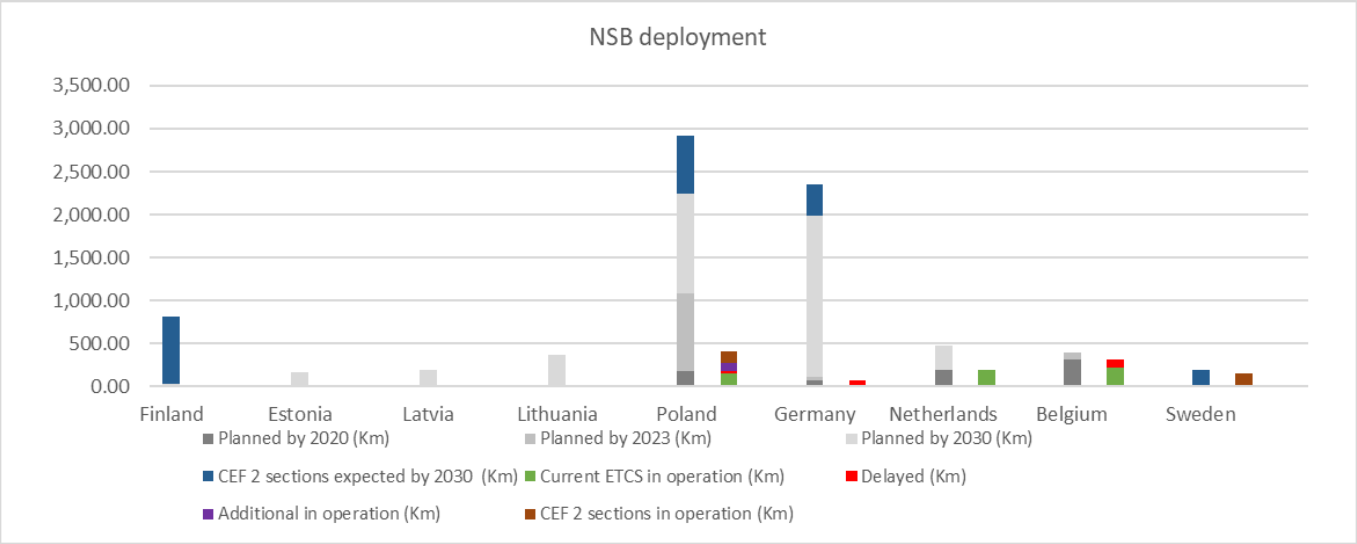
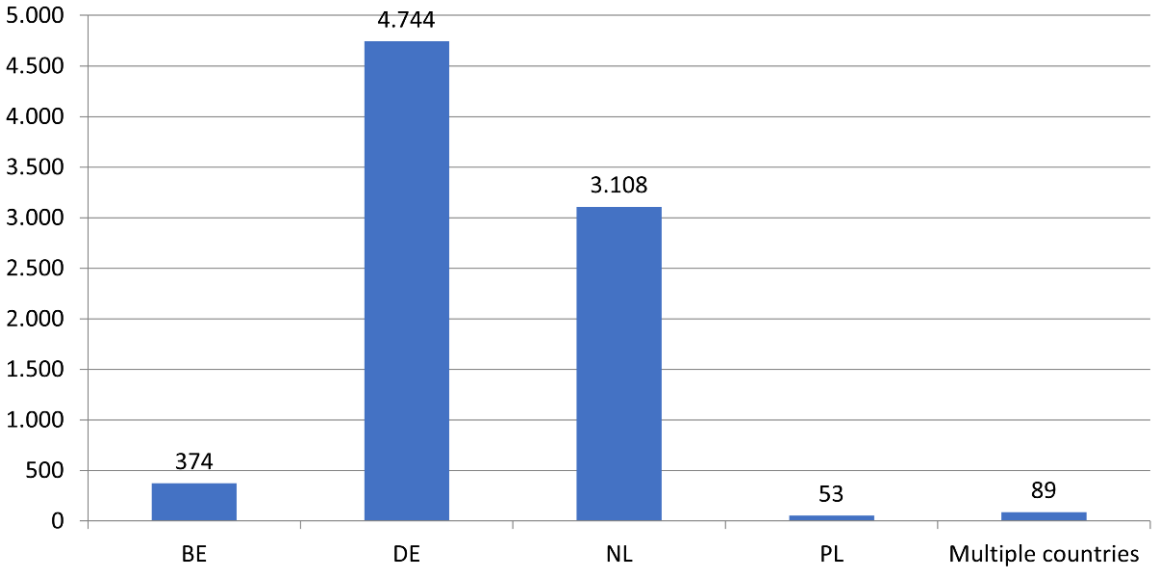


Figure 15 North Sea-Baltic Corridor ERTMS deployment status

3.1.3.IWW & inland ports including RIS deployment plan

There is **almost full compliance** on TEN-T requirements for IWW. Some capacity issues are present on the NSB Corridor, mainly related to minimum height under bridges, but these are smaller in comparison with other modes of transport. The information on investments planned for IWW projects per Member State is presented in the figure below.

Figure 16: NSB Corridor projects - category "IWW"



Source: own elaboration, the NSB Corridor 2021 project list

There are 69 IWW projects with a total value of **€8.3 bn**. The largest part of the projects and biggest investments are planned in infrastructure, including in canal upgrades. The projects are addressing **capacity problems** which mainly occur at locks, as these can create waiting times if the amount of traffic exceeds the lock's capacity. Some Member States with projects planned go beyond the minimum required for compliance, for instance, there are projects covering a CEMT V upgrade.

There are several RIS projects, two of which are related to the CEF project RIS COMEX (multiple-country project), a project developing an intelligent barge information service and optimising inland waterway and multimodal transport. RIS-related projects aim to contribute to a more coherent deployment of EU-wide harmonised information services contributing to safer, more efficient, and environmentally friendly inland navigation.

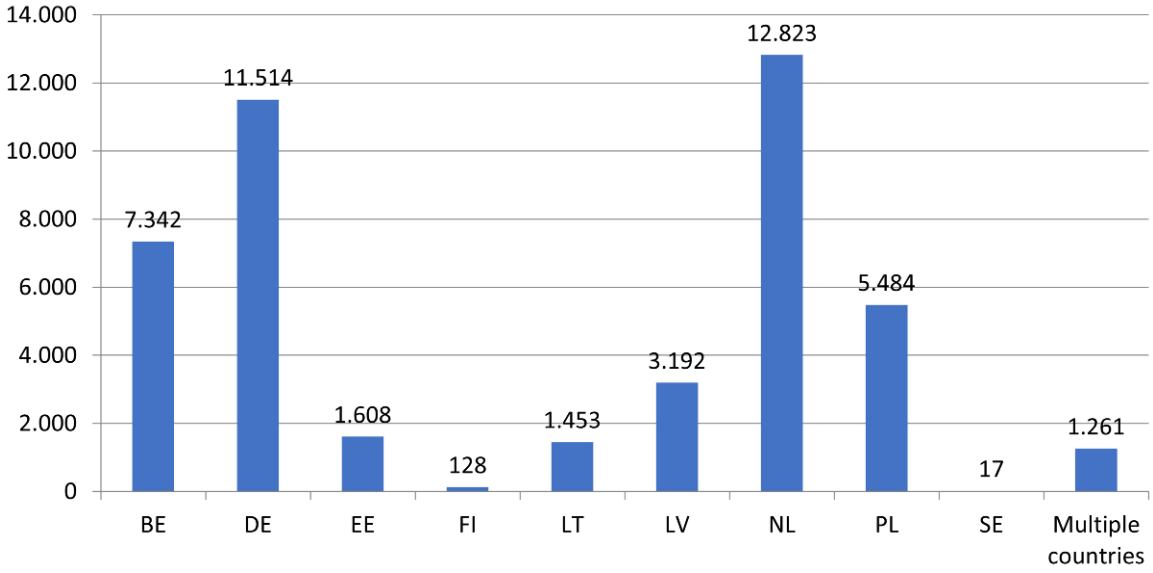
The IWW projects will contribute to the **achievement of one or more of the following KPIs**: ECMT class (6 projects), draught 2.5 m (1 project), height 5.25 m (2 projects).

3.1.4. Road transport including ITS deployment

The road projects address **non-compliance issues** in some Member States and **capacity issues** in almost all NSB Corridor Member States.

The project information per investment planned is presented in the figure below.

Figure 17: NSB Corridor projects - category "Road"



Source: own elaboration, the NSB Corridor 2021 project list

There are 206 road projects with the total cost of **€ 44.4 bn.** Most of them aim to upgrade existing infrastructure. As there is **limited possibility for expanding existing infrastructure** due to spatial and financial constraints, as well as the impact on the environment and climate change, new comprehensive initiatives for modal shift and multi-modal transport planning are required to avoid an increase of capacity bottlenecks.

For some sections of the NSB Corridor, **road safety** is the main issue due to heavy road use and further actions on road safety improvements should be undertaken.

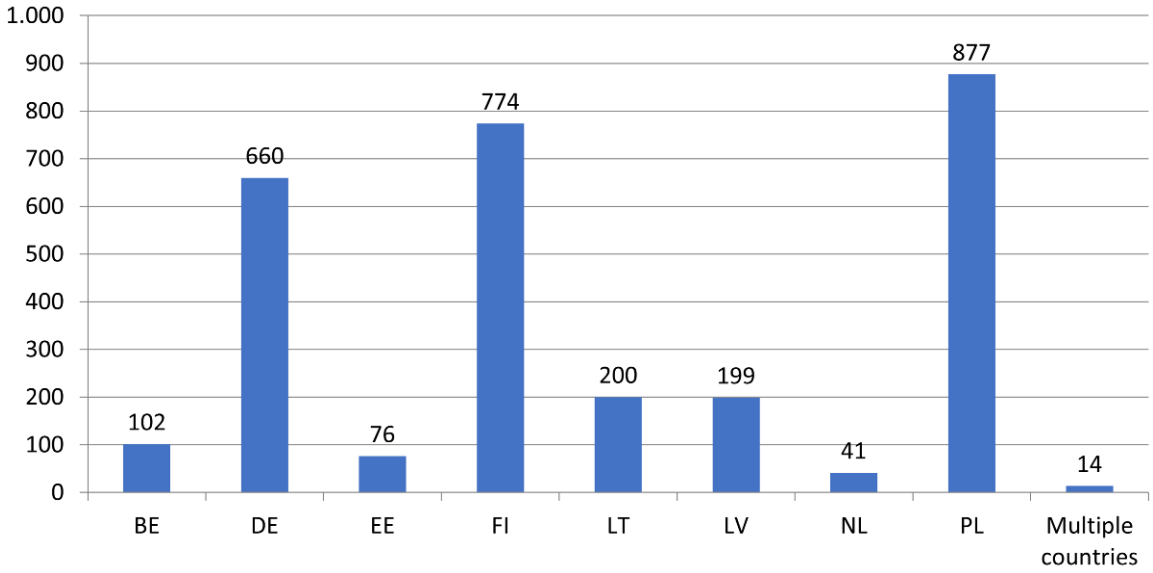
Deployment of **Intelligent Transport Systems (ITS)** along the NSB Corridor can alleviate capacity issues, as available real time information on congested road sections can help the users to better plan their movements. At the same time, it would also contribute to increased road safety.

The roads projects will contribute to the **achievement of one or more of the following KPIs**: express road / motorway (50 projects), availability of clean fuels (13 projects).

3.1.5. Airports

Due to the peripheral geographic location of some of the NSB Corridor Member States, **airports play an important role for them.** There are 83 airport related projects with the total costs of **€2.9 bn.**

Figure 18: NSB Corridor projects - category "Airport" in total million EUR



Source: own elaboration, the NSB Corridor 2021 project list

Airport projects are planned in all NSB Corridor countries with the highest investment in Poland, Finland and Germany. In Finland the project will provide further connections for cargo and long-distance passenger trains in Helsinki airport (airport line). The projects in Germany relate to Hannover, Berlin and Bremen airports. Berlin airport company intends to expand terminal capacities, however, there is still no / resilient time.

At Hannover-Langenhagen Airport, the refurbishment of the northern runway is planned as a major investment measure. This measure only involves the rehabilitation of the existing structure.

In **Poland** investments relate to Warsaw Chopin Airport, Poznań airport and Łódź airport. Poland is also working on the new Solidarity Transport Hub.

Riga International Airport has a requirement to be connected to the rail network by 2050. The solution is planned in the context of the Rail Baltica project, whereby the new fast conventional European-gauge rail line shall pass directly through Riga International Airport with a new rail passenger station to be constructed at the airport. The project will improve KPIs – connection to rail and availability of clean fuels.

Tramline projects planned in Finland to connect multimodal passenger hub with airport or any other long distance transport mode.

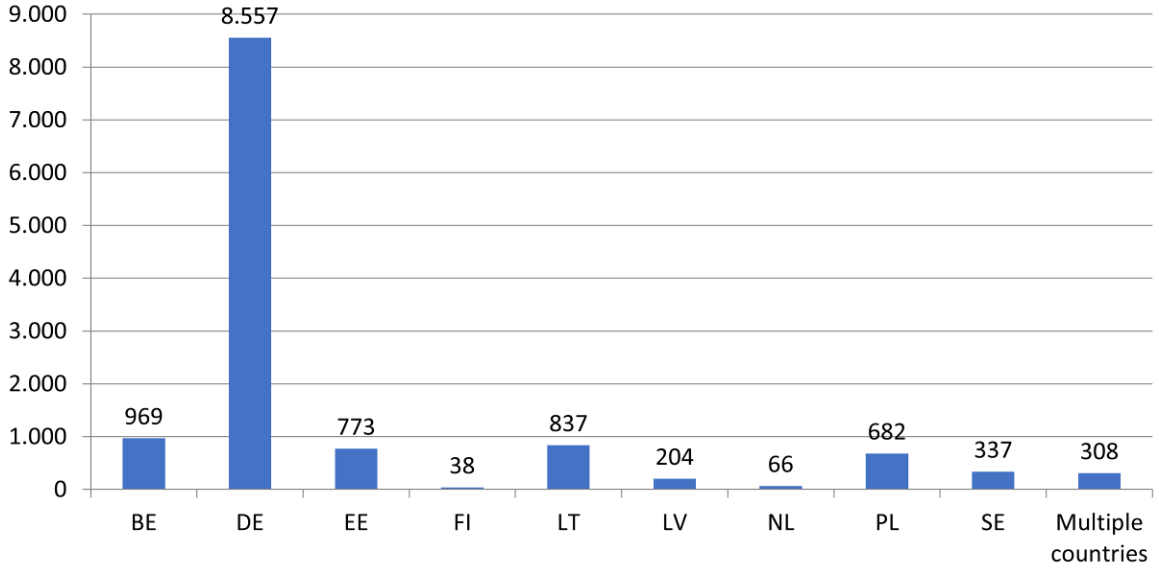
All Corridor airports have to assess the introduction of **clean fuels** for airplanes.

3.1.6. Maritime Ports on the NSB Corridor

The ports of the NSB Corridor are **among the busiest in Europe** and it is the corridor with the **second most important hinterland traffic volume**, underlining the importance of strong port-hinterland connections.

There are 106 maritime projects with the total cost of **€12.3 bn.**

Figure 19: NSB Corridor projects- category "Maritime"



Source: own elaboration, the NSB Corridor 2021 project list

There are 14 MoS projects with the total cost of **€499 million.** In Finland and Estonia there are the twin-port projects (Tallinn, Helsinki). In Hamburg, Germany, the Port authority is planning and construction of Köhlbrand Bridge replacing the current building is planned as it is an important axis between the western and the eastern part of the port.

A **modal shift from road to less carbon-intensive modes** is one way to reduce the greenhouse gas emissions of the transport sector. The NSB Corridor is a coastal corridor, and there are various regular maritime ro-ro and container services which could provide an alternative to road transport on the longer distances between the North Sea and the Baltic Sea as set out in chapter 4.

The maritime projects will contribute to the **achievement of one or more of the following KPIs**: connection to rail (11 projects), ECMT class (1 project), availability of clean fuels (4 projects). In addition, 3 projects will contribute to facilities for ship generated waste.

In parts of the Baltic Sea **ice-breaking** is needed during wintertime. According to the Detailed Implementation Plan of the Motorways of the Sea, the reliability of ice-breaking should be assessed while at the same time, analysing alternative (possibly land-based) routings in certain scenarios may be part of future resilience plans.

In the western part of the Corridor there is an active cooperation on the improvement of port hinterland connections and railway capacity to the German Ruhr region, for example in the framework of a tri-national working group, following up on the 3RX study.

3.1.7. Overview of major persisting bottlenecks and missing links

One of the main contributors to further develop the economic potential and integration of the northern part of the NSB Corridor into the European transport network is the **Rail Baltica project.** Therefore, one of the NSB Corridor priorities continues to be the timely completion of the project in an integrated and coordinated way between the Baltic States, Poland and Finland.

In the Western part of the Corridor Member States and regions work actively together on the improvement of port hinterland connections (for example the CBA of the 3RX

study connecting the North Sea ports and the German Ruhr area is currently being reassessed).

The NSB Corridor shall **provide and develop the necessary rail capacity** to the ports in the North Sea and the Baltic Sea in line with demand and work together with ports, forwarders and ship operators to improve the administrative procedures and data flows across all modes and assure the reliability of the network in order to guarantee the smooth flow of goods between MoS and the NSB Corridor. In Poland the finalisation of works will take place to ensure full TEN-T compliance on the Polish rail network along with filling the missing link between Warsaw and Poznań/Wrocław – high speed rail.

Although the existing **road network** in many countries meets the requirements of the TEN-T regulation, there are congestion issues around the main urban nodes. Further investments are needed in the road infrastructure in the Baltic States. Road safety is another challenge, which has been identified but not yet fully addressed.

The provision of alternative fuel sources and charging stations is a challenge especially considering the need to ensure alternative fuels not only for private cars but also for trucks and trains. A lot has been done by developing new technologies, national and regional plans but further activities are needed, for instance to improve the compatibility between different networks, the availability of information to final consumers, re-charging networks and networks of clean energy hubs, and different energy types, such as, hydrogen and biofuels.

Additional projects have been identified which would be needed to achieve the NSB Corridor compliance with TEN-T requirements but are not currently planned. Those projects mostly relate to the use of clean fuels for airports; the bridge height for IWW; and the train speed and length for some rail sections.

Due to the need to improve the efficiency and effectiveness of cargo management and to achieve EU's greening goals there is a need to have a better integration with **RFC North Sea-Baltic** which provides a unified system for the organisation and management of a dedicated capacity offer for international rail freight.

The NSB Corridor goals are achieved by implementing transport sector governance and infrastructure related projects, however due to the COVID crisis there have been **delays in the project implementation** because of a lack of workforce due to travel restrictions, and a lack of materials due to disrupted supply chains.

Other issues for project implementation are a lack of funding, a need to develop cross-border plans (for instance, alternative fuel charging stations) and difficulties to coordinate implementation of complex cross-border projects.

4 The deployment plans of MoS, alternative fuels and development of urban nodes

4.1. Deployment plan of MoS

Maritime transport plays a key role for the European economy, transporting about 75% of its external trade and approximately 31% of its internal trade. Specifically, short sea shipping (SSS) makes up a majority (up to 60%) of the total maritime transport of goods to and from the main EU ports. With its large network of maritime ports on TEN-T network, the European maritime sector forms an important part of the intra-European transport system. The Motorways of the Sea (MoS) programme is a

key instrument in this setting, working towards the ultimate vision of a European Maritime Space (EMS) that is **Sustainable, Seamless, Smart and Resilient**.

In the Detailed Implementation Plan (DIP) for MoS, the aim is to provide a sound analysis of priority investment needs to achieve the EMS, centred on four thematic pillars:

1. **Sustainable**: Emphasising on the reduction of GHG emissions and pollution of air, noise and water;

2. **Seamless**: enhancing the connectivity with the rest of the TEN-T (the CNCs in particular), other transport modes, peripheral and outermost regions, islands and European neighbourhood countries;

3. **Smart**: aligning maritime transport with the European digital agenda;

4. **Resilient**: ensuring the EMS is capable of facing exogenous shocks.

Maritime ports and their hinterland connections play a key role to achieve these goals. The port infrastructure and the hinterland connections must facilitate the transfer of the European economies to non-fossil fuels, providing appropriate handling and alternative fuels terminals, storage and hinterland infrastructure. Given that the future demand of alternative fuels is not yet known, investment plans need to be flexible and react quickly to a developing demand and supply.

Due to its relatively high energy efficiency, maritime transport can also play an important role in reducing the climate impact of transport. Especially on long coastal routes, maritime transport should be considered as a serious alternative to road transport. Such coastal services with a reduced carbon footprint should be developed in cooperation with shippers and forwarders.

Ports and port communities are also natural digital hubs, exchanging data with seaborne and land-based transport from all parties involved in the transport chain. Simplification of procedures, harmonisation of data flows and a common approach to deploy interoperable ICT systems will further facilitate the use of maritime transport.

Finally, the resilience of maritime transport chains requires the cooperation of ship operators, ports and forwarders. Exogenous shocks such as extreme weather events may lead to a temporary breakdown of ports or parts of the hinterland transport chain. To address such possible shocks, alternative shipping routes should be identified for relevant transport flows. Such alternative shipping routes may involve stakeholders along the TEN-T core network corridors with core and comprehensive network ports.

4.2. Plans for the deployment of alternative fuels infrastructure

The European climate law requires the Union to reduce its net greenhouse gas emission by at least 55% in 2030. Such emission reduction will require a significant contribution from transport. There is now considerable momentum as regards the market uptake of zero- and low-emission vehicles in the EU. However, to facilitate transition to a mass market and develop a truly common EU transport market full connectivity and a seamless user experience along the European transport network for low- and zero-emission vehicles, vessels and aircraft are needed. The TEN-T network has to provide the backbone of this endeavour.

The Commission report on the alternative fuel's directive provides a comprehensive assessment of the state of play of alternative fuels infrastructure rollout in the EU[4]. It

shows that market maturity varies considerably, depending on the mode of transport. Although some Member States have raised their ambition, the EU still lacks a comprehensive and complete network coverage of easy-to-use alternative fuels infrastructure, for all modes of transport. The European Court of Auditors has also stressed the significant differences between Member States in deploying charging infrastructure.[5]

The Commission is proposing a new Regulation on the deployment of alternative fuels infrastructure and repealing Directive 2014/94/EU. Being part of the Fit for 55 Package of 14 July 2021, the proposal seeks to provide for a dense, widespread network of publicly accessible alternative fuels infrastructure in the EU.

The proposal for a new regulation sets forth binding requirements for rollout of an infrastructure with a sufficient amount of minimum recharging and refuelling capacity to ensure full cross-border connectivity of light and heavy-duty vehicles throughout the EU. Distance-based targets for fast-recharging infrastructure along the TEN-T network complement national fleet-based targets for recharging of light-duty electric vehicles. A combined approach of distance-based targets along the TEN-T network with targets for overnight recharging infrastructure for trucks in safe and secure parking places and targets at urban nodes should further support the electrification of heavy-duty vehicles.

Distance-based targets for deployment of hydrogen refuelling stations, including for each urban node, will also ensure necessary minimum refuelling infrastructure for light- and heavy-duty fuel cell hydrogen vehicles.

Following the provisions of the proposal for a regulation on alternative fuels infrastructure, shore-side electricity supply should be provided in maritime and inland waterway ports. In addition, an appropriate number of refuelling points for LNG should be put in place at maritime ports and on road network of the TEN-T core and comprehensive network. Finally, stationary aircraft at airports and commercial transport operation should be able to make use of external electricity supply while parked at gates or at outfield positions at TEN-T airports.

The upcoming proposal for the revision of the TEN-T Guidelines will provide per transport mode cross-references to the Regulation on the deployment of alternative fuels infrastructure and additionally address aspects of private recharging and refuelling infrastructure in certain cases such as freight terminals. Private recharging infrastructure is also likely to be addressed in the upcoming proposal for the revision of the Energy Efficiency of Buildings Directive.

4.3. The development of urban nodes by 2030

Urban nodes represent most of the points of origin and destination of transport flows on the corridors. The effectiveness of the corridors is therefore impacted by the effectiveness of the first and last miles of the journeys in those urban nodes and it is important to ensure sufficient multimodal connections. Urban nodes can also contain bottlenecks and missing links on the corridors; conversely, they can be impacted by the negative aspects of traffic on the corridors in terms of pollution, noise and safety. In that perspective, urban nodes should receive sufficient attention in the work of the corridors as well as in the TEN-T Regulation.

Regarding the TEN-T Regulation, the Commission adopted on 14 December 2021 a proposal for a revised Regulation which more clearly defines the role of the urban nodes on the network and their constituting elements and which sets additional requirements that the Member States should ensure. In addition to infrastructure connections, the requirements include the development of Sustainable Urban Mobility Plans (SUMPs), the use of sustainable urban mobility indicators and the development of multimodal passenger hubs and freight terminals to facilitate low and zero emission urban distribution. In addition, the proposal extends the list of recognised urban nodes from the previously limited list of 88 "network defining urban nodes" to all cities of at least 100.000 inhabitants and, for NUTS2 regions without such a large city, the capital of those regions. Depending on the final version that will be adopted by the Council and Parliament, the number of urban nodes per NSB Corridor would thus significantly increase.

In this Work Plan, the reference to the current list of urban nodes is made. Considering the high number of urban nodes in the NSB Corridor and their contribution to the NSB Corridor's economic potential one of the priorities is further development of urban nodes. It will be achieved by focusing on passenger travel and mobility as a service. It will include an integration of different transport modes, development of multimodal passenger hubs, and digitalisation of urban transport. The prerequisite for urban transport digitalisation will be data availability and interoperability, and 5G infrastructure development in cities. Another important urban node development component will be greening, by this understanding not only alternative fuels availability in cities but public transport and city logistics shift to alternative fuel, higher use of trains and trams in the public transport, developing ring roads around the largest cities, developing cycling infrastructure and other initiatives such as installing zero emission zones.

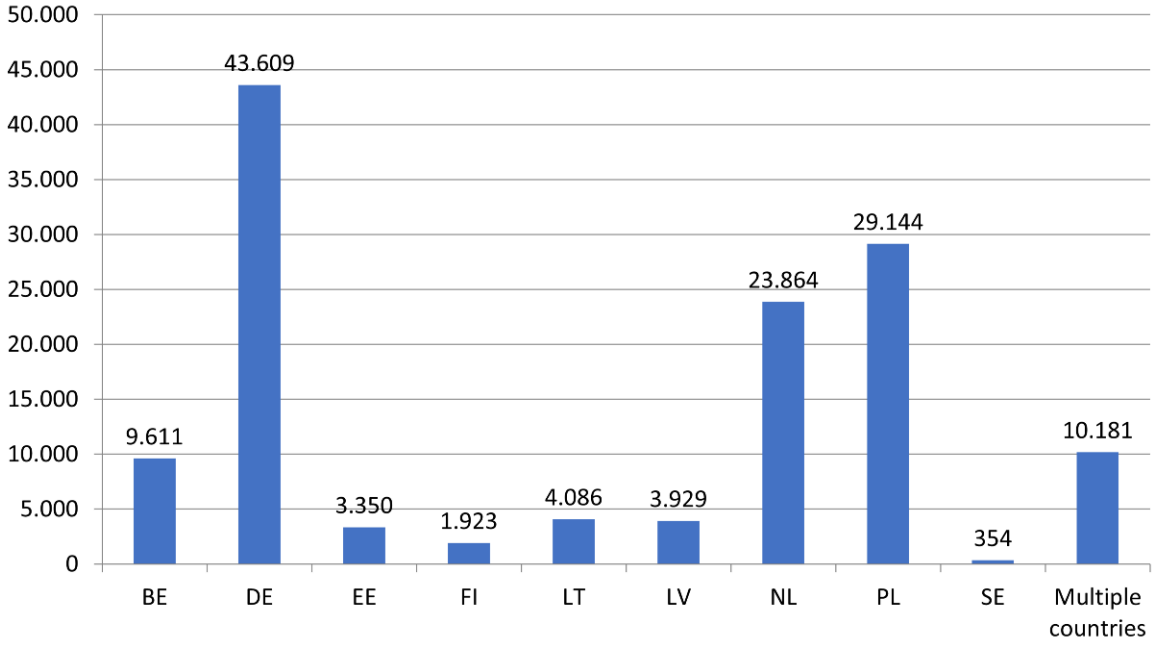
5 Funding and Financing tools

5.1. Update the NSB Corridor's funding needs

Over the years, the project list has been enhanced by reflecting more projects not only to achieve compliance with TEN-T requirements but also to address bottlenecks and to reach the economic, social and territorial cohesion objectives of the NSB Corridor development. To achieve those objectives, the number of projects has increased and the Fifth Work Plan includes 733 projects with a total value of € 130 bn in comparison to 657 projects with the total value of € 110 bn included in the Fourth Work Plan. The figure below shows the planned investments by Member State and cross-border or multi-country projects.

The financial analysis presented in Work Plan is based on the project list for the NSB Corridor. No financial obligation for the Member States concerned derives from this analysis."

Figure 20: NSB Corridor projects by Member State

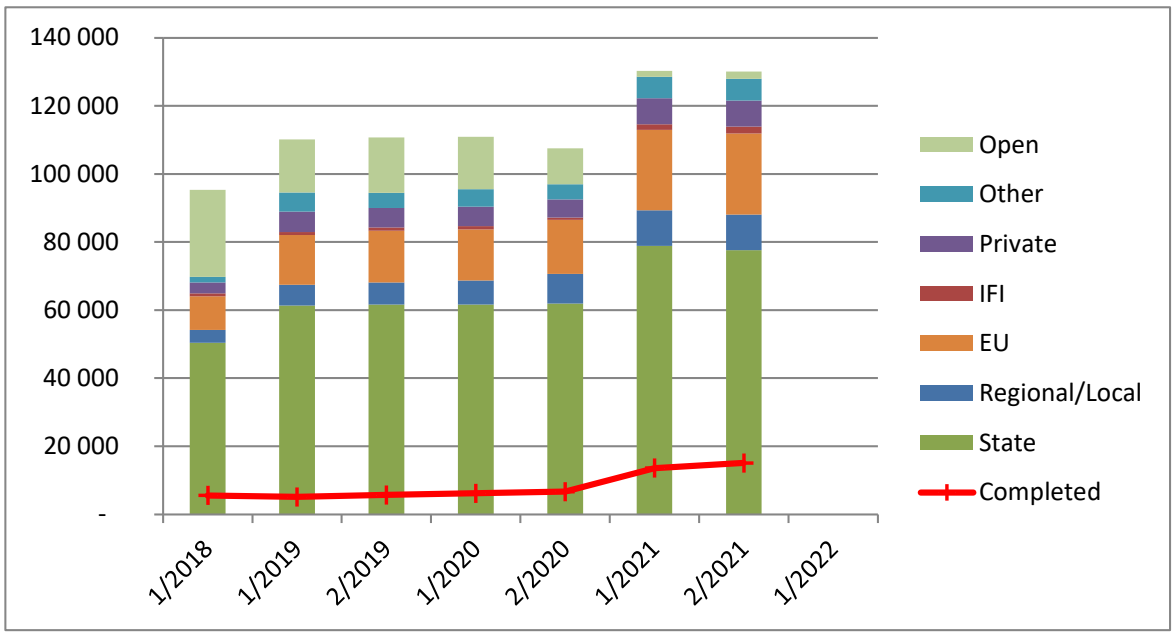


Source: own elaboration, the NSB Corridor 2021 project list

The largest investments are planned in Germany, Poland and The Netherlands, and a significant part of investments is planned for multiple-country projects by this facilitating cross-border travel.

The project funding sources differ between Member States and change over time, based on the maturity and type of the project. As it could be seen from the figure below there is a good reduction of unknown financing sources (open) and other financial sources. The figure below shows how the project financing changed due to increased number of projects, project maturity and project funding options available.

Figure 21: Evolution of project funding over the years



Source: own elaboration, the NSB Corridor 2021 project list

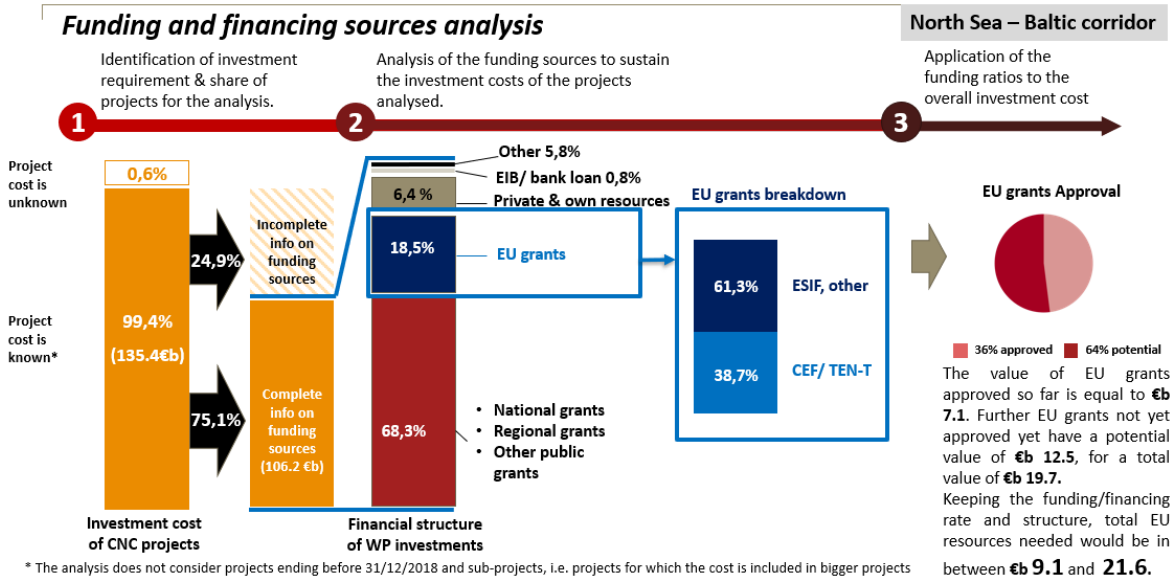
As it can be seen from the figure above, the main funding source is globally public national or regional funding, but the situation is different between Member States, and for some Member States the main funding source is EU funding which is increasing over time. EU funding is divided between EU grants (the biggest share) and loans or guarantees from the EU institutions.

For 99.4% of projects costs are known, however for 24.9% of projects there is incomplete information on funding sources. As it can be seen from the figure below 68.3% of required project funding is provided by national and regional financing.

Many of the planned projects would not have been planned and implemented without EU financing amounting to 18.5% from all funding needed. EU funding is provided by CEF (38.7%) based on the approved CEF projects included in the project list. Another important EU funding source is ESIF financing amounting to 61.3% from EU financing planned and mostly used by Poland and the Baltic States. The third important financial source is other funding including EIB, commercial banks and private financing.

The figure below provides information on the funding needs and funding sources.

Figure 22: Projects financing

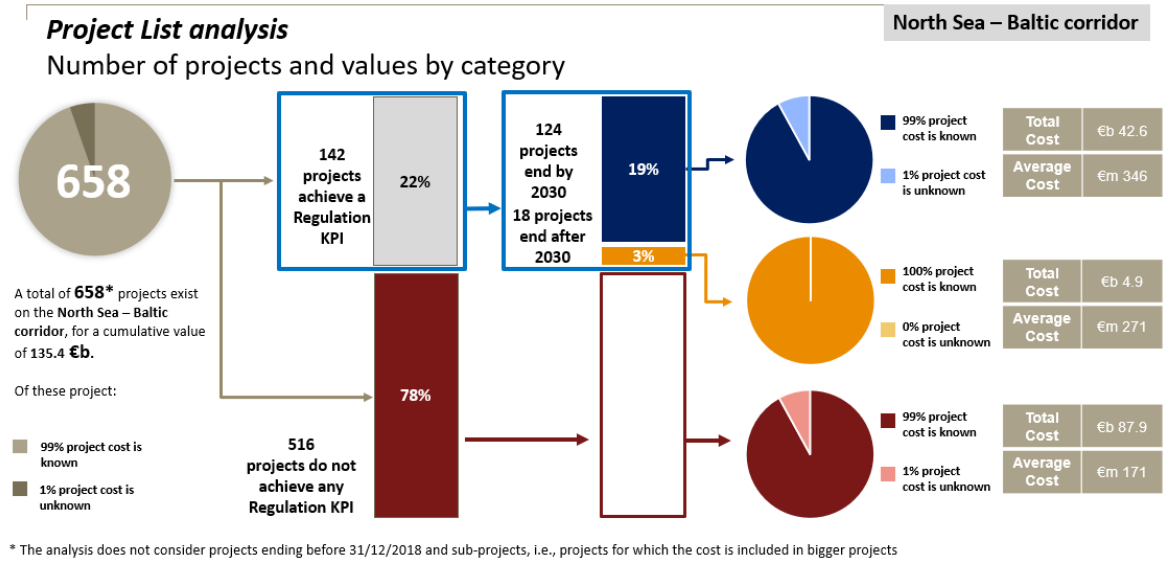


Data source: own elaboration, the NSB Corridor 2021 project list

The significant investments planned will not only contribute to the NSB Corridor's compliance with TEN-T requirements but will also contribute to the further development of the NSB Corridor and better use of the NSB Corridor's economic potential.

As it could be seen from the figure below only 142 projects or 22% from all the projects are contributing to the achievement of compliance with TEN-T requirements. Out of 142 projects contributing to TEN-T compliance achievement 124 projects or 88% with the total amount of € 42.6 bn will be completed by 2030, by this ensuring the compliance with deadlines set in the regulation. The significant part of the projects – 516 projects or 78% with total funding € 87.9 bn contributes to the further NSB Corridor development.

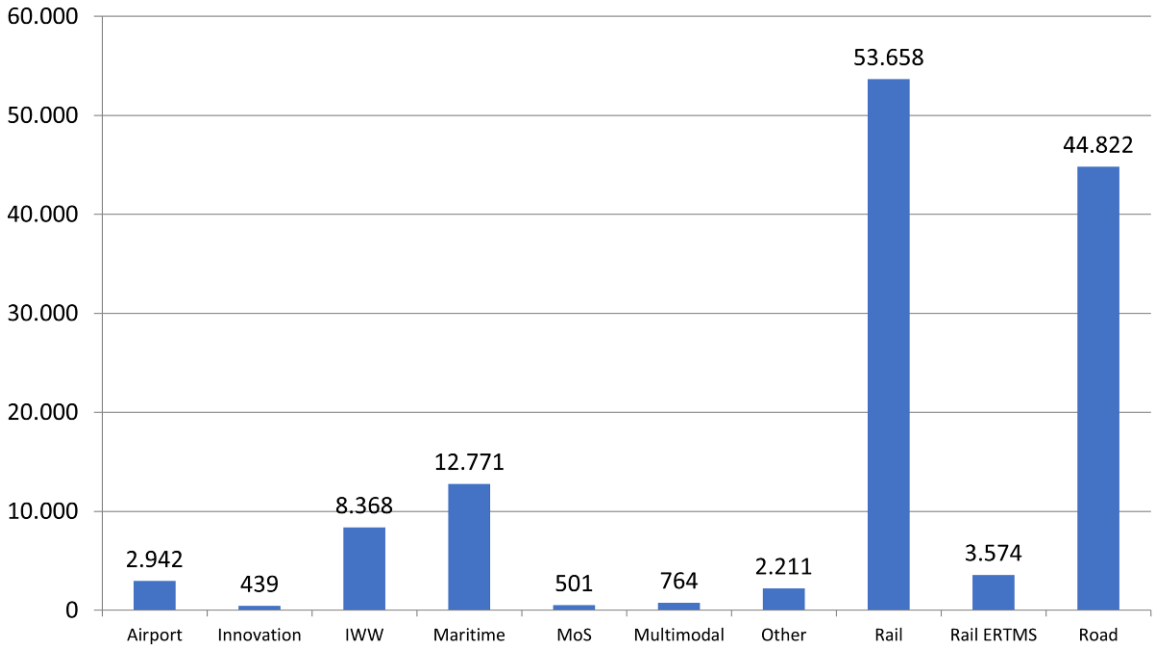
Figure 23: Projects contribution to achieving compliance with TEN-T requirements



Data source: own elaboration, the NSB Corridor 2021 project list

Another important aspect is how to analyse the NSB Corridor's projects and their contribution to the TEN-T goals is by investments needed per transport mode with highest investments made in rail as the most effective way to address the climate change issues. The second largest investment category is road.

Figure 24: NSB project costs per transport mode



Source: own elaboration, the NSB Corridor 2021 project list

5.2. The Green Deal and the Recovery and Resilience Fund

The Recovery and Resilience Facility (RRF) Regulation has made € 672.5 bn in loans and grants available to support both reforms and investments undertaken by Member States in the framework of national recovery and resilience plans. The aim is to mitigate the economic and social impact of the coronavirus pandemic and make

European economies and societies more sustainable, resilient, and better prepared for the challenges and opportunities of the green and digital transitions.

The Annual Growth Strategy for 2021 (AGS) and the Commission RRF guidelines have identified the development of sustainable, smart, and safe transport as a priority for the European recovery and mentioned the deployment of alternative fuel infrastructure among the 7 European flagship initiatives national recovery plans are invited to contribute to.

In this framework and considering the national plans already submitted, the Commission expects the Member States to dedicate significant parts of the RRF funding to transport, placing it among the top sectors of the economy to benefit from investments under NextGenerationEU.

While the RRF will finance a large variety of projects, priority will be given to those contributing to the decarbonisation of the transport system in the framework of the European Green Deal. The main contributions of RRF on the NSB Corridor will be for rail, by accelerating ERTMS deployment in Finland and 5G deployment in Lithuania, and further network development in Estonia and Latvia. RRF will also contribute to the further deployment of alternative clean fuels for road transport to respond to future needs. Other priorities will include sustainable urban mobility solutions (including collective transport and active mobility), inland navigation and the electrification of road fleets. In addition, digitalisation of the European transport system will be accelerated by RRF support to investments in ERTMS, ITS or RIS.

5.3. The new CEF2

The CEF 2021-2027 Regulation entered into force on 14 July 2021, applying retroactively from 1 January 2021. The total **budget** for the CEF transport is € 24.807[6] bn and its division between the envelopes is as follows:

- General envelope: € 12.830 bn
- Cohesion envelope: € 11.286 bn
- Military mobility envelope: € 1.691 bn

The **main priorities** of the CEF are:

- Completion of the network: supporting the completion of the TEN-T, with particular priority to cross-border sections and missing links of the Core Network Corridors (60% of general envelope and 85% of cohesion envelope).
- Modernisation of the existing infrastructure: tackle much more decisively the challenge of decarbonisation and digitalisation of the transport sector, to support the transition to smart, sustainable, inclusive, safe, and secure mobility (40% of general envelope and 15% of the cohesion envelope).
- In line with the Action Plan on Military Mobility, for the first time, support the critical development of civilian-military dual-use transport infrastructure.

The CEF will contribute at least 60% of its funding to the climate objectives (compared to 30% of the overall target of the MFF).

The **blending** of CEF grants with other financial sources will be allowed. This might be implemented either through blending calls (CEF grants in combination with non-EU

[6] All amounts are in 2021 prices.

financial instruments, e.g. commercial banks or national promotion banks) or through blending operations (blend CEF grants with InvestEU).

The CEF will allow the implementation of **synergies** between CEF transport, energy, and digital sectors. It will be applied either as "synergetic elements" (it will be possible for each sector to accept as eligible cost ancillary elements pertaining to another sector) or through joint work programmes jointly financed from each sector involved with the possibility to apply the highest co-funding rate of the sectors concerned and 10% top-up.

The Commission adopted the first multiannual work programme 2021-2027 on 5 August 2021. This specifies the funding objectives and budget for the years 2021-2023.

5.4. The inclusion of military mobility in the network development plans

As of 2021, military mobility taken into account in the Corridor Work Plans. The efforts addressing military mobility are based on 2018 EU Action Plan on Military Mobility which aims to improve military mobility in 3 key areas of action: transport infrastructure, regulatory and procedural issues, and other cross-cutting topics. In light of the location of the Corridor, its connection to the Poland's border with Ukraine and its proximity to Belarus and Russia, the dual use sections of the NSB Corridor are becoming particularly relevant.

Concerning transport infrastructure, in 2019 the Council of the EU approved the Military Requirements for Military Mobility within and beyond the EU. These Military Requirements identify the geographical scope for military mobility as well as define transport infrastructure standards necessary for the military. The gap analysis performed in 2019 by the Commission services and the EEAS emphasises the synergies between TEN-T and military mobility: 93% of the military transport network is also part of TEN-T; and military transport infrastructure standards are mostly compatible with civilian transport infrastructure needs.

Owing to these synergies between civilian and military transport needs, actions aiming to complete TEN-T Corridors can also improve military mobility. The EU's new long-term budget now includes a dedicated € 1.7 bn military mobility envelope as part of the CEF to co-fund such dual-use transport infrastructure projects. The first CEF call for proposals to improve dual-use transport infrastructure was launched on 16 September 2021. To be eligible, projects have to be on both the TEN-T and the military transport network, as well as to address dual-use transport infrastructure requirements identified in Commission Implementing Regulation (EU) 2021/1328[7].

As reaction to the Russian war of aggression against Ukraine, the Commission brought forward the calls for proposals under the military mobility part of the Connecting Europe Facility. Nearly €240 million were allocated to projects on the NSB Corridor.

[7] Commission Implementing Regulation (EU) 2021/1328 of 10 August 2021 specifying the infrastructure requirements applicable to certain categories of dual-use infrastructure actions pursuant to Regulation (EU) 2021/1153 of the European Parliament and of the Council

C/2021/5859, *OJ L 288, 11.8.2021, p. 37*.

6. Recommendations and outlook by the European Coordinator

The present report shows that we have made good progress towards the completion of the NSB Corridor since the last Work Plan – despite the pandemic which interfered with planning and construction processes due to lockdowns, interrupted supply chains, and increasing prices for transport services.

I would like to thank the NSB Corridor members for their efforts that made this possible. The quality and the implementation of the projects reflect the strong momentum which we should take into the next reporting period. I would like to thank the consultants who have worked on this report and the project list for their efforts and their support to the NSB Corridor. I would also like to thank my colleagues in the Commission and CINEA who enriched our work, facilitate the implementation and help with the important question of financing. My thanks also go to those who participated in the European Year of Rail, organised events and contributed to the success of the initiative, and to all members of the NSB Corridor forum and the participants of the NSB Corridor working groups for their cooperation. I am looking forward to continuing the work with you to develop cross-border cooperation.

Building on what we have achieved in the reporting periods since 2014, our mission for the next reporting period continues to be our work towards the completion of the NSB Corridor by 2030. The COVID pandemic will hopefully soon lie behind us, but new challenges are coming, and old ones remain. In addition to the construction of the missing infrastructure, the NSB Corridor faces four key challenges over the coming years which we should tackle jointly and in the spirit of strong cross-border cooperation between all Member States and regions of the NSB Corridor:

- Making the NSB corridor an accelerator for the green transition of the transport sector in the face of climate change;
- Driving forward a more digitalised and connected transport and logistics system on the NSB Corridor for long-distance traffic and within urban nodes;
- Driving forward an integrated planning of transport, energy, and digital infrastructure, and
- Re-evaluating the wider geopolitical context of the NSB Corridor following the Russian attack on Ukraine.

Regarding the first priority, it is clear that the transition to a cleaner and more environmentally friendly transport system remains a challenge for all stakeholders in the transport sector, including the NSB Corridor. Following the European agreement to reduce greenhouse gas emissions by 55% until 2030, the Sustainable and Smart Mobility Strategy, and increasing public pressure to take climate action, the next reporting period needs to focus on the green transition. The NSB Corridor should act as an accelerator for this change. Consequently, further priority needs to be given to a modal shift from road to rail and inland waterway transport, the latter in particular on Western part of the NSB Corridor. The railway and inland waterway infrastructure as well as service levels and the prices of these transport modes need to provide incentives to a modal shift, meaning that for instance multimodal hubs, such as rail-road terminals, will be needed. And interoperability issues on rail, especially at border crossings, and reducing railway noise near heavily populated areas have to be solved. The integration of the RFC corridor and the NSB Corridor should also help achieve this objective.

In addition, and in line with the proposals for a revised TEN-T Regulation and the Alternative Fuels Infrastructure Regulation, it will be important to accelerate the

rollout of clean fuel infrastructure. Putting in place recharging and refuelling infrastructure will help overcome the chicken and egg problem between infrastructure rollout and vehicle uptake. To make the switch to alternative fuels attractive for drivers, the rollout of alternative fuels needs to be coordinated across the EU. Cross-border cooperation and coordination should also take place within the NSB Corridor to enable continuous transport flows powered by clean fuels and energy along the entire NSB Corridor.

Even if we are taking more serious action against climate change, it is clear that the frequency of extreme weather events will increase. The heavy rainfall and flooding in some Western regions of the NSB Corridor and the extreme heat period in the Northern regions last summer were an indication of that. In addition to climate change mitigation, the NSB Corridor partners therefore need to consider climate change adaptation measures to make the NSB Corridor more resilient in the face of extreme weather events.

Regarding the second priority, it is clear that the development of new digital solutions across all aspects of life will have an impact on transport flows. Some of these will do so more directly, like ERTMS, ITS and RIS which will enable an improved management of transport modes. Other digital solutions have a more indirect impact, like the uptake of online shopping or digitally managed home delivery services for food and meals, which change the logistic in our cities. Urban nodes need to be integrated and connected to the TEN-T and multimodal hubs and rail-road terminals and charging infrastructure for e-mobility will be necessary to reduce the climate and pollution impacts of these transport flows.

Regarding the third priority, we should investigate whether the NSB Corridor can play a more active role to advance integrated planning of digital, energy, transport infrastructure and land use. Digital infrastructure needs to be developed, for ERTMS, RIS, 5G networks and broadband cables. At the same time, more renewable energy infrastructure needs to be deployed, for generation capacity, such as wind turbines and solar panels, for transmission, recharging and refuelling infrastructure and for smart grids, for the generation and distribution of alternative transport fuels (be they electricity, hydrogen, or synthetic fuels). The need for transport infrastructure has been set out in the main part of this report. To some extent, these infrastructures will belong together, e.g. deploying renewable energy generation close to recharging places or ERTMS infrastructure along railway lines. In other places, synergies could be obtained by planning infrastructure together, e.g. by integrating the 'dig once principle' into transport infrastructure planning. In some parts, evaluating such synergies is likely to be mandated by legislation, e.g. for urban nodes. Working across organisational boundaries is a challenge for administrations but it is necessary for questions of land use. The NSB Corridor could be a place to work towards a greater integration of these different infrastructures and take a more holistic approach to planning.

Regarding the fourth priority, we can assume that Russia's war of aggression against Ukraine and its consequences will be felt on the entire NSB Corridor. Its geography has always given the NSB Corridor a special geopolitical role, due to its proximity to Russia and Belarus in the North and the possibilities it opened up for transport flows to the high North and the Far East. The attack of Russia supported by Belarus on Ukraine will require a re-evaluation of the geopolitical situation. Freight volumes joining the NSB Corridor from the East might be reduced further. The NSB Corridor is an important link of the railway connection from China to the North Sea ports but uncertainty now emerges about transit routes. At the same time, some sections of the NSB Corridor play a role for military mobility, a topic which should receive greater attention as overall geopolitical assessments change. Furthermore, we see that at least in the short term, the war brought uncertainties regarding the development of fuel prices, which might influence modal choices and transport behaviour in the future.

As a consequence, the NSB Corridor needs to be prepared to adapt to the changing geopolitical situation.

Finally, the NSB Corridor should of course continue its work to bring together the Member States, regions and stakeholders of the NSB Corridor and advance cross-border cooperation.

National infrastructure and deployment strategies should continue to converge and be coordinated with the partners along the NSB Corridor. A flagship project for cooperation has to be the Rail Baltica project which is a major missing cross-border link of the NSB Corridor. Furthermore, I would like to advance the integration of the regions which the NSB Corridor welcomed in the summer of 2021 and prepare the merger of the NSB Corridor with the RFC as set out in the TEN-T Regulation proposal of the Commission. This proposal will give us the opportunity to reinforce the collaborative governance with Member States, regions, and partners.

Close cooperation among the members of the NSB Corridor and the European Coordinator will be a key for success. I am looking forward to working with the NSB Corridor members and stakeholders to bring the NSB Corridor closer to completion and tackle the challenges we face. I will always be at the disposal of the NSB Corridor members, and I hope to be able to count on your continued cooperation.