EXTENSION OF THE 11 RFCS 2024 JOINT TMS UPDATE TO THE RAIL FREIGHT NETWORK BELONGING TO THE EUROPEAN TRANSPORT CORRIDORS ESTABLISHED BY REGULATION (EU) 2024/1679

FINAL STUDY REPORT

NORTH SEA-BALTIC ETC FREIGHT CORRIDOR EXECUTIVE SUMMARY

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Prepared for:

RailNetEurope
Austria Campus 3
Jakov-Lind-Straße 5
1020 Vienna
Austria

CONTENTS

1 NORTH SEA-BALTIC ETC FREIGHT CORRIDOR TMS EXECUTIVE SUMMARY

1.1 INTRODUCTION

This note summarises the analysis of the current and future transport market along the rail freight lines of the North Sea-Baltic (NSB) European Transport Corridor. A network-wide analytical and modelling approach has been applied to the entire ETCs rail freight network to define the ETCs freight corridors' catchment areas, the modal split and volumes of international freight transport for rail, as well as road, inland waterways and maritime shipping transport along them. The methodological approach is described in Section 1.2. Section 1.3 summarises the results of the TMS for the NSB freight corridor as derived from the network-wide TMS. More detailed assumptions and results of the ETCs rail freight network TMS and the nine individual ETCs freight corridors are included in a separate report - *Extension of the 11 RFCs 2024 Joint TMS Update to the freight corridors belonging to the nine ETCs established by Regulation (EU) 2024/1679* – of which the present note represents an abstract.

1.2 ETCs FREIGHT CORRIDORS TMS BACKGROUND AND METHODOLOGICAL APPROACH

Between June 2023 and December 2024, RailNetEurope (RNE), on behalf of the operational eleven Rail Freight Corridors (RFCs) established under the scope of Regulation (EU) 913/2010, conducted a Joint Transport Markey Study (TMS) Update to comply with paragraph 3 of Article 9 of Regulation (EU) 913/2010, concerning a *European rail network for competitive freight*. In July 2024, the revised trans-European transport network (TEN-T) – Regulation (EU) 2024/1679 *on Union guidelines for the development of the trans-European transport network, amending Regulations (EU) 2021/1153 and (EU) No 913/2010 and repealing Regulation (EU) No 1315/2013* – entered into force, establishing nine European Transport Corridors (ETCs), also including nine freight corridors[1], integrating and replacing the former 11 RFCs:

- Atlantic;
- Baltic Sea-Adriatic Sea;
- Baltic Sea-Black Sea-Aegean Sea;
- Mediterranean;
- North Sea-Rhine-Mediterranean;
- North Sea-Baltic;
- Rhine-Danube;
- Scandinavian-Mediterranean;
- Western Balkans-Eastern Mediterranean.

In view of the preparation of the Implementation Plans of the newly established ETCs freight corridors, the RFCs Rhine-Alpine (RALP), North Sea-Med (NSM), Scandinavian-Mediterranean (SCANMED), Atlantic (ATL), Baltic-Adriatic (BA), Mediterranean (MED), North Sea-Baltic (NSB), Rhine-Danube (RD), and Alpine-Western Balkan (AWB), decided to extend the 11 RFCs 2024 Joint TMS Update analysis to the nine ETCs freight corridors. Among the measures for developing the freight corridor, paragraph 3 of Article 9 of Regulation (EU) 913/2010, as amended by Regulation (EU) 2024/1679, still foresees that the ETC freight corridor management boards carry out and periodically update a TMS. The TMS should relate to observed and expected changes in the traffic on the freight corridor, covering the different types of traffic, both regarding the transport of freight and the transport of passengers. It should also review, where necessary, the socio-economic costs and benefits stemming from the development of the freight corridor. The TMS is furthermore expected to provide relevant inputs to the freight corridor implementation plan, which should be drawn up and published by the freight corridor management board at least six months before making the freight corridor operational. This plan should be reviewed at least every four years, considering the progress made in the freight corridor implementation and the rail freight market on the corridor.

Regarding the requirements set in Article 9.3 for the TMS, some limitations exist in the available data for rail transport market analysis purposes, which influenced the scope and outcome of the 11 RFCs 2024 Joint TMS Update and

[1] In line with point a), paragraph 2, Art. 2 of Regulation (EU) 913/2010 as amended by Regulation (EU) 2024/1679, "freight corridor" means the freight railway lines of the European Transport Corridor as specified in Article 11(1) of Regulation (EU) 2024/1679 of the European Parliament and the Council of 13 July 2024 on Union guidelines for the development of the trans-European transport network and in Annex III to that Regulation

consequently also of its extension to the nine ETCs freight corridors. Such limitations relate to the information available from the Train Information System (TIS) database managed by RNE, assumed to be the main source of train traffic data to be used in the analysis:

- The quantity and quality of data available in TIS allows for an analysis of international freight trains, but is insufficient for the analysis of national freight trains and international and national passenger trains;
- In certain cases, trains along international itineraries are classified as national trains until border stations and only get classified as international trains from border locations onward. While this procedure does not affect the quantification of international traffic across borders, it may affect the correct representation of the Origins and/or Destinations of the trains;
- Information on the number of trains per section/node is generally available, but not the exact routing;
- Information on the type of train (i.e. block/single wagon), type of cargo (intermodal, dry bulk, liquid bulk…), type of commodities, weight, and length is also partial;
- Information for certain countries, including the three Baltic States, Ireland, and the Western Balkans, is not encoded in TIS;
- The quality of the data available from TIS is gradually improving, but the information available for the years before 2022 is not considered sufficiently consistent and coherent for the whole network.

The above-listed conditions precluded the possibility of performing a capacity analysis of the ETCs freight corridors and analysing the national and international traffic of passengers and the national traffic of freight trains. The use of a transport model (NEAC model[2]), combining available trade and transport statistics from Eurostat with the TIS trains dataset – as well as data provided by the Infrastructure managers for the Baltic States and derived from the studies conducted by the Permanent Secretariat of the Transport Community for the Western Balkan countries[3] – it was nonetheless possible to estimate the corridor catchment areas and the modal share of international freight transport along the ETCs freight corridors[4].

The NEAC demand model has been calibrated to the year 2022 (Model Base Year), whereas the network model has been adjusted to reflect the ETCs freight corridor alignment defined in Annex III of Regulation (EU) 2024/1679 (See figure overleaf). For convenience matters, it was decided to disregard the ETCs alignment in Ukraine, specifying that the model and study cover this country in terms of market analysis, as well as other relevant neighbouring countries, such as Turkey, and more generally, all EU commercial partners in the world. The freight corridors' alignment has been confirmed with the RFCs and the Permanent Secretariat of the Transport Community during the inception stage of the study to resolve any possible discrepancies regarding operating lines in 2022 and relevant links currently not in operation but expected to be operational after 2022[5].

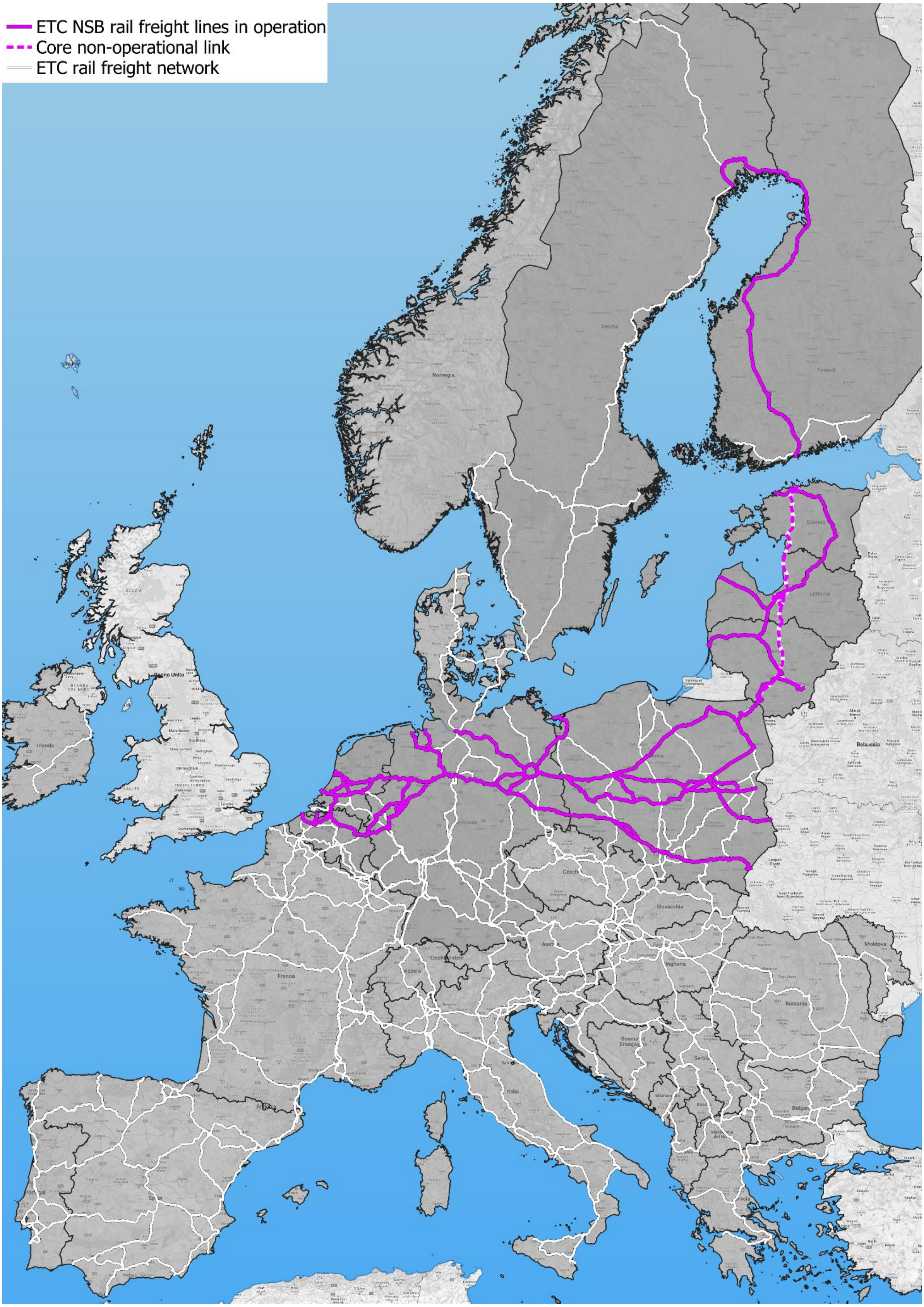
[2] Together with other tools with comparable or complementary capabilities (such as ASTRA, PRIMES-TREMOVE, and TRUST), the NEAC model is acknowledged by the European Commission as one of the valid tools for use in European studies (see https://web.jrc.ec.europa.eu/policy-model-inventory/explore/models/model-neac). As mentioned on the Commission website, NEAC is particularly suitable for modelling transport infrastructure policies (e.g. TEN-T), multimodal freight, port competition and containerisation. NEAC has been developed by Panteia (and NEA) over the past three decades and is used in different assignments. It has grown in those years as an essential source for different studies and other EU models and databases such as the TEN-T corridor studies, ETIS, Trans-tools or High-Tool.

[3] https://www.transport-community.org/studies-and-reports/.

[4] Due to the absence of information on the type of trains and inclusion in the available transport statistics of intermodal transport in general cargo, especially for road transport, it was not possible to estimate the current and future traffic of intermodal transport. The analysis of the observed changes in the traffic on the corridors was excluded from the scope of the TMS, as the ETCs freight corridors are not yet operational. The future analysis does not assess the developments of current or future planned terminals. An analysis of the socio-economic costs and benefits stemming from the development of the freight corridors was also not conducted as part of this TMS.

[5] As part of the review of the lines to be considered for analysis in the base year and future scenarios, the Atlantic Rail Freight Corridor requested to include the existing conventional railway line, part of the comprehensive TEN-T network, between Porto and Vigo, in Portugal, and the Rhine-Danube Rail Freight Corridor requested to include the existing conventional line, part of the comprehensive TEN-T network, between Simeria and Filiasi, in Romania. Whereas both segments are not represented in the freight corridor of the concerned European Transport Corridors, the Portuguese authorities intend to request the European Commission to include these sections in the ETC freight corridor alignment, whereas the Management Board of Rhine Danube ETC intends to offer capacity on the Simeria-Filiasi line, because it is the only diversionary route in the area concerned.

Figure1 NSB ETC freight corridor within the ETCs rail freight network



Source: Tplan based on TENtec

For the purposes of the TMS, a network-wide approach has been adopted based on the consideration that the rail freight market of the individual corridors can only be appropriately analysed within the rail freight market across the whole ETCs rail freight network. Each corridor has connections or overlaps with other corridors. Also, trains using a corridor often have an origin or destination outside of the corridor. Furthermore, the 'double counting' risk is mitigated by looking at the entire rail freight network. Therefore, a good knowledge of the rail freight network market forms the basis for the analysis of the individual corridor market. Accordingly, the market analysis of the individual freight corridors has been derived from the market analysis of the overall ETCs rail freight network.

The analysis of the ETCs rail freight transport market necessitates a definition of the corridor area and the corridor catchment area. The definition of both can be approached from two perspectives: the supply perspective, focusing on the railway network within a corridor and the demand perspective, centred on the volume of goods transported via an ETC. The corridor area refers to all NUTS 2[6] regions crossed by the railway freight lines. The catchment area encompasses NUTS 2 regions that use the ETC for international goods transportation by rail, often extending beyond the boundaries of the corridor area. To qualify, rail transport between an origin and destination within a corridor catchment area must cross *at least* one Border Crossing Point (BCP) associated with the respective ETC freight corridor.

The rail freight market analysis focuses, indeed, on international trains, i.e., those crossing at least one BCP. In this regard, several trains operating along international itineraries are logged and classified as national ones in national train databases and the TIS dataset. The use of the NEAC model partially overcomes the limitations of the current structure of these datasets. Nonetheless, the results presented in this report might be conservative in estimating the international flows along the rail freight network of the ETCs.

The NEAC model has also been used to estimate the short-term future market of the ETCs. Future scenarios have been built only considering socio-economic and infrastructure developments. This solution reflects the decision to develop only short-term forecasts up to 2030 and adopt a pragmatic and, as far as possible, concrete approach, thus omitting the simulation of the possible effects associated with policy developments such as:

- the proposed revision of the Weights and Dimensions Directive;
- electrification of Heavy Goods Vehicles;
- the internalisation of external costs of road transport (road pricing) or incentives to rail/combined transport operations;
- technological/operational improvements of intermodal transport solutions and logistics chains;
- market sensitivity to climate and energy transition
- etc.

In line with this approach, reflecting the scope of the study to develop the ETCs freight corridors market analysis primarily in the framework of the implementation of the TEN-T Regulation (EU) 2024/1679, the following scenarios have been defined, all of them at the 2030 time horizon:

- *Reference or background scenario*: This scenario describes the economic developments (in terms of GDP changes) that significantly impact the future of rail transport. The base for this is the EU Reference scenario 2020-2050 and the World Economic Outlook 2023 for the countries outside the EU. This scenario represents the term of comparison for the other scenarios. Assuming a business-as-usual scenario as appropriate, future projections in this scenario will only consider trade growth, keeping rail shares at their current level;
- *Projects scenario*: It provides an overview of the impacts resulting from the expected developments in the rail transport system. A consultation was made during the inception stage of the study to identify the projects to be considered in future scenarios. Several projects have been identified that are ongoing and/or planned for development and implementation to improve the railway infrastructure of the ETCs network. In line with the approach adopted in the 11 RFCs 2024 Joint TMS Update, only major projects related to missing links, upgrades,

[6] A NUTS 2 zone refers to a level within the Nomenclature of Territorial Units for Statistics (NUTS), a hierarchical system developed by the European Union to divide the economic territory of the EU into territorial units for the purpose of collecting, developing, and harmonising statistical information. NUTS 2 forms basic regions for the application of regional policies, often used for regional development and structural funding. These zones are generally composed of regions with a population between 800,000 and 3 million people, although there can be exceptions. The precise structure and the number of NUTS 2 zones can vary between countries, depending on national administrative structures and the size and population of the country.

and improvements of the rail freight network belonging to the 9 ETCs expected to be finished by 2030 have been considered. The focus on a subset of the most relevant projects reflects the purpose of the study and nature of the NEAC model, limited to freight market analysis and thus transport volumes and modal share estimation by land transport mode, excluding network capacity simulation and assessment, and looking at the short-term time horizon;

- *Sensitivity scenario: an ETCs rail freight network in line with TEN-T requirements*[7]: This scenario provides an overview of what would happen if, in addition to the infrastructure investments included in the Projects scenario, ERTMS is fully deployed, 740 meter long trains are allowed to operate anywhere on the whole network, 22.5 t axle load is achieved on the entire network, P394 intermodal loading gauge is also possible along the rail freight network of the ETCs and if the track gauge meets the European standard (1,435 mm). Furthermore, this scenario also considers improvements related to the completion of many modernisation projects expected to increase the speed standard of the freight corridors, particularly in Eastern and South-Eastern Europe. A Sensitivity scenario simulating *an ETCs rail freight network in line with TEN-T requirements* would implicitly assume the rail freight lines will also be electrified; however no specific effects have been considered for such a condition in this scenario. Last but not least, the Sensitivity scenario assumes that all the ETC lines currently not in operation will be operational, regardless of any ongoing/planned investment related to their construction/upgrading. This "TEN-T implementation scenario" should be regarded as a sensitivity analysis, as it assumes the ETCs will be aligned with the TEN-T networks and standards, irrespective of the investments required to achieve such a target.

Table 1 and Table 2 below, list respectively the major projects selected for simulation in the Projects scenario, and the non-operational links in 2022 (model base year), either foreseen to be completed by 2030 and thus included in the Projects scenario, regardless of their inclusion in the major projects list in Table 1; or expected to be completed after 2030 and thus simulated as operational in the Sensitivity scenario. Ongoing and planned major projects and non-operational links in 2022 refer to the whole 9 ETCs rail freight network, as the analysis for the individual corridor has been derived from the analysis of the whole rail freight network.

Table 1 Major projects simulated in the Projects scenario

Major projects simulated in the *Projects scenario*	End date	ETC
Follobanen	03/2023	SCM
Rehabilitation and upgrade of Corridor Section Aveiro - Vilar Formoso	12/2024	ATL
ABS Hoyerswerda–Horka–Border DE/PL	12/2024	NSB
Rehabilitation of the railway line Border-Curtici, Section Gurasda-Simeria	12/2025	RD
Upgrade Stadlau-Marchegg (Marchegger Ast)	12/2025	BSAS
Graz-Klagenfurt; Koralm line	12/2025	BSAS
Second Track Divaça-Koper	10/2025	BSAS, MED, WBEM
Future Development of Railway Infrastructure: increase of capacity: Biasca, Chiasso, Arth-Goldau, Brig-Iselle, Basle PB, Basle-Luzern, Rothrist, noise protection Gotthard and Lötschberg axes	12/2025	NSRM
ABS/NBS Karlsruhe - Basel Phase 2, No 1	12/2026	NSRM
Construction of double-track railway from Sandbukta to Såstad	08/2026	SCM
Modernisation of Vidin - Medkovets railway section	12/2026	BBA
ABS Angermünde - Border DE/PL	12/2026	NSB
ABS Berlin-Frankfurt (Oder)-Border (DE/PL)	12/2027	NSB

[7] Given the uncertainties related to the completion by 2030 of the European standard gauge network in the Iberian peninsula, as well as the full deployment of ERTMS and the possibility of operating 740 meter trains and the achievement of the 22.5 t axle load and P394 intermodal loading gauge standards, a Sensitivity scenario has been developed as part of the study for the simulation of the completion of the ETCs rail freight network in line with the TEN-T standards. This network-wide solution was deemed more appropriate than implementing individual projects within the Projects scenario 2030 as the presence of gaps in the completion of the ETCs rail freight network at TEN-T standard may question the real impact of these investments, especially for the European track gauge, 22.5 t axle load, P394 intermodal loading gauge, ERTMS and 740-meter-long trains standards. A similar approach was also adopted to consider the potential improvements associated with the ongoing and planned projects, impacting the maximum line speed in Eastern and South-Eastern European Countries, due to the uncertainties related to the possible achievable maximum speed upon completion of the many modernisation and upgrading projects in these countries, but aimed at simulating their impact. It is worth noticing that these assumptions, especially the ones related to European Standard gauge, 740-meter-long trains, P394 intermodal gauge and maximum line speed, are applied to the ETCs rail freight network as a whole – in functional terms – without specific assumptions on the achievement of the requirements by corridor sections and/or calculation of compliance by section (e.g. for 740-meter-long trains), or line (P394 intermodal loading gauge), or between terminals (100 km/h maximum design speed), or derogation request.

Major projects simulated in the *Projects scenario*	End date	ETC
Works on main passenger lines (E 30 and E 65) in Śląsk area, phase I: line E 65, section Będzin-Katowice-Tychy-Czechowice Dziedzice-Zebrzydowice, lots A, A1	06/2027	BSAS, RD
Works on railway line E 75, section Białystok-Suwałki-Trakiszki (state border), Stage I, sub-section Białystok - Ełk, phase II	12/2027	BBA, NSB
Rehabilitation of the railway line Cluj-Episcopia - Border	12/2027	BBA, RD
Upgrading of Alexandroupoli-Ormenio/BG border railway line	12/2027	BBA
Rehabilitation of the railway line Brasov - Simeria	12/2027	RD
Upgrading Gallarate-Rho line 0294	11/2028	NSRM
Upgrade of Brno - Breclav line as a High-speed Rail line	12/2029	BSAS, RD
Modernisation of the railway line Bucharest - Giurgiu	12/2029	BBA
Upgrade of the railway access line to the Fehmarn Belt Fixed Link - Section Ringsted - Rødby	06/2029	SCM
Southern access line to Brenner; Lotto/lot 1: Fortezza/Franzenfeste - Ponte Gardena/Waidbruck 0292A	12/2029	SCM
ABS/NBS Hamburg - Lübeck - Puttgarden (Hinterland connection to Fehmarn Belt Fixed Link)	12/2029	SCM
New Rail Line Dresden - Praha (Section Heidenau - State Border DE/CZ)	12/2030	RD
ABS/NBS München - Rosenheim - Kiefersfelden - Grenze D/A (--> Kufstein)	12/2030	RD, SCM
Upgraded line (ABS) (Amsterdam) - DE/NL border - Emmerich - Oberhausen (1. + 2. Phase)	12/2030	NSB, NSRM
Y Basque High-speed Rail (freight and passenger traffic): all sections + access to cities Bilbao and Vitoria +ERTMS + electrification + systems	12/2030	ATL
ABS Kehl–Appenweier (POS-Süd)	12/2030	RD
ABS München-Mühldorf-Freilassing	12/2030	RD
ABS Nürnberg-Passau	12/2030	RD
ABS Hof - Marktredwitz - Regensburg - Obertraubling (Ostkorridor Süd)	12/2030	RD, SCM
Semmering base tunnel	12/2030	BSAS
Modernisation/ Rehabilitation and Electrification of Craiova-Calafat railway section (107 km)	12/2030	BBA
Upgrade Nordbahn Wien Süßenbrunn - Bernhardsthal	12/2030	BSAS, RD
ABS Nürnberg-Marktredwitz-Reichenbach/BGr DE/CZ (–Prag)	12/2030	RD, SCM
ABS Nürnberg - Schwandorf/München - Regensburg - Furth im Wald - Grenze D/CZ	12/2030	RD, SCM
Modernisation of the line Plzeň - Česká Kubice, section Stod (excl.) - State border D	12/2030	RD
Rehabilitation of the railway line Caransebes-Craiova	12/2030	BBA, RD
Kanin-Hradec Kralove-Chocen, second track increase speed	12/2030	RD

Source: Panteia based on RFCs investment list

Table 2 Non-operational ETC lines in 2022 assumed to be operational in the Projects or Sensitivity scenarios, depending on the estimated completion date

Non-operational ETC lines in 2022 assumed to be operational in the *Projects scenario* or *Sensitivity scenario*, depending on the estimate completion date	Freight corridor
Elorrio <--> Bergara <--> Zumárraga <--> Astigarraga <--> Errenteria	ATL
Vitoria Gasteiz <--> Mondragón <--> Elorrio/Bergara	ATL
Errenteria North <--> Errenteria South	ATL
Basauri <--> Ortuella <--> Puerto de Bilbao	ATL
Elorrio <--> Bilbao	ATL
Casa Branca <--> Grândola Norte	ATL
Sines <--> Grandola	ATL
Évora <--> Elvas	ATL
Lisboa <--> Barreiro (TTT)	ATL
Thessaloniki <--> Toxotes	BBA
Kaunas <--> Kaisiadorys	BBA
Elk <--> Trakiszki/Sestokai	BBA
Fronołów <--> Biała Podlaska <--> Milanów	BBA
Bucureşti <--> Giurgiu	BBA
Ebenfurth - Sopron (border A/H) (direct link bypassing Ebenfurth train station)	BSAS
Klagenfurt <--> Werndorf	BSAS
Gloggnitz <--> Muerzzuschlag	BSAS
Zalaszentiván bypass (HU) (direct link bypassing Zalaszentiván train station)	BSAS
Ronchi dei Legionari <--> Aurisina	BSAS; MED
Gyekenyes (part 2) <--> Border (HR) (direct link bypassing Gyekenyes train station)	BSAS; MED
New line to the port of Rijeka sections Karlovac <--> Oštarije <--> Dreznica <--> Rijeka	BSAS; MED; WBEM
Kledering <--> Border AT/HU (Schwechat <--> Sarasdorf) (Wien airport new high-speed link)	BSAS; RD

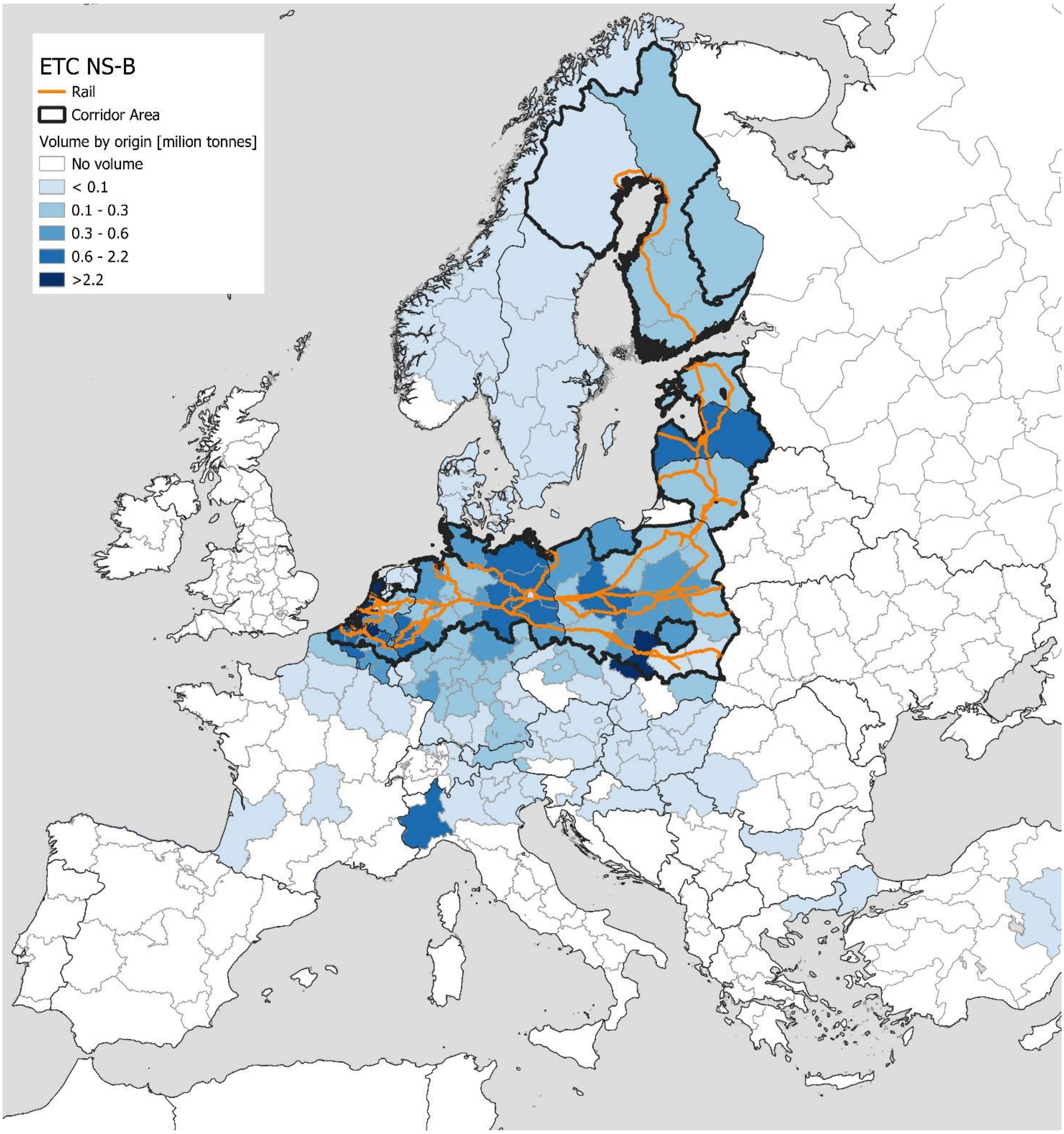
Non-operational ETC lines in 2022 assumed to be operational in the *Projects scenario* or *Sensitivity scenario*, depending on the estimate completion date	Freight corridor
Almería <--> Murcia	MED
Xàtiva <--> Valencia (high speed)	MED
Saint Laurent de Mure <--> Border FR/IT II / Modane	MED
Orbassano <--> Avigliana <--> Border FR/IT III	MED
Tortona <--> Genova	MED; NSRM
Rail Baltica	NSB; BBA
Offenburg <--> Kenzingen <--> Mulheim <--> Border (DE/CH)	NSRM
Usti n. Labem <--> Border (DE)	RD
Dresden <--> Border (CZ)	RD
Busteni <--> Sacele	RD; BBA
Umeå <--> Luleå	SCM
Puttgarden <--> Border DE/DK (Puttgarden)	SCM
Fehmarn DK/D <--> Rodby <--> Nykobing F <--> Vordingborg	SCM
Aldrans <--> Patsch <--> Brenner Tunnel (HS)	SCM
Ponte Gardena <--> Fortezza <--> Brennero (C) (high speed)	SCM
Trento Roncafort <--> Trento Sud Junction <--> Marco	SCM
Prato Isarco <--> Bronzolo	SCM
Navacchio <--> PM Il Faldo	SCM
Santa Maria Capua Vetere <--> Bivio Gricignano	SCM
Caserta <--> Vitulano Foglianise <--> Cancello	SCM
Vitulano Foglianise <--> Apice S. Arcangelo B. <--> Orsara <--> Cervaro <--> Foggia	SCM
Battipaglia <--> Praia a mare	SCM
Villa San Giovanni <--> Messina	SCM
Gyueshevo West <--> Gyueshevo	WBEM
Podgorica <--> ME/AL border <--> Vorë <--> Tiranë/Durrës	WBEM
BG/MK border <--> Kriva Palanka <--> Odreno <--> Kuklitsa <--> Shupli Kamen <--> Lopate	WBEM
Kičevo <--> MK/AL border	WBEM
Igoumenitsa <--> Ioannina <--> Kalambaka	WBEM
Kiato <--> Patra	WBEM

Source: Tplan based on TENtec

1.3 ANALYSIS OF THE CURRENT AND FUTURE TRANSPORT MARKET OF THE RAIL FREIGHT NETWORK BELONGING TO THE ETC NSB

The catchment area for international rail freight transport of the ETC freight corridor NSB exceeds the corridor area. It captures areas such as (parts of) Southern Germany, Austria, Czechia, Hungary and Northern Italy. A large portion of the rail freight transport uses the ETC freight corridor NSB lines and its border crossing points to ship freight by rail from different origins to different destinations (see overview in Figure 2 and Figure 3). Figure 2 shows the origins of the ETC NSB. The most important origins are port areas, which use the ETC NSB rail freight network to ship goods to the hinterland. In the catchment area, different zones can be seen that contribute significantly to the ETC NSB, such as Turin and Ostrava.

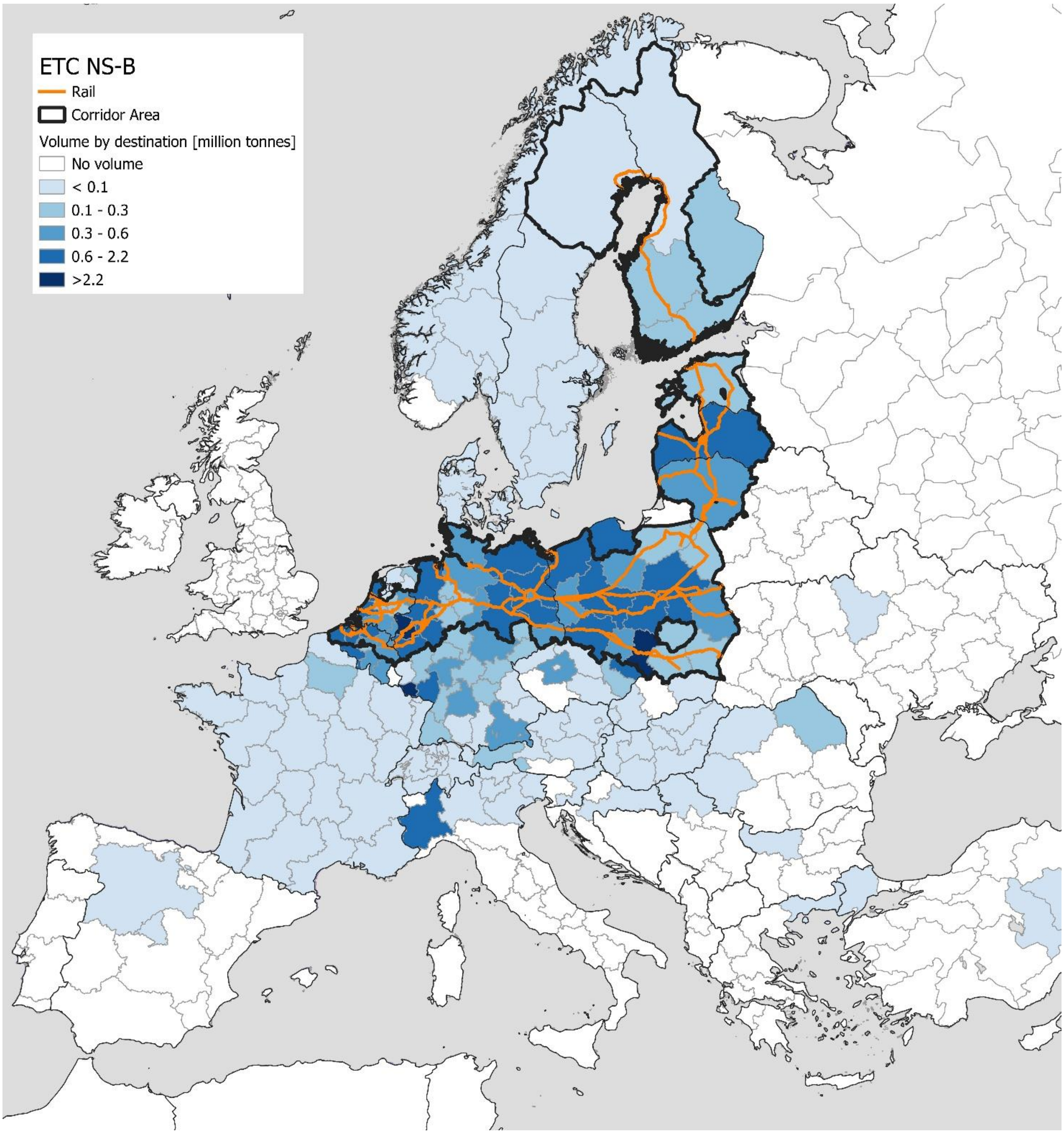
Figure 2 Origins of international rail freight volume (in million tonnes) that use the ETC NSB rail freight network



Source: NEAC Model; Legend: Orange = freight railway lines of ETC NSB. Blue = Volume by origin. Black = Delineation of freight corridor area

Figure 3 presents the destinations within the ETC NSB catchment area. The figure highlights similar zones as the origins that exhibit the high freight volumes dispatched from these destinations. In addition also transport to Spain and the whole of France is included. It is evident from the figure that numerous zones benefiting from ETC NSB's services fall outside the corridor area, such as areas in Southern Germany and Northern Italy.

Figure 3 Destinations of international rail freight volume (in million tonnes) that use the ETC NSB rail freight network

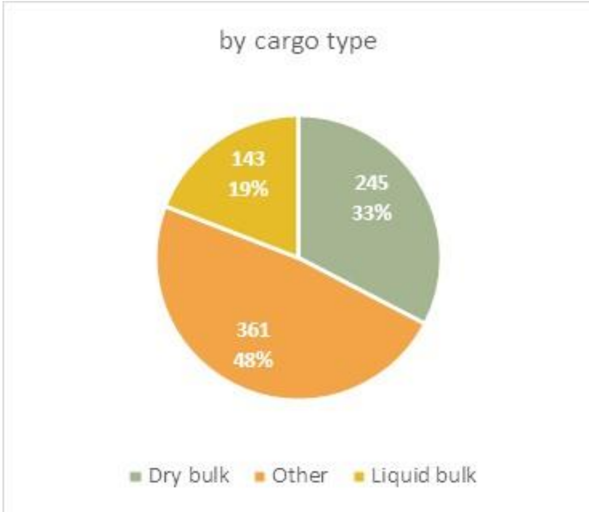


Source NEAC Model; Legend: Orange = rail tracks of ETC NSB. Blue = Volume by destination. Black = Delineation of freight corridor area

The total volume of all international freight transport in the *catchment* area of the ETC NSB is estimated at 749 million tonnes in 2022, transported by road, rail, inland shipping and sea shipping. The international rail freight transport volume in this area is estimated at 81 million tonnes. This is 11% of the total amount of freight transport for the ETC NSB. The share of inland shipping is 24% (179 million tonnes), the share of road transport 37% (276 million tonnes). Sea shipping has a share of 28% (214 million tonnes) (Figure 4).

Concerning the cargo types, *Other* (General cargo, including intermodal transport and container) is the most important one at 361 million tonnes (48%). *Dry bulk* is second in the international freight transport within the catchment area of the ETC NSB, with a volume of 245 million tonnes (33%). Liquid bulk has a share of 19% (143 million tonnes) in the total volume of international freight transport over all modes in the catchment area of the ETC NSB (Figure 4).

Figure 4 Estimated volume (million tonnes) and share of international freight transport by mode and cargo type in the corridor and catchment area of ETC NSB



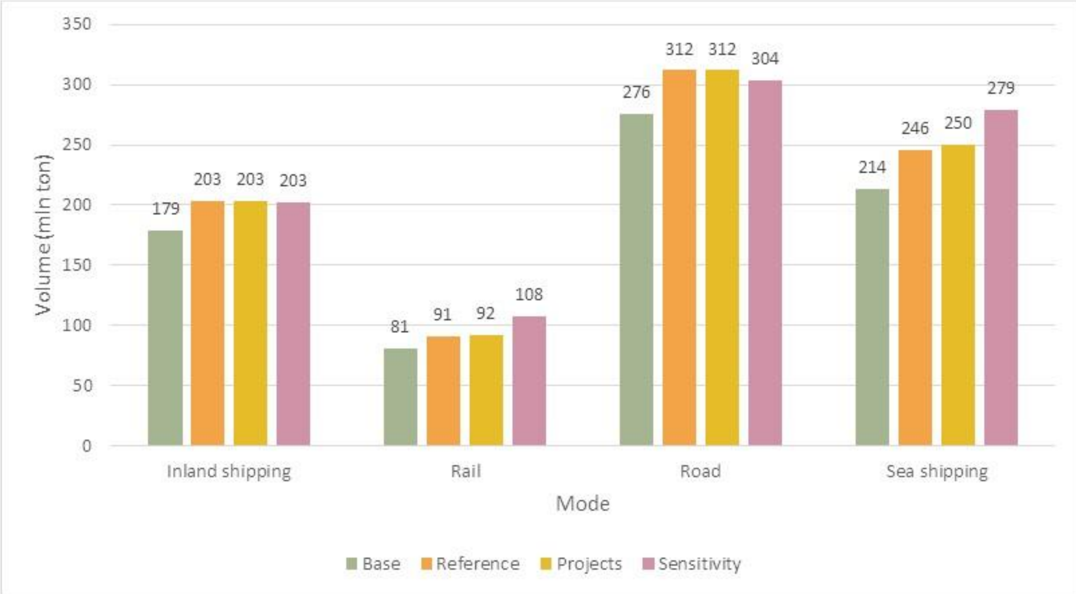
Source: NEAC estimations

Between the 2022 Base year and the 2030 Reference scenario, all modes grow due to economic developments. Rail transport grows by 13% (10 million tonnes) from 81 to 91 million tonnes. Expressed in trains (average 600 tonnes) this concerns a growth from 133,000 to 152,000 trains. Inland shipping grows by 24 million tonnes (14% growth) from 179 to 203 million tonnes, road grows by 13% (36 million tonnes) from 276 to 312 million tonnes, and sea shipping by 15% (32 million tonnes) from 214 to 246 million tonnes (Figure 5).

The Projects scenario gives a growth of 0.5% for *all* international transport in the ETC NSB compared to the Reference scenario. An overall growth of 4 million tonnes over all modes is estimated (from 853 to 857 million tonnes) as compared to the Reference scenario. Rail transport grows by 1 million tonnes. This growth is mainly due to the rail infrastructure projects foreseen to be implemented, both within the NSB corridor and outside in the catchment area. This leads to a small shift from land modes to rail. Inland shipping is not growing, but sea shipping does grow, due to changes in rail routes.

The Sensitivity scenario shows a hypothetical development for rail transport. This scenario builds on the Reference and Project scenario and adds aspects such as the 740 meters trains. For all international transport a growth of 20% is estimated (from 749 to 894 million tonnes) between the 2022 Base year and the Sensitivity scenario. Compared to the 2022 Base year, for rail transport a growth of 34% in volume (27 million tonnes, from 81 to 108 million tonnes) is estimated. This is a substantial achievement compared to the 13% growth forecasted for the Reference scenario. The modernisation of the railway lines, and especially the introduction of longer trains (740 meters) has a significant impact on this result. The growth has different causes, such as rerouting, modal shift, or splitting freight transport from one mode into transport by two modes (for instance, splitting road transport into road and rail transport).

Figure 5 Development of volume (in million tonnes) by mode and scenario for the catchment area of ETC NSB



Source: NEAC estimation

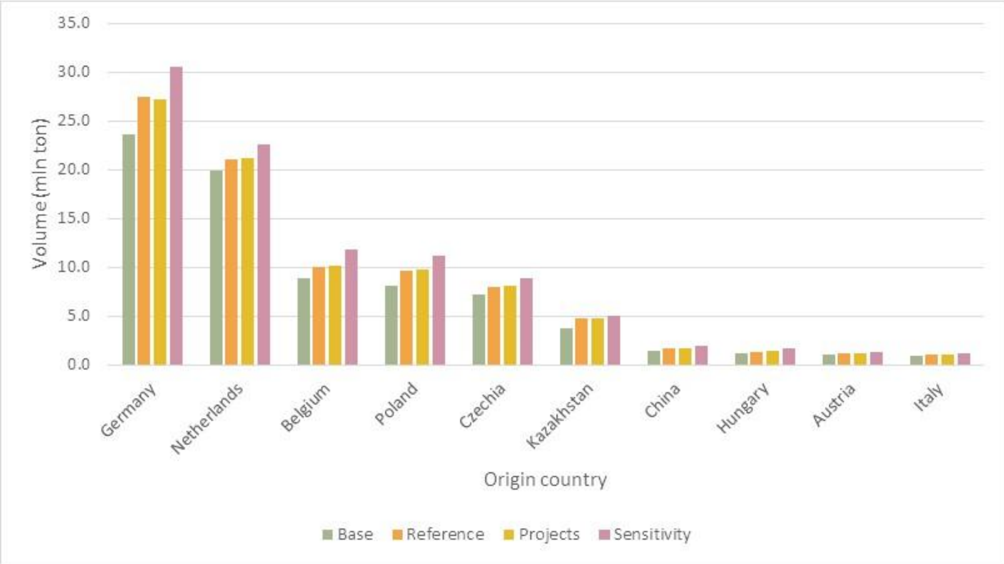
A growth from 81 million tonnes to 91 million tonnes is estimated in the Reference scenario. The Projects scenario adds another 1 million tonnes to the total volume. The Sensitivity scenario will ultimately result in a volume of 108 million tonnes.

Figure 6 and Figure 7 show the development of the volume in international *rail* freight transport for the origin and destination countries of the ETC NSB catchment area. Regarding origin countries, international rail freight transport has the highest volume in Germany, at 28 million tonnes in the Reference scenario. The Netherlands and Belgium rank second and third, with 21.0 and 10.0 million tonnes, respectively.

The Projects scenario shows the impact of infrastructure projects on the volume of international rail freight transport. Overall, the growth in international rail volume for the top 10 countries does not differ significantly compared to the Reference scenario. The potential extra volume, as shown by the Sensitivity scenario, is approximately 18% higher (about 10 million tonnes) than the total volume in the Reference scenario. This growth is similar in all countries, to some extent. For most countries the growth is primarily due to the assumed increase in train length up to 740 meters. In some cases the improvements also lead to rerouting and a modal shift.

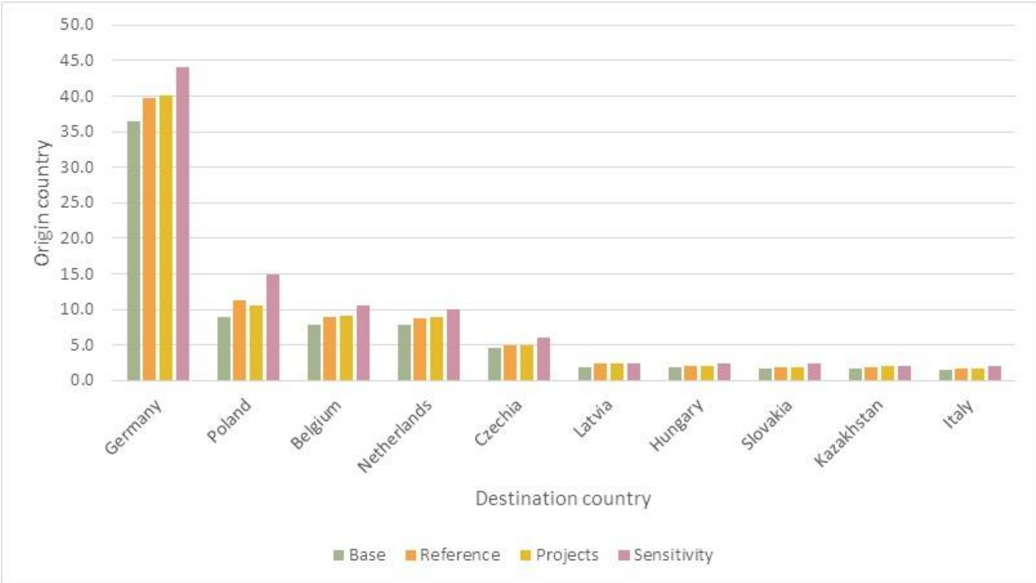
For the destination countries, a similar picture can be noticed. Germany ranks first in the ETC NSB concerning international rail freight transport. It grows from 36.4 to 39.7 million tonnes between the 2022 Base year and the Reference scenario. Poland is ranked second, growing from 8.9 to 11.2 million tonnes, and Belgium is third, growing from 7.9 to 8.9 million tonnes, between the 2022 Base year and the Reference scenario. The impact of the Projects scenario is limited, whereas the Sensitivity scenario shows higher effects. Compared to the 2022 Base year, the growth in the Sensitivity scenario is, on average, 33% but varies from 11% (Germany) to 46% (Poland).

Figure 6 Development of volume (in million tonnes) of international rail freight transport by the origin country in the ETC NSB catchment area



Source: NEAC estimation

Figure 7 Development of volume (in million tonnes) of all international rail freight transport by destination country in the ETC NSB catchment area



Source: NEAC estimation

The results of the TMS show that the development of a high-quality network in line with TEN-T requirements is important to increase the modal share of rail transport. Nonetheless, infrastructure development projects alone might not be sufficient to fully explore the potential of the ongoing and planned investments. Turning rail freight transport more competitive towards the ambitious targets set in the EU policies, i.e. increasing rail freight by 50% by 2030 and doubling it by 2050 (compared to 2015 levels), seems calling for additional policy and industry and operational measures that can impact the structure of the costs of road and rail transport in favour of the latter transport mode and make rail transport more effective and efficient.