# RAIL FREIGHT CORRIDOR ATLANTIC

## *TRANSPORT MARKET STUDY*

## 2024 UPDATE


Funded by the European Union

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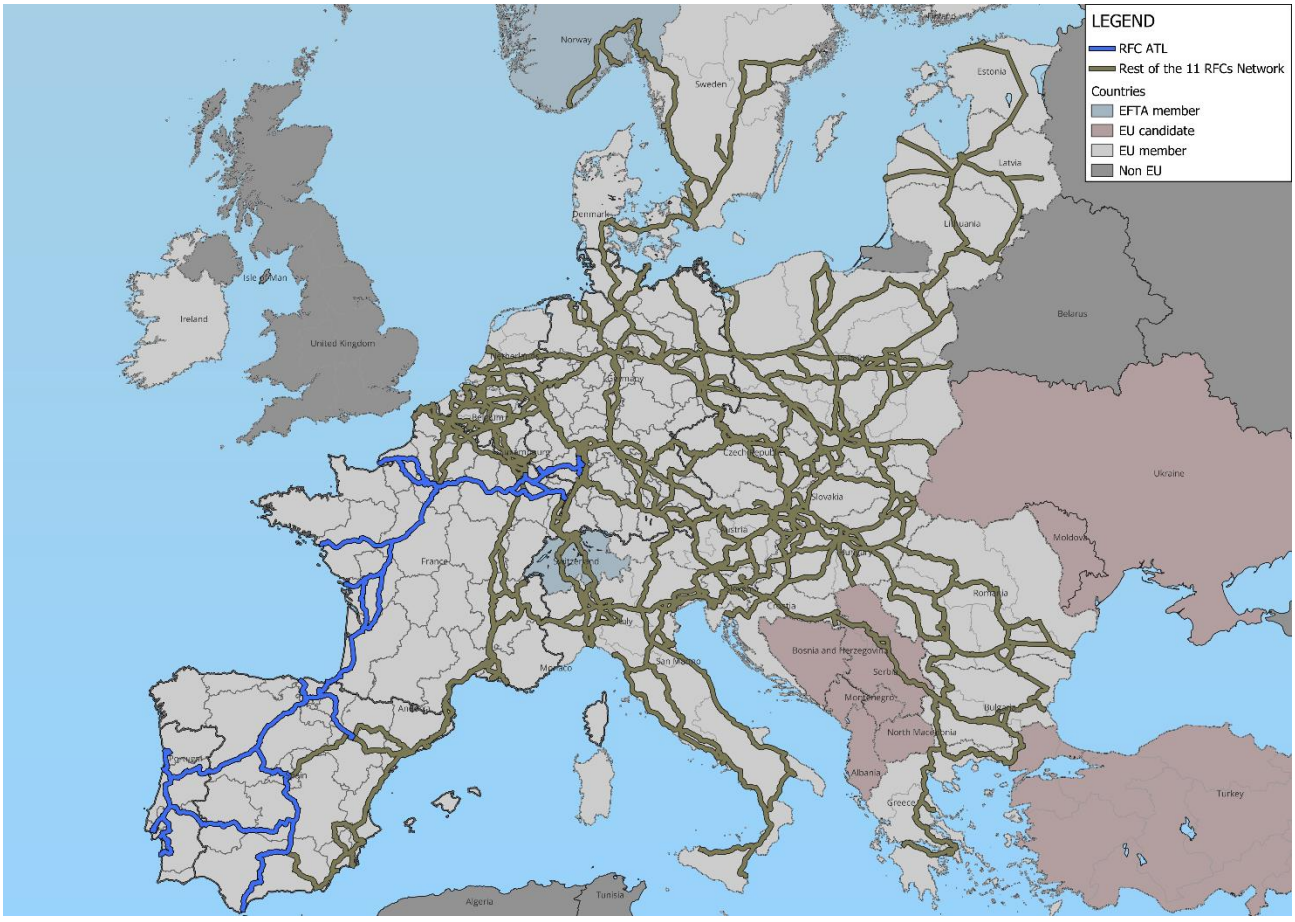
# EXECUTIVE SUMMARY

## RFC ATL 2024 TMS UPDATE RESULTS WITHIN THE 2024 JOINT TMS UPDATE OF THE 11 RFCS BELONGING TO THE EUROPEAN RAIL NETWORK FOR COMPETITIVE FREIGHT

The Rail Freight Corridor Atlantic (RFC ATL) is one of the 11 RFCs currently in operation, established under the scope of Regulation (EU) 913/2010 concerning a *European rail network for competitive freight*. According to Article 9.3 of this regulation, the Management Board of the RFC shall carry out and periodically update a Transport Market Study (TMS) related to the observed and expected changes in the traffic on the freight corridor as a consequence of the RFC being established.

Over the past decade, RFCs elaborated first TMSs and, in most cases, TMS updates. However, these studies were carried out without a common approach or a shared methodological framework. To support the RFCs in achieving compliance with the above requirement in a coordinated and harmonised manner, the Management Boards of the 11 RFCs decided to execute a Joint TMS Update under the coordination of RailNetEurope (RNE). The main findings and results of the 2024 TMS Update for the RFC ATL are summarised in the following paragraphs.

### The RFC ATL within the 11 RFCs Network




*Source: Authors based on CIP*

For the analysis of the current and future transport markets along the 11 RFCs, a European-wide transport model has been used – the NEAC Model – which combines socio-economic, trade and transport statistics with traffic flows for different transport modes. The geographic scope of the model covers the European

Union and the non-EU countries crossed by the 11 RFCs and involved in their catchment areas. The model has been calibrated to the year 2022 (Model Base Year). Future scenarios have been elaborated for the 2030 time horizon.

Due to the adoption of a common, network-wide approach and use of an EU-wide network model, the analysis of the individual RFCs has been performed within the framework of the 11 RFCs Network and overall European policy and market trends. This approach is also appropriate considering that the 11 RFCs share many infrastructure components, i.e. corridor lines, logistics nodes and Border Crossing Points, as well as their catchment areas. Also, regulatory, policy and economic backgrounds and developments, as well as most available statistics on the sector, generally concern the country or EU territorial scale.

Specifically concerning the study policy background, the 2024 11 RFCs Joint TMS Update has been conducted in the framework of the rail sector specific milestones introduced by the European Commission in its Smart and Sustainable Mobility Strategy to support the achievement of the ambitious target of the European Green Deal, of reducing transport emissions by 90% by 2050 (compared to 1990 levels), i.e., doubling passenger high-speed rail traffic by 2030 and tripling it by 2050, while increasing rail freight by 50% by 2030 and doubling it by 2050 (compared to 2015 levels). With reference to the 50% target growth set in the EU policies for the period 2015-2030, the following table provides transport volume figures in million tkm for the EU27 in 2015, and 2022. Data show that the gap to be filled between 2023 and 2030 is significant, especially for the international segment.

**Freight volume (million tkm) in 2015 and 2022**

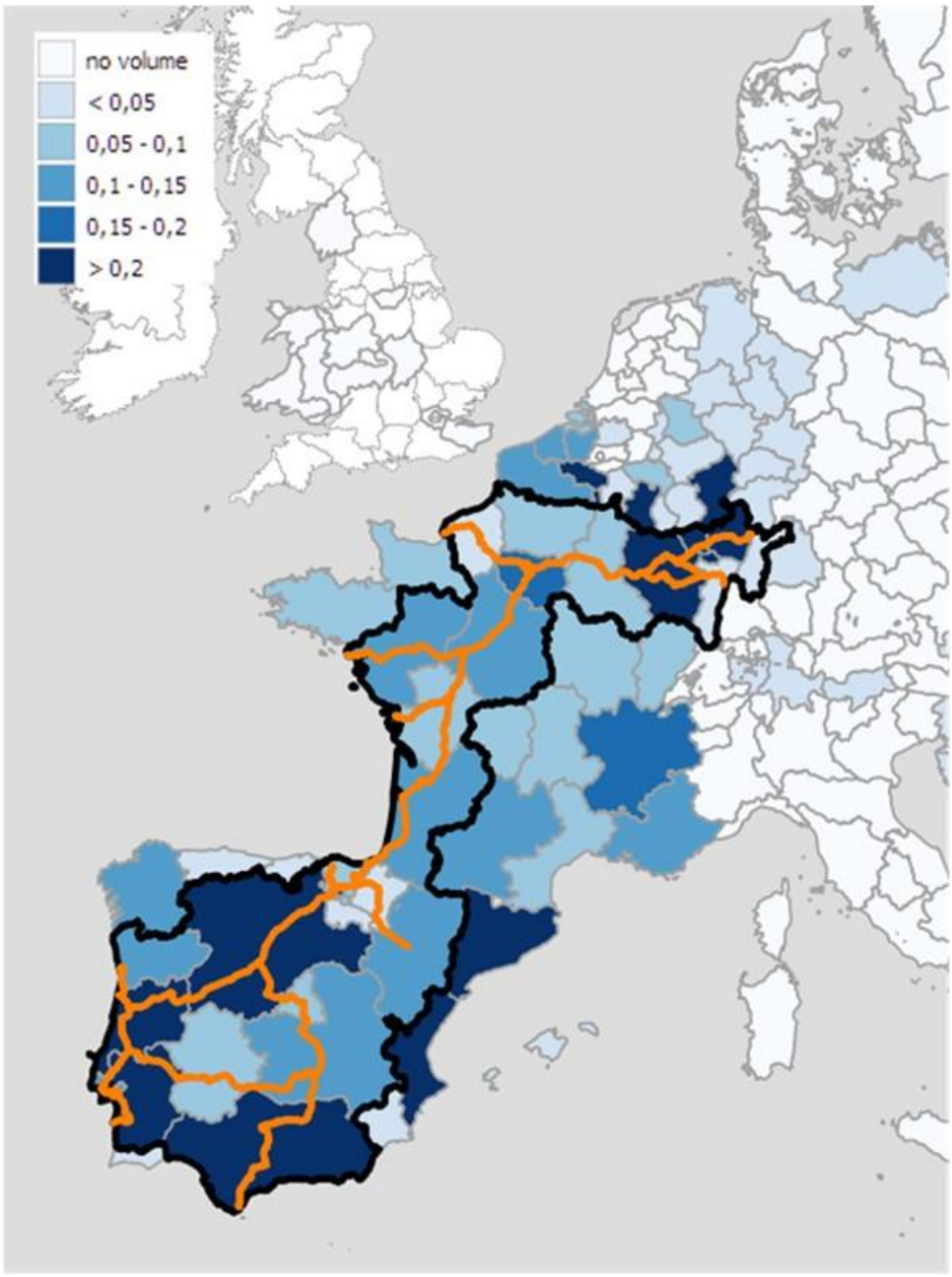
| | 2015 | 2022 | Var. % '15-22 |
|---|---|---|---|
| **International rail freight transport** | 155,289 | 149,032 | -4% |
| **National rail freight transport** | 181,811 | 199,830 | 10% |
| **Total rail freight transport** | 337,100 | 348,862 | 3% |

*Source: Eurostat [rail_go_typepas]; Notes: (1) Data for Belgium are excluded from the total as they are not available for 2015 and 2022. (2) Data are limited to main undertakings*

For the analysis of the current market (Base year scenario), train data from the Train Information System (TIS) managed by RNE have been used, which combined with available trade and economic data available at the NUTS 2 area, served as a basis to define the RFC ATL catchment area and main origin and destinations, prior to estimate the volumes of the transported goods and the modal share by land transport mode.

The catchment area for international rail freight transport of the RFC ATL exceeds the corridor area. It captures (large parts of) Germany, France, Spain and Portugal. A large proportion of the rail freight transport uses the RFC ATL, and its border crossing points, to ship freight by rail from different origins to different destinations (see overview in the next figures). The picture below shows the origins of the RFC ATL, with important origins such as the ports of Lisbon and Porto, as well as other inland locations. Also, outside the corridor area of the RFC ATL, different zones can be seen that contribute to rail freight transport of the RFC ATL. Note that outside the corridor it often concerns small amounts of volume.

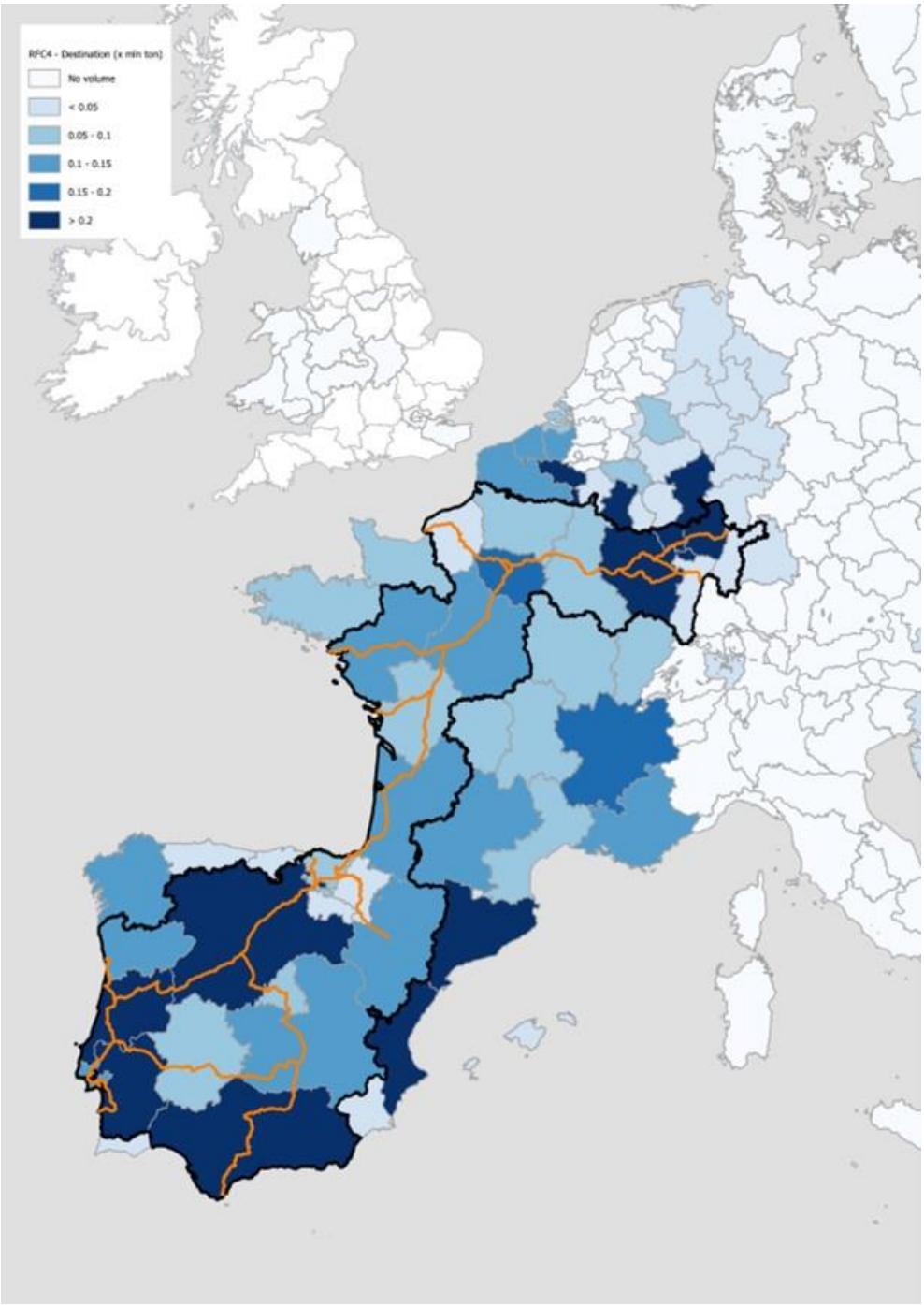
**Origins of international rail freight volume (in million tonnes) that use the RFC ATL rail network catchment area**




*Source: NEAC. Legend: Orange = rail tracks of RFC ATL. Blue = Volume by origin. Black = Delineation of corridor area*

The next figure presents the destinations within the RFC ATL catchment area. The figure highlights similar zones as the origins that exhibit the high freight volumes dispatched from these destinations. It is evident from the figure that numerous zones benefiting from RFC ATL's services fall outside the corridor area, such as areas in the Germany, Poland, Spain, and Italy.

**Destinations of international rail freight volume (in million tonnes) that use the RFC ATL rail network catchment area**




*Source: NEAC. Legend: Orange = rail tracks of RFC ATL. Blue = Volume by destination. Black = Delineation of corridor area*

For the purposes of the 2024 Joint TMS Update, 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 weights and dimensions directive and electrification of Heavy Goods Vehicles;
- The internalization of external costs of road transport (road pricing);
- Incentives to rail/combined transport operations;

- Technological/operational improvements of intermodal transport solutions and logistics chains;
- Market sensitivity to climate and energy transition.

In line with this approach, the following scenarios have been defined, all of them at the 2030 time horizon:

- *Reference or background scenario*: It describes the economic developments (in terms of GDP changes), which have the most important impacts on the future of rail transport. The base for this is the EU reference 2020-2050 scenario and the World Economic Outlook 2023.
- *Projects scenario*: It provides an overview of the impacts resulting from the expected developments in the rail transport system. Actually, a number of projects are ongoing and/or planned for the improvement of the railway infrastructure belonging to the 11 RFCs Network. Such projects were first identified in the 11 RFCs Implementation Plans, which were further confirmed by the 11 RFCs. Furthermore, the list of the investments planned for the development of the 9 TEN-T Core Network Corridors was consulted to integrate the information available from the RFCs. The ongoing and planned investments differ in size. Some are big projects. But there are also many investments related to the modernisation and rehabilitation of railway lines to meet the TEN-T standards, improve network interoperability or increase capacity by upgrading railway lines and nodes. Not all projects have been considered for future scenarios simulation purposes. First of all projects have been selected which are assumed to be completed before or in 2030. Second, only major projects were considered which should be able to 'translate' into a time gain or cost reduction. This approach reflects the purpose of the study and nature of the 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. Specifically concerning the RFC ATL, the following investments were simulated in the Projects scenario: a) the Y Basque High-speed Rail line in Spain, including access routes to Bilbao and Vitoria, as well as European standard gauge tracks between Astigarraga and the border, electrification, technological systems and ERTMS; b) the rehabilitation and upgrade of Aveiro - Vilar Formoso railway line and the construction of the new line Évora – Elvas, both located in Portugal.
- *Sensitivity scenario: the completion of the TEN-T network at standard in 2030*: It provides an overview of what would happen if – in addition to the investments included in the projects scenario - ERTMS is fully introduced, 740 meter long trains are allowed to operate anywhere on the whole network, 22.5 tonnes axle load is achieved on the entire network, intermodal loading gauge is also possible along the RFCs and if the rail gauge of the 11 RFCs network, including in Spain and Portugal, meets the European standard. This TEN-T completion scenario should be considered as a sensitivity analysis, as the projects required to reach the TEN-T standards will not be fully implemented before 2030.

In the absence of a consistent historical series of data and information on the operations along the 11 RFCs – worth also considering that the RFCs were established and entered into operation in different years between 2013 and 2020, and their alignment adjusted over time to reflect market needs – an e-survey was conducted as part of the 2024 Joint TMS Update – *2023 11 RFCs Joint TMS Update Survey* – to assess the occurred and expected changes associated with their establishment on three main areas: occurred and expected impact of the RFCs, occurred and expected market developments along the RFCs, and market drivers. The survey involved the Railway Undertakings Advisory Groups (RAGs) and Terminal Advisory Groups (TAGs) of the 11 RFCs.

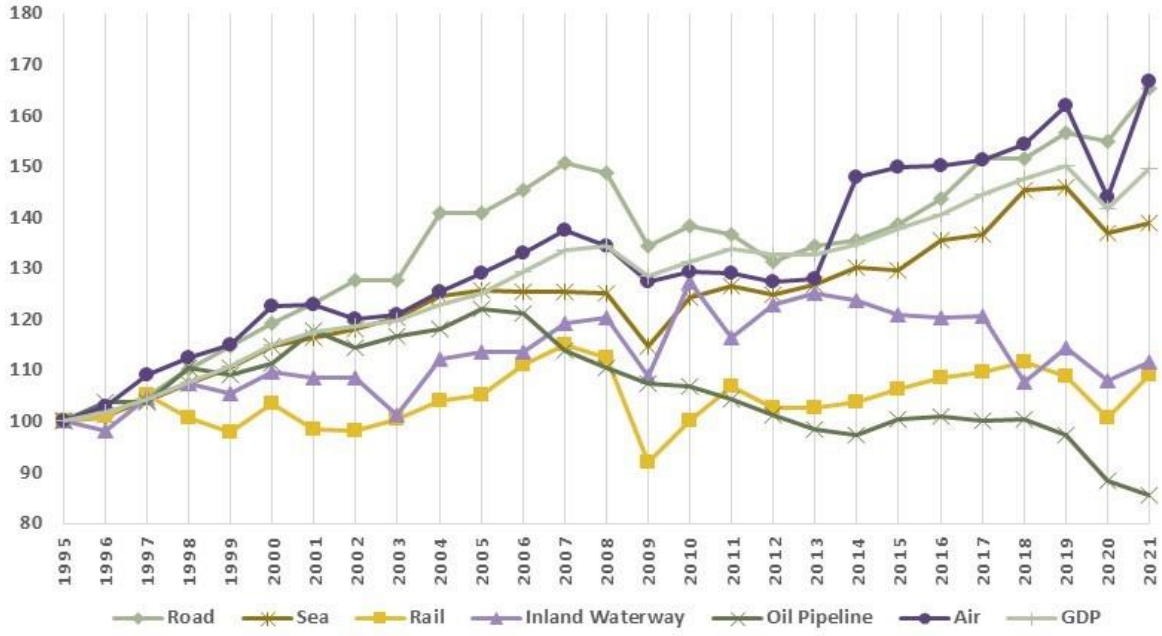
## KEY STUDY FINDINGS ON RAIL FREIGHT MARKET IN EUROPE AND ALONG THE RFC ATL

### OVERALL MARKET TRENDS AND SECTOR DEVELOPMENTS

The data available from the European Commission DG MOVE/Eurostat (Statistical Pocketbook 2023 and Rail Market Monitoring Report) and from the Independent Regulators Group (IRG) (Rail Market Monitoring Reports) provide an overview of the development of the European rail freight sector since mid of the 1990s when the rail freight market liberalization started, allowing monitoring trends before and after the 2008 credit crunch, which is considered the second major financial crisis after the 1930s Great Depression, and which was followed by additional adverse events during the past 10-15 years when the 11 RFCs were gradually established and entered into operation. Key findings from the statistical analysis are as follows:

- The period between the entry into force of the rail freight regulation has indeed been marked by a number of socio-economic, health and geopolitical events, which negatively impacted trade and transport flows at the global and European scale. The statistical review shows that the above-mentioned 2008 financial crisis basically altered the economic and transport developments experienced by Europe over the previous decades. EU27 long-term series over the past 30 years show that the effects of this crisis are persisting: albeit positive, the trend of GDP and most transport modes of the following period stands indeed at lower growth rates. Overall, the European rail freight market grew modestly over the last decade, contrasting with the strong development experienced between 2001 and 2008. The EU economy and transport markets were more recently further impacted by the 2020-2021 COVID-19 pandemic and by the current geopolitical crisis that started in 2022 with the Russian war of aggression against Ukraine war and deteriorated with the Israel-Gaza conflict and Red Sea crisis.

Transport trends in billion tkm EU27 (1995=100)




*Source: European Commission – DG MOVE – Statistical Pocketbook 2023*

- Rail freight transport between 2013 and 2021 marginally grew in the EU27 from about 385 billion tkm to 410 billion tkm, i.e. 7%, which is only half the rate of growth of total transport volumes and GDP. However, over the same period combined transport more than doubled from about 41 billion tkm to 100 billion tkm. Trends for the ATL RFC concerned countries are similar to the EU ones, specifying that the growth of rail freight transport registered higher rates. In the ATL RFC concerned countries rail freight transport grew indeed from about 157 to 172 billion tkm, i.e. 10%.
- Except Germany ATL RFC countries register a rail modal share below the EU average. At the same time, these ATL RFC countries register a stable slight declining trend in rail modal share over time. A trend that is also related to the change in the commodity basket trade. At both EU 27 and ATL RFC concerned country levels, there is an underlying stagnation or decline of dry and liquid bulk commodities (originating even from before the mid of the 1990s), associated with a growth of intermodal transport, a market segment that is apparently growing with the gradual opening of the rail freight market and greening of the logistics chains.

Share of rail in total freight transport in % (based on tkm)

| | 2008 | 2013 | 2015 | 2019 | 2022 | Var. '19-'13 | Var. '22-'13 | Var. '22-'08 |
|---|---|---|---|---|---|---|---|---|
| **Lithuania** | 64.5 | 57.2 | 56.4 | 56.8 | 37.2 | -0.4 | -20 | -27.3 |
| **Switzerland** | 35.3 | 36.0 | 37.2 | 34.1 | 33.4 | -1.9 | -2.6 | -1.9 |
| **Slovakia** | 40.0 | 38.6 | 36.3 | 30.7 | 30.1 | -7.9 | -8.5 | -9.9 |
| **Austria** | 33.3 | 31.9 | 32.3 | 30.6 | 30.0 | -1.3 | -1.9 | -3.3 |
| **Slovenia** | 26.7 | 30.5 | 30.9 | 31.4 | 28.8 | 0.9 | -1.7 | 2.1 |
| **Hungary** | 24.9 | 30.3 | 29.1 | 26 | 26.3 | -4.3 | -4.0 | 1.4 |
| **Latvia** | 47.9 | 43.1 | 42.3 | 37.4 | 26.0 | -5.7 | -17.1 | -21.9 |
| **Czechia** | 31.9 | 28.0 | 26.1 | 25.9 | 22.0 | -2.1 | -6.0 | -9.9 |
| **Romania** | 19.9 | 23.3 | 25.0 | 20.5 | 21.0 | -2.8 | -2.3 | 1.1 |
| **Poland** | 30.5 | 24.2 | 23.3 | 21.5 | 20.8 | -2.7 | -3.4 | -9.7 |
| **Germany** | **14.6** | **13.9** | **14.1** | **13.7** | **14.9** | **-0.2** | **1.0** | **0.3** |
| **Bulgaria** | 10.3 | 7.5 | 8.7 | 8.5 | 11.2 | 1.0 | 3.7 | 0.9 |
| **Finland** | 13.1 | 12.7 | 10.9 | 11.8 | 10.8 | -0.9 | -1.9 | -2.3 |
| **Sweden** | 10.3 | 9.6 | 8.6 | 9.4 | 10.5 | -0.2 | 0.9 | 0.2 |
| **Belgium** | 8.2 | 6.8 | 6.9 | 7.2 | 7.3 | 0.4 | 0.5 | -0.9 |
| **Luxembourg** | 9.8 | 7.2 | 7.0 | 6.8 | 6.1 | -0.4 | -1.1 | -3.7 |
| **European Union - 27 countries (from 2020)** | 6.0 | 5.7 | 5.7 | 5.3 | 5.5 | -0.4 | -0.2 | -0.5 |
| **Croatia** | 4.5 | 3.1 | 3.2 | 3.5 | 4.1 | 0.4 | 1.0 | -0.4 |
| **France** | **4.2** | **3.6** | **4.1** | **3.5** | **3.7** | **-0.1** | **0.1** | **-0.5** |
| **Italy** | 2.6 | 2.4 | 2.6 | 2.3 | 2.7 | -0.1 | 0.3 | 0.1 |
| **Estonia** | 10.4 | 7.6 | 4.5 | 3.3 | 2.4 | -4.3 | -5.2 | -8.0 |
| **Norway** | 2.0 | 1.9 | 1.6 | 1.6 | 2.1 | -0.3 | 0.2 | 0.1 |
| **Netherlands** | 2.0 | 1.7 | 1.8 | 1.8 | 1.9 | 0.1 | 0.2 | -0.1 |
| **Denmark** | 1.4 | 1.8 | 1.9 | 1.7 | 1.6 | -0.1 | -0.2 | 0.2 |
| **Spain** | **0.8** | **0.8** | **0.9** | **0.8** | **0.8** | **0.0** | **0.0** | **0.0** |
| **Portugal** | **0.3** | **0.3** | **0.3** | **0.3** | **0.2** | **0.0** | **-0.1** | **-0.1** |
| **Ireland** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| **Greece** | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | -0.1 |

*Source: Eurostat [tran_hv_ms_frmod]*

- The COVID-19 pandemic seems to have had different impacts at the EU27 scale on rail freight traffic measured in net tkm, with either increases or decreases in transport volumes between 2019 and

2021. Except Portugal, the ATL RFC concerned countries seem to have also registered an increase during the pandemic period.

Rail freight traffic in billion net tkm

| Country | Freight traffic | | | Evolution of tkm | |
|---|---|---|---|---|---|
| Year | 2013 | 2021 | var. 2021-2013 | 2019-2021 | 2020-2021 |
| AT - Austria | 21 | 23 | 2 | 1% | 9% |
| BE - Belgium | 7 | 7 | -0.1 | -7% | 2% |
| BG - Bulgaria | 3 | 5 | 2 | 20% | 3% |
| HR - Croatia | 2 | 3 | 1 | 9% | -3% |
| CZ - Czechia | - | 16 | - | 1% | 7% |
| DK - Denmark | 2 | 2 | 0.0 | -22% | -19% |
| EE - Estonia | - | 1 | - | -56% | -46% |
| FI - Finland | 9 | 11 | 2 | 5% | 6% |
| **FR - France** | **32** | **36** | **4** | **5%** | **14%** |
| **DE - Germany** | **113** | **139** | **26** | **8%** | **13%** |
| EL - Greece | <1 | 1 | - | 19% | 5% |
| HU - Hungary | 9 | 11 | 2 | -2% | -5% |
| IE - Ireland | - | 0.1 | - | -2% | -5% |
| IT - Italy | - | 27 | - | 8% | 16% |
| XK - Kosovo* | <1 | 0.0 | - | -9% | 60% |
| LV - Latvia | 20 | 7 | -13 | -50% | -6% |
| LT - Lithuania | - | 15 | - | -10% | -8% |
| LU - Luxembourg | - | 0.2 | - | -10% | 9% |
| MK - North Macedonia | - | 0.4 | - | 8% | 10% |
| NL - Netherlands | 6 | 7 | 1 | 2% | 8% |
| NO - Norway | 4 | 5 | 1 | 5% | 3% |
| PL - Poland | 51 | 56 | 5 | 0% | 7% |
| **PT - Portugal** | **-** | **2** | **-** | **-15%** | **-1%** |
| RO - Romania | - | 14 | - | -2% | -14% |
| RS - Serbia | - | 3 | - | 8% | 13% |
| SK - Slovakia | 9 | 9 | 0.3 | 4% | 13% |
| SI - Slovenia | 4 | 5 | 1 | -2% | 6% |
| **ES - Spain** | **9** | **10** | **1** | **-2%** | **9%** |
| SE - Sweden | 21 | 23 | 2 | 3% | 6% |
| CH - Switzerland | - | 12 | - | 3% | 9% |
| UK - United Kingdom | 22 | 17 | -5.3 | -1% | 10% |

*Source: European Commission – DG MOVE and IRG-Rail; Notes: * This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

- Since the start of the rail freight liberalisation process late 1990's and 2000's, the market share of the domestic incumbent railway undertakings gradually declined in most EU Member States, whereas the market share of non-incumbents increased together with the operations of foreign incumbents. As a general pattern, common to the EU27 and ATL RFC concerned countries, the trend of the market share by domestic incumbents continued to decline in the period 2013-2021. In the RFC ATL concerned countries, the market share of the domestic incumbent in 2021 was about 40% on average, 60% considering national and international incumbents.

Market shares of freight railway undertakings (based on net tkm)

| Country | Market share of domestic incumbent | Market share of foreign incumbent | Market share of non-incumbent | Market share of domestic incumbent | | |
|---|---|---|---|---|---|---|
| | 2021 | 2021 | 2021 | 2013 | 2021 | var. 2021-2013 |
| AT - Austria | 63.4% | 7.7% | 28.9% | 81% | 63% | -18% |
| BE - Belgium | 58.2% | 24.4% | 17.4% | 81% | 58% | -23% |
| BG - Bulgaria | 45.3% | 0.0% | 54.7% | 55% | 45% | -10% |
| HR - Croatia | 54.1% | 2.7% | 43.2% | 100% | 54% | -46% |
| CZ - Czechia | 65.4% | 7.6% | 27.0% | - | 65% | - |
| DK - Denmark | 0.0% | 0.0% | 100.0% | 77% | 0% | -77% |
| EE - Estonia | 0.0% | 0.0% | 100.0% | - | 0% | - |
| FI - Finland | 95.6% | 0.0% | 4.4% | 100% | 96% | -4% |
| **FR - France** | **68.7%** | **18.8%** | **12.5%** | **64%** | **69%** | **5%** |
| **DE - Germany** | **42.4%** | **18.9%** | **38.8%** | **67%** | **42%** | **-25%** |
| EL - Greece | 0.0% | 96.6% | 3.4% | 100% | 0% | -100% |
| HU - Hungary | 45.1% | 1.8% | 53.1% | 67% | 45% | -22% |
| IE - Ireland | 100.0% | 0.0% | 0.0% | - | 100% | - |
| IT - Italy | 39.7% | 26.6% | 33.7% | - | 40% | - |
| XK - Kosovo* | 100.0% | 0.0% | 0.0% | 100% | 100% | 0% |
| LV - Latvia | 70.3% | 0.0% | 29.7% | 77% | 70% | -7% |
| LT - Lithuania | 99.9% | 0.0% | 0.1% | - | 100% | - |
| LU - Luxembourg | 100.0% | 0.0% | 0.0% | - | 100% | - |
| MK - North Macedonia | 100.0% | 0.0% | 0.0% | - | 100% | - |
| NL - Netherlands | 0.0% | 47.0% | 53.0% | 48% | 0% | -48% |
| NO - Norway | 44.9% | 18.2% | 36.9% | 48% | 45% | -3% |
| PL - Poland | 46.4% | 8.1% | 45.5% | 66% | 46% | -20% |
| **PT - Portugal** | **0.0%** | **0.0%** | **100.0%** | **86%** | **0%** | **-86%** |
| RO - Romania | 19.9% | 11.9% | 68.2% | - | 20% | - |
| RS - Serbia | 77.7% | 0.0% | 22.3% | - | 78% | - |
| SK - Slovakia | 70.9% | 0.0% | 29.1% | 87% | 71% | -16% |
| SI - Slovenia | 77.8% | 0.0% | 22.2% | 91% | 78% | -13% |
| **ES - Spain** | **57.8%** | **24.0%** | **18.2%** | **77%** | **58%** | **-19%** |
| SE - Sweden | 48.1% | 6.7% | 45.2% | - | 48% | - |
| CH - Switzerland | 65.8% | 0.0% | 34.2% | - | 66% | - |
| UK - United Kingdom | 4.7% | 34.5% | 60.8% | 45% | 5% | -40% |

*Source: European Commission – DG MOVE and IRG-Rail; Notes: * This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

## ANALYSIS OF THE CURRENT AND FUTURE FREIGHT TRANSPORT MARKET ALONG THE RFC ATL

As part of the 2024 11 RFCs Joint TMS Update an analysis of the current and future market of the ATL RFC has been performed, estimating transport and traffic volumes using an EU wide network model applied to the whole network of the 11 RFCs. The results of such exercise are reported in the extended version of the ATL RFC Transport Market Study 2024 Update. In the following paragraphs the main findings for the ATL RFC are summarised.

The total volume of international freight transport in the *catchment* area of the RFC ATL is estimated at 83 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 11 million tonnes (about 18.000 trains). This is 14% of the total amount of freight transport for the RFC ATL. The share of inland shipping is 4%, the share of road transport 64%. Sea shipping is an important mode with a share of 18%. For the RFC Atlantic, maritime transport is strong in most countries.

Concerning the cargo types, *Other* (General cargo, including intermodal transport and container) is the most important one at 46 million tonnes (56%). *Dry bulk* is second in the international freight transport within the catchment area of the RFC ATL, with a volume of 27 million tonnes (32%). Liquid bulk has a share of 12% in the total volume of international freight transport over all modes in the corridor area of the RFC ATL.

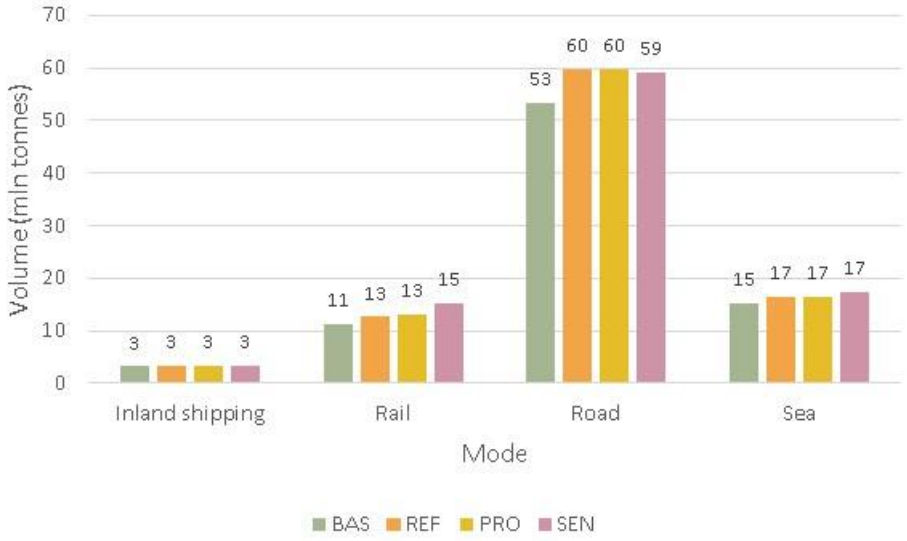
**Estimated volume (million tonnes) and share of *all* international freight transport over land by mode and cargo type in the *catchment* area of RFC ATL**


*Source: NEAC estimations*

Between the 2022 Base year and 2030 Reference scenarios, all modes grow due to economic developments. The overall growth is 11% (from 83 to 92 million tonnes). Rail transport grows by 12% (2 million tonnes) from 11 to 13 million tonnes. Inland shipping grows by 6%, road by 12%, and sea shipping by 9%. In absolute terms, international road freight transport grows most, by 7 million tonnes (from 53 to 60 million tonnes). Inland shipping remains the same in volume at 3 million tonnes. Sea shipping grows by 2 million tonnes from 15 to 17 million tonnes.

The Projects scenario does not lead to a significant growth of rail transport (2% extra, less than 1 million tonnes) in the RFC ATL compared to the Reference scenario There is a minimal shift between road and rail (not visible in the graph). On the RFC ATL, large and smaller projects across the rail network account for this shift. Also, infrastructure projects outside the RFC ATL contribute to a modal shift or rerouting.

**Development of volume (in million tonnes) by mode and scenario for the corridor area of RFC ATL**




*Source: NEAC estimations; Legend: BAS Base year scenario; REF Reference scenario, PRO Projects scenario; SEN: Sensitivity scenario*

As mentioned, the growth in the Reference scenario of international rail transport is expected at 12%, which is approximately 2 million tonnes extra compared to the 2022 situation. This would be (rounded) 2,000 extra international freight trains in the RFC ATL. The total number of international trains would then be some 20,000 trains in the Reference situation in 2030.

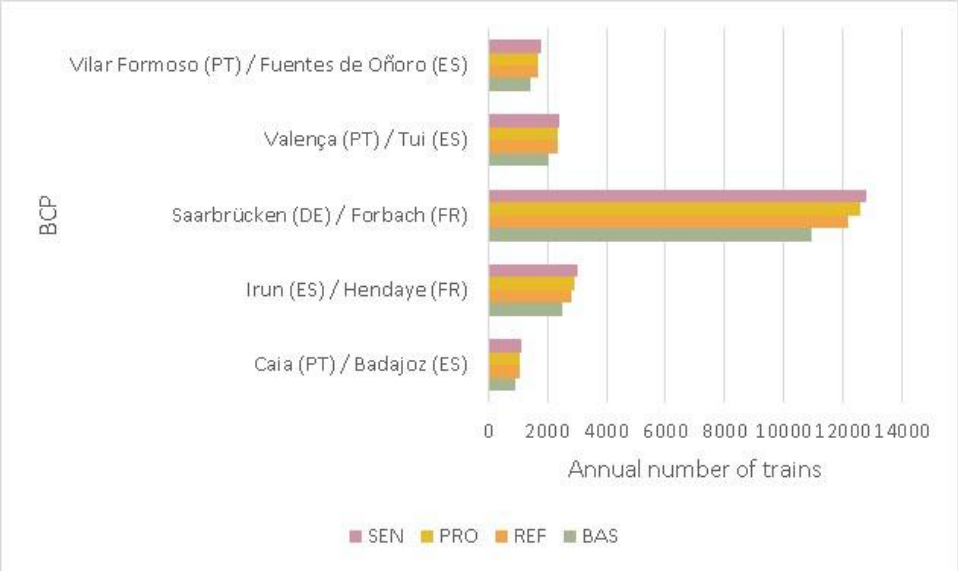
The Projects scenario shows the impact of the different rail projects and rail measures. Rail transport grows an extra 2% compared to the Reference scenario. This is due to projects both in and outside the ATL RFC (think of incoming and outgoing international rail transport). In total it is estimated that this is less than 1 million tonne of extra international rail freight transport. This gives (rounded) 1,000 extra trains in the RFC ATL compared to the Reference scenario. This would be approximately 21,000 trains within the RFC ATL.

For the RFC ATL, the Sensitivity scenario shows that there is another potential of 2 million tonnes extra rail freight transport due longer trains, intermodal loading gauge, ERTMS, and European standard track gauge in Spain and Portugal. The total number of unique international freight trains would then be around 22,000. Compared to the 18,000 unique trains in 2022, this is a growth of around 22%. It shall be noted that this growth in volume is 36%, but due to the introduction of longer trains (on average 15% extra length), the growth in number of trains is lower.

Compared to the 2022 base year, transport volumes would increase from 11 to 15 million tonnes i.e. by 36%.

The different border crossing points in the RFC ATL each show different growth between the 2022 Base year and 2030 Reference, Projects and Sensitivity scenarios. Overall, the Reference shows growth in volume of 13% on the BCPs. This is in line with the general growth for rail transport between the 2022 Base year and 2030 Reference scenarios. The completion of different projects by 2030 leads to different growth patterns; on average, the growth in relation to the base is 16% more volume, which translates into 16% more trains on average. The sensitivity scenario leads to 37% more volume, which is 18% more trains compared to 2022. Due to the extra train length, there is less growth in number of trains.

**Development of international rail freight transport (number of trains) on important border crossing points of the RFC ATL**




*Source: NEAC estimations; Legend: REF Reference scenario, PRO Projects scenario; SEN: Sensitivity scenario*

The number of trains by BCP is presented as well. As can be seen, the BCP Saarbrucken - Forbach is the busiest BCP in the RFC ATL. In 2022 at almost 10,900 trains per year, in the Reference 12,200 trains and in the Projects and Sensitivity scenario 12,600 and 12,800 trains. The other BCPs show similar growth, though at a lower absolute level. The smallest BCP is Caia-Badajoz growing from about 900 trains in 2022 to 1,100 trains in the Sensitivity scenario.

Similarly to the results of the ATL RFC, the ones for the whole 11 RFCs network are also showing that the Projects and Sensitivity scenarios might not be sufficient to achieve the ambitious targets set in the relevant EU policies, i.e. 50% growth for the period 2015-2030. Therefore, the development of a high-quality and interoperable network does not seem to be sufficient to achieve the ambitious targets set in the relevant European transport policies.

Such targets remain challenging to meet in the absence of a significant change in the structure of the costs of road and rail transport. Internalising external costs of road transport, and or incentives to reduce the costs of rail transport might be needed. The potentially negative impacts on rail market share of measures such as improving the efficiency of road transport shall also be considered, as also reported in a recent study by the Community of European Railway and Infrastructure Companies (CER) – *Study on Weights and Dimensions: Impacts of the Proposed Amendments to the Weights and Dimensions Directive on Combined Transport and Rail Freight Transport*[1]. Market opening appears also to be relevant in increasing the competitiveness of rail transport. A recent study by the European Rail Freight Association (ERFA) – *The European Rail Freight Market; Competitive Analysis and Recommendations*[2] – considers how non-incumbent operators, focussing on the fast-growing intermodal and logistics train segments, are likely to experience further growth in market share in the 2020s. According to the study, competition amongst railway undertakings has made rail more attractive compared with road, which can be partially explained by the business model of non-incumbents, more focused (i.e., intermodal and logistics, block trains, and international traffic), lean and agile, and cost competitive, able to offer better service levels consistently.

[1] https://www.cer.be/cer-reports/study-on-weights-and-dimensions
[2] https://erfarail.eu/news/the-european-rail-freight-market-competitive-analysis-and-recommendations

## OCCURRED AND EXPECTED CHANGES DUE TO THE ESTABLISHMENT OF THE RFCS

The e-survey conducted to collect the opinion of the 11 RFCs RAGs and TAGs members on the occurred and expected impact of the establishment of the RFCs, involved 42 representatives of the RAGs and 30 members of the TAGs, who submitted valid questionnaires between September 2023 and January 2024. Whereas the overall number of responses makes the survey outcome meaningful for the analysis of the occurred and expected changes at the 11 RFCs Network scale, an analysis specific to each individual RFC would not be statistically significant. The survey results are accordingly used in the 2024 11 RFCs Joint TMS Update for the 11 RFCs Network. It is worth noticing that the survey responses reflect the views of the respondents at the time of submission of the questionnaire (Autumn 2023/January 2024). They furthermore represent a partial view of the market as the sample of the respondents is not representative of the market universe; and may contrast with the findings from the statistical review presented in the previous section above, as the opinions relate to the RFCs and international trains, whereas national statistics refer to the whole country network and national as well as international traffic. The main findings from the survey are summarised in the following bullet points for each of the three investigated areas.

***Occurred and expected impact of RFCs, in the areas of governance, operational efficiency and capacity management***

- The opinion of the 11 RFCs RAGs and TAGs members about the changes within the governance area is positive, especially in terms of cooperation with the market, including but not limited to RUs and terminal operators, as well as concerning facilitation of discussion among Member States about the issues affecting the competitiveness of international rail freight transport. The opinion about the progress made regarding cooperation between RFCs and Core Network Corridors (CNCs)/ERTMS horizontal priority is less favourable. The market opinion is unfavourable about the progress made on harmonising international freight rail services' legislative, regulatory, procedural and operational aspects. The expectations of the market players concerning the future impact of the programmes and activities of the RFCs are relatively positive concerning all aspects. Respondents consider the cooperation between RFCs and an EU Network of Infrastructure Managers (ENIM) as assumed in the proposal for the new capacity regulation, to be the best governance solution for bringing issues forward.
- The stakeholders' opinion about the changes that occurred within the operational efficiency area is also generally positive, except for the progress made in the promotion of technical and operational harmonisation of the European railway transport system towards its interoperability. The respondents' expectations concerning the future impact of the programmes and activities of the RFCs are relatively positive concerning all the assessed issues related to operational efficiency. Cooperation between RFCs and an EU Network of Infrastructure Managers (ENIM) is also considered the best-fitting governance solution to bring operational efficiency issues forward.
- The respondents' opinions about the changes that occurred within the capacity management area are predominantly unfavourable. Notwithstanding the market's negative opinion of the progress made since the establishment of the RFCs in this area, the expectations on the future impact of the programmes and activities by the RFCs are rather positive with regard to all the investigated aspects related to capacity management. The best governance solution for capacity management improvements is deemed to be the cooperation between the RFCs and an European Network of Infrastructure Managers (ENIM).

***Occurred and expected market developments***

- The vast majority of the e-survey respondents operated or still operate rail services or manage/operate terminals serving trains across at least one border crossing point on any of the RFCs. Most of them also operated or served international rail freight transport before the establishment of the RFCs. The majority of the respondents declare they experienced an increase in their operations since 2013, and most of them also have a positive expectation about the future, expecting overall market growth.
- The variation in traffic experienced by RUs and terminal operators since 2013 is positive for the RFC ATL. The majority of the respondents declare they experienced market growth along the corridor.
- The prevailing type of international trains operated on the RFCs Network consists of intermodal trains, followed by conventional block trains and single-wagon load trains. Most RUs and terminal operators experienced growth in intermodal train operations in the past years, whereas the trend for conventional block and single-wagon load trains is predominantly stable. Most respondents have a positive expectation for the future in terms of traffic growth for all market segments.
- Concerning traffic between logistics nodes, most operations relate to Port to Rail-Road Terminal (RRT) transport, followed by RRT to RRT services and Port to Port operations. Experienced variations by RUs were mostly positive for the Port to RRT or RRT to RRT segments and stable for the Port to Port one. Terminal operators have predominantly experienced growing trends in all market segments in the past years. The vast majority of RUs and terminal operators are expecting positive future trends for the three market segments.
- Regarding service distances, most operations cover distances between 300 km and 900 km, followed by services covering distances longer than 900 km and below 300 km. RUs experienced mostly positive variations for services covering distances longer than 300 km and declared the market is stable for operations below 300 km. Terminal operators have predominantly experienced growing trends in all market segments in the past years. The vast majority of RUs and terminal operators are expecting positive future trends for the three market segments.

***Market drivers***

- RUs and terminal operators have very similar views about the effects of the main market drivers on the growth of international rail freight transport in the short term, i.e., up until 2030. Most identified drivers are expected to have positive effects as they are assumed to improve rail transport's competitiveness. At the same time, the geopolitical context and socio-economic outlook, as well as the shortfall of the labour force, are perceived as threats.
- The socio-economic outlook is ranked first by the market, followed by infrastructure development and interoperability, policy and economic incentives to promote shift to rail. Increased performance of rail freight services and harmonisation of procedures and national legislation to improve cross-border operations are the two most relevant market drivers, according to the respondents, if considering both first- and second-ranking options.
- Although indicated as having a potential negative impact on the market, labour shortages and geopolitical context are not ranked among the most critical market drivers. Finally, technological improvements towards better integration and increased efficiency of multimodal logistics chains, better-integrated RFCs and terminal capacity management do not seem to be considered priority issues by the RUs and terminal operators.

## RECOMMENDATIONS ON FACILITATING AND STRENGTHENING THE RAIL FREIGHT MARKET ALONG THE 11 RFCS AND THE RFC ATL

In line with the overall study approach aimed at conducting the 2024 RFC ATL TMS Update as part of a Joint TMS Update of the 11 RFCs, study recommendations are primarily formulated focussing on the short-term development of the 11 RFCs belonging to the European rail network for competitive freight. RFCs share indeed both infrastructure and market, and more importantly a same EU policy background and overall socio-economic and geopolitical challenges despite some differences between Eastern and Western as well as Northern and Southern European countries. The 2024 11 RFCs Joint TMS Update allows for an estimation of the current market with reference to the RFCs catchment areas based on a common approach and tool, and for an overall assessment of the impact of the development of the 11 RFCs Network towards the development and completion of the TEN-T network at standard. In line with the methodology decided to be adopted for the 2024 11 RFCs TMS Update, no assessment of the current and future capacity was performed as part of the study and no detailed quantitative assessment of the current and future market operations by the operators along the individual RFCs and with reference to the expansion or new construction of individual projects and logistics nodes. The adopted approach albeit appropriate for an assessment of the market and modal share of the individual RFCs as part of the 11 RFCs Network, does not allow capturing RFCs specific market elements, especially the ones related to operational aspects. Study recommendations have been formulated around two main areas: market developments and targets and institutional and operational developments.

### MARKET DEVELOPMENTS AND TARGETS

The simulations made in the study demonstrate that major projects, and particularly the completion of the TEN-T network at standard, would significantly increase the competitiveness of rail freight transport. The post-COVID recovery and the recent geopolitical crises caused delays in the implementation and completion of the projects needed to complete a high quality and interoperable TEN-T network. Price increases and shortages of construction materials particularly affected the advancement of ongoing and planned projects. A high-quality and interoperable network might, furthermore, not be sufficient to achieve the ambitious targets set in the relevant European transport policies, in the absence of a significant change in the structure of the costs of road and rail transport. This situation seems further challenging the socio-economic viability of infrastructure projects along the network, including the ones to achieve the TEN-T standards, such as the European standard gauge in the Iberian Peninsula, for which investments by the market players involved in the logistics chain in equipment facilities and rolling stock would need to be added to infrastructure costs. The following recommendations are proposed to support market development towards the achievement of the EU policy targets:

- Timely complete the development of a high-quality, interoperable network:
  - *Building missing links and removing infrastructure bottlenecks* increasing infrastructure capacity by adding new tracks and lines where needed, increasing their speed and improving their gradient, can solve congestion problems, save energy and reduce transport costs as well as improve travel times. Such developments are relevant at the network level, but produce effects also at the individual corridor scale;
  - Achieving the requirements set in the TEN-T Regulation *towards an 11 RFCs Network in line with TEN-T standards*, i.e. 740 meter long trains, ERTMS, 22.5 t axle load, intermodal loading

gauge, European standard track gauge, electrification, is fundamental to support the development of a Single European Railway Area, specified that, also in line with the approach proposed in the revised TEN-T Regulation (EU) 1679/2024, the investments in the development of UIC track gauge along the RFC network should be supported by evidences concerning their socio-economic viability considering costs and benefits to be incurred by the infrastructure managers, the operators and the logistics industry;

- *Support intermodal and combined transport*. The intermodal market is the most promising international rail freight market segment, requiring improvement of interconnectivity between main railway lines and terminals, increasing the capacity of the existing terminal infrastructure, investing in technologies to facilitate and speed up transport and transhipment operations, and tracking and making more reliable the transport of intermodal units along logistics chains and within logistics clusters;
- *Stronger cooperation between all involved parties for better effectiveness in the availability and use of funds and the definition of investment implementation strategies focussed on those sections of the network with higher market potential*. For over a decade, the sector has benefited from a stronger TEN-T policy with a dedicated Connecting Europe Facility Fund. Among the different transport modes involved in the TEN-T network, rail and rail cross-border initiatives are treated as a priority. However, the available financial resources are limited overall compared to the financial needs that would be necessary to complete all projects. Investing in infrastructure might not be sufficient, e.g. to be operational, ERTMS also requires rolling stock to be equipped with onboard units.

- *Introduce market regulatory and policy measures to increase the competitiveness of rail freight transport*. Although not a specific subject of this study, regulatory and policy measures might be necessary to facilitate and foster the rail freight market in Europe towards the achievement of higher market shares and EU policy targets. Rail freight transport is generally more expensive and less flexible compared to road transport. Internalising external costs of road transport, and/or creating incentives to reduce the costs of rail transport would increase its competitiveness and support the achievement of the ambitious EU policy targets. In this respect, policymakers shall also consider the potential effects on the modal share of measures improving the efficiency of road transport. As emphasised in the above-mentioned study by ERFA[3] regulatory measures facilitating market opening appear also to be relevant in increasing the competitiveness of rail transport (e.g. enforcement of antitrust regulations; unbundling of subsidised public service operations from open market business; and ending direct subsidies to or recapitalization of state-owned freight railway undertakings).

**INSTITUTIONAL AND OPERATIONAL DEVELOPMENTS**

Recommendations on institutional and operational developments are formulated as follows, according to the findings from the market consultation (2023 11 RFCs Joint TMS Update Survey), conducted as part of the 2024 11 RFCS Joint TMS Update:

- *Improve capacity management*. Capacity management is considered by the market and also by the analyses and studies at the basis of the proposal for the new capacity regulation, a key area for improvement. Progress was made in the management of Temporary Capacity Restrictions; however

[3] https://erfarail.eu/news/the-european-rail-freight-market-competitive-analysis-and-recommendations

capacity planning remains an issue. Digital Capacity Management as an integral part of the European program "Timetable Redesign (TTR) for Smart Capacity Management" is at the core of the proposal for the new capacity regulation, and it is paramount to reaching Green Deal targets for the transport sector and the rail freight segment within it.

- *Monitor operational performance*. The revised TEN-T Regulation (EU) 1679/2024 identifies new operational requirements, related to punctuality and dwell times at borders. Furthermore, some infrastructure requirements also depend on operations, such as 740 meter long trains. Investing in infrastructure, albeit needed, is long-lasting and capital-intensive. The competitiveness of international rail freight transport also depends on the improvement of cross-border operations and coordinated planning and management of the rail network at European scale. An RFCs common KPI framework is already in place, and RNE is also already monitoring infrastructure KPIs. Such activities might be continued in light of the new set of requirements foreseen in the revised TEN-T Regulation (EU) 1679/2024 and RFC governance structure, also defined in the Art. 67 of this regulation.
- *Balance network and corridor governance approach*. The analysis of the RFC catchment areas shows that international trains using at least one corridor BCP may actually use more than one RFC. A network approach is more fitting to the planning and management of the network capacity. Geographical specificities and logistics clusters and chains exist that still make the corridor concept useful, especially to support discussion and coordination among IMs and Member States and for a customer-oriented approach aimed at involving RUs and Terminal Operators. This consideration also seems to be in line with the opinions expressed by the 11 RFCs RAGs and TAGs members in the survey conducted as part of this study.

# 1 INTRODUCTION

## 1.1 LEGAL BASIS AND PURPOSE OF THE TRANSPORT MARKET STUDY

Regulation (EU) 913/2010 concerning a *European rail network for competitive freight* stipulates the implementation of Rail Freight Corridors (RFCs) and a package of measures to improve the competitiveness of rail freight services along these corridors. 11 RFCs have been established under the scope of this regulation since it entered into force and are currently operational. According to Article 9.3 of Regulation (EU) 913/2010, the Management Board of the RFC shall carry out and periodically update a Transport Market Study (TMS) related to the observed and expected changes in the traffic on the freight corridor as a consequence of the RFC being established. Over the past decade, RFCs elaborated first TMSs and, in most cases, TMS updates. However, these studies were carried out without a common approach or a shared methodological framework.

To support the RFCs in achieving compliance with the above requirement in a coordinated and harmonised manner, the Management Boards of the 11 RFCs decided to execute a Joint TMS Update under the coordination of RailNetEurope.

This report provides the results of the 2024 TMS Update for the Atlantic Rail Freight Corridor (ATL RFC).

## 1.2 COMMON METHODOLOGY FOR A JOINT TMS UPDATE

For the analysis of the current and future transport markets along the 11 RFCs, a European-wide transport model has been used – the NEAC Model – which combines socio-economic, trade and transport statistics with traffic flows for different transport modes. The geographic scope of the model covers the European Union and the non-EU countries crossed by the 11 RFCs and involved in their catchment areas. The model has been calibrated to the year 2022 (Model Base Year). Future scenarios have been elaborated for the 2030 time horizon. A short overview of the model is provided in Annex 1 of this report.

The scope of the current market analysis covers the alignment of the RFCs in operation at the time of the start of this study update (June 2023). The future market analysis concerns these lines and any possible expected lines that are currently foreseen to be operational in 2030.

Due to the adoption of a common, network-wide approach and use of an EU-wide network model, the analysis of the individual RFCs is presented within the framework of the 11 RFCs network and overall European policy and market trends. This approach is also appropriate considering that the 11 RFCs share many infrastructure components, i.e. corridor lines, logistics nodes and Border Crossing Points, as well as their catchment areas. Also, regulatory, policy and economic backgrounds and developments, as well as most available statistics on the sector, generally concern the country or EU territorial scale.

## 1.3 REPORT STRUCTURE

Further to this introductory chapter, the present report includes six additional sections:

- Chapter 2, describing the RFC alignment and infrastructure, the existing bottlenecks and the ongoing and planned projects to solve current gaps with reference to the TEN-T requirements and capacity constraints, as well as an overview of the operational performance of the RFC with particular reference to the international trains and the managed capacity;
- Chapter 3, providing background information to the TMS update, including a summary of the main trends related to rail freight transport in Europe and along the RFC;
- Chapter 4, describing the current transport market along the RFC;
- Chapter 5, illustrating the analysis of the future transport market along the RFC;
- Chapter 6, reporting on the outcome of a market survey conducted as part of this joint TMS update, i.e. 2023 11 RFCs Joint TMS Update Survey;
- Chapter 7, summarising key findings and providing recommendations on facilitating and strengthening the rail freight traffic along the RFC.

## 1.4 LIST OF ACRONYMS

| | |
|---|---|
| **AB** | Allocation Body |
| **BCP** | Border Crossing Point |
| **CID** | Customer Information Document |
| **CIP** | Customer Information Platform |
| **CNC** | Core Network Corridor |
| **CRD** | Central Reference File Database |
| **EC** | European Commission |
| **EU** | European Union |
| **GDP** | Gross Domestic Product |
| **IM** | (Railway) Infrastructure Manager |
| **IRG** | Independent Regulators' Group |
| **km** | Kilometre |
| **KPI** | Key Performance Indicator |
| **ETCS** | European Train Control System |
| **ERTMS** | European Rail Traffic Management System |
| **PaP** | Pre-arranged Path |
| **PCS** | Path Coordination System |
| **RAG** | Railway Undertaking Advisory Group |
| **RFC** | Rail Freight Corridor |
| **RFC AMBER** | Rail Freight Corridor Amber |
| **RFC ATL** | Rail Freight Corridor Atlantic |
| **RFC AWB** | Rail Freight Corridor Alpine-Western Balkan |
| **RFC BA** | Rail Freight Corridor Baltic-Adriatic |
| **RFC MED** | Rail Freight Corridor Mediterranean |
| **RFC NS-B** | Rail Freight Corridor North Sea-Baltic |
| **RFC NSM** | Rail Freight Corridor North Sea-Mediterranean |
| **RFC OEM** | Rail Freight Corridor Orient/East-Med |
| **RFC RALP** | Rail Freight Corridor Rhine-Alpine |
| **RFC RD** | Rail Freight Corridor Rhine-Danube |
| **RFC SCANMED** | Rail Freight Corridor Scandinavian-Mediterranean |

| | |
|---|---|
| **RFP** | Rail Facilities Portal |
| **RINF** | Register of Infrastructure |
| **RIS** | Railway Infrastructure System |
| **RNE** | RailNetEurope |
| **RU** | Railway Undertaking |
| **TAG** | Terminal Advisory Group |
| **TCR** | Temporary Capacity Restriction |
| **TIS** | Train Information System |
| **tkm** | tonne-kilometre |
| **TMS** | Transport Market Study |
| **UIRR** | International Union for Road-Rail Combined Transport |

A general glossary which is harmonised over all RFCs is also available under the following link: https://rne.eu/downloads/.

# 2 CORRIDOR PRESENTATION

## 2.1 CORRIDOR CHARACTERISTICS

The Rail Freight Corridor Atlantic (onwards ATL RFC) crosses four Member States of the European Union, namely Germany, France, Spain and Portugal. For the purposes of the Joint TMS Update, the description of the ATL RFC lines focusses on the principal and diversionary lines currently in operation, excluding the connecting lines A and B, as well as the expected lines not in operation. The total length of the ATL RFC principal and diversionary lines is 6,207 km. Most of this network is located in France (over 2,610 km), and Spain (nearly 2,360 km), followed by Portugal (about 1,050 km), and Germany (180 km).

Table 1 Corridor extent by Member State/Country (principal and diversionary lines)

| Member State | Length in km |
|---|---|
| **Germany** | 182.74 |
| **France** | 2,609.99 |
| **Spain** | 2,361.70 |
| **Portugal** | 1,053.10 |
| **Total** | **6,207.53** |

*Source: Authors based on CIP*

### 2.1.1 CORRIDOR LINES

The following table summarises the length of the ATL RFC principal and diversionary lines. Details are provided for the whole RFC and overlapping sections.

Table 2 ATL RFC – Type of RFC lines and overlapping RFCs

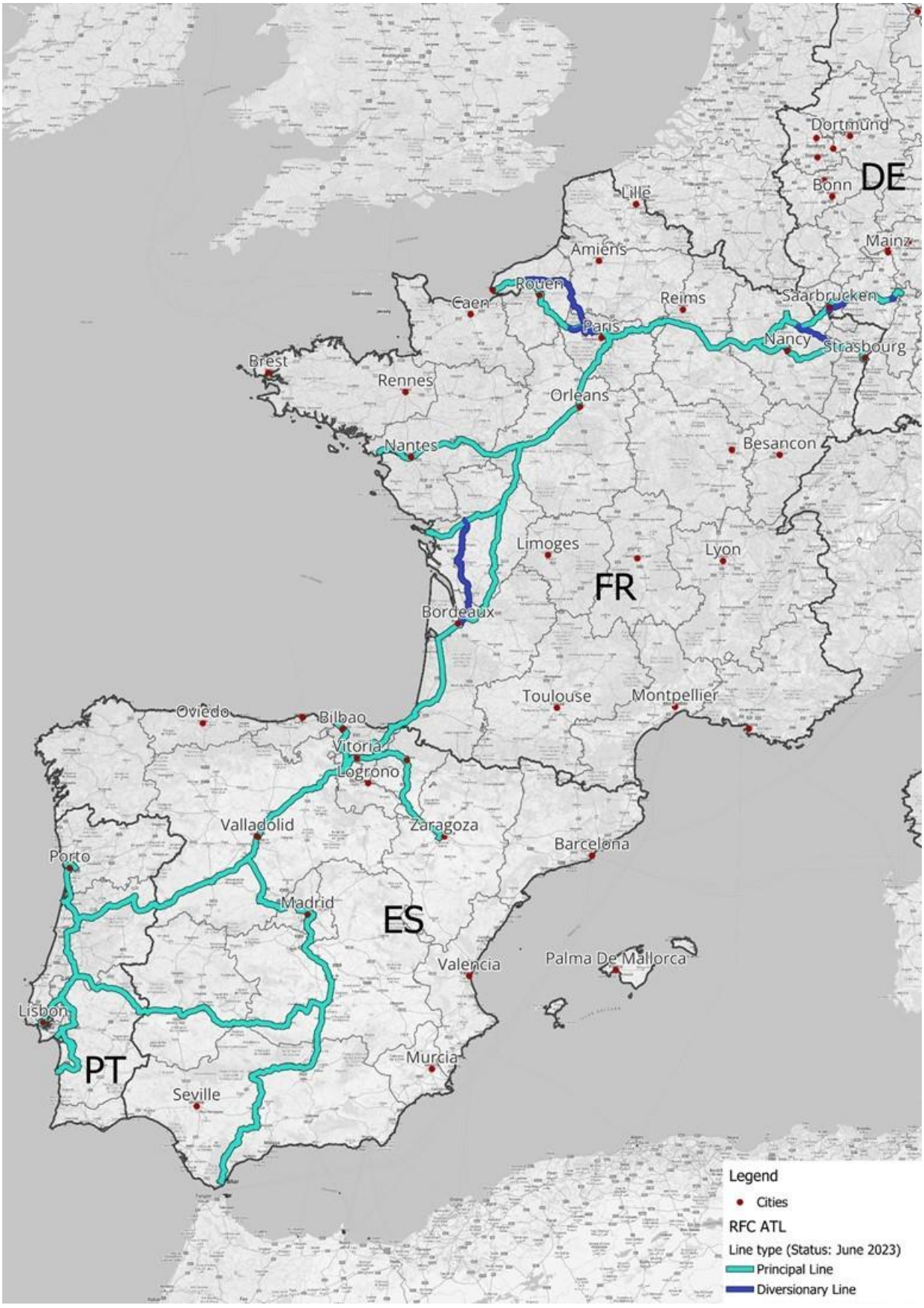
| Rail Freight Corridor | Principal Line | Diversionary Line | Total |
|---|---|---|---|
| **ATL** | 4,574.88 | 424.92 | **4,999.80** |
| **MED** | 764.30 | 0 | **764.30** |
| **NSM** | 361.13 | 62.66 | **423.79** |
| **RALP** | 4.09 | 0 | **4.09** |
| **NSM, RD** | 9.65 | 0 | **9.65** |
| **RALP, RD** | 5.90 | 0 | **5.90** |
| **Total** | **5,719.95** | **487.58** | **6,207.53** |

*Source: Authors based on CIP*

The ATL RFC consists of 5,719 km of principal lines and about 488 km of diversionary lines.

The ATL RFC shares its network with other corridors such as RFC RALP, RFC NSM, RFC RD and RFC MED. The longest overlapping is with RFC MED.

**Figure 1 ATL RFC – Type of RFC lines**




*Source: Authors based on CIP*

### 2.1.2 CORRIDOR TERMINALS

A number of terminals are active along the RFC ATL. The table below provides an indicative, not exhaustive list of active terminals along the RFC ATL also indicating overlapping RFCs where applicable.

Table 3 List of terminals on the ATL RFC

| Name | Country | Common to other RFCs according to CIP |
|---|---|---|
| **Beckingen Puhl Gmbh** | Germany | ATL |
| **Contargo Ludwigshafen** | Germany | RALP, ATL |
| **Contargo Mannheim** | Germany | RALP, ATL , RD |
| **DP World Germersheim** | Germany | RALP, ATL |
| **DP World Mannheim** | Germany | RALP, ATL , RD |
| **DUSS Terminal Mannheim-Handelshafen** | Germany | RALP, ATL , RD |
| **Kirkel Terminal** | Germany | ATL |
| **Ludwigshafen KTL** | Germany | RALP, ATL , RD |
| **Mannheim Rbf** | Germany | RALP, ATL , RD |
| **Rangierbahnhof Einsiedlerhof** | Germany | ATL |
| **Saarbrücken Puhl Gmbh** | Germany | ATL |
| **Terminal Worms** | Germany | ATL |
| **Bordeaux–Hourcade** | France | ATL |
| **Champigneulles (Nancy)** | France | NSM, ATL |
| **Changing bogies installation of Hendaye** | France | ATL |
| **Grand Port Maritime de Bordeaux – Bassens** | France | ATL |
| **Grand Port Maritime de La Rochelle** | France | ATL |
| **Grand Port Maritime du Havre** | France | ATL |
| **Grand Port Maritime of Rouen** | France | ATL |
| **Hausbergen-Traige-Yard** | France | NSM, ATL , RD |
| **Port Autonome de Strasbourg** | France | NSM, ATL , RD |
| **Port de Nantes St Nazaire** | France | ATL |
| **Port of Bayonne** | France | ATL |
| **Terminal du Havre – Soquence** | France | ATL |
| **Terminal of Bayonne – Mouguerre** | France | ATL |
| **Terminal of Cognac** | France | ATL |
| **Terminal of Le Bourget** | France | NSM, ATL |
| **Terminal of Noisy-le-Sec** | France | NSM, ATL |
| **Terminal of Saint Pierre des Corps (Tours)** | France | ATL |
| **Terminal of Valenton** | France | NSM, ATL |
| **Algeciras Port** | Spain | ATL , MED |
| **Algeciras Terminal** | Spain | ATL , MED |
| **Bilbao Port** | Spain | ATL |
| **Bilbao Terminal** | Spain | ATL |
| **Córdoba Mercancías** | Spain | ATL , MED |
| **Irún Mercancías Terminal** | Spain | ATL |
| **Júndiz Terminal** | Spain | ATL |
| **Madrid Abroñigal Terminal** | Spain | ATL , MED |
| **Madrid Vicálvaro Terminal** | Spain | ATL , MED |
| **Noáin Terminal** | Spain | ATL |
| **Pasaia Port** | Spain | ATL |
| **Pasaia Terminal** | Spain | ATL |

| Name | Country | Common to other RFCs according to CIP |
|---|---|---|
| **Puerto Seco de Madrid** | Spain | ATL , MED |
| **San Roque Terminal** | Spain | ATL , MED |
| **Valladolid Terminal** | Spain | ATL |
| **Zaragoza Plaza** | Spain | ATL , MED |
| **Alcântara-Mar** | Portugal | ATL |
| **Alfarelos TMI** | Portugal | ATL |
| **Elvas – Terminal** | Portugal | ATL |
| **Entroncamento MSC** | Portugal | ATL |
| **Entroncamento TVT** | Portugal | ATL |
| **Gaia – Terminal** | Portugal | ATL |
| **Guarda IP** | Portugal | ATL |
| **Leixões ADPL** | Portugal | ATL |
| **Leixões IP** | Portugal | ATL |
| **Mangualde IP** | Portugal | ATL |
| **Pampilhosa** | Portugal | ATL |
| **Plataforma de Cacia – Terminal** | Portugal | ATL |
| **Plataforma Logistica do Poceirão** | Portugal | ATL |
| **Porto de Aveiro** | Portugal | ATL |
| **Setúbal-Mar PORTUCEL** | Portugal | ATL |
| **Setúbal-Mar RO-RO** | Portugal | ATL |
| **Setúbal-Mar SADOPOT** | Portugal | ATL |
| **Setúbal-Mar SAPEC** | Portugal | ATL |
| **Setúbal-Mar SAPEC GRANÉIS LÍQUIDOS** | Portugal | ATL |
| **Setúbal-Mar SOMINCOR** | Portugal | ATL |
| **Setúbal-Mar TERSADO** | Portugal | ATL |
| **Sines Terminal Multipurpose** | Portugal | ATL |
| **Sines Terminal XXI** | Portugal | ATL |
| **Ter. S. Martinho do Campo (Valongo)** | Portugal | ATL |
| **Terminal de Armazém 21** | Portugal | ATL |
| **Terminal de Contentores Santa Apolónia** | Portugal | ATL |
| **Terminal de Mercadorias da Bobadela – CONTEPARQUE** | Portugal | ATL |
| **Terminal de Mercadorias da Bobadela – IP** | Portugal | ATL |
| **Terminal de Mercadorias da Bobadela – SPC** | Portugal | ATL |
| **Terminal de Silapor** | Portugal | ATL |
| **Terminal de Sotagus** | Portugal | ATL |

*Source: Authors based on CIP*

### 2.1.3 CORRIDOR BORDER CROSSING POINTS

Border Crossing Points (BCPs) are of particular relevance for RFCs as their remit is dedicated to the promotion of international traffic across the borders of the European Union Member States. According to the current alignment of the ATL RFC, there are in total 5 BCPs identifiable along the corridor as detailed in the following table.

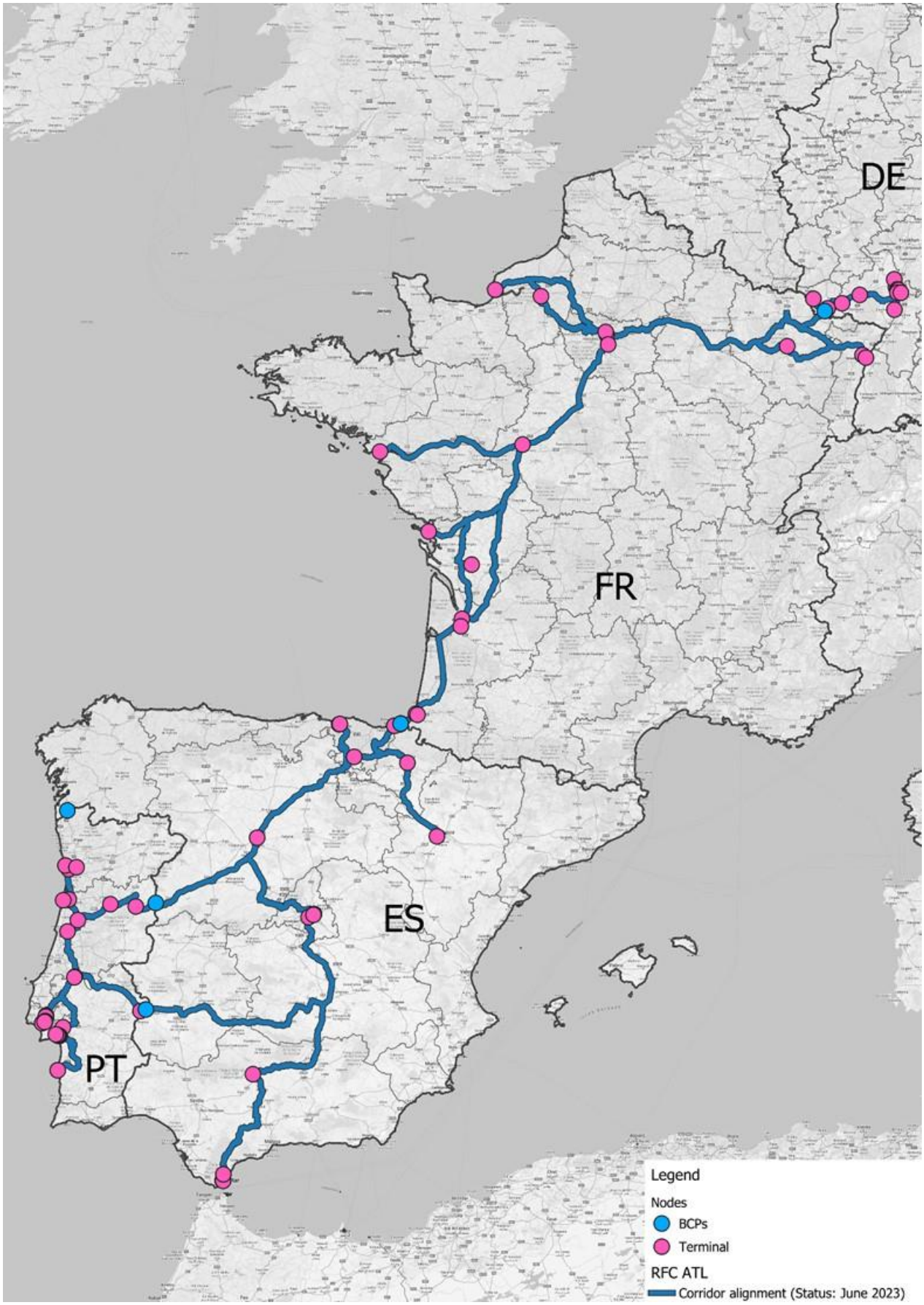
Table 4 ATL RFC BCPs

| Bordering Member States | | Border Crossing Point |
|---|---|---|
| DE | FR | Saarbrücken/Forbach |
| FR | ES | Hendaye/Irun |
| PT | ES | Valença/Tui (North) |
| PT | ES | Vilar Formoso/Fuentes de Oñoro (Middle) |
| PT | ES | Caia/Badajoz (South) |

*Source: Authors based on CIP*

The map in the figure overleaf illustrates the alignment of the ATL RFC, its terminals and cross-border nodes, also identifying the sections overlapping with other RFCs.

**Figure 2 ATL RFC alignment, terminals and cross-border nodes**




*Source: Authors based on CIP*

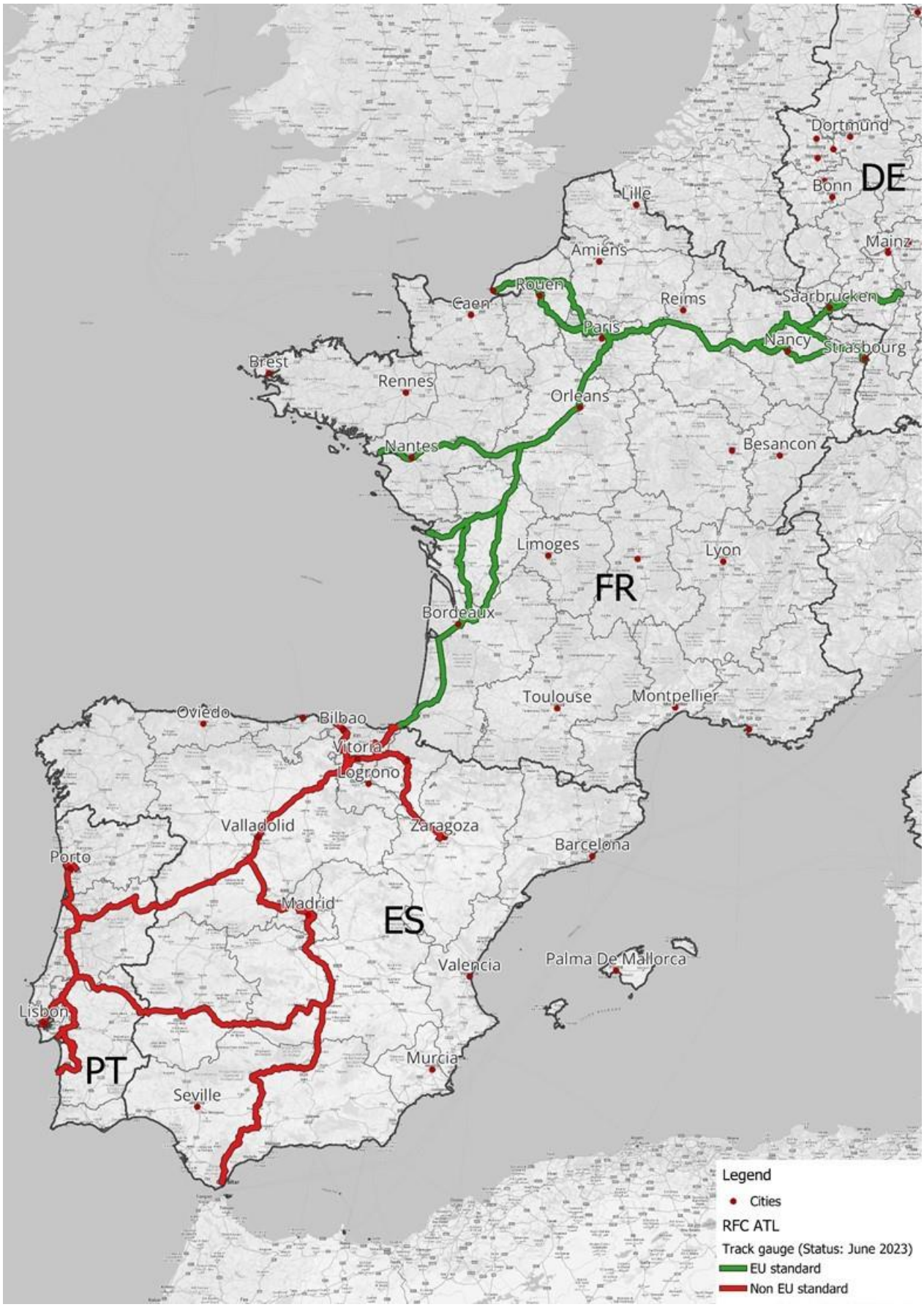
### 2.1.4 CORRIDOR INFRASTRUCTURE PARAMETERS

An analysis of the main characteristics of the corridor lines has been performed with reference to the rail infrastructure requirements set in the TEN-T regulation, i.e. EU track gauge (1435 mm), electrification, maximum line speed (100 km/h), axle load (22.5 t), train length (740 m) and ERTMS (Class A or Class A+B). Such an exercise has been conducted focussing on the principal and diversionary lines of the RFC. Data have been primarily sourced from the Customer Information Platform (CIP). The information was extracted in August 2023, and it reflects the status of the infrastructure in June 2023. For some sections, data from the CIP database have been integrated with information from the Network Statements of the corridor concerned Infrastructure Managers.

On the basis of this analysis, compliance maps have been elaborated, which are provided overleaf for each parameter.

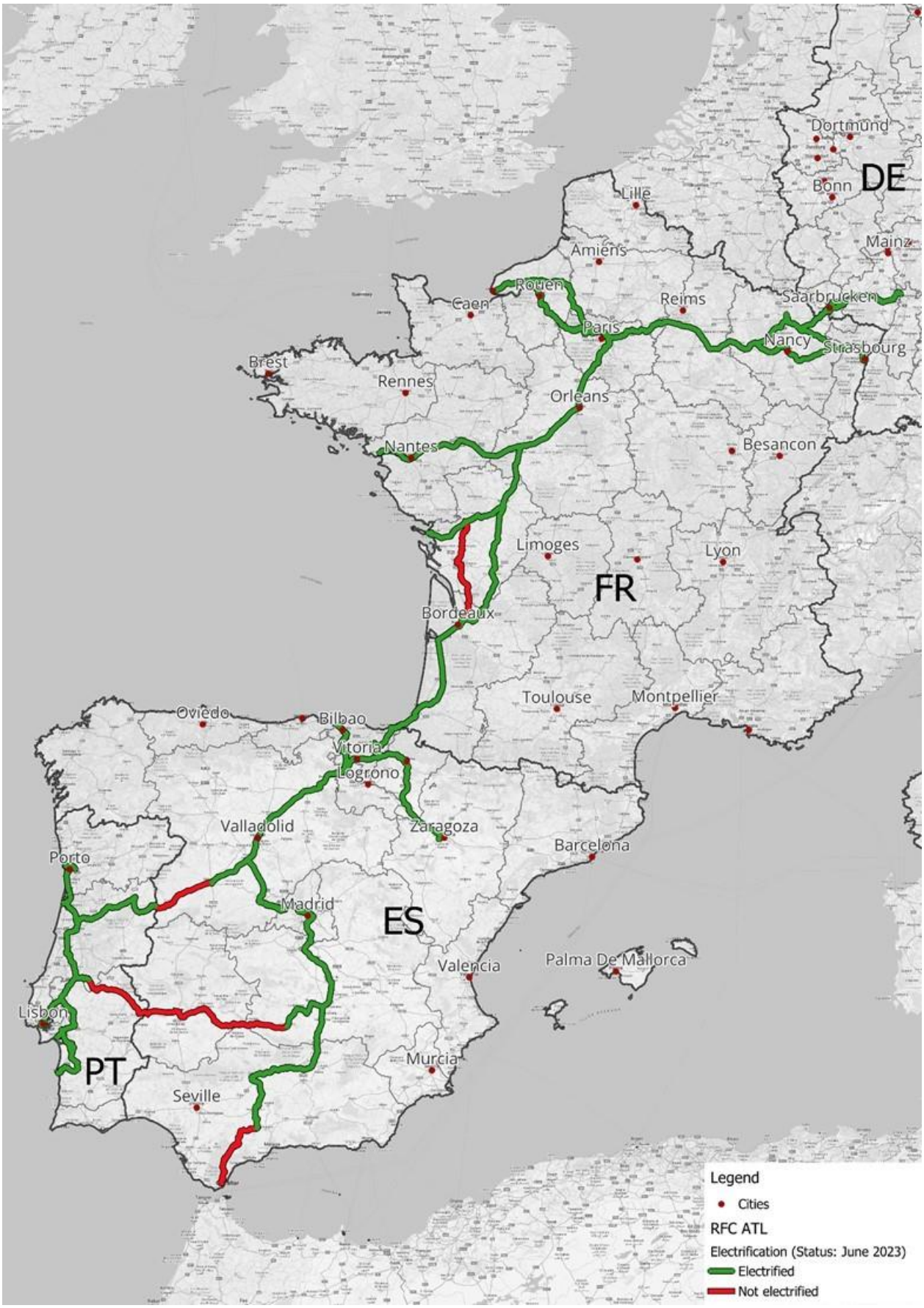
The ATL RFC is affected by lack of homogeneous track gauge as in the Iberian Peninsula the Iberian gauge is in use. The corridor is also not entirely electrified, and gaps particularly affect the cross-border itineraries between Portugal and Spain. The corridor is entirely at standard in terms of axle load and speed limitations are present on limited sections of the ATL RFC. The operation of 740 m long trains is not possible or possible subject to traffic conditions and permissions (operational compliance). Finally, ERTMS is not available along the corridor.

Figure 3 ATL RFC – Track gauge



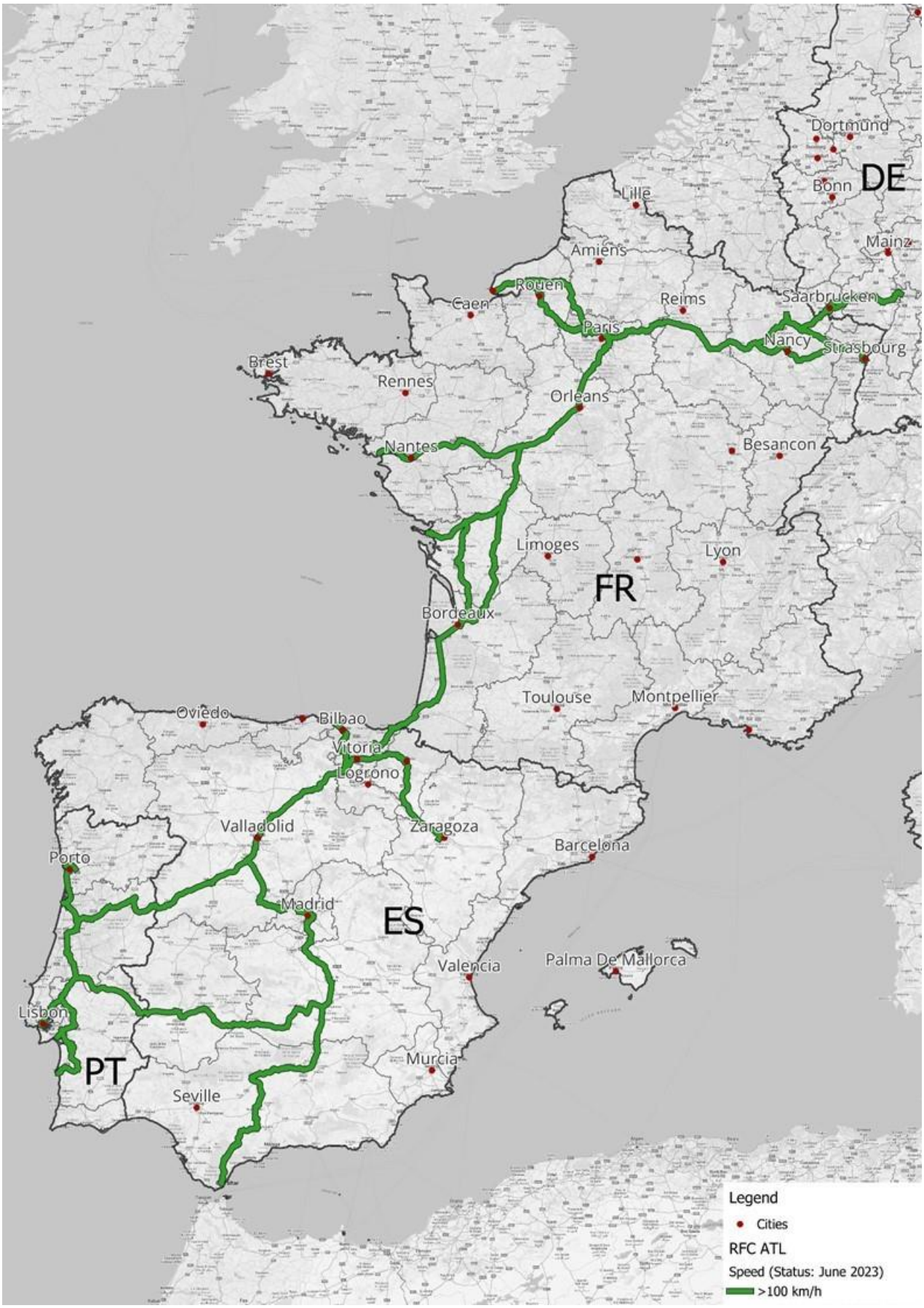

*Source: Authors based on CIP*

Figure 4 ATL RFC – Electrification



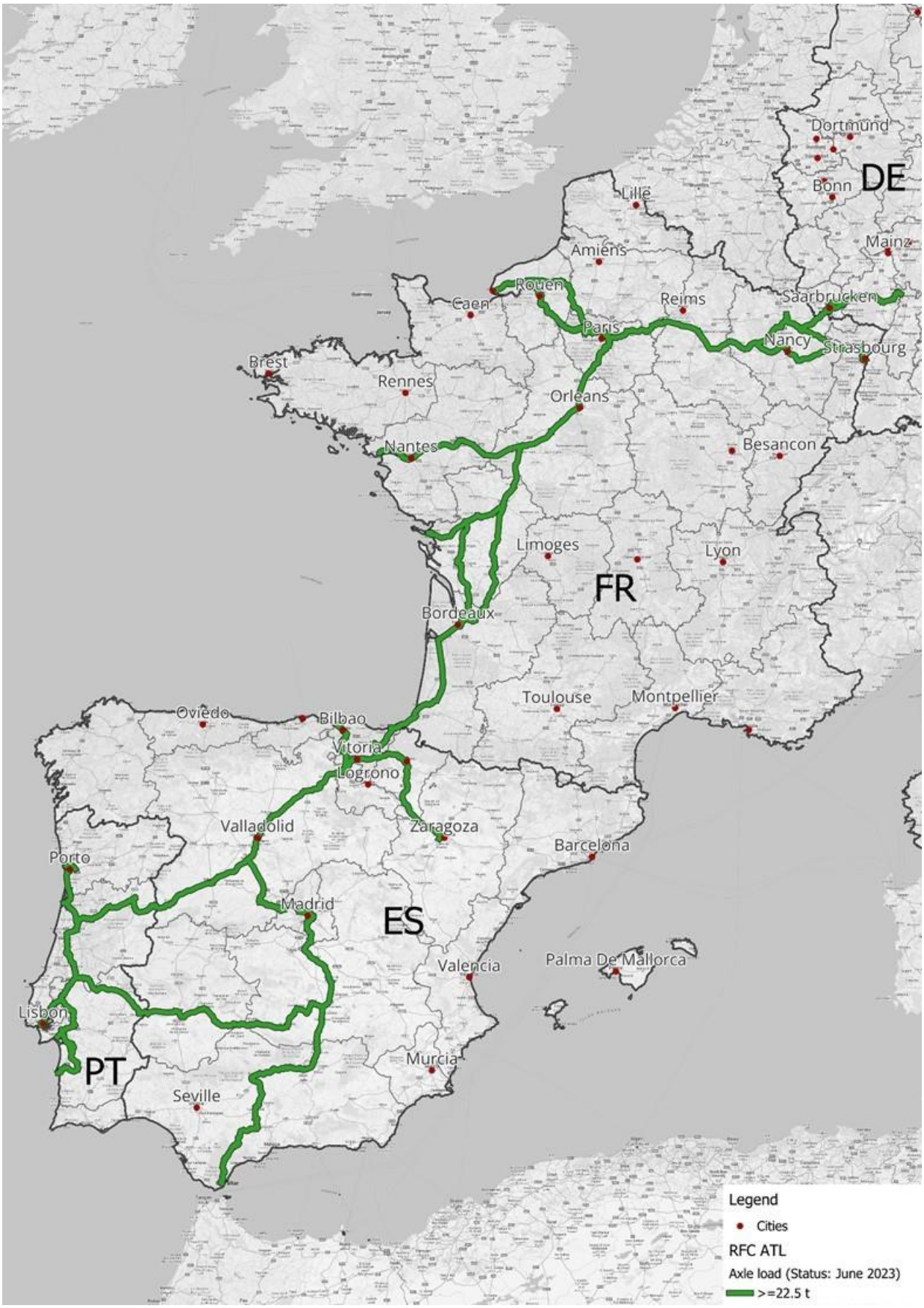

*Source: Authors based on CIP*

Figure 5 ATL RFC – Speed



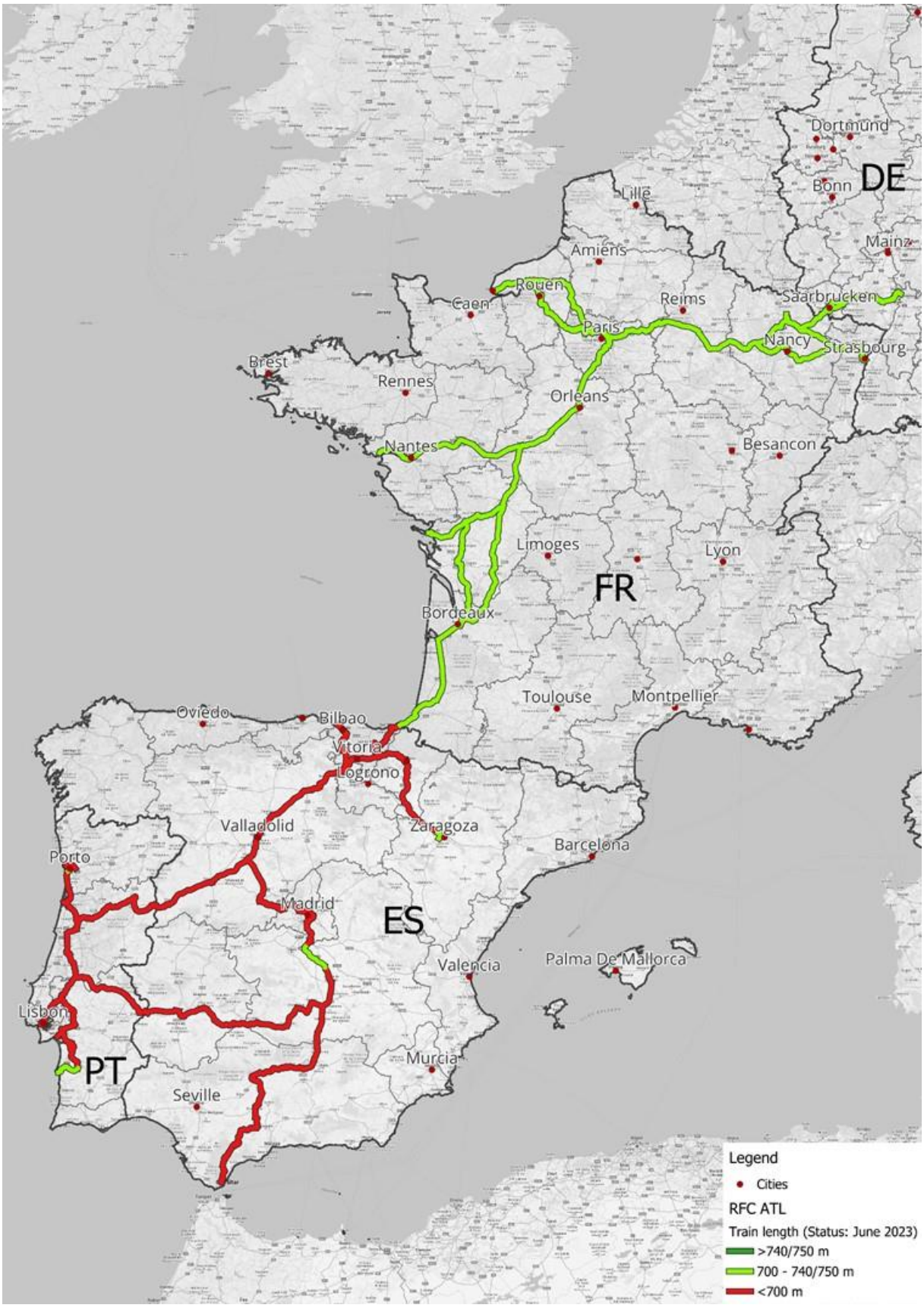

*Source: Authors based on CIP*

Figure 6 ATL RFC – Axle load



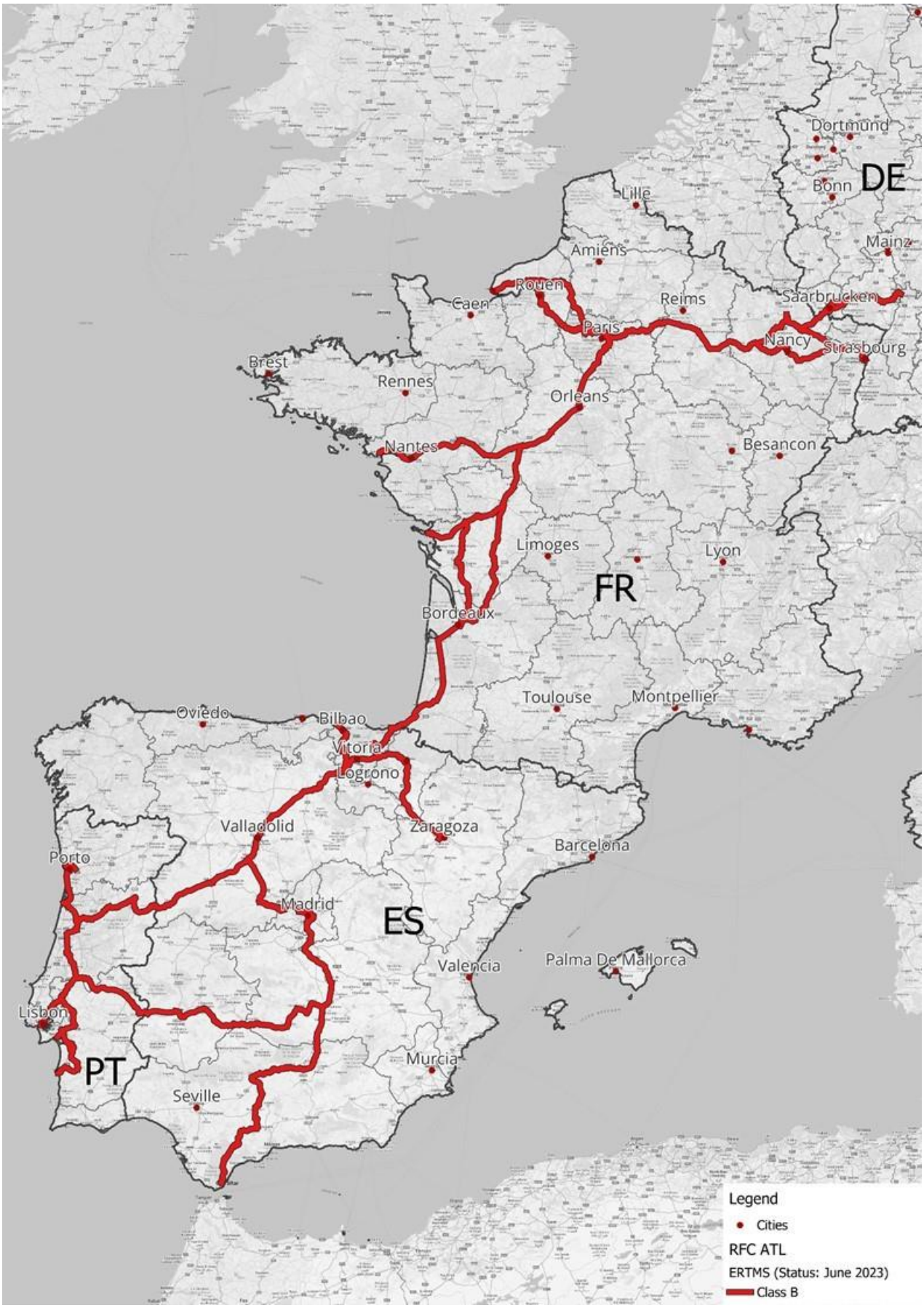

*Source: Authors based on CIP*

Figure 7 ATL RFC – Train length




*Source: Authors based on CIP; Note: * Sections displayed in light green, where 740 meter long trains are possible to be operated based on traffic conditions and upon request, i.e. "operational compliance", also include the network segments codified in CIP as "upon request"*

Figure 8 ATL RFC – ERTMS




*Source: Authors based on CIP*

### 2.1.5 INFRASTRUCTURE BOTTLENECKS, ONGOING AND PLANNED PROJECTS

The ATL RFC recently elaborated their 2025 Implementation Plan, which includes a detailed list of infrastructure bottlenecks. Such bottlenecks are predominantly related to interoperability issues, including the ones described in the previous section above:

- The different track gauge between the Iberian Peninsula, France and Germany, requiring the freight transfer or the axle change across the border between France and Spain;
- The maximum length of the trains limited to 500 m in Portugal, 550 to 600m in Spain, 750 m to 850 m in France and 740 m in Germany;
- The maximum grades reaching 18‰ and more in Spain and Portugal requiring either additional traction or split of longer trains into shorter ones south of Bayonne, depending on the gross load hauled;
- The sections with single-track lines limiting the available capacity, and/or conditioning timetabling;
- The sections with non-electrified lines requiring, when appropriate, the exchange of the locomotive;
- The disparity in the signalling systems requiring the exchange of machines and drivers at borders;
- The disparity of the power supply requiring rolling stock with dual voltage, triple voltage or thermal;
- The disparity of maintenance periods or works to be carried out on rail infrastructures depending on the country (by day, by night, on weekends) with partial or complete closure of a route.

Other than interoperability issues, which in some section may cause capacity restrictions, the corridor is not affected by widespread congestion problems at present. The 2025 ATL RFC Implementation Plan also includes an investment plan aimed at improving the efficiency of freight trains on the ATL RFC focussing on:

- ***Interoperability with UIC gauge and circulation of 750 meter long trains, as well as ERTMS deployment and voltage systems***: Spain and Portugal presently have the major section of tracks of their networks with an Iberian gauge (1668 mm); within the framework of the Investment Plan of Rail Freight Corridor Atlantic defined over different periods, several projects will enable the unification of the track gauge on the whole Corridor by converting the Iberian gauge into an UIC gauge (1435 mm) in these two countries. In conjunction with these works of uniformity of the track length, necessary investments for the circulation of trains with a maximum length of 750 m will be included. Furthermore ERTMS deployment and interoperability issues related to different voltage systems need to be tackled towards an integrated network. This uniformity will be carried out gradually, also considering the socio-economic viability of the investments under both the infrastructure and industrial point of view, specifically for the migration from the Iberian to the EU standard track gauge, consistently with the provisions set in the revised TEN-T Regulation (EU) 1679/2024.
- ***Suppression of bottlenecks***: In addition to prior investments which will enable in some cases the resolution of bottlenecks by increasing the overall capacity of the Rail Freight Corridor Atlantic with the construction and entry into service of new lines for mixed or high-speed traffic (and consequently the liberation of the capacity for freight traffic on the conventional network), other investments are planned, aimed mainly at removing the current or future bottlenecks on the Corridor. These investments are mainly planned at the level of the major railway junctions of the corridor, namely: Lisbon, Madrid, the border between Spain and France, Bordeaux and Paris.
- ***New construction and/or expansion of existing Terminals***: These investments are aimed at the sectors that create and receive major rail flows, through the development of new Terminals and the adaptation or improvement of existing Terminals. In addition to conventional freight traffic and combined transport, Terminals may also offer new international rail services of the rolling motorway

over long-distance routes type. New rail freight services expected at short term and medium term on the Atlantic Corridor will be operated with the construction of new terminals and/or reorganisation of existing terminals; some improvements are also forecasted by the development of a new variable axle gauge for freight wagon and the implementation of a variable axle gauge system in Irun at short term.

- ***Improvement of the efficiency of the transport system***: These investments include those regarding the improvement of the signalling system, as well as the improvement or development of electrification of the different sections depending on:
  - The topography of the different sections of the Corridor,
  - The length of journeys of freight trains (depending on speed and the maximum load of trains)
  - The transport plan of RU (including the working time for train drivers).

An exhaustive list of ongoing and planned investments has been also elaborated by the EEIG ATL RFC (see Table 5, Table 6, Table 7, Table 8) that are aimed at solving the existing infrastructure bottlenecks and develop the ATL RFC for a more competitive rail freight transport across Europe:

- ***Germany***: Velocity upgrade and ETCS equipment of the existing line between Saarbrücken and Ludwigshafen. This major project aims at reducing an important bottleneck on the rail section between the French-German border, Saarbrücken and Ludwigshafen as part of the east-west European railway axis from Paris to Budapest (continuing on RFC Rhine-Danube), via Eastern France and to Southwest Germany. Also, infrastructure conditions for traffic continuing on RFC Rhine-Alpine are improved. Works have already upgraded this rail section in order to enable travelling speed up to 200 km/h with ETCS. They primarily included track engineering tasks such as carrying out refined line alignment, improving the clearance of level crossings and widening bridges. The track's wiring and control and communications technologies are renewed – including equipment of the track with ETCS (European Train Control System). The installation of ETCS technology takes place along the entire rail section from the French-German border to Mannheim. It is planned to implement ETCS from the French border to Ludwigshafen by the end of 2025, considering the Mannheim node is equipped with ETCS at the latest at the same time.

- ***France***: SNCF Réseau's vision for the rail network in 2030 has five main goals:
  - Regeneration of the infrastructure, the basis of which is to continue to guarantee safe operation and safe working conditions;
  - A network that adapts to the needs of everyday life (major projects in the Île-de-France region, Metropolitan Express Services (SEM) in the regions);
  - A network that is part of Europe's railways, greener and smarter (Trans-European Transport Network);
  - Industrial programmes focusing on digitalisation and productivity;
  - Increasingly efficient maintenance and operation.

  In 2023, the government announced a plan to invest a further €100 billion between now and 2040. This announcement is the concrete expression of a new railway ambition for France. For SNCF Réseau and all the players in the rail industry, this is both a huge opportunity and a huge responsibility. Together, we must make a collective commitment to meet the challenges of the future.

While the details of the plan still need to be worked out, the State has already secured funding for network regeneration and modernisation. These are in addition to our own investments, which will amount to €7 billion by 2023.

- + 1 billion a year for regeneration
  Regeneration is being carried out on an industrial scale on the core network, i.e. the busiest part of the network, which carries all TGV and Intercity trains, as well as 82% of TER trains and 75% of goods trains. This effort also extends to the Île-de-France network and to the lines serving the region's finer areas.
- + €500m per year for modernisation
  Modernising the network involves speeding up the deployment of Centralised Network Control, the European Rail Signalling System (ERTMS) and 5G. It also involves renewing the equipment and facilities needed to handle the increase in freight traffic.

- ***Spain***: The strategic planning of transport infrastructures in Spain is reproduced in Mobility Strategy, presented by the Ministerio de Fomento to the Spanish government in December 2021. The Mobility Strategy establishes three major strategic goals as the new framework of planning of transport infrastructures:
  - Security: Guaranteeing greater protection of people and property, improving standards and reducing accidents. It encompasses infrastructure security, operational security, security in cases of emergencies and crises, security against illegal acts and cybersecurity.
  - Social economic and environmental sustainability: Prioritizing everyday mobility, economic-social equity, energy efficiency, and the fight against climate change, trying to minimize the contribution of transport to polluting emissions, both for travellers and goods. Promoting clean modes, the circular economy, climate resilience and universal mobility.
  - Connectivity: From three aspects: 1) digitalization and technological advancement, a great opportunity for the transformation of the transport sector, 2) connectivity with Europe and the world, and 3) multimodal connectivity.
- ***Portugal***: The National Investment Program 2030 (PNI) presented in October 2020, defines the strategic investments that Portugal should launch in the next decade, being articulated with the strategic objectives defined for the national plan – Portugal 2030, for which it was possible to reach a broad social, economic and political consensus. Furthermore the Recovery and Resilience Plan (PRR), approved in July 2021 aims to reinforce social, economic and territorial robustness and accelerate the dual digital and climate transition. Infraestruturas de Portugal positions itself in a privileged way, as the largest national agent of the infrastructure component to ensure a more competitive and more cohesive territory, specifically, with a great investment effort in accessibility to Business Reception Areas and the reinforcement of essential cross-border connections the affirmation of the centrality of our interior within the Iberian market as a whole, as well as the completion of missing connections. In addition to direct connections, most investments contribute to improving accessibility to the main corridors and, thus, to ports and railways, also reducing contextual costs for business activity. The PNI and PRR encompass the most relevant investments in the rail sector in Portugal, including along the TEN-T network.

The list of ongoing and planned investments also includes ERTMS projects, which are recalled in Section 6.3 of the 2025 Implementation Plan as the basis of the ATL RFC ERTMS deployment plan.

Table 5 List of ongoing and planned projects in Germany (Infrastructure and ETCS)

| ID | Typology | | | | Identification, location and description | Corridor section | Entry into service | | | Valuation (M€2013) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Track | Structures | Electrification | Signalling | | | Short term | Medium term | Long term | <50 M€ | 50 M€ a 500 M€ | > 500 M€ |
| 1 | | | | x | Installation of ERTMS-ETCS (Border F/G – Ludwigshafen) | Border F/G – Ludwigshafen | | X | | | X | |

*Source: ATL RFC 2025 Implementation Plan*

Table 6 List of ongoing and planned projects in France (Infrastructure and ETCS)

| ID | Typology | | | | Identification, location and description | Corridor section | Entry into service | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Track | Structures | Electrification | Signalling | | | Short term | Medium term | Long term | go live date | decision status |
| 1 | | | | X | signalling renewal Bordeaux Lamothe | Bordeaux Lamothe | | | X | | |
| 2 | X | | | | IPCS renewal Villeperdue | Villeperdue | | X | | | |
| 3 | X | | | | Track renewal Bayonne – Hendaye | Bayonne – Hendaye | X | | | | |
| 4 | X | | | | track renewal Ruffec to Angoulême | Ruffec à Angoulême | | X | | | |
| 5 | X | | | | Track renewal Saint-Benoît | Saint-Benoît | | | X | | |
| 6 | | | X | | Central Sub Station of Bordeaux: renewal & transfert | Bordeaux | | | X | | |
| 7 | | | X | | renewal Midi catenary between Dax &Bayonne | Dax et Bayonne | | | X | | |
| 8 | X | | | | Track renewal Arveyres – La Gorp | Arveyres – La Gorp | | | X | | |
| 9 | | | | X | renewal of CCT Nord | CCT Nord | | | X | | |
| 10 | | | | X | IT renewal | Bordeaux | | | X | | |
| 11 | X | | | | Track renewal between Ychoux & Morcenx | Ychoux et Morcenx | | | X | | |
| 12 | X | | | | GPSO: includes the creation of new high-speed rail lines between Bordeaux-Spain. It also involves rail adjustments to the existing line south of Bordeaux. | Bayonne – Hendaye | | | X | 2031 – 2032 | | study / to be decided |
| 13 | | X | | | Increase the loading gauge on the Atlantic axis. The objective is to circulate 4m high trailers without operating restrictions between Hendaye & Lille. | Orléans – Hendaye | | | X | After 2030 | | study / to be decided |
| 14 | | | | X | Modernisation between Réding &Saverne | Réding – Saverne | X | | | | | |
| 15 | | | | X | centralised network control | Blainville, Nancy | | | X | | | |
| 16 | X | | | | Track renewal between Toul &Frouard | Toul et Frouard | | | X | | | |
| 17 | | | | X | signalling renewal between Blainville (Excluded) &Sarrebourg (Excluded) | Blainville – Sarrebourg | | | X | | | |
| 18 | | | | X | centralised network control | | | | X | | | |
| 19 | | | | X | Gare de Oissel: signalling renewal | | | | X | | | |
| 20 | | X | | | Tunnel renewal | | | | X | | | |
| 21 | X | | | | The LNPN project aims to address aging infrastructure and capacity issues on the Paris-Normandy railway, which suffers from high traffic density and mixed speeds of passenger and freight trains, leading to reduced reliability and increased travel times. | Paris – Le Havre | | | X | 2035 : Timeframe for commissioning priority 1 schemes | | study / to be decided |
| 22 | X | | | | Track renewal | Boisseaux-Les Aubrais | | | X | | | |
| 23 | | | | X | renewal in Villeneuve-Saint-Georges | Villeneuve-Saint-Georges | X | | | | | |
| 24 | X | | | | Track renewal | | | | X | | | |
| 25 | X | | | | track renewal Poitiers / Niort Phase 3 | Poitiers / Niort | | | X | | | |
| 26 | X | | | | Track renewal between St Benoît & Niort | St Benoît & Niort | | | X | | | |
| 27 | X | | | | Track renewal Savenay-St Nazaire | Savenay-St Nazaire | | | X | | | |
| 28 | X | | | | Track renewal Tours – Saumur | Tours – Saumur | | | X | | | |

*Source: ATL RFC 2025 Implementation Plan*

Table 7 List of ongoing and planned projects in Spain (Infrastructure and ETCS)

| ID | Typology | | | | Identification, location and description | Corridor section | Entry into service | | | go live date | decision status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Track | Structures | Electrification | Signalling | | | Short term | Medium term | Long term | | |
| **1** | X | X | X | X | Línea Alta Velocidad Y Vasca (tráfico mixto). Entrada en ciudades y operaciones de integración urbana. Incluye conexión con Júndiz y adaptacion UIC entre Astigarraga y Irún. | Madrid – Irún/Hendaya | | X | | 2030 | realisation |
| **2** | | X | X | X | Nueva línea Astigarraga-Lezo y nueva conexion con Francia. | Madrid – Irún/Hendaya | | | X | not before 2030 | planned |
| **3** | X | X | X | X | Instalación en Irún de un Cambiador para Ejes de Ancho Varialble | Madrid – Irún/Hendaya | X | | | 2024 | secured |
| **4** | X | X | X | X | Adecuación infraestructura Burgos – Vitoria (túneles) | Madrid – Irún/Hendaya | | X | | n/a | secured |
| **5** | X | | X | X | Nueva Terminal de Júndiz (Vitoria) | Madrid – Irún/Hendaya | X | | | 2025 | realisation |
| **6** | X | | X | X | Doble vía Pinar de Antequera | Madrid – Irún/Hendaya | Already in service | | | Already in service | realisation |
| **7** | X | X | X | X | Línea Alta Velocidad tramo Valladolid – Burgos (viajeros) | Madrid – Irún/Hendaya | Already in service | | | Already in service | realisation |
| **8** | X | X | X | X | Variante de Valladolid (mercancías) (2 IB+acceso norte UIC al complejo=10 km) | Madrid – Irún/Hendaya | | X | | n/a | realisation |
| **9** | X | X | X | X | Nuevo Complejo de mercancías Valladolid | Madrid – Irún/Hendaya | | X | | n/a | secured |
| **10** | X | X | X | X | Puerto Seco de Bilbao en Pancorbo | Madrid – Irún/Hendaya | Already in service | | | Already in service | realisation |
| **11** | X | X | X | X | Línea Alta Velocidad tramo Burgos – Vitoria (viajeros) | Madrid – Irún/Hendaya | | X | | n/a | secured |
| **12** | X | X | | X | Variante de Almoraima (estación de San Roque) | Madrid – Algeciras | Already in Service | | | Already in Service | realisation |
| **13** | X | | X | X | Pinto – Villaverde bajo Cuadruplicación de Vías (parcial) | Madrid – Algeciras | | X | | n/a | planned |
| **14** | X | | X | X | Remodelación Terminales de Vicálvaro (Madrid) | Madrid – Algeciras | | X | | n/a | secured |
| **15** | | | | X | Ronda – Bobadilla Bloqueo Automático | Madrid – Algeciras | X | | | 2024 | realisation |
| **16** | | | | X | Bobadilla – Córdoba Bloqueo Automático | Madrid – Algeciras | | X | | 2026 | secured |
| **17** | | | X | | Algeciras – Bobadilla Electricación 25kV | Madrid – Algeciras | | X | | n/a | planned |
| **18** | X | | X | X | Variante Sur de Acceso al Puerto de Bilbao- Y Vasca | Miranda de Ebro – Bilbao | | X | | n/a | planned |
| **19** | | | X | X | Medina del Campo – Salamanca. Electrificación 25kV | Medina del Campo – Fuentes de Oñoro | Already in Service | | | Already in Service | realisation |

| ID | Typology | | | | Identification, location and description | Corridor section | Entry into service | | | go live date | decision status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Track | Structures | Electrification | Signalling | | | Short term | Medium term | Long term | | |
| **20** | | | X | X | Salamanca – Fuentes de Oñoro. Electrificación 25kV | Medina del Campo – Fuentes de Oñoro | X | | | 2025 | realisation |
| **21** | X | X | | X | Línea Alta Velocidad Plasencia-Cáceres-Badajoz (1er tramo) | Badajoz – Manzanares Madrid | Already in service (pending on Electrification 25 kV) | | | Already in service (pending on Electrification 25 kV) | realisation |
| **22** | X | X | X | X | Línea Alta Velocidad Extremadura Plasencia-Navalmoral-La Sagra (2º tramo) | Badajoz – Cáceres – Madrid | | X | | n/a | secured |
| **23** | X | X | X | X | Enlace línea Alta Velocidad Madrid – Extremadura con vía de mercancías Madrid | Badajoz – Cáceres – Madrid | | X | | n/a | secured |
| **24** | X | | X | X | Tramo Zaragoza-Castejón. Nueva línea AV tráfico mixto | Zaragoza-Alsasua | | | X | n/a | planned |
| **25** | X | X | X | X | Tramo Castejón-Pamplona. Nueva línea AV tráfico mixto | Zaragoza-Alsasua | | X | | n/a | planned |
| **26** | X | X | X | X | Variante de Pamplona. Nueva estación y conexión factoría Volkswagen | Zaragoza-Alsasua | | | X | n/a | planned |
| **27** | X | | X | X | Renovación vía Pamplona-Alsasua-Vitoria | Zaragoza-Alsasua | | | X | n/a | planned |
| **28** | | | | X | Implantación ERTMS 22ppose22r 4 tramo vía doble | Todo el Corredor | | X | | according to NIP | planned |
| **29** | | | | X | Implantación ERTMS 22ppose22r 4 tramo vía única | Todo el Corredor | | X | | according to NIP | planned |

*Source: ATL RFC 2025 Implementation Plan*

**Table 8 List of ongoing and planned projects in Portugal (Infrastructure and ETCS)**

| ID | Typology | | | | Identification, location and description | Corridor section | Entry into service | | | go live date | decision status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Track | Structures | Electrification | Signalling | | | Short term (until 2024) | Medium term (until 2025) | Long term (after 2025) | | |
| **1** | X | X | X | X | Track quadruplication (Ermesinde and Contumil) | P1 Oporto (Campanhã) – Ermesinde | | X | | 1st Trim. 2029 | planned |
| **2** | X | | | | Upgrading of existing terminal, new terminal and increase train length (Leixões Port) | P5 Contumil – Leixões | | X | | 2nd Trim. 2027 | planned |
| **3** | X | X | | X | Modernization (Válega-Porto) | P8 Oporto (Campanhã) – Lisbon (Sta. Apolónia) | X | | X | 2nd Trim. 2027 | realisation |
| **4** | X | X | | X | Modernization (Santana-Cartaxo-Entroncamento) | P8 Oporto (Campanhã) – Lisbon (Sta. Apolónia) | X | | X | 4th Trim. 2026 | realisation |
| **5** | X | X | X | X | Track quadruplication (Alverca-Azambuja) | P8 Oporto (Campanhã) – Lisbon (Sta. Apolónia) | | | X | | planned |

| ID | Typology | | | | Identification, location and description | Corridor section | Entry into service | | | go live date | decision status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Track | Structures | Electrification | Signalling | | | Short term (until 2024) | Medium term (until 2025) | Long term (after 2025) | | |
| **6** | X | | X | X | Construction of the transition between Beira Alta and North lines (Pampilhosa) | P20 Vilar Formoso – Pampilhosa | X | | | 3rd Trim 2024 | realisation |
| **7** | X | | X | X | Railway stations Layout (increasing of train 23ppose23) | P20 Vilar Formoso – Pampilhosa | X | | X | 4th Trim 2026 | realisation |
| **8** | X | X | X | X | Profile optimization (grades reduction) | P20 Vilar Formoso – Pampilhosa | | | X | | study / to be decided |
| **9** | X | X | X | X | Implementation of UIC gauge | P20 Vilar Formoso – Pampilhosa | | | X | | study / to be decided |
| **10** | X | X | X | | Modernization (Entroncamento-Abrantes) | P25 Abrantes – Entroncamento | | | X | | study / to be decided |
| **11** | X | | | | Modernization (Assumar-Arronche; Torre das Vargens-Crato) | P27 Elvas – Abrantes | | | X | | study / to be decided |
| **12** | X | | | | Layouts adjustments (Torre das Vargens – Portalegre) | P27 Elvas – Abrantes | | | X | | study / to be decided |
| **13** | X | X | X | X | Track quadruplication (Areeiro – Braço de Prata) | P29 Braço de Prata – Alcântara | | | X | | study / to be decided |
| **14** | X | X | X | X | Construction of fly under on Nó de Alcântara (Alcântara Mar – Campolide) | P29 Braço de Prata – Alcântara | | | X | | study / to be decided |
| **15** | X | | | X | Full track renovation and layouts adjustments (Setil – Vendas Novas) | P33 Setil – Vendas Novas | | | X | 1st Trim 2029 | planned |
| **16** | X | | | X | Full track renovation and track duplication (Poceirão – Bombel) | P34 Vendas Novas – Poceirão | | | X | 4th Trim 2028 | planned |
| **17** | X | X | X | X | Improving Connection (Sines – Grândola Norte) | P38 Ermidas do Sado – Sines | | | X | | study / to be decided |
| **18** | X | | | X | New layouts to Ermidas and C. Caveira stations (Grândola – Ermidas do Sado) | P37 Setúbal – Ermidas do Sado | X | | | 3rd Trim 2024 | realisation |
| **19** | X | | X | X | Increasing and upgrading connections to Setúbal Port (Setúbal – Praias do Sado) | P37 Setúbal – Ermidas do Sado | X | | | 3rd Trim 2024 | realisation |
| **20** | | X | | | Reinforcement of structures (Mouriscas – Covilhã) | P25 Abrantes – Guarda | | | X | 1st Trim 2026 | planned |
| **21** | X | X | X | X | Modernization (Évora – Évora Norte) | P39 Elvas – Évora – Casa Branca | | X | | 2025 | realisation |
| **22** | X | X | X | X | New line construction (Évora – Caia) | P39 Elvas – Évora – Casa Branca | | X | | 2025 | realisation |
| **23** | X | X | X | X | UIC gauge 23ppose23rt23 (Vendas Novas – Casa Branca) | P34 Casa Branca – Vendas Novas – Poceirão | | | X | | study / to be decided |
| **24** | X | X | X | X | UIC gauge 23ppose23rt23 (Casa Branca – Évora) | P39 Elvas – Évora – Casa Branca | | | X | | study / to be decided |
| **25** | X | X | X | X | UIC gauge 23ppose23rt23 (Évora – Évora Norte) | P39 Elvas – Évora – Casa Branca | | | X | | study / to be decided |
| **26** | X | X | X | X | UIC gauge 23ppose23rt23 (Évora Norte – Caia) | P39 Elvas – Évora – Casa Branca | | | X | | study / to be decided |
| **27** | | | | X | Installation of ERTMS-ETCS + GSM-R (Sines – Caia) | P39 Elvas – Évora – Casa Branca<br>P34 Casa Branca – Vendas Novas – Poceirão<br>P46 Poceirão – Águas de Moura<br>P37 Setúbal – Ermidas do Sado<br>P38 Ermidas do Sado – Sines | | X | X | | planned |
| **28** | | | | X | Installation of ERTMS-ETCS + GSM-R (Lisboa – Oporto) | P8 Oporto (Campanhã) – Lisbon (Sta. Apolónia) | | | X | 2029 | planned |

| ID | Typology | | | | Identification, location and description | Corridor section | Entry into service | | | go live date | decision status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Track | Structures | Electrification | Signalling | | | Short term (until 2024) | Medium term (until 2025) | Long term (after 2025) | | |
| **29** | | | | X | Installation of ERTMS-ETCS + GSM-R (Aveiro – Vilar Formoso) | P20 Vilar Formoso – Pampilhosa<br>P90 Feeder line of the Port of Aveiro | | X | X | 2025 | realisation |
| **30** | | | | X | Installation of ERTMS-ETCS + GSM-R (Lisboa – Poceirão) | P34 Poceirão – Pinhal Novo<br>P37 Pinhal Novo – Lisboa | | | X | | study / to be decided |
| **31** | | | | X | Installation of ERTMS-ETCS + GSM-R (Entroncamento- Caia) | P27 Elvas – Abrantes<br>P25 Abrantes – Entroncamento | | | X | | study / to be decided |

*Source: ATL RFC 2025 Implementation Plan*

## 2.2 CORRIDOR OPERATIONAL PERFORMANCE

### 2.2.1 KEY PERFORMANCE INDICATORS

According to article 19 (2) of Regulation (EU) 913/2010 the Management Boards of the Rail Freight Corridors are requested to monitor the performance of rail freight services on the freight corridor and publish the results of this monitoring once a year.

The RFCs are free to choose their own Key Performance Indicators (KPIs) to fulfil this requirement. However, in order to facilitate data provision for the calculation of the KPIs and the processing of such data, a common approach and set of KPIs applicable to all RFCs was developed and adopted under coordination of RNE.

The KPI framework includes capacity management, operations and market development indicators. The most relevant indicators are described below for the years 2020, 2021 and 2022.

Table 9 provides the number of trains per BCP along the ATL RFC (i.e. the number of trains crossing a corridor BCP regardless the actual use of the RFC), whereas Table 10 includes the number of trains crossing a BCP along the RFC (i.e. the number of trains crossing a corridor BCP, provided that trains crossing more than one BCP are only counted once).

Table 9 Number of trains per BCP along the ATL RFC

| Border | | BCP | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|
| DE | FR | Saarbrücken/Forbach | 8,857 | 9,759 | 10,919 | 9,019 |
| FR | ES | Hendaye/Irun | 2,723 | 2,139 | 2,488 | 2,487 |
| PT | ES | Valença/Tui (North) | 1,831 | 2,047 | 2,052 | 2,321 |
| PT | ES | Vilar Formoso/Fuentes de Oñoro (Middle) | 1,235 | 1,683 | 1,436 | 1,366 |
| PT | ES | Caia/Badajoz (South) | 755 | 808 | 918 | 981 |

*Source: ATL RFC KPIs*

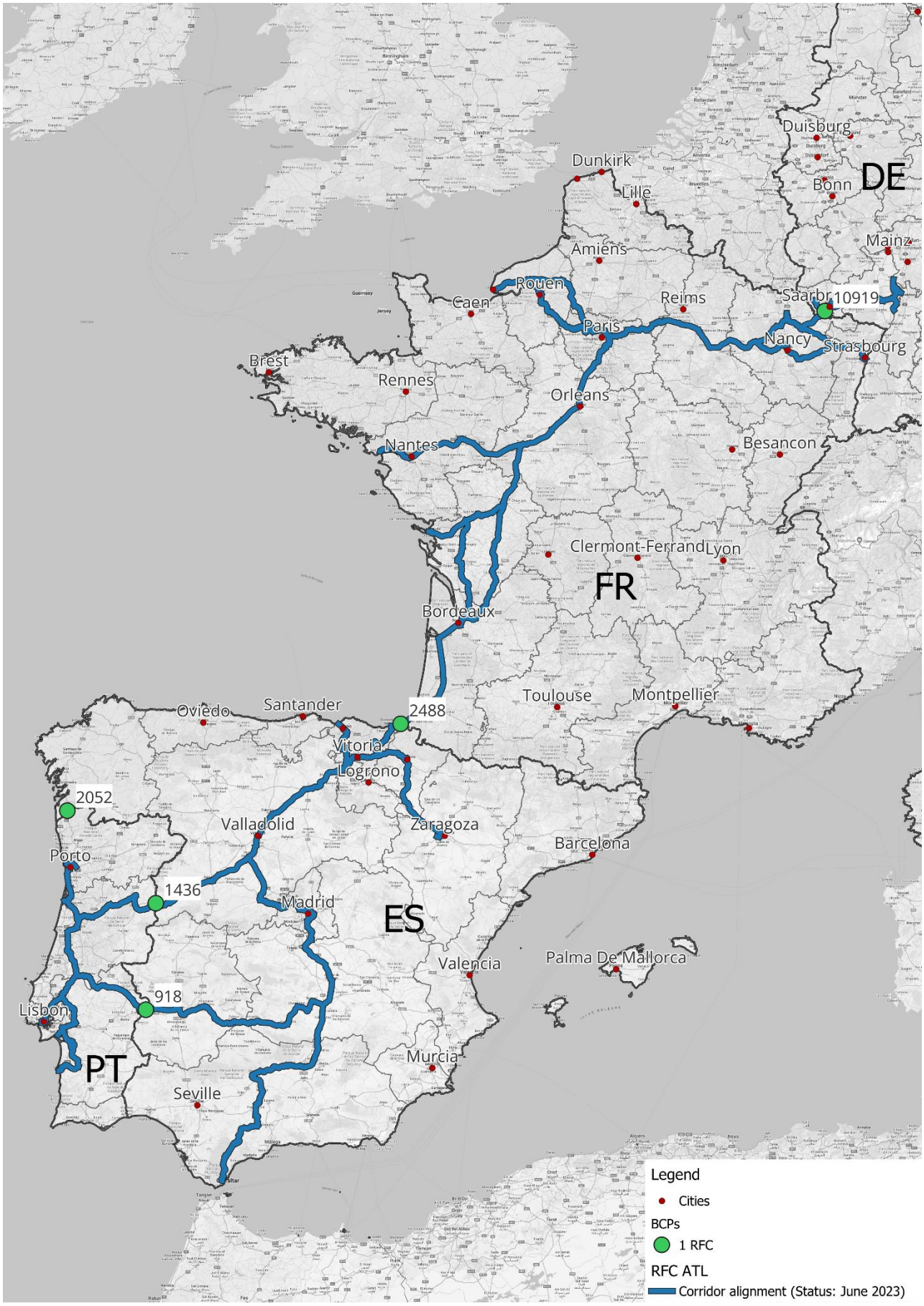
According to the available data, the highest traffic was registered during the last years at Saarbrücken/Forbach, between Germany and France. Train traffic data/trends at BCPs include all RFCs trains and may vary according to traffic management solutions and traffic conditions on the accessing/interconnected lines, as well as traffic capacity restrictions on these lines, due to temporary/permanent maintenance and/or construction works. Furthermore, the COVID Pandemic first and the Russian war of aggression against Ukraine later also affected traffic on the European network for competitive rail transport. Nonetheless, the number of corridor trains seems to be showing an overall slightly growing trend.

Table 10 Corridor trains crossing at least one ATL RFC BCP

| | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|
| Number of trains crossing a border along RFC ATL | 12,577 | 14,931 | 16,344 | 16,978 |

*Source: ATL RFC KPIs*

**Figure 9 ATL RFC – Trains at BCPs along the ATL RFC in 2022**




*Source: Authors based on CIP and ATL RFC KPIs*

Further to the number of trains at BCPs, the set of common indicators also includes capacity management related parameters, for which data are collected and provided for all RFCs. Figures for the ATL RFC are provided in Table 11 below.

**Table 11 Capacity Management KPIs**

| Parameter | TT 2022 | TT 2023 | TT 2024 | TT 2025 |
|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 |
| Volume of offered capacity – PaPs (at X-11), mio (path) km | 8.4 | 8.2 | 8.4 | 8.7 |
| Volume of requested capacity – PaPs (at X-8), mio (path) km | 4.5 | 4.5 | 4.8 | 3.6 |
| Number of requests – PaPs (at X-8) | 35 | 36 | 40 | 41 |
| Number of conflicts – PaPs (at X-8) | 0 | 0 | 0 | 0 |
| Volume of pre-booked capacity– PaPs (at X-7.5), mio (path) km | 4.5 | 4.5 | 4.8 | 3.6 |
| Ratio of pre-booked capacity (to the volume of capacity offered at x-11) | 52.7% | 55.5% | 56.7% | 42.1% |
| Volume of offered capacity – Reserve Capacity (at X-2), mio (path) km | 1.8 | 1.8 | 1.6 | |
| Number of requests – Reserve Capacity (at X+12) (number of PCS dossiers) | 2 | 0 | | |
| Volume of requested capacity – Reserve Capacity (at X+12), mio (path) km | 0.05 | 0 | | |

*Source: ATL RFC KPIs*

The commonly adopted KPI framework additionally includes indicators to measure the average planned speed of the offered Pre-allocated Paths (Figure 10) and punctuality of freight services along the RFCs (Table 12).

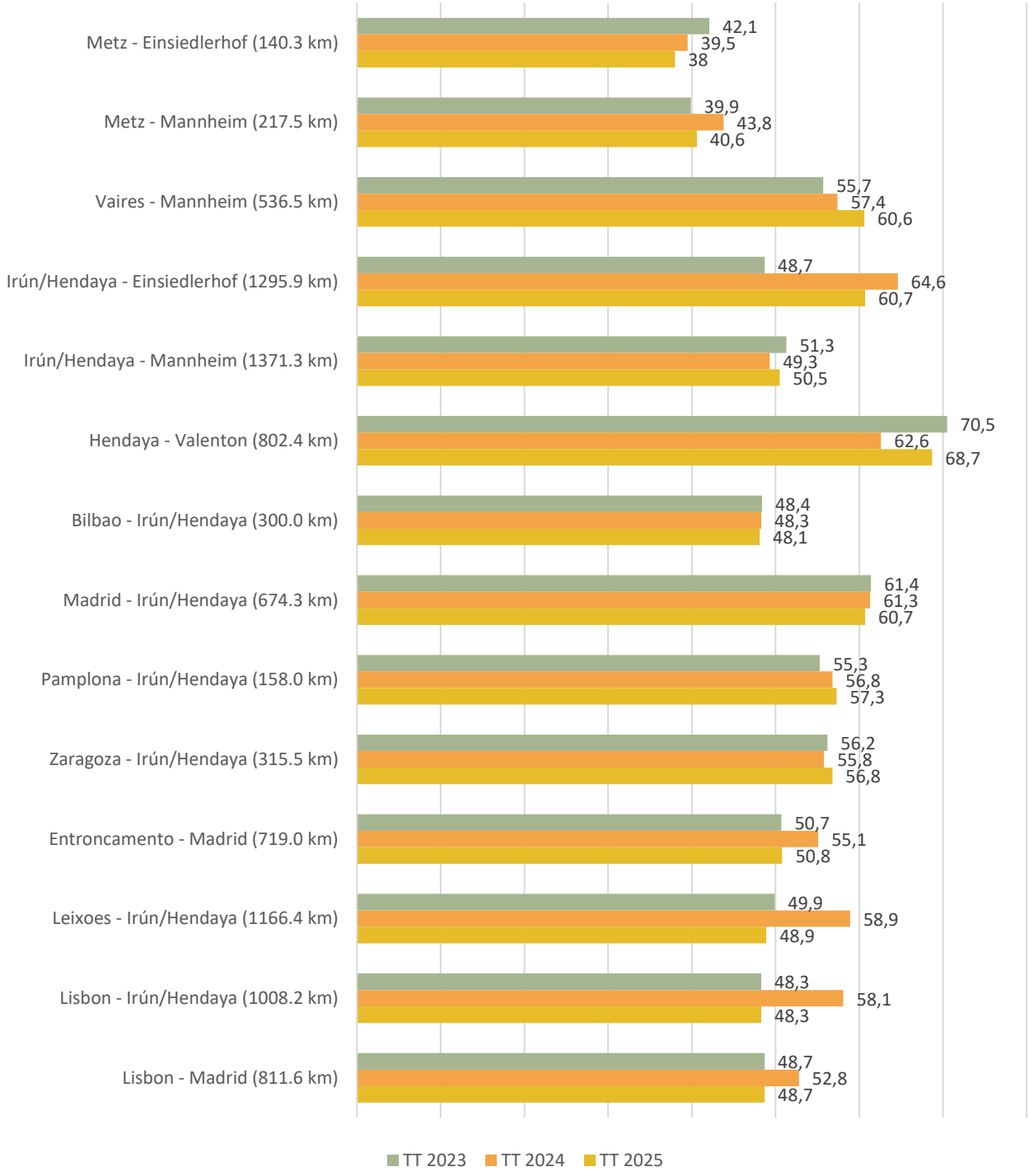
**Table 12 Punctuality**

| | | | | (delay ≤ 30 minutes) |
|---|---|---|---|---|
| | 2020 | 2021 | 2022 | 2023 |
| Punctuality at origin (RFC entry) | 81.8% | 78.5% | 77.6% | 78.0% |
| Punctuality at destination (RFC exit) | 78.1% | 74.0% | 69.8% | 73.0% |
| | | | | (delay ≤ 15 minutes) |
| Punctuality at origin (RFC entry) | 74.4% | 69.8% | 68.7% | 69.0% |
| Punctuality at destination (RFC exit) | 70.4% | 66.7% | 61.9% | 64.0% |

*Source: ATL RFC KPIs*

The indicators for the past four years seem to show a steady trend in terms of capacity management and slight decreasing indicators for punctuality, particularly at destination. The COVID Pandemic, reducing traffic of passengers' trains, might also have had a positive impact in terms of punctuality, resulting in better performance of the RFC during 2020 and 2021. Average planned speed of PaPs generally shows a stable or negative trend compared to TT 2023, except for the paths Vaires – Mannheim, Pamplona - Irún/Hendaya, Zaragoza - Irún/Hendaya.

Figure 10 Average planned speed of PaPs, km/h




*Source: ATL RFC KPIs*

### 2.2.2 SPECIFIC PERFORMANCE OBJECTIVES AND TARGETS

Further to the monitoring activities associated with the common KPIs applicable to all RFCs, specific objectives have been also adopted by the ATL RFC, associated with quantified targets. A description of the identified objectives and related targets is provided in the following paragraphs. Similarly to other RFCs, ATL RFC also undertakes Train Performance Management tasks (producing annual reports on the performance of the corridor) and the user satisfaction survey.

The general purpose of the EEIG ATL RFC is the significant increase of competitiveness of the rail services of the ATL RFC against the other means of transport. This means having a broad understanding and a control of critical factors, particularly regarding traffic capacity and management, functions clearly attributed to the EEIG ATL RFC.

The EEIG ATL RFC has defined 2 strategic objectives that underline the overview for ATL RFC in terms of production of transport on the rail freight corridor, as reported in the following table.

Table 13 Strategic objectives

| Strategic Objectives | 2020 | 2025 |
|---|---|---|
| a) Number of international prearranged freight paths using the corridor (n.)<br>▪ Method: Number of international prearranged paths and/or TTR slots crossing one or two borders available at X-11;<br>▪ Purpose: Provide a basic production indicator for ATL RFC. | 50 | +25% |
| b) Average speed of prearranged paths [km/h], excluding freight transshipment time at the border between France and Spain<br>▪ Method: AvSpeed = Sum (PaP Length) / Sum (PaP Journey time)<br>▪ AvSpeed = Average speed of the PaPs<br>▪ PaPLenght = Complete length of each PaP<br>▪ PaP Journey time = Journey time of each PaP<br>▪ Purpose: Provide a basic production indicator for ATL RFC. The PaP were selected as being the most significant commercial product of ATL RFC. | 55 km/h | +15% |

*Source: ATL RFC 2025 Implementation Plan*

Two horizons were chosen: 2020 as the reference year of ATL RFC and 2025 as a planned key date for the implementation of new sections of high-speed lines on ATL RFC which will release more capacity for freight traffic on the existing lines. The accomplishment of the identified targets will also partially depend on global economic conditions.

### 2.2.3 RAILWAY UNDERTAKINGS OPERATING FREIGHT SERVICES ALONG THE 11 RFCS AND RFC ATL

The Train Information System (TIS) tool coordinated by RNE includes a detailed database of train operations. An analysis of the TIS dataset for the year 2022 has been made as part of this study aimed at producing statistical information on train operations along the RFCs. However, train operations encoded in TIS do not correspond to individual trains by Origin and Destination as more Railway Undertakings can be involved in the operation of international trains. For the analysis presented in this section, Railway Undertakings belonging to the same group of companies have been aggregated into a single unit of analysis. This specified, according to the TIS database, 166 railway undertakings/groups of railway undertakings have been identified which were involved in the operation of international rail freight services along the RFCs in 2022. About half operated more than 1,000 trains, whereas one-fourth operated more than 5,000 trains.

Table 14 Railway Undertakings operating international rail freight trains in 2022

| N. trains | N. of RUs |
|---|---|
| > 15,000 | 18 |
| > 10,000 < 14,999 | 11 |
| > 5,000 < 9,999 | 12 |

| N. trains | N. of RUs |
|---|---|
| > 2,000 < 4,999 | 27 |
| > 1,000 < 1,999 | 16 |
| > 500 and 999 | 24 |
| > 200 < 499 | 31 |
| > 100 < 199 | 14 |
| < 100 | 13 |
| Total | **166** |

*Source: RNE – TIS*

The number of Railway Undertakings operating trains along the RFCs in 2022 varied from a minimum of 27 on the RFC ATL to 134 on the RFC Rhine-Danube. Overall, the number of RUs operating along each RFC and the number of trains they operate align with the market size and shares of rail transport in the countries crossed by the RFCs as illustrated in Sections 3.1 and 3.2 below. Not surprisingly, more operations, particularly by large Railway Undertakings/Groups of Railway Undertakings, are concentrated along the RFCs crossing Central and Eastern European countries.

Table 15 Railway Undertakings using RFCs in 2022 by class of number of operated trains

| N. trains | RALP | NSM | SCANMED | ATL | BA | MED | OEM | NSB | RD | AWB | AMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| > 5,000 | 7 | 5 | 6 | **1** | 8 | 2 | 9 | 10 | 9 | 2 | 4 |
| > 1,000 < 4,999 | 18 | 5 | 6 | **6** | 13 | 9 | 24 | 19 | 19 | 1 | 6 |
| < 1,000 | 61 | 23 | 49 | **20** | 96 | 40 | 99 | 79 | 106 | 49 | 66 |
| Total | **86** | **33** | **61** | **27** | **117** | **51** | **132** | **108** | **134** | **52** | **76** |

*Source: RNE - TIS*

Referring to the entire 11 RFCs network, most RUs operate trains on more than one corridor: 55% of the RUs operate trains on 4 to 7 RFCs, whereas about 25% operate trains on up to 3 corridors and another 20% operate trains on 8 or more corridors. Only 4 RUs operate trains on all RFCs, and 12 operate trains on only one RFC.

Table 16 Railway Undertakings using RFCs in 2022 by number of corridors where they operate

| N. of RFCs where RUs operate | N. of operating RUs by RFC | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RALP | NSM | SCANMED | ATL | BA | MED | OEM | NSB | RD | AWB | AMBER | 11 RFCs |
| 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 3 | 0 | 0 | **12** |
| 2 | 6 | 0 | 0 | 1 | 2 | 1 | 3 | 7 | 3 | 1 | 0 | **12** |
| 3 | 3 | 2 | 2 | 4 | 6 | 2 | 12 | 7 | 11 | 1 | 4 | **18** |
| 4 | 5 | 2 | 3 | 1 | 13 | 4 | 17 | 8 | 17 | 3 | 11 | **21** |
| 5 | 9 | 5 | 6 | 2 | 21 | 4 | 23 | 18 | 24 | 4 | 14 | **26** |
| 6 | 19 | 4 | 11 | 4 | 28 | 10 | 30 | 25 | 30 | 8 | 17 | **31** |
| 7 | 10 | 1 | 11 | 0 | 13 | 4 | 13 | 12 | 13 | 6 | 8 | **13** |
| 8 | 14 | 4 | 9 | 3 | 14 | 8 | 14 | 13 | 14 | 11 | 8 | **14** |
| 9 | 10 | 7 | 9 | 3 | 10 | 8 | 9 | 9 | 10 | 9 | 6 | **10** |
| 10 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | **5** |
| 11 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | **4** |
| Total | 86 | 33 | 61 | 27 | 117 | 51 | 132 | 108 | 134 | 52 | 76 | 166 |

27 RUs operated trains on the RFC Atlantic in 2022. Most of them operated trains on more corridors and registered up to 1,000 operations. One RU operated more than 5,000 trains along the Atlantic RFC in 2022.

### 2.2.4 PASSENGERS TRAIN OPERATIONS ALONG THE RFC ATLANTIC

As part of the study, a high-level recognition of the passengers' train operations was performed based on the information available from the Train Information System (TIS) tool coordinated by RNE. Given that the database is not fully complete, the analysis is limited to identifying the main Origins and Destinations (O/Ds) of international passenger traffic along the 11 RFCs Network.

The following table lists the main train relations for the year 2022, i.e. the O/Ds with more than 1,000 registered international trains per direction. All other relations present a number of international trains lower than this threshold. It shall be noted that these O/D relations may be part of trips over longer O/D.

**Table 17 Main international passengers' cross-border relations encoded in TIS using Atlantic RFC in 2022**

| Involved RFC | Origin | | Destination | |
|---|---|---|---|---|
| **RFC ATL** | Forbach | FR | Saarbrücken | DE |
| **RFC ATL** | Paris-Est | FR | Frankfurt | DE |
| **RFC ATL** | Metz-Ville | FR | Saarbrücken | DE |

*Source: RNE - TIS*

Detailed historical data are not available to assess the impact of the establishment of the RFCs on passenger operations and vice versa. There seems to be no evidence of the negative effects of the establishment and operations of the RFCs on passenger traffic.

# 3 2024 TMS UPDATE BACKGROUND INFORMATION

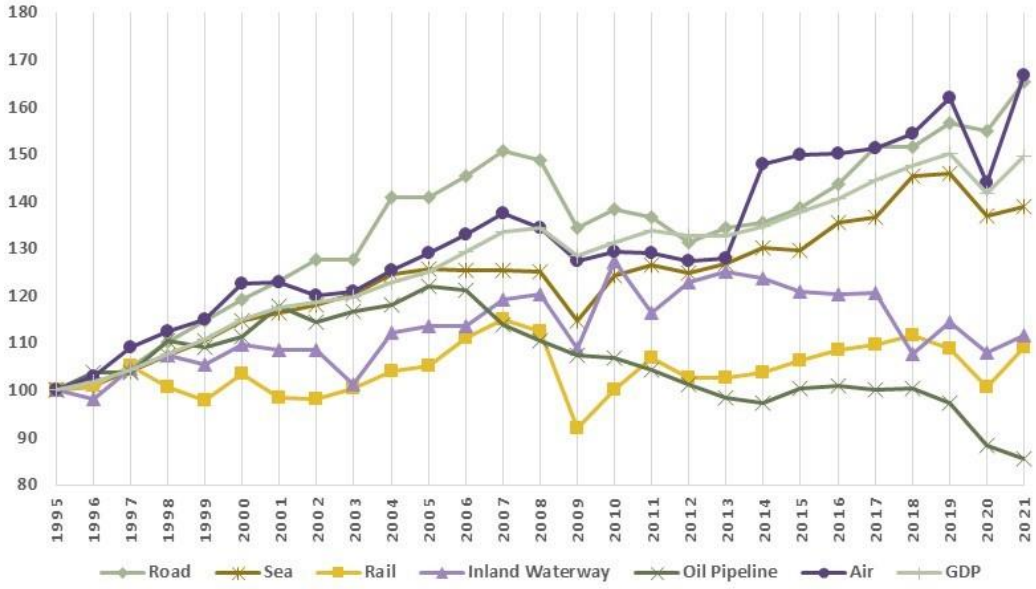
The first section of this chapter provides a statistical framework on the main socio-economic and transport developments on a European scale over the past decades. The second section reports on the main indicators monitored at the European level regarding the rail transport market and its liberalization process. The last section concerns the scenarios considered for elaborating future market estimates as part of the 2024 TMS Update, including the presentation of the main socio-economic assumptions and infrastructure developments.

Given that the rail freight market and international freight train operations across EU Member States and between the EU and its neighbouring countries are shared among the different corridors, and considering that most statistics are available at the country level, and some of them only at the EU level, the analysis in this chapter is presented for the entire 11 RFCs network, covering the entire EU and the relevant neighbouring countries for which data are collected and available from EU institutions. Whenever possible, data have been elaborated for the RFC concerned countries. Corridor countries have also been highlighted in the exhibits. Allowing for an understanding of the market trends along the RFCs within the wider EU context, such a solution is also more in line with the adopted approach of developing a market analysis using an EU-wide network model.

## 3.1 TRANSPORT MARKET TRENDS IN THE EU

This section briefly reports the main transport statistics from the Statistical Pocketbook 2023, produced by the EC – DG MOVE and Eurostat[4]. The analysis provides an overview of the development of the European rail freight sector since the middle of the 1990s when the rail freight market liberalization started, allowing monitoring trends before and after the 2008 credit crunch, which is considered the second major financial crisis after the 1930s Great Depression, and which was followed by additional adverse events during the past 10-15 years when the 11 RFCs were gradually established and entered into operation.

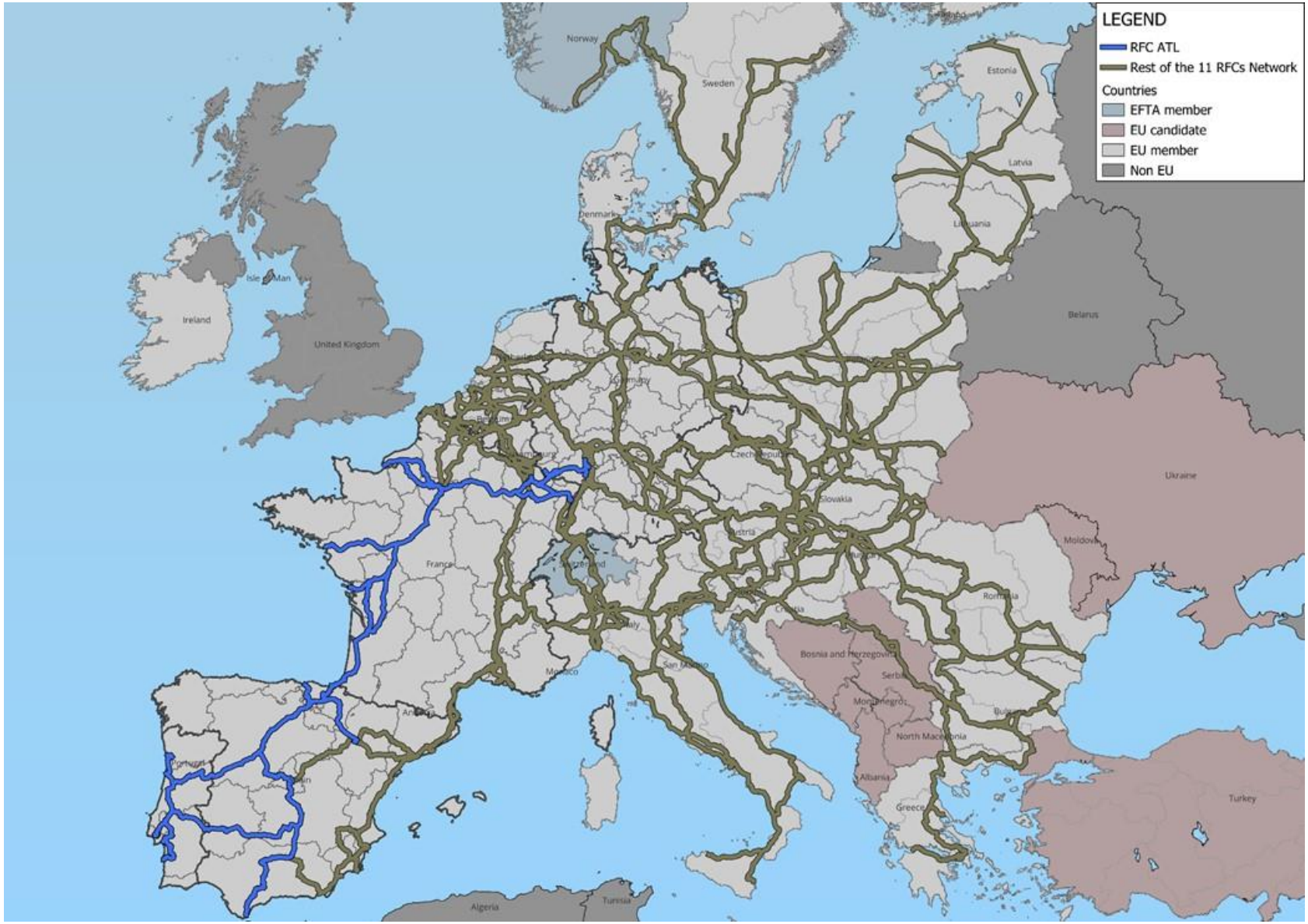
Figure 11 Transport trends in billion tkm EU27 (1995=100)




*Source: European Commission – DG MOVE – Statistical Pocketbook 2023*

[4] Figures related to countries generally refer to transport activity in their territory (territoriality principle).

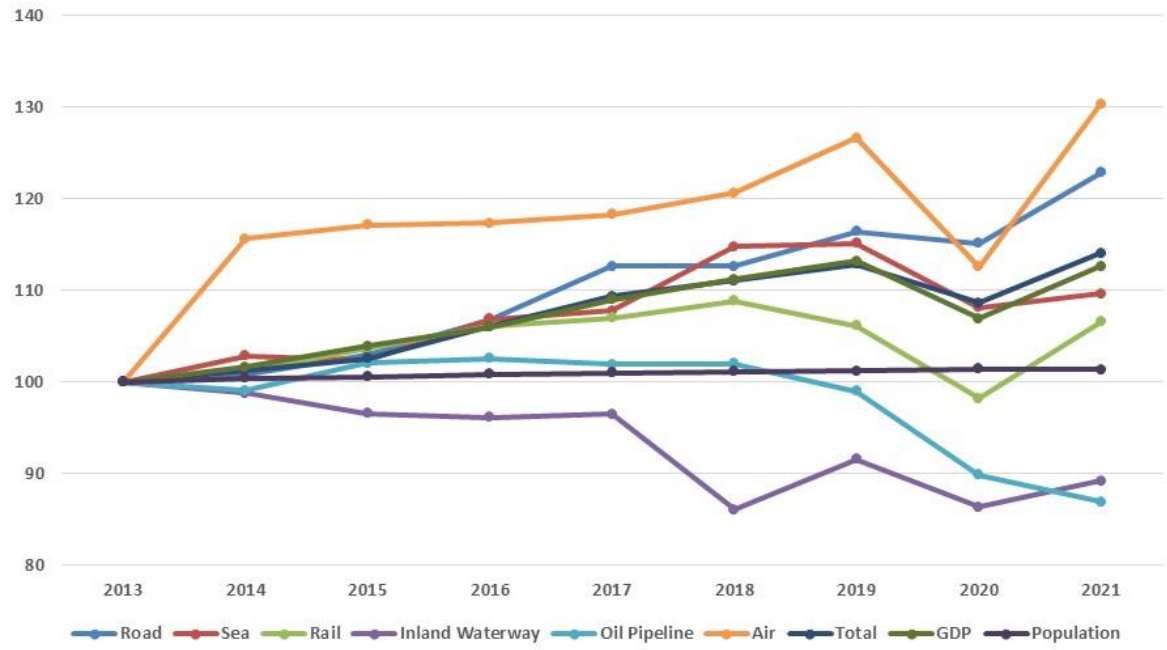
**Figure 12 The ATL RFC within the 11 RFCs Network**




*Source: Authors based on CIP*

The period since the entry into force of the Regulation (EU) 913/2010 has indeed been marked by a number of socio-economic, health and geopolitical events which negatively impacted trade and transport flows at the global and European scale. As visible from the available statistics, the above-mentioned 2008 financial crisis basically altered the economic and transport developments experienced by Europe over the previous decades. Long-term series over the past 30 years show that the effects of this crisis are persisting, which were more recently further impacted by the 2020-2021 COVID-19 pandemic and by the current geopolitical crisis that started in 2022 with the Russian war of aggression against Ukraine and deteriorated with the Israel-Gaza conflict and Red Sea crisis. Notwithstanding the recurrent negative events and persisting economic uncertainties, most socio-economic and transport developments show overall positive trends, although the curves of the period after 2008 stand at lower growth rates. This is particularly true for the primary economic variable – Gross Domestic Product (GDP) – and freight traffic for all transport modes.

Figure 13 EU-27 performance by mode for freight transport 2013-2021 (billion tkm) (2013=100)




*Source: European Commission – DG MOVE – Statistical Pocketbook 2023*

Freight transport volumes in the EU have grown from about 2,400 billion tkm in 1995 to about 3,000 billion tkm in 2013 — when six of the first 9 RFCs in the Regulation 913/2010 were established — to over 3,400 billion tkm in 2021. Aviation is the only mode for which growth levels returned close to the previous pattern from 2014 until the COVID-19 pandemic, which negatively affected all transport modes' performance. Compared to 1995, all transport modes, except oil pipelines, showed higher levels of traffic volumes expressed in tkm in 2021. All transport modes except inland waterways and oil pipelines also show overall growing trends for the past decade – up until the COVID-19 pandemic – although they are lower for rail transport than for aviation, maritime and road transport.

About 425 million inhabitants lived in the EU27 in 1995, 441 million in 2013, and 447 million in 2021. Over 5,600 tkm of goods per inhabitant were transported in the EU27in 1995, growing to 6,800 tkm in 2013 and 7,700 tkm in 2021.

Table 18 EU-27 performance by mode for freight transport 2013-2019 and 2019-2021 (billion tkm)

| | 2013 | 2019 | 2021 | CAGR '19-'13 | CAGR '21-'13 | Var. '21-'19 |
|---|---|---|---|---|---|---|
| GDP | 106.1 | 120.1 | 119.5 | 2.1% | 1.5% | -0.5% |
| Population | 441.3 | 446.4 | 447.2 | 0.2% | 0.2% | 0.2% |
| Air | 1.8 | 2.3 | 2.4 | 4.0% | 3.4% | 2.9% |
| Inland Waterway | 152.6 | 139.7 | 136.1 | -1.5% | -1.4% | -2.6% |
| Rail | 384.3 | 407.9 | 409.6 | 1.0% | 0.8% | 0.4% |
| Combined transport | 40.7 | 83.5 | 100.2 | 12.7% | 11.9% | 19.9% |
| Oil Pipeline | 102.1 | 101.0 | 88.7 | -0.2% | -1.7% | -12.2% |
| Road | 1,516.4 | 1,764.8 | 1,862.5 | 2.6% | 2.6% | 5.5% |
| Sea | 851.0 | 979.5 | 932.7 | 2.4% | 1.2% | -4.8% |
| Total | **3,008.1** | **3,395.3** | **3,431.9** | **2.0%** | **1.7%** | **1.1%** |

*Source: European Commission – DG MOVE – Statistical Pocketbook 2023*

Looking at the differences between the 2013-2019 and 2019-2021 periods, the impact of the COVID-19 pandemic seems particularly damaging for oil pipelines and maritime transport. During lockdowns, growth/decline rates were higher for all transport modes, except for air and rail transport.

Notwithstanding the marginal increase of rail freight transport between 2013 and 2021, compared to other transport modes, particularly road (see Table 18), combined transport more than doubled from about 41 billion tkm to 100 billion tkm (Table 19).

Table 19 Combined transport traffic by UIRR companies

| Year | tkm | | | | Traffic% of consignments | | |
|---|---|---|---|---|---|---|---|
| | billion | % of which: | | | Semi-trailers | Rolling motorway | Swap bodies and containers |
| | | below 300 km | between 300 and 900 km | more than 900 km | | | |
| 1990 | 18.7 | 1% | 68% | 31% | 20% | 18% | 61% |
| 2000 | 35.2 | 2% | 71% | 27% | 9% | 23% | 68% |
| 2010 | 42.4 | 5% | 58% | 37% | 10% | 15% | 75% |
| 2015 | 55.0 | 1% | 50% | 49% | 13% | 5% | 82% |
| 2020 | 90.3 | 1% | 49% | 50% | 15% | 5% | 80% |
| 2021 | 100.2 | 1% | 48% | 51% | 14% | 5% | 80% |
| 2022 | 88.8 | 1% | 52% | 46% | 16% | 4% | 80% |

*Source: European Commission – DG MOVE – Statistical Pocketbook 2023*

Trends for the ATL RFC concerned countries are similar to the EU ones, whereas rail grew at higher rates in the corridor countries than at the EU level, during the COVID-19 pandemic, and inland waterways remained stable over the same period.

Table 20 ATL RFC concerned countries performance by mode for freight transport 2013-2019 and 2019-2021 (billion tkm)

| | 2013 | 2019 | 2021 | CAGR '19-'13 | CAGR '21-'13 | Var. '21-'19 |
|---|---|---|---|---|---|---|
| Road | 862.2 | 987.9 | 1021.9 | 2.3% | 2.1% | 3.4% |
| Railways | 156.5 | 166.3 | 171.9 | 1.0% | 1.2% | 3.3% |
| Inland waterways | 69.3 | 58.9 | 55.4 | -2.7% | -2.8% | -6.0% |
| Oil pipelines | 38.7 | 40.4 | 33.1 | 0.7% | -1.9% | -17.9% |
| Total | **1,126.7** | **1,253.6** | **1,282.3** | **1.8%** | **1.6%** | **2.3%** |

*Source: European Commission – DG MOVE – Statistical Pocketbook 2023*

The share of rail in total freight transport based on tkm varies significantly across the European Union. Data in Table 21 shows rail share is generally higher in Eastern and Central European countries and lower in

Western Europe. Austria and Switzerland are exceptions to this pattern, which is also due to the support these countries give to rail transport to reduce the impact of freight transport on the environment, with a focus on the alpine crossings.

Table 21 Share of rail in total freight transport in % (based on tkm)

| | 2008 | 2013 | 2015 | 2019 | 2022 | Var. '19-'13 | Var. '22-'13 | Var. '22-'08 |
|---|---|---|---|---|---|---|---|---|
| **Lithuania** | 64.5 | 57.2 | 56.4 | 56.8 | 37.2 | -0.4 | -20 | -27.3 |
| **Switzerland** | 35.3 | 36.0 | 37.2 | 34.1 | 33.4 | -1.9 | -2.6 | -1.9 |
| **Slovakia** | 40.0 | 38.6 | 36.3 | 30.7 | 30.1 | -7.9 | -8.5 | -9.9 |
| **Austria** | 33.3 | 31.9 | 32.3 | 30.6 | 30.0 | -1.3 | -1.9 | -3.3 |
| **Slovenia** | 26.7 | 30.5 | 30.9 | 31.4 | 28.8 | 0.9 | -1.7 | 2.1 |
| **Hungary** | 24.9 | 30.3 | 29.1 | 26 | 26.3 | -4.3 | -4.0 | 1.4 |
| **Latvia** | 47.9 | 43.1 | 42.3 | 37.4 | 26.0 | -5.7 | -17.1 | -21.9 |
| **Czechia** | 31.9 | 28.0 | 26.1 | 25.9 | 22.0 | -2.1 | -6.0 | -9.9 |
| **Romania** | 19.9 | 23.3 | 25.0 | 20.5 | 21.0 | -2.8 | -2.3 | 1.1 |
| **Poland** | 30.5 | 24.2 | 23.3 | 21.5 | 20.8 | -2.7 | -3.4 | -9.7 |
| **Germany** | **14.6** | **13.9** | **14.1** | **13.7** | **14.9** | **-0.2** | **1.0** | **0.3** |
| **Bulgaria** | 10.3 | 7.5 | 8.7 | 8.5 | 11.2 | 1.0 | 3.7 | 0.9 |
| **Finland** | 13.1 | 12.7 | 10.9 | 11.8 | 10.8 | -0.9 | -1.9 | -2.3 |
| **Sweden** | 10.3 | 9.6 | 8.6 | 9.4 | 10.5 | -0.2 | 0.9 | 0.2 |
| **Belgium** | 8.2 | 6.8 | 6.9 | 7.2 | 7.3 | 0.4 | 0.5 | -0.9 |
| **Luxembourg** | 9.8 | 7.2 | 7.0 | 6.8 | 6.1 | -0.4 | -1.1 | -3.7 |
| **European Union - 27 countries (from 2020)** | 6.0 | 5.7 | 5.7 | 5.3 | 5.5 | -0.4 | -0.2 | -0.5 |
| **Croatia** | 4.5 | 3.1 | 3.2 | 3.5 | 4.1 | 0.4 | 1.0 | -0.4 |
| **France** | **4.2** | **3.6** | **4.1** | **3.5** | **3.7** | **-0.1** | **0.1** | **-0.5** |
| **Italy** | 2.6 | 2.4 | 2.6 | 2.3 | 2.7 | -0.1 | 0.3 | 0.1 |
| **Estonia** | 10.4 | 7.6 | 4.5 | 3.3 | 2.4 | -4.3 | -5.2 | -8.0 |
| **Norway** | 2.0 | 1.9 | 1.6 | 1.6 | 2.1 | -0.3 | 0.2 | 0.1 |
| **Netherlands** | 2.0 | 1.7 | 1.8 | 1.8 | 1.9 | 0.1 | 0.2 | -0.1 |
| **Denmark** | 1.4 | 1.8 | 1.9 | 1.7 | 1.6 | -0.1 | -0.2 | 0.2 |
| **Spain** | **0.8** | **0.8** | **0.9** | **0.8** | **0.8** | **0.0** | **0.0** | **0.0** |
| **Portugal** | **0.3** | **0.3** | **0.3** | **0.3** | **0.2** | **0.0** | **-0.1** | **-0.1** |
| **Ireland** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| **Greece** | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | -0.1 |

*Source: Eurostat [tran_hv_ms_frmod]*

Compared to 2013, the share of rail in total freight transport based on tkm seems to have generally declined. The most significant drops can be seen in the Baltic States and Eastern Europe, whereas in the other countries, positive and negative variations are marginal. The rail share in so-to-say "isolated networks" like Portugal, Spain, and Ireland. Greece also shows a low modal share for rail transport.

The ATL RFC countries are among the ones registering a lower rail modal share in the EU. None of the four ATL RFC countries is indeed positioned within the ten first-ranking EU countries for rail modal share in 2022. However, all the four countries are among the ones that are registering stability or minimal decline in rail modal share over time.

Table 22 Goods transported by rail by group of goods - from 2008 onwards based on NST 2007 (Tonnes '000) in the EU 27

| Main group of commodities | Transported goods in Tonnes ('000) | | | | Variations in Tonnes ('000) | | | Share in total in % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2013 | 2019 | 2022 | 2019-2008 | 2019-2013 | 2022-2019 | 2008 | 2013 | 2019 | 2022 |
| Unidentifiable goods: goods which for any reason cannot be identified and therefore cannot be assigned to groups 01-16 | 187,740 | 248,671 | 316,077 | 345,593 | 128,337 | 67,406 | 29,516 | 12.5% | 16.3% | 20.2% | 23.5% |
| Metal ores and other mining and quarrying products; peat; uranium and thorium | 241,294 | 254,245 | 254,355 | 217,994 | 13,061 | 110 | -36,361 | 16.0% | 16.7% | 16.2% | 14.8% |
| Products of agriculture, hunting, and forestry; fish and other fishing products | 70,094 | 79,243 | 88,030 | 94,987 | 17,936 | 8,787 | 6,957 | 4.7% | 5.2% | 5.6% | 6.5% |
| Chemicals, chemical products, and man-made fibers; rubber and plastic products ; nuclear fuel | 99,803 | 102,438 | 108,291 | 85,334 | 8,488 | 5,853 | -22,957 | 6.6% | 6.7% | 6.9% | 5.8% |
| Basic metals; fabricated metal products, except machinery and equipment | 169,705 | 146,343 | 135,089 | 127,790 | -34,616 | -11,254 | -7,299 | 11.3% | 9.6% | 8.6% | 8.7% |
| Coke and refined petroleum products | 206,442 | 179,497 | 154,412 | 141,855 | -52,030 | -25,085 | -12,557 | 13.7% | 11.8% | 9.9% | 9.7% |
| Coal and lignite; crude petroleum and natural gas | 267,461 | 266,949 | 213,421 | 182,566 | -54,040 | -53,528 | -30,855 | 17.8% | 17.5% | 13.6% | 12.4% |
| Other goods | 262,695 | 248,962 | 297,904 | 272,329 | 35,209 | 48,942 | -25,575 | 17.5% | 16.3% | 19.0% | 18.5% |
| **Total transported goods** | **1,505,234** | **1,526,348** | **1,567,579** | **1,468,448** | **62,345** | **41,231** | **-99,131** | **100.0%** | **100.0%** | **100.0%** | **100.0%** |

*Source: Eurostat [rail_go_grpgood__custom_10416020]*

Table 23 Goods transported by rail by group of goods - from 2008 onwards based on NST 2007 (tkm '000.000) in the EU 27

| Main group of commodities | Transported goods in tkm ('000.000) | | | | Variations in tkm ('000.000) | | | Share in total in % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2013 | 2019 | 2022 | 2019-2008 | 2019-2013 | 2022-2019 | 2008 | 2013 | 2019 | 2022 |
| Unidentifiable goods: goods which for any reason cannot be identified and therefore cannot be assigned to groups 01-16 | 72,621 | 81,257 | 101,632 | 113,203 | 29,011 | 20,375 | 11,571 | 19.0% | 21.3% | 25.0% | 29.0% |
| Products of agriculture, hunting, and forestry; fish and other fishing products | 19,100 | 21,513 | 23,723 | 25,601 | 4,623 | 2,210 | 1,878 | 5.0% | 5.6% | 5.8% | 6.6% |
| Chemicals, chemical products, and man-made fibers; rubber and plastic products ; nuclear fuel | 29,933 | 30,682 | 31,347 | 23,744 | 1,414 | 665 | -7,603 | 7.8% | 8.0% | 7.7% | 6.1% |
| Metal ores and other mining and quarrying products; peat; uranium and thorium | 50,565 | 49,328 | 49,966 | 45,058 | -599 | 638 | -4,908 | 13.2% | 12.9% | 12.3% | 11.6% |
| Coal and lignite; crude petroleum and natural gas | 43,281 | 44,928 | 38,063 | 33,768 | -5,218 | -6,865 | -4,295 | 11.3% | 11.8% | 9.4% | 8.7% |
| Basic metals; fabricated metal products, except machinery and equipment | 42,766 | 35,939 | 34,740 | 31,185 | -8,026 | -1,199 | -3,555 | 11.2% | 9.4% | 8.6% | 8.0% |
| Coke and refined petroleum products | 51,691 | 47,259 | 41,087 | 38,087 | -10,604 | -6,172 | -3,000 | 13.5% | 12.4% | 10.1% | 9.8% |
| Other goods | 73,243 | 70,606 | 85,507 | 79,055 | 12,264 | 14,901 | -6,452 | 19.1% | 18.5% | 21.1% | 20.3% |
| **Total transported goods** | **383,200** | **381,512** | **406,065** | **389,701** | **22,865** | **24,553** | **-16,364** | **100.0%** | **100.0%** | **100.0%** | **100.0%** |

*Source: Eurostat [rail_go_grpgood__custom_10416020]*

Table 24 Goods transported by rail by group of goods - from 2008 onwards based on NST 2007 (Tonnes '000) in Germany, France, Spain and Portugal

| Main group of commodities | Transported goods in Tonnes ('000) | | | | Variations in Tonnes ('000) | | | Share in total in % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2013 | 2019 | 2022 | 2019-2008 | 2019-2013 | 2022-2019 | 2008 | 2013 | 2019 | 2022 |
| Unidentifiable goods: goods which for any reason cannot be identified and therefore cannot be assigned to groups 01-16 | 89,455 | 93,558 | 117,378 | 132,428 | 27,923 | 23,820 | 15,050 | 17.5% | 19.0% | 25.2% | 27.5% |
| Metal ores and other mining and quarrying products; peat; uranium and thorium | 80,138 | 66,068 | 55,598 | 61,488 | -24,540 | -10,470 | 5,890 | 15.6% | 13.4% | 12.0% | 12.8% |
| Products of agriculture, hunting, and forestry; fish and other fishing products | 22,138 | 17,753 | 15,566 | 21,357 | -6,572 | -2,187 | 5,791 | 4.3% | 3.6% | 3.3% | 4.4% |
| Chemicals, chemical products, and man-made fibers; rubber and plastic products ; nuclear fuel | 40,608 | 38,902 | 31,648 | 30,946 | -8,960 | -7,254 | -702 | 7.9% | 7.9% | 6.8% | 6.4% |
| Basic metals; fabricated metal products, except machinery and equipment | 85,539 | 79,028 | 69,306 | 69,890 | -16,233 | -9,722 | 584 | 16.7% | 16.1% | 14.9% | 14.5% |
| Coke and refined petroleum products | 61,676 | 52,579 | 47,385 | 45,638 | -14,291 | -5,194 | -1,747 | 12.0% | 10.7% | 10.2% | 9.5% |
| Coal and lignite; crude petroleum and natural gas | 38,732 | 48,152 | 29,134 | 25,836 | -9,598 | -19,018 | -3,298 | 7.6% | 9.8% | 6.3% | 5.4% |
| Other goods | 93,991 | 95,882 | 99,028 | 94,126 | 5,037 | 3,146 | -4,902 | 18.3% | 19.5% | 21.3% | 19.5% |
| **Total transported goods** | **512,277** | **491,922** | **465,043** | **481,709** | **-47,234** | **-26,879** | **16,666** | **100.0%** | **100.0%** | **100.0%** | **100.0%** |

*Source: Eurostat [rail_go_grpgood__custom_10416020]*

Table 25 Goods transported by rail by group of goods - from 2008 onwards based on NST 2007 (tkm '000.000) in Germany, France, Spain and Portugal

| Main group of commodities | Transported goods in tkm ('000.000) | | | | Variations in tkm ('000.000) | | | Share in total in % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2013 | 2019 | 2022 | 2019-2008 | 2019-2013 | 2022-2019 | 2008 | 2013 | 2019 | 2022 |
| Unidentifiable goods: goods which for any reason cannot be identified and therefore cannot be assigned to groups 01-16 | 47,179 | 45,711 | 56,271 | 65,978 | 9,092 | 10,560 | 9,707 | 28.0% | 29.7% | 35.3% | 38.2% |
| Products of agriculture, hunting, and forestry; fish and other fishing products | 19,754 | 15,354 | 13,376 | 16,059 | -6,378 | -1,978 | 2,683 | 11.7% | 10.0% | 8.4% | 9.3% |
| Chemicals, chemical products, and man-made fibers; rubber and plastic products ; nuclear fuel | 8,502 | 6,272 | 4,945 | 6,958 | -3,557 | -1,327 | 2,013 | 5.0% | 4.1% | 3.1% | 4.0% |
| Metal ores and other mining and quarrying products; peat; uranium and thorium | 13,226 | 12,760 | 10,240 | 10,417 | -2,986 | -2,520 | 177 | 7.9% | 8.3% | 6.4% | 6.0% |
| Coal and lignite; crude petroleum and natural gas | 21,918 | 18,275 | 17,498 | 17,352 | -4,420 | -777 | -146 | 13.0% | 11.9% | 11.0% | 10.1% |
| Basic metals; fabricated metal products, except machinery and equipment | 16,280 | 13,093 | 12,510 | 12,291 | -3,770 | -583 | -219 | 9.7% | 8.5% | 7.8% | 7.1% |
| Coke and refined petroleum products | 7,092 | 8,450 | 6,506 | 6,514 | -586 | -1,944 | 8 | 4.2% | 5.5% | 4.1% | 3.8% |
| Other goods | 34,421 | 33,964 | 38,200 | 37,023 | 3,779 | 4,236 | -1,177 | 20.4% | 22.1% | 23.9% | 21.5% |
| **Total transported goods** | **168,372** | **153,879** | **159,546** | **172,592** | **-8,826** | **5,667** | **13,046** | **100.0%** | **100.0%** | **100.0%** | **100.0%** |

*Source: Eurostat [rail_go_grpgood__custom_10416020]*

The above-described trends, including market and market share reduction in Eastern European countries and growth of combined transport, seem to be associated with changes in the type and quantities of goods transported across Europe (see Table 22 and Table 23). Products such as *chemicals, chemical products, and man-made fibers; rubber and plastic products; nuclear fuel, and particularly metal ores and other mining and quarrying products; peat; uranium and thorium; coal and lignite; crude petroleum and natural gas; basic metals; fabricated metal products, except machinery and equipment; and coke and refined petroleum products;* are gradually declining, whereas unidentifiable goods, i.e. goods which for any reason cannot be identified and therefore cannot be assigned to groups 01-16 of the NST 2007 (Standard goods classification for transport statistics abbreviated as NST), are growing, which are usually transported as unitised cargo and moved across intermodal logistics chains. Such trends are also visible in the ATL RFC concerned countries (see Table 24 and Table 25).

## 3.2 RAIL MARKET MONITORING INDICATORS

In line with Article 56 (paragraph 2) of Directive 2012/34/EU, foreseeing that regulatory bodies have the power to monitor the competitive situation in the railway market, national regulatory bodies started collecting and producing statistics on the rail market, delivering IRG-Rail's Market Monitoring Reports on an annual basis[5]. The first report was released in 2013, the latest one in 2023.

Since 2007, the EC (DG MOVE) has also started collecting data on rail market developments in Member States via the Rail Market Monitoring (RMMS) Questionnaires. The recast of the first Railway package (Directive 2014/34/EU) finally created a legal base for RMMS reporting and data harmonisation. Accordingly, in July 2015, after thorough consultation with Member States and stakeholders, the Commission adopted an implementing Regulation (EU) 2015/1100 on the reporting obligations of the Member States in the framework of rail market monitoring. Since 2016, EU Member States and Norway have been providing input to the Commission's rail market monitoring in line with the format and content defined in the Regulation. The latest RMMS report was released in 2023[6].

This section combines data from the above two market monitoring reports by IRG-Rail and the EC, providing data for 2013 and 2021, where available, to comment on the trends after the entry into force of Regulation (EU) 913/2010 and subsequent establishment of the RFCs. It shall be noted that data are not consistently available for all Member States and EU neighbouring countries and for considered years.

The first relevant information analysed in the above-mentioned market monitoring reports relates to market opening and liberalisation in the EU Member States. Table 26 provides information on the year of introduction of the legislation on the liberalisation of the rail freight market and the year of operation of the first new entrant. Additionally, the number of freight railway undertakings (RUs) is indicated for 2013 and 2021. Whereas the liberalisation of the rail market started in the EU well before 2013, the number of RUs operating in the EU further increased in many Member States and particularly in Poland (35), Germany (21), Austria (18), Croatia (13) and the Netherlands (11).

Focusing on the RFC ATL-concerned countries, over 280 active RUs were registered in 2021, provided that the number would reduce to 35 if excluding Germany .

[5] https://irg-rail.eu/irg/documents/market-monitoring?page=0
[6] https://transport.ec.europa.eu/transport-modes/rail/market/rail-market-monitoring-rmms_en

Table 26 Market liberalisation summary table

| Country | Legal liberalisation freight | First new freight entrant | Number of freight RUs | | |
|---|---|---|---|---|---|
| | | | 2013 | 2021 | var. 2021-2013 |
| AT - Austria | 1998 | 2001 | 28 | 46 | 18 |
| BE - Belgium | - | - | 13 | 10 | -3 |
| BG - Bulgaria | 2002 | 2005 | 10 | 15 | 5 |
| HR - Croatia | 2009 | 2014 | 1 | 14 | 13 |
| CZ - Czechia | - | - | - | **97** | - |
| DK - Denmark | 1997 | 1997 | 5 | 8 | 3 |
| EE - Estonia | 2003 | 1999 | - | 2 | - |
| FI - Finland | 2007 | 2012 | 1 | 3 | 2 |
| **FR - France** | **2003** | **2005** | **20** | **23** | **3** |
| **DE - Germany** | **1994** | **1995** | **226** | **247** | **21** |
| EL - Greece | 2007 | - | 2 | 2 | 0 |
| HU - Hungary | 2006 | 2007 | 21 | 29 | 8 |
| IE - Ireland | - | - | - | 1 | - |
| IT - Italy | 2001 | 2001 | - | 25 | - |
| XK - Kosovo* | 2011 | 2015 | 1 | 2 | 1 |
| LV - Latvia | 1998 | 2003 | - | 4 | - |
| LT - Lithuania | - | - | - | 2 | - |
| LU - Luxembourg | 2010 | - | - | 1 | - |
| MK - North Macedonia | - | - | - | 1 | - |
| NL - Netherlands | 1995 | 1998 | 19 | 30 | 11 |
| NO - Norway | 2007 | 2007 | 8 | 12 | 4 |
| PL - Poland | 2003 | 2003 | 61 | 96 | 35 |
| **PT - Portugal** | **2007** | **2008** | **2** | **2** | - |
| RO - Romania | 2001 | 2001 | - | 24 | - |
| RS - Serbia | - | - | - | 13 | - |
| SK - Slovakia | 2006 | 2006 | 42 | 46 | 4 |
| SI - Slovenia | 2007 | 2009 | 3 | 7 | 4 |
| **ES - Spain** | **2003** | **2007** | **8** | **10** | **2** |
| SE - Sweden | 1996 | 1997 | 13 | 11 | -2 |
| CH - Switzerland | 1999 | 1999 | - | 25 | - |
| UK - United Kingdom | 1994 | 1996 | 11 | 10 | -1 |

*Source: European Commission – DG MOVE and IRG-Rail; Notes: * This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

Since the start of the liberalisation process, the market share of the domestic incumbent railway undertakings gradually declined in most EU Member States (Table 27), whereas the market share of non-incumbents increased together with the operations of foreign incumbents. As a general pattern, the trend of the market share by domestic incumbents continued to decline in the period 2013-2021.

In the RFC ATL concerned countries, the market share of the domestic incumbent in 2021 was about 40% on average, nearly 60% considering national and international incumbents.

Table 27 Market shares of freight railway undertakings (based on net tkm)

| Country | Market share of domestic incumbent | Market share of foreign incumbent | Market share of non-incumbent | Market share of domestic incumbent | | |
|---|---|---|---|---|---|---|
| | 2021 | 2021 | 2021 | 2013 | 2021 | var. 2021-2013 |
| AT - Austria | 63.4% | 7.7% | 28.9% | 81% | 63% | -18% |
| BE - Belgium | 58.2% | 24.4% | 17.4% | 81% | 58% | -23% |
| BG - Bulgaria | 45.3% | 0.0% | 54.7% | 55% | 45% | -10% |
| HR - Croatia | 54.1% | 2.7% | 43.2% | 100% | 54% | -46% |
| CZ - Czechia | 65.4% | 7.6% | 27.0% | - | 65% | - |
| DK - Denmark | 0.0% | 0.0% | 100.0% | 77% | 0% | -77% |
| EE - Estonia | 0.0% | 0.0% | 100.0% | - | 0% | - |
| FI - Finland | 95.6% | 0.0% | 4.4% | 100% | 96% | -4% |
| **FR - France** | **68.7%** | **18.8%** | **12.5%** | **64%** | **69%** | **5%** |
| **DE - Germany** | **42.4%** | **18.9%** | **38.8%** | **67%** | **42%** | **-25%** |
| EL - Greece | 0.0% | 96.6% | 3.4% | 100% | 0% | -100% |
| HU - Hungary | 45.1% | 1.8% | 53.1% | 67% | 45% | -22% |
| IE - Ireland | 100.0% | 0.0% | 0.0% | - | 100% | - |
| IT - Italy | 39.7% | 26.6% | 33.7% | - | 40% | - |
| XK - Kosovo* | 100.0% | 0.0% | 0.0% | 100% | 100% | 0% |
| LV - Latvia | 70.3% | 0.0% | 29.7% | 77% | 70% | -7% |
| LT - Lithuania | 99.9% | 0.0% | 0.1% | - | 100% | - |
| LU - Luxembourg | 100.0% | 0.0% | 0.0% | - | 100% | - |
| MK - North Macedonia | 100.0% | 0.0% | 0.0% | - | 100% | - |
| NL - Netherlands | 0.0% | 47.0% | 53.0% | 48% | 0% | -48% |
| NO - Norway | 44.9% | 18.2% | 36.9% | 48% | 45% | -3% |
| PL - Poland | 46.4% | 8.1% | 45.5% | 66% | 46% | -20% |
| **PT - Portugal** | **0.0%** | **0.0%** | **100.0%** | **86%** | **0%** | **-86%** |
| RO - Romania | 19.9% | 11.9% | 68.2% | - | 20% | - |
| RS - Serbia | 77.7% | 0.0% | 22.3% | - | 78% | - |
| SK - Slovakia | 70.9% | 0.0% | 29.1% | 87% | 71% | -16% |
| SI - Slovenia | 77.8% | 0.0% | 22.2% | 91% | 78% | -13% |
| **ES - Spain** | **57.8%** | **24.0%** | **18.2%** | **77%** | **58%** | **-19%** |
| SE - Sweden | 48.1% | 6.7% | 45.2% | - | 48% | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| CH - Switzerland | 65.8% | 0.0% | 34.2% | - | 66% | - |
| UK - United Kingdom | 4.7% | 34.5% | 60.8% | 45% | 5% | -40% |

*Source: European Commission – DG MOVE and IRG-Rail; Notes: * This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

The analysis of rail freight traffic operations based on tkm (Table 28) aligns with the one concerning train-km. The COVID-19 pandemic seems to have had different impacts on rail freight traffic measured in net tkm, with either increases or decreases in transport volumes between 2019 and 2021. The impact has been apparently significant in the Baltic States, Denmark, Luxembourg, and Portugal, whereas Bulgaria and Greece experienced about 20% growth in the same period. Except Portugal, the RFC ATL concerned countries seem to have also registered stable/positive variations during the pandemic period.

Table 28 Rail traffic in million train-km

| Country | Total rail traffic | | | Share of freight services | | |
|---|---|---|---|---|---|---|
| Year | 2013 | 2021 | var. 2021-2013 | 2013 | 2021 | var. 2021-2013 |
| AT - Austria | 149 | 174 | 25 | 26.8% | 29.1% | 2.2% |
| BE - Belgium | 97 | 98 | 1 | 13.4% | 12.3% | -1.1% |
| BG - Bulgaria | 28 | 31 | 3 | 25.0% | 30.7% | 5.7% |
| HR - Croatia | 22 | 21 | -1 | 22.7% | 33.7% | 11.0% |
| CZ - Czechia | - | 173 | - | - | 21.8% | - |
| DK - Denmark | 85 | 92 | 7 | 4.7% | 3.3% | -1.4% |
| EE - Estonia | - | 7 | 7 | - | 18.8% | - |
| FI - Finland | 50 | 47 | -3 | 28.0% | 31.0% | 3.0% |
| **FR - France** | **492** | **425** | **-67** | **15.0%** | **14.0%** | **-1.1%** |
| **DE - Germany** | **1055** | **1,140** | **85** | **24.5%** | **23.7%** | **-0.9%** |
| EL - Greece | 12 | 9 | -3 | 8.3% | 12.8% | 4.4% |
| HU - Hungary | 98 | 108 | 10 | 17.3% | 17.7% | 0.4% |
| IE - Ireland | - | 16 | 16 | - | 1.7% | - |
| IT - Italy | - | 358 | - | - | 15.4% | - |
| XK - Kosovo* | - | - | - | - | 31.2% | - |
| LV - Latvia | 19 | 10 | -9 | 68.4% | 41.8% | -26.6% |
| LT - Lithuania | - | 15 | - | - | 61.1% | - |
| LU – Luxembourg | - | 8 | - | - | 5.4% | - |
| MK - North Macedonia | - | 2 | - | - | 41.2% | - |
| NL - Netherlands | 154 | 163 | 9 | 6.5% | 6.2% | -0.3% |
| NO - Norway | 46 | 46 | 0 | 17.4% | 18.6% | 1.2% |
| PL - Poland | 211 | 259 | 48 | 35.5% | 31.6% | -4.0% |
| **PT - Portugal** | **-** | **35** | **-** | **-** | **15.7%** | **-** |
| RO - Romania | - | 83 | - | - | 26.7% | - |
| RS - Serbia | - | 14 | - | - | 42.9% | - |
| SK - Slovakia | 46 | 50 | 4 | 30.4% | 30.5% | 0.1% |
| SI - Slovenia | 20 | 22 | 2 | 50.0% | 51.8% | 1.8% |
| **ES - Spain** | **187** | **156** | **-31** | **13.4%** | **15.4%** | **2.0%** |
| SE - Sweden | 151 | 156 | 5 | 25.2% | 23.1% | -2.1% |
| CH - Switzerland | - | 233 | - | - | 11.7% | - |
| UK - United Kingdom | 541 | 494 | -47 | 7.2% | 6.7% | -0.5% |

*Source: European Commission – DG MOVE and IRG-Rail; Notes: * This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

The share of international freight services in total freight services generally increased over the period 2010-2020, except in Estonia, Luxembourg, Latvia, Romania, Sweden and Slovakia (Table 29). The COVID-19 pandemic seems to have had different impacts on rail freight traffic measured in net tkm, with either increases or decreases in transport volumes between 2019 and 2021. The impact has been apparently significant in the Baltic States, Denmark, Luxembourg, Portugal, and Romania, whereas Bulgaria and Greece experienced about 20% growth. The ATL RFC concerned countries seem to have also registered positive variations during the pandemic period, except for Portugal.

Table 29 Rail freight traffic in billion net tkm

| Country | Freight traffic | | | Evolution of tkm | |
|---|---|---|---|---|---|
| Year | 2013 | 2021 | var. 2021-2013 | 2019-2021 | 2020-2021 |
| AT - Austria | 21 | 23 | 2 | 1% | 9% |
| BE - Belgium | 7 | 7 | -0.1 | -7% | 2% |
| BG - Bulgaria | 3 | 5 | 2 | 20% | 3% |
| HR - Croatia | 2 | 3 | 1 | 9% | -3% |
| CZ - Czechia | - | 16 | - | 1% | 7% |
| DK - Denmark | 2 | 2 | 0.0 | -22% | -19% |
| EE - Estonia | - | 1 | - | -56% | -46% |
| FI - Finland | 9 | 11 | 2 | 5% | 6% |
| **FR - France** | **32** | **36** | **4** | **5%** | **14%** |
| **DE - Germany** | **113** | **139** | **26** | **8%** | **13%** |
| EL - Greece | <1 | 1 | - | 19% | 5% |
| HU - Hungary | 9 | 11 | 2 | -2% | -5% |
| IE - Ireland | - | 0.1 | - | -2% | -5% |
| IT - Italy | - | 27 | - | 8% | 16% |
| XK - Kosovo* | <1 | 0.0 | - | -9% | 60% |
| LV - Latvia | 20 | 7 | -13 | -50% | -6% |
| LT - Lithuania | - | 15 | - | -10% | -8% |
| LU - Luxembourg | - | 0.2 | - | -10% | 9% |
| MK - North Macedonia | - | 0.4 | - | 8% | 10% |
| NL - Netherlands | 6 | 7 | 1 | 2% | 8% |
| NO - Norway | 4 | 5 | 1 | 5% | 3% |
| PL - Poland | 51 | 56 | 5 | 0% | 7% |
| **PT - Portugal** | **-** | **2** | **-** | **-15%** | **-1%** |
| RO - Romania | - | 14 | - | -2% | -14% |
| RS - Serbia | - | 3 | - | 8% | 13% |
| SK - Slovakia | 9 | 9 | 0.3 | 4% | 13% |
| SI - Slovenia | 4 | 5 | 1 | -2% | 6% |
| **ES - Spain** | **9** | **10** | **1** | **-2%** | **9%** |
| SE - Sweden | 21 | 23 | 2 | 3% | 6% |
| CH - Switzerland | - | 12 | - | 3% | 9% |
| UK - United Kingdom | 22 | 17 | -5.3 | -1% | 10% |

*Source: European Commission – DG MOVE and IRG-Rail; Notes: * This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

The share of international freight services in total freight services generally increased over the period 2010-2020, except in Estonia, Latvia, Luxembourg, Romania, Slovakia, and Sweden (Table 30). The ATL RFC-concerned countries show stable/ positive growth.

Table 30 International freight services

| Member state | 2010 | 2020 | var. 2020-2010 |
|---|---|---|---|
| AT - Austria | 14% | 17% | 3% |
| BE - Belgium | 4% | 5% | 1% |
| BG - Bulgaria | 1% | 2% | 1% |
| CZ - Czechia | - | 11% | - |
| **DE - Germany** | **53%** | **62%** | **9%** |
| DK - Denmark | 2% | 2% | 0% |
| EE - Estonia | 6% | 1% | -4% |
| EL - Greece | - | 1% | - |
| **ES - Spain** | **1%** | **2%** | **0%** |
| FI - Finland | 3% | 3% | 1% |
| **FR - France** | **8%** | **13%** | **5%** |
| HR - Croatia | - | 2% | - |
| HU - Hungary | 7% | 10% | 3% |
| IT - Italy | 10% | 10% | 0% |
| LT - Lithuania | 10% | 12% | 2% |
| LU - Luxembourg | 1% | 0% | -1% |
| LV - Latvia | 17% | 7% | -9% |
| NL - Netherlands | 5% | 10% | 5% |
| NO - Norway | 1% | 1% | 0% |
| PL - Poland | 21% | 23% | 2% |
| **PT - Portugal** | **0%** | **1%** | **0%** |
| RO - Romania | 2% | 0% | -2% |
| SE - Sweden | 9% | 8% | -1% |
| SI - Slovenia | 4% | 5% | 1% |
| SK - Slovakia | 10% | 8% | -2% |

*Source: European Commission – DG MOVE and IRG-Rail*

The network usage intensity of freight trains remained overall stable, with either marginal positive, negative or null variations between 2013 and 2021, except for Austria. More significant variations during the same period occurred for total traffic, meaning that passenger services increased equally and, in most cases, more than freight services. The parameter is calculated on the total network of the countries, and the data for the electrified sections of the network generally show higher usage intensity than the one related to the entire network.

Table 31 Network usage intensity (trains per day per route km)

| Country | Network usage intensity for freight services | | | Network usage intensity for total services | | | Network usage intensity for total services on electrified routes (electrified train-km only) |
|---|---|---|---|---|---|---|---|
| Year | 2013 | 2021 | var. 2021-2013 | 2013 | 2021 | var. 2021-2013 | 2021 |
| AT - Austria | 19 | 25 | 6 | 72 | 84 | 12 | 103 |
| BE - Belgium | 10 | 9 | -1 | 74 | 75 | 1 | 81 |
| BG - Bulgaria | 5 | 6 | 1 | 19 | 21 | 2 | 25 |
| HR - Croatia | 5 | 7 | 2 | 22 | 22 | 0 | 35 |
| CZ - Czechia | - | 11 | - | 0 | 50 | - | - |
| DK - Denmark | 4 | 3 | -1 | 88 | 103 | 15 | - |
| EE - Estonia | - | 3 | - | 0 | 13 | - | 24 |
| FI - Finland | 7 | 7 | 0 | 24 | 22 | -2 | 34 |
| **FR - France** | **7** | **6** | **-1** | **45** | **42** | **-3** | **59** |
| **DE - Germany** | **18** | **19** | **1** | **74** | **79** | **5** | **112** |
| EL - Greece | 1 | 1 | 0 | 15 | 10 | -5 | 25 |
| HU - Hungary | 7 | 7 | 0 | 37 | 39 | 2 | 70 |
| IE - Ireland | - | 0 | - | 0 | 26 | - | - |
| IT - Italy | - | 8 | - | 0 | 53 | - | 71 |
| XK - Kosovo* | 1 | 0 | -1 | 3 | 1 | -2 | - |
| LV - Latvia | 8 | 5 | -3 | 24 | 13 | -11 | 39 |
| LT - Lithuania | - | 13 | - | 0 | 22 | - | 24 |
| LU - Luxembourg | - | 4 | - | 0 | 79 | - | 80 |
| MK - North Macedonia | - | 3 | - | 0 | 6 | - | - |
| NL - Netherlands | 9 | 9 | 0 | 138 | 145 | 7 | - |
| NO - Norway | 6 | 6 | 0 | 33 | 32 | -1 | - |
| PL - Poland | 10 | 12 | 2 | 29 | 37 | 8 | 48 |
| **PT - Portugal** | **-** | **6** | **-** | **0** | **37** | **-** | **45** |
| RO - Romania | - | 6 | - | 0 | 21 | - | 32 |
| RS - Serbia | - | 5 | - | 0 | 12 | - | 18 |
| SK - Slovakia | 11 | 12 | 1 | 35 | 38 | 3 | - |
| SI - Slovenia | 22 | 25 | 3 | 45 | 49 | 4 | - |
| **ES - Spain** | **5** | **4** | **-1** | **34** | **27** | **-7** | **36** |
| SE - Sweden | 9 | 9 | 0 | 37 | 39 | 2 | 51 |
| CH - Switzerland | - | 14 | - | 0 | 120 | - | - |
| UK - United Kingdom | - | 6 | - | 0 | 83 | - | 126 |

*Source: European Commission – DG MOVE and IRG-Rail; Notes: * This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence*

## 3.3 2030 FUTURE MARKET SCENARIOS

As part of the 2024 TMS Update, future market estimates were elaborated for different scenarios at the short term (2030) time horizon. A scenario represents a narrative or framework that outlines a set of assumptions regarding future developments affecting the rail freight corridors. These assumptions can cover a wide range of factors, including economic growth, technological advances, policy changes, environmental conditions, or infrastructure developments. The main purpose of using scenarios is to assess how different conditions or decisions may affect rail freight transport, which in turn impacts infrastructure requirements and rail system performance.

In general, a scenario consists of different components, each of which serves to detail the assumptions and parameters that define the future. These components include:

- *Economic conditions*: Assumptions about future economic conditions, such as GDP growth rates, trade volumes and industrial production. These conditions have an impact on freight demand by influencing production and consumption patterns.
- *Infrastructure developments*: Details of expected changes in transport infrastructure, such as expansion of rail networks, missing links in road and rail infrastructure, development of new ports or logistics hubs, and improvements in rail and intermodal facilities. Infrastructure developments are important in determining the capacity and efficiency of freight transport systems.
- *Policies and regulations*: Specific changes in policies and regulations that affect freight transport, such as environmental regulations, transport policies, tariffs, and trade agreements. These factors can change transport costs, modal choices, and operational practices.
- *Technological innovations*: Assumptions regarding the adoption and impact of new technologies within the freight transport sector. This includes advances in vehicle technologies, automation, digitalisation of supply chains and energy-efficient practices. Technological innovations can improve efficiency, lower costs, and reduce environmental impacts.
- *Environmental conditions and sustainability goals*: Assumptions regarding environmental conditions and sustainability goals, including climate change impacts and emission reduction targets. These components are becoming increasingly important in planning resilient and sustainable freight transport systems.
- *Social and demographic trends*: Reflections on social and demographic changes that may affect freight transport demand, such as urbanisation patterns, population growth and shifts in consumer behaviour.

By integrating these components, scenarios provide a comprehensive and multifaceted framework for exploring the future of transport. They enable examining the possible effects of various assumptions and support decision making regarding infrastructure investments, policy interventions, or strategic planning. Scenarios serve as an important tool in the management of transport systems and facilitate the development of strategies that are robust and flexible to future uncertainties.

For the purposes of the 2024 Joint TMS Update, 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 weights and dimensions directive and electrification of Heavy Goods Vehicles;
- The internalization of external costs of road transport (road pricing);

- Incentives to rail/combined transport operations;
- Technological/operational improvements of intermodal transport solutions and logistics chains;
- Market sensitivity to climate and energy transition.

In line with this approach, the following scenarios have been defined, all of them at the 2030 time horizon:

- *Reference or background scenario*: It describes the economic developments (in terms of GDP changes), that have the most important impact on the future of rail transport. The base for this is the EU Reference Scenario 2020-2050 and the World Economic Outlook 2023. The economic projections are described in more detail in Section 3.3.1.
- *Projects scenario*: It provides an overview of the impact resulting from the expected developments in the rail transport system. These concern projects related to , ERTMS deployment, missing links, upgrades, and improvements of the rail network belonging to the 11 RFCs, expected to be implemented by 2030, according to the project completion dates defined in the available project lists by December 2023. In Section 3.3.2 an overview of the projects that are being considered is given, which is a subset of the most relevant projects that are ongoing or planned to be implemented and completed by 2030 on the 11 RFCs Network.
- *Sensitivity scenario: an 11 RFCs network at TEN-T standard*: It provides an overview of what would happen if – in addition to the investments included in the projects scenario - ERTMS is fully introduced, 740 meter long trains are allowed to operate anywhere on the whole network, 22.5 t axle load is achieved on the entire network, intermodal loading gauge is also possible along the RFCs and if the rail gauge in Spain and Portugal meets the European track gauge standards (the Rail Baltica initiative, providing interconnectivity of the three Baltic States to Europe is already considered in the *Projects scenario*). This scenario can be regarded as a hypothetical exercise as the projects needed to achieve these standards are not fully defined. Additionally, the TEN-T legislation allows Member States to apply for derogation to achieve compliance without achieving the TEN-T requirements in those cases where the cost of the investment may not be supported by sufficient economic benefits. Section 3.3.3 further describes the assumptions underlying this scenario.

All the above scenarios were analysed using the NEAC model (see Annex 1 to this report) to assess the impact of economic developments, infrastructural improvements, and further general changes for the sensitivity analysis.

### 3.3.1 ECONOMIC PROJECTIONS TOWARDS 2030

To create the projections for international rail transport, the EU Reference Scenario 2020-2050 (EC, 2021) and the World Economic Outlook (IMF, 2023) were considered. The EU Reference Scenario is used for projections in Europe, while the World Economic Outlook provides input for the rest of the world. This section focuses first on the EU Reference Scenario 2020-2050 and then on the World Economic Outlook.

***EU Reference Scenario 2020-2050***

This scenario has been used as a common ground, because it covers the EU and makes it a consistent background framework for each of the individual 11 RFCs and their combined network.

The EU Reference Scenario 2020-2050 projects the impact of macro-economic developments, fuel prices, technology trends, and policies on the evolution of EU transport. It provides a model-based simulation of a possible future outlook until 2050, given the insights and policy context, based on certain framework conditions, assumptions, and historical trends, notably in the light of the most recent statistical data.

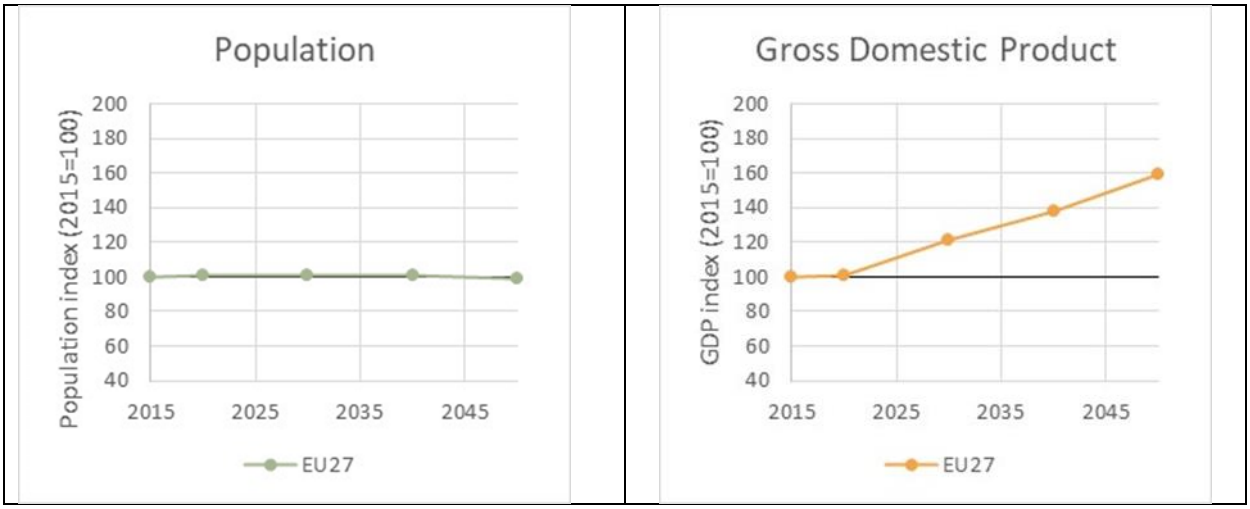
For a complete list of included transport and energy policies, we refer to the report on the EU Reference Scenario published by the European Commission[7]. The central model behind the EU Reference Scenario is the PRIMES model, an energy system model that produces projections for energy, transport and $CO_2$ emissions.

Figure 14 shows the indexed trends for population, GDP, and road and rail freight transport according to the EU Reference Scenario (*The impacts of the COVID-19 pandemic are considered in the EU Reference Scenario. However, the pandemic effects seem to be negligible for the long-term trends*).

The growth of the EU27 population is expected to stagnate between 2030 and 2050. After 2040, it even goes into negatives. GDP levels, however, are projected to keep increasing until 2050.

Figure 15 shows the indexed trends for transport by road and rail, based on performance (tkm), relating to both international and domestic transport. The impact of the COVID-19 pandemic is visible in the transport levels for 2020. However, as of 2025 the transport forecasts seem to be following the pre-COVID trend. Hence, the pandemic effects seem to be negligible for the longer term. The growth rates for rail freight are, in general, higher than those for road transport, although this can differ per country. For freight transport by rail, the largest increases are projected between 2025 and 2040. The growth of transport is not evenly distributed across Europe. Some areas or countries show a moderate growth rate.

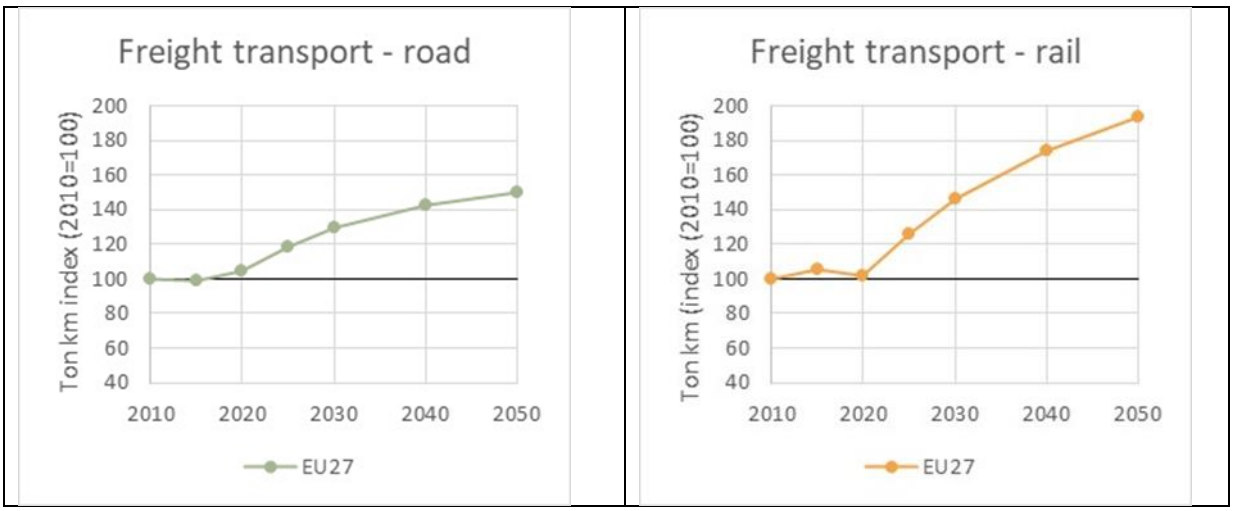
**Figure 14 Forecasts population and GDP development in the EU27 between 2015 and 2045**




*Source: EC (2021)*

[7] European Commission, Directorate-General for Climate Action, Directorate-General for Energy, Directorate-General for Mobility and Transport, De Vita, A., Capros, P., Paroussos, L., et al., EU Reference Scenario 2020 : energy, transport and GHG emissions : trends to 2050, Publications Office, 2021, https://data.europa.eu/doi/10.2833/35750

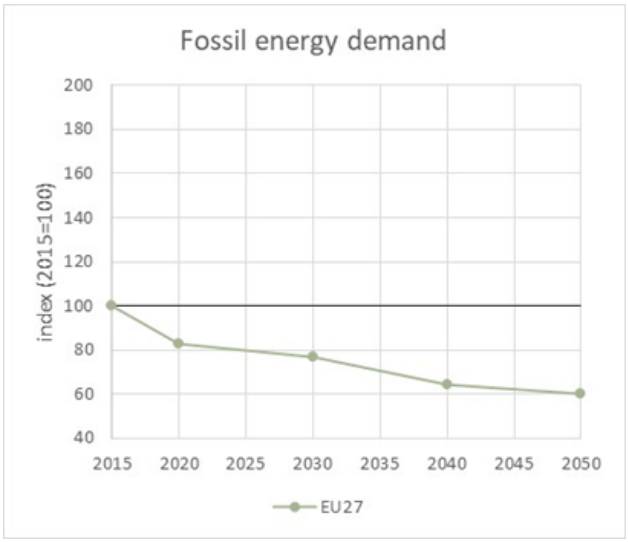
Figure 15 Forecasts on freight transport by road and rail (tkm, index 2010=100) for the EU27




*Source: EC (2021)*

Figure 16 shows the energy demand for fossil fuels (solid, petroleum products and natural gas) according to the EU Reference Scenario. The scenario predicts for the EU a decrease of 40% in 2050. This has an impact on the development of transport of dry and liquid bulk in the EU. Growth might be less or even negative.

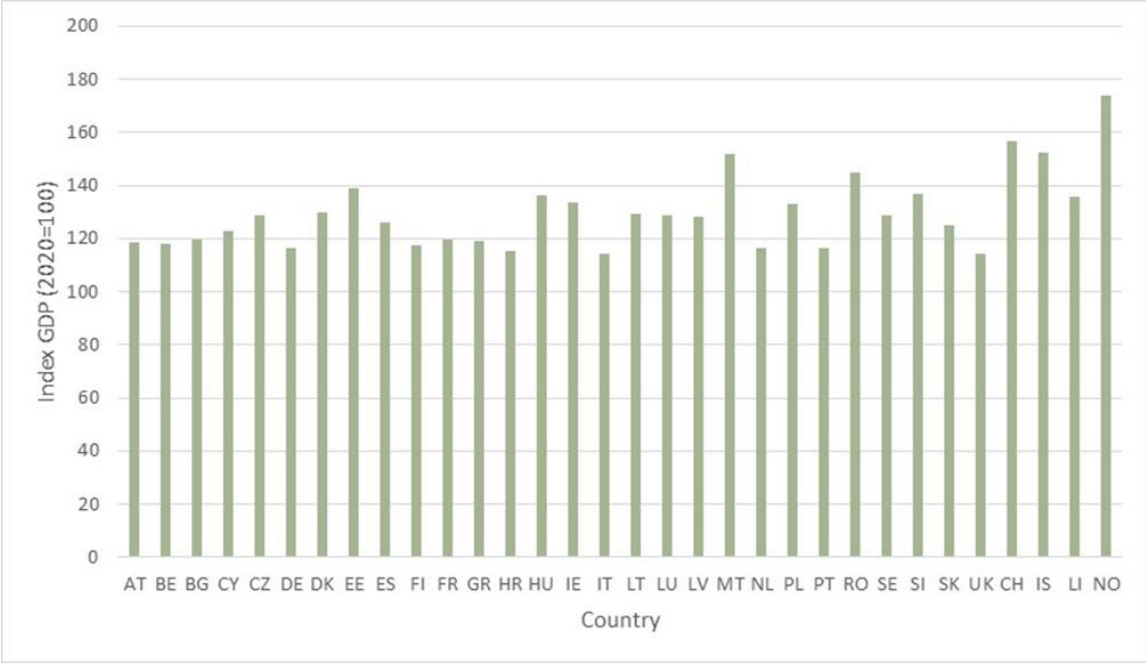
Figure 16 Forecasts on fossil energy demand for the EU27




*Source: EC (2021)*

The GDP figures from the EU Reference Scenario are used to make projections for 2030 for international rail transport in Europe. Figure 17 shows the economic development in GDP as an index (2020=100) by country, as provided by the EU Reference Scenario. The index ranges from 114 (Italy and the United Kingdom) to 174 (Norway). On average, the weighted growth index for the EU27 is about 117.

Figure 17 Development of GDP (Index 2020=100) for European countries according to the EU Reference Scenario



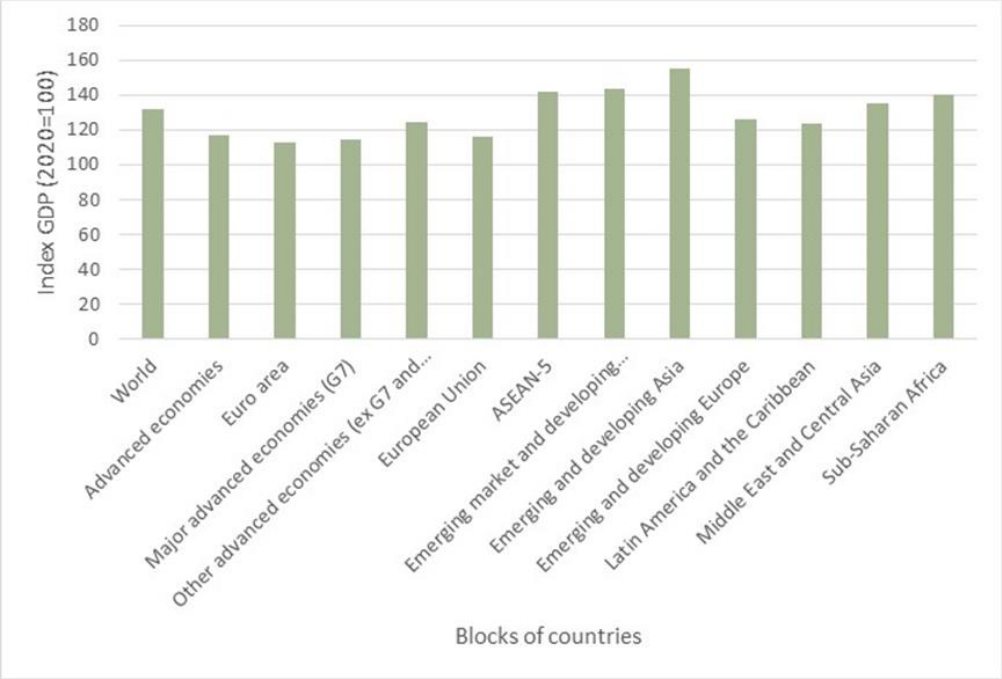

*Source: EC (2021)*

**World Economic Outlook**

Concerning the World Economic Outlook[8], the outlook for the GDP in constant prices for the period 2023-2028 was used in this study. Some historical figures are provided as well. Based on the 5-year period 2023-2028, an extrapolation was made for the remaining years until 2030. Figure 18 shows the GDP developments for blocks of countries. Worldwide, the GDP development between 2020 and 2030 is estimated at 32%. For the period 2022-2030, this is approximately 24%. The different blocks of countries show different growth patterns. Growth in the Euro area is, according to the IMF, the lowest at about 13% between 2020 and 2030, while the growth in the emerging and developing countries in Asia is the highest at about 54% between 2020 and 2030.

[8] IMF (2023). *World Economic Outlook. Navigating Global Divergences. October 2023*. Washington DC: International Monetary Fund.

Figure 18 Development of GDP between 2020 and 2030 in IMF economic blocks of countries




*Source: IMF (2023), additional calculations Panteia*

**Road projects**

Different road projects across Europe which are planned to be ready by 2030 are included in the Reference Scenario. This includes projects such as the Antwerp Western ring road, the Rotterdam Blankenburgtunnel or the A281 missing link in Bremen. These projects have an impact on road freight transport demand, which will increase.

### 3.3.2 RAIL PROJECTS FINISHED BY 2030

The Projects scenario is used to assess the impact of the different rail projects expected to be completed by 2030 along the 11 RFCs Network. Time, distance and costs are important bases for calculating the changes in transport demand until 2030. These variables are also important for determining where shifts between modes will occur. The NEAC model was used to assess the impact of the Projects scenario (see Annex 1 to this report).

Currently, a number of projects are ongoing and/or are planned for the improvement of the railway infrastructure belonging to the 11 RFCs Network. Such projects were first identified in the 11 RFCs Implementation Plans, which were further confirmed by the 11 RFCs. Furthermore, the list of the investments planned for the development of the 9 TEN-T Core Network Corridors was consulted to complement the information available from the RFCs. The ongoing and planned investments differ in size. Some are big projects such as Rail Baltica or the Fehmarnbelt. Other projects are much smaller such as the upgrading or modernisation of railway lines. A selection of projects was considered for forecasting purposes according to the following criteria:

- The projects need to be implemented before or in 2030;
- Projects should be able to 'translate' into a time gain or cost reduction.

Table 32 below shows the projects that are considered in the Projects scenario. The selected projects reflect the purpose of the study and nature of the model, limited to the freight market analysis and thus modal share estimation, excluding network capacity simulation and assessment, and looking at the 2030 time-horizon. It is worth noticing that 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 P400 loading gauge standards, a Sensitivity scenario has been developed as part of this study for the simulation of the completion of the 11 RFCs Network in line with the TEN-T standards (see 3.3.3). 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 11 RFCs Network at TEN-T standard makes the impact of those investments negligible, especially for the European track gauge, axle load, P400 loading gauge, ERTMS and 740 meter long trains standards.

**Table 32 Rail projects considered in the Projects scenario 2030**

| Project | End date | RFC |
|---|---|---|
| Follobanen | 03/2023 | SCANMED |
| Rehabilitation and upgrade of Corridor Section Aveiro - Vilar Formoso | 12/2024 | ATL |
| New line construction Évora - Elvas | 12/2025 | ATL |
| ABS Hoyerswerda–Horka–Border DE/PL | 12/2024 | NS-B |
| Rehabilitation of the railway line Border – Curtici, Section Gurasda – Simeria | 12/2025 | OEM |
| Upgrade Stadlau-Marchegg (Marchegger Ast) | 12/2025 | BA, OEM |
| Graz-Klagenfurt; Koralm line | 12/2025 | BA |
| Second Track Divaça-Koper | 10/2025 | BA, MED, AMBER |
| 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 | RALP |
| EuroCap-Rail: modernization of the Brussels-Luxembourg axis | 12/2026 | NSM |
| ABS/NBS Karlsruhe - Basel Phase 2, No 1 | 12/2026 | RALP, RD |
| Construction of double-track railway from Sandbukta to Såstad. | 08/2026 | SCANMED |
| Modernisation of Vidin - Medkovets railway section | 12/2026 | OEM |
| ABS Angermünde - Border DE/PL | 12/2026 | NS-B |
| ABS Berlin – Frankfurt (Oder) – Border (DE/PL) | 12/2027 | NS-B |
| 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 | BA |
| Works on railway line E 75, section Białystok – Suwałki – Trakiszki (state border), Stage I, sub-section Białystok - Ełk, phase II | 12/2027 | NS-B |
| Rehabilitation of the railway line Cluj – Episcopia - Border | 12/2027 | OEM, RD |
| Upgrading of Alexandroupoli-Ormenio/BG border railway line | 12/2027 | OEM |
| Rehabilitation of the railway line Brasov - Simeria | 12/2027 | OEM |
| Upgrading Gallarate-Rho line 0294 | 11/2028 | RALP |
| Upgrade of Brno - Breclav line as a High-speed Rail line | 12/2029 | OEM |
| Modernisation of the railway line Bucharest - Giurgiu | 12/2029 | OEM |
| Upgrade of the railway access line to the Fehmarn Belt Fixed Link - Section Ringsted - Rødby | 06/2029 | SCANMED |
| Southern access line to Brenner; Lotto/lot 1: Fortezza/Franzenfeste - Ponte Gardena/Waidbruck 0292A | 12/2029 | SCANMED |
| ABS/NBS Hamburg - Lübeck - Puttgarden (Hinterland connection to Fehmarn Belt Fixed Link) | 12/2029 | SCANMED |
| Rail Baltica | 12/2030 | NS-B |

| Project | End date | RFC |
|---|---|---|
| New Rail Line Dresden - Praha (Section Heidenau - State Border DE/CZ) | 12/2030 | NS-B, OEM |
| ABS/NBS München - Rosenheim - Kiefersfelden - Grenze D/A (--> Kufstein) | 12/2030 | SCANMED, RD |
| Upgraded line (ABS) (Amsterdam) - DE/NL border - Emmerich - Oberhausen (1. + 2. Phase) | 12/2030 | RALP, NS-B |
| Y Basque High-speed Rail (freight and passenger traffic): all sections + access to cities Bilbao and Vitoria + implementation of UIC between Astigarraga-border + 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 |
| Semmering base tunnel | 12/2030 | BA |
| Modernisation/ Rehabilitation and Electrification of Craiova-Calafat railway section (107 km) | 12/2030 | OEM |
| Upgrade Nordbahn Wien Süßenbrunn - Bernhardsthal | 12/2030 | BA, OEM |
| Modernization of the Radomir - Gyueshevo railway section | 12/2030 | OEM |
| ABS Nürnberg – Marktredwitz – Reichenbach/BGr DE/CZ (–Prag) | 12/2030 | RD |
| ABS Nürnberg - Schwandorf/München - Regensburg - Furth im Wald - Grenze D/CZ | 12/2030 | RD |
| Modernization of the line Plzeň - Česká Kubice, section Stod (excl.) - State border D | 12/2030 | RD |
| Rehabilitation of the railway line Caransebes – Craiova | 12/2030 | OEM |
| Kanin – Hradec Kralove – Chocen, second track increase speed | 12/2030 | OEM |

### 3.3.3 SENSITIVITY ANALYSIS: AN 11 RFCS NETWORK IN LINE WITH TEN-T STANDARDS

The Sensitivity scenario helps to understand the impact of completing the 11 RFCs Network according to TEN-T standards. This scenario concerns the availability of European standard rail gauge in Spain and Portugal, the introduction of ERTMS on the entire rail network, and the introduction of 740-meter trains along the 11 RFCs. This scenario can be regarded as a hypothetical exercise as the projects needed to achieve these standards are by no means all ready to be implemented in 2030. Additionally, the TEN-T legislation allows Member States to apply for derogation to achieve compliance without achieving the TEN-T requirements in those cases where the cost of the investment may not be supported by sufficient economic benefits. Despite being theoretical, this scenario provides insights into what would happen with rail transport demand if the TEN-T standards would be achieved in full scale along the 11 RFCs Network. The scenario has been implemented as follows:

- ***ERTMS***. The European Rail Traffic Management System (ERTMS) is important to enhance the interoperability of rail transport through a single European signalling system. ERTMS is designed to replace the multitude of incompatible safety systems currently in use across European railways, thereby facilitating cross-border rail traffic and improving the competitiveness of the rail sector. It is expected that the implementation of ERTMS will lead to safety enhancements, operational efficiency, and environmental benefits. Despite the investments and the challenges faced during its deployment, the long-term benefits of ERTMS can be substantial. To simulate the improvements in safety and efficiency, the **speed on the entire network is increased by 3%**.
- ***Introduction of 740-meter trains***. The introduction of longer freight trains (740 meters) will further enhance the efficiency and capacity of rail freight transport. The 740 meters adjustments represent

a significant increase over the standard length of freight trains, which traditionally varies by country often ranging around 400 to 600 meters. The transition to 740-meter trains is part of broader efforts to make rail freight a more competitive and sustainable alternative to road transport. The impact of deploying such long trains within the rail freight sector is multifaceted, encompassing operational, economic, and environmental perspectives. However, realizing these benefits fully necessitates significant investments in infrastructure and operational adjustments. The strategic move towards longer trains reflects a commitment to enhancing the competitiveness of rail freight and its role in a sustainable transport system, despite the challenges involved. From a study carried out for the Ministries of Transport in The Netherlands, Belgium, and Germany[9], it was found that, on average, **the average train volume will increase by 15%,** leading to a reduction in rail freight transport costs of approximately 5%. It is assumed that the 15% increase will take place **between *all* origins and destinations in Europe**. The increase will not always be possible, but as this scenario is hypothetical, we neglect these details for reasons of efficiency.

- ***European standard gauge.*** The Projects scenario already includes the development of the Rail Baltica Project, which among others integrate the rail system of the Baltic Member States into the EU one, with reference to the European standard track gauge. The sensitivity scenario complement the Projects scenario in simulating the impact of the transition to European gauge of all the RFC lines crossing Spain and Portugal, thus assuming the whole 11 RFCs Network would be in line with the TEN-T standards in terms of track gauge. Whereas the effects of such a scenario on the international traffic between the two Iberian countries might be marginal, international traffic between these two countries and other EU countries across the Pyrenees would be smoother and more efficient. Whereas the implementation of the EU track gauge network in the Iberian Peninsula (and similarly in the Baltic States) may be challenging under the socio-economic point of view, as costs may exceed possible benefits especially upon accurate consideration of investments, resources and time needed to change not just the rail infrastructure, but also the rolling stock, and the terminals equipment and facilities along the whole logistics chain, the availability of an EU track gauge network reduces in principle logistical complexities, times and costs associated with gauge changeovers between different gauge systems. Taking into consideration the difficulties in assessing the impact of the migration of the Iberian network belonging to the RFCs to the EU standard track gauge, to the purposes of this study the transition has been simulated by a reduction of the waiting time by **4 hours**. We acknowledge that this approach is simple and that not all details or costs associated with the transition are considered. Nevertheless, some positive effects on demand are expected.
- ***22.5 t axle load and P400 intermodal loading gauge***. The above-quantified effects are assumed to generally capture also the benefits potentially attributable to the TEN-T axle load requirement and P400 intermodal gauge as conditions for an 11 RFCs Network in line with TEN-T standards, specifying that both elements are crucial for the competitiveness of rail freight transport in Europe, although their direct effects on transport costs and travel times are difficult to be quantified on the entire network.

The simulated measures provide insight into the potential impact that rail freight transport may have on transport demand. A shift from road and inland shipping to rail transport is expected.

[9] TML, Panteia, ViaCon (2023). Cost-benefit analysis 3RX. Leuven: TML.

# 4 ANALYSIS OF THE CURRENT ATL RFC TRANSPORT MARKET

This chapter provides an overview of the analysis of the current freight transport market (2022) along the RFC ATL. The analysis of both the current and future market has been done using an EU-wide NEAC model, combining transport and economic statistics from Eurostat with train traffic data available from the RNE TIS database. The analysis focusses on the international trains, i.e. those trains crossing at least one BCP. In this respect, it is noticed that in national train databases and in the TIS dataset, trains logged as national ones might actually operate along international itineraries. The use of the NEAC model made it possible to partially overcome the limitations of the current structure of the datasets. Nonetheless, the results presented in this report might be conservative in the estimation of the international flows along the RFCs.

For a correct assessment and understanding of the current RFC ATL market, a top-down approach has been adopted. Before exploring the specifics of the RFC ATL, an overview of the European international (rail) freight market is given. This is appropriate as on one hand the RFC ATL is used by trains with origins and destinations outside the RFC concerned countries; on the other hand the RFC ATL overlaps with other RFCs. The analysis of the current market is presented as follows:

- Section 4.1 presents the **definition of the catchment area and corridor area**. It shows the importance of both definitions and lays a basis for the rest of the chapter.
- Section 4.2 presents the **international rail freight transport in the 11 RFCs network**:
  - Section 4.2.1 gives an overview of the **11 RFCs network corridor and catchment areas**;
  - Section 4.2.2 provides a general overview of the **international freight transport for the 11 RFCs network catchment area**. This includes total volumes by mode and cargo type. Furthermore, we present the volumes by main origin and destination countries, as well as the main relations for all freight transport. Finally, a volume-distance distribution by mode is presented;
  - Section 4.2.3 describes the **catchment area for international rail freight transport for the 11 RFCs network**. This provides a general overview of the origins and destinations of rail freight in Europe;
  - Section 4.2.4 presents the **international rail freight transport flows in the 11 RFCs network catchment area**.
- Section 4.3 provides the **international (rail) freight transport along the RFC ATL**:
  - Section 4.3.1 gives an overview of the **RFC ATL corridor and catchment areas**;
  - Section 4.3.2 provides a general overview of **all international freight transport in the RFC ATL catchment area**. This includes total volumes by mode and cargo type. Furthermore, the volumes by main origin and destination countries are described, as well as the main relations for all freight transport. Finally, a volume-distance distribution by mode is presented.
  - Section 4.3.3 illustrates the **international rail freight transport in the catchment area of the RFC ATL**. This provides a general overview of the origins and destinations of rail freight for the RFC ATL.
  - Section 4.3.4 describes the **international rail freight transport flows in the RFC ATL**.

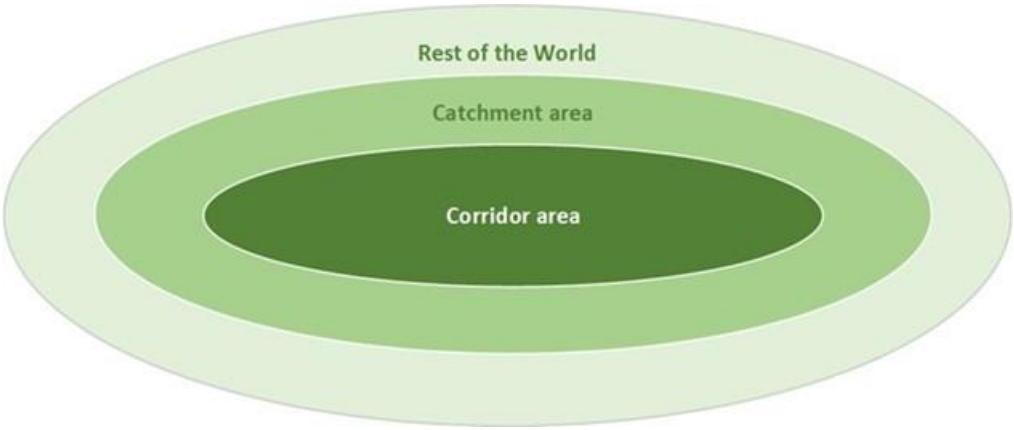
## 4.1 DEFINITION OF CATCHMENT AREA AND CORRIDOR AREA

The presentation of results for a rail freight corridor necessitates a brief definition of the corridor area and of 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 RFC. The **corridor area** refers to the geographic area traversed by the rail freight lines. The **catchment area** encompasses regions that utilise the RFC for international goods transportation by rail, often extending beyond the boundaries of the corridor area. The corridor area is (by definition) part of the catchment area.

The difference between these two types of areas is important, as numerous origins and destinations within a corridor area of an RFC may currently not receive or use rail services. However, they may be served by rail transport in the future. Furthermore, understanding the current origins and destinations served by an RFC is essential. This is where the catchment area comes in. It comprises all NUTS2[10] regions that are being served by a specific RFC. Figure 19 shows the differences between the corridor area and the catchment area, as well as the rest of the world. As can be seen, the corridor area has the smallest coverage of all areas.

Figure 19 Schematic concept of the geographic coverage of the market analysis




The **corridor area** of an RFC is defined as NUTS 2 zones which are being traversed by railways within this RFC. Regarding the **catchment area**, a more precise definition is applied. To qualify, rail transportation between an origin and destination must traverse *at least* one border crossing point (BCP) associated with the respective RFC.

## 4.2 INTERNATIONAL FREIGHT TRANSPORT IN THE 11 RFCS NETWORK

The rail freight market for the individual RFCs can only be appropriately understood within the rail freight market across the whole European rail network. Each RFC has connections or overlaps with other RFCs. Also, trains using an RFC often have an origin or destination outside of a corridor area. Furthermore, by looking at the entire network, the 'double counting' risk is mitigated. Therefore, a good knowledge of the European rail freight market forms the basis for the analysis of the individual RFCs' markets.

This section starts with a description of the corridor and catchment areas of the 11 RFCs Network. It then first focusses on all international freight transport of the catchment area of the 11 RFCs Network. After that, it

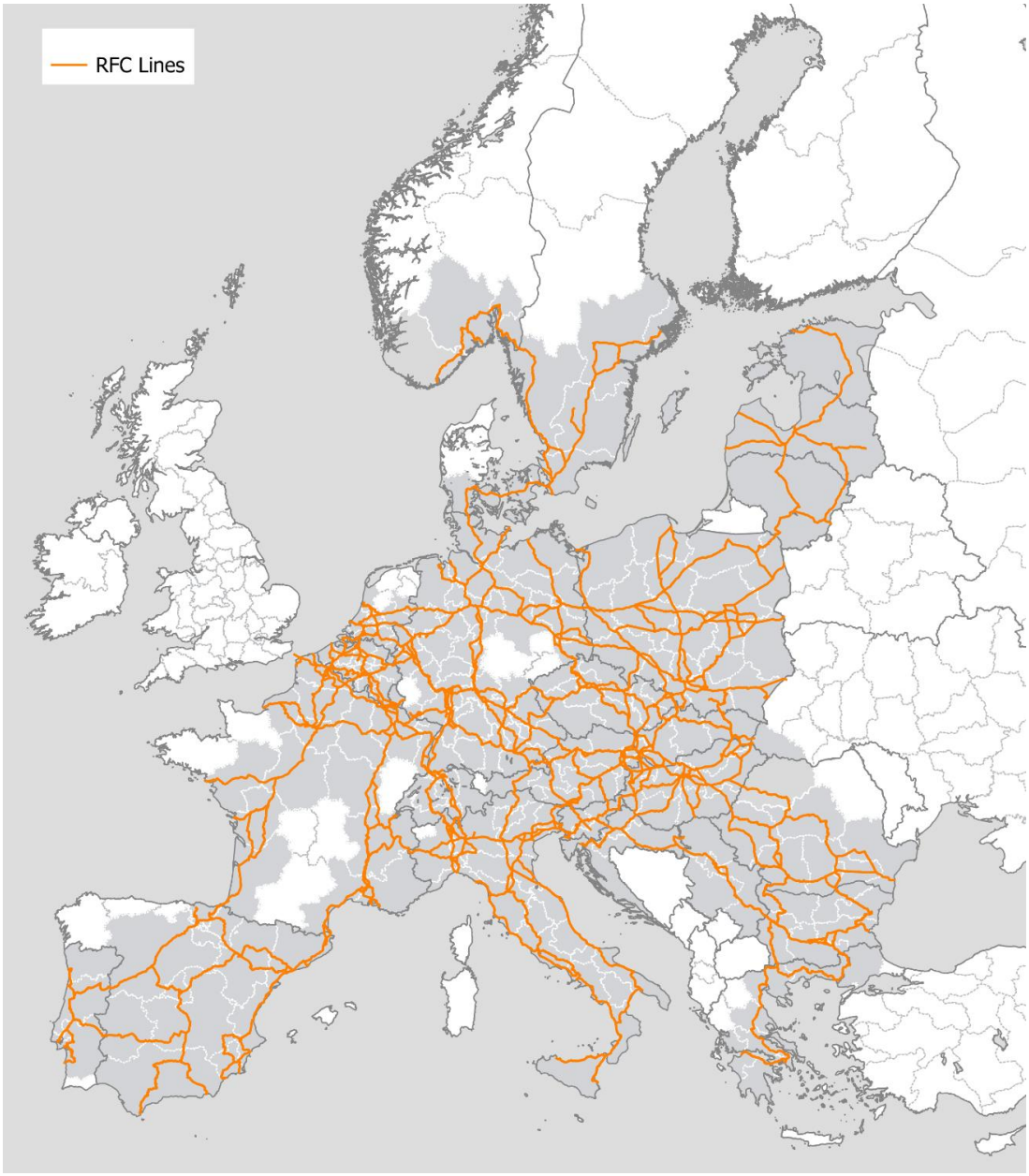
[10] A NUTS 2 zone refers to a level within the Nomenclature of Territorial Units for Statistics (NUTS), a hierarchical system developed by the European Union to divide the economic territory of the EU into territorial units for the purpose of collecting, developing, and harmonising statistical information. 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.

presents the results at an aggregate level, before describing the volumes for origin and destination countries and the top 10 relations for the land transport modes, i.e. road, rail, and IWW (inland shipping).

### 4.2.1 CORRIDOR AND CATCHMENT AREAS OF THE JOINT RFCS

Figure 20 provides an overview of the *corridor areas* of the 11 RFCs Network. It covers a vast part of Europe, but excludes countries such as UK, Ireland, Finland, Northern Scandinavia, and parts of the Balkan. Those countries or parts of countries that have no railway lines that belong to an RFC. The 11 RFCs Network *catchment area*[11] covers a much wider area. Besides the excluded countries, it also includes countries such as Ukraine, Moldova, Kazakhstan, and China. For rail transport the catchment area seems vast, but the number of rail relations is limited when compared to road transport. This is due to the character of road transport which can reach any location in Europe, while rail transport only serves areas with a rail connection.

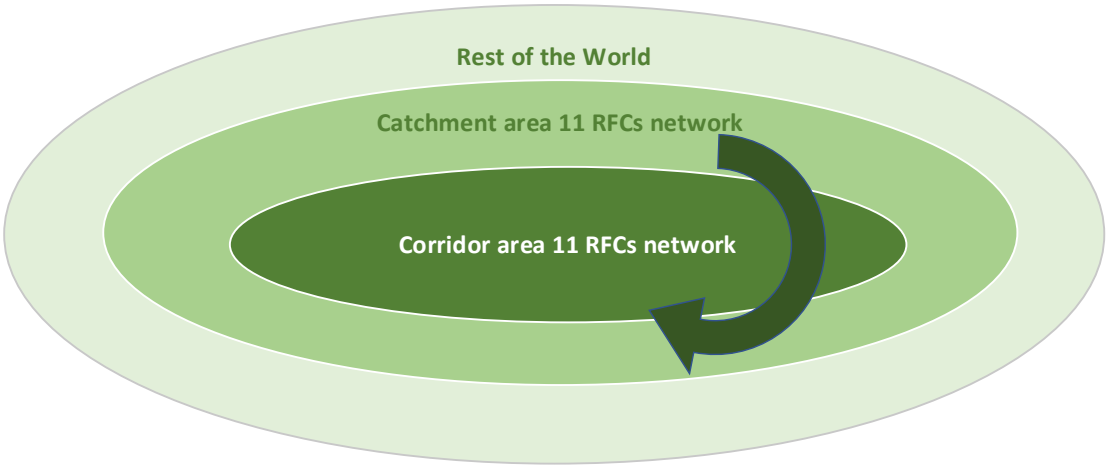
Figure 20 Corridor area and railway lines of the 11 RFCs Network




[11] Not shown here, it will be shown later when presenting the international rail freight transport results.

The next figure shows which results for the international freight transport for the 11 RFCs Network are presented in this section. It includes *all* international freight transport within the 11 RFCs Network corridor and catchment area. The latter includes all international freight transport to and from locations such as China, Ukraine, Moldova, Kazakhstan, the UK, or Northern Scandinavia as these countries and regions are part of the 11 RFCs Network catchment area. However, it excludes international freight transport from Africa, the US, or South America, as these are not part of the catchment areas of the 11 RFCs Network. The analysis focusses on land modes that compete within the catchment area, i.e. road, rail, and IWW[12]. For the RFC specific part, also sea transport receives attention.

Figure 21 Schematic concept of the geographic coverage of the results presented in this section.




### 4.2.2 ALL INTERNATIONAL FREIGHT TRANSPORT FOR THE COMBINED 11 RFCS NETWORK AREA[13]

The total volume of international freight transport over land in the 11 RFCs Network catchment area is 1,439 million tonnes. The volume of international rail freight transport is 265 million tonnes (about 442,000 international trains[14]), which is 18% of the total amount of transport to, from, and within the catchment area of the 11 RFCs Network. The share and volume of IWW is 17% (240 million tonnes), and the share of road transport is 65% (934 million tonnes).

Concerning the cargo types[15], the category *Other* (general cargo, including intermodal transport and container) dominates the international freight transport for the 11 RFCs Network, by 845 million tonnes of volume. This is about 59% of all international freight transport. This cargo type is mostly transported by road (about 69%). *Dry bulk* is the second largest cargo type at 32% (465 million tonnes). *Liquid bulk* has as share of 9% (128 million tonnes) in the total volume of international freight transport over all land modes.

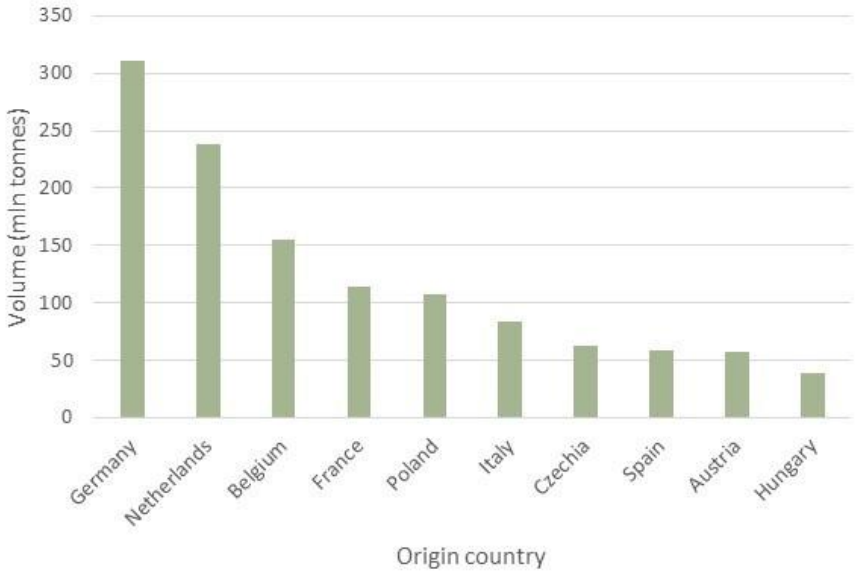
[12] Maritime transport is left out, as it makes the interpretation of the results challenging. As we only consider the rail catchment area, several other maritime relations are not considered, which might easily lead to misinterpretations. Therefore, we only consider land modes at European level, also because these are the main sources for modal shift to or from rail.
[13] This chapter is a copy of section 4.2.2 of the RFCs joint transport market study.
[14] Using an average of 600 tonnes per train
[15] We distinguish dry bulk, liquid bulk, and other (general cargo and container). Dry bulk comprises commodities such as sand, ores and coal. Liquid bulk comprises mainly oil(products) and liquid chemicals. General cargo concerns a broad range of products such as cars, machinery, and electronics. Containers concern intermodal transport. The content is often unknown.

**Figure 22 Estimated volume (million tonnes[16]) and share of international freight transport over land by mode and cargo type within the combined 11 RFCs network area**


*Source: NEAC estimations*

Figure 23 and Figure 24 show the top 10 origin and destination countries of all international freight transport within the 11 RFCs Network catchment area. The top 3 origin and destination countries for international freight transport over land in the 11 RFCs Network catchment area are Germany, the Netherlands and Belgium. This concerns transport by road, rail, and IWW (inland shipping). A volume of 311 million tonnes of international freight transport has its origin in Germany, while 352 million tonnes have Germany as a destination in 2022. Due to the ports in the Rhine-Scheldt delta (such as Port of Rotterdam, Port of Amsterdam, North Sea Ports (Ghent-Terneuzen) and Port of Antwerp-Bruges), both the Netherlands and Belgium are important origin and destination countries as well for international freight transport. The top 10 countries for origin cover 85% of all international freight transport for the catchment area of the 11 RFCs Network, while the top 10 destination countries cover 84% of all international freight transport

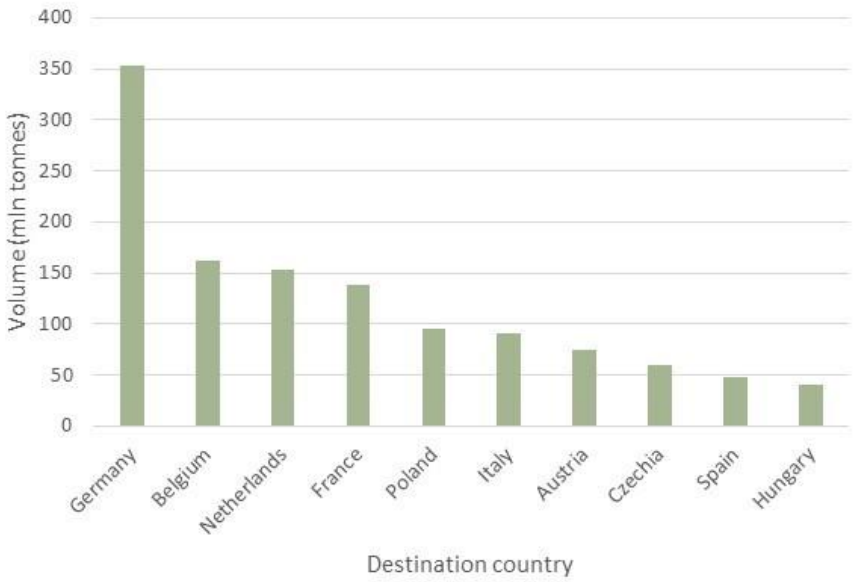
**Figure 23 Estimated volume (million tonnes) of *all* international freight transport over land by *origin* in 2022 for the top 10 origin countries in the 11 RFCs Network catchment area**




*Source: NEAC estimations*

[16] The volumes for 2022 are based on a combination of observed values from Eurostat, RNE (TIS) and estimated values from NEAC at a detailed NUTS2 level. Therefore, the results are called estimation. Detailed observed values are not available.

Figure 24 Estimated volume (million tonnes) of *all* international freight transport over land by *destination* in 2022 for the top 10 destination countries




*Source: NEAC estimations*

The following table shows the international freight volumes transported between the 15 most important origin countries and the 15 most important destination countries within the catchment area of the 11 RFCs Network. The total freight volume for these countries is 1,266 million tonnes, which is 85% of all international freight transport in the 11 RFCs Network catchment area. The most important freight transport relation is between the Netherlands and Germany at 123 million tonnes of freight transport by all land modes. Other big relations concern Netherlands-Belgium (79 million tonnes), Germany-Netherlands (67 million tonnes), Belgium-Netherlands (58 million tonnes), and Belgium-Germany (42 million tonnes). Together the freight transport relations between these 3 countries show once more the importance of the ports in the Rhine-Scheldt delta for their hinterlands. Some 27% of all international freight transport in the 11 RFCs Network catchment area concerns the relationship between these 3 countries.

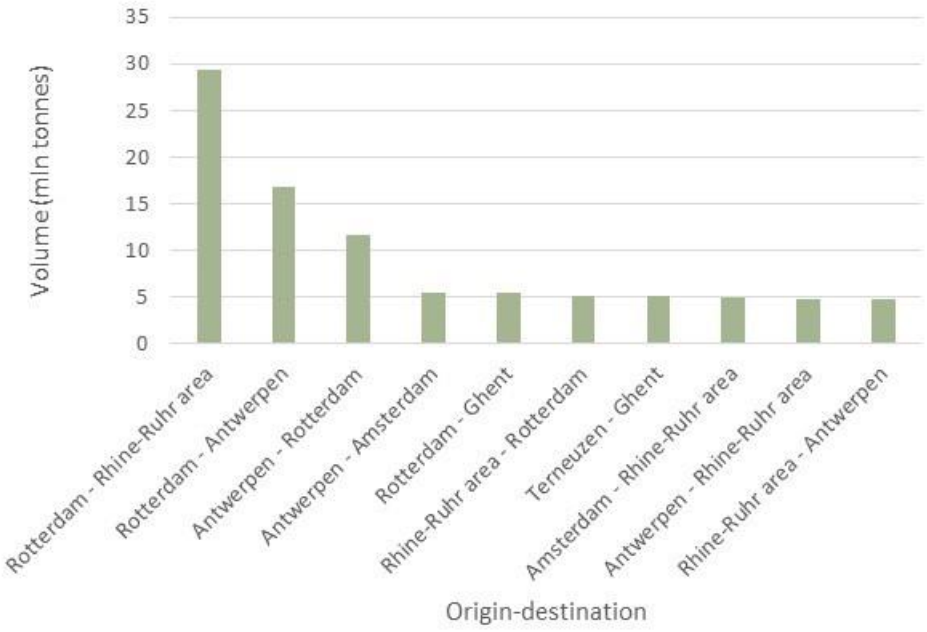
Table 33 Freight volume (million tonnes) between the 15 most important origin and the 15 most important destination countries

| From/To | AT | BE | CH | CZ | DE | ES | FR | HU | IT | NL | PL | PT | RO | SI | SK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AT** | | 1 | 2 | 3 | 25 | 0 | 1 | 4 | 9 | 1 | 2 | 0 | 1 | 5 | 2 | **56** |
| **BE** | 1 | | 1 | 2 | 42 | 2 | 35 | 1 | 3 | 58 | 5 | 0 | 0 | 0 | 0 | **150** |
| **CH** | 1 | 0 | | 0 | 7 | 1 | 4 | 0 | 4 | 1 | 0 | 0 | | 0 | 0 | **18** |
| **CZ** | 5 | 1 | 0 | | 23 | 0 | 2 | 3 | 3 | 2 | 12 | | 0 | 1 | 8 | **61** |
| **DE** | 33 | 38 | 17 | 18 | | 8 | 31 | 7 | 28 | 67 | 36 | 1 | 2 | 2 | 5 | **292** |
| **ES** | 0 | 2 | 1 | 1 | 8 | | 26 | 0 | 4 | 2 | 2 | 12 | 0 | 0 | | **58** |
| **FR** | 1 | 30 | 7 | 1 | 25 | 20 | | 0 | 11 | 10 | 3 | 1 | 0 | 0 | 0 | **110** |
| **HU** | 6 | 1 | 0 | 2 | 7 | 0 | 1 | | 5 | 1 | 3 | 0 | 3 | 2 | 4 | **34** |
| **IT** | 8 | 2 | 7 | 2 | 25 | 4 | 12 | 3 | | 3 | 5 | 0 | 1 | 4 | 1 | **79** |
| **NL** | 2 | 79 | 3 | 2 | 123 | 2 | 13 | 1 | 4 | | 5 | 0 | 0 | 0 | 0 | **235** |
| **PL** | 3 | 3 | 1 | 17 | 41 | 1 | 4 | 3 | 5 | 4 | | | 3 | 1 | 6 | **93** |
| **PT** | 0 | | 0 | | 1 | 9 | 1 | 0 | 0 | 0 | 0 | | | 0 | | **12** |
| **RO** | 1 | 0 | | 0 | 2 | 0 | 1 | 3 | 2 | 1 | 2 | | | 0 | 1 | **13** |
| **SI** | 8 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 5 | 0 | 1 | 0 | 0 | | 1 | **21** |
| **SK** | 4 | 0 | 0 | 9 | 6 | 0 | 0 | 7 | 2 | 0 | 5 | | 1 | 1 | | **35** |
| **Total** | **73** | **158** | **39** | **58** | **336** | **48** | **133** | **35** | **86** | **150** | **81** | **14** | **11** | **15** | **29** | **1,266** |

*Source: NEAC estimations*

The main origins and destinations for all land modes in international freight transport are depicted in Figure 25 below. As can be seen, these concern relations between the Netherlands, Belgium, and Germany mainly (with ports such as Rotterdam, Amsterdam, Ghent (North Sea Ports) and Antwerp (Port of Antwerp-Bruges), and inland locations such as the Rhein-Ruhr area).

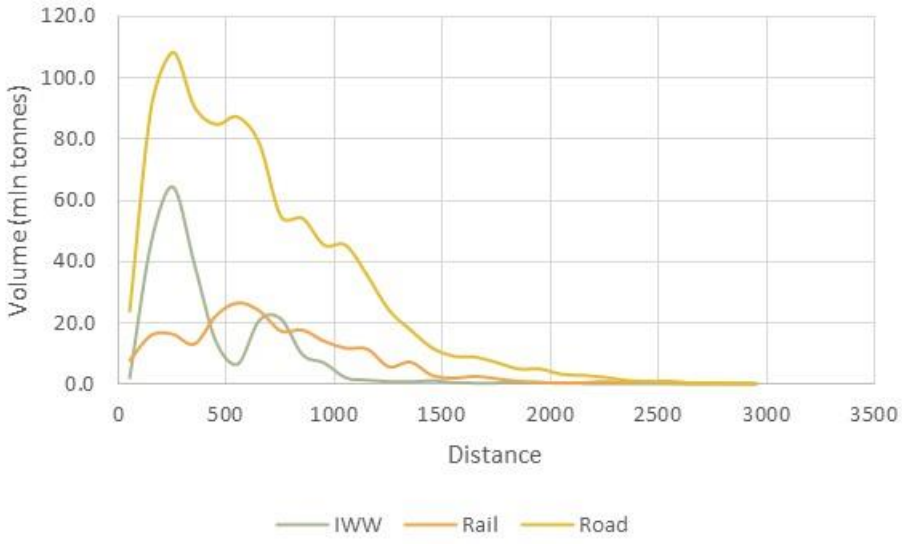
**Figure 25 Estimated volume (million tonnes) for the 10 relations (at NUTS2 level) of all international freight transport over land in 2022 within the 11 RFCs network catchment area**




*Source: NEAC estimations*

The 'trip' length distribution for international freight transport in Europe in the catchment area of the 11 RFCs Network is shown in Figure 29. This graph shows the volume (in million tonnes) by distance (in km). The peak for road (107 million tonnes) and inland shipping (64 million tonnes) is in both cases around 250 km. For international rail transport this is around 550 and 750 km at 27 million tonnes.

**Figure 26 Volume distribution (million tonnes) by distance (km) *within* the 11 RFCs network catchment area in 2022**




*Source: NEAC estimations*

### 4.2.3 INTERNATIONAL RAIL FREIGHT TRANSPORT IN THE 11 RFCS NETWORK CATCHMENT AREA

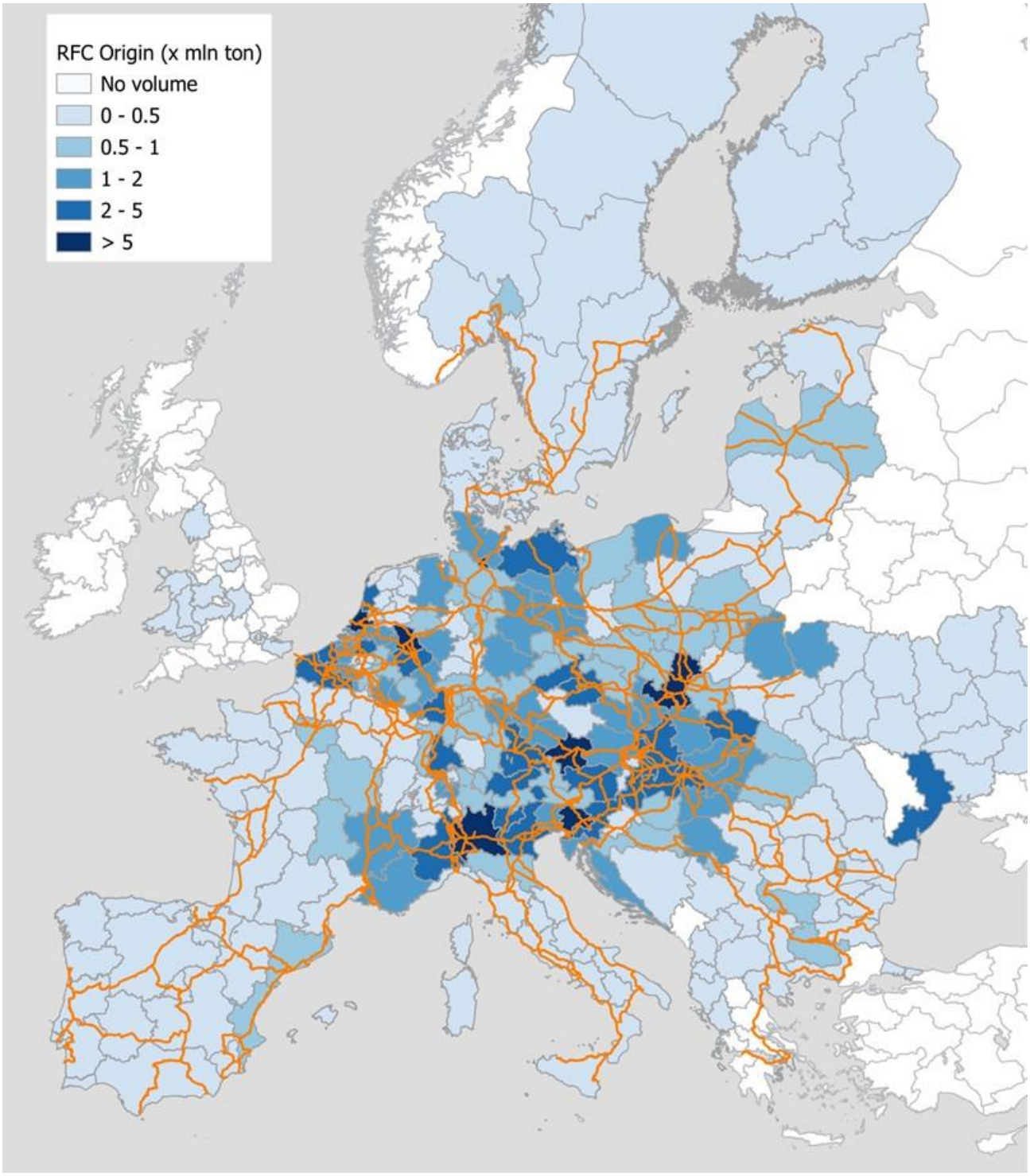
Figure 20 provides an overview of the *corridor area* of the 11 RFCs Network. The corridor area of the 11 RFCs Network covers a vast part of Europe, but excludes countries and regions such as the UK, Ireland, Finland, Northern Scandinavia, and parts of the Balkan. The 11 RFCs Network catchment area covers a much wider area. It includes the previously mentioned countries, as well as countries east of Europe such as Ukraine, Moldova, Kazakhstan, and China.

The rail freight transport catchment area for the 11 RFCs network is shown in Figure 27 and Figure 28. Figure 27 provides an overview of the volumes by origin, while Figure 28 shows the volumes by destinations. As can be seen, international rail freight transport is clearly generated or destinated outside the corridor area of the 11 RFCs Network area (in countries such as Ukraine, Finland and UK). The 11 RFCs Network catchment area for international rail freight transport is thus wider than the corridor area of the 11 RFCs Network area. Note that some areas are white coloured. These do not generate or receive international rail freight transport.

Important NUTS2 origins[17] for rail freight transport are Rotterdam, Hamburg, the Rhein-Ruhr area, Linz, Ostrava, Katowice, Koper, and Milan. On the destination side, we see similar locations such as Rotterdam, Hamburg, Rhein-Ruhr area, Saarland, Ostrava, Katowice, Linz, Turin, Milan, and Budapest. Typically, land-locked regions in countries such as Austria, Czechia, Hungary, Poland and Slovakia rely upon rail transport for larger quantities of transport volumes. This is expressed in the maps presented below.

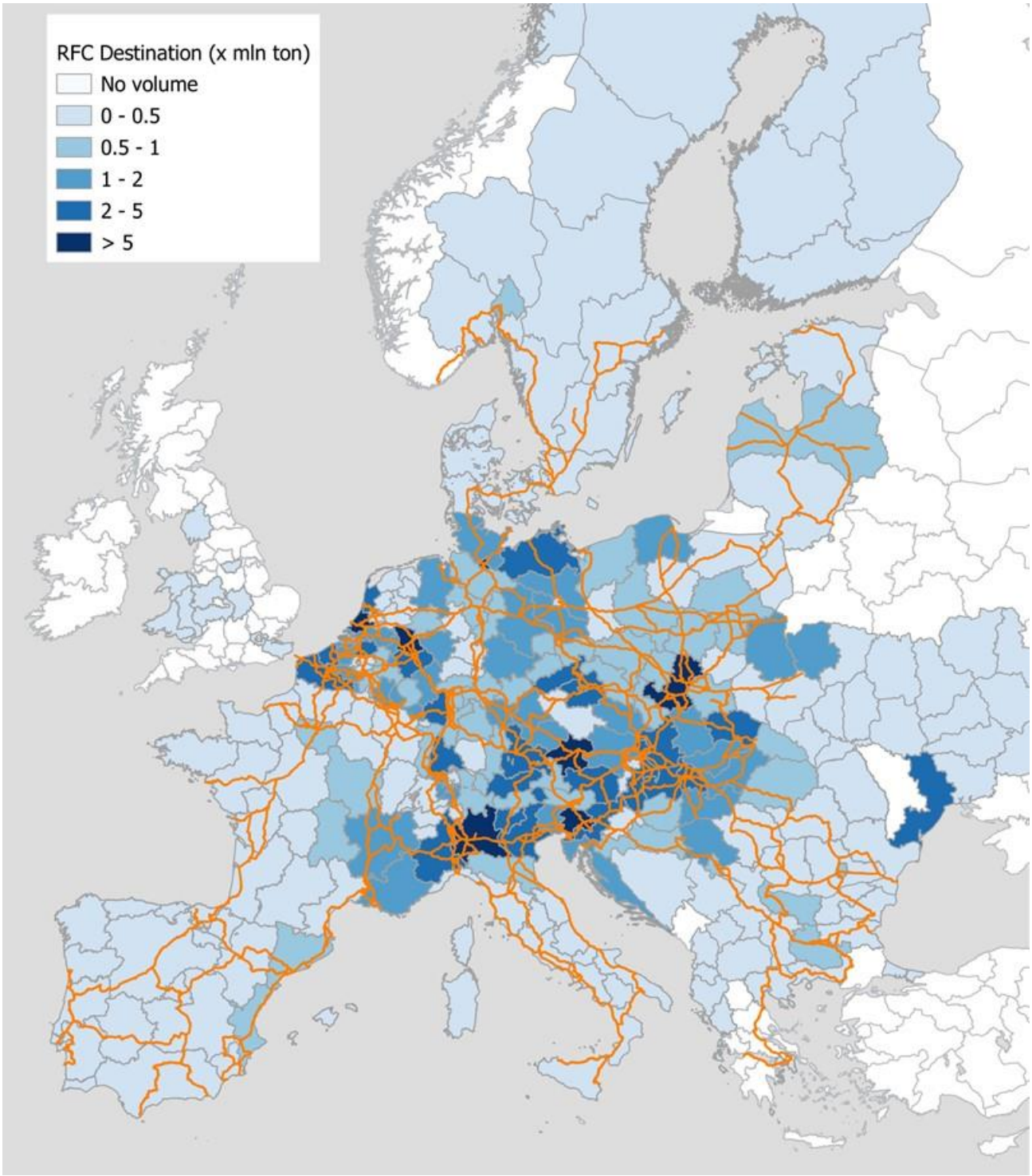
[17] We present the NUTS2 regions by mentioning the main cities in these regions, to make it easier to understand the results.

Figure 27 Origins of international rail freight transport (in million tonnes) for the 11 RFCs network catchment area in 2022




*Source: NEAC estimations*

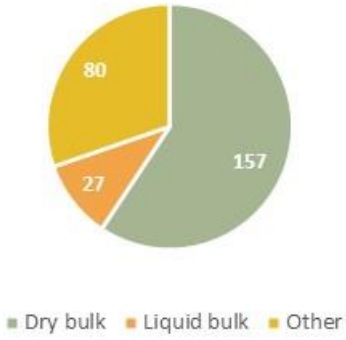
Figure 28 Destinations of international rail freight transport (in million tonnes) for the 11 RFCs network catchment area




*Source: NEAC estimations*

The figure below shows the volumes of international rail freight transport by cargo type in the 11 RFCs Network catchment area. Dry bulk is the most important cargo type for international rail freight transport. It has a share of 59%, which is equivalent to 157 million tonnes. The cargo type *Other* (general cargo, including intermodal transport and container) has a share of 30% (80 million tonnes), and liquid bulk of 10% (27 million tonnes) in the total volumes of international rail freight transport.

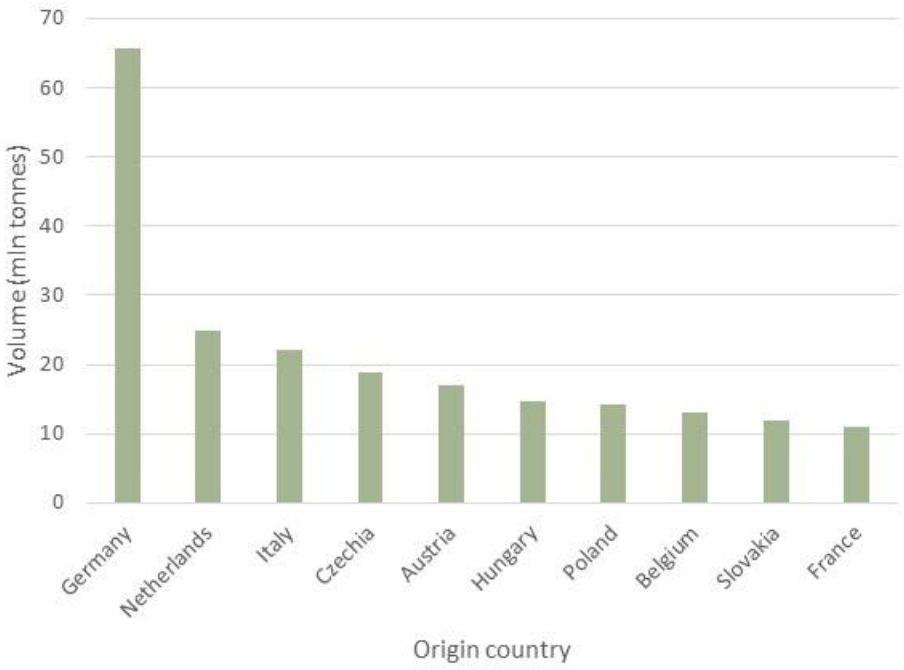
**Figure 29 Estimated Volume of international rail freight transport (million tonnes) by cargo type in 2022, in the combined 11 RFCs network catchment area**




*Source: NEAC estimations*

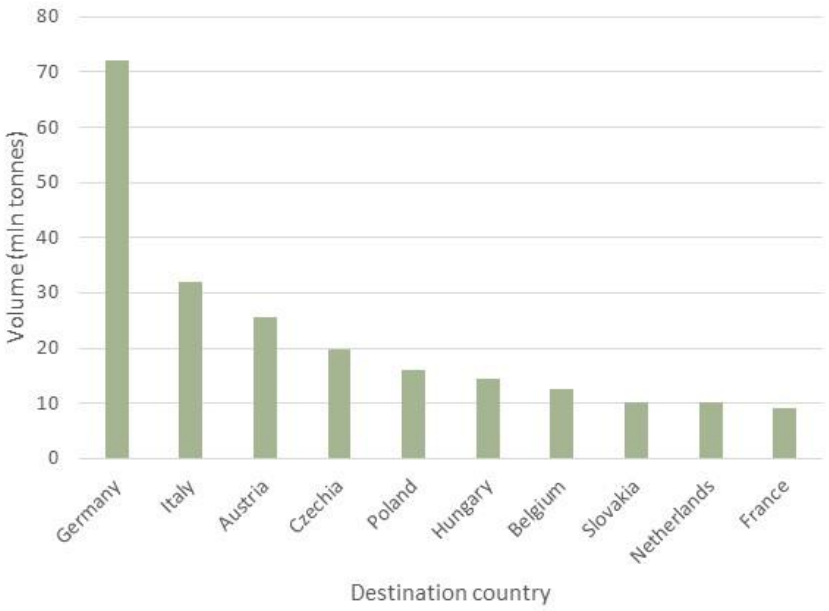
The most important origin and destination countries for rail transport are provided in the graphs below. Concerning both origin and destination, Germany is the country with the highest international rail freight transport volumes. As an origin country it ships 66 million tonnes, while as a destination it receives 72 million tonnes of international rail freight transport. Other important origin countries are The Netherlands and Italy (25 and 22 million tonnes). Concerning destination, Italy and Austria are number 2 and 3 with respectively 32 and 26 million tonnes of international rail freight transport.

**Figure 30 Estimated volume of international rail freight transport (million tonnes) by *origin* country in 2022 in the combined 11 RFCs network catchment area**




*Source: NEAC estimations*

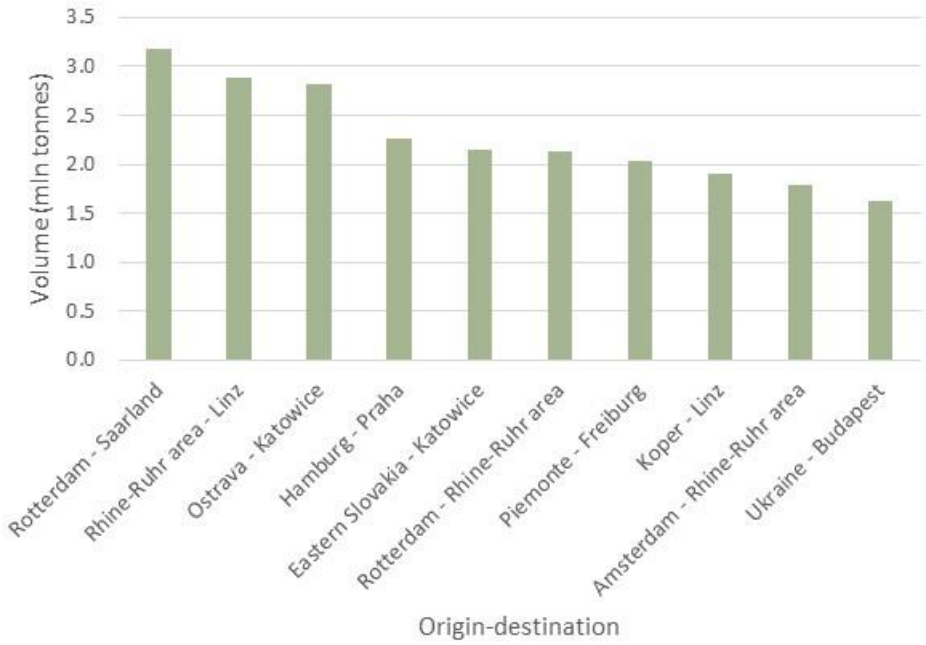
**Figure 31 Estimated volume of international rail freight transport (million tonnes) by *destination* country in 2022 in the combined 11 RFCs network catchment area**




*Source: NEAC estimations*

The figure below shows the 2022 top 10 international rail freight transport relations in the 11 RFCs Network catchment area. The relation between Rotterdam and Saarland is the most important one, with a volume of 3.2 million tonnes. This concerns the transport of dry bulk (coal). Second comes the relation between the Rhein-Ruhr area and Linz, at 2.9 million tonnes. This concerns mostly liquid bulk transport. In third place we see the relation between Ostrava and Katowice, which is mostly dry bulk. The relation between Hamburg and Prague (Praha) comes in fourth place. This rail transport relation is mostly about the transport of general cargo. There is not a single relation that dominates the international rail freight transport market.

**Figure 32 Estimated volume of international rail freight transport (million tonnes) on the top 10 relations in 2022 in the 11 RFCs network catchment area**



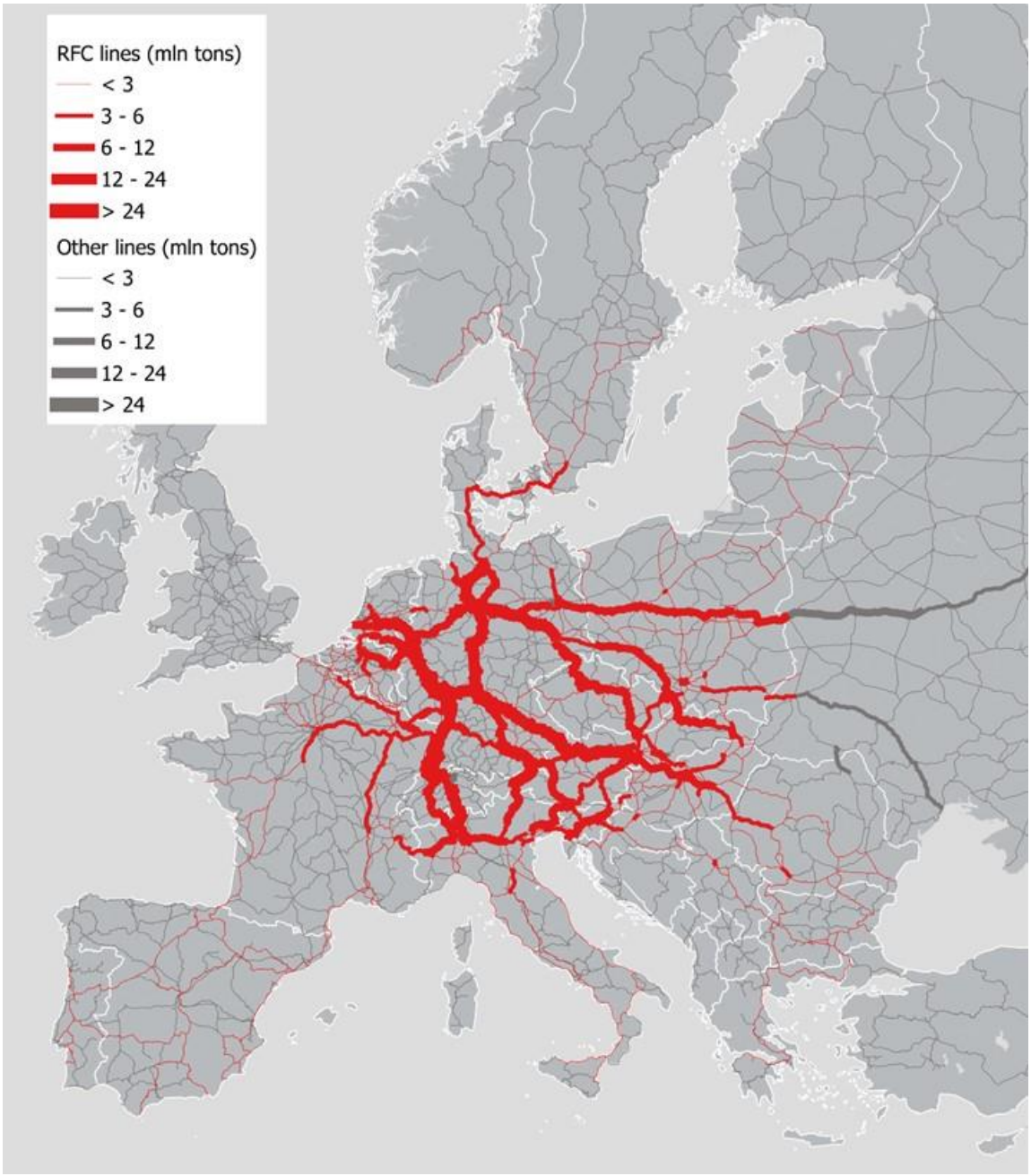

*Source: NEAC estimations*

### 4.2.4 INTERNATIONAL RAIL FREIGHT TRANSPORT FLOWS IN THE 11 RFCS NETWORK AREA

The figure below shows the estimated international rail freight flows (in tonnes) for the 11 RFCs Network catchment area. This provides a general overview of the main railway lines in Europe. As can be seen, Germany comprises the most used railway lines for international rail freight transport. Important relations between Germany and its neighbouring countries are also clearly depicted. Furthermore, a large amount of rail transport can be seen between Poland and Czechia. At the different border crossing points the volumes are consistent with the number of trains observed. Also important to note is the transport to/from Ukraine and China.

Another thing to notice is the relatively small amount of international rail freight transport in Spain, Portugal, the Balkans, Mid and South Italy, South of France, Greece, Sweden, Norway and the Baltic States. The international rail freight volumes in those areas are limited compared to the larger volumes in the centre of Europe.

Figure 33 Estimated Volume of international rail freight transport (million tonnes) by cargo type in 2022




*Source: NEAC estimations*

## 4.3 INTERNATIONAL FREIGHT TRANSPORT IN THE RFC ATL

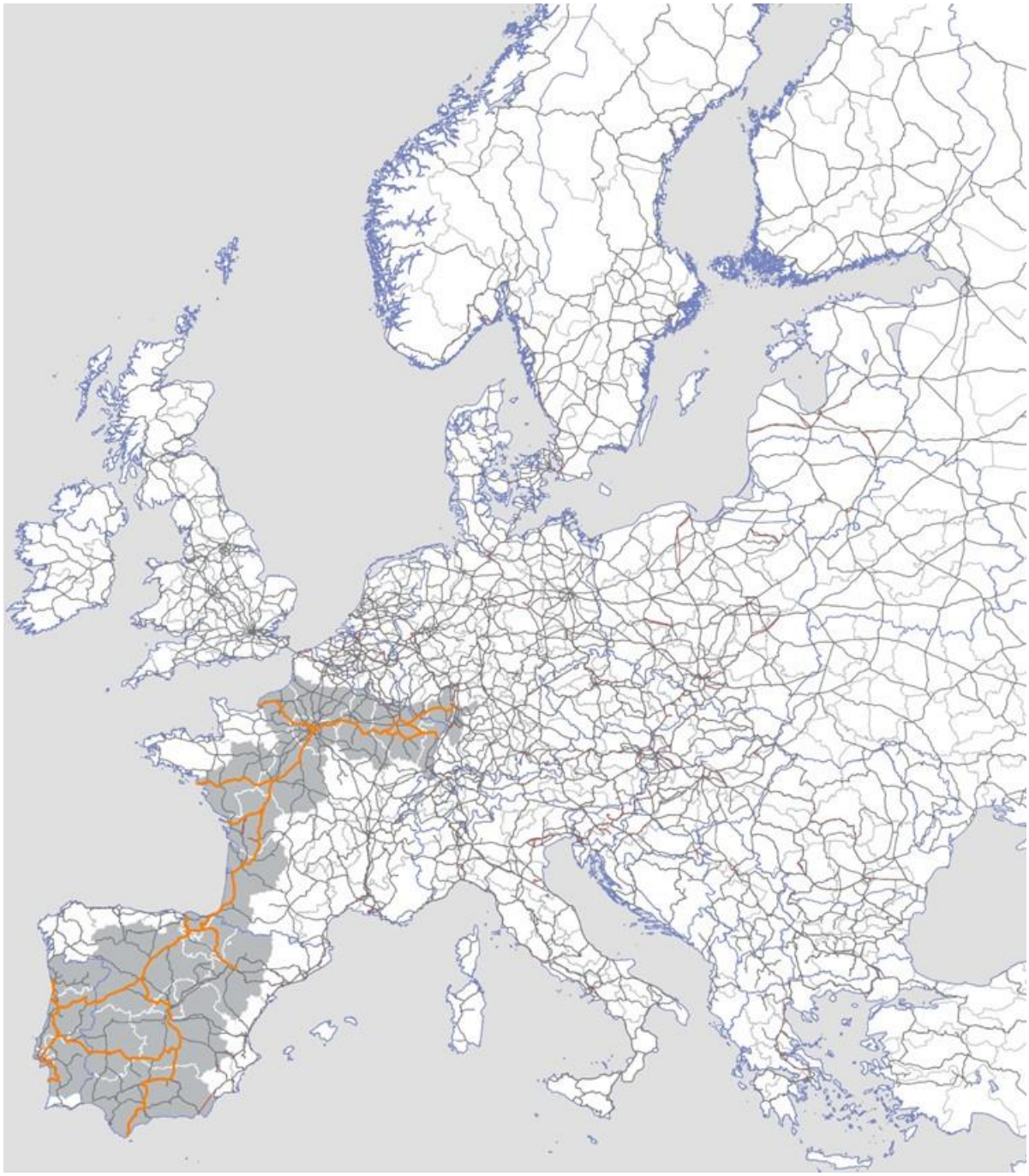
After the presentation of the European international freight transport market, this section provides further details on international freight transport for the RFC ATL. The structure of this section is as follows:

1. Presentation of the catchment and corridor areas of the RFC ATL;
2. Description of the results for all international freight transport for the RFC ATL corridor area;
3. Results of the international rail freight transport in the RFC ATL catchment area;
4. Flows of rail freight on the RFC ATL.

### 4.3.1 CORRIDOR AND CATCHMENT AREA OF RFC ATL

In section 4.1, a definition of corridor and catchment areas is given. This section details the corridor area for the RFC ATL. Figure 34 provides an overview of the RFC ATL network within its corridor area, in relation to the rest of the European rail network. The RFC ATL network and corridor area serves as a basis for the estimation of the international rail freight volumes transported between the different origins and destinations. It is worth noticing that international rail transport within the RFC ATL is also dependent upon rail transport to and from locations outside the corridor area of the RFC ATL, as further elaborated in later sections.

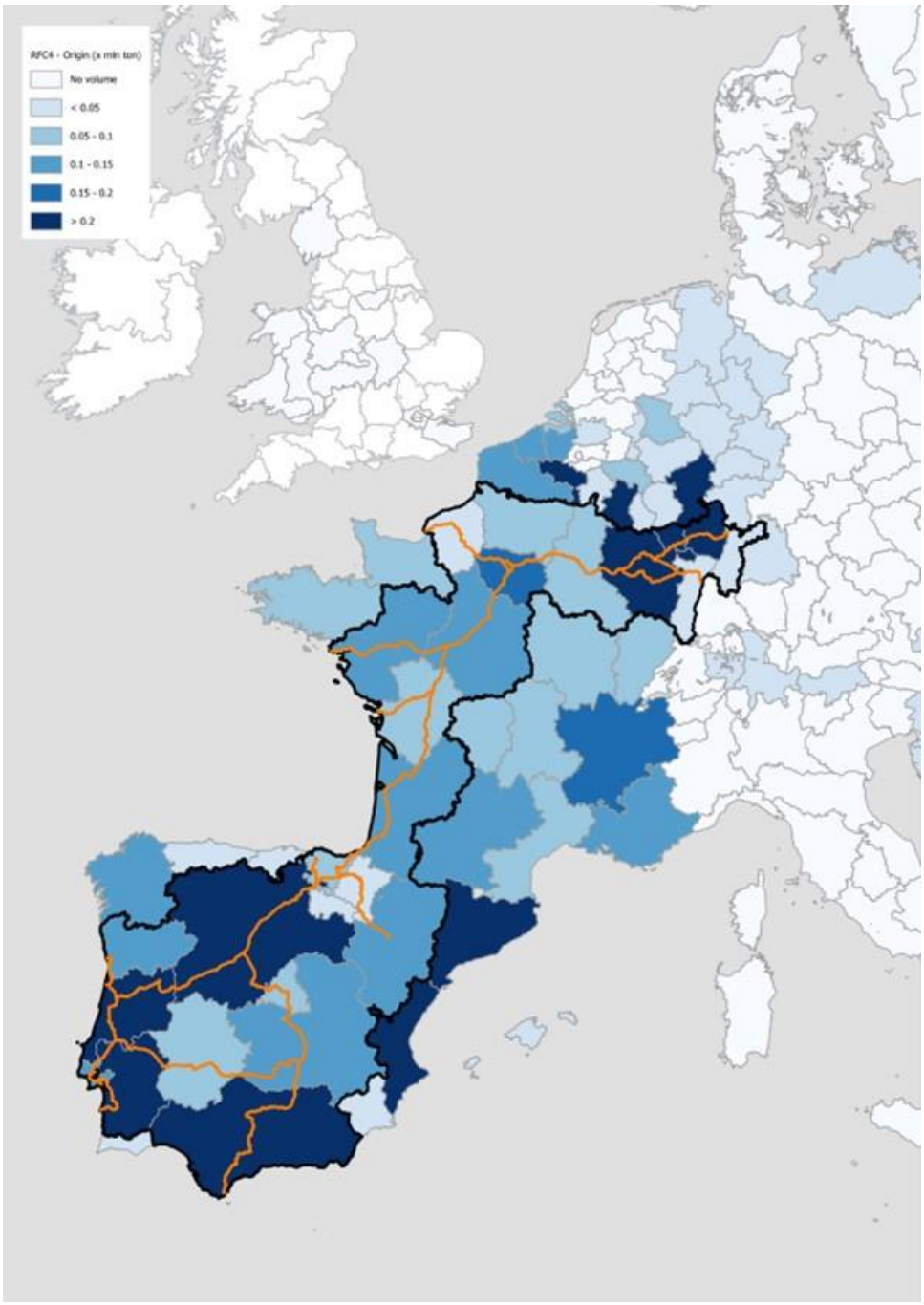
Figure 34 Corridor area and rail network of the RFC ATL



*Source: NEAC*

The catchment area for international rail freight transport of the RFC ATL exceeds the corridor area. It captures large parts of Portugal, Spain, France, and a small part of Germany. A large proportion of the rail freight transport uses the RFC ATL, and its border crossing points, to ship freight by rail from different origins to different destinations (see overview in the next figures). The picture below shows the origins of the RFC ATL, with important origins such as Metz and Saarland in the north and port areas such as Bordeaux and Porto in the south. The origins are both port areas and inland locations, that use the RFC ATL to ship goods. Also, outside the corridor area different zones can be seen that contribute to the RFC ATL, such as Barcelona and Valencia. Note that outside the corridor it often concerns small amounts of volume.

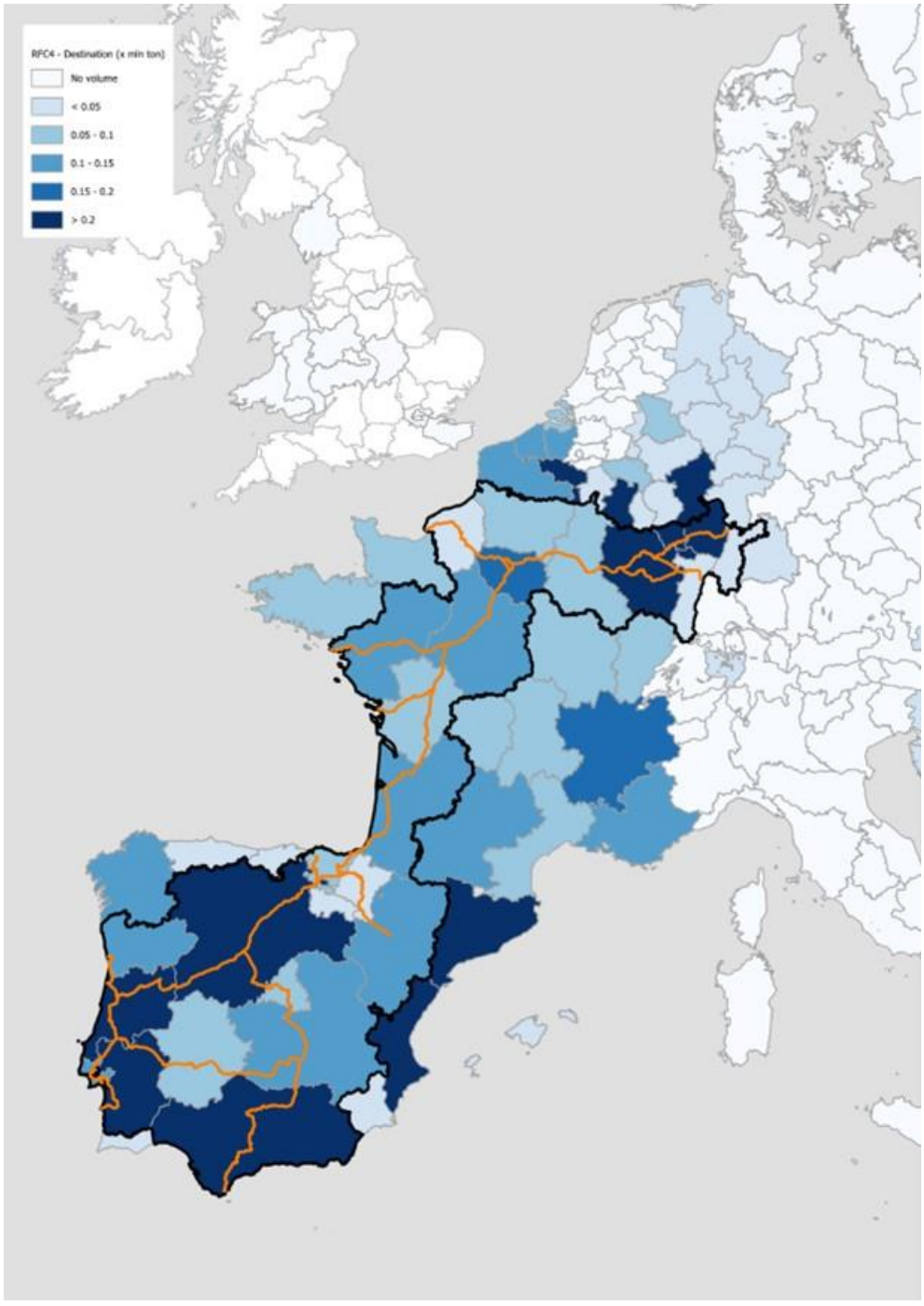
**Figure 35 Origins of international rail freight volume (in million tonnes) that use the RFC ATL rail network catchment area**




*Source: NEAC estimations. Legend: Orange = rail tracks of RFC ATL. Blue = Volume by origin. Black = Delineation of corridor area*

The next figure presents the destinations within the RFC ATL catchment area. The figure highlights similar zones as the origins that exhibit the high freight volumes dispatched from these destinations. It is evident from the figure that numerous zones benefiting from RFC ATL's services fall outside the corridor area, such as areas in the rest of Germany, and France.

**Figure 36 Destinations of international rail freight volume (in million tonnes) that use the RFC ATL rail network catchment area**




*Source: NEAC estimations. Legend: Orange = rail tracks of RFC ATL. Blue = Volume by origin. Black = Delineation of corridor area*

### 4.3.2 ALL INTERNATIONAL FREIGHT TRANSPORT FOR THE RFC ATL

The total volume of international freight transport in the *catchment* area of the RFC ATL is estimated at 83 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 11 million tonnes (about 18.000 trains). This is 14% of the total amount of freight transport for the RFC ATL. The share of inland shipping is 4%, the share of road transport 43%. Sea shipping has a share of 18%.

Concerning the cargo types, *Other* (General cargo, including intermodal transport and container) is the most important one at 46 million tonnes (56%). *Dry bulk* is second in the international freight transport within the catchment area of the RFC ATL, with a volume of 27 million tonnes (32%). Liquid bulk has a share of 12% in the total volume of international freight transport over all modes in the corridor area of the RFC ATL.

**Figure 37 Estimated volume (million tonnes) and share of *all* international freight transport over land by mode and cargo type in the *catchment* area of RFC ATL**

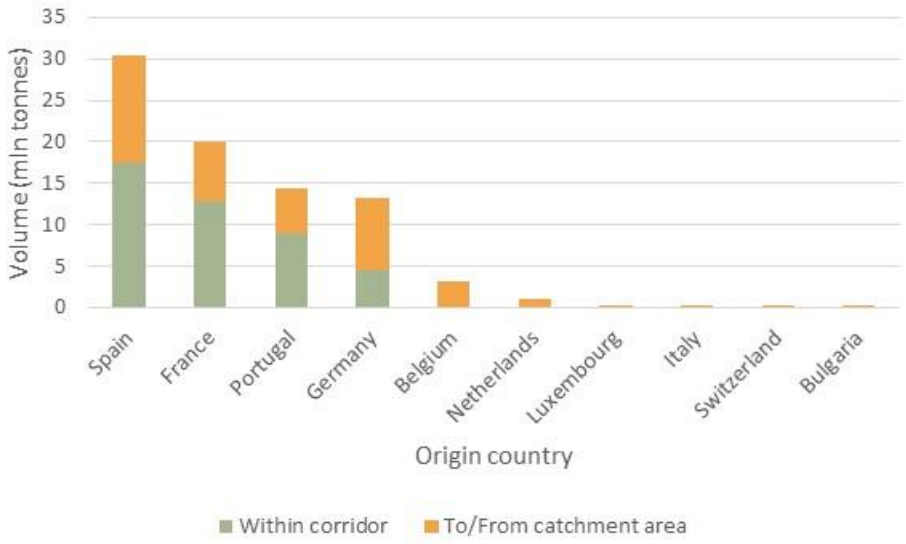

*Source: NEAC estimations*

Figure 38 and Figure 39 show the origin and destination countries for all international freight transport within the catchment area (which includes the corridor area) of the RFC ATL. The green colour shows the origin and destination within the corridor area of the RFC ATL. The orange colour shows the international freight transport to and from the rest of the catchment area. As can be seen, only the RFC ATL countries (Portugal, Spain, France, Germany) have green-coloured bars beside the orange ones, as these are the corridor countries.

The main countries with origin locations for international freight transport in the RFC ATL are Spain, France, Portugal, and Germany. This concerns all transport by road, rail, inland shipping, and sea shipping. A volume of 30 million tonnes of international freight transport has its origin in Spain. Of this volume, 57% (17 million tonnes) is transported to other countries within the RFC, such as France or Germany. France comes in second place with 20 million tonnes originating from locations in this country. In this case, 13 million tonnes go to other countries within the RFC. Portugal is the third most important origin country with 14 million tonnes. Countries such as Italy, The Netherlands, and Belgium are origin countries located outside of the RFC ATL.

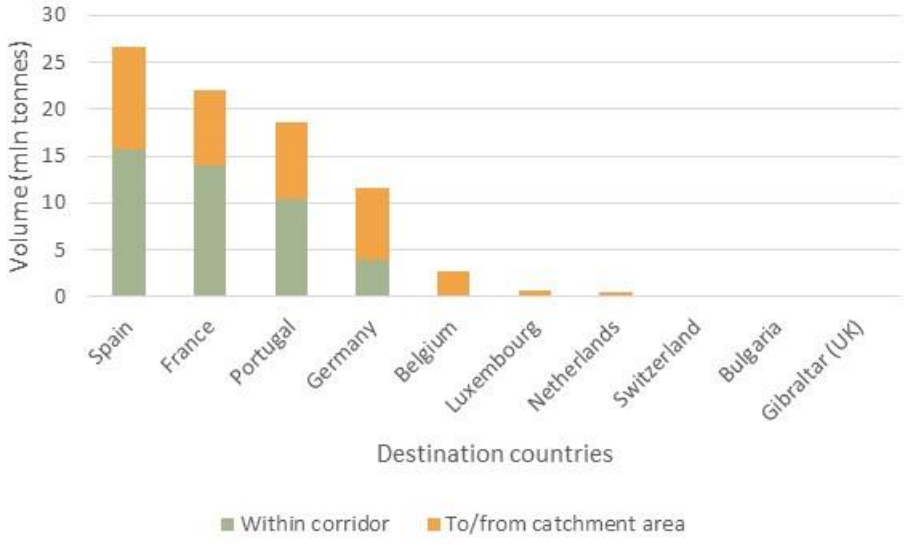
The main countries with destination locations are Spain, France, and Portugal. Spain receives 27 million tonnes, of which 16 million tonnes (59%) stem from other RFC ATL countries. France is second, with a volume of 22 million tonnes, of which 14 million tonnes have their origin in other RFC ATL countries. Portugal receives 14 million tonnes, with 9 million tonnes coming from other RFC ATL countries.

**Figure 38 Estimated volume (million tonnes) of *all* international freight transport over land by *origin* in 2022 within the catchment and corridor area of RFC ATL**




*Source: NEAC estimations*

**Figure 39 Estimated volume (million tonnes) of *all* international freight transport over land by *destination* in 2022 within the catchment and corridor area of RFC ATL**




*Source: NEAC estimations*

The next table shows all international freight volume between the countries *within the corridor area* of RFC ATL for the *land* modes. The total amount of international freight volume is 35.3 million tonnes within the corridor area. The most important freight transport relation is between locations in Spain and Portugal at 6.8 million tonnes of freight transport by all land modes. The reverse direction has 5.9 million tonnes. Also, the volume on the relation Spain-France (vv) is high. The main reason to look at all modes in the corridor area is that it is there where we expect most competition between modes.

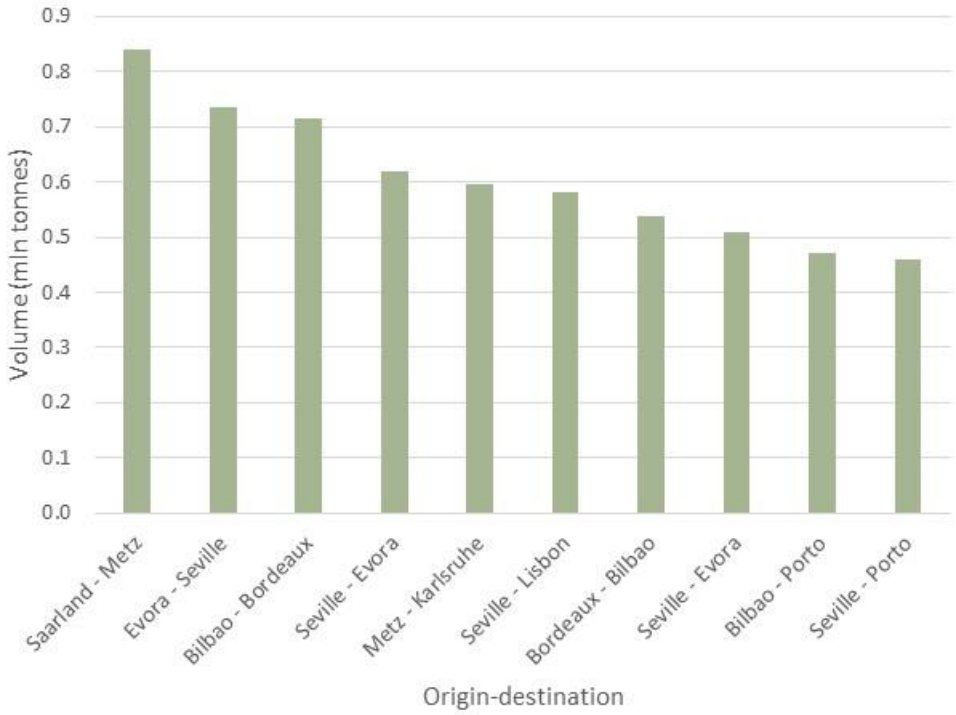
Table 34 Total freight volume (million tonnes) between the countries for land modes within the corridor area of the RFC ATL

| From/To | DE | ES | FR | PT | Total |
|---|---|---|---|---|---|
| **DE** | | 0.7 | 3.7 | 0.2 | 4.6 |
| **ES** | 0.6 | | 6.6 | 6.8 | 14.1 |
| **FR** | 3.1 | 5.9 | | 0.6 | 9.6 |
| **PT** | 0.1 | 5.9 | 1.0 | | 7.0 |
| **Total** | 3.8 | 12.6 | 11.3 | 7.6 | 35.3 |

*Source: NEAC estimations*

The chart below depicts the main origins and destinations for all land modes. The most important relation is Saarland-Metz at 0.8 million tonnes. In second place we see Evora - Seville at 0.7 million tonnes, followed by Bilbao - Bordeaux at 0.7 million tonnes. As can be seen, most of the top-10 origins and destinations can be found on the Iberian Peninsula. The exceptions are Saarland-Metz and Metz-Karlsruhe. Note that the volumes on the different relations are relatively small compared to other RFCs.

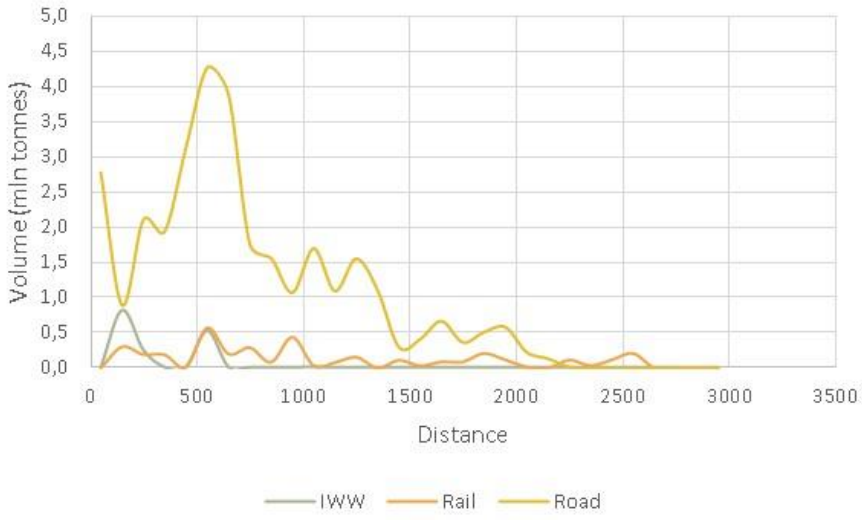
Figure 40 Estimated volume (million tonnes) for the 10 relations (at NUTS2 level) of *all* international freight transport over land in 2022 *within the corridor area* of RFC ATL




*Source: NEAC estimations*

The 'volume' distance distribution for international freight transport within the corridor area of RFC ATL is shown in the figure below (in million tonnes) by distance (in km). The peak for road (4 million tonnes) is around 550 km. Inland shipping has a small volume and no real peak. For international rail transport no real peaks can be spotted. The highest is 0.6 million tonnes around 550 km. As can be seen, distances are quite long for road and rail transport. This is partly due to the diverse character of the RFC ATL, having border crossing points from Portugal/Spain, up to France/Germany. This notion is important as it shows there might be a potential for shift from road to rail on longer distances (over 1500 km).

Figure 41 Volume distribution (million tonnes) of international freight flows by distance (km) *within corridor area* of RFC ATL in 2022

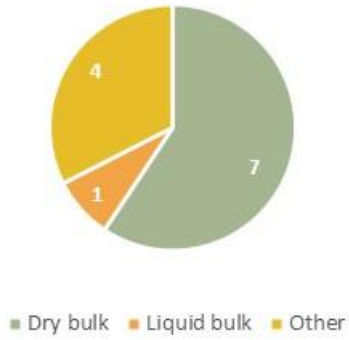



*Source: NEAC estimations*

### 4.3.3 INTERNATIONAL RAIL FREIGHT TRANSPORT IN THE RFC ATL CATCHMENT AREA

Looking at the volumes of international rail freight transport by cargo type within the catchment (and corridor) area of the RFC ATL, *Dry bulk* is the most important cargo type. It has a share of 52%, with 19 million tonnes of rail freight. The category *Other* has a share of 38% and liquid bulk of 10% in the total volumes of international rail freight transport in the RFC ATL.

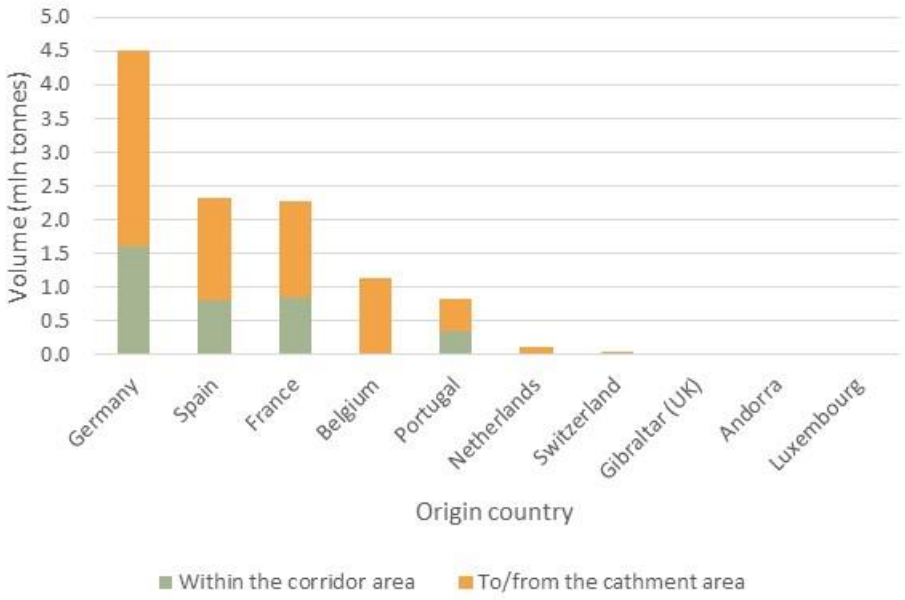
Figure 42 Estimated Volume of international rail freight transport (million tonnes) by cargo type in 2022 within the catchment (and corridor) area of the RFC ATL




*Source: NEAC estimations*

The origin and destination countries for international rail freight transport in the catchment and corridor area are provided in the graphs below. Concerning origin, Germany is the country with the highest international rail freight transport volume. As an origin country, it ships 4.5 million tonnes. Locations in this country are an important origin for countries outside of the RFC ATL, 64% of the rail freight is transported to locations in outside of the RFC ATL countries, using the RFC ATL network. In second place comes the Spain at 2.3 million tonnes. Third comes France, also at 2.3 million tonnes of international rail freight transport volume. Note that the share of rail freight transport within the corridor area of the RFC ATL is 32% (which relates to the green bars in the graph). Also note that the flows from non-RFC ATL countries are relatively small.

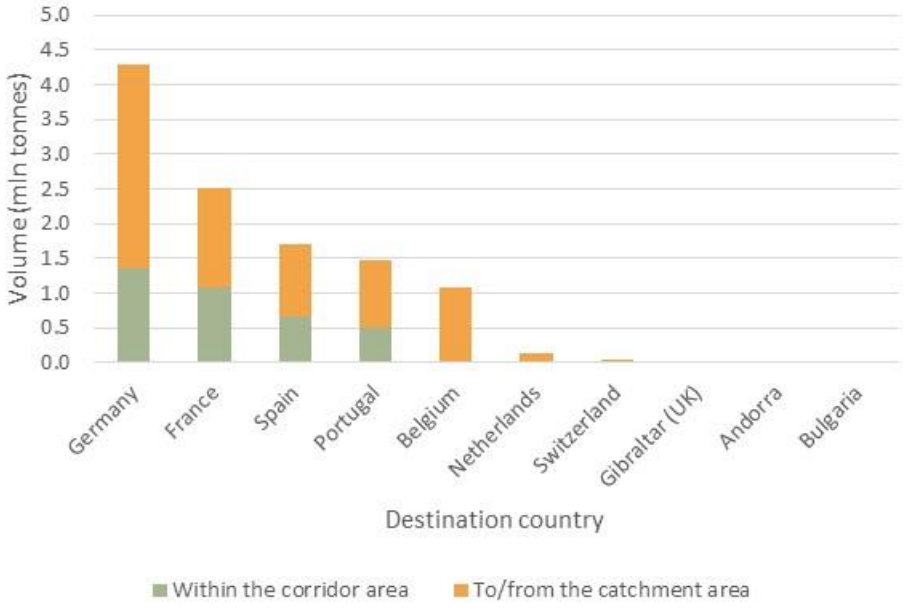
**Figure 43 Estimated volume of international rail freight transport (million tonnes) by *origin* country in 2022 in the catchment and corridor area of the RFC ATL**




*Source: NEAC estimations*

The most important destination country is Germany. It receives almost 4.3 million tonnes of rail transport. Other important destination countries are France (2.5 million tonnes), and Spain (1.7 million tonnes). The volume stemming from other countries in the RFC ATL is 32%. It shows that the RFC ATL is a rail freight corridor with an important international position as 68% of the relations outside the RFC ATL uses the rail network of the RFC ATL.

**Figure 44 Estimated volume of international rail freight transport (million tonnes) by *destination* country in 2022 in the catchment and corridor area of the RFC ATL**

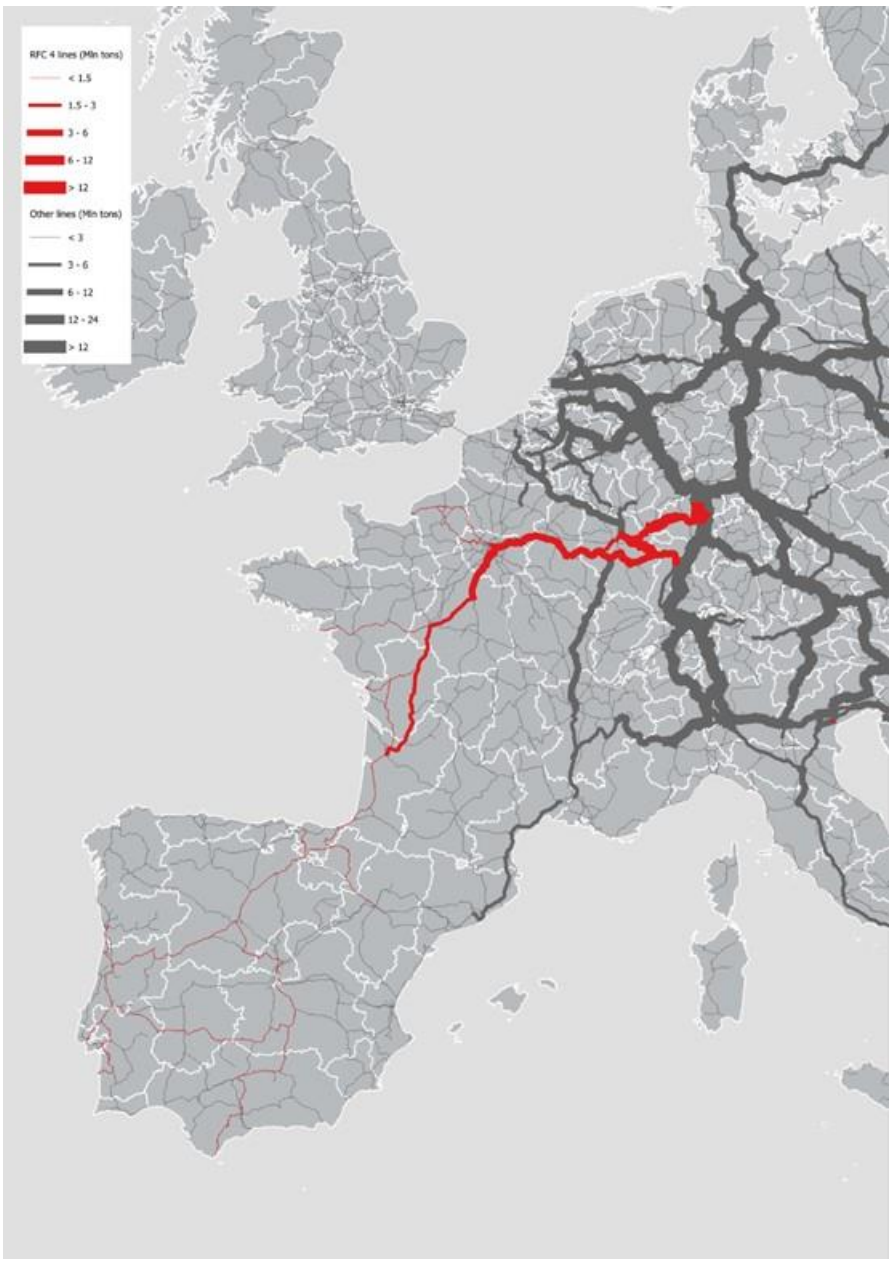



*Source: NEAC estimations*

### 4.3.4 INTERNATIONAL RAIL FREIGHT TRANSPORT FLOWS IN THE RFC ATL

The figure below shows the estimated international rail freight flows (in tonnes) for the RFC ATL. This provides a general overview of the use of the main rail lines in the corridor area. The volumes on the RFC ATL cannot be understood if we present them isolated. The rail volumes on the different tracks of the RFC ATL often have an origin or destination elsewhere in Europe. Looking at the map, we see that the rail volumes in the RFC ATL mainly are in the north of the RFC in northeast France and the adjacent areas in Germany. Towards the south (Dijon-Marseille), the flows decrease gradually. On the Iberian Peninsula, the rail flows are small.

Figure 45 Estimated Volume of international rail freight transport (million tonnes) in 2022




*Source: NEAC estimations*

# 5 ANALYSIS OF THE FUTURE ATL RFC TRANSPORT MARKET

The future market analysis has been performed for the three scenarios described in Section 3.3 above, i.e. the Reference scenario, the Projects scenario and the Sensitivity scenario. The results for these three scenarios have been produced for 2030. The future freight transport is presented in steps to help understand the importance of international freight transport in general and rail freight transport specifically. Results for the 11 RFCs Network catchment and corridor area are presented first, then the results for the RFC ATL catchment and corridor area follow:

- Section 5.1 presents the **future freight transport market in the 11 RFCs network area**:
  - Section 5.1.1 provides a general overview of the **future of all international freight transport for the 11 RFCs network catchment area**. This includes total volumes by mode and cargo type. Furthermore, the volumes by main origin and destination countries are illustrated, as well as the main relations for all freight transport. Finally, a volume-distance distribution by mode is given;
  - Section 5.1.2 presents the **future of international rail freight transport for the 11 RFCs network catchment area**, with the volume by cargo type, the flows on the rail network, the rail volumes by origin and destination countries and the top 10 relations for international rail freight transport.
- Section 5.2 provides the **future of the international freight transport in the RFC ATL.**
  - Section 5.2.1 provide a general overview of the **future of all international freight transport in the RFC ATL**. This includes total volumes by mode and cargo type. Furthermore, we present the volumes by main origin and destination countries, as well as the main relations for all freight transport. Finally, a volume-distance distribution by mode is presented;
  - Section 5.2.2 describes the **future of international rail freight transport of the RFC ATL**. This provides a general overview of the origins and destinations of rail freight for the RFC ATL. We present the volume by cargo type, the flows on the rail network, the rail volumes by origin and destination countries and the top 10 relations for international rail freight transport;
  - Section 5.2.3 presents the **developments on the most important BCPs** in the RFC ATL.

## 5.1 FUTURE TRANSPORT MARKET IN THE COMBINED 11 RFCS NETWORK AREA

This section describes the results of the future market analysis in the 11 RFCs Network area. As explained in the previous chapter on the current market analysis, the market analysis of the individual RFCs is more appropriately assessed in the framework of the 11 RFCs Network, as the RFCs do not function in isolation.

### 5.1.1 FUTURE OF INTERNATIONAL ALL FREIGHT TRANSPORT FOR THE 11 RFCS NETWORK CATCHMENT AREA

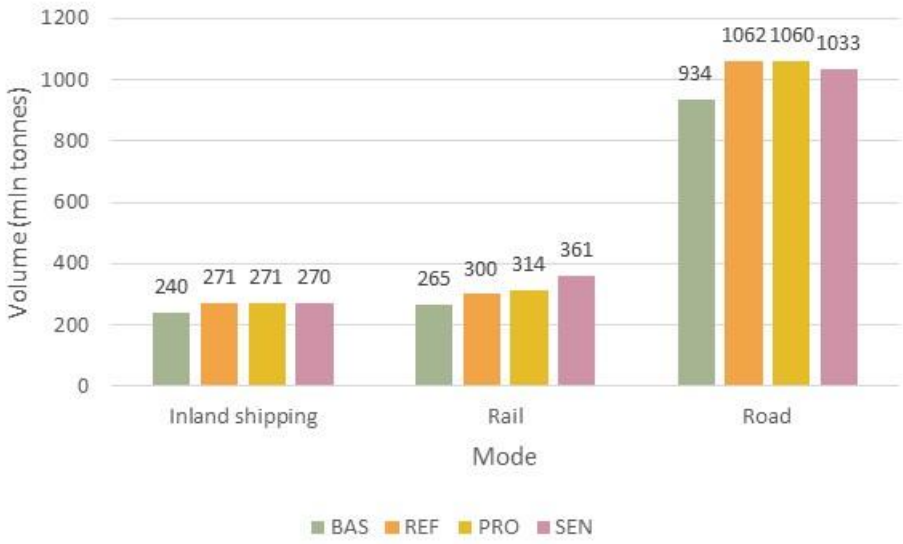
Due to the economic developments, all modes grow in the Reference scenario between 2022 and 2030. Inland shipping and rail grow by 13%, road by 14%. In absolute terms, international road freight transport grows most, by 126 million tonnes (from 934 to 1,062 million tonnes). Inland shipping grows by 31 million tonnes (from 240 to 271 million tonnes) and rail transport by 35 million tonnes (from 265 to 300 million tonnes). Figure 46 shows the overall developments by mode and scenario within the 11 RFCs network catchment area.

The implementation of different rail projects across Europe (Projects scenario) leads to an extra growth of 5% for rail transport compared to the Reference scenario, which is 14 million tonnes. Large projects across Europe such as Rail Baltica, Fehmarn Belt, the Koralm railway line and tunnel, the Semmering tunnel, the

second track Koper-Divača or Rijeka-Zagreb-Koprivncica, account for this growth. The volume for IWW (inland shipping) remains the same and road transport decreases a bit. Although not shown in the graph, a small shift in sea transport also causes extra growth.

The third scenario (Sensitivity) shows a hypothetical development for rail transport, assuming the completion of infrastructure with reference to the TEN-T requirements and the loading gauge. Compared to the base year situation, a growth of 36% is calculated for rail (+23% compared to the Reference scenario). The introduction of longer trains (740 meter) has an important effect on this result. This scenario can be regarded as a maximum potential for rail transport. Compared to the Reference, both inland shipping and road transport decrease, inland shipping by 1 million tonnes and road transport by 29 million tonnes. Keep in mind that the increase of rail transport (61 million tonnes) is not fully covered by a shift from inland shipping and road. This is due to the use of road transport for the first and last mile and a shift to shortsea transport.

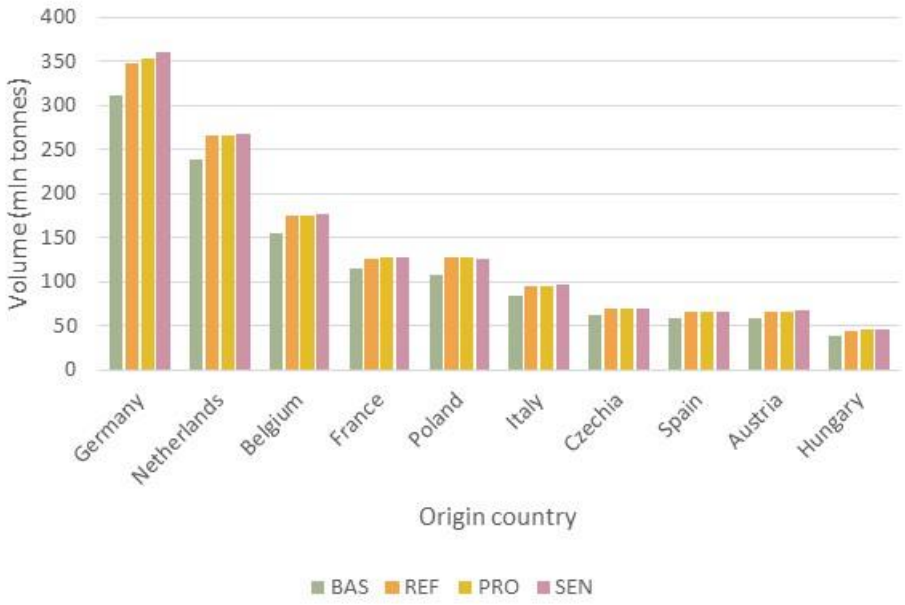
**Figure 46 Development of volume (in million tonnes) by mode and scenario for the 11 RFCs network catchment area**




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

The next two figures show the development of the volume of international freight transport for all modes for the top 10 countries and per scenario. The most prominent growth stems from the Reference scenario for both origins and destinations. The Projects scenario and the Sensitivity scenario show only small differences compared to the Reference scenario; the largest differences can be seen in Germany. The top 10 origin countries remain the same as presented earlier for 2022. Germany, the Netherlands, and Belgium constitute the 3 largest origin countries for international freight transport. The total amount of volume for Germany increases by 12% between the 2022 Base year and 2030 Reference scenario, from 311 to 348 million tonnes. Similar growth can be found in the Netherlands (+12% from 238 to 265 million tonnes) and Belgium (+13% from 155 to 175 million tonnes). The largest growth between the 2022 Base year and the 2030 Reference scenario can be found in Poland (+20% from 107 to 128 million tonnes) and in Hungary (+18%, from 38 to 45 million tonnes).

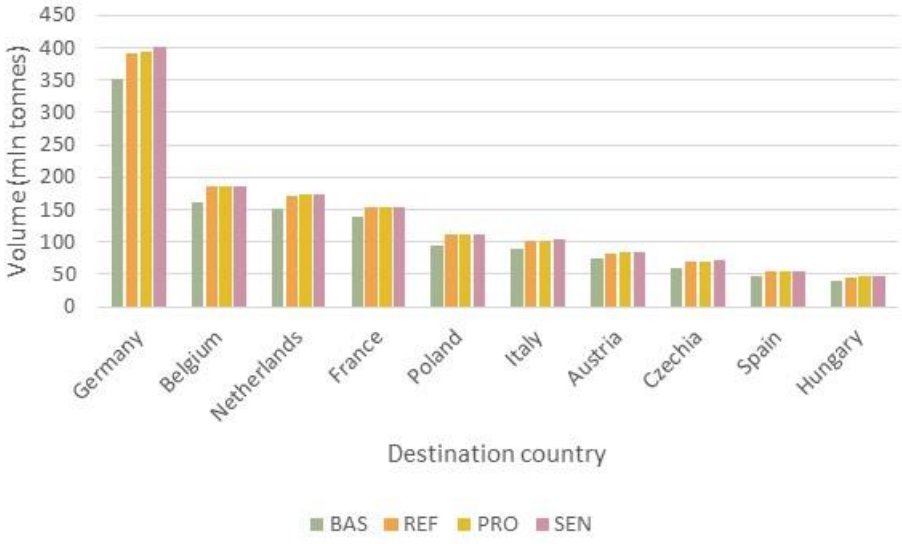
Figure 47 Development of volume (in million tonnes) of all international freight transport by the top 10 origin countries within the 11 RFCs network catchment area




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

Similar growth rates can be found for the destination countries. Also, the top three countries for international freight transport consists of Germany (+11% from 352 to 392 million tonnes), Belgium (+14% from 163 to 185 million tonnes), and The Netherlands (+13% from 152 to 172 million tonnes). As with the origin countries, the ranking of the destination countries does not change in 2030 compared to 2022

Figure 48 Development of volume (in million tonnes) of all international freight transport by the top 10 destination countries within the 11 RFCs network catchment area




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

### 5.1.2 FUTURE OF INTERNATIONAL RAIL FREIGHT TRANSPORT FOR THE 11 RFCS NETWORK CATCHMENT AREA

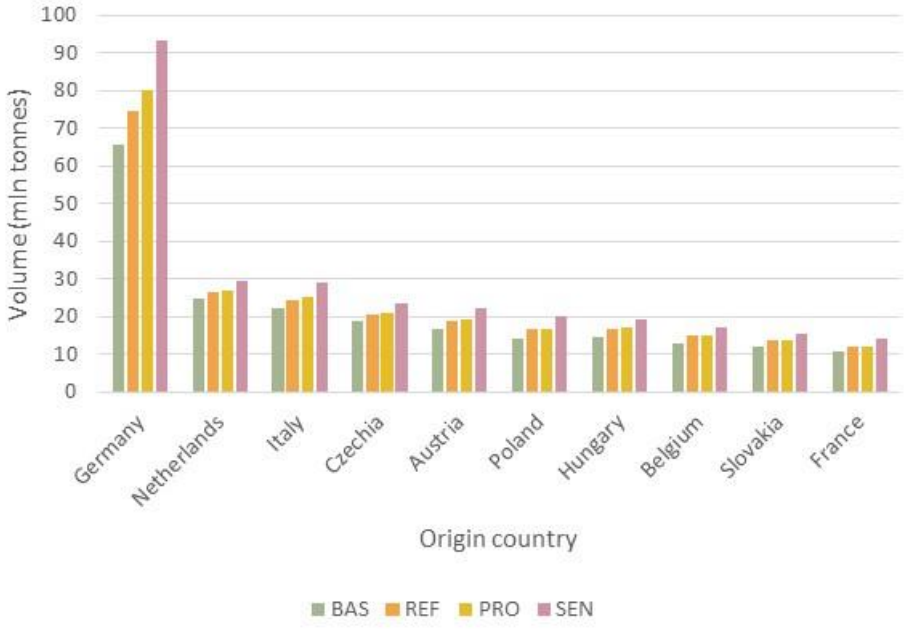
The next two graphs show the development of the volume in international rail freight transport for origins and destinations in the top 10 countries within the catchment area of the 11 RFCs Network. The changes are more prominent for international rail freight transport than for *all* international rail freight transport as shown in the previous section.

In the *Reference scenario*, growth from 2022 on for international rail freight transport is the highest in Germany for both origin (+14% from 65 to 75 million tonnes) and destination (+11% from 72 to 80 million tonnes). In the top 10 origin countries, the overall growth varies per country from 7% (The Netherlands from 25 to 27 million tonnes) to 19% (Poland from 14 to 17 million tonnes). For the destination countries, similar growth patterns are forecasted.

The *Projects scenario* has a limited impact on international rail freight transport volume, except for Germany. On average, the growth in international rail volume for the top 10 countries is 4%, compared to the Reference scenario. The lowest extra growth for the Projects scenario compared to the Reference scenario is reported for Poland at 0%, the highest for Germany at 6% (from 75 to 80 million tonnes). For the destination top 10 countries the growth is 3%. The smallest growth is found in Czechia (+1% from 22 to 23 million tonnes), the largest growth can be found in Slovakia (+15%, from 12 to 14 million tonnes).

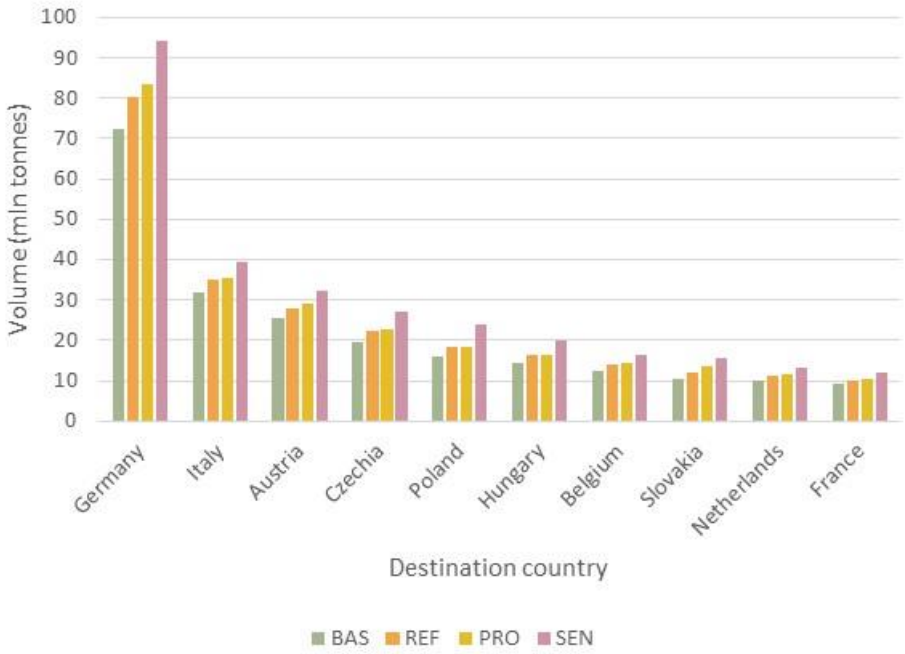
The potential extra volume in the top 10 origin countries, as shown by the *Sensitivity scenario*, is overall 18% (from 239 to 283 million tonnes), compared to the Reference scenario. The lowest growth compared to the Reference scenario can be seen for the Netherlands (+10% from 27 to 29 million tonnes), the highest growth for Germany (+25% from 75 to 93 million tonnes). For the destination countries the growth is 19% (from 247 to 293 million tonnes) compared to the Reference scenario. Italy has the lowest growth at +12% (from 35 to 39 million tonnes) and Poland shows the largest growth at +33% (from 18 to 24 million tonnes).

**Figure 49 Development of volume (in million tonnes) of all international rail freight transport by the top 10 origin countries within the 11 RFCs network catchment area**




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

**Figure 50 Development of volume (in million tonnes) of all international rail freight transport by the top 10 destination countries within the combined 11 RFCs network**



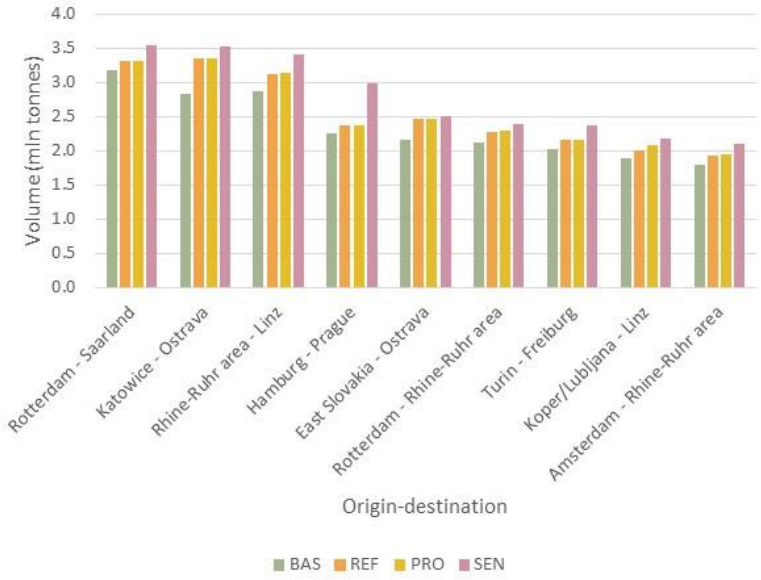

*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

Looking at the top 10 relations of the 11 RFCs Network, the main one is between Rotterdam (NL) and Saarland (DE). The second most important relation is between Katowice (PL) and Ostrava (CZ). Both relations concern the transport of coal which is important for the steel production in Saarland and Ostrava. Another important relation concerns transport from the Rhein-Ruhr area to Linz. In this case, the type of cargo is more varied, but the transport of liquid bulk (oil products and chemicals) is important in this relation. Between Hamburg and Prague, the cargo comprises mainly general cargo.

Interesting to see is the impact of the Projects scenario between Katowice and Ostrava. It shows that new projects have a significant impact on international rail freight transport also on this relation. The same can be seen on the relation Eastern Slovakia – Ostrava.

The Sensitivity scenario shows, compared to the Reference scenario most growth between Hamburg and Prague (+25% from 2.3 to 3.0 million tonnes compared to the Reference). The general measures such as extra train length, function as a multiplier and add extra growth.

Figure 51 Development of volume (in million tonnes) of all international rail freight transport by the top 10 relations within the 11 RFCs network area




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

## 5.2 FUTURE OF THE INTERNATIONAL FREIGHT TRANSPORT FOR RFC ATL

### 5.2.1 FUTURE OF ALL INTERNATIONAL FREIGHT TRANSPORT FOR RFC ATL

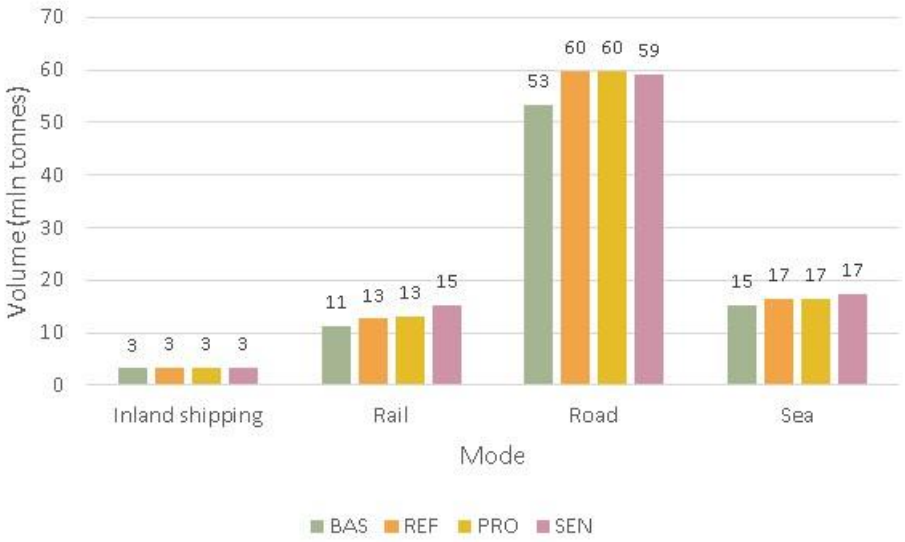
This section shows the results of the future market analysis for the RFC ATL. Figure 52 shows the overall developments by mode and scenario in the catchment and corridor area of RFC ATL.

Between the 2022 Base year and 2030 Reference scenarios, all modes grow due to economic developments. The overall growth is 11% (from 83 to 92 million tonnes). Rail transport grows by 12% (2 million tonnes) from 11 to 13 million tonnes. Inland shipping grows by 6%, road by 12%, and sea shipping by 9%. In absolute terms, international road freight transport grows most, by 7 million tonnes (from 53 to 60 million tonnes). Inland shipping remains the same in volume at 3 million tonnes. Sea shipping grows by 2 million tonnes from 15 to 17 million tonnes.

The implementation of different rail projects across Europe, does not lead to a significant growth of rail transport in the RFC ATL. There is some modal shift between road and rail. In the RFC ATL large and smaller projects across the rail network account for this shift. Also, infrastructure projects outside the RFC ATL contribute leading to mode shift or rerouting. Road transport decreases a bit (though not visible in the graph), while rail transport grows by 1 million tonnes.

The third scenario shows a hypothetical development for rail transport. Compared to the base year situation, overall a growth of 15% in volume (million tonnes) is estimated. The introduction of longer trains (740 meters) and the transition to standard European gauge has an important impact on this result. This scenario can be regarded as a maximum potential for rail transport in 2030. The growth has different causes, such as rerouting, mode shift, or splitting freight transport from one mode into transport by two modes (for example, splitting road transport into road and rail transport). In the third scenario, rail transport in the RFC ATL grows by 36% compared to the base situation. This is a substantial achievement compared to the 12% forecasted for the Reference scenario.

Figure 52 Development of volume (in million tonnes) by mode and scenario for the corridor area of RFC ATL

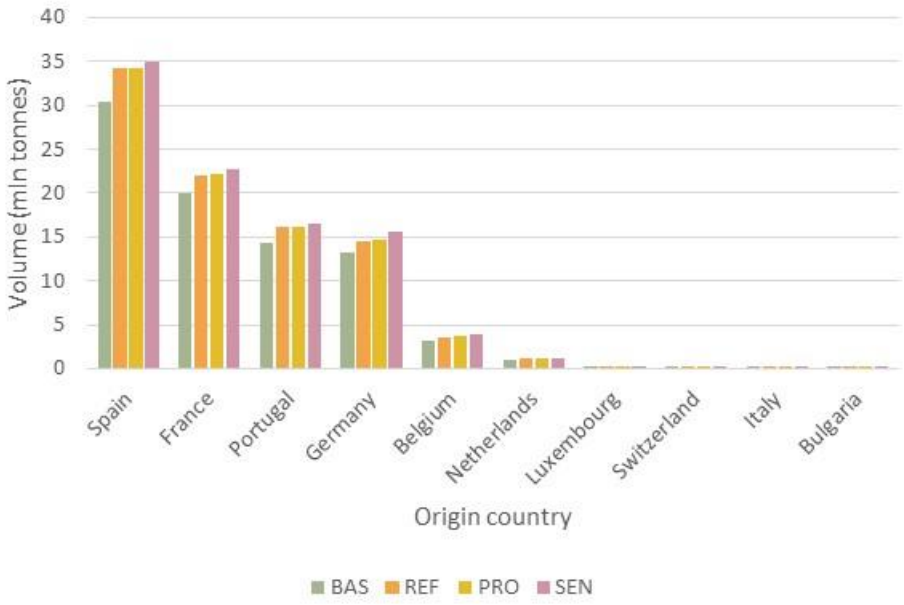



*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

The next two figures show the development of the volume of international in freight transport by *land modes* for the origin and destination countries in the catchment area and the corridor area of the RFC ATL for their respective scenarios. In general, the most prominent growth stems from the economic development (REF). The Projects (PRO) scenario and the Sensitivity (SEN) scenario show small differences. Concerning the Projects scenario variations are primarily due to mode shifts, where the total volume does not really change. The Sensitivity scenario for all land modes shows a bit more volume compared to the Reference and Projects scenarios. The totals are almost equal between the different scenarios. The reason is mainly due to a shift between the land modes.

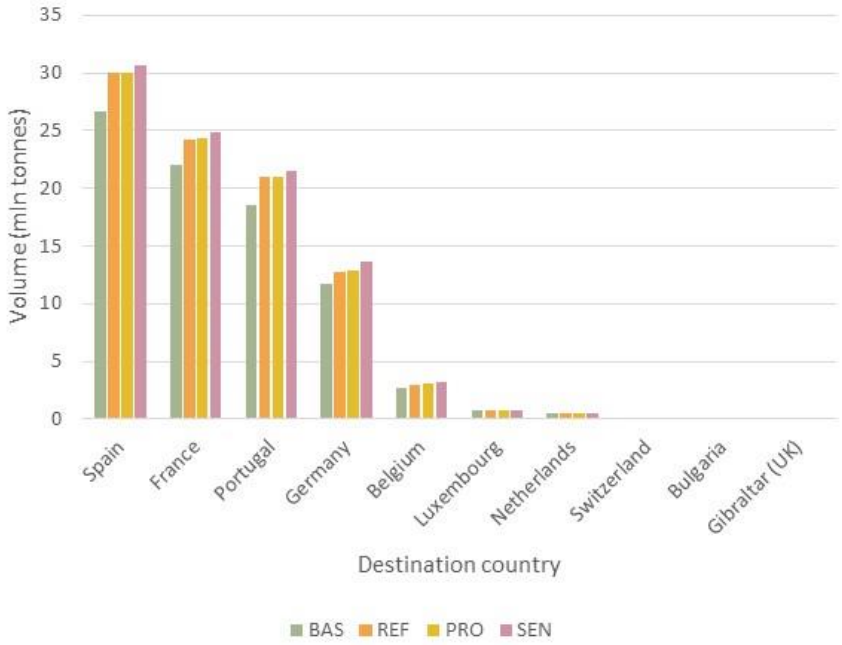
Concerning the top 10 origins, these are the same as for the base year. The overall growth for the top-10 origins in the Reference scenario is 12% and varies from 6% (Luxembourg) to 14% (Portugal). Spain, France and Germany are the top 3 origin countries in the RFC ATL. Concerning the Projects scenario, in general the average growth rate does not deviate from the Reference scenario. Concerning the Sensitivity scenario, a slightly higher volume is registered at 15% compared to 2022. The growth per countries varies in the sensitivity scenario from 9% (The Netherlands) to 26% (Switzerland).

**Figure 53 Development of volume (in million tonnes) of all international freight transport from locations in the origin countries in the catchment area of the RFC ATL**




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

**Figure 54 Development of volume (in million tonnes) of all international freight transport to locations in the destination countries in the RFC ATL**




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

The picture for the destination countries is like the one for the origin countries. The overall growth in the top 10 countries is approximately 11% for both the Reference scenario and 12% for the Projects scenarios. The growth between the 2022 Base year and the Reference scenario varies from 9% (Luxembourg, the Netherlands, and Germany) to 13% (Portugal). The growth for the Sensitivity scenario ranges from 10% (Luxembourg) to 39% (Switzerland). Compared to other RFC's the growth figures are moderate.

### 5.2.2 FUTURE OF INTERNATIONAL RAIL FREIGHT TRANSPORT FOR RFC ATL

As concerns the RFC ATL, we see a growth from 11 million tonnes to 13 million tonnes in the Reference situation. Expressed in trains,[18] this would mean a growth from about 2,000 international trains to about 21,000 trains . The Projects scenario adds less than 1 million tonnes to the total volume leading to a total number of trains of 22,000. The sensitivity scenario will finally lead to a volume of 15 million tonnes, which is about 22,000 trains. The slightly lower number of trains compared to the project scenario is because the volume is transported by longer trains.

The next two graphs show the development of volume in international *rail* freight transport for origin and destination countries for the RFC ATL. Concerning origin countries, international rail freight transport is highest in Germany (5 million tonnes in the Reference scenario). Spain and France come in second and third place (both at 2.6 million tonnes).

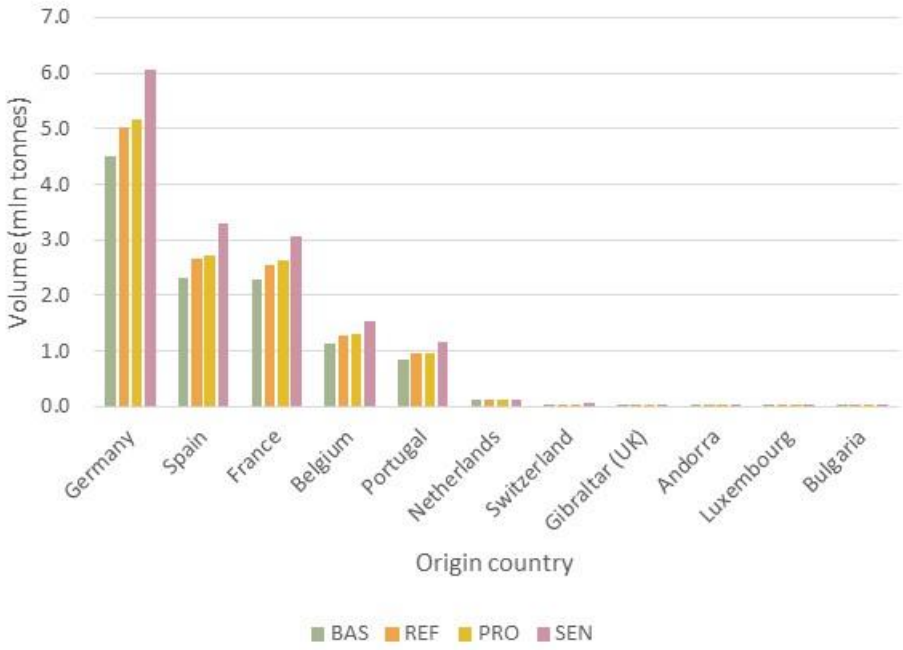
The Projects scenario shows the impact on the volume of international rail freight transport. Overall, the growth in international rail volume for the top-10 countries is less than 1% compared to the Reference scenario. The potential extra volume as shown by the Sensitivity scenario is overall 24% higher on the total volume compared to the Reference scenario. In the sensitivity scenario we see a relatively high growth in Portugal (40%) and Spain (42%). This is mainly due to the increase of train length up to 740 m and the transition to the standard gauge in Spain and Portugal. The introduction of standard gauge has impact, although it is not directly reflected in huge volumes.

For destinations, a similar picture can be seen. In this case, Germany has a number 1 position in the RFC ATL concerning international rail freight transport. France and Spain are ranked 2 and 3 for international rail freight transport. The impact of the Projects scenario is limited, whereas the Sensitivity scenario shows higher effects. Compared to the 2022 Base year situation, the growth in the sensitivity scenario varies from 20% (The Netherlands) to 44% (Portugal).

At request, a special project concerns the connection between Lisbon via Evora to Elvas. For the future it is foreseen that rail transport is rerouted from the old connection via Entroncamento. Via the BCP Elvas-Badajoz, currently about 920 freight trains per year cross the border. A large proportion stems from Lisbon or the south of Portugal, it is estimated at approximately 740 trains. After opening of the new connection, a growth is expected of approximately 20%. This would lead to about 870 trains in total (or half in each direction). This is equivalent to 2 or 3 freight trains per day or 17 to 18 freight trains per week.

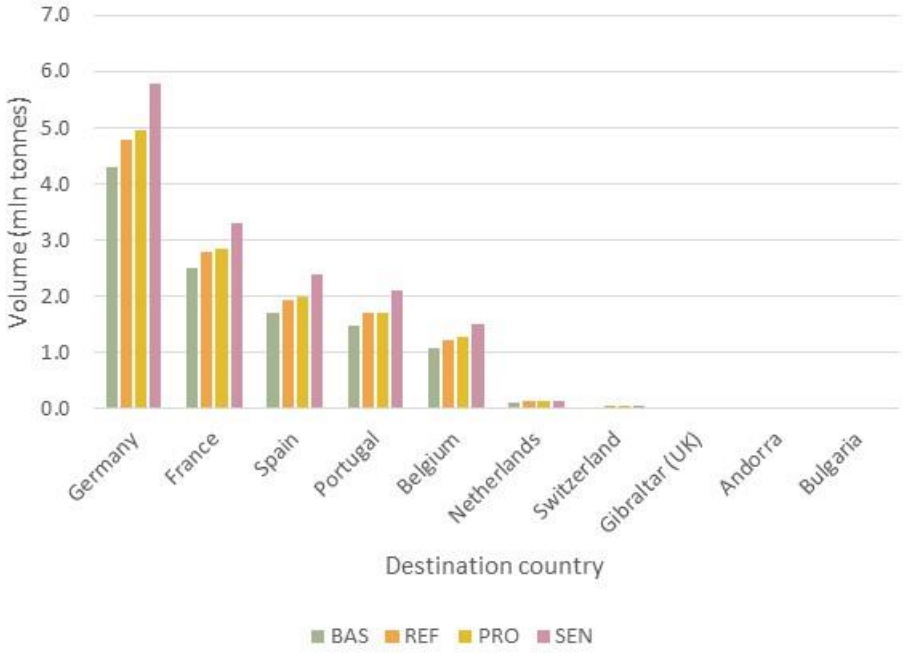
[18] Using an average volume of 600 tonnes per train and 690 tonnes per 740m trains.

**Figure 55 Development of volume (in million tonnes) of all international rail freight transport from origin locations in the catchment area of origin countries in the RFC ATL**




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

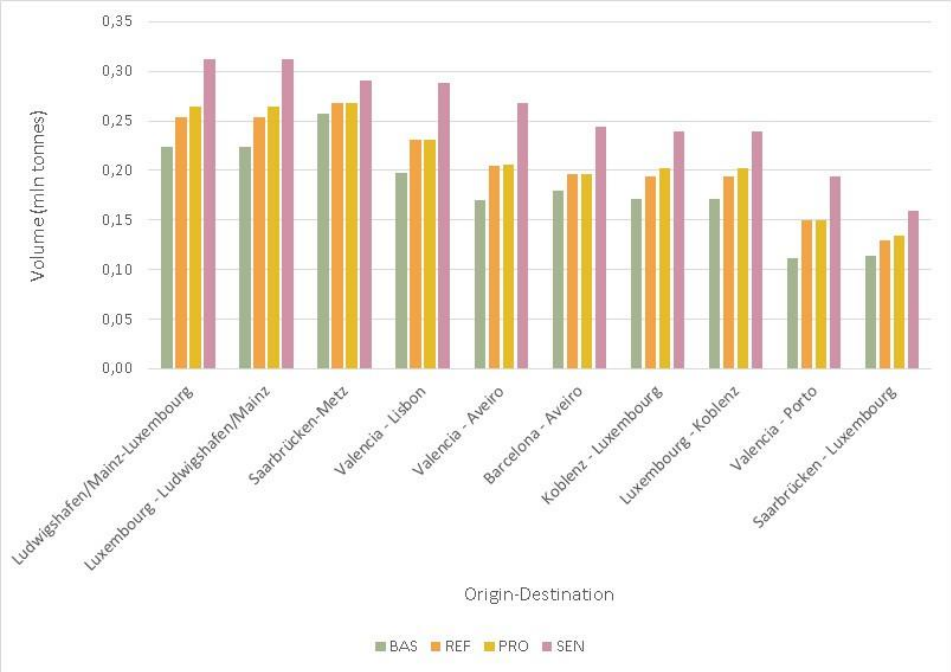
**Figure 56 Development of volume (in million tonnes) of all international rail freight transport to destination locations in the destination countries in the catchment area of the RFC ATL**




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

Looking at the top 10 relations within the RFC ATL, the main relation is between Ludwigshafen/Mainz and Luxembourg at 0.22 million tonnes in 2022 and 0.31 million tonnes in the sensitivity scenario. In second place comes the reverse direction which is another important relation. Note that the volumes are relatively small volumes when compared to other RFCs.

**Figure 57 Development of volume (in million tonnes) of all international rail freight transport by the top 10 relations in the catchment area of RFC ATL**




*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

### 5.2.3 DEVELOPMENT OF THE MOST IMPORTANT BCPS IN THE RFC ATL

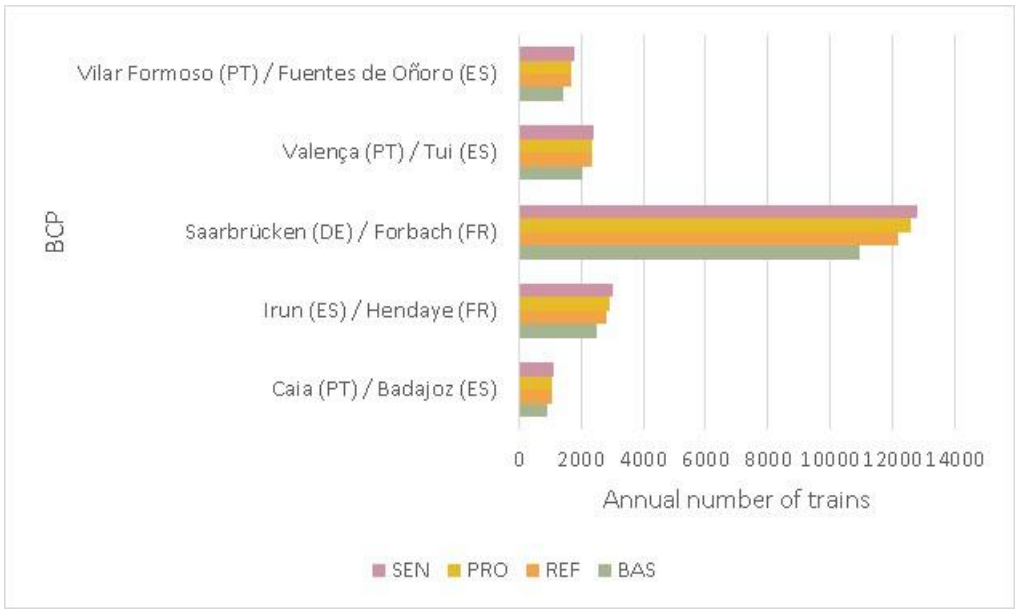
The different border crossing points in the RFC ATL each show different growth between the 2022 Base year and 2030 Reference, Projects and Sensitivity scenarios. Overall, the Reference shows growth in volume of 13% on the BCPs. This is in line with the general growth for rail transport between the 2022 Base year and 2030 Reference scenarios. The completion of different projects by 2030 leads to different growth patterns; on average, the growth in relation to the base is 16% more volume, which translates into 16% more trains on average. The sensitivity scenario leads to 37% more volume, which is 18% more trains compared to 2022. Due to the extra train length, there is less growth in number of trains.

The number of trains by BCP is presented as well. As can be seen, the BCP Saarbrücken - Forlach is the busiest BCP in the RFC ATL. In 2022 at almost 10,900 trains per year, in the Reference 12,200 trains and in the Projects and Sensitivity scenario 12,600 and 12,800 trains. The other BCPs show similar growth, though at a lower absolute level. The smallest BCP is Caia-Badajoz growing from about 900 trains in 2022 to 1,100 trains in the Sensitivity scenario.

**Figure 58 Development of volume (in million tonnes) of international rail freight transport on important border crossing points of the RFC ATL**


*Source: NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

**Figure 59b: Development of the number of trains per border crossing in the RFC ATL by scenario**

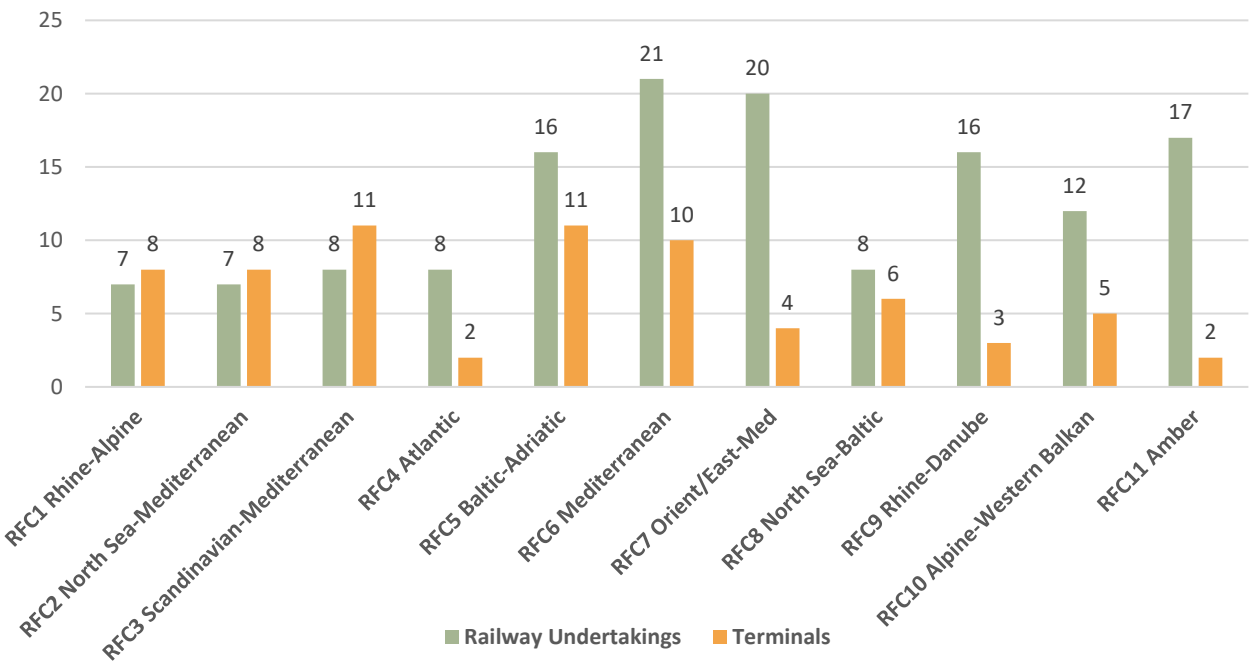



*Source: BPC observation and NEAC estimation; Legend: BAS=Base year, REF=Reference, PRO=Projects, SEN=Sensitivity*

# 6 OCCURRED AND EXPECTED CHANGES ASSOCIATED WITH THE ESTABLISHMENT OF THE RAIL FREIGHT CORRIDORS: 2023 11 RFCS JOINT TMS UPDATE SURVEY

No relevant time series data are available supporting a consistent appraisal of the occurred and expected changes associated with the establishment of the 11 RFCs. It is worth adding that the current 11 RFCs started operating in different years, 5 in 2013, 3 in 2015 and 3 after 2018, and their alignment was adjusted over time to market needs. To assess the occurred and expected changes associated with their establishment, an e-survey (2023 11 RFCs Joint TMS Update Survey) has been conducted, submitting a questionnaire to the members of the Railway Undertaking Advisory Groups (RAGs) and the Terminal Advisory Groups (TAGs) of the 11 RFCs. Questionnaires were collected via the EUSurvey platform of the European Commission (DG DIGIT) between September 2023 and January 2024. Forty-two members of the RAGs and thirty members of the TAGs participated in the survey, for a total of seventy-two respondents, operating services/terminals along the alignment of all 11 RFCs (Figure 59).

Figure 59 RFCs usage by respondents operating or serving trains at terminals crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 3.R and 3.T*

The survey was conducted to collect the opinion of the 11 RFCs market players on three main areas:

1. Occurred and expected changes due to the establishment of the RFCs;
2. Occurred and expected market developments along the RFCs; and
3. Market drivers.

This chapter summarises the main outcome of the survey with reference to these three areas. The full set of responses is provided in Annex 2 of this report.

Whereas the total number of responses for all RFCs makes the outcome of the survey meaningful from the 11 RFCs Network perspective, a presentation of the results by individual RFC would lose significance due to the limited number of answers. As a result, the outcome of the survey is presented in this report for all RFCs together /for the RFC Network as a whole.

Especially regarding the opinion of the 11 RFCs RAGs and TAGs members on the occurred and expected market developments, it is worth noticing that it reflects their views at the time of submission of the questionnaire (Autumn 2023/January 2024). Additionally, survey responses represent a partial view of the market as the sample of the respondents is not representative of the market universe. Furthermore, differences may exist between RFCs as they were established and entered into operation in different years. Finally, the survey outcome may partially diverge from the findings from the statistical review presented in the previous section above, as the opinions relate to the RFCs and international trains, whereas national statistics refer to the whole country network and national as well as international traffic.

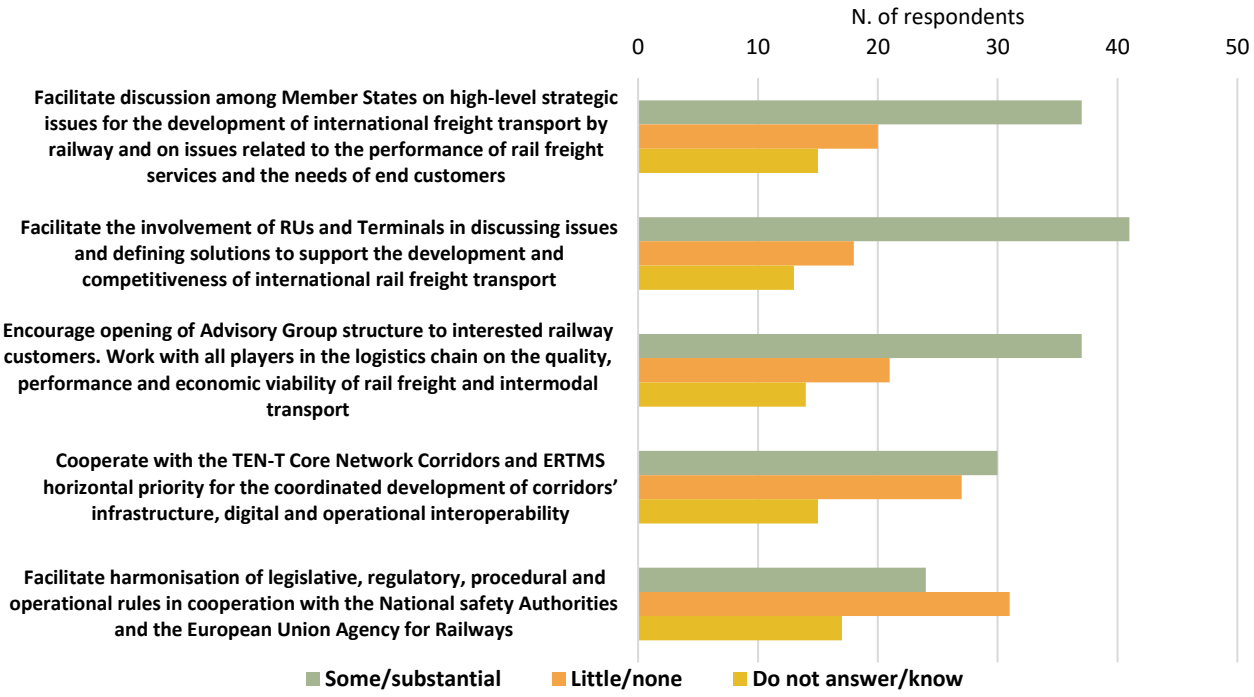
## 6.1 CHANGES OCCURRED SINCE THE ESTABLISHMENT OF THE RFCS AND EXPECTED CHANGES CONCERNING THE FACILITATION OF INTERNATIONAL RAIL FREIGHT TRANSPORT

Occurred and expected changes have been investigated as part of the survey around three main areas of activity of the Rail Freight Corridors, which are of relevance for the facilitation of international rail freight transport, and namely: governance, operational efficiency and capacity management. For each area, questions have been made to assess:

- Changes occurred since the establishment of the RFCs;
- Expected changes assuming continuation of the activities by the RFCs; and
- The best fitting governance to address the issues identified for each of the three investigated areas, also considering the proposed termination of the RFCs activities in the Proposal for a Regulation of the European Parliament and of the Council on the use of railway infrastructure capacity in the single European railway area, amending Directive 2012/34/EU and repealing Regulation (EU) No 913/2010[19]

### 6.1.1 GOVERNANCE ISSUES

Figure 60 Progress made to date since the establishment of the RFCs - Governance Issues

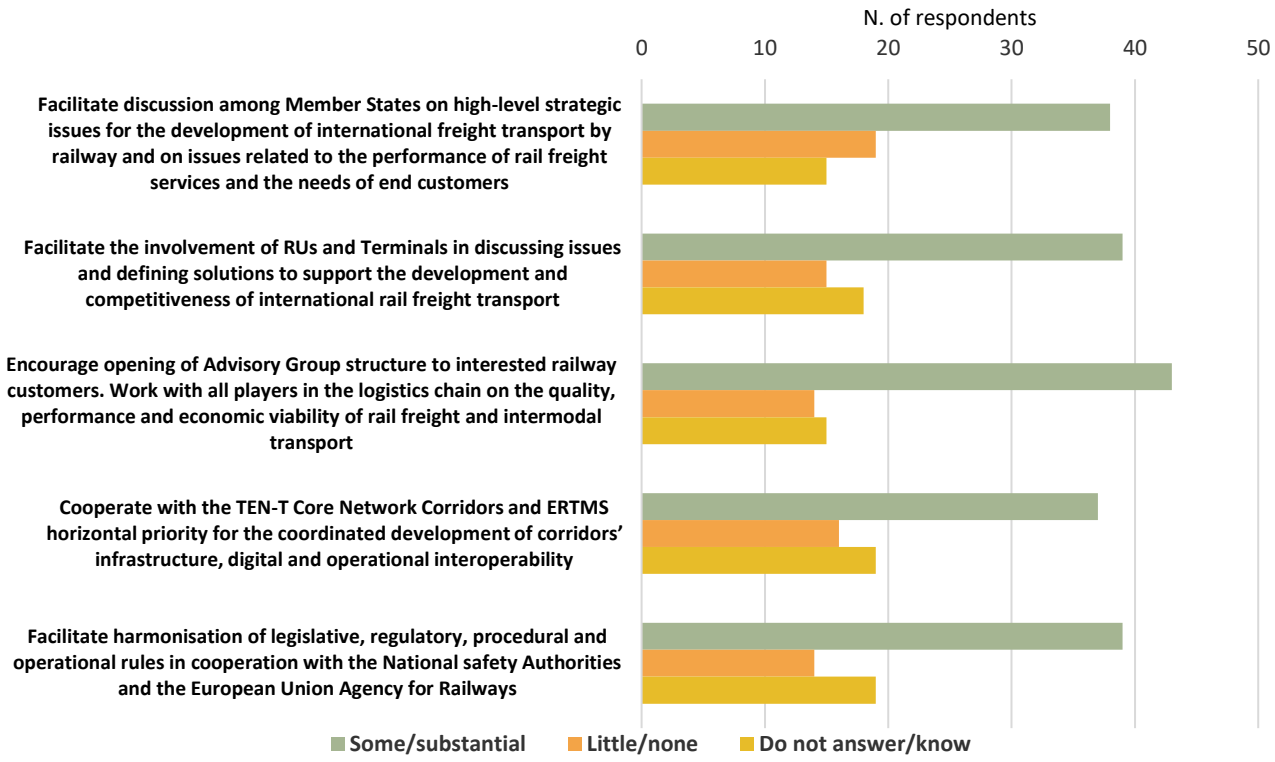



*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 1.RT*

[19] https://ec.europa.eu/transparency/documents-register/detail?ref=SEC(2023)443&lang=en

The respondents' opinion about the changes within the governance area is positive, especially in terms of cooperation with the market, including but not limited to RUs and terminal operators, as well as concerning facilitation of discussion among Member States about the issues affecting the competitiveness of international rail freight transport (Figure 60). The opinion about the progress made regarding cooperation between RFCs and Core Network Corridors (CNCs)/ERTMS horizontal priority is less favourable. The market opinion is negative about the progress made on harmonising international freight rail services' legislative, regulatory, procedural and operational aspects.

Figure 61 Expected changes based on current programmes/initiatives - Governance Issues

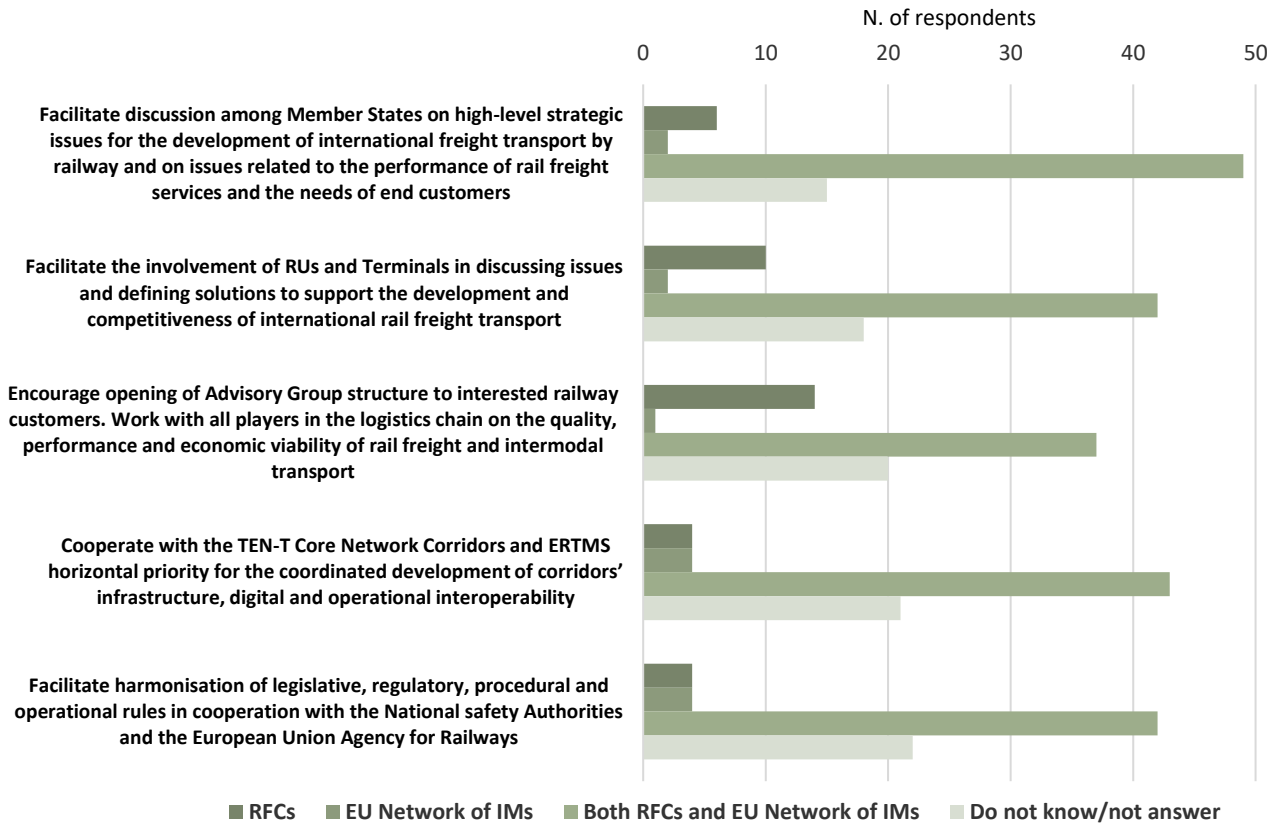



*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 1.RT*

The expectations of the market players concerning the future impact of the programmes and activities of the RFCs are relatively positive concerning all issues (Figure 61).

Respondents consider the cooperation between RFCs and an European Network of Infrastructure Managers (ENIM) to be the best governance solution for bringing issues forward (Figure 62)

Figure 62 Best fitting governance to bring the issue forward - Governance Issues

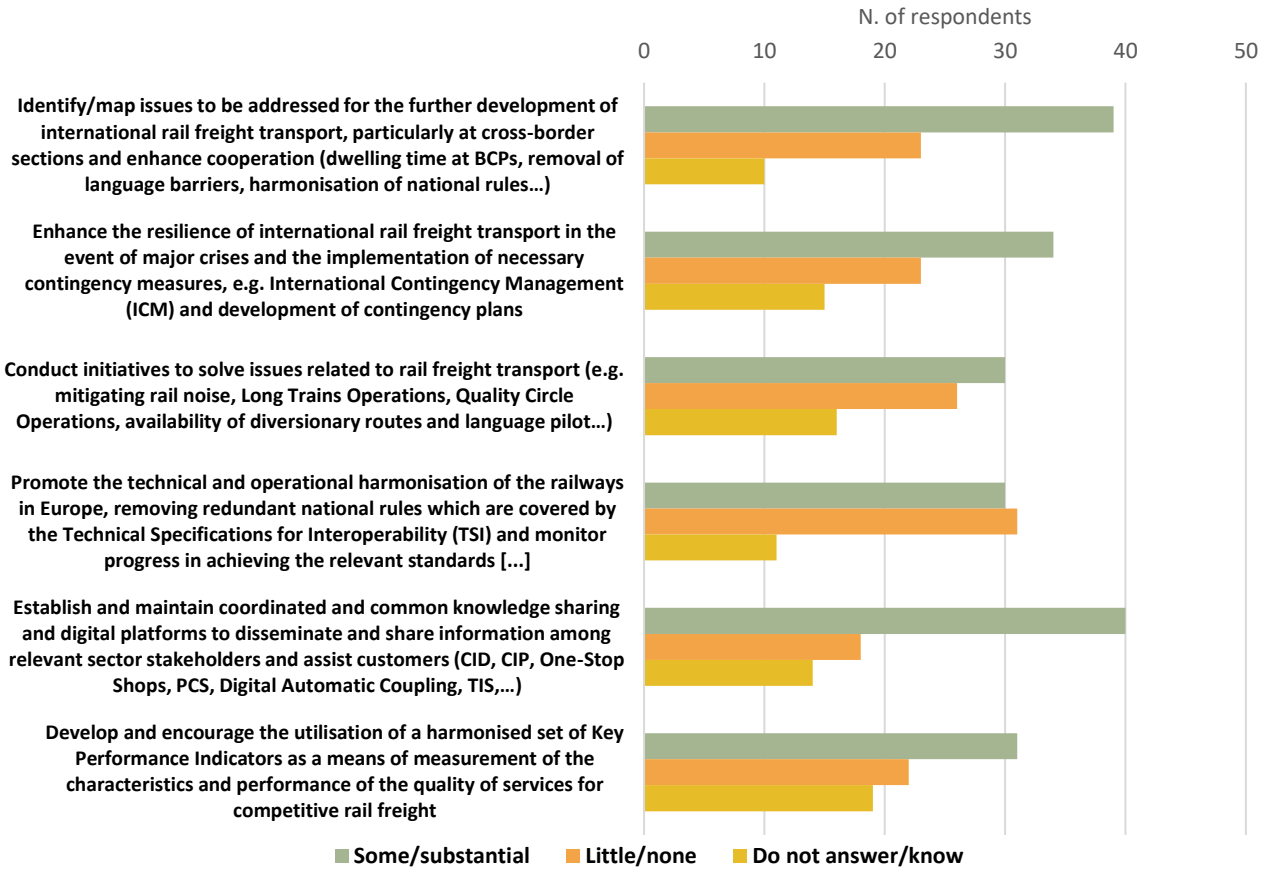



*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 1.RT*

### 6.1.2 OPERATIONAL EFFICIENCY ISSUES

The market opinion about the changes that occurred within the operational efficiency area is also generally positive, except for the progress made in the promotion of technical and operational harmonisation of the European railway transport system towards its interoperability (Figure 63).

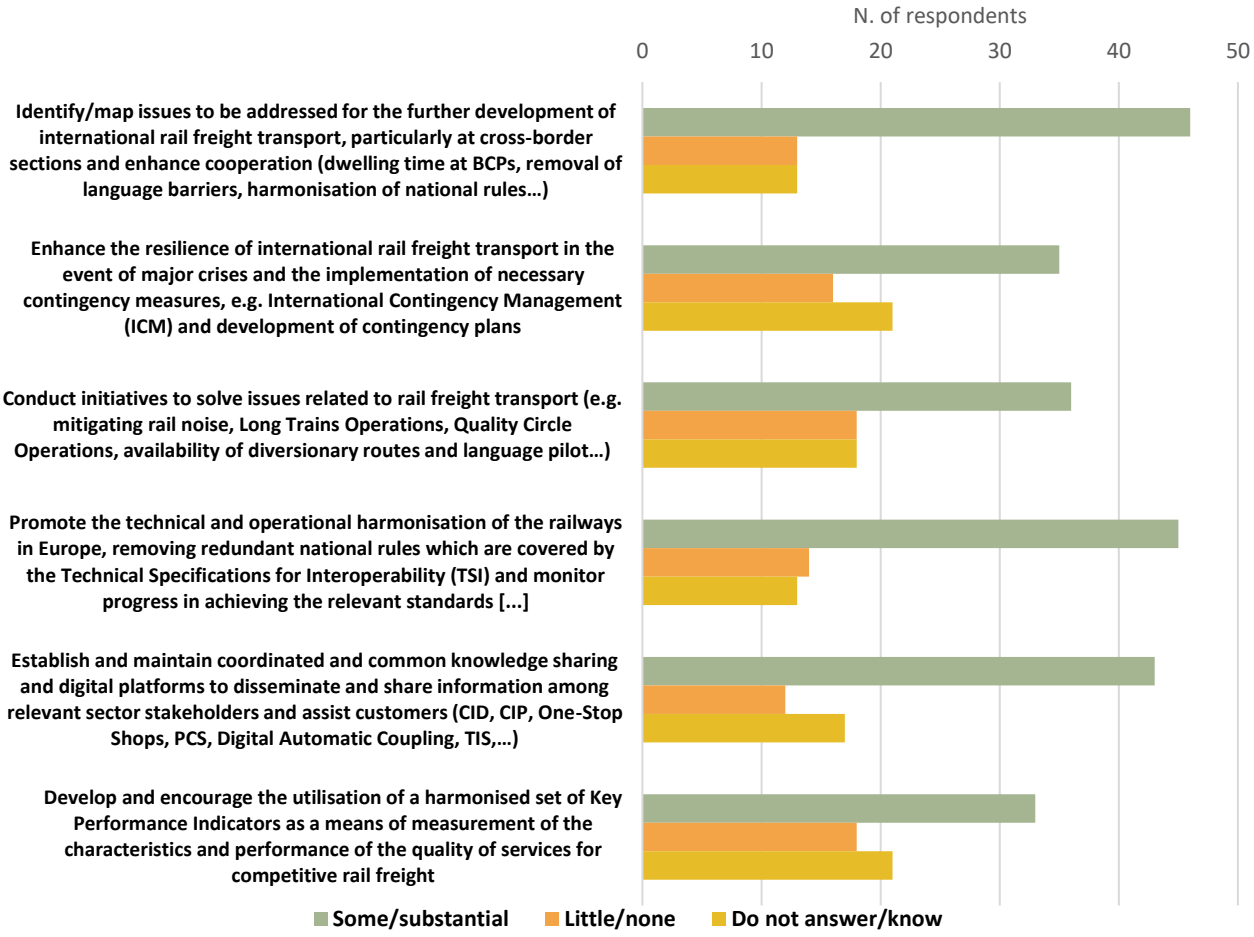
Figure 63 Progress made to date since the establishment of the RFCs - Operational Efficiency Issues




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 2.RT*

The respondents' expectations concerning the future impact of the programmes and activities of the RFCs are relatively positive concerning all issues (Figure 64).

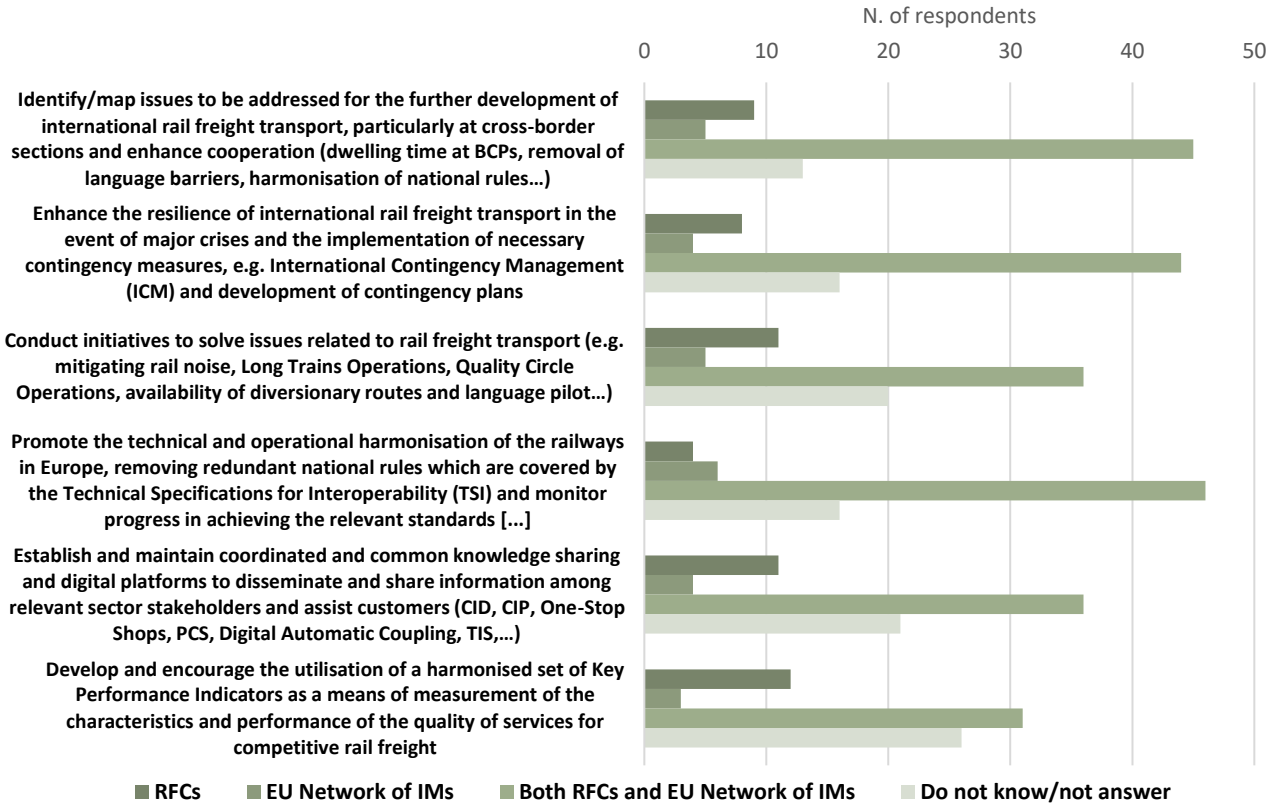
Figure 64 Expected changes based on current programmes/initiatives by RFCs - Operational Efficiency Issues




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 2.RT*

Cooperation between RFCs and an European Network of Infrastructure Managers (ENIM) is also considered the best-fitting governance solution to bring operational efficiency issues forward (Figure 65).

Figure 65 Best fitting governance to bring the issue forward - Operational Efficiency Issues

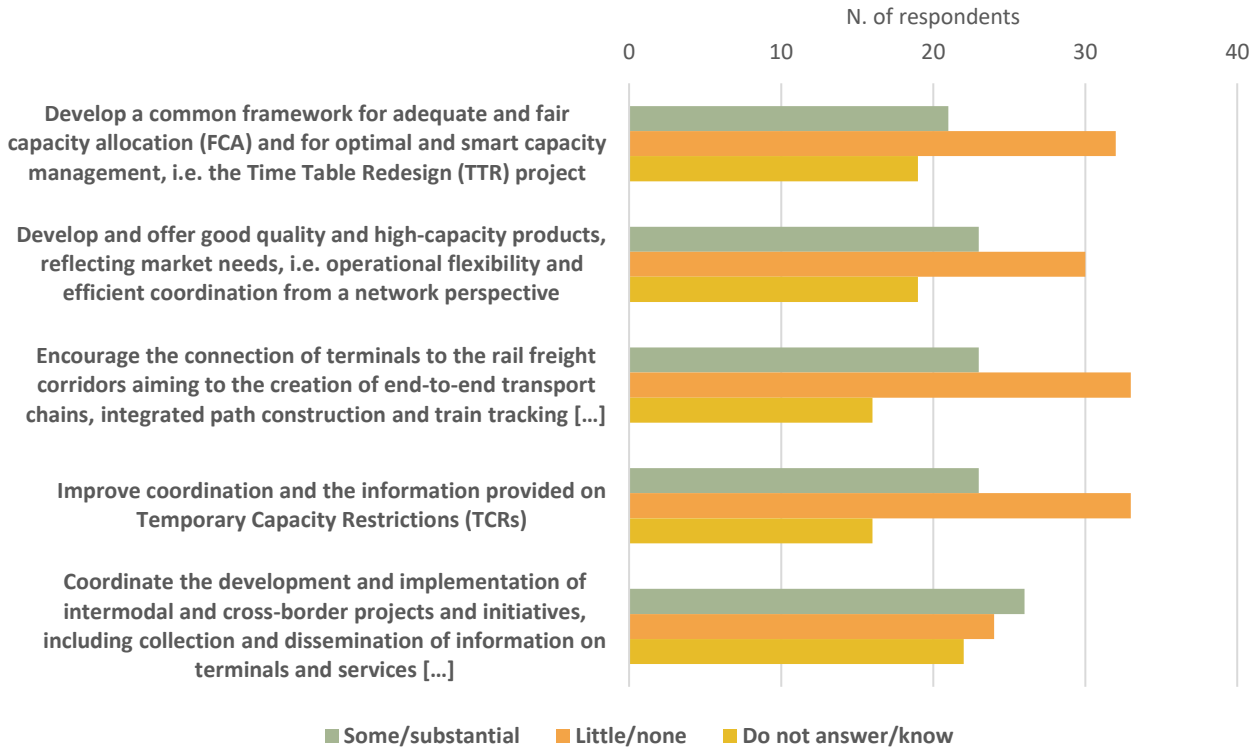



*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 2.RT*

### 6.1.3 CAPACITY PLANNING ISSUES

The respondents' opinions about the changes that occurred within the capacity management area are predominantly negative, except for the coordination of the development and implementation of cross-border projects and initiatives (Figure 66).

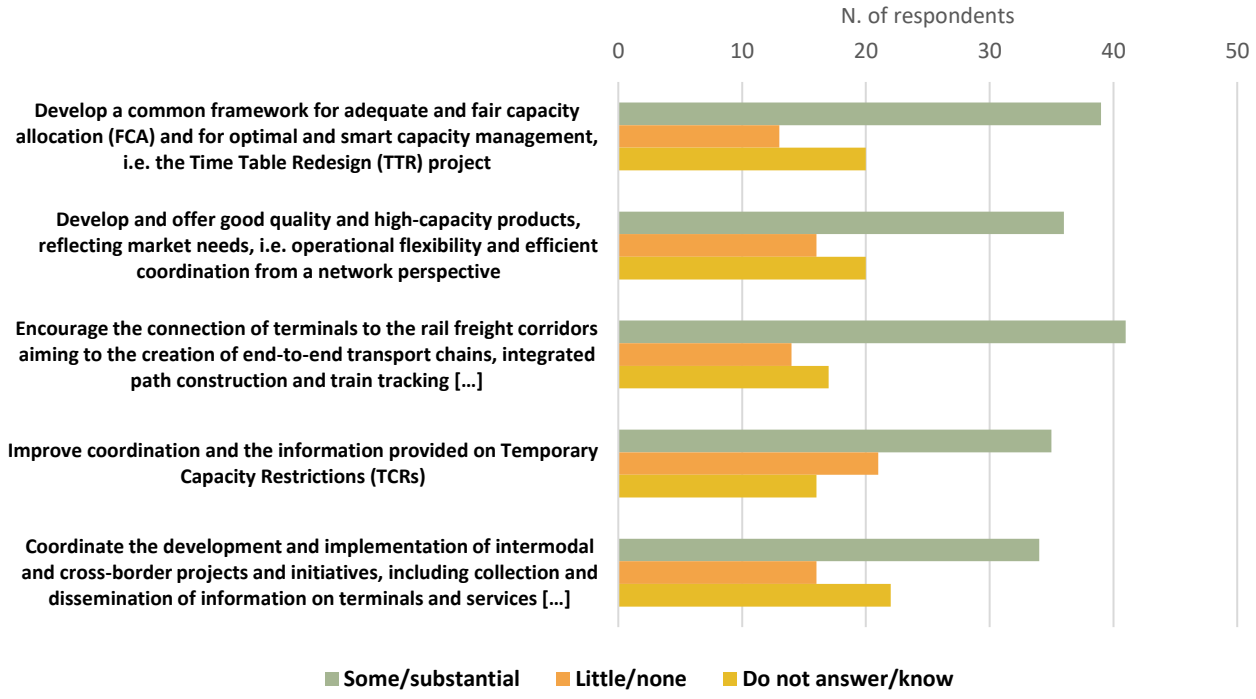
Figure 66 Progress made to date since the establishment of the RFCs - Capacity Planning Issues




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 3.RT*

Notwithstanding the market's opinion that little or no progress made since the establishment of the RFCs, the expectations on the future impact of the programmes and activities by the RFCs are rather positive with regard to all issues (Figure 67).

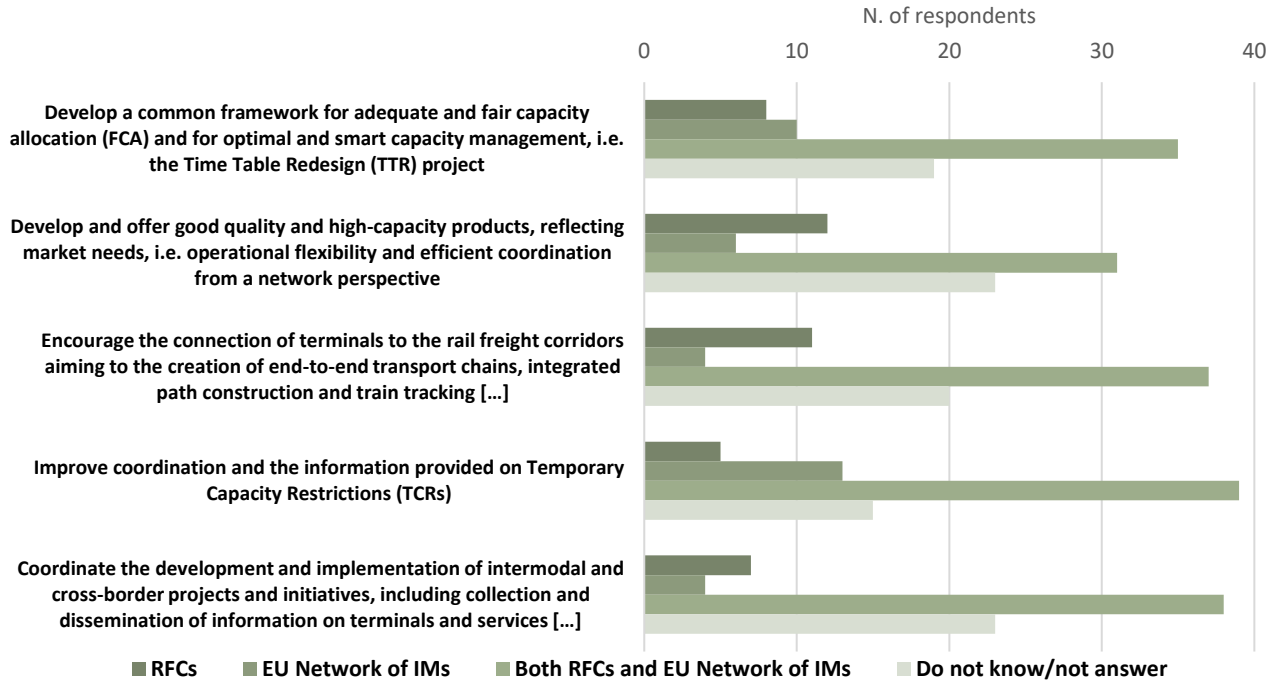
Figure 67 Expected changes based on current programmes/initiatives - Capacity Planning Issues




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 3.RT*

Also, for the improvement of capacity management-related issues, the best governance solution is deemed to be the cooperation between RFCs and an European Network of Infrastructure Managers (ENIM) (Figure 68).

Figure 68 Best fitting governance to bring the issue forward - Capacity Planning Issues

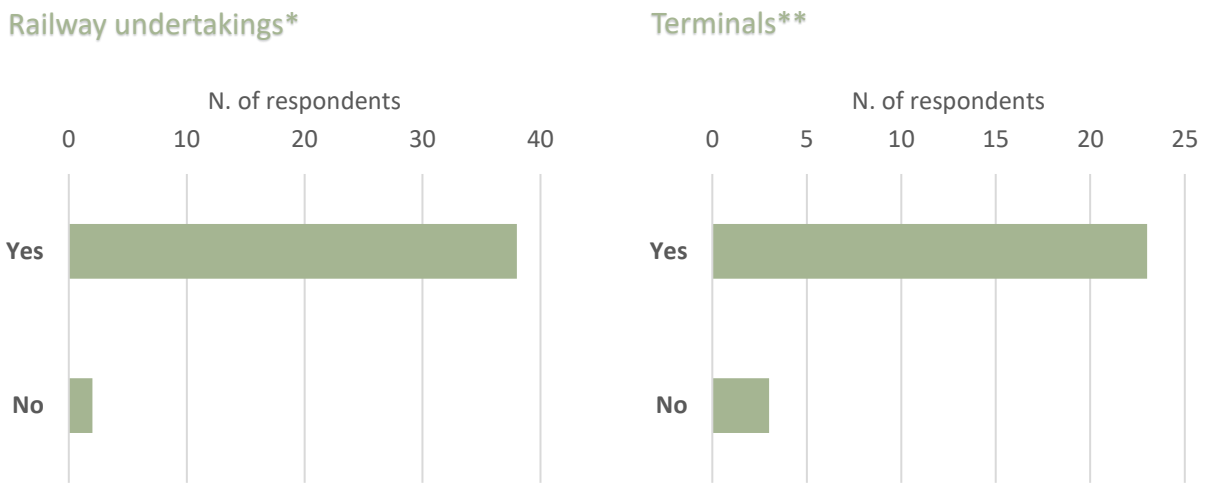



*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question B) 3.RT*

## 6.2 EXPERIENCED AND EXPECTED MARKET DEVELOPMENTS

Experienced and expected variations in the market have also been investigated as part of the 2023 11 RFCs Joint TMS Update Survey, which is further described in this section.

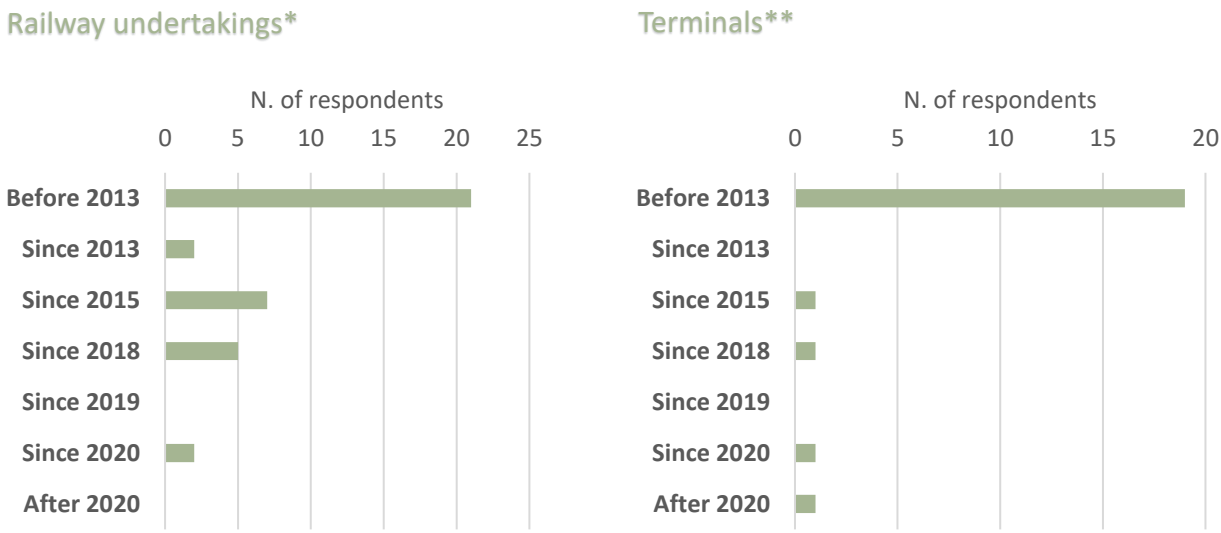
**Figure 69 Respondent has operated/operates rail services or manages/operates terminals serving trains across at least one border crossing point(s) on any RFC**




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 1.R and 1.T,*
**40 out of 42 respondents, **26 out of 30 respondents*

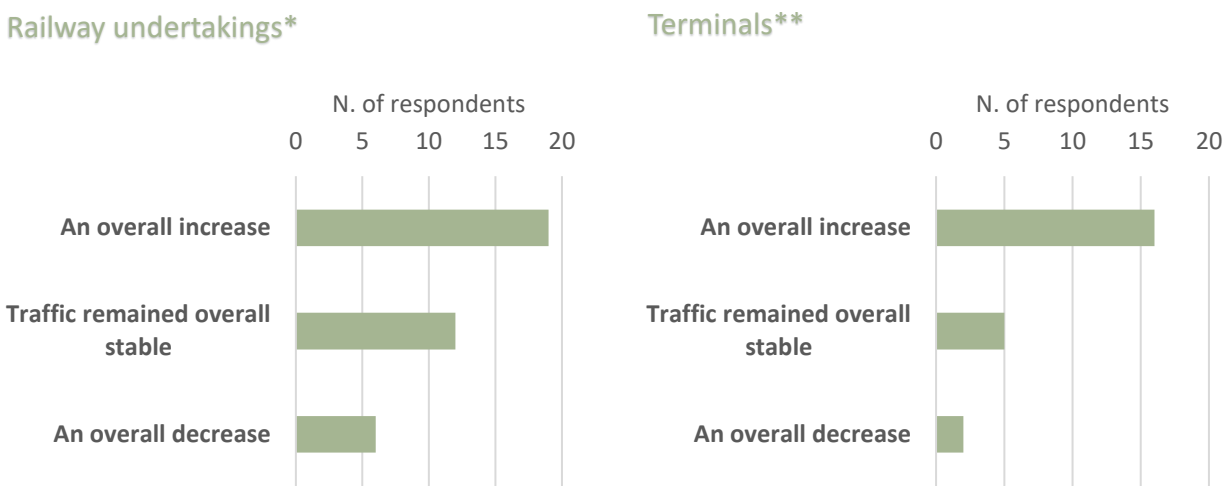
The vast majority of the respondents who participated in the survey operated or still operates rail services or manage/operate terminals serving trains across at least one border crossing point(s) on any RFC. Most of them also operated or served international rail freight transport before the establishment of the RFCs.

**Figure 70 Respondent has operated/operates rail services or manages/operates terminals serving trains across at least one border crossing point(s) on any RFC**




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 1.1R and 1.1T,*
**37 out of 42 respondents, ** 23 out of 30 respondents*

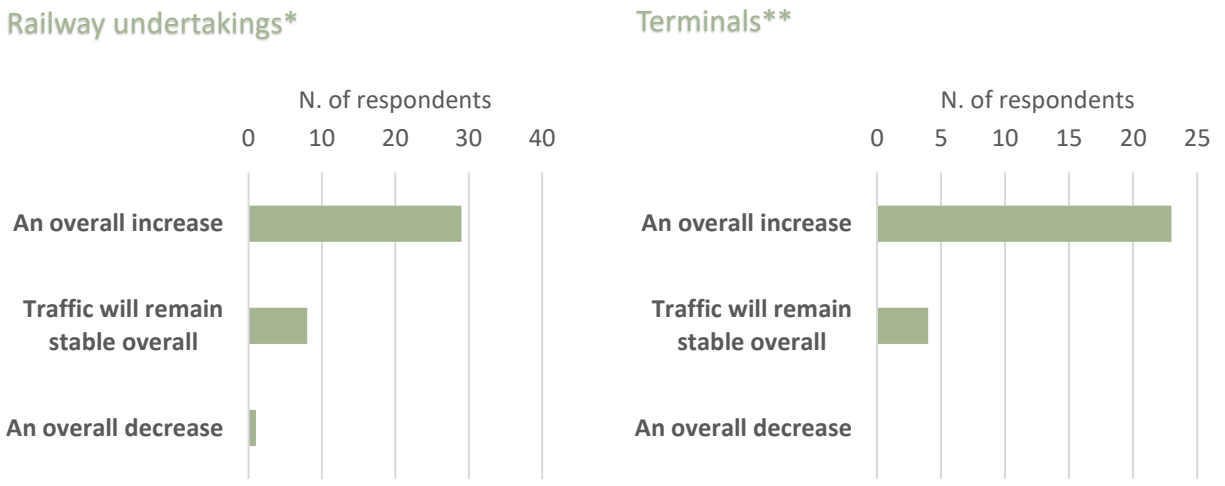
Figure 71 Variation in the operation of trains and in serving trains crossing at least one border crossing point(s) on any RFC since 2013




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 1.2R and 1.2T, *37 out of 42 respondents, ** 23 out of 30 respondents*

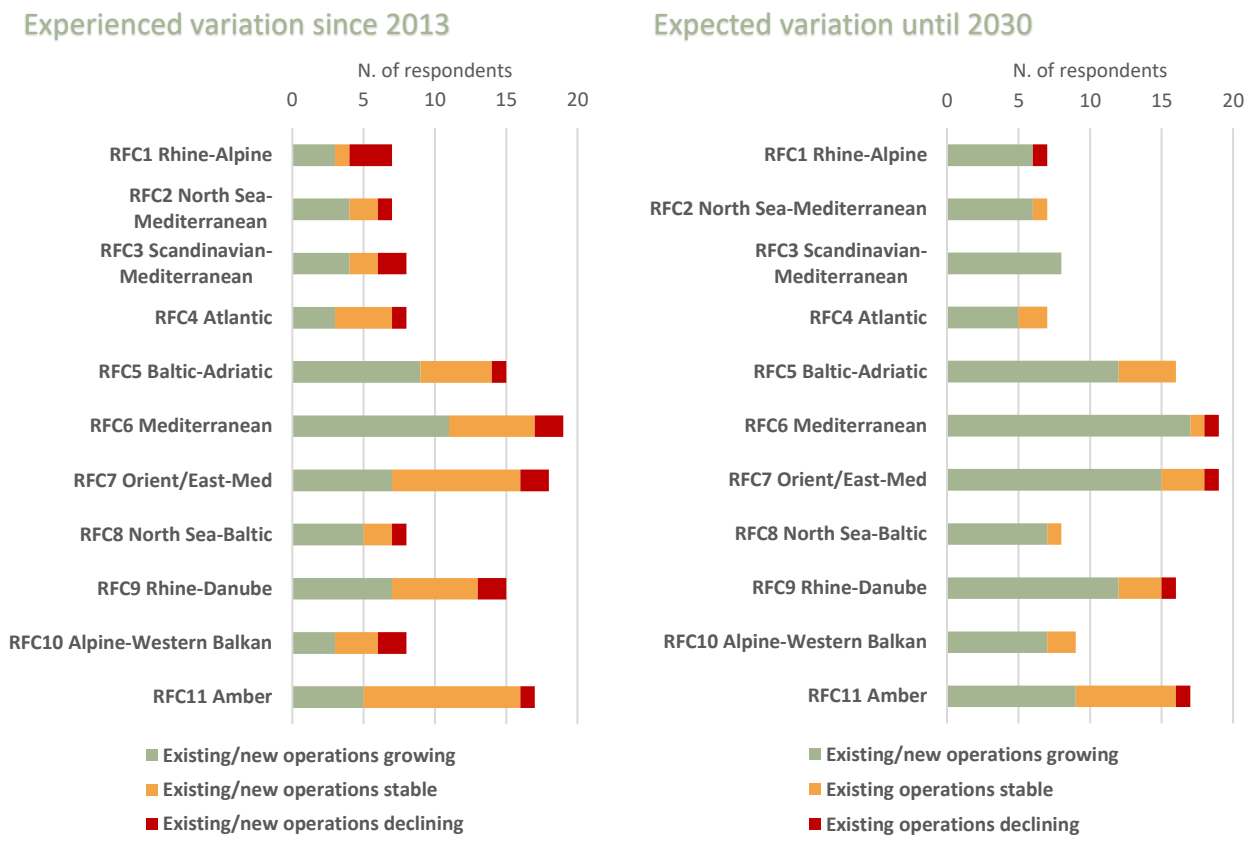
The majority of the respondents declare they experienced an increase in their operations since 2013 (Figure 71), and most of them also have a positive expectation about the future, expecting overall market growth (Figure 72).

Figure 72 Variation in the operation of trains and in serving trains crossing at least one border crossing point(s) on any RFC in the short term until 2030




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 2.R and 2.T, *38 out of 42 respondents, ** 23 out of 30 respondents*

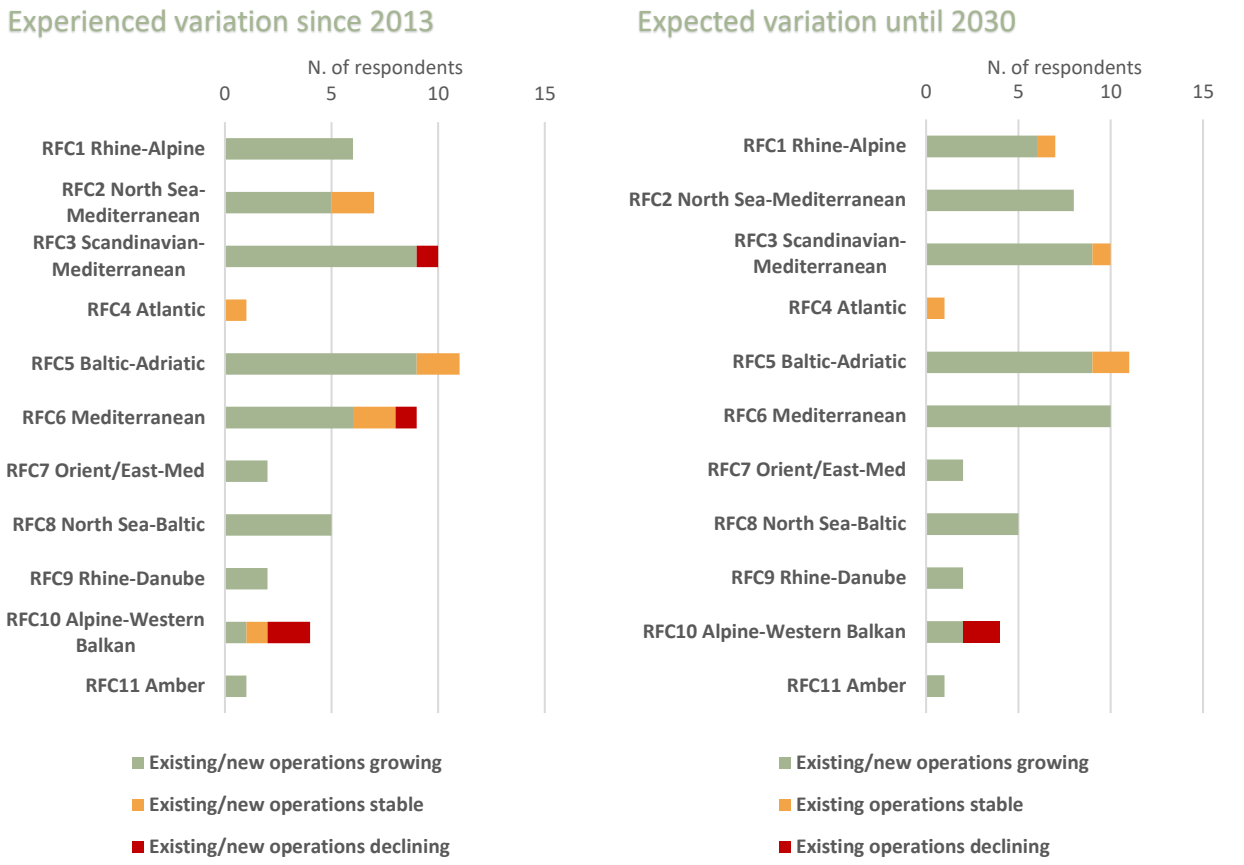
Figure 73 Experienced and expected traffic trends according to the trains operated by RUs, crossing at least one border crossing point(s) on any RFC




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 3.R*

The variation in traffic experienced by RUs since 2013 differs from RFC (Figure 73). The majority of the respondents declare they experienced market growth along the NSM, SCAN-MED, BA, MED, NSB, and RD RFCs, whereas a prevailing stable trend is registered for the ATL, OEM, AWB, and Amber RFCs. For RALP, the number of growing and declining registered trends are similar. The expectation for the future (2030) is generally positive for all RFCs.

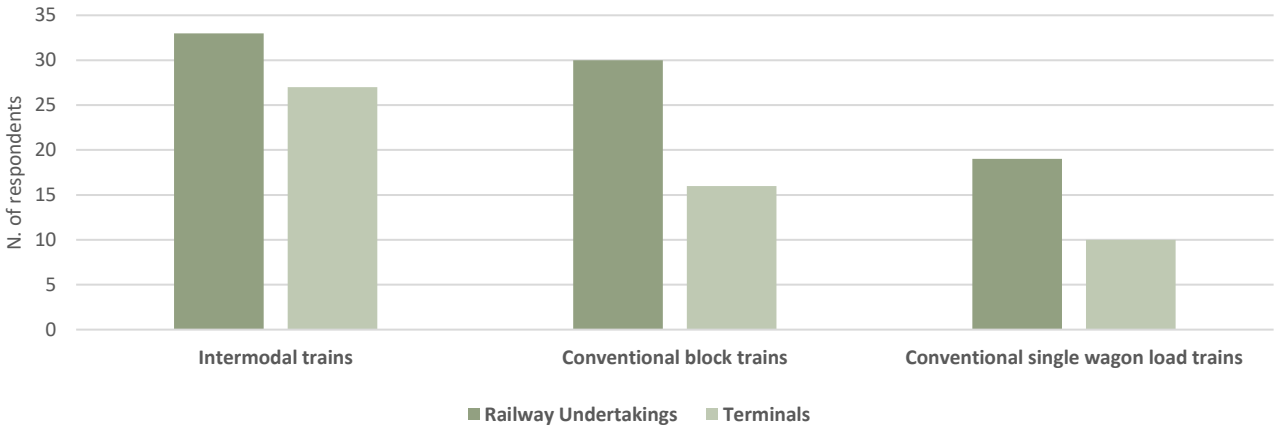
Figure 74 Experienced and expected traffic trends on corridors according to the trains served at terminals, crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 3.T*

The variation in traffic experienced by terminal operators since 2013 and the expected growth are generally positive, except for the ATL and AWB RFCs (Figure 74). The prevailing response is pessimistic about the experienced variation, whereas the number of growing and declining registered trends is similar regarding future expectations.

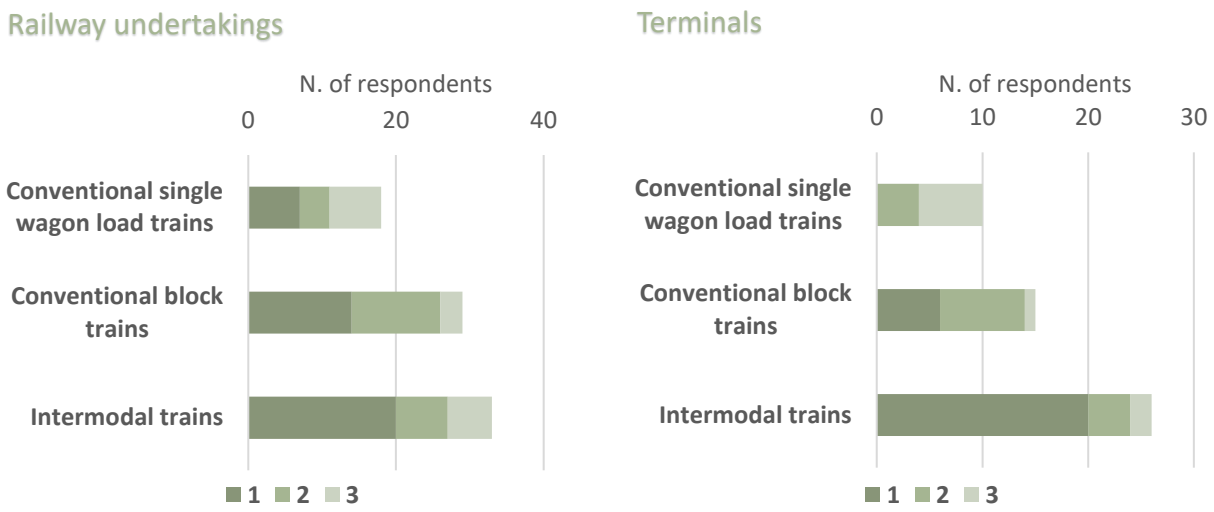
Figure 75 Type of trains operated by railway undertakings or served at terminals crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 4.R and 4.T*

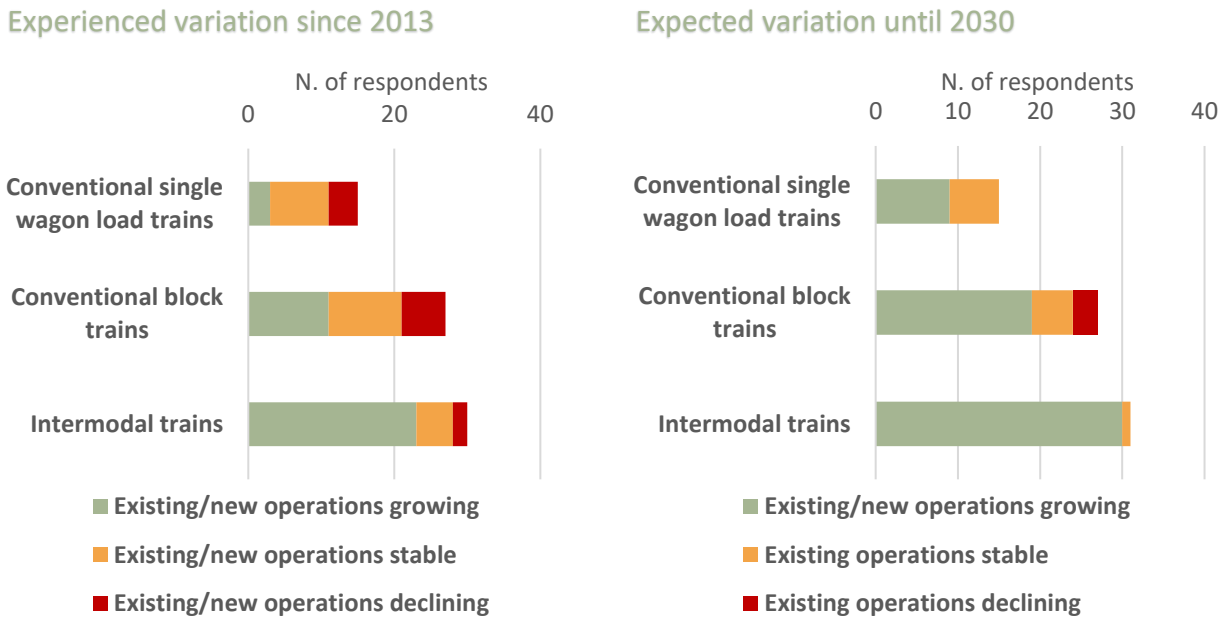
The prevailing type of international trains operated on the 11 RFCs Network consists of intermodal trains, followed by conventional block trains and single wagonload trains (Figure 75 and Figure 76).

Figure 76 Ranking of type of trains operated by railway undertakings or served at terminals crossing at least one border crossing point(s) on any RFC




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 4.R and 4.T; Note: 1= first, 2=second, 3= third*

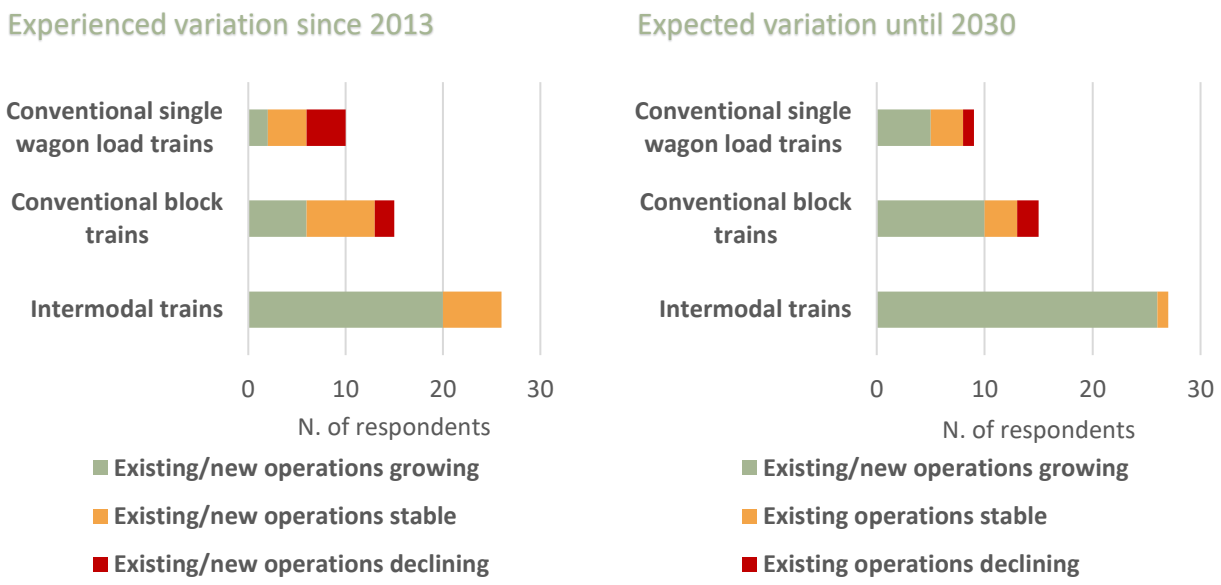
Figure 77 Experienced and expected traffic trend on the type of trains operated by RUs crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 4.R*

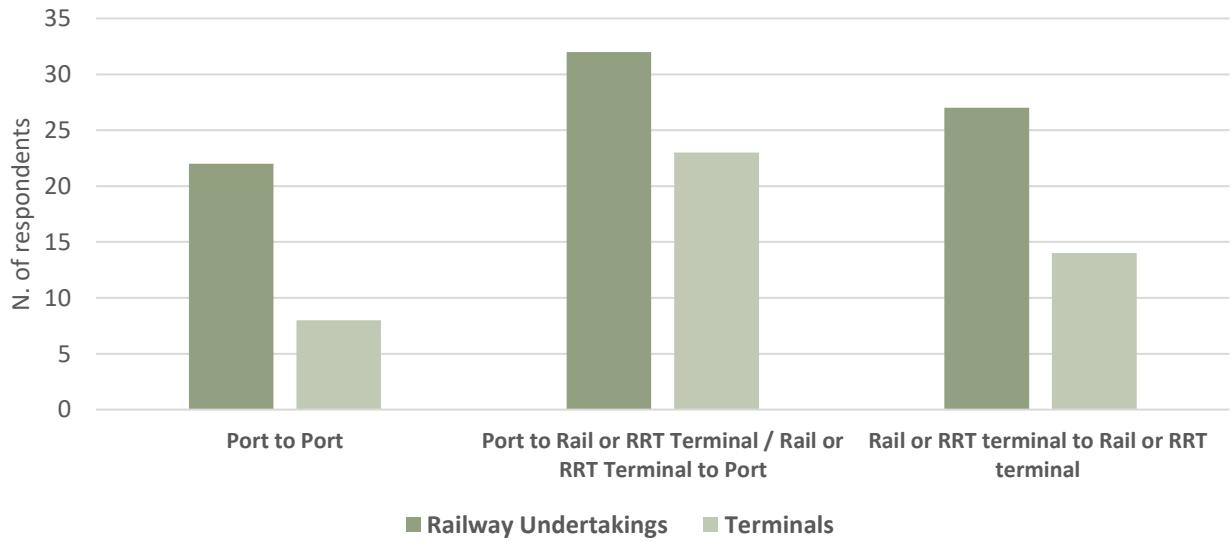
Most RUs and terminal operators experienced growth in intermodal train operations in the past years (Figure 77 and Figure 78), whereas the trend for conventional block and single wagonload trains is predominantly stable. Most respondents have a positive expectation for the future in terms of traffic growth for all market segments.

Figure 78 Experienced and expected traffic trend on the type of trains served at terminals crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 4.T*

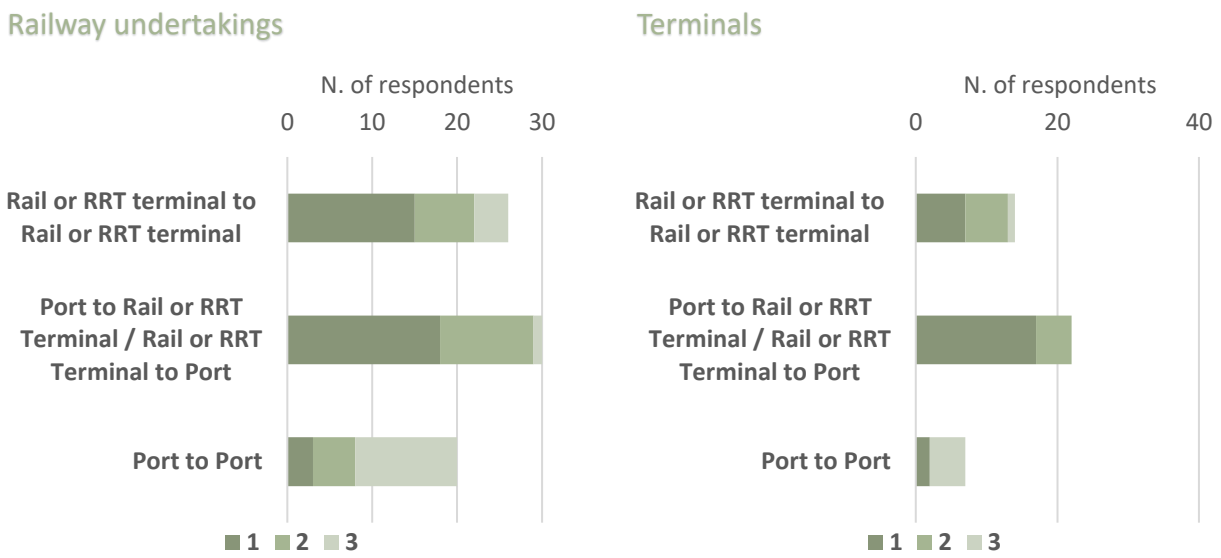
Figure 79 The type of O/Ds of the trains operated by railway undertakings or served at terminals crossing at least one border crossing point(s) on any RFC




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 5.R and 5.T*

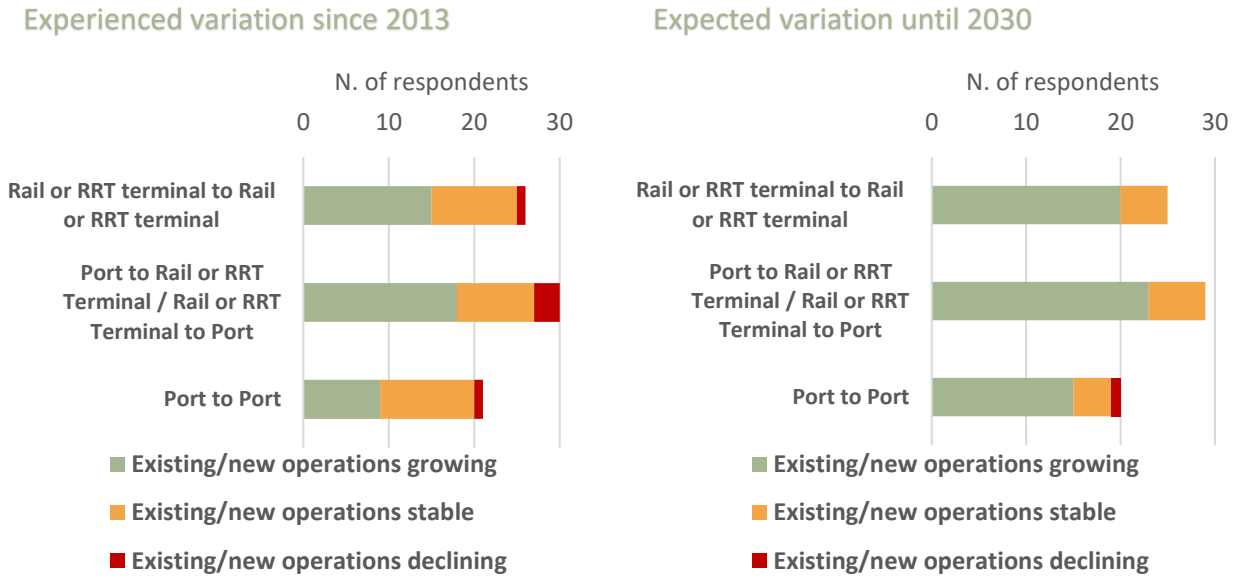
Most operations relate to Port to Rail-Road Terminal (RRT) transport, followed by RRT to RRT services and Port to Port operations (Figure 79 and Figure 80).

Figure 80 Ranking of the types of O/Ds of the trains operated by RUs or served at terminals crossing at least one border crossing point(s) on any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 5.R and 5.T; Note: 1= first, 2=second, 3= third*

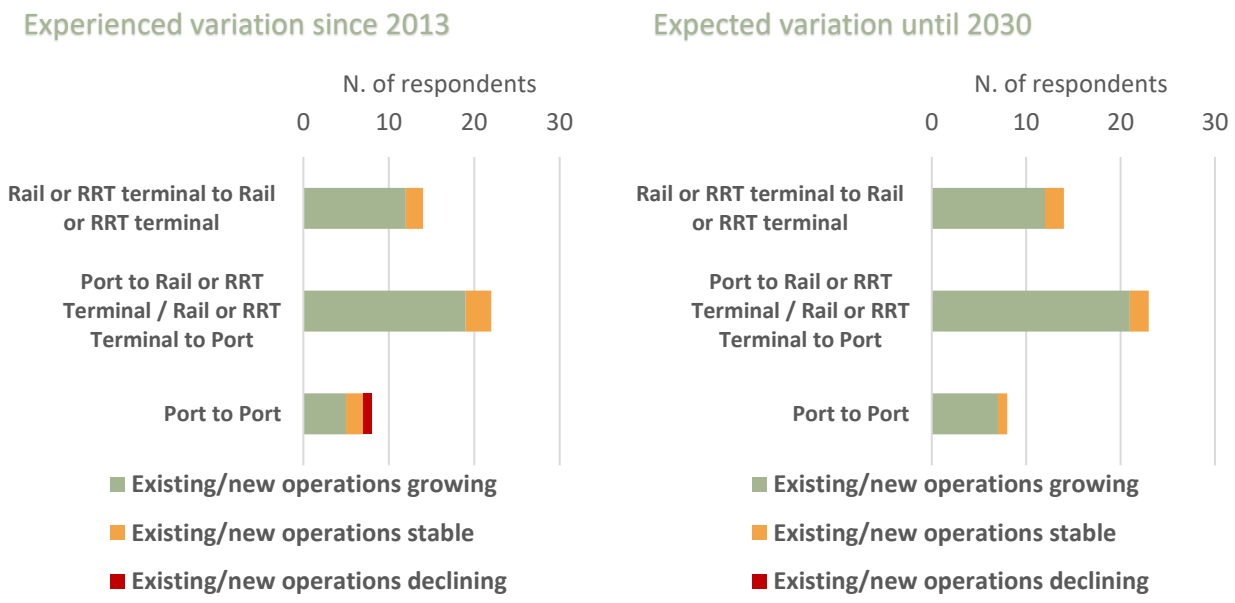
Figure 81 Experienced and expected traffic trend on the type of O/Ds of the trains operated by RUs crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 5.R*

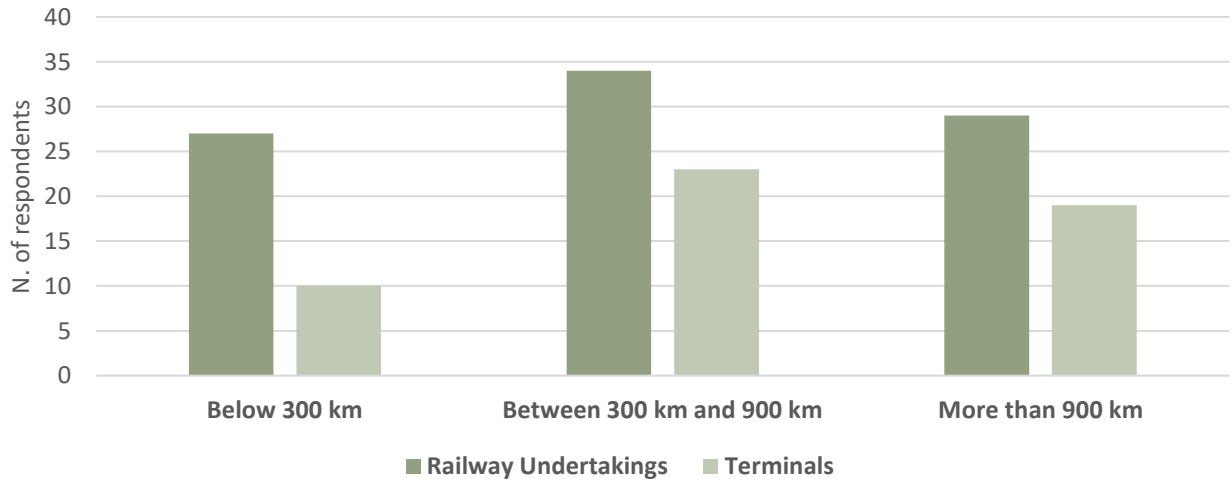
Experienced variations by RUs were mostly positive for the Port to RRT or RRT to RRT segments and stable for the Port to Port one (Figure 81). Terminal operators have predominantly experienced growing trends in all market segments in the past years (Figure 82). The vast majority of RUs and terminal operators are expecting positive future trends for the three market segments (Figure 81 and Figure 82).

Figure 82 Experienced and expected traffic trend on the type of O/Ds of the trains served at terminals crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 5.T*

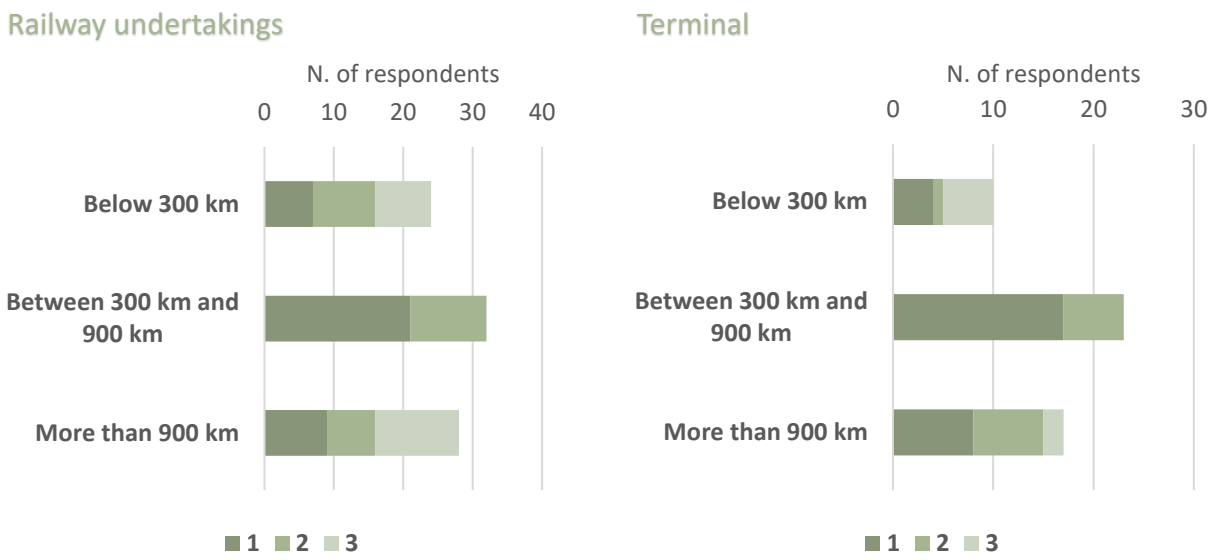
Figure 83 Type of distances of the trains operated by railway undertakings or served at terminals crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 6.R and 6.T*

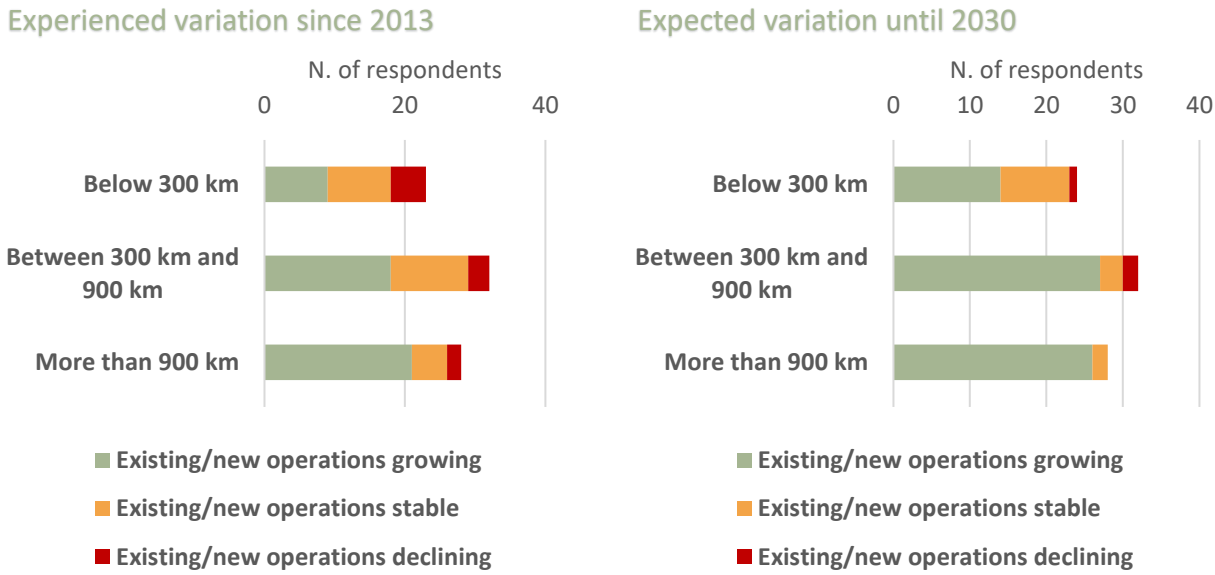
Most international train operations cover distances between 300 km and 900 km, followed by services covering distances longer than 900 km and below 300 km (Figure 83 and Figure 84).

Figure 84 Ranking of types of distances of the trains operated by railway undertakings or served at terminals crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 6.R and 6.T; Note: 1= first, 2=second, 3= third*

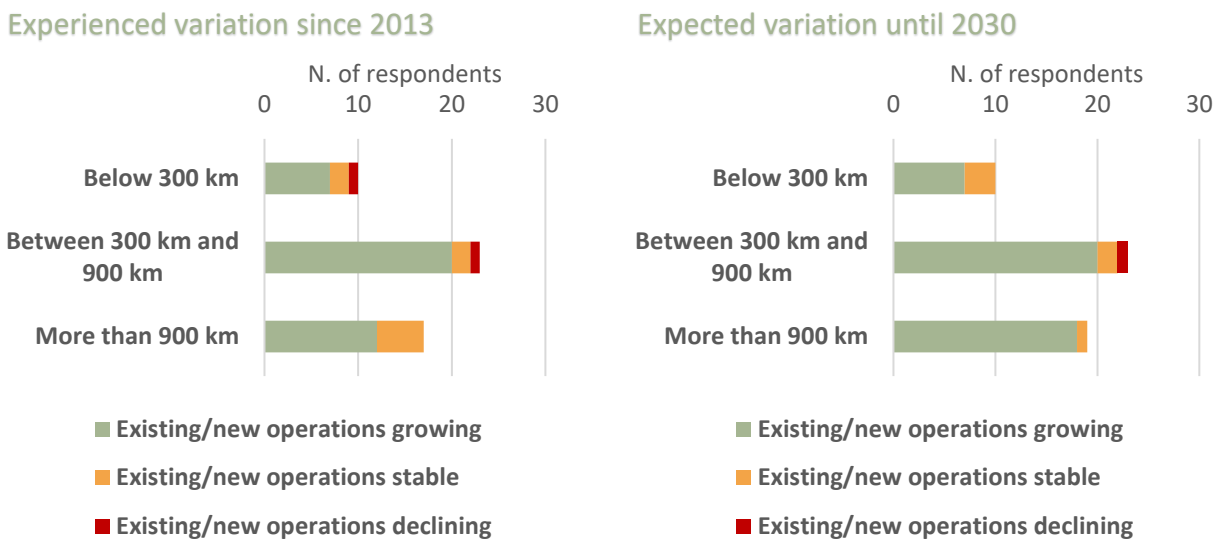
Figure 85 Experienced and expected traffic trend on type of distances of the trains operated by RUs crossing at least one border crossing point(s) in any RFCs




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 6.R*

RUs experienced mostly positive variations for services covering distances longer than 300 km and declared the market is stable for operations below 300 km (Figure 85). Terminal operators have predominantly experienced growing trends in all market segments in the past years (Figure 86). The vast majority of RUs and terminal operators are expecting positive future trends for the three market segments.

Figure 86 Experienced and expected traffic trend on type of distances of the trains or served at terminals crossing at least one border crossing point(s) in any RFCs

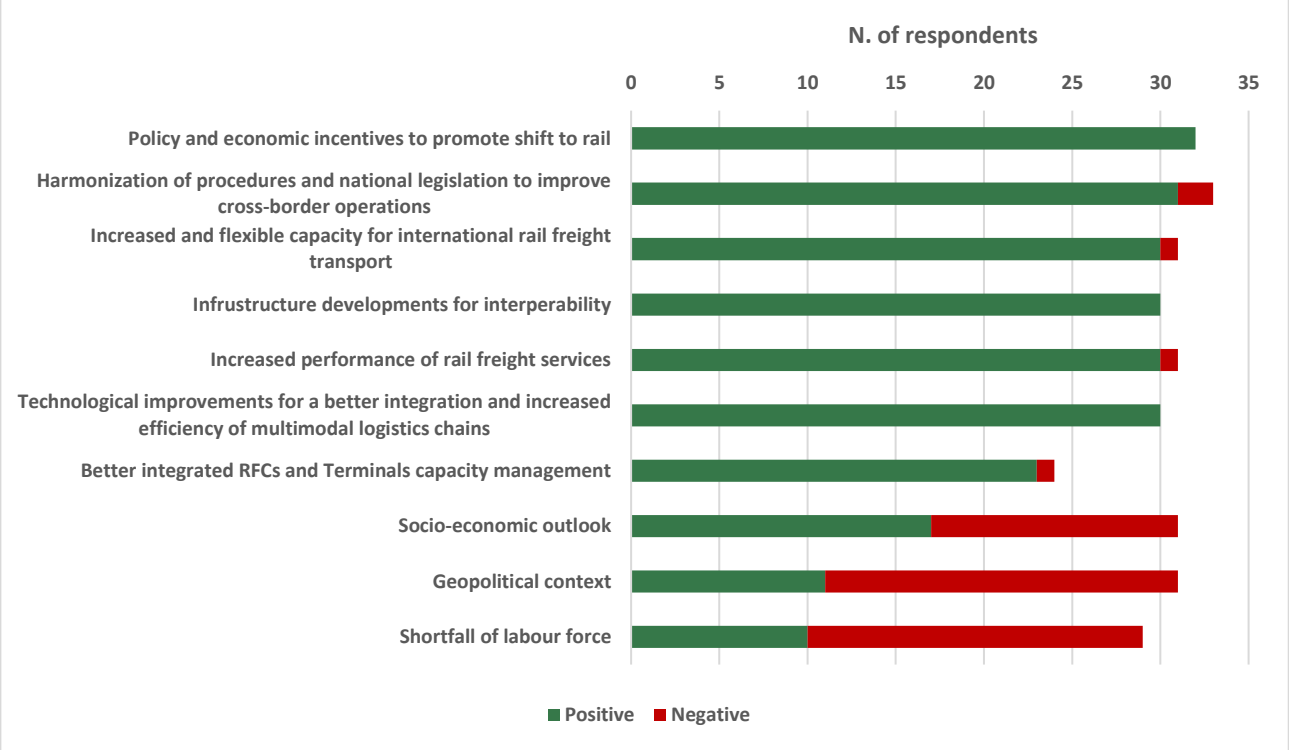



*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Questions C) 6.T*

## 6.3 MARKET DRIVERS

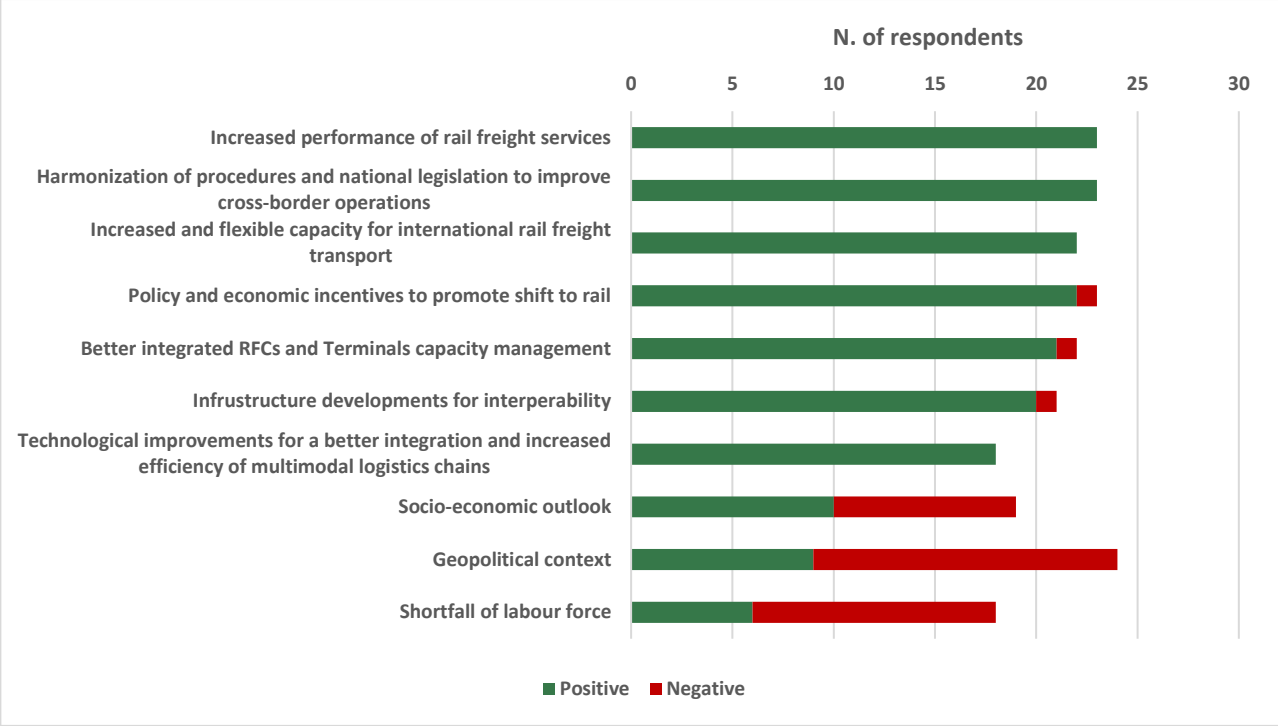
RUs and terminal operators have very similar views about the effects of the main market drivers on the growth of international rail freight transport in the short term, i.e., up until 2030 (Figure 87 and Figure 88). Most identified drivers are expected to have positive effects as they are assumed to improve rail transport's competitiveness. At the same time, the geopolitical context, the socio-economic outlook as well as the shortfall of the labour force are perceived as threats.

Figure 87 Potential effect of market drivers on the evolution of international rail freight transport operated by RUs until 2030




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 7.RT*

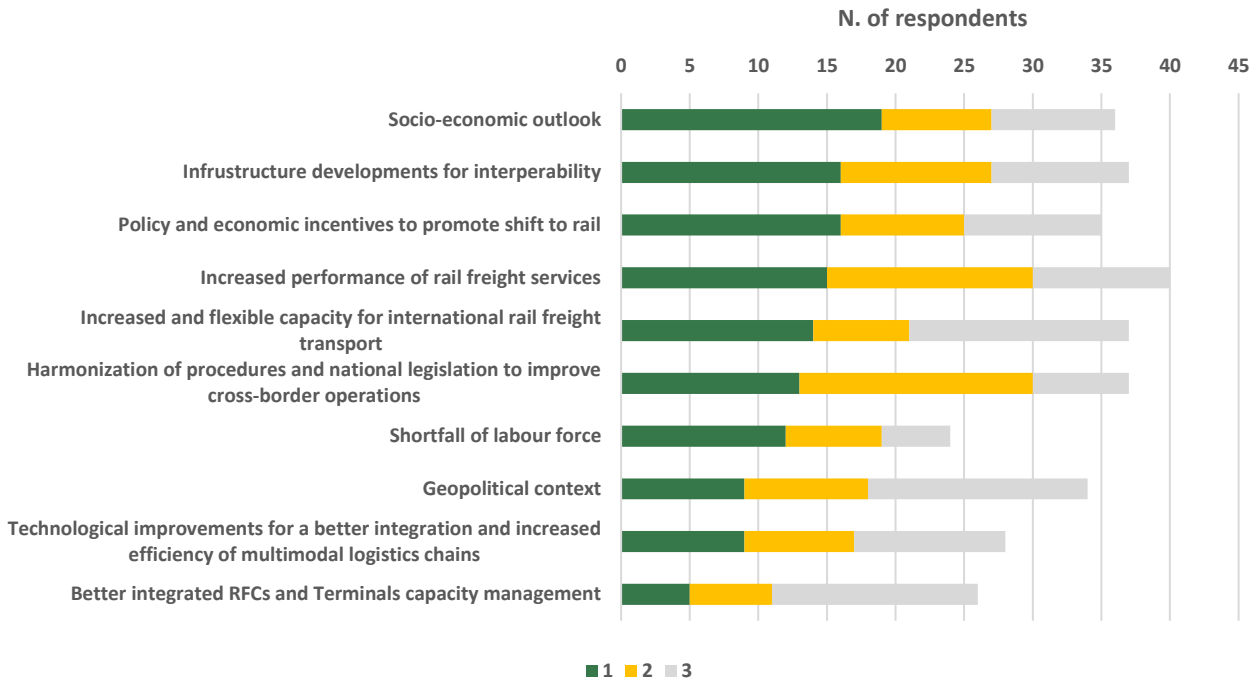
Figure 88 Potential effect of market drivers on the evolution of international rail freight transport served at terminals until 2030




*Source: 2023 11 RFCs Joint TMS Update Survey; Notes: Question C) 7.RT*

Market players rank as most relevant market driver the socio-economic outlook (Figure 89). This is followed by "infrastructure developments for interoperability", "policy and economic incentives to promote shift to rail", "increased performance of rail freight services" and "harmonisation of procedures and national legislation to improve cross-border operations" are the two most relevant market drivers, according to the respondents, if considering both first- and second-ranking options.

Figure 89 Ranking of the most relevant short-term market drivers for RUs and Terminals




*Source*: 2023 11 *RFCs* Joint TMS Update Survey; Notes: Question C) 7.RT

Although indicated as having a potential negative impact on the market, labour shortages and geopolitical context are not among the most critical market drivers. Finally, “technological improvements towards better integration and increased efficiency of multimodal logistics chains” and “better-integrated RFCs and terminal capacity management” do not seem to be considered priority issues by the RUs and terminal operators.

# 7 KEY FINDINGS AND RECOMMENDATIONS ON FACILITATING AND STRENGTHENING RAIL FREIGHT MARKET ALONG THE 11 RFCS NETWORK AND THE RFC ATL

The European Commission introduced the European Green Deal at the end of 2019, representing Europe's long-term comprehensive strategy to make the European continent carbon-neutral by 2050. To implement the European Green Deal and support the achievement of its ambitious goals, the European Commission updated between 2020 and 2021 all main economic sector policies, including for transport and mobility. About one year after the adoption of the European Green Deal, the European Commission published its Smart and Sustainable Mobility Strategy, replacing the 2011 White Paper. To support the achievement of the ambitious target of the European Green Deal, of reducing transport emissions by 90% by 2050 (compared to 1990 levels), the Sustainable and Smart Mobility Strategy sets specific milestones for the rail sector, i.e., doubling passenger high-speed rail traffic by 2030 and tripling it by 2050, while increasing rail freight by 50% by 2030 and doubling it by 2050 (compared to 2015 levels).

To make the above vision and targets a reality, the strategy identifies a total of 82 initiatives in 10 key areas for action, including one dedicated to the greening of freight transport, proposing measures to make freight transport more efficient and more sustainable, by improving rail infrastructure management, offering stronger incentives for low-emission lorries, and better information on freight transport greenhouse gas emissions. The Greening Freight Transport flagship action of the Smart and Sustainable Mobility Strategy involves three main measures:

- A new regulation on the use of railway infrastructure capacity in the single European railway area, amending Directive 2012/34/EU and repealing Regulation (EU) No 913/2010[20] aimed at optimising the use of the railway infrastructure, improving cross-border coordination, increasing punctuality and reliability, and ultimately attracting more freight to rail. Current rules on capacity management are decided annually, nationally and manually. This does not favour cross-border traffic (around 50% of rail freight crosses borders); the fractured approach leads to delays at borders. This, in turn, hinders the functioning of the Single Market. Delays due to congestion caused by uncoordinated maintenance works are also common. The proposal for a regulation on the use of railway infrastructure capacity in the single European railway area builds on the industry-led Timetable Redesign Project. The aim is to better respond to the different needs of the rail sector: stable timetables and early booking of tickets for passenger services, and flexible train runs adapted to just-in-time supply chains for freight shippers.
- A new directive amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic[21]. More than 50% of freight is carried by road in the EU (2020 figures), and this transport is a major contributor to greenhouse gas emissions. The current Weights and Dimensions Directive sets the maximum weight length, width and height for heavy-duty vehicles. The proposed directive revises these rules to allow additional weight for vehicles using zero-emission technologies, as they tend to increase a vehicle's weight. This is expected to incentivise the take-up of cleaner vehicles and technologies. The uptake of more

[20] https://transport.ec.europa.eu/document/download/9393e22e-72ee-440d-a983-e2ee116e11ba_en?filename=COM_2023_443_0.pdf
[21] https://transport.ec.europa.eu/document/download/6d96dca5-11f2-4499-81cd-b3d44b67a73d_en?filename=COM_2023_445_0.pdf

aerodynamic cabins and other energy-saving devices will also be encouraged increasing the efficiency of zero-emission powertrains (further to improving driver comfort and safety). The proposal also provides clarity on the use in cross-border traffic, in certain conditions, of heavier and longer vehicles than allowed today in some Member States. This includes clarifying that Member states who allow European Modular Systems (EMS) in their territories will also be able to use them in international operations among the neighbouring Member States, without a need for a bilateral agreement and without a restriction of crossing only one border. As a results, the same amount of cargo can be carried in fewer trips. Finally, to encourage intermodal transport, whereby goods are moved using two or more transport modes but with a standardised cargo unit (like a container trailer or other), lorries, trailers and semitrailers will be allowed to carry extra weight. Extra height will also facilitate the transport of high-cube containers by standard vehicles.

- A new regulation on the accounting of greenhouse gas emissions of transport services[22], defining a new methodology for companies to calculate their greenhouse gas emissions if they choose to publish this information, or if they are asked to share it for contractual reasons. The method is based on the recently adopted ISO/CEN standard for the quantification and reporting of greenhouse gas emissions arising from the operation of transport chains of passengers and freight. Reliable data on door-to-door emissions will enable operators to benchmark their services and allow consumers to make informed choices on transport and delivery options.

The Greening Freight Transport package is part of a broader effort to make mobility and transport more sustainable. It follows on from the key components of the "Fit for 55" package, such as its targets for recharging and refuelling stations, and for the deployment of sustainable fuels in aviation and maritime transport. To complement these proposals, the European Commission is also revising the Combined Transport Directive, as part of which it will consider a range of regulatory, operational and economic measures to make intermodal transport more competitive.

Finally, the Greening Freight Transport package also complements the revised Trans-European Transport Network (TEN-T) policy through incentives and requirements for infrastructure development, and by better integrating the different modes within a multimodal transport system. Digital technologies are also helping to increase efficiency, including the European Rail Traffic Management System and Digital Automatic Coupling for rail, the Electronic freight transport information Regulation and the European Maritime Single Window environment.

With reference to the 50% rail target growth set in the EU policies for the period 2015-2030, Table 35 provides the transport volume figures in million tkm for the EU27 in 2015 and 2022. Data show that the gap to be filled between 2023 and 2030 is significant, especially for the international segment.

**Table 35 Freight volume (million tkm) in 2015 and 2022**

| | 2015 | 2022 | Var. % '15-22 |
|---|---|---|---|
| **International rail freight transport** | 155,289 | 149,032 | -4% |
| **National rail freight transport** | 181,811 | 199,830 | 10% |
| **Total rail freight transport** | 337,100 | 348,862 | 3% |

*Source: Eurostat [rail_go_typepas]; Notes: (1) Data for Belgium are excluded from the total as they are not available for 2015 and 2022. (2) Data are limited to main undertakings*

[22] https://transport.ec.europa.eu/document/download/6fd194f0-1618-45c8-822e-1b13e808eb23_en?filename=COM_2023_441.pdf

## 7.1 SUMMARY OF KEY FINDINGS OF THE STUDY

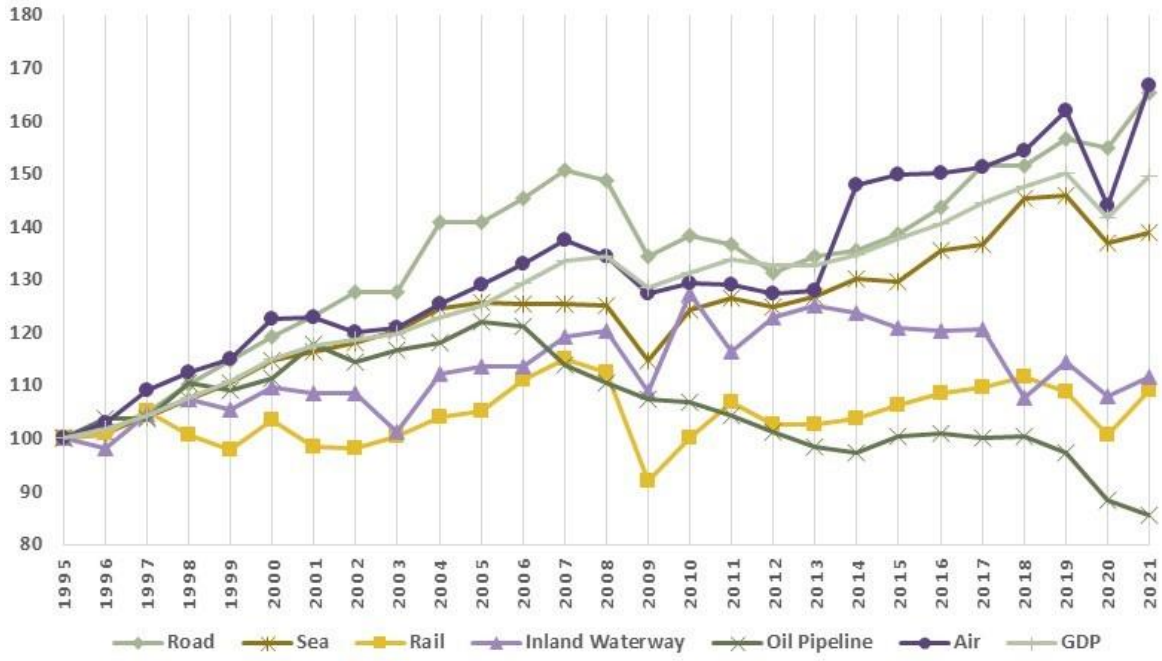
### 7.1.1 THE RAIL FREIGHT MARKET IN EUROPE AND ON THE ATL RFC

**Overall market trends and sector developments**

An analysis of the available statistics was performed as part of the study based on the data available from the European Commission DG MOVE/Eurostat (Statistical Pocketbook 2023 and RMMS Rail Market Monitoring Report) and from the Independent Regulators Group (IRG)-Rail (Rail Market Monitoring Reports). The analysis provides an overview of the development of the European rail freight sector since mid of the 1990s when the rail freight market liberalization started, allowing monitoring trends before and after the 2008 credit crunch, which is considered the second major financial crisis after the 1930s Great Depression, and which was followed by additional adverse events during the past 10-15 years when the 11 RFCs were gradually established and entered into operation. Key findings from the statistical analysis are as follows:

- The period since the entry into force of the Regulation 913/2010 has indeed been marked by a number of socio-economic, health and geopolitical events which negatively impacted trade and transport flows at the global and European scale. The statistical review shows that the 2008 financial crisis basically altered the economic and transport developments experienced by Europe over the previous decades. EU27 long-term series over the past 30 years show that the effects of this crisis are persisting: albeit positive, the trend of GDP and most transport modes of the following period stands indeed at lower growth rates. Overall, the European rail freight market grew modestly over the last decade, contrasting with the strong development experienced between 2001 and 2008. The EU economy and transport markets were more recently further impacted by the 2020-2021 COVID-19 pandemic and by the current geopolitical crisis that started in 2022 with the Russian war of aggression against Ukraine and deteriorated with the Israel-Gaza conflict and Red Sea crisis.

Transport trends in billion tkm EU27 (1995=100)




*Source: European Commission – DG MOVE – Statistical Pocketbook 2023*

- Rail freight transport between 2013 and 2021 marginally grew in the EU27 from about 385 billion tkm to 410 billion tkm, i.e. 7%, which is only half the rate of growth of total transport volumes and GDP. However, over the same period combined transport more than doubled from about 41 billion tkm to 100 billion tkm. Trends for the ATL RFC concerned countries are similar to the EU ones, specifying that the growth of rail freight transport registered higher rates. In the ATL RFC concerned countries rail freight transport grew indeed from about 157 to 172 billion tkm, i.e. 10%.
- Except Germany  ATL RFC countries register a rail modal share below the EU average. At the same time, these ATL RFC countries register a stable slight declining trend in rail modal share over time. A trend that is also related to the change in the commodity basket trade. At both EU 27 and ATL RFC concerned country levels, there is an underlying stagnation or decline of dry and liquid bulk commodities (originating even from before the mid of the 1990s), associated with a growth of intermodal transport, a market segment that is apparently growing with the gradual opening of the rail freight market and greening of the logistics chains.
- The COVID-19 pandemic seems to have had different impacts at the EU27 scale on rail freight traffic measured in net tkm, with either increases or decreases in transport volumes between 2019 and 2021. The impact has been apparently significant in the Baltic States, Denmark, Luxembourg, and Portugal, whereas Bulgaria and Greece experienced about 20% growth. Except Portugal, the ATL RFC concerned countries seem to have also registered positive variations during the pandemic period.
- Since the start of the rail freight liberalisation process late 1990's and 2000's, the market share of the domestic incumbent railway undertakings gradually declined in most EU Member States, whereas the market share of non-incumbents increased together with the operations of foreign incumbents. As a general pattern, common to the EU27 and ATL RFC concerned countries, the trend of the market share by domestic incumbents continued to decline in the period 2013-2021. In the RFC ATL concerned countries, the market share of the domestic incumbent in 2021 was about 40% on average, 60% considering national and international incumbents.

**Analysis of the current and future freight transport market along the 11 RFCs Network**

As part of the 2024 Joint TMS Update, an analysis of the current and future market has been done using an EU-wide NEAC model, combining transport and economic statistics from Eurostat with train traffic data available from the RNE TIS database.

Within the 11 RFCs Network catchment area, rail freight transport in 2022 accounts for 18% of the total international freight transport volume, which is approximately 265 million tonnes. This relates to approximately 442,000 trains[23].

For the analysis of the future short-term market trends, at the 2030 time horizon, three scenarios have been simulated. The first one only simulates economic growth (Reference scenario); another one simulates the effects of the completion of major transport investments currently ongoing or expected to be finished by 2030 (Projects scenario). The third one simulates the impact of a fully interoperable rail network, regardless the possibility to implement the required projects (Sensitivity scenario). The three scenarios show an increase in international freight transport in general. Within the 11 RFCs Network areas, due to economic growth (EU Reference), the increase of all freight transport is about 13%. This is in line with the GDP growth for the EU27, which is 17%. IWW shows a growth of 13%, road has a growth of 14% and rail transport of 13% in the 11 RFCs

[23] An average volume per train of 600 tonnes is assumed.

Network catchment area. In the absence of further developments, the rail freight market is expected to grow at a slower pace compared to GDP and to the overall transport sector, therefore losing market share. This is due to the changing trends in the basket of transported commodities and differentiated geographic demand growth distribution. For all land freight transport, the projects scenario and the sensitivity scenario have a limited impact on the overall growth of international freight transport.

Focusing on international rail freight transport in the 11 RFCs Network catchment area, the Reference scenario expects a growth of 13%, which is approximately 35 million tonnes extra compared to the 2022 Base year. Both the Projects scenario and the Sensitivity scenario show the impact of the different rail projects and rail measures. In the Projects scenario, rail transport grows an extra 5% compared to the Reference scenario (300 million tonnes to 314 million tonnes). In total it is estimated that this is approximately 14 million tonnes of extra international rail freight transport.

The hypothetical Sensitivity scenario shows that compared to the Reference scenario, there is a potential of 61 million tonnes extra rail freight transport due longer trains, intermodal loading gauge, ERTMS, and European standard track gauge along the RFCs network. The total expected rail freight transport volumes in this scenario reaches 361 million tonnes, corresponding to a 20% growth compared to the Reference scenario.

Considering both economic and infrastructure developments, the Sensitivity scenario can be regarded as the potential maximum growth for rail transport across the 11 RFCs Network. Compared to the 2022 Base year, transport volumes would increase from 265 to 361 million tonnes i.e. by 36%, out of which around 1/3 is due to economic development and 2/3 to infrastructure investments.

As a result of the analysis performed, it is possible to conclude that the major planned projects along the 11 RFCs Network are assumed to be completed by 2030 (see Section 3.3.2), and the modernisation of railway lines and cross-border sections, are fundamental to removing infrastructure bottlenecks and reducing travel times and transport costs. Such initiatives are expected to increase the competitiveness of rail transport on the 11 RFCs Network, and thus on each RFC, including the RFC ATL. Further to these projects, completing an interoperable network in line with the TEN-T requirements is key to increase the rail market share.

With reference to the 50% rail growth set in the EU policies for the period 2015-2030, the combined observed growth for the period 2015-2022 (-4% Table 35) and expected for the time frame 2023-2030 (+36%) still lags below the target. Therefore, the development of a high-quality and interoperable network does not seem to be sufficient to achieve the ambitious targets set in the relevant European transport policies, an outcome that would hardly change even assuming that additional mega cross-border projects would be completed like the Brenner and Turin-Lyon.

Such targets remain challenging to meet in the absence of a significant change in the structure of the costs of road and rail transport. Internalising external costs of road transport and incentives to reduce the costs of rail transport might be needed. The potentially negative impact on the rail market share of measures such as improving the efficiency of road transport shall also be considered, as also reported in a recent study by the Community of European Railway and Infrastructure Companies (CER) – *Study on Weights and Dimensions: Impacts of the Proposed Amendments to the Weights and Dimensions Directive on Combined Transport and Rail Freight Transport*[24]. Market opening appears also to be relevant in increasing the competitiveness of rail transport. A recent study by the European Rail Freight Association (ERFA) – *The European Rail Freight Market;*

[24] https://www.cer.be/cer-reports/study-on-weights-and-dimensions

*Competitive Analysis and Recommendations*[25] – considers how non-incumbent operators, focussing on the fast-growing intermodal and logistics train segments, are likely to experience further growth in market share in the 2020s. According to the study, competition amongst railway undertakings has made rail more attractive compared to road, which can be partially explained by the business model of the non-incumbents, more focused (i.e., intermodal and logistics, block trains, and international traffic), lean and agile, and cost competitive, able to offer better service levels consistently.

**Analysis of the current and future freight transport market along the RFC ATL**

International freight transport across all modes in the catchment area of the RFC ATL amounts to 83 million tonnes. Overall, most transport concerns cargo type *Other* (46 million tonnes, 56%), followed by dry bulk (27 million tonnes, 32%). The cargo type *Other* is mostly transported by road. Rail does not have a specific cargo type in which it dominates transport.

On relations within the catchment area of RFC ATL, rail freight transport has a share of 14% in the total amount of international freight transport. This is a volume of approximately 11 million tonnes. The total amount of international rail freight transport of 11 million tonnes relates to approximately 18,000 trains within the corridor area of RFC ATL.

For the analysis of the future short-term market trends, at the 2030 time horizon, three scenarios have been simulated. The first one only simulates economic growth (EU Reference); another one simulates the effects of the completion of major transport investments currently ongoing or expected to be finished by 2030 (Projects); and an additional one simulates the impact of a fully interoperable rail network, regardless the possibility and costs to implement the required projects (Sensitivity).

The three future scenarios (Reference, Projects and Sensitivity) show an increase in international freight transport in the RFC ATL in line with what is expected at the European level. Mainly due to autonomous economic growth, the increase in general is about 13%, in the RFC ATL slightly less at 11%. This is in line with the GDP growth for the EU27 which is 17%. In the RFC ATL, inland shipping shows a growth of 6%, road and rail each have a growth of 12%, and sea shipping 9%. In the absence of further developments, the rail freight market is expected to grow at the same pace compared to GDP and to the overall transport sector, therefore keeping its market share. For all land freight transport, the Projects scenario and the sensitivity scenario have an impact on the overall growth of international freight transport, especially in the RFC ATL.

In the RFC ATL, for the Reference scenario, a growth of international rail transport is expected at 12%, which is approximately 2 million tonnes extra compared to the 2022 situation. Using an average volume of 600 tonnes per train, this would be (rounded) 2,000 extra international freight trains in the RFC ATL.

The Projects scenario shows the impact of the different rail projects and rail measures. Rail transport grows an extra 3% compared to the Reference scenario. In total it is estimated that this is less than 1 million tonnes of extra international rail freight transport. Taking an average volume of 600 tonnes per train, this gives (rounded) 1,000 extra trains in the RFC ATL. Together with the Reference scenario results, this would be approximately 21,000 trains for the RFC ATL.

The Sensitivity scenario shows that there is another potential of 5 million tonnes extra rail freight transport due to longer trains, intermodal loading gauge, ERTMS, and European standard track gauge in Spain and Portugal. With an average volume of 690 tonnes per train (15% extra), the total number of unique international freight

[25] https://erfarail.eu/news/the-european-rail-freight-market-competitive-analysis-and-recommendations

trains would then be around 22,000. Compared to the 18,000 unique trains in 2022, this is a growth of around 22%.

Overall, the sensitivity scenario can be regarded as a conservative assessment of potential growth for rail, considering both economic and infrastructure developments. Compared to the 2022 base year, transport volumes would increase from 11 to 15 million tonnes i.e. by 36%.

### 7.1.2 OCCURRED AND EXPECTED CHANGES DUE TO THE ESTABLISHMENT OF THE RFCS

In the absence of a consistent historical series of data and information on the operations along the 11 RFCs – worth also considering that the RFCs were established and entered into operation in different years between 2013 and 2020 – an e-survey was conducted as part of the 2024 Joint TMS Update – *2023 11 RFCs Joint TMS Update Survey* – to assess the occurred and expected changes associated with their establishment. The survey involved the Railway Undertakings Advisory Groups (RAGs) and Terminal Advisory Groups (TAGs) of the 11 RFCs. In total, 42 representatives of the RAGs and 30 members of the TAGs submitted valid questionnaires between September 2023 and January 2024.

The survey was conducted to collect the opinion of the 11 RFCs market on three main areas: occurred and expected impact of the RFCs, occurred and expected market developments along the RFCs, and market drivers. The main findings from the survey are summarised in the following bullet points for each of the three areas. Especially regarding the opinion of the RAG and TAG members on the occurred and expected market developments, it is worth noticing that: it reflects their views at the time of submission of the questionnaire (Autumn 2023/January 2024); it represents a partial view of the market as the sample of the respondents is not representative of the market universe; it may contrast with the findings from the statistical review presented in the previous section above, as the opinions relate to the corridors and international trains, whereas national statistics refer to the whole country network and national as well as international traffic.

***Occurred and expected impact of RFCs, in the areas of governance, operational efficiency and capacity management***

- The respondents' opinion about the changes within the governance area is positive, especially in terms of cooperation with the market, including but not limited to RUs and terminal operators, as well as concerning facilitation of discussion among Member States about the issues affecting the competitiveness of international rail freight transport. The opinion about the progress made regarding cooperation between RFCs and Core Network Corridors (CNCs)/ERTMS horizontal priority is less favourable. The market opinion is negative about the progress made on harmonising international freight rail services' legislative, regulatory, procedural and operational aspects. The expectations of the market players concerning the future impact of the programmes and activities of the RFCs are relatively positive concerning all issues. Respondents consider the cooperation between RFCs and an EU Network of Infrastructure Managers (ENIM) as assumed in the proposal for the new capacity regulation, to be the best governance solution for bringing issues forward.
- The stakeholders' opinion about the changes that occurred within the operational efficiency area is also generally positive, except for the progress made in the promotion of technical and operational harmonisation of the European railway transport system towards its interoperability. The respondents' expectations concerning the future impact of the programmes and activities of the RFCs are relatively positive concerning all the assessed issues related to operational efficiency. Cooperation between RFCs and an EU Network of Infrastructure Managers (ENIM) is also considered the best-fitting governance solution to bring operational efficiency issues forward.

- The respondents' opinions about the changes that occurred within the capacity management area are predominantly negative. Notwithstanding the market's negative opinion of the progress made since the establishment of the RFCs in this area, the expectations on the future impact of the programmes and activities by the RFCs are rather positive with regard to all the investigated issues related to capacity management. The best governance solution for capacity management improvements is deemed to be the cooperation between the RFCs and an European Network of Infrastructure Managers (ENIM).

***Occurred and expected market developments***

- The vast majority of the respondents operated or still operate rail services or manage/operate terminals serving trains across at least one border crossing point on any of the RFCs. Most of them also operated or served international rail freight transport before the establishment of the RFCs. The majority of the respondents declare they experienced an increase in their operations since 2013, and most of them also have a positive expectation about the future, expecting overall market growth.
- The prevailing type of international trains operated on the RFCs network consists of intermodal trains, followed by conventional block trains and single-wagon load trains. Most RUs and terminal operators experienced growth in intermodal train operations in the past years, whereas the trend for conventional block and single-wagon load trains is predominantly stable. Most respondents have a positive expectation for the future in terms of traffic growth for all market segments.
- Concerning traffic between logistics nodes, most operations relate to Port to Rail-Road Terminal (RRT) transport, followed by RRT to RRT services and Port to Port operations. Experienced variations by RUs were mostly positive for the Port to RRT or RRT to RRT segments and stable for the Port to Port one. Terminal operators have predominantly experienced growing trends in all market segments in the past years. The vast majority of RUs and terminal operators are expecting positive future trends for the three market segments.
- Regarding service distances, most operations cover distances between 300 km and 900 km, followed by services covering distances longer than 900 km and below 300 km. RUs experienced mostly positive variations for services covering distances longer than 300 km and declared the market is stable for operations below 300 km. Terminal operators have predominantly experienced growing trends in all market segments in the past years. The vast majority of RUs and terminal operators are expecting positive future trends for the three market segments.

***Market drivers***

- RUs and terminal operators have very similar views about the effects of the main market drivers on the growth of international rail freight transport in the short term, i.e., up until 2030. Most identified drivers are expected to have positive effects as they are assumed to improve rail transport's competitiveness. At the same time, the geopolitical context and socio-economic outlook, as well as the shortfall of the labour force, are perceived as threats.
- The socio-economic outlook is ranked first by the market, followed by infrastructure development and interoperability, policy and economic incentives to promote shift to rail. Increased performance of rail freight services and harmonisation of procedures and national legislation to improve cross-border operations are the two most relevant market drivers, according to the respondents, if considering both first- and second-ranking options.
- Although indicated as having a potential negative impact on the market, labour shortages and geopolitical context are not ranked among the most critical market drivers. Finally, technological improvements towards better integration and increased efficiency of multimodal logistics chains,

better-integrated corridors and terminal capacity management do not seem to be considered priority issues by the RUs and terminal operators.

## 7.2 STUDY RECOMMENDATIONS

Building on the study's key findings, recommendations have been formulated around two main areas:

- Market developments and targets; and
- Institutional and operational developments.

**Market developments and targets**

The simulations made in the study demonstrate that major projects, and particularly the availability of an 11 RFCs Network in line with TEN-T standards, would significantly increase the competitiveness of rail freight transport. The post-COVID recovery and the recent geopolitical crisis caused delays in the implementation and completion of the projects needed to develop a high-quality 11 RFCs Network in line with TEN-T standards. Price increases and shortages of construction materials particularly affected the progress of ongoing and planned projects. A high-quality 11 RFCs Network might, furthermore, not be sufficient to achieve the ambitious targets set in the relevant European transport policies, in the absence of a significant change in the structure of the costs of road and rail transport. This situation seems further challenging the socio-economic viability of infrastructure projects along the network, including the ones to achieve the TEN-T standards, such as the European standard gauge in the Iberian Peninsula, for which investments by the market players involved in the logistics chain in equipment facilities and rolling stock would need to be added to infrastructure costs. The following recommendations are proposed to support market development towards the achievement of the EU policy targets:

- *Timely complete the development of a high-quality 11 RFCs Network in line with TEN-T standards:*
  - *Building missing links and removing infrastructure bottlenecks* increasing infrastructure capacity by adding new tracks and lines where needed, increasing their speed and improving their gradient, can solve congestion problems, save energy and reduce transport costs as well as improve travel times. Such developments are relevant at the network level, but produce effects also at the individual corridor scale;
  - Achieving the requirements set in the TEN-T Regulation *towards an 11 RFCs Network in line with TEN-T standards*, i.e. 740 meter long trains, ERTMS, 22.5 t axle load, intermodal loading gauge, European standard track gauge, electrification, is fundamental to support the development of a Single European Railway Area, specified that, also in line with the approach proposed in the revised TEN-T Regulation (EU) 1679/2024, the investments in the development of UIC track gauge along the RFC network should be supported by evidences concerning their socio-economic viability considering costs and benefits to be incurred by the infrastructure managers, the operators and the logistics industry. In this sense, the deployment of the UIC track gauge should not mean the suppression of the Iberian gauge. This way the benefits from the UIC gauge could be obtained while, at the same time, would allow the continuity of the operations in the Iberian gauge. This approach would not negatively affect the flows currently moved by rail and the business plans of the different agents involved (infrastructure managers, railway undertakings, terminal operators, producers, etc.);

- *Support intermodal and combined transport*. The intermodal market is the most promising international rail freight market segment, requiring improvement of interconnectivity between main railway lines and terminals, increasing the capacity of the existing terminal infrastructure, investing in technologies to facilitate and speed up transport and transhipment operations, and tracking and making more reliable the transport of intermodal units along logistics chains and within logistics clusters;
- *Stronger cooperation between all involved parties for better effectiveness in the availability and the use of funds and the definition of investment implementation strategies focussed on those sections of the network with higher market potential*. For over a decade, the sector has benefited from a stronger TEN-T policy with a dedicated Connecting Europe Facility Fund. Among the different transport modes involved in the TEN-T network, rail and rail cross-border initiatives are treated as a priority. However, the available financial resources are limited overall compared to the financial needs that would be necessary to complete all projects. Investing in infrastructure might not be sufficient, e.g. to be operational, ERTMS also requires rolling stock to be equipped with onboard units.

- *Introduce market regulatory and policy measures to increase the competitiveness of rail freight transport*. Although not a specific subject of this study, regulatory and policy measures might be necessary to facilitate and foster the rail freight market in Europe towards the achievement of higher market shares and EU policy targets. Rail freight transport is generally more expensive and less flexible compared to road transport. Internalising external costs of road transport and/or creating incentives to reduce the costs of rail transport would increase its competitiveness and support the achievement of the ambitious EU policy targets. In this respect, policymakers shall also consider the potential effects on the modal share of measures improving the efficiency of road transport. As emphasised in the above-mentioned study by ERFA[26] regulatory measures facilitating market opening appear also to be relevant in increasing the competitiveness of rail transport (e.g. enforcement of antitrust regulations; unbundling of subsidised public service operations from open market business; and ending direct subsidies to or recapitalization of state-owned freight railway undertakings).

**Institutional and operational developments**

Recommendations on institutional and operational developments are formulated as follows, according to the findings from the market consultation (2023 11 RFCs Joint TMS Update Survey), conducted as part of this study and the use of the available infrastructure and market dataset to produce the current and future market analysis for the 11 RFCs:

- *Improve capacity management*. Capacity management is considered by the market and also by the analyses and studies at the basis of the proposal for the new capacity regulation, a key area for improvement. Progress was made in the management of Temporary Capacity Restrictions; however capacity planning remains an issue. Digital Capacity Management as an integral part of the European program “Timetable Redesign (TTR) for Smart Capacity Management” is at the core of the proposal for the new capacity regulation, and it is paramount to reaching the Green Deal’s targets for the transport sector and the rail freight segment within it.
- *Monitor operational performance*. The revised TEN-T Regulation (EU) 1679/2024 identifies new operational requirements, related to punctuality and dwell times at borders. Furthermore, some

[26] https://erfarail.eu/news/the-european-rail-freight-market-competitive-analysis-and-recommendations

infrastructure requirements also depend on operations, such as 740 meter long trains. Investing in infrastructure, albeit needed, is long-lasting and capital-intensive. The competitiveness of international rail freight transport also depends on the improvement of cross-border operations and coordinated planning and management of the rail network at European scale. An RFCs common KPI framework is already in place, and RNE is also already monitoring infrastructure KPIs, as also graphically represented in CIP. Such activities might be continued in the light of the new set of requirements foreseen in the TEN-T Regulation (EU) 1679/2024, and RFC governance structure, also defined in the Art. 67 of this regulation.

- *Balance network and corridor governance approach*. The analysis of the RFC catchment areas shows that international trains using at least one corridor BCP may actually use more than one RFC. A network approach is more fitting to the planning and management of the network capacity. Geographical specificities and logistics clusters and chains exist that still make the corridor concept useful, especially to support discussion and coordination among IMs and Member States and for a customer-oriented approach aimed at involving RUs and Terminal Operators. This consideration also seems to be in line with the opinions expressed by the RAG and TAG members in the survey conducted as part of this study.

# ANNEX 1 – OVERVIEW OF THE NEAC MODEL

NEAC is a freight transport forecast model, which helps to identify the best policy options and infrastructure alternatives at European level. The model is able to produce forecasts of transport flows (both volume and vehicles) for different modes (road, rail, inland shipping, maritime, and other). The model results can be used in transport studies, but also for studying emissions or for use in social cost-benefit analysis.

Over the past decades, NEAC freight transport forecast system has frequently helped to assess and evaluate different policy options at European and national level. The system was used successfully in several projects such as corridor studies (such as North Sea-Med or Rhine-Alpine), Iron Rhine cost-benefit analysis, French international freight transport, Alpine crossings, North-South freight transport markets and safe truck parking. The system helped to get insights to pick the best policy options to make the European transport system more sustainable, resilient and robust.

For the near future, the model is able to assist in studies such as corridor studies, infrastructure projects for rail, road and inland waterways, port studies, safe and secure truck parking, impact of COVID, Russian war of aggression against Ukraine or road pricing at both European and national level. These are typically topics that play an important role in shaping the future of Europe. Scenarios for Green Deal or the Reference scenario are used to look at the impacts.

The system comprises of a database and a forecast model. Together they are very helpful:

- The database contains freight transport chains to, from and within Europe. It is based on reliable data such as Comext by mode and commodity, Port-to-Port statistics and socioeconomic data on population and GDP. Furthermore, the database contains mode specific networks for road, rail, inland waterways and sea. Terminals and ports form connection points in the networks. An extra asset in the database are the transport costs for the different modes which help to get insights in policies on modal shift;
- The forecast model is based on reliable methods and have been used in many other transport models in Europe and abroad. Think of ETIS+, Transtools, Worldnet or HIGH-TOOL. The forecast model comprises an economic model, a distribution/mode choice model and assignment models for different modes. The model is able to use different scenarios such as the European Reference or Green Deal package. These help to show the impacts on freight transport in general or on modes more specifically.

# ANNEX 2 – 2023 11 RFCS JOINT TMS UPDATE SURVEY COMPLETE RESULTS

This annex is enclosed as a separate file.