



European
Commission

Rhine Alpine



Fourth Work Plan of the
European Coordinator

Paweł Wojciechowski

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Abbreviations

EFSI	European Fund for Strategic Investment
EIB	European Investment Bank
ERTMS	European Rail Traffic Management System
EU	European Union
GDP	Gross Domestic Product
ICT	Information and Communication Technology
ITS	Intelligent Transport System
IWW	Inland Waterway
KPI	Key performance indicator
LNG	Liquefied natural gas
m	metre
MTMS	Multimodal Transport Market Study
TEN-T	Trans-European Transport Network

Country Codes after ISO 3166:

BE	Belgium
CH	Switzerland
DE	Germany
FR	France
IT	Italy
NL	The Netherlands
UK	United Kingdom

1 Towards the fourth Work Plan of the Rhine-Alpine Corridor

My role as the European Coordinator for the Rhine–Alpine Core Network Corridor began in 2015, with the approval of the first Corridor Work Plan. Since then, the Work Plan had two updated versions in 2016 and 2018.

Over the last five years, I have seen progress on the corridor. The opening in 2016 of the Gotthard – the world’s longest and deepest rail tunnel, was a significant step towards increasing the competitiveness of rail transport. Other projects, even if of smaller scale, contributed greatly to completing the corridor. In total, sixty infrastructure projects and studies have been implemented until December 2018. The total investment sum amounts to € 15.4 billion.

In the meantime, the general policy context has evolved. Sustainability goals and climate change mitigation and adaptation are key drivers of the EU’s infrastructure policy. The transport sector is one of the largest contributors to greenhouse gas emissions, as well as one of those that need greater efforts to decarbonize. On 11 December 2019, the European Commission presented the European Green Deal¹, with the ambition for Europe to be the first climate-neutral continent in the world by 2050, reducing 50% of the emissions by 2030.

It is clear that the new European Commission is committed to take action against climate change. The Rhine-Alpine Corridor should contribute to that. My task is to ensure that we have a fully compliant, operationally efficient multimodal and sustainable corridor by 2030.

To address those challenges, the present Work Plan is looking to the current and future compliance, the persisting bottlenecks, the most important recommendations regarding project implementation, financing and funding. A new element is the identification of the additional projects contributing to technical compliance, removal of bottlenecks and shift to environmentally friendly transport modes.

The Work Plan results from many discussions I had with ministers and officials from corridor countries. Furthermore, I organized several corridor fora and working group meetings, to allow exchange of views among a greater number of stakeholders. I have listened to the users of infrastructure, taking note in particular of the needs expressed by railway undertakings operating on the rail freight corridor. I also appreciate the assistance of the team of consultants.

The present document is a continuation of the process started in 2014-2015, while taking into account the evolving policy context.

¹ https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

2 Characteristics of the Rhine-Alpine Corridor

The Rhine-Alpine Corridor is the shortest of the nine corridors of the core network. At the same time, it runs through some of the most densely populated and economically strongest regions in Europe. Along the corridor, 138 billion tonne-kilometres of freight are transported annually. The regions of the corridor generate a GDP of more than € 3100 billion, representing 20% of EU's total². Altogether, more than 70 million people live, work and consume in the catchment area of the Rhine-Alpine Corridor. Leading manufacturing and trading companies, production plants and distribution centres are located within the corridor. It corresponds largely to the so-called "Blue banana", which includes major EU economic centres such as Brussels and Antwerp in Belgium, the Randstad region in the Netherlands, the German Rhine-Ruhr and Rhine-Neckar regions, the Basel and Zürich regions in Switzerland and the Milan and Genova regions in Northern Italy.

The Rhine-Alpine Corridor includes two of Europe's largest ports: Rotterdam and Antwerp. Together, they handled 650 million tonnes in 2018. The other six ports of the corridor add another 250 million tonnes. More than 800 million tonnes of this are hinterland traffic entering or leaving the corridor, while transshipment accounts for around 80 million tonnes that is 9% of the traffic (mostly Rotterdam and Antwerp, smaller volumes also in Zeebrugge and Genova). The corridor includes six of the top ten EU airports in terms of freight: Frankfurt, Amsterdam, Köln/Bonn, Liège, Brussels and Milano Malpensa. Together, they handled 6.7 million tonnes of cargo and mail in 2018, accounting for 40% of the EU total.

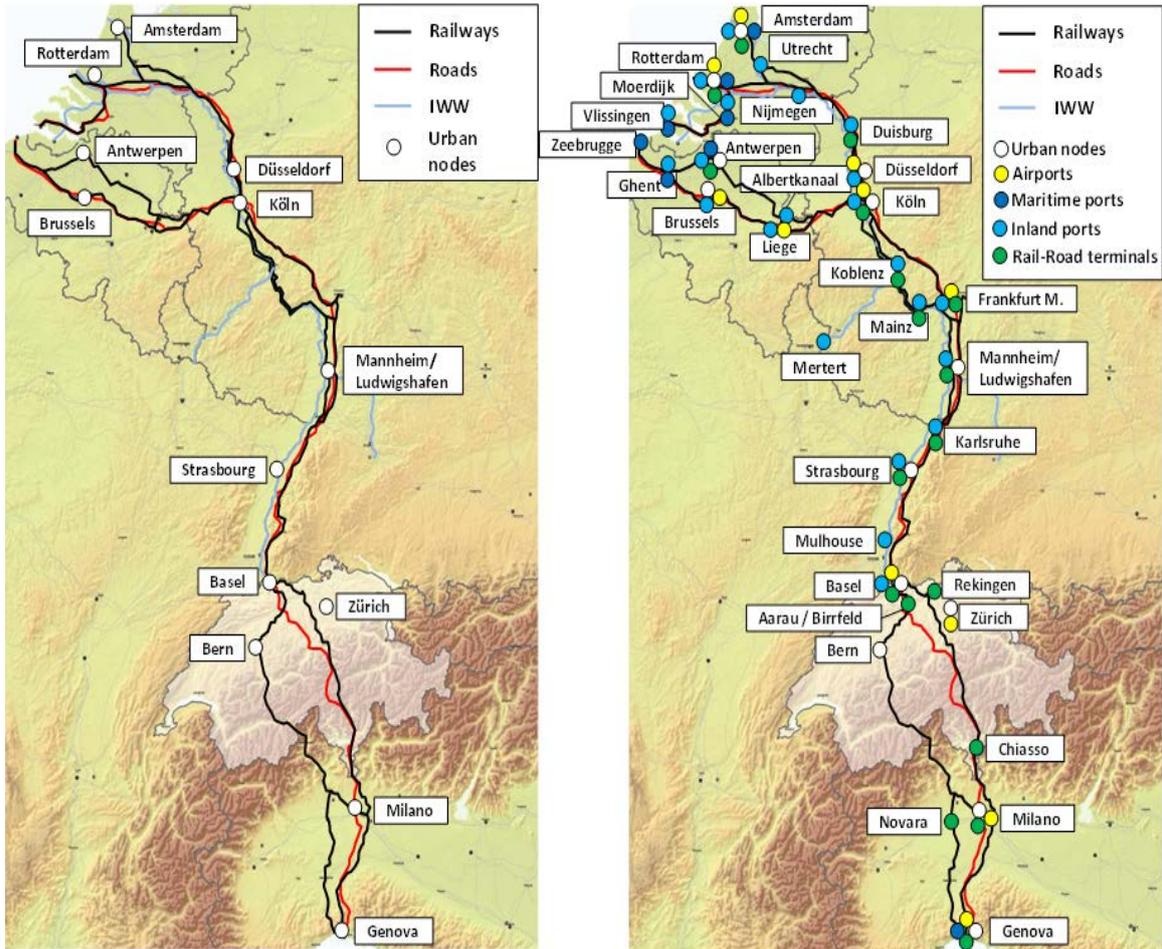
2.1 Alignment

The Rhine-Alpine Corridor runs through five Member States and Switzerland. France was added to the catchment area of the corridor in light of the relevance of inland waterways and their ports along the river Rhine. Moreover, the rivers Mosel and Neckar in Germany as well as Luxembourg's inland port of Mertert are included in the corridor. Inland waterways in Belgium are included in the North Sea Mediterranean Corridor, but are also of importance for further development of this corridor.

The particularity of the Rhine-Alpine Corridor is the partnership with Switzerland, the country, which provides a high quality multimodal infrastructure. Swiss representatives are members of the Corridor Forum and Swiss projects are included in the analysis of the corridor infrastructure.

² 2017 Eurostat data for GDP at current market prices by NUTS 2 regions of the EU, located along the corridor, excluding Switzerland

Figure 1: Alignment of Rhine-Alpine Corridor



Source: Regulation (EU) 1316/2013 Annex 1, Part 1 / HaCon

2.2 Persisting bottlenecks and compliance with the TEN-T requirements by 2030

The Rhine-Alpine Corridor is among the most mature corridors with a well-developed infrastructure. The analysis has shown that only few issues must be addressed to ensure the full compliance with the TEN-T requirements by 2030.

Table 1 gives an overview of the analysed parameters per mode and country. For each parameter, the status of compliance regarding the Regulation targets is indicated.

Table 1: Compliance with TEN-T requirements (2018)

	NL	BE	DE	FR	CH	IT	Total
Railways							
Train length \geq 740m	100%	100% ³	100% ⁴	-	100%	0%	87%
Line speed \geq 100km/h	95% ⁵	82%	100% ⁶	-	90%	100%	95%
ERTMS deployment	50%	34%	10%	-	96%	5% ⁷	27%
Roads							
Availability of clean fuels ⁸	available	available	available	-	available	available	100%
Inland waterways⁹							
Min. draught 2.5m	100%	-	74%	90%	100%	-	82%
Min. height under bridges 5.25m	100%	-	100%	100%	100%	-	100%

Regarding the **rail** characteristics, a wide gap exists in ERTMS implementation, with only 27% of the rail sections being currently equipped (for details see chapter 4.3).

There is a diverging situation on the corridor as regards the minimum train length of 740 meters. Italy's rail sections do not allow such trains in operation; however, an increase in track length up to 750 meters is planned on most Italian sections by early 2020s. Moreover, a number of train paths for trains with length of 740 meters will be regularly offered as of 2021. In Belgium, 740m trains cannot be operated during peak-hours; however, investments are foreseen to facilitate the movement of such trains. Similarly in Germany, 740 m trains can be operated at certain times in line with the timetable; projects exist to address this problem. A dedicated study in 2019 has identified concrete measures for improvement in the Netherlands. The train length is the main compliance issue as regards multimodal terminals. Currently, only 12 of in total 71 identified terminals provide transshipment tracks of at least 740m length.

Freight line speeds are restricted in Belgium and Switzerland (bordering into Italy) as well as on the line leading to the North Sea Port in the area of Vlissingen and in and around the urban area of Köln. It has to be noted however, that these sections with lower speed are not deemed problematic by the infrastructure manager because they are separate freight lines that can be used to avoid conflicts with passenger services.

³ Operation of 740m long trains is theoretically possible in Belgium and Germany. Restrictions e.g. due to capacity bottlenecks during peak hours are likely to occur; however, it is not possible to mathematically measure the impact of these restrictions on the compliance, hence the 100% compliance rate in the table.

⁴ See footnote 3

⁵ In 2016 the Netherlands were granted a derogation from this requirement for the railway line in the Port of Rotterdam due to a negative cost-benefit analysis.

⁶ There are some speed limit restrictions for junctions in the area around Köln (10km in total).

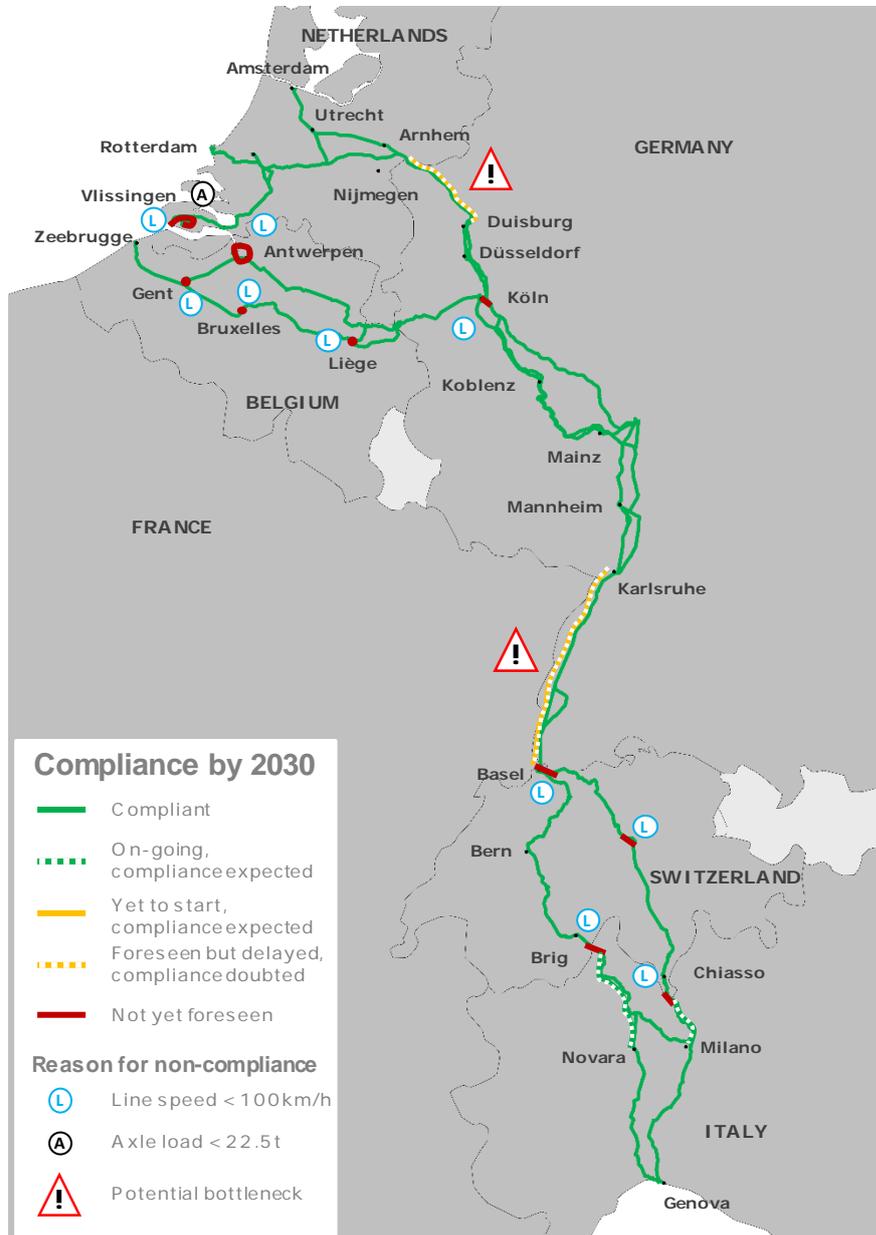
⁷ In Italy the deployment of ERTMS takes place also on the section Domodossola – Novara (via Borgomanero), located on the comprehensive network.

⁸ The TEN-T Regulation does not distinguish between different types of alternative fuels. Neither does it define the term availability. Therefore the notion "available" does not necessarily mean that the demand for a particular type of alternative fuel is met.

⁹ Belgian inland waterways are not part of the alignment but are analysed in the corridor characteristics and the transport market study

Looking beyond the compliance analysis, there are some potential bottlenecks, where infrastructure projects will not be fully implemented by 2030 (e.g. on the section Karlsruhe – Basel).

Figure 2: Rail compliance by 2030 overview



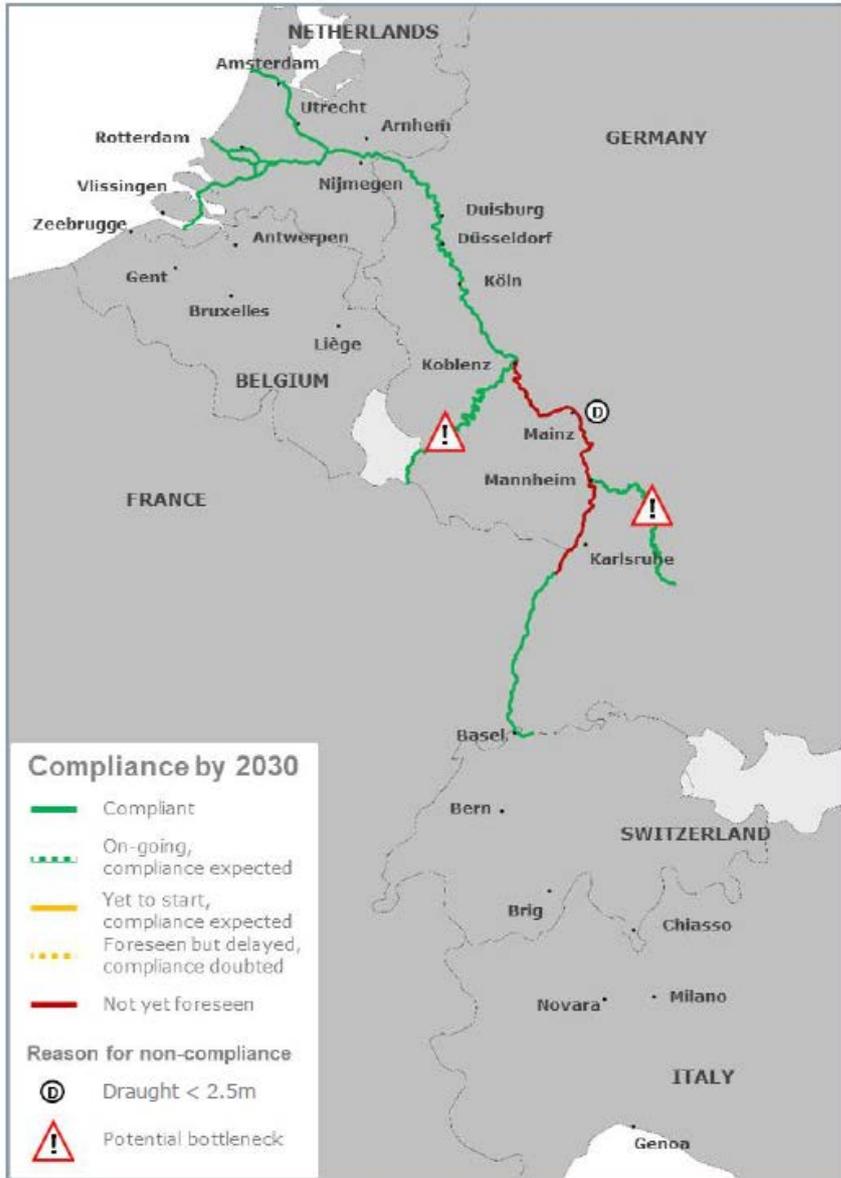
Source: Rapp Trans

For **inland waterways**, which represent approximately 25% of the corridor length, the main objective is to ensure reliable navigation along the river Rhine. The target draught of min. 2.50 m is not achieved on the section of the Rhine between Duisburg and Iffezheim on a long-term average of at least 345 days. This has negative consequences on an extended section of the river, in particular in periods of extreme aridity and low water, such as those experienced in recent years. The German 2030 Federal Transport Infrastructure Plan includes as a top priority upgrade measures in two sections of the Rhine: from Mainz to St Goar and from Stürzelberg to Duisburg. Although these will not ensure compliance with Article 15 of the TEN-T Regulation, they will nevertheless improve transport conditions on the most important inland waterway in Europe.

Other potential bottlenecks exist on rivers Mosel and Neckar. These are due to lock capacity on the former and lock length on the latter. In order to improve the situation, the German 2030 Federal Transport Infrastructure Plan includes upgrade of lock chambers on the Neckar and new construction of several second (additional) lock chambers on the Mosel.

Operational and administrative barriers have less visible impact on inland waterway transport than on other modes. However, a better integration of ICT services in inland waterway transport, supporting seamless international transport chains, would be beneficial.

Figure 3: IWW compliance by 2030 overview



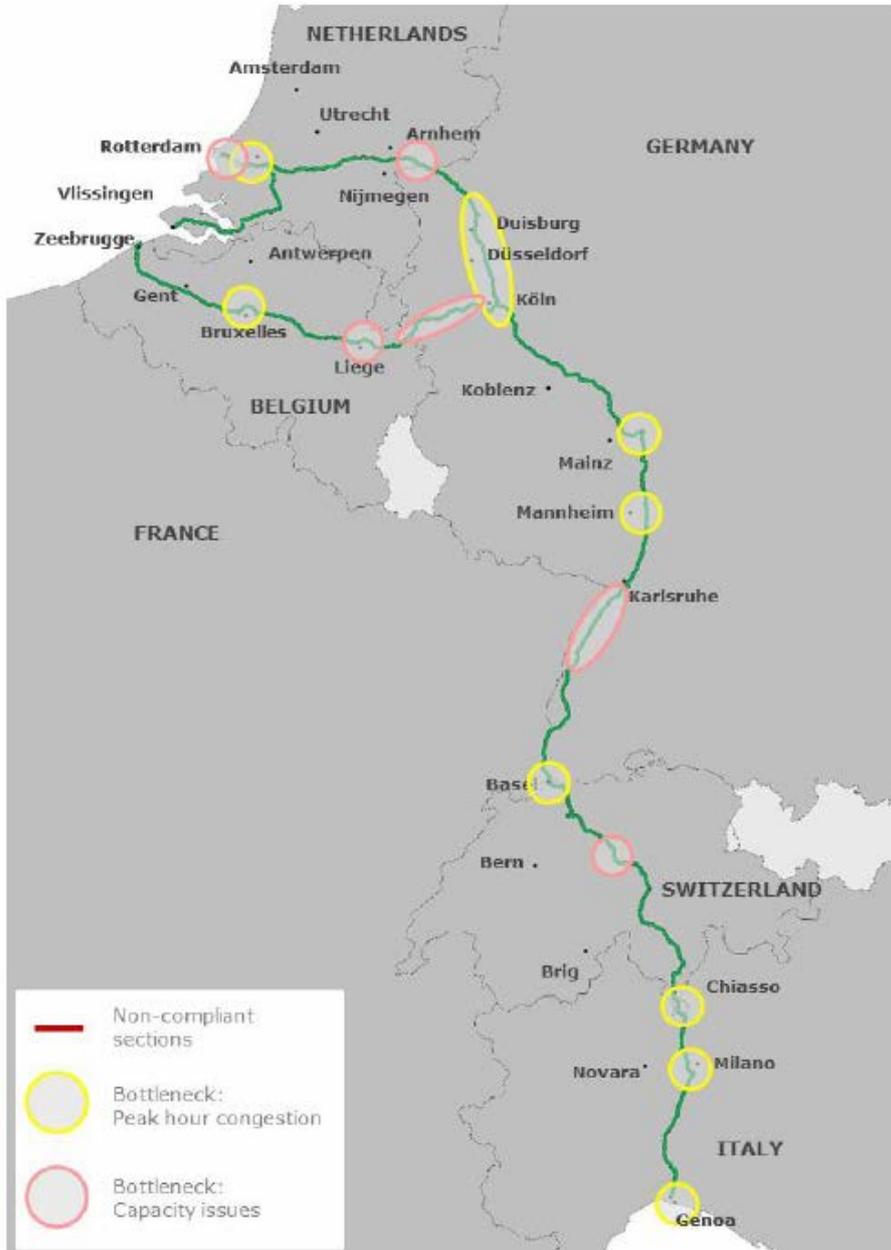
Source: Rapp Trans

The corridor's extensive **road** network fulfils, largely, the TEN-T requirements. Almost all road sections (1,721km) are categorized as motorways. However, road capacity bottlenecks are common. Serious traffic congestion problems occur along many highway sections, in particular around urban nodes. They are often due to intense mixed transit and local traffic during peak hours. With some of the road infrastructure being in a mature stage of its lifespan, significant maintenance work has to be performed to ensure the performance of our corridor. In the short term, this will lead however to further temporary capacity limitations. The map (Figure 4) highlights these sections where peak-hour congestion is expected on the motorway network in 2030.

One can observe a dynamic growth in the availability of clean fuels. However, the density of stations along the corridor differs from section to section and country to country. The majority of the stations are located in the vicinity of the urban nodes. Further investments are necessary to diversify the supply and enhance decarbonisation.

In border crossing sections and around important multimodal nodes as well as ports, there is a growing demand for secure truck parking and information on parking availability, in particular for UK-bound traffic. In turn, this jeopardizes compliance with the applicable driving time regulations and creates a safety and security hazard resulting in trucks stationed outside the designated areas, while at the same time existing safe and secure parking are not optimally used.

Figure 4: Road compliance by 2030 overview



Source: Rapp Trans

The **maritime** port infrastructure complies with all criteria. However, it is essential to establish efficient connections to the existing rail and inland waterway network. Moreover, there is a need to improve availability of clean fuels and facilities for ship generated waste, contributing to better protection of the environment and biodiversity.

The **airport** infrastructure on the Rhine-Alpine Corridor is well established and provides good hinterland connections. The remaining compliance issue is the missing connection to the rail network in Milano Linate. Currently, a project to connect the airport with the underground (Metro Line 4) is being implemented and is expected to be completed by 2022. Clean fuels are not available at the corridor airports.

3 Transport Market Study

The objective of the Multimodal Transport Market Study (Market Study)¹⁰ is to assess the impact of the projects planned to be realized on the corridor. The Market Study provides an assessment of the prospective traffic flow by 2030, while also offering a view on the associated impact on the economy and the environment.

As of today, some 138 billion tonnes-kilometre of freight is carried over the corridor annually. Inland waterways have a share of 50%. The share of rail is 16%, while the share of road stands at 34%. For passenger transport, all passengers combined travel yearly 77 billion kilometres across the corridor. Road has by far the highest share of 82%.

In **the Baseline Scenario**, which assumes that from 2016 onward no further investments are made, rail would be the most losing mode. A total of 8.7 billion potential ton-kilometres on rail would not take place when comparing the Baseline scenario to the Reference scenario. The road freight traffic would continue to increase, while no extra road capacity is created to facilitate this shift. Inland waterway traffic volumes would not experience major changes.

The non-completion of the corridor, according to the Baseline Scenario, would generate the highest potential losses to the Maasvlakte (NL)–Cologne (DE) section in terms of rail freight traffic, which will go down by 83%, and on the Brugge (BE)-Cologne (DE) road section, with a 10.8% decrease in road traffic.

According to **the Reference scenario for 2030**, which assumes full implementation of the network, both passenger and freight transport on the corridor will be increasing, for all transport modes. Considering the currently planned projects are carried out, freight volumes on the corridor are estimated to increase on average by 25%. Rail is the biggest beneficiary of the implementation of projects, as its share grows to 21%. Inland waterways remain the dominant mode, while its share decreases slightly to 48%. The share of road drops to 31%.

Looking at the macro-sections of the corridor, the Reference Scenario for 2030 show that rail transport will experience an unevenly distributed growth, with a remarkable increase of 114% on the section between Maasvlakte (NL) – Cologne (DE), 97% between Brugge (BE) and Cologne (DE) and 86% between Chiasso (CH) and Genova (IT). The corridor average for rail growth for freight is 79%. The growth rates for road transport are more moderate, with a 16% corridor average and the biggest growth on the section between Mannheim (DE) and Basel (CH), at 31%.

Growth rates for passenger transport show similar trends, with rail having the highest growth – 38% on average along the whole corridor. The biggest increase will take place on the Mannheim (DE) - Basel (CH) and the Brugge (BE) – Cologne (DE) sections, with 54% and 51% respectively. For road, the growth is approximately 15% on average along the whole corridor, with the highest increase on the Maasvlakte (NL) – Cologne (DE) section at 18%.

Economic and environmental effects

The analysis shows that the corridor implementation will lead to a GDP increase in the corridor countries of more than € 500 billion over the period of 2017 – 2030. Employment will also be stimulated and more than 1.7 million jobs are estimated to be created.

¹⁰ The methodology for developing the MTMS is explained in the Corridor Study

In 2015, the transport sector in the corridor Member States¹¹ emitted together around 351 million tonnes of CO₂. While transport volumes are forecasted to increase over the period 2015 – 2030, modal shift and efficiency gains are outweighing growth. CO₂ emissions are estimated to fall by 14% in 2030 if all planned TEN-T projects on the corridor are implemented.

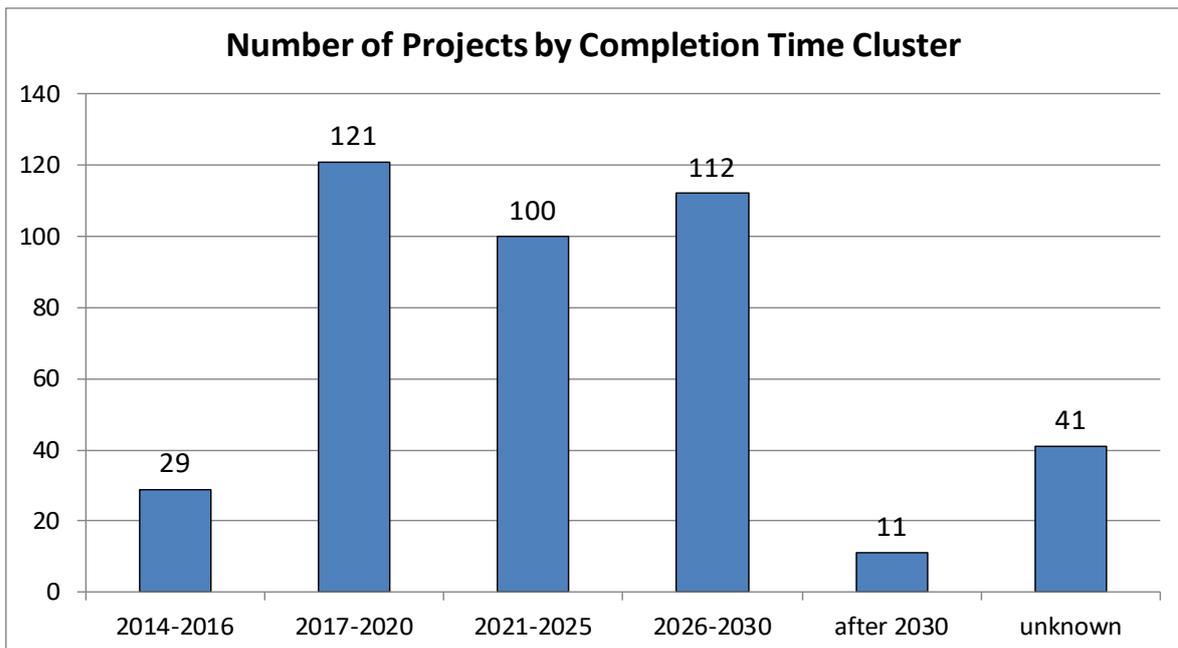
¹¹ Emission values reflect the sum of the total emissions coming from the transport sector in all corridor Member States, except France and Luxembourg.

4 What is still to be realised by 2030

4.1 Analysis of the project list

In the framework of the corridor study, a list of projects has been developed. The final indicative list of 2019 consists of 414 projects, an increase by 101 projects since 2017. Of these, 66 are already completed since the adoption of the TEN-T Regulation and by June 2019. The vast majority of projects, i.e. 362, is expected to be completed by 2030.

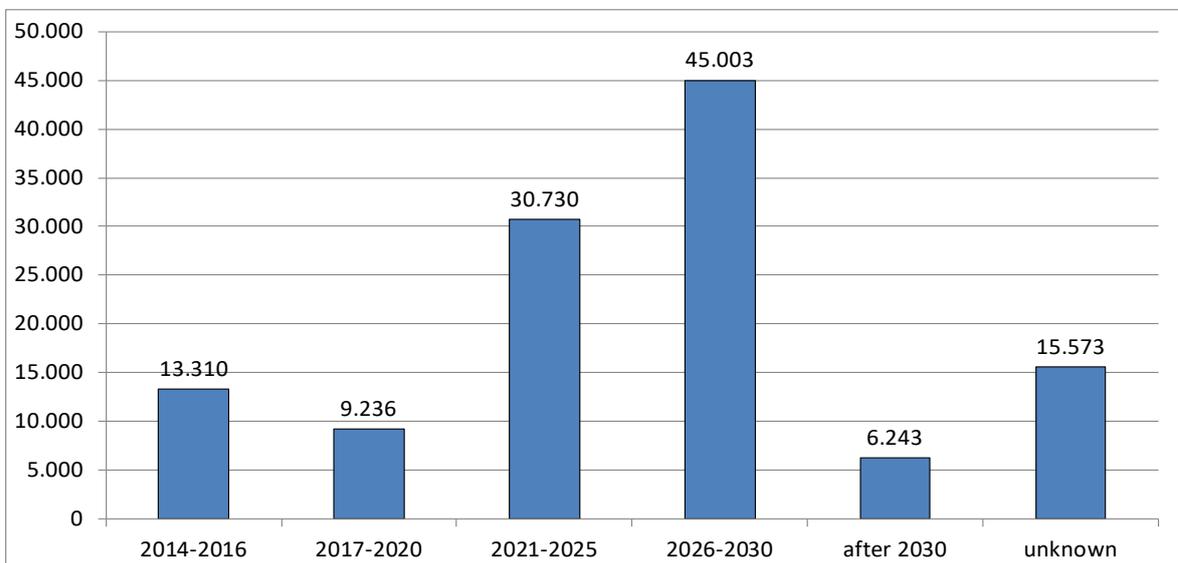
Figure 5: Planned completion time of projects



Source: KombiConsult analysis based on status 10/2019 Project List of the corridor

There is information about the costs for 340 projects (82% of the total). These envisaged projects' costs sum up to a total of about € 120 billion with the highest value for measures foreseen to be finalised in the timeframe between 2026 and 2030.

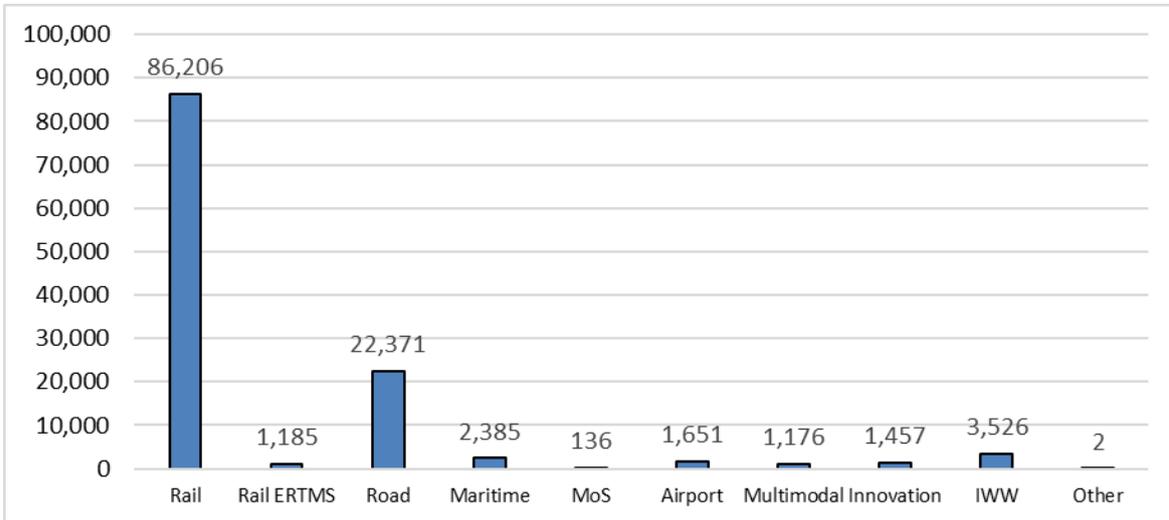
Figure 6: Total Cost (in million €) by Completion Time Cluster



Source: KombiConsult analysis based on status 10/2019 Project List of the corridor

The planned investment per project category (as indicated by Figure 7) shows that rail has by far the highest needs for infrastructural upgrades.

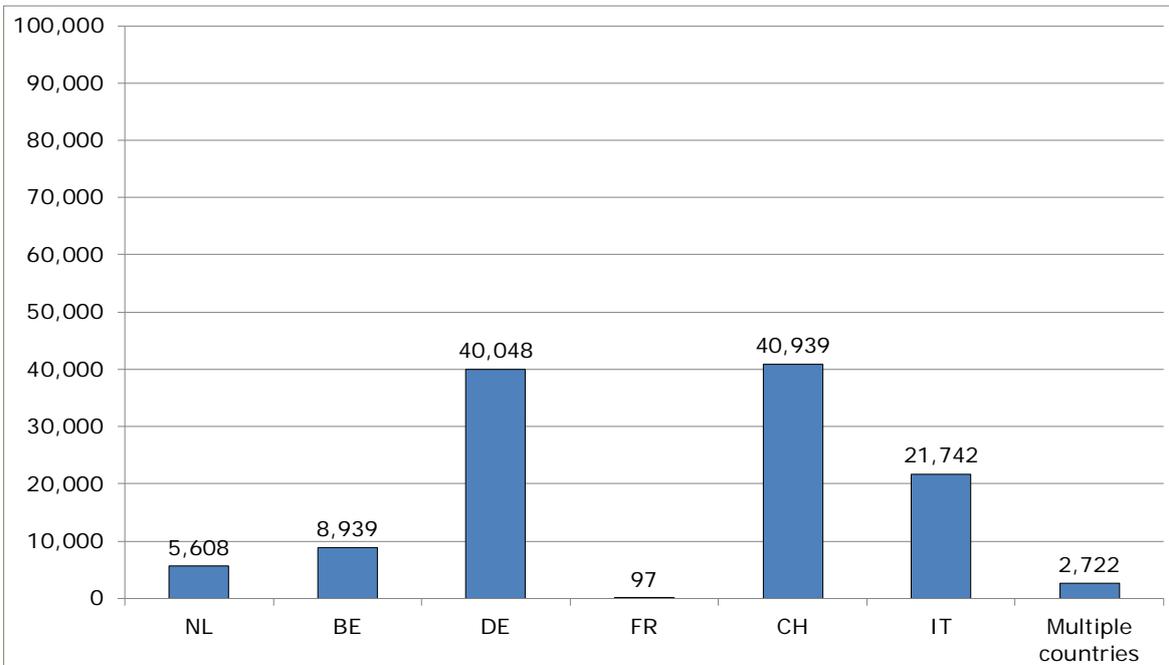
Figure 7: Investments per category in € billion



Source: KombiConsult analysis based on status 10/2019 Project List of the corridor

Looking at the investment per country (Figure 8), Switzerland and Germany have the largest share with more than 40 billion EUR each. For Germany, this corresponds with the largest number of projects (147). For Switzerland, this can be explained with a high share of “costly” projects under the New Rail Link across the Alps programme.

Figure 8: Investment per country in billion EUR



Source: KombiConsult analysis based on status 10/2019 Project List of the corridor

The analyses in chapter 2.2 have shown that not all KPI requirements will be fulfilled by ongoing or planned projects until 2030. Therefore, the consultants proposed a list of additional measures designed to complete the corridor. According to the identified

compliance gaps, the majority of these additional measures refer to the TEN-T parameters “Clean fuels” (all modes concerned) and “Train length” (rail). Next to the requirements of the Regulation, the list also includes market driven measures, mainly intended to improve competitiveness of intermodal transport. These refer to the KPIs of Rail/Road Terminals.

In order to reach compliance until 2030, in total 59 additional projects on the corridor (projects for detailed sections and nodes), thereof 86% for train length terminal accessibility (25) and clean fuels (26, all modes).

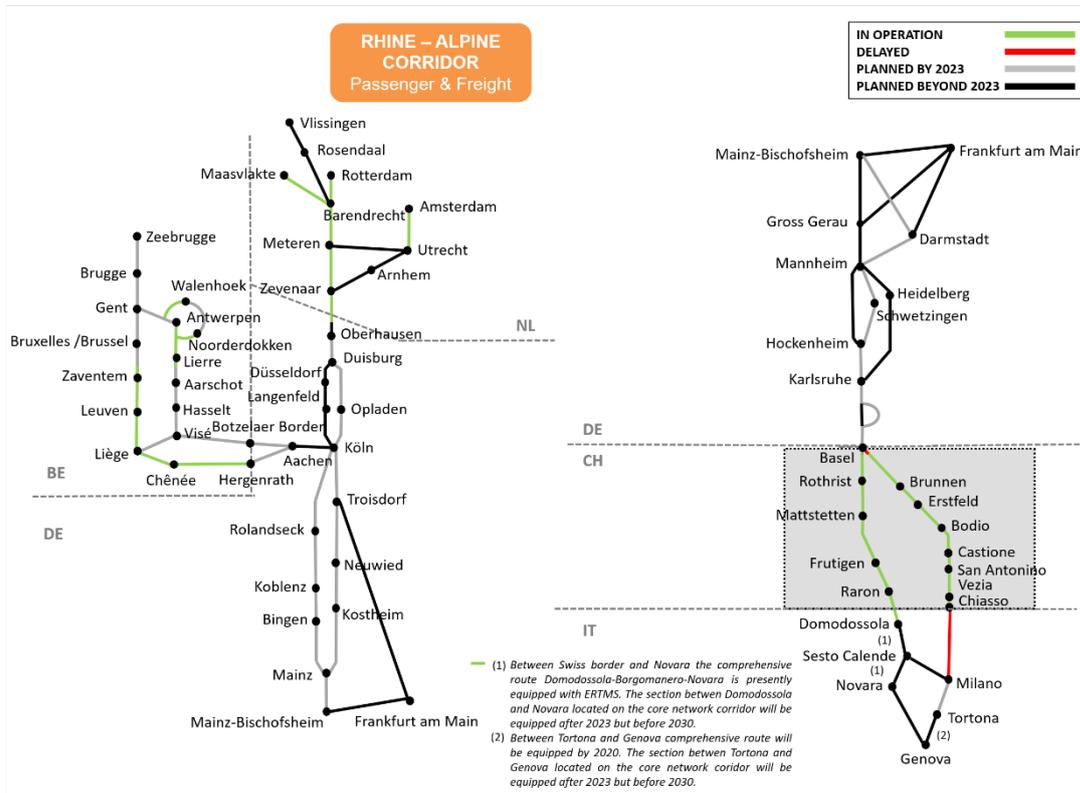
4.2 Rail and multimodality

The most important challenge is to continue upgrading corridor sections, most of which cannot cope with the existing and future needs for capacity. These are mostly adjacent to borders: Zevenaar (NL) – Oberhausen (DE); Karlsruhe (DE) – Basel (CH); Chiasso (CH) – Milano (IT). But they also concern hinterland connections from ports such as Zeebrugge – Ghent in Belgium.

Other necessary measures for rail include upgrading passing tracks for 740 m trains, reduction of noise and upgrade of terminals to increase their handling capacity. The latter is crucial to ensure competitive and seamless transport chains for intermodal services.

4.3 The deployment of ERTMS

The following scheme shows the state of play and deadlines for the ERTMS deployment in the corridor, in accordance with the European Deployment Plan¹²:



Source: Ineco and EY study

¹² Commission Implementing Regulation (EU) 2017/6 of 5 January 2017 on the European Rail Traffic Management System European deployment plan

The most challenging situation is in Germany and in Italy. The former has the longest network (808 km), where the ERTMS is to be put in operation by 2023. The latter faces a delay on a 48 km section between Chiasso and Milano, which is expected to become operational in 2021.

The Work Plan of the European Coordinator for ERTMS addresses challenges related to the on-board deployment.

4.4 Inland waterways and ports

Projects addressing lock capacity and length as well as the optimization of fairway to enable greater laden draught are included in the project list, aiming at enhancing the navigation conditions and increasing the reliability of navigation. Nevertheless, these works will not ensure full compliance with the TEN-T requirements for draught, along the whole corridor by 2030. The deployment of River Information Services has to continue.

4.5 Road transport

As the road network on the corridor almost fulfils the standards of a motorway or an expressway, the envisaged measures aim mostly at the modernisation of the network (outdated road sections, bridges, parking areas, etc.). An important group of projects are those aimed at providing infrastructure for clean fuels and deploying intelligent transport systems (ITS). The most prominent projects concerning road infrastructure are the rings of Brussels and Antwerp in Belgium, the extension of A15 motorway south of Arnhem and the bypass of Genova.

4.6 Airports

There are still missing connections to the rail network in Milano Linate, Bergamo, Liège, Genova and Rotterdam. However, only Linate is under the relevant TEN-T obligation. A project to connect the airport with the underground (Metro Line 4) is being implemented and is expected to be completed by 2022.

For Genova a project has already been approved, with works expected to end in 2025. For Liège, the Carex project about the implementation of a new rail link to the future cargo terminal is planned. There are also plans to establish a rail connection to Bergamo airport.

More attention to clean fuels availabilities should be given, as they are not available at the corridor airports.

4.7 Maritime Ports and Motorways of the Sea

Seaports, which are the main access points to the Rhine Alpine corridor, face a number of capacity and connectivity issues, for which relevant projects are being implemented or are planned. They concern both hinterland connections and maritime access.

The port of Antwerpen needs a second rail freight access and upgrades of bridges. In Ghent, the capacity of the cross-border Terneuzen (NL) locks emerges as a critical issue but works are to be completed by 2022. For the port of Zeebrugge the major bottleneck concerns its different gauge connection to the inland waterway network but measures to improve the situation are being analysed. Moreover rail investments are foreseen to improve the capacity and the multimodal chain characteristics. The infrastructure upgrade for 740m long trains is also necessary for the Belgian seaports.

The port of Rotterdam has to secure sufficient capacity both for future developments in the port and connections to its hinterland. Maintaining its capacity and upgrading of the Caland Bridge and the Suurhoff Bridge are critical issues. In addition, the new Theemswegtracé will increase capacity of the harbour rail line.

There is also an active cooperation in the northern part of the corridor, including on the improvement of port hinterland connections to the German Ruhr, for example in the framework of a tri-national working group, following up on the 3RX study.

Amsterdam and Genova require an improved maritime access – given their space/territorial constraints. These ports are limited in their physical expansion planning, which requires further efficiency upgrades and improvements in accessibility of the port areas from the land and maritime side. In the port of Genova, a re-configuration of the maritime access to the Sampierdarena Port Basin is planned. Moreover, the reconstruction of the motorway viaduct (the Morandi bridge) is necessary to solve capacity constraints on the land side. On the railway side significant investments for improving the accessibility to the ports of Genova are planned.

The potential of Motorways of the Sea is not fully used by the Corridor's large seaports, with only 9% of their traffic accounting for trans-shipment. Closer collaboration with the MoS is needed.

4.8 Innovation

The corridor's Project List includes 133 projects, which have an innovative component (including ERTMS), amounting to about 6% of the total investment needs. Most innovation takes place for road and air transport, while multimodal or seaborne transportation represent a smaller share.

The corridor has a great potential to be a frontrunner in developing green and innovative technologies. This is already reflected in its performance to apply transport solutions that meet new and existing mobility needs. It includes deployment of alternative fuels infrastructure and of transport digital tools, as well as implementation of sustainable freight transport services across different modes and deployment of Clean Energy Hubs.

5 Funding and Financing

5.1 The funding needs and sources

The financial analysis presented below concerns projects ending after December 2018. The first step has been an assessment of the maturity status of the projects. It showed that the vast majority (95%) of the projects have information on cost. These global costs equal to € 110.1 billion.

The following step was the analysis of the funding sources of the projects. There is complete information on the funding sources of projects accounting for € 59.3 billion, slightly more than half of the list's value. There is a low level of private financing, with own and other private resources accounting for less than 10% of the above amount. The remaining 90% are public funds, mostly from national and other public entities. The funding from the EU is low: according to figures from INEA, grants from the Connecting Europe Facility account for only € 0.7 billion.

The final step of the analysis consisted in determining the number and value of corridor projects able to generate returns from the market to cover the operating and possibly a share of the capital expenditure. According to the analysis:

- **16.7%** of the total projects investment, for a total value of **€ 18.4 billion**, are **financially sustainable**. Projects fall in this group following either a direct assessment from the project owner promoter or a subsequent analysis of the consultants.
- **0.7%** of the total projects investment, for a total value of **€ 0.8 billion**, present **good potential for financial sustainability**. Projects included in this category, are considered appropriate based on consultants' assessment.
- **82.6%** of total projects investment, for a total value of **€ 90.9 billion**, have **low to non-existent potential for financial sustainability**. This was based either on a direct assessment from the project owner or on a subsequent analysis of the consultants.

5.2 The innovative financial tools

In line with the European Coordinators' Work Plans for all nine corridors, the aggregate demand for investment stands at about € 640 billion, which can only be supported with a substantial contribution of private financing.

In this regard, the European Investment Bank (EIB) plays an important role. Around 20% of EIB's total lending goes to the transport sector, representing more than € 150 billion of investment mobilized since 2014. In the period 2014-2018, about 60% of EIB transport lending went to TEN-T. A share of EIB financing is backed by EU budget, notably in the form of the EU financial instruments and budgetary guarantee, such as the European Fund for Strategic Investment (EFSI). The EFSI delivered well in areas such as road and airports, mobile assets and rolling stocks. On the other hand, due to the economics and risk profile of transport infrastructure, the use of EU financial instruments for the financing of the TEN-T, in particular for rail and IWW projects, fell below expectations.

In the next budgetary period 2021-2027, the InvestEU will cover all financial instruments, as well as blending. The InvestEU will also offer a broader risk spectrum than the EFSI, allowing for both lower and higher risk projects to be financed. This, together with blending, is expected to lead to a higher uptake of innovative financial instruments for the financing of the TEN-T. The effects of these instruments should be monitored closely.

The 3rd CBS report of September 2019 by Coordinators Bodewig and Secchi “Enabling the uptake of the TEN-T pipeline by the financial market”¹³ gives a more detailed insight into financing issues for the TEN-T networks.

¹³ <https://ec.europa.eu/transport/sites/transport/files/2019-09-cbs3-report.pdf>

6. Recommendations and outlook by the European Coordinator

Remaining critical issues

Compared to other core network corridors, the Rhine-Alpine Corridor is largely compliant with the requirements defined in the TEN-T guidelines. However, certain critical infrastructure characteristics still have to be upgraded.

- Rail capacity is already stretched to maximum at certain sections. In order to accommodate heavy mixed passenger/freight traffic, Member States must speed up implementation of **major rail infrastructure projects** at cross-border sections between Germany and Netherlands and Switzerland on the one hand and between Italy and Switzerland on the other hand. Similarly, extensions of capacity of hinterland connections to the ports of Zeebrugge and Genova remain a priority.
- To further increase the attractiveness and competitiveness of rail for international freight services, it is indispensable to allow for **740m trains** to run the entire day on the whole corridor. Current diverging situation in Member States creates a serious obstacle to seamless international freight traffic flows. A study, performed by Rail Freight Corridor Rhine-Alpine demonstrated that with limited financial resources serious gains in capacity (of up to 15%) could be achieved.
- Finally as regards rail, there are still **operational barriers** stemming from the historically founded interoperability issues in the national rail networks. These issues occur in particular on cross-border sections, where voltage, signaling and safety systems change. The deployment of ERTMS will only partly solve these problems. Furthermore, language requirements pose an extra barrier. As a result, the continuity of traffic is jeopardized, requiring railway companies to use dedicated locomotives or train outfits. This leads to longer travel time and higher transport costs. Rail **noise** remains an important negative externality. It requires a European, harmonized solution, while avoiding unilateral actions, which would hamper the functioning of the internal market.
- Regarding **inland waterways**, enhancement of the fairway depth on German sections of the Rhine is needed to improve the navigation conditions. Even if it is clear that a major section of the river will not be compliant with the 2.5m draught requirement, projects tackling this problem should continue to be treated with priority. On the Neckar, lock extensions should be made to accommodate large barges with 135m length. On the Mosel, lock capacity and operational volume should be improved.
- To make rail and IWW more competitive the **robustness** of the corridor should be guaranteed for reliable operations, including in terminals. Diversion routes and alternative routes cannot be ignored in this respect.
- Concerning **roads**, many bottlenecks exist around core urban areas, mainly during peak-hours. Intelligent transport systems hold great potential for road infrastructure. High level of bridge and tunnel safety must be ensured through upgrades and rehabilitation.
- **Multimodality** plays a crucial role for the corridor and its further development. Besides pure rail-road terminals, tri-modal terminals connecting inland waterways, rail and road, as well as bi-modal barge-road terminals, support the multimodal functioning of the corridor. To improve multimodality, there is a need to invest in longer transshipment tracks. Furthermore, electrification of terminals should be pursued in order to reduce local pollution.

- **Seaports** face a number of capacity and connectivity issues which needs to be resolved, both when it comes to hinterland connections (Antwerpen, Zeebrugge, Rotterdam, Genova) and maritime access (Amsterdam, Genova).

Evolving policy context

The time for further reflection on the TEN-T policy has come. To this end, the European Commission has started the review of the TEN-T process in spring 2019, with the finalization date expected to be first half of 2021. Depending on the outcome, the Commission might propose a new TEN-T Regulation. It will take into account the evolving policy context. In particular, the drive for decarbonisation and reduction of air and water pollution will have a major impact on transport. This can be translated into a set of mode-specific legislation. Further, digitilisation and automation will become more common in the transport sector. Finally, the military mobility is a new concept, which may be reflected in the revised TEN-T Regulation.

Decarbonisation

Representing almost a quarter of Europe's greenhouse gas emissions, transport will have to contribute to reaching EU's decarbonisation objectives. Still, much work is required to achieve the decarbonisation objectives. In the 2011 White Paper for Transport, the EU set out its goal to reduce greenhouse gas (GHG) emissions from transport by 2050 to a level that is 60% below that of 1990. This includes the intermediate goal for 2030 of reducing GHG emissions from transport by 20% compared with 2008 levels. However, in 2017 GHG emissions from transport were still almost on par with 2008 levels. Further actions are urgently needed to increase the efficiency of the transport system, speed up the deployment of low-emission alternative energy for transport and transition towards zero-emission vehicles. Already a number of such projects are carried out on the corridor, these being easily transferable to other parts of the corridor. For an efficient and optimal transition a coordinated approach with the energy and digital sector is necessary.

Climate change adaptation

Climate change poses a critical threat to the corridor infrastructure networks, requiring adaptive measures to minimize the losses and disruptions caused by extreme weather conditions. The climate along the corridor is characterized by a temperate continental climate in the north, and a hot Mediterranean climate in the south.

The critical climate-related topics and their effects are mostly known for years. Nevertheless there are several issues that are relevant for the corridor, posing high risks: rail buckling and road degradation due to higher summer temperatures; extreme weather conditions, such as: increased precipitation, floods and heavy rains as well as winds and lightning throughout the corridor; river flooding; more frequent droughts in inland areas and more precipitation at sea areas. All modes of transport are affected by one or several of these issues.

It is then of utmost importance to maximise the effort on projects that help mitigating the climate change and particularly carbon emissions, such as favouring rail and inland waterway transport over road, while increasing resilience of the two modes. For international rail passenger transport for instance a consistent international network should be developed to reduce the number of continental flights.

Funding and financing

Since 2014, the Connecting Europe Facility has contributed to the decarbonisation of the European economy by investing heavily in environmentally friendly modes. This is also true for the Rhine-Alpine Corridor, where 75% of the allocated funding went to rail projects, slightly above the overall CEF average of 72%.

In 2019, the Council and the European Parliament reached an agreement on non-budgetary provisions of the Connecting Europe Facility for 2021 – 2027. While the

overall EU budget has a proposed target of 20% climate expenditure, the co-legislators retained the 60% target the Commission had proposed for the CEF programme. In fact, CEF transport will contribute even a higher percentage (70-80%) than the energy and digital sectors.

The new CEF will be instrumental to deliver on the Green Deal objectives. Most of the supported actions will relate to sustainable modes of transport (railways, inland waterways), to intermodality and efficiency of the transport system, clean urban transport and the deployment of alternative fuels in all transport modes. Among these priorities, the share dedicated to intermodality, efficiency and alternative fuels will double compared with the 2014-2020 period. From the Rhine-Alpine Corridor perspective, which is the most mature of all nine corridors, this modified approach creates additional opportunities for funding.

It is however obvious, that the new CEF will not satisfy high investment needs, which for the Rhine-Alpine Corridor alone exceed € 100 billion. Where possible, project promoters should turn to alternative financing instruments. Identifying financially sustainable projects is crucial, because they can be developed with less or zero impact on public finances.

Joint effort for the successful completion of the corridor

The corridor concept is based on the cooperation between all stakeholders: countries, regions, cities, infrastructure managers, transport operators, shippers, etc. The multi-level governance is critical to ensuring the harmonious development of the corridor. A particular attention should be given to three actors, whose commitment has been instrumental: the Central Commission for the Navigation on the Rhine, the Rail Freight Corridor "Rhine-Alpine" and the EGTC "Rhine-Alpine". Cooperation and participation of all these stakeholders needs to be enhanced and supported, to ensure the impact of the corridor activities.

Only by jointly concentrating our efforts on common goals, can we meet the needs of the corridor in the evolving policy context.

Final remark

This Fourth Work Plan has been prepared since November 2019 and was finalised in June 2020. In the meantime, the world has been affected by the SARS-CoV-2 pandemic and it has a great impact on our lives, our health systems and our economies. We know only part of the pandemic's dramatic effects on people and economies so far.

The transport sector has been heavily impacted by the containment measures in Europe and worldwide. Continuity of service has been ensured by transport workers under difficult conditions, showing their critical function in serving the population's basic needs. The transport sector will also be crucial in supporting the economic recovery.

It is too early at this stage to undertake a thorough analysis and to draw conclusions in this work plan. Nevertheless, I propose that I will start an initial analysis with all the Member States and stakeholders of our corridor and gather insight on the impact of the crisis and related recovery plans on transport infrastructure investments, as well as views on the future possible orientation of the corridor work and Work Plan priorities.

Without jeopardising the final objective of the realisation of the Rhine-Alpine Corridor, this approach is intended to further align our activities with current events which have considerably changed our social and economic life and will affect our approach towards mobility and transport, along with the climate and digital transition.

Contacts



Paweł Wojciechowski

European Coordinator

Rhine-Alpine Core Network Corridor

Łukasz Wojtas

European Commission

Advisor to the European Coordinator

lukasz.wojtas@ec.europa.eu

Corridor website Rhine-Alpine Corridor

http://ec.europa.eu/transport/themes/infrastructure/ten-t-guidelines/corridors/rhine-alp_en.htm



Contact details:

European Commission – Directorate General for Mobility and Transport

Directorate B – Investment, Innovative & Sustainable Transport

Unit B1 – Transport Networks

http://ec.europa.eu/transport/index_en.htm

email: move-info@ec.europa.eu

Offices:

Rue Demot 28

1049 Brussels, Belgium

