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Atlantic

Fourth Work Plan of the European Coordinator

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Mobility and Transport

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Acronyms and Abbreviations

ATL	Atlantic core network corridor
AVEP	Alta Velocidad España-Portugal
bn	Billion
CBA	Cost benefit analysis
CBS	Christophersen Bodewig Secchi (Reports)
CEF	Connecting Europe Facility
CF	Corridor Forum
C-ITS	Cooperative Intelligent Transport Systems
CNC	Core Network Corridor according to Regulation (EU) 1316/2013
CNG	Compressed Natural Gas
CEMT	Classification of European Inland Waterways
DE	Germany
DG MOVE	European Commission – Directorate General for Mobility and Transport
EC	European Commission
EFSI	European Fund for Strategic Investments
ESIF	European Structural and Investment Funds
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ERTMS	European Rail Traffic Management System
ES	Spain
ETCS	European Train Control System
ETS	Emission Trading System
EU	European Union
FR	France
GDP	Gross Domestic Product
GPSO	Grand Projet Sud-Ouest
ICT	Information and Communication Technologies
IFI	International Financial Institutions
INEA	Innovation and Networks Executive Agency
IRU	International Road Union
ITS	Intelligent Transport Systems
IWW	Inland waterway
km	kilometre
KPI	Key Performance Indicator
LGV	Ligne à Grande Vitesse (high-speed line, in French)
LNG	Liquefied Natural Gas
m	metre
MFF	Multiannual Financial Framework
mln	Million
MMTMS	Multimodal Transport Market Study
MoS	Motorway(s) of the Sea
MS	Member States of the European Union
mtkm	million tonne-kilometres
n.a.	not available / not applicable
p.a.	per year / annual
PT	Portugal
RFC	Rail Freight Corridor
RIS	River Information System
RRT	Rail-Road Terminal
SEA	Strategic Environmental Assessment
SNCF	Société Nationale des Chemins de fer Français
TEN-T	Trans-European Transport Network

TENtec	Information system of the European Commission to coordinate and support the TEN-T Policy
TEU	Twenty-foot equivalent unit
ToR	Terms of reference
VTS	Vessel Traffic Service
WG	Working group

1. Towards the Atlantic Corridor 4th Work Plan

1.1 Introduction

This document is the 4th edition of the Atlantic Corridor Work Plan and reflects both the progresses and achievements already made or on-going and those that still have to come by 2030.

Similar to the previous Work Plans, this 4th Work Plan comprises both an analytical and a strategic perspective, resulting from the outcomes of the analysis performed during the period 2018-2019 and the discussions with the Corridor's stakeholders along three Forum meetings, five working group meetings, three ministerial meetings and more than ten site visits and bilateral meetings. All these analysis and interactions represent a solid foundation to identify the remaining Corridor priorities, while enhancing and capitalising on what has been already achieved. It is also important to note that, since the 3rd Work Plan, a special high-level working group was set up in 2018 between France and Spain about their cross-border rail connections on both the Atlantic and Mediterranean Corridors. For the Atlantic Corridor, this special working group is key to deliver a worthy solution for the line Vitoria-Bordeaux, especially for freight traffic. Another important note is that, since the adoption of the Implementing Decision for the Évora-Mérida cross-border section on the line Lisboa-Madrid in April 2018, the Atlantic Corridor is officially represented at the general assemblies of AVEP, the body in charge of high-speed and interoperability of rail in the Iberian Peninsula.

We are now reaching a crucial moment: in ten years from now, the core TEN-T network and, thus, the Atlantic Corridor, should be completed. We have ten years left to deliver a technically compliant and operationally efficient multimodal Corridor. Against that objective, the Atlantic Corridor, albeit experiencing some delays, seems to be well positioned.

A "Union that Strives for More" is the motto of the new Commission that entered in office on 1 December 2019. With the Green Deal Communication recently adopted, our action against climate change needs to be stronger than before. This is a major opportunity for creating a more sustainable Corridor. We still need important investments in infrastructure to meet the requirements of the TEN-T Regulation, but we are progressing well in that direction. With a well-targeted approach, we can achieve both goals simultaneously, that is, ensuring efficient transport systems, while enabling all modes of transport to be decarbonised.

As of now, we have to recognise that track gauge interoperability is not going to be achieved in the Atlantic Corridor by 2030. However, we are witnessing important developments for interoperable variable axle gauge wagons not only for passenger trains but also for freight trains which, if correctly taken up by the market with the necessary investments into rolling stock, could ensure a continuous rail network along the Corridor by that deadline. Together with the advanced digitalisation of the logistic flows in the Atlantic Corridor, efficient and sustainable transport systems can become a reality by 2030.

The challenges ahead are large and require concerted joint efforts from all of us: European Union, Member States, Regions, Infrastructure Managers, public and private project promoters.

The following chapters will present a summary of the technical and financial needs for the realisation of the Atlantic Corridor. The last chapter will put forward the strategic perspective and a set of recommendations from the European Coordinator, targeted at future strategic and investment decisions.

1.2 Achievements along the Corridor since 2014

The Atlantic Corridor shows investments into all modes since 2014, but it is in rail that one can find the highest share of investments.

The rail projects of the Project List of the Atlantic Corridor address critical issues on the completion of the missing links and the removal of bottlenecks, as well as interoperability issues, such as the deployment of the UIC gauge (directly or via polyvalent sleepers or third rails), train length and electrification, in particular in the Iberian Peninsula.

While the Corridor will be fully realised only after 2030 (postponement of the GPSO and especially the Bordeaux-Dax and Dax-Spanish border high-speed lines and of high-speed lines in Portugal), major achievements have already been made since the adoption of the TEN-T Guidelines: 38 projects have been completed, 100 projects are due to be completed by 2020, 103 by 2025 and 81 by 2030, while 63 projects remain with an unknown completion time.

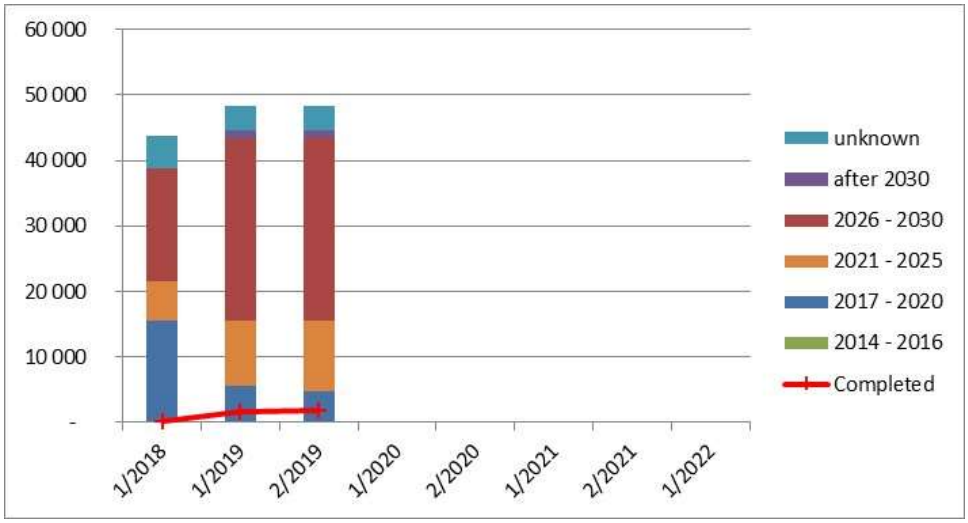

Figure 1: Evolution of total cost (in million €) by completion time cluster
Source: Analysis based on the 2017 and 2019 Project Lists of the Atlantic Corridor

Among the most relevant achievements so far, one can highlight:

- The LGV East high-speed line, in operation since September 2016;
- The Tours-Bordeaux high-speed line, in operation since July 2017;
- LNG bunkering facilities in the Ports of Bilbao and Le Havre, soon to be completed also in the Port of Algeciras;
- ITS deployment along the road network of France, Spain and Portugal, ensuring an advanced level of traffic management and traffic information systems for road users;
- Upgrade of VTS in the Ports of Lisboa and Sines, required to ensure high levels of safety and efficiency of maritime traffic;
- Rail connections to the Port of Bordeaux, renewing existing rail lines which were obsolete and causing losses of freight traffic volumes;
- Road access to the airport of Bilbao, including the Derio Junction and Mamariga tunnels adaptation to EU tunnel safety standards;
- Deployment of the Logistics Single Window in the Portuguese Ports, extending the Port Single Window towards the hinterland through the entire national logistics chain,

connecting the various inland transport modes with the dry ports and the logistics platforms;

- Conclusion of two C-ITS[1] pilot projects (AUTOCITS and SCOOP@F), preparing roads for automation and connectivity, with a focus on urban nodes and cross-border sections;
- The installation of permanent counterflow installations between Morcenx and Dax[2], as part of a CEF co-funded project which is still on-going to improve freight services between Morcenx and Dax.

Furthermore, it is also important to highlight the CEF project Med Atlantic Ecobonus, which developed an interesting approach to eco-incentives. It established a system to promote (green) investments through incentives based on their social-environmental benefits. The project carried out a test on the Atlantic and West-Mediterranean regions, consisting of giving an incentive to trucks using, instead of road, a ro-ro or ferry service having demonstrated positive socio-environmental benefits. This scheme, which is applicable to all freight transport modes and transferable to other regions, is much more powerful than giving a subvention to the ship-owner, because it not only incentives the ship-owner to invest into less emissions based on the expectation of having more clients, but also the clients to change mode, leading to a true modal shift and to a reduction of negative social-environmental impacts of transport. In summary, the project paves the way for eco-incentives schemes at national and possibly EU level; its learnings can be viewed at http://mae-project.eu/.

Among the most relevant ongoing projects to be completed by 2023, are:

- The construction of the missing Évora-Caia rail section on the Lisboa-Madrid line, with works ongoing for all 3 lots for the track bed;
- The electrification of the Salamanca-Fuentes de Oñoro cross-border section between Portugal and Spain, with completion expected end of 2023;
- The electrification and signalling of the Badajoz-Mérida section on the Lisboa-Madrid line, with completion expected in early 2021;
- The finalisation of the UIC rail connection between the stations of Madrid Chamartín and Puerta de Atocha, allowing for continuity of high-speed passenger flows in Madrid;
- The Y Basque in Spain, foreseen by the end of 2023 (likely to be delayed to the end of 2026);
- Works in the North line in Portugal to increase capacity;
- Upgrade of the railway line Saarbrücken – Ludwigshafen, with a volume of investment of 752 Mio. Euro.

Moreover, major investments in all Ports of the Corridor have been launched and are progressing as planned, which will contribute to reinforce the maritime dimension of the Corridor. This includes the ad-hoc platform for the accessibility of Spanish ports.

Major achievements and advancements are also visible in terms of governance, with the continuous cooperation between Portugal and Spain on rail interoperability and between France and Spain for the rolling motorway between Vitoria and Lille, as well as through the close cooperation with the Atlantic Rail Freight Corridor.

[1] AUTOCITS, with pilot deployments in the urban nodes of Lisboa, Madrid and Paris and SCOOP@F with the urban node of Bordeaux and cross-border tests in Portugal-Spain.

[2] Extending the counterflow installations between Morcenx and Bordeaux is necessary to have the whole conventional line banalised, so that works can be carried out on one track without having to close the line and interrupt (freight) traffic.

2. Characteristics of the Atlantic Corridor

2.1 Alignment

The existing alignment of the Atlantic Corridor, as established in the EU Regulations 1315/2013 and 1316/2013, connects Europe's South-Western regions towards the centre of the EU, linking the Iberian Peninsula's Ports of Algeciras, Sines, Lisboa, Leixões (Porto) and Bilbao through Western France to Paris and Normandy and further east in Germany to Strasbourg and Mannheim. It covers rail, road, airports, ports, Rail-Road Terminals (RRTs) and the River Seine inland waterway (IWW). Figure 2 shows the current alignment of the Atlantic Corridor:

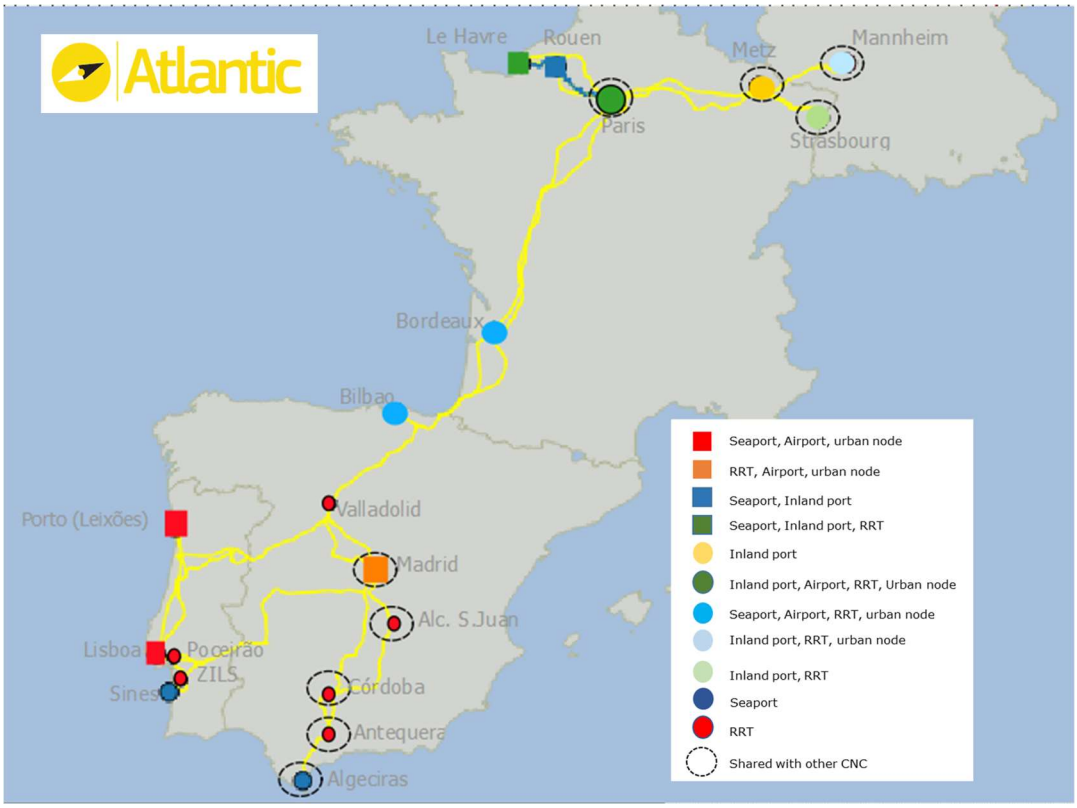

Figure 2: Current alignment of the Atlantic Corridor

The Atlantic Corridor includes seven urban nodes[3] (of which three are capital cities), six inland ports[4], eight maritime ports[5], seven airports[6] as well as ten Rail-Road Terminals (RRTs). Several sections of the Atlantic Corridor overlap with those of the Mediterranean and North-Sea Mediterranean Corridors and, in the urban node of Mannheim, with the Atlantic Corridor also crossing with the Rhine–Danube and Rhine-Alpine Corridors.

The Atlantic Corridor has an outstanding maritime dimension, given its positioning at the crossroads of global maritime routes, via the Panama Canal and the Strait of Gibraltar, notably towards North and South America, neighbouring countries and Africa, which will be further explored by deploying the Motorways of the Sea and Short Sea Shipping along the Corridor's ports and feeder ports.

[3] Lisboa, Porto, Madrid, Bilbao, Paris, Bordeaux, Mannheim
[4] Le Havre, Rouen, Paris, Strasbourg, Metz, Mannheim
[5] Sines, Lisboa, Leixões, Algeciras, Bilbao, Le Havre, Rouen, Bordeaux
[6] Paris CDG, Paris Orly, Madrid Barajas, Lisboa Humberto Delgado, Bordeaux Mérignac, Porto Sá Carneiro, Bilbao

2.2 Compliance 2018 and 2030 with the technical infrastructure parameters of the TEN-T guidelines

Since 2014, a set of technical infrastructure parameters (KPIs) are being monitored.

Overall, the Atlantic Corridor's compliance levels are quite good along the different transport modes. With the already completed, ongoing and planned investments, compliance will be achieved for almost all parameters by 2030:

- For rail, where compliance will not be fully achieved by 2030 includes track gauge (74% expected in 2030) and ERTMS deployment (92%), although all four Corridor's cross-border sections will have ERTMS deployed by 2030. Regarding track gauge, and notwithstanding the fact that developments in variable axle wagons may help achieve the objective of interoperability through the rolling stock additionally to the infrastructure, the gaps will be in Portugal on the North line connecting Lisboa and Porto and for the high-speed lines program throughout Portugal, though the situation may evolve positively with the National Investment Program of Portugal PNI 2030. Other challenges are identified in relation to respecting the timings of certain projects, though not impacting on compliance by 2030.
- For roads, the classification criterion is already at 99.9% compliance and will reach 100% by 2020, whereas complete coverage of alternative fuels will be achieved by 2030. There is still a need to convince the private sector to invest in recharging/refilling points to ensure that the Corridor will be entirely covered for all alternative fuels.
- The Seine River, currently the only inland waterway belonging to the Corridor, already reaches full compliance between Paris and Le Havre. However, there is still the issue of the low bridges in Paris, limiting the height of container barges during floods i.e. a few days per year. This issue cannot be solved due to the historic value of those bridges.
- All maritime and inland ports are already fully compliant in relation to land connections. Nevertheless, a better connection between the maritime ports and the inland logistics chains is still needed. The compliance for the eight maritime ports has already been reached for all criteria, with the exception of alternative fuels, currently at 25%. In addition, several projects are ongoing, and it is expected that compliance will increase to 62.5% by 2020 and to 100% by 2025. For inland ports, alternative fuels compliance is currently at 33%, targeted to reach 100% by 2025.
- Rail connection of airports is currently at a 29% compliance rate, expected to achieve 86% by 2030. For the airports in capital cities (Lisboa, Madrid and the two airports of Paris), connection to high-speed lines should be in place by 2050, with a 75% compliance rate by 2030.
- None of the Rail-Road Terminals' compliance targets have already been achieved, but compliance is expected to reach 90% by 2030 for all parameters[7].

However, it should be acknowledged that although infrastructure will in its majority be compliant by 2030, operational restrictions and capacity bottlenecks are also present and need to be addressed in order to reach the EU's objective to establish an efficient and sustainable single European transport area.

The following table presents the different compliance targets per mode:

[7] This is due to the fact that, based on actual plans, the core RRT of Poceirão in Portugal will not be realised. It is expected that with the revision of the TEN-T Regulation, the list of core Rail-Road Terminals in Portugal will change to better align with the logistics planning of the country. In that case, full compliance could be reached by 2030.

Table 1: Compliance 2018 with TEN-T requirements

KPI	Member State				Total	
	DE	FR	ES	PT	2018[8]	2030[9]
Railways						
ERTMS[10]	0%	22%	8%	0%	**12%**	**92%**
Traction (electrification)	100%	98%	72%	100%	**87%**	**100%**
Line speed (freight lines)	100%	94%	87%	80%	**89%**	**100%**
Axle load (freight lines)	100%	100%	100%	100%	**100%**	**100%**
Track gauge	100%	100%	26%	0%	**54%**	**74%**
Track gauge (IB gauge < 2014 excluded)[11]	100%	100%	100%	100%	**100%**	**92%[12]**
Train length (freight lines)	100%	100%	0%	10%	**58%**	**100%**
IWW						
CEMT class > Class IV	-	100%	-	-	**100%**	**100%**
Draught > 2.5 m	-	100%	-	-	**100%**	**100%**
Bridge height	-	100%	-	-	**100%**	**100%**
RIS	-	75%	-	-	**75%**	**100%**
Roads						
Type (express road or motorway)	-	100%	99.8%	99.7%	**99.9%**	**100%**
Alt fuels (electric)[13]	-	84%	48%	22%	**56%**	**100%**
Alt fuels (LNG / CNG)[9]	-	14%	28%	12%	**20%**	**100%**
Alt fuels (Hydrogen)[9,14]	-	5%	0%	0%	**2%**	**N/A**
Seaports						
Rail connection	-	100%	100%	100%	**100%**	**100%**
CEMT connection	-	100%	-	-	**100%**	**100%**
Clean fuels	-	33%	50%	0%	**25%**	**100%**
Term. Availability	-	100%	100%	100%	**100%**	**100%**
Waste facilities	-	100%	100%	100%	**100%**	**100%**
Inland ports						
Rail connection	100%	100%	-	-	**100%**	**100%**
CEMT connection	100%	100%	-	-	**100%**	**100%**
Clean fuels	100%	20%	-	-	**33%**	**100%**
Term. availability	100%	100%	-	-	**100%**	**100%**
Airports						
Rail connection	-	33%	50%	0%	**29%**	**86%**
Clean fuels (land side)	-	100%	100%	100%	**100%**	**100%**
Clean fuels (air side)	-	0%	0%	0%	**0%**	**N/A**
Term. availability	-	100%	100%	100%	**100%**	**100%**
Rail-Road Terminals						
Intermodality	100%	100%	67%	50%	**80%**	**90%**
740m train	100%	75%	0%	0%	**40%**	**90%**
Electrification	100%	75%	67%	50%	**70%**	**90%**
Term. availability	100%	100%	67%	50%	**80%**	**90%**

[8] Current compliance levels reflect the status of the network (in operation or to be upgraded) as of December 2017 and are based on the analysis performed in the 1st Corridor Study Update Report (November 2018). Planned sections not yet in operation are only considered for compliance in 2030.
[9] The expected compliance levels by 2030 are based on the Corridor Project List of June 2019.
[10] The calculation of the KPI "ERTMS in operation" does not distinguish between different ETCS levels.
[11] Sections with Iberian gauge lines in operation before 2014 are excluded from the KPI compliance calculation in line with Article 39 of the TEN-T Regulation.
[12] In 2030, the compliance rate will drop from 100% to 92%. This is due to the new lines added to the network with non-compliance will be in Portugal (Porto-Lisboa, Lisboa-Évora and North Line).
[13] Extension of corridor sections with availability of alternative fuels. Do not consider the distance between stations.
[14] Paris node within 5 km distance from corridor sections.

2.2.1 The Atlantic railway network and Rail-Road Terminals

The rail network is fully compliant in terms of the parameter axle load and has high compliance rates for electrification (87%) and line speed for freight trains (89%). Electrification is still missing in France (Serqueux-Gisors, with works expected to be concluded in the first quarter of 2021) and in Spain (in Algeciras-Bobadilla and in the two cross-border sections with Portugal, all being worked on). Moreover, the current non-achievement of the 100 km/h line speed for freight trains occurs in France, Spain and Portugal, while Germany is fully compliant. Based on the current Project List, full compliance for these two parameters – electrification and line speed - will be reached by 2030. Train length (740m freight trains length) is particularly low in Portugal and Spain, although full compliance is foreseen by 2030.

Inversely, the track gauge and ERTMS parameters currently have much lower compliance rates (54% and 12%, respectively). Both parameters will not be fully achieved by 2030, with Portugal being the only country where the targets will not be reached, according to the plans currently available.

As for Rail-Road Terminals, no changes in the Corridor's compliance rates have been observed. Nonetheless, improvements in two RRT terminals in the beginning of 2018 can be pointed out:

- Valenton terminal in Paris was upgraded to 740m train capability.
- Increase of transhipment capacity and extension of the length of one track at the Contargo terminal in Mannheim.

Figures 3 and 4 in the next pages depict a compliance overview of the TEN-T parameters "Electrification", "Track gauge", "Line speed for freight trains" and "Axle load" by 2030. The two figures differ in terms of the "Track gauge" parameter. Figure 3 is in line with the TEN-T Regulation, showing UIC gauge compliance only for new lines i.e. those constructed after the adoption of Regulation 1315/2013. Figure 4 shows for information purposes where there will be and where there will not be UIC gauge, given the Coordinator's wish to consider the upgrade to UIC gauge as a priority to achieve full interoperability on the Corridor.

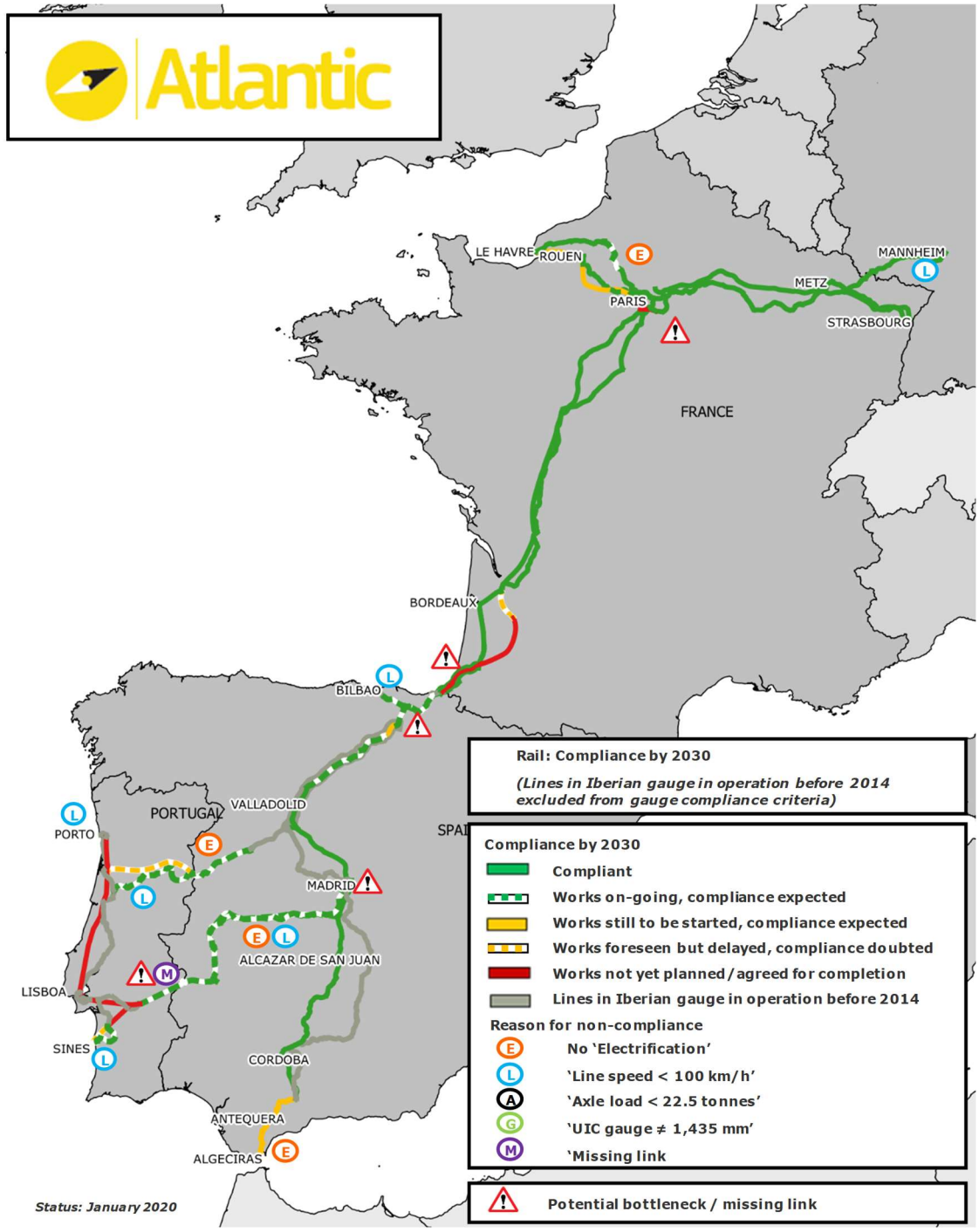

Figure 3: Rail compliance by 2030 (with Iberian gauge lines existing before 2014 shown in grey), reflecting the requirements of the TEN-T Regulation

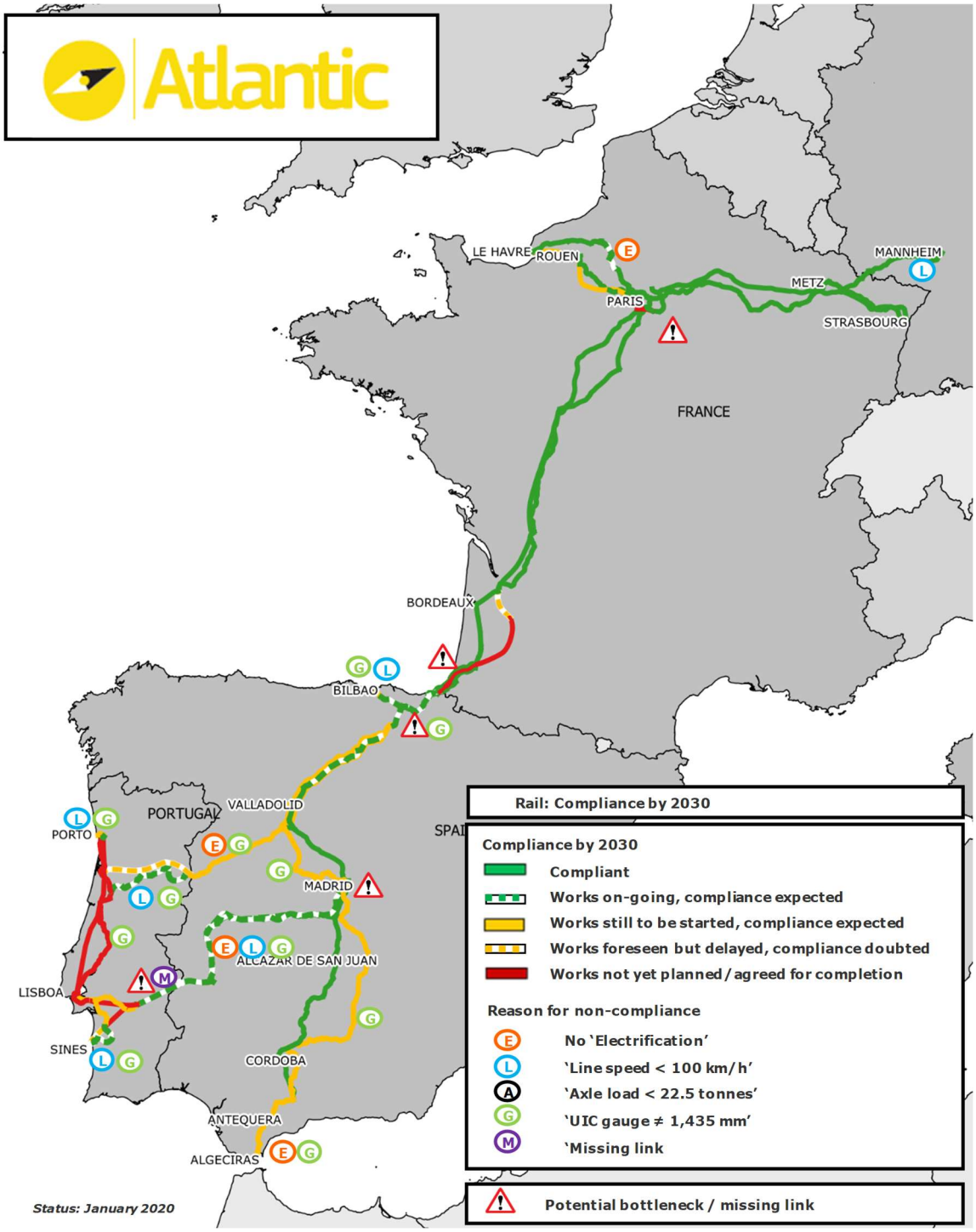

Figure 4: same as Figure 3 but with Iberian gauge lines existing before 2030 shown in orange as "works still to be started". This is not reflecting the requirements of the TEN-T Regulation, but the Coordinator's view

2.2.2 The Atlantic inland waterway network

The inland waterway component of the Atlantic Corridor comprises the section of the Seine River from Le Havre to Paris. North of Paris, the Corridor is linked with the planned Seine-Scheldt Canal, included in the North Sea-Mediterranean Corridor.

The compliance rate for IWW in the Atlantic Corridor is very high and does not raise specific challenges. The River Information Service (RIS) in the Seine River is still being deployed and deployment of alternative fuels along the Seine is also ongoing. The issue of low bridges in Paris has been previously explained.

Even though the Douro River is not yet part of the Corridor (it will join it in 2021 together with the Guadalquivir River), it is an important waterway which still needs the rehabilitation of its locks and the enlargement of some of its sections.

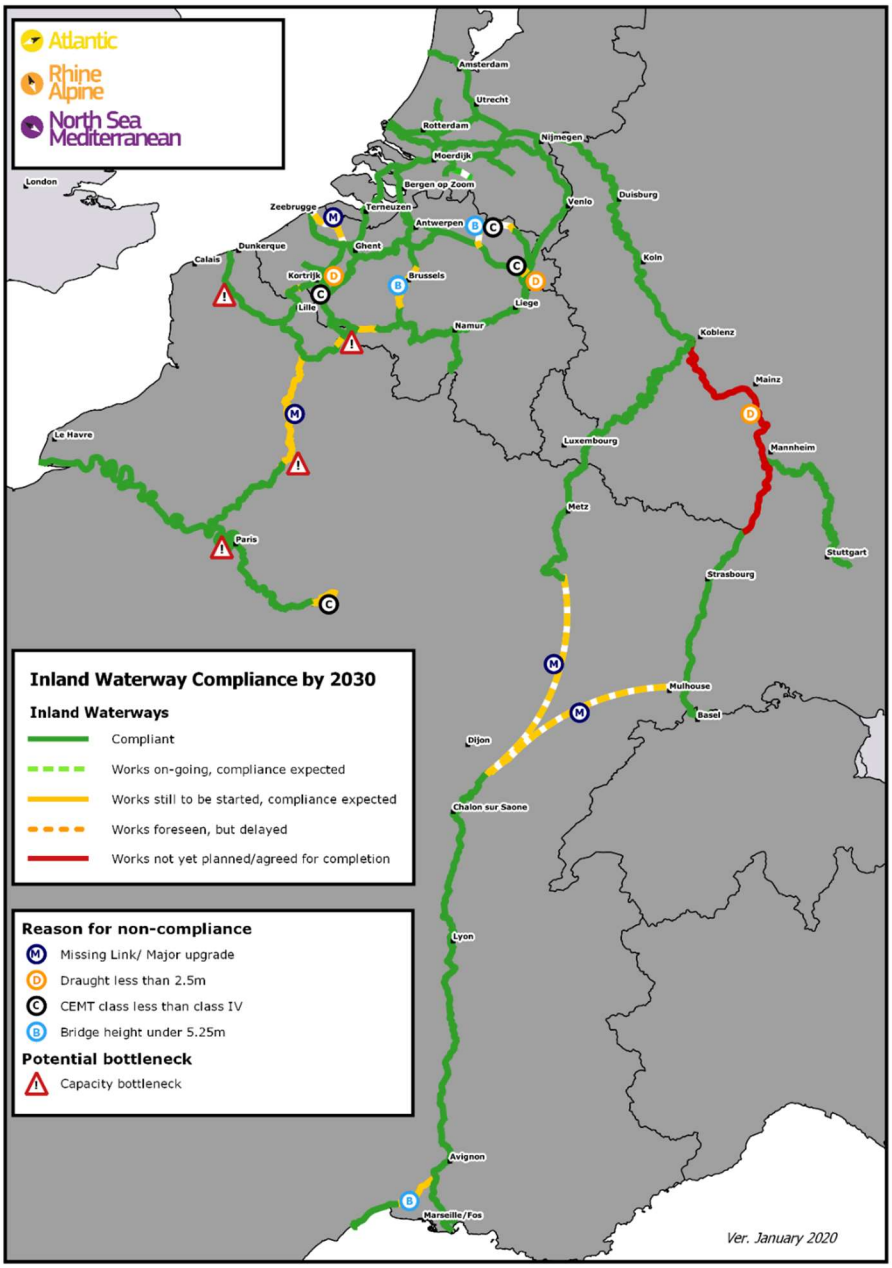

Figure 5: IWW compliance by 2030

2.2.3 The Atlantic road network

Regarding the road infrastructure of the Atlantic Corridor, it is highly developed in terms of its motorways and expressways, complying with the KPIs almost in its entirety. The exception of less than 10 km belongs to the cross-border section between Vilar Formoso and Fuentes de Oñoro (PT/ES). The upgrade is already completed on the Spanish side and the conclusion of the works is foreseen by the end of 2020 on the Portuguese side.

For the availability of alternative fuels, actual compliance rates are in average low, with 20% for LNG and 56% for electric charging. Hydrogen is also present in the national action plans for alternative fuels, with deployment expected in the coming years.

2.2.4 The Atlantic maritime ports

The eight core seaports of the Atlantic Corridor are complying with all KPIs, with the exception of the availability of alternative fuels, currently at 25%. Several projects are ongoing, with compliance rate expected to increase to 62.5% by 2020 and to 100% by 2025.

Although the inland modal connections for the eight seaports are accomplished[15], the bottlenecks already referred to in the previous Work Plans, affecting in particular the Ports of Algeciras, Sines and Leixões, still remain, notably regarding gauge, line speed, train length, gradient and electrification (in the case of Algeciras). These bottlenecks are addressed in several ongoing and planned projects and will all be solved by 2030.

The compliance rates for the Atlantic inland ports are also very high, with the main change in compliance rate observed for the availability of clean fuels, now reaching 33%.

Pioneering projects, such as CoreLNGHive, are bringing an important contribution to pave the way towards LNG availability in the Corridor's ports, with full compliance for alternative fuels foreseen by 2025.

2.2.5 The Atlantic airports

Airport compliance is related with its connection to rail, while for airports in capital cities (Lisboa, Madrid and the two airports of Paris) such connection should be established with high-speed rail, but only by 2050. In the present situation, compliance rate for the seven airports is of 29% (rail connection is available in Paris CGD and Madrid Barajas) and will reach 86% by 2030. The rail connection with the airport of Lisboa is not yet addressed, though this connection is not required before 2050. Moreover, the details regarding the second airport of Lisboa, Montijo, have not yet all been decided upon.

The other two parameters against which airport compliance is calculated regard the availability of at least one terminal open to all operators, as well as the availability of clean fuels supply infrastructure both landside and airside. Landside availability of clean fuels is already in place in all Corridor's airports, particularly referring to the availability of electric charging points in parking areas. Nevertheless, airside availability of clean fuels is still currently at 0%. While this affects the compliance rates for the Corridor, any progress on that front is dependent on the developments to be made in the aeronautic industry. Even though IATA commits to the development of alternative jet fuels, no dedicated roadmap, central feasibility study or specific information for the 2030 horizon is available yet.

[15] Rail connection for Sines is ensured via the existing comprehensive line Sines-Ermidas do Sado–Grandola.

2.3 Persisting bottlenecks and missing links

The preceding chapter highlighted the remaining gaps vs. the requirements of the TEN-T Regulation. Nonetheless, other limiting factors still hinder the good functioning of the Corridor and might continue to limit it beyond 2030.

Regarding **rail infrastructure**, issues related with different electrification systems between the countries of the Corridor, which require the use of multi-tension rolling stock or changing locomotives at borders, as well as different signalling systems between the countries still remain to be addressed. Other operational and administrative barriers that need to be addressed include, among others: guaranteed capacity bands in the annual timetable, especially for long-distance traffic crossing France; English-training for staff involved in international traffic; mutual acceptance or harmonisation of rear tail plates; real-time train composition directly readable in the Train Information System, etc.

In addition, the combination of the postponement of the new high-speed line Bordeaux-Dax and Dax to the Spanish border until after 2037 and of the expected increase of freight traffic flows from and to the ports of the Iberian Peninsula is bound to create bottlenecks for rail freight transport between Spain and France. Therefore, it is necessary to foresee the completion of capacity increase upgrades on the existing conventional line between Bordeaux and the border, when the Y Basque starts operating. These capacity upgrades include, on top of the renewal of tracks, platforms and catenary, the installation of permanent counterflows between Bordeaux and Morcenx, as well as the enlargement of the loading gauge of tunnels so as to make this section suitable for rail motorway operations. The planning of these investments by the Member State and its infrastructure manager should be made according to the need to carry out urgent track renewal works and to significantly increase rail freight traffic.

Finally, the rail connection to the port of Sines can only be carried out through the current comprehensive network because of environmental constraints; a matter that needs to be addressed in the revision of the TEN-T Regulation.

With regards to **road**, the electronic tolling systems are only partly interoperable, but progress is ongoing. Challenges related to the deployment of alternative fuels have already been previously developed. During the 2014 studies, the assessment of the availability of parking areas[16] (International Road Transport Union's- IRU's Label database of parking areas) along the Corridor showed a good coverage of classified parking areas. Following the Study on Safe and Secure Parking Places for Trucks[17] published in February 2019, the European Commission introduced a new standard for the certification of parking areas, which provides more clarity and consistency on what constitutes a secure parking area. Following that new methodology, the Atlantic Corridor is well covered with "other non-basic parking" but has important gaps for "certified secure parking areas".

Ports are actively developing facilities and programmes to enhance their efficiency (digitalisation, extended gateways, single windows, etc.) and to develop multimodal hinterland connections. However, in several cases, enhancing capacity for both terminals and storage areas is called for to cope with increasing international traffic (e.g. Leixões). Ports' capacity is also conditioned by the necessary adaptation of infrastructure and superstructure to comply with larger ships' requirements: access channels and berths,

[16] Information about available parking areas on the Corridor can be accessed via: http://www.iru.org/transpark-app. This web service offers an overview of location and amenities of all accessible parking areas.

[17] Parking on Safe and Secure Parking Places for Trucks – Final Report, Panteia, ESPORG, CERTH-HIT, CBRA, IRU, DEKRA, available at https://ec.europa.eu/transport/sites/transport/files/2019-study-on-safe-and-secure-parking-places-for-trucks.pdf.

quay length and strength, yard size, crane height and width are the most relevant limiting factors.

Regarding **inland waterways**, besides what has already been previously described, the IWW connection to the new Port 2000 in Le Havre and the Seine / Scheldt rivers connecting Paris to Benelux are currently under study.

As for **airports**, the one bottleneck which is not yet addressed is the required connection of the airport of Lisboa with the railway network. However, this is only required for 2050 and needs to be framed with the detailed decisions for the second airport of Lisboa.

As for **multimodal terminals**, there is a clear potential for the provision of better multimodal services along the Corridor. However, an overall planning, implementation and management model for Rail-Road Terminals is still missing. Especially in Portugal, the forthcoming revision of the TEN-T Regulation should be used to better align the core RRTs with the country logistics planning.

Climate change

Additionally, with climate change, issues such as major fires and floods that now occur every year in the Corridor's countries, as well as the extremely low water levels in the Rhine, affecting the Port of Mannheim, are likely to become more and more prominent. Much more attention needs to be placed on measures to enhance the resilience of the Corridor’s infrastructure to such climate change-related issues.

Digitalisation

Finally, although no specific Corridor barriers or bottlenecks have been identified, due consideration should be given to the promotion and development of digital links and initiatives for the exchange of traffic data and provision of information to users. In parallel with the technological developments, important challenges also need to be addressed, including governance models, cybersecurity and privacy.

3. Transport Market Study

3.1 Current flows along the Corridor

The overview of the transport market growth and performance of the Atlantic Corridor since the adoption of the TEN-T Regulation, can be summarised as follows:

- Following the economic crisis impacting particularly the Iberian countries, sustained economic growth has been visible again since 2014.
- Freight and passenger transport are still dominated by road, although a slight decrease of the modal share of road can be observed.
- Freight traffic volumes are growing but are still below the figures of before the economic crisis. The freight rail modal share for the four Corridor countries as a whole is nearly 17%. For passenger transport, rail has a modal share of 12%, although that share has been slightly increasing over the last 20 years.
- There is a significant growth of international freight trains between Spain and Portugal; the Atlantic Rail Freight Corridor highlights an increase of traffic of 23% at the border, which is encouraging, notably in view of the expected completion of the missing link Évora-Caía in 2023, which will allow avoiding the existing detour section.
- International long-distance freight traffic is stable at a low level at the French-Spanish border and decreased by 10% at the French-German border from 2018 to 2019.
- Port volumes continue to grow, particularly in container handling for both maritime and inland ports:
  - The eight seaports of the Atlantic Corridor handled more than 300 million tonnes in 2018.
  - 48.3 million tonnes were handled in the six inland ports of the Atlantic Corridor.
- Passenger traffic is significantly growing at the Corridor's airports: Airports of the Corridor handled 2.8 million tonnes of freight and 215 million passengers in 2018. Compared to 2014, freight volumes in Lisboa, Porto and Madrid raised by almost 30%, while Paris Orly and Bilbao saw their volumes decreasing. In contrast to freight, passenger volumes increased by 30% for the Atlantic Corridor, with the most significant increases at Porto (72%) and Lisboa (60%) airports. Passenger traffic at Bilbao, Madrid and Bordeaux airports increased by almost 40%, while for Paris airports the increase was limited to 15%. Therefore, it is not surprising that the Corridor Project List shows significant planned investments at airports.

3.2 Multimodal Transport Market Study and Corridor scenarios

The objective of the Multimodal Transport Market Study (MTMS), carried out for all Corridors, is to determine the impact of the successful implementation of each Corridor. However, **we must give an important word of caution that this must be considered as only a part of the picture, given the limitations inherent to all modelling exercises which rely on assumptions and can never take all elements into account. Besides, the MTMS only considers the Corridor's road and rail flows, therefore not reflecting the important maritime dimension of the Corridor (maritime transport makes up nearly 30% of the Corridor's freight flows).**

With this word of caution in mind, the MTMS provides an estimate of the prospective traffic flows on the Corridor in 2030, while also simulating the associated impacts on the economy and the environment.

3.2.1 Methodology

The MTMS conducted for the 4th Work Plans is a follow-up of the modelling exercise of the 3rd Work Plans but with a revised methodology harmonised across all Corridors. To carry out the modelling, the TRUST ("TRansport eUropean Simulation Tool") and AsTra ("Assessment of Transport Strategies") models from the companies TRT and M-Five were used. The year 2030 was selected as the forecasting horizon. The MTMS was carried out using the following considerations:

- Data on traffic flows forming the basis of the Baseline Scenario and the Reference Scenario is collected from public sources and national authorities and reflect the transport flows of the year 2016;
- Macro-economic trends behind the modelling are derived from the EU Reference Scenario 2016;
- The Reference Scenario is based on the projects that are included in the 2017 Project List (i.e. not the 2019 one).

For the Reference Scenario (full Corridors completion), this work plan draws on the results of the study "*The impact of TEN-T completion of growth, jobs and the environment"* published in 2019 by the European Commission. The Corridor-specific scenario was instead elaborated as part of an additional.

Besides the analysis of the current flows and available capacity of the Corridor infrastructure, future transport activities have been estimated, as well as macro-economic impacts for three different Corridor development scenarios:

- In the **Baseline Scenario**, it is assumed that the implementation of the core TEN-T network stops at the end of 2016 and no further investments are made.
- In the **Reference Scenario**, the core TEN-T network is assumed to be fully implemented by 2030, in line with the requirements of Regulation 1315/2013.

The difference between these two scenarios is equivalent to the impact of the TEN-T core network implementation between 2017 and 2030. The results of the economic modelling estimate the impact on growth and jobs by country along each Corridor.

- A third scenario is defined, unique to each Corridor. For the Atlantic Corridor, the **Corridor-Specific Scenario** measures two major issues:
  - The non-completion of UIC gauge in the Iberian Peninsula
  - The non-completion of the Dax-Bordeaux high-speed rail section

The following macro sections, illustrated in the Figure on the next page, were adopted for the MTMS: Sines-Porto; Sines – Lisboa-Madrid; Algeciras-Valladolid; Aveiro-Valladolid; Valladolid-Burgos-Irún; Irún-Paris; Paris-Le Havre; Paris-Metz-Strasbourg; Metz-Mannheim.

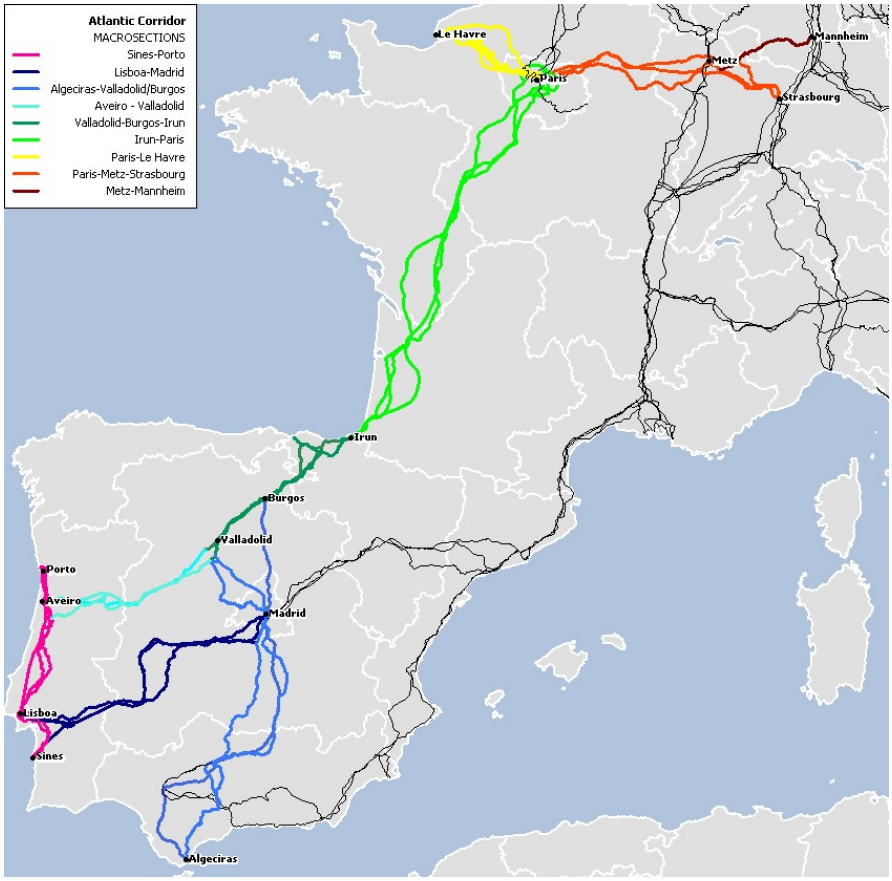

Figure 6: Atlantic macro sections for the MTMS

3.2.2 Reference Scenario – all Corridors implemented by 2030

Looking forward to 2030, both passenger and freight transport will be increasing for all modes:

- Freight volumes on the Atlantic Corridor are estimated to increase by 29% to 115 billion tonnes-kilometre in 2030. Rail transport will experience the largest increase, 71%, while road transport will grow by 25%. IWW transport, which today represents a modest 2.6% of all freight moved annually across the Corridor, will grow to 3.4%. Road will retain the largest modal share, representing 83% of all freight volumes, while the share of rail freight will grow to 15% and IWW transport will remain at around 2%.
- Growth rates for passenger transport show the opposite picture. The largest increases are expected in the Iberian Peninsula, close to an average 90% growth in passenger-kilometres travelled, while the rest of the Corridor expects a growth rate of around 30%. The modal share for rail passenger transport will grow to 21.2%.

The impact analyses performed under the Growth and Jobs study allow capturing the direct effects of the new infrastructure developments in the transport sector and the indirect effects on supplying industries and the wider economic impacts induced by mechanisms such as higher productivity diffusing to other economic agents and into future years at regional/national scale.

For the Atlantic Corridor, according to this study, the implementation of the whole EU-wide core TEN-T will result, in the Corridor Member States during the period 2017-2030, in an increase of cumulated GDP by 0.9% corresponding to about €795 billion, and in the generation of a total of 2,7 million additional man-years of jobs.

These socioeconomic gains will be furthermore coupled with additional benefits in terms of reduction of external costs and environmental protection. The planned investments along the Corridor, in accordance with the present Work Plan (notably in the field of rail and the improvement of intermodal transport) will enhance the environmental and social performance of the TEN-T, creating favourable conditions to increase the modal share of more sustainable transport modes, mitigating greenhouse gas emissions, noise and, as appropriate, other negative environmental and social impacts, such as air pollution, accidents and congestion.

Whereas the transition to innovative and sustainable transport technologies will make possible the decarbonisation of all transport modes overall, a positive contribution is also expected from the large-scale adoption of alternative clean fuels and zero-emission vehicles. The ongoing and planned projects on the TEN-T are expected to play an important enabling role by supporting the early adoption of such technologies.

3.2.3 Baseline Scenario – implementation of all Corridors stopped after 2016

The Baseline Scenario for 2030 analysed the situation along the Corridors if none of the planned projects would be implemented until 2030.

If the planned projects would not be realised, 3 billion tonnes-kilometre on rail would not be materialised, while 1.8 billion passenger-kilometres on rail would not occur. This represents 31% and 11% of all rail traffic along the Corridor today.

The cumulative TEN-T impacts lost between the Baseline and the Reference scenario in the year 2030 is equivalent to a reduction of employment of 4.9% and 4% of GDP. The GDP impacts are particularly noted in Portugal (-16.8%), while employment impacts are mostly centred in France (-11.6%). For Spain, both GDP and employment are negatively impacted in the order of 6%.

3.2.4 Corridor-Specific Scenario

The UIC gauge is a key issue for the Iberian Peninsula and therefore one component of the Atlantic Corridor specific scenario is to test the impact of its non-completion. The impact of the non-completion of the new high-speed lines Bordeaux-Dax, Madrid-Extremadura, Basque High-Speed Rail and the line Valladolid-Burgos in Spain and the non-upgrading of the North line in Portugal has also been tested.

The non-implementation of these projects (corresponding to a total investment of 11 € billion) would result in a loss of 4.0% and 4.9% of the TEN-T implementation impact on national GDP and employment (Corridor Specific Scenario vs. Reference Scenario in 2030) in the Member States crossed by the Atlantic Corridor, with higher negative effects in Portugal (-17.8% on GDP and -4.2% on employment) and Spain (-6.2% on GDP and -6.0% on employment).

4. What still has to be realised by 2030

As can be derived from the previous chapters, the Atlantic Corridor is progressing well, albeit experiencing some delays and postponements of projects.

While in the previous chapters we focused on the delivery against the Regulation parameters and whether they will be met by 2030, this chapter focuses on the concrete projects and actions towards that delivery.

The Atlantic Project List 2019 consists of 362 projects. Compared to the 3rd Work Plan, this represents an increase by 90 projects. This is mainly due to additions by the Member States or other stakeholders, but also to the optimised methodology of the handling of overlapping projects.

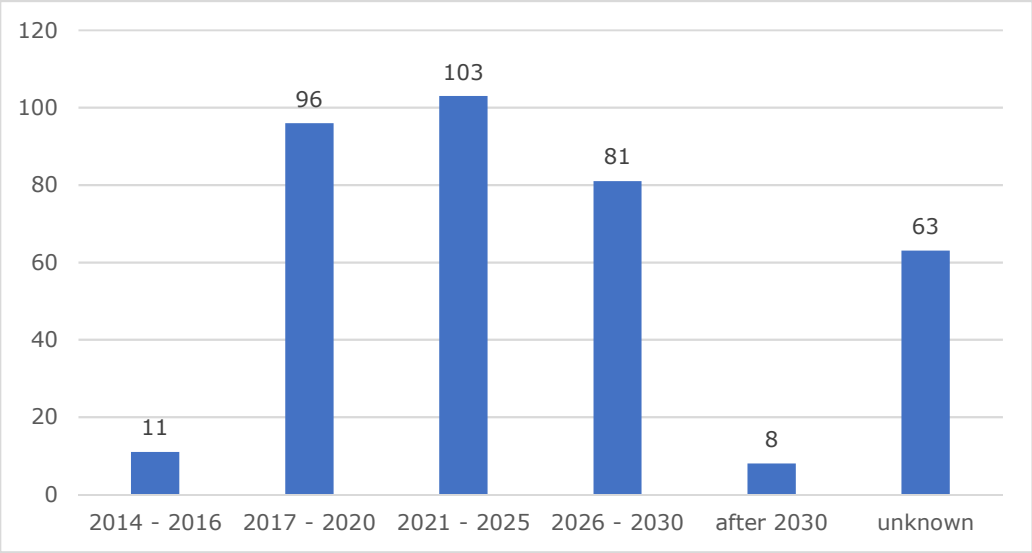

Figure 7: Number of projects by completion time cluster (status of October 2019)

For 319 out of the 362 projects, the costs are known, amounting up to €48.3 billion. On top of that investment, it is estimated that an additional investment of €8.2 billion covers the projects for which the costs are not yet officially known. This has been estimated by the consultants, following a common methodology for the nine Corridors.

As can be seen in Figure 8, most of the costs (58%) are foreseen for measures to be finalised in the timeframe between 2026 and 2030. Until 2030, the target date of the Regulation (EU) 1315/2013, the costs of all projects completed and envisaged to be finalised until then cumulate to a total of €43.5 bn. About €1.2 bn are foreseen for after 2030, while the completion dates for the remaining €3.7 bn are still unknown.

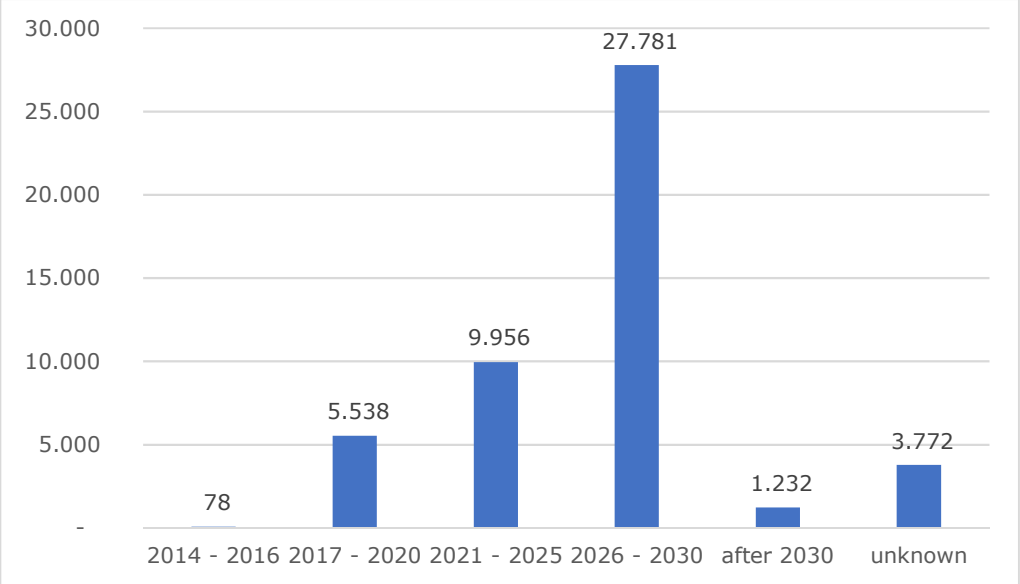

Figure 8: Total cost (in million €) by completion time cluster

Figure 9 emphasises the importance of rail projects, representing 34% of the Atlantic Corridor's projects, with 17% listed as maritime and 12% classified as multimodal. Although Innovation only corresponds to about 8% of the projects, their importance is paramount for the achievement of the Corridor's objectives, notably to enhance its maritime dimension. Most of the projects falling in this category are related with alternative fuels deployment, for both road and maritime.

Furthermore, 37 projects have a cross-border dimension. Other projects addressing critical issues were also identified, namely last-mile section projects (44 projects), intermodal projects (45) and projects implying the elimination of current or potential future capacity bottlenecks (74).

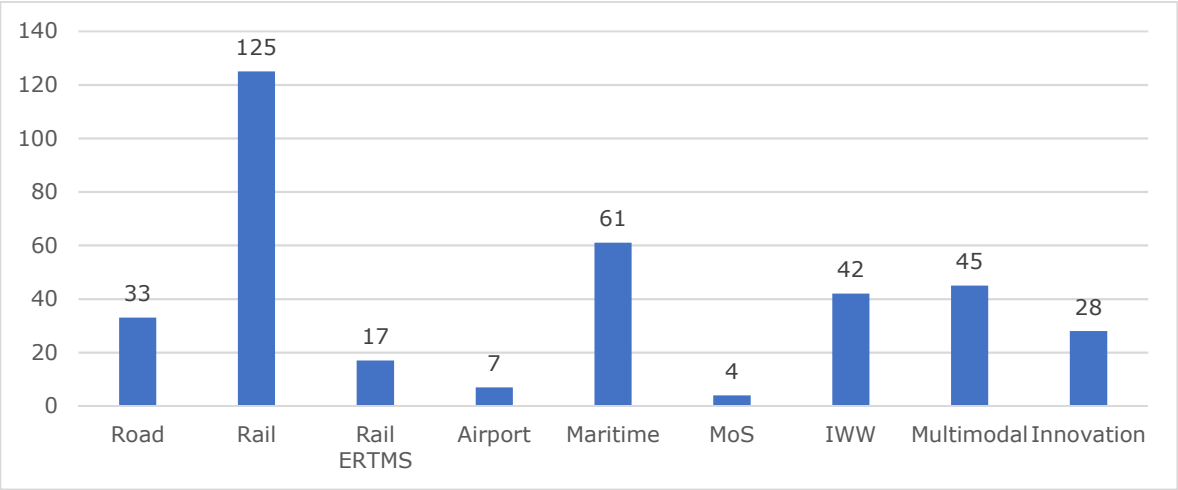

Figure 9: Total number of Corridor projects[18] per category

[18] A rail project at a port is classified as a rail project if it refers to the rail line up to the port or as a maritime project if it refers to a rail line within the port terminals.

The planned investment per project category clearly demonstrates the importance of rail (including ERTMS) for the completion of the Corridor, representing 68% of the total Corridor investments:

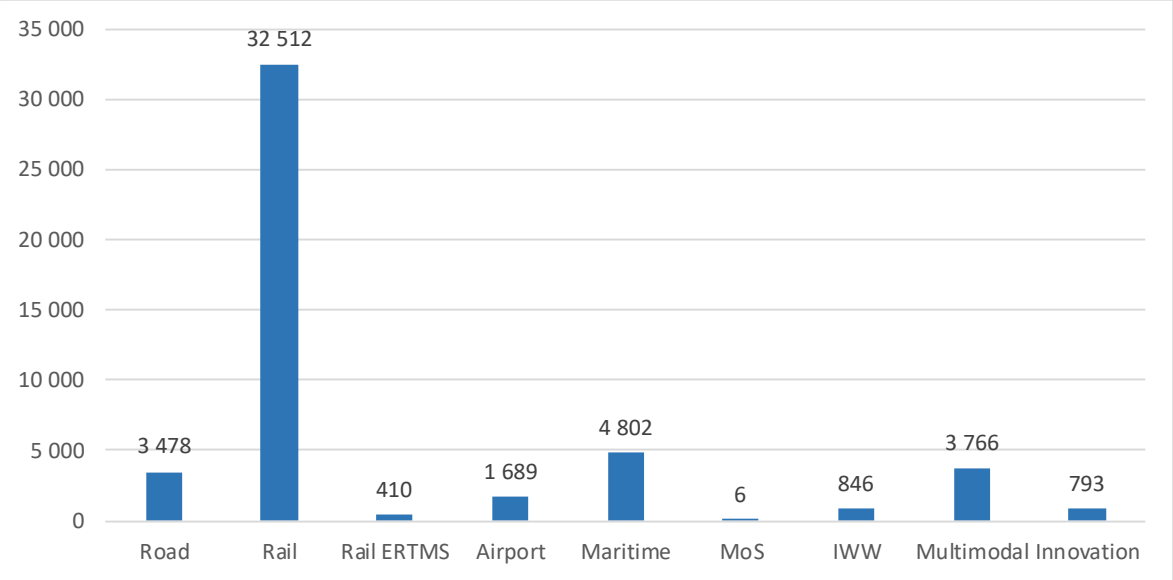

Figure 10: Investments in Corridor projects per category (in billion €)

The split of the 362 projects per Member State is shown below. As in the past, multi-country projects reflect cases of projects that are common to several Corridors but belonging to only one country (i.e. for shared sections), as well as projects belonging to several Corridors and countries at the same time:

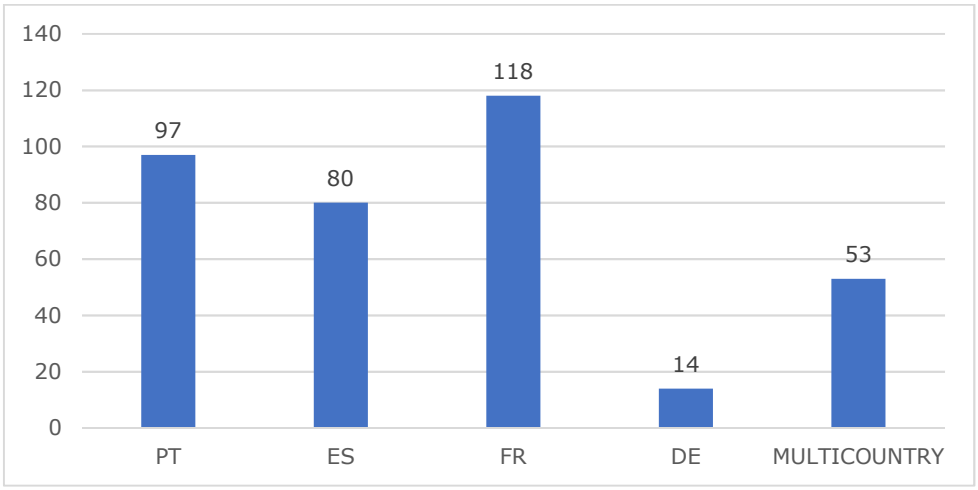

Figure 11: Total number of Corridor projects per country

The compliance analysis showed that not all KPI requirements will be fulfilled with on-going or planned projects by 2030. Therefore, the consultants proposed a list of additional measures designed to complete the Corridor. Such 28 additional projects were identified. The majority of them refer to clean fuel availability at airports and rail projects related to

loading gauge of tunnels, speed >100 km/h for freight and intermodal gauge. Other additional projects include the rail connection to Lisboa airport and the implementation of the Poceirão RRT in Portugal. For those additional projects, costs are not available. These additional projects will be discussed between the Commission and the Member States/stakeholders in order to agree on those that should become part of the Project List.

The next paragraphs provide some more details in relation to each of the main project categories, without repeating information provided in previous chapters. The reader should therefore especially refer to sub-chapter 2.2 about the compliance with the TEN-T parameters, for a more complete view on the state of realisation of the Atlantic Corridor and on the remaining priorities.

4.1 Rail & RRT

Although track gradient is not included in the requirements for 2030, it is a constraint present in the Corridor, with sections in Portugal with 20-21‰ (e.g. Pampilhosa- Guarda) and Spain with 23‰ (e.g. Bobadilla-Algeciras line). Several projects within the "Rehabilitation and upgrade of North line" in Portugal address this issue.

41 projects are classified as rail breakthrough, representing 12% of all Corridor projects. Most projects relate to investments in infrastructure (22 projects), while 13 projects are classified as rolling stock projects. The total investment of rail breakthrough projects amounts to €9.3 bn, which represents 19% of the total projected costs of the Atlantic Corridor. Figure 12 shows the split of these 41 rail breakthrough projects:

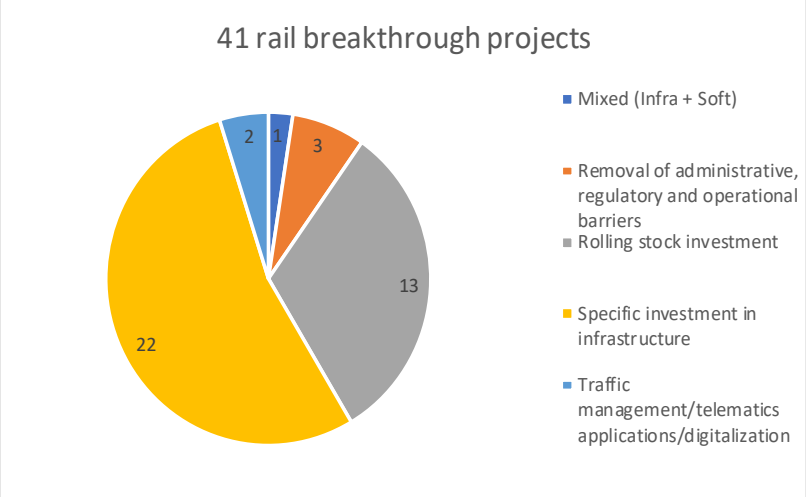

Figure 12: Number of rail breakthrough projects per category

4.2 ERTMS deployment by 2023

The current state of ERTMS deployment of the Atlantic Corridor is 12%. It has 1,027 km of ETCS in operation, which was already the case in the end of 2018. Nevertheless, there are still 7,188 km where ERTMS is not yet deployed. The 188 km planned to be deployed in 2019 in Spain have been postponed to 2023. ETCS deployment should reach **21%** by **2023** in the best case, which is one of the lowest rates among all Corridors. For freight, none of the sections are in operation, thus, it will be a huge effort to realise that part of the Atlantic Corridor by 2030.

The following figure shows the status of ETCS deployment per Member State:

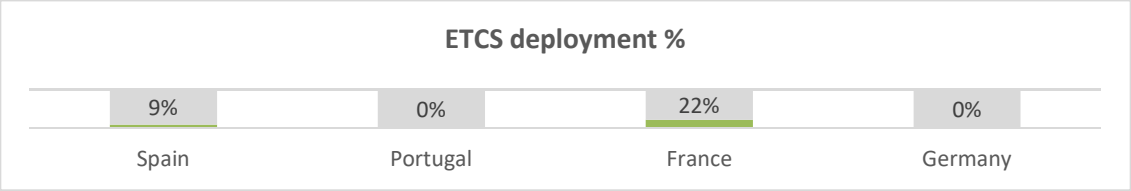

Figure 13: Status of ECTS deployment in the Atlantic Corridor per Member State

Portugal is not obliged to deploy any sections by 2023. Germany has only 136 km to deploy by 2025 and these are already under construction. France has the most advanced deployment in the Atlantic Corridor, with 714 km in operation, which represents 83% of the km to be deployed in France by 2023. Spain has some delays (188 km postponed from 2019 to 2023) but has already set in operation some sections (134 km) that were planned for after 2019.

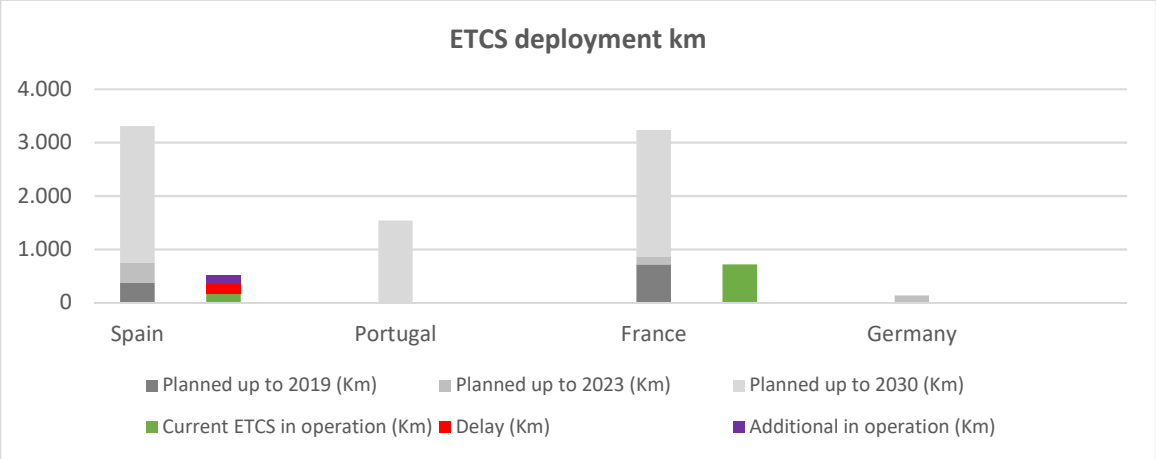

Figure 14: ECTS deployment (km) in the Atlantic Corridor per Member State

The main bottlenecks are as follows:

- In Spain, the deployment on the section Córdoba – Madrid is planned for after 2023, leaving the already operational Córdoba – Antequera section isolated. The section Burgos – Vitoria is also planned for after 2023, while the adjacent sections Vitoria-Bilbao/San Sebastian will be deployed by 2023, in the best-case scenario, and 2026 in the worst scenario.
- In France, the cross border section with Spain (San Sebastian – Bordeaux), the cross border section with Germany (Rémilly – Forbach/Saarbrücken) and Monts – Noisy-le-Sec are planned for after 2023, leaving some gaps in the passengers branch of the Atlantic Corridor in France, which will have major parts of the network already in operation by 2023.
- In Portugal, no section will be deployed by 2023, as planned in the Commission Implementing Regulation (EU) 2017/6 of 5 January 2017 on the European Rail Traffic Management System European Deployment Plan.
- In Germany, the section Saardam border – Saarbrucken – Mannheim will be deployed by 2023 in the best-case scenario, and 2026 in the worst scenario.

The following schematic diagram shows the state of play and the deadlines for ERTMS deployment in the Atlantic Corridor:

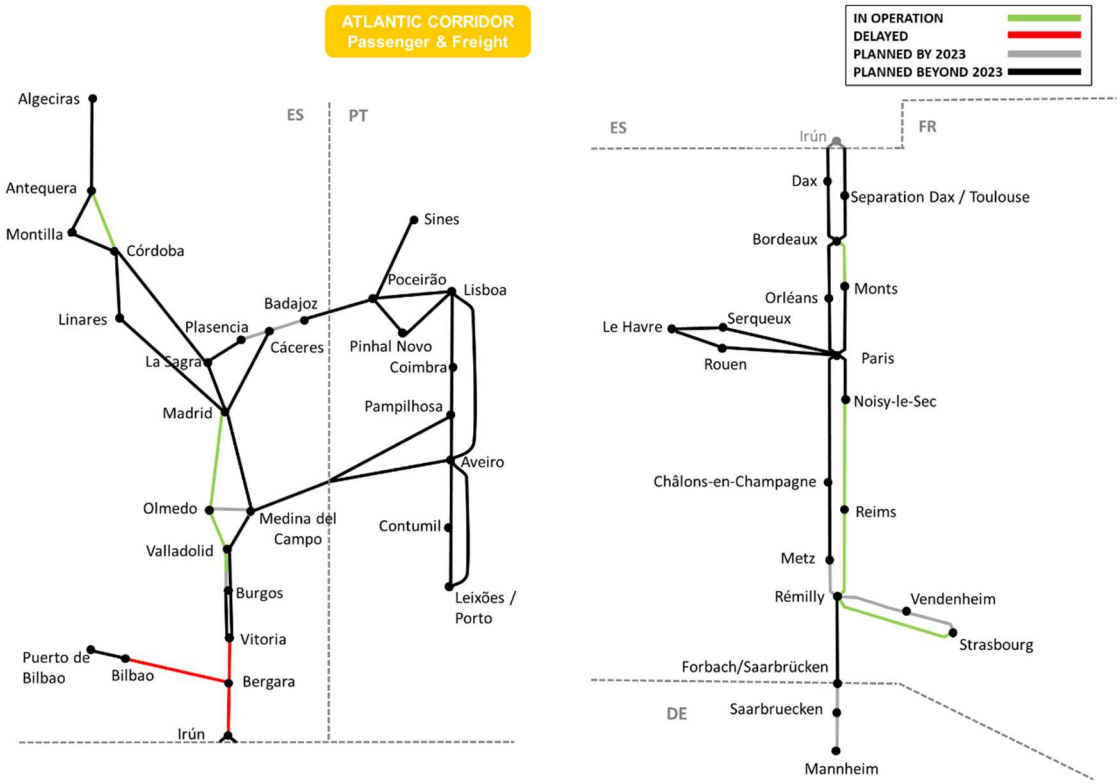

Figure 15: Status of ERTMS deployment in the Atlantic Corridor

4.3 IWW & inland ports including RIS deployment plan

In the Seine River, some local bottlenecks have been identified, notably on locks and port accesses.

Tackling these issues will increase reliability of navigation on the Seine. The doubling of single locks upstream of Paris and the lengthening of smaller second locks will offer alternatives to barges in case of issues, while reducing waiting time at locks under normal conditions. Upgraded dams and locks will also decrease the risks of issues. Finally, controlling the locks remotely from headquarters will improve efficiency of waterway operations. The sum of those various local improvements will accommodate the flow of traffic along the basin, at the junction between the Atlantic and the North Sea Mediterranean Corridors, improving IWW competitiveness and promoting multimodality. As stated above, maritime and inland waterways are not included in the Transport Modelling Study and, thus, the benefits they bring to the realisation of the Corridor need to be seen in addition to those highlighted under Chapter 3, which are based on rail and road only.

4.4 Road transport (including ITS deployment)

The most remarkable actions included in the Project List with regards to road address three main issues: continuity of highways, progress on e-tolling compatibility and ITS deployment.

It is also important to highlight the inclusion of some road projects related to urban nodes and last mile accesses to ports and railroad terminals.

Regarding projects for sustainable and future-oriented mobility, 16 projects address the road component, notably in relation to alternative fuels, as well as ITS and C-ITS projects.

The Atlantic Corridor is a good performer in relation to ITS and C-ITS. Largely benefitting from the support of the European Union (i.e. projects Arc Atlantique, MEDTIS, etc.), the Atlantic core roads are already well covered by traffic management and traffic information systems, in line with Action b of the ITS Directive. Furthermore, from Portugal towards France and further to Germany (although without a road component in the Corridor), the deployment of interoperable C-ITS Day 1 and Day 1.5 services is being achieved through the full engagement of the three countries in the C-Roads Platform. This already allowed several cross-border pilots of interoperable solutions to be carried out, with upscale planned along the coming years. Moreover, several projects are ongoing along the Atlantic roads regarding road safety and preparation for automation.

4.5 Airports

Nothing to add compared to previous chapters.

4.6 Maritime Ports on the Atlantic Corridor, interactions and complementarity with the MoS Implementation Plan

The core ports of the Atlantic Corridor handled 290 million tonnes of cargo in 2018, which is around 7% of all cargo transiting through European ports.

A modal shift from road to less carbon-intensive modes is an important way to reduce the carbon emissions of the transport sector. The Atlantic Corridor is a typical coastal Corridor, so maritime transport should be exploited as an alternative to road, next to rail transport. Besides, the development of the Corridor must also take into account the growing demand of maritime hinterland traffic.

The Atlantic Corridor should:

- Make sure to provide the necessary rail capacity to and from ports.
- Work together with ports, forwarders and ship operators to improve the administrative procedures and data flow across all modes.
- Ensure the reliability of the network in order to guarantee smooth flows of goods between MoS and the Corridor, as well as avoid delays, with a particular attention to last-mile connections.

The top legislative drivers and emerging trends for maritime transport in the Atlantic Corridor are as follows:

1. Ever-larger ships: the infrastructure of ports (risk management procedures, terminals, etc.) on the Atlantic Corridor must be adapted to have the capacity to host larger ships. In addition, larger ships represent more cargo. Thus, ports also need to adapt their hinterland connections.

2. Panama and Suez Canals' widening: linked to the above, the widening of the Panama and Suez canals will lead to increased traffic and allow the passage of larger ships, therefore requiring ports on the Atlantic Corridor to adapt their infrastructure.
3. Digitalisation: implementing digital tools is a great opportunity to increase trade efficiency. The integration of blockchain, the operation of ships and ports through ICT solutions and the digitalisation of freight transport information are the three big areas in which ports will need to invest, in order to benefit from the opportunities offered by new technologies.
4. Access to overseas markets: North Africa is the gateway of Africa for European trade. Given the fast-growing economy and demography of the African continent, cooperating and facilitating access to these countries will offer great opportunities.
5. Withdrawal of the United Kingdom: making this withdrawal an opportunity for the ports of the Atlantic Corridor to create new maritime links for example with Ireland.
6. Decarbonisation: The EU is taking firm steps towards incentivising decarbonisation. Over the next few years, the ports of the Atlantic Corridor will need to adapt to this new framework, especially with regards to the possible integration of the maritime sector into the EU Emission Trading Scheme (ETS), sulphur caps for ship fuel and green conditionality of EIB loans.

Some projects concerning last-mile connections to ports are also relevant for the functioning of the transport system in the Corridor. There are a number of projects in the Atlantic Project List that focus on the improvements to land access and last-mile connections to ports, especially related to rail but also to road.

As aforementioned, container rail services are substantially growing in the ports of the Atlantic Corridor. Improving ports accessibility in Portugal, Spain and France is a necessary condition to promote such traffic, using rail in the hinterland.

It is also worth noting that these investments could attract significant private involvement, turning them into potential candidates for innovative financial instruments.

4.7 Innovation

The innovative potential of the Corridor is reflected in its performance to apply better transport solutions that meet new and existing mobility needs. Innovative projects are considered those involving some form of sustainable and future-oriented mobility, such as:

- Deployment of alternative fuels recharging and refuelling infrastructure for IWW, maritime, road and air transport and associated mobile assets.
- Transport telematics applications, according to Regulation (EU) 1315/2013, Article 31[19], as seen above.
- Implementing sustainable freight transport services, according to Regulation (EU) 1315/2013, Article 32, excluding MoS.
- Corridor information systems (as recommended by the Digital Transport and Logistic Forum).

For the Atlantic Corridor, the innovation projects targeting the deployment of alternative fuels, as well as those related with digital solutions for freight transport, are of utmost relevance to boost the maritime potential of the Corridor.

[19] Projects involving ERTMS are left out of the analysis

Within the Corridor Project List, several projects are also addressing **wider environmental aspects**:

- Improvement of local environment (pollutants): "Improving the environmental performance of the Port System of APDL management and develop its clean fuels infrastructures/supply"; "Restoring the environmental continuity with the construction of fish passes on the downstream Seine (Seine-Scheldt inland waterway)".
- Mitigation of Climate Change: "Implementing LNG fuel (LNGHIVE2 global project) and other clean fuels in all ports (Spain)"; "Action Plan for LNG in Portuguese Ports (study and pilots) and Further Implementing Actions"; "Alternative fuels facilities (bunkering/storage facilities)" in HAROPA ports; or "PEEPOS green transport: development of alternative fuel facilities (LNG/NGV/electricity) for ship bunkering and road transport" in the Port of Bordeaux.

It is also worth referring to several projects addressing **LNG deployment** and to studies related with **on-shore electric supply**.

- On the road component, it is worth referring to the projects CIRVE and CIRVE_PT, as well as the MEGA-E: Metropolitan Greater Areas – Electric on electric charging and the Deployment of Autogas refuelling stations in metropolitan areas in Spain and Portugal and Connect2LNG: Develop LNG powered freight market on medium or long distances from the perspective of cargo owners.
- For the maritime dimension, in addition to the ones above referred, it is worth referring to the Gainn4Ship and the LNGHIVE2 VESSELS DEMAND: GREEN AND SMART LINKS - LNG solutions for smart maritime links in Spanish Core ports, supported through the CEF Blending facility.

Regarding **digitalisation**, some ongoing CEF actions include:

- FEDERATED: a EU Member States driven initiative (ES, NL, SE, BE, IT,FI, among others) which contributes to the establishment of a viable federated network of platforms for data sharing in freight transport and logistics.
- FENIX: which aims at supporting the development, validation and deployment of digital information systems along the core network, including the Atlantic Corridor.

This being said, there are many cases where there is a need to go further and beyond the TEN-T requirements in order to boost sustainable freight transport services. This is particularly the case for land access to the Corridor's ports, which also calls for qualitative and capacity improvements. For rail, the issues related to the differences in voltage, the steep gradients and the non-harmonised loading gauges also need to be addressed, which causes that not all routes allow the same vertical clearance, limiting the interoperability of trains. For roads, we need to address the issue of tolling interoperability.

Moreover, as developed earlier, there is a clear potential on the Corridor for the provision of better multimodal services and for improving multimodal connections. Nevertheless, an overall planning, implementation and management model for Rail-Road terminals is still missing.

Finally, there is also a strong opportunity to deploy logistic single windows along the Corridor, extending the current port single windows towards the hinterland and integrating with e-maritime services and information technologies. Finding innovative solutions to enhance multimodality on the Corridor is key to meet the continuous growth of maritime flows to the inland routes.

5. Funding and Financing

5.1 Funding needs

The total cost of the projects in the Atlantic Project List amounts to €48.3 bn (official cost data available for 88% of the projects), with rail projects representing 67.3% of that amount. Almost 10% of the total costs refer to projects in the maritime sector, nearly 8% to multimodal projects (notably inland connections to ports), 7% to road projects, 3% to airports projects, nearly 2% to inland waterway projects and 0.8% to ERTMS projects. Innovation represents approximately 1.6% of the total costs (mainly alternative fuels) and MoS less than 0.1%.

The split per category/mode and country is shown in the following figure:

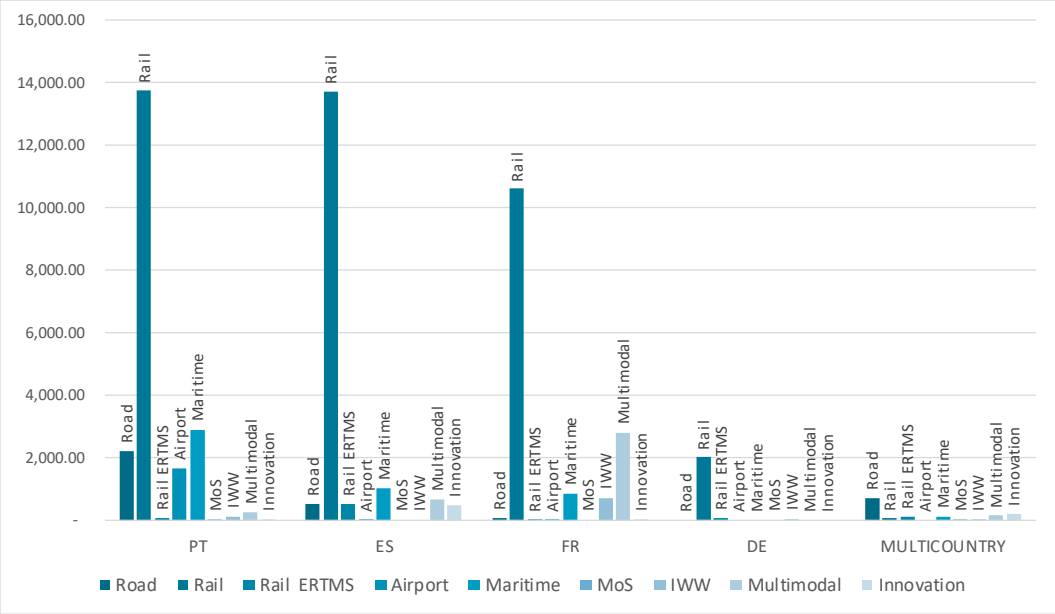

Figure 16: Official and estimated costs (M€) of Atlantic projects per country and category

The following analysis identifies the funding sources and the range of EU resources needed to implement the Atlantic Project List. It shall be noted that the analysis does not consider projects ending before 31/12/2018 nor sub-projects (i.e. projects whose costs are included in bigger projects). Thus, a total of 331 projects are included in this analysis, amounting to a total cost of €54.96 bn (official plus estimated costs), covering 98% of the projects.

The following figure shows the number of projects and values per category:

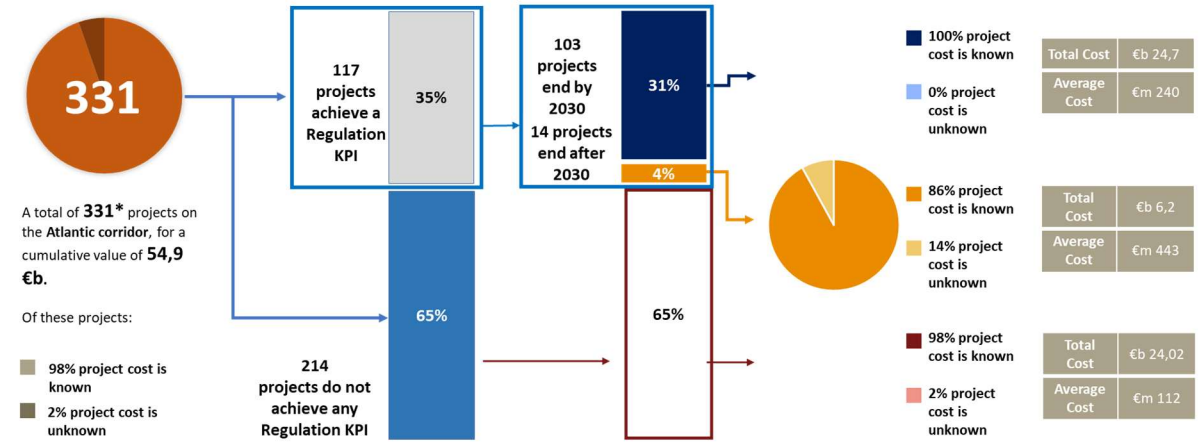

Figure 17: Number of projects and values per category

Regarding funding sources, 127 projects have complete information, amounting to €9.56 bn of the total costs (official plus estimated). For those projects, 35.3% of the funding would come from public sources (State, Regional/Local or other public sources), 15.1% from EU grants (ERDF, CEF, etc.), 1.2% from International Funding Institutions (EIB and commercial banks), 43.3% from private sources, and the rest (5.1%) from other sources.

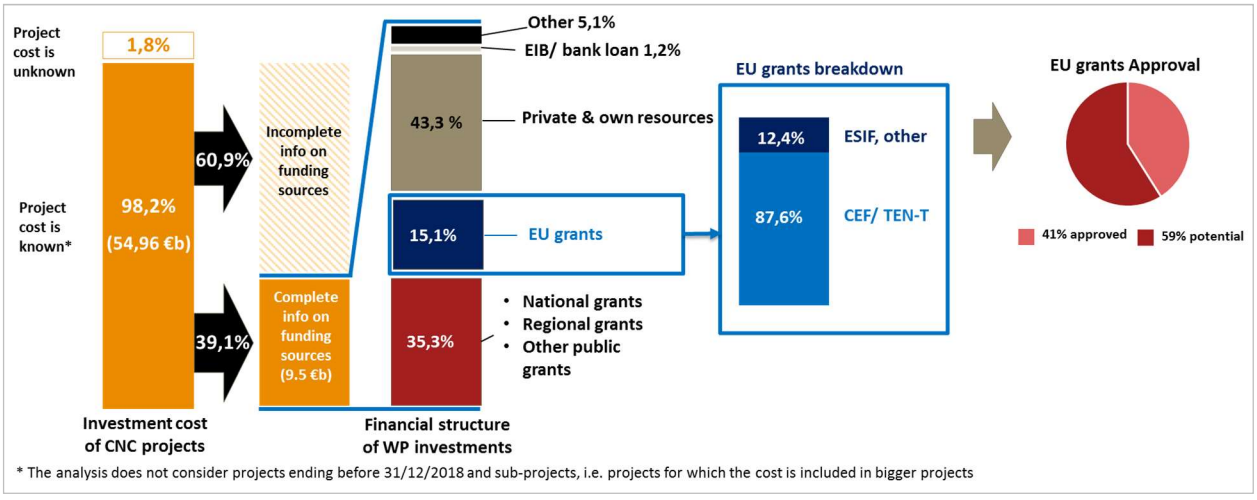

Figure 18: Funding and financing sources analysis for the Atlantic Corridor

75 of those 127 projects have expected EU funding, accounting for a total value of €1.44 bn, with 87.6% of the grants coming from CEF and TEN-T funds and the remainder (12.4%) from the structural funds and other sources. Only 6.2% of these projects have an already approved EU grant.

The value of EU grants approved so far is equal to €590 million. Further potential EU grants have thus a value of €850 million. Keeping the same funding/financing rate and structure, the total EU resources needed for implementing the Atlantic Corridor Project List would be between €3.4 bn and €8.3 bn.

Whereas for the lower side this might be achievable until 2030, reaching the higher side might be difficult, meaning that the completion of the Atlantic Corridor may be challenged by the lack of funding.

This requires specific attention to be placed in the discussion with Member States and other stakeholders in the assessment of other potential financing sources.

A preliminary assessment of the potential of projects for financial sustainability, or the potential to stand by their own feet without needing grants, indicates that:

- Low to non-existing potential for financial sustainability projects account for €44.7 bn in the Atlantic Corridor, representing 75.7% of all projects.
- Good potential for financial sustainability projects account for €522 million in the Atlantic Corridor, representing 1.5% of all projects.
- Financially sustainable projects sum €9.8 bn in the Atlantic Corridor, representing 17.5% of all projects.

The high share of low to non-existent potential for financial sustainability deserves that a more dedicated analysis is performed together with the Member States. For example, smaller projects could be aggregated to gain scale and some bigger projects may be disaggregated to identify components that could be of interest for the financial market.

5.2 Financial tools

The aggregated demand for investment in all Corridors represents a total value of about €640 bn, which can only be supported with a substantial contribution of private financing.

Around 20% of the European Investment Bank's (EIB) lending goes to the transport sector, representing more than €150 bn of investment mobilised since 2014. In the period 2014-2018, about 60% of that went to the 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). While the EFSI delivered well in areas such as road and airports, mobile assets and rolling stocks, due to the economics and risk profile of transport infrastructure, its use for rail projects fell below expectations.

To improve the quality and bankability of TEN-T projects, DG MOVE and the EIB tested in the current multiannual financial framework (2014-2021) the blending approach, setting up CEF blending calls and more recently the CEF Blending Facility. In the next MFF (2021-2027), InvestEU will cover all EU financial instruments as well as blending. It will also have a broader risk spectrum than the current EFSI.

The 3rd CBS report of September 2019 of Coordinators Bodewig and Secchi "Enabling the uptake of the TEN-T pipeline by the financial market" gives a more detailed insight into financing issues for the TEN-T and is available under the download section of the TEN-T website at https://ec.europa.eu/transport/themes/infrastructure/downloads_en.

6. The European Coordinator's recommendations and future outlook

Introduction

This 4th Work Plan is very much consistent with the 3rd one of beginning 2018. The realisation of the Corridor progressed over the last two years and the expected compliance by 2030 is still in line with how we projected it two years ago. Of course, this is under the caveat of the consequences of the covid 19 crisis, which are still difficult to pin down at the time of concluding the write-up of this Work Plan. Nevertheless, the challenges have in any case become more acute, as the deadline of 2030 is approaching. Before going into some details, I would like to reiterate my thanks to all members of the Atlantic Corridor Forum and Working Groups, to the Atlantic Rail Freight Corridor and to our consultants. Their input and contributions continued to be very valuable and I look forward to the pursuit of our collective work in the good spirit of collaboration which we have built together.

Infrastructure investment planning

Beyond implementing the Atlantic Project List, updated infrastructure investment planning from the Member States is needed.

In this respect, I am glad to see that the National Investment Program of Portugal for 2020-2030, PNI 2030, lists a number of projects which will contribute to a well-functioning Atlantic Corridor. These include, without being exhaustive: the deployment of an electric recharging network along motorways; the upgrade of the rail line between Porto and Lisboa; the improvement of rail traffic around Lisboa and Porto; a new rail line between Sines and Grandola; the modernisation of the rail line between Lisboa and Évora; a new rail line between Aveiro and Mangualde; the construction of the new airport of Montijo; further upgrade and full deployment of the Logistics Single Window in the Portuguese Ports, the deployment of ITS and C-ITS, etc.

For France, the "Loi d'Orientation des Mobilités", adopted in December 2019, has established a national financial trajectory for major infrastructure projects based on the scenario 2 of the conclusions of the "Conseil d'Orientation des Infrastructures".

For Spain, such an updated planning is expected in 2021 with the preparation of a new Mobility Law, which will follow the existing PITVI 2012-2024, while the Innovation Plan for Transport and Infrastructure 2018-2020 includes the development of a national multimodal transport model for passengers and freight, which will be useful for the planning of the Corridor.

For Germany, the existing Federal Transport Infrastructure Plan for 2030, the BVWP, remains valid.

Once again, this is under the caveat of the covid-crisis which may require adaptations to these plans. Transport infrastructure investments may reveal even more important in that context, in order to re-build growth and jobs.

Challenges

Regarding the projected state of realisation of the Atlantic Corridor by 2030, we are overall well on track, as described under Chapters 2 and 4. This positive outlook does not mean that we do not have challenges, as the on-going and planned projects do need to be implemented and this must happen on schedule. In many cases, this still requires the financial commitment of the Member States and sometimes also specific financing agreements between them, the Regions and the Infrastructure Managers.

Perhaps the most crucial projects on the Corridor are the cross-border sections which still need to be built, or whose capacity still needs to be increased in order to remove or avoid bottlenecks.

On that front, I would like to first underline the rail cross-border connection between Spain and France on the **line Vitoria-Bordeaux**. The TEN-T Regulation foresees on the side of Spain the construction of a network of mixed passengers and freight high-speed lines in the Basque Region and, on the side of France, the construction of a passenger high-speed line, while the existing conventional line would become dedicated to freight. Spain will finish the works up to the border by the end of 2026 (our estimate; the official deadline is still the end of 2023), in standard UIC gauge. However, France postponed its new high-speed line until after 2037. Therefore, I am closely following up the work of the special high-level working group set up in 2018 between France and Spain about their cross-border rail connections, as well as working directly with the French Ministry and SNCF Réseau to plan a renewal and upgrade of the existing conventional line. The objective is to have a fluid and sufficient capacity rail freight connection between Vitoria and Bordeaux when the Y Basque starts operating. That includes the renewal of the platforms, tracks and catenaries, but also the increase of the loading gauge of tunnels and the installation of permanent counter-flow installations where missing. As stated under chapter 2.3, the planning of these investments by the Member State and its infrastructure manager should be made according to the need to carry out these works and to significantly increase rail freight traffic. That also includes the implementation of rolling motorways services, which will be possible after the loading gauge of tunnels and the long-distance capacity offer are increased.

Secondly, I would also like to underline the cross-border connection between Portugal and Spain on the **line Lisboa-Madrid**, which needs a section still under construction on the side of Portugal and a new high-speed line partly under construction on the side of Spain. I am working with the two Ministries and the relevant stakeholders to get that connection realised by the end of 2030. In that context, I supported the adoption, with the approval of both Member States, of a Commission's Implementing Decision[20] for the cross-border section Évora-Mérida.

The Atlantic Corridor also has to manage the issue of the **Iberian gauge**. I am working very closely with Spain and Portugal, directly and via AVEP, to ensure the interoperability of their cross-border connections and the gradual upgrade of their lines to the standard UIC gauge (directly via new tracks or via polyvalent sleepers or third rails), under the caveat of the development of variable axle gauge rolling stock, which may help avoiding some changes of track gauge.

Another element which I would like to see given priority to, which is not covered by the TEN-T Regulation, is the infrastructure needs for the new **rolling motorway services expected between Vitoria and Lille**. Such needs include the enlargement of tunnels for trains carrying semi-trailers. Around ten tunnels in France, between Poitiers and Hendaye, and some in Spain are concerned.

The above challenges are about infrastructure. But in order to achieve a sizable modal shift from road to rail on the Corridor, the **administrative and operational barriers for rail** also need to be addressed. Even though those are not covered in the TEN-T Regulation, I would like them to become priorities for the Member States and the Regions on the Corridor. Amongst the necessary measures are: guaranteed capacity bandwidths available for the annual timetable, especially for international long distance traffic crossing France; English training for staff involved in international traffic; mutual acceptance or

20 https://ec.europa.eu/transport/sites/transport/files/c_2018_2356_f1_commission_implementing_decision_v2_p1_972036_en.pdf

harmonisation of rear tail plates; real-time train composition directly readable in the Train Information System (TIS) tool provided by RailNetEurope; coordination of temporary capacity restrictions to detect and solve conflicts in order to provide sufficient and effective international long-distance capacity requested by the market, etc.

Another element crucial for rail is the **need to invest into appropriate rolling stock**. This includes bi-tension and bi-signalling locomotives (like, for example, 25000V & 3000V for traffic between Spain and Portugal; 25000V & 15000V for traffic between France and Germany; ERTMS2 & KVB or AFSA for traffic between France and Spain), as well as variable axle gauge wagons for international rail freight traffic between the Iberian Peninsula and the rest of Europe.

Net, I would like to make a clear call to all four Member States to look beyond the mere requirements of the TEN-T Regulation – which is being reviewed and will likely be revised – at also the above elements and to make the related planning, financial and political commitments. Only that way will we achieve an increase of rail traffic, especially long-distance, and a sizable modal shift from road to rail, leading to reduced congestion, increased safety and especially lower emissions. This is even more necessary now, with increasing international trade flows and with the development of technologies that could give further economic advantages to road, such as autonomous platooning trucks.

As of 2021

I would like to underline a few changes which will take place as of January 2021.

First, we will soon be including in our analysis, and we will include in the next Work Plan, the projects related to the **extensions of the Corridor per 1 January 2021**. Indeed, the Corridors have been adapted, notably in view of a better connectivity of the core ports, increased focus on inland waterways, increased focus on cross-border connections and better alignment with the Rail Freight Corridors. Following the preliminary adoption of the CEF2 Regulation by the Council and the European Parliament, the Atlantic Corridor will experience a substantial increase as of 1 January 2021. With its new alignment, the maritime dimension of the Corridor will become even clearer as the number of maritime core ports will rise from eight to 17[21], also as a consequence of Brexit. Besides these additional ports and new rail extensions, the Atlantic Corridor will also include the Douro River and the Guadalquivir River. The new alignment of the Corridor will be as follows, with Ireland included as a fifth (new) Member State:

[21] Additional ports will be Gijón, A Coruna, Huelva, Gran Canaria, Tenerife, Nantes Ste Nazaire, Cork, Dublin and Shanon Foys.

Figure 19: Future alignment of the Atlantic Corridor following new extensions as of 2021

Another change as of 2021 will be the addition of a **military envelope** to CEF2, under which the European Commission will fund transport infrastructure built or upgraded for military purposes and also useful for civilian transport (so-called "dual uses"). We will also analyse what could be the impacts of this for the Atlantic Corridor.

Yet another change is the fact that the **CEF2 for 2021-2027** includes a few positive evolutions compared to the current CEF: more focus on the modernisation of existing infrastructure to better tackle the challenges of decarbonisation and digitalisation and support the transition to smart, sustainable, inclusive, safe and secure mobility (this priority will receive 40% of the general envelope and 15% of the cohesion envelope); simplified maximum co-funding rates; top-up for actions implemented by integrated management structures; a closer link between the selection of projects and the Corridors' priorities. There is no doubt that the revised MFF in the context of the covid crisis will bring further important changes.

Last, January 2021 will normally mark the start of the Brexit with the agreement that is being negotiated. This will represent both challenges and opportunities, one of which being the extension of the Atlantic Corridor to Ireland. It is premature to anticipate all the impacts, but there will for sure be a number of them.

Financing

I would not be complete if I would not briefly elaborate on an important topic, financing, on which I am working with my colleague Prof. Bodewig. We are making recommendations to the European Commission, the Member States and project promoters to attract more private/commercial financing to the TEN-T projects. We produced a few related documents, of which the last one was published in September 2019[22]. To summarize our recommendations in a few sentences:

- We believe that the European Commission should continue to improve its support instruments, be it the Connecting Europe Facility, InvestEU or the European Structural and Investment Funds. It must leverage the review of the TEN-T Regulation to reflect the latest state of the infrastructure investment needs and provide stability until the end of 2030. Likewise, it must also give stability to its financial instruments through a strong InvestEU.
- Secondly, we believe that Member States and other project promoters need to further increase the level of preparedness of project proposals especially in terms of the financial and business plans and to better address the expectations of potential investors, i.e. make the projects bankable by meeting specific criteria which we outlined in our last paper. Member States should also play a bigger role in terms of advisory services and the internalisation of both negative and positive externalities. Internalising also positive externalities is very much needed to make a number of strategically important projects more attractive, i.e. profitable for banks, other institutions and private investors. This is certainly the case of rail, for example.
- Thirdly, we believe that all actors involved, including investors themselves, should reflect on how to improve the EU's granting system so that all bankable projects reach and are taken up by the market while only the ones which absolutely need a grant or a grant component benefit from EU grant instruments. A possible route to look into is that of an auction mechanism to receive a grant: the beneficiary would be willing to increase its purchase price of the grant only up to the amount it truly needs. Another interesting route is the one already applied in blending calls, i.e. offering grants based on the financing gap, which could be individualised by sector or type of projects with the help of the financial market's actors.

[22] https://ec.europa.eu/transport/sites/transport/files/2019-09-cbs3-report.pdf.

Financing is going to be a major topic for the next few months, and probably years, in the context of the covid crisis. After the initial relief measures, it is and will be important that the Member States and the EU make well-chosen and effective decisions to support the economy and the re-building of growth and jobs. I am convinced that infrastructure investments, such as in transport, have a key role to play in that respect. More flexibility in the EU rules related amongst others to the Stability and Growth Pact and to state aids will certainly be needed. I will be happy to contribute further to this topic with my colleagues European Coordinators.

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Annexes and useful links

available at https://ec.europa.eu/transport/themes/infrastructure/downloads_en

and https://ec.europa.eu/transport/themes/infrastructure/atlantic_en

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