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Baltic Adriatic

Third Work Plan of the European Coordinator

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Mobility and Transport

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List of acronyms and abbreviations

AB	Allocation Bodies
AC	Alternating current
Alpine Crossings	Semmering base tunnel and Koralm railway line and tunnel in Austria
Art.	Article
ASFINAG	Autobahnen- und Schnellstraßen-Finanzierungs-Aktiengesellschaft/Motorway and Highway Infrastructure Manager
AT	Austria
BAC	Baltic-Adriatic Corridor
CAPEX	Capital expenditures
CBA	Cost Benefit Analysis
CBS	Christophersen-Bodewig-Secchi Report
CCS	Command and Control System
CEF	Connecting Europe Facility
CEMT	Conférence Européenne des Ministres des Transports/ European Conference of Ministries of Transport
CF	Cohesion Fund
CIS	Charging Information System
CNC	Core Network Corridor
CNG	Compressed Natural Gas
CO^2	Carbon Dioxide
CZ	Czech Republic
DARS	Družba za avtoceste v Republiki Sloveniji/ Motorway Infrastructure Manager
DC	Direct current
DG MOVE	Directorate-General for Mobility and Transport
DG REGIO	Directorate-General for Regional and Urban Policy
EC	European Commission
EEIG	European Economic Interest Grouping
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EFSI	European Fund for Strategic Investment
ENI	European Neighbourhood Instrument
ERDF	European Regional Development Fund
ERTMS	European Rail Traffic Management System
ERTMS EDP	European Rail Traffic Management System European Deployment Plan
ESIF	European Structural and Investments Fund
ETCS	European Train Control System
EU	European Union
EV	Electric Vehicle
GDDKiA	Generalna Dyrekcja Dróg Krajowych i Autostrad/ Motorway and Highway Infrastructure Manager
GHG	Greenhouse Gases

Hz	Hertz
ICT	Information Communication Technologies
IM	Infrastructure Manager
INEA	Innovation and Networks Executive Agency
IPA	Instrument for Pre-Accession
IT	Italy
IT (tools)	Information Technology (tools)
ITS	Intelligent Transport System
JASPERS	Joint Assistance in Supporting Projects in European Regions
KPI	Key Performance Indicator
LNG	Liquefied Natural Gas
MoS	Motorways of the Sea
MS	Member State
OPEX	Operating expenses
PAX	Passengers
PCS	Path Coordination System
PKP PLK SA	PKP Polskie Linie Kolejowe S.A./Railway Infrastructure Manager
PL	Poland
PRM	Persons with reduced mobility
REG.	Regulation
RFC	Rail Freight Corridor
RFC5	Baltic-Adriatic Rail Freight Corridor
RIS	River Information Services
RNE	RailNetEurope
Ro-La	Rolling Highway/Rolling Road
RP	Rail Policy
RRT	Rail-Road Terminal
RU	Railway Undertaking
SDM	Sesar Deployment Manager
SEA	Strategic Environmental Assessment
SESAR	Single European Sky ATM Research
SI	Slovenia
SK	Slovakia
SŽDC	Správa železniční dopravní cesty/Railway Infrastructure Manager
TAF-TSI	Telematics Applications for Freight Service – Technical Specifications for Interoperability
TCC	Traffic Control Centres
TCCCom	Traffic Control Centres Communication
TEN-T	Trans-European Transport Network
TIS	Train Information System
VTMIS	Vessel Traffic Management and Information System
WG PM&O	Performance Management and Operations Working Group
WP	Work Plan
ŽSR	Železnice Slovenskej republiky/Railway Infrastructure Manager

1. Towards the third Baltic-Adriatic corridor work plan

Around four years ago, in March 2014, I have been given the mandate as European Coordinator for the Baltic-Adriatic Corridor in accordance with the stipulations of Regulation (EU) 1315/2013 which establishes the Union guidelines for the development of the trans-European transport network (TEN-T). The Baltic-Adriatic Corridor links major nodes (urban nodes, ports, airports and other transport terminals) through key rail, road, maritime and air transport connections from North to South, i.e. from Poland through the Czech Republic, Slovakia, Austria to Italy and Slovenia. By implementing the Baltic-Adriatic axis, new traffic flows between the Baltic and Adriatic ports and their hinterland are being developed and the ports as start and end point of the corridor are being boosted. Such a reinforced network in Central Europe significantly strengthens the infrastructural basis for efficient, safe and high-quality multimodal transport chains for freight and passengers.

Looking back at the past four years of my mandate as European Coordinator, I can conclude that I am very grateful that I was given this important task to assist the Member States in shaping an integrated and modern transport network and extremely proud of the "corridor spirit" that we have jointly established. All together, we have made considerable progress along our corridor. Each Member State, in close cooperation with the respective infrastructure managers, has been continuously and strongly engaged to develop and realise the necessary infrastructure projects and investments along our corridor. This strong engagement is for instance reflected in an increased compliance of our corridor infrastructure with the TEN-T standards that are laid down in Regulation (EU) 1315/2013. In addition, a number of the identified critical issues are already adequately addressed and incorporated in the investment plans. Out of the 76.9 € billion that have been programmed as investments for the realisation of our corridor infrastructure, 35.2 € billion have been earmarked for our corridor work plan priorities; and 87 projects of an investment volume of 6.6 € billion have already been completed.

Moreover, we have been very successful with regard to the use of funds allocated under the Connecting Europe Facility (CEF), especially considering the extremely high competition in and oversubscription of the calls. In the first three series of calls for proposals of 2014, 2015 and 2016, we managed to receive over 2 € billion of co-funding for a total investment of over 3 € billion for 68 corridor projects/investments. We have to further build upon these strong achievements and follow-up on the sound implementation of these co-financed projects in order to ensure that the committed funds are efficiently used.

I like to sincerely thank Member States, infrastructure managers and all other involved stakeholders for their strong engagement and commitment, not only operationally but also financially. I wish to continue being a close partner for you in this task and to assure a very close follow-up of the investments.

Although a sound project pipeline has been developed and important investments have been realised, there is however still a lot that remains to be done to ensure the full completion of our Baltic-Adriatic Corridor by 2030. The present corridor work plan thereby acts as a solid analytical and political basis for building a strong case for future strategic and investment decisions along our corridor for all parties involved. It constitutes a concrete technical and financial basis for the development and realisation of the Baltic-Adriatic Corridor in terms of defining inter alia the critical issues and overall investment needs.

The present third corridor work plan is the outcome of an intensive consultation and participation process and a sound corridor analysis which has been further refined and updated with reference to the preceding two work plans, which were adopted by all the six Member States concerned in May 2015 and December 2016 respectively.

A high number of meetings and dialogues have brought us to the present results. Indeed, during 11 Corridor Forum meetings we have discussed the corridor analysis and priorities in an increasing round of stakeholders, including representatives of Member States, railway and road infrastructure managers, ports, airports, rail-road terminals, the Baltic-Adriatic Rail Freight Corridor (RFC 5), regions, urban nodes and also the four macro-regional strategies crossed by our corridor. This rich exchange helped me in shaping the analysis and the priorities of the present corridor work plan. In addition, I organised four cross-border dialogues for all our critical cross-border sections which led to a better understanding of the problems on each side of the respective border and a further intensification of bilateral and trilateral agreements for the removal of the cross-border bottlenecks. I also chaired three working group meetings of the 'Ports and Rail-Road Terminals' and three working group meetings of the 'Regions, urban nodes and macro-regions', some of which have been organised jointly with my fellow Coordinators of interconnected corridors. I pursued all my contacts at Ministerial level, regional and local level, including political decision makers, the CEOs of the infrastructure managers both for rail and road, all port authorities and private industry and civil society stakeholders during a high number of bilateral meetings on more than 50 missions.

In addition, I strived for a strong cooperation with the Baltic-Adriatic Rail Freight Corridor. In operation since November 2015, it has already made major steps forward with regard to the management of their operations, the set-up of a one-stop-shop service, the analysis of operational bottlenecks and many other measures. I very much appreciate the very good cooperation between our core network corridor and this Rail Freight Corridor and wish to further build on this. For instance, their preliminary results of operational bottlenecks have been included in the present corridor work plan. This is a very good start to combine our efforts of investing in the hard infrastructure and of accompanying this by removing adequately all operational bottlenecks.

All these activities, led by a unique and innovative corridor governance approach combining bottom-up and top-down mechanisms, brought our "corridor family" much closer and reinforced mutual exchanges and trust between all actors committed to the realisation of our Baltic-Adriatic Corridor. I am very proud to be part of this family as European Coordinator. I thank Member States and all other involved parties for the strong and continuous support given to me and the very constructive and harmonious atmosphere during our meetings which comforts me in my conviction that this Baltic-Adriatic Corridor is on a good way and indeed much more than ‘hard’ infrastructure.

Our close cooperation and dialogue was continuously backed by a very sound corridor analysis, which was undertaken by the corridor consultants team around tplan consulting (IT, PL) and their subcontractors Paradigma (AT), NDCON (CZ, SK) and the University of Maribor (SI). Thanks to their strong and continuous efforts, we have gained a very detailed overview of the state of compliance of our corridor infrastructure with the TEN-T requirements. The transport market study analysed the socio-economic situation of our corridor as well as its transport flows. We have a clear picture of the investment needs on the corridor for all transport modes to reach the EU targets by 2030. Closely linked to this, we can base our work on a very solid project pipeline with the definition of a corridor project list that offers a comprehensive picture of the individual projects and measures planned to be realised by 2030, including their detailed timing, financial requirements and funding sources. This allowed us to assess where projects stand in terms of maturity and financing. For the first time, we have now with this third corridor work plan also a concrete view on the impact of our corridor investments on the "wider elements" that relate to our policy objectives, namely the corridor's potential for innovation deployment, climate change adaptation and decarbonisation as well as the expected impact of the corridor infrastructure investments on jobs and economic growth. The consultants have worked very hard in setting this common ground for our discussions. I would like to present them my very special thanks for their high-quality work and for the excellent collaboration throughout the past four years.

I also wish to sincerely thank my corridor support and advisory team, composed of different services of the European Commission (notably DG MOVE, INEA, DG REGIO) and the European Investment Bank, which are actively supporting me in my tasks as European Coordinator.

I trust that the present work plan in its second update is another important step to enable the corridor to become reality, not only by connecting North and South, but by generating growth along the corridor and its adjacent areas. It provides us with a common vision of the corridor and thus represents the basis for continuing the development and implementation of the corridor investments which are needed to develop a fully functional Baltic-Adriatic Corridor.

For me, a fully functional Baltic-Adriatic Corridor is thereby more than a functional hard infrastructure. My vision of the Baltic-Adriatic Corridor is that this corridor turns into a corridor of sustainable and socio-economic growth. I wish that this corridor becomes a key development zone and that it plays an important role as one of the main drivers of economic development in Central Europe. Preliminary estimates point to an overall creation of about 1.4 million job-years generated by the volume of ongoing and planned investments currently identified for the development of corridor by 2030. This is a very strong additional selling point to continue investing in our corridor infrastructure.

My vision of this corridor is also based on its sustainable dimension, giving clear preference to greener transport modes and fostering a shift from road to rail. Moreover, this corridor needs to be seen far beyond the pure transport links across borders. It needs to be well embedded into national and regional development strategies as to maximize the positive influence of its transport infrastructure on other social and economic sectors. We thus need to come from a regional and national planning perspective to a real corridor perspective.

Our challenge will be to turn this ambition into reality and to turn the Baltic-Adriatic Corridor into a living environment. In order to reach this ambitious goal, a strong cooperation of all relevant stakeholders at all levels of intervention is needed. I am very pleased that we have with the Baltic-Adriatic axis a corridor with a long history of interregional cooperation on which we can base our activities. This constitutes an important competitive advantage.

In a nutshell, the Baltic-Adriatic corridor activities of the past four years have enabled us to come to a powerful "Acquis Corridor". This is a great momentum and chance to realise what has been worked upon in the past years. I invite you to closely cooperate with me and to assume a vital role in implementing this work plan. The process is not over with the submission of this third work plan; it is instead the continuation of an interesting path that I would like to go together with you. Together we can create the conditions for growth and prosperity, driving competitiveness for everyone in Europe to the benefit of citizens and businesses by setting up a real European transport network with high standards on the Baltic-Adriatic core network corridor that can face the challenges of today's economy and environment. The joint interest of all Member States and relevant stakeholders involved is the crucial driving force behind the work plan. I thus count on and thank you for your continuous engagement!

2. Characteristics of the Baltic-Adriatic Corridor

2.1. From the Polish to the Adriatic ports – corridor alignment

The alignment and infrastructure of the Baltic-Adriatic core network corridor are legally defined by Regulations (EU) 1315/2013 and 1316/2013. Crossing six Member States (Poland, Czech Republic, Slovakia, Austria, Italy and Slovenia), the corridor connects the Baltic ports of Gdynia/Gdańsk and Szczecin/Świnoujście with the following ports in the Adriatic basin: Sistema Portuale del Mare Adriatico Orientale – Porto di Trieste (hereinafter Port of Trieste), Sistema Portuale del Mare Adriatico Settentrionale – Porti di Venezia e Chioggia (hereinafter Port of Venezia), Sistema Portuale del Mare Adriatico Centro-Settentrionale – Porto di Ravenna (hereinafter – Port of Ravenna) and the Port of Koper.

Figure 1: Alignment of the Baltic-Adriatic Corridor

Source: Baltic-Adriatic corridor study consortium

The 1,800 km long Baltic-Adriatic Corridor allows for several itineraries between the Baltic and Adriatic basins: from North to South, either starting in the ports of Szczecin and Świnoujście, via Poznan and Wrocław, or in the ports of Gdynia and Gdańsk directly to Katowice or through Warszawa and Łódź, the corridor interconnects the Polish core urban and logistics nodes to the ones located in the Czech Republic, Slovakia and Austria, reaching Wien through Bratislava or Ostrava. The corridor road and rail links continue from Austria towards the Adriatic ports of Koper, Trieste, Venezia and Ravenna via Ljubljana in Slovenia or via Udine, also passing through Venezia and Bologna in Italy.

The corridor encompasses a total of 13 urban nodes and airports, 10 ports and 24 rail-road terminals in operation. The backbone of the Baltic-Adriatic axis is based on railway and road routes. Indeed, it is the only corridor that does not include inland waterways, even though the corridor interconnects with the inland waterway TEN-T core network at various sections. Its railway network corresponds mostly to the Baltic-Adriatic Rail Freight Corridor.

This corridor has intersections with five other corridors. In Poland, the corridor is crossed by the North-Sea Baltic Corridor in West-East direction and in the Czech Republic, Austria and Slovakia by the Orient-East Med and Rhine-Danube Corridors. Further South – in Italy and Slovenia – the corridor runs for large parts parallel to the Mediterranean Corridor. Finally, there is one intersection with the Scandinavian-Mediterranean Corridor between Bologna and Faenza along the Bologna – Ravenna rail itinerary, also including the Bologna urban and logistics nodes.

2.2. Compliance with the technical infrastructure parameters of the TEN-T guidelines in 2017

The TEN-T Regulation (EU) 1315/2013 sets a clear basis for action. General objectives and priorities for the development of the core network corridors are defined in Articles 4 and 10 which include *cohesion development targets* such as ensuring enhanced accessibility, reducing infrastructure quality gaps between Member States, developing interconnection of long-distance, regional and local traffic flows and optimal integration of the transport modes; *efficiency objectives* like bridging missing links and removing bottlenecks, particularly in cross-border sections, promoting interoperability within transport modes; supporting the efficient and sustainable use of the infrastructure and, where necessary, increasing capacity. *Sustainability and users' benefits related targets* are also foreseen to increase the quality of the infrastructure in terms of safety, security, efficiency, climate change and, where appropriate, disaster resilience, environmental performance, social conditions, accessibility for all users (including persons with reduced mobility – PRM); as well as to improve the quality of the services and ensure continuity of traffic flows, implement and deploy telematics applications and promotion of innovative technological development.

Furthermore, ambitious transport infrastructure requirements have been defined for the core network which have to be achieved by 2030. With respect to these standards, Key Performance Indicators (KPIs) have been defined for the nine core network corridors as part of the 2015-2017 core network corridor studies, in order to measure the status and set the targets for the development of the corridors. The supply side KPIs values for the Baltic-Adriatic Corridor are presented in Table 1 for all transport modes, which include the baseline year at 2013, the updated indicator at 2015 and 2017 as well as the target for 2030.

Improvements have been made since 2013, in particular with regard to rail transport. ERTMS technology has been installed on several sections of the corridor in Poland, Czech Republic, Slovakia, Austria and particularly Slovenia. Works for the modernisation of the network in Poland, Czech Republic, Slovakia and Slovenia contributed to the increase of the parameters for freight transport, namely speed (PL, CZ, SI), axle load (PL, SI) and train length (PL, SK, SI). An increase of the corridor KPIs for road transport is also noticeable due to completion of works in Poland and in Slovakia.

Table 1: Supply-side Key Performance Indicators for the Baltic-Adriatic Corridor (2013 to 2017)

Mode	Objectives	Passenger / Freight	KPI	Unit	2013	2015	2017#	2017 vs 2013	2030
Rail network	Cohesion	P/F	**Electrification**	%	99%	99%	99%	(=)	100%
	Cohesion	P/F	**Track gauge 1435mm**	%	100%	100%	100%	(=)	100%
	Cohesion/ Efficiency	P/F	**ERTMS implementation**	%	0%	7%	17%	(+)	100%
	Cohesion	F	**Line speed (>=100km/h)**	%	69%	71%	72%	(+)	100%
	Cohesion	F	**Axle load (>=22.5t)**	%	89%	92%	93%	(+)	100%
	Cohesion	F	**Train length (740m)**	%	16%	29%	29%	(+)	100%
Road network	Cohesion	P/F	**Express road/ motorway**	%	81%	82%	84%	(+)	100%
	Sustainability	P/F	**Availability of alternative clean fuels**	No.	*n.a.*	*n.a.*	*n.a.*		n.a.
Airports	Cohesion/ Efficiency	P/F	**Connection to rail by 2050 (Warszawa, Wien)**	%	100%	100%	100%	(=)	100%
	Efficiency	P/F	**Open accessibility to at least one terminal ***	%	*n.a.*	100%	100%		100%
		P/F	**Availability of alternative clean fuels**	%	*n.a.*	0%	0%		100%
Seaports	Cohesion/ Efficiency	F	**Connection to rail**	%	100%	100%	100%	(=)	100%
	Cohesion/ Efficiency	F	**Connection to IWW CEMT IV (5 Seaports connected to IWW)**	%	*n.a.*	100%	100%		100%
	Sustainability	F	**Availability of alternative clean fuels**	%	0%	0%	0%	(=)	100%
	Efficiency	F	**Open accessibility to at least one terminal ***	%	*n.a.*	100%	100%		100%
	Sustainability	P/F	**Facilities for ship generated waste**	%	*n.a.*	63%	63%		100%
Inland ports	Cohesion/ Efficiency	F	**Class IV waterway connection**	%	100%	100%	100%	(=)	100%
	Cohesion/ Efficiency	F	**Connection to rail**	%	100%	100%	100%	(=)	100%

Mode	Objectives	Passenger / Freight	KPI	Unit	2013	2015	2017#	2017 vs 2013	2030
Rail-Road Terminals (RRT)	Sustainability	F	**Availability of alternative clean fuels**	%	*n.a.*	0%	0%		100%
	Efficiency	F	**Open accessibility to at least one terminal ***	%	*n.a.*	100%	100%		100%
	Cohesion/ Efficiency	F	**Capability for Intermodal (unitised) transhipment**	%	*n.a.*	100%	100%		100%
	Cohesion/ Efficiency	F	**740m train terminal accessibility**	%	*n.a.*	38%	38%		100%
	Cohesion	F	**Electrified train terminal accessibility**	%	*n.a.*	75%	75%		100%
	Efficiency	F	**Open accessibility to at least one terminal ***	%	*n.a.*	42%	42%		100%

*Source: Baltic-Adriatic corridor study consortium; Notes: the elaboration of the KPIs of the rail and road networks is based on the sections encoded in the TENtec database as of 2014, corresponding to a total length of the corridor links of the rail network of 4,287 km, of which 3,740 km classified as freight or mixed passengers and freight railway lines; and 3,611 km of roads. # Status at November 2017. * Availability of one terminal open to all operators and application of transparent charges*

A deviation analysis by comparing the current infrastructure parameters with the target values set in Art. 39 of Regulation (EU) 1315/2013 for the core network infrastructure has been undertaken in the 2014 corridor study. As part of the ongoing 2015-2017 study the above exercise has been updated and complemented by means of a review of the corridor infrastructure and operation with respect to the requirements set in Chapter II of Regulation (EU) 1315/2013. The updated analysis shows the following results which give clear guidance for action on the Baltic-Adriatic Corridor.

Rail

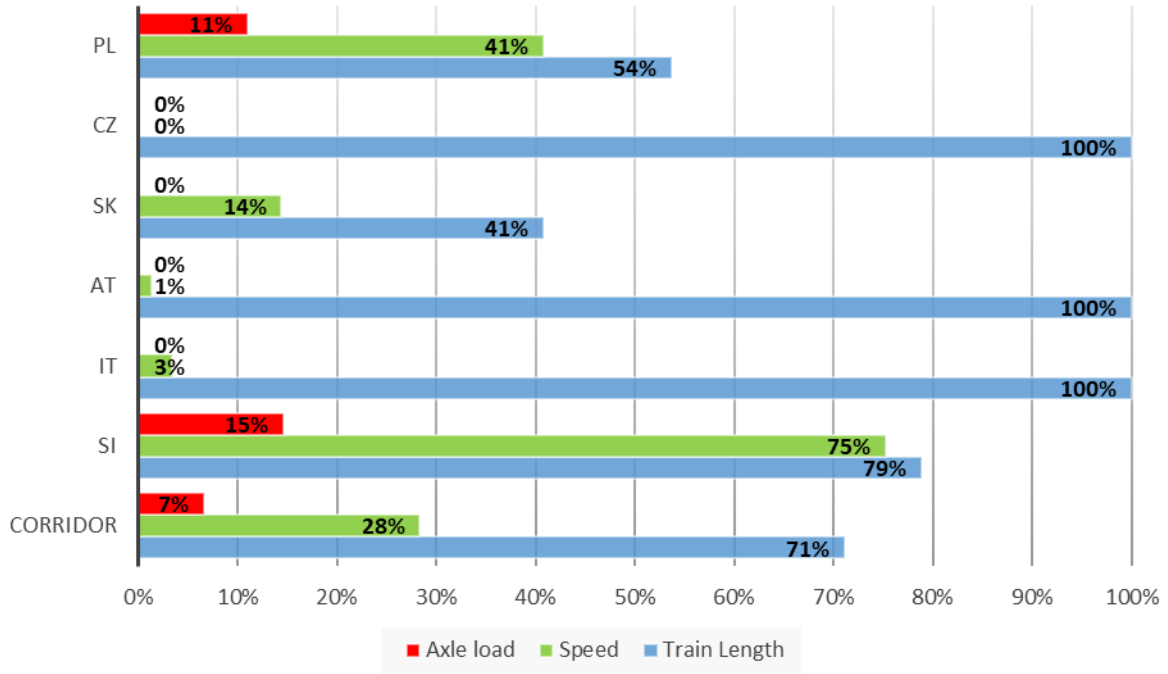
The Baltic-Adriatic Corridor includes 4,285 km of 1435 mm standard gauge railway infrastructure. The corridor railway infrastructure is already continuous and in operation with only the exception of the two sections in Austria (Koralmbahn line section Wettmannstätten – Grafenstein within the wider section Graz – Klagenfurt and Semmering Base Tunnel Gloggnitz – Mürzzuschlag).

As regards **electrification**, with reference to passenger, freight and mixed use lines, the railway infrastructure along the corridor is also almost entirely electrified with the exception of diesel passenger sections at the cross-border railway line between Bratislava and Wien. In this regard it is however noticed that three different power systems are in use: AC 15 kV 16.7 Hz (Austria), AC 25 kV 50 Hz (Czech Republic and Slovakia) and DC 3 kV (Poland, Czech Republic, Slovakia, Italy, Slovenia). Those differences in traction (electrification and power systems) constitute an obstacle for interoperability on the corridor which can only be particularly mitigated by the use of multi-traction locomotives.

Figure 2 summarises the outline in percentage (over the national sections of the corridor) and absolute km values of the non-compliant infrastructure with reference to main compliance parameters related to the rail freight infrastructure of the Baltic-Adriatic Corridor:

- ***Axle load*** – The corridor is mostly compliant with the Regulation (22.5 t). There are however some corridor sections (7% of the total corridor railway infrastructure) that are not at standard yet, in Poland (some sections on the lines Katowice – Czechowice-Dziedzice – Zwardoń, Wrocław – Jelcz – Opole) and Slovenia (some sections between Zidani Most – Šentilj, where studies and works are currently ongoing).
- ***Line speed*** – 28% of the Baltic-Adriatic Corridor is also not at standard with relevant bottlenecks particularly affecting the Polish and Slovenian networks which call for infrastructure modernisation. In greater detail, over 840 km of the Polish railway lines (about 20% of the total corridor railway infrastructure) and 270 km of Slovenian railway lines would need to be upgraded to meet the requirement set in the Regulation with respect to the line speed for freight trains (100 km/h).
- ***Train length*** – The maximum permitted length of trains is on most sections of the corridor shorter than the 740 meters required by the Regulation. The prevailing maximum train length along the corridor is around 600 m, but more severe restrictions exist on specific sections.

Figure 2: Extent of the non-compliant rail freight infrastructure in km and % of the total length (2017)



Source: Baltic-Adriatic corridor study consortium, elaboration based on the sections encoded in the TENtec database as of 2014, corresponding to a total length of the corridor links classified as freight or mixed passengers and freight railway lines, equal to 3,740 km; Data refers to November 2017

ERTMS deployment is progressing and by 2017 the ERTMS related technology was available on 17% of the corridor sections. In Poland ETCS level 1 is available on subsections between Grodzisk Mazowiecki and Zawiercie. In Austria ERTMS (ETCS Level 2) is available on the subsections connecting Bernhardsthal to Wien's main station. In Slovakia, thanks to the recent completion of works on sections Žilina - Považská Teplá and Trenčianská Teplá – Zlatovce, the system (ETCS Level 1) is currently in operation

between Žilina and Považská Tepla and between Púchov and Svätý Jur. ERTMS (ETCS Level 2) is also installed on the Žilina – Čadca railway line. In Slovenia all sections except Pragersko – Maribor – Šentilj / Spielfeld-Strass (border AT / SI) are equipped with ERTMS (ETCS Level 1). Albeit not yet in use, the system is also under implementation in the Czech Republic and Italy.

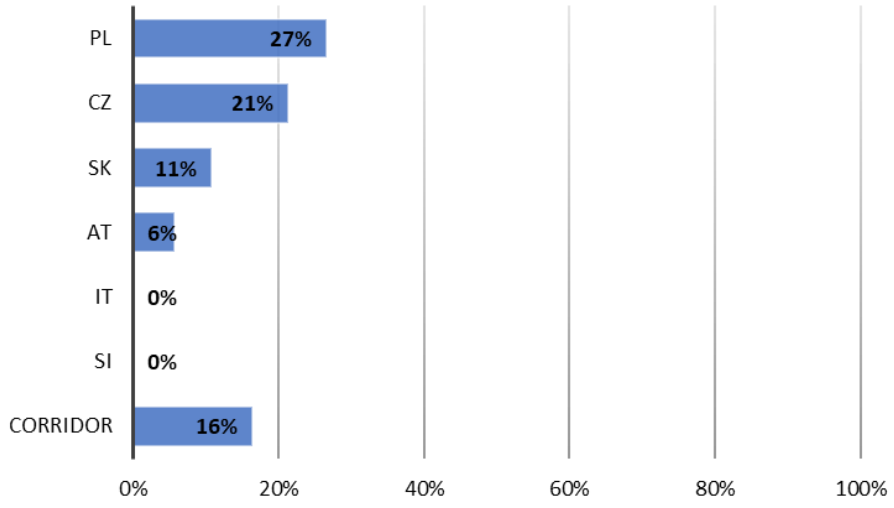
Overall the compliance is mostly lagging behind for the ERTMS, line speed and train length parameters. Issues with the technical required standards for freight on the main sections of the railway infrastructure are specifically present in Poland and Slovenia and at the cross-border sections between Poland and Czech Republic, Poland and Slovakia, Slovakia and Austria, Austria and Slovenia, Italy and Slovenia.

Along the corridor, stations and junctions are generally technically adequate in the Czech Republic, Slovakia, Austria and Italy and are gradually undergoing modernisation and upgrading in Poland and Slovenia. Limitations are however identified, particularly regarding speed in Brno (Czech Republic), Žilina (Slovakia), Udine (Italy) and Zidani Most (Slovenia). Issues have been also identified in the rail network, stations and/or junctions on the main lines within core urban nodes: speed restrictions exist in Warszawa, Ostrava, Bratislava and Wien as well as in Gdańsk, Łódź, Katowice, Szczecin, Poznań, Wrocław, and Ljubljana. The network is also not at standard in Łódź and Wrocław, and within the Ljubljana core urban node. 740 meters train operability is possible only in Gdańsk and Szczecin and partially within the Wien urban node. ERTMS is available in Ljubljana and only partially available in Wien; it is not available in the other nodes.

Road

The 3,600 km road infrastructure on the Baltic-Adriatic Corridor is also not entirely compliant with the requirements of the Regulation (EU) 1315/2013, especially with regard to the type of infrastructure (expressway/motorway standard). The situation is particularly relevant for the Polish road network, whereas the corridor infrastructure in Italy and Slovenia is fully compliant. Currently, 16% of the road corridor infrastructure is constituted by ordinary roads which do not comply with the requirements.

Figure 3: Extent of the non-compliant road infrastructure in km and % of the total length (2017)



Source: Baltic-Adriatic corridor study consortium, elaboration based on the sections encoded in the TENtec database as of 2014, corresponding to a total length of the road corridor links of 3,611 km; Data refers to November 2017

Issues with the technical required standards of the main sections of the road infrastructure are also present at cross-border sections between Poland and Slovakia, Czech Republic and Austria. No compliance issues have been identified in core urban nodes where at least one urban motorway/expressway route exists interconnecting between the links outside the node.

Intelligent Transport Systems (ITS) activities are ongoing at the national level with respect to many of the measures foreseen by Directive 2010/40/EU, including the definition and implementation of multiannual strategies. The signature in 2015 of a Memorandum of Understanding between the motorway operators ASFINAG, Autovie Venete and DARS (also involving partners from Croatia and Hungary) is also worth mentioning. The exchange of traffic related data and information is expected to facilitate the harmonisation of traffic management measures and allow the provision of cross-border information services to road users. The European Electronic Toll Collection system – provisions of the Directive 2004/52/EC and subsequent Decision 2009/750/EC – are not yet implemented in the Baltic-Adriatic Corridor Member States.

Alternative clean fuels are available on the corridor road infrastructure. More in detail, electricity is available on several sections of the corridor and in all core urban nodes, including rapid charging stations with nominal power output of more than 40kW in the Czech Republic, Austria, Slovakia and in Slovenia (where electric fuel is considered to be already available on the whole corridor). CNG is available in Poland, Czech Republic, Italy and Slovenia; LPG is available in all Member States. LNG is starting to be available in Poland and in Slovenia (where two stations are already in operation since December 2017 (Ljubljana) and January 2018 (Sežana)), and hydrogen in Austria. Biofuels are available in the Czech Republic. Table 2 provides the results of a study by the European Commission on *Clean Power for Transport Infrastructure Deployment* along the core network corridors, specifying the existing and required facilities to support the development of alternative clean fuels along the road corridor infrastructure.

Table 2: Existing and required clean fuel stations along the Baltic-Adriatic Corridor (2015)

Clean Fuel	Existing	Required Brownfield	Required Greenfield
EV	5	111	10
CNG	10	45	0
LNG	0	26	0
H2	0	52	0

Source: Clean Power for Transport Infrastructure Deployment; Data refers to end of 2015

Ports

Ports represent the main gateways for passengers and especially freight transport to core network corridors. There are ten core ports in operation along the Baltic-Adriatic Corridor: five classified as maritime and inland waterway ports (Szczecin and Świnoujście, Trieste, Venezia and Ravenna), three classified as maritime ports (Gdynia, Gdańsk and Koper) and two inland waterway ports (Wien and Bratislava).

All ports operate passenger and freight services. General cargo, bulk and container services exist at all eight maritime ports as well as Motorway of the Sea (MoS) infrastructure and operations. At these ports, logistics platforms are also already in operation or under development to promote multimodal transport, which include Ro-La services, particularly advanced at the Adriatic Ports.

Regarding the analysis of the compliance of the port infrastructure, all ports have at least one terminal open to all operators in a non-discriminatory way and charges are applied transparently. Facilities for ship generated waste are available at all ports except sewage treatment equipment at Trieste, Venezia and Ravenna. All classified inland waterway ports fulfil the CEMT IV requirement.

All ports are furthermore connected to the road and railway links of the corridor. However, last mile railway and/or road port interconnections issues are present and limit the development in all Baltic-Adriatic corridor seaports. With regard to rail last mile connections, improvements are required to increase the standards of the existing dedicated rail links in terms of electrification, axle load, speed and train length at all maritime ports except Venezia. Improvements of the rail infrastructure within the port areas are also needed in Gdynia, Bratislava and at all Adriatic ports. Improvements to respond to capacity expansion needs in view of future traffic increase are foreseen or already ongoing in Gdynia, Gdańsk and at the Adriatic ports. Due to their location within or in the proximity of urban nodes, measures to reduce/mitigate the impact of rail traffic either at present or in the future are also required in Venezia and Ravenna. As of road, works to increase the standards of the last mile connections are envisaged at the ports on the Baltic Sea and at Koper. The internal road infrastructure requires modernisation/upgrading at all Baltic ports as well as in Bratislava, Venezia, Ravenna and Koper. Improvements to respond to capacity expansion needs in view of future traffic increase are foreseen or already ongoing in the Baltic ports, Venezia and Koper. In Gdynia, Szczecin, Świnoujście, Venezia, Ravenna and Koper solutions to mitigate the impact of road transport on the respective urban areas are also needed.

As of 2017 alternative clean fuels were not available for maritime transport operations at any of the ten corridor ports. LNG fuel is available at the LNG terminal in Świnoujście, where it can be loaded onto road units.

Finally, VTMIS and e-Maritime services are available or under development at the ports, although they are not integrated and fully interoperable at the Union level (RIS deployment is also ongoing).

Airports

There are 13 core airports along the corridor which are all interconnected to the road network (Szczecin, Gdańsk, Poznań, Wrocław, Łódź, Warszawa, Katowice, Ostrava, Bratislava, Wien, Ljubljana, Venezia, Bologna). The two core airports of Wien and Warszawa (Chopin) are already interconnected to the Baltic-Adriatic corridor railway network, which satisfies the requirements of the Regulation. The second Warszawa airport (Modlin) is developing relatively quickly and should therefore be analysed in future. In addition, a rail connection exists for the Szczecin, Gdańsk and Ostrava airports.

The interoperable traffic management system for air traffic is currently under development as part of the ongoing Single European Sky Air Traffic Management Research and Development (SESAR) project, representing the technological pillar of the Single European Sky. Under the political oversight of the European Commission, a SESAR Deployment Manager (SDM) has been set up to develop and submit a Deployment Programme to the European Commission for its approval and execution. The SESAR Deployment Manager coordinates and monitors the realisation of all implementation projects, with the ultimate goal of providing the Union by 2030 with a high performing air traffic management infrastructure. Initiatives are currently planned and ongoing which will develop SESAR in the Member States and airports along the Baltic-Adriatic Corridor.

The analysis on the corridor KPIs shows that alternative clean fuels are not available at airports.

Rail-Road Terminals

24 rail-road terminals are currently in operation in the areas and vicinity of the Baltic-Adriatic corridor core nodes as defined by Regulation (EU) 1315/2013. These are shown in Figure 4 together with the corridor port infrastructure where additional multimodal terminals are located and in operation. A new rail-road terminal – Inzersdorf Wien South – is in operation in the Austrian capital city since January 2017, which will replace the Nordwestbahnhof terminal upon completion of its development. The existing terminal in Žilina is also assumed to be replaced by the new multimodal platform at Žilina Teplička, whose construction has already been completed.

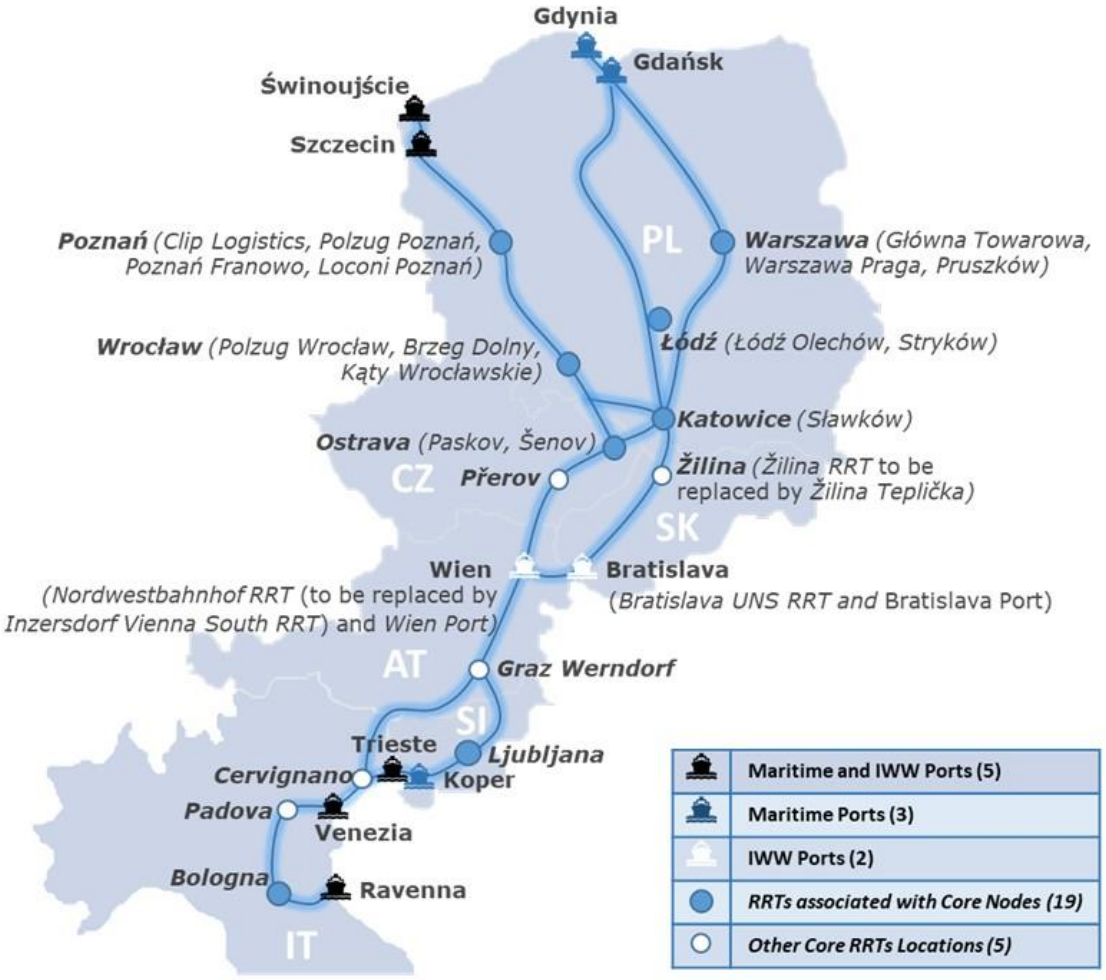
Other rail-road terminals also in operation or under development have been indicated as relevant for the development of multimodal and combined transport either on the corridor or on the core network: 3 rail-road terminals are under development at present in Warszawa (Brwinów), Poznań (Kórnik) and Přerov; other rail-road terminals are in operation, the recently opened Loconi terminals in Warszawa and Łódż (Łódż-Chojny) two terminals in Radomsko and one in Kutno in the Łódz Voivodship, where a new logistic, reloading base and industrial park is also foreseen to be developed to operate the connection Łódź – Chengdu. Additional terminals are present in the Masovian Voivodship (Mława) as well as in the Katowice area (Sosnowiec Południowy, Dąbrowa Górnicza); and in the comprehensive nodes of Gliwice (Gliwice, Śląskie Centrum Logistyki), Bydgoszcz, Brno, Villach-Sud, Rovigo, Maribor. The dry port at Tczew in Poland, in the hinterland of Gdańsk and Gdynia seaports, designed as a fully functional load distributing centre aimed at the integration of the streams of container serviced by both ports, planned for construction by 2021, the Interporto Fernetti near the port of Trieste functioning as hinterland terminal for Ro-La traffic and the Interporto Pordenone on the comprehensive railway line between Udine, Treviso and Venezia, part of the Baltic-Adriatic Rail Freight Corridor, are also worth mentioning.

The 24 rail-road terminals located at the Baltic-Adriatic corridor core nodes are all interconnected to their respective national road and rail networks. With regard to rail interconnections and with respect to the technical compliance of the rail accessibility to terminals, 9 out of 24 rail-road terminals have 740 meters train length accessibility and 18 out of 24 have electrified train terminal accessibility. No specific critical issues have been identified so far that would affect the quality of last mile connections, except capacity constraints at the Poznań railway bypass and Bratislava railway node. Referring to the infrastructure inside the terminals, 5 out of 24 terminals have a maximum length of loading/unloading tracks of minimum 740 meters, 12 terminals do not have electrified rail tracks at terminal. As of road last mile connections, issues have been reported which relate to local urban road accessibility and traffic in Poznań, Warszawa and Wrocław. For the terminals located within seaports and inland waterway ports, similar considerations apply as the ones described for the ports in which they are situated in terms of conditions and issues associated to their accessibility by rail and road.

With regard to the other parameters, all terminals are equipped to handle intermodal units. 10 rail-road terminals declare they have at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges, 14 does not meet this condition or did not confirm.

Regarding sustainable freight transport/innovation, at least six terminals (Warszawa Praga, PCC Brzeg Dolny, Wien Nordwestbahnhof, Padova, Bologna, Ljubljana) are active in the field of green logistics in urban areas for the promotion of low noise and low carbon urban freight delivery, which is becoming of particular relevance due to the increase in e-commerce.

Figure 4: Multimodal Transport Infrastructure

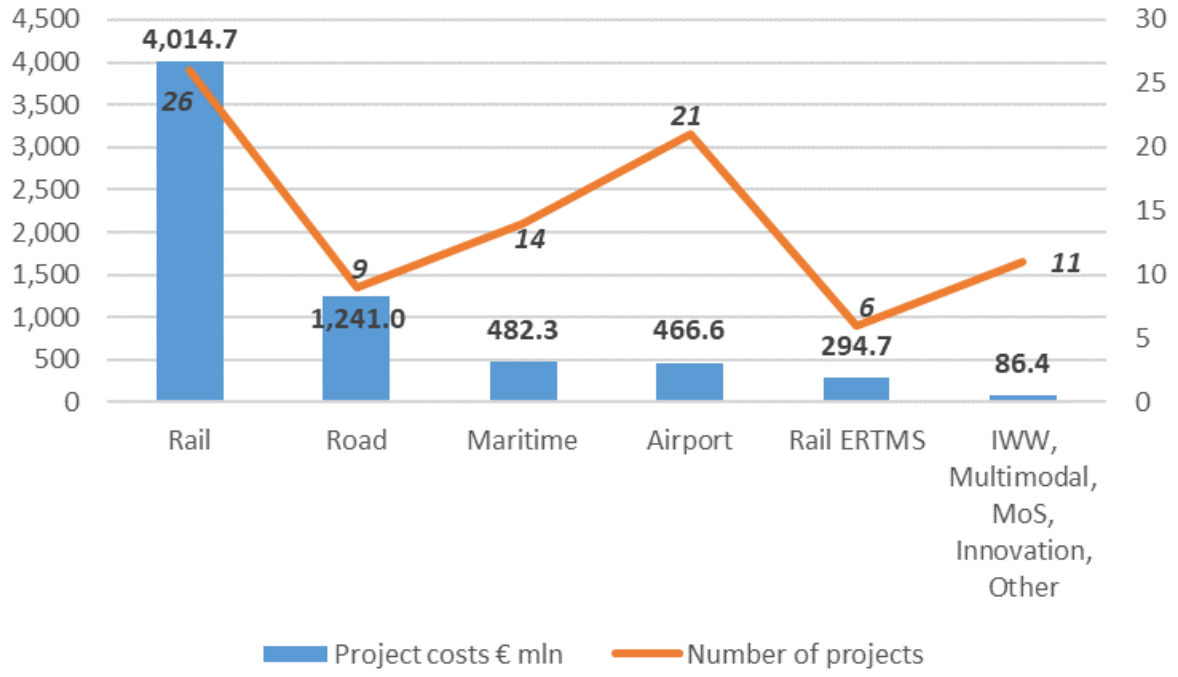


Source: Baltic-Adriatic corridor study consortium

2.3. Progress of corridor development

Remarkable efforts have been made since the inception of the new TEN-T Policy in 2014 for the development of the Baltic-Adriatic Corridor. Nearly 640 investments have been identified by the concerned stakeholders, totalling 83.5 € billion. Activities for the development and implementation of more than 400 projects have already started for about 46 € billion investment costs. Out of these projects 87 projects have been already completed, for an overall budget of 6.6 € billion. Figure 5 provides the main statistics for the completed projects, reflecting their split by mode and budget.

Figure 5: Total number and costs of completed projects by category



Source: Baltic-Adriatic corridor study consortium

Significant steps forward have been made for the development of infrastructure of the Baltic-Adriatic Corridor which relate to all main transport modes: road, maritime, airport and particularly railway transport. Indeed more than one third of the total number of finalised projects and over two thirds of the costs of the completed investments relate to rail and ERTMS deployment initiatives.

The specific objectives for the development of the Baltic-Adriatic Corridor are well addressed by the completed projects. These investments include the preparatory works for the rail cross-border sections between Poland, Czech Republic and Slovakia, and several modernisation works of the national railway lines in Poland, Czech Republic and Slovakia, among which the completion of the Eastern Branch in Poland, namely the E65 national railway section between Gdynia and Warsaw is notable. Furthermore, the list of finalised investments comprises works for the development of the road cross-border section between Katowice and Žilina; studies for the improvement of the last mile connections of the ports in Poland; road last mile connection works at the port of Gdańsk; completion of the reconstruction of the "Stary Most (Old Bridge)" in Bratislava (as part of works for the improvement of the public transport system in the Bratislava core urban node and removal of operational bottlenecks affecting IWW transport along the river Danube); improvement of the existing road infrastructure interconnecting to the port of Trieste; road last mile connection works and rail last mile connection works to the new Ro-Ro terminal Fusina at the Venezia port; and reconstruction of the existing track between Koper and Divača, providing direct access by railway to the port of Koper.

Other relevant concluded projects relate to the completion of the new main railway station in Vienna; construction of the rail-road terminal in Žilina Teplička; expansion of container terminals at the ports of Gdańsk, Gdynia and Vienna; improvement of airport connections in Ostrava and Vienna; enlargement of the airports in Katowice, Łódź, Szczecin, Poznań, Wrocław, Venezia and Bologna; modernisation and upgrading of the corridor road network in Poland, Austria and Italy.

3. Transport market analysis

3.1. Results of the multimodal transport market study

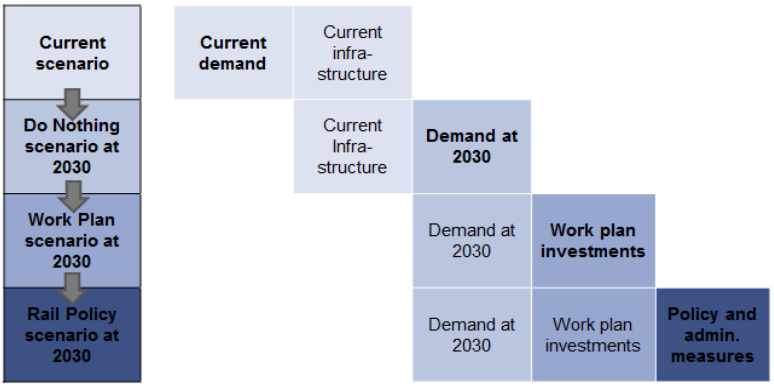
A multimodal transport market study that covers all corridor relevant modes of transport has been elaborated in 2014 and further complemented by the elaboration of market performance indicators and the consideration of the market analysis of the Baltic-Adriatic Rail Freight Corridor as presented in their Implementation Plan. This analysis has been prepared at the threefold purpose of:

- providing a comprehensive view on the current multimodal transport flows on the rail and road corridor infrastructure and at the main interconnecting nodes (maritime and inland ports, airports);
- measuring the current performance of rail and road transport along the corridor and developing a prognosis of its evolution during the time horizon of the corridor work plan (2014-2030), also including the effects of the investments planned to be implemented for the improvement of the corridor;
- supporting the definition of the critical issues for the development of the corridor, complementing the analysis of the compliance and quality of the infrastructure with a view to identifying the possible issues related to the transport infrastructure capacity on the road and rail networks.

Prognosis of the transport market evolution until 2030

Four main scenarios were developed for the prognosis of the rail and road performance, gradually introducing different assumptions on a step-by-step basis, thus allowing for the separate assessment of their effects.

- *2014 (current scenario)* – describing the interaction of the current travel and transport demand and the current corridor infrastructure;
- *2030T (do-nothing scenario at 2030)* – describing the interaction of the travel and transport demand at 2030 with the current corridor infrastructure (as for the 2014 scenario);
- *2030WP (work plan scenario at 2030)* – describing the interaction of the travel and transport demand at 2030 (as for the 2030T scenario) and with the corridor infrastructure improved based on the major rail and road investments planned to be implemented for the development of the corridor;
- *2030RP (rail policy scenario at 2030)* – describing the interaction of the travel and transport demand at 2030 with the corridor investments (as in scenario 2030WP), combined with policy and administrative measures in support of rail transport (such as the internalisation of the total transport costs, the promotion of more attractive rail services, the fourth railway package, the removal of administrative and operational barriers).

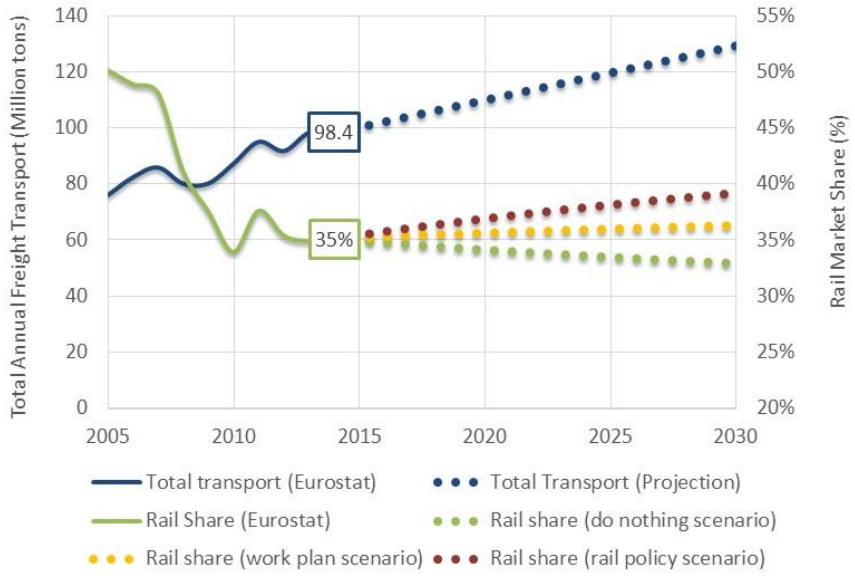


In the interpretation of the results of the transport market study for the corridor, the scope of the study, together with the very large area covered by the analysis and the limitations in the demand and traffic data available, should be kept in mind. Inevitably, significant margins of uncertainty affect the results in terms of absolute values and shares. Notwithstanding these limitations, by comparing the outcomes in the different scenarios and in consideration of the past trends, the analysis provides some clear indications concerning the main trends. Transport performance by mode, the potential effects of the planned rail and road transport investments in combination with policy measures aiming at supporting the use of railway and environmentally friendly transport systems are the most visible.

In what concerns the freight transport, Figure 6 shows the aggregated international transport volumes and modal share along the Baltic-Adriatic Corridor in the last decade and the prognosis for the duration of the work plan:

- Notwithstanding the effect of the economic recession in 2008/2009 and 2012, total transport volumes have significantly increased since 2005 (from 75.8 million tons in 2005 to 98.4 in 2014, +30%, +2.9% average year-over-year), mainly driven by the economic growth in the Eastern European countries and their integration in the EU economy. This growth is expected to continue in the future, albeit at a reduced pace reaching 130 million in 2030 (+31%, +1.7% in average year-over-year).
- In the past, the rail modal share has declined progressively, from around 50% of the total transport in 2004 to around 35% in the last two years of analysis (2013 and 2014). This decline has been more rapid in the period 2004-2010. Whilst since then the modal share has stabilised, the decline in rail transport share was driven by the high growth in road transport in the Eastern European Countries, combined with the higher sensitivity to economic recession of rail transport.
- Without significant investments, the rail freight share is expected to further decline (32%). The investments in rail and road infrastructure planned to be implemented for the development of the corridor in addition to improving sustainability and cost efficiency in all transport modes, are expected to have a positive, although limited, effect in counterbalancing this trend, with a rail share slightly exceeding the current position (36%).
- Additional policy and administrative measures (including the implementation of the Baltic-Adriatic Rail Freight Corridor which became operational in autumn 2015) could contribute to a great extent in the promotion of rail transport, with market shares for this mode rising to 39%.

Figure 6: Total volume and rail market share of the international inland freight transport along the Baltic-Adriatic Corridor (millions of tons)



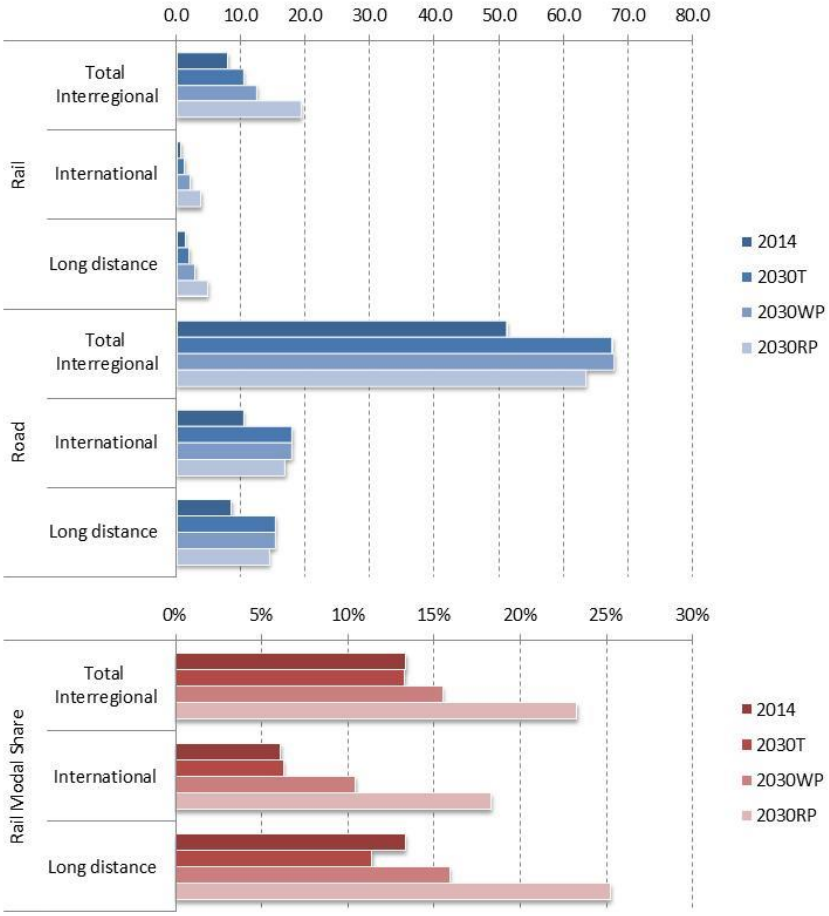
Source: Baltic-Adriatic corridor study consortium based on Eurostat data and Baltic-Adriatic Multimodal Model

The results for passenger transport presented in Figure 7 focus on the rail and road interregional[1], international and long distance transport demand along the corridor, which are the key target of the EU and TEN-T transport policy, and show that:

- The current rail modal share in interregional transport is around 13% overall (measured in pax*km) but much lower for international transport.
- The transport demand is expected to grow significantly by 2030 (+32% for passenger, +1.8% in average year-over-year).
- Without significant investments, the rail share is expected to remain stable (13%). The investments in rail and road infrastructure, in addition to the positive impacts on environments and transport costs, will have a positive, although limited, effect on the rail modal share (15% in 2030 overall), with major increases in the international and long distance segments.
- Additional policy and administrative measures, also including significant steps in the development of a single EU transport market, could contribute to a great extent in the promotion of rail transport, with market shares for this mode rising to 23% of interregional demand (25% for long distance transport).

[1] The interregional demands include only trips occurring between two distinct NUTS2 regions both located along the Baltic-Adriatic corridor alignment. The long distance demand includes interregional trips longer than 300 km.

Figure 7: Performance and modal share of the Baltic-Adriatic inland surface transport modes (millions of pax*km/year)



Source: Baltic-Adriatic corridor study consortium

In conclusion, the prognosis of the market trends shows that in the time horizon of the work plan the total transport volumes are expected to continue growing, especially in the North-East part of the Baltic-Adriatic Corridor, where most of economic growth is also expected.

The investments in the inland rail and road networks are expected to generate significant benefits improving the sustainability within each transport mode and overall, increasing cost efficiency for transport providers and generating benefits for the users. More significant benefits in terms of sustainability and development of rail transport may be achieved if additional accompanying policy and administrative measures are put in place. In this case, the combination of the envisaged market shift and the natural growth of the rail market will lead to almost doubling of the current rail volumes in certain corridor sections. Based on the analysis of these current and potential capacity issues under the various scenarios described above, capacity issues have been analysed for the rail and road networks which are illustrated in the following section.

3.2. Capacity issues on the rail and road networks

The identification of the possible capacity issues on the rail and road corridor infrastructure is based on the analysis of the current and predicted traffic volumes in comparison with the available number of rail tracks and road lanes. It should be noted that this analysis does not constitute a complete assessment of the capacity of the infrastructure, which would require much more detailed analysis (especially for rail, where capacity limitations may refer to any of the rail subsystems and not necessarily the number of tracks). The main purpose of the analysis is to provide a comprehensive view on the use of the available capacity of the rail and road infrastructure and to contribute identifying in advance possible capacity issues in the mid and long term. To this respect, additional information concerning the assessment of capacity issues is derived from the list of capacity bottlenecks identified in the Implementation Plan of the Baltic-Adriatic Rail Freight Corridor.

Flows and capacity on the rail network

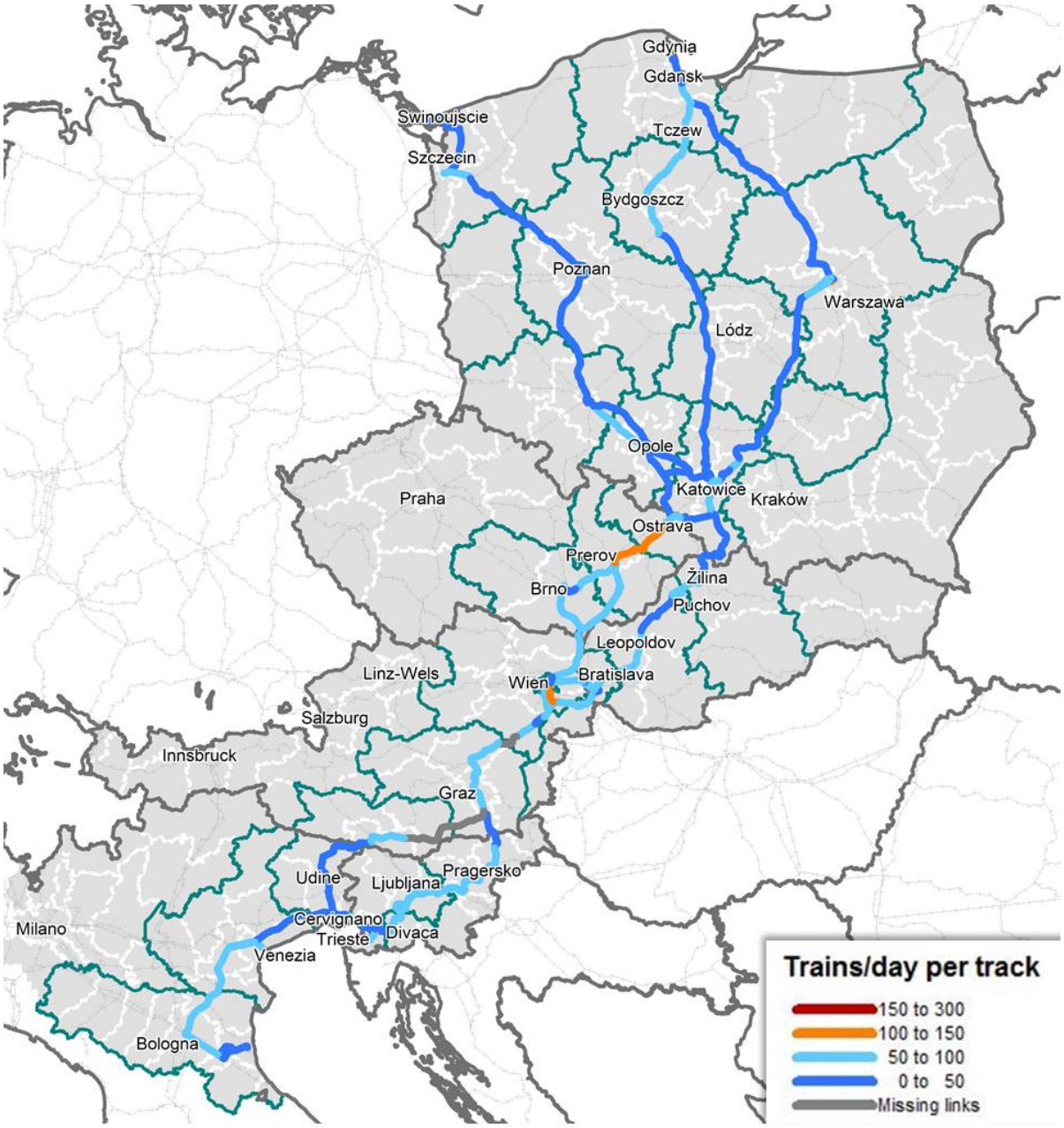
Figure 8 shows that current flows on the rail network are generally below the critical level, set in the corridor analysis at 150 trains per day per track for a double track line. Taking into account that rail infrastructure can also operate above this traffic level – especially if specific technological and signalling solutions are implemented – rail capacity is not a widespread short-term issue for the corridor.

On the other hand, it should be underlined that by restricting the analysis to the work day rather than to the calendar day some sections of the corridor already present high levels of traffic, such as the Graz – Bruck/Mur section, with 240 trains per work day and the single line section connecting Werndorf to Spielfeld – Strass/Šentilj with 112 trains per work day between Werndorf and Leibnitz. The section Brno – Přerov is also worth mentioning in terms of capacity, although not directly resulting from the analysis as significantly critical due to the replacement of railway services with bus operations for capacity related issues.

Finally, it is worth noting that in certain sections of the corridor rail infrastructure, specific capacity issues exist due to poor technical parameters of the infrastructure limiting the capacity below the theoretical level allowed by the number of tracks. This is for instance the case in several sections in Slovenia requiring modernisation, including the single track section Koper – Divača, where investments are foreseen to solve current capacity constraints due to strong gradient and limited train length and hence the available residual capacity might be exhausted in the near future, should freight traffic growth continue at today's pace.

In the medium and long term, the improvement of the railway infrastructure will induce a significant growth in the corridor rail transport volumes, at the same time, increasing capacity by means of construction of new links and infrastructure and technological modernisation of existing lines, including doubling of some of the existing single track sections.

Figure 8: Intensity of rail transport (2014, trains/day/track)



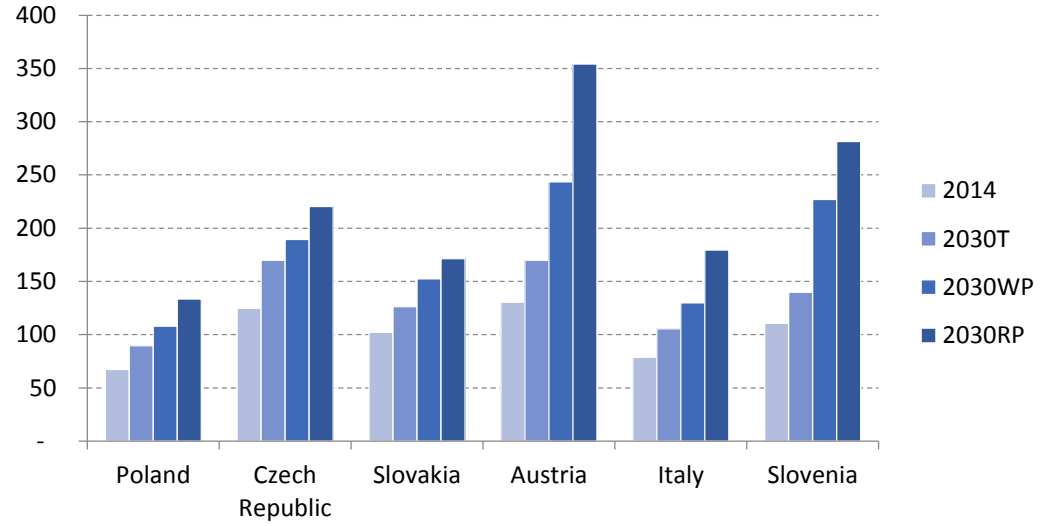
Source: Baltic-Adriatic corridor study consortium, elaboration based on TENtec data and sections as of 2014

In this respect, it should be noted that in certain urban and metropolitan areas, new services are being implemented, e.g. Bologna node, between Bologna and Castelbolognese, and Gdynia/Gdańsk where the Pendolino high-speed trains are in operation and the Pomerania Metropolitan rail services were introduced. These foreseen increases in rail services may lead to capacity issues particularly in view of the increase in freight traffic operations from the ports of Ravenna and Gdynia as well as Gdańsk respectively, which may be addressed by means of infrastructure and technological upgrading investments and timetabling/operational measures. Having specified this, it should be also noted that, under the applied approach, the growth in the corridor train traffic is also correlated to re-routing of services from alternative lines to take advantage of the improved infrastructure. This is of course an operational decision that might not be implemented by train operators and/or infrastructure managers, and subject to the

availability of train paths. For this reason, the present assessment is likely to identify an upper limit in the increase in train flows on the corridor.

Based on the analysis, the current available track capacity will be sufficient to accommodate train traffic growth along the corridor in the do-nothing scenario (2030T). This is also generally true for the work plan scenario, where the train volumes will further increase compared to the current situation (+60% in average along the corridor, but with growth mainly concentrated on the new or upgraded sections). However, local capacity issues would need to be appropriately managed – both in the detailed definition of the investments or in the management of the available capacity. These issues are considered to be mainly concentrated in urban agglomerations i.e. Warszawa and Katowice in Poland, Brno in the Czech Republic, Bratislava in Slovakia, Wien in Austria, and Ljubljana in Slovenia; and in specific sections such as the Ostrava – Přerov section in the Czech Republic. In addition, high traffic flows are expected to occur in the Austrian section between Werndorf and Wiener Neustadt, as a result of traffic induced by the completion of the two Alpine crossings (Semmering and Koralm).

Figure 9: Average train flows along the corridor (trains/day)



Source: Baltic-Adriatic corridor study consortium

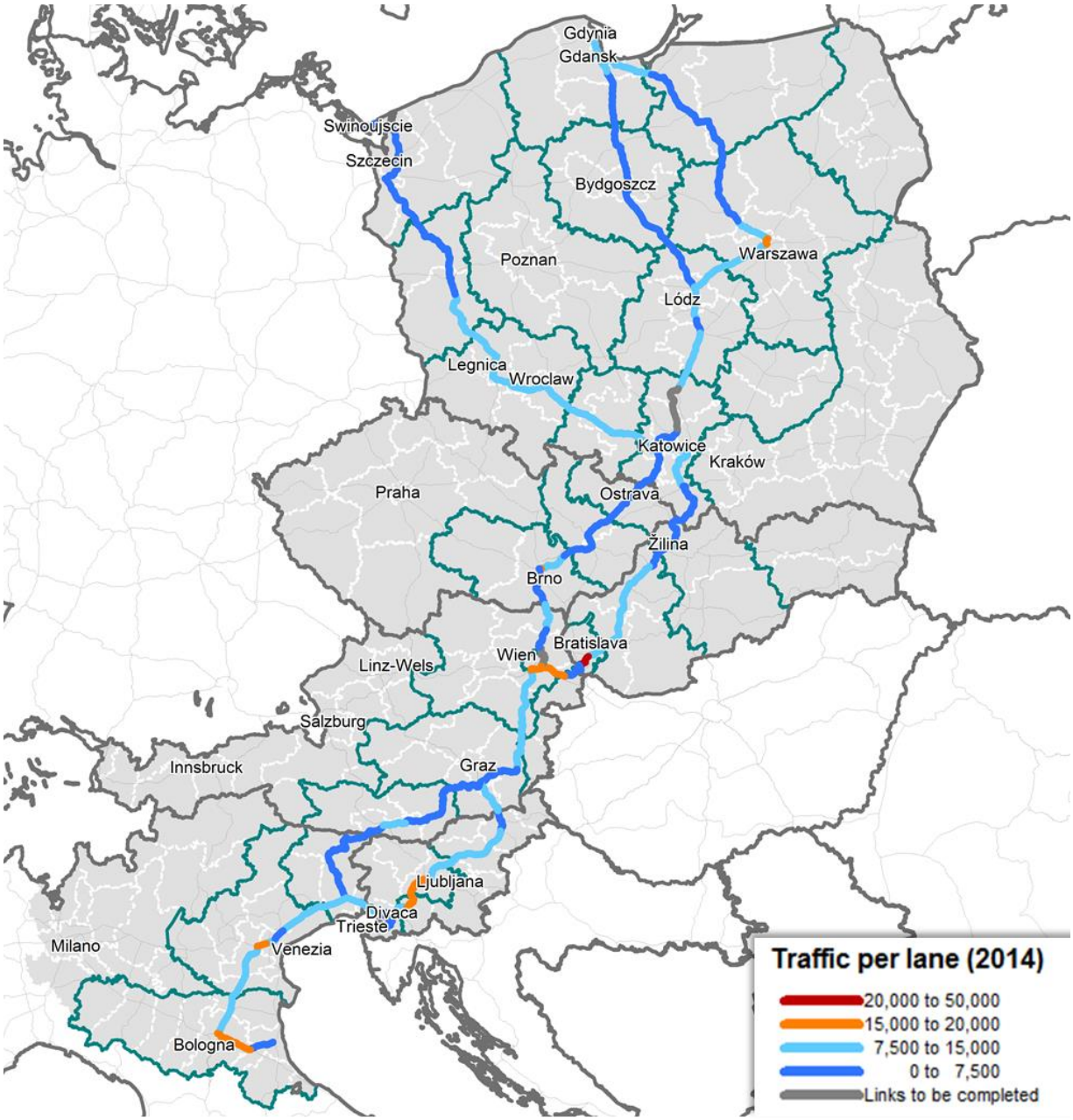
It is therefore only in the case of a more significant shift of transport demand towards the rail mode (such as the one depicted in the 2030RP scenario) that capacity issue might arise on the corridor, limiting the effective growth of the rail mode and the smooth flows of long distance transport. This is in particular the case for some single track sections along the corridor (such as the AT – SK cross-border section Wien – Marchegg – Devínska Nová Ves, the AT – SI cross-border section Werndorf – Maribor, the section Wien Meidling – Wampersdorf in Austria and the Udine – Cervignano section, including the Udine node, in Italy), but potentially also for other high traffic two-tracks sections. However, it should be noted that, in case this scenario will materialise, capacity to accommodate this additional demand might be provided not only with additional investments on the corridor, but also with the improvement of the comprehensive network, which can provide alternative routes to the main Baltic-Adriatic core network corridor. Such additional capacity needs would need to be fully analysed in due time should the traffic develop in line with the higher future projections.

Flows and capacity on the road network

Figure 10 shows that current road flows are generally below the critical level, set in this analysis at 20,000 vehicles per day per lane.

Taking into account that road infrastructure can also operate above this traffic level (although with reduced efficiency in terms of congestion), capacity is not a general issue for the corridor. The only section currently above the identified critical level is on the D4 motorway, within the urban area in Bratislava, where projects for a new external by-pass are being developed. By adding capacity to the existing D4 motorway between the intersection with the D1 and the border between Slovakia and Austria, the foreseen development of the D4 Bratislava motorway bypass is expected to solve this capacity bottleneck, diverting long-distance Light Duty Vehicles (LDV) and Heavy Duty Vehicles (HDV) from the D4 motorway crossing the Bratislava urban area.

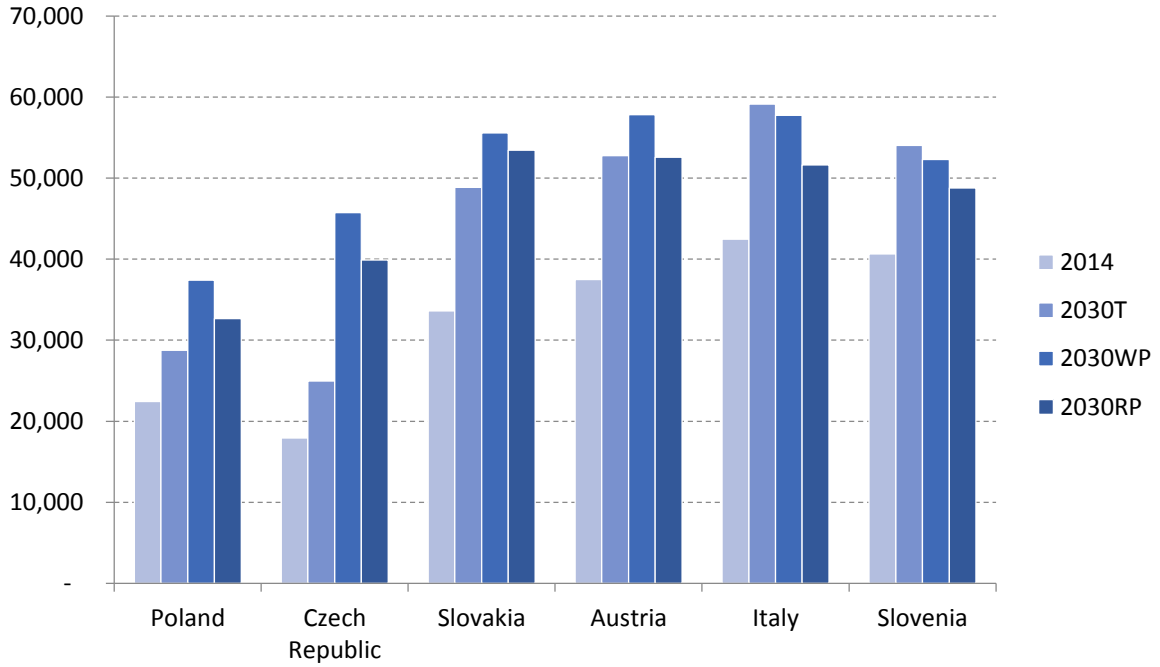
Figure 10: Intensity of road transport (2014, vehicles/day/lane)



Source: Baltic-Adriatic corridor study consortium, elaboration based on TENtec data and sections as of 2014

Figure 11 shows that, as a result of the improvement of the infrastructure, the flows on the road infrastructure are expected to grow significantly in the time plan horizon, although this effect might be mitigated by improvements of the rail infrastructure and implementation of modal shift measures.

Figure 11: Intensity of road transport (vehicles/day)



Source: Baltic-Adriatic corridor study consortium

The available infrastructure capacity (also taking into account the full implementation of all investments already included in the project list that has been elaborated in the framework of the corridor study) will be generally adequate to accommodate growth in road transport volumes for all scenarios under assessment.

In a nutshell, the results of the transport market study show that with reference to existing and future likely flows of traffic on the Baltic-Adriatic Corridor *no specific critical issues in terms of capacity* are worth noting at present. This does not however aprioristically exclude that capacity problems may occur in the future, particularly in proximity of urban agglomerations and other major demand generation points as well as on the lines and roads interconnecting these nodes. In these terms, the corridor study may underestimate the extent and severity of specific situations where long distance flows add up and mix to the regional, metropolitan or even local traffic, which may be analysed in a more detailed way in future studies.

4. Planned projects along the Baltic-Adriatic Corridor until 2030

4.1. General overview

A bottom-up approach has been adopted for the analysis of the investments required for the development of the corridor infrastructure by 2030. Rail, road, port, airport and rail-road terminal infrastructure managers as well as Member States and regional authorities have been constantly consulted as part of the 2015-2017 Baltic-Adriatic corridor study. Furthermore, development plans have been reviewed in order to compile and maintain updated a detailed list of projects targeted to the development of the corridor by 2030 as a multimodal, interoperable, high quality standard infrastructure, interconnecting European core urban and transport nodes across the concerned Member States.

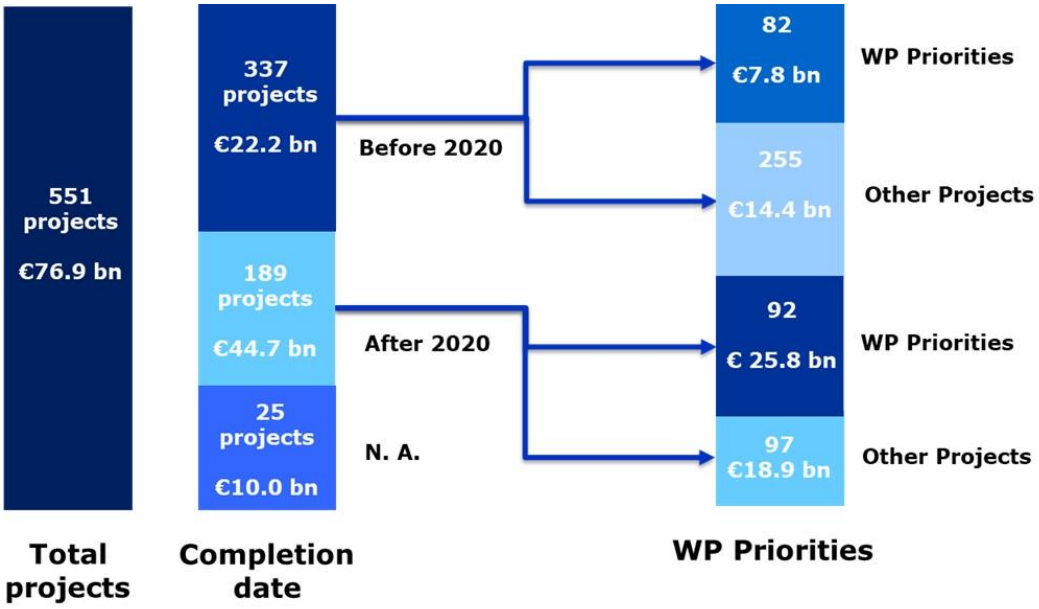
Table 3: Projects for the development of the Baltic-Adriatic Corridor

Project category		Projects	Investment volumes in € million	Approved funds in value and % of investment volumes	
Development of the railway infrastructure	**Cross-border sections** (WP priority)	**22**	**4,028.1**	**1,730.5**	**43.0%**
	Missing links (WP priority)	**2**	**8,854.3**	**9,198.8**	**100.0%**
	Modernisation and upgrading of national railway lines, including junctions and nodes outside core urban areas in Cohesion Member States (WP priority)	**31**	**7,570.0**	**2,966.3**	**39.2%**
	Other projects for the modernisation and upgrading of national railway lines, including junctions and nodes outside core urban areas	18	11,052.9	1,602.6	14.5%
	Technological upgrading, telematics applications and other horizontal measures (art. 31 to 37 of Reg. 1315/2013)	25	1,421.3	1,282.6	90.2%
	ERTMS including dedicated projects at cross-border sections (WP priority)	**23**	**1,470.3**	**1,033.7**	**70.3%**
	Other railway projects	13	346.8	100.0	28.8%
Development of the road infrastructure	**Cross-border sections** (WP priority)	**13**	**3,077.3**	**657.1**	**21.4%**
	Completion and upgrading of national roads outside core urban nodes	46	10,894.5	6,060.5	55.6%
	ITS, ETC and other horizontal measures (art. 31 to 37 of Reg. 1315/2013)	43	1,962.6	682.5	34.8%
Development of the port infrastructure	**Developing interconnections** (WP priority)	**34**	**2,306.9**	**672.9**	**29.2%**
	Modernisation / Expansion of the infrastructure	55	8,268.6	785.2	9.5%
	VTMIS and Innovation and other projects	19	322.0	178.5	55.4%
	Cross-corridor projects including MoS	6	59.0	59.0	100.0%
Development of Inland Waterway Ports		13	254.8	10.2	4.0%
Development of the airport infrastructure, excluding last mile connections in core urban nodes		93	4,963.9	2,906.8	58.6%
Development of the RRT infrastructure		14	569.3	335.5	58.9%
Development of the urban node infrastructure (WP priority)		**68**	**9,286.4**	**3,453.2**	**37.2%**
Additional horizontal studies and initiatives		13	155.0	92.5	59.7%
Total project list		**551**	**76,864.1**	**33,808.4**	**44.0%**
WP Priorities		**186**	**35,185.8**	**19,119.8**	**54.3%**

Source: Baltic-Adriatic corridor study consortium; Note: 1) ERTMS initiatives are also included in modernisation, upgrading and construction of railway lines and nodes; 2) For the purposes of the elaboration of this summary table and in the remaining of this document values for projects included in Polish or Czech planning/strategic documents have been estimated adopting the average exchange rate for the year 2015 as provided by the European Central Bank: 1EUR = PLN 4.1841, 1 EUR = CZK 27.279 – For the projects supported by the CEF instrument, the value reported in the grant agreement has been used as appropriate.

Table 3 above summarises the Baltic-Adriatic Corridor project list with reference to the main categories of investments according to the relevant articles of the Regulation (EU) 1315/2013 and with respect to the priorities of the Baltic-Adriatic corridor work plan. For each category the total number of initiatives and budget as well as the percentage in share of total budget are provided.

Figure 12: Corridor projects (total and work plan priority projects) by completion date



Source: Baltic-Adriatic corridor study consortium

551 projects have been identified for the development of the corridor, which are either ongoing or planned for implementation, for a total budget of 76.9 € billion. Most of the ongoing and planned projects (337) are foreseen to be completed by 2020, 189 are planned to be completed after 2020, and for 25 projects the implementation dates are either not available or not defined at present. The work plan priorities encompass 186 investments, of which 12 without implementation dates specified as yet, 82 to be implemented by 2020 and 92 afterwards, totalling 35.2 € billion, equivalent to over 45% of the total project list.

4.2. Analysis per transport mode

Rail, ERTMS and Rail-Road Terminals

The Baltic-Adriatic Corridor list includes 134 projects for the development of the railway infrastructure, totalling 34.7 € billion. Modernisation works to reach the TEN-T standards are ongoing and planned at the cross-border sections between Poland – Czech Republic / Slovakia, Slovakia – Austria, Austria – Slovenia and Slovenia – Italy as well as on the national network in Poland and Slovenia, including junctions and nodes. The further upgrading of the cross-border railway line between Brno and Wien is also foreseen. In the Czech Republic, Slovakia, Austria and Italy an upgrading of lines and improvements at junctions and nodes to increase capacity is in the needed focus, including studies and projects for the development of high-speed lines solutions. Initiatives aimed at improving the railway infrastructure and the stations by reaching the technical standards for interoperability are also planned.

Further to studies and works for the modernisation and upgrading of cross-border and national sections, stations and junctions, two projects also relate to the completion of the Alpine crossings in Austria, amounting to 8.9 € billion.

31 rail initiatives among the 134 are finally classified as Rail ERTMS projects for about 1.9 € billion investments. Eight out of these 31 projects relate to the instalment of ERTMS technology on rolling stock in the corridor and other EU Member States as well as initiatives to support the implementation of this technology at the multi-country and multi-corridor levels.

A dedicated project for the development and operation of the Baltic-Adriatic Rail Freight Corridor is also ongoing aimed at enhancing international and interoperable long distance transport along the corridor mitigating and solving operational and administrative solutions to rail transport.

In addition to the above projects for the development of the rail infrastructure and the deployment of ERTMS, 14 projects are ongoing and planned for the development of rail-road terminals, totalling 569 € million. These relate to the development and expansion of infrastructure for multimodal transport at Wrocław (Kąty Wrocławskie), Ostrava Paskov, Přerov, Freight Centre Wien South (Inzersdorf), Graz Süd (planned to be expanded by 2024, also in view of the completion of the Koralm railway line and tunnel), Padova and Ljubljana. Improvements of interconnections are either part of these developments or presented as dedicated projects, as for the Warszawa, Łódź and Cervignano rail-road terminals. ICT and innovation initiatives are also ongoing and planned to promote intermodality and support the smooth flow of information along the logistic chain also including the terminals.

Road transport

A total of 102 projects are ongoing and planned for the development of road transport, amounting to 15.9 € billion. Works for the modernisation of the corridor network to reach compliance are planned for implementation at the cross-border sections between Poland – Slovakia, Czech Republic – Austria, Italy – Slovenia as well as on the national road networks in Poland, Czech Republic and Slovakia. In Austria, Italy and Slovenia works are also foreseen to upgrade the existing motorway infrastructure. Studies and works are also ongoing and planned for the implementation of ITS solutions to improve traffic management and flow orientation as well as to boost development and availability of alternative clean fuels across the Baltic-Adriatic corridor network and Member States. Nearly half of these initiatives are multi-country and cross-corridors projects aiming at supporting ITS deployment and alternative clean fuels availability in Europe. The ITS projects also include eCall emergency system in Austria, and three studies relate to the implementation of C-ITS solutions (in Austria, Czech Republic and Slovenia). Most of the alternative clean fuel projects concern electric mobility in all corridor Member States. The projects are also under implementation for the development of LNG for road transport (in Poland, Italy, Slovenia); and one project is aimed at developing hydrogen in Austria.

Maritime and IWW Ports and Motorways of the Sea

127 projects have been identified for the development of ports infrastructure, including terminals, last mile connections, MoS operations, alternative clean fuels and VTMIS and e-Maritime initiatives. These investments total a budget of 11.2 € billion for the development of both the maritime and inland waterway ports.

Initiatives aimed at developing port infrastructure and terminals, including dredging works and activities to improve maritime accessibility as well as navigability are ongoing and planned for the future to increase port capacity and improve the performance at all ports along the corridor.

At all maritime ports along the corridor projects are also ongoing and planned to increase the standards of the existing rail and road links and to further improve the interconnections between the ports and the other transport modes. These investments will be crucial to support the planned port expansions and to enhance multimodality along the corridor.

Projects for the development of LNG are furthermore included in the corridor project list for Gdynia, Świnoujście, Bratislava, Venezia and Ravenna to promote availability of alternative clean fuels for maritime transport operations.

VTMIS and e-Maritime solutions are under implementation for the development of interoperability and simplify/facilitate intermodal transport solutions and improve safe and secure maritime transport.

Airports

Airport terminals and runways expansion works as well as technological improvements are included in the corridor list for a total of 93 projects and almost 5.0 € billion of investment costs. The majority of the investments relate to passenger transport operations. Cargo facilities expansions are also planned at Gdansk, Warszawa, Katowice and Ljubljana. Telematic applications (including SESAR) at corridor airports as well as cross-corridor and multi-country initiatives are also under development.

One initiative has been identified at this stage for the promotion of alternative clean fuels, which is 'Sustainable airport area - CO2 neutral airport' implemented at Wien aiming at fulfilling the requirements and standards of the 'ACAS - Airport Carbon Accreditation' and 'EMAS Eco Management Systems'.

Projects of urban nature for the development of rail and transit interconnections are also planned for the improvement of last mile connections to airports. Investments are foreseen and ongoing in this regard at Venezia and Bologna airports, which represent with Warszawa and Wien the largest airports along the corridor. For Bologna and Venezia, the interconnection to the corridor railway network represents the possibility to directly connect high-speed rail to aviation services, increasing the attractiveness of rail transport and responding to the most recent request from the market of developing a network of high-speed nodes. Connection to the railway network is also under implementation/consideration at Katowice, Bratislava and Ljubljana as part of rail modernisation projects. The development of the Pomeranian Metropolitan Railway is expected to further extend the accessibility to the Gdańsk Airport in the Tricity (Gdynia, Gdańsk, Sopot) metropolitan area. Projects for the improvement of existing road links to the airports are also foreseen by the concerned infrastructure managers at Venezia as well as Warszawa, Katowice and Łódź.

Regarding last mile connections to airports by rail, high-speed rail studies are also worth mentioning which are planned to further consolidate the strategic relevance of the Vienna Airport as a «cross-border» hub for AT, CZ, SK and HU.

4.3. Urban nodes

In the framework of the new TEN-T policy, urban nodes play an important role within the development and functioning of the core network as a multimodal and interoperable infrastructure for both passenger and freight traffic. Urban nodes along the corridor connect network links – both of the core and the comprehensive networks. They also interconnect transport modes, thus enhancing multimodality. Finally, they connect long distance and/or international traffic with regional and local transport (passengers and freight).

As such all the following different types of investments have been considered for the identification of relevant investments to ensure the corridor will develop as an interoperable infrastructure, which may affect both urban areas and core urban nodes:

- Projects for the improvement of the standards of the rail and road core network corridor links in urban areas, including stations, sidings, etc. as well as junctions (last mile sections);
- Actions for the improvement of rail and road links directly interconnecting the corridor with a core transport node in an urban area and possible alternatives to solve capacity issues (last mile connections);
- Initiatives for the improvement of interconnections between core transport nodes and between transport modes in core urban nodes, i.e. projects relating to regional and suburban railways, metro or tramway lines (and interchange facilities located on their alignment) which are directly interconnecting to at least one core transport node in a core urban area, where services are operated towards other core urban nodes belonging to the core network (core urban node projects);
- Initiatives to promote interconnection between different transport modes and sustainable transport solutions for both passengers and freight, including ICT, ITS, Clean fuel (or other sustainable transport and mobility) projects that are implemented in core urban areas or at a territorial scale involving at least one core urban area. These may also include any other soft or administrative measure for the promotion of integrated transport and mobility in core urban area towards Mobility as a Service solutions (other core urban node projects);
- Infrastructure solutions to mitigate the negative effects of long distance traffic along the corridor transiting urban areas, including corridor rail and road bypasses regardless their classification as core or comprehensive, provided that they are implemented to mitigate environmental impacts associated to the existing corridor sections.

In line with the above categorisation 68 projects for a total of 9.3 € billion investment costs have been identified which are located in the core nodes of the Baltic-Adriatic Corridor. These include:

- Actions to improve the standards and increase the capacity of rail corridor sections at the following core urban nodes: Gdańsk, Warszawa, Łódź, Katowice, Szczecin, Poznań, Wrocław (Poland), Ostrava (Czech Republic), Bratislava (Slovakia), Wien (Austria) and Ljubljana (Slovenia);
- Investments to increase capacity, improve safety and reduce congestion on the corridor road infrastructure at core nodes, by means of development of corridor bypasses or upgrading of corridor sections and junctions. Projects are located in Gdańsk (including the project for the development of the S6 Tricity bypass, currently not included in the project list, but confirmed to be implemented after 2025), Warszawa, Łódź, Szczecin, Poznań (Poland), Ostrava (Czech Republic), Bratislava (Slovakia), Wien (Austria), Bologna (Italy) and Ljubljana (Slovenia):
- Projects to improve multimodal infrastructure for the interconnection between transport modes in order to support modal shift from road to rail are also included on the list (Gdańsk, Szczecin, Łódź, Bratislava, Bologna) focussing on the development of urban transit and interchange facilities as well as ITS and ICT solutions for both passenger and freight transport.

Further to the above projects, last mile connections to the core airports presented in the previous section have been considered among the urban projects for their relevance at the metropolitan scale in terms of accessibility to the core airports within the core urban nodes. Last mile connections of ports and rail-road terminals even when affecting urban areas have instead been considered in the analysis of the respective modes because of the predominance of freight transport and the presence of core logistic nodes outside core urban areas. Similarly, the improvement of the standards of the corridor rail and road links in urban areas located outside core urban nodes have been considered in the development of the respective modes (e.g. modernisation of railway nodes, stations and junctions at Brno (Czech Republic), Žilina (Slovakia), Udine (Italy) and Zidani Most (Slovenia); or development of the D1 Přerov bypass and D52 Mikulov bypass (Czech Republic), and upgrading of the A2 Klagenfurt bypass (Austria)).

5. Future challenges for the development of the Baltic-Adriatic Corridor

The review of the characteristics of the Baltic-Adriatic Corridor describing its compliance with the requirements of the TEN-T Regulation (Chapter II, and particularly Art. 39) and identifying the missing links based on the definition of the alignment of the corridor according to Regulations (EU) 1315/2013 and 1316/2013 (see Chapter 2 above), complemented with the analysis of the current and future capacity bottlenecks resulting from the transport market study (Chapter 3 of this work plan) clearly point to the identification of the specific objectives for the development of the corridor at standard by 2030.

In line with the requirements set in Art. 47 of Regulation (EU) 1315/2013 a project list for the development of the corridor by 2030 has been elaborated. This includes 551 projects identified adopting a bottom-up approach, which has seen the direct involvement of all the Members of the Baltic-Adriatic Corridor Forum (see Chapter 4 above).

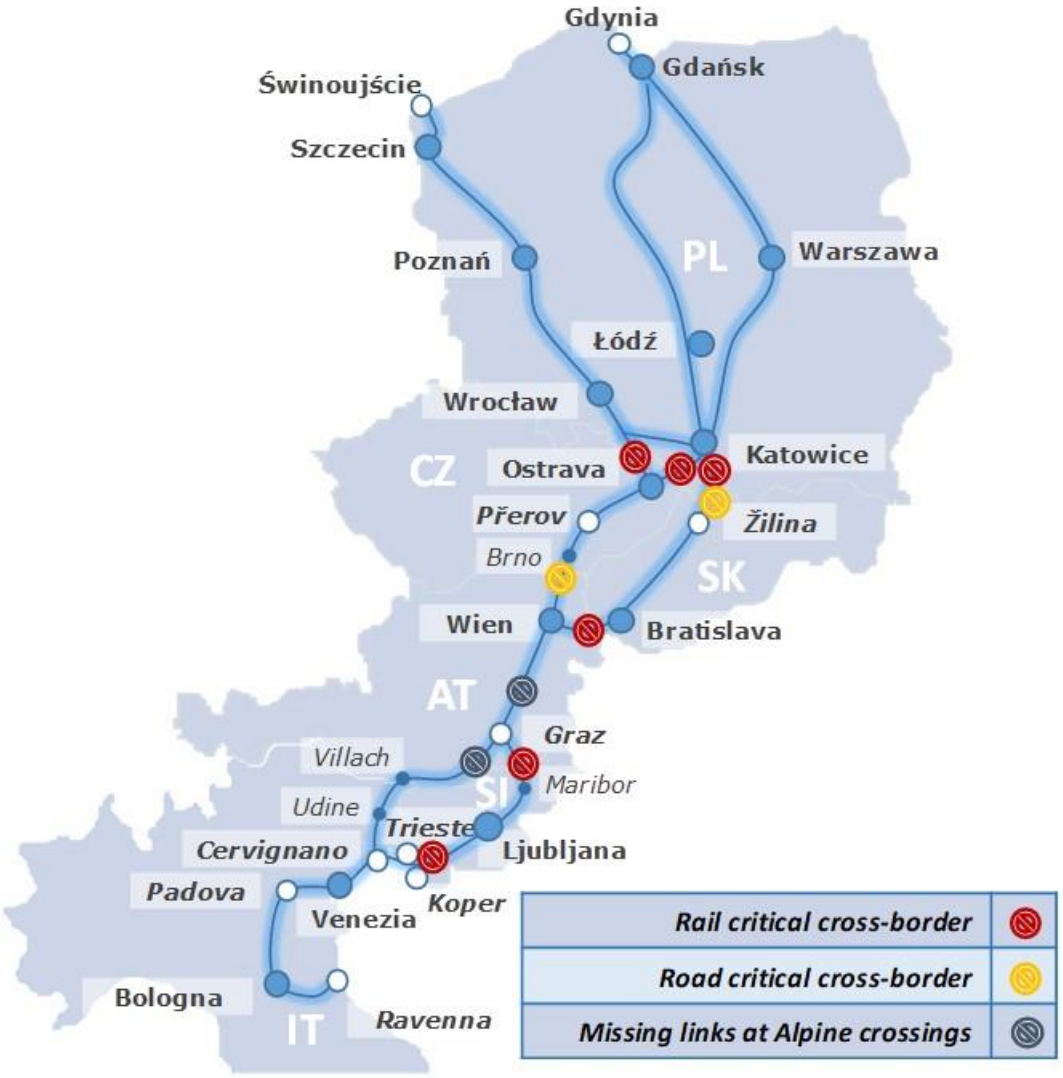
The following sections describe the specific objectives for the development of the Baltic-Adriatic Corridor by 2030 and present a review of the effectiveness of the 551 investments included in the project list, in solving the critical issues affecting the development of a compliant, intermodal and interoperable corridor infrastructure by 2030. Persisting bottlenecks at this time horizon are furthermore commented where identified. Persisting administrative and operational barriers are also described based on the assessment of the existing corridor infrastructure and operations, the ongoing initiatives and planned solutions.

5.1. Critical issues and specific objectives for the corridor development

The analysis of the characteristics of the Baltic-Adriatic Corridor and the results of the transport market study, as extensively discussed with the Members of the Corridor Forum, led to the identification of the specific objectives of the corridor towards the achievement of the general objectives and the priorities of the TEN-T policy:

- Removing the main rail and road bottlenecks to encourage the development of long-distance international traffic flows along the corridor, by improving the most critical cross-border rail and road connections (Poland – Czech Republic / Slovakia, Czech Republic – Austria, Austria – Slovakia, Slovenia – Austria / Italy), also promoting the development of digital cross-border links for the exchange of traffic data and provision of information services:
  - Among the critical cross-border sections the Katowice-Ostrava-Žilina Triangle rail cross-border sections between Poland, Czech Republic and Slovakia are particularly important for their localisation in relevant economic and industrial areas of the corridor, with sustained traffic of freights between Poland and the Czech Republic. The Bratislava-Wien cross-border section via Devínska Nová Ves and Marchegg, is the only non-electrified section of the whole corridor;
  - Improve the performance of railway transport by means of identification and solution of operational and administrative barriers affecting the development of intermodal and combined traffic along the corridor and at its main logistics nodes.
- Ensuring the timely completion of the ongoing projects at the Alpine crossings in Austria in order to remove the two missing links along the corridor.

Figure 13: Critical cross-border sections and missing links on the Baltic-Adriatic Corridor



Source: Baltic-Adriatic corridor study consortium

- Improving the infrastructure quality and standards with the target to comply with the technical requirements set in Regulation (EU) 1315/2013, in particular concerning transport infrastructure for rail (especially speed, axle load, train length of the core sections and train length and electrification of the rail access to the core freight terminals) and road transport (road class – motorways or expressways):
  - Substantial efforts are required for the modernisation of the national corridor railway links in the Eastern Member States where the gaps in reaching the standards set in the Regulation appear to be more extensive.
- Enhancing multimodal transport by supporting the optimal infrastructure integration and interconnection of all transport modes at transport nodes, and the deployment of ICT solutions to simplify administrative processes and improve the performance of the terminals in the wider logistics chain in terms of time savings, reliability and security:
  - Improvement of last mile connections outside and inside the ports and development of hinterland connections of ports are crucial to support growth of multimodal transport along the corridor and core network, with a need to focus on rail last mile connections to support competitiveness and growth of sustainable transport by railway.

- Improving interconnection in all urban nodes along the corridor between TEN-T and local transport infrastructure, for both passenger and freight traffic:
  - The development of the rail infrastructure at core urban nodes, including rail interconnections to core airports (or alternative fixed links) as well as the development of interchange and transit systems are considered of relevance to facilitate the transfer of passengers between the corridor nodes within the urban area and between long distance and regional/local traffic. ITS/ICT telematic applications for multimodal and integrated transport operations either within the metropolitan area or along the corridor are also important for the development of sustainable transport and mobility solutions for both passengers and freight.
- Support the development of interoperable transport networks, in particular through the promotion of transport digitalisation and the deployment of telematic applications and their further technological advancement, with a focus on ERTMS.

With reference to the above specific objectives the following section provides a description of the critical issues for the development of a fully compliant and functional corridor by 2030, also commenting on the expected impact of the ongoing and planned investments by this time horizon, specifying the presence of persisting bottlenecks.

5.2. Persisting bottlenecks

Rail infrastructure

Rail cross-border sections

Further to the analysis of the compliance to the requirements of the TEN-T Regulation in terms of electrification, axle load and speed, critical issues have been identified for six out of nine rail cross-border sections along the corridor. The following box provides a brief overview of the issues affecting these sections, and the expected impact of the planned investments.

- **Opole (PL) – Ostrava (CZ)** [Chałupki (PL) – Bohumín (CZ)]: This rail section requires improvement works on the Polish side between Kędzierzyn Koźle and Chałupki (state border) to reach compliance in terms of speed, and train length. Due to limited availability of financial resources the project comprised in the corridor project list to reach the required standards is included in the reserve list of the National Railway Programme; national funds are foreseen to secure only part of the works and the implementation dates are not defined (47 € million). Whilst the Polish Authorities assume that the project will be in any case completed by 2030 in line with the requirements set in the TEN-T Regulation, the possibility to implement the works during the current financing period (up to 2023) will be considered in the event additional financial resources will be identified. On the Czech side works were already completed to increase the speed up to 140 km/h, including the improvement of the Bohumín station. This cross-border section is also expected to benefit from the modernisation of the double track railway line E30 between Kędzierzyn Koźle – Opole Groszowice – Opole Zachodnie to increase maximum operational speed by 2022 (150.2 € million) as well as from the modernisation of the Ostrava junction on the Czech side by 2021 (222.2 € million). This cross-border section is currently expected to be at standard by 2030 at the latest, except for train length on the Czech side.
- **Katowice (PL) – Ostrava (CZ)** [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]: Preparatory works are ongoing on the Polish side for the modernisation of this rail section requiring major investments on the lines E30 and E65, especially in the area of Katowice, to increase the standards of the existing railway lines and stations. The modernisation of the existing dual track electrified line and stations is expected on the section Będzin – Sosnowiec – Katowice – Katowice Ligota and at exit from Katowice towards Gliwice (centre of agglomeration), where the railway tracks will be extended by an additional pair of tracks. The works will allow for separating long distance and agglomeration traffic. The action foresees the implementation of computer traffic control compatible with ERTMS/ETCS - Level 2. The modernisation works are

expected to be implemented in three phases. The first phase includes works for the improvement of the sections Most Wisła – Czechowice-Dziedzice - Zabrzeg including Czechowice-Dziedzice station, currently expected to be completed by 2023 (141.6 € million). The second and third phases relate respectively to the modernisation of the section Tychy - Most Wisła and Zabrzeg - Zebrzydowice (state border); and to the modernisation of the network within the urban agglomeration of Katowice (sections Będzin – Sosnowiec – Katowice – Katowice Ligota and Katowice – Gliwice). For the latter phases the implementation dates are not defined yet. Whilst the Polish Authorities trust that the projects will be in any case completed by 2030 in line with the requirements set in the TEN-T Regulation, the possibility to implement the works during the current financing period (up to 2023) will be considered in the event additional financial resources will be identified (812.6 € million). On the Czech side, track optimisation works at the Dětmarovice station are planned to be finalised by 2019, which together with the instalment of remote traffic control system between Petrovice u Karviné and Ostrava during 2018, will further improve the performance of the line. The section from the state border to Petrovice u Karviné and Ostrava was already modernised; the works were completed in 2002, which increased the speed up to 120-140 km/h. Also this cross-border section is expected to benefit from the completion of the modernisation of the Ostrava junction by 2021 (222.2 € million). This cross-border section is currently planned to be at standard by 2030 at the latest except for train length on the Polish section Zebrzydowice – state border as well as on the Czech sections.

- **Katowice (PL) – Žilina (SK)** [Zwardoń (PL) – Skalité (SK)]: On the Polish side works are foreseen to modernise 65 km of the existing predominantly single track electrified railway line between Czechowice-Dziedzice and Zwardoń. Due to limited availability of financial resources the project comprised in the corridor project list to reach the required standards (47.8 € million, expected to be completed by 2023) is included in the reserve list of the National Railway Programme; national funds are foreseen to secure only part of the works. Whilst the Polish Authorities assume that the project will be in any case completed by 2030 in line with the requirements set in the TEN-T Regulation, the possibility to implement the works during the current EU financing period (up to 2023) will be considered in the event additional financial resources will be identified. On the Slovak side, no works are foreseen on the single track section Zwardoń – Skalité – Čadca. The Skalité – Čadca section was already modernised and electrified with a maximum speed of 100 km/h, axle load of 225 kN and maximum train length of 650 m. The 7.1 km subsection Zwardoń – Skalité is compliant with regard to the axle load, but non-compliant with respect to speed (70 km/h) and has limited train length operability (due to limitations at the Zwardoń station on the Polish side). The modernisation of the double track Krásno nad Kysucou – Čadca section, also common to the cross-border itinerary between Ostrava and Žilina, is expected to be completed by 2030 (220 € million). This cross-border section is currently expected to be compliant by 2030 except for speed limit on the short section Zwardoń – Skalité. No works are planned till 2030 to deploy ERTMS on the Čadca – Zwardoń section so far.

- **Bratislava (SK) – Wien (Stadlau) (AT)** [Devínska Nová Ves (SK) – Marchegg (AT)]: Two cross-border railway lines are in operation between Bratislava and Wien, one passing through Petržalka (SK) – Kittsee (AT) and already compliant in the sections outside the Bratislava railway node, except for train length; another one for passenger transport going via Devínska Nová Ves (SK) and Marchegg (AT). The latter is the only non-electrified section along the Baltic-Adriatic Corridor, also requiring upgrading works. The electrification of the existing single track railway line on the Slovak side is planned to be completed by 2020 (4 € million); feasibility studies are also ongoing which relate to the construction of a second track on this line, also including the bridge over the river Morava, which may be subsequently developed. Upgrading of the line Wien Stadlau – Border AT/SK (next to Marchegg) including partial doubling of the section, full line electrification and railroad stations works are planned to be implemented by 2023 (550 € million). The doubling of the line in its entire extent on the Austrian side is foreseen to be subsequently developed, also based on the possibility to upgrade the cross-border section on the Slovak side.

- **Graz (AT) – Maribor (SI)** [Spielfeld-Straß (AT) – Sentilj (SI)]: The section on the Austrian side is already compliant in terms of axle load, speed and electrification. Studies and administrative procedures for the upgrading of the line to two tracks are envisaged to be undertaken between 2022 and 2026 (19.1 € million); the works for doubling the line to be implemented based on market developments. In Austria, train length compliance is also expected to be achieved by 2030. Rehabilitation works of the existing line are planned to be completed on the Slovenian side by 2022 which will allow increasing axle load, train length and

speed to reach compliance (247 € million). The construction of the second track is also planned for 2030 (170 € million). The whole section is thus currently expected to be fully compliant by 2022 at the latest and doubled on the Slovenian side by 2030.

- **Trieste (IT) – Divača (SI)** [Villa Opicina (IT) – Sežana (SI)]: The studies for this cross-border railway section have been completed reconsidering the previous high-speed project solution. The new proposed studies for a conventional railway line are expected to allow reaching compliance on the section by 2030 on both sides, including train length and speed (envisaged total cost on both sides € 101.9 million).

Missing links

The two missing links along the Baltic-Adriatic axis are the major obstacles towards the full exploitation of the corridor: the 27.3-kilometer-long Semmering base tunnel between Gloggnitz in Lower Austria and Mürzzuschlag in Styria and the new 127 km long Koralm railway line connecting Graz in Styria with Klagenfurt in Carinthia, also comprising a 32.9 km long tunnel will remove these missing links.

The Semmering base tunnel and the Koralm railway line and tunnel are both under construction and are expected to be completed by 2026 and 2024 respectively (8.9 € billion). Upon completion of the two "Alpine Crossings" the TEN-T network will benefit from a new seamless high-speed railway connection for trans-European passenger and goods transportation and offer a modern level of comfort with substantially reduced journey times. As an example, the combined effect of the Koralm tunnel and the Semmering base tunnel will reduce travel time between Vienna and Venice by 120 minutes.

National railway lines

Besides the major issues and needs for upgrading at the borders and the completion of the two Alpine crossings, several national bottlenecks need to be addressed on the Baltic-Adriatic Corridor. Even though these bottlenecks are on the national transport network, their removal will bring important network benefits for the whole corridor. In particular, the railway network in Poland and Slovenia require modernisation to comply with the EU requirements.

The following box provides details on the current status and likely evolution of the corridor lines, with a focus on speed, axle load and train length parameters for freight lines.

- In ***Poland*** works are currently under implementation and preparation to improve the quality and standards of the railway infrastructure. These include the modernisation of the major railway axis (E59, E30 and E65/C-E65) aimed at removing line speed bottlenecks, increase train length and axle load standards which will be particularly beneficial for freight transport along the corridor. In greater detail, modernisation works on the Eastern Branch, E65 railway line Gdynia – Warszawa were recently completed which allow reaching the standards required by Regulation (EU) 1315/2013 (1,130 € million), except from very short sections in Tczew (approx. 2 km of 60 km/h), Iława (approx. 4 km of 90 km/h) and near Modlin (approx. 7 km of 60-80 km/h) where due to technical constraints (line geometry) the required standard will not be reached. Furthermore, two actions are planned in the Warszawa node to solve critical issues on the main freight and passenger routes by 2018 and 2024 respectively (321.2 € million). In addition, two projects to modernise and improve capacity on the section Warszawa – Grodzisk Mazowiecki are expected to be implemented by 2019 (389.6 € million). The line E65 is already compliant on the section from Grodzisk Mazowiecki to Zawiercie, and improvement works were already completed on the section Zawiercie – Dąbrowa Górnicza (towards Katowice; 88.9 € million). Modernisation works aiming at reaching compliance with the TEN-T Regulation on the Central Branch between Gdańsk and Katowice, C-E65 railway line, are envisaged to start in 2020 and are expected to be completed by 2022 except on section Bydgoszcz – Tczew, for which the implementation dates are not defined (656.2 € million). Further modernisation works are also planned on the line E65 and E30 – section Chorzów Batory – Gliwice Łabędy – at the

interchange between the Central and Western Branches of the corridor (340.9 € million), but for this particular section the start and end date are not specified. On the Western Branch, railway axis E59, between Świnoujście and Gliwice, a number of projects is ongoing whose completion will result in speed, axle load and train length compliance. These include works between Poznań and Wrocław (389.8 € million) and on the passenger section Błotnica Strzelecka – Opole Groszowice (45.7 € million), which are nearly finalised, as well as between the Dolnośląskie Voivodship border and Czempiń station, currently foreseen to be completed by 2020 (364.8 € million). Additional works are planned between Szczecin and Poznań, which are expected to be completed by 2023 (881.3 € million). The project for the modernisation of the Poznań central railway station is nearly completed (11.3 € million); works for the improvement of the freight Poznań bypass are also planned, for which the implementation dates are however to be defined (10.5 € million). Modernisation works are finally foreseen between Wrocław and Katowice, with no implementation dates specified as yet (134.6 € million). The investments considered by the Polish Authorities and listed in the current plans refer to the 2023 time horizon, including the ones for which implementation dates are not specified, which due to scarcity of financial resources are currently assumed to be realised after 2020, and completed by 2030. The implementation of these investments will contribute to the achievement of the required TEN-T standard on several corridor lines in Poland; however additional investments will be required to reach compliance by 2030. Based on the analysis of the corridor project list and of the impact of the investments on the KPIs at present, investments are missing to solve speed and axle load bottlenecks between Szczecin and Świnoujście as well as at the Wrocław node (sections Popowice – Mikołajów – Brochów). Speed limitations may also remain on the rail freight section Opole Groszowice – Rudziniec Gliwicki on the main itinerary Wrocław – Katowice (however the alternative routing Opole Groszowice – Gliwice Łabędy will be compliant, except from a very short non-compliant section in Kędzierzyn Koźle). 740 meters train length operating bottlenecks may remain between Szczecin and Świnoujście, between Wronki and Słonice along the main itinerary Szczecin – Poznań – Wrocław, at the Wrocław node (sections Popowice – Mikołajów – Brochów), on the main section Gdańsk – Tczew – Katowice, and between Opole and Gliwice on the main itinerary Wrocław – Katowice. Depending on limited availability of financial resources the achievement of the speed, axle load and 740 meters train length standards may be delayed at the Poznań node, and between Wrocław, Jelcz and Opole (the projects relating to the works on these sections are indeed included in the reserve list of the National Railway Programme and no national funds are foreseen to secure their full implementation).

- In the ***Czech Republic***, capacity and speed bottlenecks exist which affect operations of trains at the junctions in Ostrava and Brno where modernisation works are expected to be completed by 2022 (222.2 € million) and 2030 (756 € million) respectively. Upgrading works at the Břeclav node have been completed including instalment of remote control. The works for the reconstruction of the Přerov station have been divided into different construction phases. The first one has been already completed. The upgrade of the Přerov junction by developing the northern bypass, which represents the second construction phase, is planned to be completed by 2021 (84.6 € million). The third phase relating to the development of grade-separate crossing infrastructure between the Olomouc - Hranice and Prerov – Olomouc railway traffic is also foreseen to be completed by 2021 (26.1 € million). Except for speed limitations at the above mentioned nodes and train length on the entire corridor, the freight rail network is already compliant. At present it is expected that the network by 2030 will not be compliant only with respect to the 740 meters train length requirement, in particular on the mixed passenger and freight sections between Ostrava and Přerov. This is also due to the fact that most of the railway lines belonging to the corridor in the Czech Republic have been recently modernised in line with previous standards prescribing a lower train length parameter. Regarding the Ostrava - Přerov section, it is also noticed that this line may face capacity constrains in the future as commented in Chapter 3 above. About this a TEN-T comprehensive railway line parallel to the corridor is currently considered to be upgraded at high speed standard, between Břeclav and Ostrava, which could increase capacity and facilitate the identification of functional solutions for the operation of longer trains along the corridor.
- In ***Slovakia***, bottlenecks are concentrated at major railway junctions in particular Žilina and Bratislava, where maximum speed is respectively of 60 km/h and 40 km/h. Works for the modernisation of the Žilina railway junction, including connection to the Žilina Teplička rail-road terminal will be completed by 2021 (234 € million). Studies and works for the modernisation of the Bratislava railway node, including its interconnection to the airport and ERTMS are planned to be completed after 2030, although the Devínska Nová Ves – Bratislava cross-border section and stations are expected to be improved by 2030 (926.3 € million). As part of the

modernisation of the node, speed and train length improvements on the cross-border itinerary Petržalka – Kittsee on the main route Bratislava – Wien are currently not expected to be undertaken. Except for speed limitations at the above mentioned nodes and on some very short sections between Žilina and Púchov and Krásno nad Kysucou and Čadca as well as train length on many corridor sections, the freight rail network is already compliant. At present it is expected that the network by 2030 will be fully compliant between Čadca and Bratislava with respect to all parameters.

- In ***Austria***, further to the two missing railway links, works for compliance to 740 meters train length operability are required. Some sections of the network are also operating close to capacity limits such as the Graz – Bruck/Mur railway line. As plans for the implementation of 740 meters train length are currently under development in Austria, it may be assumed that 740 meters train length standard will be achieved on all corridor sections by 2030. Concerning the other parameters, the national network is already at standard, except for line speed on the short section Wien Meidling – Wien Inzersdorf within the Wien urban node, where speed is in any case not expected to reach 100 km/h for freight trains even after completion of the upgrading of the section by 2023. This can be justified by topographic, noise and socio-economic cost-benefit considerations.
- In ***Italy***, works are required on the corridor lines to reach 740 meters train length operability. In the medium-long term capacity issues may exist on the Venezia – Trieste railway line. Upgrading works to support capacity expansion are also foreseen at the Venezia/Mestre and Udine nodes. The corridor lines are already compliant with respect to all parameters except train length. This KPI is assumed to be achieved by 2030.
- In ***Slovenia***, works are required to improve the standards of the network particularly with respect to speed and train length. Works for the modernisation and improvement of the section Poljčane – Slovenska Bistrica, including railway stations Poljčane and Slovenska Bistrica as well as works at the Pragersko station and on the section Zidani Most – Celje and Maribor Šentilj (Austrian border) are either ongoing or planned to start by 2018 at the latest, which are expected to be completed by 2020 (376.5 € million). Studies are ongoing for the improvement and upgrading of the sections Ljubljana – Zidani Most (further to the border between Slovenia and Croatia) and Ljubljana – Divača, further to Sežana and to the border between Slovenia and Italy. The works are expected to be undertaken after 2020 and to be completed by 2030 at the latest (according to the first results of the prefeasibility study the total envisaged cost exceeds 1 € billion). The modernisation of the existing track between Koper and Divača was recently completed. Works for the elimination of a technical bottleneck at Bivje are ongoing and planned to be completed by 2020 (21.4 € million). Studies for the construction of the second track on the line Koper – Divača have been recently finalised. A special purpose vehicle company (Second Track Koper- Divača - 2TDK) has been established which will act as a promoter of this initiative. The works are planned for implementation in the period 2017-2025 in support of the planned expansion of the port terminal infrastructure (960.1 € million). Based on current planning activities, ongoing works and studies it can be concluded that the Slovenian Baltic-Adriatic corridor network is expected to be compliant by 2030 with respect to axle load and train length. Whilst the planned projects are at least deemed to improve speed parameters on the corridor sections, studies have been finalised to ensure compliance will be achieved by reaching the standards set in the TEN-T Regulation and/or support requests for derogation according to Art. 39, point 3.

Deployment of ERTMS

ERTMS is currently planned to be deployed by 2030 on the entire corridor lines, investments are still missing on the corridor list which include the Polish central branch of the axis between Tczew and Katowice, the section Wrocław – Jelcz – Opole – Katowice, the Warsaw Railway Node and particularly the Polish side of the Opole – Ostrava and Katowice – Ostrava sections, as well as between Katowice and Čadca along the cross-border itinerary Katowice – Žilina. Project costs for ERTMS projects in Austria are also still to be defined.

- In ***Poland*** ETCS Level 1 was installed on the Eastern branch of the corridor, section CMK Grodzisk Mazowiecki – Zawiercie in 2014 (12.40 € million). The works for the modernisation of railway line E65/C-E65 on the section Gdynia – Warszawa which are planned for completion by mid of 2018 also include ETCS Level 2 instalment (142 € million). The ongoing modernisation of the railway line Warszawa – Łódź on the section Warszawa Zachodnia – Grodzisk Mazowiecki foresees ERTMS technology implementation works expected to be completed by mid of 2018. ETCS Level 2 is furthermore planned to be installed on the E59 between Wronki – Słonice as part of the works for the modernisation of the line, expected to be undertaken between 2020-2023. On railway line E30, section Legnica – Wrocław – Opole, ETCS Level 2 is expected to be installed by 2018 (26.46 € million). Works for the modernisation of the main passenger lines E30 and E65 in the Śląsk area (on section Będzin – Sosnowiec – Katowice – Katowice Ligota, without specified time schedule), include the instalment of the Remote Train Control system in view of future deployment of ETCS Level 2, subject to definition and confirmation of the National Plan for the Implementation of the Technical Specification for Interoperability "CCS". Finally, horizontal actions aiming at constructing ERTMS/ETCS on core TEN-T network lines as well as GSM-R on PKP PLK S.A. railway lines are also foreseen. The scope of the ERTMS/ETCS covers several national sections including sections Szczecin Dąbie – Poznań – Wrocław and Wrocław – Katowice, expected to be completed by 2023 (0.4 € billion). The scope of the GSM-R project covers the whole country network, approximately 13,800 km of railway lines, including all Baltic-Adriatic corridor lines, except the sections Gdynia – Warszawa – Grodzisk Mazowiecki and Wrocław – Brzeg – Opole, on which GSM-R is implemented as part of the ongoing works to be completed by 2018 (0.7 € billion). The National Plan for the Implementation of the Technical Specification for Interoperability "CCS" approved in June 2017, foresees implementation of ERTMS on all corridor lines. Investments are however missing on the corridor project list for the implementation of ERTMS on the Central branch of the corridor between Tczew and Bytom, on the section Opole Groszowice – Rudziniec Gliwicki on the main itinerary Wrocław – Katowice as well as on the cross-border sections between Poland and the Czech Republic, Opole Groszowice – Kędzierzyn Koźle – Racibórz – Chałupki and Katowice – Pszczyna – Most Wisła – Zebrzydowice – state border, and on the cross-border section between Poland and Slovakia, Most Wisła – Żywiec – Zwardoń.

- In the ***Czech Republic*** GSM-R is in operation on the entire corridor excluding the section Brno – Přerov. ETCS Level 2 is envisaged to be deployed on the same corridor sections by 2018. Works are ongoing on the sections between the border PL/CZ – Petrovice u Karviné – Ostrava – Přerov – Břeclav – border CZ/AT (24.1 € million). The railway line Brno – Břeclav is already equipped with ETCS Level 2 since March 2017, but it is still at the testing phase. The section Brno – Přerov and the Brno node will be equipped with ETCS Level 2 as part of the projects for the modernisation of the respective infrastructure by 2024 and by 2030.

- In ***Slovakia*** GSM-R is in operation between Bratislava and Čadca. Thanks to the recent completion of works on sections Žilina - Považská Teplá and Trenčianská Teplá – Zlatovce, ETCS Level 1 is currently in operation between Žilina and Považská Tepla and between Púchov and Svätý Jur. ETCS Level 2 is also installed on the Žilina – Čadca railway line. Deployment of ERTMS on the remaining sections of the corridor is planned as part of the improvement and upgrading works of the national rail infrastructure. ETSC Level 1 will be deployed on the section Trenčianská Teplá – Púchov by 2020. Deployment of ETCS Level 2 at the Bratislava node is planned for completion by 2030 as part of the modernisation of the node, also including cross-border sections between Devínska Nová Ves (SK) – Marchegg (AT) and Petržalka (SK) – Kittsee (AT). At the cross-border section Čadca – Skalité, ERTMS is currently not envisaged to be deployed before 2030, although ETCS Level 2 is foreseen to be installed in the future.

- In ***Austria*** GSM-R is pervasive on all sections of the corridor, whereas ETCS Level 2 is installed so far only on the subsections connecting Bernhardsthal to Wien's main station. According to the investment plans of ÖBB Infra, other sections of the Baltic-Adriatic Corridor, Pottendorf/Wien – Wampersdorf and Graz – Klagenfurt (Koralm railway line), will be ETCS Level 2 compliant in 2024 and the section comprising the Semmering tunnel will be ready by 2026. Investments are included in the Baltic-Adriatic corridor list which cover the entire axis; whilst the costs for these investments are still to be defined, it is assumed that ERTMS technology will be installed by 2030 on all corridor sections.

- In ***Italy*** ETCS Level 1 or Level 2 are foreseen to be implemented on the sections between Padova and Villa Opicina by 2020 and on the remaining sections of the corridor by 2030 (217 € million). These investments are part of a wider project also including sections/nodes located on and/or common to the Mediterranean, Scandinavian-Mediterranean and Rhine-Alpine corridors. ERTMS on the cross-border section between Villa Opicina, Sezana and the border with Slovenia will be installed as part of the upgrading of the cross-border section.

- In ***Slovenia***, with the exception of railway line Pragersko – Maribor – Sentilj/Spielfeld – Strass (border AT/SI), ETCS Level 1 technology is currently installed on the corridor sections of the Baltic-Adriatic Corridor. Works for GSM-R instalment on the entire corridor have been completed by September 2016. ETCS Level 1 on the Pragersko – Maribor – Šentilj section is currently planned to be installed by 2022 (7.5 € million).

Technical compliance map for railway infrastructure

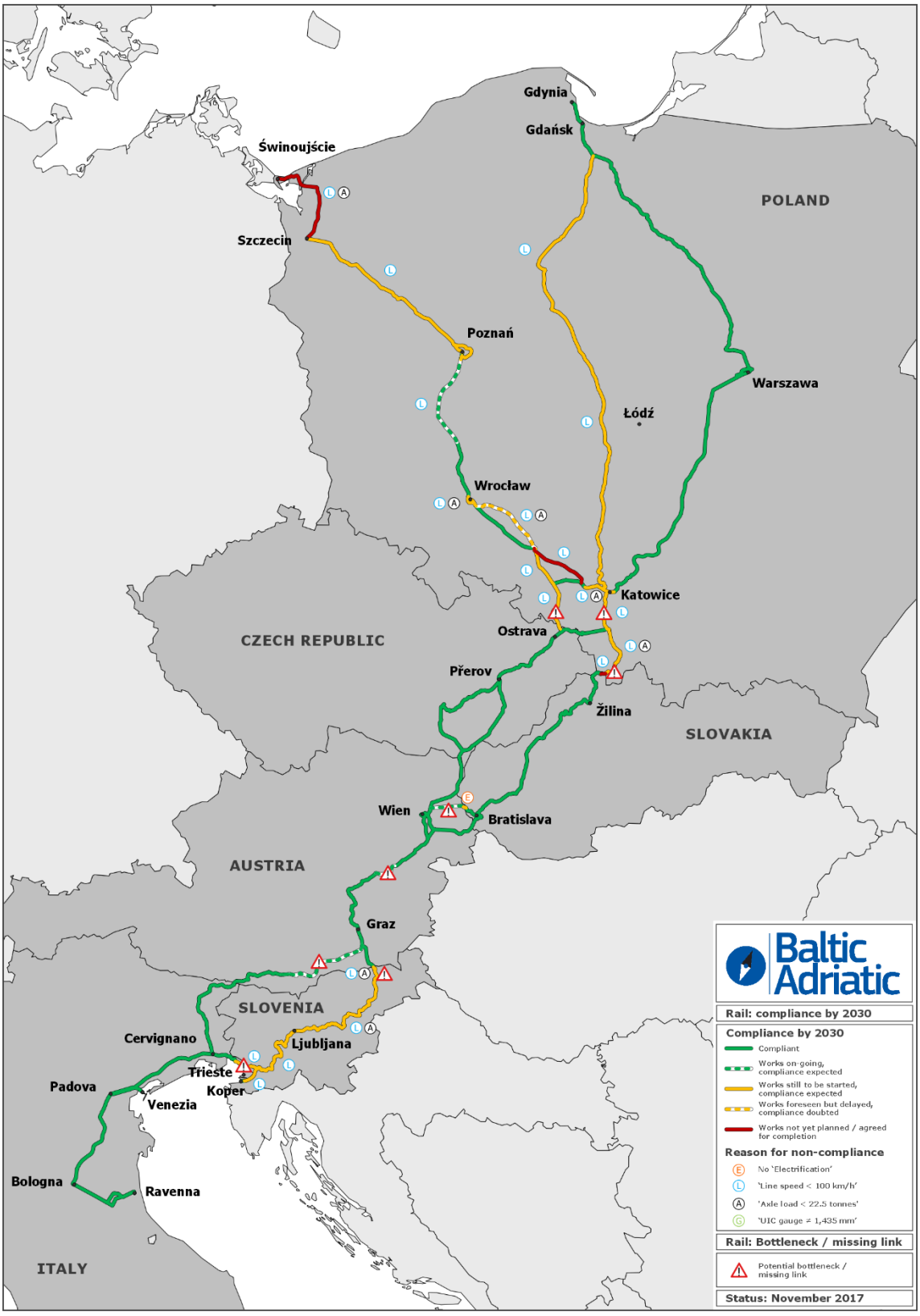
A technical compliance map for the railway infrastructure has been developed (see Figure 14) for a better representation of the likely status of the corridor at 2030, considering the impact on the critical issues of the corridor infrastructure of all the ongoing and planned investments.

The map is based on the TENtec system encoded sections and shows the prevailing standard on these segments with reference to electrification, axle load, line speed and track gauge. The colour of the lines refers to the planned works and their impact on the corridor compliance by 2030, whereas the non-compliance icons show the problems at the time of the analysis (2017).

Based on current plans and foreseen projects, the rail network of the Baltic-Adriatic Corridor, including cross-border sections, is expected to be complete by 2030 (with the construction of the Koralm railway line and tunnel and Semmering tunnel) and overall modernised. The identification of all the required investments, the definition of the scope of the projects, their costs and their time-schedule for implementation is however missing for some sections or requirements set in the TEN-T Regulation, which makes the development of a fully compliant and functional corridor by 2030 still a potential bottleneck:

- There are some sections where no investments are planned yet to comply with the standards, particularly affecting speed. The requirements of the TEN-T Regulation are not fully met at present at some rail-road terminals, nodes and junctions and may not be achieved in the future. Sections crossing core urban nodes may also fall short in meeting the requirements of the Regulation especially for speed. However, all the above bottlenecks are not of any critical stage for the full functioning of the corridor.
- 740 meters train length compliance and full ERTMS deployment on many corridor sections are still open questions at present. In this regard plans by the concerned infrastructure managers are currently under definition/review which are expected to solve these gaps. Particularly regarding the 740 meters train length compliance, a study is currently foreseen to be implemented by the Baltic-Adriatic Rail Freight Corridor aimed at understanding the market needs and solutions to improve the operational performance of the corridor lines. The study may also propose solutions for the development of the investments gradually and progressively at specific nodes, stations and junctions, based on traffic and train scheduling.

Figure 14: Rail infrastructure scenario by 2030 vis-à-vis the planned investments and main bottlenecks



Source: Baltic-Adriatic corridor study consortium; Note: a) Based on Art. 39, point 3, Slovenia is evaluating the possibility to apply for an exemption to fulfil the requirement relating to speed for freight transport on part of their railway network should such case be justified.

Specific details are provided below concerning the possible persisting bottlenecks on the corridor railway lines at the critical cross-border sections and on the national railway lines. Overall the analysis of the project list vis-à-vis the functioning of the corridor lines seems more pointing to the need to turn the plans and project list into a mature and stable pipeline of projects, rather than showing gaps in terms of infrastructure development projects:

- ***Critical cross-border sections***: The projects planned for the development of the Opole (PL) – Ostrava (CZ) and Katowice (PL) – Žilina (SK) cross-border sections on the Polish side are included in the reserve list of the National Railway Programme, and for some of them the implementation dates are to be confirmed. Whilst these projects may be either partially or fully implemented in the period after 2020, the required speed and axle load standards on these lines are in any case assumed to be reached by 2030 by the Polish Authorities.

  Works for the partial double tracking, upgrading and electrification of the Bratislava (SK) – Wien (Stadlau) (AT) cross-border section have commenced in October 2016 on the Austrian side; these are expected to be completed by 2023. The full double tracking of the remaining single track sections will happen in a later phase depending on the transport demands. Other projects aimed to modernise and upgrade the other critical cross-border sections have not progressed since the inception of the new TEN-T policy in 2014. For these sections either one or all of the three main administrative steps of project implementation are still to be completed, namely: land acquisition, Environmental Impact Assessment and final project approval by relevant governmental and administrative authorities.

  Finally, ERTMS is not expected to be deployed on the Polish side of the Opole – Ostrava and Katowice – Ostrava sections and between Katowice and Čadca along the cross-border itinerary Katowice – Žilina. At the same cross-border sections, 740 meters length compliance is also currently not expected to be either partially or fully achieved except on the Polish and Czech side of the Opole-Ostrava and Polish and Slovak side of Katowice–Žilina cross-border sections. 740 meters length compliance is also not expected to be achieved between Bratislava and Wien on the Slovak section Bratislava – Petržalka. In Austria both ERTMS and 740 meters train length are assumed to be implemented on all corridor sections, although the investments in the project list are still to be fully defined also concerning cross-border sections.

  The situation described above makes all critical cross-border sections still a potential bottleneck, particularly under the management and administrative stand points of the definition and implementation of the planned solutions.

- ***National railway lines***: All the national sections are expected to be compliant with respect to axle load and speed by 2030, except between Szczecin and Świnoujście as well as at the Wrocław node (sections Popowice – Mikołajów – Brochów). At this stage, speed limitations will also remain on the rail freight section Opole Groszowice – Rudziniec Gliwicki on the main itinerary Wrocław – Katowice, although the alternative routing Opole Groszowice – Gliwice Łabędy will be compliant. The short cross-border section Zwardoń – Skalité will also not be at standard with respect to speed. These are the only non-compliant sections of the Baltic Adriatic Corridor where no investments are currently planned. Works are also planned for the modernisation and upgrading of the Slovenian railway network between Divača and Maribor, where a study is ongoing to confirm the scope of the works particularly regarding the definition of the speed standards of the planned solutions. The Slovenian authorities are fully committed to develop the corridor at standard by 2030; however based on Art. 39, point 3, they are also evaluating the possibility to apply for an exemption to fulfil the requirement relating to speed for freight transport on part of their railway network should such case be justified. In consideration of the fact that both the investments to modernise the whole section and the study to fully define the scope for possible derogations are already included in the Baltic-Adriatic corridor project list, the work plan expects reaching compliance on the whole section between Divača and

Maribor by 2030. The completion of the ongoing analysis either resulting in the confirmation of the scope of the investments to reach compliance or reflecting a need for a possible agreement between the Slovenian Authorities and the European Commission on the exemption from the speed standard is expected before the next revision of the work plan. In absence of agreement on the results, the current positive assessment will be revised on the basis of the effective impact of the construction works included in the project list, reflecting any possible doubt about the attainment of the standards of the network by 2030.

With respect to speed, infrastructure parameters will also fall short in meeting the KPI targets in some national short sections of the eastern branch of the corridor in Poland between Gdańsk and Warszawa, where modernisation works have already been completed. These are located by Tczew and Iława and between Nowy Dwór Mazowiecki and Modlin, due to technical constraints (line geometry). According to the list of investments planned up until 2023, on these lines speed targets will not be further improved. Within core urban nodes speed limitations are currently expected to persist after completion of the planned works at Warszawa, Wrocław, Katowice, Bratislava, Wien, and possibly Ljubljana. Finally, speed limitations currently exist at short subsections of the Ostrava and Brno rail nodes as well as at the Žilina node and following short sections between Žilina and Púchov, and between Krásno nad Kysucou and Čadca. These are expected to be solved by means of implementation of the planned investments. However, in all the above mentioned cases, the prevailing line speed of the sections is already up to the standard, and speed limitation at urban nodes could be subject of derogations from standard. Hence, these segments are not shown in the above technical compliance map in this report.

Due to limited availability of financial resources the achievement of the speed and axle load standards may be delayed in Poland at the Poznań node, and between Wrocław, Jelcz and Opole. The projects relating to the works on these sections are indeed included in the reserve list of the National Railway Programme and no national funds are foreseen to secure their full implementation. Whilst the works on these lines may be implemented in the period after 2020, the possibility to reach the required speed and axle load standards by 2030 remains uncertain at present. For these investments and for other initiatives on the corridor project list the implementation dates are not defined at present. Albeit not reflected in the current analysis of the technical compliance, the lack of this information, further to the unavailability of financial resources, seems adding elements of risk in terms of project maturity.

Based on the analysis of the current investments, 740 meters train length compliance along the corridor will remain unachieved in many sections in Poland, Czech Republic and Slovakia, particularly in urban areas. Though not critical for the overall performance of the corridor, compliance of railway accessibility to rail-road terminals in terms of train length and electrification shall also be considered for improvement, especially where these facilitate open access to multimodal infrastructure.

Road infrastructure

The road network is currently expected to be fully modernised at motorway/expressway standard by 2030, including cross-border sections.

Road cross-border sections

Two road cross-border sections (out of a total of seven along the corridor) have been identified as critical in terms of compliance as these two sections are neither motorways nor expressways.

- **Katowice (PL) – Žilina (Brodno) (SK)** [Zwardoń (PL) – Skalité (SK)]: The works for the development of the S1 express road on the Polish side, sections Kosztowy – Bielsko-Biała – state border, including the Węgierska Górka bypass, is expected to be completed by 2022 (1,203.7 € million). The development of the D3 for the upgrading of the road infrastructure to motorway/express standards on the Slovak side are ongoing. The sections Svrcinovec – Skalite – Zwardoń have been already completed. The Čadca bypass between Čadca (Bukov) and Svrčinovec is currently under construction, with expected completion by 2020 (229.1 € million). The remaining segments between Žilina and Čadca are planned to be completed by 2024 (816.7 € million).
- **Brno (CZ) – Wien (Schwechat) (AT)** [Mikulov (CZ) – Mistelbach (AT)]: On the Austrian side works have been recently completed for the upgrading of the motorway A5 from Schrick to Poysbrunn. Additional works for the construction of the last segment of the cross-border section, adopting a 2x1 lane carriageway project solution are expected to be completed by 2019. The upgrading of the entire road to motorway standard up to the border is foreseen by 2027 (428.7 € million, including the costs of the recently completed projects). On the Czech side, studies including an updated Environmental Impact Assessment have been finalised for the D52 Pohořelice – Perná – border CZ/AT section; the revision of the regional land use plan has been completed and the preparatory works for this road are under development. Works are planned to be completed by 2030 (380 € million).

National roads

As regards national roads, critical issues exist for Poland, Czech Republic and Slovakia where a completion of the modernisation of the motorway network is also needed in addition to the upgrading of the cross-border sections.

- In ***Poland***, part of the road infrastructure belonging to the corridor including section on the A1, S3, S7 and A4 are being upgraded or are planned to be upgraded by 2024 to comply with the Regulation (8,151.3 € million).
- In the ***Czech Republic***, the D1 motorway section between Říkovice – Přerov – Lipník nad Bečvou, including the Přerov bypass, is planned to be completed by 2022 to reach compliance (453.4 € million), the D1 section Brno – Holubice is planned to be upgraded to six lanes with expected completion by 2028 – 2035 (241.8 € million).
- In ***Slovakia***, the section of the D3 between Žilina (Brodno) and Žilina (Strážov), representing the western bypass of the Žilina city has been completed in December 2017 (254.9 € million). This segment of the D3 which is also directly interconnected with the Katowice – Žilina cross-border section, is expected to solve traffic congestion on the existing roads I/11, I/60 and I/61. Upgrading works for sections and junctions of the D1 motorway between Trnava and Bratislava are planned to be completed by 2027 (832.6 € million).

Improvement of last mile connections of ports

All the sea and inland ports along the Baltic-Adriatic Corridor are already connected to the rail and road infrastructure. However, investments are required to improve the standards and performance of the last mile sections of the core network to ensure interoperability of the corridor infrastructure, increase its capacity facing port terminals expansion and mitigate the impact of transiting of long-distance traffic to and from core city ports in their urban areas. Specific details on the description of the critical issues at the ports and the planned investments are given in the box below. As a result of these projects, all last mile connections to the ports are planned to be improved towards reaching the requirements set in Regulation (EU) 1315/2013 and support port capacity and operation expansions.

- *Port of Gdynia* – Concerning rail transport, works for the improvement of the standards of the railway lines interconnecting the terminals to the main lines 202 and 201 belonging to the Baltic-Adriatic Corridor are required. Projects for the improvement of the technical parameters are foreseen, covering among others the implementation of Layout Command Control within the port area, electrification of access to the container terminal, instalment of Remote Train Control in view of future ETCS implementation as well as construction of road and railway bridges to improve safety and capacity. Works are planned to start in 2018, expected to be completed by 2020 (190.9 € million). Works inside the port area to increase the throughput capacity of the rail infrastructure are also expected to be implemented between 2021 and 2027 (59.8 € million). Some other modernisation works are also planned, including reconstruction of railway access to the Western port areas of the port of Gdynia, with expected completion of the works by 2020 (approximately 17.7 € million). Works on the TEN-T comprehensive partially non-electrified railway line 201 are also planned; this representing the railway line that will be predominantly used by the traffic generated by the port. Regarding road connections, the S6/S7 express road is already in good condition up to the junction with Morska Street in Gdynia. However, critical issues exist in the road network providing access to the port: the Kwiatkowski Viaduct although recently completed (2008) represents a critical issue in terms of axle load standards and the Kwiatkowski Route registers high traffic levels which may turn into a capacity issue particularly in view of the further development of the traffic at the port. The upgrading of the port's surrounding urban road network is also under consideration which could help solving the existing and future capacity bottlenecks. The actions addressing the road bottlenecks are under consideration/definition by the concerned stakeholders at present which may be implemented by 2030: reconstruction of Kwiatkowski viaduct, construction of Droga Czerwona and upgrading of Polska Street and Janka Wiśniewskiego Street.
- *Port of Gdańsk* – About rail interconnections, modernisation works on railway line 226 are ongoing which include construction of the second track, increase in axle load and operating speed standards as well as reconstruction of bridges. All activities are expected to be completed by 2018 (76.2 € million). Investments aiming at improving the railway connection to the port (in particular improvement of railway infrastructure within the railway stations Gdańsk Port Północny, Gdańsk Zaspa Towarowa and Gdańsk Kanał Kaszubski, construction of a road viaduct and development of a Local Control Centre between Gdańsk Port Północny and Gdańsk Kanał Kaszubski, electrification of railroad no. 965 as well as instalment of Railway Traffic Control devices in view of future ETCS implementation) are foreseen to be implemented with expected completion date by 2020 (141.5 € million). Concerning road last mile connections, the construction of a road tunnel and a rail bridge to cross the Martwa Wisła River have been recently completed which improved accessibility to the port; the first one allowing direct interconnection with the A1 as an alternative to the existing interconnection with the S7, and the second one increasing capacity on the existing line. The improvement/upgrading of the Nowa Kościuszki street, resulting in the completion of the Gdańsk ring road, also represents a critical issue in terms of road accessibility to the port.
- *Świnoujście and Szczecin ports* – Regarding rail transport, train length and freight speed limitation are currently affecting railway accessibility to the ports. Modernisation works are planned to increase axle load to 221 kN/axis for the main existing line tracks and stations and up to 245 kN for the reconstructed and newly constructed sections. The reconstruction of the railway viaduct on line no. 990, the electrification of railway lines no. 990 and no. 996 and the elimination of bottlenecks at Szczecin Port Centralny and Świnoujście stations are also foreseen. All the initiatives are expected to be completed by 2020 (143.67 € million). About road interconnections, access to the port of Szczecin is primarily provided through the national

road no. 10, Parnica viaduct and local roads. The reconstruction of the local road communication system in the area of Międzyodrze is currently under consideration, the works expected to be completed by 2020 (69.1 € million). Road access to the port of Świnoujście is provided by the national road no. 3 and lower class roads (Poviat roads). Short segments of both national road no. 3 and Poviat roads require upgrading works.

- *Wien and Bratislava inland waterways ports* – The two inland waterway ports of Freudenau in Wien and Bratislava are both located on the Danube River. These ports are planned to be expanded aimed at further increasing their capacity and competitiveness to support the development and growth of intermodal services and transport. Also based on the relevant road and particularly rail services operated by Wiencont, investment plans at the Port of Wien emphasize the expansion of tri-modal facilities, particularly storage of containers and the modernisation of the handling equipment, in an endeavour to provide adequate service level required to encourage modal shift from road to rail and inland waterways. The expansion of the port's container handling capacities will emphasize land recovery and the construction of a new quay wall to optimise the operational efficiency. Regarding the interconnections of the two ports with the Baltic-Adriatic corridor by rail, the Freudenau port is connected with the railway network by a direct link (national code 124), parallel to national road 14. The Bratislava inland waterway port has its own siding network connected with the main railway network through the Bratislava – ÚNS freight station on the Baltic-Adriatic corridor freight branch (section Bratislava – Petržalka). As of road accessibility, the Fradenau port is interconnected with the A4 through national road 14 and motorway A 23. The Bratislava port has good connections with the motorway D1 on the Baltic-Adriatic Corridor, being only 0.5 km distant from the Bratislava – Prievoz junction on the D1 and R7 under construction (expected to be completed by 2020). No specific problems have been identified which affect last mile connections at present for the two ports; however critical issues exist which affect the navigability of the Danube river between the two cities and particularly in Slovakia, for which works are already ongoing or planned to be implemented by 2018-2020. In addition to the need to improve navigability in the section Freudenau – Slovak border, in the National Park Donau-Auen, works are planned between km 1880,260 and km 1862,000 in Slovakia, including dredging of the river bed and removal of obstacles. The reconstruction of the "old bridge" in Bratislava (completed in December 2015) and the possibility to operate simultaneously the two Gabčíkovo locks represent relevant projects to develop inland waterway transport services along the Danube. Regarding the port of Bratislava, modernisation works are also required for the improvement of both the rail and road infrastructure inside the port area.
- *Port of Trieste* – Concerning accessibility to the port by rail, a double track line is interconnecting the port to the Trieste – Venezia railway line, leaving from Campo Marzio, tunnelling and crossing the city. Furthermore, there is a single track line going from Campo Marzio directly to Villa Opicina, which is however temporary closed and with a steep gradient that prevents operation of heavy trains. Based on the current schedule, increases in the future traffic on the line in operation may lead to congestion. The port's development plans consider this "last mile" issue a critical one to ensure continuity in the operation of freight services. In addition to this, investments are deemed necessary to develop the railway terminal at Campo Marzio (Port Station) to improve operations at existing port terminals. Shunting and coupling of trains is indeed currently possible only at port terminals. Due to the limited length of tracks at these terminals more shunting operations and train manoeuvring is required to assemble trains even limited to 550 m length, which impacts on the effectiveness and efficiency of terminal operations. Investments to increase train length operations up to 750 m at Trieste C. Marzio station are planned for implementation as part of a wider initiative aimed at modernising the whole Trieste Campo Marzio station, increasing its capacity and performance in support of the development of intermodal services. The project, which also includes works for the improvement of the so called railway line "Linea di cintura" between Campo Marzio and Trieste Aquilinia, is planned to be completed by 2026 (77 € million). Works to improve the railway infrastructure within the port area and terminals as well as the construction of a new railway link in view of the development of the new logistics platform are also planned for implementation between 2016 and 2020 (36 € million). Concerning road last mile connections, a direct junction and a flyover (within the port) interconnect the Port of Trieste and its terminals to the main city road network and to the national highway and motorway networks, including the Baltic-Adriatic corridor links. Improvement works on the SS 202, also providing access to the port, have been completed for the stabilisation of the retaining walls (from km 9+850 to km 12+200) and for the structural repair of the viaduct "Molo VII".

- *Port of Venezia* – The rail and road infrastructure interconnecting to the port and within the port areas and terminals is overall compliant thanks to recently completed modernisation and upgrading works. Rail accessibility will be improved by means of upgrading of the rail links between the South Industrial Area of Marghera and Marghera Scalo Station, construction of the second track to the Fusina Ro-Ro terminal as well as construction of a new rolling stock vehicle maintenance and repair depot, all works expected to be completed by 2025 (42.5 € million). A first phase of telematic application works for rail traffic have been developed (Railway telematics systems for shunting operations – SIMA); additional improvements of SIMA and its integration with PCS and additional information systems relating to rail operations are ongoing, expected to be completed by 2018 (1.55 € million). In the long term, the existing railway connection is expected to become a possible capacity bottleneck, also causing traffic congestion problems at the Mestre railway node, which will require the development of a direct connection to the main railway line (following the railway section of the Baltic-Adriatic and Mediterranean core network corridors and the respective Rail Freight Corridors 5 and 6). Road investments have also been recently completed outside and inside the port area on the SR11, SS309 and SP81 up to the bridge located in via Volta; new parking areas near the Customs perimeter at the port have also been completed. Telematic application investments for road on the local roads interconnecting the port to the national motorway network have been completed in 2017 to increase fluidity and safety as well as to reduce congestion.
- *Port of Ravenna* – Regarding rail transport, works are planned to eliminate one level crossing on the line interconnecting the port to the Baltic-Adriatic corridor network as well to upgrade to P/C 80 standard the line between Castelbolognese and Ravenna and extend the existing infrastructure on the right side of the port canal by 2021. Additional upgrading and improvements of the existing infrastructure is also planned for implementation by 2026 (70 € million for all the above rail related projects). Works for the improvement of road accessibility to the port are also planned for the upgrading of the SS 309Dir and its interconnection to the SS 16, expected to be completed by 2020 (175 € million) as well as for the upgrading of the SS 16 (72 € million).
- *Port of Koper* – About rail last mile connections, the reconstruction of the existing track between Koper and Divača was recently completed. Works for the elimination of the technical bottleneck at Bivje are ongoing and planned to be completed by 2019 (21.4 € million). Studies for the construction of the second track on the line Koper and Divača have been recently completed; the works are planned for implementation in the period 2017-2025 to solve capacity bottlenecks on the existing line expected in the short period and support traffic growth and development of the Port of Koper (960 € million). The port capacities will also be upgraded in the period 2016 – 2020 (300 € million – including public and private port infrastructure expansion and equipment). As of road accessibility, investments are also planned to start already in 2016 for the development of a direct interconnection between the A1 motorway and the port, which are expected to be completed by 2023 (23.1 € million). In addition to last mile connections, works for the improvement of the road and rail internal infrastructure are also foreseen to be implemented by 2020 to improve accessibility (40 € million), and subsequently by 2030 in view of the expansion of the port infrastructure and operations (30 € million).

Urban nodes

The analysis of the rail infrastructure at urban nodes reveals that several main corridor lines are not at standard within most urban nodes at least in terms of train length and ERTMS. Specifically regarding speed and axle load, non-standard sections have been identified at the following core urban nodes: Gdańsk, Warszawa, Łódź, Katowice, Szczecin, Poznań, Wrocław, (Poland), Ostrava (Czech Republic), Bratislava (Slovakia), Wien (Austria) and Ljubljana (Slovenia). Investments are planned on the corridor lines in urban nodes which are both deemed to improve the performance of the infrastructure and increase capacity. Despite the implementation of the planned investments for the Baltic-Adriatic Corridor, possible rail capacity issues in the future have been identified for the urban nodes of Warszawa, Katowice, Bratislava, Wien and Ljubljana.

As for road, problems exist at present in Gdańsk, Warszawa, Łódź, Szczecin, Poznań, Ostrava, Bratislava, Wien, Bologna, Ljubljana. Issues are here usually related to capacity constraints and the need to improve safety and reduce congestion, considering the development of bypassing alternative routes or upgrading of corridor sections and junctions. Particularly regarding the corridor sections, the investments included in the Baltic-Adriatic corridor project list are so far deemed to solve capacity issues. Congestion problems may however remain in proximity of urban agglomerations and other major demand generation points located in urban areas as well as on the lines and roads interconnecting these nodes.

Improvements of multimodal infrastructure for the interconnection between transport modes to support modal shift from road to rail are also included on the list (Gdańsk, Szczecin, Łódź, Bratislava, Bologna) focussing on the development of urban transit and interchange facilities as well as ITS and ICT solutions for both passenger and freight transport.

Other KPIs for the development of a fully compliant corridor

Not strictly related to the specific corridor objectives, but still important to achieve full compliance by 2030, alternative clean fuels development shall be monitored closely especially at ports and airports. LNG related projects for maritime transport operations are included on the corridor project list for Gdynia, Świnoujście, Bratislava, Venezia and Ravenna. LNG fuel is available at the LNG terminal in Świnoujście, where it can be loaded onto road units, and bio fuel is also possible to be stored at airports (e.g. Wien). Alternative clean fuels are not yet in use except for road transport along the corridor. Facilities for ship generated waste relating to sewage treatment are also still not available at the Adriatic ports in Italy and no investments are foreseen in the project list at present in this regard.

5.3. Persisting administrative and operational barriers

To develop the Baltic-Adriatic Corridor as an interoperable multimodal infrastructure part of a single EU wide TEN-T core network, efforts expended in the preparation and implementation of infrastructure projects to fulfil the requirements of the TEN-T Regulation alone, are not sufficient. Administrative and operational barriers exist at present, which predominantly affect cross-border transport operations hindering the seamless and continuous flow of passenger and goods. These barriers shall be gradually overcome to allow the development of the corridor generating the expected benefits for the EU society.

Railway transport is particularly affected by administrative and operational bottlenecks, namely those issues relating to procedural and organisational or legal aspects affecting the functioning of transport services along the corridor. In 2017, the Baltic Adriatic Rail Freight Corridor started an analysis of the operational bottlenecks along the rail freight corridor. The analysis is performed by the *Performance Management and Operations Working Group (WG PM&O)* within the governance structure of the Baltic-Adriatic Rail Freight Corridor.

According to the analysis of this Working Group a disturbance was defined as operational bottleneck when it relates to:

- communication between Infrastructure Managers (IMs') Traffic Control Centres (TCCs) or among Railway Undertakings (RUs) or between RUs and IMs at the borders;
- or to operational rules between RUs and IMs at the borders.

The main categories of operational bottlenecks and possible solutions have been identified accordingly to the above definitions:

- *Bottlenecks related to communication:*

  a) Inadequate communication in situations of big disturbances. One of the preliminary results of the analysis is about malfunction in communication between IMs TCCs in situations of big disturbances on the network.
  This kind of operational bottleneck could be eliminated when all IMs of the RFC use the RNE tool TCCCom and have English fluent staff available 24/7 at TCCs in the future.

  b) Faulty communication of delays and arrival sequence of trains. Untimely inter-system communication of delays and arrival sequence of freight trains at some border crossings represents an operational bottleneck.
  Solving of this bottleneck requires the deployment of TAF-TSI messages for data communication in train planning & operations and of TAF-TSI compliant interfaces between national IT tools and the RNE tools like Train Information System (TIS) and Path Coordination System (PCS), whose deployment is already ongoing.
  TIS usage as a RFC-wide tool is an important measure as well, but it is vital that IMs feed it on time with accurate data and that international trains running with different numbers are linked in the system.

  c) Long dwelling times at cross-border sections. Insufficient communication between railway undertakings in takeover of trains leads to prolonging dwelling times on cross-border sections, which are particularly sensitive to congestion.
  Communication between cooperating RUs for international traffic should be improved to reduce the trains dwelling times at the border crossings. Particularly for the ad hoc traffic, often the path is requested separately to each IM at a different time in not coordinated way. The use of path coordination tools like RNE PCS for ad hoc international trains would contribute to the solutions of this communication barrier.

- *Bottlenecks related to operational rules:*

  a) Technical inspection of rolling stocks. Among operational rules leading to extensive dwelling times at international border crossings, the technical inspection of rolling stocks has been identified. For that, a better trust/cooperation scheme among RUs would be beneficial.

  b) Necessity to change locomotives. In addition, to reduce idle times at the border crossings, RUs should extend the use of multi-system locomotives and/or fasten the operations of changing the locomotives. Higher punctuality of freight traffic would largely be beneficial as well.

In order to solve the above communication and operational barriers the Railway Sector, particularly the Rail Infrastructure Managers, has set up the RNE – RailNetEurope, an organisation through which railway experts started developing tools and processes that would enable a more effective and efficient operation of international rail traffic. By such approach many processes, templates, handbooks and guidelines were already developed which together with the developed Information Technology (IT) tools might provide a solution to the barriers affecting long-distance international transport by railway. In this regard the following IT tools, already mentioned in the paragraphs above are worth describing, which are considered the most relevant ones by the RFC5 and RNE:

- *Path Coordination System (PCS)* - which is an international path request coordination system for path applicants, e.g. Railway Undertakings (RUs), Infrastructure Managers (IMs) and Allocation Bodies (ABs). This internet-based application optimises international path coordination by ensuring that path requests and path offers are harmonised by all involved parties. Input for international path requests needs to be placed only once into one system – either into the domestic application or directly

into PCS. For the efficient use the PCS or an interface between the national systems and the PCS has to be installed or developed.

- *Train Information System (TIS)* – which is a web-based application that supports international train management by delivering real-time train data concerning international passenger and freight trains. The relevant data is obtained directly from the Infrastructure Managers' systems.
- *Traffic Control Centres Communication „TCCCom" tool* – is a multilingual information exchange tool, working in 21 different languages to facilitate necessary communication between the Traffic Control Centres.

As also mentioned in the Rotterdam Sector Statement on Rail Freight Corridors titled *Boosting International Rail Freight* the further development and deployment of these IT tools is considered essential by the railway sector in order to solve the existing operational barriers and improve the performance of the European railway network, which shall also be financially supported by EU funds to accelerate the development of a Single Railway Area.

Further to the above, to support transition to a more rail-oriented transport market, open accessibility to terminals shall be always possible. Policy measures shall be also considered supporting the rail mode and mitigating external competition risks. These may also include pricing policies for road transport, also for the full internalisation of external costs of transport, inclusive of GHG emissions.

Regarding passenger transport by railways, some of the above-mentioned limitations concerning the infrastructure also apply. In addition when trying to enter the international rail passenger market, new operators are often facing barriers linked to inadequate implementation of previous railway packages or loopholes in previous EU legislation. Such barriers can be administrative (difficulties in obtaining a safety certificate or vehicle), operational (need for staff speaking all official languages along the route, volatility of infrastructure charges, access to operational facilities and services, difficulties to align train paths in domestic timetables to get suitable international paths, lack of the inter-availability of tickets) and also commercial (difficulties to use existing sales facilities on a fair and non-discriminatory basis or to rent space in stations). Due consideration shall be given to these barriers, especially in those cross-border areas where international rail passenger market services have some potential market or could be implemented to support cohesion between cross-border regions.

About **multimodal transport** operations of freights at the core ports and rail-road terminals no corridor specific issues are noticed. General aspects particularly relevant for the development of multimodal freight and combined transport fall however within the scope of the implementation of VTMIS and e-Maritime services and solutions aimed at promoting Single Window initiatives to access ports, track flows of vessels and transported intermodal vehicles, rolling stock and goods entering and exiting port areas; and/or simplifying administrative procedures associated to custom, safety and security processes. Activities and initiatives in these fields are already operative and under constant development/evolution (i.e. the Polish Port Community System under implementation by the Polski PCS Ltd., dedicated to the optimisation, automation and control of transport processes). These solutions are however found to apply more at the national/local scale and are not integrated and fully interoperable at the Union level.

Initiatives including pilot projects are also ongoing which relate to safety and security aspects of multimodal transport at rail-road terminals. Telematics solutions are furthermore in place or going to be implemented aimed at simplifying the administrative procedures related to multimodal transport. ICT real time information initiatives are in place or are being implemented even between nodes to monitor and increase the effectiveness and efficiency of the logistics chain and its basic operations. Still, these seem to be more local or in any case associated to the network of operations of the Multimodal Transport Operators rather than implemented at the European transport system scale. About these aspects the 2014 study "Analysis of the EU Combined

Transport" by the European Commission notices how combined transport seems lacking an "open data" ICT platform for exchanging booking, operational and tracking and tracing data between relevant companies involved in the combined transport supply chain. "Open data" means that the system has standardised interfaces and is not determined or controlled by a single actor.

In the same study it is noticed that further to the interoperability issues associated with the characteristics of the rail infrastructure and national systems (also including train weight, axle weight, loading gauge not allowing 4m high semi-trailers or transport of 9'6" high-cube containers) the development of rail combined traffic is currently hindered by total handling costs. This applies to a higher extent to continental shipments with at least two additional handlings compared to road transport. Substantial cost savings on the rail leg are required for the feasibility of combined services, given also the additional cost of the pre- and post- carriage legs by road. In this respect, the availability of inland terminals within a short road distance is a main prerequisite for users of combined transport services to ensure competitive door-to-door costs. In fact, disproportionately high last-mile costs arise if terminals are located off the main line. Also, efficient last mile rail connections and rail logistics terminals in the main ports are essential to support the growth in the maritime-based rail combined transport.

Finally, no corridor specific barriers have been identified which affect **other transport modes** infrastructure and services. However, in view of the growing trends in cross-border traffic operations and the target for the core network to support the development of long distance traffic across the Union, due consideration shall be given to the promotion and development of digital links and initiatives for the exchange of traffic data and provision of information to the users. This objective is paramount for all transport modes and for both freight and passenger transport. However, these actions would be particularly beneficial for road transport, at urban nodes, particularly at multimodal and transfer hubs. The future outlook seems to point to the development of cross-modal and borderless commercial solutions of mobility services. Services information and travel planner multimodal platforms as well as Mobility as a Service solutions at different territorial and operational scales are currently under development and implementation which are facing challenges particularly concerning the governance models and trust mechanisms required to set up and manage a common database of sensitive and commercial data on both service operations and users. Legal and administrative actions are required in addition to technological solutions to support the development of the digitalisation of mobility services along and across the corridors and in their urban nodes. This would be required also to facilitate the implementation of development of interoperable toll collection systems on the EU agenda since more than a decade (Directive 2004/52/EC - 2009/750/EC), and the provision of key data to users, including real time information and passengers' rights at corridor links and nodes.

6. Infrastructure implementation by 2030 and its environmental and socio-economic effects

According to Art. 47 of Regulation (EU) 1315/2013, the work plan shall also include, in addition to the analysis and identification of the investments and measures for the development of a fully compliant and functional corridor by 2030, details on the implementation of the projects, including time-schedule and financial resources. This is required to assess the technical and financial maturity of the investments, particularly those identified to reach the specific corridor objectives and the targets of the TEN-T policy. Furthermore the work plan shall also include an analysis of the impact of the development of the corridor in deploying innovative solutions, generate jobs and economic growth and reduce external costs of transport. The following sections are dedicated to the presentation of these elements of the work plan.

6.1. Cluster analysis of the project list - what has still to be done

The 551 projects in the Baltic-Adriatic corridor project list with a total investment volume of 76.9 € billion are likely to contribute to a significant development of the corridor towards the attainment of the requirements set in the TEN-T Regulation by 2030.

The specific objectives of the corridor and work plan priorities have been well addressed in the investment plans by the stakeholders. Indeed, as summarised at Table 3 (see Chapter 4.1 above), 186 projects, corresponding to more than 45% of the project list's total investment costs are related to the work plan priorities. As regards the remaining 365 projects, these are not less relevant if compared to the general objectives of the new TEN-T Policy.

A cluster analysis has been undertaken in this regard aimed at classifying the projects in terms of their relevance towards the achievement of the targets set in Regulations (EU) 1315/2013 and 1316/2013. 484 projects have been reviewed in total, excluding 67 initiatives related to studies only and/or horizontal projects (i.e. those not allocated to any core network corridor) and/or projects classified in the project list under the category 'other'. These investments have been classified into four clusters, generally applying one or more of the following criteria:

- Projects located on the so called pre-identified sections of the CEF Regulation as defined in Part 2 of Annex I to Regulation (EU) 1316/2013 (Cluster 1);
- Projects having a direct impact on the achievement of the infrastructure standards set in Regulation (EU) 1315/2013 (Clusters 1 or 2);
- Projects related to the improvement of capacity and performance of the TEN-T core network or to the implementation of horizontal priorities as defined in Part 1 of Annex 1 to Regulation (EU) 1316/2013 (Clusters 1, 2 or 3);
- Projects included in the list for possible developments and further improvement of the infrastructure, with a relatively minor direct impact on priorities set in the TEN-T policy (Residual Cluster).

Table 4 summarises the results of the cluster analysis for the different transport modes and categories of projects considered in the study.

Table 4: Cluster analysis: overall results

	New technologies and telematic applications	Rail & Rail ERTMS	IWW	Road	Seaports	Airport	Multimodal	Total
Cluster 1	31	126	7	25	86	8	11	294
Cluster 2	17	0	0	22	3	8	2	53
Cluster 3	3	0	1	11	0	19	0	34
Residual Cluster	2	23	0	33	2	44	0	104
Total	53	149	8	91	91	79	13	484

Source: Baltic-Adriatic corridor study consortium

The overall distribution of the projects confirms that the implementation of the Baltic-Adriatic Corridor project list is crucial to reach the objectives and targets of the TEN-T policy. 346 projects belong to clusters 1 and 2, corresponding to over 70% of the assessed projects. 138 projects only belong to cluster 3 and to the residual cluster. This is also due to the fact that many projects are proposed for the development and improvement of corridor links and nodes, which correspond to the pre-identified sections of the CEF Regulation (about 200).

Also based on the review of the persisting bottlenecks, the analysis of the project list seems showing that relatively minor gaps exist in terms of type and quantity of projects and that the projects appear relevant to reach the overall targets of the TEN-T policy and specific corridor objectives.

The list is however not satisfactory in terms of maturity and readiness for implementation of the planned investments. A scoring system has been developed as part of the project cluster analysis, also aimed at assessing the effectiveness of the Baltic-Adriatic corridor project list in providing a pipeline of mature projects to develop the corridor at standard by 2030. The following scores have been defined for the assessment of the maturity of the projects:

- Technical readiness (Tm): showing high maturity if all necessary technical steps of project implementation (i.e. Detailed Design/Detailed Implementation Plan/Administrative Permits and Licences) have been concluded (score 1). Medium maturity (score 0.5) is associated to the completion of the preliminary technical analysis (i.e. Preliminary project analysis/ Feasibility studies). In absence of any of the above conditions projects are considered not mature (score 0).
- Financial/economic maturity (Fm): high maturity rate has been given if projects have their Cost-Benefit-Analysis completed and full financing is guaranteed (score 1), medium maturity rate (0.5) if only one of this two conditions is met. Projects are not mature in all the remaining cases (score 0).
- Social environmental maturity (Em): set according to the presence/absence of the Environmental Impact Assessment (EIA): high maturity is given in case of complete/approved EIA (score 1), low maturity in case of EIA under preparation as well as no EIA (score 0).

Further to the above, a score for the institutional readiness (Im) of the projects have been also considered, equal to 1 for all the investments. This assumption is based on the fact that all projects have been proposed/revised/suggested by the relevant institutions involved in the implementation of the corridor. A project maturity indicator has been finally generated assuming that each maturity criteria has the same relative importance.

A simple calculation was applied accordingly: Project Maturity Indicator= (Tm+Im+Fm+Em)/4, which is below or equal to 1. The results of this scoring exercise are summarised in Table 5. The values in the table correspond to the averages of the whole set of projects included in each cluster.

Table 5: Cluster analysis: project maturity

	Technical readiness	Institutional readiness	Financial/ economic maturity	Social environmental maturity	Project Maturity Indicator
Cluster 1	0.52	1.00	0.48	0.39	0.60
Cluster 2	0.54	1.00	0.50	0.54	0.64
Cluster 3	0.44	1.00	0.24	0.32	0.50
Residual Cluster	0.31	1.00	0.29	0.34	0.48

Source: Baltic-Adriatic corridor study consortium

Considering the possible score range between 0 and 1, the projects on the list show overall a low level of maturity. It is however positively noticed that the projects in cluster 1 and in cluster 2, which are more relevant to reach the priorities and targets set in the TEN-T policy show higher maturity indicators than the ones included in cluster 3 and in the residual cluster.

The analysis of the project list with reference to the project maturity is not encouraging overall, particularly for construction projects. Referring to the three main administrative steps of project implementation identified in the project list for the 356 investments concerning construction works it is noticed that land acquisition has been concluded for only 59 projects; the Environmental Impact Assessment has been approved for only 74 initiatives and the project has received final approval by the relevant governmental and administrative authorities only for 63 projects.

Focussing on funding and financing, Table 6 shows that considerable financial resources are still required to implement the projects included in the Baltic-Adriatic corridor list. The comparison of the total investment costs with the approved funds shows a gap of over 42.5 € billion that would still be needed to complete all 484 corridor projects assessed as part of the clustering exercise. It is moreover noticed that over 34.5 € billion of required financial resources relate to the implementation of projects belonging to clusters 1 and 2, of which over 32.4 € billion would be needed to complete projects in cluster 1.

Table 6: Cluster analysis: summary of financial results (€ million)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Total
Projects	294	52	34	104	484
Investment costs	58,294.6	2,714.1	5,429.8	6,876.6	73,315.0
Approved funds	25,923.6	587.5	2,029.0	2,223.0	30,763.1
Financial gap	32,371.1	2,126.6	3,400.8	4,653.5	42,551.

Source: Baltic-Adriatic Corridor study consortium

As also detailed in Table 3 of Chapter 4 above, the share of approved funds on the total investment costs for the whole Baltic-Adriatic corridor project list is only 44.0%. The same figure for the work plan priorities is higher, 54.3%. However, if excluding the Alpine crossings and ERTMS, the share of approved funds on total investment costs is in line or below the average for the entire list and more specifically: 43.1% for the rail cross-border sections, 39.2% for the modernisation of the railway lines in Cohesion Member States, 21.5% for the road cross-border sections, 29.2% for the port last mile connections, 37.2% for the urban nodes projects.

Referring to the work plan priorities, Table 7 provides the main summary data for the projects identified for their development.

Table 7: Projects for the development of the Baltic-Adriatic Corridor – work plan priorities

Work plan priorities	Number of Projects	Budget in € mln	Approved funds in %	Maturity index
Critical cross-border sections	***17***	***2,639.8***	***43.1%***	***0.52***
Katowice-Ostrava-Žilina Triangle cross-border sections	10	1,547.0	27.1%	0.63
Bratislava-Wien twin city cross-border section	2	554.8	100.4%	0.56
Other critical cross-border sections	5	538.0	30.1%	0.42
Missing links	***2***	***8,854.3***	***103.9%***	***1.00***
Modernisation and upgrading of the national railway networks - improvement of the quality and standards of the lines in Eastern Member States	***31***	***7,570.0***	***39.2%***	***0.74***
Deployment of ERTMS	***23***	***1,470.3***	***70.3%***	***0.55***
Critical road cross-border sections	***11***	***3,058.2***	***21.5%***	***0.80***
Developing hinterland interconnections inside and outside port areas	***34***	***2,306.9***	***29.2%***	***0.45***
Rail last mile connections outside port areas	9	923.9	69.4%	0.67
Rail last mile connections inside port areas	7	146.3	0.0%	0.32
Rail and road last mile connections inside port areas	3	66.8	43.1%	0.58
Road last mile connections outside port areas	11	1,126.6	0.0%	0.27
Road last mile connections inside port areas	4	43.3	6.7%	0.59
Development of the core network corridor within urban nodes and urban transport infrastructure ensuring interconnections between and within transport modes and a seamless connection between long distance and regional or local traffic flows	***68***	***9,286.4***	***37.2%***	***0.50***
Development of the rail infrastructure at core urban nodes	39	4,000.0	31.6%	0.53
Development of rail interconnections to core airports	3	675.0	20.3%	0.69
Development of interchange and transit systems at core urban nodes	4	533.3	18.8%	0.28
Development of the road infrastructure at core urban nodes	16	3,904.6	49.6%	0.47
Development of road interconnections to core airports	6	173.6	6.6%	0.50
Total project list	**551**	**76,864.1**	**44.0%**	**0.65**
Work plan priorities	***186***	***35,185.8***	***54.3%***	***0.65***

Source: Baltic-Adriatic corridor study consortium

Also the analysis of the projects for the development of the work plan priorities confirms the need to develop a more stable and mature pipeline of transport investments for the development of the Baltic-Adriatic Corridor at standard by 2030. Based on the information included in the Baltic-Adriatic corridor project list the level of maturity of most of the priorities is not satisfactory and there is a possibility that the projects identified for the development of the Baltic-Adriatic Corridor by 2030 may not be implemented due to the status of their preparation. The fact that projects are not ready for implementation may also represent a risk concerning the exact definition of their scope. This calls for specific measures to be put in place to mitigate risks relating to the development of the corridor by 2030:

- *Upgrading and modernisation of rail and road cross-border sections*: efforts shall be put in place by all concerned stakeholders including Infrastructure Managers and Member States to complete all the necessary steps and administrative procedures relating to the definition of the solutions and dates for the implementation of the actions for the development of these sections. Continuity shall be given to cross-border dialogues in order to ensure cross-border section projects are well defined and effectively implemented; and their development coordinated on both sides of the borders. The scope of the projects, particularly regarding ERTMS as well as speed and 740 meters train length for freight lines, shall allow the achievement of all the relevant standards.
- *Modernisation of national railway lines*: overall the persisting bottlenecks are deemed relatively marginal, which shall be filled in by means of identification of projects (e.g. on the Western branch of the corridor in Poland), or better definition of the projects already included on the list. The scope of the projects, particularly regarding ERTMS as well as speed and 740 meters train length for freight lines, shall allow the achievement of all the relevant standards. Requests for derogation from standard to reach compliance shall be presented and agreed with the Commission by 2020 where applicable, in order to mitigate risks of delay in the implementation of relevant projects and ensure the corridor will be compliant by 2030. The ongoing activities and studies by the Baltic-Adriatic Rail Freight Corridor concerning the operation of 740 meters trains along the corridor shall be considered to ensure a functional solution can be found for the improvement of this KPI, in view of a gradual achievement of the target set in the Regulation for the corridor infrastructure.
- *Last mile and hinterland connections of ports*: due consideration shall be given to the development of port last mile connections to support the expansion of the terminals and promote the development of intermodal transport and Motorways of the Sea operations. Also in line with the priorities and pillars of the Motorways of the Sea detailed Implementation Plan, specific attention shall be given to the improvement of the standards and performance of the rail infrastructure to ensure competitiveness of the corridor ports; and to transport digitalisation to simplify administrative procedures associated with maritime and intermodal operations.
- *Development of the corridor infrastructure at urban nodes*: make sure the projects on the list effectively promote the integration of the urban nodes into the TEN-T network, implementing measures and actions for the development of last mile sections, last mile connections and efficient transfer hubs for both passengers' and freight transport.
- ERTMS deployment: make sure the investments planned either specific to ERTMS technology or related to infrastructure modernisation and upgrading also including ERTMS equipment cover the entire network and are implemented in line with the updated European Deployment Plan.

In order to maximise the impact of the development of the corridor in terms of expected socio-economic and environmental benefits, the following shall also be considered:

- Identify and implement actions for the solution of operational bottlenecks affecting railway transport particularly across borders as well as policy measures in favour of railway transport. The analysis of the persisting administrative and operational bottlenecks and the market study show indeed that infrastructure development projects are not sufficient to develop the corridor as an interoperable infrastructure and support modal shift from road to rail. Investments in the field of innovation i.e. alternative clean fuels and more efficient means of transport, in particular zero/low emission vehicles, as well as behavioural and sustainable freight transport actions to reduce the overall emissions generated from motorised mobility and transport shall also be encouraged to reduce the impact of transport on the environment and mitigate climate change.
- Maximise the coordinated development of alternative clean fuels and telematic applications projects along the corridor to avoid fragmentation, gaps or concentration of facilities at the Member State, section or node levels. For the development of an interoperable corridor, solutions and measures shall ensure urban and transport nodes are effectively integrated into the corridor, also with respect to the availability of alternative clean fuels and ITS/ICT solutions for the development of multimodal transport.

6.2. Innovation deployment

The impact of the development of the Baltic-Adriatic Corridor within the wider TEN-T network in terms of deployment of innovative solutions has been assessed as part of the 2015-2017 corridor studies. Different categories of possible innovation projects have been identified matching with the criteria and requirements set in Articles 31, 32, 33 of Regulation (EU) 1315/2013 and with the findings and recommendations foreseen in the following *Issue Papers* elaborated by the European Coordinators in 2016:

- Enabling multimodality and efficient freight logistics;
- Boosting intelligent transport systems (ITS);
- Boosting new technologies & innovation;
- Effectively integrating urban nodes.

An aggregated statistical review of the projects has been performed referring to the following additional elements:

- Assessment of the type of innovation, aimed at distinguishing between catch-up, incremental or radical innovation initiatives;
- Assessment of project innovation character with respect to: the main impacts in terms of its contribution to achieve EU's transport policy objectives through innovation; barriers that may hinder the success of the project or the market uptake of its results; enablers that may facilitate the success of the project or accelerate the market uptake of its results. Scalability in terms of capacity to do more with a given product or innovation. Transferability, which refers to the capacity to apply the learnings from one project in different locations;
- Assessment of the impact on decarbonisation, with an aim to identify and select those initiatives directly addressing and/or impacting on CO2 reduction or modal shift.

Overall 161 innovation projects have been identified in the Baltic-Adriatic corridor project list, of which 147 ongoing or planned for development/implementation and 14 already completed. The 14 already completed projects relate to GSM-R or ERTMS deployment (6), MoS infrastructure and services (3) telematic applications and data sharing solutions at the ports of Wien and Venezia (3) and low carbon and decarbonisation (1), sustainable transport by freight (1). Both considering the overall limited number of innovation completed projects and the need to focus on the ongoing and planned initiatives and identification of possible gaps, the analysis in the following paragraphs focusses on the ongoing and planned projects.

Of the ongoing projects, 90 are telematic applications also including 31 ERTMS, 24 ITS and 25 SESAR projects; 9 initiatives relate to sustainable freight transport services and 48 projects are classifiable as other new technologies and innovation actions, which include 33 alternative clean fuel projects.

Table 8 summarises the analysis of the project list with respect to innovation projects.

Table 8: Innovation projects: aggregated statistical analysis of the corridor project list

	Telematic applications	Sustainable freight transport services	Other new technologies and innovation	Total
Total	90	9	48	147
Enabling multimodality and efficient freight logistics	1	9	13	23
Boosting intelligent transport systems (ITS)	90	0	12	102
Boosting new technologies & innovation	90	3	40	133
Effectively integrating urban nodes	0	6	9	15
Type of Innovation				
Catch-up	79	9	40	128
Incremental	11	0	2	13
Radical	0	0	6	6
Impacts				
Transport digitalisation	57	5	10	72
Safety improvement	82	1	3	86
Transport decarbonisation	0	4	36	40
Transport efficiency improvement through data sharing	83	5	10	98
Contribution to development of European technological industry	56	0	0	56
Others	0	0	3	3
Barriers				
Insufficient standardisation and regulation	0	0	0	0
High investment costs	0	0	5	5
Lack of sufficient public funding support	31	1	10	42
Enablers				
Research and industrial sectors coordination (which minimises death valley risk)	0	0	0	0
Existing public/private funding for real implementation of the innovation idea	31	1	10	42
Joint initiative from the Transport and Energy sectors	0	0	5	5
Scalability & Transferability				
Scalability	90	4	48	142
Transferability	79	9	38	126
Decarbonisation				
Addresses decarbonisation directly	0	4	33	37
Decarbonisation typology				
Alternative Fuels (electricity or hydrogen)	0	0	17	17
Alternative Fuels (Natural Gas or Biofuels)	0	0	16	16
Efficiency	0	0	2	2
Modal Shift	0	4	0	4

Source: Baltic-Adriatic corridor study consortium

The aggregated statistical analysis of the Baltic-Adriatic corridor project list seems to support the following considerations:

- The project list is satisfactorily addressing the definition, development and implementation of telematic applications as defined in Regulation (EU) 1315/2013, including the ERTMS, ITS, VTMIS/e-Maritime and SESAR horizontal priorities.
  - Efforts shall be made in this regard aimed at monitoring project preparation and implementation to ensure the Baltic-Adriatic Corridor will be fully at standard by 2030.
  - Regarding ITS, the list includes projects aimed at providing real-time information to users, rationalise traffic flows, implement e-calls and develop C-ITS solutions. Yet the project list and additional information available are not entirely adequate to understand the grade of coverage and availability of these solutions at the corridor level. Measures and/or actions could be considered for the coordinated development of these solutions along the corridor.
- The project list is also increasingly including clean fuel innovation projects. However particularly regarding solutions for road transport most projects seem relating to pilot initiatives. This seems mostly due to the lack of sufficient demand and consolidated commercial/business solutions.
  - The project list and additional information available are not entirely adequate to understand the grade of coverage and availability of these solutions at the corridor level. Measures and/or actions could be considered for the coordinated development of these innovations along the corridor. Particularly regarding clean fuel availability at transport nodes, including ports and airports, the infrastructure managers shall either include projects on the Baltic-Adriatic corridor list or present their strategy to reach the required standards.
  - Regarding alternative clean fuel innovation projects, the list positively includes initiatives promoted and/or implemented by entities from both the transport and energy sector, also co-financed by private stakeholders. This is deemed to represent a successful result also in terms of contribution of the CEF to the future development of innovative financial instruments.
- It is also positively noted that the project list includes an increasing number of initiatives for the development of interoperable solutions for multimodal transport, including data sharing, cooperation systems and real-time predictive analysis and sustainable transport services. On the other hand the overall number of projects impacting on the scope of the *Enabling multimodality and efficient freight logistics* issue paper is overall limited (23). The number of projects impacting on the *Effectively integrating urban nodes* issue paper is even lower, only 15, which may let assume the focus on the development of innovation projects concentrates so far more on the links and transport nodes of the corridor than in the urban nodes.
- Finally the number of incremental and radical innovation projects is overall very limited (19 out of 147 ongoing projects). Whilst this may be seen as a limited interest in the development of new technological solutions, the fact that the majority of the projects relate to catch-up innovations is an indicator of the attention by the stakeholders to focus on the priority of reaching the standards set in the TEN-T Regulation.

6.3. Impacts on Jobs & Growth

A *Study on the cost of non-completion of the TEN-T* has been undertaken by the European Commission in 2015 in order to estimate the impact of the development of the nine core network corridors on jobs and growth. A new assignment is also ongoing for the update of this important analysis aimed at investigating the impact of the corridor on the economy.

In view of the release of the results of this study an exercise has been performed as part of the 2015-2017 corridor studies applying to the investments cost of the Baltic-Adriatic corridor project list the multipliers factors for jobs and economic growth as derived from the ASTRA Input/Output model developed for the first study in 2015. To the scope of this assessment the projects contained in the list have been classified into three mutually exclusive categories:

- Cross-border projects;
- Innovation projects;
- Other and thus average projects.

Only those projects were considered that were not completed before 2016. The total costs of the investments planned for the period 2016 until 2030 have been aggregated under each category and the respective multiplier applied to the total budget for both GDP growth and Jobs. Table 9 provides the multipliers adopted for each category of projects.

Table 9: Multipliers for GDP and Jobs growth estimation

Categories	Type of measurement			Unit of measurement
	Average	Cross-border	Innovation	
GDP-Multiplier	4,35	16,8	17,7	bn€-GDP / bn€-INV
JOB-Multiplier	16.300	37.000	38.700	FTE-JobY / bn€-INV

Source: MFIVE based on the 2015 study lead by the Fraunhofer Institut für System und Innovations-forschung (ISI)

Table 10 details the different cost categories used as inputs for the estimation of the jobs and GDP that would be lost if the Baltic-Adriatic Corridor would not be developed.

Table 10: Project costs used for the estimation of the cost of non-completion of the corridor

Cost category	Amount in € billion
All projects ongoing 2016 and later	64.9
Cross-border projects	7.3
Innovation (by project category from the project list)	2.5
Innovation (alternative clean fuels)	0.2
Innovation (telematic applications)	4.6
Rail works including ERTMS*	14.3

*Source: Baltic-Adriatic Corridor study consortium; Note: * only the 10% of this total investment cost has been considered*

By applying the multipliers of Table 9 to the investment costs of the corridor project list of Table 10, the results of Table 11 have been estimated.

Table 11: GDP and Jobs lost assuming the corridor project list would not be implemented by 2030

Impact of CNC	GDP Growth	Jobs
Unit of measurement	bn € (2015)	Job-years
Total by CNC	489	1,403,661
Cross-border projects	123	271,552
Innovation	153	335,394
Other projects	213	796,715

Source: Baltic-Adriatic corridor study consortium

The projects for which cost estimates and implementation dates are available and that are planned to be implemented over the period 2016 until 2030 amount to an investment of 64.9 € billion (year 2015). The implementation of these projects will lead to an increase of GDP over the period 2016 until 2030 of 489 € billion (year 2015) in total. Further benefits will also occur after the year 2030.

The investments will also stimulate additional employment. The direct, indirect and induced job effects of these projects will amount to 1,403,661 additional job-years created over the period 2016 to 2030. It can be expected that also after 2030 further job-years will be created by the projects.

6.4. Modal shift and impact on decarbonisation and climate change adaptation

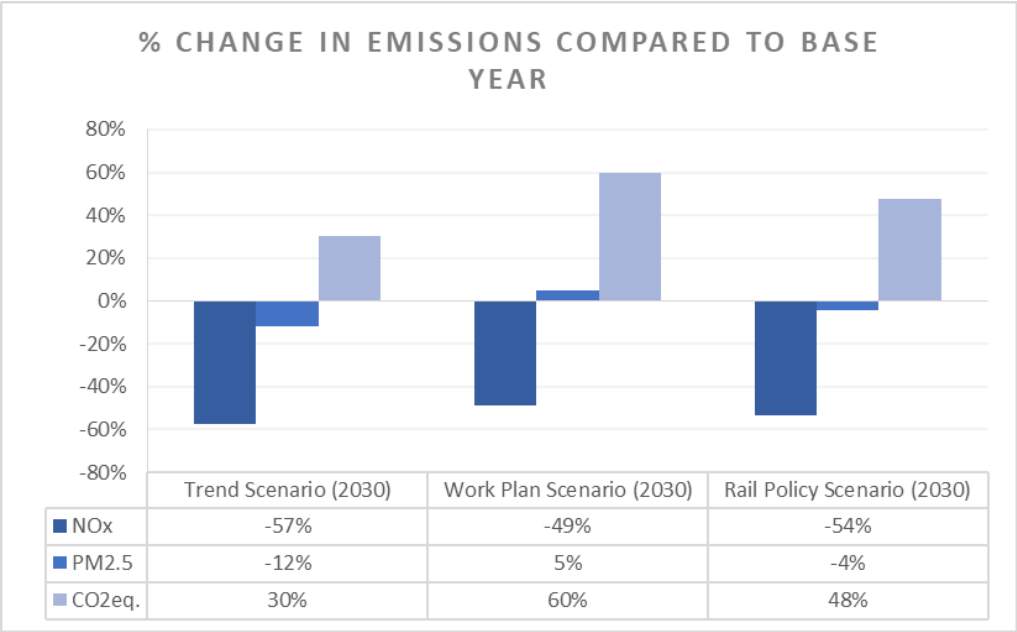
Impact on decarbonisation

In order to assess the impact of the development of the Baltic-Adriatic Corridor by 2030 on decarbonisation an estimation of the impact of the development of the corridor on modal shift has been performed based on the results of the market study. More specifically the analysis of transport activity volumes by mode along the TEN-T is based on the results of the transport market study for the current situation (year 2014) and the future scenarios at the time horizon of the work plan (2030). With reference to these scenarios an estimate of environmental impacts was computed, notably for:

- GHG emissions, expressed in tons of CO2 equivalents and external costs due to climate change (expressed in € million);
- Air pollutant emissions, based on an evaluation of external costs due to air pollution (expressed in € million);
- Noise, based on an evaluation of external costs due to noise (expressed in € million).

Figures 15 and 16 provide the graphic results of the calculation of the environmental impact of the passenger and freight transport activities along the Baltic-Adriatic rail and road corridor infrastructure. The results of the performed analysis show that the environmental impacts of the transport flows along the corridor are expected to increase with the implementation of the foreseen projects, mainly driven by the increase of transport activity. It shall be noted that the growth in volumes is not only driven by the general demand growth but also by the increased attractiveness of the corridor compared to alternative routes thanks to its development. Among the scenarios considered in the study it is only by promoting modal shift to more sustainable modes (rail policy scenario) that the corridor development may mitigate the impacts of the growth of transport activity along the corridor.

Figure 15: Emissions (tons/year)

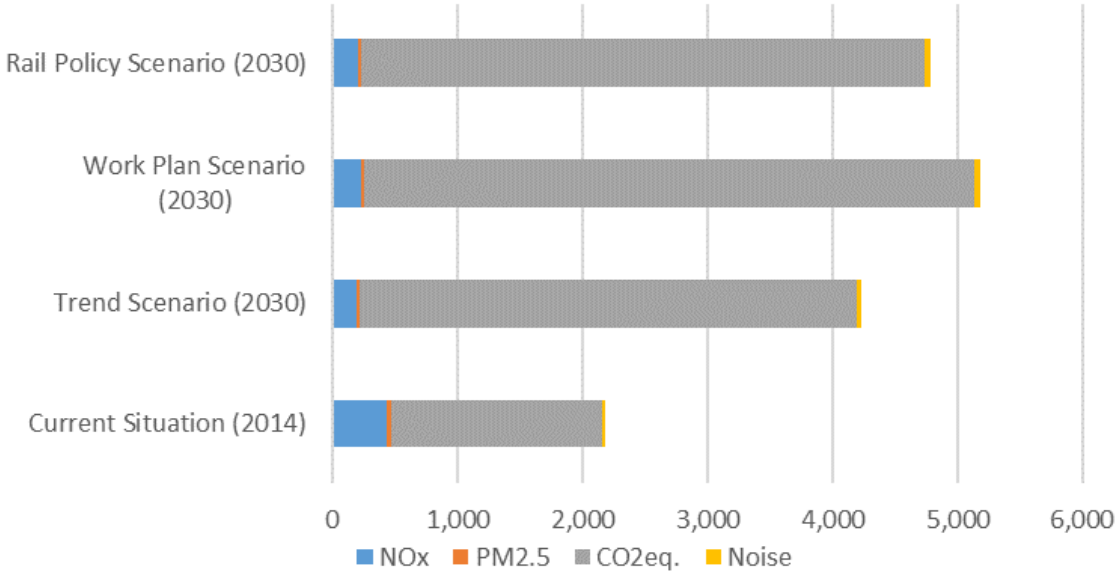


	Trend Scenario (2030)	Work Plan Scenario (2030)	Rail Policy Scenario (2030)
NOx	-57%	-49%	-54%
PM2.5	-12%	5%	-4%
CO2eq.	30%	60%	48%

Source: Baltic-Adriatic corridor study consortium; Note: With reference to the transport demand scenarios developed in the market study, the graph shows the levels of emissions foreseen to be generated by the Traffic along the Baltic-Adriatic Corridor by 2030, in comparison to 2014. Three scenarios are considered at 2030, one with no investments (trend scenario), one assuming all investments in the work plan will be implemented (work plan scenario), and one foreseeing the adoption of policies in favour of rail transport in addition to the implementation of the investments included in the project list (rail policy scenario).

The negative impact of the corridor development on the environment can be also counterbalanced by investments in the field of innovation i.e. supporting the diffusion of alternative clean fuels, and the gradual market uptake of more efficient means of transport, in particular zero/low emission vehicles, as well as behavioural actions to rationalise the mobility passengers and delivery of freights to reduce the overall emissions generated by transport operations.

Figure 16: Monetary impact (€ million/year)



Source: Baltic-Adriatic corridor study consortium

It is positively noticed in this regard that numerous horizontal measures for the development of this type of initiatives have been funded by the CEF instrument since 2014. It is auspicated that in the future many of the pilot projects will turn into permanent commercial operations and that actions will be proposed by the stakeholders to maximise the coordinated development of alternative clean fuels. Market studies and ex-post assessment studies shall also be undertaken aimed at estimating and monitoring the possible and real effects of these measures at the wider corridor scale in order to provide guidelines and directions towards the maximisation of the impacts of these projects in mitigating the negative effects of the growth of mobility along the corridor.

Resilience to climate change

An assessment of the impact of climate change on the corridor infrastructure has been made based on the review of the existing literature both for the identification of the most relevant possible impacts of climate change and their grade of threat and probabilities of occurrence. Table 12 outlines the most important climate change related threats that may impact transport systems, together with the vulnerabilities.

Table 12: Climate impacts and vulnerabilities by transport modes

Climate Impact	Transport Mode	Vulnerabilities
Increased Summer Temperatures	Road	- Heat stress for asphalt road pavement
		- Heat and Drought
	Rail	- Rail buckling
Increased Winter Temperatures	Road and Rail	- No major vulnerabilities (eventually positive impacts may be observed)
Increased Precipitation and Floods	Road	- Precipitation-induced road degradation (no estimated negative impacts)
		- Floods
		- Bridge scour
	Inland Waterways	- Floods
	Aviation	- Floods
	Rail	- Bridge scour
Increased summer droughts	Inland Waterways	- Drought periods causing low water levels and resulting in lower load factors,
		- Lower speeds, more fuel consumption and possibly a disruption of traffic (in particular for bigger vessels)
Increased and more frequent extreme winds	Road	- Storms (affecting signs, overhead structures, cables etc)
	Rail	- Storms (affecting signs, overhead structures, cables etc)
	Maritime	- Storms
	Air	- Storms, air traffic management (ATM) disruptions, delays
Sea Level Rise and sea storm surges	Road, Rail	- Erosion of coastal infrastructure
	Maritime	- Higher tides
		- Sea storm surges
Change in frequency of Winter Storms	Road	- Winter storms (traffic interruption and de-icing)
	Rail	- Winter storms (delays caused by freezing elements of infrastructure, heavy snow, interruptions due to external impacts e.g. fallen trees on tracks or broken cables)

Climate Impact	Transport Mode	Vulnerabilities
	Aviation	- Airport operations (de-icing substances and the clearance of movement Surfaces)
Permafrost degradation and thawing	Road, Rail, Aviation	- Thawing
Reduced Arctic sea ice cover	Maritime	- New Northern shipping routes
Earlier River Ice Breakup	Inland Waterways	- Ice-jam flooding risk

Source: Baltic-Adriatic corridor study consortium

Further to the identification of the climate impacts and vulnerabilities by mode, a detailed review of the national action plans on adaptation to climate change for the six Member States crossed by the Baltic-Adriatic Corridor has been performed. This was aimed at assessing the 'exposure' of the corridor links and nodes to the climate change impacts and vulnerabilities, and understand the probability and potential severity of a given system and section to be affected by a certain threat.

On the basis of the above analysis the following impacts and vulnerabilities have been identified that seem most affecting the Baltic-Adriatic corridor sections and nodes, and which present a high threat probability at least in one Member State:

Rail transport:

- Increased temperature causing potential damages to materials and structures, deformation of rail infrastructure (rail buckling), failure of electronic equipment (signal systems) and engines due to overheating and risk of avalanches in certain regions;
- Increase in precipitation and floods causing potential damages in rail infrastructure elements, disturbs in the transport smoothness, erosion and washouts potentially threatening the stability of railroad embankments, land movements (landslides, mud flows).

Road transport:

- Increased temperature affecting negatively both vehicles and road infrastructure elements and causing potential pavement deterioration and subsidence, reduced life of asphalt road surfaces (e.g. surface cracks); increased wildfires can also damage infrastructure and land movements (landslides, mud flows);
- Increased precipitation and floods causing potential damages of infrastructure, road submersion, scour to structures, underpass flooding, overstain drainage systems, erosion and washouts can threaten the stability of road beds, land movements (landslides, mud flows), disturb the smoothness of transport operations.

Maritime transport:

- Increased and more frequent extreme winds causing potential interruption of safe navigation and risk of ship sinking;
- High amplitude wave causing potential damages to infrastructure.

The above impacts defined as highly affecting the infrastructure and services are clearly associated to disaster events or unforeseen interruption of services. In the mid-long terms all maritime ports will also be affected by sea level rise. For IWW and airport transport modes, the analysis does not seem to reveal high threat probability impacts.

Referring to Art. 35 of Regulation (EU) 1315/2013, the analysis undertaken as part of the 2015-2017 corridor studies and particularly the review of the national action plans on adaptation to climate change shows that there is an increasing awareness of climate change impacts. The Member States are progressively undertaking studies to identify and

monitor the impacts due to climate change, assess vulnerability and risks of specific areas and infrastructure and define measures to mitigate negative effects and consequences.

Infrastructure managers seem also increasingly taking into consideration climate change resilience measures. Some examples of projects including measures to mitigate climate change impacts along the Baltic-Adriatic Corridor have been kindly provided by the Baltic-Adriatic corridor infrastructure managers, representing meaningful examples in this respect (e.g. the works on the cross-border section E 65 Będzin – Katowice – Tychy – Czechowice-Dziedzice – Zebrzydowice).

Despite the growing awareness and sensibility to the analysis of climate change impacts as well as identification of the measures to mitigate their negative effects, the study and the consultations with the concerned stakeholders seems supporting the consideration that the approach to this subject is rather at an inception stage and somehow fragmented, which would call for a more consistent and standardised approach also at the European level.

6.5. Infrastructure funding and innovative financial instruments

With the adoption of the dual Regulation for the trans-European network for transport (TEN-T) and the Connecting Europe Facility (CEF) in December 2013 – setting out together a political objective and financial tools – the new TEN-T policy provides for a long-term strategy for the implementation of TEN-T by way of a core and comprehensive networks by 2030 and 2050.

The core network corridors are amongst the primary focus of funding through the Connecting Europe Facility. The CEF does however not represent the ultimate scope of the work plans and of the new TEN-T policy; it is rather a tool to emphasise the strategic relevance of the core network corridors in the Union transport policy; still representing only one of the possible sources for the financing of the investments needed to develop a seamless intermodal and interoperable core network across the Union by 2030.

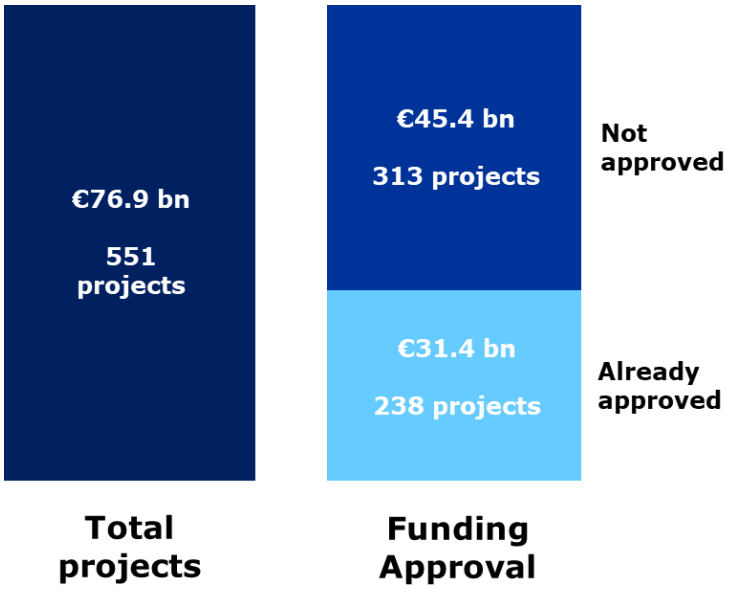
The synergies that the core network corridors generate between infrastructure, transport and other policy actions, makes them an ideal case for combining the CEF with complementary funding from other EU sources, in particular the European Structural and Investment Fund (ESIF) (comprising the European Regional Development Fund and the Cohesion Fund), Horizon 2020, the Instrument for Pre-Accession (IPA) or the European Neighbourhood Instrument (ENI).

Loans from the European Investment Bank are also worth mentioning which have also already been extensively used and are being utilised for a number of projects, including port expansions at Ravenna, Trieste and Koper, widening of the A4 motorway between Mestre and Villesse, the Warszawa Ring-Road, the A1 motorway between Pyrzowice and Częstochowa as well as between Toruń, Stryków and Częstochowa, the D4/R7 Bratislava bypass and the construction of the S3 expressway between Gorzów and Legnica. Also railway projects have benefited from European Investment Bank support, including the Semmering Base Tunnel and Pottendorf Line as well as the new railway station in Wien (recently completed), the Warszawa Railway Node, the E 59 railway line between Rawicz and Czempiń and Poznań as well as between Wrocław and the border of the Lower Silesian, the Žilina Teplička rail-road terminal and GSM-R digital radio communication system installation on the entire public railway infrastructure network in Slovenia.

All this makes the core network corridors frontrunners of the Union's new infrastructure policy: they can be considered as the backbone of the economic and social development. In these terms it is reasonably expected that synergies will be established between the planning processes relating to national and regional transport plans across Europe and between Member States and regions to be also reflected in the targets and objectives of the national and regional operational programmes as well as transnational territorial cooperation and macro-regional strategies.

Three sets of annual and multiannual CEF calls have been launched and completed between 2014 and 2017. The results of these calls have been particularly beneficial for the development of the Baltic-Adriatic Corridor. An overall EU contribution of more than 2 € billion has been indeed assigned to projects located on the corridor. More importantly nearly all the infrastructure projects co-financed by the CEF relate to the development of the specific objectives and priorities of the work plan. Successful applications include indeed studies and works for the development of the rail critical cross-border section between Katowice and Ostrava; studies and works for the two road critical cross-border sections between Katowice and Žilina and between Brno and Wien; construction works for the development of the Koralm railway line and tunnel in Austria; studies and works for the modernisation of national railway lines on the Eastern and Central branches of the corridor in Poland, Czech Republic and Slovenia, including modernisation works of the lines in Warsaw and at the Přerov junction; studies and works for development of rail last mile connections at all maritime ports, deployment of ERTMS in Poland, Czech Republic, Italy and Slovenia. Furthermore developments of ports and MoS infrastructure in Gdańsk, Swinoujscie, Trieste, Venezia and Koper and rail-road terminals in Padova and Ostrava (Paskov) have been also supported by the CEF as well as horizontal ITS and alternative clean fuel projects along the core network corridors, including at transport and urban nodes. Finally, the CEF instrument is also co-financing the deployment of SESAR at the wider EU scale, including at the corridor Member States.

Figure 17: Ongoing and planned projects and funding approval status



Source: Baltic-Adriatic corridor study consortium

Despite the significant amount of funds received under the scope of the CEF instrument and the additional sources already committed to the projects as detailed at Table 13, the amount of financial resources required for the development of the corridor is still very high. The funding and financial structure of 313 projects out of 551 investments included in the corridor list is still to be fully defined and approved.

Table 13: Approved and potential funds for the development and implementation of corridor projects

Funds by type	Approved	Potential
MS/ public grants / regional and local /own sources for road and rail infra managers and port authorities/ (Declared EIB non-revenue based)	**18,929.7**	**3,326.5**
Declared private/ own resources of motorway / airport / port terminals and RRTs	**3,936.5**	**2,709.6**
EU grants (CEF, TEN-T, CF, ERDF, IPA, H2020)	**8,606.09**	**5,518.4**
CEF	4,152.6	2,024.2
TEN-T	27.4	-
ESIF (CF/ERDF) 2014-2020	2,718.4	3,449.4
CF/ERDF 2007-2013	1,708.0	44.9
Other EU Fund	0.4	-
Declared EIB/ bank loan (revenue-based)	**270.0**	**193.5**
Other, not specified	**2,065.4**	**232.9**
Total funds	**33,808.4**	**11,981.0**

Source: Baltic-Adriatic corridor study consortium

In order to face the challenges imposed by the huge amount of demanded funding and the limited sources available from public or equivalent sources, including the EU funds, all different possible sources shall be considered also depending on the type of projects and their suitability for mixed and multiple financing options. The projects to be developed can be ranked in three different categories from the point of view of funding and financing needs:

a. For several revenue generating projects "closer to the market" in terms of development (technological components, including on large infrastructure of key European interest, brownfield upgrade) or service provision (terminals for freight / passengers, enhancement of infrastructure capacity / performances), a substantial component of the project funding can come from own resources (e.g. equity) and financing resources gathered by the project promoters on the market (e.g. in the form of equity, loans or bonds). The private investors would need to recover their initial costs of capital and receive a reward for the risk born (the higher the risk the higher the return required).

   The project may look at conventional lending from public and private banks, alternative financing from institutional investors (e.g. bonds) and at financial instruments for instance to cope with the unbalances of cash-flow during its construction and rump-up phase until a sustainable flow of revenues is secured, and to address particular risks and market failures, and to secure lending with long maturity. Financial instruments could be provided in the form of credit enhancing and guarantees (be it a specific legal guarantee or a financial guarantee to ease access to financing).

b. Hard-infrastructure, greenfield, risky and long-term projects might require a substantial public support through public funding, even if innovative approaches can apply to project development and/or to specific components of the investment. Public funding can be structured in different ways (also depending on the budgetary constraints of the public authorities) such as lump sum subsidy (grant), fiscal incentives, operational deficit coverage and availability payment schemes.

c. In a variety of intermediate cases the project will require a more limited funding component in order to reinforce its financial viability – these projects could be supported through a blending of funding (e.g. grants) and financing.

In this respect, beside the national budget, the funding contribution can effectively come from the EU centralized managed funds, such as the Connecting Europe Facility (CEF) and from decentralized managed funds such as the European Structural and Investment Funds (ESIF) while the financing resources may come from the EU financial instruments, such as the CEF Debt Instruments and financial products available under the European Fund for Strategic Investment (EFSI).

For all these three different categories of projects the public intervention with the different degree of intensity is justified on the ground that these projects of high socio-economic and EU added value, substantially address overall public service obligations, suboptimal investment level, market failures and distortion due to externalities (positive, for the projects supported, including in terms of strategic added-value, and negative for competing modes), and therefore calls for the transfer of resources.

When considering the project funding structure in a comprehensive and multimodal setting, earmarking of revenues and cross-financing solutions, applying "polluter-pays" and "user-pays" principles ought to be duly explored.

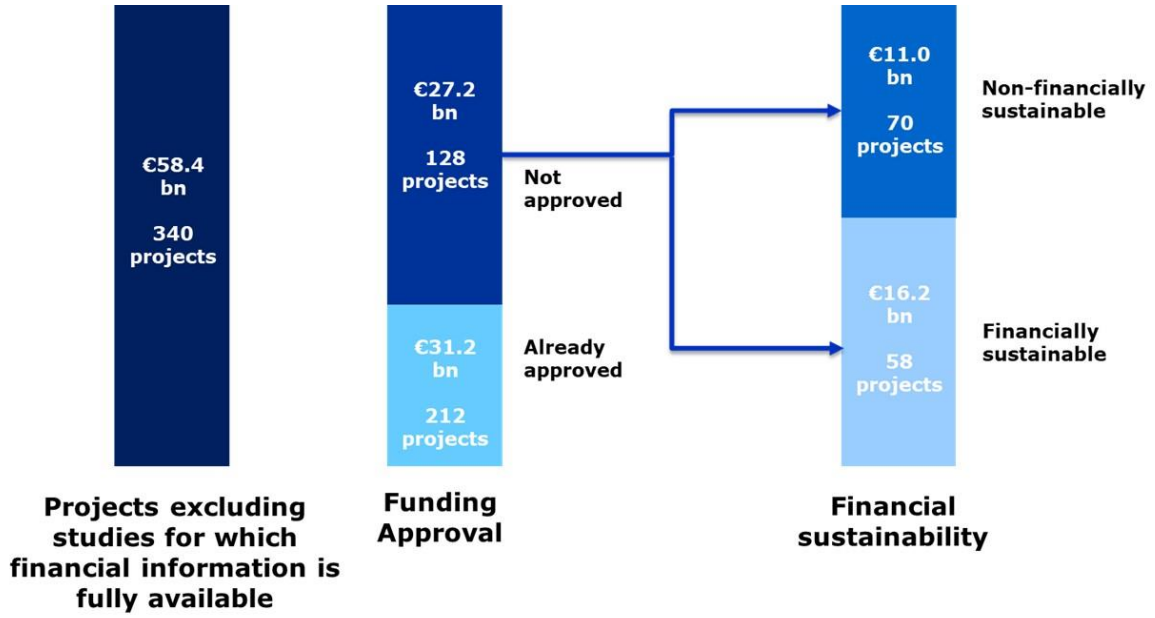
A project can be fully developed through project financing if the revenue stream (secured by public and/or private funding) exceeds the investment and operational costs (CAPEX+OPEX). Such an approach calls for a careful risk sharing between the Member States (project management) and private partners.

Notwithstanding the project self-financing potential linked to user fees, a cautious and innovative approach aimed at exploiting the project's life-cycle and define clear responsibilities and risk sharing between project promoters, sponsors and implementing bodies is more and more needed to deliver projects on time, cost and quality and to fully exploit the potential, while minimising future liabilities on public budgets.

A pre-condition for project financing is a conducive regulatory and legal environment, in order to set the incentives right to enhance the public and private sector involvement in the delivery of infrastructure investment.

In light of the above a high level review of the project list has been undertaken, aimed at identifying the so called financially sustainable or partially financially sustainable projects. The analysis excluded the initiatives related to studies and considered the projects for which full financial information was available. The corridor list includes 340 ongoing and planned projects totalling 58.4 € billion. Out of these, 212 projects are fully financed for a total of about 31.2 € billion investment costs. 128 projects are either only partially or not financed, for a budget of 27.2 € billion. 58 investments amounting to 16.2 € billion are considered either fully or partially financially sustainable, most of them related to road, port, airport and rail-road terminal upgrading and expansion initiatives. Whilst this assessment is rather preliminary, as many of the details to fully confirm the financial sustainability and best financial structure of project development and implementation depends on many elements and conditions, the number of projects potentially suitable for innovative and multiple financing options and the overall amounts seem supporting the case for their further analysis, towards their possible implementation by means of innovative financial instruments.

Figure 18: Funding and financial sustainability of the investments included in the project list



Source: Baltic-Adriatic corridor study consortium

Several of these projects were also submitted under the scope of the recent CEF blending call which was launched in 2017 with the aim of developing an innovative approach to infrastructure funding in favour of those initiatives implementable by means of more and diversified financial source. According to the results of the call published in December 2017, among the proposals that have been recommended for funding the following ones are worth mentioning, totalling together over 315 € million of allocated CEF funds. These projects will significantly contribute to the achievement of the specific objectives identified for the development of the Baltic-Adriatic Corridor and the development of its infrastructure towards the targets set in the Regulation (EU) 1315/2013:

- Optimisation works of the critical cross-border section between Katowice and Ostrava, located on the Czech side, between Dětmarovice and Petrovice u Karviné and the border with Poland;
- Upgrading and electrification on the Austrian side of the critical passenger cross-border section between Wien Stadlau and the border with Slovakia, near Marchegg;
- Modernisation works and ETCS deployment on the Western branch of the corridor in Poland along the itinerary of the E59 railway line;
- Works for the development of the second track of the Divača-Koper railway line;
- Construction of a LNG terminal at the port of Venezia;
- Expansion of the Port of Gdańsk;
- Dredging activities and expansion of the Port of Ravenna.

7. Innovative flagship project

Innovative flagship projects: translating the Issues Papers into concrete action

As part of their mandate under the scope of Regulation (EU) 1315/2013 the European Coordinators have elaborated in 2016 five *Issues Papers* on the following areas of particular attention in integrating transport policy issues into further core network corridor development:

- Multimodality and efficient freight logistics;
- Intelligent Transport Systems;
- Innovation and alternative clean fuel infrastructure;
- Integrating urban nodes;
- Cooperation with third countries.

With the *Issues Papers* the European Coordinators started, in addition to their geographically-based corridor work, an action aiming to advance newer components of TEN-T development and to strengthen corresponding cross-corridor synergies. In order to translate into concrete action the basic work of the five *Issues Papers* the European Commission has proposed a pilot initiative aiming at generating at least one innovative flagship project per corridor. Each flagship project shall include a set of connected actions which – as a whole – can generate, in a period of no more than 3 to 4 years, clear benefits for users or/and society, to be expressed in KPIs such as time gains, emissions' reduction, enhanced service quality etc.

The initiative is conceived as the beginning of a process which will have to go on since strong interaction between infrastructure development and transport policy/services is the only way forward for transport to meet the societal and technological challenges of the future and to boost decarbonisation. Such a continuing process is, for example, important to further specify the standards set out in the TEN-T Guidelines to ensure they remain aligned with the needs of a quickly changing transport system.

Enhance passengers' transfer hubs in urban nodes along the corridor

The innovative flagship project allocated for development to the Baltic-Adriatic Corridor relates to the *Issue Paper* dedicated to the integration of the urban nodes in the core network corridors, with a focus on passenger transport. The title of the flagship project is *Enhance passengers' transfer hubs in urban nodes along the corridor*. Table 14 provides the description of the main characteristics of this initiative.

Table 14: *Enhance passengers' transfer hubs in urban nodes along the corridor*

Scope of the flagship project (why)

Enhance passengers' transfer hubs in urban nodes along the corridor aims to translate into concrete action the policy targets set in the *Issues Papers* on Urban nodes. The actions foreseen for possible implementation as part of the project focus on art. 30 of Regulation (EU) 1315/2013 and on the need to ensure and maximise the effectiveness of the integration of urban nodes into the core network. The implementation of these actions will facilitate the transfer of passengers between long-distance destinations and between long-distance and urban transport solutions along the corridor.

Market and Beneficiaries (whom)

The direct beneficiaries of the project and related actions are passengers transferring between two different nodes of the core network (Airport, Rail, Coach, Port) or accessing/egressing the core network from a core transport node (Airport or Port) or from a rail and coach station located along the corridor, where services are operated towards at least a core urban node. Passengers include here all type of possible users, namely individual or group of passengers from all nationalities, and of all ages, including people with reduced mobility. The target market of the project includes clients of long distance passengers' services of all transport modes, users of the local public transport services, taxi passengers and users of other forms of collective/shared transport solutions (motorised and non-motorised) as well as users of private means of transport (motorised and non-motorised), and pedestrians.

Places (where)

The flagship project foresees the implementation of a wide range of possible hard and soft measures, which may include development of infrastructure as well as information and communication technologies, R&I (Research and Innovation) solutions, including those aimed at solving administrative and legal barriers, particularly related to the provision of integrated and multimodal information, travel planning and mobility solutions along corridors and across country borders. The flagship project can have both a virtual and physical dimension thanks to the implementation of information and communication technologies accessible from internet and mobile devices; however the places subject of the actions shall affect transfer operations at least at one core transport node or rail and coach station along the corridor, where services are operated towards at least a core urban node. Solutions shall more specifically affect interchange places, and particularly those involving public transit systems (Heavy Metro, Light Metro, Tramway, Trolley Buses and Buses), park and ride and bike and ride solutions.

Actions (what, when, who, to what purpose)

A wide spectrum of actions focusing on transfer operations at hubs along the corridor can contribute to the objectives of the flagship project. These actions can be grouped to the scope of this flagship project into three different areas, including: *Land use and infrastructure solutions*, *Intermodal operations and information provision*, *Governance and management solutions*.

The nature of the actions, as identified and described below allows their implementation as independent solutions. Depending on the existing and planned conditions of the infrastructure and operations at the core transport and urban nodes along the corridor(s), more actions may be possible to be implemented, thus generating more effects or improving the capacity of the existing nodes and services to generate wellbeing for society.

Actions	**Time schedule for implementation**	**Relevant promoters**	**Expected effects**
Land use and infrastructure solutions Development or improvement of direct interconnections between core transport nodes and the rail and coach stations along the corridor, by means of high capacity rapid transit systems (i.e. fixed links, dedicated bus lanes, etc.). Construction, upgrading or restructuring and reorganisation of interchange stations and facilities.	Actions whose construction is expected to be completed in a period of 12-18 months.	Infrastructure managers of the concerned infrastructure, owners of the infrastructure and concessionary companies.	Travel time savings. Travel time reliability. Reduction of operating and maintenance costs of transport. Reduction of external costs of transport (safety, GHG, noise…). Improvement of accessibility to the core network. Improvement of the quality of public transport services. Improvement of the image of the transport nodes and urban environment.

Intermodal operations and information provision Information strategies and technologies to improve the performance of transfer operations at interchange stations and centres, between different modes and urban transport solutions (motorised and non-motorised, public and/or private). Integrated and multimodal travel solutions towards Mobility as a Service.	Actions ready to be implemented or put in operation in a period of 18 months. Actions ready to be implemented or put in operation in a period of 24 months.	Infrastructure managers of the concerned infrastructure, public transport operators, MaaS providers, owners of the infrastructure and concessionary companies, users' and passengers' federations and associations, institutions or civil associations of PRM.	Travel time savings. Travel time reliability. Improvement of accessibility to the core network. Improvement of the quality of public transport and mobility services for all type of users and modes. Improvement of the image of the transport nodes and urban environment. Promote territorial cohesion.
Governance and management solutions Establishment of temporary or permanent consultative, concertation or management bodies for the planning, monitoring and provision of integrated and multimodal services, including MaaS solutions along the corridor(s).	Actions ready to be started and completed in a period of 12-18 months.	Local authorities, infrastructure managers, service providers, city users, passengers' federations and associations, institutions or civil associations of PRM.	Improvement of accessibility to the core network. Reduction of operating costs and of external impacts of transport on the environment. Improvement of the quality of public transport and mobility services for all type of users and modes, also supporting market opening and integration.

Funding and financing (how)

Similarly to other infrastructure and services, the actions part of this flagship project can be financed by means of public or equivalent funds as well as private resources from the operators and/or users. It is in any case worth noting how the actions to be developed or implemented as part of this flagship project seem to present a high potential for innovative funding and financing, particularly if located at large core transport nodes and stations. Transfer operations within the same transport mode or between different transport modes at nodes can indeed generate relevant flows of passengers. This generally represents a business opportunity for retail and shop activities to be located within these centres. The rental revenues from these activities may be partially used/allocated to the development or improvement of interchange nodes. Interchange stations and centres usually involve parking infrastructure. These may be constructed and/or managed by private developers under concession agreements. The concession fees related to the operation of these parking facilities may be also used for the development or improvement of interchange nodes. The modernisation/ improvement of interchange stations and centres in large urban areas may finally create spaces for real estate developments. The revenues from these operations may be also used to enhance transfer infrastructure and services at transport and urban nodes along the corridors. Apart from these possible revenues associated with infrastructure developments at interchanges, examples exist of revenue generating activities, which are linked to the possibility to share information technologies and displayers with providers of publicity/marketing services. These companies may offer the use of their technologies and devices to combine provision of information on transport services with publicity of other products and services. Furthermore transit systems and interconnections to airports usually operate with higher tariffs than standard urban services, usually allowing for their development and operation as PPP, Design Build Operate Finance projects. These considerations should encourage the stakeholders in identifying innovative financial solutions for the implementation of the flagship project.

Source: Baltic-Adriatic corridor study consortium

Status of implementation of the flagship projects and perspectives

The Baltic-Adriatic Corridor project list includes several initiatives relating to the development of public transport systems infrastructure in urban nodes. These also comprise the development of interchange stations as well as rail and transit infrastructure, allowing for the transfer of local and long distance traffic along the corridor. Such projects include rail and transit developments in the core urban nodes in Gdańsk, Łódź, Poznań, Bratislava and Bologna. The list furthermore comprises projects for the development of transfer infrastructure at core airports including last mile rail links in Katowice, Bratislava, Venice, Bologna and Ljubljana. Interconnections to the airports already exist or have been recently completed in Warszawa, Wien, Szczecin, Gdańsk and Ostrava. In most core urban nodes heavy/light metro and tramway systems are furthermore available and in Venice waterway services and a People Mover interconnecting the city to the Port are also in operation. A very large project concerning ITS implementation in Bratislava is also worth mentioning, covering the entire motorway network in this core urban node, up until the borders with the neighbouring countries.

Focussing on the initiatives included on the list which are already under implementation or which may be mature enough to be completed and/or generate tangible effects in a period of 3-4 years' time, the following projects are noticed:

- The development of the suburban regional railway network in Gdańsk, Gdynia, Sopot (Tricity), also interconnecting to the Airport. The project list includes an action of this wide initiative to be further implemented in the future, whose cost equals 11.7 € million. This is fully funded under the scope of the OPIE 2014-2020 through ESI funds and almost completed.
- The ongoing and planned works in Łódź, some of which relating to the Fabryczna interchange node development project which is fully funded under the scope of the OPIE 2007-2013 through ESI funds, and almost completed, for a total cost of about 100 € million.
- The modernisation of the railway station in Poznań, also including adjustments of the infrastructure to PRM needs, totalling 11.3 € million investment cost, funded by means of national funds and almost completed.
- The Automated People Mover in Bologna, under implementation as a PPP project for a total cost of about 120 € million. Expected to be completed by 2018, the project will interconnect the Airport with the Central Railway Station.
- The Linking Danube initiative, which is aimed at providing cross-border traveller information on public transport, particularly focussing on cross-border commuting and mobility in rural areas within the Danube Macro-Region. The project is currently under implementation and it is expected to be completed by mid-2019. It is fully funded as an INTERREG initiative totalling a cost of 2.9 € million.
- The projects for the electrification and upgrading of the cross-border section between the twin core nodes of Bratislava and Vienna. Albeit the projects are not expected to be completed before 2022, totalling over 550 € million costs, the works are already ongoing on the Austrian side, and the connection may present high potential for the development off cross-border multimodal passengers services along the corridor in the Danube area.

The Baltic-Adriatic corridor project list seems thus already including examples of possible relevant actions which may be adjusted and expanded in their scope to reach the targets of the flagship project and *Issue Paper* on urban nodes and/or maximise the benefits generated by these initiatives with reference to these targets. Also considering the intermodal and interdisciplinary scope of the flagship project, according to the objectives of the *Issue Paper* on urban nodes, the flagship project *Enhance passengers' transfer hubs in urban nodes along the corridor* is proposed as a modular corridor wide initiative aimed at facilitating the identification of new initiatives or the adaptation of projects at their inception stage to the targets of the *Issue Paper*.

The expectation through this initiative is that the existing and planned infrastructure, facilities, tools and information or commercial solutions for travellers across the core network will be designed, implemented and managed towards the development of a *single multimodal market* for EU passengers. By focussing on the continuity of travelling activities across nodes and networks, *Enhance passengers' transfer hubs in urban nodes along the corridor* aims at supporting the development of integrated intermodal infrastructure and services between modes, smoothing or eliminating interruptions and barriers of operational, informative and commercial nature at transport nodes.

8. Recommendations and outlook by the European Coordinator

Since the adoption of the first and second corridor work plans for the Baltic-Adriatic Corridor in May 2015 and December 2016 respectively, huge efforts have been made on all sides to bring this corridor to success and to turn it into a competitive development area for growth and jobs in Central Europe. 327 initiatives and investments to improve the corridor infrastructure and ensure compliance with the technical requirements of the TEN-T Regulation are currently under development and implementation which total over 39.2 € billion. Furthermore, 87 projects have been completed since the inception of the new TEN-T policy for a total budget of 6.6 € billion.

The progress in the development of the corridor is also reflected in the deepened corridor analysis which has been undertaken by the corridor consultants in very close cooperation and intense consultation with Member States and all stakeholders involved in the Corridor Forum. The very rich and constructive debates and exchanges I had the pleasure to chair since 2014, be it in the eleven corridor forum meetings, our cross-border dialogues, our various working group meetings or during my official visits to the countries and regions along the corridor, combined with the refined results of the corridor study, have given me a very good insight into the challenges and the progress of the development of the Baltic-Adriatic Corridor. This participatory process over the past four years has enabled us to gain very detailed insights into where our corridor stands as of today and to project how the corridor may likely perform in 2030.

In 2014, when we started our process of identifying the priorities for our corridor, this was primarily based on our analysis of the corridor infrastructure in terms of its compliance with the requirements and standards set in the TEN-T Regulation. This was justified by the evident need to put our corridor infrastructure at standard, particularly in the Cohesion Countries. Also in line with the political priorities set in above-mentioned Regulation, I had proposed you five respective corridor work plan priorities, focusing mainly on infrastructure development at the cross-border sections, missing links, last mile connections at the ports and within urban nodes as well as on interoperability and ERTMS.

The second work plan was further complemented by broader policy objectives such as digitalisation – a topic that is likely to increase in its relevance in the future. Indeed, digitalisation is complementary to infrastructure development in setting up a continuous and interoperable infrastructure and may even partly compensate physical gaps, overcome and bridge technical barriers. Our cross-border dialogues, our meetings with the ports and rail-road terminals and my exchanges with the Baltic-Adriatic Rail Freight Corridor already showed that this is an area of strategic importance for the development of an interoperable corridor with sound links between the different nodes and infrastructure networks.

Based on this valuable experience with two preceding corridor work plans, I am very pleased that I can now present with this third work plan a further refined and comprehensive analysis of the necessary conditions for a fully-functional, continuous and interoperable corridor. This leads me to confirm the five development priorities of the first and second work plan and to amend it by one additional priority with regard to the compliance of the (national) corridor infrastructure in order to ensure overall coherence of the analysis with the corridor priorities.

The following six issues are thus for me of highest priority and need to be primarily addressed on the Baltic-Adriatic Corridor:

- the **cross-border links** both for rail and road, including digital cross-border links for the exchange of traffic data and provision of information services for both modes;
- the timely implementation of the major projects of the Alpine crossings in Austria in order to remove the two **missing links**;
- the compliance of the corridor infrastructure with the **quality and standards** set in Regulation (EU) 1315/2013, with a particular focus on the completion of the modernisation of the railway infrastructure in Cohesion Member States;
- the **'last mile'** connection of the **ports** building the start and end point of the corridor;
- the **interconnection in all urban nodes** along the corridor between TEN-T and local transport infrastructure;
- and last but not least the **interoperability** of the transport network, in particular through the full deployment of ERTMS along the corridor.

With these six corridor priorities, I like to set the framework for a forward-looking, efficient and sustainable implementation of the Baltic-Adriatic Corridor. They will help guiding our discussions in the future with each of the six Member States and help prioritising the necessary investments, thereby thinking beyond the purely national concepts towards a true corridor planning. We need to continue working at full speed on these priorities in order to get them implemented by 2030 as to convert today's transport patchwork into a real and fully-functioning network and to ensure smooth transport flows along the corridor from the Baltic to the Adriatic Sea.

Priorities for the Baltic-Adriatic Corridor

Removing the bottlenecks at the cross-border sections with highest European added value

A chain is only as strong as its weakest link. In other words, the corridor can only highly perform if the main rail and road bottlenecks at the cross-borders are removed. Only by investing in the cross-border sections can the development of long-distance international traffic flows across the corridor countries be encouraged. This is also where the European added value of our joint investments and actions is the most visible and evident.

The updated corridor analysis has confirmed that important bottlenecks continue to exist on six railway and two road cross-border sections in terms of their compliance with the requirements of electrification, axle load, speed and train length. These are the following railway cross-border sections which need to be addressed with priority:

Railway cross-border priorities

- Opole (PL) – Ostrava (CZ), [Chałupki (PL) – Bohumín (CZ)];
- Katowice (PL) – Ostrava (CZ), [Zebrzydowice (PL) – Petrovice u Karviné (CZ)];
- Bratislava (SK) – Wien (Stadlau) (AT), [Devínska Nová Ves (SK) – Marchegg (AT)];
- Katowice (PL) – Žilina (SK), [Zwardoń (PL) – Skalité (SK)];
- Graz (AT) – Maribor (SI), [Spielfeld-Straß (AT) – Šentilj (SI)];
- Trieste (IT) – Divača (SI), [Villa Opicina (IT) – Sežana (SI)].

In addition, the following two road cross-border sections have been identified as critical in terms of compliance as these two sections are neither motorways nor expressways.

Road cross-border priorities

- Katowice (PL) – Žilina (Brodno) (SK), [Zwardoń (PL) – Skalité (SK)];
- Brno (CZ) – Wien (Schwechat) (AT), [Mikulov (CZ) – Mistelbach (AT)].

Out of the six critical rail cross-border sections, the Katowice-Ostrava-Žilina triangle rail cross-border sections between Poland, Czech Republic and Slovakia are particularly important for their localisation in a relevant economic and industrial area of the corridor, with sustained traffic of freights on the lines between Poland and the Czech Republic. It should also be noted that the Bratislava-Wien cross-border section is the only non-electrified section of the whole corridor and is interconnecting two European capital cities, creating together a cross-national twin city metropolitan area.

The corridor analysis shows that the development of the Katowice (PL) – Ostrava (CZ) and Katowice (PL) – Žilina (SK) rail cross-border sections to reach speed and axle load standards is challenged by a limited availability of financial resources on the Polish side. This also hampers the definition of the implementation dates of several projects identified for the full modernisation of these lines. These investments are included in the reserve list of the National Railway Programme covering the period up to 2023 and the Polish Authorities consider that these investments will be completed by 2030, and their implementation may start before 2023 in the event additional financial resources will be identified. The fact that the implementation dates of the projects are not defined at present represents however an uncertainty with regard to the project maturity. At the Katowice (PL) – Žilina (SK) cross-border section speed standard on the short section Zwardoń – Skalité will also not be achieved on the Slovak side. Particularly regarding this cross-border section it is noticed that it is located in a mountainous area and the development of the line to reach the required standards would result in high construction costs. Solutions need however to be found for this and more generally all the cross-border sections and the entire corridor network to reach compliance in line with Art. 39 of Regulation (EU) 1315/2013. In line with this and in order to realise our European vision of this corridor, it is also not acceptable that the realisation of some cross-border sections is not even fully supported by identified investments yet, e.g. a) the ERTMS deployment on the Opole – Ostrava and Katowice – Ostrava sections (Polish side) and between Katowice and Čadca along the cross-border itinerary Katowice – Žilina; and b) the achievement of the 740 meters train length standard which may only be partially be attained on the Polish side of the above referred cross-border sections. 740 meters length compliance is also not expected to be achieved between Bratislava and Wien on the Slovak section Bratislava – Petržalka. In Austria both ERTMS and 740 meters train length are assumed to be implemented on all corridor sections, although detailed investments are still to be included in the project list, also concerning cross-border sections.

Overall, cross-border projects often suffer from non-harmonised planning and timing of the necessary investments on each side of the borders as well as from different processes and procedures affecting both the construction and technical standards of the infrastructure as well as administrative procedures and steps, including permitting, procurement and fiscal aspects on each side of the border. These problems are even amplified by the development of the legislation and policies on market opening and integration of railway transport. In addition, considering the peripheral nature of the cross-border territories, the required investments at these sections are often not in the needed focus and priority planning of Member States and infrastructure managers.

For this reason, I will continue to pay utmost attention to the removal of the bottlenecks at these cross-border sections. Technical, political, financial and procedural obstacles which may affect the implementation of cross-border initiatives call for more coordination in the definition of common processes and tools for the harmonised planning, development and implementation, including funding and financing of projects of common interest. Those cross-border initiatives are considered as projects of common interest with highest European added value; as such they should be planned, designed and implemented conjointly. These projects do not just require the commitment of the

Ministries, they also require the direct involvement of the infrastructure managers to align on standards and make sure processes and procedures are implemented timely and consistently.

I have therefore given strong attention to the development of the above mentioned critical cross-border sections over the past four years of my mandate, by engaging in a very deep and continuous dialogue with the relevant stakeholders. I have organised and chaired four **cross-border dialogues**, involving all relevant stakeholders (notably Member States, rail/road infrastructure managers, the respective border regions and urban nodes, but also representatives of the Baltic-Adriatic Rail Freight Corridor, EIB, JASPERS, DG REGIO and INEA) as to ensure that the existing bottlenecks of these most critical cross-border sections are removed and the necessary investments are made.

Table 15: Cross-border dialogues

Cross-border dialogues		**Results**
May 2016	First cross-border dialogue on the three rail connections between Katowice (PL) and Ostrava (CZ), Opole (PL) and Ostrava (CZ) and Katowice (PL) and Žilina (SK) as well as on the road connection between Katowice (PL) and Žilina (SK)	Joint Declaration between the three Transport Ministers of the Czech Republic, Poland and Slovakia on the enhanced cooperation to eliminate bottlenecks and facilitate international traffic on critical rail and road cross-border sections between the three countries *Signed on 19 October 2016 in Warszawa*
September 2016	Second cross-border dialogue on the rail connection between Bratislava (SK) and Wien (AT)	Memorandum of Understanding between the Transport Ministries of Austria and Slovakia concerning coordination and implementation of cross-border transport projects *Signed on 28 September 2016 in Wien*
October 2016	Third cross-border dialogue on the rail connection between Graz (AT) and Maribor (SI)	Bilateral implementation agreement between the Transport Ministry of Austria and the Slovenian Infrastructure Agency *Signed on 20 October 2016 in Maribor*
December 2016	Fourth cross-border dialogue on the road connection between Brno (CZ) and Wien (AT)	Dialogue based on the existing bilateral agreement between the Transport Ministries of Czech Republic and Austria on the importance of the R52/A5 motorway axis between Jihomoravský kraj and Niederösterreich, signed in December 2009

Overall, the cross-border dialogues aimed at assisting Member States and infrastructure managers in finding cross-border agreements for the smooth and coordinated implementation of those projects on both sides of the border and thereby to clear potentially diverging interests and uncoordinated implementation plans and timings. More precisely, the diverse meetings allowed getting a detailed insight into the state of project implementation on each side of the border, to discuss about possible steps for improvements (on infrastructural as well as operational side), to mediate – where and whenever needed – between different (national) interests and to harmonise planning and timing of the respective project implementations on both sides of the border. The ultimate goal was to come to joint and stable **cross-border agreements** for each critical cross-border section (e.g. in form of Memorandum of Understanding, Letter of Intent or any other appropriate form of agreement) for the smooth, coordinated and harmonised implementation of those projects on both sides of the border. Indeed, it is of utmost importance that all the investments aiming at the full compliance with the TEN-T standards of each section by 2030 are carried out in a coordinated manner in order to avoid situations when a line section is upgraded up to the national border and then on the other side of the border upgrading is delayed.

Significant progress has been made since 2014, with agreements at highest political level as well as at technical level between infrastructure managers. I am very pleased to report that – based on existing bilateral cooperation initiatives and agreements, further enhanced by our cross-border dialogues – we have now jointly achieved our objective of having stable arrangements for each of the critical cross-border sections.

Apart from the political commitment at highest level to realise our cross-border sections, we also need to further advance on the (existing) technical agreements between the infrastructure managers that lay down the exact planning and timing of the respective cross-border sections. For instance, the Connecting Europe Facility is currently financing studies and works for the development of the Katowice-Ostrava rail cross-border section as well as for the Brno-Wien and Katowice-Žilina road cross-border sections. These are important projects to further advance on the realisation of our ultimate goal.

Based on this positive experience, I am keen to continue such dialogues wherever deemed necessary by the relevant parties and wish to encourage infrastructure managers to set-up even more formalised bilateral working groups for concrete projects. As European Coordinator, I strive to ensure that the technical and financial solutions for the development of the cross-border sections are defined by 2020 in order to ensure the corridor compliance by 2030. I thereby understand my role as a mediator between different (national) interests and as a facilitator for those intensified bilateral exchanges.

Finally, the corridor shall not only be an issue of compliance of the infrastructure to the requirements and standards set in the respective TEN-T Regulation. Cross-border services should be promoted across the borders of the regions and Member States. This requires a close cooperation between the railway undertakings and the terminal operators who should also consider the possibility to develop or participate to working groups and conjoint initiatives. Regions should also be interested especially for the promotion of economic growth and passengers flows under a territorial cooperation perspective.

Ensuring the timely completion of the missing links at the Alpine crossings

The Baltic-Adriatic Corridor is almost continuous, apart from two missing links at the Alpine crossings in Austria (Koralm railway line and Semmering Base Tunnel). During my various missions to Austria, I positively noticed that the Austrian stakeholders continue working very hard and make huge investments efforts at national level (8.9 € billion) to realise the projects needed to remove these important bottlenecks. The completion of the Semmering tunnel by 2026 and of the Koralm railway line and tunnel by 2024 will significantly reduce travel times and allow for a big step forward with regard to the Alpine crossing of major traffic flows. Especially the Northern Adriatic Ports will benefit from such improved connectivity.

We should grasp all the important network benefits that these two major projects will bring for the whole corridor. As European Coordinator, I will therefore continue closely monitoring the timely implementation of these major projects and assist the Austrian stakeholders in promoting and advancing these crucial investments that are not only of national but of high European added value.

In addition, the implementation of these major tunnel projects need to be accompanied very closely by our joint efforts with the Baltic-Adriatic Rail Freight Corridor to remove the operational and administrative barriers along our corridor. Indeed, the time savings that we will reach thanks to the major investments made with respect to the upgrade of our corridor infrastructure and in particular with regard to these two major infrastructure projects of the Alpine crossings must not be diminished by persisting delays due to operational and administrative barriers along our corridor.

Ensuring the compliance of the corridor infrastructure with the technical requirements of the TEN-T Regulation

The analysis of the corridor infrastructure with reference to the standards required by Regulation (EU) 1315/2013 and the priorities defined in Regulation (EU) 1316/2013 shows that significant efforts shall be undertaken to develop a compliant corridor by 2030, in line with Art. 39 of the TEN-T Regulation. According to the review of the corridor project list and consultation with the concerned infrastructure managers and stakeholders, the development of a compliant corridor by 2030 is challenged by financial constraints, technical difficulties and costs associated to the solutions to be adopted to meet the required standards, which also impact on the economic viability of the projects. This is not just the case of main corridor lines; it also affects the cross-border sections and the infrastructure within urban nodes.

Indeed, our planned investments for removing the bottlenecks at the cross-border sections and the missing links will only pay off if the entire network is improved. I will therefore also draw the necessary attention to all relevant stakeholders to improve the entire corridor network and make it compliant with the TEN-T standards. This is an engagement that is needed by all Member States to ensure corridor continuity, on both cross-border and national stretches.

In line with the overall targets set by the new TEN-T policy of developing a continuous high quality and interoperable infrastructure across Member States, for the development of long distance traffic and support modal shift, I thus encourage the concerned stakeholders, and particularly the infrastructure managers in the Cohesion Member states, to see the possibility of developing a modern EU wide corridor in their regions as an opportunity to grow. This is of utmost importance particularly for the modernisation of the railway infrastructure towards reaching the targets of the set Key Performance Indicators on the entire corridor.

Enhancing multimodal transport, in particular by improving the last mile connection of ports and promoting transport digitalisation

A truly impact on climate change and decarbonisation by a modal shift from road to rail can only be realised by enhancing our multimodal transport infrastructure along the corridor and in particular by improving the last mile (rail) connection of our ports. The development of appropriate last mile connections to the seaports is therefore a specific target to be continuously monitored along the Baltic-Adriatic Corridor.

During the past four years of my mandate, the concerns of the ports with respect to their last mile connection were very close to me. I have visited all core ports along the corridor which enabled me to get a clear insight into their development challenges and needs. In addition, I have organised three working group meetings for the ports and the rail-road terminals and assisted two meetings of the Northern Adriatic Ports Association. Thanks to these various exchanges, I feel confident that we have made important steps forward in finding a very good way of efficient and fruitful cooperation between the ports whilst keeping a fair competition. I see myself as a close partner for ports and like to further assist them in developing their "last miles" as well as their common ground for cooperation.

As the corridor analysis also confirms, the last mile connection of ports continues to be a predominant issue to enhance their competitiveness. The planned investments indicate that the improvement of the existing connections aimed at increasing infrastructure standards and performance are planned in the mid-short term with expected completion by 2020 or 2025; additional investments at port "last miles" are also foreseen between 2020 and 2030 to support traffic development. Rail last mile connections are financed by CEF in all Baltic ports and at Koper. CEF also supports the development of LNG as an alternative fuel at the ports of Ravenna and Venice as well as an electric fuel solution at the port of Koper. In addition, MoS initiatives are supported by CEF at the ports of Trieste, Venezia and Koper.

Regarding intermodality, relevant investments are foreseen up until 2030, totalling over 11.2 € billion for the development of the ports infrastructure and 569 € million for rail-road terminals. My working group of ports and rail-road terminals has shown that the relevant stakeholders for the promotion of multimodal transport along the corridor share the same concerns. With the overall objective to support the growing trends and meet the potential user's need and demand at the ports on the Baltic and Adriatic basins, they aim at improving last mile connections and more generally the interconnection between logistics nodes by further improving the conditions and standards of the rail infrastructure.

In order to boost competitiveness of multimodal and combined transport, last mile connections shall be overall considered in the wider context of the conditions and development of the corridor railway infrastructure and capacity and performance of hinterland connections. In particular, logistics terminals in the wider hinterland of ports will have an increasing role to play. I therefore call for a close cooperation of rail and road infrastructure managers with the port authorities and rail-road terminals. They need to join forces and efforts towards the improvement of the attractiveness of railway transport for freight between the core corridor and network logistics nodes.

Last but not least, the ports along the Baltic-Adriatic Corridor are all located in urban areas, five of them in core urban nodes, which also requires due consideration of the integration and impact of last mile connections in these cities environment.

In parallel to my work programme, Brian Simpson, the European Coordinator for Motorways of the Sea, delivered the second version of the Motorways of the Sea (MoS) Detailed Implementation Plan (DIP). Strong links between our efforts to improve the hinterland connection of the ports and his efforts in improving the sea-side connections of ports need to be tied. I am therefore very grateful that the MoS Coordinator presented his programme in October 2017 at one of my working group meetings for the ports and RRT.

The MoS document, following extensive consultations with stakeholders and Member States, presents a number of recommendations to shape the MoS programme of tomorrow in close coordination with other European Coordinators.

The DIP singles out three key future development priorities:

- Environment;
- Integration of maritime transport in the logistic chain;
- Safety, Traffic Management and Human Element.

The MoS work programme is instrumental in identifying future TEN-T policy maritime objectives and it clarifies the main areas that would require EU financial contribution in order to help the maritime industry to improve its environmental and safety performance. It also includes a number of suggestions with the objective to contribute to the increased efficiency of the logistic chain within the nine core network corridors by pointing out to gaps in terms of maritime links.

The MoS work programme comprises also a set of recommendations defining possible future funding objectives with regard to the maritime dimension of the TEN-T policy. It pays particular attention to future trends in Short Sea Shipping in Europe and to the crucial MoS contribution for a better connectivity with peripheral and outermost regions.

The document is supported by a full set of data on ports characteristic, which are an integral part of the TEN-TEC database and in the form of an annex it consists of a detailed analysis on ports and shipping operations with regard to all 331 seaports included in the TEN-T core and comprehensive network. The document makes an effort to characterise the main bottlenecks and investment needs in the comprehensive network of ports as well as point out the main inadequacies when it comes to current network of MoS links.

Besides appropriate last mile connections and MoS links, more efficient logistic solutions are needed for transferring cargo to the hinterland connections, both in the Baltic and the Northern Adriatic ports. Indeed, the challenge of the future may particularly be related to a sound digitalisation of the port services and forward-looking ICT solutions for traffic management.

In the future, I will continuously monitor that the necessary investments are made for appropriate last mile connections. In addition, I wish to intensify the dialogue with the ports with regard to the future challenges of the port industry (e.g. digitalisation). I thereby strongly support existing platforms such as the Baltic Ports Organisation (BPO) and the Northern Adriatic Ports Association (NAPA) which are an excellent tool to showcase how good cooperation and fair competition can go hand in hand.

Improving the interconnection in all urban nodes

Urban nodes, embedded with the corridor regions, have a high potential for the maximisation of the impact of the corridor infrastructure on economic development, growth and territorial cohesion as well as the development of sustainable transport of passengers and freight and thus its impact on decarbonisation. As traffic is heavily generated and attracted by urban nodes, high performance connectivity between the urban nodes and the axes of the corridor is also vital. For instance, traffic congestion and noise in urban areas are important issues when discussing about the mitigation of the impact of long distance traffic transiting urban nodes.

Besides, urban nodes are apart from the ports also somehow the "first and last miles" of the corridor since they serve as connecting points, linking transport modes and corridors. There needs to be an excellent connectivity between the network infrastructure and the urban nodes, including the urban and regional traffic, for the corridor to be fully functional. I therefore recommend that the definition of project solutions to remove existing and future bottlenecks in urban areas and to promote their integration in the core network should, wherever possible, consider the possible impact of soft policy

measures to support the modal shift such as transport demand management and promotion of public transport, cycling and walking, in addition to infrastructure capacity expansion.

Moreover, the analysis of the impact of the development of the corridor on innovation deployment shows that more consideration shall be given by the stakeholders to the development and implementation of sustainable freight transport solutions, also at urban level.

These are also the issues that we intensively discussed in three working group meetings for the urban nodes, regions and the four macro-regions that cross our corridor and that I wish to further address in the years to come. For this reason, I very much welcome that we have started to develop an innovative flagship project on enhancing transfer hubs within urban nodes. Some investments are already included in the project list of the Baltic-Adriatic Corridor which aim at enhancing the transfer of passengers between long distance and regional and local traffic flows, at interchange nodes. I call all interested players to become active partners in this flagship initiative.

Over 9.3 € billion investments are foreseen for the development of the corridor infrastructure within the core urban areas along the corridor, including interconnections to the airports and interchange facilities to enhance the transfer of traffic between long distance and regional/local flows. Further to the improvement of the standards of the networks, the projects for the development of the rail and road infrastructure are also aimed at increasing capacity. In spite of the implementation of the planned investments for the Baltic-Adriatic Corridor, possible rail capacity issues in the future have been identified for the urban nodes of Warszawa, Katowice, Bratislava, Wien and Ljubljana. As for road, the planned investments for road transport are overall expected to solve existing and future capacity issues in the core urban nodes of the Baltic-Adriatic Corridor; congestion problems may however remain in proximity of urban agglomerations and other major demand generation points located in urban areas as well as on the lines and roads interconnecting these nodes.

The urban nodes are the central points which connect the people on the ground. This is where the benefits of European intervention through a better connectivity become the most visible. However, we need to strengthen our communication efforts in order to properly communicate to our European citizens about the added value of our European interventions. This goes hand in hand with initiatives such as INTERREG which are a very positive add-on to my work as European TEN-T Coordinator.

A very strong asset of the Baltic-Adriatic Corridor is that its corridor activities can be based on a long tradition of regional cooperation across borders. Apart from the forward-looking Baltic-Sea, Adriatic Ionian, Alpine and Danube macro-regional strategies as well as initiatives such as the Baltic Sea Forum or the Association of Polish Baltic-Adriatic corridor regions, there are numerous cross-border, transnational and interregional cooperation projects (such as BatCo, SoNoRa, TENtacle) which have been financed by the European Territorial Cooperation programmes and which have been and are still very active along the corridor. These cooperation projects and initiatives are of high value in order to come to a joint understanding of cross-border issues and to set-up a joint vision for our corridor. Through regional cooperation, forces within the region can be bundled, innovative ideas can be developed and available resources can be used in a more efficient way. As European Coordinator, I therefore strongly support and encourage those bottom-up initiatives and invite all relevant stakeholders to create synergies with the corridor activities.

In this context, we also need to join forces and should strive for more coherence between the different European policies and funding instruments, mainly the Regional funds under Cohesion Policy and the Connecting Europe Facility of the European Transport Policy. TEN-T policy, the priorities of the macro-regional strategies and the INTERREG Cooperation Programmes are already supporting each other to some extent. However, better coordination and streamlining could make this more effective. Apart from the various cooperation initiatives financed by Structural Funds, further synergies ought to

be created between the transport projects implemented through the "mainstream" funds (i.e. European Structural Investments Funds) and the Connecting Europe Facility. For this reason, I also involve DG REGIO as well as some relevant INTERREG initiatives and the macro-regional strategies very closely in our corridor activities.

Promoting interoperability, in particular through the full deployment of ERTMS

Without ensuring an interoperable corridor, a modal shift from road to rail cannot be realised. Investing in ERTMS is therefore a prerequisite to reach the targets of the White Paper on Transport. ERTMS deployment has thus been a priority of my work plan since 2015. Improvements have already been made along the Baltic-Adriatic corridor since 2014, and ERTMS is currently under implementation supported by the CEF Instrument in Poland, Czech Republic, Slovakia and Italy as well as in Slovenia, where the system is already available on the entire network, except on the section between Pragersko – Maribor - ŠentilJ/Spielfeld. In order to grasp the full benefits of ERTMS deployment and to achieve higher added value for our corridor, ERTMS shall be deployed on all corridor links, including at the cross-border sections.

On 5 January 2017 the European Commission adopted the Implementing Regulation (EU) 2017/6 on the European Rail Traffic Management System European Deployment Plan (ERTMS EDP) that replaces the old deployment plan of 2009. The reviewed ERTMS EDP adapts the geographical scope of deployment to the TEN-T Regulation and sets new targets for ERTMS deployment on the core network corridors until 2023. These target dates are firm commitments made by Member States and infrastructure managers during the consultation and negotiations between 2014 and 2016 which were led by my colleague Karel Vinck, European ERTMS Coordinator.

In 2023, the ERTMS European Deployment Plan will be updated again setting out the precise implementation dates for the remaining part of the corridors between 2024 and 2030. The ERTMS Coordinator proposed this two-step approach for defining the consistent deployment of the core network corridors by 2030 which was appreciated by all affected stakeholders. This approach ensures that the reviewed EDP sets out more realistic dates and therefore it can serve as the basis for business planning of railway undertakings.

The deployment of an interoperable Single European Rail Area has faced numerous barriers by implementing ERTMS over the last 10 years. However, an ERTMS Deployment Action Plan, adopted by the Commission as a Commission Staff Working Document on 14 November 2017 (SWD(2017) 375 final) has been officially introduced. It defines the actions to remove all identified obstacles with the responsible parties in the frame of well-defined timelines. This Action Plan is the last step in a thorough analysis of the ERTMS deployment in the European Union, followed by detailed negotiations with the Member States and the Rail Sector, including their commitment in terms of actions and execution times.

I will continue to strongly support the European Coordinator for ERTMS to ensure the full deployment of ERTMS along the corridor by 2030. In addition, I wish to further intensify my exchanges with the Baltic-Adriatic Rail Freight Corridor in order to ensure that our efforts undertaken in realising the hard infrastructure investments are duly complemented by (soft) measures as to remove existing operational and administrative bottlenecks that may hamper the interoperable transport flows along our corridor. Indeed, when looking at rail investments, we can and need to differentiate between long-term and short-term projects, though both types of investment may create the same level of economic impact as a result. The way we have been approaching the implementation of our core network corridors is mainly through long-term, infrastructure projects (renewal of tracks, tunnels, bridges, etc.) which represents the most significant part of the allocation of the needed funds. These investments require a lot of time in terms of planning, approvals, societal acceptance and realisation. However, there are

many possibilities to reach tangible results through the execution of short-term actions requiring lower level of investments – through the so called 'rail breakthroughs'.

Rail breakthroughs can be identified on each corridor, if we consider the potential included in interoperability of existing rail infrastructure: implementation of ERTMS and of the harmonisation of operational, administrative and authorisation issues. At the same time there is also a political need to achieve results in the railway sector which are concrete and visible in a shorter period of time. It is essential for the railway sector to increase quality through competitiveness and to deliver tangible results now. This can be reached through rail breakthroughs.

I am very grateful to be able to build on a very fruitful cooperation with the Baltic-Adriatic Rail Freight Corridor and strive to continue this close exchange. I would like to thank the Rail Freight Corridor for its continuous efforts undertaken in removing both operational and administrative barriers along the corridor and their intention to conclude their bottleneck analysis in the coming months. I will encourage the Baltic-Adriatic Rail Freight Corridor to establish on that analytical basis a concrete action plan for the removal of operational bottlenecks as to improve the operational and functional performance of our corridor. Studies for the Baltic-Adriatic Rail Freight Corridor, including long train study and last mile study, are currently being co-financed by the CEF and I will closely monitor their results.

High investments required on the corridor

The corridor study identifies about 551 investments that would be needed for the development of the Baltic-Adriatic Corridor until 2030 which represent an estimated total volume of around 76.9 € billion. 50.5% of this total volume of investments is allocated to railways and ERTMS, 25.6% to road, around 14.1% to ports, including their interconnections (3.0%) and MoS projects (0.1%), and 9.8% to airports (7.6%), rail-road terminals (0.7%), innovation (0.8%) and transit and multimodal interchange facilities in core urban nodes (0.7%). 9.2% of the total budget is allocated to cross-border sections related initiatives. The cost of the two Alpine crossings is equivalent to 11.5% of the total investment value. Compared to the 2014 study analysis, the total investment volume for the development of the corridor by 2030 has increased by nearly 28.5%. This shows us that there is much to do to realise the Baltic-Adriatic core network corridor.

Stable pipeline of mature projects needed

These financial estimates also clearly illustrate that it is of utmost importance to establish a stable pipeline of mature projects that encourage investors to engage in transport infrastructure. Moreover, a prioritisation of the investments along the corridor is needed. As European Coordinator, I wish to assist the Member States in this challenging task and this work plan shall constitute one tool in this regard.

The project analysis shows that the current project list falls short in the identification of projects and investments to fully reach the KPI standards by 2030, particularly with respect to rail transport (train length and ERTMS). These targets are as relevant to develop an interoperable corridor as speed, axle load and electrification. I will therefore closely monitor the development of the project pipeline and ensure that all bottlenecks of the corridor are properly addressed in the project and investment plans of the Member States.

Availability of alternative clean fuels, particularly at ports and airports, is also a theme which requires further attention and which may become subject of discussion among the stakeholders in order to understand and share views on problems and opportunities related to its development along the corridor.

Furthermore, the detailed analysis of the project pipeline shows that – even though most projects currently included in the updated project list are planned to be completed by

2020 – some key milestones of project implementation have not been concluded yet. This regards in particular aspects such as land acquisition or the Environmental Impact Assessment (EIA). Focussing on construction projects, out of a total of 356 ongoing and planned investments, land acquisition is completed for 59, EIA is approved for 74, final project approval is available for 63 initiatives; and the CBA has been undertaken for 236 projects.

In terms of project maturity, we can also notice that funding and financing has not been secured yet for over 45% of the total investments required to implement the work plan priorities, including critical cross-border sections. Furthermore, the list of the Baltic-Adriatic Corridor includes nearly 300 projects that relate to key priorities of the Regulations (EU) 1315/2013 and 1316/2013 for a total cost of 58.3 € billion, whose implementation requires 32.4 € billion financial resources, which are not available at present. As European Coordinator, I will therefore closely follow up on those issues in order to ensure that the necessary efforts are made towards the development of a mature and stable project pipeline.

In this respect, the principle of use-it or lose-it as applied by the CEF is essential in a competitive environment and requires the development of a stable pipeline of mature projects. As a result, I strive to engage with the respective stakeholders in a dialogue as to ensure that all studies relating to the standards (KPIs) of the infrastructure, particularly those relating to requests for derogation should be agreed with the EC by 2020. Projects should be mature for implementation by 2023 (particularly those relating to KPIs and work plan priorities) as our target remains to have a compliant corridor by 2030.

Calling for a powerful tool for infrastructure financing at European level

The investment needs on the Baltic-Adriatic Corridor – as well as on all other core network corridors – are extremely high. Indeed, current figures state that 750 billion € would be needed to realise the entire TEN-T core network from 2016 by 2030. At the same time, almost 97% of the CEF budget has already been committed only after three calls for proposals and this only three and a half years after the adoption of the CEF. The Cohesion envelope under CEF has even been fully allocated.

Against this background, I have recently published with my fellow European Coordinators our "Joint Declaration of the European Coordinators on the future of TEN-T and CEF". By this Declaration, we call for a strong EU support with an increased grant budget for European added-value investments in transport, energy and telecom and for making a greater use of blending and financial instruments at the same time.

We also ask that CEF becomes the main instrument for infrastructure financing, removing overlaps with other funds such as the European Structural and Investment Funds. Last but not least, we call for the removal of remaining regulatory barriers, for increased technical assistance to project promoters and for a better visibility of investment opportunities towards potential investors. This is what we hope to see realised from the side of the EU to help us complete our corridors and make them an even stronger enabler of the EU transport policy.

Considering the high investment needs on the corridors and TEN-T in general, they can however not be met by grant financing only – even if a future CEF 2 budget is increased. In our Joint Declaration we therefore call for a future funding and financing framework that is composed of a carefully set up framework of grants, financial instruments and blending facilities.

Given the limited resources, grants should be concentrated on projects of high EU added-value such as cross-border projects, the removal of bottlenecks with EU-wide effect and horizontal priorities such as SESAR and ERTMS. They should be complemented by well-designed EU financial instruments in which revenue generating TEN-T projects are supported without relying on grant finance. And finally, some parts of the TEN-T policy can be realised with a mix of funding and financing, the so called blending of

instruments. Here areas in transition could find their place, such as the initial roll-out of certain alternative clean fuels.

In the interest of a timely implementation of our Baltic-Adriatic corridor network, we need to look very closely how we can make best use of the different funding and financing streams. Given the huge challenges and the problems identified with regard to the financial maturity and readiness of our project pipeline, we have to further work on the financing of projects, by also opening up to innovative financial instruments. I therefore very much welcome that many proposals have been submitted by the stakeholders along the Baltic-Adriatic Corridor for the first CEF blending call. The results of the call have been very successful for the Baltic-Adriatic Corridor with more than 300 € million funds allocated to the development our corridor infrastructure and work plan priorities. This shows that we can open up to other ways of financing.

On the Baltic-Adriatic Corridor, projects identified so far for potential use of financial instruments concern the areas of motorway expansion projects including urban bypasses, fixed link connections to airports and airport capacity expansions, logistics nodes development projects or innovation projects including alternative fuels infrastructure. In times of scarce public resources, I encourage all project promoters to study the possible options to diversify the funding and financing sources for investments. The results of the use of EFSI for projects on the corridor and the take-up of the blending call are encouraging in this respect.

This is also very much in line with my "CBS Action Plan" that I have presented in 2015. Indeed, together with my fellow colleague Prof. Carlo Secchi, European Coordinator of the Atlantic Corridor, and former Vice-President of the European Commission, Henning Christophersen (†), I presented in June 2015 a concrete action plan to the Council of the Ministers of Transport and to the European Commission which outlines twelve concrete recommendations of how to make the best use of new financial schemes for European transport infrastructure projects. This Action Plan, so-called "CBS Report", largely contributed to the debate on the Jobs, Growth and Investment Package of President Juncker and supported the implementation of the related EFSI fund. It aimed at fully grasping the opportunities offered by EFSI and financing on transport in general, facilitating synergies between public sources at national (in particular National Promotional Banks) and EU level (CEF, ESIF, EIB) and private sources such as institutional investors, commercial banks and insurance companies. The report had been presented in formal and informal Transport Councils in Milano, Bruxelles and Luxembourg.

Since then, several measures called for by the Action Plan with its twelve recommendations have been developed and successfully implemented in order to improve the (regulatory) financing framework for infrastructure investments (e.g. revision of the financial market regulations, the statistical criteria for PPPs, the permitting study issued by DG MOVE, etc.). Taking into consideration these improvements, Prof. Secchi and I issued in December 2017 a progress report that highlights the progress made with regard to the twelve CBS recommendations and most importantly outlines the steps and measures that are still needed to improve the framework for investments in Europe. In this report, we particularly make specific recommendations of how to leverage as much as possible additional financing from the private sector, including guarantees from the Juncker Plan.

Setting up of a competitive planning and financing framework and offering a right choice of accompanying measures

Alongside the development of a stable and mature project pipeline capturing all funding and financing opportunities, the timely and successful implementation of our corridor can only be ensured if the right accompanying measures and planning instruments are set up. Indeed, even in case the financial means for the realisation of the corridor projects are at hand, local, regional and national authorities face problems in realising, in particular major, transport projects. This especially counts for projects that are planned

in environmental sensitive areas which often capture the attention of several opponents. Their concerns have to be seriously considered and not neglected as otherwise they can lead to significant delays in the completion of Strategic Environmental Assessments (SEA) and Environmental Impact Assessments (EIA) and other planning and development processes as well as during construction. Citizens have to be involved in those planning and development processes in an appropriate and consequent manner by putting in place sound and forward-looking information and participation tools. These have to be adequately integrated in the regional planning procedures as to ensure that planning decisions are legally sound and non-contestable.

Lengthy and complex procedures of the SEA/EIA often add on to this problematic. Therefore, acceleration of planning and approval processes need to be considered when and wherever possible. Similarly, it is needed to streamline, adapt and simplify procurement and permitting procedures in order to accelerate the implementation of projects. Tender procedures as well as plan approval processes, especially for cross-border projects, need to be harmonised.

In our CBS 2 Action Plan (see above), we recommend a number of measures that lead to a simplification of procurement and permitting procedures, such as the set-up of special (single) procurement rules for cross-border projects, the establishment of a single permitting authority for TEN-T projects including all environment assessments, the set-up of time limits for permitting procedures and so on. Further to our advice, DG MOVE issued in 2016 a study on the facilitation of the implementation of TEN-T projects in cooperation with other EC services. Based on this, an impact assessment is currently on-going to design the best actions that can be undertaken at EU level to assist the Member States with this task. In this context, DG MOVE recently launched a public consultation and organised dedicated workshops to examine these issues with the relevant stakeholders. As European Coordinator, I will closely follow-up on the results of this initiative and public consultation and promote it for the use along our corridor.

Intensifying the efforts for sustainable transport investments supporting decarbonisation

The corridor analysis has shown us that the corridors generally have a great potential to support decarbonisation by reducing GHG emissions, air pollutant emissions and noise. The applied corridor perspective can provide useful tools to pave the way for a sustainable modal shift. To increase the corridor's potential in this regard, the necessary efforts for decarbonisation of transport and for mitigating the negative effects of the growth of mobility along the corridor have to be taken.

In a first place, I call all relevant stakeholders to invest in the sustainable modes of transport. If the needed investments in high-standard railway connections are made – not only along the corridor, but in particular as hinterland connections to the ports, inland ports and RRT – we can make a significant step forward to realise a sustainable, low-carbon transport corridor from North to South.

Next to the necessary investments in the hard (railway) infrastructure, more investments have to be made in the field of innovation, i.e. by supporting the diffusion of alternative clean fuels, the introduction in the market of more efficient means of transport, in particular zero/low emission vehicles, as well as behavioural actions to rationalise the mobility of passengers and delivery of freights to reduce the overall emissions generated by transport operations. The development of our innovative flagship project on enhancing passengers' transfer hubs in urban nodes along the corridor could already become one pilot exercise to test new approaches to boost sustainable transport. Indeed, it is particularly in urban nodes that the negative effects of transport flows become visible and noticeable, especially in terms of noise and air pollution. The promotion of e-mobility of public transport services would be one very efficient way forward as the decision for such e-mobility concept for public transport would not depend on individual decision-making but could be a clear political engagement for the future.

Furthermore, we have to do our utmost to increasingly apply measures for climate change resilience. To this aim, I wish that we unite our forces in this regard, exchange good practices along our corridor and jointly elaborate a more consistent and standardised approach also at European level of how to mitigate the negative effects of climate change on our transport corridor infrastructure and operations.

Continuation of the corridor process – outlook

I propose with the present third work plan six concrete development priorities for the Baltic-Adriatic Corridor. In view of these priorities, Figure 19 presents the most important milestones and steps to be taken for the Baltic-Adriatic Corridor. These are the steps that will guide our future work along the corridor, accompanied by a continuation of a sound process of stakeholder participation (e.g. in the framework of a continuation of our Baltic-Adriatic Corridor Forum meetings, cross-border dialogues and working groups and also in form of joint working groups of different corridors). In addition, our close cooperation amongst the core network corridors and the horizontal priorities proved to be extremely useful in the past as shown by the organisation of joint working group sessions or joint missions. I will further build on such joint initiatives, as to ensure a harmonised development of our corridor in line with the development of the other core network corridors and also in the light of a possible extension within future revisions of the CEF and TEN-T Regulations.

Figure 19: Baltic-Adriatic corridor priorities – milestones and steps to be taken

Priorities	by 2018	by 2020	by 2023	by 2030
Developing cross-border links both for rail and road with highest European added-value	Monitor the timely development and implementation of cross-border projects Continuation of the cross-border dialogues and bilateral working groups to align national planning and timing of cross-border projects	Monitor timely development and implementation of cross-border projects Continuation of the cross-border dialogues and bilateral working groups to align national planning and timing of cross-border projects	Cross-border projects mature and ready to be implemented or under implementation	All cross-border sections fully compliant with the TEN-T requirements
Ensuring the timely implementation of the missing links at the Alpine crossings	Monitor the timely implementation of projects	Monitor the timely implementation of projects	Monitor the timely implementation of the Semmering Tunnel and finalisation of the works for the construction of the Koralm railway line and tunnel, expected to be completed by 2024	2026: Both missing links completed

Improving the infrastructure quality and standards, especially in terms of modernisation of the national corridor railway links in the Cohesion Countries of the corridor	Monitor the timely development and implementation of projects impacting on KPIs for freight transport, including visits to Infrastructure Managers Consolidating synergies with RFC5 for the analysis of the operational and administrative bottlenecks, market study and priorities for infrastructure development	Projects for the development of the corridor at standard defined Monitor the timely development and implementation of projects impacting on KPIs for freight transport, including visits to Infrastructure Managers Consolidating synergies with RFC5 for the analysis of the operational and administrative bottlenecks, market study and priorities for infrastructure development	Projects impacting on KPIs for freight transport mature and ready to be implemented or under implementation	All sections fully compliant with TEN-T requirements
Enhancing multimodal transport, by improving the last mile connection of ports and promoting transport digitalisation	Continuation of the working group for ports (and RRTs), focussing on the role of the ports and corridor in the Baltic/North Sea and Adriatic/Mediterrane an basins (possibly involving the Baltic Ports Organisation and North Adriatic Ports Association) Monitor the implementation of last mile/hinterland connection projects, and transport digitalisation solutions	Continuation of the working group for ports (and RRTs), strengthening mutual support between the MoS Detailed Implementation Plan and the Baltic-Adriatic corridor work plan Monitor the implementation of last mile/hinterland connection projects, and transport digitalisation solutions	Monitor the implementation of last mile/hinterland connection projects, and transport digitalisation solutions	All ports well integrated into a multimodal Baltic-Adriatic Corridor
Improving the interconnection in all urban nodes	Continuation of the working group for regions, urban nodes and macro-regional strategies – understanding synergies between TEN-T and regional policy Monitor the implementation of innovative flagship projects and initiatives associated to this concept	Continuation of the working group for regions, urban nodes and macro-regional strategies – presenting progresses/results in the implementation of innovative flagship projects Monitor the implementation of the multimodal development and connection to the wider TEN-T network within urban nodes	Monitor the implementation of the multimodal development and connection to the wider TEN-T network within urban nodes	Core urban nodes along the corridor well connected to the corridor showing examples of integration of the TEN-T policy in the wider context of the EU policies for Mobility and Transport

Promoting interoperability, in particular through the full deployment of ERTMS	Support ERTMS deployment, focussing on cross-border sections (in line with the 2017 ERTMS European Deployment Plan)	Support ERTMS deployment, focussing on cross-border sections (in line with the 2017 ERTMS European Deployment Plan)	Support ERTMS deployment, focussing on cross-border sections (towards the update of the ERTMS European Deployment Plan)	ERTMS equipped and in operation on the whole core network corridor, including at cross-border sections

Let me conclude by re-emphasizing that the TEN-T corridors have a great sustainable and economic growth potential. To maximise those growth effects and take full benefits from the development of our corridor, we need a fully integrated, cooperative and implementation-oriented development approach. This is also why we need to look much closer into the structure of our cooperation and the proper involvement of the right stakeholders. For instance, spatial and transport planners need to work much closer together and work 'from isolation to cooperation'. With our corridor activities, we have been frontrunners for such new integrative and participatory approach.

I would like to thank all members of the Baltic-Adriatic Corridor Forum for their active participation in the development of the corridor over the past years. We would not have achieved such a good progress and results without your involvement and dedication. I am especially pleased to have witnessed over time closer and closer cooperation between inter-dependent stakeholders, as can be evidenced for example by the setting-up of the cross-border dialogues.

The challenges of the corridor which are ahead of us are important and its investment needs high. As European Coordinator, I will assist you, Member States, in facing these challenges and in realising the needed investments. I invite you to follow me on this interesting path.

9. Contacts

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