Baltic-Adriatic

Core Network Corridor Study

Final Report

December 2014

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1. Introduction

1.1. Aim and content of the BA Corridor work plan development study

This document has been prepared by the European Commission's Contractor LeighFisher Limited and their subcontractors Jacobs Polska, NDCON, Paradigma and ASTRA-PROJEKT d.o.o. – University of Maribor (BA Corridor study consortium) in fulfilment of the requirements of the Contract No. MOVE / B.1 / FV2012-573 / STUDY BALTIC-ADRIATIC TEN-T CORRIDOR / LOT 1 / SI2.669435 concerning the preparation of the study for the development of the Baltic-Adriatic Corridor.

This study has been prepared to provide the technical basis for the definition of the Baltic-Adriatic (hereinafter BA) Corridor work plan, by the European Coordinator, Prof. Kurt Bodewig, together with the Member States concerned, Poland, Czech Republic, Slovakia, Austria, Italy and Slovenia, and in consultation with the Corridor Forum. The study comprised the following tasks:
- Identification of relevant stakeholders;
- Collection and review of studies on sections and parts of the corridor;
- Analysis of available data on the corridor infrastructure parameters and encoding of the TENtec database;
- Preparation of elements of the work plan of the core network corridor, including: a description of its characteristics, the definition of its objectives, a programme of measures necessary for its development, a multimodal transport market study, an implementation plan and the investments required;
- Preparation, support and follow up of the meetings of the Corridor Forum.

This report is the final deliverable of the study.

In line with the provisions set by Regulation EU 1315/2013, the objective of the work plan is that of facilitating the coordinated development and implementation of the BA Corridor as a continuous intermodal and interoperable TEN-T core network infrastructure.

In addition to this introductory Chapter, this report includes 3 additional sections:
- Chapter 2: Identification of the stakeholders and their consultation contribution towards the definition of the BA Corridor work plan;
- Chapter 3: Review of relevant studies;
- Chapter 4: Elements of the work plan, including the description of the characteristics of the BA Corridor infrastructure and its compliance with the Regulation EU 1315/2013; summary of the results of the multimodal market study; the analysis of critical issues; the identification of the objectives of the BA Corridor work plan; the tools for the implementation of the work plan including an analysis and review of the planned investments with reference to the critical issues; the *ERTMS Deployment Plan* and the *Plan for the removal of barriers and enhancement of efficient multimodal transport and services*.

The main report is also complemented by 5 appendices:
- Appendix A: List of relevant EU regulations;
- Appendix B: List of studies and initiatives;
- Appendix C: BA Corridor alignment;
- Appendix D: Characteristics of the BA Corridor;
- Appendix E: BA Corridor Multimodal Market Study.

1.2. Methodology remarks

From a methodological standpoint, the content of this report has been prepared based on the following approach:

- The description of the BA Corridor alignment is based on Regulation EU 1315/2013, defining the TEN-T core and comprehensive networks (new TEN-T regulation); on Regulation EU 1316/2013, establishing the Connecting Europe Facility instrument (CEF regulation); and on the information already available in the TENtec database as also integrated, reviewed and commented on with the stakeholders and the owners of the infrastructure;
- The description of the BA Corridor infrastructure and the identification of the critical issues are based on the analysis of the compliance of the corridor infrastructure to Regulation 1315/2013, the results of the market study with reference to the analysis of capacity issues, review of publicly available sources including existing studies, as well as consultation with the infrastructure managers and professional knowledge of the corridor;
- The BA Corridor market study is based on data provided by the Infrastructure Managers either directly or from their Internet Web Sites, available studies, socio-economic data and statistics from Eurostat, OECD and IMF as well as national/regional statistical databases. The study also takes into consideration the results from the Transport Market Study under development by the Rail Freight Corridor 5;
- The general objectives of the BA Corridor work plan are derived from Regulation EU 1315/2013; the specific corridor objectives have been identified based on general objectives and the characteristics of the BA Corridor infrastructure, its critical issues and problems;
- The implementation of the BA Corridor work plan includes information on investments gathered from national, regional and infrastructure managers' development plans as also discussed with the responsible entities in coordination with the main stakeholders, including Ministries, National Infrastructure and Development Agencies, Regional Authorities.

1.3. Presentation of the information by Member State

The information and data included in this report is generally ordered reflecting the alignment of the BA Corridor as listed in Annex 1 to the Regulation EU 1316/2013:

- Gdynia – Gdańsk – Katowice/Sławków;
- Gdańsk – Warszawa – Katowice;
- Katowice – Ostrava – Brno – Wien;
- Szczecin/Świnoujście – Poznań – Wrocław – Ostrava;
- Katowice – Žilina – Bratislava – Wien;
- Wien – Graz – Villach – Udine – Trieste;
- Udine – Venezia – Padova – Bologna – Ravenna;
- Graz – Maribor – Ljubljana – Koper/Trieste.

In line with the above sections, the sequence of the description of the information by Member Sate is as follows: Poland (PL), Czech Republic (CZ), Slovakia (SK), Austria (AT), Italy (IT) and Slovenia (SI).

1.4. Maps and tables included in this report and TENtec database

The maps and tables included in this report to describe the BA Corridor rail and road links, including traffic, are the result of the Contractor's independent analysis of the BA Corridor infrastructure; these have been elaborated with reference to the sections encoded in the TENtec database.

Maps representing the characteristics of the BA Corridor have been also produced based on the data encoded in the TENtec database; these have been annexed to the work plan. These maps refer to the situation of the BA Corridor infrastructure at January 2014.

By comparing the maps in this report and the maps annexed to the work plan, some differences may be identified with reference to the representation of the rail and road infrastructure which relate to the more detailed structure of our analysis: the maps in our main report also represent information relating to sub-sections of TENtec encoded sections, thus representing the partial compliance of segments of the BA Corridor railway lines and roads, whereas the TENtec maps are less detailed in this respect, mainly showing information at the entire section level.

The maps do not represent the infrastructure at transport and urban nodes as the infrastructure at nodes is not encoded in the TENtec database. Specifically regarding the analysis of the interconnections between the ports and main airports along the corridor and the BA Corridor rail and road links, maps illustrating the last mile connections have been included at Section 4.2.4 and 4.2.5 of this report.

2. Stakeholders’ consultation towards the BA Corridor Work Plan

2.1. BA Corridor Forum and Working Groups

Art. 42 of Chapter IV of Regulation EU 1315/2013 defines Core Network Corridors as instruments to facilitate the coordinated implementation of the core network, which shall enable Member States to achieve a coordinated and synchronised approach with regard to investment in infrastructure, so as to manage capacities in the most efficient way.

In order to facilitate the coordinated implementation of core network corridors, on the basis of the previously successful experience with the core network 30 Priority Projects, European Corridor Coordinators have been designated, acting in the name and on behalf of the Commission. European Coordinators may consult, together with the Member States concerned, regional and local authorities, transport operators, transport users and representatives of civil society in relation to the work plan and its implementation. According to the Regulation EU 1315/2013, a Corridor Forum and working groups may be organised by the European Coordinators in support of the elaboration and implementation of the Core Network Corridor work plans:

- ***Corridor Forum*** The European Coordinator shall be assisted in the performance of his/her tasks concerning the work plan and its implementation by a secretariat and by a consultative forum (the Corridor Forum). In agreement with the Member States concerned, the Corridor Forum shall be established and chaired by the European Coordinator. The Member States concerned shall agree on the membership of the Corridor Forum for their part of the core network corridor;
- ***Corridor Working Groups*** With the agreement of the Member States concerned, the Coordinator may set up and chair corridor working groups which focus on the three priority cohesion policy targets of corridor implementation: cross-border projects, interoperability issues and better modal integration.

In line with the above principles a BA Corridor Forum has been set up, chaired by Prof. Kurt Bodewig as European Coordinator for the BA Corridor. As part of the consultation activities of the BA Corridor Forum, four Corridor Forum meetings and two working groups have been identified to be organised with a view to submission of the work plan to the Ministries for approval, by December 2014.

Participation in the Corridor Forum has already seen a gradual and incremental involvement of the main stakeholders:

- 1st Corridor Forum Meeting: Member States;
- 2nd Corridor Forum Meeting: Member States, Railway and Port Infrastructure Managers and the Management and Executive Boards of the Rail Freight Corridor 5;
- 3rd Corridor Forum Meeting: Member States, Railway and Port Infrastructure Managers and the Management and Executive Boards of the Rail Freight Corridor 5, Road and Airport Infrastructure Managers as well as representatives from the Regional Authorities;
- 4th Corridor Forum Meeting: Member States, Railway and Port Infrastructure Managers and the Management and Executive Boards of the Rail Freight Corridor 5, Road and Airport Infrastructure Managers as well as representatives from the Regional Authorities.

In addition to the Forum Meetings, two working groups have been set-up to allow participation of all port authorities and representatives of the BA Corridor Regions; the former in a working group in advance of the third corridor forum meeting; the latter adjacent to the fourth corridor forum meeting.

2.2. List of participants to the BA Corridor Forum

We provide below the list of participants to the BA Corridor Forum Meetings. The stakeholders have been grouped in four different tables: Ministries, Infrastructure Managers (also including National Development Agencies and Regulatory Authorities), BA Corridor Regions (including association of regions and territorial cooperation entities) and other entities, including Rail Freight Corridor 5, and EU institutions.

Table 1 Ministries of Transport Infrastructure

Poland
Ministerstwo Infrastruktury i Rozwoju (Ministry of Infrastructure and Development)
Czech Republic
Ministerstvo dopravy (Ministry of Transport)
Slovakia
Ministerstvo dopravy, výstavby a regionálneho rozvoja (Ministry of Transport, Construction and Regional Development)
Austria
Bundesministerium für Verkehr, Innovation und Technologie (Ministry of Transport, Innovation and Technology)
Italy
Ministero delle Infrastrutture e dei Trasporti (Ministry of Transport and Infrastructure)
Slovenia
Ministrstvo za infrastrukturo in prostor (Ministry of Infrastructure and Spatial Planning)
DRI Investment Management (Consultancy Body of the Ministry)

Table 2 Infrastructure Managers

Poland
PKP PLK S.A. - PKP Polskie Linie Kolejowe (National Railway Infrastructure Manager)
Port of Gdynia Authority S.A.
Port of Gdańsk Authority (PGA)
Szczecin and Świnoujście Ports Authority
GDDK&A - Generalna Dyrekcja Dróg Krajowych i Autostrad (National Roads Manager)
Gdańsk Airport
Warszawa Airport
Łódź Airport
Katowice Airport
Szczecin Airport
Poznań Airport
Wrocław Airport
Czech Republic
Správa železniční dopravní cesty, s.o. (National Rail Infrastructure Manager)
Ředitelství silnic a dálnic (National Highway Agency)
Letiště Ostrava
Slovakia
Železnice Slovenskej republiky (National Rail Infrastructure Manager)
Verejné prístavy, a.s. (Public Ports, j.s.c.)
Národná diaľničná spoločnosť, a.s. (National Motorway Agency, j.s.c.)
Slovenská správa ciest (National Highway Agency)
Letisko M. R. Štefánika – Airport Bratislava, a. s. (BTS)
Austria
ÖBB-Infrastruktur AG (National Infrastructure Manager)
Ports of Wien and WienCont Container Terminal
ASFINAG - Österreichische Autobahn- und Schnellstraßen Finanzierungs Aktiengesellschaft
Flughafen Wien AG
Italy
Rete Ferroviaria Italiana (National Rail Infrastructure Manager)
Port of Ravenna
Port of Venezia
Port of Trieste

ANAS - Società per Azioni (National Roads and Highways Administration)
Struttura di vigilanza sulle concessioni autostradali (Ministerial Toll Road Monitoring Office)
AISCAT - Associazione Italiana Società Concessionarie Autostrade e Trafori
Marco Polo Airport (Venezia)
Guglielmo Marconi Airport (Bologna)
ENAC - Italian Civil Aviation Authority
Slovenia
Slovenske železnice – Infrastruktura, d.o.o. (Slovenian Railways – Infrastructure Ltd)
Javna agencija za železniški promet Republike Slovenije (Public Agency of the Republic of Slovenia for Railway Transport)
Luka Koper
Družba za avtoceste Republike Slovenije - DARS - (Slovenian Road Agency)
Ljubljana Jože Pučnik Airport

Table 3 BA Corridor Regions representing all BA Corridor Regions to the Forum

Poland
Union of the Voivodeships of the Republic of Poland
Association of Polish Baltic-Adriatic Corridor Regions
Czech Republic
Association of Regions in the Czech Republic
Slovakia
Žilinský samosprávny kraj
Bratislavský samosprávny kraj
Austria
Amt der Steirischen Landesregierung
Amt der Kärntner Landesregierung
Italy
Regione Veneto
Regione Emilia Romagna
Slovenia
Communities of Slovenian Eastern NUTS II region
Communities of Slovenian Western NUTS II region
Cross-country
Danube Macroregional Strategy

Table 4 Other Entities

Rail Freight Corridor 5
Management Board
Executive Board
EU Institutions
European Commission DG MOVE
European Commission DG REGIO
European Commission INEA
European Investment Bank
BA Corridor study consortium: LeighFisher Limited (Contractor) & Jacobs Polska, ND-Con, Paradigma, Astra Project, University of Maribor (Sub-contractors)

The stakeholders invited to the working group of ports are the same port authorities participating in the Forum meetings as reported in table 2 above. The list of stakeholders invited to the working group of regions also including the representatives participating in the Corridor Forum, is reported in the following table.

Table 5 BA Corridor regions representatives invited to the BA working group of regions

Poland
Pomorskie Voivodeship
Warminsko-Mazurskie Voivodeship
Kujawsko-Pomorskie Voivodeship

Mazowieckie Voivodeship
Lodzkie Voivodeship
Wielkopolskie Voivodeship
Slaskie Voivodeship
Swietokrzyskie Voivodeship
Opolskie Voivodeship
Dolnoslaskie Voivodeship
Lubuskie Voivodeship
Zachodniopomorskie Voivodeship
Czech Republic
Moravskoslezský kraj
Zlínský kraj
Olomoucký kraj
Jihomoravský kraj
Slovakia
Žilinský samosprávny kraj
Trenčiansky samosprávny kraj
Trnavský samosprávny kraj
Bratislavský samosprávny kraj
Austria
Amt der Niederösterreichischen Landesregierung
Amt der Steirischen Landesregierung
Amt der Kärntner Landesregierung
Italy
Regione Friuli Venezia Giulia
Regione Veneto
Regione Emilia Romagna
Slovenia
Regionalna razvojna agencija - Ljubljanske urbane regije (Regional Development Agency of the Ljubljana Urban Region)
Other representatives of associations of regions participating to the BA Corridor Forum
Union of the Voivodeships of the Republic of Poland
Association of Polish Baltic-Adriatic Corridor Regions
Association of Regions in the Czech Republic
Danube Macroregional Strategy
Communities of Slovenian Eastern NUTS II region
Communities of Slovenian Western NUTS II region

2.3. Stakeholder's consultation towards the implementation of the BA Corridor Work Plan

The complexity and articulateness of our economies and societies, as also reflected in the analysis of the stakeholders involved in this as well as previous studies undertaken for the development of the BA Corridor as a continuous interoperable and intermodal infrastructure, reveals that both problems and solutions can be identified by adopting an inclusive approach to consultation and problem solving. In this respect it is worth noting that:

- 1) Critical issues should not be treated as single applicant or beneficiary ones as problems are usually of a different nature: financial, economic (market), technical, legal/administrative and even of environmental/social acceptability nature; The BA Corridor is furthermore aimed at enhancing multimodal transport, requiring the implementation of cross-modal infrastructure operations and business solutions. It is a cross-border European infrastructure from the physical and operational stand points;
- 2) The BA Corridor is much more than an infrastructure; it adds European value to the infrastructure investments, it enhances cross-border and interregional cooperation and thereby aims at coordinated approaches and implementation. Last but not least the Corridor constitutes a powerful tool to bring relevant stakeholders

across countries and sectors together in order to pave the way for a living corridor environment.

Regarding the first point, consensus on development and implementation of projects, and on their technical, administrative and financial feasibility, may benefit from the cooperation and involvement of multiple stakeholders, including Member States, Regions, Port Authorities and Infrastructure Managers as well as transport operators, vehicle and rolling stock manufacturers and research institutions, either as single entities or in a form of temporary or permanent association at multiple territorial levels.

The review of the existing studies, and particularly Baltic-Adriatic Transport Cooperation project (BATCo), South-North Axis (SoNorA), and the Adriatic-Baltic (AB) Landbdrige Project, shows how the BA Corridor already represents a success in terms of multi-level governance, with a number of relevant initiatives at the cross-border territorial cooperation level already undertaken in the past by the concerned Member States, Regions, and stakeholders from the economic and transport sectors.

Building on these previous experiences, with an aim to be more systematic and inclusive in the definition of the BA Corridor work plan and its development, the scope of the study, work plan and Corridor Forum is also that of promoting and identifying solutions to critical issues from a European perspective, using sources from CEF, but also from Marco Polo, Horizon 2020, as well as ERDF, CF and Interreg.

Regarding the second point, our analysis of the stakeholders already shows a significant number of representatives of territorial cooperation, including:

- 6 European Groupings of Territorial Cooperation [(CETC-EGTC limited – Central European Transport Corridor (SE, PL, SK, CZ, HU, HR - http://www.cetc.pl), TRITIA limited (PL, CZ, SK - www.tritia.wbs.cz), TATRY Limited (PL, SK - www.euwt-tatry.eu), Spoločný región limited (CZ, SK - www.spolocnyregion.sk), Euregio Senza Confini r.l. (AT, IT) and GECT GO (IT, SI - www.euro-go.eu)];
- 4 Macro-Regional Strategies: Baltic Sea, Danube, Alpine and Adriatic-Ionian;
- 11 Metropolitan European Growths Areas (MEGAS) have been also indentified along the BA Corridor: Gdańsk, Warszawa, Łódź, Katowice, Szczecin, Poznań, Wrocław, Bratislava, Wien, Bologna, Ljubljana;
- Governmental and civil society associations and initiatives aimed at promoting the development of the BA Corridor within the context of their territories, the wider TEN-T network and the Motorways of the Sea. Examples in this respect are the Agreement for the Baltic-Adriatic Corridor initiated by: Amber Road Cities Association (www.smab.pl), Association of Polish Regions of the Baltic-Adriatic Corridor (http://regionybac.pl), Association of Vistula River Towns (www.zmn.org.pl), Association of Sea Cities and Communes (www.zmigm.org.pl), Local Authorities Consortium for the Revitalisation of the Coal Rail Line Silesia-Ports (www.zdunskawola.pl), Local Government Association for the A1 Motorway (http://stowarzyszeniea1.pl), Central European Transport Corridor[1] (CETC-ROUTE65 - www.cetc.pl), the North Adriatic Ports Association (NAPA - www.portsofnapa.com) and the Baltic Port Organization (BPO - www.bpoports.com);
- Among other relevant EU actions the Central European Initiative (www.cei.int) and Cultainer (www.cultainer.com) are also worth mentioning, the last one aimed at

[1] These associations decided to jointly prepare and implement the EU Regulation 1315/2013 – on local and regional level of governance. All partners of the Agreement are stakeholders of the corridor. Moreover, there are some representatives of cross-territorial cooperation in Baltic Sea Region: Union of Baltic Cities (www.ubc.net), Euroregion Baltic (www.eurobalt.org.pl).

supporting cross-country integration along the BA Corridor in the fields of art, culture and science in the regions from the Baltic to the Adriatic.

Within this context of strategic relevance, the various stakeholders possibly contributing to the development of the BA Corridor at different levels, the Corridor Forum is seen as an important tool which is intended to be continued over the next months and years.

A revision of work plan is already foreseen for 2016 and 2018. Two Forum meetings are planned to be held in in Brussels in June and Autumn 2015; three Forum meetings are likely to be organised in 2016 in support of the planned revision of the work plan. In addition, other working groups may be envisaged for 2015 and 2016. Working groups may also be organised in Brussels or at Member States level specific to critical issues, including but not limited to cross-border and last mile connections to ports.

In addition to the Forum meetings and working groups, visits to Ministries and/or Infrastructure Managers and their project sites are also envisaged for 2015 where a focus will be set on cross-border sections and ports; this is intended to give continuation to the missions to all Ministers of Transport along the Corridor and to face-to-face meetings held with the rail and road infrastructure managers in the six BA Corridor Member States during 2014.

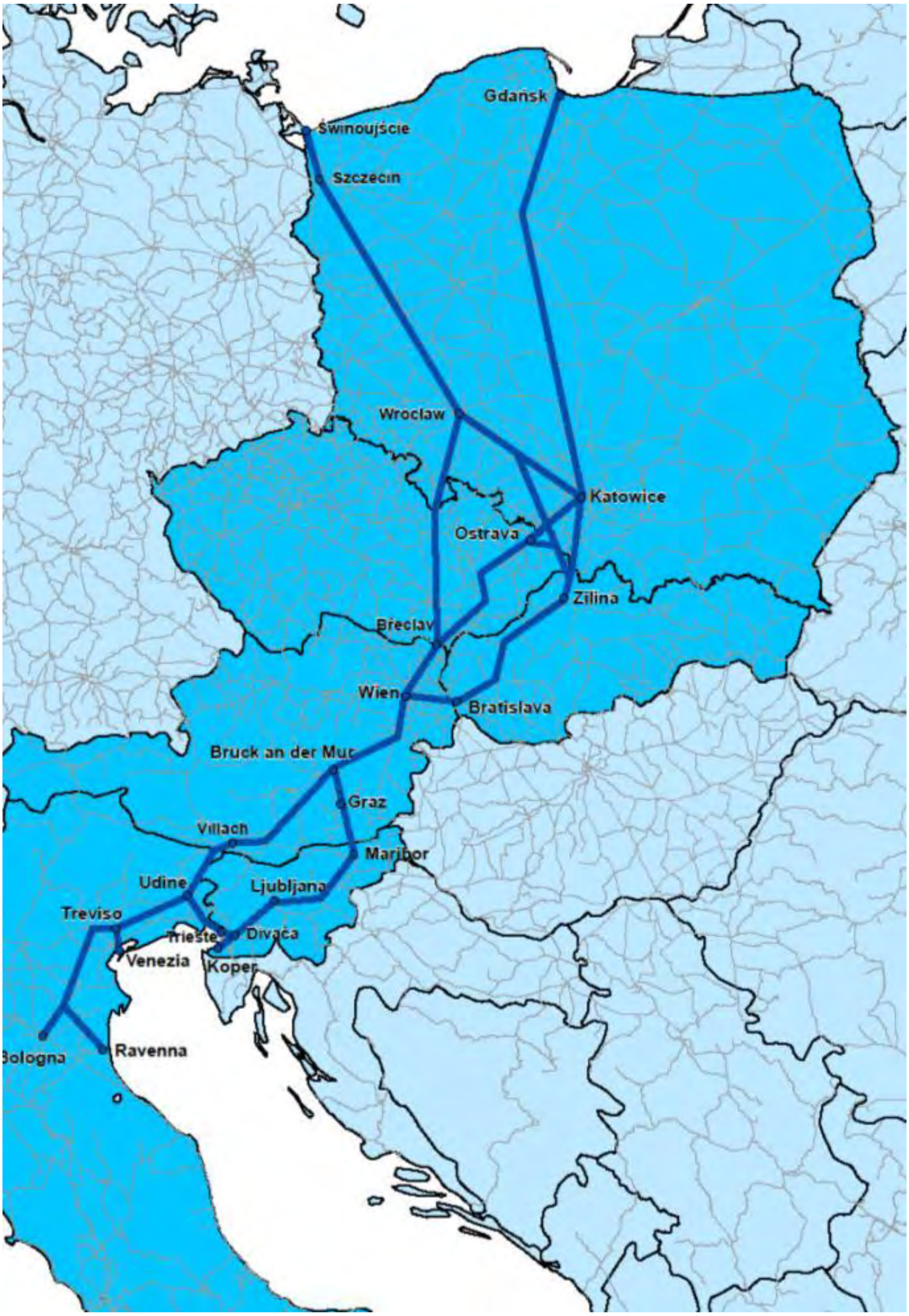
Dissemination and communication on activities and results are also expected to be undertaken by the European Coordinator in the future. This is aimed at extending participation to civil society not directly involved (yet) in the Corridor Forum and including relevant stakeholders such as rail-road terminal and transport operators, professional and industry organisations and citizens associations. According to this inclusive approach, the European Coordinator may also directly consult and assist initiatives aimed at solving critical issues representing an impediment to the definition of the work plan and its implementation.

2.3.1 Rail Freight Corridor 5

The need for a systemic and inclusive approach makes it also necessary to coordinate the preparation of the BA Corridor work plan and its implementation strategy in synergy with the parallel development of Rail Freight Corridor 5, also currently under study. In this respect we note that as also stated by Regulation EU 913/2010, Core Network Corridors (CNC), including the BA Corridor, overlap wherever possible the Railway Freight Corridors (RFC). According to Regulation EU 913/2010 governance structures for each freight corridor exist consisting of Member States and Infrastructure Managers and the Allocation Body. The infrastructure managers together form the Management Board of the Rail Freight Corridor (RFC) 5, in charge of the studies to be undertaken for its implementation, whereas the Ministries represent the Executive Board. Advisory Groups to the Management Board are also worth mentioning in the RFC 5 governance structure - consisting of the Freight Terminal Operators and Railway Undertakings.

The map overleaf is a draft version of the schematic routing of the RFC 5. Studies, including market analyses are still on-going which could result in an amendment of the alignment.

Figure 1 Routing of the Rail freight Corridor 5



Source: RFC 5

In the context of the definition of the BA Corridor work plan and of the RFC 5 Transport Market Study and investment plan, information from the studies regarding the development and implementation of the two corridors have been shared between the CNC BA Corridor Forum and RFC 5 Management Board, as well as the consultants involved in the analyses, and taken into account accordingly. Such cooperation brings added value to the BA Corridor works. Once the RFC 5 is operational (foreseen by Autumn 2015), coordination activities between the RFC 5 and the CNC BA Corridor may be continued by the RFC 5 definitive management structure.

2.3.2 ERTMS and Motorways of the Sea

In addition to 9 Core Network Corridors Coordinators, the EU Regulation 1315/2013 also foresees the identification of two additional coordinators, one for the Motorways of the Sea and one for the deployment of ERTMS. This approach responds to the need to promote an intermodal and interoperable network of core corridors.

2.3.3 Other initiatives: Platina II and inland waterway transport

PLATINA II (2013 - 2016) is a European Coordination Action aimed at the implementation of the NAIADES II policy package "Towards quality inland waterway transport". NAIADES II seeks to create the conditions for inland navigation to become a quality mode of transport and sets its priorities on shifting freight to waterway transport and reducing emissions. It is the second European action plan aimed at moving more freight transport onto Europe's waterways and it is the continuation of the previous NAIADES 2006-2013 programme. NAIADES II sets out the programme for policy action in the field of inland waterway transport for the period 2014-2020. Actions are taken in the following key areas of intervention:

- Quality infrastructure;
- Quality through innovation;
- Smooth functioning of the market;
- Environmental quality through low emissions;
- Skilled workforce and quality jobs;
- Integration of inland navigation into the multimodal logistics chain.

The consortium consists of 12 partners from seven different countries. The core consortium is formed by Via Donau (Austria) as coordinator, Promotie Binnenvaart Vlaanderen (Belgium), Ministry of Infrastructure and the Environment (The Netherlands) and Stichting STC-Group (The Netherlands).

Regarding the development of the TEN-T core network corridors, PLATINA II has the remit to support (not execute) the integration of the IWT into the Core Network Corridor studies/work plans, by providing information on 'why', 'what' and 'how' to collect IWT related data and information for the Core Network Corridor studies. PLATINA II will be pro-active by addressing the work of the Corridor Consortia. The input is currently planned to be distributed at the different preparatory meetings planned for 2014 through a series of Information Packages.

Given that inland waterways are not part of the BA Corridor, considerations from the Platina II activities to the CNC work plan development studies are primarily focussed on the description of the BA Corridor IWW nodes.

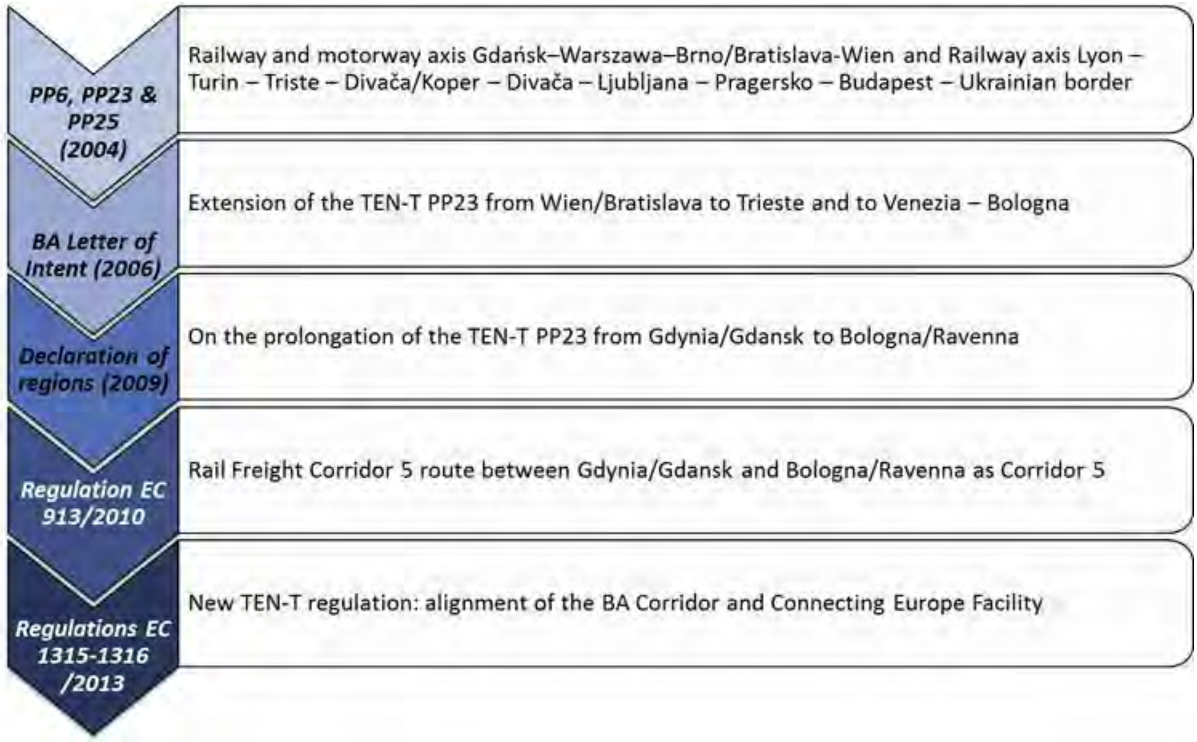
3. Review of relevant studies

Core Network Corridors have a long history of Priority Projects, Memoranda of Understanding and Agreements, Interreg Projects, Major Projects and research studies as well as national projects that form together a strong backbone for future action and the basis for the political, infrastructural, socio-economic and operational/functional development of the Corridor within European Member States and Regions. The following is the list of main development milestones for the BA Corridor:

- ***Priority Projects PP6, PP23 & PP25*** – In 1996 the EU defined Trans-European Network (TEN) for the advancement of its internal market. 30 priority projects (PP) were designated by the EC in 2004. Among the priority projects identified and based on the former pan-European transport corridor V and VI identified at the Crete (1994) and Helsinki (1997) conferences, the following three axis are worth mentioning: priority projects PP6 (railway axis Lyon-Trieste-Divača/Koper- Divača - Ljubljana-Budapest-Ukrainian border), PP 23 (railway axis Gdańsk–Warszawa–Brno/Bratislava-Wien) and PP 25 (motorway axis Gdańsk–Warszawa–Brno/Bratislava-Wien);
- ***2006*** Ministries Letter of Intent – In 2006, the Ministers of Transport and Infrastructure of Poland, Czech Republic, Slovakia, Austria and Italy signed a "Letter of Intent on the Development of the Baltic-Adriatic Transport Corridor". This was aimed at promoting the extension of the TEN-T PP23 from Wien/Bratislava via Graz – Klagenfurt – Villach – Udine to Trieste and to Venezia – Bologna;
- ***2009 Declaration of regions*** – On the basis of the afore mentioned letter, the representatives of 14 regions along the Baltic – Adriatic Corridor signed a Declaration on the extension of the TEN-T PP23 in support of the implementation of the transport infrastructure between Gdynia/Gdańsk and Bologna/Ravenna;
- ***November 2010*** – Release of Regulation EC 913/2010 – concerning a European rail network for competitive freight – setting out the rules for the selection, organisation, management and indicative investment planning of rail freight corridors. The directive identifies nine rail freight corridors among which the Baltic-Adriatic route between Gdynia/Gdańsk and Bologna/Ravenna as Corridor 5. On this basis the Commission co-financed in 2012 Preparatory studies and activities of organizational structures of Rail Freight Corridor 5 - 2012-EU-94126-S;
- ***January and June 2011*** – Also following a meeting of the representatives of the regions on the Baltic-Adriatic Axis with Mr. Siim KALLAS, EU Vice-President and Commissioner for Transport, held in January 2011, the Baltic-Adriatic Axis was named in the European Commission's budget proposal *A budget for Europe 2014 – 2020* in June the same year;
- ***March 2012*** – EU transport ministers give strong political backing to the EU regulation for guidelines for Trans-European Transport Networks (TEN-T) aiming to remove cross-border bottlenecks, upgrade infrastructure and streamline cross-border transport operations for passengers and economic activities throughout the EU by setting-up the strategic transport connections necessary to support Europe's future economic growth;
- ***December 2012*** – The European Parliament – Transport and Tourism Committee – approves the TEN-T core network and backs "Connecting Europe Facility" to invest in Trans-European transport infrastructure;
- ***December 2013*** – Release of the two regulations – Regulation EU 1315 /2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU – and Regulation EU 1316 /2013 – establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010, setting the new TEN-T infrastructure and financial policy for the development of TEN-T core network corridors, also including a list of pre-identified sections and projects;
- ***January 2014*** – Release of the Commission Implementing Decision 1919, establishing an Annual Work Programme 2014 for financial assistance in the field of Connecting Europe Facility (CEF) - Transport sector; and Commission Implementing

Decision 1919 establishing a Multi-Annual Work Programme 2014 for financial assistance in the field of Connecting Europe Facility (CEF) - Transport sector for the period 2014-2020.

Figure 2 Towards the legal definition of the corridor alignment



In addition to the above, the 2000-2006 Multiannual Funding Framework and particularly during the 2007-2013 one, a number of initiatives have been undertaken and financed by the EU, the Member States and the Regions in support of the analysis and development of the BA Corridor, its infrastructure and services. These form what we may define the "knowledge database of the BA Corridor work plan".

About 300 projects and initiatives have been identified in our analysis. These are listed in Section D.7 below grouped according to their funding source; in addition to national relevant studies, the list comprises particularly relevant EU co-financed projects, including:

- **TEN-T – Priority Projects related initiatives**, including preparatory works and construction works for infrastructure modernisation and ERTMS implementation; solutions to operational and administrative barriers; promotion of ITS and technological solutions to support sustainable transport;
- **EU (Cross-border and Transnational Projects, ERDF and Cohesion Fund Major Projects)** – Transnational and cross-border cooperation projects as well as Major Projects under national and regional operational programmes; Among the Interreg actions, the following are worth noting, particularly focussing on the development of the BA Corridor as a "living" socio-economic European infrastructure; Adriatic Baltic Landbridge (AB Landbridge), SOuth-NORth Axis (SoNorA), and Baltic-Adriatic Transport Cooperation (BATCo);
- **MARCO POLO** supported initiatives, including start-up of intermodal operations and services; dissemination of intermodal practices, services and training and telematics application to support administrative and business procedures related to freight transport as part of the wider logistic chain;
- **Research Projects (FP6, FP7)** – European and multi-regional, multi-country databases in support of policy making, analysis of traffic flows, development of

transport models, innovation supporting projects and dissemination of best practices and networking among research and business institutions.

Further to the above initiatives and national projects, other EU studies supported by DG Move have been considered in the analysis, aimed at monitoring and reporting on the status of the implementation of EU Directives.

In this section we summarise the findings from those studies that have been selected from the identified database of initiatives and projects for their relevance in the analysis of the BA Corridor critical issues. Attention has been given to those problems and situations representing a physical, technical and operational barrier for the development of the BA Corridor as an interoperable infrastructure, supporting the growth of international intermodal traffic flows. Studies have been grouped to the scope of our review into the following main categories:

- Studies for the development of the BA Corridor;
- Intelligent Transport Systems (ITS) and Information and Communication Technologies (ICT) for Interoperability;
- Promotion of intermodality and sustainable transport;
- Horizontal issues;
- Feasibility and project implementation studies;
- Infrastructure Investment Plans.

The above categories have been also identified with reference to the targets and requirements of the Regulation 1315/2013, in order to comment on the availability of studies relevant for the analysis of the current status and future development of the BA Corridor.

Depending on the relevance of these projects for our analysis the studies have also been recalled in the main text and appendices to this report. Where appropriate, information from studies has been framed into dedicated boxes, in the appendices to this report.

Studies for the development of the BA Corridor

Among the reviewed studies the BA Corridor particularly benefited from the implementation of EU cross-border territorial cooperation projects among which the following Interreg actions promoted by the BA Corridor Member States and Regions, seeing in the development of this infrastructure an opportunity for the economic growth of their territories: Baltic-Adriatic Transport Cooperation (BATCo), SOuth-NORth Axis (SoNorA), and Adriatic Baltic Landbridge (AB Landbridge). The recognition of the BA Corridor by the European Commission in 2011 has also been due to the results of the efforts from the stakeholders in undertaking the activities and actions implemented within these studies. More recently developed and only partially overlapping in terms of alignment and modes, the conclusions from the South East Transport Axis (SETA) study are also considered in this review due to their relevance for promotion of cross-border international railway transport of passengers and goods. In commenting the findings from these studies with reference to the market studies undertaken as part of their implemented tasks, consideration is also given to North Adriatic Port Association and Baltic Ports Organisation initiatives for their relevance in the analysis of the demand and future trends at Ports.

Critical issues As part of the above mentioned studies an analysis of the critical issues in terms of physical barriers, technical barriers and operational and administrative barriers affecting the development and operation of the BA Corridor was carried out:

- Physical barriers: cross-border sections, and particularly completion of the railway infrastructure at alpine crossings is expected to solve main physical bottlenecks along the BA Corridor and promote its use as an intermodal infrastructure;

particularly to support development of intermodal long distance traffic flows, last mile connections to ports are also identified as critical issues;

- Technical barriers: modernisation and revitalisation of railway lines, including technical upgrading and speed improvements at junctions as well as doubling of tracks on sections, is deemed crucial either to solve physical and technical bottlenecks or improve the quality of the infrastructure thus supporting competitiveness of railway transport and promotion of intermodality through interoperability;
- Operational and administrative barriers: in addition to basic TSI requirement for the removal of technical barriers and particularly delays in ERTMS deployment are also considered one of the most relevant obstacles affecting the interoperable use of the infrastructure by most of the mentioned studies, other barriers particularly affecting the operation of cross-border rail and intermodal freight and passenger services are represented by the following critical issues all of them possibly impacting significantly on transit times: traction and the possible need to change locomotives; technical wagon inspection (e.g. breaks) to ensure conformity to national regulations; lack of mutual acceptance of train drivers; path allocation processes for international trains as well as customs as well as health and safety procedures for vehicles and cargo, the latter not only affecting railway transport, but also activities at ports and rail-road terminals, reducing their attractiveness and competitiveness.

In greater detail, the following critical issues were identified as part of the network and demand analysis undertaken as part of the above mentioned studies:

- *Cross-border rail connections to be upgraded:*
  - Katowice-Ostrava;
  - Opole-Ostrava;
  - Katowice-Žilina;
  - Brno-Wien;
  - Bratislava-Wien;
  - Graz-Maribor;
  - Villach-Ljubljana;
  - Villa Opicina-Sežana;
- *Cross-border road connections to be upgraded:*
  - Morice-State border with Poland, part of the wider Bielsko-Biala – Žilina cross-border section;
  - Pohorelice-Mikulov/Drasenhofen- Mistelbach-Shrick;
- *Rail infrastructure bottlenecks and mitigation measures:*
  - Gdynia-Katowice railway section – line upgrading;
  - Szczecin - Poznań - Wrocław – line upgrading;
  - Katowice-Tczew – line upgrading;
  - Opole-Kędzierzyn Koźle – Gliwice – line upgrading;
  - Přerov-Ostrava rail connection (already modernised although affected by lack of capacity)– Přerov and Ostrava nodes upgrading;
  - Brno-Přerov – line doubling;
  - Břeclav-Wien Simmering – line upgrading;
  - Wien intermodal station – terminal extension/improvement;
  - Wien Simmering-Wien Flughafen (Airport) – capacity increase;
  - Wien Flughafen (Airport)-Götzendorf – alignment correction and speed increase;
  - Graz-Klagenfurt (KORALMBAHN) – new line and tunnel construction;
  - Gloggnitz-Mürzzuschlag (SEMMERING) –new line and tunnel construction;
  - Ljubljana-Koper – line upgrading;
  - Ljubljana-Zidani Most – line upgrading;
- *Road infrastructure bottlenecks and mitigation measures:*
  - Eibesbrunn Junction (A5, S1)-Shrick – new motorway;
  - Quarto d'Altino-Trieste - Construction of 3rd lanes, Route Optimization;
  - Łódź Stryków (A1) - Warszawa – Construction of new motorway (already constructed and in operation);
  - Kosztowy-Bielsko Biała - expressway construction and upgrading;

- Legnica-Gorzów Wielkopolski - construction of new expressway;
- Gdańsk-Warszawa - Construction of new express road;
- E 65 road – to be extended to the parameters of express road;
- Pesnica-Maribor South (Ptujska) - Construction of new motorway, Eastern ringroad of Maribor.

- *Intermodality and interconnections to be developed:*
  - Gdynia, Gdańsk, Ravenna, Venezia and Trieste – port interconnection improvements/upgrading and further development of multi-modal platforms;
  - Świnoujście/Szczecin – upgrading of the road and rail connection
  - Gdańsk Port – new universal quay, construction of Logistic Centre Infrastructure and dredging and deepening of the Port Channel;
  - Gdynia - improve hinterland connection to support the development of traffic, construction of public ferry terminal, deepening the approach fairway and internal waters, reconstruction of quay areas and Liquid Fuels Terminal;
  - Świnoujście/Szczecin Ports – new container terminal and quays, Ro-Ro ramp facility and intermodal infrastructure in both, Szczecin and Świnoujście;
  - New Westpomeranian Logistics Centre and a new LNG terminal in Świnoujście
  - Port of Koper – direct interconnection between the motorway and the port (Sermin) as well as truck terminal; extension of Pier I for the needs of the existing container terminal.

Many projects prepared for the solution of the above listed critical issues have already been completed. Others are currently at their implementation stage (i.e. the alpine crossings in Austria); others are still to be implemented, like the improvements of the interconnections to the ports and have also been identified as critical issues in our study, as further commented in the following sections of this report. The report is substantially aligned with the identification of the most relevant infrastructure and operational/administrative problems from the above mentioned studies.

In addition to the critical issues related to the development of the infrastructure, the BA Corridor development studies also identified interoperability and operational/administrative barriers, which particularly affect the cross-border operation of freight and passengers trains. These have been recently systematically analysed by the SETA study:

- *European railway Traffic Management System – ERTMS:*
  - The study emphasises how interoperability can be primarily achieved by implementing the respective EU regulations (decisions 2006/920/EG, 2006/679/EG and 2008/386/EG of the European Commission) by introducing compatible ERTMS based railway control systems in all countries;
- *Cross-border transit times:*
  - Traction:
    - Issue: If traction is different across the border (electric/diesel) a change of locomotive is required. Similarly, if the electrification and signalling/safety systems are different (three different voltage systems are in use along the BA Corridor) on either side of the border and no multisystem locomotives are available, locomotives need to be changed;
    - Suggested measure: Introducing trust based train handover procedures based on mutual agreements between train operators, in which the technical handover procedure is only carried out by one operator while the other operator (or operators) 'trust' the technical checks carried out;
  - Technical wagon inspection (e.g. breaks inspection):
    - Issue: inspection is carried out to ensure that the condition of the wagons entering a country conforms to national regulations, which requires administrative time;
    - Suggested measure: Harmonising operational and safety rules so that procedures to change the tail signal lamp, the breaking sheet and the wagon list can be avoided;
  - Documents concerning the train and the cargo are exchanged:

        - Issue: If it is not done electronically, this activity adds to the time needed for border procedures;
        - Suggested measure: Carrying out the detailed inspection only at the origin and the destination of the train;
    - Mutual acceptance of drivers:
        - Even when multi-system locomotives are available, the lack of mutual acceptance of drivers may prevent the same locomotive from travelling across the border and hence border-crossing is delayed;
        - Suggested measure: Facilitating the mutual acceptance through harmonised train driving licences introduced in the EU by Commission Regulation (EU) No 36/2010;
- *Demand for freight rail services:*
    - Issue: a market survey undertaken as part of this study has shown that there is considerable demand for reliable transport services towards Asia and America via major European ports. Competitive services can be offered through the Adriatic ports demand for train services;
    - Issue: The freight forwarding and transport market is quite volatile especially because road hauliers change their prices much more flexibly and in a more reactive way than railway operators;
    - Suggested measure: New competitive services can only be offered if clients can be convinced to change from a well-established route/method of transport to major European ports and try a new route via, for example, the Adriatic ports [although the scope of the SETA study was specific to the Adriatic basin, the same considerations apply to the Baltic ports].
- *Operation of passengers' services:*
    - Issues: Since international cross-border passenger services are normally operated as commercial services, the connections that carry only few passengers across the border producing low revenue can hardly be justified;
    - Suggested measure: Funding opportunities for international train services should be investigated as international trains are not expected to be self-sustaining particularly at the beginning of their operation;
    - Suggested measure: Railway infrastructure managers and operators should also commit themselves to provide priority to international trains along the corridor over local and regional services in order to significantly reduce the travel time.

A general remark from the review of the studies for the development of the BA Corridor relates to the implementation of projects aimed at solving physical and technical barriers; these are usually deemed to be affected by problems of a financial nature, also due to limited existing and expected demand levels for intermodal services; This is deemed a particularly relevant obstacle in the absence of policies supporting modal shift from road to railways and motorways of the sea.

Cross-border sections are also difficult to be implemented due to the need for coordination in their implementation between authorities belonging to different country systems, often with different implementation processes, planning and political priorities; an issue that could be mitigated by the new TEN-T policy approach and the possibility of establishing European Economic Interest Grouping (EEIG) in line with already existing experiences including the Trieste-Divača on the BA Corridor.

Market studies Demand and market analysis were also undertaken as part of the above mentioned initiatives to test the impact of infrastructure development projects and/or test the effect of policies supporting development of intermodality and cross-border long distance flows. Market studies were also developed as part of initiatives specifically aimed at assessing the strategic relevance of Ports within the intermodal logistic chain and their development, either in the Baltic and Adriatic basins. The following are the main considerations:

- The promotion and development of the Adriatic and Baltic ports as gateways to the main third party commercial partners may contribute to further economic growth and competitiveness of the regions along the Corridor; in greater detail, the development of the port infrastructure and more particularly of container traffic and Motorways of the Sea is also an opportunity to develop intermodality at the EU level thus supporting investments at ports and improvement of last mile connections;
- Development and growth of intermodal transport and cross-border traffic is also and in any case associated with:
  - Traffic and Transport Demand Management (TDM) policies increasing the cost of road transport compared to railway transport (i.e. increase in direct and indirect charges and or fuel price increases, to be in any case counterbalanced in investments in railway transport to increase quality and attractiveness of the latter more sustainable transport mode);
  - Investigate funding opportunities to support cross-border passengers' service operations as these are usually operated as commercial services but could have low patronage to be entirely self-sustainable; Incentivise at the same time the operators to identify competitive market segments and offer an attractive set of flexible and low cost services, possibly combined with travel packages to tourist destinations;
  - Economic support for the start-up of intermodal operations [see also studies co-financed by Marco Polo, including ADRIATIC, Ko-Ka train, Euro Reefer Rail, S.C.AD.AE, ScanBalt, Mover, SIWALOC, AGROTAINER], and/or logistics operations [Load Control Centre Platform LCC];
  - Developing cooperation between infrastructure managers and operators to overcome operational barriers;
  - Disseminating information on intermodal infrastructure and services, also promoting the knowledge of intermodal best practices and supporting training [see also studies co-financed by Marco Polo, including AGORA (www.intermodal-terminals.eu), SYNTHESIS (www.synthesis-project.gr), INSECTT];
  - Develop telematics application to support the development and maintenance and continuity in the use of databases to simplify administrative and business procedures. This is aimed at reducing the total time of transport operations for intermodal freight transport as part of the wider logistic chain, including activities at terminals as well as custom, safety and security checks [see also studies co-financed by Marco Polo, including OCRA (www.ocra.eu), ARTEMIS (www.artemis-project.eu), ITS-IT, ACCESS, SINGER].

Some of the reviewed market studies also show the relevance of infrastructure not belonging to the current alignment of the BA Corridor. In this respect it is worth noting that the alignment of the BA corridor is defined by Regulation EU 1316/2013; infrastructure not currently belonging to the BA Corridor alignment is referred to in Appendix C, for consideration in possible future amendments of the Regulation. These routes have been taken into account in the elaboration of the market study and demand analysis developed as part of this study.

Intelligent Transport Systems (ITS) and Information and Communication Technologies (ICT) for Interoperability

Interoperability could both depend on physical and technical standards of infrastructure and technology as well as administrative procedures relating to the control of the manufacture and performance standards of equipment and vehicles. It may be associated with both travel and terminal activities of transport.

The predominant application of interoperability is associated with traffic management. Intelligent Traffic Systems are under development and implementation for all transport modes. An overview and description of the technologies under implementation for the railway, maritime and inland waterways and ports, airports as well as roads, is provided at Appendix B, with reference to the relevant EU legislation regarding the development of these systems: Commission Decision 2012/88/EU on

ERTMS; Directive 2002/59/EC on VTMIS, Directive EC/2005/44 on RIS, Council Regulation (EC) 219/2007 for SESAR, Directive 2010/40/EU for road transport. Either the transposition or implementation of the above mentioned directives is still to be completed in the BA Corridor Member States:

- ERTMS: Whilst the importance of the implementation of ERTMS in support of the development of a Single European Railway has been identified as a priority in many of the above mentioned studies, including SoNorA, AB Landbridge and particularly SETA, no studies have been undertaken to systematically assess the status and plans of the deployment of ERTMS along the BA Corridor. As of the date of submission of this report, ERTMS (ETCS+GSM-R) is not deployed on the corridor railway infrastructure. However ETCS Level 1 is already installed in Poland on railway line E65, section Grodzisk Mazowiecki – Zawiercie and planned to be operational by end of 2014; sub-section connecting Bernhardsthal to Wien's main station in Austria will feature ETCS Level 2 by end of 2014;
- VTMIS: Numerous initiatives are being implemented at the wider European Union area, national or basin cluster level in order to support the promotion of Single Window initiatives to access ports, track flows of vessels and transported intermodal vehicles, rolling stock and goods entering and exiting port areas;
- RIS: River Information System technology is also under implementation at BA Corridor inland ports and interconnected inland waterways links belonging to other Core Network Corridors or sections of the Core Network, from experimental initiatives in Italy and recently completed pilot projects in Poland to a more advanced development in Austria, and on-going refinements of system implementation in the Czech Republic and Slovakia;
- SESAR: From the review of the research and project experience activities of this initiative, no other BA Core Network Corridor airports other than Wien has been significantly involved in the development of this relevant system with a possible need for promotion of the involvement of other Core Network Corridor Airports in the deployment phase of SESAR;
- ITS for roads (including EETC): The review of the five year action plans developed by the BA Corridor Member States in compliance with Directive 2010/40/EU shows that activities are on-going with respect to many of the foreseen measures with differences between the Member States about the priorities and actions under implementation or envisaged to be implemented. The TEN-T Core Network Corridor approach, may also in this respect facilitate a more coordinated development of these initiatives, although many of them apply to units of infrastructure – regional, or national networks if not specific motorways under concession – that differ from the one of the Core Network Corridor. Specifically regarding the European Electronic Toll Collection system as per Directive 2004/52/EC and subsequent Decision 2009/750/EC, it is not yet implemented in the BA Corridor Member States.

In addition to the above mentioned Intelligent Transport Systems, ICT projects have been implemented to solve operational and administrative related issues. Customs, security, as well as health and safety related processes and procedures for vehicles and cargo can impact significantly on transit times. This particularly affects railway and maritime transport along the BA Corridor.

ICT initiatives aimed at simplifying administrative procedures relating to custom, safety and security procedures – particularly impacting on transit times – have been implemented by the BA Corridor ports, particularly in the Adriatic basin to support the development of shared databases among the responsible authorities, institutions and operators, replacing paper based requests and processing of permits with electronic processes. Whilst projects have already been initiated at the single basin area, no initiatives have however been so far implemented involving all Port Authorities along the corridor and/or the ports authorities and the rail road terminals and railway undertakings. Experience and pilot projects exist in any case involving some of these relevant stakeholders of the intermodal chain (i.e. ARTEMIS, also involving the Bologna rail-road terminal and the Port of Venezia); the efficiency and efficacy of such initiatives aimed at developing a smooth flow of information among the relevant stakeholders, could be improved by the corridor approach introduced by the new TEN-T policy aimed at establishing coordinated network of nodes along the Core Network.

It is worth noting in this respect that as a major criticism about the implementation of these last categories of studies is the difficulty in consolidating the pilot initiatives implemented as part of the projects, due to lack of resources to support the required efforts in the further refinement of and continuity in the updating of the databases.

Regarding rail transport, the RFC 5 and infrastructure managers as active stakeholders in the activities of Rail Net Europe, are involved in the development and use of the systems Path Coordination System (PCS), Train Information System (TIS), and Charging Information System (CIS); all these aimed at simplifying and further supporting the development of international, cross-border train operations.

Promotion of intermodality and sustainable transport

Studies relating to the development of ports and rail-road terminals have been considered for their relevance for the growth of intermodal transport along the BA Corridor. Particular attention has been given to those initiatives aimed at developing Motorways of the Sea, but also container terminals, expansion of Inland Waterway Ports as well as rail-road terminals.

Regarding the promotion of sustainable transport solutions and related technology, the Regulation EU 1315/2013 also foresees availability of clean fuels at core network corridor ports and airports by 2030; no initiatives on such developments on the BA Corridor are under implementation at present.

Horizontal issues

The TEN-T Regulation EU 1315/2013 also sets standards and targets with reference to issues that are not specific to transport modes or nodes, and can rather be considered horizontal for their implications on more modes of transport and intermodal nodes. These particularly relate to ensuring that transport infrastructure provides for safe and secure passenger and freight movements (Art. 34); and allows for seamless mobility and accessibility for all users, in particular elderly people, persons of reduced mobility and passengers with a disability (Art. 37). The core network, […] shall also reflect evolving traffic demand and the need for multimodal transport and contribute to coping with increasing mobility and ensuring a high safety standard (Art. 38).

At this stage we are not aware of dedicated initiatives specific to horizontal issues, whilst it can be confirmed that the prescriptions in the directives are taken into consideration in the design and implementation of projects related to the development of the BA Corridor infrastructure. For a more coordinated development of the core network corridor infrastructure in compliance with the TEN-T Regulation it may be useful undertaking specific actions aimed at classifying and monitoring the implementation of standards and KPIs of existing and future infrastructure on the Core Network Nodes and services. Such actions may be coordinated at the level of the BA Core Network Corridor if not on the entire Core Network infrastructure.

Actions aimed at systematically collecting, monitoring and processing traffic data along the Corridor, including market surveys, may also be proposed, aimed at supporting the coordinated identification and prioritization of investments along the corridor regarding the need to increase capacity. Classification, monitoring and reporting of accidents and other related safety and security issues, may also be considered for the implementation and prioritization of technological improvement projects.

Feasibility studies

Feasibility studies have also been considered in our review to comment on the status and possible solution of critical issues, particularly relating to physical and technical barriers affecting the completion of the BA Corridor as a continuous interoperable infrastructure. Most of these studies, many of which are still on-going, refer to cross-border sections and railway junctions; some of them are about ERTMS deployment; others relate to terminal and port infrastructure development and accessibility. Some of these studies, co-financed by TEN-T, also relate to the development of High Speed railway lines (i.e. Venezia-Trieste-Divača-Ljubljana).

A relevant finding from the review of these feasibility studies, as well as from previous company experiences in the assessment of the implementation of studies of projects in the BA Corridor Member States over the past decade is represented by the outdated status of some of these studies compared with more recent implementation strategies by the Member States and Infrastructure Managers. This is particularly the case of modernisation of railway lines including ERTMS implementation and high speed passenger railway lines.

Investment Plans The last category of documents that have been considered in the elaboration of this study are the investment plans developed by the Ministries and other relevant stakeholders. Notes on the reviewed plans are reported in Appendix B. Investments cover all the infrastructure components of the TEN-T network (rail, inland waterways road, maritime, air, multimodal infrastructure) which are deemed relevant at the EU or national level, also considering those implemented by regional or local authorities or Infrastructure Managers (such as Railway Infrastructure Managers, Road Agencies, Port Authorities, Airports).

4. Elements of the BA Corridor Work Plan

4.1. Summary of the BA Corridor Work Plan development study

4.1.1 Characteristics of the BA Corridor

The Baltic-Adriatic (BA) Core Network Corridor alignment and infrastructure are defined by Regulations 1315/2013 and 1316/2013. Involving 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 Adriatic ports of Trieste, Venezia, Ravenna and Koper.

Figure 3 Alignment of the BA Core Network Corridor

Source: BA Corridor study consortium

The 1,800 km long BA Corridor allows for more possible 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 network 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 Baltic-Adriatic axis is one of the few corridors that does not include inland waterways (IWW). The Corridor interconnects however with the inland waterway TEN-T Core Network at the following inland waterway ports, where IWW services are already in operation: Bratislava, Wien (on the Rhine Alpine Core Network Corridor) and Szczecin (Core Network Corridor section on the Odra River, between Berlin and Szczecin: section Widuchowa – Odra River estuary, not belonging to any of the Core Network Corridors). Trieste, Venezia and Ravenna, also classified as inland ports, are connected to the inland waterways on the Mediterranean Core Network Corridor; permanent IWW services are not operated at present at these ports although experiences and pilot projects have been already undertaken and are under consideration to promote the use of inland waterway transport in Italy. In addition to the above mentioned Odra River route, the inland waterway section E40 from the Baltic up to Warsaw is worth mentioning; this require development and do not belong at present to the Core Network, however some initiatives aimed at revitalising the Vistula River and restoring the E40 waterway Warszawa – Gdańsk were recently undertaken.

Excluding inland waterways at present, the backbone of the BA Corridor is therefore based on its railway and road routes, its urban nodes and ports, airports and rail-road terminals being interconnected only by rail and road infrastructure. The Corridor encompasses a total of 13 urban nodes and airports, 10 ports and nearly 30 rail-road terminals. The BA Corridor railway network corresponds mostly to the Baltic-Adriatic Rail Freight Corridor.

Technical infrastructure parameters for each transport mode

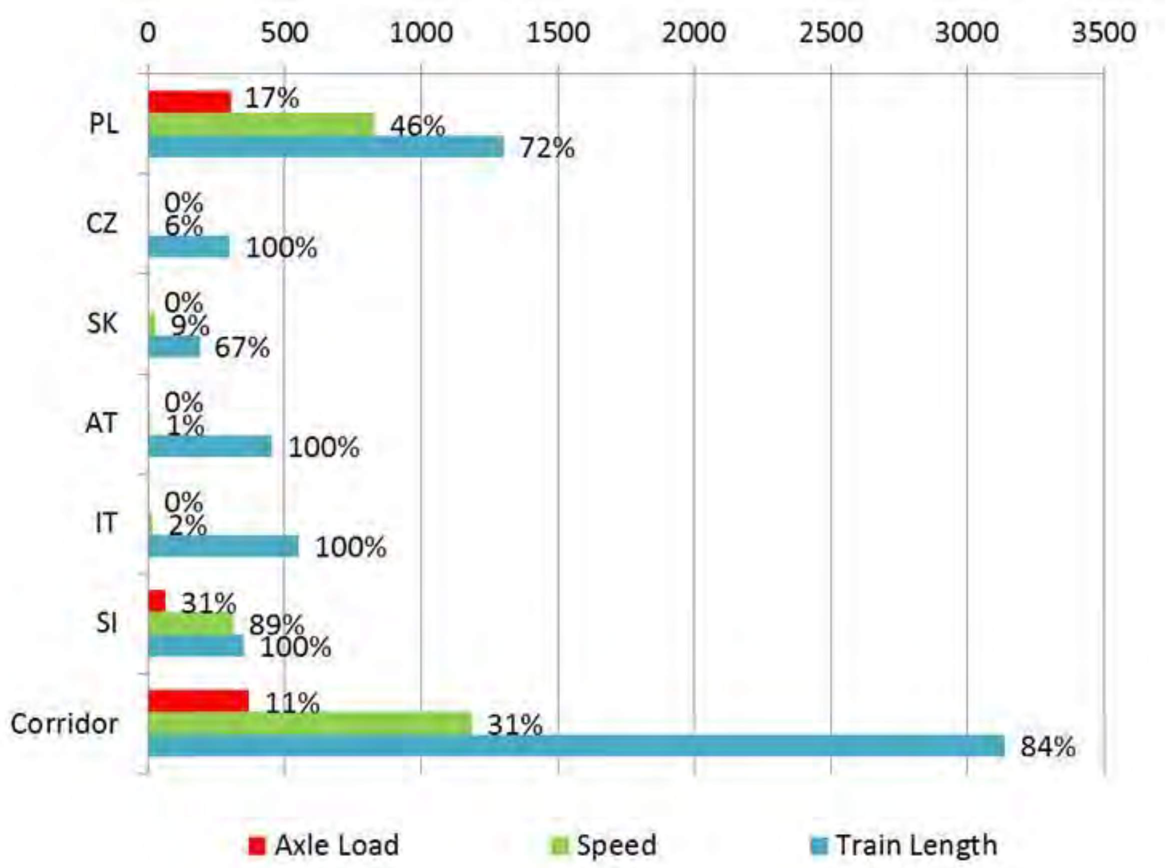
Rail

The BA Corridor includes 4,200 km of 1435 mm standard gauge railway infrastructure. 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), the corridor railway infrastructure is already continuous and in operation. However, a number of challenges are to be faced in terms of compliance with the different infrastructure requirements as laid down in the EU Regulation 1315/2013.

As regards electrification, with reference to passenger, freight and mixed use lines, the railway infrastructure along the Corridor is almost entirely electrified with the exception of diesel passengers sections at the cross-border between Slovakia and Austria on the Bratislava-Wien railway line. Different power systems are however 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) which constitutes an obstacle for interoperability on the Corridor only partially mitigated by the use of multisystem locomotives.

The figure below summarises the outline in percentage (over the national sections of the corridor) and absolute km values of the non-compliant infrastructure with reference to the main compliance parameters related to the BA rail freight corridor lines (axle load, speed and train length).

Figure 4 Extension of the non-compliant rail freight infrastructure in km and % of the total length



Source: BA Corridor study consortium elaboration based on TENtec data

With respect to the axle load, the Corridor is mostly compliant with the Regulation (22.5 t). There are however some corridor sections (11% of the total corridor railway infrastructure) that do not comply with this standard yet, especially in Poland (including several sections on the lines: Katowice – Czechowice Dziedzice – Zwardoń, Wrocław – Jelcz – Opole; Kędzierzyn Koźle – Chałupki and Kędzierzyn Koźle – Gliwice – Chorzów; Warszawa Wschodnia – Warszawa Zachodnia – Grodzisk Mazowiecki); and Slovenia (several sections between Zidani Most – Šentilj) and the Czech Republic (railway line between Brno – Přerov).

Line speed is also not homogeneous along the BA Corridor, with relevant bottlenecks particularly affecting the Polish network which calls for infrastructure modernisation. In greater detail, over 800 km of the Polish railway lines (about 20% of the total corridor railway infrastructure) need to be upgraded to meet the requirement set in the Regulation EU 1315/2013 with respect to the line speed for freight trains (100 km/h).

When it comes to the maximum permitted length of trains, this is on most sections of the BA Corridor shorter than the 740 m required by Regulation EU 1315/2013. The prevailing maximum train length along the Corridor is around 600 m, but more severe restrictions exist on specific sections, especially on the Slovenian network.

An additional rail interoperability issues on the BA Corridor other than the ones above described relates to the loading gauge; most of the corridor already complies or exceeds the combined classes 70/400 or 78/402. This issue is however not analysed in detail, as no prescriptions are set in Regulation EU 1315/2013, this parameter being relevant especially for the RFC 5.

Despite the installation of ETCS Level 1 on certain lines or GSM-R already available on most of the corridor sections, ERTMS (ETCS + GSM-R) technology is not deployed on the BA Corridor at the time this report is delivered. Overall ERTMS is not expected to be operational by end of 2014 on any of the corridor railway sections, its gradual deployment starting in any case from 2015 on:

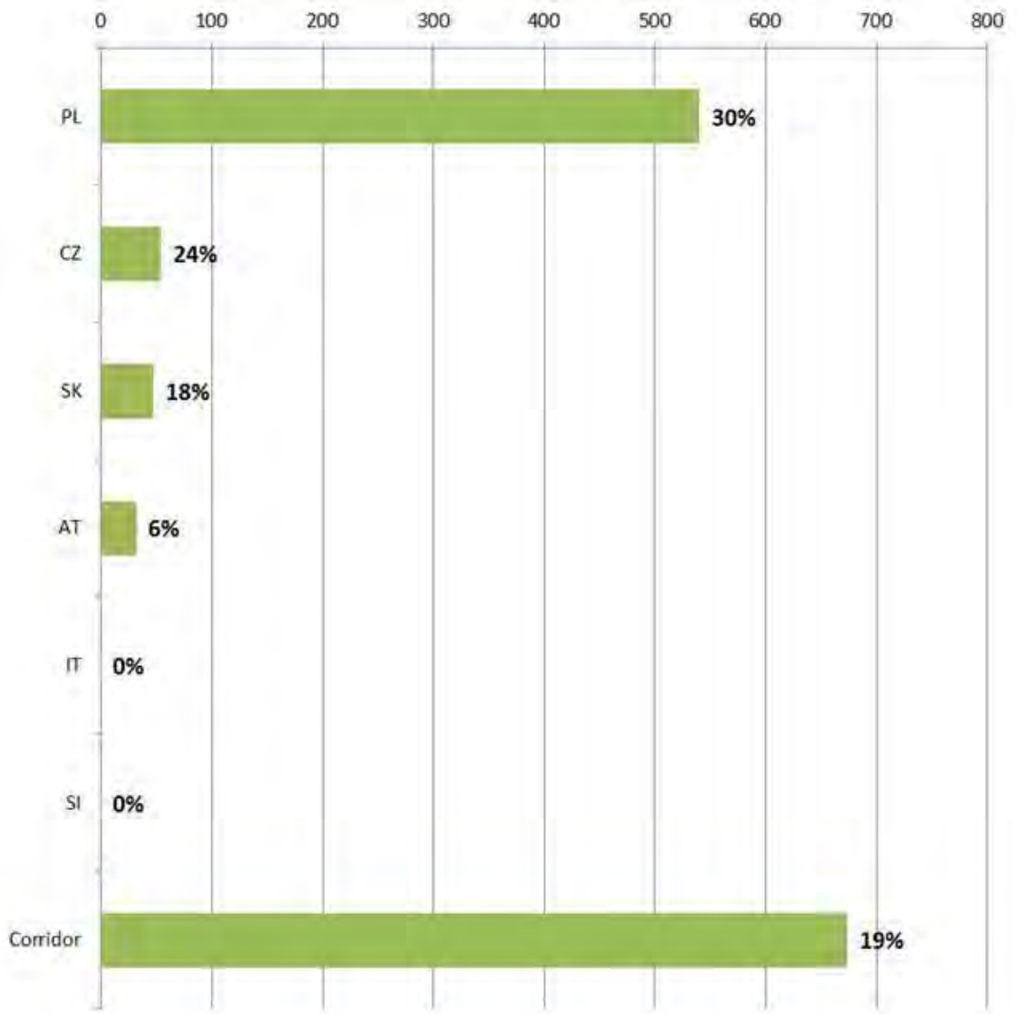
- In Poland, ERMTS technology is expected to be deployed by 2030. Railway line E65, section Grodzisk Mazowiecki – Zawiercie, is already equipped with ETCS Level 1, to be operational in December 2014, although GSM-R is not installed on the line;
- In the Czech Republic, the ETCS Level 2 is envisaged to be deployed by 2017 with the exception of the Přerov – Brno railway line on which instalment is expected to be completed by 2024;
- In Slovakia, ETCS Level 1 is already available on the section Bratislava – Zlatovce; ETCS Level 1 technology is expected to be installed on the section Zlatovce – Žilina by 2015 up to Púchov and by 2018 up to Žilina. ETCS Level 2 technology will be implemented on the Žilina – Čadca railway line by 2016. Deployment of ETCS at the Bratislava junction is planned for 2019. There are no defined plans for the deployment of ERTMS in the cross-border section Čadca – Skalité at present;
- In Austria, the deployment of ERTMS is on-going. The sub-section connecting Bernhardsthal to Wien's main station will feature ETCS Level 2 by end of 2014. According to investment plans of ŐBB Infra, other sections of the BA Corridor, Pottendorf/Wien – Wampersdorf (106) and Graz – Klagenfurt (401 Koralm railway line), will be ETCS Level 2 compliant in 2023 and the section comprising the Semmering tunnel will be ready by 2024;
- The rail infrastructure on the BA Corridor in Italy is equipped with national control and command systems, which in most cases was upgraded to national digital system (SCMT) that uses the same infrastructure digital equipment of ETCS (Eurobalise). Planned investments on the Italian rail network include the upgrade of existing lines equipped with national signalling system to ETCS Level 1 or Level 2, as appropriate;
- With the exception of railway line Pragersko-Maribor-Šentilj, ETCS Level 1 is currently under implementation on the Slovenian sections of the BA Corridor, with expected completion date by end of 2015. The time-schedule for the implementation of the ERMTS technology on the Pragersko-Maribor-Šentilj section is to be confirmed.

Finally, regarding stations and junctions, in line with the overall considerations about the status of the railway lines: in Poland, stations and junctions are being gradually modernised and upgraded, however modernisation works are still necessary to improve the performance of the entire network at nodes; in the Czech Republic, capacity and speed limitations exist at junctions Ostrava, Brno and Břeclav, the latter is expected to be fully modernised by 2015. In Slovakia the Žilina and Bratislava junctions have speed limitations respectively of 60 km/h and 40 km/h, requiring modernisation works. In Austria, works are on-going for the construction of new Wien Haupbahnhof; the station is already partially in operation since October 2014 and is expected to be fully completed by 2015. In Italy the Udine junction is affected by constraints existing on the access point to the Northern part of the city and partly on the belt-line which still is single track. In Slovenia, the capacity of the current railway station in Ljubljana is rather limited, therefore possibilities for rerouting of cargo traffic out of the station is under consideration.

Road

The 3,600 km road infrastructure on the BA Corridor does not fully comply with the requirements of EU Regulation 1315/2013 in relation to the type of infrastructure and parking areas. The situation is particularly relevant for the Polish road network, whereas the corridor infrastructure in Italy and Slovenia is fully compliant. Currently, 19% of the road corridor infrastructure is constituted by ordinary roads which do not comply with the requirements.

Figure 5 Extension of the non-compliant road infrastructure in km and % of the total length



Source: BA Corridor study consortium elaboration based on TENtec data

Ports

Ports represent the main gateways for passengers and especially freight transport to Core Network Corridors. There are 10 Core ports in operation along the BA Corridor: 5 classified as maritime and inland waterway ports (Szczecin and Świnoujście, Trieste, Venezia and Ravenna), 3 classified as maritime ports (Gdynia, Gdańsk and Koper), two inland waterway ports also classified as maritime ports (Wien and Bratislava). These ports are all interconnected to the road and rail links of the corridor, representing a basic infrastructure for intermodal transport. Container terminals provide access to commercial global maritime flows of cargo; Ro-Ro/Ro-Pax terminals allow for continuity in the flows between the surface road and rail transport links of the Baltic-Adriatic Axis and the Motorways of the Sea in operation within the Baltic and Mediterranean basins.

Investments planned at the ports are expected to support the economic activities and growth of the BA Corridor Regions both serving the existing traffic and capturing additional demand, which makes the need for effective and efficient "last mile" accessibility a key focus of attention in the development of the Core Network Corridors.

Airports
There are 13 core airports along the corridor which are all interconnected to the road network (Szczecin, Gdańsk, Poznan, Wrocław, Łódź, Warszawa, Katowice, Ostrava, Bratislava, Wien, Ljubljana, Venezia, Bologna). The two core airports (Warszawa and Wien) which have to be connected to the rail network according to EU Regulation 1315, already fully comply with this requirement. In addition, a rail connection exists for the Szczecin airport and is currently under construction for the Gdańsk and Ostrava airports. Investments are also planned at Katowice, Venezia, Bologna and Ljubljana for the development of railway interconnections with the TEN-T Core Network.

Rail-road terminals
Nearly 30 rail-road terminals are in operation along the BA Corridor and more are under construction at present, all of them already interconnected or planned to be interconnected to the BA Corridor rail and road infrastructure.

4.1.2 Results of the BA Corridor Market Study

As part of the study for the development of the BA Corridor work plan, a transport market study (TMS) has been prepared with the threefold objective 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 listed at Table 33;
- Supporting the definition of the critical issues on the BA Corridor, complementing the analysis of the compliance and quality of the infrastructure with a view to identifying the possible issues related to transport infrastructure capacity on the road and rail networks.

Our market analysis of the rail and road transport flows along the corridor has been developed by means of a multi-modal model, which has been developed ad hoc for this study, covering the BA Corridor area at the level of NUTS3 units.

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 included in the list of investments presented at Table 33;
- **2030RP** (*Rail Policy scenario at 2030*) – describing the interaction of the travel and transport demand at 2030 and with the corridor infrastructure improved based on the major rail and road investments presented at Table 33 (as for the 2030WP scenario), combined with policy and administrative measures aimed at reducing by 20% the generalized transport cost of the rail mode compared to road transport

(such as the internalization of the total transport costs, the promotion of more attractive rail services, the effect of the on-going liberalization process in railways and the IV railway package, the removal of administrative and operational barriers). This last assumption does not constitute an assessment of the likely impact of these measures, but is only aimed at providing an indication of the magnitude of the possible modal shift and its implication on the available rail capacity on the BA corridor.

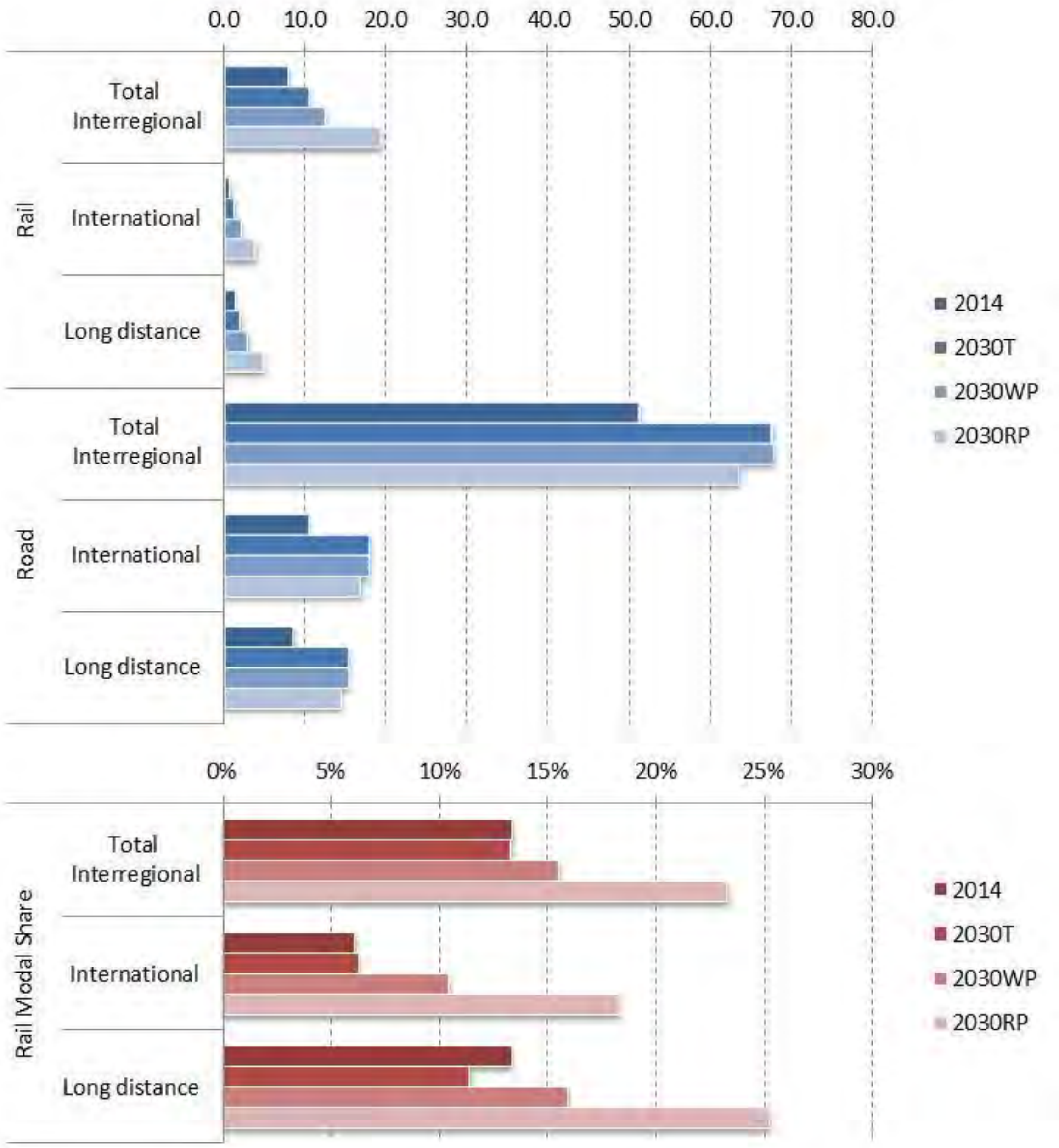
In the interpretation of the results of our TMS, the scope of our study, the very large area covered by the analysis, and the limitations in the demand and traffic data available, should be kept in mind. Inevitably, significant margins of uncertainty affect the results in terms of absolute values and shares.

Notwithstanding these limitations, by comparing the outcomes between the different scenarios, the analysis provides clear indications concerning the main trends in the transport performance by mode and the potential effects of the rail and road transport investments presented at Table 33 together with policy measures aimed at supporting the use of railway and environmentally friendly transport solutions. The results presented in the following charts are focused on the interregional[2], 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 is around 13% for passengers (measured in pax*km) and 19% for freight (measured in tons*km); the rail modal share is significantly higher for long distance freight transport (39%). It is worth noting in this respect that the corridor already satisfies the 2030 freight modal share target of the 2011 White Paper (30% rail share for trips longer than 300 km);
- The transport demand is expected to grow significantly by 2030, both on rail and road, although at a reduced pace when compared to the historically observed trends. In the do-nothing scenario, the growth in the total inter-regional demand along the corridor is around 32% for passenger and 33% for freight;
- Without significant investments, rail share is expected to remain stable for passengers (13%) and is envisaged to decline slightly for freight (18%), due to a combination of increasing car ownership (especially in the Eastern European countries), also combined with the forecast demographic development;
- The investments in rail and road infrastructure, as included in the list at Table 33, have a positive, although limited effect in counterbalancing this trend, with rail demand exceeding the current market shares (15% for passengers and 21% for freight), with major increases in the international and long distance market segments;
- The results of the fourth developed scenario (2030RP) show that additional policy and administrative measures could contribute to a great extent in the promotion of rail transport, with market shares for this mode rising to 23% of interregional demand for passenger and 24% for freight (43% for long distance trips). While these changes may appear limited in terms of modal shift, the combination of this shift with the natural growth of the rail market will lead, under this scenario to doubling of the current rail volumes – which may induce potential capacity issues on the BA corridor.

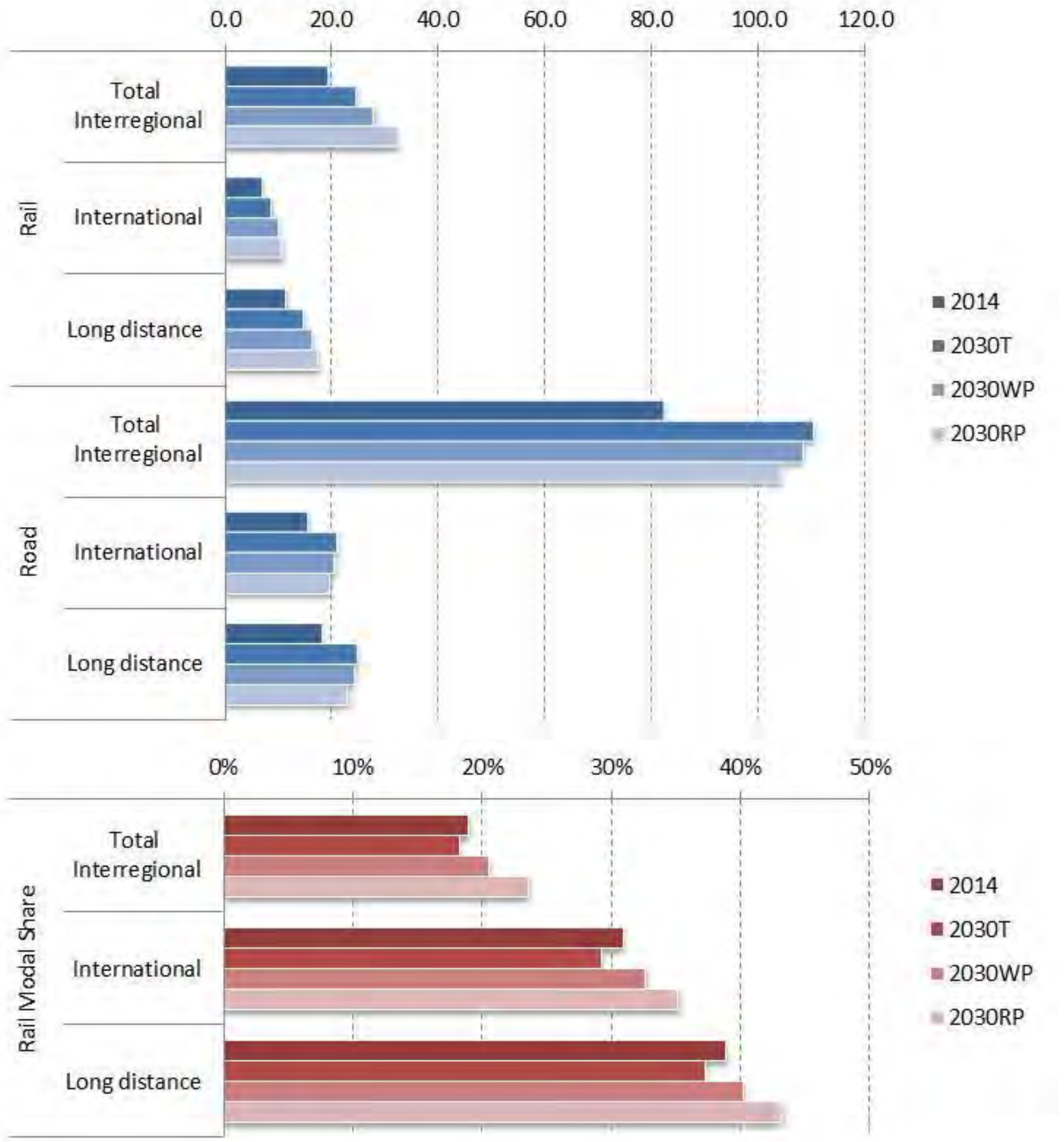
[2] The inter-regional demand includes only trips occurring between two distinct NUTS2 regions both located along the BA Corridor alignment. The long distance demand includes inter-regional trips longer than 300 km.

Figure 6 Performance and modal share of the BA transport modes (millions of pax*km/year)



Source: BA Corridor study consortium

Figure 7 Performance and modal share of the BA transport modes (millions of tons*km/year)



Source: BA Corridor study consortium

Capacity issues on the rail and road networks

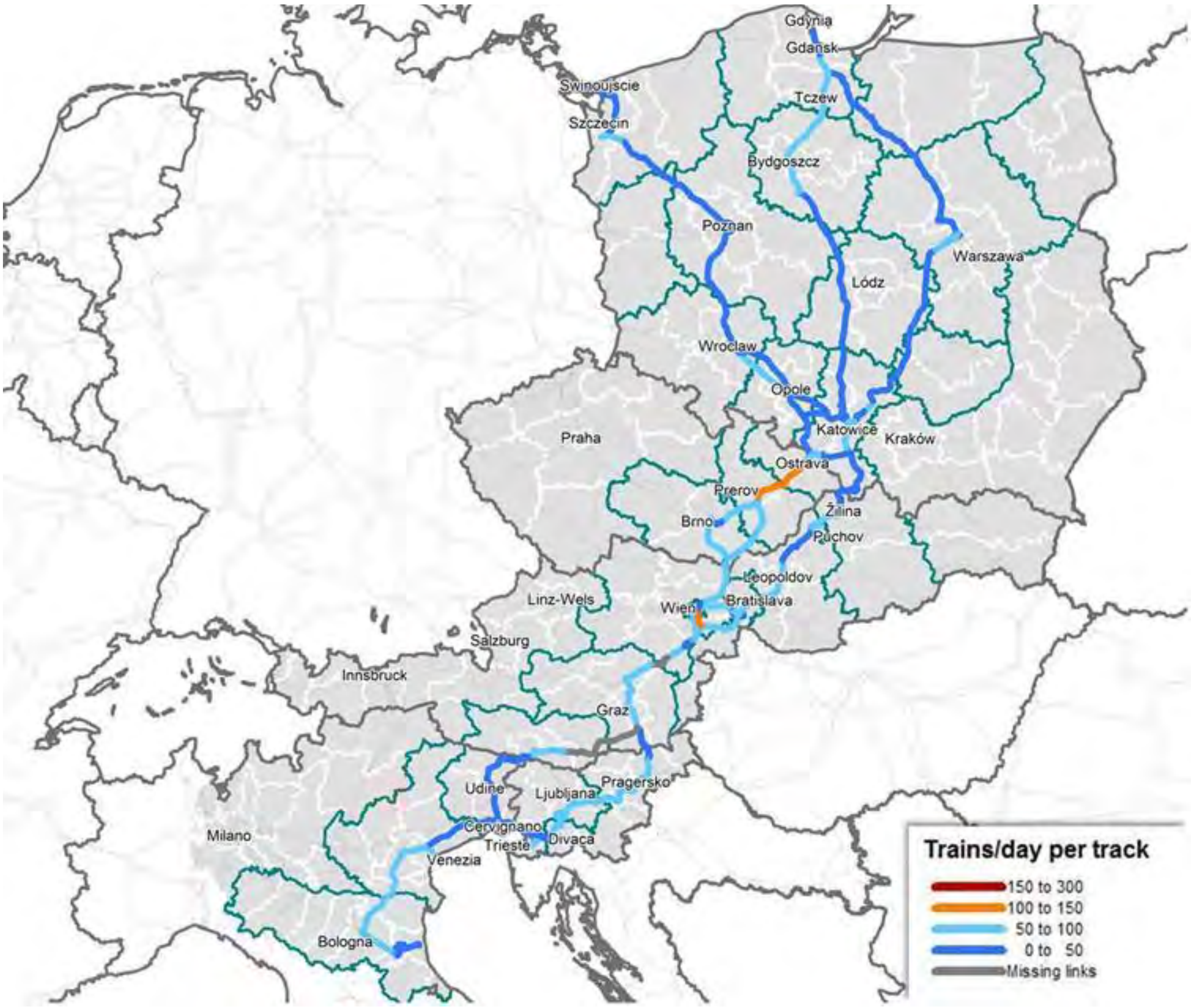
Our identification of the possible capacity issues on the rail and road corridor infrastructure is based on the analysis of the current and predicted traffic volumes in comparison with the available number of rail tracks and road lanes.

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 examination (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 to identifying in advance possible capacity issues in the mid and long term.

Flows and capacity on the rail network

The following map shows that current rail flows are generally below the critical level - set in our analysis at 150 trains/day/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 generalized short term issue for the corridor.

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



Source: BA Corridor study consortium elaboration based on TENtec data and sections

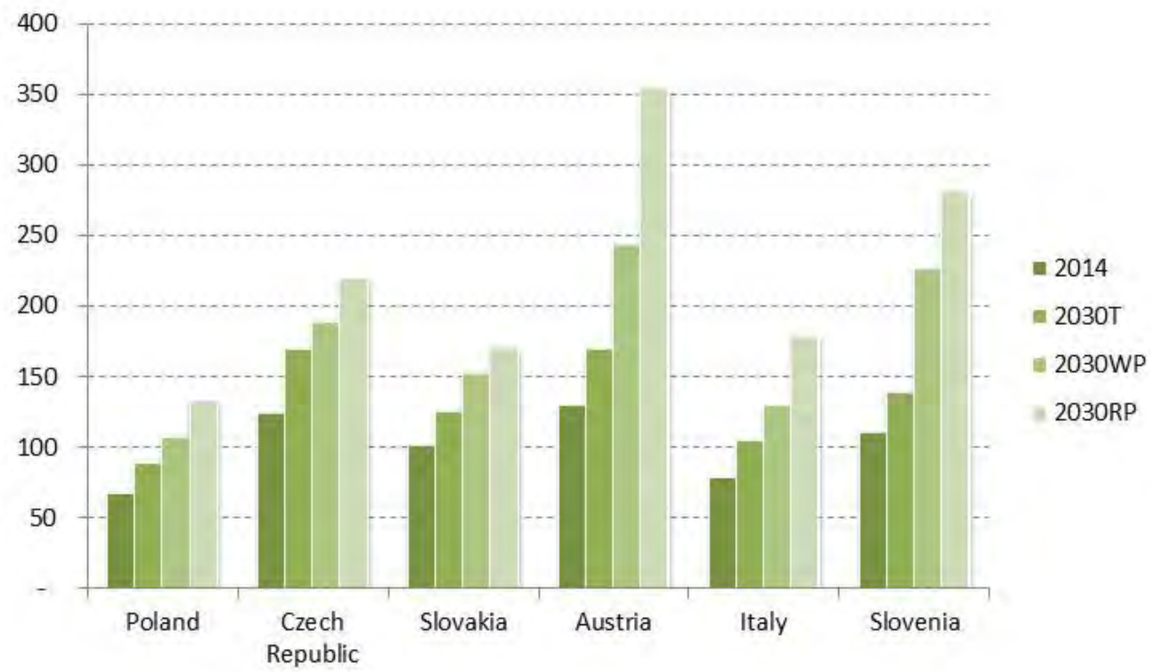
On the other hand it is also worth noting that by restricting the analysis to the workday rather than to the calendar days some sections of the BA Corridor already present high levels of traffic, such as the Graz-Bruck/Mur section, with 240 trains per workday and the single line section connecting Werndorf to Spielfeld-Strass/Sentilij with 112 trains per workday between Werndorf and Leibnitz. The section Brno-Přerov is also worth mentioning in terms of capacity, although not directly resulting from our analysis as significantly critical due to the replacement of railway services with bus operations for capacity related issues. Investments are already planned to increase capacity on these lines.

In the medium and long term, the improvement of the railway infrastructure will induce a significant growth in the corridor rail transport volumes, which will be even higher in the case of effective implementation of modal shift measures.

Based on our analysis, the current available capacity will be sufficient to accommodate train traffic growth along the corridor in the do-nothing scenario (2030T). It should be however noted that in certain urban and metropolitan areas, new services are going to be implemented, i.e. Bologna node, expected to increase services between Bologna and Castelbolognese, and Gdynia/Gdańsk where the Pendolino high speed and the Pomerania Metropolitan rail services are planned to be introduced in the future. 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.

The current available capacity is also deemed to be generally sufficient to accommodate traffic growth in 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 will be mainly located in urban nodes (Warszawa and Katowice in Poland, Wien in Austria, and Ljubljana in Slovenia) and in specific sections (Ostrava-Přerov in the Czech Republic). In addition, high traffic flows might occur in the Austrian section between Werndorf and Wiener Neustadt, also as a result of traffic induced by the completion of the Alpine crossings (Semmering and Koralm). In any case, investments are already planned or under consideration on these sections to allow accommodating for the expected traffic increase.

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



Source: BA Corridor study consortium

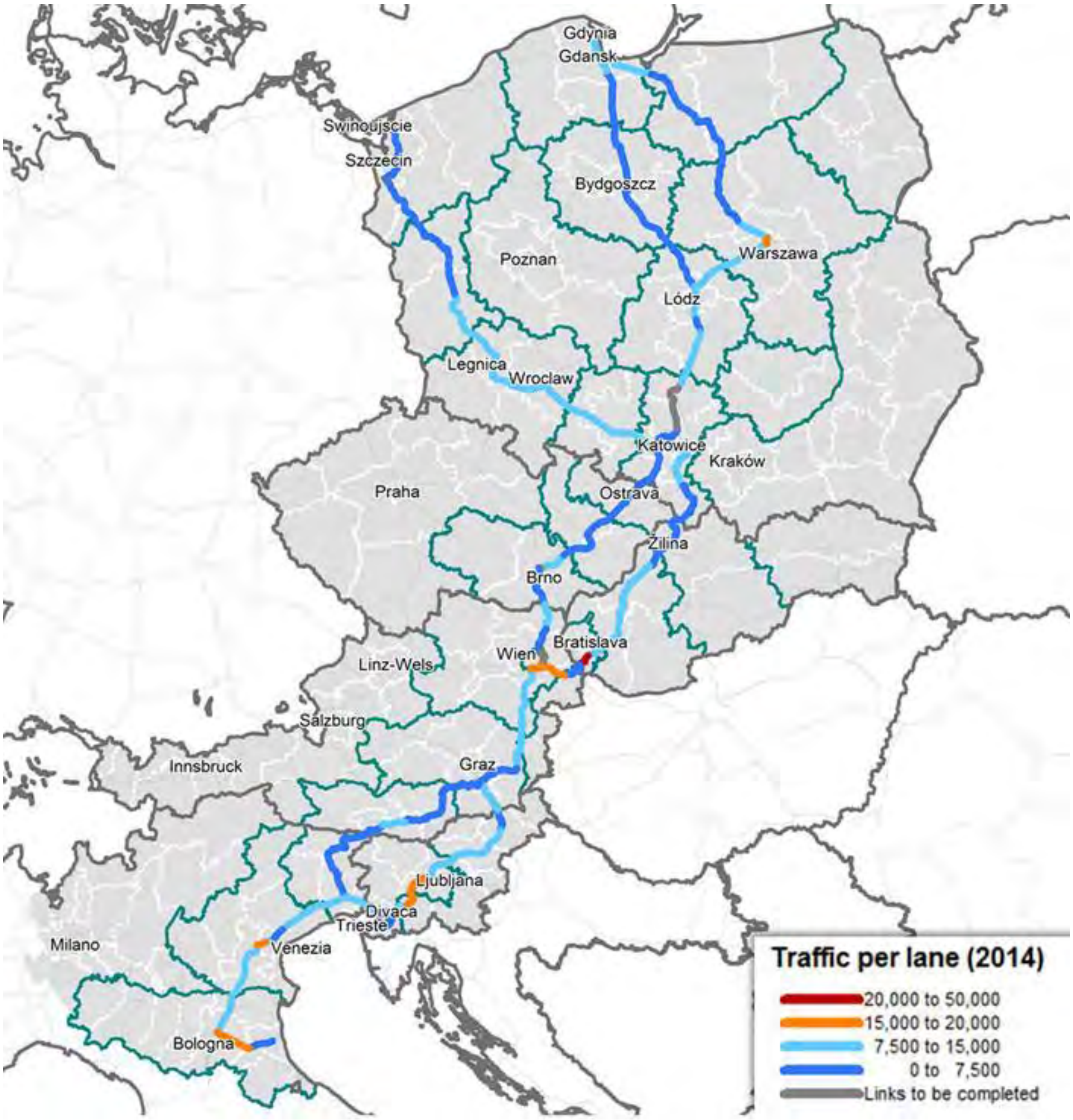
It is therefore only in the case of a more significant shift of transport demand towards the rail mode (such as the one depicted in the 2030RP scenario) that capacity issue might arise on the corridor, limiting the effective growth of the rail mode and the smooth flows of long distance transport. However, 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 BA corridor.

All the above considered it is worth noting that, under the applied approach, the growth in the corridor train traffic is also associated 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 BA corridor.

Flows and capacity on the road network

The following map shows that current road flows are generally below the critical level - set in our analysis at 20,000 veh/day/lane.

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

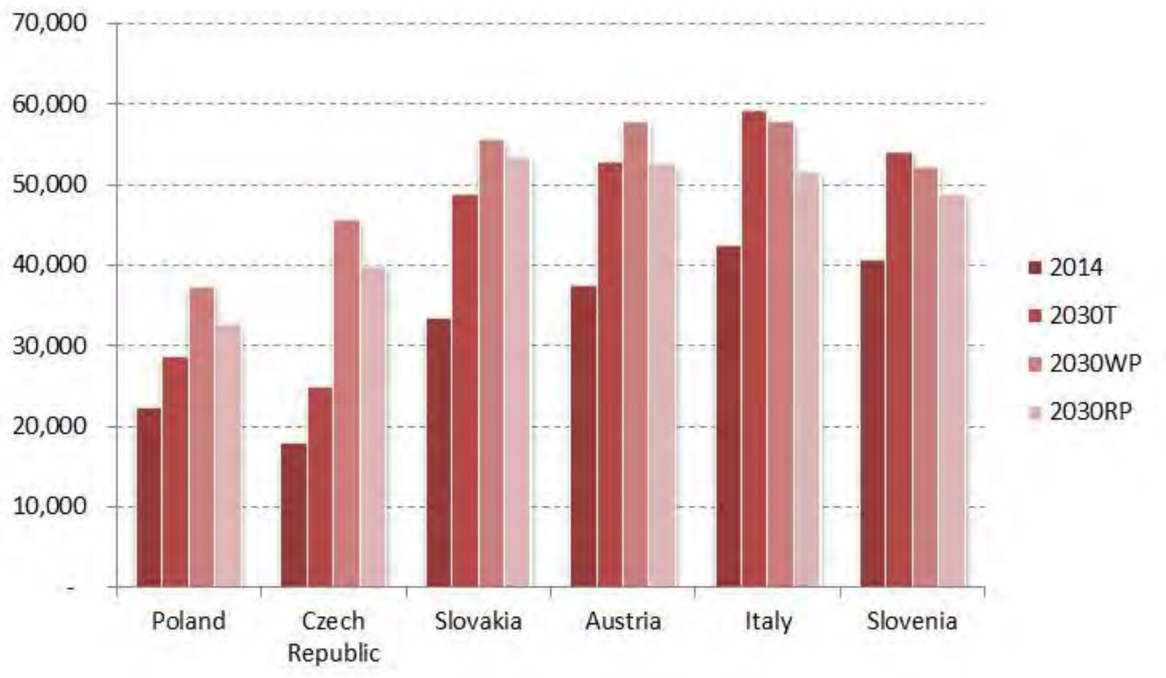


Source: BA Corridor study consortium elaboration based on TENtec data and sections

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 within the urban area in Bratislava, where projects for a new external by-pass are being developed – although not included in our corridor alignment.

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

Figure 11 Intensity of road transport (vehicle/day)



Source: BA Corridor study consortium

The available infrastructure capacity (also taking into account the full implementation of all investments already included in the corridor work plan) will generally be adequate to accommodate growth in road transport volumes for all scenarios under assessment. Limited and specific exceptions to this situation may occur within or in the approaches to major urban nodes, in particular in Warszawa, Brno and Bologna.

It should be noted that issues in Warszawa and Bologna seems more limited and might be solved by the implementation of modal shift measures, while the capacity issues in Brno might call also for capacity improvements in the mid or long term.

4.1.3 Critical issues for the development of the BA Corridor

Critical issues hampering the development of the BA Corridor as part of the TEN-T core network have been identified on the basis of the analysis of the compliance of the infrastructure with the requirements of the Regulation EU 1315/2013, also complemented by means of the review of existing studies, professional knowledge of the BA Corridor infrastructure, consultation with the relevant stakeholders. The main findings from our analysis are reported in the following paragraphs.

Aimed at completing/integrating our assessment we also considered the results of our BA Corridor market study. The results of our analysis, as summarised in the previous section, show that with reference to existing and future likely flows of traffic on the BA Corridor critical issues in terms of capacity are not a generalised issue and rather limited to specific sections; particularly regarding existing problems, these are all object of planned investments. This overall consideration 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 and on the railway lines and roads interconnecting these nodes. In these terms our study may underestimate the extent and severity of specific situations where long distance flows add up and mix with the regional, metropolitan or even local traffic.

Cross-border sections

In line with the targets and objectives of the TEN-T regulation aimed at supporting the development of intermodal and interoperable long distance traffic across Member States, the primary focus of attention of our assessment of the critical issues along the BA Corridor have been the cross-border sections.

Figure 12 Critical issues at cross-border sections

Source: BA Corridor study consortium

Cross-border sections have been defined in our study adopting two basic principles: one referring to the two relevant economic centres, the other one referring to the shortest TENtec section. Both criteria are used below to refer to the assessed cross-border sections; the use of this general criteria does not preclude the adoption of a different definition should this reflect specific circumstances and be more appropriate for the solution of particular problems.

Critical issues have been identified with reference to 6 out of rail 9 cross-border sections based on the analysis of the compliance of the infrastructure to Regulation EU 1315/2013, with reference to electrification, speed, axle load, and train length.

Railway sections
- 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) - Sentilj (SI)];
- Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)];

The rail cross-border section Břeclav (CZ) – Wien (Stadlau); (AT) [Břeclav (CZ) – Hohenau / Bernhardsthal (AT)], although not defined as a critical one, is subject of future improvements planned by the concerned relevant infrastructure managers.

The following two road cross-border sections (out of a total of 7 cross-border sections present along the BA Corridor) have been also identified as critical on the basis of the analysis of the compliance of the infrastructure to Regulation EU 1315/2013 in terms of type of infrastructure: the two sections are neither motorways nor expressways.

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

Missing links and bottlenecks
Besides the major issues and needs for upgrading at the borders, several national missing links and bottlenecks need to be addressed on the BA Corridor.

National bottlenecks - rail
Poland has already started an extensive investment programme for the modernisation of their railway infrastructure during the period 2007-2013. Several works have already been completed and others are currently under implementation, however further improvements are required on several sections of the Polish BA Corridor for the removal of line speed bottlenecks, increase in train length and axle load standards, which particularly affect the transport of freight along the corridor.

In the Czech Republic, capacity and speed bottlenecks exist which affect operations of trains at the Ostrava and Brno junctions. Similar problems exist at the Břeclav node where upgrading works are nearly completed. The section Přerov – Brno represents a capacity bottleneck; the line is also not compliant to Regulation EU 1315/2013 with respect to speed, train length and axle load standards. Different solutions are currently under review by the relevant stakeholders for the modernisation of this railway line.

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 line Žilina – Bratislava railway line are already on-going or planned to increase the speed from 120 to 160 km/h.

In Austria, the two Alpine Crossings (Semmering and Koralm) are both at the construction stage as well as the new main railway station in Wien (the latter opened to traffic in October 2014 and is already partially in operation, expected to be completed by the end of 2015). The line Wien Inzersdorf – Wampersdorf is planned to be doubled by 2023. Some sections of the network are operating close to capacity limits such as the Graz-Bruck/Mur railway line.

In Italy, major critical issues exist on the Venezia – Trieste railway line (improvement of headway system signalling and need for removal of level crossings); the Venezia/Mestre and Udine nodes also require upgrading works. Works to increase train length and gauge standards in favour of freight traffic are required on more sections along the corridor.

In Slovenia, major deficiencies exist compared to the requirements of the TEN-T standards. The upgrading of the existing line Divača – Koper is under implementation/modernization to be concluded by the end of 2015.

National bottlenecks - road

In Poland, part of the road infrastructure belonging to the BA Corridor (S69, S3, S7, A1 and S1) is being upgraded or is planned to be upgraded to comply to EU Regulation 1315/2013. The S69 in particular is directly interconnected to the Katowice – Žilina cross-border section.

In the Czech Republic the construction of the D1 motorway section Lipník nad Bečvou – Říkovice is still to be completed, currently planned for 2021.

In Slovakia, upgrading works for sections and junctions of the D1 motorway between Trnava – Bratislava are planned to be completed by 2019; Works for the implementation of the D4 bypass motorway to solve capacity issues in Bratislava are under preparation, the infrastructure assumed to be completed by 2020. The D3 motorway bypassing the Žilina urban area is currently under implementation to solve traffic congestion on the existing road I/18; this section which is directly interconnected with the future Katowice – Žilina cross-border section is expected to be completed by 2017.

In Austria, Italy and Slovenia the motorway network is compliant to the Regulation.

Transport Nodes

Another priority area of analysis is represented by the last mile connections to transport nodes, including ports, airports and rail-road terminals. Last mile connections to ports in particular are considered to be of strategic relevance for the development of the BA Corridor as an intermodal infrastructure as ports are seen as main gateways to the EU third commercial partners and may thus also contribute to further economic growth and competitiveness of the regions along the Corridor. Furthermore the development of the Motorways of the Sea is also seen as an opportunity to develop intermodality at the EU level, whereas the development of inland waterway transport can contribute to the EU policy objectives supporting the promotion of sustainable transport.

All the sea and inland ports included in the BA corridor are already connected to the rail and road infrastructure. However, last mile railway and/or road port interconnections issues have been identified which limit development in all BA Corridor seaports:

- Port of Gdynia – Works for the improvement of the standards of railway lines interconnecting the terminals to the main lines 202 and 201 belonging to the BA Corridor are required; works on comprehensive railway line 201 are also planned, which is the railway line predominantly used by the traffic generated by the port. Regarding road connections, the S6 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 critical issue affecting the Kwiatkowski Viaduct is already under consideration by the relevant stakeholders, the infrastructure is planned to be modernised in the short term. In addition to these, potential capacity issues in the surrounding urban road network have been reported by the Port and local authorities affecting in particular the Northern Bypass of Tricity agglomeration (OPAT), providing access to National Road no.6; and the Droga Czerwona road connecting OPAT to Janka Wiśniewskiego Street. Polska Street and Janka Wiśniewskiego Street require upgrading works to solve capacity related issues in view of future increases in traffic;

- Port of Gdańsk – Railway line 226 requires modernisation works (i.e. upgrading of the second track and increase in axle load and operating speed standards). 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. The completion of the tunnel under the Martwa Wisła River, currently expected by 2015 will also improve road access to the port, allowing direct interconnection to the A1 as an alternative to the existing interconnection with the S7;
- Świnoujście and Szczecin ports – Train length and freight speed limitation are currently affecting railway line 401, section Szczecin Dąbie – Świnoujście Port, and railway line 351, section Szczecin Główny -Szczecin Dąbie. Road access to the Port of Szczecin is primarily provided through national road no. 10, Parnica viaduct and local roads; the reconstruction of local road communication system in the area of Międzyodrze is currently representing a critical issue in terms of last mile connection to the port. Road access to the Port of Świnoujście is provided by national road no. 3 and lower class roads (Poviat roads). Short segments of both national road no. 3 and Poviat roads require upgrading works. Świnoujście and Szczecin ports are also interconnected through a 68 km long fairway, which is deemed not adequate to support the interconnection between the two ports via water; studies and investments are already planned in this respect aimed at deepening the fairway works and improving ferry and intermodal connection between the two ports;
- Wien and Bratislava ports – The two inland waterway ports of Freudenau in Wien and Bratislava-Pálenisko 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 further 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 modernization 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 extension of the port's container handling capacities will emphasize land recovery and the construction of a new quay wall in order to optimize the operational efficiency. Regarding the interconnections of the two ports with the BA Corridor road and rail networks, the Freudenau port is interconnected with the A4 through national road 14 and motorway A 23; it is also connected with the railway network by a direct link (national code 124) parallel to national road 14. The Bratislava-Pálenisko inland waterway port has its own siding network connected with the main railway network through the Bratislava - ÚNS freight station on the BA Corridor freight branch (section Bratislava - Petržalka). The port has good connections with the motorway D1 on the BA Corridor, being only 0.5 km distant from the Bratislava – Prievoz junction on the D1. 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 on-going 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, which includes dredging of the river bed and removal of obstacles. The reconstruction of the "old bridge" in Bratislava and the possibility to operate simultaneously the two Gabčíkovo locks are also relevant to develop inland waterway transport services along the Danube;

- Port of Trieste – 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 BA Corridor links. Improvement works on the SS 202, also providing access to the Port, are currently on-going 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". Concerning accessibility to the port by railway, one 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) in order 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 650 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. As part of the analysis of the last mile connection to the Port of Trieste, the interconnecting railway section Bivio Aurisina-Trieste is also worth mentioning as a bottleneck providing direct access between the BA Corridor and the Port of Trieste through Trieste Central Station. This section has a speed limitation of 90 km/h, and train length limited to 600 meters;
- Port of Venezia – Investments are already foreseen to improve road and rail accessibility to the port; traffic management related works are planned on the local roads interconnecting the port to the national motorway network to increase fluidity and safety as well as to reduce congestion. Regarding interconnection by railway, in the medium term, solutions have already been identified to upgrade the internal railway infrastructure (doubling the existing track) and avoid interferences between manoeuvring and national traffic. In the long term, as a consequence of the entry into operation of the planned offshore terminal, 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 development of a direct connection to the Venezia-Trieste railway line bypassing the Mestre node;
- Port of Ravenna – Upgrading, electrification and extension of the existing infrastructure providing access to the port and its terminals is already planned; works aimed at eliminating level crossings on the line interconnecting the port to the BA Corridor network are also foreseen, as well as the upgrading to P/C 80 standard of the line between Castelbolognese and Ravenna; Last mile connections to the port by road are also planned to be improved, studies and works to be implemented on the following infrastructure, SS16, SS67 (including new construction of the Candiano bypass), and SS 309dir in particular;
- Port of Koper – The modernisation of the existing track between Koper and Divača is at its implementation phase. Works are underway and expected to be completed by the end of 2015. Construction of the second track on the line Koper and Divača is planned for the period 2016-2022 also to support the planned expansion of the port terminal infrastructure. Road and rail internal works are planned to be implemented by 2020 to improve accessibility. Direct interconnection between the A1 motorway and the port should be developed also including construction of a truck terminal.

The extent and severity of the critical issues at the ports and more specifically the scope of the proposed solutions is in many cases to be further defined; however most of the problems relate to the need to increase the standards of the existing railway connections in terms of electrification, speed, axle load, train length. Due to their location within urban areas capacity/congestion and road safety related problems may also exist in the urban network surrounding the ports partly attributable to the heavy traffic generated by the ports.

Regarding **airports**, the two airports of Warszawa and Wien are already interconnected to the BA Corridor railway network, which satisfies the requirements of the EU regulation 1315/2013.

Although not primarily aimed at solving existing critical issues related to technical or capacity barriers, investments are planned at the most relevant BA Corridor Airports particularly to promote accessibility by public transport, with target to meet user needs and support modal shift. This is the case of Wien (the major airport along the BA Corridor, with already more than 20 million passengers per year). The Austrian authorities are currently considering the opportunity of increasing the interconnectivity between the Wien airport and the Czech Republic, Slovakia and Hungary. This is expected to improve the capacity and performance of the existing railway services, in view of future traffic growth at this multinational cross-border hub, and in consideration of the recent trends in travel patterns, showing an increase in the demand for integrated high-speed railway and aviation services.

With reference to the other BA Corridor airports, rail interconnection is at its final stage of construction at the Gdańsk airport; rail interconnections are also planned to be constructed at Katowice and Ljubljana airports as well as at Venezia and Bologna airports, these latter representing with Warszawa and Wien the largest airports along the BA Corridor, with more than 6 and 8 million passengers at 2013 respectively. Also for Bologna and Venezia, the interconnection to the BA Corridor railway network represents the possibility to connect directly 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.

Nearly 30 **rail-road terminals** have been identified along the BA Corridor with reference to the list of nodes provided by EU Regulation 1315/2013. New rail-road terminals are currently under construction and additional ones have been considered in this study for their functional relevance for the development of the BA Corridor as an intermodal infrastructure. The Rail-Road Terminals on the BA Corridor are all interconnected to their respective national road and rail networks. For the terminals at seaports and inland waterway ports (namely Gdynia (PL), Gdańsk (PL), Szczecin (PL), Świnoujście (PL), Wien and Bratislava) similar considerations apply as the ones described for the ports in which they are located, in terms of conditions and issues associated to their accessibility by rail and road. For the other rail-road terminals no critical issues have been identified that affect the quality of last mile connections.

Interoperability

The predominant application of interoperability is associated with traffic management. Intelligent Traffic Systems are under development and implementation for all transport modes; the analysis of the status of the transposition and implementation of the relevant legislation is progressing with regard to all systems; although for many of them, and particularly ERTMS, delays in the completion of the deployment plans are significant. Differences between the BA Corridor concerned Member States in terms of status of implementation of the legislation and technological solutions also exist: the CNC approach introduced by the new TEN-T policy aimed at establishing coordinated network of nodes along the Core Network, is deemed to represent an opportunity to improve the efficiency and efficacy of such initiatives in terms of timely and coordinated development of deployment plans and removal of local/regional scale differences:

- ERTMS: Whilst the importance of the implementation of ERTMS in support of the development of a Single European Railway has been identified as a priority in many relevant studies, including SONORA, AB Landbridge and particularly SETA, no studies have been undertaken to systematically assess the status and plans of the deployment of ERTMS along the BA Corridor. ERMTS (ETCS+GSM-R) is planned to start to be available on some sections of the BA corridor railway network by end of 2014, more likely and significantly by end of 2015. Based on current plans ERTMS is expected to be fully deployed on the BA Corridor not earlier than 2030; on three sections: Skalité – Čadca (SK), Blumental – Wampersdorf (AT) and Pragersko-Maribor-Šentilj (SI) the time-schedule for ERTMS implementation is still not defined;

- VTMIS: Numerous initiatives are being implemented at the wider European Union scale, as well as at the national or basin cluster level in order to support the promotion of Single Window initiatives to access ports, track flows of vessels and transported intermodal vehicles, rolling stock and goods, entering and exiting port areas. It is however worth noting that no initiative has been so far implemented at the wider corridor level, nor at the level of the core network;
- RIS: River Information System technology is also under implementation at BA Corridor inland ports and interconnected inland waterways links belonging to other Core Network Corridors or sections of the Core Network. The experiences vary from trial initiatives in Italy and recently completion of pilot projects in Poland to a more advanced development in Austria and on-going refinements of system implementation in the Czech Republic and Slovakia;
- SESAR: From the review of the research and project experience activities of this initiative, no other BA Core Network Corridor airports other than Wien has been significantly involved in the development of this technology with a possible involvement of other Core Network Corridor Airports in the foreseen deployment phase of SESAR;
- ITS for roads (including EETC): The review of the five years action plans developed by the BA Corridor Member States in compliance with Directive 2010/40/EU shows that activities are on-going with respect to many of the foreseen directive measures, with differences between the Member States about the priorities and actions under implementation or envisaged to be implemented. The TEN-T Core Network Corridor approach, may also in this respect facilitate a more coordinated development of these initiatives, although many of them apply to units of infrastructure – regional, or national networks if not specific motorways under concession – that differ from the one of the Core Network Corridor. Specifically regarding the European Electronic Toll Collection system as per Directive 2004/52/EC and subsequent Decision 2009/750/EC, it is not yet implemented in the BA Corridor Member States.

Promotion of intermodality and sustainable transport

Initiatives for the development of ports and rail-road terminals infrastructure have been implemented in the past to support the development of intermodal transport. Additional projects are still on-going and planned for the future aimed at further developing Motorways of the Sea and container terminals as well as expanding existing rail-road terminals and constructing new ones. The focus of attention under the new TEN-T policy will also be that of maximising the use and benefits from the completion of these infrastructure projects by promoting the physical and operational interconnection of different transport modes and particularly the one between rail and maritime transport.

In order to further promote the increase of modal shift from road to rail transport and the use of Motorway of the Sea services, ICT, and more generally innovation and research initiatives and pilot projects are also deemed relevant. Usually involving more stakeholders from the wider intermodal logistics chain these projects are crucial for the solution of operational barriers affecting the competitiveness of intermodal transport. Pilot projects have already been implemented in this respect for the development of real-time operational databases and portals. However a major criticism about those initiatives is the difficulty in consolidating the pilot initiatives implemented as part of the projects, due to lack of resources to support the required efforts in the further refinement and continuity in the updating of the databases.

Similarly to what has already been identified with reference to ITS solutions, the efficiency and efficacy of such initiatives aimed at developing a smooth flow of information among the relevant stakeholders, could be improved by the corridor approach introduced by the new TEN-T policy aimed at establishing a coordinated network of nodes along the Core Network.

Regarding the promotion of sustainable transport solutions and related technology, the Regulation EU 1315/2013 also foresees the availability of clean fuels at core network corridor ports and airports by 2030; no initiatives on such developments on the BA Corridor are under implementation at present; the Polish ports in the Baltic and particularly Świnoujście where a new LNG terminal is under construction at present, as well as Venezia and Ravenna in the Adriatic, are however considering developing LNG clean fuel related facilities in the future. Clean fuel distribution is present along the BA Corridor road network; however it is not possible at present to assess the extent of its availability.

Operational and administrative barriers

Different types of operational and administrative barriers affect the development of the BA Corridor. Particularly considering the ultimate target of the Core Network Corridors to support the development of intermodal long distance flows of passengers and freight across the Member States, a first category of critical issues has been identified with reference to those barriers hampering the interoperability of railway transport. In this respect it should be noted that interoperability for this mode is not just restricted to traffic management; it also affects other railway subsystems such as energy and infrastructure standards (i.e. loading gauge and train length).

Relevant studies have already analysed railway interoperability related critical issues such as SoNorA and AB Landbridge, and more recently the SETA project. For this study interoperability can be primarily achieved by implementing the respective EU regulations (decisions 2006/920/EG, 2006/679/EG and 2008/386/EG of the European Commission), particularly by introducing compatible ERTMS based railway control systems in all countries.

Regarding differences in traction (electrification and power systems) problems may be solved by means of use of multi-traction locomotives; however these locomotives are considerably more expensive; they cost 10-15% more than traditional ones and technical maintenance and repairs are also much more costly. Therefore operators would only invest in these locomotives if the time savings over locomotive change at the border can justify it. From the point of view of the train operator it is not relevant which company provides the traction service with the multisystem locomotive as long as a competitive price is offered. Therefore the national railway companies could create a pool of multi-system locomotives that could be deployed based on the demand instead of creating competition for traction services by parallel procurement of the locomotives.

Concerning the other main interoperability infrastructure parameters, i.e. line speed, axle loading category, number of tracks and capacity of railway sections and stations, the study highlights how these issues can primarily be improved by investment into the railway infrastructure through refurbishment and upgrading of respective sections and stations. This is the responsibility of the national governments and their railway infrastructure managers. It is however highly desirable that these investments 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 resulting in a significant difference in transport speed and quality.

Beyond infrastructure or rolling stock related barriers, operational and administrative barriers between and within transport modes exist. These are possibly hindering the seamless and continuous flow of passenger and goods, such as the lack of harmonization of procedures for railway vehicles authorisations in different Member States or the absence of coordination between agency-specific and country specific regulatory and operational requirements for international trade and transport. Studies have also been implemented in the past to describe and identify solutions to these issues. Among these the already mentioned SETA study, identifies the following critical issues and related possible solutions:

- *Cross-border transit times:*
  - Traction:
    - Issue: If traction is different across the border (electric/diesel) a change of locomotive is required. Similarly, if the electrification and signalling/safety systems are different on either side of the border and no multisystem locomotives are available, locomotives need to be changed;
    - Suggested measure: Introducing trust based train handover procedures based on mutual agreements between train operators, in which the technical handover procedure is only carried out by one operator while the other operator (or operators) 'trust' the technical checks carried out;
  - Technical wagon inspection (e.g. breaks inspection):
    - Issue: inspection is carried out to ensure that the condition of the wagons entering a country conforms to national regulations, which requires administrative times;
    - Suggested measure: Harmonising operational and safety rules so that procedures to change the tail signal lamp, the breaking sheet and the wagon list can be avoided;
  - Documents concerning the train and the cargo are exchanged:
    - Issue: If it is not done electronically, this activity adds to the time needed for border procedures;
    - Suggested measure: Carrying out the detailed inspection only at the origin and the destination of the train;
  - Mutual acceptance of drivers:
    - Even when multi-system locomotives are available, the lack of mutual acceptance of drivers may prevent the same locomotive to travel across the border and hence border-crossing is delayed;
    - Suggested measure: Facilitating the mutual acceptance through the harmonised train driving licences introduced in the EU by Commission Regulation (EU) No 36/2010;
- *Demand for freight rail services:*
  - Issue: a market survey undertaken as part of this study has shown that there is considerable demand for reliable transport services towards Asia and America via major European ports. Competitive services can be offered through the Adriatic ports demand for train services;
  - Issue: The freight forwarding and transport market is quite volatile especially because road hauliers change their prices much more flexibly and in a more reactive way than railway operators;
  - Suggested measure: New competitive services can only be offered if clients can be convinced to change from a well-established route/method of transport to major European ports and try a new route via, for example, the Adriatic ports;
- *Operation of passengers' services:*
  - *Issues:* Since international cross-border passenger services are normally operated as commercial services, the connections that carry only few passengers across the border producing low revenue can hardly be justified;
  - Suggested measure: Funding opportunities for international train services should be investigated as international trains are not expected to be self-sustaining particularly at the beginning of their operation;
  - Suggested measure: Railway infrastructure managers and operators should also commit themselves to provide priority to international trains along the corridor over local and regional services in order to significantly reduce the travel time.

Customs, security, as well as health and safety related processes and procedures for vehicles and cargo can impact significantly also on transit times. This kind of barriers particularly affects international flows of freight transport at cross-border sections and Ports.

In addition to the above mentioned Intelligent Transport Systems, ICT projects, including e-Maritime initiatives have been implemented to this respect aimed at simplifying administrative procedures relating to custom, safety and security procedures. Whilst projects have already been initiated at the single basin area, no initiatives have however been so far implemented involving all Port Authorities along the corridor and/or the ports authorities and the rail road terminals and railway undertakings.

Regarding rail transport, the RFC 5 and infrastructure managers as active stakeholders in the activities of Rail Net Europe, are involved in the development and use of the systems Path Coordination System (PCS), Train Information System (TIS), and Charging Information System (CIS); all these aimed at simplifying and further supporting the development of international, cross-border train operations.

In addition to the above issues affecting the operation of rail and maritime services, administrative barriers have been identified with reference to the implementation of infrastructure projects which require coordination and consensus on both the definition of the problems and identification of the solutions. This is usually frequent for cross-border initiatives but may also occur for those investments deemed beneficial under the functional stand-point to a stakeholder which is however not the owner of the infrastructure. This is particularly the case of last mile connections to ports; but may also happen in situations in which local/regional traffic adds to long distance traffic. Examples currently under analysis to this respect seem to be related to road improvements to the port of Gdynia (OPAT providing access to National Road no.6 and the Droga Czerwona road connecting OPAT to Janka Wiśniewskiego Street); railway and road works improving accessibility to the port of Ravenna (elimination of one railway crossing in the urban area as well as improvements of the roads SS16 and SS67 and their main interchanges); improvement of the urban road network in Bologna, including some roads affecting accessibility to the Bologna Airport; the construction of a railway intersection on the railway between Granarolo and Faenza. Problems may also exist relating to reaching consensus on the development of projects in environmental sensitive areas, as it is the case of the Brno-AT border road cross-border section in the Czech Republic.

The nature of the problems in the above and other similar cases may vary from the presence of different positions about the definition of a critical issue and identification of an agreed project solution, to lack or delays of formal administrative requirements such as the inclusion of the projects in the investment plans of the relevant concerned infrastructure managers. The Corridor approach may be helpful also in finding coordinated solutions among the stakeholders to solve similar situations, particularly if associated to key priority intervention areas of the TEN-T policy.

4.1.4 Objectives of the BA Corridor

The analysis of the characteristics of the Baltic-Adriatic Corridor and identification of the above described critical issues emphasises the importance of the general objectives set in the Regulation EU 1315/2013 for the development of the Core Network Corridor, including the BA Corridor.

The following table specifies the general objectives set by the Regulation emphasising those elements that are deemed particularly relevant also for the BA Core Network Corridor.

Table 6 General TEN-T objective and specific objectives of the BA corridor

COHESION	**A high quality infrastructure corridor with interconnected long distance and regional/urban flows**
General Objectives	• Accessibility of all regions of the Union • Reduction of infrastructure quality gaps between Member States • Interconnection of long-distance, regional and local traffic flows. • Balanced transport infrastructure coverage of all European regions

Specific Objectives	• Improving the infrastructure quality and standards - especially of Eastern Member States - with the target to comply to the technical requirements
	  ○ Rail: line speed (freight), train length, axle load
	  ○ Road: motorways or expressways
	• Improving interconnection in all urban nodes along the corridor between TEN-T and local transport infrastructure, for both passenger and freight traffic

EFFICIENCY	**A continuous, interoperable and intermodal corridor**
General Objectives	• Continuity of long distance flows • Interconnection and interoperability of transport networks • Intermodality • Economic efficiency, contributing to further economic growth and competitiveness • Innovation

Specific Objectives	• Removal of rail and road bottlenecks:
	• Improvement, modernisation and upgrading of:
	  ○ Cross-border connections (Poland - Czech Republic / Slovakia, Czech Republic - Austria, Slovakia – Austria, Slovenia - Austria / Italy)
	  ○ National rail lines (Poland, Czech Republic, Slovakia, Slovenia) and specific railway links and nodes (Austria, Italy)
	  ○ Road network to motorway/expressway standard (Poland, Czech Republic, Slovakia)
	• Interoperability of national transport networks:
	  ○ ERTMS, ITS, VTM and e-Maritime services, SESAR
	• Optimal integration and interconnection of all transport modes, especially improving the "last mile" connections to ports, airports and rail-road terminals
	• Promotion of economically efficient, high-quality and competitive transport, contributing to the development of intra and extra EU trade, also trough the promotion of the role of the Adriatic and Baltic ports as gateways to the main third commercial partners

SUSTAINABILITY	**A corridor targeted at reducing externalities, preserving sensitive areas and reducing emissions**
General Objectives	• Long term sustainability • Clean transport • Low-carbon transport
Specific Objectives	• Contributing to the objectives of low-carbon and clean transport, fuel security, reduction of external costs of transport (especially for highly populated areas) and protection for environmentally sensitive areas (such as the Alpine space) • The BA Corridor will also be serving the objective, set out in the White Paper, of reducing greenhouse gas emissions from transport by 60 % below 1990 levels by 2050
USERS' BENEFITS	**A safe corridor, accessible to all users', meeting the needs of the demand**
General Objectives	• Meeting users' needs • Safety and security • Risk resilience • Establishment of requirements • Accessibility PRM

Specific Objectives	• Meeting the mobility and transport needs of its users within the Union and in relations with third countries, improving the performance of the transport system for its users, reducing congestion and expanding the infrastructure capacity when necessary • Ensuring safe, secure and high-quality standards, for both passenger and freight transport; supporting mobility even in the event of natural or man-made disasters, and ensuring accessibility to emergency and rescue services • Improving accessibility for elderly people, persons with reduced mobility and disabled passengers

4.1.5 Implementation of the BA Corridor Work Plan

More than 350 investments have been identified for the development of the BA Corridor up to 2030. The total volume of investments at present is 59.7 € billion (assumed at 2014 prices), including the cost of on-going projects and excluding the cost for those investments for which only studies are foreseen to be implemented by 2030 or the estimates of the investment costs are not available.

The table below provides an overview of the current financial distribution of the investments among the identified actions and sub-actions of the work plan. Of the total volume of investments, 52% is allocated to railway, 30% to road, 12% to ports (including interconnections) and about 6% is allocated to airports, rail-road terminals and urban nodes. 13% of the total budget is allocated to cross-border sections. The cost of the two alpine crossings is equivalent to 14% of the total investment value.

On the basis of our review and assessment of the list of investments planned on the BA Corridor we outlined the *Plan for the removal of barriers and enhancement of efficient multimodal transport and services*. This analysis is also aimed at commenting on the efficacy and efficiency of the proposed list of investments with reference to:

- The actions and sub-actions of the work plan, identified with respect to the objectives of the BA Corridor;
- The efficacy of the investments in removing the critical issues identified in the study and in enhancing efficient multimodal transport and services along the BA Corridor.

Table 7 BA Corridor: investments by action and sub-action

Actions		Sub-Actions		BA Corridor	PL	CZ	SK	AT	IT	SI
1	Development of the railway infrastructure	1.1	Cross-border	4,820.9	1,158.8	52.0	305.0	1,740.1	1,040.0	525.0
		1.2	Missing links	8,489.3	-	-	-	8,489.3	-	-
		1.3	National railway lines	16,656.6	5,391.0	2,696.1	1,997.5	1,606.5	2,386.2	2,579.2
		1.4	ERTMS	804.4	245.4	32.5	-	190.0	130.0	206.5
		1.5	Specific environmental and safety measures	-	-	-	-	-	-	-
2	Development of the road infrastructure	2.1	Cross border	2,878.9	473.5	380.0	1,556.4	469.0	-	-
		2.2	National roads	14,200.4	7,705.1	535.2	1,090.1	2,142.0	1,932.0	796.0
		2.3	ITS and ETC	583.7	375.0	-	-	4.6	4.1	200.0
		2.4	Specific environmental and safety measures	-	-	-	-	-	-	-
3	Development of the port infrastructure	3.1	Developing interconnections	1,323.7	990.0	-	-	-	333.7	-
		3.2	Modernization / Expansion of the infrastructure	5,709.0	1,333.7	-	173.1	-	3,402.3	800.0
		3.3	Technological upgrading and innovation	44.7	27.5	-	2.4	-	14.8	-
		3.4	Specific environmental and safety measures	303.3	183.3	-	-	-	120.0	-
4	Development of the airport infrastructure	4.1	Developing interconnections	1,006.9	400.0	22.9	-	189.0	395.0	-
		4.2	Modernization / Expansion of the infrastructure	1,595.1	250.6	-	-	800.0	425.0	119.5
		4.3	Technological upgrading and innovation	1.9	1.9	-	-	-	-	-
		4.4	Specific environmental, safety and security measures	46.9	46.9	-	-	-	-	-
5	Development of the RRT infrastructure	5.1	Developing interconnections	-	-	-	-	-	-	-
		5.2	Modernization / Expansion of the infrastructure	453.6	-	-	33.1	375.5	-	45.0
		5.3	Technological upgrading and innovation	0.2	-	-	-	0.2	-	-
		5.4	Specific environmental and safety measures	-	-	-	-	-	-	-
6	Development of the urban node infrastructure	6.1	Development of the urban transport infrastructure	739.8	-	-	-	-	739.8	-
			Total	**59,659.3**	**18,582.7**	**3,718.7**	**5,157.6**	**16,006.2**	**10,922.8**	**5,271.3**

Regarding the effectiveness of the proposed investments in solving the critical issues described in the previous paragraphs to reach the objectives set by the EU Regulation 1315/2013, the following considerations can be drawn by means of comparison of the analysis of the critical issues and the review of the investments:

- Cross-border critical issues:
  - Opole (PL) – Ostrava (CZ); [Chałupki (PL) – Bohumín (CZ)]: this rail section requires relatively minor investments (45.8 € million) on the Polish side for the modernisation of the line between Kędzierzyn Koźle - Chałupki (state border), which is expected to be completed by 2019. No investments are currently planned on the Czech side where two single track sections are in operation between Bohumín Vrbice and Bohumín stations, and the state border towards Chałupki, already allowing train operation up to 100 km/h for both passenger and freight services. The remaining sections in the Czech Republic were already modernized to increase the operating speed up to 160 km/h, including the improvement of the Bohumín station. This cross-border section is expected to benefit from the modernisation of the Opole Zachodnie – Kędzierzyn Koźle section to increase maximum operational speed on the Polish side (75 € million) by 2018, and of the Ostrava junction on the Czech side (220 € million), by 2021;
  - Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]: this rail section requires major investments on lines E30 and E65 on the Polish side (1,025 € million), expected to be completed by 2021. On the Czech side, limited improvements are required at the stations Petrovice u Karviné and Dětmarovice to increase operating speed; the section from the state border to Petrovice u Karviné and Ostrava was already modernised since 2002, increasing the speed up to 120 - 160 km/h. Also this cross-border section is expected to benefit from the completion of the modernisation of the Ostrava junction (220 € million), by 2021;
  - Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]: works for the improvement of the existing single track line on the Polish side are under study and their scope under definition, with works already planned on the line which are expected to be completed by 2019 (88 € million); on the Slovak side, the single track Skalité – Čadca (with maximum speed 100 km/h and maximum train lengths 650 m) was already modernised and no additional works are planned;, ERTMS is not planned to be deployed on this section. The modernisation of the double track section Krásno nad Kysucou – Čadca also common to the cross-border itinerary between Ostrava and Žilina is expected to be completed by 2022, including deployment of ERTMS (300 € million);
  - Katowice (PL) – Žilina (Brodno) (SK); [Zwardoń (PL) – Skalité (SK)]: the upgrading of the road infrastructure to express road standards is expected to be completed by 2023 (2,030 € million including both the Polish and Slovak sides);
  - Brno (CZ) – Wien (Schwechat) (AT); [Mikulov (CZ) – Mistelbach (AT)]: on the Austrian side the A5 will be completed to the border up to 2030, subject to positive resolution of the environmental related administrative issues on the Czech side (471 € million); on the Czech side the Pohořelice - Perná - border CZ/AT sections are planned to be completed by 2030 (378 € million);
  - Bratislava (SK) – Wien (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]; Two cross-border railway lines are in operation between Bratislava and Wien, one predominantly used for freight transport passing through Petržalka (SK) - Kittsee (AT), another one going via Devínska Nová Ves (SK) and Marchegg (AT). The latter is the only non-electrified section along the BA Corridor, also requiring upgrading works. Works for the electrification of the existing single track railway line on the Slovak side are planned to be completed by 2019 (5 € million); Upgrading of the line Wien Stadlau - Border AT/SK (next

  to Marchegg) including two tracks, electrification and railroad station works are planned to be implemented by 2030 (550 € million);
  - Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]; this cross-border section is planned to be rehabilitated on the Slovenian side between 2020-2030 (245 € million); the time-schedule for ERTMS deployment on the Pragersko-Maribor-Šentilj railway line is not yet defined. The completion of the upgrading of the section on the Austrian side is planned for 2030 (570 € million);
  - Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]: the studies for this cross-border section are on-going, the feasibility for the completion of the works by 2030 still to be confirmed (envisaged cost 1320);
- Other cross-border infrastructure:
  - Břeclav (CZ) – Wien (Stadlau); (AT) [Břeclav (CZ) – Hohenau / Bernhardsthal (AT)]: this section will benefit from technological upgrading on the Czech side, including bridge reconstruction at km 80,930 enabling an increase in speed up to 160 km/h; as well as from the improvement of the Brno junction expected to be completed by 2020 (52 € million); the Austrian side is expected to be further improved to increase capacity by 2020 when the modernisation of the Wien border AT/CZ is planned to be completed (620 € million);
  - Trieste (IT) - Divača (SI); [Fernetti (IT) - Divača (SI)]: Highway improvement works on the R.A. 14 between Trieste and Sežana are expected to be undertaken for works related to the elimination of the custom and police check point related buildings and facilities (time and cost under definition);
- Missing links at the Alpine Crossings will be completed not earlier than mid of the 2020s (8.5 billion);
- Priority last mile connections to seaports will be solved by 2020 (789 € million); additional investments are planned for the period 2020 and 2030 (535 € million), also based on the development of traffic;
- Rail connections to largest airports in the network are already under implementation or in any case planned to be completed by 2020 (972 € million). Although not specifically included in the plan with reference to sub-action 4.1, the Ljubljana Airport railway interconnection is also worth mentioning, which is currently under evaluation as part of the feasibility study for the construction of the 2nd track Ljubljana-Jesenice;
- Modernisation of railway lines as well as junctions will be implemented gradually over the course of the entire duration of the work plan:
  - In the first phase of the work plan, investments in national railway lines and junctions are planned for a total of 8.4 € billion; these include projects that are expected to complete modernisation of the Polish, Slovak and Slovenian railway network;
  - Investments between 2020 and 2030 (8.3 € billion), are expected to support development of higher quality lines particularly for passengers in the Czech Republic, Austria and Italy;
- The modernisation of the road network in the three Northern BA Corridor Member States sections – Poland, Czech Republic and Slovakia will be completed by 2020, when the upgrading of other road sections in Italy and Austria is also foreseen to be finalised (10.3 € billion); other improvement works are planned between 2020 and 2030 to solve capacity and environmental related issues predominantly at nodes (3.9 € billion).

In addition to infrastructure development projects, the *Plan for the removal of barriers and enhancement of efficient multimodal transport and services* also includes ITS related investments:
- ERTMS – this technology is expected to be fully deployed on the BA Corridor not early than 2030; on three sections: Skalité – Čadca (SK), Blumental – Wampersdorf (AT) and Pragersko-Maribor-Šentilj (SI) the time-schedule for ERTMS

implementation is still not defined (envisaged total cost 804 € million, excluding sections in Slovakia where the cost for ERTMS implementation is already included in the cost for the modernisation/upgrading of the lines and junctions;

- ITS and ICT projects for roads and ports are included on the list (584 € million for roads and 45 € million for ports); there are also on-going relevant initiatives at rail-road terminals; projects aimed at solving specific environmental safety and security issues at airports are also listed. Initiatives are also planned regarding availability of clean fuels at ports and airports already by 2020.

Finally, regarding intermodality, relevant investments at ports and rail-road terminals are foreseen (nearly 5 € billion for ports and 454 € million for rail-road terminals).

On the basis of our analysis of the planned investments, the following considerations apply with reference to the work plan objectives:

- The technical information on the investments included in the plan and the proposed technical standards is minimal; however the projects indicated by the stakeholders are overall expected to allow the modernisation of most of the railway and road BA Corridor network and make the corridor compliant to the required TEN-T standards by the end of the work plan time-horizon;
  - With specific reference to the passengers' railway network we notice that the initiatives foreseen for the upgrading of the lines to high speed standards are on-going or planned, most projects targeting speed between 200 km/h and 300 km/h; the planned high speed line Venezia-Trieste has been postponed until after 2030 – investments are currently planned on the existing conventional line to increase speed up to over 200 km/h (construction of two additional tracks is also considered before 2030); studies are on-going regarding the cross-border high speed line between Trieste and Divača and between Divača and Ljubljana, the feasibility for the completion of the works by 2030 still to be confirmed;
- No investments are currently included regarding the deployment of SESAR at BA Core Airports;
- Consideration should be given to the development of initiatives regarding horizontal issues; or the promotion of cross-border operations and services along the BA Corridor; or projects aimed at promoting cooperation among the network of logistic nodes. None of these initiatives is included in the work plan at present; with particular respect to horizontal measures, we also notice that the plan does not include at present any of the following additional possible specific measures identified by Regulation EU 1315/2013:
  - Measures to improve the administrative and technical capacity to conceive, plan, design, procure, implement and monitor projects of common interest;
  - Measures to enhance resilience to climate change;
  - Measures to be taken in order to mitigate greenhouse gas emissions, noise and, as appropriate, other negative environmental impacts.

The list of investments assessed as part of this study is not conceived as fixed. Updates to the work plan are foreseen for the coming years. Investments currently not listed may be included in the future. From the financing stand point, the non-inclusion of a project in the list does not preclude its eligibility under the CEF; equally its inclusion is not a guarantee of eligibility for funding.

4.2. Definition and characteristics of the BA Corridor

4.2.1 Legal definition of the BA Corridor

Part of the Core TEN-T Network, the BA Corridor is legally defined by the two mentioned regulations, EU 1315/2013 and EU 1316/2013, determining the new TEN-T policy.

The New TEN-T Policy

The Trans-European Networks Policy has its basis in the Maastricht Treaty signed in 1992 and entered into force in 1993. Under the Terms of Articles 154, 155 and 156 of the Treaty, the European Union aims at promoting the development of a Trans-European Network as a key element for the creation of the Internal Market and the reinforcement of Economic and Social Cohesion in compliance with objectives of the Lisbon Agenda on growth and jobs to be achieved. This development includes the interconnection and interoperability of national networks as well as its accessibility. It also supports Free Movement of Persons within the territory (EU Law 341 –Directive 2004/38 and successive) of the Member States. It finally integrates environmental protection requirements with a view to promoting sustainable development.

The First Support Framework for the development of the Trans-European Network was set up in 1990, with the adoption of 14 (national) Priority Projects at the European Council meeting that was held in Essen on 9 and 10 December 1994.
The first Guidelines defining the TEN-T policy and infrastructure planning were adopted in 1996. These were drawn up with Decision No. 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community guidelines for the development of the trans-European transport network, consisting of road and railway projects. Seaports, inland ports and intermodal terminals were included in May 2001, with European Parliament and the Council Decision No 1346/2001/EC.
In order to identify priority infrastructure, in 1997 and 1999 the Pan-European Corridors I – X ("Helsinki Corridors") and the TINA ("Transport Infrastructure Needs Assessment") network were introduced.

The first revision of the original 1996 guidelines occurred in 2004; Beside the TINA network of 1999, the list of priority projects was extended in the enlarged 27 Member States Union to 30 "Projects of Common Interest", in order to take into account the EU enlargement when the European Parliament and the Council adopted Decision N° 884/2004/EC. Since its inception stage, the planning process of the network of "European Common Interest" was based on a dual layers approach: a comprehensive network layer (outlining plans for rail, road, inland waterway, combined transport, airport and port networks) and a second layer of 30 priority projects – including projects of common interest.

Over the course of the years questions arose as to the methodological soundness of the selection of the priority projects, the potential for interconnection and extension (both geographically and modally), the approach to coherent capacity and quality standards, and the means of better stimulating their completion within the planned timeframe.

In 2006 the European Commission created the Trans-European Transport Network Executive Agency (TEN-T EA) to manage the technical and financial implementation of its TEN-T programme. In 2007 general rules were set for the granting of Community financial aid in the field of TEN-T/TEN-E networks (Regulation N° 680/2007). EU financing of TEN-T projects was related to two different instruments: the TEN-T programme and more extensively the Cohesion and Structural Funds. Both instruments were assumed to contribute to fulfilling the objectives set out in the TEN-

T guideline, however, each has its own rules and characteristics, including the fact that whilst funding under the Cohesion and Structural Funds could reach up to 85% in eligible Member States (cohesion countries), funding in the TEN-T programme was limited to 50% for studies and in case of infrastructure realisation it was limited up to 30% for cases involving cross-border sections or lower percentages in other cases. Furthermore while the TEN-T programme is under direct management of the EU Commission, which selects projects to be financed, the Cohesion and Structural Funds are affected by a shared management, in which the choice is made by Member States after the Commission agrees on the overall budget of each programme. This situation implied difficulties in setting common priorities and a strong national priority-setting and therefore, the lack of integrated funding strategy at EU level has been indicated as a critical issue for the completion of the TEN-T network, especially considering the outstanding investment needs.

In order to maximise the development of the TEN-T network, the EU has made relevant efforts to concentrate its investments on the Priority Projects and in particular on cross-border sections and bottlenecks (including access routes to both) thus leveraging effect of the TEN-T budget. At the same time, in order to deal with lack of resources and impact of the financial crisis started in 2008, the EU called for the exploitation of other financial means such as those provided by the European Investment Bank (EIB); Private Public Partnership (PPP) initiatives were also explored. Particularly regarding the EIB, its lending activity to TEN-T projects increased by 50% from 7.9 € billion in 2007 to 11.9 € billion in 2009. In addition to EIB loans and credit guarantees, the EIB supports the development of TEN-T projects through several joint initiatives with the Commission, encompassing not only mere funding, but also knowledge and best practice support.

The implementation and development of the TEN-T network also proved to be a challenge from a different view point, other than merely financial one. Technical realisations and the need for ever more enhanced project coordination that also includes a wide range of activities related to consensus building as well as evaluation and mitigation of the impacts of infrastructure realisation have also been identified by Stakeholders as relevant areas of attention, particularly for cross-border initiatives. In general, the experience of international cooperation processes on cross-border project coordination has revealed that Member States often lacked joint traffic forecasts, which leads to different investment plans. There have also been episodes of lack of investment planning coordination, thus leading to disconnected or even contradictory timelines, capacity planning, alignment, technical and interoperability characteristics, and environmental assessments. Therefore, joint management of both infrastructure development and operations (once built) is often insufficient and moreover, in the decision making process Regional and local economies and other stakeholders have gained the importance that derives from the significant effects on local and regional economies, and local stakeholders. Additionally, regions have more often been requested to contribute to the financing of infrastructure projects. In order to accompany these developments, local stakeholders should be able to find their relevant place in the national decision-making processes.

In order to accelerate implementation, especially in cross-border projects and sections, European coordinators were appointed by the Commission in 2005, to cover the Priority Projects Nos. 1, 3, 6, 17, 18, 21 and 30, as well as ERTMS in order to cope with all the mentioned issues. The effectiveness of this choice has been proven in several cases, playing a major role in pushing forward realisation and in some cases also in helping with preparation and implementation of certain priority projects.
The above elements were considered in the review process of the TEN-T policy that was launched in 2009 and in the elaboration of the new one started in 2010, when the

European Rail Freight Corridors were also defined by Regulation EC 913/2010, also including the Rail Freight Corridor 5 (RFC5) almost overlapping with the Baltic-Adriatic Core Network Corridor. The regulation requests Member State to establish international market-oriented Rail Freight Corridors to meet three challenges:

- Strengthening co-operation between Infrastructure Managers on key aspects such as allocation of path, deployment of interoperable systems and infrastructure development;
- Striking the right balance between freight and passenger traffic along the Rail Freight Corridors, giving adequate capacity and priority for freight in line with market needs and ensuring that common punctuality targets for freight trains are met;
- Promoting intermodality between rail and other transport modes by integrating terminals into the corridor management and development.

The main outcome from the above mentioned review of the TEN-T programme was that the European transport network is fragmented, geographically – particularly between countries, and modally – both between and within transport modes. The following additional elements were identified as critical ones regarding the previous policy and implemented Priority Projects which were deemed:

- Not reflecting a European planning perspective (rather investment than common market and cohesion needs);
- Forming rather a patchwork than a network;
- Not sufficiently connected with neighbouring countries and other continents;
- Not integrating transport policy objectives;
- Not take into account environmental and climate needs;
- Lacking of multimodality, interoperability, technological innovation and overlap with other concepts (PETC's, De Palacio axes, ERTMS and Rail Freight Corridors);
- Showing deficits in implementation.

In line with consultations held on the future TEN-T policy in 2010, the new strategy should have focused on:

- Strengthening sustainable development (low carbon transport systems);
- Strengthening cohesion;
- Inclusion of ITS (e.g. ETRMS, telematics) and ICT (energy efficiency, sustainability);
- Connection with neighbouring countries;
- Better coordination of funding / financing instruments (cohesion fund, structural fund, TEN-T);
- Confirmation of the role of European Coordinators, possibly extending this concept (large border crossing projects, packages of smaller infrastructure measures and implementation in general).

The review and process ended in 2013 with the publication of two new EU Regulations, representing the basis of the new TEN-T policy:

- Regulation EU 1315 /2013 on *Union guidelines for the development of the trans-European transport network* and repealing Decision No 661/2010/EU;
- Regulation EU 1316/2013, establishing the *Connecting Europe Facility* instrument, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010.

Similarly to the previous policy, the Regulation EU 1315/2013 sets out that the Trans-European transport network is to be developed through a dual-layer structure consisting of a comprehensive network and a core network, those two layers being the highest level of infrastructure planning within the Union:

- The Comprehensive Network is the dense basic network aimed at/defined as:
    - Ensuring regional accessibility;

  - Comprising all modes of transport;
  - It is determined by Member States, according to a set of rules updating the TEN-T rules of 1996;
  - It is to be implemented by 2050.
- The Core Network is a subset of the Comprehensive Network:
  - Interconnecting the strategically most important nodes and links;
  - Comprising all modes of transport;
  - Equipped with innovative technology applications;
  - Determined by a special methodology mixing a geographical and traffic demand driven approaches: it is composed of nodes and links between nodes, replacing TEN-T PP's of 2004;
  - It is to be implemented by 2030.

The Core Network is composed of a total of 9 multimodal corridors (See Figure 13):
- Baltic-Adriatic (Dark Blue);
- North Sea-Baltic (Red);
- Mediterranean (Green);
- Orient/East-Med (Brown);
- Scandinavian-Mediterranean (Purple);
- Rhine-Alpine (Orange);
- Atlantic (Yellow);
- North Sea-Mediterranean (Violet);
- Rhine-Danube Corridor (Light Blue).

Figure 13 Schematic map of the Core Network Corridor

Source: TENtec

Each corridor crosses at least two borders and, could possibly involve at least three transport modes, including, where appropriate, motorways of the sea.
The following elements summarise the new TEN-T Policy based on the identification of the Core Network Corridors and the lessons learned from previous policies:

- To cover the most important long-distance flows in the core network and are intended, in particular, to improve cross-border links within the Union;
- To enable and optimise modal integration and multimodal operation for passengers & freight (with particular focus on nodes), including all TEN-T transport modes (railway, inland waterways and maritime, road and air) and the relevant traffic management systems (particularly ERTMS and RIS);
- To improve coordination of implementation; the governance structure of the core network corridors is based on the identification of 11 European Coordinators (1 per Corridor, + MoS, ERTMS). Corridor Forum have been identified as 'Corridor platforms' for each TEN-T corridor, bringing together stakeholders to co-ordinate work and prevent technical divergence;
- To enhance deployment of innovative technologies (pilot applications).

Whilst the above set of policy principles and targets are set by Regulation EU 1315/2013, the geographical alignment of the nine Core Network Corridors as presented at Figure 14 below has been defined by Regulation EU 1316/2013 establishing the Connecting Europe Facility. The CEF Regulation also sets the new TEN-T infrastructure and financial policy framework for the development of TEN-T core network corridors.

The establishment of the Connecting Europe Facility, directly managed by DG MOVE and by the Innovation and Networks Executive Agency (INEA) as the successor of the Trans-European Transport Network Executive Agency (TEN-T EA) is expected to increase the effectiveness in the development of an intermodal, interoperable network under a European perspective. The overall increase in the total available budget managed by DG MOVE and INEA passing from 8-9 € billion during the period 2007-2013 to 26 € billion in 2014-2020, is expected to concentrate funding on major corridors aimed at removing bottlenecks, upgrading infrastructure and streamlining cross-border passenger and freight movement to turn Europe's existing patchwork of roads, railways, airports and canals into a 'genuinely European' unified trans-European transport network.

Notwithstanding the increase in available funds for the development of the TEN-T Core Network infrastructure, these will not be sufficient to implement all transport investments foreseen to be implemented on the core network; it is worth noting to this respect that the cost of implementing the first phase of the core network in the EU's 2014-20 budget period is estimated at 250 € billion. It is clear that the scope of the CEF is not that of ensuring funding for all transport investment that could be implemented along the corridors; it's purpose is to stimulate investment by Member States and the private sector with the primary target of completing 'difficult' cross-border connections and links which might not otherwise get built, as well as to support interoperable and intermodal operations along the corridors by deploying ERTMS and RIS technologies.

In continuity with the previous programming periods Member States and Infrastructure Managers, as well as other stakeholders as possible beneficiaries of funds, additional funding instruments other than the CEF should be considered, including: the DG REGIO co-financed programmes both at the regional, national and particularly interregional level; the Marco Polo initiative supported the start-up and dissemination of intermodal and combined transport operations at the European level and the CORDIS financed studies and projects to finance research and pilot innovation projects. The involvement of the private sector is also assumed to be facilitated by a more extensive use of European Investment Bank support through loans and credit guarantees. Project bond initiatives are also foreseen to possibly be considered.

Continuity with respect to funding policy targets within a more coordinated and systematic approach to the development of the European TEN-T core network corridors is confirmed by Art. 50 of Regulation 1315/2013 stating that stakeholders may, within the scope of their competence, also use, in addition to the Connecting Europe Facility and the Cohesion Fund, other specific European programmes, in particular those supporting regional development, 'European Territorial Cooperation', 'Research and Innovation' or 'Environment and Climate action'.

Annex 1 to CEF Regulation EU 1316/2013 includes the following list of pre-identified sections and projects. In addition to the projects for the BA Corridor, the table below also includes those initiatives that the CEF Regulation assigns to the alignment of other Core Network Corridors, but which are partially or totally corresponding to the links and nodes of the BA Corridor.

Table 8 List of pre-identified sections and projects from CEF Regulation EU 1316/2013

TEN-T Network Links/Nodes	Mode	Pre-identified Projects
Baltic-Adriatic Corridor		
Gdynia – Katowice	Rail	Works
Gdynia, Gdańsk	Ports	Port interconnections, (further) development of multimodal platforms
Warszawa – Katowice	Rail	Works
Wrocław – Poznań – Szczecin/Świnoujście	Rail	Works
Świnoujście, Szczecin	Port	Port interconnections
Bielsko Biała – Žilina	Road	Works
Katowice - Ostrava - Brno - Wien & Katowice - Žilina - Bratislava – Wien	Rail	Works, in particular cross-border sections PL-CZ, CZ-AT, PL-SK and SK-AT, Brno-Přerov line; (further) development of multimodal platforms and airport-rail interconnections
Wien - Graz - Klagenfurt - Udine - Venezia – Ravenna	Rail	Partial construction of new lines (Semmering Base Tunnel and Koralm Railway line), rail upgrading; works on-going; (further) development of multimodal platforms; upgrading of existing two-track line between Udine - Cervignano and Trieste
Graz - Maribor – Pragersko		Studies and works for second track
Trieste, Venezia, Ravenna, Koper	Ports	Port interconnections; (further) development of multimodal platforms
Mediterranean Corridor		
Brescia - Venezia – Trieste	Rail	Works to start before 2014 on several sections in synergy with upgrading actions undertaken in overlapping stretches as in the BA Corridor
Cremona, Mantova, Venezia, Ravenna, Trieste	Inland Ports	Port interconnections, (further) development of multimodal platforms
Trieste – Divača	Rail	Studies and partial upgrading on-going; cross-border section to be realised until after 2020
Koper - Divača - Ljubljana – Pragersko	Rail	Studies and upgrading/partially, new line
Ljubljana node	Rail	Rail node Ljubljana, including multi-modal platform; rail airport interconnection
Orient – East-Mediterranean Corridor		
Section Brno - Břeclav of the Praha - Brno – Břeclav	Rail	Upgrading, including rail node Brno and multi-modal platform
Rhine Danube Corridor		
Ostrava/Přerov – Žilina – Košice – UA	Rail	Upgrading, multimodal platforms

TEN-T Network Links/Nodes	Mode	Pre-identified Projects
border		
Scandinavian – Mediterranean Corridor		
Bologna – Ancona	Rail	Upgrading
Other		
Brno – AT border	Cross-border	Road Upgrading
UA Border – Kraków – Katowice – Wrocław – Dresden	Other core network	Rail Works
Horizontal		
Innovative management & services	Horizontal	Single European Sky – SESAR system
Innovative management & services	Horizontal	Telematics applications systems for road, rail, inland waterways and vessels (ITS, ERTMS, RIS and VTMIS)
Innovative management & services	Horizontal	Core network ports, motorways of the sea (MoS) and airports, safe and secure infrastructure
New technologies and innovation	Horizontal	New technologies and innovation in accordance with points (a) to (d) of Article 33 of Regulation (EU) No 1315/2013

Source: ANNEX I Reg. EU 1316/2013

Alignment of the BA Corridor

The BA Corridor connects the Baltic ports in Poland with the ports of the Adriatic Sea in Italy and Slovenia. Annex 1 to Regulation EU 1316/2013 provides the following definition of the alignment of the BA Core Network Corridor:

- Gdynia – Gdańsk – Katowice/Sławków;
- Gdańsk – Warszawa – Katowice;
- Katowice – Ostrava – Brno – Wien;
- Szczecin/Świnoujście – Poznań – Wrocław – Ostrava;
- Katowice – Žilina – Bratislava – Wien;
- Wien – Graz – Villach – Udine – Trieste;
- Udine – Venezia – Padova – Bologna – Ravenna;
- Graz – Maribor – Ljubljana – Koper/Trieste.

The backbone of the BA Corridor is the existing TEN-T core rail and road infrastructure linking the urban and transport nodes. Motorways of the Sea are the Northern and Southern extension of the corridor, widening its dimension to the Baltic and Mediterranean basins. Inland waterways are not an internal component of the BA Corridor, although interconnections with this mode are provided at the inland ports.

The nodes of the BA Corridor

From a structural standpoint, the BA Corridor is defined by the two components of a transport or logistic infrastructure network: nodes and links. In line with the definitions of Regulation 1315/2013, the corridor nodes can be grouped into the following categories:

- Urban nodes, including their ports and airports;
- Passenger and freight airports;
- Maritime ports and inland waterways ports;
- Rail-road terminals.

The urban nodes are main nodes for passenger and freight traffic and include the capital city of each EU Member State and cities with EU capital function; in addition, other urban areas have been classified as TEN-T urban nodes based on socio-economic criteria (such as the "Metropolitan European Growth Area" in the ESPON9

Atlas 2006, all the conurbation or city clusters which exceed 1 million inhabitants and all the main cities of an island or a of group of islands forming a NUTS 1 region with at least 1 million inhabitants).

Table 9 Urban Nodes along the BA Corridor

Member State	Urban Nodes in the BA Corridor
Poland (PL)	Gdańsk, Warszawa, Łódź, Katowice, Szczecin, Poznań, Wrocław
Czech Republic (CZ)	Ostrava
Slovakia (SK)	Bratislava
Austria (AT)	Wien
Italy (IT)	Bologna, Venezia
Slovenia (SI)	Ljubljana

Source: Annex II of the Regulation EU 1315/2013

Figure 14 Alignment of the BA Core Network Corridor

Source: BA Corridor study consortium

In the framework of the new TEN-T approach, urban nodes play an important role within the multimodal Core Network, with regard to their infrastructure both for passengers and for freight. Urban nodes are particularly relevant in the following respect:

- They connect network links – both of the core and the comprehensive networks;
- They interconnect transport modes, thus enhancing multimodality;
- They connect long distance and/or international with regional and local transport (passengers and freight).

The list of nodes of the BA Corridor includes also the hubs of the transport and logistic infrastructure: airports, maritime ports, inland ports and rail-road terminals of the TEN-T Core network.

Table 10 Transport Nodes in the BA Corridor: airports, ports and rail-road terminals

MS	Node Name	Airport	Maritime Port	Inland Port	Rail-Road Terminal
PL	Gdynia, Gdańsk	Core (Gdańsk)	Core (Gdynia) Core (Gdańsk)		Core
PL	Warszawa	Core			Core
PL	Łódź	Core			Core (Łódź / Stryków)
PL	Katowice	Core (Pyrzowice)			Core (Sławków) Compr. (Gliwice / Pyrzowice)
PL	Szczecin, Świnoujście	Core (Szczecin)	Core (Szczecin) Core (Świnoujście)	Core (Szczecin) Core (Świnoujście)	Core (Szczecin) Core (Świnoujście)
PL	Poznań	Core			Core
PL	Wrocław	Core			Core
CZ	Ostrava	Core			Core
CZ	Přerov				Core
SK	Bratislava	Core		Core	Core
SK	Žilina				Core
AT	Wien	Core (Schwechat)		Core	Core
AT	Graz	Compr.			Core (Werndorf)
IT	Trieste	Compr.	Core	Core	
IT	Cervignano				Core
IT	Venezia	Core	Core	Core	
IT	Padova				Core
IT	Bologna	Core			Core
IT	Ravenna		Core	Core	
SI	Ljubljana	Core			Core
SI	Koper		Core		

Source: Annex II of the Regulation EU 1315/2013

The links of the BA Corridor

The second component of the BA Corridor is the multi-modal transport infrastructure links providing interconnections between the corridor nodes which are adequate for the long distance traffic. The transport links of the TEN-T core network cover the following infrastructure: inland waterways, railway and road. The land-based core network links are complemented by the Motorways of the Sea, to give due access to insular Member States and to shortcut connections to or between peninsulas.
The BA Corridor does not include any inland waterway link; however, the Corridor interconnects with the inland waterway TEN-T Core Network at Bratislava, Wien (on the Rhine Alpine Core Network Corridor) and Szczecin (Core Network Corridor section

on the Odra river, between Berlin and Szczecin, not belonging to any of the Core Network Corridors) where services are already in operation. Trieste, Venezia and Ravenna, also classified as inland ports, do not have connections at present although pilot projects have already been undertaken and are under consideration to promote the use of inland waterway transport in Italy. The backbone of the BA Corridor is therefore based on the railway and road routes described below.

The definition of the corridor alignment for rail and road infrastructure is based on Regulations EU 1315/2013 and EU 1316/2013 and the information currently encoded in the TENtec system. The corridor route within urban nodes and "last mile" accessibility to transport nodes is not encoded in the TENtec database. Given the intermodal nature of the Core Network Corridors and the multimodal definition of the nodes, for the purposes of the work plan it may be assumed that the alignment within urban nodes may either be represented by the possible existing continuation of the links in urban areas or by other existing city or urban crossing or bypassing infrastructure. A similar approach could be considered for the last mile connection to the other nodes, including ports, rail-road terminals and airports, particularly if located in urban nodes.

Cross-border sections

The table below summarizes the rail and road cross-border sections included in the BA Corridor. Two principles have been considered in the identification of the cross-border sections:

- One referring to the two relevant economic centres (using as start and end point the TENtec names: this was always possible except for the road PL-CZ road section for which we do not have Ostrava, only Belotin);
- One referring to the shortest TENtec section (this was always possible for railways, for roads we have four sections PL-CZ, CZ-AT, SK-AT and AT-SI for which we actually refer to the nearest junctions).

Table 11 Cross-border sections of the BA Corridor

Border		Railway	Road
PL	CZ	Opole (PL) – Ostrava (CZ); [Chałupki (PL) – Bohumín (CZ)]	Gliwice (Sosnica J. E040/E075) (PL) – Ostrava (CZ); [(Gorzyczki (PL) – Bohumín (CZ)]
PL	CZ	Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]	
CZ	AT	Břeclav (CZ) – Wien (Stadlau); (AT) [Břeclav (CZ) – Hohenau / Bernhardsthal (AT)]	Brno (CZ) – Wien (Schwechat) (AT); [Mikulov (CZ) – Mistelbach (AT)]
PL	SK	Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]	Katowice (PL) – Žilina (Brodno) (SK); [Zwardoń (PL) – Skalité (SK)]
SK	AT	Bratislava (SK) – Wien (Inzersdorf) (AT); [Petržalka (SK) - Kittsee (AT)]	Bratislava (Petržalka) (SK) – Wien (Schwechat) (AT); [Jarovce (SK) - Kittsee (AT)]
SK	AT	Bratislava (SK) – Wien (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]	
AT	IT	Villach (AT) – Udine (IT); [Thörl-Maglern (AT) - Tarvisio B. (IT)]	Villach (AT) – Udine (IT); [Arnoldstein (AT) – Tarvisio (IT)]
AT	SI	Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]	Graz West (AT) – Maribor Pesnica (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]
IT	SI	Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]	Trieste (IT) - Divača (SI); [Fernetti (IT) - Divača (SI)]

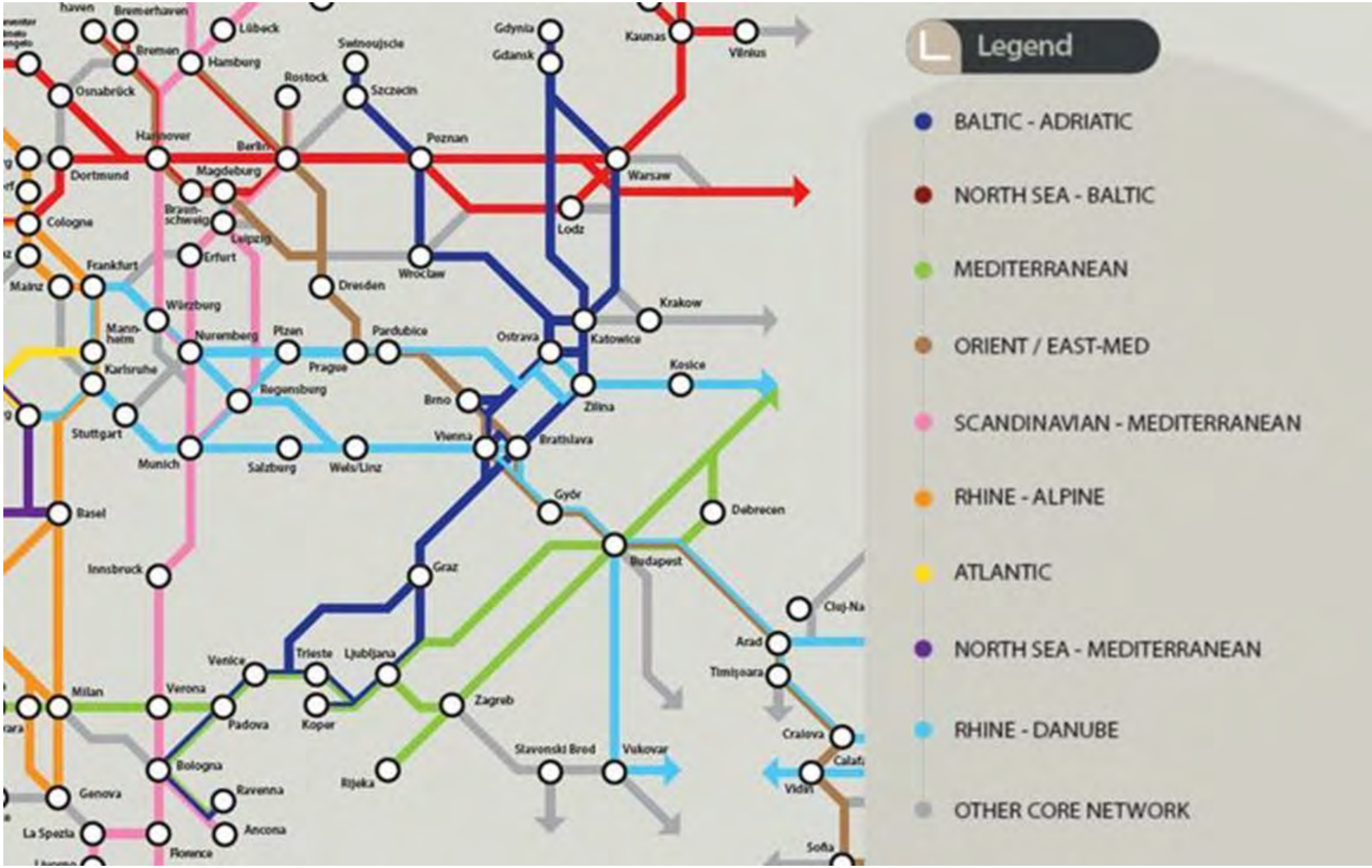
The combination of the two principles together allows for flexible interpretations of the extension of cross-border sections with reference to critical issues of infrastructural and operational nature i.e. implementing works per operational phases reflecting the existence of junctions (for instance the section Werndorf-Maribor within the longer section Graz-Maribor) or longer missing link i.e. road cross-border section Pohorelice-Schrick). This definition also takes into account the list of pre-identified projects in Annex 1 to the CEF Regulation EU 1316/2013 and is also aimed at facilitating the identification of functional units of analysis for demand and CBA studies to be provided in support of future applications.

Connections with other corridors

The alignment of the BA Corridor intersects directly with five other core network corridors and with other core links that compose the TEN-T core network:

- The ***North Sea – Baltic Corridor*** interconnects with the BA Corridor in Poland; Warszawa, Poznań and Łódź urban nodes and their airport and rail road terminals are common to both corridors; the following sections of the alignments are common to the two corridors: railway network: section Warszawa – Mszczonów / Szeligi and road network: section Warszawa - Stryków;
- The ***Rhine – Danube Corridor*** overlaps with the BA Corridor in the Czech Republic between Ostrava/Přerov and Žilina as well as in Austria and Slovakia between Wien and Bratislava; The Ostrava, Bratislava and Wien urban nodes and their airports, and rail-road terminals are common to the two corridors as well as the Přerov and Žilina rail road terminals and the Bratislava and Wien Inland Ports;
- The ***Orient – East-Mediterranean Corridor*** interconnects with the BA Corridor in the Czech Republic overlapping section Brno – Břeclav, and between the Czech Republic and Austria as well as Slovakia and Austria, overlapping railway sections Břeclav – Wien and Wien Bratislava; The Bratislava and Wien urban nodes and their airports, inland ports and rail road terminals are common to both corridors;
- The ***Mediterranean Corridor*** overlaps with the BA Corridor for most of its stretch within Italy (from Ravenna to Trieste) and Slovenia (from Koper to Ljubljana - Pragersko) as well as between Italy and Slovenia, overlapping cross-border section Trieste- Divača; The Venezia, Bologna and Ljubljana urban nodes and airports, as well as the Trieste, Venezia, Ravenna and Koper ports, and the Bologna, Ljubljana, Padova and Cervignano rail-road terminals, are common to both corridors;
- The ***Scandinavian – Mediterranean Corridor*** interconnects with the BA Corridor in Italy, overlapping sections between Bologna and Faenza and Bologna urban node, airport and rail-road terminal;
- ***Other interconnections*** with the TEN-T core network not belonging to any of the 9 core network corridors are in Poland (Szczecin, interconnected to Berlin by Inland Waterway along the Odra river: section Widuchowa – Oder River estuary); Wrocław and Katowice, located on the alignment Dresden – Wrocław – Kraków – Katowice – UA Border; as well as Łódź, Warszawa on the alignment Germany – Poznan – Łódź/Warszawa – BY Border) and Italy (interconnecting Bologna with Milan and from here to the Rhine Alpine Corridor).

Figure 15 Connections with other corridors



Source: TENtec

4.2.2 Railway infrastructure

This section provides the analysis of the characteristics of the BA Corridor railway infrastructure and its compliance to the requirements of the TEN-T Regulation EU 1315/2013, also addressing deployment of ERTMS.

A more detailed description of the BA Corridor alignment and of the railway infrastructure belonging to the corridor, including cross-border sections, is provided respectively in Appendices C and D below.

Overview of the rail infrastructure

The following figure illustrates the layout of the alignment of the BA Corridor with reference to the railway infrastructure.

Figure 16 Railway BA corridor network

Source: BA Corridor study consortium elaboration based on TENtec data and sections

With the only exception of the two sections in Austria (Koralmbahn line section Wettmannstätten-Grafenstein within the wider section Graz – Klagenfurt and Semmering Base Tunnel Gloggnitz - Mürzzuschlag), the 4,200 km long BA Corridor railway infrastructure is already continuous and in operation.

The BA Corridor is entirely double track except in the following sections:

- Passenger railway corridor sections:
  - Zwardoń- Żywiec (PL-SK cross-border section);
  - Přerov-Holubice (CZ);
  - Zwardoń- Čadca (SK-PL cross-border section);
  - Marchegg-Devínska Nová Ves (SK-AT cross-border section);
  - Wien Stadlau-Marchegg (AT);
  - Wien Inzersdorf- Wampersdorf (AT);
  - Sentilj-Werndorf (AT-SI cross-border section);
  - Palmanova and Cervignano on the Udine-Cervignano (IT);
  - Sentilj-Maribor (SI-AT cross-border section);
  - Divača-Koper (SI);
- Freight railway corridor sections:
  - Wrocław Brochów - Jelcz Miłoszyce (PL);
  - Parndolf-Petržalka (AT);
  - Gramatneusiedl-Wampersdorf (AT);
  - Kledering-Wien Freudenau Hafen (AT);
  - Castel Bolognese-Ravenna (IT);
  - Faenza-Ravenna (IT);

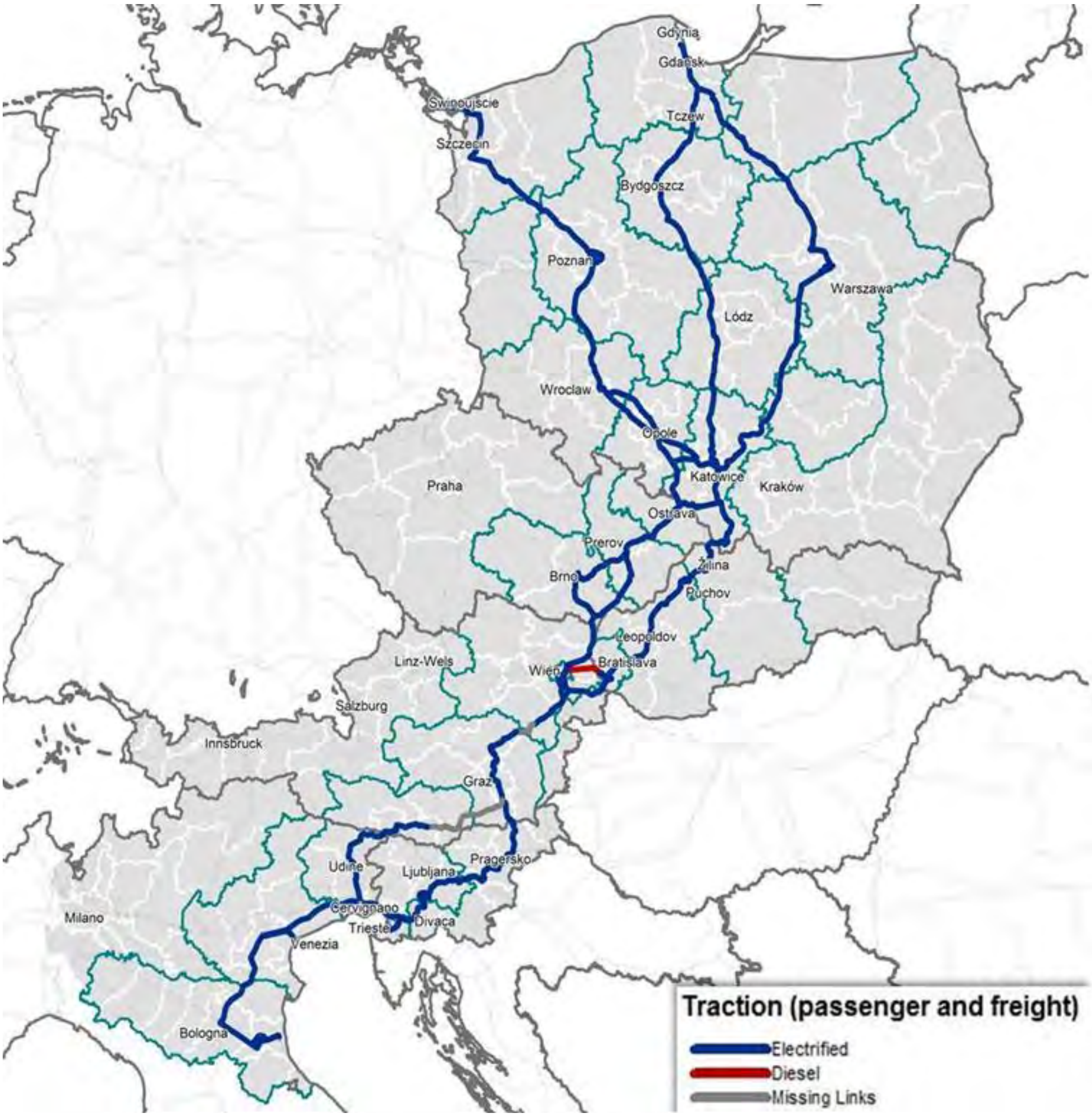
Compliance of rail infrastructure with the TEN-T Regulation

The following paragraphs provide an analysis of the compliance of BA Corridor railway infrastructure to the TEN-T Regulation EU 1315/2013 with reference to the requirements set out in article 39. The analysis primarily focusses on the rail lines illustrated in Annex I to the EU Regulation 1315/2013 and do not include stations and junctions infrastructure and last mile connections to nodes, the latter are described in more detail at Sections 4.2.3 to 4.2.6 below.

Table 12 TEN-T Requirements set by REG EU 1315/2013 for railways

Requirement	Comprehensive Network	Core Network
Electrification: ***Core network to be electrified by 2030 (including sidings where necessary)***	**Art. 12 (2).** Member States shall ensure that the railway infrastructure: [...]; (d) save in the case of isolated networks, is fully electrified as regards line tracks and, to the extent necessary for electric train operations, as regards sidings.	**Art. 39 (2a)**. Full electrification of the line tracks and, as far as necessary for electric train operations, sidings.
Track gauge: ***New lines to be built in UIC standard gauge (1435mm), except in certain circumstances***	**Art. 13**. In the promotion of projects of common interest related to railway infrastructure, and in addition to the general priorities set out in Article 10, priority shall be given to the following: [...]; (b) migrating to 1 435 mm nominal track gauge;	**Art. 39 (2a)**. Nominal track gauge for new railway lines: 1 435 mm except in cases where the new line is an extension on a network the track gauge of which is different and detached from the main rail lines in the Union.
Line speed: ***Core freight lines 100 km/h by 2030 (no speed requirement are set for passenger lines)***		**Art. 39 (2a)**. Freight lines of the core network as indicated in Annex I: at least [...] 100 km/h line speed [...]
Axle load: ***Core freight lines 22.5 t axle load by 2030***		**Art. 39 (2a)**. Freight lines of the core network as indicated in Annex I: at least 22.5 t axle load [...]
Train length: ***Core freight lines to allow for 740m trains by 2030***		**Art. 39 (2a)**. Freight lines of the core network as indicated in Annex I: [...] possibility of running trains with a length of 740 m
ERTMS / signalling system: ***Core network to be equipped with ERTMS by 2030***	**Art. 12 (2a)**. Member States shall ensure that the railway infrastructure, save in the case of isolated networks, is equipped with ERTMS.	**Art. 39 (2)**. Full deployment of ERTMS.

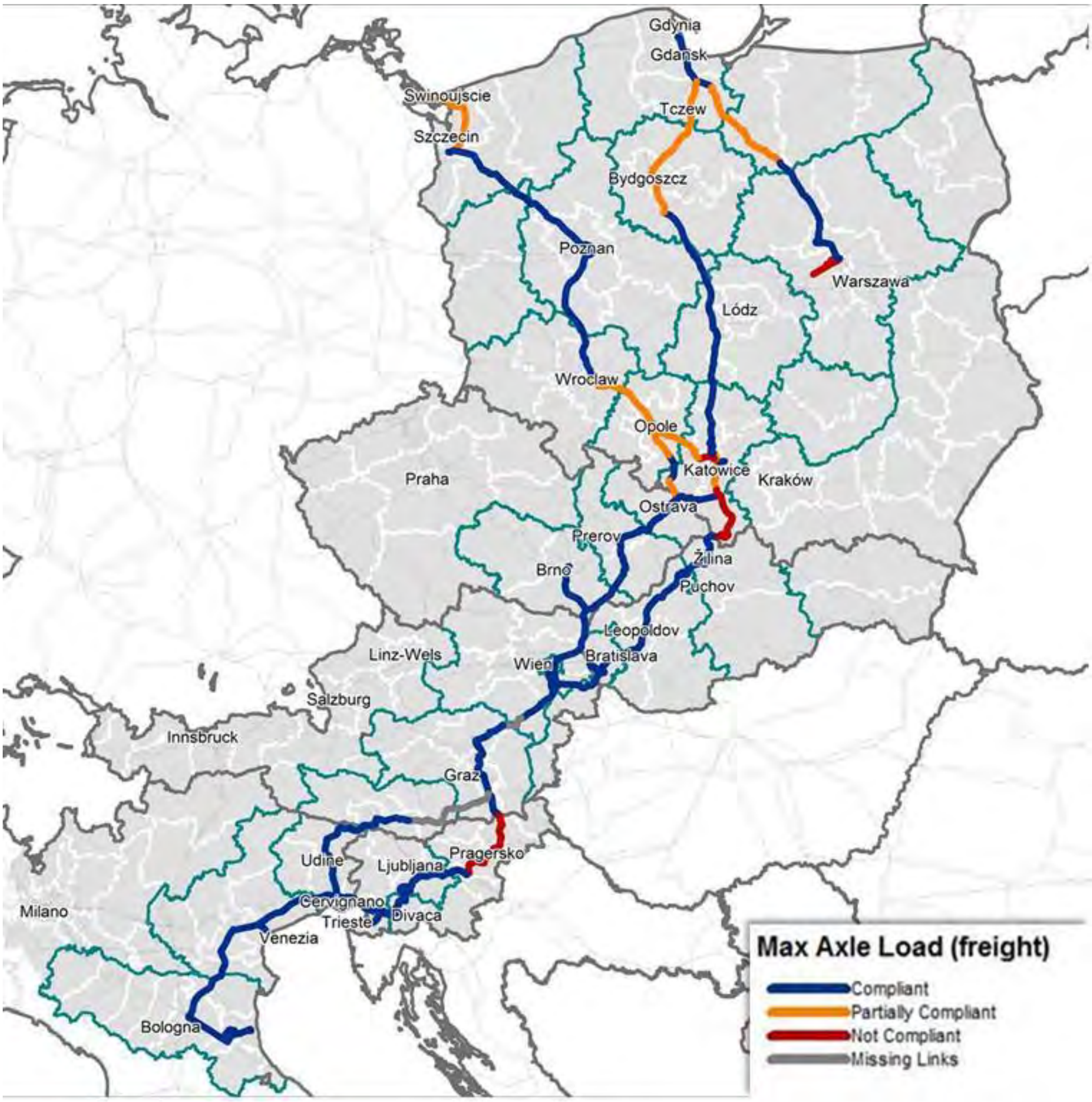
Figure 17 Rail traction compliance map



Source: BA Corridor study consortium elaboration based on TENtec data and sections

As regards electrification, with reference to passenger, freight and mixed use lines, the railway infrastructure along the Corridor is almost entirely electrified with the exception of diesel passengers sections at the cross-border between Slovakia and Austria on the Bratislava-Wien railway line. Different power systems are however 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) which constitutes an obstacle for interoperability on the Corridor only partially mitigated by the use of multisystem locomotives.

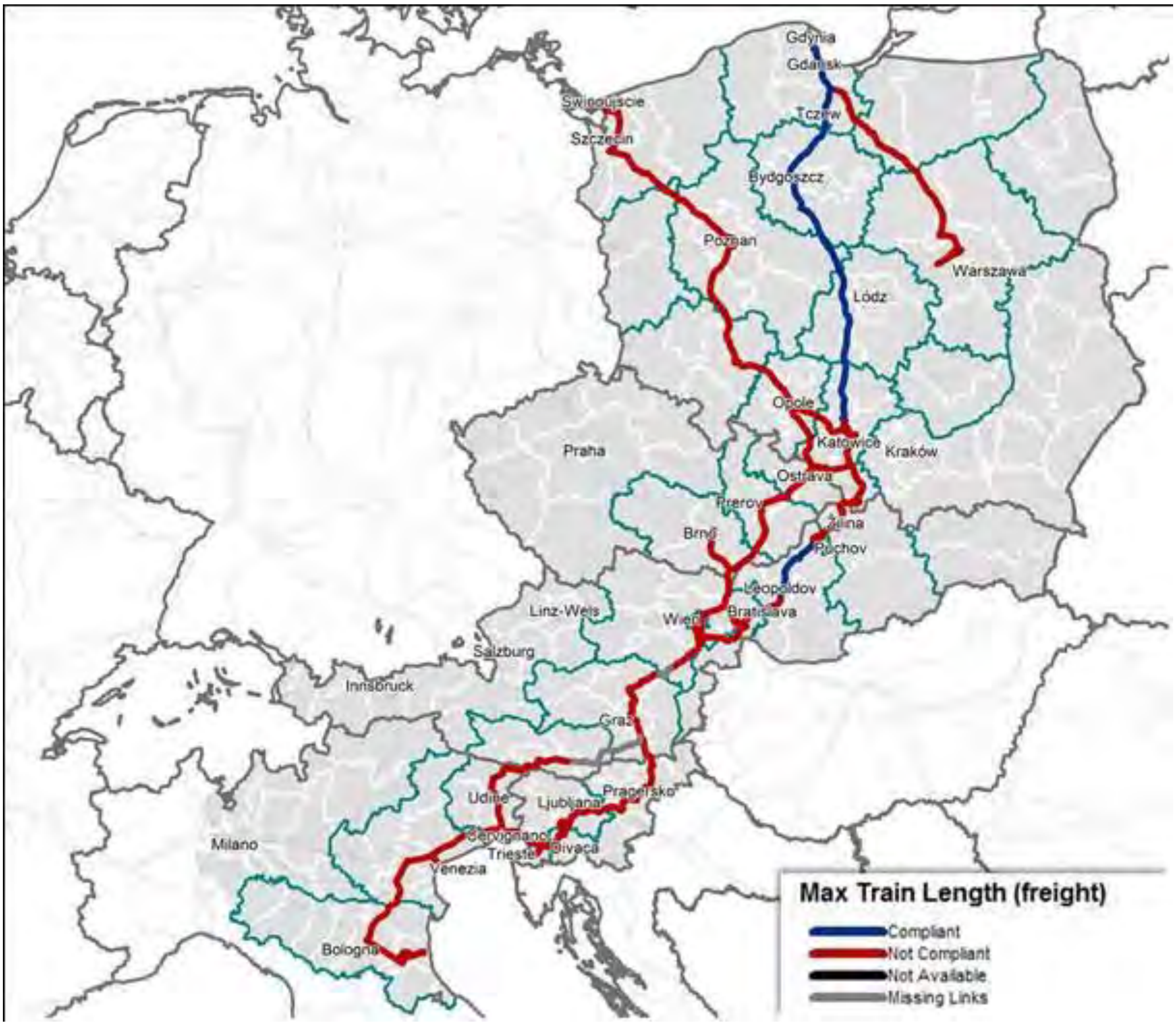
Figure 18 Maximum axle load compliance map



Source: BA Corridor study consortium elaboration based on TENtec data and sections; Note: the map represents the maximum axle load on the encoded TENtec sections excluding urban nodes; sections presenting a mix of compliant and non-compliant subsections have been generally marked with orange. Sections entirely compliant or non-compliant as well as sections almost compliant or non-compliant have instead been marked with blue and red respectively; the presence of limited non-compliant sub-sections within almost compliant sections is described in the text in the following paragraphs

With respect to the axle load, the Corridor is mostly compliant with the Regulation (22.5 t). There are however some corridor sections (11% of the total corridor railway infrastructure) that do not comply with this standard yet, especially in Poland (including several sections on the lines: Katowice – Czechowice Dziedzice – Zwardoń, Wrocław – Jelcz – Opole; Kędzierzyn Koźle – Chałupki and Kędzierzyn Koźle – Gliwice – Chorzów; Warszawa Wschodnia – Warszawa Zachodnia – Grodzisk Mazowiecki); and Slovenia (several sections between Zidani Most – Šentilj) and the Czech Republic (railway line between Brno – Přerov).

Figure 19 Maximum train length compliance map



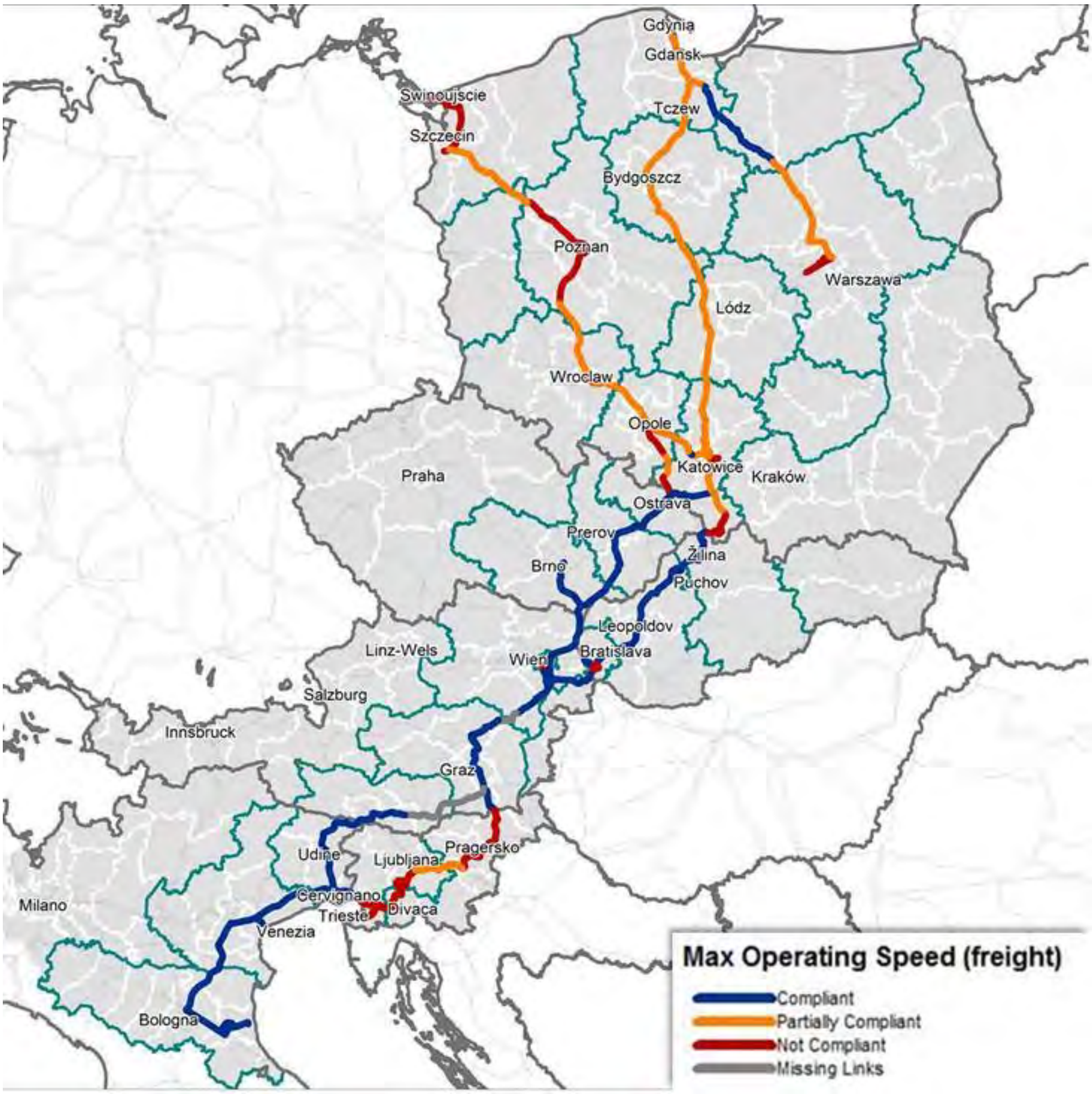
Source: BA Corridor study consortium elaboration based on TENtec data and sections

When it comes to the maximum permitted length of trains, this is on most sections of the BA Corridor shorter than the 740 m required by Regulation EU 1315/2013. The prevailing maximum train length along the Corridor is around 600 m, but more severe restrictions exist on specific sections, especially on the Slovenian network.

Line speed is also not homogeneous along the BA Corridor, with relevant bottlenecks particularly affecting the Polish network which calls for infrastructure modernisation.

In greater detail, over 800 km of the Polish railway lines (about 20% of the total corridor railway infrastructure) needs to be upgraded to meet the requirement set in the Regulation EU 1315/2013 with respect to the line speed for freight trains (100 km/h).

Figure 20 Maximum operating speed compliance map



Source: BA Corridor study consortium elaboration based on TENtec data and sections; Note: the map represents the maximum operating speed on the encoded TENtec sections excluding urban nodes; sections presenting a mix of compliant and non-compliant subsections have been generally marked with orange. Sections entirely compliant or non-compliant as well as sections almost compliant or non-compliant have instead been marked with blue and red respectively; the presence of limited non-compliant sub-sections within almost compliant sections is described in the text in the following paragraphs

Based on the maps above, the following sections present issues of compliance according to the Regulation 1315/2013:

Cross-border sections

- Opole (PL) – Ostrava (CZ) of 103.5 km length is 19.36% non-compliant regarding maximum axle load and 77.9% non-compliant with respect to maximum operating speed;
- Katowice (PL) – Ostrava (CZ) of 96.5 km length is 32.5% non-compliant in relation to maximum axle load and 8.7% non-compliant with regard to maximum operating speed;

- Katowice (PL) – Žilina (SK) of 164.1 km length is 62.35% non-compliant for maximum axle load and 46.44% non-compliant regarding maximum operating speed;
- Bratislava (SK) – Wien (AT) of 91.2 km length is 18.64% non-compliant regarding maximum operating speed;
- Graz (AT) – Maribor (SI) of 84.4 km length is 100% non-compliant regarding both maximum axle load and maximum operating speed in Slovenia, therefore for the 41.7% of the entire section;
- Trieste (IT) – Divača (SI) of 40 km length is 100% non-compliant with regard to the maximum axle load.

The cross-border section Brno (CZ) – Wien (AT) of 171.1 km length is fully compliant with regard to maximum axle load and maximum operating speed.

With reference to the national sections, the results of our analysis are as follows:

Poland

- *Line E 30 Opole – Katowice* section of 94 km length is 24% non-compliant in what concerns maximum axle load (which affects however the operation of the trains on the entire section) and 44% of the link is non-compliant regarding maximum operating speed. In greater detail, the issues of compliance are related to the following sections:
  - Kędzierzyn Koźle - Opole Zachodnie;
  - Chorzów Batory - Gliwice Łabędy;
- *Line E 59 Świnoujście – Poznań (including the by-pass section Poznań Górczyn - Poznań Starołęka - Poznań Franowo - Swarzędz/Zieliniec - Kiekrz) – Wrocław – Opole* of 598 km length is 15% non-compliant regarding maximum axle load (which affects however the operation of the trains on the entire section) and 74% of the link is non-compliant with respect to maximum operating speed;
- *Line C-E 65 Gdynia – Bydgoszcz – Katowice* of 520 km length is almost fully compliant with regard to maximum axle load (only 1.3% of the entire section is non-compliant, which affects however the operation of the trains on the entire section) whereas 32% of the link is non-compliant concerning maximum operating speed;
- *Line E 65 Gdynia – Warszawa* of 346 km length is 15% non-compliant in what concerns maximum axle load (which also affects the operation of the trains on the entire section); 3% of the link is non-compliant with respect to maximum operating speed (this section is already under modernisation);
- *Node of Warszawa*, section *Warszawa Wschodnia - Warszawa Zachodnia* (Line E65) of 7 km length 100% non-compliant both regarding maximum axle load and maximum operating speed;

Czech Republic

The freight railway network in the Czech Republic is entirely compliant. It is in any case worth adding that the passenger section Přerov – Brno (83.2 km in total) is 37% non-compliant with regard to the maximum axle load parameter and around 10% non-compliant with respect to maximum operating speed.

Slovakia

Except for the cross-border sections there are no major issues of compliance affecting the railway network in Slovakia.

Austria

Only the section Wien Meidling – Wien Inzersdorf is classed as non-compliant; however, since it stretches for 6.2 km, this is considered not critical at the corridor scale.

Italy
The freight railway network in Italy is overall compliant except for the Ronchi dei Legionari Sud - S. Polo Junction section of a 2.2km length between Trieste and Cervignano.

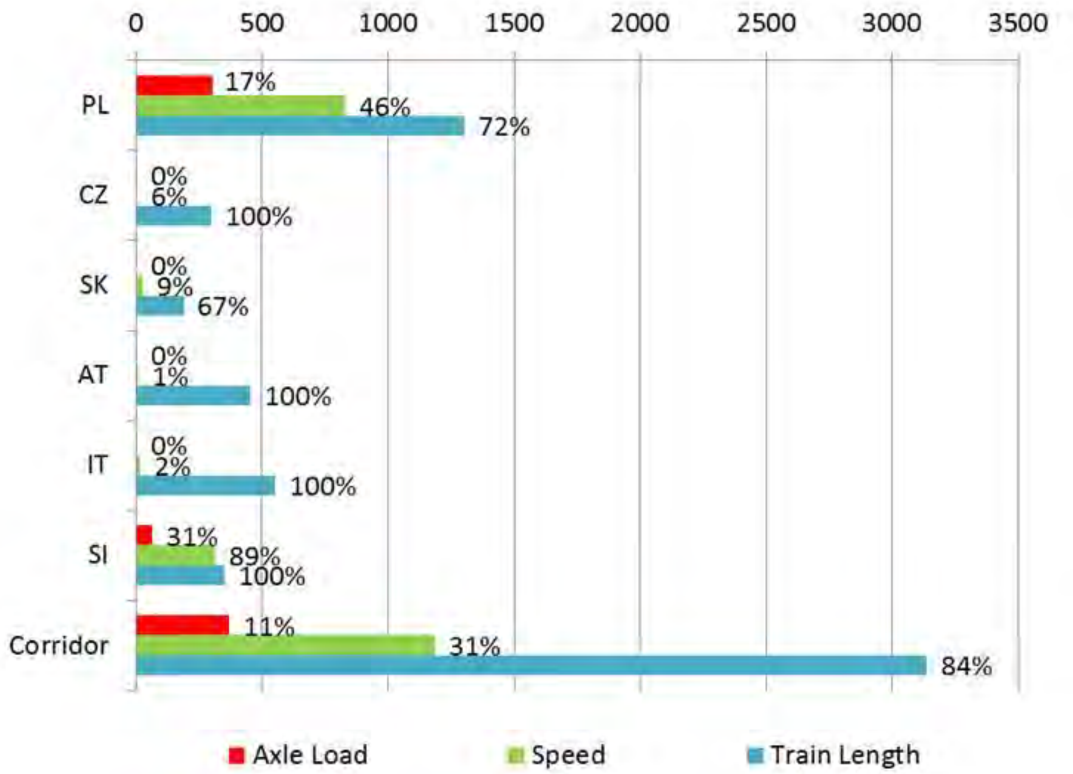
Slovenia
The freight railway network in Slovenia presents several issues of compliance with Regulation EU 1315/2013, particularly regarding the maximum operating speed:

- 72% of the Ljubljana – Pragersko section of 137.1 km length fails to meet the maximum operating speed standard and is 20% non-compliant in relation to maximum axle load (sub-section Zidani Most-Celje of 28 km length);
- The Ljubljana – Divača section of 103 km length is fully compliant with regard to maximum axle load, whereas it is 100% non-compliant with respect to maximum operating speed;
- The Divača – Koper section of 48 km length is 100% non-compliant in relation to maximum operating speed; it is fully compliant concerning maximum axle load.

As a general comment, the overall BA freight network corridor is almost all not-compliant with regard to the maximum train length standard except for the following sections:

- Gdynia Port – Tczew – Tarnowskie Gory in Poland of 517.9 km length;
- Puchov – Leopoldov in Slovakia of 94.5 km length.

Figure 21 Extension of the non-compliant rail freight infrastructure in km and % of the total length



Source: BA Corridor study consortium elaboration based on TENtec

The figure above summarises the outline in percentage terms (over the national sections of the corridor) and absolute km values of the non-compliant infrastructure with reference to the main compliance parameters related to the BA rail freight corridor represented in the maps above.

In addition to axle load, speed and train length compliance, which are particularly relevant for freight transport, ERTMS deployment is also a relevant policy target set by the EU Regulation 1315/2013. Despite the installation of ETCS Level 1 on certain lines or GSM-R already available on most of the corridor sections, ERTMS (ETCS + GSM-R) technology is not deployed on the BA Corridor at the time this report is delivered. Overall ERTMS is not expected to be operational by end of 2014 on any of the corridor railway sections, its gradual deployment starting in any case from 2015 on:

- In Poland, ERMTS technology is expected to be deployed by 2030. Railway line E65, section Grodzisk Mazowiecki – Zawiercie, is already equipped with ETCS Level 1, which is expected to be operational in December 2014, although GSM-R is not installed on the line;
- In the Czech Republic, the ETCS Level 2 is envisaged to be deployed by 2017 with the exception of the Přerov – Brno railway line on which instalment is expected to be completed by 2024;
- In Slovakia, ETCS Level 1 is already available on the section Bratislava – Zlatovce; ETCS Level 1 technology is expected to be installed on the section Zlatovce – Žilina by 2015 up to Púchov and by 2018 up to Žilina. ETCS Level 2 technology will be implemented on the Žilina – Čadca railway line by 2016. Deployment of ETCS at the Bratislava junction is planned for 2019. There are no defined plans for the deployment of ERTMS in the cross-border section Čadca – Skalité at present;
- In Austria, the deployment of ERTMS is on-going. The sub-section connecting Bernhardsthal to Wien’s main station will feature ETCS Level 2 by end of 2014. According to investment plans of ŐBB Infra, other sections of the BA Corridor, Pottendorf/Wien – Wampersdorf (106) and Graz – Klagenfurt (401 Koralm railway line), will be ETCS Level 2 compliant in 2023 and the section comprising the Semmering tunnel will be ready by 2024;
- The rail infrastructure on the BA Corridor in Italy is equipped with national control and command systems, which in most cases was upgraded to national digital system (SCMT) that uses the same infrastructure digital equipment of ETCS (Eurobalise). Planned investments on the Italian rail network include the upgrade of existing lines equipped with national signalling system to ETCS Level 1 or Level 2, as appropriate;
- With the exception of railway line Pragersko-Maribor-Šentilj, ETCS Level 1 is currently under implementation on the Slovenian sections of the BA Corridor, with expected completion date by end of 2015. The time-schedule for the implementation of the ERTMS technology on the Pragersko-Maribor-Šentilj section is to be confirmed.

An additional rail interoperability issue on the BA Corridor other than the ones described above relates to the loading gauge; most of the corridor already complies or exceeds the combined classes 70/400 or 78/402. This issue is however not analysed in detail, as no requirements are set in Regulation EU 1315/2013, this parameter being relevant especially for the RFC 5.

Issues at railway stations and junctions

Although the analysis of the compliance of the railway infrastructure with EU regulation 1315/2013 has been primarily undertaken with reference to the railway lines of the corridor, as part of our study an assessment of the status and conditions of the stations and junctions has been also undertaken to identify critical issues at nodes. This was based on the review of existing studies, discussions with the stakeholders and professional knowledge of the infrastructure and projects.

In conjunction with the upgrading programme of the railway network in Poland, stations and junctions are being gradually modernised and upgraded, however modernisation works are still deemed necessary to improve the performance of the entire network at nodes. In the Czech Republic capacity and speed limitations exist at junctions Ostrava, Brno and Břeclav, the latter are expected to be fully modernised by 2015. In Slovakia the Žilina (60 km/h) and Bratislava (40 km/h) junctions require modernisation works. In Austria, the new Wien Haupbahnhof, which already opened to traffic in 2014, is under construction and is expected to be in fully operation by 2015. In Italy the junction of Udine is affected by existing constraints on the access point to the Northern part of the city and partly on the belt-line which is still single track. In Slovenia, the capacity of the current train station in Ljubljana is rather limited, therefore possibilities for rerouting cargo traffic out of the station are under consideration.

4.2.3 Road infrastructure

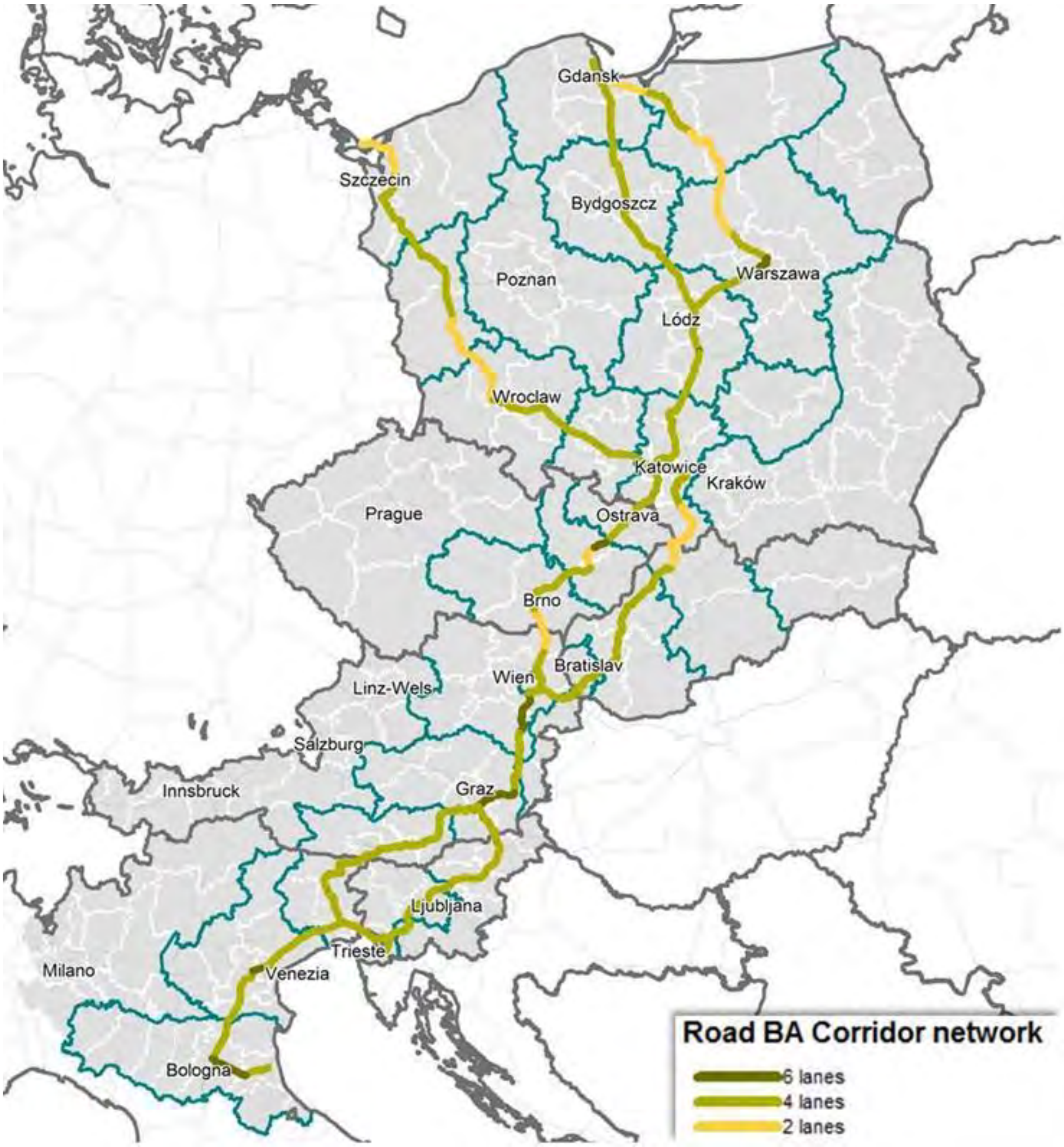
This section provides the analysis of the characteristics of the BA Corridor road infrastructure and its compliance to the requirements of the TEN-T Regulation EU 1315/2013.

Overview of the road infrastructure

The figure overleaf illustrates the layout of the alignment of the BA Corridor with reference to the road infrastructure.

The total length of the BA Corridor road infrastructure is 3,600 km. The BA Corridor consists of a four to six lane road infrastructure except for sections Ostroda - Elbląg (J. 7/504), Ostroda-Plonsk (J. 10/7), Świnoujście-Goleniow, Legnica-Sulechow and Gdańsk-Elblag (J. 7/504) in Poland; sections Žilina-Skalité in Slovakia and Lipnik-Kromeriz in the Czech Republic; and cross-border sections between Poland and Slovakia, and between the Czech Republic and Austria.

Figure 22 Road BA corridor network



Source: BA Corridor study consortium elaboration based on TENtec data and sections

Compliance of road infrastructure with the TEN-T Regulation

The following paragraphs provide an analysis of the compliance of the BA Corridor road infrastructure with the standards set out in article 39 of Regulation EU 1315/2013.

A more detailed description of the BA Corridor alignment and of the road infrastructure belonging to the corridor, including cross-border sections, is provided respectively in Appendices C and D below.

Table 13 TEN-T Requirements set by REG EU 1315/2013 for roads

Requirement	Comprehensive Network	Core Network
Road Type: *Roads have to be either an express road or a motorway by 2030*	**Art. 17(3).** High-quality roads shall be specially designed and built for motor traffic, and shall be either motorways, express roads or conventional strategic roads: (a) A motorway is a road specially designed and built for motor traffic, which does not serve properties bordering on it and which: (i) is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic *[…]*; (ii) does not cross at grade with any road, railway or tramway track, bicycle path or footpath; and (iii) is specially sign-posted as a motorway. (b) An express road is a road designed for motor traffic, which is accessible primarily from interchanges or controlled junctions and which: (i) prohibits stopping and parking on the running carriageway; and (ii) does not cross at grade with any railway or tramway track. (c) A conventional strategic road is a road which is not a motorway or express road	**Art. 39 (2c)**. Requirements under points (a) or (b) of Article 17(3)
Availability of Parking Areas. *Sufficient parking areas, at least every 100 km, by 2030*		**Art. 39 (2c)** The development of rest areas on motorways approximately every 100 km in line with the needs of society, of the market and of the environment, in order inter alia to provide appropriate parking space for commercial road users with an appropriate level of safety and security
Safety of Road Tunnels	**Art. 18 (c).** Road tunnels over 500 m in length comply with Directive 2004/54/EC of the European Parliament and of the Council	
Availability of alternative clean fuels. *By 2030*		**Art. 39 (2c)** Availability of alternative fuels

The map below summarises the findings from our analysis with reference to the requirements described in the above table for the Core Network. Detailed information concerning the current status of the corridor infrastructure concerning the safety of road tunnels and the availability of clean fuel was not possible to be gathered and reported systematically as part of this study.

Figure 23 Road compliance map

Source: BA Corridor study consortium elaboration based on TENtec data and sections

On the basis of our analysis the following sections present issues of compliance according to the Regulation EU 1315/2013, with reference to the road type standard (motorway or expressway):

Cross-border sections

- Katowice (PL) – Žilina (SK) of 169 km length is 72% non-compliant;
- Brno (CZ) – Wien (AT) of 102 km length is 54% non-compliant.

The cross-border sections Katowice (PL) – Ostrava (CZ), Bratislava (SK) – Wien (AT), Graz (AT) – Maribor (SI) and Trieste (IT) – Divača (SI) are fully compliant. However cross-border between Villa Opicina and Sežana requires works for the removal of customs and policy check points buildings, still present on the road.

Regarding national sections, the following considerations apply:

Poland

- *S3 Świnoujście – Szczecin – Legnica* section of 408 km length is 52% non-compliant;
- *S7/S8: Gdańsk – Warszawa* section of 331 km length is 60% non-compliant;
- *A1 Gdańsk – Łódź – Katowice* section of 518 km length is 10% non-compliant;

Czech Republic

- *D1 Ostrava – Brno* of 160 km length is 18% non-compliant; particularly *Lipnikv – Přerov – Kromeriz* sub-section (30 km) presents a 100% non-compliance with the regulation.

Slovakia

Except from the cross-border sections there are no major issues of compliance in the road network in Slovakia.

Austria

The road network in Austria is overall compliant, the Wien external ring-road, (S1) between Schwechat and Eibesbrunn, is under development: the first part of the section (Eibesbrunn - Süßenbrunn) is already in operation (about 15 km). The second part from Süßenbrunn to Groß-Enzersdorf (about 11 km) is still to be developed and construction works are expected to start in 2016, expected to be finished by 2018. The third part from Groß-Enzersdorf to Schwechat (about 8 km) is also to be constructed; the works for the Lobau tunnel are planned to start in 2018, expected to be finished by 2025.

Italy

The road network in Italy is overall compliant.

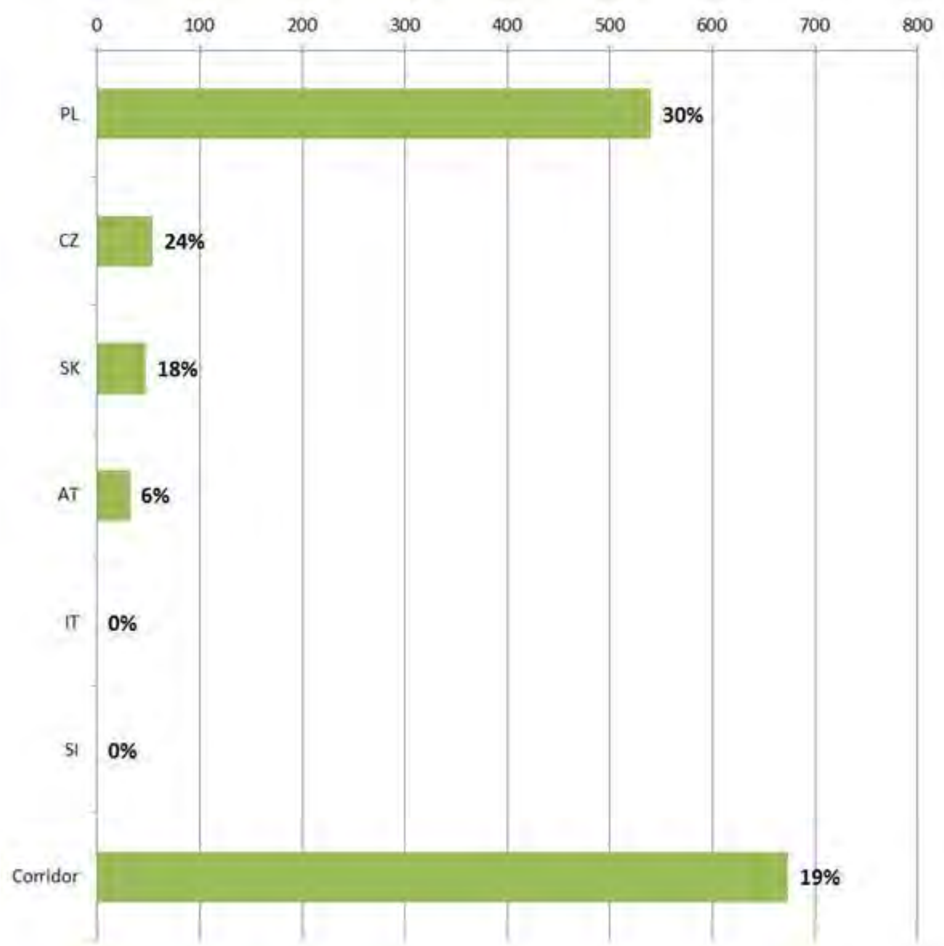
Slovenia

The road network in Slovenia is overall compliant.

The following figure provides an outline in percentage (over the total national corridor length) and absolute km values of the non-compliant infrastructure with reference to the road type parameter.

It should be noted that the corridor road infrastructure today does not fully comply with the requirements of Regulation 1315/2013 in what concerns the type of infrastructure and parking areas. The situation is particularly relevant for the Polish road network, whereas the corridor infrastructure in Italy and Slovenia is fully compliant. Currently, 19% of the road corridor infrastructure constitutes ordinary roads which do not comply with the requirements.

Figure 24 Extension of the non-compliant road infrastructure in km and % of the total length



Source: BA Corridor study consortium elaboration based on TENtec

4.2.4 Maritime and inland waterways ports

Ten core ports have been identified by Regulation 1315/2013 which belong to the BA Corridor: 5 are maritime ports also classified as inland waterway ports: Szczecin and Świnoujście in Poland, Trieste, Venezia and Ravenna in Italy; 3 are seaports: Gdynia, Gdańsk in Poland and Koper in Slovenia; and 2 are inland waterway ports also classified as seaports: Bratislava in Slovakia and Wien in Austria.

Figure 25 Core Ports of the BA Corridor

Source: BA Corridor study consortium

The table overleaf summarises the main characteristics of the core ports which are part of the BA Corridor. Additional information on the BA Corridor alignment and its transport nodes including ports, is provided respectively in Appendices C and D below.

Table 14 BA core maritime and inland waterways ports

BA Maritime and Inland Waterways Ports	Activity	Type of Port	Area (sq.m.)	Maximum draught (m)	Passenger Traffic Flow (pax per year) 2013	Freight Traffic Flow (tons per year) 2013	Connection with rail	Rail connection (no. of tracks)	Road connection (no. of lanes)	Waterway connection (CEMT class)
Gdańsk (PL)	Passenger and Freight	Maritime	6,520,000	15.00	125,897	30,259,295	Yes	3	8	I/II/III
Gdynia (PL)	Passenger and Freight	Maritime	7,550,000	13.00	589,863	17,658,700	Yes	3	4	
Świnoujście (PL)	Passenger and Freight	Maritime and Inland Waterways	860,047	13.20	474,868	14,035,000	Yes	1	2	Vb
Szczecin (PL)	Passenger and Freight	Maritime and Inland Waterways		9.15	10,020	8,715,000	Yes	4	6	III-Vb
Bratislava (SK)	Passenger and Freight	Inland Waterways	1,431,586	2.50	170,000	2,078,077	Yes	1	2	VIb
Wien (AT)	Passenger and Freight	Inland Waterways	3,500,000	2.70	362,316	*1,160,000 (2012)*	Yes	7	6	VIb
Trieste (IT)	Passenger and Freight	Maritime and Inland Waterways	2,300,000	18.00	147,718 (2012)	56,585,000	Yes	2	6	n.a.
Venezia (IT)	Passenger and Freight	Maritime and Inland Waterways	n.a.	11.50	2.072.642	24.411.377	Yes	1	2	V
Ravenna (IT)	Passenger and Freight	Maritime and Inland Waterways	2,080,000	10.50	101,819	22,486,000	Yes	3	4	n.a.
Koper (SI)	Passenger and Freight	Maritime	2,800,000	18.00	65,434	17,999,662	Yes	1	4	

Source: BA Corridor study consortium Based on TENtec

Specifically regarding compliance with the Regulation 1315/2013 of the maritime and inland waterway ports, the following targets are set:

- Connection to rail network, inland waterways and road network: core ports are to be connected to rail by 2030;
- Availability of alternative clean fuels by 2030.

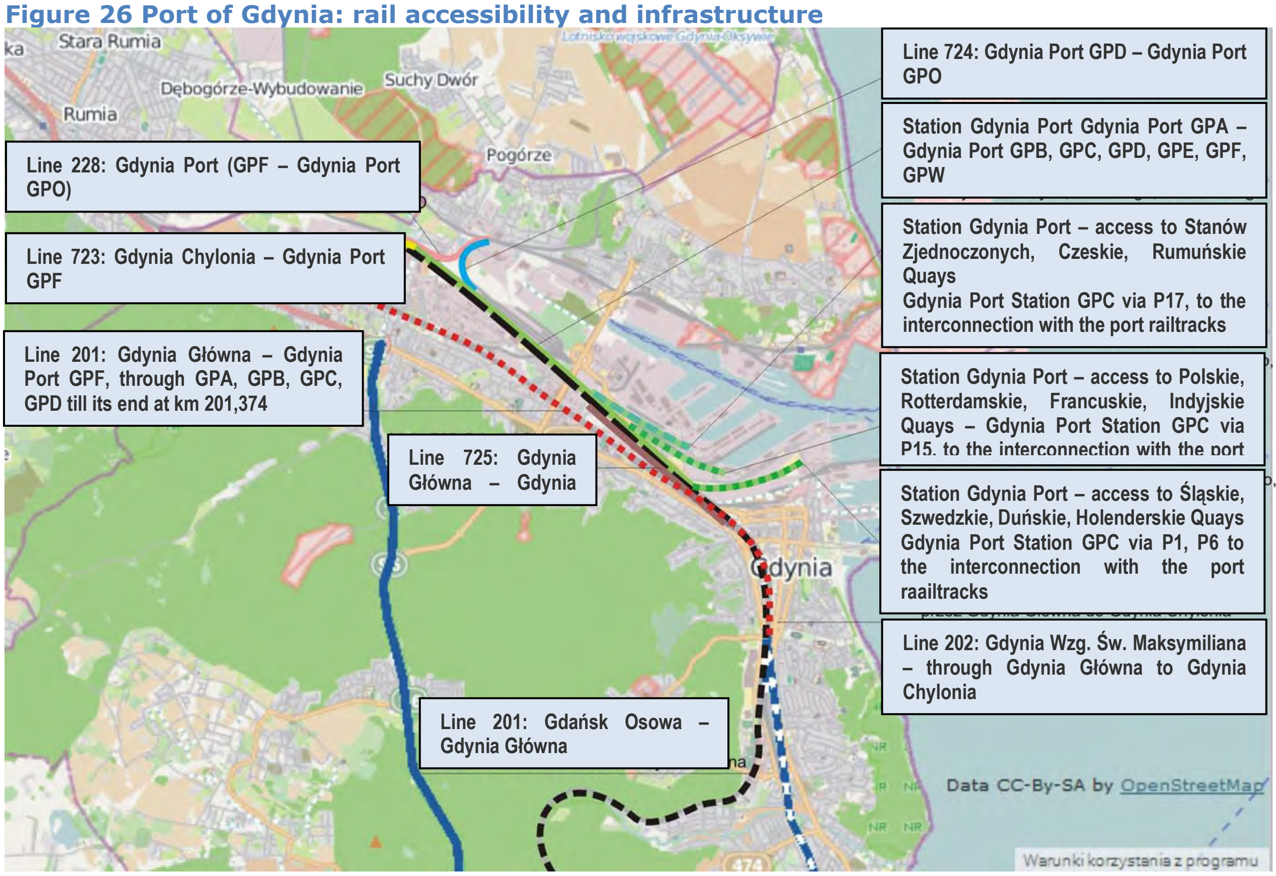
All the core sea and inland ports included in the BA Corridor are connected to the rail and road infrastructure; however in many cases last mile railway and/or road port interconnection issues relating to compliance of the infrastructure with TEN-T standards and capacity, are present that limit rail freight operation and development in Gdynia, Gdańsk, Świnoujście, Szczecin, Trieste and Koper as well as Ravenna and Venezia (following implementation / completion of the port expansions). The description of the last mile connections to the ports is provided in the paragraphs below of this section, particularly focussing on seaports.

Regarding the availability of clean fuels, these are not currently available at BA Corridor ports. One of the projects included in the BA Corridor list of investments is the construction of a new LNG terminal in Świnoujście, however it will not include facilities for the refuelling of vessels from the beginning of its operation; this is planned to be developed in the future. Initiatives are generally under consideration also by other Port Authorities and the BA Corridor Polish ports are currently involved in the activities related to the *LNG in Baltic Sea Ports II* initiative; although no specific investments are currently planned by 2030 for these ports. Venezia and Ravenna in the Adriatic are considering developing LNG clean fuel related facilities in the future as also reflected in the list of investments at Table 33.

Last mile connections

The maritime Port of **Gdynia** is connected to the BA Corridor core network by railway lines 201/202 and by road infrastructure (S6 express road).

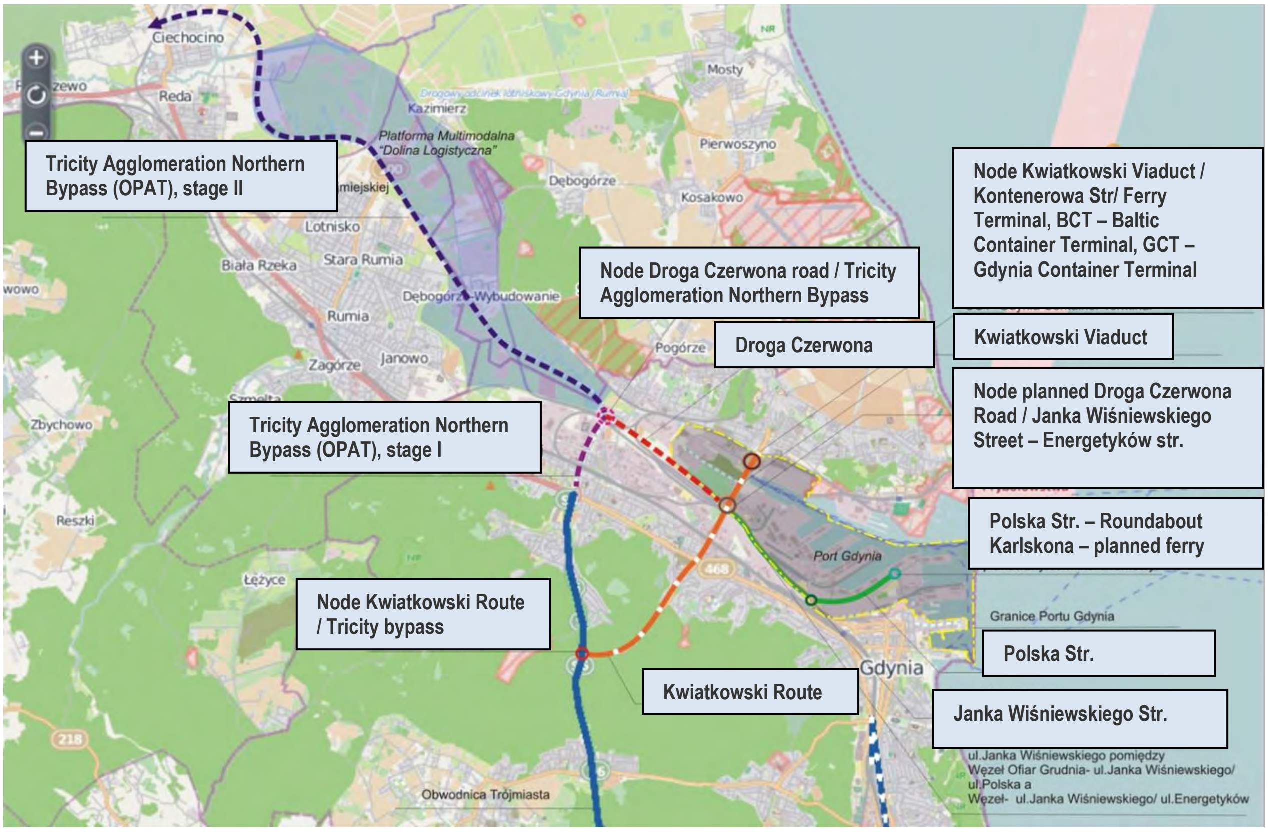
Figure 26 Port of Gdynia: rail accessibility and infrastructure



The following additional railway infrastructure interconnected with lines 201 and 202 is relevant in providing accessibility to the port and terminals: lines 228, 723, 228, 724, 725. All lines allow operating trains up to 750m length. However Line 228 Gdynia Port GPO - Gdynia Port GPF (pink coloured) is non electrified; line 723 Gdynia Port GPF - Gdynia Chylonia (yellow coloured) has maximum axle load lower than 22.5t; and line 724 Gdynia Port GPO - Gdynia Port GPD (blue coloured) is non electrified and has maximum axle load lower than 22.5t. The sections Gdynia Port Station from Gdynia Port GPA to Gdynia Port GPB, GPC, GPD, GPE, GPF, GPW (black coloured) are all electrified and allow operating 750m long trains; however the maximum axle load is in some segments below 22.5t. The infrastructure at terminals is generally non electrified, it does not allow operating trains of length up to 750m and has limited axle load capacity.

Whilst according to the alignment of the BA Corridor the main interconnection between the port and the core network is provided by line 202 and a small section of line 201 between Gdynia Port – Gdynia Główna and Maksymilianowo – Nowa Wieś Wielka, the entire railway line no. 201 connecting Nowa Wieś Wielka with the Port of Gdynia is deemed relevant for the Port of Gdynia as well as the BA Corridor and RFC 5. This line which belongs to the comprehensive network, is a main freight railway route together with line 131 (Chorzów Batory – Tczew); improvement works on the line are planned and included in the Implementation Document (*Works on alternative transport line Bydgoszcz – Trójmiasto, including lines 201 and 203, phase I & Works on alternative transport line Bydgoszcz – Trójmiasto, including lines 201 and 203, phase II – including electrification*), which are aimed at contributing to a significant reduction of freight traffic through the railway section Tczew – Gdańsk (railway line no. 9).

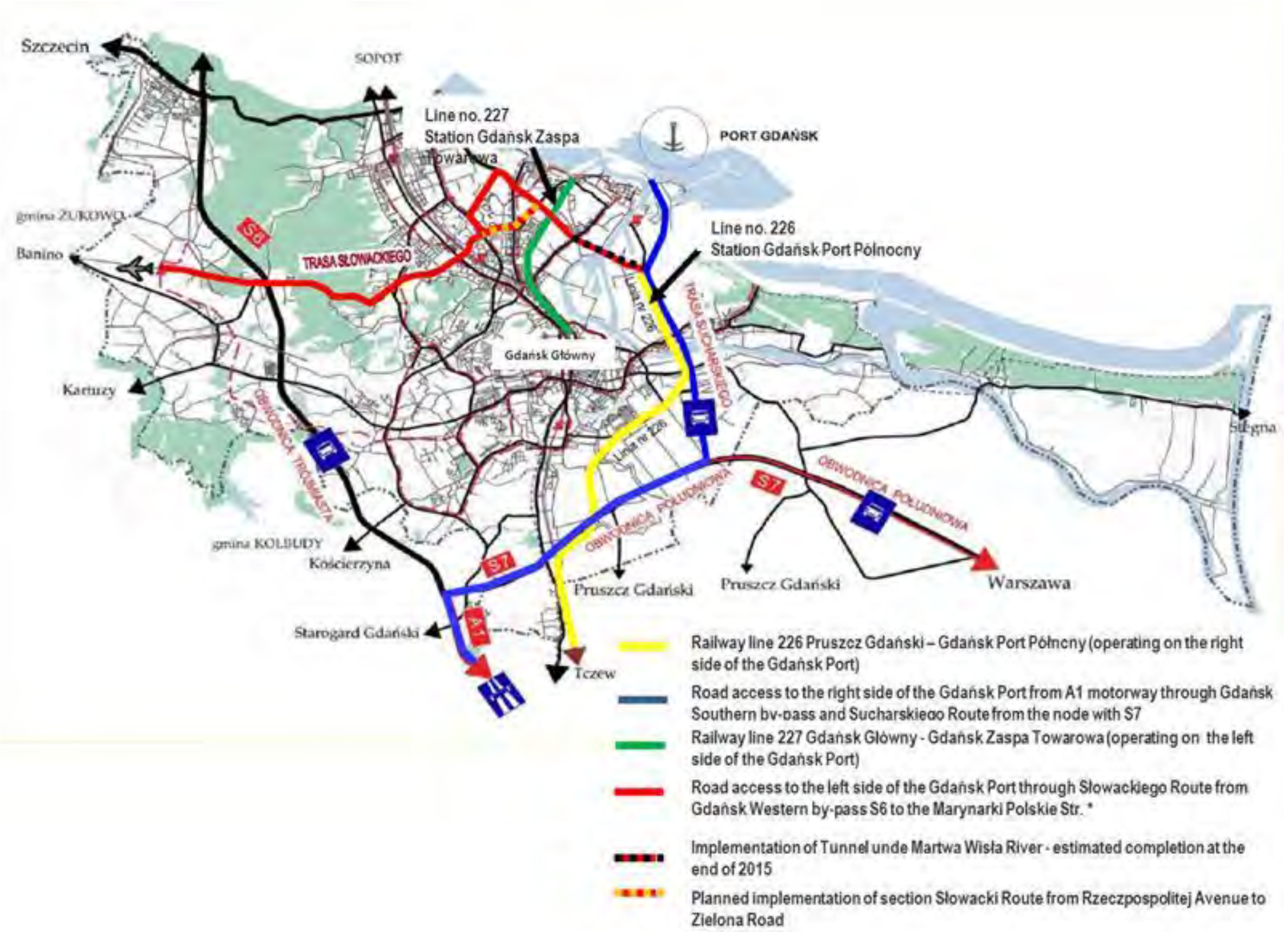
Figure 27 Port of Gdynia: road accessibility



S6 Express Road is already in good conditions 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 (this issue is already under consideration by the relevant stakeholders, the infrastructure is planned to be modernised in the short term); and the Kwiatkowski Route registers high traffic levels which may turn into a capacity issue particularly in view of the further development of the port. Capacity issues in the port surrounding urban network have been also reported by the Port and Local Authorities: Northern Bypass of Tricity agglomeration (OPAT) providing access to National Road no.6 and Droga Czerwona road connecting OPAT to Janka Wiśniewskiego Street. Polska Street and Janka Wiśniewskiego Street are also deemed to be improved for capacity related issues in view of possible increases in traffic.

The main railway line providing access to the Port of **Gdańsk** is - line no. 9 Tczew – Gdańsk. This line interconnects with the Inner Port via railway line no. 227 (5.46 km) and with the External Port via railway line no. 226 (13.5 km). The latter requires modernisation (i.e. upgrading of the second track and increase in axle load and operating speed standards), representing for this port the most critical and urgent bottleneck.

Figure 28 Port of Gdańsk: rail and road accessibility



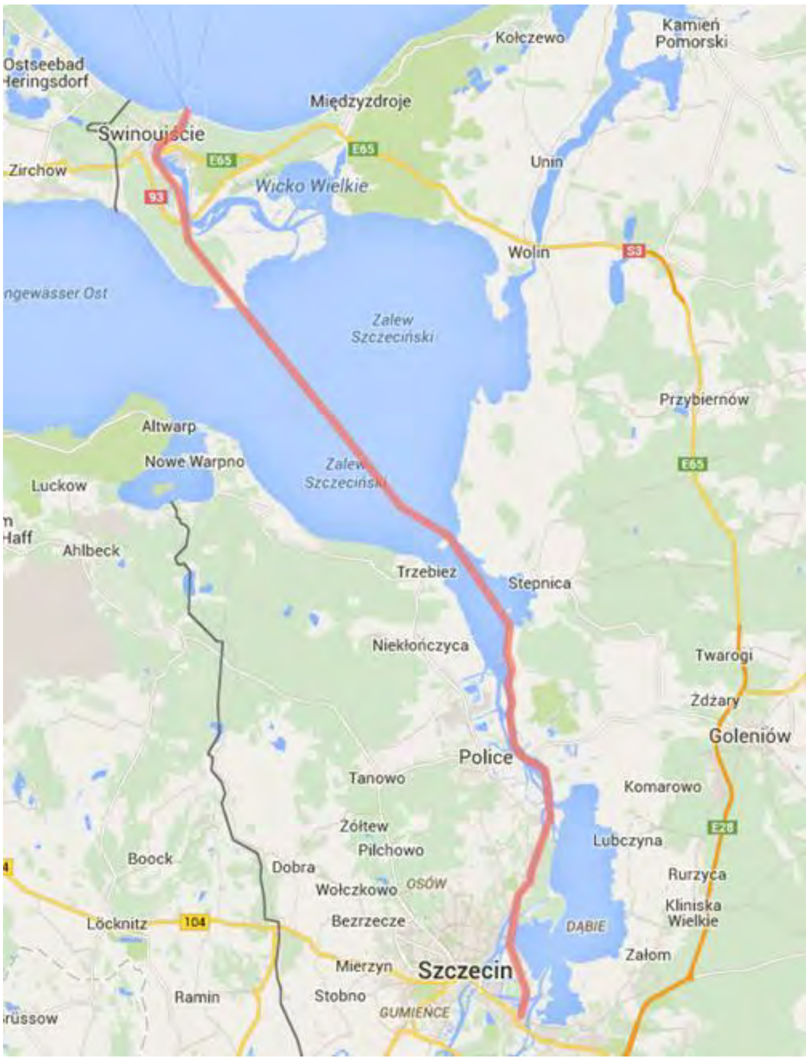
Regarding road accessibility, the port is accessible from the BA Corridor via the S7 express road, interconnected with the Port by the new, good quality national road no. 89 (10 km). Access to the port is nowadays possible via Słowackiego Route from Gdańsk Western by-pass to the Marynarki Polskiej Street (see S6 road marked in black on the above map).

In addition and as an alternative to the above mentioned accessibility interconnection with the port via the A1(see blue itinerary on the map above) is also worth mentioning, this will be possible after completion of the tunnel under the Martwa Wisła River, expected by 2015.

The improvement/upgrading of Nowa Kościuszki street resulting in the completion of the Gdańsk ring road, is deemed to represent the last critical issue in terms of road accessibility to the port.

The ports of **Szczecin** and **Świnoujście** have connections with a complex system of land facilities transportation. The two ports are also interconnected through a 68 km long fairway, which is deemed not adequate to support the interconnection between the two ports via water; studies and investments are already planned in this respect aimed at deepening the fairway works and improving ferry and intermodal connection between the two ports.

Figure 29 Ports of Szczecin and Świnoujście interconnecting fairway

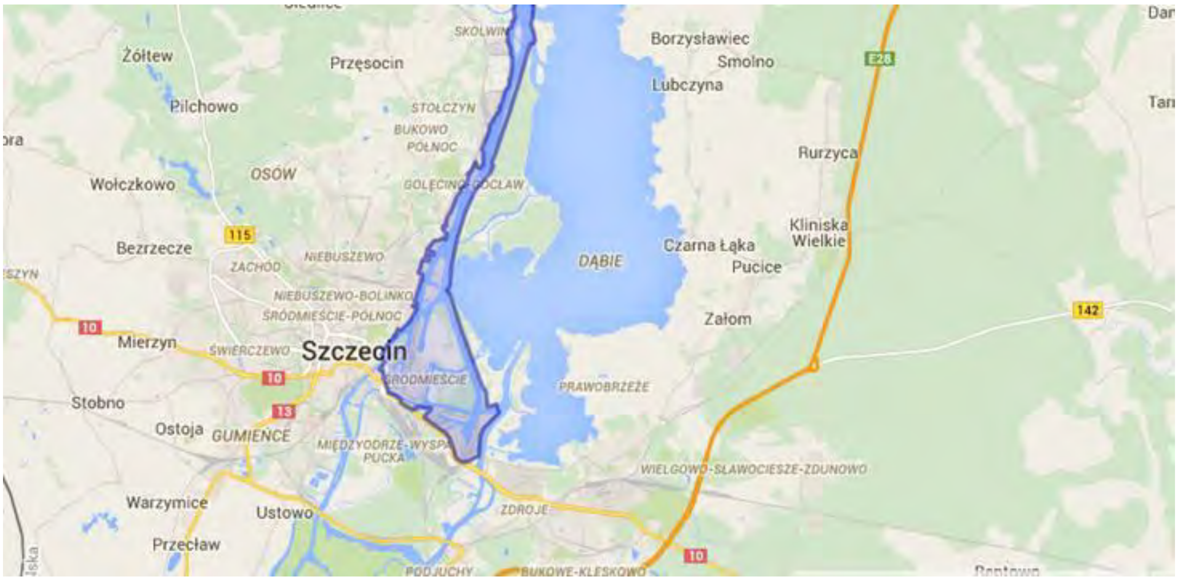


The Ports of Szczecin and Świnoujście are connected with the European system of highways by the A11 and A20 motorways (Berlin – Szczecin; continuing as A6 in Poland), and through national road No. 3 (S3 - express road no. 3), partially belonging to the BA Corridor and connecting the Port with the South of Poland, Czech Republic and Slovakia, and then with South of Europe.

Both ports are interconnected with railway line E-59 belonging to the BA Corridor; through this line and line C-E59 (so called Oder railway line belonging to the comprehensive network) the two ports are connected to the industrial centres of Western and Southern Europe.

The last mile connection to the Port of Szczecin is provided by national road no. 10, Parnica viaduct and local roads. Reconstruction of local road communication system in the area of Międzyodrze represents a critical issue in terms of last mile connection to the port.

Figure 30 Ports of Szczecin: rail and road accessibility



As regards railway infrastructure, insufficient technical capacity (mainly train length and freight speed) of railway access to the port on railway line 401 section Szczecin Dąbie – Świnoujście Port and railway line 351 section Szczecin Główny -Szczecin Dąbie represents a critical issue.

Figure 31 Ports of Świnoujście: rail and road accessibility

Road access to the Port of Świnoujście is provided by national road no. 3 and lower class roads (Poviat roads). Short segments of both national road no. 3 and Poviat roads require upgrading works due to inadequate axle load.

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 BA Corridor links. Improvement works on the SS 202, also providing access to the Port, are currently on-going 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".

Traffic studies developed as part of the activities for the preparation of the Port Master Plan (*Piano Regolatore Portuale*) adopted in 2009 and subsequently updated to consider the growing traffic trends, are showing possible capacity issues in the mid-long term for both the road and rail infrastructure providing access to the Port. Road and rail investments are also included in the Master Plan and in the Three Year Operating Plan (*Piano di Rilancio Pluriennale Aggiornamento 2012*) in order to improve road and rail transport operations within the port area.

Specifically concerning accessibility to the port by railway, one double track line interconnects 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, but it is temporarily closed and with a steep gradient that prevents operation of heavy trains. Based on the current schedule, increases in future traffic on the line in operation may lead to its 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 in order to improve operations at existing port terminals. Configuration 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 are required to assemble trains even limited to 550 m length, which impacts on the effectiveness and efficiency of terminal operations. Works for the extension of the maximum allowed train length operation up to 650 m at Trieste Campo Marzio station are planned for implementation. The initiative is part of a larger investment aimed at developing a new rail-road terminal to serve piers V, VI and VII and increase intermodality. The new terminal will include 5 tracks and will be equipped with rail mounted gantry cranes.

As part of the analysis of the last mile connection to the Port of Trieste, the interconnecting railway section Bivio Aurisina-Trieste is also worth mentioning as a bottleneck providing direct access between the BA Corridor and the Port of Trieste through Trieste Central Station. This section has a speed limitation to 90 km/h, and maximum train length operation limited to 600 m.

Figure 32 Port of Trieste: rail accessibility and infrastructure

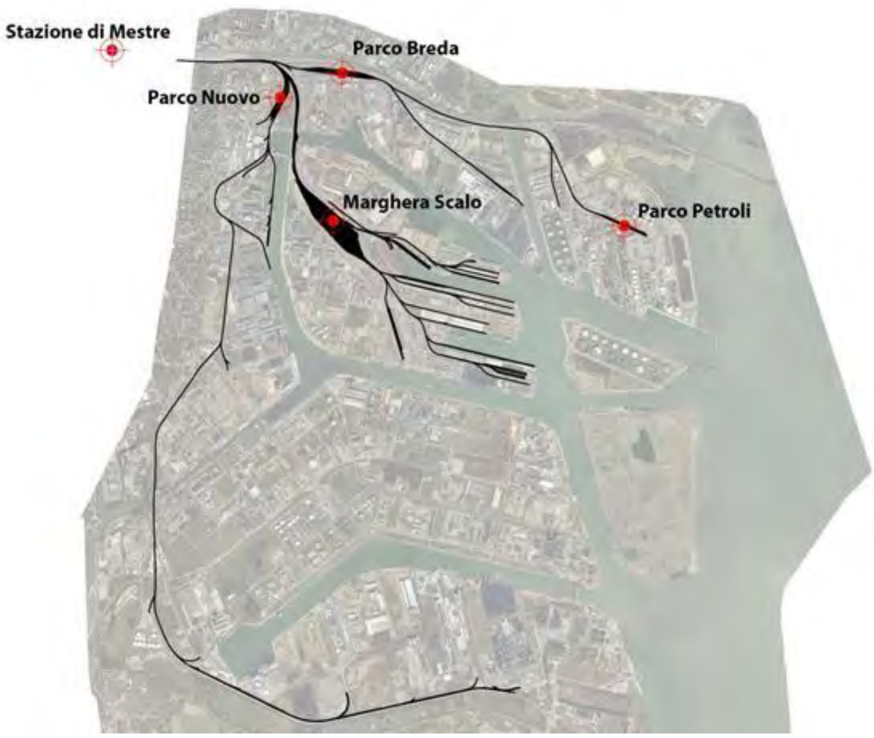
The Port of **Venezia** lies 5 km from the main national road network. The port is interconnected with the motorway A4 mainly through Via dell'Elettricità and Via della Pila, serving most of the traffic to and from the terminals. A dedicated lane is available to each terminal, with automated traffic management system in place.

Regarding rail transport, the Port of Venezia is served by an internal railroad network of 30 km, not including individual branch lines. Such infrastructure consists of essentially the following elements:

- Venezia Mestre railway station;
- Venezia Marghera Scalo rail freight yard;
- Venezia Mestre – Venezia Marghera Scalo railway line;
- Rail sidings of the Parco Breda yard;
- Rail sidings of the Parco Nuovo yard;
- Rail sidings of the Parco Petroli yard;
- Main branch line, branching off from Venezia Marghera Scalo;
- Individual branch lines and sidings/yards inside single port areas.

Of these, about 16.5 km are situated in an area owned by the Municipality of Venezia and 14.6 km (including 13 non-electrified branch lines and 7 tracks of a new yard at the Venezia Marghera Scalo) are located on land belonging to the Italian State, under the responsibility of Venezia Port Authority.

Figure 33 Port of Venezia: rail accessibility and infrastructure



The Port of Venezia is directly linked to the main international railroad corridors thanks to the Marghera Scalo station, and can operate trains up to 740m. Marghera Scalo station comprises essentially three yards: 2 reception/delivery yards with 17 non-electrified tracks, and, in between, an arrival and departure yard with 12 tracks managed by a central signal box, of which 10 are completely electrified and 2 only partially. The reception/delivery yards constitute an interface between primary and secondary manoeuvres for the port terminal operators.

Esercizi Raccordi Ferroviari (ERF) is the company in charge of primary and secondary manoeuvres. The company also supervises the network of RFI branch lines so as to ensure its correct and safe operation.

At present the infrastructure serving Marghera's port areas seems compatible with the traffic levels of goods attracted/generated by the port. However a number of operational issues exist, the main ones being:

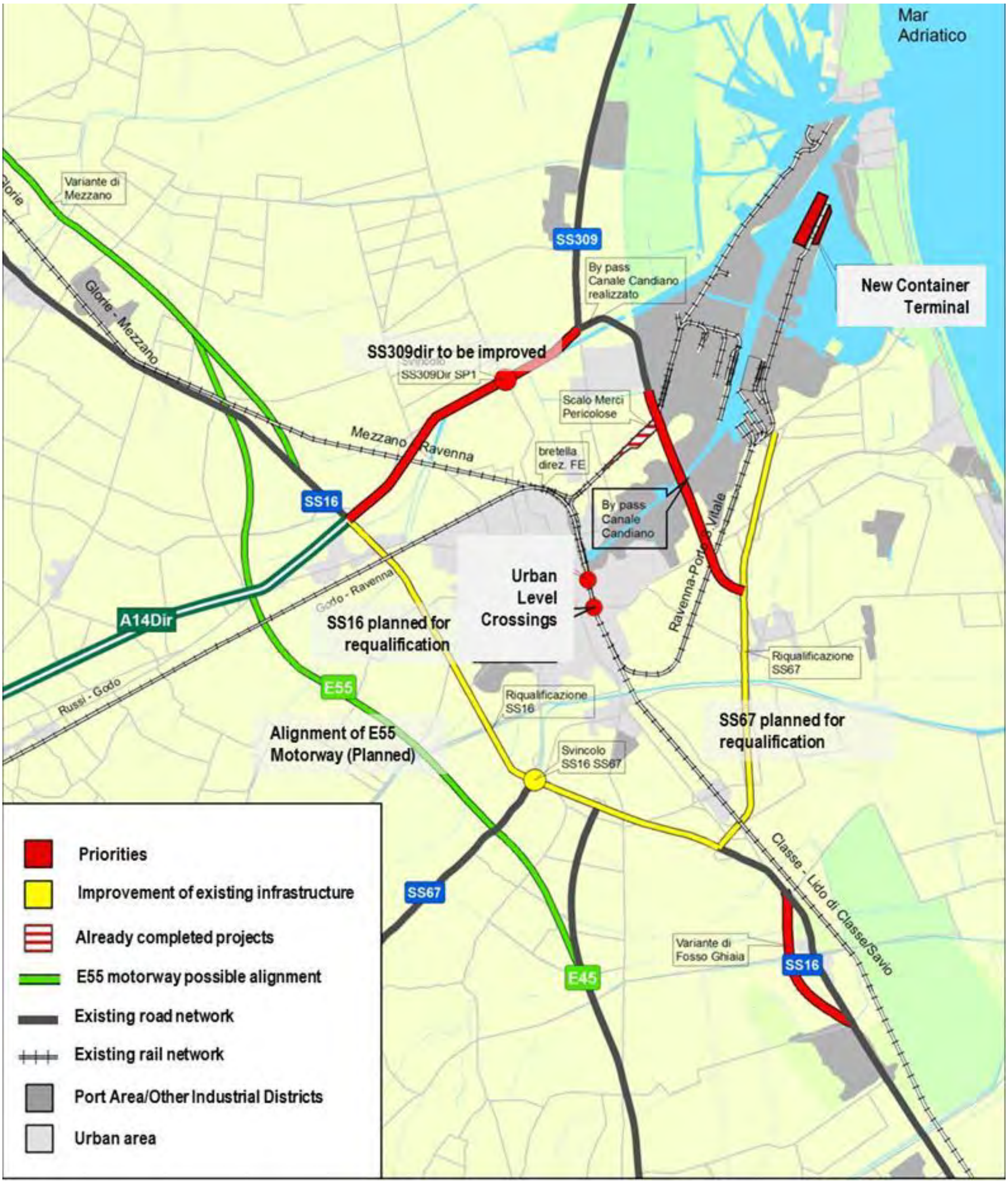
- Presence of single track lines and high number of non-compatible routes operated by ERF for the reception or delivery of rolling stock;
- Non-compatibility of routes from Venezia Mestre to the arrival & departure yard (Venezia Marghera Scalo), used by railway undertakings, and routes from reception/delivery yards to private sidings, used by ERF;
- Operation of shunting manoeuvres with locomotives at the rear of the train (pushing) for delivery to private sidings;
- High number of level crossings (public/private roads, private crossings);
- Lack of systematic planning of reception/delivery times.

To solve the above issues and to face the expected traffic growth, investments are already foreseen in the medium term to upgrade the internal railway infrastructure (doubling single track lines) and avoid the interferences between yard and main line operations. In the long term, as a consequence of the entry into operation of the planned offshore terminal, the existing railway connection is expected to become a possible capacity bottleneck, also causing traffic congestion at the Mestre railway node, which will necessitate the development of a direct connection to the Venezia-Trieste railway line bypassing the Mestre node. On the basis of a preliminary project realised by the Venezia Port Authority, the solution could be a direct linkage between Fusina Ro-Ro terminal and Linea dei Bivi, bypassing the Mestre junction; the project may also involve construction of a new marshalling yard located in Penisola della Chimica).

The Port of **Ravenna** is interconnected with the main national road and railway network. Both road and rail accessibility and internal infrastructure have been and are still the subject of planned improvements. Specifically regarding railways, infrastructure has already been expanded within the Port area and is expected to be further developed to serve the port terminals (i.e. New Container Terminal under implementation).

Additional investments are planned for the implementation of signalling and communication technology on one of the two lines providing access to the Port (specifically the one interconnecting the New Container Terminal at the Port to the Ravenna-Rimini railway line); works for the elimination of two railway crossings are also foreseen on the same alignment, to solve safety issues as well as traffic congestion in the urban area, which may become critical once the New Container Terminal will be in operation. Two additional railway crossings have been identified as possibly impacting on the safe operation of the last mile connections to the port. The relevance of these interventions is also reflected in the recently updated *Piano Nazionale delle Infrastrutture Strategiche*, which includes railway works at the Port of Ravenna, in addition to the construction of the New Container Terminal. Last mile connections to the port by road are also planned to be improved, studies and works to be implemented on the following infrastructure, SS16, SS67, SS 309dir.

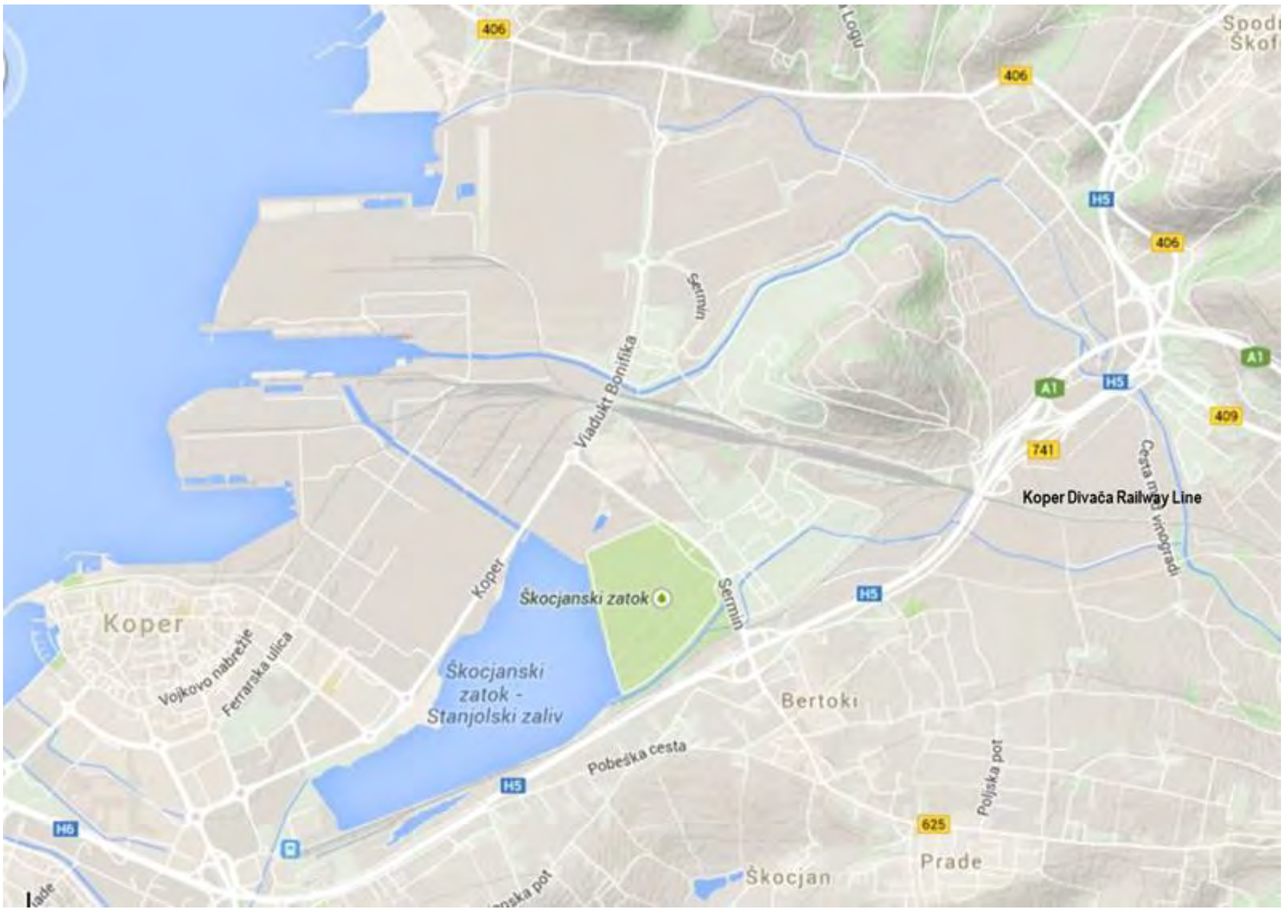
Figure 34 Port of Ravenna: existing and future accessibility infrastructure



Another relevant infrastructure development project for the Port of Ravenna as well as for the Port of Venezia is the improvement of the Cesena-Ravenna-Mestre highway interconnecting Venezia to Ravenna, to Rome. This project is currently under study, assumed to be developed under a PPP scheme.

The Port of **Koper** is connected with the main national railway network through the Koper-Divača railway line, belonging to the BA Corridor. It is connected with the national motorway network through national roads 741 and 406, interlinked with the A1 motorway.

Figure 35 Port of Koper: road and rail accessibility



The modernisation of the existing track between Koper and Divača is at its implementation phase. Works are underway and expected to be finished by the end of 2015. Construction of the second track on the line Koper-Divača is planned for the period 2016-2022, to support the planned expansion of the port infrastructure and expected traffic increase. Road and rail internal works are also planned to be implemented by 2020 to improve accessibility. Direct interconnection between the A1 motorway and the Port is missing at present and should be developed together with the associated construction of a truck terminal.

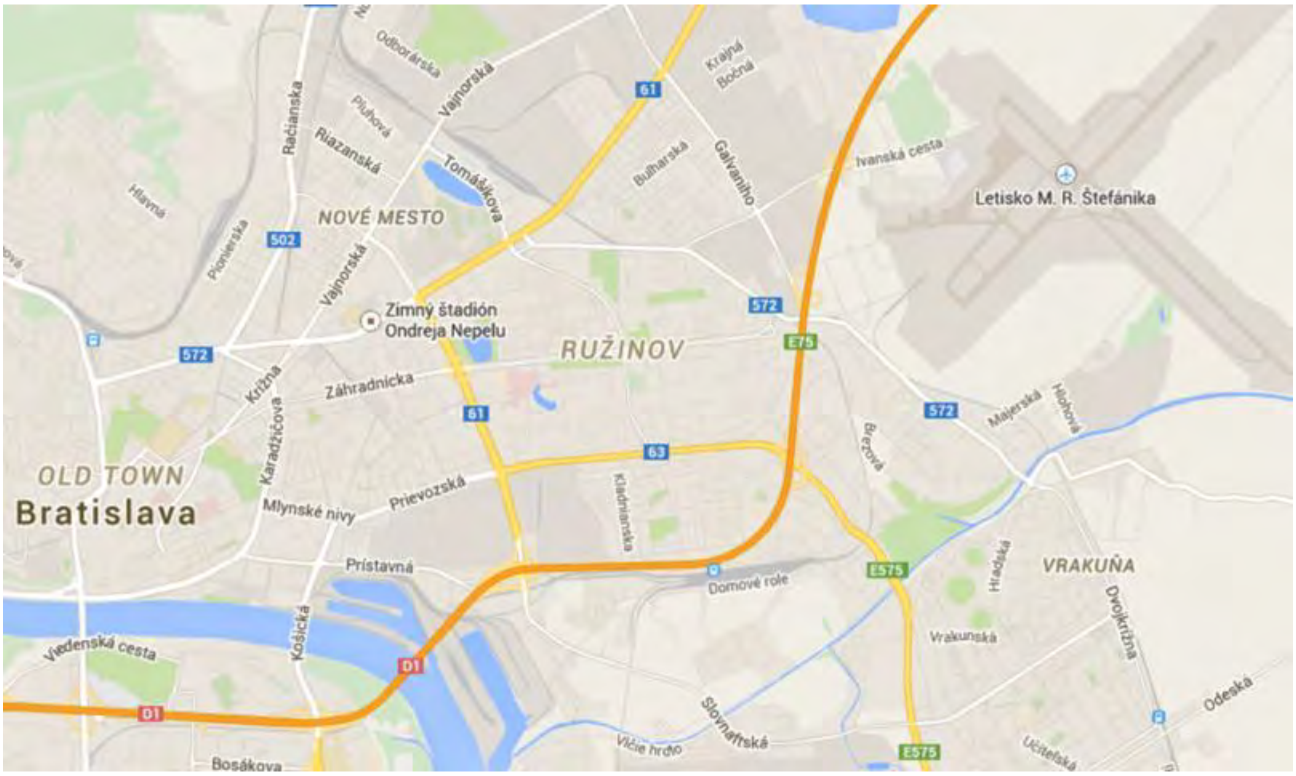
In addition to the last mile connections for the above described maritime ports, the accessibility to the two inland waterway ports of **Bratislava** and **Wien** is also worth describing. No critical issues have been identified with reference to the last mile connection for these two nodes.

The Bratislava-Pálenisko inland waterway port, together with its tri-modal terminal has its own siding network connected with the main railway network through the Bratislava - ÚNS freight station on BA Corridor freight branch (section Bratislava - Petržalka). The port and tri-modal terminal have good connections with the motorway D1 on the BA

Corridor, being only 0.5 km distant from the Bratislava – Prievoz junction on the D1. Prístavná Street connects the motorway with the port's gate; this has two lanes per direction, only one of them is open for freight road transport on entrance.

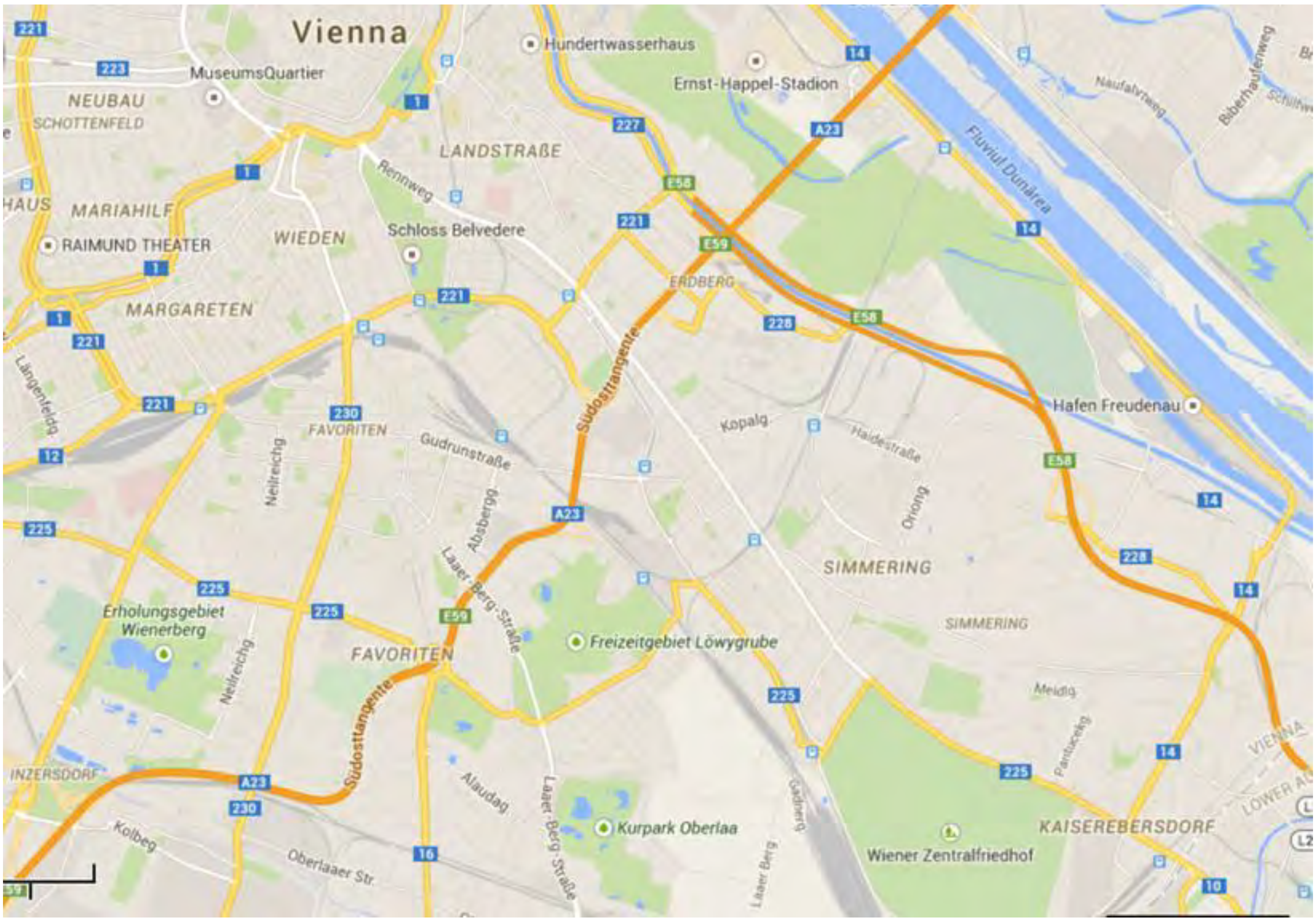
Modernisation of passenger and cargo port and tri-modal terminal infrastructure is under preparation by *Verejné prístavy, a.s.* for the period 2015 – 2020, which does however not foresee the upgrading of last mile rail and road connections to the port.

Figure 36 Port of Bratislava: road and rail accessibility



The Freudenau tri-modal terminal and inland waterway port of **Wien** is interconnected with the A4 on the BA Corridor through national road 14 and motorway A 23. The port, which is currently used to a limited extent to operate waterway services due to the reduction in the demand from shippers and freight-forwarders, is primarily serving rail (120 trains per week) and road traffic. The tri-modal terminal is interconnected with the BA Corridor railway network by a direct link (national code 124) parallel to national road 14. Although the referred to electrified section is single track only, its capacity is considered sufficient by the authorities as well as by the terminal operator WIENCONT.

Figure 37 Port of Wien: road and rail accessibility



4.2.5 Airports

There are 13 core airports along the BA Corridor which are all interconnected with the road network: Szczecin, Gdańsk, Poznan, Wrocław, Łódź, Warszawa, Katowice, Ostrava, Bratislava, Wien, Ljubljana, Venezia, and Bologna. Among these, only 4 out of 13 airports exceed five million passenger traffic flow; these major airports include Warszawa, Wien, Venezia and Bologna.

The table overleaf provides summary information about the airports. Additional information on the BA Corridor alignment and its transport nodes, including airports, is provided respectively in Appendices C and D below.

Table 15 BA core airports

BA Corridor Airports	Type	Activity	N. of runways	Length of the longest runway (m)	Passenger traffic flow (pax per year) 2013	Freight traffic flow (tons per year) 2013	Connection with rail
Gdańsk (PL)	International	Passenger and Freight	1	2,800	2,843,737	4,918	No
Szczecin (PL)	International	Passenger and Freight	1	2,500	347,744	650	Yes
Poznan (PL)	International	Passenger and Freight	1	2,504	1,355,330	2,600	No
Warszawa (PL)	International	Passenger and Freight	2	3,690	10,683,706	48,219	Yes
Łódź (PL)	International	Passenger and Freight	1	2,500	353,633	3,162	No
Wrocław (PL)	International	Passenger and Freight	1	2,500	1,920,179	5,100	No
Katowice (Pyrzowice) (PL)	International	Passenger and Freight	1	2,800	2,544,198	10,873	No
Ostrava (CZ)	International	Passenger and Freight	1	3,500	259,167	2,096	No
Bratislava (SK)	International	Passenger and Freight	2	3,190	1,373,078	20,530 (2011)	No
Wien (Schwechat) (AT)	International	Passenger and Freight	2	3,600	21,999,926	256,200	Yes
Ljubljana (SI)	International	Passenger and Freight	1	3,300	1,321,153	17,777	No
Venezia (IT)	International	Passenger and Freight	2	3,300	8,403,790	45,662	No
Bologna (IT)	International	Passenger and Freight	1	2,805	6,127,221	44,149	No

Source: BA Corridor study consortium based on TENtec

Specifically regarding the compliance to the Regulation 1315/2013 of core airports the following targets are set:

- The two core airports (Warszawa and Wien) have to be connected to the rail network by 2050;
- Capacity to make available alternative clean fuels by 2030.

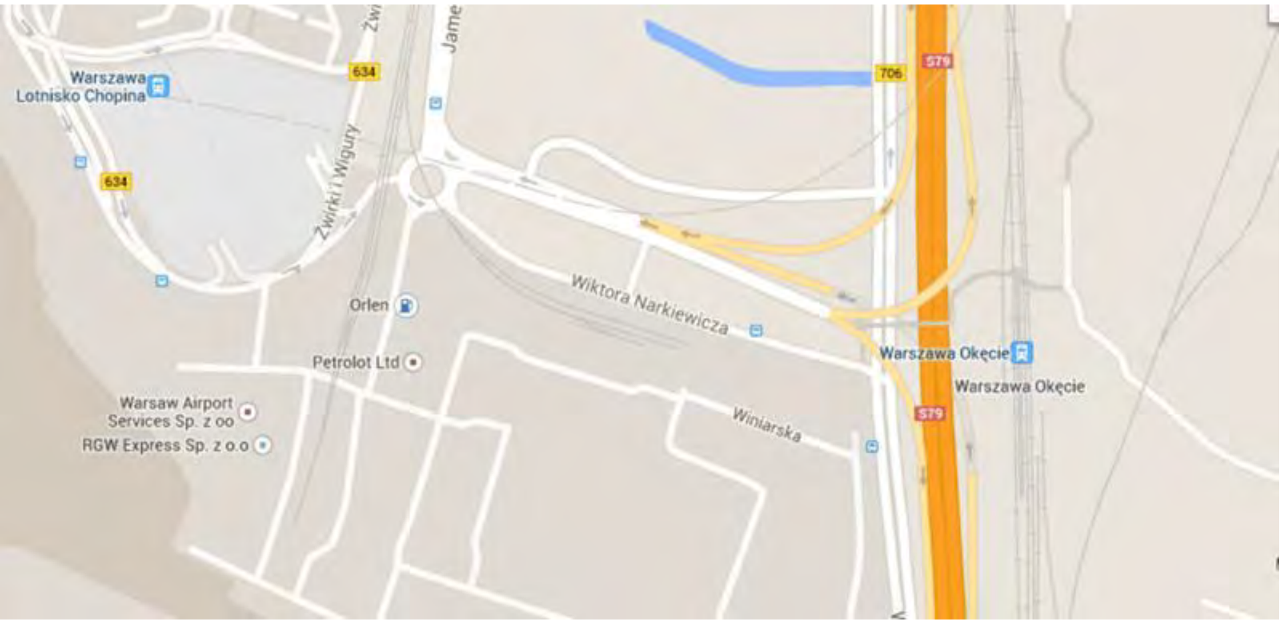
The **Wien** airport has direct access to the A4 motorway on the BA Corridor and is also already connected to the national and BA Corridor railway network.

Figure 38 Wien Airport: road and rail accessibility

The Wien airport is already satisfactorily interconnected to the Austrian Capital city and to the Western cities and regions of Austria; capacity issues exist regarding its accessibility from the Eastern and Northern territories including Czech Republic and Slovak cities and regions.

The **Warszawa** airport is also already interconnected to the national railway and BA Corridor networks through the Warszawa Okęcie station.

Figure 39 Warszawa Airport: road and rail accessibility



In addition to the above main airports, rail connection also exists for the Szczecin airport and is currently under construction at the Gdańsk airport (Pomorska Kolej Metropolitalna planned to be completed in 2015) and Ostrava airport.

Finally, rail interconnections are also planned to be constructed at Katowice and Ljubljana airports as well as at Venezia and Bologna airports, the latter representing with Warszawa and Wien the largest airports along the BA Corridor, with more than 6 and 8 million passengers at 2013 respectively.

The construction of a railway connection between Katowice Pyrzowice Airport and Górnośląskie cities agglomeration, section Katowice-Pyrzowice is planned to be completed by 2020. The Ljubljana Airport railway interconnection is currently under evaluation as part of the feasibility study for the construction of the second track Ljubljana-Jesenice.

At the Venezia airport, investments are already envisaged for the construction of a conventional railway link between Venezia Mestre and the Marco Polo airport, including a railway station integrated with the passenger terminal; feasibility studies are also on-going for the identification of the optimal infrastructure solution to allow high-speed trains to reach the airport directly. The airport is also well connected with the Italian highway and motorway networks, having direct access to the A27. Road works are also currently planned by ANAS S.p.A. on the national road SS 14, for the construction of the bypass at Campalto and Tessera, providing access to the Venezia Marco Polo Airport.

The Gugliemo Marconi airport is planned to be interconnected with the Bologna main railway station by 2017; the project includes the construction of an automated people mover and two terminal stations, one within the main railway station and one at the airport. The Bologna airport is also well positioned with respect to the national road and motorway networks; due to its location in the Bologna urban area, last mile accessibility by road to the Airport is however affected by congestion on the main itinerary and junctions interconnecting the national and motorway network with the urban road network providing access to the Airport.

Regarding the availability of clean fuels these are not currently available at any of the BA Corridor airports.

4.2.6 Rail-road terminals

Nearly 30 rail-road terminals have been identified along the BA Corridor with reference to the list of nodes provided by EU Regulation 1315/2013 (see Table 10 above). These are mentioned in the table below.

Table 16 BA core rail-road terminals

Node	Terminals
Gdynia (PL)	1. Gdynia Container Terminal (GCT) 2. Baltic Container Terminal Gdynia – BCT
Gdańsk (PL)	1. Gdański Terminal Kontenerowy S.A. – The Gdańsk Container Terminal 2. Deepwater Container Terminal Gdańsk (DTC Gdańsk S.A.)
Szczecin (PL)	Container Terminal - DB Port of Szczecin
Świnoujście (PL)	Terminal OT Logistic Świnoujście (Port Handlowy Świnoujście)
Warszawa (PL)	1. Warszawa (Główna Towarowa; Terminal Spedcont Warszawa) 2. Warszawa (Praga; TK Cargosped Warszawa)

Node	Terminals
	3. Pruszków Polzug Container Terminal
Łódź (Łódź / Stryków) (PL)	1. Container Terminal Łódź Olechów 2. Stryków
Katowice (Sławków) (PL)	Euroterminal Sławków Rail-Road Terminal
Poznań (PL)	1. Poznań (Swarzędz) Rail-Road Terminal (CLIP Container Terminal) 2. HUB Terminal Polzug Poznań 3. Poznań (Gądki) Rail-Road Terminal 4. Container Terminal Cargosped Kobylnica 5. Terminal Spedcont Poznań Garbary
Wrocław (PL)	1. Wrocław Container Terminal (Terminal Polzug Wrocław) 2. Container Terminal PCC Brzeg Dolny
Ostrava (CZ)	Ostrava Rail-Road Terminal
Přerov (CZ)	Přerov Rail-Road terminal
Bratislava (SK)	Bratislava-Pálenisko Tri-modal terminal
Žilina (SK)	Žilina Rail-Road Terminal
Wien (AT)	Wien Rail-Road Terminals
Graz (Werndorf) (AT)	Graz-Süd/ Werndorf Rail-Road Terminal
Cervignano (IT)	Cervignano Rail-Road Terminal
Padova (IT)	Padova Rail-Road Terminal
Bologna (IT)	Bologna Rail-Road Terminal
Ljubljana (SI)	Ljubljana Container Terminal

Source: BA Corridor study consortium

In addition to the above rail-road terminals the following have been also identified as relevant to the scope of the BA Corridor Study, at least from the functional stand point.

Table 17 Other relevant rail-road terminals

Node/Areas	Terminals
In operation	
Katowice (Gliwice) (PL)	1. Container Terminal PCC Gliwice; 2. Dąbrowa Górnicza Polzug Container Terminal; 3. Sosnowiec Poludniowy Spedcont Container Terminal; 4. Container Terminal Cargosped Gliwice
Wrocław (PL)	Container Terminal in Kąty Wrocławskie
Under development	
Gdynia/Gdańsk (PL)	1. Gdynia Public Port Station as public intermodal terminal (under modernisation) 2. Dry-port concept ICY Tczew
Warszawa (PL)	HHLA Intermodal Polska Sp. z o.o. in Brwinów
Katowice (PL)	HHLA Intermodal Polska Sp. z o.o. in Dąbrowa Górnicza
Poznań (PL)	1. HHLA Intermodal Polska Sp. z o.o. in Kórnik 2. PKP Cargo – Poznań Franowo
Žilina (SK)	Žilina-Teplička (2015)
Wien (AT)	Container Terminal Inzersdorf (replacing the Nordwestbahnhof terminal – ready in 2017)
Villach-Fürnitz (AT)	Dry-port concept Villach-Fürnitz

Source: BA Corridor study consortium

As also emphasised by previous studies such as BATCo, SoNorA and the Bothnian Green Logistic Corridor project, rail-road terminals and particularly dry-port concept terminals are deemed strategically relevant for the promotion of intermodal services and traffic along the BA Corridor and within the Core Network Corridors. The identified number of rail-road terminals already in operation along the BA Corridor together with the ones under implementation and the ones suggested to be implemented by relevant stakeholders (i.e. the Břeclav rail-road terminal currently under consideration by initiatives at the regional level) is an indicator of the growing relevance of intermodal nodes to support traffic and economic growth by means of more sustainable freight transport solutions.

Further information on the BA Corridor Alignment and its transport nodes, including rail-road terminals, is provided respectively in Appendices C and D below.

4.3. BA Corridor Market Study

This section summarises the main scope and results of our recognition of the transport market along the BA Corridor. The detailed study is provided in Appendix E to this report, also including the outline of the socio-economic conditions in the study area (i.e. population, GDP, employment).

4.3.1 Scope of the transport market study

This section illustrates the results of our recognition of the transport market along the BA Corridor, also including the outline of the socio-economic conditions in the study area (i.e. population, GDP, employment). Our Transport Market Study (TMS) pursues a threefold propose 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 listed at Table 33;
- Supporting the definition of the critical issues on the BA Corridor, complementing the analysis of the compliance and quality of the infrastructure with a view to identifying the possible issues related to transport infrastructure capacity on the road and rail networks.

The main results of the TMS for each of these key areas are summarized in this Chapter, which also includes a brief overview of the current and projected socio-economic context of the countries and regions along the corridor. More details concerning the methodology and results of the TMS are provided at Appendix E.

4.3.2 Current traffic flows

Rail traffic on the BA corridor infrastructure

The table below shows that average traffic on the rail sections belonging to the BA Corridor is 87 trains/day in the two directions. Traffic is significantly more dense in Austria and Czech Republic (both above 120 trains/day) and lower in Poland and Italy (both below 80 trains/day).

On average, around one third of the train traffic is due to freight transport, but these shares greatly differ by Member State. At the top and bottom ends of the range, rail freight traffic - by number of trains - is higher than passenger traffic in Slovenia, while account only for 16% in Italy. It should be however noted that these values are not entirely representative of the real use of the rail infrastructure; they also reflect the definition of the corridor alignment, which in some cases includes main rail lines that are primarily dedicated to passenger transport, whereas lines dedicated to freight transport have generally been included in the rail freight corridor (this situation is for instance common in Italy and Poland).

Table 18 Average daily train flows on the BA Corridor (trains/day)

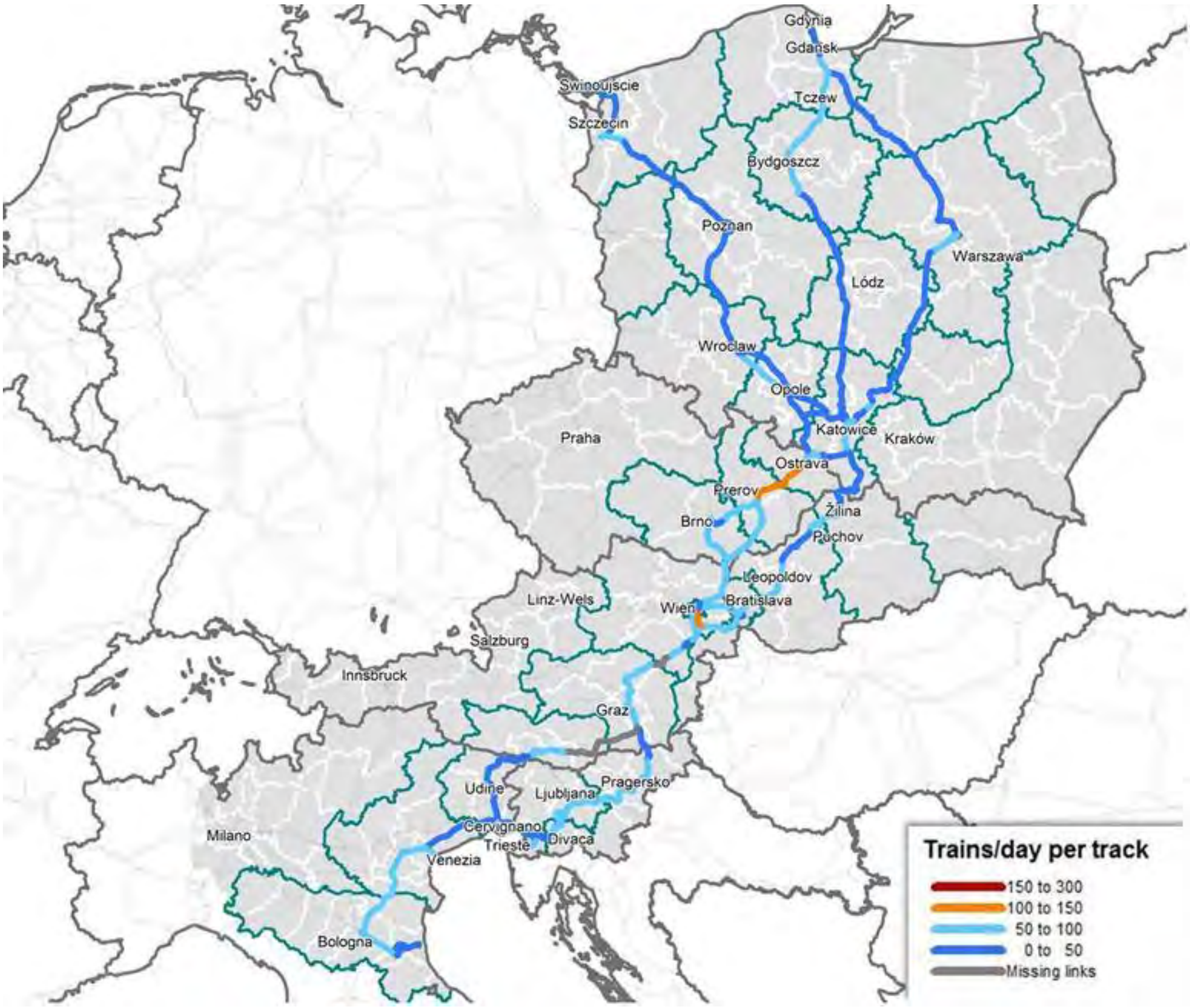
Country Section	Passenger	Freight	Total
Poland	43	24	67
Czech Republic	79	46	125
Slovakia	73	29	102
Austria	84	47	130
Italy	66	13	79
Slovenia	55	56	111
Entire corridor	**57**	**30**	**87**

Source: LF elaboration based on TENtec data

Indicatively, assuming on the entire corridor an average load of 120 passenger/train and 650 net tons/train, the total transport volume along the corridor is around 11 million passenger*km/year and 31 million tons*km/year.

As illustrated in the map below, the higher level of traffic on the BA corridor infrastructure is in its central section between Graz and Ostrava, with traffic volumes peaking in the urban area of the Wien and between Přerov and Ostrava, close to the border between Czech Republic and Poland. High train traffic is also recorded in the Warszawa, Bratislava and Venezia nodes and between Ljubljana and Pragersko.

Figure 40 Train traffic flows on the BA Corridor (trains/day, 2014)



Source: BA Corridor study consortium elaboration based on TENtec data and sections

Road traffic on the BA corridor infrastructure

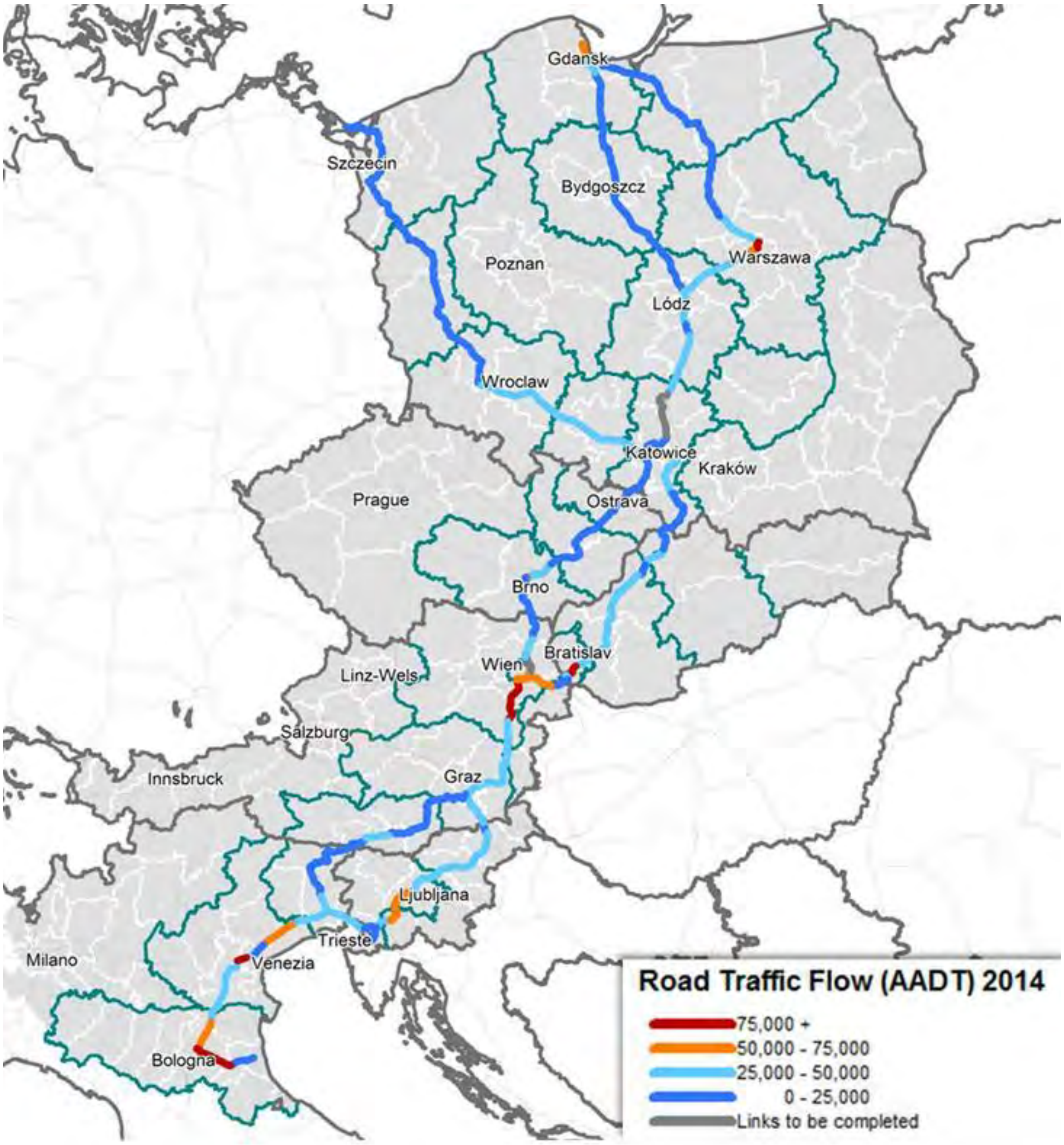
Current road traffic volumes on the BA Corridor infrastructure are relatively constant in the sections belonging to Slovakia, Austria, Italy and Slovenia, where traffic exceeds 30 thousands vehicle/ day. Lower volumes are currently recorded in Poland and the Czech Republic, also because the road corridor infrastructure is still to be completed.

Table 19 Average daily vehicle flows on the BA Corridor (vehicles/day)

Country Section	Cars	Trucks	Total
Poland	18,700	3,800	22,400
Czech Republic	13,800	4,200	17,900
Slovakia	27,200	6,400	33,600
Austria	33,500	4,000	37,500
Italy	31,300	11,200	42,400
Slovenia	31,500	9,100	40,600
Entire Corridor	**23,900**	**5,400**	**29,300**

Source: LF elaboration based on TENtec data

Figure 41 Vehicle traffic flows on the BA Corridor (vehicles/day, 2014)



Source: BA Corridor study consortium elaboration based on TENtec data and sections

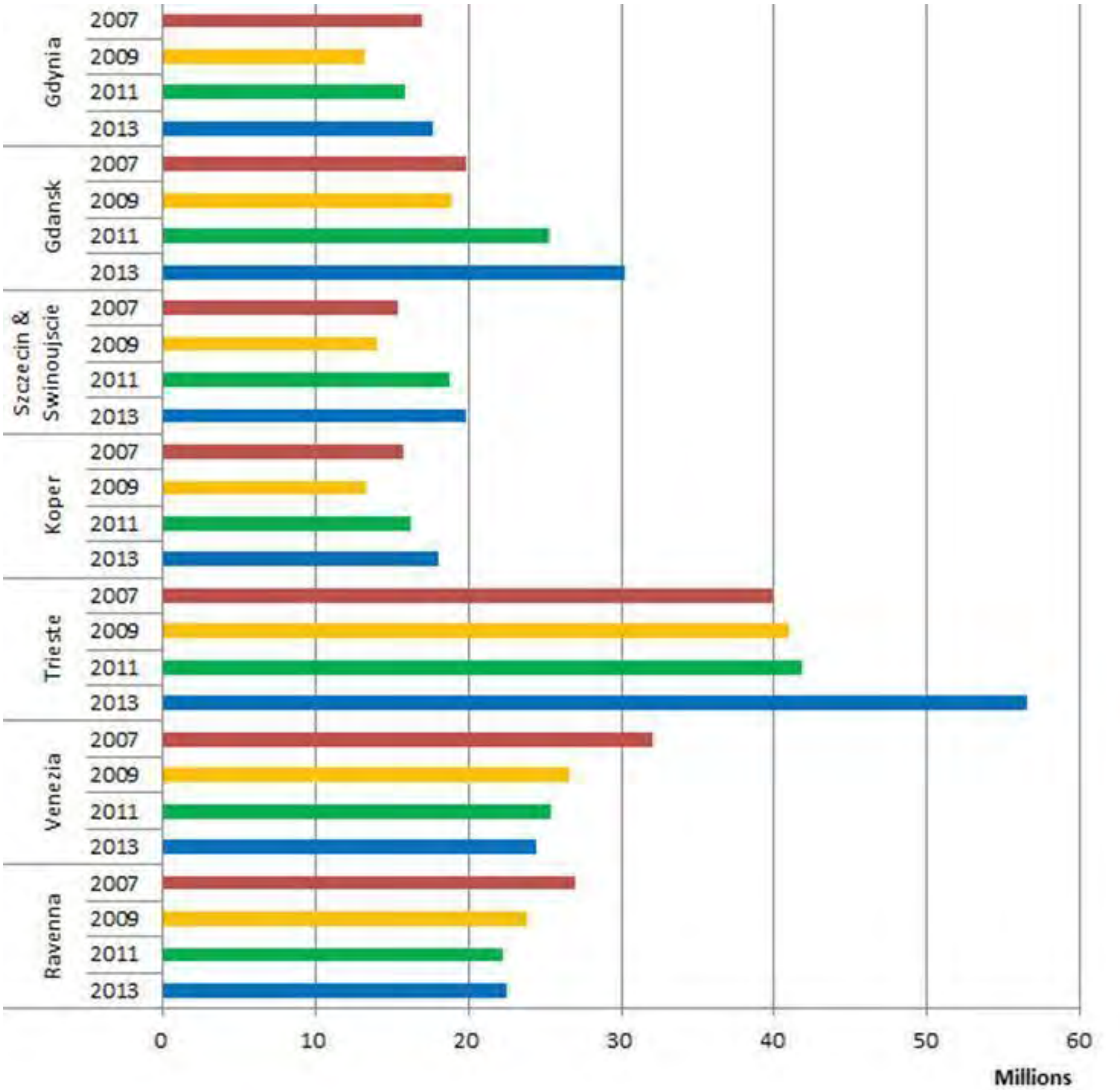
At a finer scale, as observed in the previous map, road traffic volumes are higher when approaching and within the main urban nodes along the BA Corridor, and in particular Gdańsk, Warszawa, Brno, Bratislava, Wien, Ljubljana, Venezia and Bologna.

On the basis of an average load of 1.4 pax/car and 7 tons/truck, the total annual road transport volume is around 44 million passenger*km/year and 51 million tons*km/year, which in both cases is higher than the corresponding performance of the rail corridor infrastructure – although the two systems cannot be directly compared in terms of total transport, given their different extension and alignment.

Cargo traffic of Core BA Corridor seaports

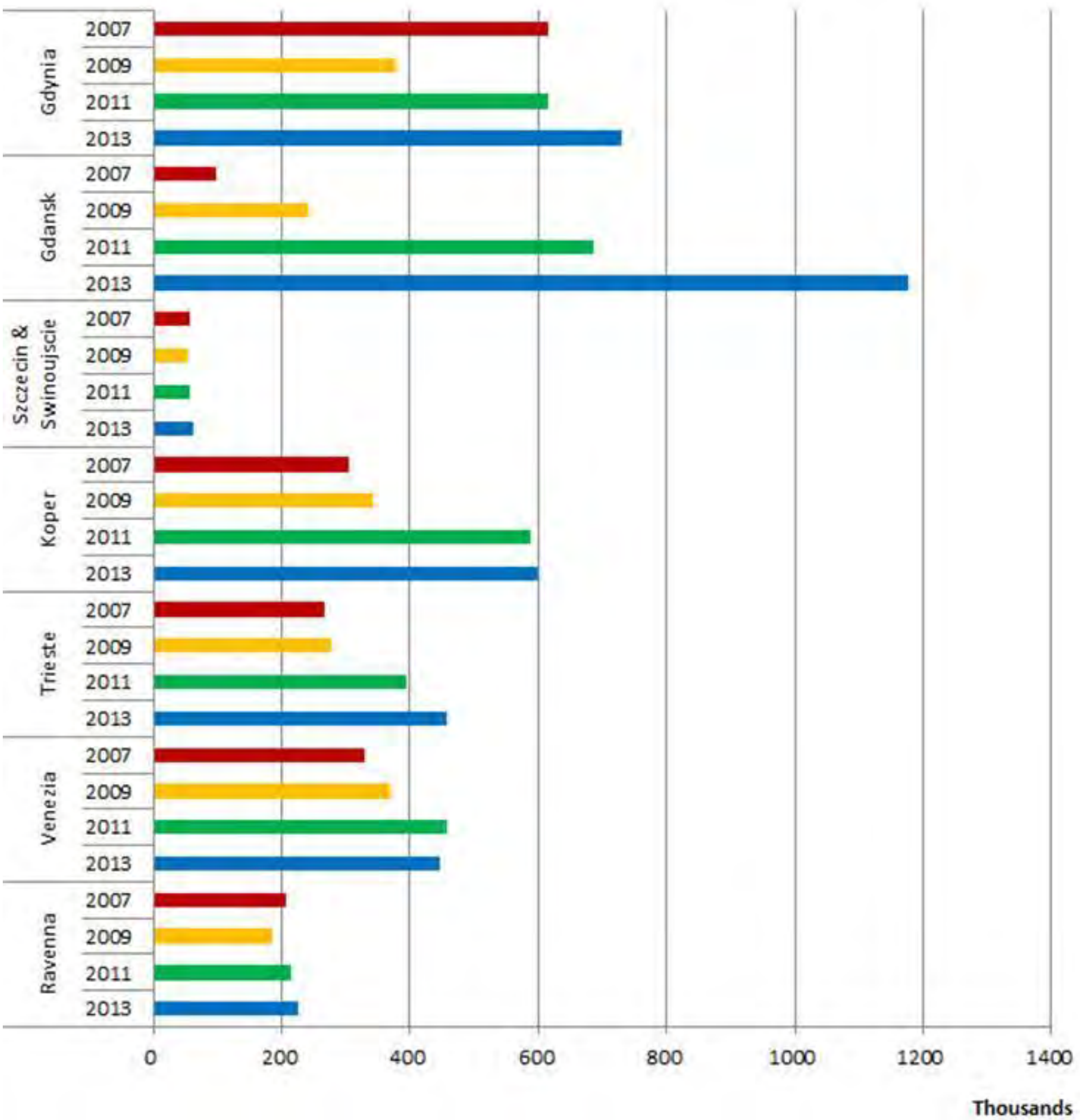
For the core seaports, the next figures and tables show the cargo trends expressed in terms of general tonnes and TEUs (Twenty-foot Equivalent Units) from 2007 to 2013.

Figure 42 Cargo trend of BA Corridor core seaports in tonnes



Source: BA Corridor study consortium based on the ports website.

Figure 43 Cargo trend of BA Corridor core seaports in terms of TEUs



Source: BA Corridor study consortium based on the ports website.

Except Venezia, from 2011 to 2013 the cargo trend increased for any core seaport both in terms of tonnes and TEUs.

Table 20 Cargo trend of BA Corridor core seaports in 1000 tonnes

	2013	2012	2011	2010	2009	2008	2007
Gdynia	17659	15809	15911	14735	13257	15467	17025
Gdańsk	30259	26898	25305	27182	18862	17781	19826
Szczecin & Świnoujście	19910	18870	18744	18652	14030	16630	15393
Koper	17999	16907	16198	14591	13322	16499	15805
Trieste	56585	42144	41803	40557	40986	37195	39833
Venezia	24411	24598	25457	26212	26640	29920	32042
Ravenna	22486	22402	22281	22186	23848	30075	27008

Source: BA Corridor study consortium based on the ports website.

The main seaport for tonnes is Trieste while Gdańsk has the supremacy for the number of TEUs. This is due to the different kind of goods in which the seaports are specialised.

Table 21 Cargo trend of BA core seaports in terms of TEUs

	2013	2012	2011	2010	2009	2008	2007
Gdynia	729607	676349	616441	485255	378340	610767	614373
Gdańsk	1177623	928905	685643	511876	240623	185661	96873
Szczecin & Świnoujście	62300	52178	55098	56503	52809	62913	56321
Koper	600441	570744	589314	476731	343165	353880	305648
Trieste	458497	411247	393186	281643	276957	335943	265863
Venezia	446591	429893	458363	393913	369474	379072	329512
Ravenna	226760	208152	215336	183577	185022	214324	206786

Source: BA Corridor study consortium based on the airports website.

With respect to the inland ports, Bratislava is the main inland port along the corridor, reaching 2.5 million tons in 2012. The inland port of Wien reached 1.16 million tons in 2012.

Passenger flows of BA Corridor core airports

The next table shows the trends of passenger traffic for the core airports: it is possible to see that the main airport is Wien Airport with more than 20 million passengers in 2013. The gap with the second busiest BA Corridor airport is significant since Warszawa Airport last year had just more than 10 million passengers.

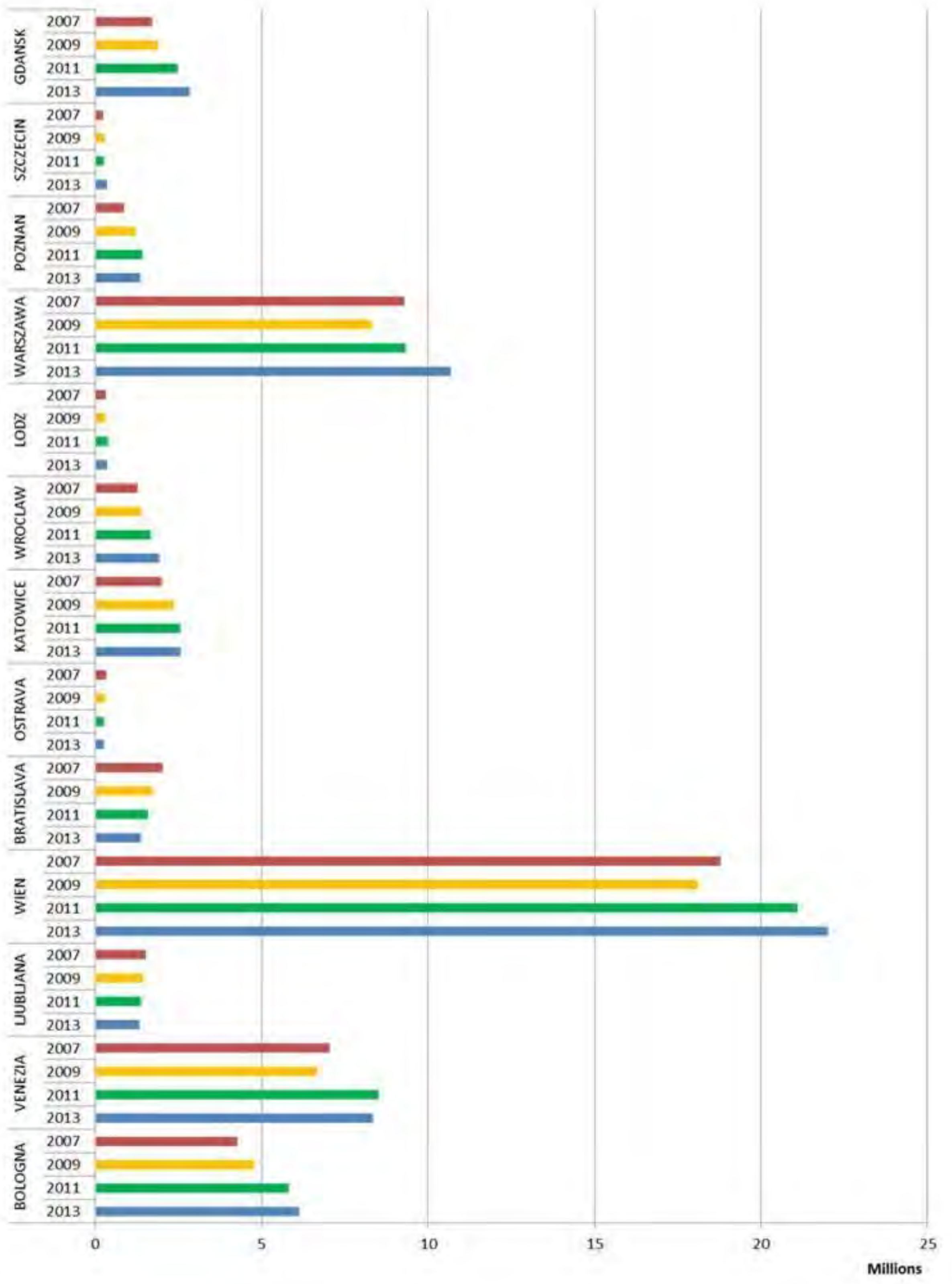
Table 22 Passenger traffic trend of BA Corridor core airports

Core Airport	2013	2012	2011	2010	2009	2008	2007
Gdańsk	2872594	2976277	2483000	2232590	1890925	1954166	1708739
Szczecin	347744	360000	258217	268563	276582	300000	228071
Poznan	1355330	1600000	1425865	1383656	1235942	1270000	863018
Warszawa	10683706	9587842	9337734	8712384	8320927	9460606	9268476
Lodz	353633	460000	390261	413392	312197	340000	312365
Wrocław	1920179	1996552	1657472	1654439	1365456	1486442	1270825
Katowice	2544198	2550848	2544124	2403253	2364613	2426942	1995914
Ostrava	259167	288393	273563	279973	307130	353737	332266
Bratislava	1373078	1416010	1585064	1665704	1710018	2218545	2024142
Wien	21999926	22165794	21106291	19691206	18114427	19747289	18768563
Ljubljana	1321153	1198911	1369485	1388651	1433855	1673050	1524028
Venezia	8327899	8110520	8507691	6801941	6655612	6848244	7032499
Bologna	6127221	5879627	5815971	5432248	4765232	4124298	4253198

Source: BA Corridor study consortium extrapolation based on the airports website.

Generally all airports have increased in terms of passengers in the last years with the only exception represented by Bratislava Airport. As further detailed in the annex, it is worth mentioning that in some cases, other minor city airports exists, which may serve significant traffic volumes.

Figure 44 Passenger traffic trend of BA Corridor core airports



Source: BA Corridor study consortium based on airport data

4.3.3 Key drivers of traffic growth

Demographic and economic background and socio-economic forecasts

Around 125 million European citizens live in the six countries crossed by the BA Corridor, about the 25% of the total population living in Europe. Italy is the most populated country along the axis, followed by Poland and then the Czech Republic, Austria, Slovakia and Slovenia.

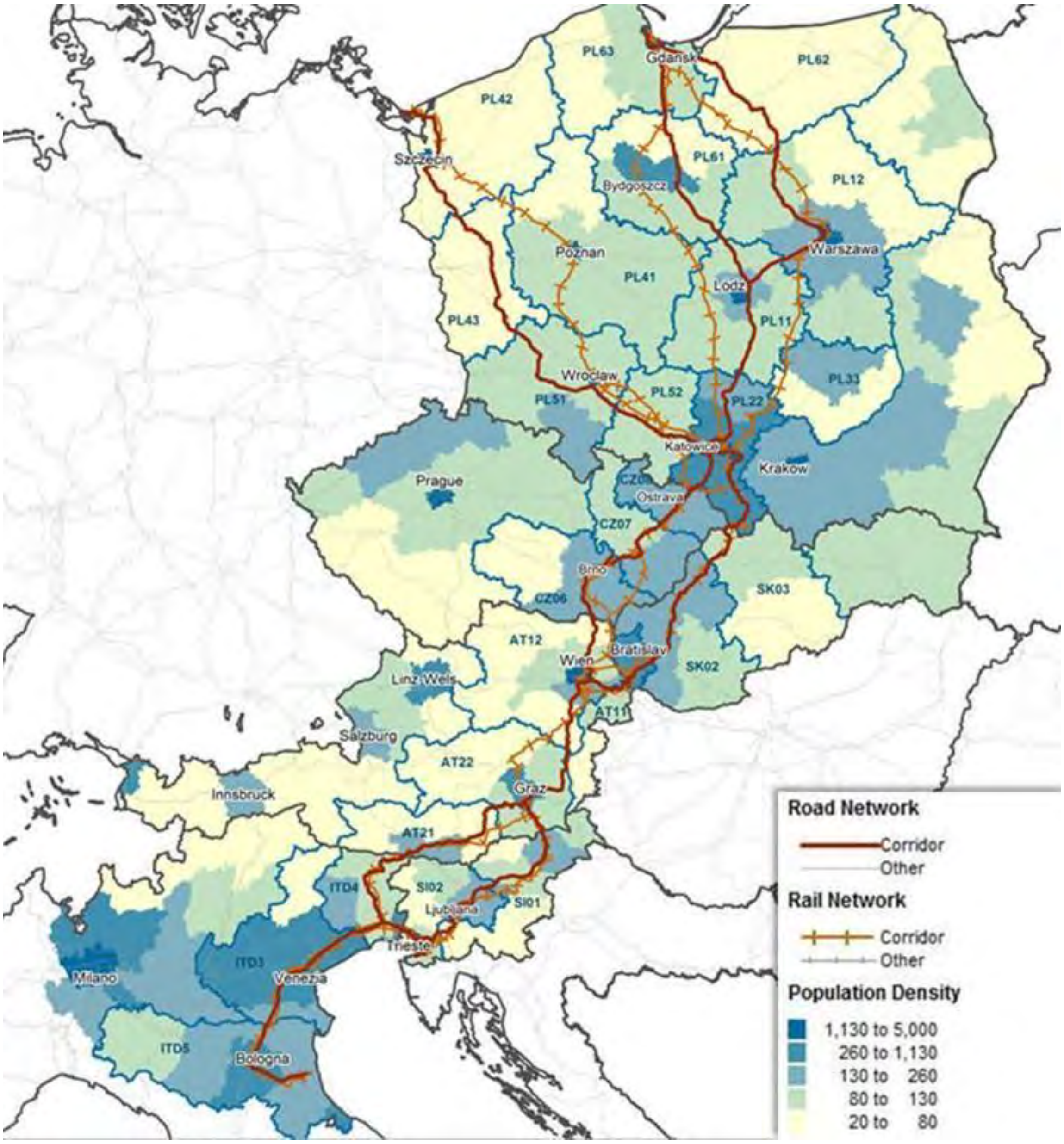
Table 23 2014 Population in the BA Corridor's countries

Countries	Total Population (million) – 2014	% Share over BA Corridor Population	% Share over the total EU28
Slovenia	2.06	1.6%	0.41%
Austria	8.52	6.8%	1.68%
Czech Republic	10.54	8.4%	2.08%
Italy	59.96	48.0%	11.83%
Poland	38.54	30.8%	7.60%
Slovakia	5.42	4.3%	1.07%
Total BA Corridor	125.03	100%	24.66%
Total EU28	506.99		100%

Source: IMF May 2014

The analysis of the population density for 2010 suggests the regions in the Poland-Czech Republic-Slovakia cross-border areas and the main provinces in Poland as well as Wien and Graz in Austria, Bratislava in Slovakia, and the North-Eastern area of Italy (e.g. Venezia, Trieste, Padova, Bologna etc.) represent the key generator/attractor sites along the Corridor; which has an impact on the distribution of passengers and goods.

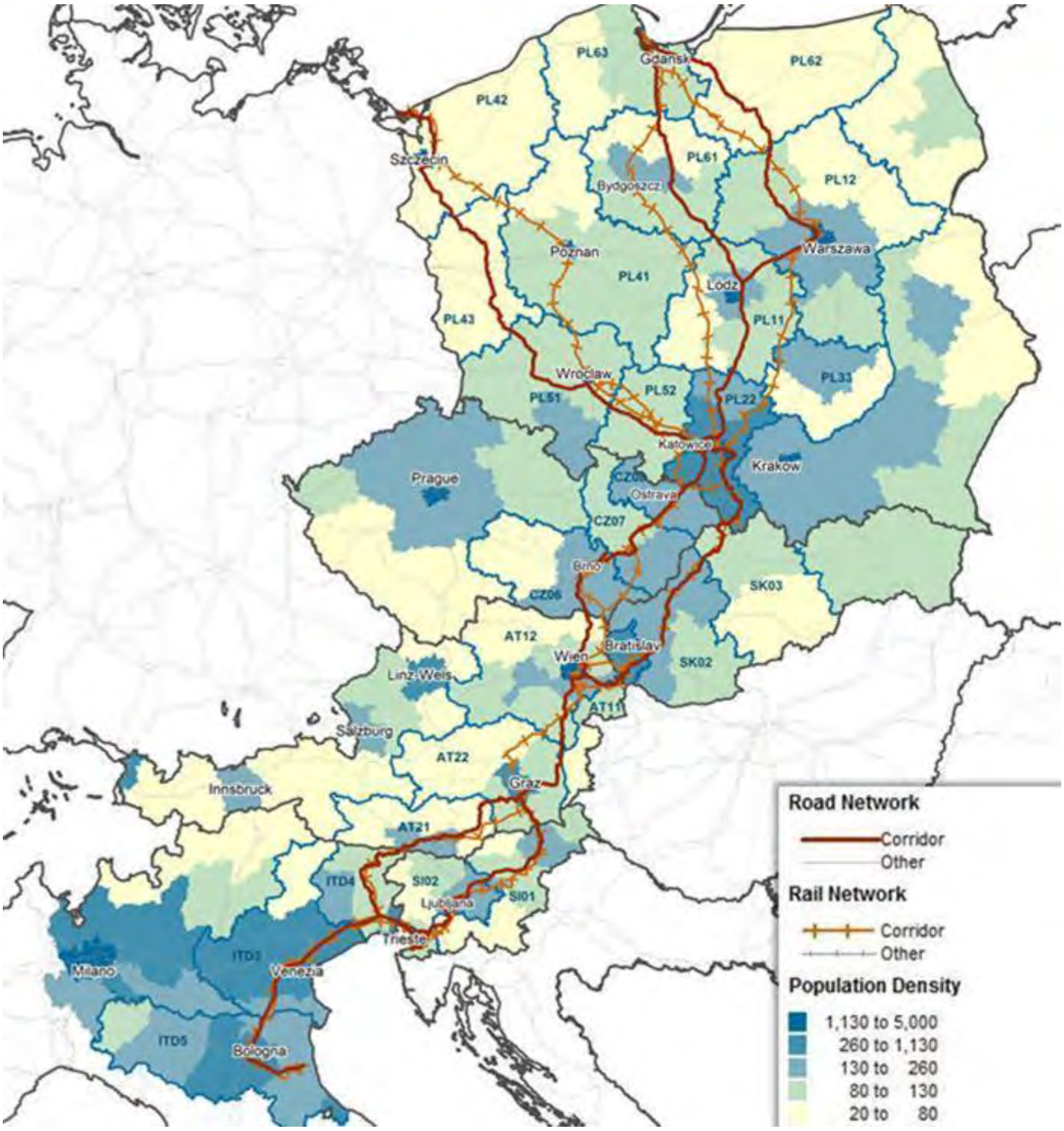
Figure 45 Population Density along the BA Corridor (2010)



Source: BA Corridor study consortium based on ETIS+ data

The population forecast trends for the BA Member States is positive overall, increasing year over year constantly with the exception of Poland and the Czech Republic, particularly in the 2020-2030 period; Italy and Austria are expected to grow at higher rates than the average for the BA Corridor. In line with these expectations, the population density will not vary significantly in the Czech Republic, Slovakia and Slovenia during 2014-2030; it is expected to grow in the Emilia-Romagna region in Italy (2020) and in the Wien South-Western area (2030) whereas in the *Lubuskie* region in Poland population may decrease by 2030.

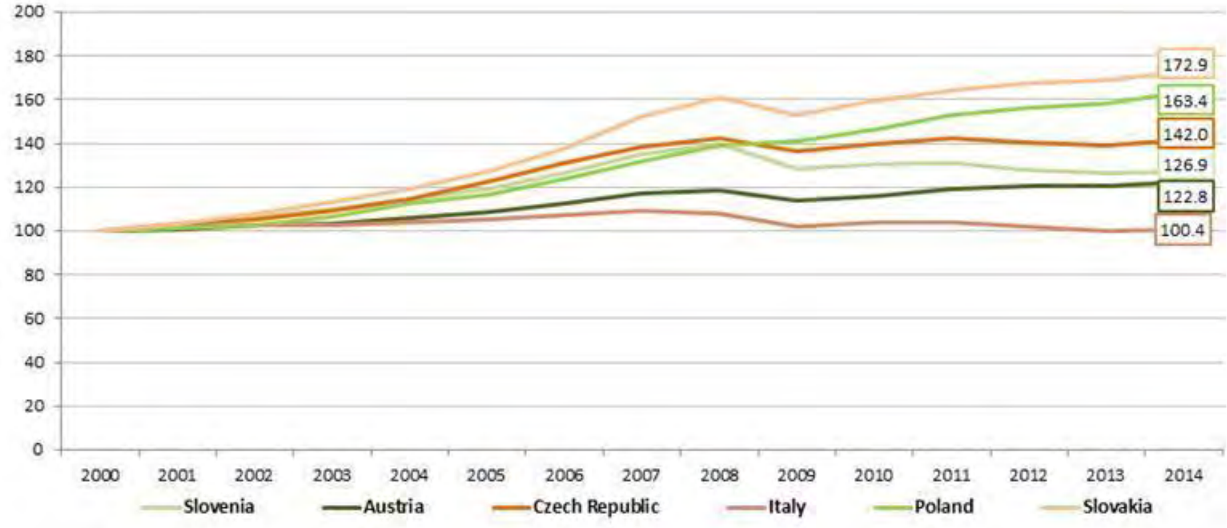
Figure 46 Population Density along the BA Corridor (2030)



Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

In correlation with the positive population trend the national real Gross Domestic Product – GDP – (shown in the figure overleaf) is also generally increasing for the countries along the BA Corridor, with a slowdown and decline in the 2008-2012 period due to the international economic crisis. Some countries such as Italy, Austria and Slovenia are facing a stronger economic recession in the recent years and the forecasts present a lower positive emphasis with respect to the Czech Republic, Poland and Slovakia. This is particularly the case for Italy which has been highly affected by the economic crisis thus reaching in 2014 around the same GDP level as in 2000 year. On the other hand, Poland seems relatively unaffected by economic crisis and presents the highest GDP growth rates amongst the six countries along the BA Corridor.

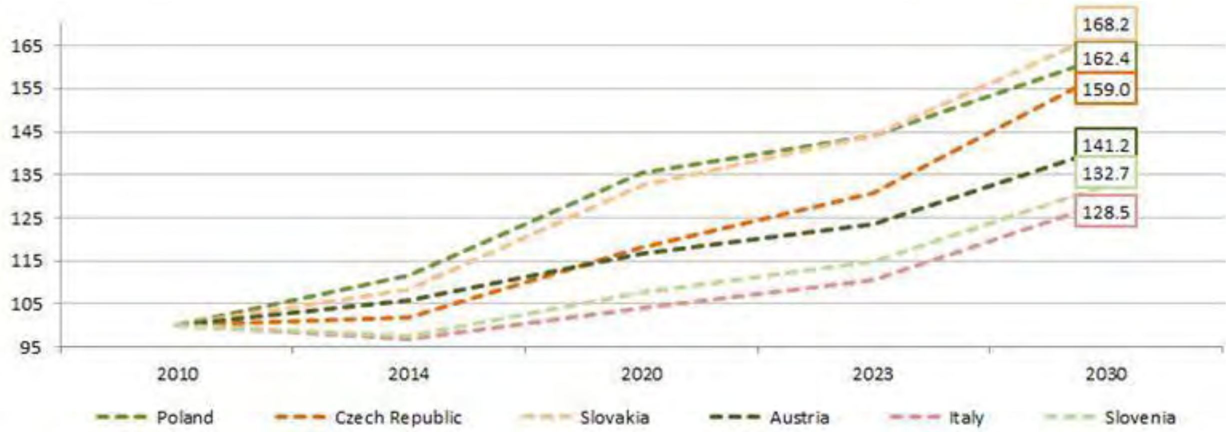
Figure 47 2000-2014 Real GDP historical trend



Source: BA Corridor study consortium based on IMF

As for the population projections, also the GDP of the BA Member States is expected to continuously grow in the next years. Particularly, the 2030 Italian GDP will be 28.5% greater than in 2010 which however represents the lowest growth compared to the other BA countries. In line with this most recent negative trends and with the 2013 *Long-term Growth Scenarios* published by the OECD Economics Department (Working Papers No. 1000), the GDP growth in Italy is projected to be persistently weak; on the other hand, renewed policies also including fiscal consolidation could boost the economy in the long-term projections.

Figure 48 2010-2030 GDP trend for the BA Member States



Source: BA Corridor study consortium based on IMF and OECD database

Based on the forecasts as shown on the figure above, the GDP long-term projections for Poland and Slovakia seem acting the best performance amongst the BA Member States. According to the Economist Intelligence Unit (*EIU*), the productivity growth (labour productivity growth is forecast to be 3.4% over the next two decades) in Poland will continue to be strong also thanks to an improving policy background and the gradual adoption of modern technology, including a boost to investment for research and development (R&D).

With regard to Slovak Republic, the GDP forecasts are very positive as well, despite slower average growth rates than in the 2000s. Also in line with the *EIU,* the decline in the working-age population will affect the potential for faster growth as average incomes and productivity increase and the economy matures.

The figure above also shows the GDP for the Czech Republic is expected to have a very positive growth in the 2020-2030 period. In accordance with the *EIU long-term outlook*, in the medium term, the high rates of unemployment will hold back labour productivity whereas over the longer term a steady expansion of economic output is expected.

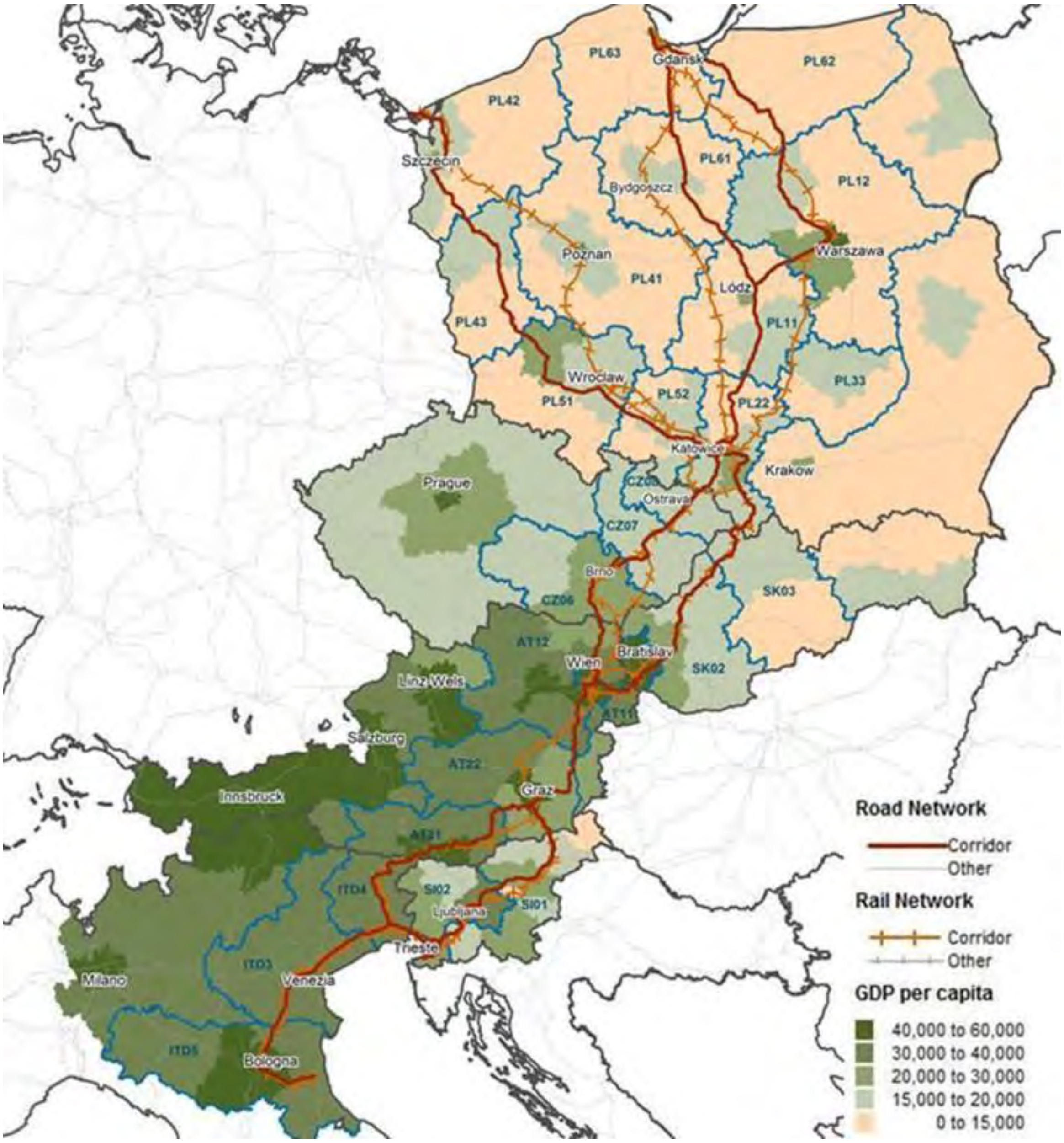
Slovenia, Italy and Austria have also positive GDP growth rates although lower than the ones for Poland, Slovakia and Czech Republic.

Figure 49 GDP per capita along the BA Corridor (2010)

Source: BA Corridor study consortium based on ETIS+ data

The maps above and below show the distribution of the GDP per capita per region at 2010 and 2030. In both maps the Southern area of the BA Corridor remains the richest area. More in detail, at 2010, the GDP per capita is highest in Italy and in Austria; particularly Bologna province in Italy, and Klagenfurt-Villach, Graz and Wien provinces in Austria are the richest ones crossed by the BA Corridor. During 2015-2030 the GDP per capita continues growing in the Southern richest area of the BA Corridor – particularly in Austria and in Italy – but with high income areas expanding from South to North. In particular, in the Czech Republic the GDP per capita is expected to grow with more emphasis in the 2020-2030 overall the country. Also, in the regions surrounding the main cities in Poland as well as in the area around Bratislava, the income per head will significantly increase.

Figure 50 GDP per capita along the BA Corridor (2030)

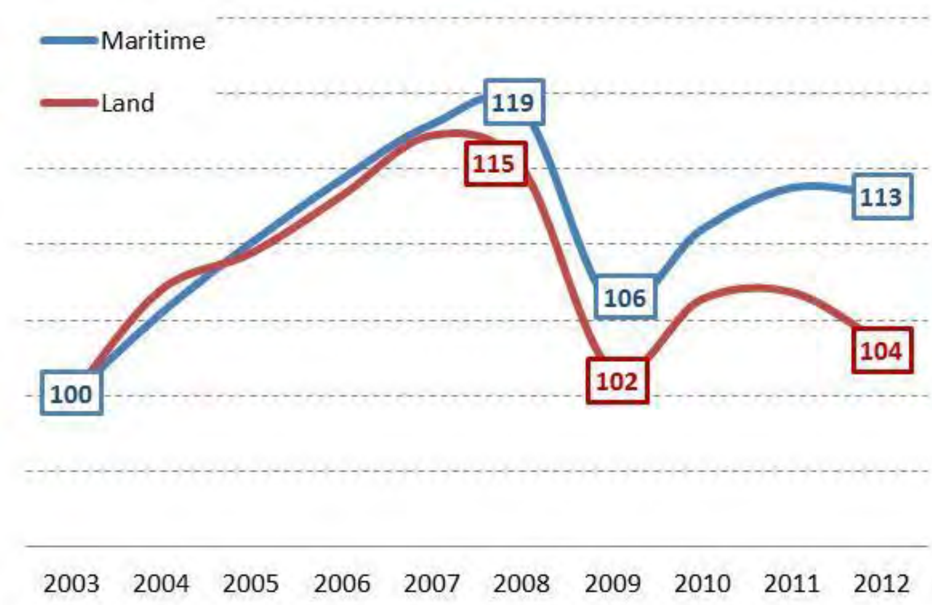


Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

The role of global trade

Growth in global trade is one of the main drivers in freight transport flows, also because the recent trend indicates that in Europe, flows coming from third commercial partners are growing at a faster rate than the inland transport within the Union. Especially, recovery after the 2009 world crisis is more evident for the intercontinental flows.

Figure 51 Historical trend of maritime and inland freight traffic (2003=100)



*Source: BA Corridor study consortium based on EUROSTAT data. Maritime traffic trend is based on the total flow (in tons) recorded at the main EU ports. The inland trend is based on the total intra-EU transport flows in tons*km, including road, rail and inland waterways.*

In line with these considerations, the expected growth at maritime and inland ports is included in our prognosis of the growth in rail and road transport in terms of generation/attraction points of additional freight demand, with growth rates that are generally twice as much as the growth in internal freight transport.

4.3.4 Results of the transport market study

Our market analysis of the rail and road transport flows along the corridor has been developed by means of a multi-modal model, which has been developed ad hoc for this study, covering the BA Corridor area at the level of NUTS3 units.

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 included in the list of investments presented at Table 33;

- **2030RP** (*Rail Policy scenario at 2030*) – describing the interaction of the travel and transport demand at 2030 and with the corridor infrastructure improved based on the major rail and road investments presented at Table 33 (as for the 2030WP scenario), combined with policy and administrative measures aimed at reducing by 20% the generalized transport cost of the rail mode compared to road transport (such as the internalization of the total transport costs, the promotion of more attractive rail services, the effect of the on-going liberalization process in railways and the IV railway package, the removal of administrative and operational barriers). This last assumption does not constitute an assessment of the likely impact of these measures, but is only aimed at providing an indication of the magnitude of the possible modal shift and its implication on the available rail capacity on the BA Corridor.

In the interpretation of the results of our TMS, the scope of our study, 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.

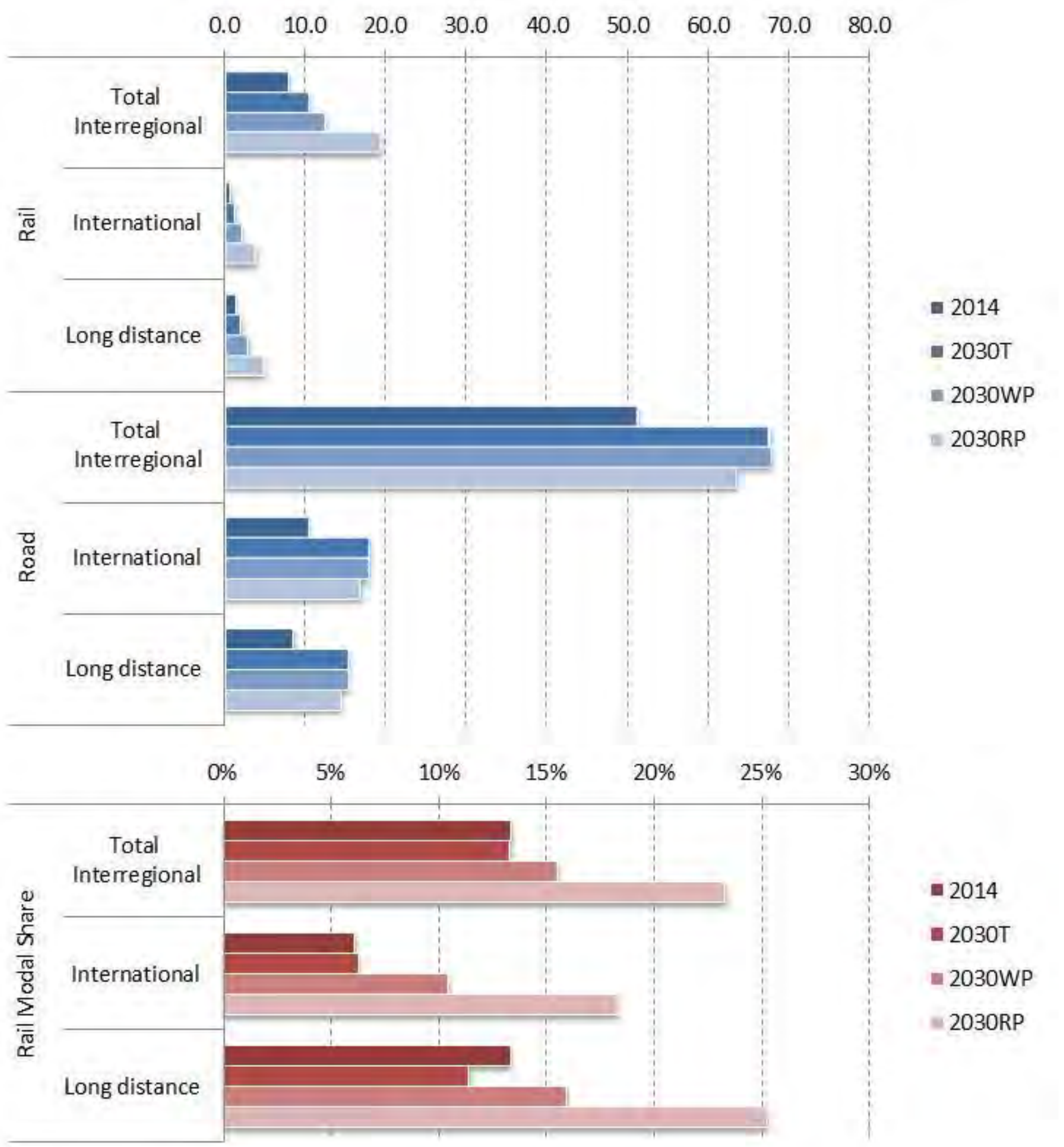
Notwithstanding these limitations, by comparing the outcomes between the different scenarios, the analysis provides clear indications concerning the main trends in the transport performance by mode and the potential effects of the rail and road transport investments presented at Table 33 together with policy measures aimed at supporting the use of railway and environmentally friendly transport solutions. The results presented in the following charts are focused on the interregional[3], 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 is around 13% for passengers (measured in pax*km) and 19% for freight (measured in tons*km); the rail modal share is significantly higher for long distance freight transport (39%). It is worth noting in this respect that the corridor already satisfies the 2030 freight modal share target of the 2011 White Paper (30% rail share for trips longer than 300 km);
- The transport demand is expected to grow significantly by 2030, both on rail and road, although at a reduced pace when compared to the historically observed trends. In the do-nothing scenario, the growth in the total inter-regional demand along the corridor is around 32% for passenger and 33% for freight;
- Without significant investments, rail share is expected to remain stable for passengers (13%) and is envisaged to decline slightly for freight (18%), due to a combination of increasing car ownership (especially in the Eastern European countries), also combined with the forecast demographic development;
- The investments in rail and road infrastructure, as included in the list at Table 33, have a positive, although limited effect in counterbalancing this trend, with rail demand exceeding the current market shares (15% for passengers and 21% for freight), with major increases in the international and long distance market segments;
- The results of the fourth developed scenario (2030RP) show that additional policy and administrative measures could contribute to a great extent in the promotion of rail transport, with market shares for this mode rising to 23% of interregional demand for passenger and 24% for freight (43% for long distance trips). While these changes may appear limited in terms of modal shift, the combination of this shift with the natural growth of the rail market will lead, under this scenario to

[3] The inter-regional demand includes only trips occurring between two distinct NUTS2 regions both located along the BA Corridor alignment. The long distance demand includes inter-regional trips longer than 300 km.

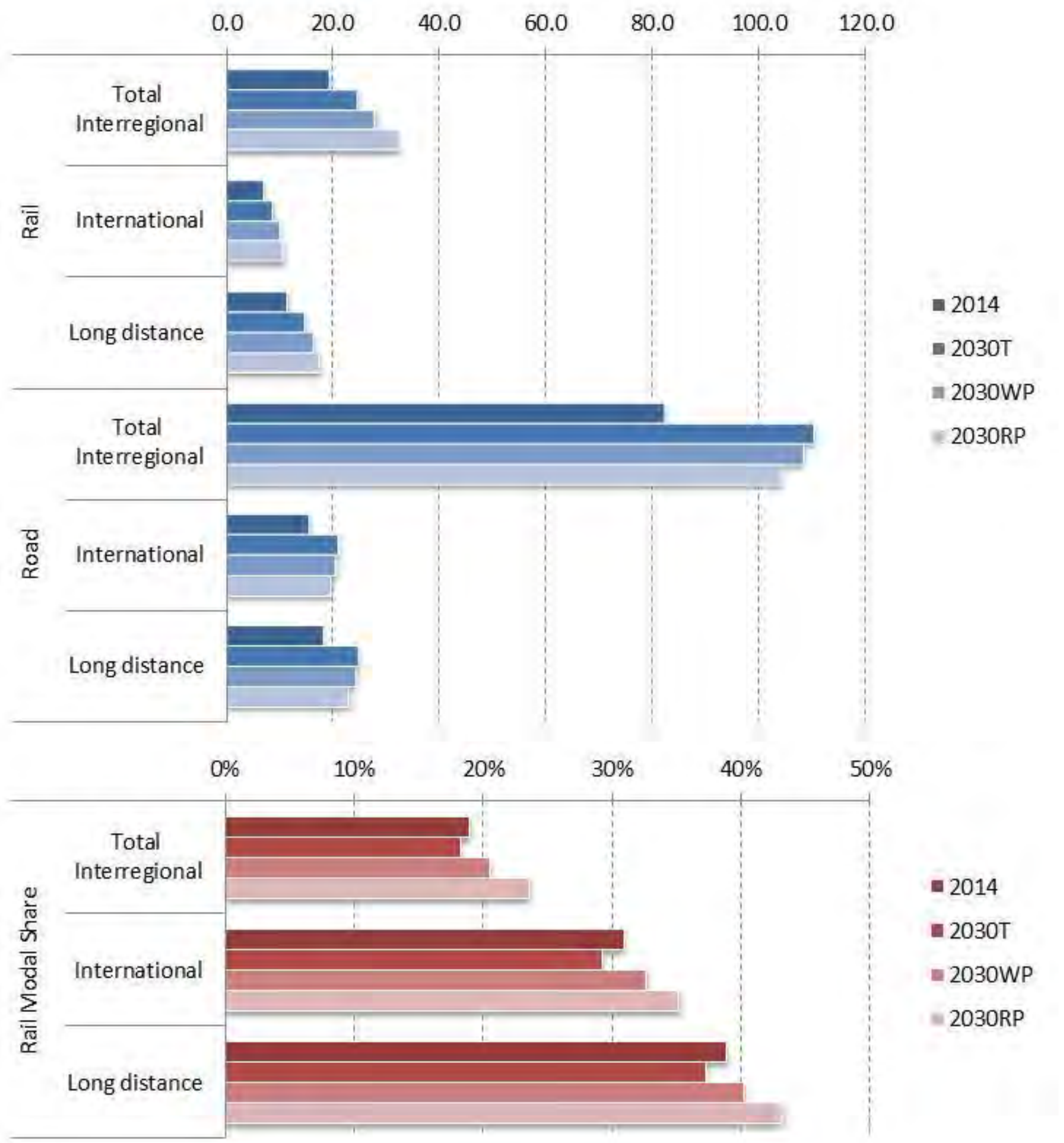
doubling of the current rail volumes – which may induce potential capacity issues on the BA Corridor.

Figure 52 Performance and modal share of the BA transport modes (millions of pax*km/year)



Source: BA Corridor study consortium

Figure 53 Performance and modal share of the BA transport modes (millions of tons*km/year)

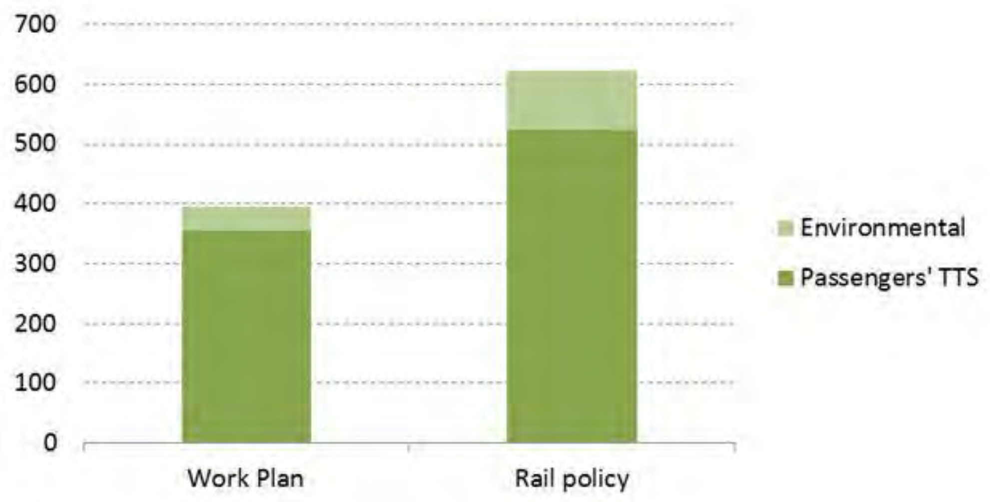


Source: BA Corridor study consortium

As an additional output of our TMS, we provide in the following chart an indicative quantification of the main benefits associated to the 2030WP and 2030RP scenarios (do-something) in comparison with the 2030T (do-nothing), applying monetary conversion factors[4] to the passengers' travel time savings and air pollution and greenhouse gas emissions for the inter-regional TEN-T road and rail flows.

[4] Sources: *HEATCO* for Value of Travel Time Savings and *Update of the Handbook on External Costs of Transport* for the Environmental Benefits

Figure 54 Benefits of the do-something scenarios (millions of 2010 €/year)



Source: BA Corridor study consortium

Although a comprehensive and detailed assessment of the benefits associated with the implementation of the work plan investments is out of the scope of this study, it is worth noting that the benefits generated for the inter-regional demand alone are in any case significant in both scenarios, with a total value of around 400 € million per year (2010 prices) in the Work Plan scenario, increasing up to over 600 € million if additional policies to increase the competitiveness and efficiency of the rail transport system are implemented.

4.3.5 Capacity issues on the rail and road networks

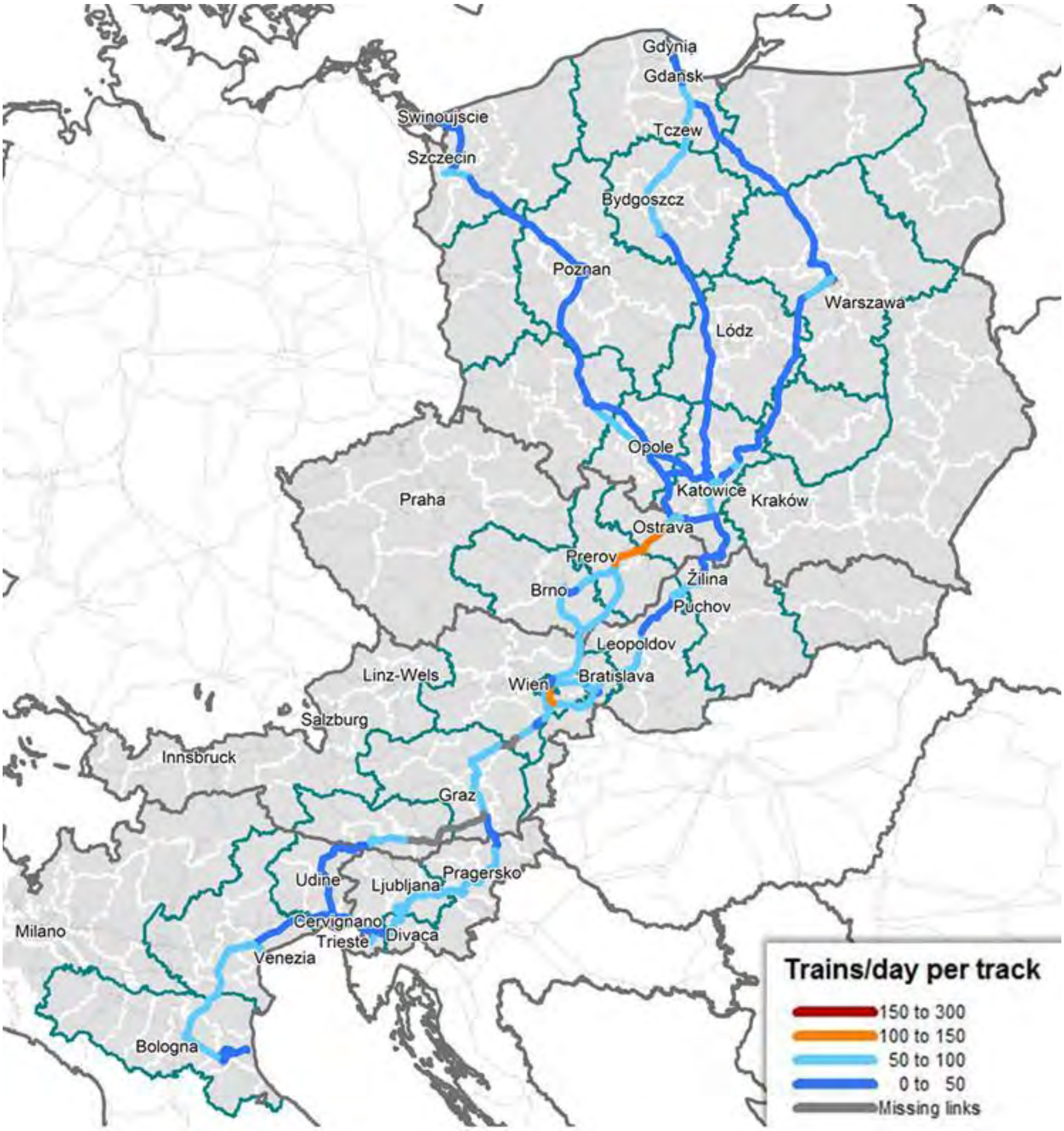
Our identification of the possible capacity issues on the rail and road corridor infrastructure is based on the analysis of the current and predicted traffic volumes in comparison with the available number of rail tracks and road lanes.

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 examination (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 to identifying in advance possible capacity issues in the mid and long term.

Flows and capacity on the rail network

The following map shows that current rail flows are generally below the critical level - set in our analysis at 150 trains/day/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 generalized short term issue for the corridor.

Figure 55 Intensity of rail transport (2014, trains/day/track)



Source: BA Corridor study consortium elaboration based on TENtec data and sections

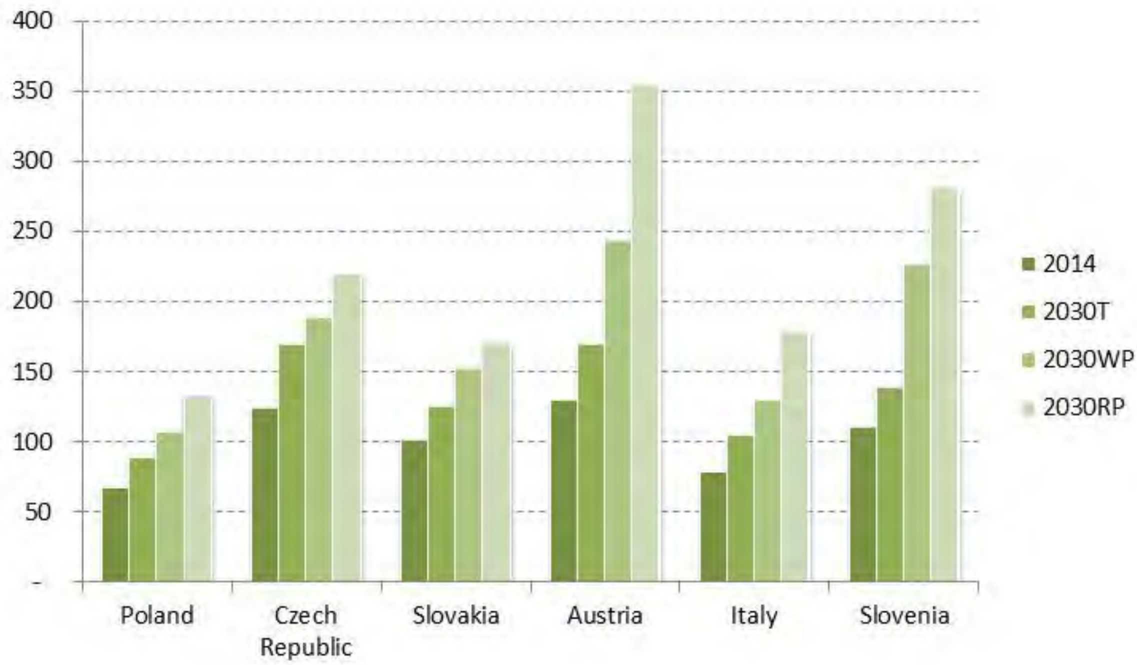
On the other hand it is also worth noting that by restricting the analysis to the workday rather than to the calendar days some sections of the BA Corridor already present high levels of traffic, such as the Graz-Bruck/Mur section, with 240 trains per workday and the single line section connecting Werndorf to Spielfeld-Strass/Sentilij with 112 trains per workday between Werndorf and Leibnitz. The section Brno-Přerov is also worth mentioning in terms of capacity, although not directly resulting from our analysis as significantly critical due to the replacement of railway services with bus operations for capacity related issues. Investments are already planned to increase capacity on these lines.

In the medium and long term, the improvement of the railway infrastructure will induce a significant growth in the corridor rail transport volumes, which will be even higher in the case of effective implementation of modal shift measures.

Based on our analysis, the current available capacity will be sufficient to accommodate train traffic growth along the corridor in the do-nothing scenario (2030T). It should be however noted that in certain urban and metropolitan areas, new services are going to be implemented, i.e. Bologna node, expected to increase services between Bologna and Castelbolognese, and Gdynia/Gdańsk where the Pendolino high speed and the Pomerania Metropolitan rail services are planned to be introduced in the future. 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.

The current available capacity is also deemed to be generally sufficient to accommodate traffic growth in 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 will be mainly located in urban nodes (Warszawa and Katowice in Poland, Wien in Austria, and Ljubljana in Slovenia) and in specific sections (Ostrava-Přerov in the Czech Republic). In addition, high traffic flows might occur in the Austrian section between Werndorf and Wiener Neustadt, also as a result of traffic induced by the completion of the Alpine crossings (Semmering and Koralm). In any case, investments are already planned or under consideration on these sections to allow accommodating for the expected traffic increase.

Figure 56 Average train flows along the corridor (trains/day)



Source: BA Corridor study consortium

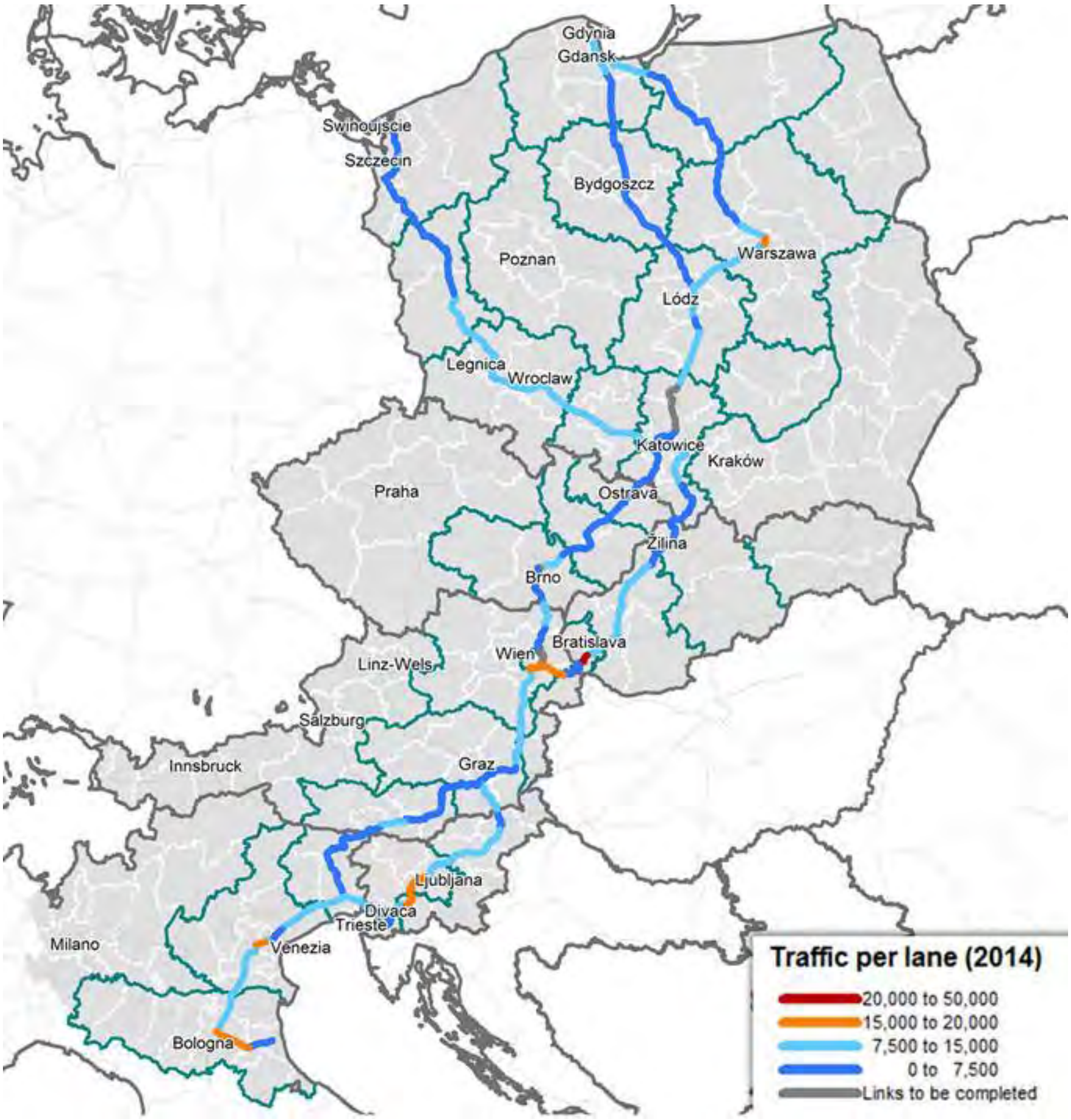
It is therefore only in the case of a more significant shift of transport demand towards the rail mode (such as the one depicted in the 2030RP scenario) that capacity issue might arise on the corridor, limiting the effective growth of the rail mode and the smooth flows of long distance transport. However, 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 BA corridor.

All the above considered it is worth noting that, under the applied approach, the growth in the corridor train traffic is also associated 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 BA corridor.

Flows and capacity on the road network

The following map shows that current road flows are generally below the critical level - set in our analysis at 20,000 veh/day/lane.

Figure 57 Intensity of road transport (2014, veh/day/lane)

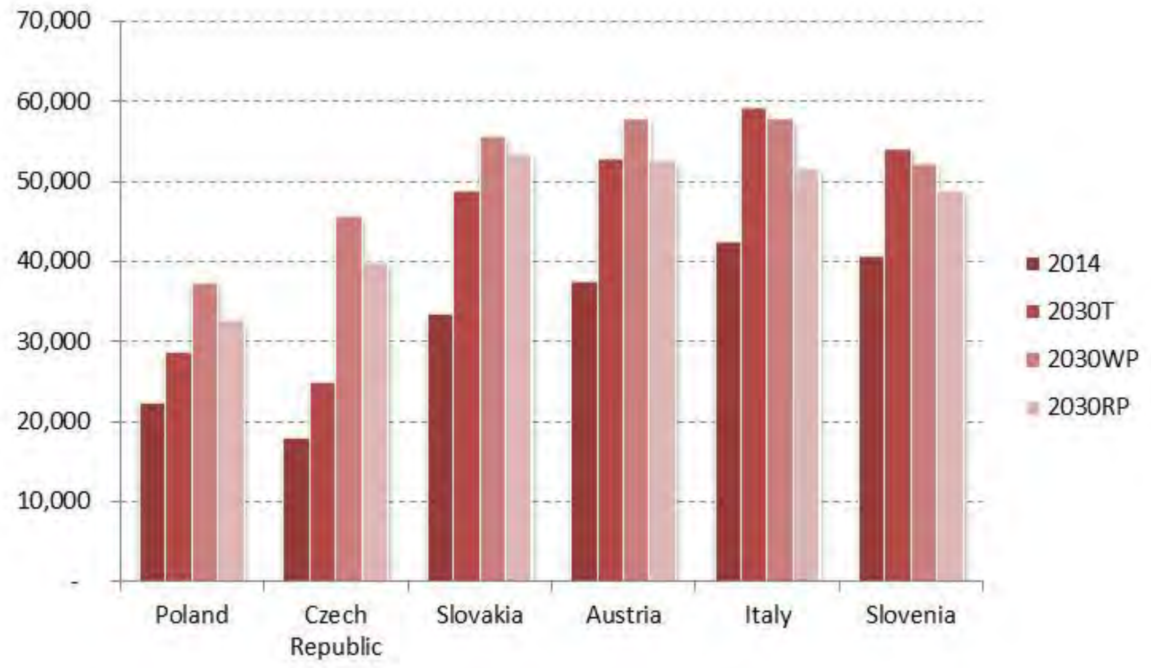


Source: BA Corridor study consortium elaboration based on TENtec data and sections

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 within the urban area in Bratislava, where projects for a new external by-pass are being developed – although not included in our corridor alignment.

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

Figure 58 Intensity of road transport (vehicles/day)



Source: BA Corridor study consortium

The available infrastructure capacity (also taking into account the full implementation of all investments already included in the corridor work plan) will generally be adequate to accommodate growth in road transport volumes for all scenarios under assessment. Limited and specific exceptions to this situation may occur within or in the approaches to major urban nodes, in particular in Warszawa, Brno and Bologna.

It should be noted that issues in Warszawa and Bologna seem more limited and might be solved by the implementation of modal shift measures, while the capacity issues in Brno might call also for capacity improvements in the mid or long term.

4.4. Critical issues on the BA Corridor

This section of the report identifies the critical issues that may affect the development and seamless operation of long distance flows of goods and passengers along the BA Corridor intended as an intermodal and interoperable infrastructure.

In accordance with this overall aim of the TEN-T policy as defined by EU Regulations 1315/2013 and 1316/2013, critical issues have been identified with reference to the following key priority interventions areas, also in line with the general objectives set in Art. 4 of EU Regulation 1315/2013:

- Improvement of **cross-border sections** to support operation and development of traffic flows between EU Member States along the Core Network Corridors;
- Elimination of **missing links** along the BA Corridor;
- Elimination of technical barriers hampering the **interoperable use** of the infrastructure under the European single market perspective, particularly **ERTMS**;
- Improvement of the interconnections to transport nodes and particularly ensure compliance to regulation in what concerns connection to ports, airports and rail road terminals to the BA railway and road networks and, that **last mile connections** to ports and airports are adequate to meet existing demand and support the growth of intermodal traffic;
- Improvement or upgrading of the rail and road network, also ensuring that the BA Corridor links are compliant to the EU Regulation 1315.

In addition to the above mode specific intervention areas the New TEN-T policy also identifies additional horizontal issues, as also referred to at Section 3 above, which relate to the need to implement solutions aimed at providing safe and secure passenger and freight movements (Art. 34); and allowing for seamless mobility and accessibility for all users, in particular elderly people, persons of reduced mobility and passengers with a disability (Art. 37). For the scope of this study it is assumed that projects and solutions that will be included under the work plan aimed at solving one of the above mode specific critical issues, possibly also aim at considering the above targets as well as other requirements set by relevant regulations, including compliance to TSIs.

The analysis, identification and description of the critical issues have been based on the following methodology:

- The analysis of the problems affecting the **cross-border sections**, the identification of the **missing links** along the BA Corridor and more generally the need to **improve/upgrade the rail and road links** along the axis refers to the results of the analysis of the compliance of the infrastructure with the requirements of the Regulation EU 1315/2013 as also presented at Sections 4.2.2 and 4.2.3 above; The analysis of the compliance has been confirmed and integrated by means of the review of existing studies (as also reported at Section 3 above and at Appendices B and D below), discussions with the relevant stakeholders and professional knowledge of the Ba Corridor;
- The definition of the **critical issues** at urban **nodes**, at railway stations and junctions, as well as at transport nodes and particularly the analysis of the **last mile connections** to ports and airports has been based on the review of existing studies (as also reported at Section 3 above as well as at Appendices B and D below), discussions with the relevant stakeholders and professional knowledge of the BA Corridor;
- The analysis of the critical issues affecting the BA Corridor railway and road links has also been integrated by means of an analysis of the **traffic flows** on the corridor as a result of the market study presented at Section 4.3 above, simulating the utilisation of the railway and road sections at 2014 and at 2030 and used as a proxy for the analysis of the BA Corridor capacity;

- The analysis of **interoperability**, including **ERTMS** as well as VTMIS, RIS and ITS; and that of the administrative barriers affecting the effective and efficient operation of terminals or cross-bordering activities impacting on the competitiveness of intermodal transport solutions and/or long distance international services has been made with reference to existing studies as also reported at Section 3 above and Appendix B below).

The results of our analysis are presented in the sections below, excluding the results of the market study and more specifically the ones relating to the analysis of the traffic flows along the BA Corridor. These are commented at Section 4.3.2 above. Our analysis shows that with reference to existing and future likely flows of traffic on the BA Corridor no specific critical issues in terms of capacity are worth noting at present, which does not however aprioristically exclude that capacity problems may occur in the future, particularly in the proximity of urban agglomerations and other major demand generation points and on the lines and roads interconnecting these nodes. In these terms our study may underestimate the extent and severity of specific situations where long distance flows add up and mix with the regional, metropolitan or even local traffic.

Although not included on the BA Corridor alignment, issues exist on several comprehensive lines and roads that are deemed functionally relevant as alternative or complementary routes to the BA Corridor links. Examples include freight railway line 201 in Poland providing accessibility to the Port of Gdynia, several freight railway sections in the North of Italy between Padova/Mestre-Treviso, Udine-Treviso, Udine-Gorizia, Gorizia-Bivio S.Polo. These and other links have been also mentioned in Appendix C on the BA Corridor alignment, although they have not been reviewed under the scope of this study because these are not part of the Corridor Alignment.

4.4.1 Cross-border sections

The major cross-border bottlenecks on the Corridor have been identified with reference to the following cross-border sections:

Railway sections

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

Road sections

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

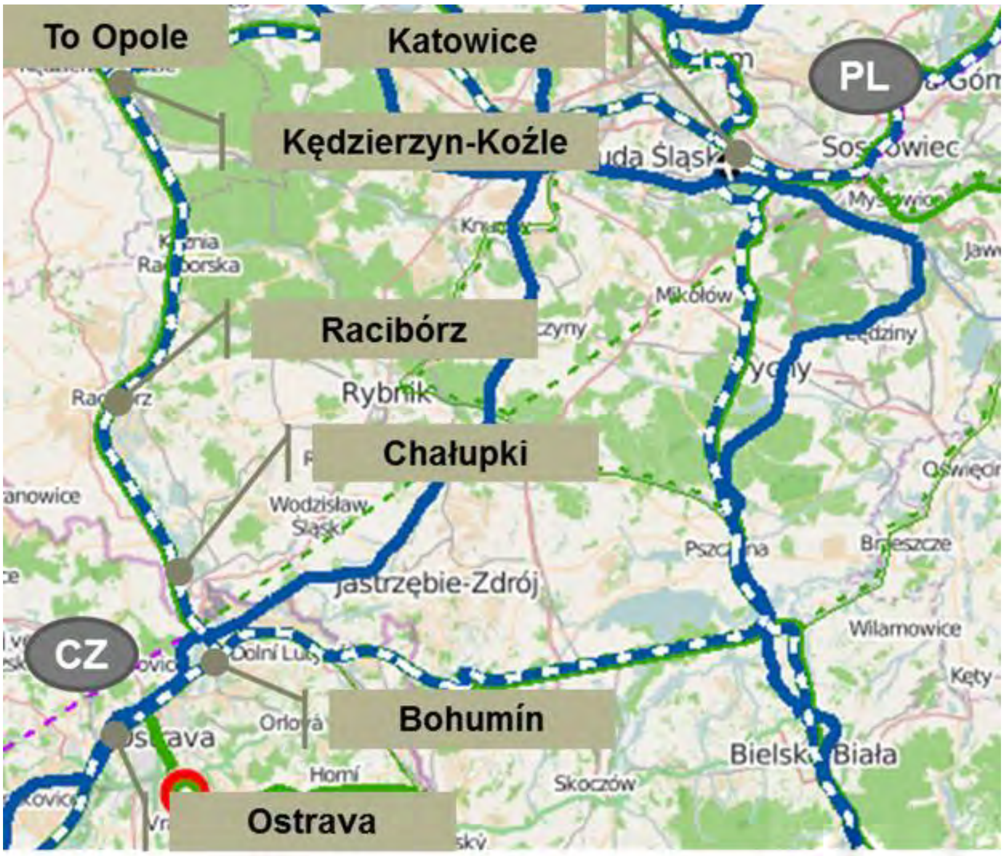
In this section we provide a description of the critical issues identified at these cross-border sections.

Railway Section: Opole (PL) – Ostrava (CZ); [Chałupki (PL) – Bohumín (CZ)]

On the Polish side the 20 km long double track section Racibórz-Chałupki (part of Opole-Chałupki railway line), requires modernisation, due to speed limitations (50 km/h for almost 17 km) on one of the two tracks. Limitations on axle load and train length are also present on this section.

On the Czech side, two parallel single track sections are in operation. The short cross-border section Bohumín Vrbice / Bohumín, state border - Chałupki allows for operating trains up to 100 km/h for passenger and freight services. The remaining sections in the Czech Republic were already modernized to increase the speed up to 160 km/h, including the modernisation of the Bohumín station.

Figure 59 Railway section Opole (PL) – Ostrava (CZ); [Chałupki (PL) – Bohumín (CZ)]



Source: BA Corridor study consortium based on TENtec

On the Polish side, the Feasibility Study for the section Kędzierzyn-Koźle - Chałupki (state border) is planned to be completed in 2016. Scope of the study includes improvement of international connection parameters, freight transport speed increase, and increase of axle load and train length as well as ERTMS.

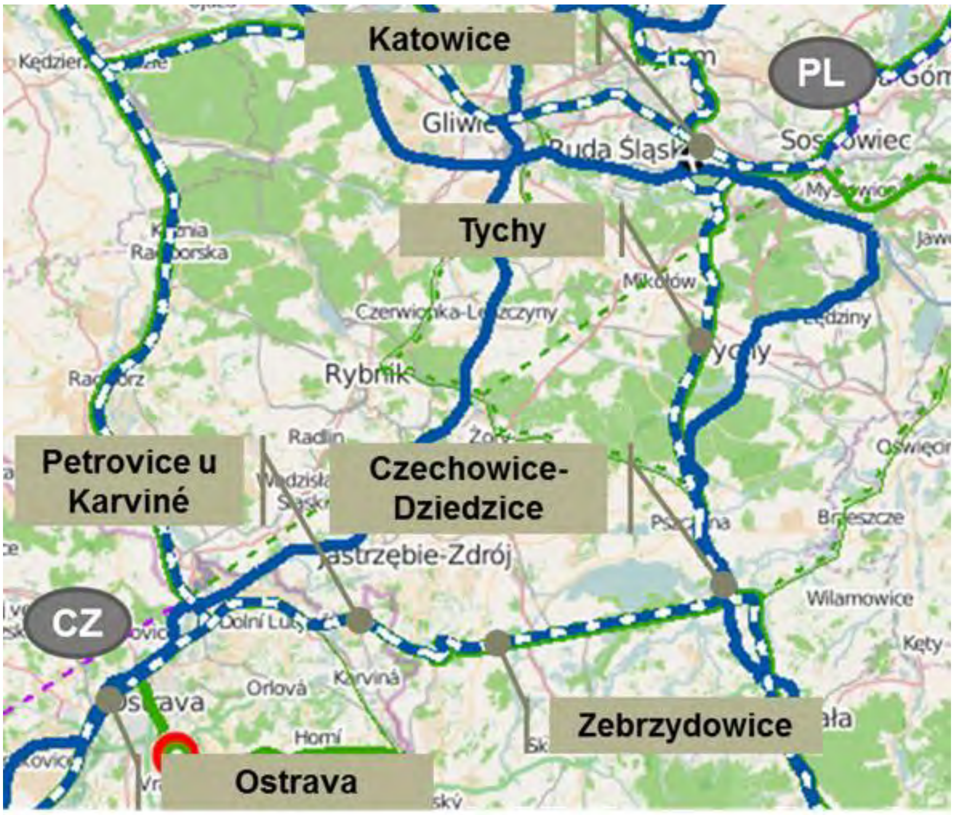
No investments are currently planned on the Czech side. The cross-border section is expected to benefit from the completion of the modernisation of the Ostrava junction.

Railway section: Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]

On the Polish side, the section from Katowice-Zebrzydowice (74 km) has highest maximum speed of 120 km/h on 72% of the total section length; the lowest maximum speed on the section is 70 km/h (12%). Additionally, restrictions exist in terms of axle load and train length standards.

On the Czech side, the section from the state border to Petrovice u Karviné and Ostrava has been modernised since 2002, increasing the speed up to 120 - 160 km/h. Speed bottlenecks are still present at the stations Petrovice u Karviné (65 km/h), Dětmarovice (60 km/h), and Ostrava (60 km/h).

Figure 60 Railway section Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]



Source: BA Corridor study consortium based on TENtec

Preliminary design for modernisation of railway line E65 South to TEN-T core network standards is on-going for the line Katowice – Zebrzydowice – state border section (excluding section Katowice Ligota – Tychy). Feasibility study and preliminary design documentation is currently under preparation for railway stations in Czechowice-Dziedzice, Zebrzydowice. Completion of the works on the section Będzin – Katowice – Tychy – Czechowice Dziedzice – Zebrzydowice is expected by 2021.

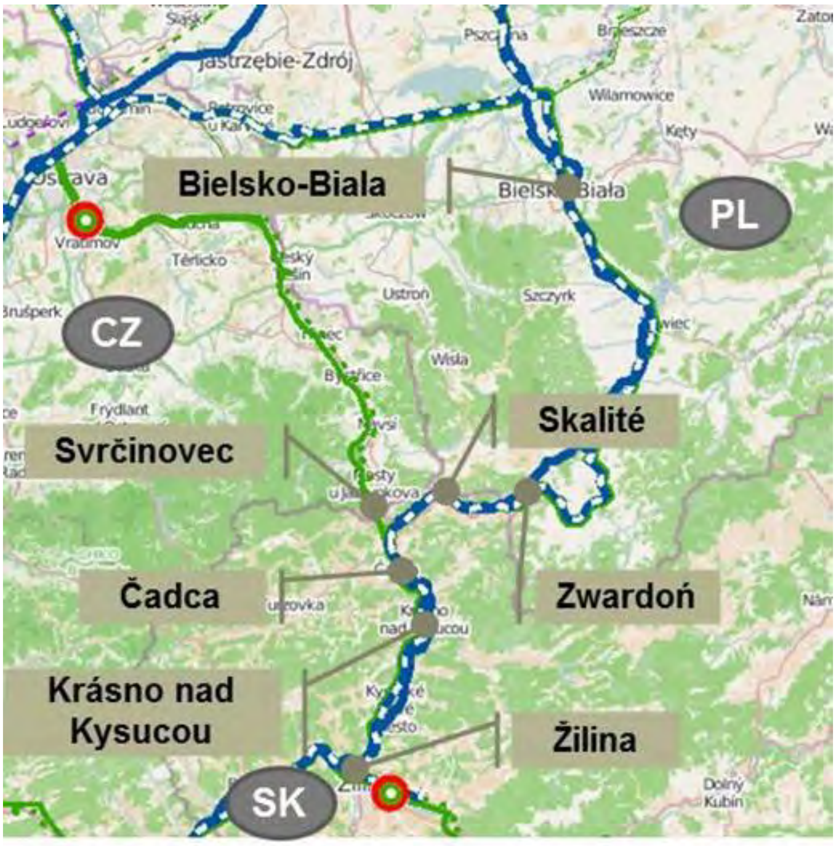
Limited improvements (mostly at stations) are required on the Czech side. The cross-border section is expected to benefit from the completion of the modernisation of the Ostrava junction.

Railway section: Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]

Located in mountainous area, most of the section (49 km) on the Polish side is electrified single track line, with severe limitations concerning line speed (the maximum speed on 72% of the section length is 50-60 km/h) and maximum permitted length of train (between 350 and 400 m).

On the Slovak side, the main bottleneck is the subsection from the border to Skalité with maximum speed allowed at 70 km/h and maximum train lengths limited to 250 m. The situation is particularly severe at Zwardoń station in Poland; regarding the line, most of its subsections were already modernized, although with different standards: the subsection Skalité – Čadca is a single track electrified line with maximum allowed speed of 100 km/h and maximum train lengths of 650 m. The section from Čadca to Krásno nad Kysucou is double track with speed limit of 120 km/h, still requiring modernization, whereas the last subsection Krásno nad Kysucou - Žilina was already modernised allowing a maximum operating speed of 140 km/h.

Figure 61 Railway section Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]



Source: BA Corridor study consortium based on TENtec

On the Polish side, the feasibility study for section the Czechowice-Dziedzice – Bielsko-Biała – Zwardoń (state border) is planned to be completed in 2016. The original scope of the on-going feasibility study has been limited and the cross-border section was excluded. It is expected that a separate study for the section Bielsko-Biała – Zwardoń will be undertaken. Works on this section are planned under the Multiannual Reference Framework, their scope to be further defined.

On the Slovak side, the modernization of railway section Krásno nad Kysucou – Čadca – Svrčinovec state border with the Czech Republic (also including section Krásno nad Kysucou – Čadca on BA Corridor) is under preparation and planned to be constructed between 2019 and 2022.

Road section: Katowice (PL) – Žilina (Brodno) (SK); [Zwardoń (PL) – Skalité (SK)]

On the Polish side, section of the S69 express road (Bielsko-Biala/Mikuszowice – Żywiec) is still under construction. The 15.5 kilometres long section is planned to be opened in 2014 or 2015. The most problematic issue is the 8.5 km long section in the area of Węgierska Górka, where national road passes through the village.

On the Slovak side, the short D3 section Zwardoń – Skalité crossing the border line is in operation. The remaining planned D3 motorway connection Skalité - Svrčinovec – Žilina, Strážov is not completed. Roads I/12, I/11 and I/18 (parallel to future D3 alignment) are speed and capacity bottleneck, I/12 is even closed for freight traffic above 7.5 tons. Most of cross-border transport uses currently Slovak and Czech roads I/11 (interconnected at Svrčinovec) and expressways: Czech R48 and Polish S1 instead of D3 - S69.

Figure 62 Road section Katowice (PL) – Žilina (Brodno) (SK); [Zwardoń (PL) – Skalité (SK)]

Source: BA Corridor study consortium based on TENtec

Construction of the bypass of Węgierska Górka (8.5 km) is under preparation (first construction works commencement foreseen in 2015).

Section of D3 Skalité – Svrčinovec (12.3 km) is under construction, with one lane per direction, and D3 section Svrčinovec – Žilina Brodno (35 km) is under preparation. Adjacent D3 section Žilina, Brodno – Žilina, Strážov is currently under construction.

Road section: Brno (CZ) – Wien (Schwechat) (AT); [Mikulov (CZ) – Mistelbach (AT)]

On the Czech side, the planned I/52-R52 expressway from Brno to the AT border is completed from Brno to Pohořelice (24 km), while the Southern section from Pohořelice to Mikulov - national border CZ/AT (24 km) is still an ordinary road with level junctions, speed limitations and pedestrian crossings.

On the Austrian side, the Southern part of the A5 motorway (Wien-Schrick) in Austria was completed in 2010, the section from Schrick to state border is a secondary, rural road B7 with level junctions, traffic lights, capacity bottlenecks, speed limitations and pedestrian crossings.

Figure 63 Road section Brno (CZ) – Wien (Schwechat) (AT); [Mikulov (CZ) – Mistelbach (AT)]

Source: BA Corridor study consortium based on TENtec

In the Czech Republic, project implementation in the section Pohořelice - Mikulov - national border CZ/AT is only gradually progressing in the last few years and environmental issues (Natura 2000) are still not resolved. The construction of the Perná – Mikulov section is however planned to be commenced in 2016.

Construction works for section Schrick – Poysbrunn, A5 Nordautobahn, are planned to start in spring 2015 depending on the decision regarding the environmental impact assessement. The motorway's release for traffic should be achieved in 2017. The works for the section Poysbrunn – national border CZ/AT (close to Drasenhofen) are planned to start in 2016 and finish in 2018 as a two lane road bypass of Drasenhofen in the first phase of its implementation. Depending on traffic demand as well as on the timely positive resolution of the environmental consent pending decisions for this cross-border section on the Czech side, the last 9 km between Poysbrunn and the national border will be constructed in the period 2020 - 2030.

Railway section: Bratislava (SK) – Wien (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]

On the Slovak side, the connection between Bratislava and Devínska Nová Ves (12.8 km) is a double track electrified line, with speed limit at 120 km/h. The line is also mostly compliant to TEN-T requirements. The Devínska Nová Ves – state border section is single track and non-electrified line with speed limit at 80 km/h.

On the Austrian side, the section connecting Marchegg with Wien (34.2 km), as well as the short section Marchegg - state border (2.3 km), are single track, non-electrified sections used primarily for passenger traffic; the speed limit is 120 km /h, with reduction to 80 km/h at the cross-border section.

Figure 64 Railway section Bratislava (SK) – Wien (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]

Source: BA Corridor study consortium based on TENtec

In Austria, plans call for commencement of work in 2015 to expand the line towards a two track, electrified link to be concluded by 2025. The project includes a second track in the Wien area (up to the Aspern airfield) and an expansion of the railroad station Marchegg. Further works are planned as part of „Zielnetz 2025+" to increase the capacity between Aspern and Marchegg as well as to allow operating trains up to 160km/h.

In Slovakia, according to national transport development strategies the section Devínska Nová Ves – state border is under preparation and planned to be electrified in the period 2018 – 2019. ŽSR plans to upgrade the line to 100 km/h simultaneously.

Railway section: Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]

On the Austrian side, the connection between Werndorf and Sentilj/Spielfeld-Straß (AT/SI border) is a 30 km long electrified single track line.

On the Slovenian side, the connection between Sentilj/Spielfeld-Straß (AT/SI border) and Pragersko is a 17 km long electrified single track line, with speed limitation to 80 km/h.

Figure 65 Railway section Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]

Source: BA Corridor study consortium based on TENtec

The single line section connecting Werndorf to Spielfeld-Strass/Sentilij is currently operating close to capacity. In 2012 for example 112 trains per workday have been scheduled on the subsection connecting Werndorf to Leibnitz. The Austrian authorities have been evaluating the feasibility of the expansion to two tracks in the past. There are plans for a complete two-track upgrading (stage 2) after 2019.

On the Slovenian side, studies for the modernisation (upgrading) of the existing line and building of the second track are on-going. First results of the feasibility analysis on the Slovenian side revealed that, without a temporary line closure, upgrading of the existing rail track is possible only after building the second track.

Railway section: Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]

On the Italian side, the interconnection between Italy and Slovenia is a double track electrified rail line (15 km) through Bivio Aurisina (on the Venezia – Trieste line) - Villa Opicina, with maximum gradient of 15‰ and maximum allowed speed of 80km/h.

On the Slovenian side, the 19 km long section Villa Opicina - Sežana - Divača (along the Koper – Ljubljana line) is a double track electrified rail line, with speed limitations to 75 km/h at the cross-border section. The existing line is marked in green in the figure below.

Figure 66 Railway section Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]

Source: BA Corridor study consortium based on TENtec

Following the feasibility study in 2008 (financed under the INTERREG III A 2000-2006), and subsequent evolutions concerning the impact as far as karst geology and hydro-geology were concerned, in 2011 agreement was found on a new alignment which is the basis for the preliminary design yet to be elaborated.

The setting up of the organizational structure for the Trieste-Divača corridor, taking the form of a European economic interest grouping (EEIG) were agreed in 2012 and the signature of the EEIG's statutes took place in May 2013. The elaboration of the preliminary design and other preparatory works required for the adoption of the National Spatial Plan on the Slovene section of Trieste-Divača line is on-going.

4.4.2 Alpine crossings: missing links and associated bottlenecks

The main BA Corridor missing links have been identified in the two Alpine Crossings in Austria (Semmering and Koralm):

- Section Klagenfurt - Graz: the subsections from Graz to Wettmannstätten and from Grafenstein to Klagenfurt are capacity and technical bottlenecks (single track, not electrified) and require upgrading works. The section in between Wettmannstätten and Grafenstein is a missing link. The section starting in Graz and ending in Klagenfurt will be 130 km long including the Koralm Tunnel (33 km, two one-track tunnel tubes). With the opening of the Koralmbahn (expected by 2023) the traffic will in first instance run via Werndorf up to when capacity limit on the existing double track line between Graz and Werndorf will be reached. In view of this situation a new line is already planned for construction between Weitendorf and Graz which has already obtained all necessary approvals. The section between

Werndorf and Wettmannstätten is in operation since 2010 but only single track and not electrified;

- Section Gloggnitz - Mürzzuschlag: currently under construction this section is a new and tunnelled line (Semmering Tunnel: 27.3 km) connecting the regions Lower Austria and Styria. The investment is aimed at significantly reducing travel times compared to the existing Semmering Bahn crossing the Alps. The construction works comprise two one-track tunnel tubes and are expected to be finished by 2024.

4.4.3 Improvement/upgrading of the national railway infrastructure

The critical issues identified on the basis of our analysis of the railway infrastructure and concerning the national railway lines included in the BA Corridor are summarised below by Member State.

Poland already started an extensive investment programme for the modernisation of its railway infrastructure during the period 2007-2013; several works have been already completed, others are under implementation. Improvements are still required on several sections aimed at finalising modernisation of the network and to improve its standards in terms of line speed, train length and axle load, particularly affecting the transport of freight along the corridor:

- Line E 30, section Kędzierzyn Koźle - Opole Zachodnie, section Chorzów Batory - Gliwice Łabędy;
- Line E 59 section Wrocław – Poznań: section Dolnośląskie Voivodship border – Czempiń; section Poznań Główny - Szczecin Dąbie;
- Node of Warszawa, section Warszawa Wschodnia - Warszawa Zachodnia;
- Line C-E 65 section Chorzów Batory - Tarnowskie Góry - Karsznice - Inowrocław - Bydgoszcz – Maksymilianowo, section Bydgoszcz – Tczew;
- Line C-E 30 section Opole Groszowice - Jelcz - Wrocław Brochów;
- By-passing line in Poznań (section Poznań Górczyn - Poznań Starołęka - Poznań Franowo - Swarzędz/Zieliniec - Kiekrz);
- By-passing line in Warszawa (section Warszawa Gołąbki / Warszawa Zachodnia - Warszawa Gdańska);

The above bottlenecks are expected to be solved by the investments planned in the Multiannual Financial Framework 2014-2020.

In the **Czech Republic**, capacity and speed bottlenecks exist which affect operations of trains at the Ostrava and Brno junctions. Similar problems exist at the Břeclav node where upgrading works are nearly completed. The section Přerov – Brno represents a capacity bottleneck; the line is also not compliant with Regulation EU 1315/2013 with respect to speed, train length and axle load standards. Different solutions are currently under review by the relevant stakeholders for the modernisation of this railway line.

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 line Žilina – Bratislava railway line are already on-going or planned to increase the speed from 120 to 160 km/h.

In addition to the two above described missing links, the line Wien Inzersdorf – Wampersdorf is planned to be doubled by 2023. The new main railway station in Wien was opened to traffic in October 2014 and is already partially in operation; the works are expected to be fully completed by the end of 2015. Some sections of the network are operating close to capacity limits such as the Graz-Bruck/Mur railway line.

In **Italy**, the following critical issues exist or could exist on growing of future traffic on the rail corridor sections. More specifically:

- There are capacity issues in the Venezia node (Mestre) and, in the future, there could be capacity critical issues accessing Trieste (Bivio S.Polo – Bivio Aurisina – Trieste) due to increase in traffic to and from the Port. There are also performance and safety limitations due to the existing level crossing on the line;
- The transit at the Udine node is also affected by operational constraints accessing the station from the North; capacity issues exist on the belt-line which still is a single track line.

In **Slovenia**, major deficiencies exist compared to the requirements of the TEN-T standards. In particular, the most severe critical issues along the BA line sections are:

- The Ljubljana – Zidani Most section fail to meet the required technical standards. The maximum axle load on the track is D3 (except Zagorje–Sava (right track), Sava–Litija (right track), on 40% of the track, maximum operating speed is lower than 100km/h; GB profile is not assured, track is only partially equipped with block system; utilisation of throughput is at 42%;
- Ljubljana is a major node bottleneck. The majority of railway tracks in Ljubljana run at ground level, grade separated crossings of roads and railways occur only in some places, mostly at main line crossings. Level crossings with gates are still in the majority, which causes significant congestion, especially during rush hours. Capacity of current train station in Ljubljana is rather limited, therefore possibilities for rerouting of cargo traffic out of the station is under consideration;
- Ljubljana-Divača section fails to meet the required technical standards. The maximum axle load on the track is D3 (except Postojna–Prestranek and Gornje Ležeče–Divača); on majority of the track (92%) maximum operating speed is lower than 100km/h; GB profile is not assured, block system is not enabled on some parts of the track; utilisation of throughput is at 62%;
- The existing single track line between Divača and Koper does not have sufficient transport and throughput capacity for freight transport between Adriatic and Central Europe (transport capability of the line is estimated to be saturated by 2018). Modernisation is on-going and is expecting to be completed by the end of 2015.

4.4.4 Improvement/upgrading of the national road infrastructure

With respect to the **road network**, we have identified the following main deficiencies in the national network:

- In Poland, significant sections of the corridor infrastructure (S69, S3, S7, A1 and S1) have not yet been upgraded to expressways or motorways. These sections are being upgraded or planned to be upgraded;
- In the Czech Republic, the D1 motorway section Lipník nad Bečvou – Říkovice is still to be completed;
- In Slovakia, upgrading works for sections and junctions on the D1 motorway are planned between Trnava – Bratislava; D4 bypass motorway is under preparation to solve capacity issues in Bratislava. Existing road I/18 through Žilina is close to its capacity limit, D3 motorway bypassing Žilina urban area is currently under implementation to solve this traffic bottleneck;
- In Austria, Italy and Slovenia the motorway network is compliant to the Regulation.

4.4.5 Last mile connections to ports, airports and rail-road terminals

The promotion of the Adriatic and Baltic ports as main gateways to the EU third commercial partners and may thus also contribute to further economic growth and competitiveness of the regions along the Corridor. Furthermore the development of the Motorways of the Sea is also seen as an opportunity to develop intermodality at the EU level, whereas the development of inland waterway transport can contribute to the EU policy objectives supporting the promotion of sustainable transport. All this emphasises the importance of the requirement by the EU Regulation 1315/15 of the interconnection of the port infrastructure to BA Corridor by railway and road.

Detailed descriptions of the last mile connections to the BA Corridor ports has been presented in Section 4.2.4 above, also including details on the critical issues affecting their interconnection with the BA Corridor railway lines and roads. All the core sea and inland ports included in the BA Corridor are connected to the rail and road infrastructure; however in many cases last mile railway and/or road port interconnections issues relating to compliance of the infrastructure to TEN-T standards and capacity, are present that limit rail freight operation and development in Gdynia, Gdańsk, Świnoujście, Szczecin, Trieste and Koper as well as Ravenna and Venezia (following implementation / completion of the port expansions). The extent and severity of the critical issues at the ports and more particularly the scope of the proposed solutions is in many cases to be further defined; however most of the problems relate to the need to increase the standards of the existing railway connections in terms of electrification, speed, axle load, train length; problems of capacity/congestion and safety issues also related to the location of the ports within urban areas exist due to the mixed use of the infrastructure providing access to the port by urban and port generated traffic.

Regarding airport last miles, as also described at Section 4.2.5, the two airports of Warszawa and Wien are already interconnected to the BA Corridor railway network, which satisfies the requirements of the EU regulation 1315/2013. Specifically concerning Wien, the Austrian authorities are currently considering the opportunity of increasing the interconnectivity between the Wien airport and the Czech Republic, Slovakia and Hungary. This is expected to improve the capacity and performance of the existing railway services, in view of future traffic growth at this multinational cross-border hub, and in consideration of the recent trends in travel patterns, showing an increase in the demand for integrated high-speed railway and aviation services.

Rail interconnection is at its final stage of construction at the Gdańsk airport; rail interconnections are also planned to be constructed at Katowice and Ljubljana airports as well as at Venezia and Bologna airports, these latter representing with Warszawa and Wien the largest airports along the BA Corridor, with more than 6 and 8 million passengers at 2013 respectively.

The construction of a railway connection between Katowice Pyrzowice Airport and Górnośląskie cities agglomeration, section Katowice-Pyrzowice is planned to be completed by 2020. The Ljubljana Airport railway interconnection is currently under evaluation as part of the feasibility study for the construction of the second track Ljubljana-Jesenice.

At the Venezia airport, investments are already envisaged for the construction of a conventional railway link between Venezia Mestre and the airport, including a railway station integrated with the passengers' terminal; feasibility studies are also on-going for the identification of the optimal infrastructure solution to allow high-speed trains reaching directly the airport. Road investments are also planned by ANAS to improve road accessibility to the airport. The Gugliemo Marconi airport is planned to be interconnected to the Bologna main railway station by 2017; the project includes the construction of an automated people mover and two terminal stations, one within the main railway station and one at the airport. Works are also planned at major junctions interconnecting the national road/motorway network with the urban network which may improve accessibility to the Bologna airport and solve traffic congestion problems in the urban area.

The rail-road terminals on the BA Corridor are all interconnected with their respective national road and rail networks. For the terminals located within seaports and inland waterway ports (namely Gdynia (PL), Gdańsk (PL), Szczecin (PL), Świnoujście (PL), Trieste (IT), Wien (AT) and Bratislava (SK)) same 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. For the other rail-road terminals considered in this study, no critical issues have been identified, although investments are planned at some of them, i.e. Cervignano, to improve the quality of the last mile connection in view of on-going investments in the railway line between Mestre and Udine and possible increase in traffic.

Similarly to ports, the fact that many of the transport nodes are located in proximity or within urban agglomerations represents in principle a possible source of capacity or traffic congestion issue, particularly with reference to future demand scenarios. An analysis of the problems and possible solutions at the local/regional scale, affecting last mile connections to rail-road terminals in terms of capacity and more generally the in-depth analysis of capacity issues at connections to urban nodes has not been undertaken as part of this study. Our analysis has focussed on the BA Corridor links and does not assess problems at the node level where the BA Corridor interconnects with regional and urban local infrastructure; this is in line with a view of the Core Network Corridors as primarily aimed at supporting long distance cross-border traffic flows. It is also in line with the consideration that Regulation 1315 is less specific with regard to the requirements of the infrastructure interconnecting the links at urban nodes and to the transport nodes, including airports, ports and rail-road terminals. In these terms our study may underestimate the magnitude of local problems within the nodes and at last mile connections, where long distance flows add up and mix to the regional, metropolitan or even local traffic.

4.4.6 Interoperability

Interoperability could both depend on physical and technical standards of infrastructure and technology as well as administrative procedures relating to the control of the manufacturing and performance standards of equipment and vehicles. It may be associated to both travel and terminal activities of transport.

The predominant application of interoperability is associated with traffic management. Intelligent Traffic Systems are under development and implementation for all transport modes. An overview and description of the technologies under implementation for the railway, maritime and inland waterways and ports, airports as well as roads, is provided at Appendix B, with reference to the relevant EU legislation regarding the development of these systems: Commission Decision 2012/88/EU on ERTMS; Directive 2002/59/EC on VTMIS, Directive EC/2005/44 on RIS, Council Regulation (EC) 219/2007 for SESAR, Directive 2010/40/EU for road transport.

In this section we focus on interoperability of railway infrastructure and train operations, as a key critical issue for the development of the BA Corridor, particularly considering the ultimate target of the Core Network Corridors of supporting the development of intermodal long distance flows of passengers and freights across the Member States. In this respect it should be noted that interoperability for this mode is not just restricted to traffic management; it also affects other railways subsystems: energy and infrastructure (loading gauge, train length).

Relevant studies have already analysed railway interoperability related critical issues such as SoNorA and AB Landbridge, and more recently the SETA project. For this study interoperability can be primarily achieved by implementing the respective EU regulations (decisions 2006/920/EG, 2006/679/EG and 2008/386/EG of the European Commission) by introducing compatible ERTMS based railway control systems in all countries. In this respect at least the implementation of Level 1 of the European Train Control System (ETCS) is required to introduce interoperable services. Level 2 that includes GSM-R could further enhance this technology by simplifying communication between locomotives and the control system.

Rolling stock interoperability of different electrification systems also requires that multi-traction locomotives are available. These locomotives are considerably more expensive; they cost 10-15% more than traditional ones and technical maintenance and repairs are also much more costly. Therefore operators would only invest in these locomotives if the time savings over locomotive change at the border can justify it. From the point of view of the train operator it is not relevant which company provides the traction service with the multisystem locomotive as long as a competitive price is offered. Therefore the national railway companies could create a pool of multi-system locomotives that could be deployed based on the demand instead of creating competition for traction services by parallel procurement of the locomotives.

Regarding the other main interoperability infrastructure parameters, i.e. line speed, axle loading category, number of tracks and capacity of railway sections and stations, the study highlights how these issues can primarily be improved by investment into the railway infrastructure through refurbishment and upgrading of respective sections and stations. This is the responsibility of the national governments and their railway infrastructure managers. It is, however, highly desired that these investments 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 resulting in a significant difference in transport speed and quality.

4.4.7 Operational and administrative barriers

Beyond infrastructure, operational and administrative barriers between and within transport modes exist possibly hindering the seamless and continuous flow of passenger and goods, such as lack of harmonization of procedures for railway vehicle authorisations in different Member States or the lack of coordination between agency-specific and country specific regulatory and operational requirements for international trade and transport. These kind of barriers particularly affect international flows of freight transport at cross-border sections and Ports as also described and commented in more detail at Appendix B of this report, dedicated to the review of the studies.

As a particular relevant critical issue for the development of the BA Corridor, the problems affecting the operation of rail cross-border services are worth describing in this report with reference to the priority intervention areas of the TEN-T policy. Studies have already been implemented in the past to describe and identify solutions to these issues. Among these the already mentioned SETA study, identifies the following critical issues and related possible solutions:

Cross-border transit times - Issues: Delays can result from cross-border procedures for passenger and freight trains. The time needed for cross-border procedures is linked to several factors, including:

- Level of interoperability: If traction is different across the border (electric/diesel) a change of locomotive is required. Similarly, if the electrification and signalling/safety systems are different on either side of the border and no multisystem locomotives are available, locomotives need to be changed.
- Technical wagon inspection (e.g. breaks) are carried out to ensure that the condition of the wagons entering a country conform to national regulations.

- Documents concerning the train and the cargo are exchanged. If not done electronically, it will add to the time needed for border procedures.
- Even when multi-system locomotives are available, the lack of mutual acceptance of drivers may prevent the same locomotive from travelling across the border and hence border-crossing is delayed.

Cross-border transit times – Suggested measures: Transit times for rail freight services can be reduced considerably by introducing trust based train handover procedures. They are based on mutual agreements between train operators, in which the technical handover procedure is only carried out by one operator while the other operator (or operators) 'trust' the technical checks carried out. Such agreements consist of references to the mutual acceptance of rolling stock. Railway companies agree to accept any technical inspections or checks on rolling stock carried out by railway undertakings with agreements of mutual confidence with other railway undertakings in the sense of mutual confidence in order to speed up the border dispatching procedures. A rail operator may also carry out the technical inspection of rolling stock in one of its hinterland terminals. Cross-border procedures can further be simplified by harmonising operational and safety rules. This way, procedures to change the tail signal lamp, the breaking sheet and the wagon list could be avoided. The transport of hazardous goods could also be speeded up by carrying out the detailed inspection only at the origin and the destination of the train. The establishment of cross-border operation centres can further enhance cross-border procedures by taking responsibility for cross-border traffic management, quality management and real time information to customers. Mutual acceptance of train drivers can speed up cross-border procedures as the same train personnel can drive the train for the whole length of the route. The mutual acceptance will be facilitated through the harmonised train driving licences introduced in the EU by Commission Regulation (EU) No 36/2010. As not all train drivers will automatically receive the licence that is accepted all over the EU, train operators will have to invest in the training of their train drivers so that more and more of them could get this new licence. The above proposals can come together in a so-called corridor quality management system (QMS). The objective of a QMS is to enable rail transport to compete with the quality and transport time of road transport by significantly increasing customer satisfaction. This last concept has been particularly investigated in another relevant EU funded project – the CREAM project – which demonstrated how these QMS measures can dramatically improve transport quality.

Demand for freight rail services – Issues: Progress and dynamics in the logistics industry and factory production are gradually leading to a specialisation of rail transport in the operation of block trains either assembled at production site or at Rail-Road terminals as a result of multimodal transport operators logistics activities. According to the study at least three regular connections per week would be required for the block train to be attractive. Demand may come from the automotive industry, factories producing electronics or household appliances in Poland, the Czech Republic, Slovakia and Hungary as well as raw materials from mining in Poland and the Czech Republic. The survey has shown that there is considerable demand for reliable transport services towards Asia and America via major European ports. Currently most of the traffic from Central Europe goes through the Northern Range ports (e.g. Hamburg and Rotterdam). If similar, competitive services can be offered through the Adriatic ports demand for train services can be generated and sustained. Although the SETA study focusses on the Adriatic area, same considerations apply to Baltic Sea ports. The freight forwarding and transport market is, however, quite volatile especially because road hauliers change their prices much more flexibly and in a more reactive way than railway operators. Therefore the market needs to be monitored continuously to adapt the offerings to the actual market situation.

Demand for freight rail services – Suggested measures: Demand for block trains can only be sustained through regular and direct contact with the production and logistics industry that can provide the goods to be transported. New competitive services can only be offered if clients can be convinced to change from a well-established route/method of transport to major European ports and try a new route via, for example, the Adriatic ports. In order to sustain such new services the freight forwarding market needs to be monitored continuously. As freight forwarding is primarily a private business, railway infrastructure managers should attract this market by providing the necessary framework conditions as regards high quality infrastructure and an attractive regulatory and business environment. Then it is the task of the operators to search for potential competitive market segments that can be served.

Operation of passengers' services – Issues: Cross-border passenger services are normally operated as commercial services as no public funding is available and the usual national discounts offered to young persons and pensioners are not offered on international trains (except for inter-rail). Therefore connections that carry only few passengers across the border producing low revenue can hardly be justified. A potential solution is the connection of inland services across the border as the respective national sections can be funded as national public services carrying regional or long distance traffic. The disadvantage of such services could be in some cases that regional/local traffic is prioritised over international passengers, which may result in more stops, longer travel time and inconvenient timetables.

Operation of passengers' services – Suggested measures: The objective of the alternative organisational measures concerning passenger transport is to provide fast and reliable direct passenger services along the SETA corridor and provide passengers with flexible and competitive offers. Funding opportunities for international train services should be investigated as international trains are not expected to be self-sustaining particularly at the beginning of their operation. The passenger services offered have to be also competitive and attractive. Railway operators need to create offers that combine flexibility with low cost providing a feasible alternative to road transport or even flights. These offers could be combined with offers of touristic destinations (e.g. promotions offering tickets combining a rail ticket and entrance fee or local public transport). Railway infrastructure managers and operators should also commit themselves to provide priority to international trains along the corridor over local and regional services in order to significantly reduce the travel time.

In addition to the above issues affecting the operation of rail and maritime services, administrative barriers have been identified with reference to the implementation of infrastructure projects which require coordination and consensus on both the definition of the problems and identification of the solutions. This is usually frequent for cross-border initiatives but may also occur for those investments deemed beneficial under the functional stand-point to a stakeholder which is however not the owner of the infrastructure. This is particularly the case of last mile connections to ports; but may also happen in situations in which local/regional traffic adds to long distance traffic. Examples currently under analysis to this respect seem to be related to road improvements to the port of Gdynia (OPAT providing access to National Road no.6 and the Droga Czerwona road connecting OPAT to Janka Wiśniewskiego Street); railway and road works improving accessibility to the port of Ravenna (elimination of one railway crossing in the urban area as well as improvements of the roads SS16 and SS67 and their main interchanges); improvement of the urban road network in Bologna, including some roads affecting accessibility to the Bologna Airport; the construction of a railway intersection on the railway between Granarolo and Faenza.

Problems may also exist relating to reaching consensus on the development of projects in environmental sensitive areas, as it is the case of the Brno-AT border road cross-border section in the Czech Republic.

The nature of the problems in the above and other similar cases may vary from the presence of different positions about the definition of a critical issue and identification of an agreed project solution, to lack or delays of formal administrative requirements such as the inclusion of the projects in the investment plans of the relevant concerned infrastructure managers. The Corridor approach may be helpful also in finding coordinated solutions among the stakeholders to solve similar situations, particularly if associated to key priority intervention areas of the TEN-T policy.

4.5. Objectives of the BA Corridor Work Plan

In line with the EU current practice for developing plans and programmes, the *intervention logic* underpinning the work plan has been defined in terms of:

- *General objectives* of the work plan, which are based on the overall EU TEN-T policy objectives and priorities, and are then translated into *specific corridor objectives*, on the basis of the characteristics and critical issues of the BA Corridor, as defined in the analysis included in the previous Chapter;
- *Actions* of the work plan, further specified in *sub-actions*, which are the building blocks of the plan and provide the logical framework for the investments and measures required to meet the specific corridor objectives; actions have been defined in accordance with the priorities set in the Regulation EU 1315/2013, also taking into account the funding priorities of the CEF (EU1316/2013);
- *Indicators*, which will be used to monitor the plan implementation and measure the effects of the implemented actions in terms of reaching the work plan specific objectives.

4.5.1 General objectives from TEN-T Regulation EU 1315/2013

Core Network Corridors have been set up as an instrument to implement the EU TEN-T policy, with the general strategic target to implement the Europe 2020 strategy as summarized in the Regulation EU 1315/2013: strengthening the social, economic and territorial cohesion of the Union, contributing to the creation of a single European transport area which is efficient and sustainable, and increasing the benefits for its users while supporting inclusive growth.

Table 24 Objectives of the trans-European transport network

Category	TEN-T objectives
Cohesion	**Accessibility**. Accessibility and connectivity of all regions of the Union, including remote, outermost, insular, peripheral and mountainous regions, as well as sparsely populated areas **Infrastructure quality**. Reduction of infrastructure quality gaps between Member States **Interconnection of flows**. For both passenger and freight traffic, interconnection between transport infrastructure for, on the one hand, long-distance traffic and, on the other, regional and local traffic **Balanced infrastructure**. A transport infrastructure that reflects the specific situations in different parts of the Union and provides for a balanced coverage of all European regions
Efficiency	**Continuity of long distance flows**. Removal of bottlenecks and the bridging of missing links, both within the transport infrastructures and at connecting points between these, within Member States' territories and between them **Interoperability**. The interconnection and interoperability of national transport networks

Category	TEN-T objectives
	Intermodality. Optimal integration and interconnection of all transport modes **Economic efficiency**. The promotion of economically efficient, high-quality transport contributing to further economic growth and competitiveness; the efficient use of new and existing infrastructure **Innovation**. Cost-efficient application of innovative technological and operational concepts
Sustainability	**Long term sustainability**. Development of all transport modes in a manner consistent with ensuring transport that is sustainable and economically efficient in the long term **Clean transport**. Contribution to the objectives of low greenhouse gas emissions, low-carbon and clean transport, fuel security, reduction of external costs and environmental protection **Low-carbon transport.** Promotion of low-carbon transport with the aim of achieving by 2050 a significant reduction in CO 2 emissions, in line with the relevant Union CO 2 reduction targets
Increasing the users' benefits	**Meeting users' needs**. meeting the mobility and transport needs of the users within the Union and in relations with third countries **Safety and security**. Ensuring safe, secure and high-quality standards, for both passenger and freight transport **Risk resilience**. Supporting mobility even in the event of natural or man-made disasters, and ensuring accessibility to emergency and rescue services **Establishment of requirements**. The establishment of infrastructure requirements, in particular in the field of interoperability, safety and security, which will ensure quality, efficiency and sustainability of transport services **Accessibility PRM**. Accessibility for elderly people, persons of reduced mobility and disabled passengers

Source: EU Regulation 1315/2013 Art. 4

The TEN-T guidelines in EU Regulation 1315/2013 also set general and thematic (mostly by transport mode) priorities that should be achieved implementing measures and projects of common interest. Priorities have also been set in order to enable the trans-European transport network to be developed within the timescales set in the regulation (2030 for the core network and 2050 for the comprehensive network).

The general priorities are defined in Art. 10 of the Regulation 1315/2013 and include ensuring enhanced accessibility and optimal integration of the transport modes and interoperability within transport modes; bridging missing links and removing bottlenecks, particularly in cross-border sections; promoting the efficient and sustainable use of the infrastructure and, where necessary, increasing capacity; improving or maintaining the quality of 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) and the quality of services and continuity of traffic flows; implementing and deploying telematics applications and promoting innovative technological development.

4.5.2 Specific BA Corridor objectives

The core network corridors constitute the backbone of the development of the TEN-T multimodal transport network, enabling Union action to concentrate on those components with the highest European added value - in particular cross-border sections, missing links, multimodal connecting points and major bottlenecks, including those related to operational, technical and administrative barriers.

The analysis of the characteristics of the BA Corridor, in terms of consistency with the regulations, bottlenecks and missing links in the road and rail infrastructure, deployment of traffic management systems, intermodal nodes and their interconnections, operational and administrative barriers – as illustrated in the previous Chapter – provides the recognition of the main development needs of the corridor, and allows for translating the general objectives and the priorities of the TEN-T policy into specific corridor objectives for each policy category. Unlike general TEN-T objectives and priorities, which are set out at Union level, specific objectives are defined at the corridor level, providing additional specifications to ensure appropriate targeting for the national and regional context.

In order to promote the economic, social and territorial **cohesion** along the corridor, the work plan will aim at:

- Improving the **infrastructure quality and standards** - especially of Eastern Member States - with the target to comply to the technical standards set in the Regulation, in particular concerning transport infrastructure for rail (especially line speed, axle load, train length) and road (road class - motorways or expressways) transport;
- 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 an **efficient multi-modal transport network** supporting economic growth and competitiveness is recognised as a main strategic objective of the corridor work plan, corresponding to the following specific objectives:

- **Removal of the main remaining rail and road bottlenecks**, ensuring the timely completion of the on-going projects (especially at the Alpine crossing), improving the cross-border connections (Poland - Czech Republic / Slovakia, Czech Republic - Austria, Slovenia - Austria / Italy), completing the modernization of the national rail lines (Poland, Czech Republic, Slovakia, Slovenia), upgrading specific railway links and nodes (Austria, Italy) and completing the upgrade of the road network to motorway/expressway standard (Poland, Czech Republic, Slovakia);
- **Interoperability** of national transport networks, in particular through the deployment of existing interoperable telematics applications (ERTMS, RIS, VTMIS, SESAR) and their further technological advancement;
- Optimal **integration and interconnection** of all transport modes, especially improving the "last mile" connections to ports, airports and rail-road terminals;
- Promotion of **economically efficient, high-quality and competitive transport,** contributing to the development of intra and extra EU trade, also trough the proportion of the role of the Adriatic and Baltic ports as gateways to the main third commercial partners.

The work plan specific objectives also include the development of an integrated and multi-modal **sustainable transport systems**, contributing to the objectives of low-carbon and clean transport, fuel security, reduction of external costs of transport (especially for highly populated areas) and protection for environmentally sensitive areas (such as the Alpine space). In the area of sustainable development, the BA Corridor will also be serving the objective, set out in the White Paper, of reducing greenhouse gas emissions from transport by 60 % below 1990 levels by 2050.

The last category of specific corridor objectives includes those related to the increase of the **direct benefits for the transport infrastructure users**:

- **Meeting the mobility and transport needs** of its users within the Union and in relation with third countries, improving the performance of the transport system for its users, **reducing congestion and expanding the infrastructure capacity** when necessary;

- **Ensuring safe, secure and high-quality standards**, for both passenger and freight transport; **supporting mobility even in the event of natural or man-made disasters**, and ensuring accessibility to emergency and rescue services;
- Improving **accessibility** for elderly people, persons with reduced mobility and disabled passengers.

4.5.3 Actions and sub-actions of the Work Plan

The *intervention logic* of the work plan is defined by the cause-effect relationship between the actions (and, at finer detail, between the projects and measures) and the specific objectives/priorities to be attained.

The effectiveness and efficiency of the proposed actions in relationship with the objectives is also deemed relevant for setting up a coherent work plan and providing a basis for implementation monitoring and evaluation.

The actions proposed in the corridor plan have been defined with respect to the general TEN-T objectives and priorities and further specified based on the corridor's specific objective. The actions provide a general definition of the categories of projects and measures that will be identified in the next phases of this study and later included in the work plan to be approved by Member States along the corridor.

We propose a structure of **actions and sub-actions specific for each component of the TEN-T core network infrastructure** (rail, road, maritime, air, rail-road terminals and urban nodes), which is also in line with the structure of the priorities set in the TEN-T and CEF Regulations (1315/2013 and 1316/2013).

The organization of the activities by mode allows for a clear definition of the investment projects – which constitute the main component of the work plan. At the sub-action level, infrastructure projects are distinguished between measures aimed at solving critical issues predominantly related to barriers of physical and/or technical standards nature, at cross-border sections, as well as bridging missing links.

The work plan also identifies those ITS/ICT sub-actions aimed at solving interoperability and more generally operational and administrative barriers affecting the development and smooth flows of international, cross-border, intermodal traffic.

Modernisation and expansion of the existing infrastructure to meet user's benefits and support sustainable intermodal transport solutions and environmental friendly service modes is another category of sub-actions identified as part of the BA Corridor work plan. Another category of sub-actions has been also included in the plan for each transport mode and logistic node, regarding environmental, safety and security measures.

The horizontal actions listed in the table overleaf are finally worth considering, grouping **cross-mode, administrative and regulatory measures**, identified in order to enhance efficient multimodal transport and services along the BA Corridor.

Table 25 Actions and specific objectives for the rail and road infrastructure

Actions	Sub-Actions	Objectives			
		Cohesion	Efficiency	Sustainability	Users' benefits
1. Development of the railway infrastructure	1.1 Improvement of Cross-border sections		Removal of bottlenecks at border crossings		
	1.2 Bridging missing links		Implement missing link projects		
	1.3 Improvement of national railway systems	Removal of bottlenecks and meet infrastructure requirements, homogenizing technical parameters (track gauge, electrification, axle load, train length)			Where necessary, increasing capacity
	1.4 New technology and innovation		Deployment of ERTMS		
	1.5 Specific environmental and safety measures				
2. Development of the road infrastructure	2.1 Improvement of cross-border sections		Removal of bottlenecks at border crossings		
	2.2 Improvement of national roads	Removal of bottlenecks and improvement of the infrastructure standards along the corridor			Where necessary, increase capacity and mitigate congestion on existing roads
	2.3 New technology and innovation		Implementation of ITS Actions Plans measures, including EETC		
	2.4 Specific environmental and safety measures			Provision of supply points for alternative fuels	Provision of appropriate parking areas; Improvement of road and tunnel safety

Table 26 Actions and specific objectives for logistic and urban nodes

Actions	Sub-Actions	Objectives			
		Cohesion	Efficiency	Sustainability	Users' benefits
3. Development of the port infrastructure	3.1 Development of interconnections		"Last miles" and development of hinterland connections	Promoting Motorways of the Sea	
	3.2 Modernisation / Expansion of the infrastructure	Modernisation of the infrastructure			Where necessary, increasing capacity
	3.3 New technology and innovation		ITC/ITS implementation including VTMIS, RIS, e-Maritime		
	3.4 Specific environmental and safety measures			Promotion of alternative fuels	
4. Development of the airport infrastructure	4.1 Development of interconnections		Improvement of multimodal interconnections		
	4.2 Modernisation / Expansion of the infrastructure	Modernisation of the infrastructure			Where necessary, increase capacity
	4.3 New technology and innovation		ITC/ITS, implementation including SESAR		
	4.3 Specific environmental, safety and security measures			Improvement of sustainability and mitigating the impact from aviation, promoting alternative fuels	
5. Development of the RRT infrastructure	5.1 Development of interconnections		Provision for effective interconnections		
	5.2 Modernization / Expansion of the infrastructure	Modernisation of the infrastructure			Where necessary, increase capacity
	5.3 New technology and innovation		ITC/ITS implementation for developing a smooth flow of information		
	5.3 Specific environmental and safety measures			Promotion of alternative fuels	
Developmen t of the urban node infrastructur	6.1 Development of the urban transport infrastructure	Provision of seamless connection between the TEN-T and local infrastructure	Improvement of interconnection between all modes	Mitigation of the negative effects of transiting rail and road transport	

Table 27 Horizontal actions to enhance efficient multimodal transport and services along the BA Corridor

Sub-Actions	Objectives			
	Cohesion	Efficiency	Sustainability	Users' benefits
7.1 Sustainable freight transport services	Improve links to the most vulnerable and isolated parts of the Union, in particular outermost, island, remote and mountain regions	Analyse and provide information on fleet characteristics and performance, administrative requirements and human resources Facilitate multimodal transport service operations, and improve cooperation between transport service providers Deployment of innovative transport services, as well as the establishment of relevant governance structures	Stimulate resource and carbon efficiency, in particular in the fields of vehicle traction, driving/steaming systems and operations planning	Promotion of road safety
7.2 New technologies and innovation for services		Improve the operation, management, accessibility, interoperability, multimodality and efficiency of the network, (including multimodal ticketing and timetables coordination); Promote efficient ways to provide information; Promoting innovative technological development Further advance the development and deployment of telematics applications	Promote measures to reduce externalities; Promote the decarbonisation of transport; Improve resilience to climate change	Improve the safety and sustainability of the movement of persons and of the transport of goods; Introduce security technology and compatible identification standards on the networks
7.3 Administrative, regulatory and preparatory measures		Removing the main technical and administrative barriers to multimodal transport	Improve sustainable use of transport infrastructure	

4.5.4 Work Plan Indicators

In the table below, we provide the list of possible indicators for the actions and sub-actions related to the development of the BA Corridor. With reference to the identified indicators it is worth noting that only indicators for which available data and statistics are available shall be considered, in relation to which both the baseline and target are quantifiable by referring to external official sources, without estimating the parameters.

Table 28 Result indicators (infrastructure actions)

Mode	Indicator			2014 Baseline	2030 Target
	Description	Measure	Source		
Development of Rail Transport and Infrastructure	Missing links	n.	Ten-Tec	2	0
	Deployment of ERMTS	% km	Ten-Tec	0%	100%
	Electrification	% km	Ten-Tec	99%	100%
	Max axle Load (freight)	% km	Ten-Tec	89%	100%
	Speed (freight)	% km	Ten-Tec	69%	100%
	Train length (freight)	% km	Ten-Tec	16%	100%
Development of Road Transport and Infrastructure	Motorways or expressways	% km	Ten-Tec	81%	100%
	EETC	% km	Ten-Tec	0%	100%
	Parking areas	% km		81%	100%
	Availability of clean fuels	% km		n.a.	n.a
Development of Maritime and IWW Ports	Ports connected to railways	% n.	Ten-Tec	100%	100%
	Ports equipped with Clean Fuel Supply Stations	n.	Ten-Tec	0	10
	CEMT Class IV IWW Ports	n.	Ten-Tec	5 (7)	5 (7)
Development of Airports	Airports connected to the rail network	% n.	Ten-Tec	23%	100%
	Deployment of SESAR	n.		1	13
	Airports equipped with Clean Fuel Supply Stations	n.	Ten-Tec	0	13
Development of Rail Road Terminals	Terminals connected to railways	% n.	Ten-Tec	100%	100%
	Core terminals to be opened	n.	Ten-Tec	2	0

4.6. Implementation of the BA Corridor Work Plan

4.6.1 List of Investments

Table 33 at the bottom of Section 4.6.3 below includes the list of the planned investments that have been identified in our analysis with reference to the BA Corridor infrastructure and its use. The list has been divided into six different sections according to the following transport modes and sector: railway, road, ports, airports, rail-road terminals and urban transport.

The table includes for each project:

- An ID code composed of the country 2-digit ISO code and a progressive numbering. The numbering has no correspondence with the relevance of the project for the study and work plan; ID codes have only been introduced for cross-reference in the report and in the elaboration of a number of outputs and maps. Codes are specific to each single investment; in the event the project will be deleted from the list the same number is not used for a different project; new added projects are logged using new codes;
- The indication of the transport mode, the territorial location, the scope (studies and or work), a brief description, the project promoter, the envisaged timing for completion, the estimated total investment cost in € millions and the financing source, where available;
- A specification on whether it was already indicated in the list of pre-identified sections included in Annex 1 to EU Regulation 1316/2013, and whether it is associated to the solution of a critical issue as referred to in the previous sections of this report. In this respect we notice that all critical issues have been marked, including all cross-border sections.

As a note to the level of definition of the information included in the list or investment, we notice that many projects are at a very incipient stage of their definition / implementation, with technical standards and functional parameters that may be subject to changes in the future, thus representing a possible cause of modification in their total investment cost. Also, for most of them, costs represent estimates and may be subject to variation in their future refinement and development. Residual costs for on-going projects are not reported.

As an additional remark we also notice that for many investments both studies and works are included in the reported total investment cost. For many projects no financial or detailed time-schedule information was available, although most of them are assumed to be implemented by 2030.

Regarding the identified sources of funding so far identified by the project promoters, the analysis shows that in addition to CEF and Cohesion Fund (or ERDF) as primary EU sources, own financial sources and other public equivalent sources are also considered. Investment costs of projects proposed by private concessionary companies particularly for roads and airports, are partially or totally covered by means of their own revenues and commercial credit. EIB support and other loans and grants from the States and the Regions are also foreseen to be used.

In the two following sections on the basis of our review and assessment of the list of investments provided at Table 33 we outline the *Plan for the removal of barriers and enhancement of efficient multimodal transport and services*, and the *ERTMS Deployment Plan*.

4.6.2 Plan for the removal of barriers and enhancement of efficient multimodal transport and services

More than 350 investments are included in the list of investments at Table 33, which have been identified based on the analysis of the plans by the Member States, Regions and Infrastructure Managers.

As shown in the summary table overleaf, reflecting the allocation of the investments with reference to the actions and sub-action of the work plan, the total volume of investments up to 2030, estimated on the basis of the available budgets is about 59.7 € billion (assumed at 2014 prices); 52% is allocated to railway, 30% to road, 12% to ports (including interconnections) and about 6% is allocated to airports, rail-road terminals and urban nodes. 13% of the total budget is allocated to cross-border sections. The cost of the two alpine crossings is equivalent to 14% of the total investment value.

From the geographical stand point, most of the investments are located in the Northern part of the corridor, in line with a need for modernisation of the corridor railway network and completion of the improvement of the road infrastructure.

Table 30 below shows the *Plan for the removal of barriers and enhancement of efficient multimodal transport and services* elaborated on the basis of the review of the proposed projects. This analysis has been undertaken aimed at commenting on the efficacy and efficiency of the proposed list of investments with reference to:

- The actions and sub-actions of the work plan, identified with respect to the objectives of the BA Corridor;
- The efficacy of the investments in removing the critical issues identified in the study and in enhancing efficient multimodal transport and services along the BA Corridor.

Table 29 BA Corridor: summary table of the work plan investments by action and sub-action

Actions		Sub-Actions		BA Corridor	PL	CZ	SK	AT	IT	SI
1	Development of the railway infrastructure	1.1	Cross-border	4,820.9	1,158.8	52.0	305.0	1,740.1	1,040.0	525.0
		1.2	Missing links	8,489.3	-	-	-	8,489.3	-	-
		1.3	National railway lines	16,656.6	5,391.0	2,696.1	1,997.5	1,606.5	2,386.2	2,579.2
		1.4	ERTMS	804.4	245.4	32.5	-	190.0	130.0	206.5
		1.5	Specific environmental and safety measures	-	-	-	-	-	-	-
2	Development of the road infrastructure	2.1	Cross border	2,878.9	473.5	380.0	1,556.4	469.0	-	-
		2.2	National roads	14,200.4	7,705.1	535.2	1,090.1	2,142.0	1,932.0	796.0
		2.3	ITS and ETC	583.7	375.0	-	-	4.6	4.1	200.0
		2.4	Specific environmental and safety measures	-	-	-	-	-	-	-
3	Development of the port infrastructure	3.1	Developing interconnections	1,323.7	990.0	-	-	-	333.7	-
		3.2	Modernization / Expansion of the infrastructure	5,709.0	1,333.7	-	173.1	-	3,402.3	800.0
		3.3	Technological upgrading and innovation	44.7	27.5	-	2.4	-	14.8	-
		3.4	Specific environmental and safety measures	303.3	183.3	-	-	-	120.0	-
4	Development of the airport infrastructure	4.1	Developing interconnections	1,006.9	400.0	22.9	-	189.0	395.0	-
		4.2	Modernization / Expansion of the infrastructure	1,595.1	250.6	-	-	800.0	425.0	119.5
		4.3	Technological upgrading and innovation	1.9	1.9	-	-	-	-	-
		4.4	Specific environmental, safety and security measures	46.9	46.9	-	-	-	-	-
5	Development of the RRT infrastructure	5.1	Developing interconnections	-	-	-	-	-	-	-
		5.2	Modernization / Expansion of the infrastructure	453.6	-	-	33.1	375.5	-	45.0
		5.3	Technological upgrading and innovation	0.2	-	-	-	0.2	-	-
		5.4	Specific environmental and safety measures	-	-	-	-	-	-	-
6	Development of the urban node infrastructure	6.1	Development of the urban transport infrastructure	739.8	-	-	-	-	739.8	-
			Total	**59,659.3**	**18,582.7**	**3,718.7**	**5,157.6**	**16,006.2**	**10,922.8**	**5,271.3**

The following considerations can be drawn by comparing the plan at Table 30 below with the BA Corridor identified critical issues relating to cross-border sections, missing links and interconnections:

- Cross-border critical issues:
    - Opole (PL) – Ostrava (CZ); [Chałupki (PL) – Bohumín (CZ)]: this rail section requires relatively minor investments (45.8 € million) on the Polish side for the modernisation of the line between Kędzierzyn Koźle - Chałupki (state border), which is expected to be completed by 2019. No investments are currently planned on the Czech side where two single track sections are in operation between Bohumín Vrbice and Bohumín stations, and the state border towards Chałupki, already allowing train operation up to 100 km/h for both passenger and freight services. The remaining sections in the Czech Republic were already modernized to increase the operating speed up to 160 km/h, including the improvement of the Bohumín station. This cross-border section is expected to benefit from the modernisation of the Opole Zachodnie – Kędzierzyn Koźle section to increase maximum operational speed on the Polish side (75 € million) by 2018, and of the Ostrava junction on the Czech side (220 € million), by 2021;
    - Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]: this rail section requires major investments on lines E30 and E65 on the Polish side (1,025 € million), expected to be completed by 2021. On the Czech side, limited improvements are required at the stations Petrovice u Karviné and Dětmarovice to increase operating speed; the section from the state border to Petrovice u Karviné and Ostrava was already modernised since 2002, increasing the speed up to 120 - 160 km/h. Also this cross-border section is expected to benefit from the completion of the modernisation of the Ostrava junction (220 € million), by 2021;
    - Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]: works for the improvement of the existing single track line on the Polish side are under study and their scope under definition, with works already planned on the line which are expected to be completed by 2019 (88 € million); on the Slovak side, the single track Skalité – Čadca (with maximum speed 100 km/h and maximum train lengths 650 m) was already modernised and no additional works are planned;, ERTMS is not planned to be deployed on this section. The modernisation of the double track section Krásno nad Kysucou – Čadca also common to the cross-border itinerary between Ostrava and Žilina is expected to be completed by 2022, including deployment of ERTMS (300 € million);
    - Katowice (PL) – Žilina (Brodno) (SK); [Zwardoń (PL) – Skalité (SK)]: the upgrading of the road infrastructure to express road standards is expected to be completed by 2023 (2,030 € million including both the Polish and Slovak sides);
    - Brno (CZ) – Wien (Schwechat) (AT); [Mikulov (CZ) – Mistelbach (AT)]: on the Austrian side the A5 will be completed to the border up to 2030, subject to positive resolution of the environmental related administrative issues on the Czech side (471 € million); on the Czech side the Pohořelice - Perná - border CZ/AT sections are planned to be completed by 2030 (378 € million);
    - Bratislava (SK) – Wien (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]; Two cross-border railway lines are in operation between Bratislava and Wien, one predominantly used for freight transport passing through Petržalka (SK) - Kittsee (AT), another one going via Devínska Nová Ves (SK) and Marchegg (AT). The latter is the only non-electrified section along the BA Corridor, also requiring upgrading works. Works for the electrification of the existing single track railway line on the Slovak side are planned to be completed by 2019 (5 € million); Upgrading of the line Wien Stadlau - Border AT/SK (next to Marchegg) including two tracks, electrification and railroad station works are planned to be implemented by 2030 (550 € million);

Table 30 BA Corridor: Plan for the removal of barriers and enhancement of efficient multimodal transport and services

Actions	Sub-Actions	Description	Location and Project Ref. Codes	Timeline	Investments Values
1. Railways	1.1 Cross-border	Katowice (PL) – Ostrava (CZ): Railway section Raciborz (PL) – Bohumín (CZ)	Kędzierzyn Koźle - Chałupki (state border) (PL08)	2020 (2019)	45.8
				Total	**45.8**
		Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]	Works on main passenger lines (E 30 and E 65) in Śląsk area, phase I: line E 65 section Będzin – Katowice – Tychy – Czechowice Dziedzice – Zebrzydowice (PL01)	≤2020 (2021)	1,025.0
				Total	**1,025.0**
		Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]	Czechowice Dziedzice - Bielsko Biała - Zwardoń (state border) (PL15)	≤2020 (2019)	88.0
			Krásno nad Kysucou – Čadca (SK07)	2020-2030 (2022)	300.0
				Total	**388.0**
		Břeclav (CZ) – Vienna (Stadlau); (AT) [Břeclav (CZ) – Hohenau / Bernhardsthal (AT)]	Břeclav Junction (CZ01); Reconstruction of the bridge at km 80.930 railway Hohenau - Přerov (CZ11)	≤2020 (2015)	52.0
			Bernhardsthal to Vienna/Sűssenbrunn (AT08)	≤2020	620.5
				Total	**672.5**
		Bratislava (SK) – Vienna (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]	Devínska Nová Ves - state border (SK05)	≤2020 (2019)	5.0
			Wien Stadlau - Border AT/SK (next to Marchegg) (AT03)	2030	549.6
				Total	**554.6**
		Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]	Maribor–Šentilj (SI01)	≤2020	245.0
			Werndorf - Spielfeldstraß (stage 2) (AT06)	2030	570.0
				Total	**815.0**
		Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]	Trieste-IT Border (IT16)	2016 (studies) 2020-2030 to be confirmed	1,040.0
			SI Border-Divača (SI14)	2016 (studies) n.a. (works)	280.0
				Total	**1,320.0**
		Rail cross-borders		**Total**	**4,820.9**

Actions	Sub-Actions	Description	Location and Project Ref. Codes	Timeline	Investments Values
	1.2 Missing links	Missing links	New section from Gloggnitz to Mürzzuschlag (Semmering Base Tunnel) (AT01)	2020-2030 (2024)	3,122.0
			New section from Graz to Klagenfurt (Koralm railway line and tunnel (AT02)	2020-2030 (2023)	5,367.3
				Total	**8,489.3**
	1.3 National railway lines	National railway sections	Poland (PL02, PL03, PL03a, PL03b, PL04, PL5a, PL5b, PL06, PL07, PL07a, PL09, PL24a, PL24b, PL24c, PL24d); Czech Republic (CZ02); Slovakia (SK01, SK02, SK03, SK04, SK06); Italy (IT04, IT05, IT07, IT09, IT10, IT12); Slovenia (SI03, SI05, SI06, SI08, SI12)	≤2020	6,980.2
			Poland (PL24, PL25, PL27); Slovenia (SI11)		To be defined
			Poland (PL12); Czech Republic (CZ06, CZ07, CZ08); Austria (AT05, AT07, AT18); Italy (IT14, IT15, IT18); Slovenia (SI13)	2020-2030	5,128.8
			Italy (IT19, IT20); Czech Republic (CZ03); Slovenia (SI07)		To be defined
			Italy (IT97)	To be defined	To be defined
				Total	**12,109.0**
		Junctions, stations and nodes	Poznań (PL10); Warsaw (PL11); Říkovice (CZ16a); Žilina (SK08); Udine (IT01); Mestre I Phase (IT03); Bologna (IT02); BA Corridor stations Italy (IT11); Wien (AT17); Pragersko (SI02); Poljčane (SI04)	≤2020	1,371.2
			Warsaw (PL05); Přerov (CZ04 (2021)); Brno (CZ05 (2022)) Ostrava (CZ09 (2021)); Bratislava ((SK09 (2021)); Graz (AT19); Ljubljana (SI09, SI10)	2020-2030	3,176.4
			BA Corridor stations Italy (IT 98); Mestre II Phase (IT93)		To be defined
				Total	**4,547.6**
		National railways		**Total**	**16,656.6**
	1.4 ERTMS	ERTMS deployment	Poland (PL23); Czech Republic (CZ10; CZ12); Italy (IT08), Slovenia (SI15, SI16); [for Slovakia, ERTMS is included in investments SK01, SK02, SK03, SK04, SK06, SK07, SK09]	≤2020	326.9
			Poland (PL22); Austria (AT04); Italy (IT17)	2020-2030	477.5
				Total	**804.4**

Actions	Sub-Actions	Description	Location and Project Ref. Codes	Timeline	Investments Values
	1.5 Specific environmental and safety measures	*No investments identified*	-	-	-
2.Roads	2.1 Cross-border	Road section Katowice (PL) – Žilina (SK)	S69 Bielsko-Biała – Żywiec – Zwardoń, section „Mikuszowice" junction-Żywiec (PL44b); Žilina Strážov - state border (SK14-20)	≤2020	1,609.4
			S69 Bielsko Biała - state border (PL44)	2020-2030 (2023)	420.5
				Total	**2,029.9**
		Brno (CZ) – Wien (AT): Road section Pohořelice (CZ) – Schrick (AT)	A5 "Nord/Weinviertel", motorway section Schrick to Poysbrunn (AT22); A5 "Nord/Weinviertel", Drasenhofen by-pass (AT23)	≤2020	378.0
			A5 "Nord Autobahn" motorway section Poysbrunn - AT/CZ border (AT24); R52 section Perná - border CZ/AT (CZ15); R52 section Pohořelice - Perná (CZ15a)	2020-2030	471.0
				Total	**849.0**
		Road section Trieste (IT) - Sežana (SI)	Trieste (IT) - Sežana (SI) (IT82)	Under bilateral negotiation	Under bilateral negotiation
		Road cross-borders		**Total**	**2,878.9**
	2.2 National roads	National roads sections	Poland (PL28, PL33, PL34, PL35, PL36, PL37, PL38, PL39, PL40, PL42, PL42a, PL43, PL44a); Czech Republic (CZ13) Slovakia (SK10, SK11, SK12, SK13); Austria (AT12, AT14, AT20); Italy (IT24, IT30, IT31, IT32, IT33, IT95, IT99)	≤2020	10,289.0
			Italy (IT34)		To be defined
			Czech Republic (CZ14 (2021)); Austria (AT21, AT25); Slovenia (SI32)	2020-2030	2,853.5
			Poland (PL28a); Italy (IT83)	To be defined	1,057.9
		National road sections		**Total**	**14,200.4**
	2.3 ITS and ETC	ITS and ECT	Poland Roads (PL45); Austria Roads (AT15)	≤2020	379.6
			Slovenia Roads (SI33)	2020-2030	200.0
			Italian Roads (IT84)	To be defined	4.1
				Total	**583.7**

Actions	Sub-Actions	Description	Location and Project Ref. Codes	Timeline	Investments Values
	2.4 Specific environmental and safety measures	*No investments identified*	-	-	-
3. Ports	**3.1 Developing interconnections**	Rail "last mile"	Port of Gdynia (PL16, PL19, PL19a); Port of Gdańsk (PL17, PL20); Ports of Szczecin and Świnoujście (PL18, PL21); Port of Trieste (IT21); Port of Ravenna (IT96)	≤2020	675.0
			Port of Ravenna (IT22); Port of Venice (IT23)	2020-2030	260.0
				Total	**935.0**
		Road "last mile"	Port of Gdynia (PL29); Port of Szczecin (PL32); Port of Trieste (IT25); Port of Venice (IT49)	≤2020	113.7
			Port of Gdynia (PL30, PL52o, PL52p)	2020-2030	275.0
			Port of Gdynia (PL52m, PL52o, PL52p)	2020-2030	To be defined
				Total	**388.7**
		Rail and road connections to ports		**Total**	**1,323.7**
	3.2 Modernization / Expansion of the infrastructure	Port infrastructure	Port of Gdynia (PL46, PL47, PL48, PL51, PL52a, PL53); Port of Gdańsk (PL31, PL54, PL55, PL55a, PL55b, PL55c); Ports of Szczecin and Świnoujście (PL56, PL57, PL58, PL59, PL60, PL61, Pl62, PL63, PL66, PL67); Port of Bratislava (SK22, SK23, SK25, SK26); Port of Trieste (IT35, IT36, IT37, IT38, IT39, IT40); Port of Venice (IT44, IT45, IT46, IT47, IT48, IT54, IT55); Port of Ravenna (IT56, IT57, IT59); Port of Koper (SI17, SI18, SI19, SI20, SI21, SI22, SI23, SI24, SI25, SI26, SI27, SI28)	≤2020	4,958.1
			Port of Gdańsk (PL123a)	≤2020	To be defined
			Port of Ravenna (IT58); Port of Koper (SI29, SI30, SI31, SI32)	2020-2030	716.0
			Ports of Szczecin and Świnoujście (PL124, PL125)	2020-2030	To be defined
			Ports of Szczecin and Świnoujście (PL123); Port of Trieste (IT 43)	To be defined	34.9
			Port of Gdynia (PL52b, PL52c, PL52e, PL52f, PL52h, PL52k, PL52l, PL52n)	To be defined	To be defined
				Total	**5,709.0**

Actions	Sub-Actions	Description	Location and Project Ref. Codes	Timeline	Investments Values
	3.3 Technological upgrading and innovation	Port ICT/ITS	Port of Gdynia (PL49, PL50); Port of Bratislava (SK27); Port of Trieste (IT41, IT42, IT42a); Port of Venezia (IT50, IT51, IT52, IT53); Port of Ravenna (IT60)	≤2020	42.7
			Port of Gdynia (PL52g, PL52i, PL52j)	2020-2030	To be defined
			Port of Ravenna (IT61)	To be defined	2.0
				Total	**44.7**
	3.4 Specific environmental and safety measures	Environmental, safety and security measures at ports	Port of Gdynia (PL52, PL53a, PL55d); Ports of Szczecin and Świnoujście (PL64, PL65) Port of Venezia (IT92); Port of Ravenna (IT93)	≤2020	303.3
			Port of Gdynia (PL52d)	2020-2030	To be defined
				Total	**303.3**
4. Airports	**4.1 Developing interconnections**	Rail connections to airports	Katowice Airport (PL91a); Ostrava Airport (CZ16); Vienna Airport (AT27, AT28); Venice Airport (IT13); Bologna Airport (IT65, IT66)	≤2020	971.9
				Total	**971.9**
		Road connections to airports	Venezia Airport (IT88)	To be defined	35.0
				Total	**35.0**
		Rail and road connections to airports		**Total**	**1,006.9**
	4.2 Modernization / Expansion of the infrastructure	Airport expansion	Łódź Airport (PL68, PL69, PL70, PL71); Wrocław Airport (PL74, PL75, PL76, PL77, PL78, PL79, PL82, PL83); Szczecin Airport (PL84, PL85, PL88, PL89, PL90); Katowice Airport (PL91, PL92, PL93, PL94, PL95, PL96, PL97, PL98, PL101, PL102, PL103, PL105); Poznań Airport (PL106, PL107, PL108, PL110, PL111, PL112, PL115, PL116, PL117, PL122); Venice Airport (IT62, IT63, IT64); Ljubljana Airport (SI34)	≤2020	558.1
			Vienna Airport (AT29); Venice Airport (IT89, IT90, IT91)	2020-2030	1,037.0
			Katowice Airport (PL 99, PL100, PL104)	To be defined	To be defined
				Total	**1,595.1**
	4.3 Technological upgrading and innovation	Airport ICT/ITS	Poznań Airport (PL118)	≤2020	1.9
				Total	**1.9**

Actions	Sub-Actions	Description	Location and Project Ref. Codes	Timeline	Investments Values
	4.4 Specific environmental, safety and security measures	Environmental, safety and security measures in airports	Łódź Airport (PL72, PL73); Wrocław Airport (PL81); Szczecin Airport (PL86, PL87); Poznań Airport (PL109, PL113, PL114, PL119, PL120, PL121)	≤2020	46.4
			Wrocław Airport (PL80)	2020-2030	0.5
				Total	**46.9**
5. Rail-Road Terminals	**5.1 Developing interconnections**	Rail connections to RRT	Cervignano Rail-Road Terminal (IT85)	2020-2030	To be defined
				Total	**To be defined**
	5.2 Modernization / Expansion of the infrastructure	RRT construction, modernization and expansion	Žilina Rail-Road Terminal (SK21); Vienna Rail-Road Station and Cargo Centre (AT16); Tri-modal Container Terminal and IWW Port of Vienna (AT30, AT31); Ljubljana Container Terminal (SI35)	≤2020	396.6
			Tri-modal Container Terminal and IWW Port of Vienna (AT26)	2020-2030	57.0
			Tri-modal Container Terminal and IWW Port of Vienna (AT33)	To be defined	To be defined
				Total	**453.6**
	5.3 Technological upgrading and innovation	RRT technological upgrading and innovation	Tri-modal Container Terminal and IWW Port of Vienna (AT32); Bologna Rail-Road Terminal (IT69, IT70, IT71, IT72, IT73, IT74, IT75, IT76, IT77, IT78, IT79); Padova Rail-Road Terminal (IT67, IT68)	≤2020	0.2
			Bologna Rail-Road Terminal (IT94)		To be defined
				Total	**0.2**
	5.4 Specific environmental and safety measures	*No investments identified*	-	-	-
6. Urban Nodes	**6.1 Development of the urban transport infrastructure**	Development of urban transport infrastructure	Venice Urban Node (IT80); Bologna Urban Node (IT81)	≤2020	739.8
				Total	**739.8**

Note: the Plan in this table includes all investments listed at Table 33 below; project codes have been included in the table for cross-reference

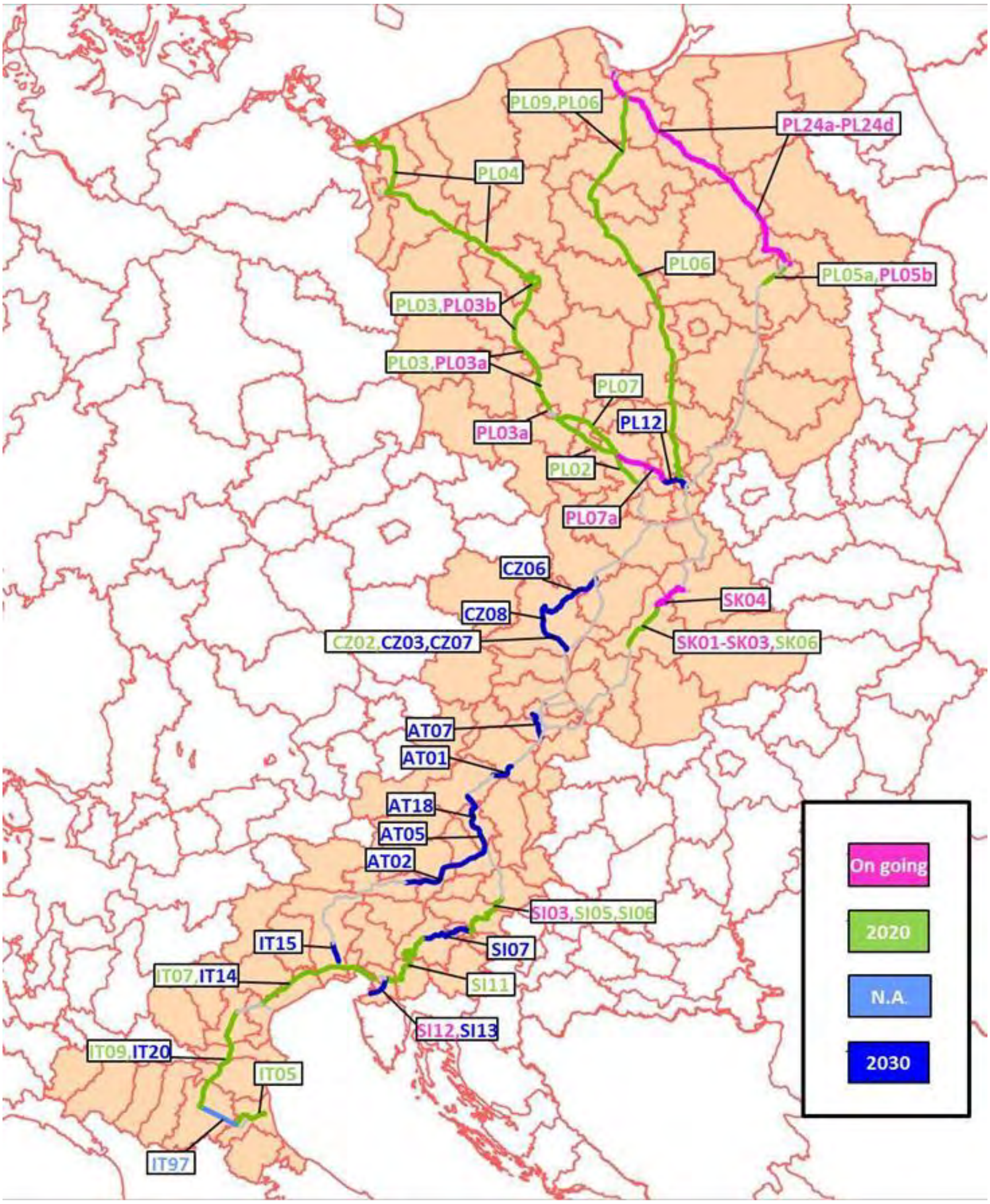
  - Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]; this cross-border section is planned to be rehabilitated on the Slovenian side between 2020-2030 (245 € million); the time-schedule for ERTMS deployment on the Pragersko-Maribor-Šentilj railway line is not yet defined. The completion of the upgrading of the section on the Austrian side is planned for 2030 (570 € million);
  - Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]: the studies for this cross-border section are on-going, the feasibility for the completion of the works by 2030 still to be confirmed (envisaged cost 1320);
- Other cross-border infrastructure:
  - Břeclav (CZ) – Wien (Stadlau); (AT) [Břeclav (CZ) – Hohenau / Bernhardsthal (AT)]: this section will benefit from technological upgrading on the Czech side, including bridge reconstruction at km 80,930 enabling an increase in speed up to 160 km/h; as well as from the improvement of the Brno junction expected to be completed by 2020 (52 € million); the Austrian side is expected to be further improved to increase capacity by 2020 when the modernisation of the Wien border AT/CZ is planned to be completed (620 € million);
  - Trieste (IT) - Divača (SI); [Fernetti (IT) - Divača (SI)]: Highway improvement works on the R.A. 14 between Trieste and Sežana are expected to be undertaken for works related to the elimination of the custom and police check point related buildings and facilities (time and cost under definition);
- Missing links at the Alpine Crossings will be completed not earlier than mid of the 2020s (8.5 billion);
- Priority last mile connections to seaports will be solved by 2020 (789 € million); additional investments are planned for the period 2020 and 2030 (535 € million), also based on the development of traffic;
- Rail connections to largest airports in the network are already under implementation or in any case planned to be completed by 2020 (972 € million). Although not specifically included in the plan with reference to sub-action 4.1, the Ljubljana Airport railway interconnection is also worth mentioning, which is currently under evaluation as part of the feasibility study for the construction of the 2nd track Ljubljana-Jesenice.

Regarding critical issues affecting the development of the rail and road networks, on the basis of the above table we elaborated the maps overleaf respectively showing the investments for the modernisation/expansion of railway lines and roads sections (the maps exclude investments at nodes and junctions, including last mile connections).

The following considerations are worth noting with reference to the efficacy of the proposed investments in modernising the national sections of the BA Corridor rail and road infrastructure:

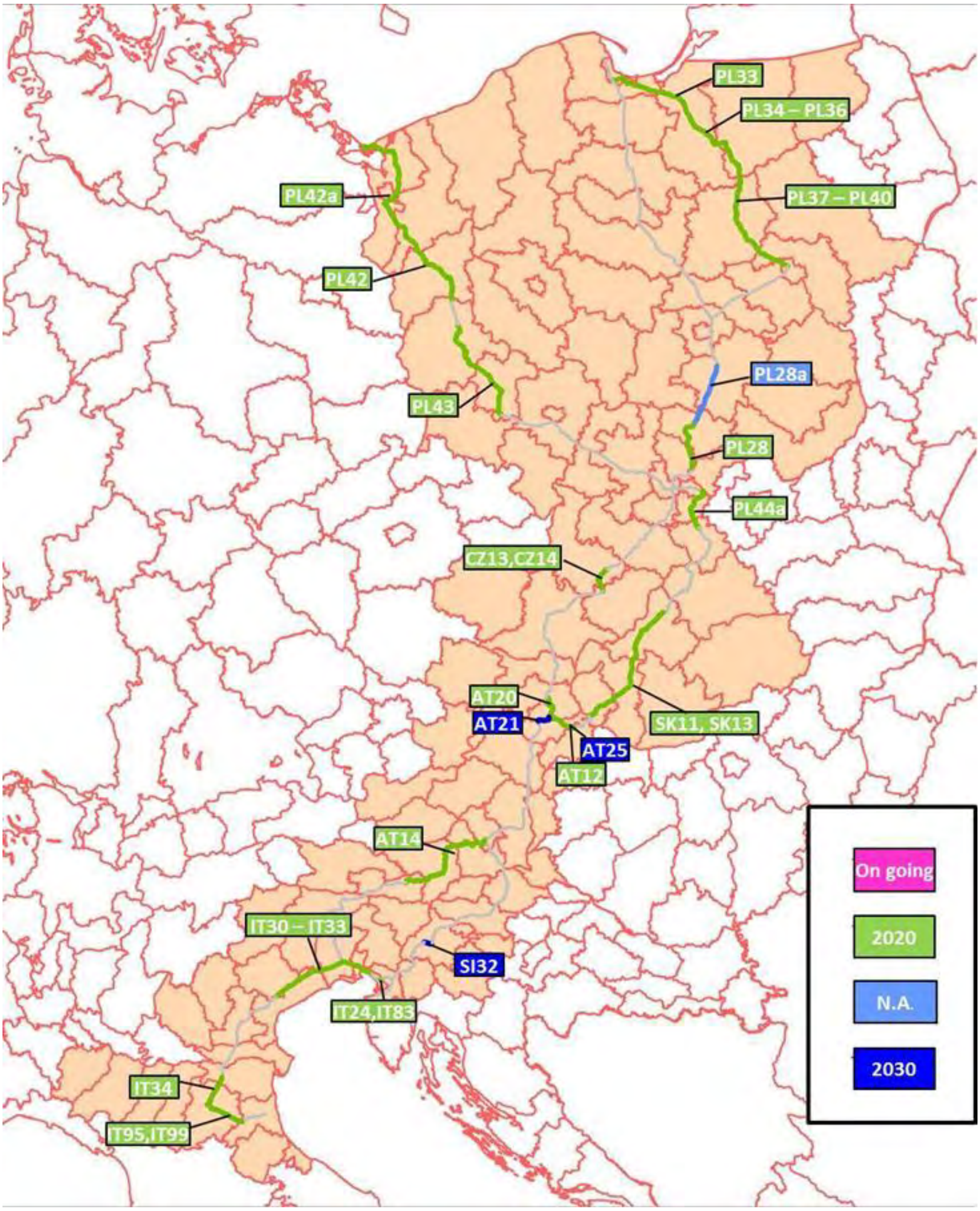
- Modernisation of railway lines as well as junctions will be implemented gradually over the course of the entire duration of the work plan:
  - In the first phase of the work plan, investments in national railway lines and junctions are planned for a total of 8.4 € billion; these include projects that are expected to complete modernisation of the Polish, Slovak and Slovenian railway network;
  - Investments between 2020 and 2030 (8.3 € billion), are expected to support development of higher quality lines particularly for passengers in the Czech Republic, Austria and Italy;
- The modernisation of the road network in the three Northern BA Corridor Member States sections – Poland, Czech Republic and Slovakia will be completed by 2020, when the upgrading of other road sections in Italy and Austria is also foreseen to be finalised (10.3 € billion); other improvement works are planned between 2020 and 2030 to solve capacity and environmental related issues predominantly at nodes (3.9 € billion).

Figure 67 Investments in railway modernisation and expansion



Notes:1) the map shows the rail link improvement investments listed at Table 33 geocoded on TENtec sections; 2) given that more projects are foreseen to be implemented on same sections in different time-horizons, project codes have been indicated for each initiative using the font colour referring to the 4 time-horizons in the legend; the colour for the line on the map only refers to the last implementable project.

Figure 68 Investments in road modernisation and expansion



Note: the map shows the road link improvement investments listed at Table 33 geocoded on TENtec sections

In addition to infrastructure development projects, the *Plan for the removal of barriers and enhancement of efficient multimodal transport and services* also includes ITS related investments:

- ERTMS – this technology is expected to be fully deployed on the BA Corridor not earlier than 2030; on three sections: Skalité – Čadca (SK), Blumental – Wampersdorf (AT) and Pragersko-Maribor-Šentilj (SI) the time-schedule for ERTMS implementation is still not defined (envisaged total cost 804 € million, excluding sections in Slovakia where the cost for ERTMS implementation is already included in the cost for the modernisation/upgrading of the lines and junctions;
- ITS and ICT projects for roads and ports are included on the list (584 € million for roads and 45 € million for ports); there are also on-going relevant initiatives at rail-road terminals; projects aimed at solving specific environmental safety and security issues at airports are also listed. Initiatives are also planned regarding availability of clean fuels at ports and airports already by 2020.
- Finally, regarding intermodality, relevant investments at ports and rail-road terminals are foreseen (nearly 5 € billion for ports and 454 € million for rail-road terminals).

On the basis of our analysis of the planned investments, the following considerations apply with reference to the work plan objectives:

- The technical information on the investments included in the plan and the proposed technical standards is minimal; however the projects indicated by the stakeholders are overall expected to allow the modernisation of most of the railway and road BA Corridor network and make the corridor compliant to the required TEN-T standards by the end of the work plan time-horizon;
  - With specific reference to the passengers' railway network we notice that the initiatives foreseen for the upgrading of the lines to high speed standards are on-going or planned, most projects targeting speed between 200 km/h and 300 km/h; the planned high speed line Venezia-Trieste has been postponed until after 2030 – investments are currently planned on the existing conventional line to increase speed up to over 200 km/h (construction of two additional tracks is also considered before 2030); studies are on-going regarding the cross-border high speed line between Trieste and Divača and between Divača and Ljubljana, the feasibility for the completion of the works by 2030 still to be confirmed;
- No investments are currently included regarding the deployment of SESAR at BA Core Airports;
- Consideration should be given to the development of initiatives regarding horizontal issues; or the promotion of cross-border operations and services along the BA Corridor; or projects aimed at promoting cooperation among the network of logistic nodes. None of these initiatives is included in the work plan at present; with particular respect to horizontal measures, we also notice that the plan does not include at present any of the following additional possible specific measures identified by Regulation EU 1315/2013:
  - Measures to improve the administrative and technical capacity to conceive, plan, design, procure, implement and monitor projects of common interest;
  - Measures to enhance resilience to climate change;
  - Measures to be taken in order to mitigate greenhouse gas emissions, noise and, as appropriate, other negative environmental impacts.

The list of investments assessed as part of this study is not conceived as fixed. Updates to the work plan are foreseen for the coming years. Investments currently not listed may be included in the future. From the financing stand point, the non-inclusion of a project in the list does not preclude its eligibility under the CEF; equally its inclusion is not a guarantee of eligibility for funding.

4.6.3 ERTMS deployment plan

Traffic Management Systems Deployment Plan

An overview on the implementation of ITS for the management of traffic for all transport modes has been provided in Appendix B to this report, dedicated to the review of the studies, also commenting on the ITS actions plans, RIS, and SESAR.

These systems are considered essential for the development of cross-border intermodal flows of passengers and freights along the Core Network including the BA Corridor. Initiatives under the above systems and particularly ERTMS are all eligible under the CEF period. The following section outlines the deployment schedule of ERTMS technology related studies and works in the BA Corridor Member States and BA Corridor Sections.

Table 31 BA Corridor: ERTMS development plan

BA Corridor Section	Current status				Expected Completion of Studies	Expected Completion of Works
	Qualitative description/notes	In use	Studies	Works		
Poland						
Eastern branch	In Poland, the ERMTS technology is planned to be installed on the entire BA Corridor infrastructure and RFC 5 by 2030		x		≤2020	≤ 2030
Gdynia – Warszawa				X	≤2020	≤ 2030
Central branch			x		≤2020	≤ 2030
Western branch			x		≤2020	≤ 2030
Czech Republic						
Petrovice u Karviné – Břeclav	GSM-R in operation; ETCS Level 2 expected to be deployed by 2017		x		≤2020	≤ 2020
Přerov – Brno	GSM-R and ETCS Level 2 expected to be deployed after 2020 (probably till 2024)		x			2020-2030
Brno – Břeclav	GSM-R in operation; ETCS Level 2 in realisation till 2015			X		≤ 2020
Břeclav – state border to Austria	GSM-R in operation; ETCS Level 2 in realisation till 2015			X		
Slovakia						
Skalité – Čadca	GSM-R and ETCS is currently not planned to be deployed					
Čadca – Žilina	GSM-R to be deployed by 2015; ETCS Level 2 to be deployed by 2016			X	≤ 2020	≤ 2020
Žilina – Púchov	GSM-R to be deployed by 2015; ETCS Level 1 to be deployed by 2018			X		
Púchov - Zlatovce	GSM-R and ETCS Level 1 to be deployed by 2015		x	X		
Zlatovce – Nové Mesto n.V.	GSM-R to be deployed by 2015; ETCS Level 1 is in operation			X		
Nové Mesto nad Váhom – Bratislava, Rača				X		
junction Bratislava (incl. two sections Bratislava –border)	GSM-R and ETCS Level 2 to be deployed by 2019					
Austria						
Wien – Graz						
Bernhardsthal – Wien	ETCS Level 2 in use by end of 2014			x		≤ 2020
Muerzzuschlag – Gloggnitz	ETCS Level 2 deployed by 2024		x			2020-2030
Graz – Klagenfurt	ETCS Level 2 deployed by 2023		x			2020-2030
Blumental – Wampersdorf	Not defined					
Pottendorf/Wien – Wampersdorf	ETCS Level 2 deployed by 2024		x			2020-2030
Italy						
Tarvisio-Udine	Studies and works for the implementation of ERTMS on the BA Corridor sections of the Italian network will be implemented in two phases, partially by 2020 and partially by 2025/2030					
Trieste-Venezia						
Udine-Cervignano						
Venezia-Bologna-Ravenna						
Slovenia						
Divača – Koper	ETCS Level 1 is currently under implementation on the Slovenian sections of the BA Corridor, with expected completion date by end of 2015			X		≤ 2020
Divača-Ljubljana; Ljubljana-Zidani Most				X		≤ 2020
Zidani Most-Pragersko				X		≤ 2020
Pragersko-Maribor-Šentilj	Not defined as yet					

ERTMS Deployment Plan

The table overleaf summarises the current status and time-schedule for the deployment of ERTMS on the BA Corridor. According to current available information:

- ***Poland***: In Poland, the ERMTS technology is expected to be deployed by 2030. Railway line E65, section Grodzisk Mazowiecki – Zawiercie, is already equipped with ETCS Level 1, which is expected to be operational in December 2014, although GSM-R is not installed on the line;
- ***Czech Republic***: New National Implementation Plan 2014-2020 is currently under consideration for approval. The GSM-R is in operation except the section Brno - Přerov, where the implementation will take place as a part of the construction works during modernization (2019 – 2024). System ETCS Level 2 is being implemented in the section Brno – Břeclav - state border to Austria with the deadline in 2015. The section state border – Petrovice u Karviné – Přerov – Břeclav is in preparation and will be implemented 2015-2017. The implementation of ETCS in the section Brno – Přerov is planned together with its modernization to 200 km/h (2019 – 2024);
- ***Slovakia***: Slovakia: Implementation Strategy from 2009, update is currently being processed; There is no implementation plan for GSM-R and ETCS on the section Skalité – Čadca and new decision concerning the implementation is not expected before 2020. The GSM-R in the section Čadca – Žilina – Nové Mesto nad Váhom - Bratislava will be deployed in the period 2014-2015. ETCS L2 will be implemented in the section (state border CZ/SK-) Čadca – Žilina in 2014-2016, ETCS L1 in the section Žilina – Púchov by 2018, ETCS L1 in the section Púchov – Zlatovce by 2015. In the section Zlatovce – Bratislava there is ETCS L1 already in operation. The deployment of ETCS L2 in Bratislava node including the sections from Bratislava to the state borders by Kittsee and Marchegg is planned to the period 2018 – 2019;
- ***Austria***: In Austria, the deployment of ERTMS is on-going. ÖBB Infra considers ERTMS to comprise GSM-R and ETCS. Whereas GSM-R is fully implemented on the Austrian sections of the corridor, this is not the case regarding ETCS Level 2. The 75 km section between Bernhardsthal and Wien HBF (Main Station) will be equipped with ETCS Level 2 by the end of 2014. The three sections from Kledering to Parndorf are equipped with ETCS (but not in operation). Section Meidling Wien – Wampersdorf ("Pottendorferlinie") and the section Graz – Klagenfurt (Koralmbahn) are expected to be ETRMS compliant by 2023; the section Gloggnitz-Bruck a.d. Mur (Semmering tunnel) is expected to by compliant by 2024. Railroad Terminal in Inzersdorf (CCW) will be ERTMS ready concurrent with the "Pottendorferlinie"; the terminal in Graz-Werndorf in conjunction with the implementation on the Koralm tunnel (2023). On other sections of the Corridor ETCS Level 2 will not be in use on all sections of the corridor until 2030;
- ***Italy***: plans for the deployment of ERTMS in Italy are under review; studies and works for the implementation of ERTMS on the BA Corridor sections of the Italian network are assumed to be implemented in two phases, partially by 2020 and partially by 2025/2030;
- ***Slovenia***: Two pilot projects are in operation on the section Pivka-Sežana (sub-sections Pivka-Divača and Divača-Sežana) of the BA Corridor. ERTMS will be deployed by 2015 except on the Pragersko-Maribor-Šentilj railway section. For this line, deployment plan is not defined as yet.

The total cost for the implementation of ERTMS on the BA Corridor sections is currently estimated at 0.8 € billion, excluding investments for Slovakia whose cost is included in the price of the following investments:

- Modernisation of railway line Zlatovce-Trenčianska Teplá (245 € million);
- Modernisation of railway line Trenčianska Teplá-Beluša (290 € million);
- Modernisation of railway line Beluša-Púchov (92 € million);
- Modernisation of railway line Považská Teplá-Žilina (128 € million);

- Modernisation of railway line Púchov-Považská Teplá (300 € million);
- Modernisation of railway line Krásno nad Kysucou-Čadca (300 € million);
- Modernisation of Bratislava junction (900 € million).

Table 32 BA Corridor: ERTMS development cost preliminary estimates

BA Corridor	PL	CZ	SK	AT	IT	SI
804.4	245.4*	32.5	-	190.0	130.0	206.5

Note: The value for Poland includes projects PL22 and PL23; the project PL22 (Development of the railway infrastructure – ERTMS-PL) also includes in its scope sections not belonging to the BA Corridor

Based on current information, ERTMS along the BA Corridor is not going to be fully deployed until 2030.

Differences between the member States exist both in terms of period of envisaged implementation and completion of the studies and works; the detail of the available information per country and section of the BA Corridor is also uneven and details are missing about the main activities and phases of technology implementation, including pilot projects and testing periods and fully operational phases. This seems to be emphasising the need for a more coordinated approach and systematic monitoring in the development of the activities required to deploy ERTMS along the Core Network Corridor.

Table 33 BA Corridor draft list of investments

The project list in the table below is the result of the independent analysis of the BA Corridor study consortium. It is an indicative list that shall identify all projects relevant for the completion of the core network corridor by 2030. The European Commission does not guarantee the accuracy of the data included in this list. The inclusion of a project in the list does not guarantee its eligibility for funding under the Connecting Europe Facility or any other funding source; the non-inclusion of a project in the list does not preclude its eligibility either. The list is structured per transport mode and sector as follows: railway, road, port, airport, rail-road terminals and urban transport. Projects common to more than one core network corridor have been marked with the colours below:

Investments Common BA Corridor and other Core Network Corridors	
	North Sea – Baltic
	Orient East Med
	Rhine-Danube
	Mediterranean
	Scandinavian-Mediterranean

Railway transport

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL01	Rail	Śląskie Voivodship (PL)	Works	Works on main passenger lines (E 30 and E 65) in Śląsk area, phase I: line E 65 section Będzin – Katowice – Tychy – Czechowice Dziedzice – Zebrzydowice	PKP PLK S.A.	2017-2021	1025.0	Public funds and possible EU Co-financing (CEF)	X cross-border	X
PL02	Rail	Opolskie Voivodship (PL)	Works	Works on railway line E 30 section Kędzierzyn Koźle - Opole Zachodnie	PKP PLK S.A.	2016-2018	75.0	Public funds and possible EU Co-financing (CEF)	X national railway	
PL03	Rail	Dolnośląskie Voivodship - Wielkopolskie Voivodship (PL)	Works	Works on railway line E 59 section Wrocław – Poznań, phase IV, section Dolnośląskie Voivodship border - Czempiń	PKP PLK S.A.	2014-2019	392.5	Public funds and possible EU Co-financing (CEF)	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL03a	Rail	Wielkopolskie Voivodship (PL)	Works	Modernisation of railway line E59 Wrocław – Poznań, phase II, section Wrocław – Dolnosląskie Voivodship border	PKP PLK S.A.	2009-2015	380.5	**Financed: (under OPIE 2007-2013)**		X
PL03b	Rail	Wielkopolskie Voivodship (PL)	Works	Modernisation of railway line E59 Wrocław – Poznań, phase III, section Czempiń – Poznań	PKP PLK S.A.	2015	235.0	**Financed: (under OPIE 2007-2013)**		X
PL04	Rail	Wielkopolskie Voivodship - Zachodniopomorskie Voivodship (PL)	Works	Works on railway line E 59 section Poznań Główny- Szczecin Dąbie	PKP PLK S.A.	2016-2020	550.0	Public funds and possible EU Co-financing (CEF)	X national railway	X
PL05	Rail	Mazowieckie Voivodship (PL)	Works	Works on diametrical line in Warsaw section Warszawa Wschodnia - Warszawa Zachodnia	PKP PLK S.A.	2016-2022	250.0	Public funds and possible EU Co-financing (CEF)	X national railway	X
PL05a	Rail	Mazowieckie Voivodship (PL)	Works	Works on railway line Warszawa Włochy - Grodzisk Mazowiecki (line no. 447)	PKP PLK S.A.	2015-2018	87.5	Public funds and possible EU Co-financing (CEF)	X national railway	X
PL05b	Rail	Mazowieckie Voivodship (PL)	Works	Modernisation of railway line Warszawa – Łódź, phase II, lot A, section Warszawa Zachodnia – Skierniewice (Miedniewice)	PKP PLK S.A.	2009-2015	553.8	**Financed: (under OPIE 2007-2013)**		X
PL06	Rail	Śląskie Voivodship - Łódzkie Voivodship - Kujawsko-Pomorskie Voivodship - Wielkopolskie Voivodship (PL)	Works	Works on railway line C-E 65 section Chorzów Batory - Tarnowskie Góry - Karsznice - Inowrocław - Bydgoszcz – Maksymilianowo	PKP PLK S.A.	2016-2020	250.0	Public funds and possible EU Co-financing (CEF)	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL07	Rail	Opolskie Voivodship - Dolnośląskie Voivodship (PL)	Works	Works on railway line C-E 30 section Opole Groszowice - Jelcz - Wrocław Brochów	PKP PLK S.A.	2015-2018	75.0	Public funds and possible EU Co-financing (CEF)	X national railway	
PL07a	Rail	Opolskie Voivodship (PL)	Works	Improvement of transport services through improvement of technical conditions of railway line 132 section Błotnica Strzelecka– Opole Groszowice	PKP PLK S.A.	2013-2015	51.2	**Financed: (under OPIE 2007-2013)**		
PL08	Rail	Opolskie Voivodship - Śląskie Voivodship (PL)	Works	Works on railway line E-59 section Kędzierzyn Koźle - Chałupki (state border)	PKP PLK S.A.	2017-2019	45.8	Public funds and possible EU Co-financing (CEF)	X cross-border	X
PL09	Rail	Kujawsko-Pomorskie Voivodship - Pomorskie Voivodship (PL)	Works	Works on railway line C-E 65 section Bydgoszcz – Tczew	PKP PLK S.A.	2017-2020	175.0	Public funds and possible EU Co-financing (CEF)	X national railway	X
PL10	Rail	Wielkopolskie Voivodship (PL)	Works	Works on by-passing line in Poznań (section Poznań Górczyn - Poznań Starołęka - Poznań Franowo - Swarzędz/Zieliniec - Kiekrz)	PKP PLK S.A.	2016-2019	50.0	Public funds and possible EU Co-financing (CEF)	X national railway	X
PL11	Rail	Mazowieckie Voivodship (PL)	Studies and Works	Works on by-passing line in Warszawa (section Warszawa Gołąbki / Warszawa Zachodnia - Warszawa Gdańska)	PKP PLK S.A.	2016-2018	125.0	Public funds and possible EU Co-financing (CEF)	X national railway	X
PL12	Rail	Śląskie Voivodship (PL)	Works	Works on main passenger lines (E 30 and E 65) in Śląsk area, phase III: line E 30 section Katowice - Chorzów Batory - Gliwice Łabędy	PKP PLK S.A.	2019-2021	275.0	Public funds and possible EU Co-financing (CEF)	X national railway	X
PL15	Rail	Śląskie Voivodship (PL)	Works	Works on railway line no. 139 section Czechowice Dziedzice - Bielsko Biała - Zwardoń (state border)	PKP PLK S.A.	2016-2019	88.0	Public funds and possible EU Co-financing (CEF)	X cross-border	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL16	Rail (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Improvement of railway connection to Maritime Port in Gdynia	PKP PLK S.A.	2018-2020	162.5	Public funds and possible EU Co-financing (CEF)	X port last mile	X
PL17	Rail (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Improvement of railway connection to Maritime Port in Gdańsk	PKP PLK S.A.	2018-2020	200.0	Public funds and possible EU Co-financing (CEF)	X port last mile	X
PL18	Rail (Seaport last mile)	Zachodniopomorskie Voivodship (PL)	Works	Improvement of railway connection to Maritime Ports in Szczecin i Świnoujście	PKP PLK S.A.	2018-2020	115.8	Public funds and possible EU Co-financing (CEF)	X port last mile	X
PL19	Rail (Seaport last mile)	Pomorskie Voivodship (PL)	Studies	Improvement of railway connection to Maritime Port in Gdynia - preparatory works	PKP PLK S.A.	2015-2016	0.8	**Financed: (under OPIE 2007-2013)**		X
PL19a	Rail (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Project of improvement of railway connection to Gdańsk Port (bridge + double track railway line)	PKP PLK S.A.	2013-2016	128.9	**Financed: (under OPIE 2007-2013)**		X
PL20	Rail (Seaport last mile)	Pomorskie Voivodship (PL)	Studies	Improvement of railway connection to Maritime Port in Gdańsk - preparatory works	PKP PLK S.A.	2015-2016	1.0	**Financed: (under OPIE 2007-2013)**		X
PL21	Rail (Seaport last mile)	Zachodniopomorskie Voivodship (PL)	Studies	Improvement of railway connection to Maritime Ports in Szczecin and Świnoujście - preparatory works	PKP PLK S.A.	2015-2016	1.1	**Financed: (under OPIE 2007-2013)**		X
PL22	Rail	Poland	Works	Implementation of ERTMS (ETCS/GSM-R) on core network lines and freight corridors (RFC)	PKP PLK S.A.	2014-2030	237.5	Public funds and possible EU Co-financing (CEF)	X ERTMS	X
PL23	Rail	Poland	Works	Design and implementation of ETCS Level 1 on the section of railway line E65, CMK Grodzisk Mazowiecki - Zawiercie	PKP PLK S.A.	2013-2015	7.9	**Financed: (from TENT)**		X
PL24	Rail	Poland	Studies	Modernisation of railway line E65 section Chorzów Batory – Tarnowskie Góry – Karsznice – Inowrocław – Bydgoszcz – Maksymilianowo, section Bydgoszcz – Tczew	PKP PLK S.A.	2015 - 2017	To be defined	Public funds and possible EU Co-financing	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL24a	Rail	Pomorskie Voivodship (PL)	Works	Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Gdańsk, LCC Gdynia	PKP PLK S.A.	2009-2014	486.0	**Financed: (under OPIE 2007-2013)**	X national railway	X
PL24b	Rail	Pomorskie Voivodship (PL)	Works	Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Iława, LCC Malbork	PKP PLK S.A.	2011-2014	556.6	**Financed: (under OPIE 2007-2013)**	X national railway	X
PL24c	Rail	Warmińsko-Mazurskie Voivodship (PL)	Works	Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Działdowo	PKP PLK S.A.	2015	336.9	**Financed: (under OPIE 2007-2013)**	X national railway	X
PL24d	Rail	Mazowieckie Voivodship (PL)	Works	Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Ciechanów	PKP PLK S.A.	2009-2014	486.0	**Financed: (under OPIE 2007-2013)**	X national railway	X
PL25	Rail	Poland	Studies	Works on railway line C-E 30 section Opole Groszowice - Jelcz - Wrocław Brochów within project: "Works on selected railway lines under EU perspective 2014-2020 – preparatory works – OPIE 7.1-103"	PKP PLK S.A.	2014-2015	To be defined	**Financed: (under OPIE 2007-2013)**		
PL27	Rail	Poland	Studies	Works on railway line E 30 section Kędzierzyn Koźle – Opole Zachodnie (preparatory works)	PKP PLK S.A.	2015-2016	To be defined	Public funds and possible EU Co-financing	X national railway	
PL91a	Rail (Airport last mile)	Śląskie Voivodship (PL)	Works	Katowice airport - Construction of railway connection between Katowice Pyrzowice Airport and Górnośląskie cities agglomeration, section Katowice-Pyrzowice	PKP PLK S.A.	2016-2020	400.0	Public funds and possible EU Co-financing (CF)		X
PL52l	Seaport	Pomorskie Voivodship (PL)	Works	Further elimination of bottlenecks in rail transport accessing to the Port terminals of Gdynia, complete electrification of the rail system and the possibility to serve full-length 750m trains with axle load 22.5t as well as full deployment of ERMTS	ZMP Gdynia	2020-2027	To be defined	To be defined		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
CZ01	Rail	South Moravian region (CZ)	Works	Břeclav junction modernisation, 2nd phase	SŽDC	2012-2015	35.1	**Financed:** (public funds (15%) and cohesion fund OPT 1 (85 %))		X
CZ02	Rail	South Moravian region (CZ)	Works	Modřice - Horní Heršpice (Brno node): railway modernisation	SŽDC	2015	9.0	**Procured, financing not decided yet**(Public funds and possible EU Co-financing (CF - OPT1))	X national railway	X
CZ03	Rail	South Moravian region (CZ)	Studies and Works	New high speed parallel section Brno – Vranovice 200 – 350 km/h and modernisation of section Vranovice – Břeclav to 200+ km/h	SŽDC	2020-2030	To be defined	Public funds and possible EU Co-financing (CF)	X national railway	X
CZ04	Rail	Olomouc region (CZ)	Works	Přerov junction modernisation, 2nd phase	SŽDC	2016-2021	84.6	Public funds and possible EU Co-financing (CEF, CF)		X
CZ05	Rail	South Moravian region (CZ)	Studies and Works	Brno junction modernisation/new main station	SŽDC	2018-2022	756.0	Public funds and possible EU Co-financing (CEF, CF)	X national railway	X
CZ06	Rail	South Moravian region, Olomouc region (CZ)	Studies and Works	Blažovice - Nezamyslice: railway modernisation to 200 km/h	SŽDC	2018-2022	896.8	Public funds and possible EU Co-financing (CEF, CF)	X national railway	X
CZ07	Rail	Olomouc region (CZ)	Studies and Works	Nezamyslice - Přerov: railway modernisation to 200 km/h	SŽDC	2020-2022	453.1	Public funds and possible EU Co-financing (CEF, CF)	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
CZ08	Rail	South Moravian region (CZ)	Studies and works	Brno - Blažovice: railway modernisation to 200 km/h	SŽDC	2023-2024	262.3	Public funds and possible EU Co-financing (CF)	X national railway	X
CZ09	Rail	Moravian-Silesian region (CZ)	Studies and Works	Ostrava junction modernisation	SŽDC	2019-2021	222.2	Public funds and possible EU Co-financing (CEF+CF)	X national railway	X
CZ10	Rail	South Moravian region (CZ)	Works	ETCS Břeclav - Brno	SŽDC	2015	10.3	To be defined	X ERTMS	X
CZ11	Rail	South Moravian region (CZ)	Works	Reconstruction of the bridge at km 80.930 railway Hohenau (ÖBB) - Přerov	SŽDC	2015	16.9	**Procured** (Financing to be confirmed) (Public funds and possible EU Co-financing (CF - OPT1))	X cross-border	X
CZ12	Rail	Moravian-Silesian region, Olomouc region, South Moravian region (CZ)	Works	ETCS Petrovice u Karviné – Ostrava – Přerov - Břeclav	SŽDC	2015-2017	22.2	Public funds and possible EU Co-financing (CF)	X ERTMS	X
CZ16	Rail (Airport last mile)	Moravian-Silesian region (CZ)	Works	Connection of Mošnov airport to railway network	SŽDC/Moravian-Silesian region	2013-2015	22.9	**Financed:** (public funds (15%) and cohesion fund OPT 1 (85 %))		X
CZ16a	Rail	Olomouc region (CZ)	Works	Říkovice - increased performance of traction substation	SŽDC	2014-2015	12.1	State budget		X
SK01	Rail	Trenčín region (SK)	Works	Zlatovce – Trenčianska Teplá: railway modernisation	ŽSR	2012-2016	245.0	**Financed:** (public funds (15%) and cohesion fund (85 %))		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SK02	Rail	Trenčín region (SK)	Works	Trenčianska Teplá - Beluša: railway modernisation	ŽSR	2009-2014	289.9	**Financed:** (public funds (15%) and cohesion fund (85 %))		X
SK03	Rail	Trenčín region (SK)	Works	Beluša - Púchov: railway modernisation	ŽSR	2012-2015	91.8	**Financed:** (public funds (15%) and cohesion fund (85 %))		X
SK04	Rail	Trenčín region, Žilina region (SK)	Works	Považská Teplá – Žilina: railway modernisation to 160 km/h	ŽSR	2015-2016	127.8	**Financed:** (public funds (15%) and cohesion fund (85 %))		X
SK05	Rail	Bratislava region (SK)	Works	Devínska Nová Ves - state border: railway electrification and modernisation to 100 km/h	ŽSR	2018-2019	5.0	Public funds and possible EU Co-financing (CF)	X cross-border	X
SK06	Rail	Trenčín region (SK)	Works	Púchov - Považská Teplá: railway modernisation to 160 km/h	ŽSR	2015-2018	300.0	Public funds and possible EU Co-financing (CEF)	X national railway	X
SK07	Rail	Žilina region (SK)	Works	Krásno nad Kysucou – Čadca: railway modernisation	ŽSR	2019-2022	300.0	Public funds and possible EU Co-financing (CEF/CF)	X cross-border	X
SK08	Rail	Žilina region (SK)	Works	Žilina junction modernisation	ŽSR	2018-2020	318.0	Public funds and possible EU Co-financing (CF)	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SK09	Rail	Bratislava region (SK)	Works	Bratislava junction modernisation	ŽSR	2019-2021	625.0	Public funds and possible EU Co-financing (CF)	X national railway	X
AT01	Rail	Lower Austria and Styria (AT)	Works	New section from Gloggnitz to Mürzzuschlag (Semmering Base Tunnel)	ÖBB Infrastruktur	2012-2024	3122.0	**Partially financed:** State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X missing link	X
AT02	Rail	Styria and Carinthia (A)	Works	New section from Graz to Klagenfurt (Koralm railway line and tunnel	ÖBB Infrastruktur	1999-2023	5367.3	**Partially financed:** State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X missing link	X
AT03	Rail	Vienna and Lower Austria (AT)	Studies and Works	Upgrading line Wien Stadlau - Border AT/SK (next to Marchegg): two tracks, electrification and railroad station	ÖBB Infrastruktur	2030	549.6	State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X cross-border	X
AT04	Rail	Vienna, Lower Austria, Styria and Carinthia (AT)	Works	Upgrade to ERTMS level 2 (all BA Corridor sections)	ÖBB Infrastruktur	2030	190.0	State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X ERTMS	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
AT05	Rail	Styria (AT)	Studies and Works	Section upgrade (Graz-Weitendorf)	ÖBB Infrastruktur	2024	111.5	State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X national railway	X
AT06	Rail	Styria (AT)	Studies and Works	Two track upgrade of line Werndorf - Spielfeldstraß (stage 2)	ÖBB Infrastruktur	2030	570.0	State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X cross-border	X
AT07	Rail	Vienna and Lower Austria (AT)	Studies and Works	Upgrading line Wien Meidling - Wampersdorf ("Pottendorferlinie"): planning, two tracks, railroad stations reconstruction	ÖBB Infrastruktur	2017 - 2024	871.8	State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X national railway	X
AT08	Rail	Vienna and Lower Austria (AT)	Studies and Works	Upgrade section Bernhardsthal to Vienna/Suessenbrunn (e.g. to allow trains speeds of 160km/h.)	ÖBB Infrastruktur	2015 - 2020	620.5	State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)	X cross-border	X
AT17	Rail	Vienna (AT)	Works	Wien main railroad station reconstruction	ÖBB Infrastruktur	2007-2015	238.6	**Financed:** State guaranteed loans taken by OEBB Infra		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
AT18	Rail	Styria (AT)	Studies and Works	Railroad stations reconstruction on the line Bruck a.d. Mur - Graz; and line upgrading on the same line to increase capacity until traffic starts on the new Koralm line	ÖBB Infrastruktur	2014-2024	219.3	**Partially Financed:** State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)		X
AT19	Rail	Styria (AT)	Works	Main railroad station Graz	ÖBB Infrastruktur	2008-2024	165.3	**Partially Financed:** State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)		X
AT27	Rail (Airport last mile)	Vienna (AT)/Lower Austria (AT)	Works	Rail connection Wien Hauptbahnhof ("Ostbahn") with Airport Wien	ÖBB Infrastruktur	2012-2014	69.8	**Financed:** State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)		X
AT28	Rail (Airport last mile)	Vienna (AT)/Lower Austria (AT)	Works	Reconstruction of railroad station Airport Wien	ÖBB Infrastruktur	2004-2014	119.2	**Financed:** State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)		X
IT01	Rail	Friuli Venezia Giulia Region (IT)	Studies and Works	Udine Railway Junction Upgrading and Improvement Works	RFI spa	2020	60.0	Public funds and possible EU Co-financing	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT03	Rail	Veneto Region (IT)	Studies and Works	Mestre Railway Junction: Improvement of the Bivi railway line (first phase)	RFI spa	2020	120.0	Public funds and possible EU Co-financing	X national railway	X
IT93	Rail	Veneto Region (IT)	Studies and Works	Mestre Railway Junction: Improvement of the Bivi railway line (completion)	RFI spa	2025/2030	To be defined	Public funds and possible EU Co-financing	X national railway	X
IT04	Rail	Friuli Venezia Giulia, Veneto and Emilia Romagna Regions (IT)	Studies and Works	Works to allow train length operation to 750m along the corridor	RFI spa	2020	80.0	Public funds and possible EU Co-financing	X national railway	X
IT05	Rail	Emilia Romagna Region (IT)	Studies and Works	Upgrading to P/C 80 standard of the Bologna- Ravenna railway line, between Castelbolognese and Ravenna	RFI spa	2020	30.0	Public funds and possible EU Co-financing	X national railway	X
IT07	Rail	Friuli Venezia Giulia and Veneto Region (IT)	Studies and Works	Speed increase of the Venezia-Trieste conventional railway line	RFI spa	2020	60.0	Public funds and possible EU Co-financing		X
IT08	Rail	Friuli Venezia Giulia, Veneto and Emilia Romagna Regions (IT)	Studies and Works	ERTMS instalment on the corridor (first phase)	RFI spa	2020	80.0	Public funds and possible EU Co-financing	X ERTMS	X
IT17	Rail	Friuli Venezia Giulia, Veneto and Emilia Romagna Regions (IT)	Studies and Works	ERTMS instalment on the corridor (completion)	RFI spa	2025/2030	50.0	Public funds and possible EU Co-financing	X ERTMS	X
IT09	Rail	Veneto and Emilia	Studies and Works	Technological Upgrading of the Padova-Bologna railway line (first phase)	RFI spa	2020	175.0	Public funds and possible EU Co-		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
		Romagna Regions (IT)						financing		
IT20	Rail	Veneto and Emilia Romagna Regions (IT)	Studies and Works	Technological Upgrading of the Padova-Bologna railway line (completion)	RFI spa	2025/2030	To be defined	Public funds and possible EU Co-financing		X
IT10	Rail	Friuli Venezia Giulia and Veneto Region (IT)	Studies and Works	Technological upgrading of the sections corridor in the Friuli Venezia-Giulia and Veneto regions (first phase)	RFI spa	2020	105.0	Public funds and possible EU Co-financing	X national railway	X
IT18	Rail	Friuli Venezia Giulia and Veneto Region (IT)	Studies and Works	Technological upgrading of the sections of the corridor in the Friuli Venezia-Giulia and Veneto regions (completion)	RFI spa	2025	50.0	Public funds and possible EU Co-financing	X national railway	X
IT11	Rail	Friuli Venezia Giulia, Veneto and Emilia Romagna Regions (IT)	Studies and Works	Railway station improvement works (accessibility, quality of services, TSI conformation works) on the corridor	RFI spa	2020	200.0	Public funds and possible EU Co-financing	X national railway	X
IT02	Rail	Emilia Romagna Region (IT)	Studies and Works	Bologna High Speed Railway Junction: interconnection to Venice line	RFI spa	2020	36.2	Public funds and possible EU Co-financing		X
IT21	Rail (Seaport last mile)	Friuli Venezia Giulia Region (IT)	Studies and Works	Upgrading and improvement of the railway infrastructure at Campo Marzio and the Port of Trieste	RFI spa	2020	50.0	Public funds and possible EU Co-financing	X port last mile	X
IT13	Rail (Airport last mile)	Veneto Region (IT)	Studies and Works	Railway link to the Venice Marco Polo Airport	RFI spa	2020	250.0	Public funds and possible EU Co-financing		
IT12	Rail	Friuli Venezia Giulia, Veneto and Emilia	Studies and Works	Elimination of railway crossings on various sections of the corridor	RFI spa	2020	300.0	Public funds and possible EU Co-financing	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
		Romagna Regions (IT)								
IT96	Rail (Seaport last mile)	Emilia Romagna Region (IT)	Studies and Works	Elimination of level crossing between the Ravenna station and the Port of Ravenna	RFI spa	2020	15.0	Public funds and possible EU Co-financing	X port last mile	X
IT14	Rail	Friuli Venezia Giulia and Veneto Region (IT)	Studies and Works	Upgrading to 4 tracks of the Venice-Trieste conventional railway line	RFI spa	2025/2030	1000.0	Public funds and possible EU Co-financing		
IT15	Rail	Friuli Venezia Giulia Region (IT)	Studies and Works	Completion of the upgrading to two tracks of the Udine-Cervignano railway line, between Palmanova and Udine	RFI spa	2025/2030	170.0	Public funds and possible EU Co-financing		X
IT16	Rail	Cross-border IT-SI	Studies and Works	New High Speed railway line Trieste-Divača	RFI spa	2030	1040.0	Public funds and possible EU Co-financing	X cross-border	X
IT22	Rail (Seaport last mile)	Emilia Romagna Region (IT)	Studies and Works	Technological upgrading and electrification of the railway infrastructure between the Core Network Corridors and the Port of Ravenna (Dx Canale Candiano)	RFI spa	2025	10.0	Public funds and possible EU Co-financing	X port last mile	X
IT23	Rail (Seaport last mile)	Veneto Region (IT)	Studies and works	New dedicated railway link between the Core Network Corridors and the Port of Venice	RFI spa	2025/2030	250.0	Public funds and possible EU Co-financing	X port last mile	X
IT19	Rail	Friuli Venezia Giulia, Veneto and Emilia Romagna Regions (IT)	Studies and Works	TSI improvement works on the BA Corridor lines not already subject of upgrading/improvement or new construction in previous projects	RFI spa	2025/2030	To be defined	Public funds and possible EU Co-financing	X national railway	X
IT98	Rail	Friuli Venezia Giulia, Veneto and Emilia Romagna Regions (IT)	Studies and Works	TSI improvement works at the BA Corridor stations not already subject of upgrading/improvement or new construction in previous projects	RFI spa	2025/2030	To be defined	Public funds and possible EU Co-financing	X national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT85	Rail (Rail-Road Terminal last mile)	Friuli Venezia Giulia	Studies and Works	Improvement of the accessibility by railway to the Cervignano Core Network Rail Road Terminal	RFI spa	2025/2030	To be defined	Public funds and possible EU Co-financing		X
IT97	Rail	Emilia Romagna Region (IT)	Studies and Works	Technological upgrading of the Bologna-Castelbolognese railway line	RFI spa	To be defined	To be defined	Public funds and possible EU Co-financing		X
SI01	Rail	Eastern Slovenia (SI)	Studies and Works	Rehabilitation of existing line and construction of the 2nd track (new line) on the section Maribor-Šentilj	Ministry of infrastructure and spatial planning	2014-2020	245.0	Studies financed - 50% co-financing - TEN-T CEF (Study-Preliminary design and pre-investment assessment) CEF (Implementation)	X cross-border	X
SI02	Rail	Eastern Slovenia (SI)	Works	Railway station Pragersko - Creation of siding, pax tracks, extra tracks	Ministry of infrastructure and spatial planning	2016-2020	185.0	Studies financed - 50% co-financing - TEN-T Works: State, Cohesion Fund 2014-2020	x national railway	X
SI03	Rail	Eastern Slovenia (SI)	Works	Upgrading of railway line on the section Slovenska Bistrica-Pragersko	Ministry of infrastructure and spatial planning	2014-2017	35.6	**Financed:** Cohesion Fund 2007-2013, State		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SI04	Rail	Eastern Slovenia (SI)	Works	Railway station Poljčane - Creation of siding, pax tracks, extra tracks	Ministry of infrastructure and spatial planning	2016-2017	26.3	Public funds and possible EU Co-financing (CEF, CF)	x national railway	X
SI05	Rail	Eastern Slovenia (SI)	Works	Upgrading of railway line on the section Dolga Gora-Poljčane	Slovenian railways Ministry of infrastructure and spatial planning	2014-2015	45.4	Financed: public funds and CF	x national railway	X
SI06	Rail	Eastern Slovenia (SI)	Works	Assuring D4 down the whole section Zidani Most – Celje	Ministry of infrastructure and spatial planning	2018-2020	200.0	Studies financed - 50% co-financing - TEN-T Works: State, Cohesion Fund 2014-2020	x national railway	X
SI07	Rail	Eastern and Western Slovenia (SI)	Studies and works	Upgrading and reconstruction of the section Ljubljana - Zidani Most	Ministry of infrastructure and spatial planning	Studies until 2020, works after 2020	To be defined	To be defined	x national railway	X
SI08	Rail	Western Slovenia (SI)	Studies and Works	Creation of siding, pax tracks, extra tracks - Tivoli Arch in Ljubljana	Ministry of infrastructure and spatial planning	2010-2016	0.5	**Financed:** State, CF		X
SI09	Rail	Western Slovenia (SI)	Works	New section assuring direct connection and increase capacity of train station in Ljubljana (project called Tivoli Arch)	Ministry of infrastructure and spatial planning	2018-2020	20.0	Public funds and possible EU Co-financing (CEF, CF)	x national railway	X
SI10	Rail	Western Slovenia (SI)	Studies and Works	Eliminate of cargo traffic from the Ljubljana city centre and bisburdening of main train station Ljubljana, reconstruction of LJ Station	Ministry of infrastructure and spatial planning	Studies 2014 – works after 2020	1053.3	To be defined	x national railway	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SI11	Rail	Western Slovenia (SI)	Studies	Verification of reconstruction or upgrading of the track Ljubljana - Divača	Ministry of infrastructure and spatial planning	2020	To be defined	Public funds and possible EU Co-financing (CEF, CF)	x national railway	X
SI12	Rail	Western Slovenia (SI)	Works	Reconstruction of the existing line on the section Divača-Koper	Ministry of infrastructure and spatial planning	2013-2016	194.1	**Financed**: Cohesion Fund 2007-2013, State		X
SI13	Rail	Western Slovenia (SI)	Works	Construction of the 2nd track Divača-Koper	Ministry of infrastructure and spatial planning	2014-2022 (End date means for works)	819.0	Public funds and possible EU Co-financing (CEF, CF)	x national railway	X
SI14	Rail	Western Slovenia (SI)	Studies and Works	Upgrading of the section Trieste-Divača	Ministry of infrastructure and spatial planning	2013-2016 (End date of the works means only for Preliminary study)	280.0	Studies financed; works: CF, State	X cross-border	X
SI15	Rail	Eastern and Western Slovenia (SI)	Works	Signalling enhancement (ERTMS/ETCS…) and implementation of the ETCS Level 1 - Sežana/Koper-Ljubljana-Hodoš	Ministry of infrastructure and spatial planning	2008-2015	57.0	**Financed**: CF (85%), State		X
SI16	Rail	Eastern and Western Slovenia (SI)	Works	Implementation of the GSM-R system on the Slovenian railway network (SI)	Ministry of infrastructure and spatial planning	2006-2015	149.6	**Financed**: CF (85%), State		X

Road transport

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL28	Road	Śląskie Voivodship PL)	Works	A1: Pyrzowice-Częstochowa by-pass	GDDK&A	2014-2018	857.5	Public funds and possible EU Co-financing (CF)	X national roads	
PL28a	Road	Łódzkie Voivodship - Śląskie Voivodship (PL)	Works	A1: Piotrków Trybunalski - Częstochowa	GDDK&A	To be defined	1055.0	To be defined (Concessionaire considered)	X national roads	
PL29	Road (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Reconstruction of Kwiatkowski viaduct in Gdynia the full TEN-T requirements	Urząd Miasta w Gdyni	2016-2018	50.0	Public funds and possible EU Co-financing (CEF)	X port last mile	X
PL30	Road (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Construction of North by-pass of Tricity agglomeration (works affecting last mile connection to Gdynia port)	Urząd Miasta w Gdyni	2017-2021	275.0	Public funds and possible EU Co-financing (CF)	X port last mile	X
PL32	Road (Seaport last mile)	Zachodniopomorskie Voivodship (PL)	Works	Modernisation of road access to Szczecin Port: reconstruction of communication network in the area of Międzyodrze	Gmina Miasto Szczecin	2017-2020	55.0	Public funds and possible EU Co-financing (CEF)	X port last mile	X
PL33	Road	Pomorskie Voivodship (PL)	Works	S7: section Koszwały – Kazimierzowo	GDDK&A	2014-2017		Public funds and possible EU Co-financing (CF)	X national roads	
PL34	Road	Warmińsko-Mazurskie Voivodship (PL)	Works	S7: section Ostróda Południe – Olsztynek	GDDK&A	2013-2017	3587.7	Public funds and possible EU Co-financing (CF)	X national roads	
PL35	Road	Warmińsko-Mazurskie Voivodship (PL)	Works	S7: section Ostróda Płn. – Ostróda Płd.	GDDK&A	2013-2017		Public funds and possible EU Co-financing (CF)	X national roads	

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL36	Road	Warmińsko-Mazurskie Voivodship (PL)	Works	S7: section Miłomłyn – Ostróda Północ	GDDK&A	2013-2017		Public funds and possible EU Co-financing (CF)	X national roads	
PL37	Road	Warmińsko-Mazurskie Voivodship (PL)	Works	S7: section Nidzica – Napierki	GDDK&A	2013-2017		Public funds and possible EU Co-financing (CF)	X national roads	
PL38	Road	Mazowieckie Voivodship (PL)	Works	S7: section Napierki – Płońsk	GDDK&A	2016-2019		Public funds and possible EU Co-financing (CF)	X national roads	
PL39	Road	Mazowieckie Voivodship (PL)	Works	S7: section Płońsk – Czosnów	GDDK&A	2016-2020		Public funds and possible EU Co-financing (CF)	X national roads	
PL40	Road	Mazowieckie Voivodship (PL)	Works	S7: section Czosnów – Warszawa	GDDK&A	2016-2021		Public funds and possible EU Co-financing (CF)	X national roads	
PL42	Road	Lubuskie Voivodship (PL)	Works	S3: Sulechów (Kruszyna junction) – Nowa Sól, II lane of Gorzów Wielkopolski by-pass and II lane of Międzyrzecze by-pass	GDDK&A	2013-2019	456.6	Public funds and possible EU Co-financing (CEF/CF)	X national roads	
PL42a	Road	Zachodniopomorskie Voivodship (PL)	Works	S3: express road Świnoujście - Szczecin	GDDK&A	2020	563.9	Public funds and possible EU Co-financing (CF)	X national roads	
PL43	Road	Lubuskie Voivodship-Dolnośląskie Voivodship (PL)	Works	S3: Nowa Sól (Nowe Miasto junction) – Legnica (A4, Legnica II junction)	GDDK&A	2013-2018	734.4	Public funds and possible EU Co-financing (CEF)	X national roads	
PL44	Road	Śląskie Voivodship (PL)	Works	S69: express road Bielsko Biała - state border	GDDK&A	2015-2023	420.5	Public funds and possible EU Co-financing	X cross-border	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
								(CEF/CF)		
PL44a	Road	Śląskie Voivodship (PL)	Works	S1: express road section Kosztowy - Bielsko-Biała	GDDK&A	2020	450.0	Public funds and possible EU Co-financing (CF)	X national roads	
PL44b	Road	Śląskie Voivodship (PL)	Works	S69: Continuation of S69 express road construction, section Bielsko-Biała – Żywiec – Zwardoń, section „Mikuszowice" junction-Żywiec	GDDK&A	2014-2015	53.0	Financed: (under OPIE 2007-2013)	x cross-border	X
PL45	Road	Poland	Works	National Traffic Management System on TEN-T network	GDDK&A	2020	375.0	Public funds and possible EU Co-financing (CEF)	X ITS/ITC	
PL52o	Road (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Droga Czerwona road in Gdynia (from Janka Wiśniewskiego Street to OPAT)	Under evaluation	Under evaluation	Under evaluation	Under evaluation	X port last mile	X
PL52p	Road (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Upgrading of Polska Street and Janka Wiśniewskiego Street (from the planned Motorway of the Sea Gdynia-Karlskrona new ferry terminal to the planned Droga Czerwona road)	Under evaluation	Under evaluation	Under evaluation	Under evaluation	X port last mile	X
CZ13	Road	Olomouc region (CZ)	Works	Přerov - Lipník: motorway D1 construction	ŘSD	2014-2018	222.7	Public funds and possible EU Co-financing (CF)	X national roads	
CZ14	Road	Olomouc region (CZ)	Works	Říkovice - Přerov: motorway D1 construction	ŘSD	2017-2021	312.5	Public funds and possible EU Co-financing (CF)	X national roads	
CZ15	Road	South Moravian region (CZ)	Works	Perná - border CZ/AT: expressway R52 construction (Mikulov bypass expected to be completed by 2020)	ŘSD	2020-2030	123.6	Public funds and possible EU Co-financing (CEF+CF)	X cross-border	X
CZ15a	Road	South Moravian region (CZ)	Works	Pohořelice - Perná: expressway R52 construction	ŘSD	2020-2030	256.4	Public funds and possible EU Co-financing (CEF+CF)	X cross-border	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SK10	Road	Bratislava region (SK)	Works	Triblavina junction construction	NDS	2014-2016	39.6	To be defined		
SK11	Road	Bratislava region (SK)	Works	Bratislava – Senec: motorway D1 widening to 6 lanes	NDS	2016-2019	662.3	State Budget		
SK12	Road	Bratislava region (SK)	Works	Blatné junction construction	NDS	2015-2016	25.1	State Budget		
SK13	Road	Bratislava region, Trnava region (SK)	Works	Blatné – Trnava: motorway D1 widening to 6 lanes	NDS	2016-2018	363.1	State Budget		
SK14	Road	Žilina region (SK)	Works	Žilina Strážov - Žilina Brodno: motorway D3 construction	NDS	2014-2017	254.9	**Financed:** (public funds (15%) and cohesion fund (85 %))		X
SK15	Road	Žilina region (SK)	Works	Žilina Brodno - Kysucké Nové Město: motorway D3 construction	NDS	2016-2020	428.0	Public funds and possible EU Co-financing (CF)	X cross-border	X
SK16	Road	Žilina region (SK)	Works	Kysucké Nové Město – Oščadnica: motorway D3 construction	NDS	2016-2019	254.3	Public funds and possible EU Co-financing (CF)	X cross-border	X
SK17	Road	Žilina region (SK)	Works	Oščadnica – Čadca: motorway D3 construction	NDS	2018-2020	82.2	Public funds and possible EU Co-financing (CF)	X cross-border	X
SK18	Road	Žilina region (SK)	Works	Čadca – Svrčinovec: motorway D3 construction	NDS	2015-2018	207.0	Public funds and possible EU Co-financing (CF)	X cross-border	X
SK19	Road	Žilina region (SK)	Works	Svrčinovec – Skalité: motorway D3 construction	NDS	2013-2016	330.0	**Partially financed:** public funds and possible EU Co-financing	X cross-border	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
								(CEF/CF)		
SK20	Road	Žilina region (SK)	Works	Skalité - border SK/PL: motorway D3 construction	NDS	2013-2016		**Partially financed:** public funds and possible EU Co-financing (CEF/CF)	X cross-border	X
AT12	Road	Lower Austria (AT)	Works	A4 motorway: section Airport Vienna - Fischamend, additional lane for each direction	ASFINAG	2014-2015	43.0	**Financed:** State road infrastructure budget; province of Lower Austria; ASFINAG revenues		
AT14	Road	Carinthia (AT)	Works	A2 motorway: northern by-pass Klagenfurt, general overhaul (stage 1)	ASFINAG	2013-2018	54.0	**Financed:** State road infrastructure budget; province of Lower Austria; ASFINAG revenues		
AT15	Road	Austria (AT)	Studies	Regional European Electronic Toll Service (REETS TEN) for Trucks; (one single OBU compliant with multiple systems)	ASFINAG; AETIS	2013-2015	4.6	**Financed:** (2012-EU-50009-S TEN-T 2007-2013 50%)		
AT20	Road	Vienna and Lower Austria (AT)	Studies and Works	S1 "Wiener Aussenring" express road from Süßenbrunn to Groß-Enzersdorf	ASFINAG	2016-2018	300.0	State road infrastructure budget; City of Vienna, province of Lower Austria; ASFINAG revenues		
AT21	Road	Vienna and	Studies	S1 "Wiener Aussenring" express road from	ASFINAG	2018-	1500.0	State road		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
		Lower Austria (AT)	and Works	Groß-Enzersdorf to Schwechat		2025		infrastructure budget; City of Vienna, province of Lower Austria; ASFINAG revenues		
AT22	Road	Lower Austria (AT)	Studies and Works	A5 "Nord/Weinviertel" motorway from Schrick to Poysbrunn (2 lanes each direction)	ASFINAG	2015-2017	324.0	State road infrastructure budget; province of Lower Austria; ASFINAG revenues	X cross-border	
AT23	Road	Lower Austria (AT)	Studies and Works	A5 "Nord/Weinviertel" motorway Drasenhofen by-pass (1 lane each direction, not conform with Reg. 1315/2013!)	ASFINAG	2016-2018	54.0	State road infrastructure budget; province of Lower Austria; ASFINAG revenues	X cross-border	
AT24	Road	Lower Austria (AT)	Studies and Works	A5 "Nord/Weinviertel" motorway Poysbrunn - Drasenhofen AT/CZ border (2 lanes each direction) , AT legal decision is awaited by end of 2014, start of construction depends on CZ environmental review	ASFINAG	2020-2030	91.0	State road infrastructure budget; province of Lower Austria; ASFINAG revenues	X cross-border	
AT25	Road	Lower Austria and Burgenland (AT)	Studies and Works	A4 motorway: section Fischamend - Neusiedl, additional lane for each direction	ASFINAG	2018-2023	245.0	State road infrastructure budget; province of Lower Austria and Burgenland; ASFINAG revenues		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT82	Road	Friuli Venezia Giulia Region (IT)	Studies and Works	Improvement of the Cross-border Road section (custom and police check areas) between Italy and Slovenia (R.A. 14 motorway)	ANAS	Under bilateral review	Under bilateral review	To be defined	X cross-border	
IT24	Road	Friuli Venezia Giulia Region (IT)	Studies and Works	R.A. 14: Interventions planned in order to reorganize and separate different types of traffic flows (highway traffic and urban traffic) on the Italian side of the border, section adjacent to the cross-border	ANAS	2014-2020	8.1	Public funds and possible EU Co-financing		
IT25	Road (Seaport last mile)	Friuli Venezia Giulia Region (IT)	Studies and Works	SS 202: works for the static consolidation of the wing walls (from km 9+850 to km 12+200) and for the structural recovery of the viaduct "Molo VII"	ANAS	On-going	4.3	**Financed:** (public funds)		
IT49	Road (Seaport last mile)	Veneto Region (IT)	Works	New road infrastructures outside the port area aiming at ameliorating the traffic flow management. The main problem is the high mix of different traffic flows	Venice Port Authority (Venice Municipality)	2015-2016	4.4	Public funds and possible EU Co-financing	X port last mile	X
IT83	Road	Friuli Venezia Giulia Region (IT)	Studies	R.A.13: Interventions planned in order to reorganize and separate different types of traffic flows (highway traffic and urban traffic) on the Italian side of the border	ANAS	To be defined	2.9	**Financed:** Public funds and possible EU Co-financing		
IT84	Road	Friuli Venezia Giulia, Veneto and Emilia Romagna Regions (IT)	Works	Installation of several road telematics systems such as: weather support systems, points for measuring vehicle speed, traffic structure and flow, points for measuring environmental parameters, electronic information boards and variable message signs, data transmission and data	ANAS	To be defined	4.1	To be defined	X ITS/ITC	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
				processing systems, video cameras and accident detection systems, dispatcher's supervision points and information points). The objective is to increase traffic safety and avoid congestion.						
IT88	Road (Airport last mile)	Veneto Region (IT)	Studies and Works	SS 14 bypass at Campalto and Tessera, providing access to the Venice Marco Polo Airport	ANAS	To be defined	35.0	Public funds and possible EU Co-financing		
IT30	Road	Veneto Region (IT)	Studies and Works	Upgrading of the A4 Venice-Trieste Motorway: Toll Booth Alvisopoli and interconnection with national road S.S. 14	Concessionary Company	2014-2020	67.4	Private		
IT31	Road	Friuli Venezia Giulia Region (IT)	Studies and Works	Upgrading of the A4 Venice-Trieste Motorway: Bridge over the Tagliamento and Palmanova junction	Concessionary Company	2014-2020	440.7	Private		
IT32	Road	Veneto Region (IT)	Studies and Works	Upgrading of the A4 Venice-Trieste Motorway: third lane section upgrading works between S. Donà di PIAVE - Alvisopoli junction	Concessionary Company	2014-2020	560.7	Private		
IT33	Road	Friuli Venezia Giulia Region (IT)	Studies and Works	Upgrading of the A4 Venice-Trieste Motorway: third lane section upgrading works between Gonars - Villesse	Concessionary Company	2014-2020	215.3	Private		
IT34	Road	Emilia Romagna Region (IT)	Studies and Works	Third lane upgrading of the A13 Motorway between Bologna and Ferrara	Concessionary Company	2014-2020	To be defined	Private		
IT95	Road	Emilia Romagna Region (IT)	Studies and Works	Fourth lane upgrading of the A14 Motorway between Bologna and Castelbolognese	Concessionary Company	2014-2020	600.0	**Financed:** Private		
IT99	Road	Emilia Romagna Region (IT)	Studies and Works	Realisation of the metropolitan expressway road North of the A14 between Ozzano and Bologna	ANAS	2014-2020	37.0	Public funds and possible EU Co-financing (CEF, CF)		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT100	Road (Seaport last mile)	Emilia Romagna Region (IT)	Studies and Works	Upgrading to CNR standards of the SS309dir	Under evaluation	Under evaluation	Under evaluation	Under evaluation	X port last mile	X
SI32	Road	Western Slovenia (SI)	Studies and works	Extension of Ljubljana Motorway ring	DARS	2020-2030	796.0	To be defined		
SI33	Road	Eastern and Western Slovenia (SI)	Studies and works	ITS implementation on state roads (Motorway cross - part of Pan European corridor V and X in Slovenia)	Ministry of infrastructure and spatial planning, DARS, DRSC	2014-2030	200.0	Public funds and possible EU Co-financing (CEF, CF)	X ITS/ITC	X
PL52m	Road (Seaport last mile)	Pomorskie Voivodship (PL)	Works	Further integration and modernization of national roads and motorways links with the port's road infrastructure and ensuring an alternative, non-collision road connection of the Port of Gdynia to the national road network according to TEN-t requirements	ZMP Gdynia	2020-2027	To be defined	To be defined		X

Sea and inland waterway ports

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL31	Seaport	Pomorskie Voivodship (PL)	Works	Extension and modernisation of road and rail network in External Port of Gdańsk	ZMP Gdańsk	2016-2019	37.5	Public funds and possible EU Co-financing (CEF/CF)		X
PL52n	Seaport	Pomorskie Voivodship (PL)	Works	Elimination of bottlenecks in road transport access to the port terminals, including strengthening the load bearing capacity of the surfaces, increasing throughput and ensuring efficient handling of oversize cargo	ZMP Gdynia	2020-2027	To be defined	To be defined		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL46	Seaport	Pomorskie Voivodship (PL)	Works	Construction of public ferry terminal in Gdynia Port	ZMP Gdynia	2015-2017	30.0	Public funds and possible EU Co-financing (CF)		X
PL47	Seaport	Pomorskie Voivodship (PL)	Works	Deepening the approach fairway and internal waters Of Gdynia Port, phase I-III	ZMP Gdynia, Urząd Morski Gdynia	2015-2018	55.0	Public funds and possible EU Co-financing (CF)		X
PL48	Seaport	Pomorskie Voivodship (PL)	Works	Reconstruction of Quay areas in Gdynia Port, phase II and III	ZMP Gdynia	2015-2017	55.0	Public funds and possible EU Co-financing (CF)		X
PL49	Seaport	Pomorskie Voivodship (PL)	Works	Integrated system of navigation marking including e-Navigation	Urząd Morski w Gdyni	2016-2017	10.0	Public funds and possible EU Co-financing (CF)	X ITS/ITC	X
PL50	Seaport	Pomorskie Voivodship (PL)	Works	Construction of GMDSS system for maritime administration	Urząd Morski w Gdyni	2020	17.5	Public funds and possible EU Co-financing (CF)	X ITS/ITC	X
PL51	Seaport	Pomorskie Voivodship (PL)	Works	Reconstruction of railway access to Western part of Gdynia Port	ZMP Gdynia	2015-2016	7.0	Public funds and possible EU Co-financing (CF)		X
PL52	Seaport	Pomorskie Voivodship (PL)	Works	Construction of port infrastructure for sanitary sewerage collection and vessel's electric power supply	ZMP Gdynia	2015-2018	22.5	Public funds and possible EU Co-financing (CF)		X
PL52a	Seaport	Pomorskie Voivodship (PL)	Works	Extension of fuel terminal in Gdynia Port breakwater	ZMP Gdynia	2015-2016	12.5	Public funds and possible EU Co-financing (CF)		X
PL52b	Seaport	Pomorskie Voivodship (PL)	Works	Increasing the throughput capacities in port and creating new infrastructure on the extended port areas	ZMP Gdynia	2020-2027	To be defined	To be defined		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL52c	Seaport	Pomorskie Voivodship (PL)	Works	Further adaptation of port infrastructure parameters to meet growth forecasts, size and types of ships as well as ensuring the possibility to handle Baltmax size vessels including improvements in safety of navigational conditions, including ensuring the possibility to provide services to the biggest cruise vessels	ZMP Gdynia	2020-2027	To be defined	To be defined		X
PL52d	Seaport	Pomorskie Voivodship (PL)	Works	Further adaptation of the maritime access infrastructure by the Maritime Administration, so that the port can be capable of handling vessels with Baltmax parameters as well as ensuring navigational safety to and in the port	ZMP Gdynia	2020-2027	To be defined	To be defined		X
PL52e	Seaport	Pomorskie Voivodship (PL)	Works	Increasing the throughput capacity of rail tracks within the administrative borders of the Port of Gdynia according to TEN-t requirements	ZMP Gdynia	2020-2027	To be defined	To be defined		X
PL52f	Seaport	Pomorskie Voivodship (PL)	Works	Integration of port with its hinterland, especially through intermodal terminals	ZMP Gdynia	2020-2027	To be defined	To be defined		X
PL52g	Seaport	Pomorskie Voivodship (PL)	Works	Implementation of PCS, and integration of IT systems of port use	ZMP Gdynia	2020-2027	To be defined	To be defined	X ITS/ITC	X
PL52h	Seaport	Pomorskie Voivodship (PL)	Works	Development of Multimodal Platform „Logistics Valley”	ZMP Gdynia	2020-2027	To be defined	To be defined		X
PL52i	Seaport	Pomorskie Voivodship (PL)	Works	Implementation of Single Window system	ZMP Gdynia	2020-2027	To be defined	To be defined	X ITS/ITC	X
PL52j	Seaport	Pomorskie Voivodship	Works	Increasing efficiency of serving heavy loads and trucks in the Port of Gdynia, including	ZMP Gdynia	2020-2027	To be defined	To be defined	X ITS/ITC	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
		(PL)		implementation of Central Parking system and port traffic IT platform						
PL52k	Seaport	Pomorskie Voivodship (PL)	Works	Full integration of the Port of Gdynia as a TEN-T core port with other core elements in the network and as the origin port of the BA Corridor	ZMP Gdynia	2020-2027	To be defined	To be defined		X
PL53	Seaport	Pomorskie Voivodship (PL)	Works	Reconstruction of Southern access to Gdynia Port	Urząd Morski w Gdyni	2022	150.0	Public funds and possible EU Co-financing (CF)		X
PL53a	Seaport	Pomorskie Voivodship (PL)	Works	Reconstruction of local sources of thermal energy with use of renewable energy sources and the construction of facilities producing the "green" energy (stage I and II)	Urząd Morski w Gdyni	2016-2018	5.0	Public funds and possible EU Co-financing (CF)		X
PL54	Seaport	Pomorskie Voivodship (PL)	Works	Modernisation of seaway, extension of Quay and improvement of shipping conditions in Inner Port of Gdańsk	ZMP Gdańsk	2014-2019	90.5	Public funds and possible EU Co-financing (CEF)		X
PL55	Seaport	Pomorskie Voivodship (PL)	Works	Construction of North Quay near to peninsular breakwater In External Port of Gdańsk	ZMP Gdańsk	2015-2017	13.5	Public funds and possible EU Co-financing (CEF)		X
PL55a	Seaport	Pomorskie Voivodship (PL)	Works	Modernisation of entrance to Inner port (in Gdańsk), phase III	Urząd Morski w Gdyni	2016-2019	37.5	Public funds and possible EU Co-financing (CF)		X
PL55b	Seaport	Pomorskie Voivodship (PL)	Works	Modernisation of protective breakwaters system in Northern Port	Urząd Morski w Gdyni	2016-2020	165.0	Public funds and possible EU Co-financing (CF)		X
PL55c	Seaport	Pomorskie Voivodship (PL)	Works	Modernisation of seaway into Northern Port	Urząd Morski w Gdyni	2015-2020	13.5	Public funds and possible EU Co-financing (CF)		X
PL55d	Seaport	Pomorskie Voivodship (PL)	Works	Gdańsk Northern Port - construction of port of refuge for ships in distress and threatening ecological disaster along with breakwater infrastructure and anti-flood	Urząd Morski w Gdyni	2016-2020	120.0	Public funds and possible EU Co-financing (CF)		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
				barrage						
PL56	Seaport	Zachodniopomorskie Voivodship (PL)	Studies	Modernisation of the fairway Świnoujście-Szczecin to a depth of 12.5m - preparatory works	Urząd Morski w Szczecinie	2014-2015	0.1	Financed: (under OPIE 2007-2013)	X port interconnections	X
PL57	Seaport	Zachodniopomorskie Voivodship (PL)	Works	Modernisation of the fairway Świnoujście-Szczecin to a depth of 12.5m	Urząd Morski w Szczecinie	2017-2021	346.2	Public funds and possible EU Co-financing (CF)	X port interconnections	X
PL58	Seaport	Zachodniopomorskie Voivodship (PL)	Works	Adjustment of Ferry Terminal Infrastructure to intermodal transport services	ZMPSiŚ S.A.	2017 - 2020	32.0	Public funds and possible EU Co-financing (CEF)	X port interconnections	X
PL59	Seaport	Zachodniopomorskie Voivodship (PL)	Works	Improvement of Szczecin Port access in the area of Kaszubski Basin	ZMPSiŚ S.A.	2018 - 2020	50.0	Public funds and possible EU Co-financing (CF)		
PL60	Seaport	Zachodniopomorskie Voivodship (PL)	Works	Improvement of Port Szczecin access in the area of Dębicki Basin	ZMPSiŚ S.A.	2018 - 2020	50.0	Public funds and possible EU Co-financing (CF)		
PL61	Seaport	Zachodniopomorskie Voivodship (PL)	Works	Extension of Port infrastructure in Dębicki Canal in Port of Szczecin	ZMPSiŚ S.A.	2018 - 2020	37.5	Public funds and possible EU Co-financing (CF)		
PL62	Seaport	Zachodniopomorskie Voivodship (PL)	Works	Construction of vessel's stand for LNG export in External Port of Świnoujście	ZMPSiŚ S.A.	2018 - 2020	17.5	Public funds and possible EU Co-financing (CF)		
PL63	Seaport	Zachodniopo	Works	Extension and modernisation of technical	ZMPSiŚ S.A.	2016-	24.0	Public funds and		

ID	Transpo rt mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
		morskie Voivodship (PL)		infrastructure in Szczecin and Świnoujście Ports		2020		possible EU Co-financing (CF)		
PL64	Seaport	Zachodniopo morskie Voivodship (PL)	Works	Functional and environmentally friendly access to Świnoujście Port infrastructure, phase I	Gmina Miasto Świnoujście	2016-2018	22.9	Public funds and possible EU Co-financing (CEF)		
PL65	Seaport	Zachodniopo morskie Voivodship (PL)	Works	Functional and environmentally friendly access to Świnoujście Port infrastructure, phase II	Gmina Miasto Świnoujście	2018-2020	12.9	Public funds and possible EU Co-financing (CEF)		
PL66	Seaport	Zachodniopo morskie Voivodship (PL)	Works	Construction of deep sea berth at the outer port in Świnoujście	ZMPSIŚ S.A.	2017 - 2020	75.0	Public funds and possible EU Co-financing (CF)		
PL67	Seaport	Zachodniopo morskie Voivodship (PL)	Works	Development of port infrastructure at Górnośląski Basin in Port of Szczecin	ZMPSIŚ S.A.	2018 - 2020	22.5	Public funds and possible EU Co-financing (CF)		
PL124	Seaport	Zachodniopo morskie Voivodship (PL)	works	Adjustment of Bytmoskie Quay to receive vessels with draft of 11,5 m	ZMPSiS S.A.	2020-2027	To be defined	To be defined		
PL125	Seaport	Zachodniopo morskie Voivodship (PL)	works	Construction of port infrastructure on development areas of Ostrow Grabowski Penisula	ZMPSiS S.A.	2020-2027	To be defined	To be defined		
SK22	Inland port	Bratislava region (SK)	Studies and Works	Modernization of infrastructure in port of Bratislava: binding elements, perpendicular edges, stairs, coastal trails, berths for waiting position, warning signs in the Cargo port BA and completion port infrastructure in	VP, a.s.	2015-2019	64.7	Public funds and possible EU Co-financing (CF)		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
				the passenger port BA						
SK23	Inland port	Bratislava region (SK)	Works	Modernisation and completion of port quays and paved areas in port of Bratislava	VP, a.s.	2015-2020	41.4	Public funds and possible EU Co-financing (CF)		X
SK25	Inland port	Bratislava region (SK)	Works	Passenger port - waterfront Eurovea in Port of Bratislava	VP, a.s.	2014-2017	7.0	To be defined		X
SK26	Inland port	Bratislava region (SK)	Works	Landing positions for the purposes of passenger shipping - Winter port in Port of Bratislava	VP, a.s.	2015-2020	60.0	To be defined		X
SK27	Inland port	Bratislava region (SK)	Studies and Works	Safety radar navigation of shipping in public ports of SR	VP, a.s.	2014-2018	2.4	To be defined	X ITS/ITC	X
IT35	Seaport	Friuli Venezia Giulia Region (IT)	Works	First phase: construction of a new quay called "Logistic Platform" which has to be directly connected to the belt-road and the off-port rail network, with a wharf of about 600 meters in length and a depth of 14 meters	Trieste Port Authority	2014-2018	132.4	**Financed:** [Public (77%) and private funds (23%)]		X
IT36	Seaport	Friuli Venezia Giulia Region (IT)	Studies and works	Second phase: construction of a new quay called "Logistic Platform", with a wharf of about 600 meters in length and a depth of 12-14 meters	Trieste Port Authority	2014-2020	184.5	Public and private funds		X
IT37	Seaport	Friuli Venezia Giulia Region (IT)	Studies and works	Enlargement of the container terminal at quay VII increasing the potential up to a maximum of 1,200,000 TEU (dimension 200m, 18m depth)	Trieste Port Authority	2014-2020	187.0	Public and private funds		X
IT38	Seaport	Friuli Venezia Giulia Region (IT)	Works	Realization of a new Ro-Ro terminal in the Noghere valley area with a "working" draught of no less than 12 meters for berthing Ro-Ro	Trieste Port Authority	2014-2020	27.0	**Financed**: (private funds)		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
				vessels and a total surface of 430.000 sqm (first phase)						
IT39	Seaport	Friuli Venezia Giulia Region (IT)	Studies and Works	Realization of a new Ro-Ro terminal in the Noghere valley area with a "working" draught of no less than 12 meters for berthing Ro-Ro vessels and a total surface of 430.000 sq.m. (second phase)	Trieste Port Authority	2014-2020	126.0	To be defined		X
IT40	Seaport	Friuli Venezia Giulia Region (IT)	Studies and Works	Second phase of passengers terminal upgrade encompassing the enlargement of the related quay	Trieste Port Authority	2014-2020	14.0	To be defined		X
IT41	Seaport	Friuli Venezia Giulia Region (IT)	Studies	Automation of the authorization for the rail-entry process, subsequent to the already implemented project relating to road- entry process automation	Trieste Port Authority	2014-2015	0.4	**Financed:** EU and own funds		X
IT42	Seaport	Friuli Venezia Giulia Region (IT)	Studies	Feasibility study for a dangerous goods tracking systems (Under the Losamedchem European project) in order to monitor the flow of dangerous goods both incoming and outgoing port and to improve management of the flow of goods within the port. The project concerning the automation of road gates of the port of Trieste (acronyms: SEC and SILI) had been implemented (first phase)	Trieste Port Authority	2013-2015	4.0	**Financed:** EU and own funds		X
IT42a				Afterwards, three additional modules have been designed in order to develop the system. This later expansion regards also the tracking of dangerous goods		2020	2.0	Not yet financed: public funds and possible EU Co-financing (CEF, CF)	X ITS/ITC	X
IT43	Seaport	Friuli Venezia Giulia Region (IT)	Studies and Works	New operating centre for integrating all ancillary port services (COS)	Trieste Port Authority	To be defined	23.0	To be defined		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT44	Seaport	Veneto Region (IT)	Works	Upgrading to 2 tracks railway line in order to support growth in traffic flows due also to the realisation of Fusina Ro-Ro terminal (Adriamos EU project)	Venice Port Authority	2014-2020	5.7	Public funds and possible EU Co-financing		X
IT45	Seaport	Veneto Region (IT)	Works	Railway project supporting Ro-Ro terminal Fusina (part of the Adriamos EU project). Realisation of four transfer tracks within Fusina terminal	Venice Port Authority	2014-2015	7.0	Public funds and possible EU Co-financing		X
IT46	Seaport	Veneto Region (IT)	Works	Upgrade of rail links between the South Industrial Area of Marghera and Marghera Scalo Station: realisation of a new rail line (1,300 m) and construction of a road underpass to avoid traffic interferences	Venice Port Authority	2015-2018	7.5	Public funds and possible EU Co-financing		X
IT47	Seaport	Veneto Region (IT)	Studies and Works	New rolling stock vehicle maintenance and repair depot in response to increasing demand for this kind of services by port's railway operators	Venice Port Authority	2015-2017	2.5	Public funds and possible EU Co-financing		X
IT48	Seaport	Veneto Region (IT)	Works	New parking areas aiming at ameliorating road congestion problems and access to the port	Venice Port Authority	2016	2.5	Public funds and possible EU Co-financing		X
IT50	Seaport	Veneto Region (IT)	System Implementation	Interoperability between National Single Window and Venice Port Community System: realisation of a New Port Community System with the objective of increasing the interoperability between National Maritime Single Window and Port Operators Information Systems	Venice Port Authority	2015-2017	1.6	Public funds and possible EU Co-financing	X ITS/ITC	X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT51	Seaport	Veneto Region (IT)	System Implementation	Realisation of an information system in order to real time monitor maritime traffic and forecast the maritime traffic levels in the last maritime mile	Venice Port Authority	2015-2016	0.6	Public funds and possible EU Co-financing	X ITS/ITC	X
IT52	Seaport	Veneto Region (IT)	System Implementation	ICT system related to the port accessibility (gate-in, gate-out process) and data exchange with the others traffic management systems	Venice Port Authority	2015	0.8	Public funds and possible EU Co-financing	X ITS/ITC	X
IT53	Seaport	Veneto Region (IT)	System Implementation	Railway telematics systems for shunting operations and its integration with PCS and information systems of other subject involved in developing rail services	Venice Port Authority	2015-2017	1.6	**Financed:** (Own and EU)		X
IT54	Seaport	Veneto Region (IT)	Studies and Works	Construction of an offshore Port HUB for large ships avoiding oil carriers to transit on the Laguna and able to host up to Ultra Large Container Vessel (seawall, oil terminal, pipeline and container quay)	Venice Port Authority	2014-2019	2198.0	State (43%) and private (57%)		X
IT55	Seaport	Veneto Region (IT)	Works	NAPADRAG PROJECT- Works of dredging of the West Industrial Canal to reach the depth of 11.8 m	Venice Port Authority	2013-2015	12.8	**Financed:** [State (11,59-90%) EU (1,28-10%)]		X
IT92	Seaport	Veneto Region (IT)	Studies and Works	LNG supply facilities implementation at the Port of Venezia	Port authority of Ravenna	2014-2020	60.0	State, EU funds (CEF) and private		
IT56	Seaport	Emilia Romagna Region (IT)	Studies	EU project: Ravenna Port Hub: final detailed design and supporting technical analyses	Port authority of Ravenna	2013-2015	4.4	**Financed:** [Port Authority of Ravenna (50%) EU (50%)]		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT57	Seaport	Emilia Romagna Region (IT)	Works	First Phase: dredging works in several channels (Candiano, S.Vitale, Trattaroli) up to 11,5 – 13,5 meters; adapting quay layout Second Phase: dredging works up to 14m; realisation of a new quay serving a specific container terminal	Port authority of Ravenna	2015-2020	200.0	**Financed:** State (60 mln) Port authority of Ravenna (120 – EIB loans), Port authority of Ravenna (20)		X
IT58	Seaport	Emilia Romagna Region (IT)	Studies and works	Third phase: additional quay adjustments; Fourth phase: dredging works increasing depth up to 15.5 meters	Port authority of Ravenna	2018-2025	246.0	Possible EU Co-financing, Public funds, EIB loans, own funds		X
IT59	Seaport	Emilia Romagna Region (IT)	Works	Upgrading of the existing Ro-Ro and Ro-pax terminals (Largo Trattaroli): marine jetties and service area	Port authority of Ravenna	2016-2018	22.0	Possible EU Co-financing, Public funds, EIB loans, own funds		X
IT60	Seaport	Emilia Romagna Region (IT)	System Implementation	Port of Ravenna Fast Corridor: Implementation of telematics systems for the management of customs declarations and any other documents that are commonly used in goods transportation	Port authority of Ravenna	2014-2015	1.9	**Financed:** 50% UE and 50% beneficiaries		X
IT61	Seaport	Emilia Romagna Region (IT)	System Implementation	Implementation of telematics systems for the management of customs declarations and any other documents that are commonly used in goods transportation	Port authority of Ravenna	To be defined	2.0	Possible EU Co-financing, own funds	X ITS/ITC	X
IT93	Seaport	Emilia Romagna Region (IT)	Studies and Works	LNG supply facilities implementation at the Port of Ravenna	Port authority of Ravenna	2014-2020	60.0	State, EU funds (CEF) and private		
SI17	Seaport	Western Slovenia (SI)	Works	Port of Koper - Extension of Pier I Southern side and capacity upgrading in order to support the growing volumes of container business	Luka Koper d.d.	2015-2020	100	CEF, EIB loan, Luka Koper		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SI18	Seaport	Western Slovenia (SI)	Works	Port of Koper - New berthing facilities in Basin I, II and III	Luka Koper d.d.	2015-2020	40	CEF, EIB loan, Luka Koper		X
SI19	Seaport	Western Slovenia (SI)	Works	Port of Koper - New port entry and supporting road infrastructure	Luka Koper d.d.	2015-2020	20	CEF, EIB loan, Luka Koper		X
SI20	Seaport	Western Slovenia (SI)	Works	Port of Koper -Construction of additional rail connecting infrastructure network within the port	Luka Koper d.d.	2015-2018	20	CEF, EIB loan, Luka Koper		X
SI21	Seaport	Western Slovenia (SI)	Works	Port of Koper - Passenger terminal infrastructure	Luka Koper d.d.	2015-2016	3	CEF, EIB loan, Luka Koper		X
SI22	Seaport	Western Slovenia (SI)	Works	Port of Koper - Deepening of the navigational channel in basin II (outside the concession area)	Ministry of Infrastructure and Spatial Planning	2015-2020	15	Cohesion fund 2014-2020, State		X
SI23	Seaport	Western Slovenia (SI)	Works	Port of Koper - Arrangement of ports back areas	Luka Koper d.d.	2015-2020	12	CEF, EIB loan, Luka Koper		X
SI24	Seaport	Western Slovenia (SI)	Works	Port of Koper - Dredging works in port's basins according needs (within the concession area of the port)	Luka Koper d.d.	2015-2020	10	CEF, EIB loan, Luka Koper		X
SI25	Seaport	Western Slovenia (SI)	Works	Port of Koper -Extension of Pier I -Northern side	Luka Koper d.d.	2021-2025	60	CEF, EIB loan, Luka Koper		X
SI26	Seaport	Western Slovenia (SI)	Works	Port of Koper - New berthing facilities in Basin I, II and III	Luka Koper d.d.	2021-2030	20	CEF, EIB loan, Luka Koper		X
SI27	Seaport	Western Slovenia (SI)	Works	Port of Koper - New port entry and supporting road infrastructure	Luka Koper d.d.	2021-2030	10	CEF, EIB loan, Luka Koper		X
SI28	Seaport	Western Slovenia (SI)	Works	Port of Koper -Construction of additional rail connecting infrastructure network within the port	Luka Koper d.d.	2021-2030	20	CEF, EIB loan, Luka Koper		X
SI29	Seaport	Western Slovenia (SI)	Works	Port of Koper - Arrangement of ports back areas	Luka Koper d.d.	2021-2030	10	CEF, EIB loan, Luka Koper		X
SI30	Seaport	Western Slovenia (SI)	Works	Port of Koper - Dredging works in port's basins according needs (within the concession area of the port)	Luka Koper d.d.	2021-2030	10	CEF, EIB loan, Luka Koper		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SI31	Seaport	Western Slovenia (SI)	Works	Port of Koper - Extension of Pier II	Luka Koper d.d.	2020-2030	200	To be defined		X
SI32	Seaport	Western Slovenia (SI)	Works	Port of Koper - Construction of Pier III	Luka Koper d.d.	2020-2030	250	To be defined		X
PL123	Seaport	Zachodniopomorskie Voivodship (PL)	Studies	Container Terminal Świnoujscie - Storage area for handling container block trans using reachstackers or rtg cranes. Yard No 11-12	PHŚ	To be defined	11.9	Own funds		
PL123a	Seaport	Pomorskie Voivodship (PL)	Works	Deepwater Container Terminal Gdańsk - Construction of new part of the terminal with capacity of 1,000,000 TEU to reach 2,500,000 TEU handling capacity for the entire container terminal with further expansion of another 500,000 TEU planned for 2017-2019	DCT	2016-2019	To be defined	To be defined		X

Airports

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL68	Airport	Łódzkie Voivodship (PL)	Studies and Works	Łódź Airport - Extension of Apron	Lodz Airport	2014-2015	3.8	Own and possible bonds		
PL69	Airport	Łódzkie Voivodship (PL)	Works	Łódź Airport - Building of garage and service station for airport maintenance equipment	Lodz Airport	2014	4.3	Possible EU Co-financing and Bonds		
PL70	Airport	Łódzkie Voivodship (PL)	Studies and Works	Łódź Airport - Extension of Approach Lights on main approach direction	Lodz Airport	2014-2015	2.5	Own and possible bonds		
PL71	Airport	Łódzkie Voivodship (PL)	Studies and Works	Łódź Airport - Extension of parallel taxiway with RET	Lodz Airport	2014-2015	10.7	To be defined		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL72	Airport	Łódzkie Voivodship (PL)	Works	Łódź Airport -Implementation of Constant Noise Monitoring System	Lodz Airport	2014	0.2	Own and possible bonds		
PL73	Airport	Łódzkie Voivodship (PL)	Studies and Works	Łódź Airport -Extension of radar - camera security system	Lodz Airport	2014-2015	0.3	Own and possible bonds		
PL74	Airport	Dolnośląskie Voivodship (PL)	Studies and Works	Wrocław Airport - Adjustment of the airport to the ILS CAT II/III system	PLW S.A.	2015-2017	15.0	Own and possible EU Co-financing		
PL75	Airport	Dolnośląskie Voivodship (PL)	Studies and Works	Wrocław Airport - Modernisation of the runway	PLW S.A.	2015-2018	23.0	Own and possible EU Co-financing		
PL76	Airport	Dolnośląskie Voivodship (PL)	Studies and Works	Wrocław Airport - Construction of the technical background together with extension of terminal 1	PLW S.A.	2017-2018	4.0	Own and possible EU Co-financing		
PL77	Airport	Dolnośląskie Voivodship (PL)	Studies and Works	Wrocław Airport - Construction of the plane de-icing aircraft with a possible extension of an existing one	PLW S.A.	2017-2018	2.0	Own and possible EU Co-financing		
PL78	Airport	Dolnośląskie Voivodship (PL)	Studies and Works	Wrocław Airport - Construction of the fuel storage	PLW S.A.	2017-2018	3.5	Own and possible EU Co-financing		
PL79	Airport	Dolnośląskie Voivodship (PL)	Works	Wrocław Airport - Sleeves	PLW S.A.	2019-2020	1.0	Own and possible EU Co-financing		
PL80	Airport	Dolnośląskie Voivodship (PL)	Works	Wrocław Airport - Remediation of former military sites belonging to the Airport	PLW S.A.	2020-2022	0.5	Own and possible EU Co-financing		
PL81	Airport	Dolnośląskie Voivodship (PL)	Works	Wrocław Airport - Modernisation of the Airport Fire Protection location	PLW S.A.	2015-2017	0.3	Own and possible EU Co-financing		
PL82	Airport	Dolnośląskie Voivodship (PL)	Studies and Works	Wrocław Airport - Reconstruction of internal roads and airports taxiways	PLW S.A.	2018-2020	15.0	Own and possible EU Co-financing		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL83	Airport	Dolnośląskie Voivodship (PL)	Studies and Works	Wrocław Airport - Extension of parking and kerb	PLW S.A.	2018-2020	1.0	Own and possible EU Co-financing		
PL84	Airport	Zachodniopomorskie Voivodship (PL)	Works	Szczecin Aiport - Works on airport's infrastructure on airside (aprons, taxiways, runway)	"Port Lotniczy Szczecin - Goleniów" Sp. z o.o.	2015	24.1	**Financed:** (by EU (49,9 %) and commercial credit (51.1%))		
PL85	Airport	Zachodniopomorskie Voivodship (PL)	Studies	Szczecin Aiport -Works on airport's infrastructure on airside / landside (extensions on passenger terminal up to 10.000 sq.m ext. Runway up to 2900m length, ext. Apron at 2 parking positions for plane code B/C (B738), repairs airside surface taxiways	Port Lotniczy Szczecin - Goleniów Sp. z o.o.	2017-2020	9.9	Possible EU Co-financing (65% regional contract) and commercial credit (35% project promoter)		
PL86	Airport	Zachodniopomorskie Voivodship (PL)	Studies	Szczecin Aiport -Replacement security control units at passenger security control zone.	Port Lotniczy Szczecin - Goleniów Sp. z o.o.	2014-2016	0.9	Possible EU Co-financing (85%) and commercial credit (15%)		
PL87	Airport	Zachodniopomorskie Voivodship (PL)	Studies	Szczecin Aiport -Rebuild CCTV system at airport	Port Lotniczy Szczecin - Goleniów Sp. z o.o.	2014-2017	0.5	Possible EU Co-financing (85%) and commercial credit (15%)		
PL88	Airport	Zachodniopomorskie Voivodship (PL)	Studies	Szczecin Aiport -Building a new entrance to airport airside zone	Port Lotniczy Szczecin - Goleniów Sp. z o.o.	2016-2018	1.2	Possible EU Co-financing (85%) and commercial credit (15%)		
PL89	Airport	Zachodniopomorskie Voivodship (PL)	Studies	Szczecin Aiport -Purchase a new units for winter maintenance at airport surface.	Port Lotniczy Szczecin - Goleniów Sp. z o.o.	2016-2018	0.6	Possible EU Co-financing (85%) and commercial credit (15%)		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL90	Airport	Zachodniopomorskie Voivodship (PL)	Studies	Szczecin Aiport -Building a new airport lighting approach system cat.II	Port Lotniczy Szczecin - Goleniów Sp. z o.o.	2016-2020	7.3	Possible EU Co-financing (85%) and commercial credit (15%)		
PL91	Airport	Śląskie Voivodship (PL)	Works	Katowice Airport -Construction of the new runway	GTL S.A.	2011-2014	36.7	**Financed:** (50% EU Co-financing; 50% own)		
PL92	Airport	Śląskie Voivodship (PL)	Works	Katowice Airport -Construction of the new terminal arrivals	GTL S.A.	2012-2015	11.0	**Financed:** (50% EU Co-financing; 50% own)		
PL93	Airport	Śląskie Voivodship (PL)	Works	Katowice Airport -Construction of the Cargo apron along with taxiway E0	GTL S.A.	2012-2015	5.6	**Financed:** (50% EU Co-financing; 50% own)		
PL94	Airport	Śląskie Voivodship (PL)	Works	Katowice Airport -Construction of the position of de-icing planes	GTL S.A.	2009-2015	5.5	**Financed:** (50% EU Co-financing; 50% own)		
PL95	Airport	Śląskie Voivodship (PL)	Works	Katowice Airport -Redevelopment of the runway into the taxiway	GTL S.A.	2009-2017	9.1	**Financed:** (own funds/ Regional Operational Programme / EU)		
PL96	Airport	Śląskie Voivodship (PL)	Works	Katowice Airport -Construction of the terminal cargo	GTL S.A.	2013-2015	11.6	Own funds		
PL97	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Redevelopment of passenger terminals A and B	GTL S.A.	2015-2016	3.3	Own funds/ possible Regional Operational Programme (EU)		
PL98	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Construction of the fire watchtower	GTL S.A.	2018-2020	5.6	Own funds/ possible Regional Operational Programme (EU)		
PL99	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Construction of the new air traffic control tower	PAŻP	To be defined	To be defined	To be defined		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL100	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Heliport	GTL S.A.	To be defined	To be defined	To be defined		
PL101	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Adaptation of the movement area to CAT II	GTL S.A.	2014-2016	2.8	Own funds/ possible Regional Operational Programme (EU)		
PL102	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Construction of the base of the technical support	GTL S.A.	2018-2020	4.1	Own funds/ possible Regional Operational Programme (EU)		
PL103	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Base General Aviation	GTL S.A.	2015-2016	3.5	Own funds/ possible Regional Operational Programme (EU)		
PL104	Airport	Śląskie Voivodship (PL)	Studies	Katowice Airport -Installation for storing the aviation fuel	GTL S.A.	To be defined	To be defined	To be defined		
PL105	Airport	Śląskie Voivodship (PL)	Works	Katowice Airport -Construction of gas connection	GTL S.A.	2014-2015	0.7	Own funds		
PL106	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Aircraft de-icing area - the execution of the area dedicated to carrying out the de-icing operation	PLPŁ Sp. z o. o.	2015	1.7	To be defined		
PL107	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Modernization Runway - seeks to implement the modernization in terms of drainage, surface and telecommunication installations and lighting	PLPŁ Sp. z o. o.	2015	10.4	To be defined		
PL108	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Modernization of aircraft parking aprons military part of the airport - is aimed at the modernization of surface in the apron.	PLPŁ Sp. z o. o.	2015	0.6	To be defined		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL109	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Improving airport security system - is designed to increase safety of flight operations by limiting the intrusion on the airport grounds	PLPŁ Sp. z o. o.	2015	0.9	To be defined		
PL110	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Modernization Road taxiing - seeks to implement the modernization and installation of surface	PLPŁ Sp. z o. o.	2019	1.0	To be defined		
PL111	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Terminal Modernization - will have to make the necessary modernization works in the field of facade and renovate the rooms inside the terminal	PLPŁ Sp. z o. o.	2017-2019	1.7	To be defined		
PL112	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Modernization of aircraft parking aprons military part of the airport - is aimed at the modernization of surface in the apron	PLPŁ Sp. z o. o.	2019	0.7	To be defined		
PL113	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Energy Infrastructure Modernization - will aim to strengthen energy security at airport by reducing overall system power failure	PLPŁ Sp. z o. o.	2016-2019	0.3	To be defined		
PL114	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Security - the scope of this task includes both investment tasks as well as the purchase of specialized equipment used to ensure the safety of flight operations	PLPŁ Sp. z o. o.	2015-2019	2.1	To be defined		
PL115	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Construction of parking with the communication system - the implementation of this task is to enable the expansion of existing parking spaces as well as the modernization of the transport system	PLPŁ Sp. z o. o.	2015-2018	0.7	To be defined		
PL116	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Modernization of aircraft parking aprons - realization of this task involves the modernization of surface and installation of improvement after years of service	PLPŁ Sp. z o. o.	2016	0.2	To be defined		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL117	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Modernization of Buildings and Structures - Successive execution of the project involves modernization of the buildings owned airports	PLPŁ Sp. z o. o.	2015-2019	0.4	To be defined		
PL118	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Network elements Informatics - perform work to modernize and fuller utilization of the existing IT network at the airport, including software for managing	PLPŁ Sp. z o. o.	2015-2019	1.9	To be defined	X ITS/ITC	
PL119	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Photovoltaic Power Plant - the project has met this requirement: • Ensure the independence of the Energy Airports. • Creating Power with a capacity of 10 MW - which will meet the energy needs of the airport as well as to get revenue from the resale of third parties	PLPŁ Sp. z o. o.	2015-2019	11.9	To be defined		
PL120	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Station pre-treatment with rainwater distribution system, - the project has met this requirement: • Ensure the independence of the airport in terms of discharge for the installation of urban storm water. • The possibility of development of water obtained in the screening process for their own needs	PLPŁ Sp. z o. o.	2015-2019	7.1	To be defined		
PL121	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Modernization and extension of Runway, - the project has meet this requirement: • Increase the safety of air operations, • management of air operations in order to reduce the negative effects of noise,	PLPŁ Sp. z o. o.	2015-2019	21.9	To be defined		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
PL122	Airport	Wielkopolskie Voivodship (PL)	Works	Poznań Airport - Technical Base - The function of Base will garaging, repair, maintenance and cleaning of equipment to maintain airport (plows, snowblowers, aircraft de-icing vehicles, tractors), and ground support equipment (buses, trucks to unload luggage, baggage carts, luggage belt, vehicles, tankers, aggregates generators, aircraft stairs, etc.).	PLPŁ Sp. z o. o.	2015-2019	4.8	To be defined		
AT29	Airport	Lower Austria (AT)	Works	Third runway for the Vienna International Airport	Vienna Airport PLC	2019-2028	800.0	Own and possible EU Co-financing		
IT62	Airport (last mile)	Veneto Region (IT)	Studies and Works	Conventional railway link to the Venice Marco Polo Airport: complementary works within the Airport terminal area, including construction of a station integrated with the passenger terminal	SAVE (Airport Operator)	2016-2020	114.2	Public funds and possible EU Co-financing (CF)		
IT63	Airport	Veneto Region (IT)	Studies and Works	Construction of multimodal Terminal	SAVE (Airport Operator)	2017-2020	41.1	Own, public funds and possible EU contribution		
IT64	Airport	Veneto Region (IT)	Works	People Mover	SAVE (Airport Operator)	2013-2014	32.6	Financed: own funds		
IT89	Airport	Veneto Region (IT)	Studies and Works	Airside planned infrastructures: Parking areas expansion	SAVE (Airport Operator)	2013-2030	150.0	Own funds		
IT90	Airport	Veneto Region (IT)	Studies and Works	Airside planned infrastructures: New layout configuration for Cargo infrastructures	SAVE (Airport Operator)	2025-2030	47.0	Own funds		
IT91	Airport	Veneto Region (IT)	Studies	Airside planned infrastructures: Internal road layout upgrade	SAVE (Airport Operator)	2013-2025	40.0	Own funds		
IT65	Airport (last mile)	Emilia Romagna Region (IT)	Studies and Works	People Mover between Railway Station and Airport	Comune di Bologna and Regione Emilia Romagna	2015-2018	107.0	**Financed:** Public (including EU Co-financing) and Private funds		

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT66	Airport (last mile)	Emilia Romagna Region (IT)	Studies and Works	People Mover Station at Airport Terminal	SAB (Airport Operator)	2015-2018	3.0	Own funds		
SI34	Airport	Western Slovenia (SI)	Works	New passenger and freight terminal, reallocation of the main road, energy rehabilitation of buildings, other supporting (commercial) activities at the Airport Ljubljana	Aerodrome Ljubljana, d.d.	2014-2020	119.5	Own and Public funds		

Rail-Road Terminal

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
SK21	Rail-Road Terminal	Žilina region (SK)	Works	Rail-road terminal construction in Žilina, Teplička	ŽSR	2012-2015	33.1	**Financed:** [Public Funds (15%) Public and CF (85%)]		X
AT16	Rail-Road Terminal	Vienna and Lower Austria (AT)	Works	Planning and construction of Cargo-Centre Wien	ÖBB Infrastruktur	2013-2017	300.3	**Financed:** State guaranteed loans taken by OEBB Infra; OEBB considers to apply for EU co-funding (CEF)		X
AT26	Rail-Road-Inland Waterway Terminal	Vienna (AT)	Works	Planning and construction of the expansion of the trimodal Port of Freudenau/Vienna	Port of Vienna	2015-2025	57.0	Port of Vienna, EU co-funding (CEF) planned		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
AT30	Rail-Road-Inland Waterway Terminal	Vienna (AT)	Studies	Studies for the expansion of the trimodal port of Freudenau/Vienna	Port of Vienna	2012-2015	5.4	**Financed:** TEN-T (2012-AT-91099-S) EU co-funding		X
AT31	Rail-Road-Inland Waterway Terminal	Vienna (AT)	Works	Expansion of the tri-modal inland port of Vienna by land recovery	Port of Vienna	2012-2015	12.8	**Financed:** TEN-T (2012-AT-18070-P) EU co-funding		X
AT33	Rail-Road-Inland Waterway Terminal	Vienna(AT)	Works	Freudenau Equipment modernization Development of infrastructure and modernization of cargo handling equipment	Port of Vienna	To be defined	To be defined	To be defined		
AT34	Rail-Road-Inland Waterway Terminal	Vienna (AT)	Studies	IMPALA - Intermodal hubs as urban logistics centres	Port of Vienna	2014-2015	0.2	**Financed:** State (BMVIT)		X
IT67	Rail-Road Terminal	Veneto Region (IT)	Studies	WIDERMOSS - Sustainable freight transport services	Autorità Portuale di La Spezia	2012-2015	6.0*	**Financed:** (EU Co-financing)		X
IT68	Rail-Road Terminal	Veneto Region (IT)	Studies	SMARTSET - Sustainable freight transport services	City of Goteborg	2013-2015	2.5*	**Financed:** (EU Co-financing)		X
IT69	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	Swiftly-Green - Sustainable freight transport services	Closer/ Lindholmen Science Park	2013-2015	2.9*	**Financed:** (EU Co-financing)		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT70	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	LOGICAL - Technological upgrading	Aufbauwerk Region Leipzig	2011-2014	3.1*	**Financed:** (EU Co-financing)		X
IT71	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies and Works	CONTAIN - Safety improvements	FOI - Totalforsvaret Forskningstitut	2011-2015	15.5*	**Financed:** (EU Co-financing)		X
IT72	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	E-MAR - Technological upgrading	BMT Group	2012-2015	5.7*	**Financed:** (EU Co-financing)		X
IT73	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	iCARGO - Environmental and safety improvements	Athos Spain SA	2011-2015	17.1*	**Financed:** (EU Co-financing)		X
IT74	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	Viwas - Technological upgrading	Hacon Ingenieurgesellscaft mbH	2012-2015	4.2*	**Financed:** (EU Co-financing)		X
IT75	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	ECOHUBS - Environmental and safety improvements	BMT GROUP LIMITED	2012-2015	4.1*	**Financed:** (EU Co-financing)		X
IT76	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	SPIDER PLUS - Sustainable freight transport services	Hacon Ingenieurgesellscaft mbH	2012-2015	4.1*	**Financed:** (EU Co-financing)		X
IT77	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	EUROSKY - Environmental and safety improvements	BMT GROUP LIMITED	2013-2017	19.1*	**Financed:** (EU Co-financing)		X
IT78	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies	LOGICON - New technologies and innovation	ILiM	2013-2015	2.8*	**Financed:** (EU Co-financing)		X
IT79	Rail-Road Terminal	Emilia Romagna Region (IT)	Studies and Works	CORE - Safety improvements	BMT GROUP LIMITED	2014-2018	48.8*	**Financed:** (EU Co-financing)		X

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT94	Rail-Road Terminal	Emilia Rom. Region (IT)	Studies and Works	ICT system application in RRT on the Italian part of corridor, for operations synchronization and management efficiency with other nodes	Interporto di Bologna	2020	To be defined	Public funds and EU Co-financing (CEF)	X ITS/ITC	X
SI35	Rail-Road Terminal	Western Slovenia (SI)	Works	Upgrading and modernization of Ljubljana container terminal infrastructure for improvement of intermodal transport services	Slovenian railways	2015-2020	45.0	Public funds and EU Co-financing (CEF)		X

*Note:*the costs for these investments indicates the total value of the project and not the amount allocated to the Interporto di Bologna. These values have not been included at Tables 7, 29 and 30 of the main report*

Urban Nodes

ID	Transport mode	Location	Studies or work	Description of project	Project promoter	Timing	Cost (in MEUR)	Financing sources	Critical issue	CEF pre-identified section
IT80	Urban	Veneto Region (IT)	Studies and Works	Venice Metro (Sub-Lagunare)	Comune di Venezia	2014-2020	377.0	To be defined		
IT81	Urban	Emilia Romagna Region (IT)	Studies and Works	Bologna suburban rail and trolley bus development	Comune Bologna and Emilia-Romagna Region and TPER	2014-2020	362.8	To be defined		

Appendix A. List of EU regulations

A.1. Main EU Regulations on Transport Infrastructure

Table A1 EU Regulation on Transport Infrastructure

	Regulation	Year	Transport Modes	Subject
01	Commission Regulation COM(2011) 650 of 19 October 2011	2011	All	Union guidelines for the development of the Trans-European Transport Network
02	Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008	2008	Rail	Interoperability of the comprehensive network
03	*Technical specification for Interoperability (TSI) adopted pursuant to Article 6 of Directive 2008/57/EC*	*2002 onwards*	*Rail*	*TSI for new and upgraded railway lines (see the following table for the current TSIs status)*
04	European Agreement on Main Inland Waterways of International Importance (AGN)	1996	WW	Minimum requirements for class IV waterways
05	Directive 2008/96/EC of the European Parliament and of the Council of 19 November 2008	2008	Road	Road infrastructure safety management
06	Directive 2004/54/EC of the European Parliament and of the Council of 29 April 2004	2004	Road	Minimum safety requirements for tunnels in the trans-European road network
07	Directive 2004/52/EC of the European Parliament and of the Council of 29 April 2004	2004	Road	Interoperability of electronic road toll systems in the Community
08	Commission Decision 2009/750/EC of 6 October 2009	2009	Road	Definition of the European Electronic Toll Service and its technical elements.
09	Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010	2010	Road	Framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport
10	Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000	2000	Port	Port reception facilities for ship-generated waste and cargo residues
11	Directive 2002/59/EC	2002	Port	Community vessel traffic monitoring and information system
12	Regulation (EC) No 300/2008 of the European Parliament and of the Council of 11 March 2008	2008	Air	Common rules in the field of civil aviation security
13	Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004	2004	Air	Framework for the creation of the single European sky (the framework Regulation)
14	Regulation (EC) No	2004	Air	Provision of air navigation services in

	550/2004 of the European Parliament and of the Council of 10 March 2004			the single European sky (the service provision Regulation)
15	Regulation (EC) No 551/2004 of the European Parliament and of the Council of 10 March 2004	2004	Air	Organisation and use of the airspace in the single European sky (the airspace Regulation)
16	Regulation (EC) No 552/2004 of the European Parliament and of the Council of 10 March 2004	2004	Air	Interoperability of the European Air Traffic Management network (the interoperability Regulation)
17	Directive 2001/16/EC	2001	Rail	Interoperability of the Trans-European conventional rail system
18	Directive 96/48/EC	1996	Rail	Interoperability of the Trans-European high speed rail system
19	Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004	2004	Rail	Safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification
20	Regulation (EU) 1315/2013	2013	All (TEN-T)	Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU
21	Regulation (EU) 1316/2013	2013	All (TEN-T)	Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010
22	Communication for Commission COM(2013) 940	2013	All (TEN-T)	Building the Transport Core Network: Core Network Corridors and Connecting Europe Facility
23	Commission Decision 2009/561 EC	2009	Rail	Implementation of the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European conventional rail system
24	Council Regulation (EC) 219/2007	2007	Air	Joint Undertaking to develop the new generation European air traffic management system (SESAR)
25	Directive 2005/44/EC of the Parliament and the Council of 7 September 2005	2005	WW	Harmonised river information services (RIS) on inland waterways in the Community
26	Directive 2010/65/EU of the European Parliament and of the Council of 20 October 2010	2010	Port	Reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2002/6/EC
27	Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012	2012	Rail	Single European railway area
28	Regulation 913/2010 of the European Parliament and the Council of 22 September 2010	2010	Rail	Concerning a European rail network for competitive freight

A.2. Current status of the Technical Specification for Interoperability for Railway Infrastructure

Table A2 TSI for Railway Infrastructure

Subsystem	High-Speed	Conventional
Infrastructure	Decision 2008/217/EC (20 Dec 2007) amended by Decision 2012/464/EU (23 Jul 2012)	Decision 2011/275/EU (26 Apr 2011) amended by Decision 2012/464/EU (23 Jul 2012)
Energy	Decision 2008/284/EC (6 Mar 2008) amended by Decision 2012/464/EU (23 Jul 2012)	Decision 2011/274/EU (26 Apr 2011) amended by Decision 2012/464/EU (23 Jul 2012)
Control-Command and Signalling (on board and trackside)	Decision 2012/88/EU (25 Jan 2012) amended by Decision 2012/696/EU (6 Nov 2012)	
Rolling Stock. Locomotives and passenger rolling stock	Decision 2008/232/EC (21 Feb 2008) amended by Decision 2012/464/EU (23 Jul 2012)	Decision 2011/291/EU (26 Apr 2011) amended by Decision 2012/464/EU (23 Jul 2012)
Rolling Stock. Freight Wagons	Not applicable	Decision 2006/861/EC (28 Jul 2006), amended by Decision 2009/107/EC (14 Feb 2009) Decision 2012/464/EU (23 Jul 2012) Regulation (EU) No 321/2013 (13 Mar 2013)
Rolling Stock. Noise (transverse TSI, including locomotives, passenger rolling stock and freight wagons)		Decision 2011/229/EU (4 Apr 2011) amended by Decision 2012/464/EU (23 Jul 2012)
Operation and Traffic Management	Decision 2008/231/EC (1 Feb 2008) amended by Decision 2010/640/EU (21 Oct 2010) Decision 2012/464/EU (23 Jul 2012)	Decision 2011/314/EU (12 May 2011) amended by Decision 2012/464/EU (23 Jul 2012)
	Decision 2012/757/EU (14 Nov 2012) repealing Decision 2008/231/EC and Decision 2011/314/EU from 01 Jan 2014	
Telematics Applications for Freight Services	Not applicable	Regulation (EC) No 62/2006 (23 Dec 2005) amended by Regulation (EU) No 328/2012) (17 Apr 2012)
Telematics Applications for Passenger Services	Regulation 454/2011/EU (5 May 2011) amended by Regulation 665/2012/EU (20 July 2012)	
Safety in Railway Tunnels (transverse TSI, including infrastructure, energy, CCS and rolling stock)	Decision 2008/163/EC (20 Dec 2007) amended by Decision 2011/291/EU (26 Apr 2011) Decision 2012/464/EU (23 Jul 2012)	
Accessibility for PRM (transverse TSI, including infrastructure and rolling stock)	Decision 2008/164/EC (21 Dec 2007) amended by Decision 2012/464/EU (23 Jul 12)	

Source: European Railway Agency (Updated April 2013)

Appendix B. Studies and initiatives on the BA Corridor

Since the 2000-2006 Multiannual Funding Framework and particularly during the 2007-2013 one, a number of initiatives have been undertaken and financed by the EU, the Member States and the Regions in support of the analysis and development of the BA Corridor, its infrastructure and services. These form what we may define the "knowledge database of the BA Corridor work plan".

About 300 projects and initiatives have been identified in our analysis. These are listed in Section B.7 below grouped according to their funding source; in addition to national relevant studies, the list comprises particularly relevant EU co-financed projects, including:

- **TEN-T – Priority Projects related initiatives**, including preparatory works and construction works for infrastructure modernisation and ERTMS implementation; solutions to operational and administrative barriers; promotion of ITS and technological solutions to support sustainable transport;
- **EU (Cross-border and Transnational Projects, ERDF and Cohesion Fund Major Projects)** – Transnational and cross-border cooperation projects as well as Major Projects under national and regional operational programmes; Among the Interreg actions, the following are worth noting, particularly focussing on the development of the BA Corridor as a "living" socio-economic European infrastructure; Adriatic Baltic Landbridge (AB Landbridge), SOuth-NORth Axis (SoNorA), and Baltic-Adriatic Transport Cooperation (BATCo);
- **MARCO POLO** supported initiatives, including start-up of intermodal operations and services; dissemination of intermodal practices, services and training and telematics application to support administrative and business procedures related to freight transport as part of the wider logistic chain;
- **Research Projects (FP6, FP7)** – European and multi-regional, multi-country databases in support of policy making, analysis of traffic flows, development of transport models, innovation supporting projects and dissemination of best practices and networking among research and business institutions.

Further to the above initiatives and national projects, other EU studies supported by DG Move have been considered in the analysis, aimed at monitoring and reporting on the status of the implementation of EU Directives.

In the following sections from B.1 to B.6, we comment on those studies that have been selected from the identified database of initiatives and projects for their relevance in the analysis of the BA Corridor critical issues. Attention has been given to those problems and situations representing a physical, technical and operational barrier for the development of the BA Corridor as an interoperable infrastructure, supporting the growth of international intermodal traffic flows. Studies have been grouped to the scope of our review into the following main categories:

- Studies for the development of the BA Corridor;
- Intelligent Transport Systems (ITS) and Information and Communication Technologies (ICT) for Interoperability;
- Promotion of intermodality and sustainable transport;
- Horizontal issues;
- Feasibility and project implementation studies;
- Infrastructure Investment Plans.

The above categories have been also identified with reference to the targets and requirements of the Regulation 1315/2013, in order to comment on the availability of studies relevant for the analysis of the current status and future development of the BA Corridor.

B.1. Studies for the development of the BA Corridor

The alignment of the BA Corridor has been gradually developing over the past decade on the basis of the Priority Projects PP 6, railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukrainian border, and particularly PP 23 and PP 25: railway and motorway axis Gdańsk–Warszawa–Brno/Bratislava-Wien. Originally limited to Poland, Czech Republic, Slovakia and Austria, the alignment was gradually proposed to be extended by the Baltic-Adriatic Member States and Regions, towards Italy, to connect by railway Bratislava and Wien to Trieste, Venezia and Bologna and then to Ravenna. The Corridor as defined by Regulations EU 1315/2013 and 1316/2013 involves today Slovenia in addition to Poland, Czech Republic, Slovakia, Austria and Italy; rail and road sections extends towards its entire length; the land surface transport network of the corridor expanded significantly particularly with the inclusion of a Polish Western section connecting the inland and seaports of Szczecin and Świnoujście to Katowice and the Czech Republic; two alternative multimodal itineraries are available between Poland and Austria through the Czech Republic or Slovakia; it is then possible to reach the Ports of Trieste, Venezia and Ravenna in the Adriatic either through the Italian or Slovenian networks, and the Port of Koper through the Slovenian network.

The current layout of the BA Corridor as gradually evolved over time, and its inclusion in the Core TEN-T Network, has been also the result of studies and initiatives aimed at developing a multimodal corridor between the Baltic and Adriatic Ports, promoted by the Member States and the Regions, seeing in the development of the corridor an opportunity for economic growth of their territories. A summary of these studies is provided below, including the Baltic-Adriatic Transport Cooperation (BATCo), South North Axis (SoNorA), Adriatic Baltic Landbridge and the South East Transport Axis (SETA). Whilst some elements considered in these studies, particularly regarding the definition of the study area and infrastructure network and the assumptions adopted for the development of the market studies could be outdated or only partially relevant to the scope of the elaboration of the BA Corridor, the findings from these studies are worth mentioning particularly regarding the effort in emphasising the European dimension and relevance of the development of the corridor, and the analysis of the critical issues and barriers identified with reference to the physical continuity of the infrastructure, its technical compliance with the relevant EU legislation, the operational and administrative difficulties limiting and harming the use and further development of cross-border international services and traffic flows as well as intermodal sustainable transport.

In addition to the above mentioned initiatives a summary of the preliminary finding and progresses of the Rail Freight Corridor 5 market study is provided.

B.1.1. Baltic-Adriatic Transport Cooperation (BATCo)

The Baltic-Adriatic Transport Cooperation (BATCo) study is the most recent completed study aimed at supporting the development of a TEN-T multimodal corridor between the Baltic and Adriatic. Although not involving directly all Member States and Regions along the corridor and not including the Western alignment of the BA Corridor, the network considered in the study already extended from Poland to Slovenia.

Figure B1 BATCo Network

Source: BATCo Final Report, page 18

The overall objective of the study was to emphases the relevance of the Corridor under the EU perspective; among the tasks undertaken within the project, a market study was developed aimed at assessing the performance of the corridor, identifying critical issues and proving the benefits resulting from its development under the economic, environmental and traffic safety stand points.

Other tasks were related to harmonising advancement of the TEN-T Baltic-Adriatic Axis enhancing its competitiveness and promoting intermodal transport connections in favour of environmental friendly transport modes (green corridor sustainable transport concept). These included the development of a Decision Support Model (DSM), cooperation activities between the single logistics nodes (Transnational logistics centre (TLC) Incubator concept) and the establishment of a business cooperation alliance Network of Transnational Business Cooperation Points (TCPs).

Critical issues

The following critical issues were identified as part of the network and demand analysis related tasks:

- *Cross-border sections to be upgraded:*
  - Katowice-Ostrava;
  - Opole – Ostrava;
  - Brno-Wien;
  - Katowice-Žilina;
  - Bratislava-Wien;
  - Villa Opicina-Sežana;
- *Identified bottlenecks and proposed measures:*
  - Gloggnitz – Mürzzuschlag line (project: new construction of railway line, including the tunnel, due to limitations on the existing line of tonnage as well as load dimension and train coupling hook load limits);
  - Graz-Klagenfurt line (project: new construction of railway line including the Koralm tunnel between the Carinthia and Styria regions);
  - Wien station – trains will no longer end in terminal stations, but may be connected to international railway lines (project: extending/improving the station);
  - Gdynia – Katowice rail line (project: to be upgraded);
- *Intermodality and interconnections to be developed:*
  - Ravenna, Venezia and Trieste ports interconnections – further development of multi-modal platforms;
  - Austrian Villach dry port and rail connection between Villach and the Port of Venezia Port (Venezia-Villach rail connection to be implemented);
  - Gdynia – Gdańsk port interconnection – further development of multi-modal platforms.

Market and demand analysis

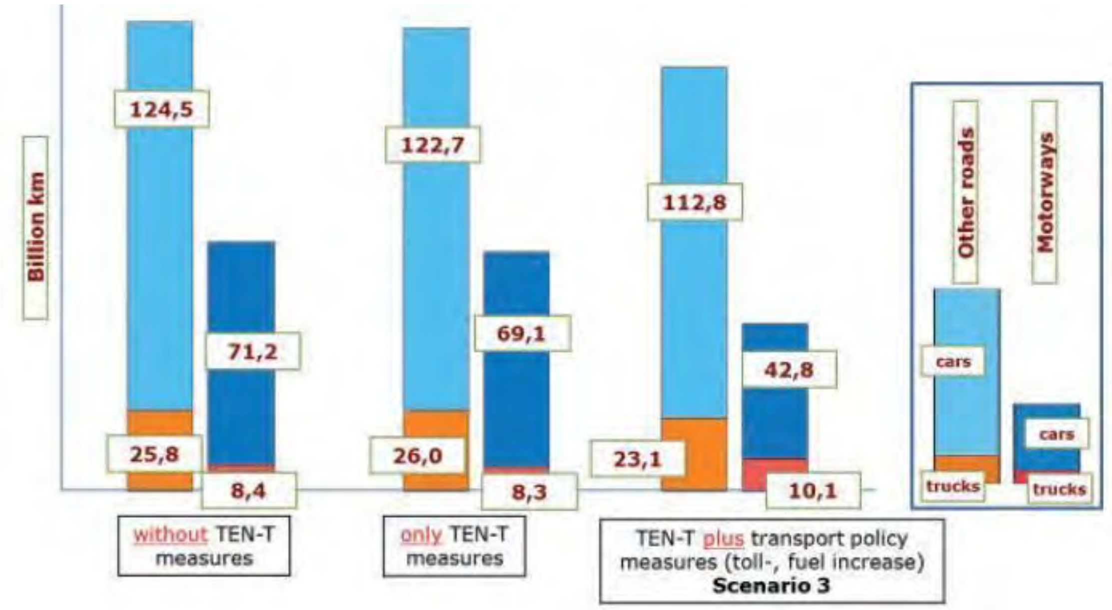
As part of the study a transport model based on TRANSTOOLS including 7,000 road links (41,000km), 800 rail links (14,000km) and 80 traffic zones (NUTS3)) was developed. According to the results of the demand analysis an increase of approximately 50% has been forecasted for road freight transport volume in tonnes/year along the BATCo Corridor between the period 2005 and 2030. In the case of rail freight transport in the BATCo Corridor, an increase of about 30% in the same period was identified. These increases were determined by assuming that no improvements to the transport infrastructure would be implemented in this period (Baseline 2030).

In addition to the estimation of the overall throughput of increase in the demand, specific sensitivity tests and analysis were undertaken to test the impact of the implementation of certain works and economic trends on modal share and development of intermodal transport.

In addition to the estimation of the overall throughput of increase in the demand, specific sensitivity tests and analysis were undertaken to test the impact of the implementation of infrastructure improvements and policy measures and traffic trends on modal share and development of intermodal transport.

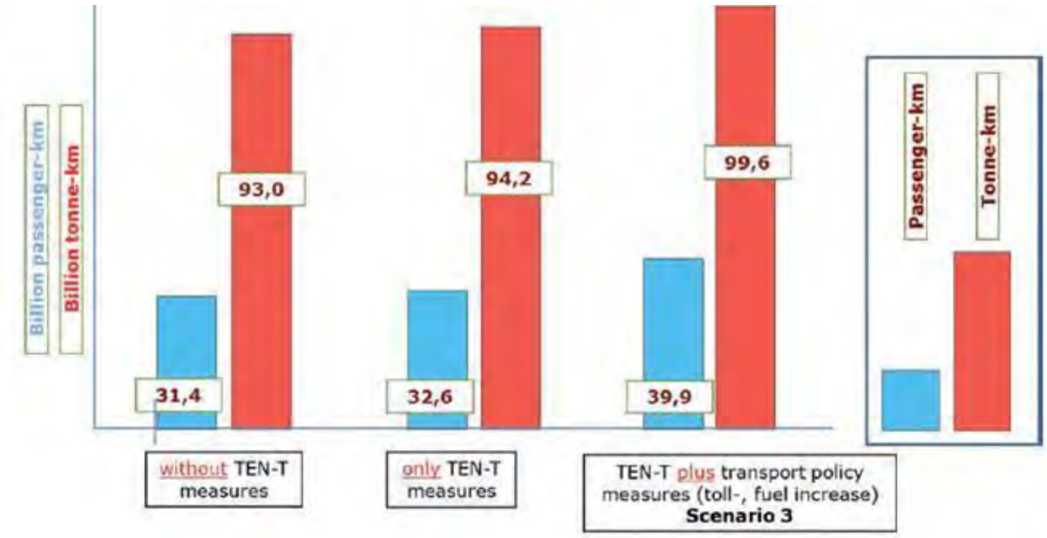
The main findings from the study are that investments to improve the quality of the infrastructure, removing physical barriers are already relevant to support traffic development along the corridor. Intermodal traffic is likely to be a consequence of the increase in freight transport volumes at Adriatic and Baltic Ports; modal share is maximised by the increase in the total cost of road transport (also generated by extension of toll payment to all vehicles and/or increase in toll charges; or increase in fuel price). The figures below summarise the main general conclusions on the overall BATCo Corridor for road and railway transport modes.

Figure B2 Annual mileage between BATCo Corridor – Road (vehicle-km/year)



Source: BATCo Final Report, page 47

Figure B3 Annual mileage between BATCo Corridor – Railway (passenger-km/year and tonne-km/year)



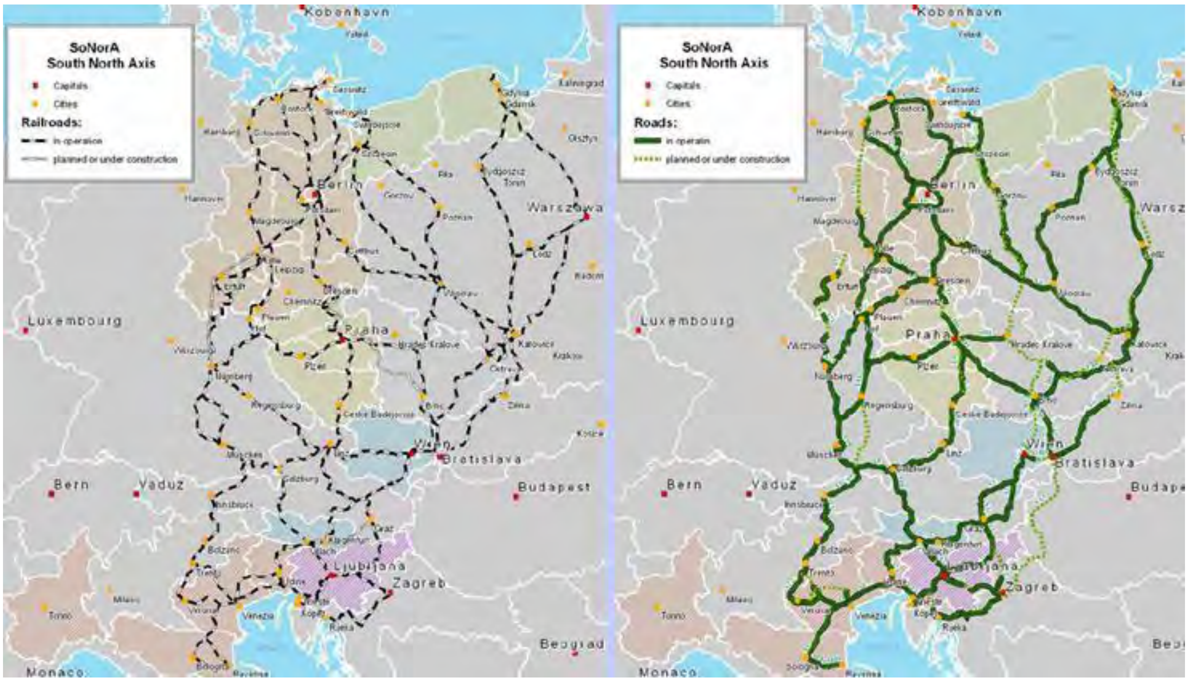
Source: BATCo Final Report, page 48

B.1.2. South North Axis (SoNorA)

The SoNorA project was aimed at developing accessibility between the Adriatic and Baltic seas also activating and improving multimodal freight logistics services and transnational action plans thus supporting new regional development opportunities due to transport network improvements.

The road and rail network in the study area is represented in the figure below. The corridor crosses Poland, Czech Republic, Slovakia, Austria, Italy, and Slovenia. Germany and Croatia were also considered in addition to the BA Corridor Member States.

Figure B4 SoNorA Network



Source: SoNorA overview presentation

The overall objective of the study was to support the development and use of the SoNorA network; among the tasks undertaken within the project, the market study already developed for the AB Landbridge study was updated also considering additional links and nodes, aimed at assessing the performance of the corridor optimising transport flows (identifying the most important pathways in Central and Eastern Europe, but also possible alternatives); assessing critical issues in terms of saturation rates, highlight the most important bottlenecks and misalignments.

Not differently from BATCo the project also included consultation processes to validate the results of the study and support the coordinated development of the corridor infrastructure as well as removing obstacles for infrastructure realisation. Actions to improve multimodal freight logistics services were also undertaken including the activation of services along corridor itineraries – (e.g. from to the Port of Koper) and the setting up of a Transitional Cooperation Platform.

Critical issues

The following critical issues were identified as part of the network and demand analysis related tasks:

- *Intermodality and interconnections to be developed;*
  - Poland, the Czech Republic and Slovakia railway interconnections;
  - Wien railway intermodal station;

RAIL

- *Cross-border sections to be upgraded:*
  - Götzendorf – Petržalka (Bratislava) - railway line to be extended;
  - Brno – Wien;
- *Identified bottlenecks and proposed measures:*
  - Přerov - Ostrava rail connection – project: line upgrading , block length and passing distance;
  - Brno - Přerov – project: track addition;
  - Břeclav – Wien Simmering – project: line upgrading;
  - Wien Simmering – Wien Flughafen (Airport) – project: capacity increase;

- Wien Flughafen (Airport) - Götzendorf – project: line correction and speed upgrading;
- Graz – Klagenfurt (KORALMBAHN) – project: new line and tunnel;
- Gloggnitz – Mürzzuschlag (SEMMERING) – project: new line and tunnel; upgrade and reconstruction of the line until the tunnel is finalised;
- Gdynia – Katowice railway line - project: to be upgraded;
- Szczecin –Wrocław - project: rail line to be upgraded;
- Katowice – Tczew - project: rail line to be upgraded;
- Opole - Kędzierzyn Koźle – Gliwice - project: rail line to be upgraded;
- Ljubljana – Koper - project: rail line to be upgraded;
- Ljubljana – Zidani Most - project: rail line to be upgraded;

ROAD

- *Cross-border sections to be upgraded:*
  - Morice – Border Poland – new motorway;
  - Pohorelice –Mikulov/Drasenhofen (Border CZ/AT) - New expressway with Connection to Austrian A5 (see AT0007);
- *Identified bottlenecks and proposed measures:*
  - Eibesbrunn Junction (A5, S1) - Shrick – new built motorway;
  - Quarto d'Altino - Trieste - Construction of 3rd lanes, Route Optimization;
  - Łódź Stryków (A1) - Warszawa - Construction of new motorway (now already completed and in operation);
  - Kosztowy - Bielsko Biała - expressway construction and upgrades;
  - Legnica - Gorzów Wielkopolski - construction of new expressway;
  - Quarto d'Altino - Trieste - Construction of 3rd lanes, Route Optimization;
  - Gdańsk – Warszawa - Construction of new motorway;
  - Pesnica – Maribor South (Ptujska) - Construction of new motorway, Eastern ringroad of Maribor.

Market and demand analysis

Further to the upgrading/updating of the transport model as undertaken under the previous AB Landbridge Project, the main results of the simulations were carried out for the 2020 scenario which includes modifications of both the demand side and the supply side with a 11% demand growth in the 2009-2020 period and the 2030 scenario with solely demand side variations and a total 21% of 2009-2030 demand growth. The results of the study support the need to invest in the road and railway network in order to deal with the expected increase in transport traffic, to avoid/reduce the risk for physical bottlenecks. The greatest variations in demand were foreseen for the Eastern European countries, in particular Poland and the Czech Republic, and in general, internal demand was greater than external demand. This happens both in the 2020 and 2030 scenarios.

These results, both in terms of road and rail transport, are presented in the tables below. The significant measured indicators for the road mode are the following:

- The average speed for the distance covered;
- The average saturation rate (relation between flow and capacity);
- The percentage of critical road network (i.e. the km of road network in which flow exceeds capacity by 90%); and
- The overall mileage (vehicle*km) covered.

Table B1 2020 and 2030 scenarios for Sonora Model Area – Road

Scenarios	Average speed (km/h)		Average saturation rate (F/C)		% Critical network (F/C > 0.9)		Vehicle*km (million)	
	2020	%2009-2020	2020	%2009-2020	2020	%2009-2020	2020	%2009-2020
2020	**84**	**2.8%**	**43%**	**-6%**	**9.4%**	**-10%**	**1,517**	**11%**
2030	81	-0.2%	49%	8%	13.6%	30%	1,703	24%

Source: SoNorA report 3.2.5 – page 17

Concerning the road network, at 2020 the simulation results show a clear improvement of vehicles circulation status that appears evident both in terms of an increase of the average speed and the reduction of critical situations on the networks. On the other hand, at 2030 the expected increase in the demand, with a marginal adjustment of the supply compared to 2020, induces an increase of critical situations with respect to the 2009 base case situation.

The measured indicators for the rail mode are the following:
- The passengers trains (trains per day);
- The freight trains (trains per day);
- The average saturation rate (relation between flow and capacity);
- The percentage of critical rail network (i.e. the km of rail network in which flow exceeds capacity by 90%).

Table B2 2020 and 2030 scenarios for Sonora Model Area – Rail

Scenarios	Passengers Trains (Trains per day)		Freight Trains (Trains per day)		Average saturation rate (F/C)		% Critical network (F/C > 0.9)	
	2020	%2009-2020	2020	%2009-2020	2020	%2009-2020	2020	%2009-2020
2020	**74,883**	**9%**	**48,558**	**28%**	**57%**	**5%**	**9%**	**30%**
2030	**78,187**	**14%**	**60,919**	**61%**	**65%**	**19%**	**19%**	**178%**

Source: SoNorA report 3.2.5 – page 20

Regarding the rail network, as shown in the tables above, the planned investment as identified in the SoNorA transport model appears to be not sufficient to allocate the expected increase of the demand. In fact, compared to the 2009 base case situation, criticalities are expected to increase already in 2020 and are going to worsen in 2030.

B.1.3. AB Landbdrige Project

Representing the basis for the development of the subsequent SoNorA study the AB Landbridge road and railway network encompasses infrastructure belonging to Poland, Czech Republic, Slovakia, Austria Italy, Slovenia as well as Germany and Croatia. Three distinct North South itineraries were identified as part of this study:
- Western Itinerary (connecting port of Rostock with the Adriatic ports);
- Central Itinerary (connecting ports of Szczecin and Świnoujście to the Adriatic);
- Eastern Itinerary (connect the Adriatic area with two primary Polish ports – Gdynia and Gdańsk).

Figure B5 AB Landbridge Network

Source: AB Landbridge Reporting Documents

The overall objective of the study was to improve multimodal connections between the Baltic and Adriatic Sea basins, supporting the growth of maritime markets and logistics services and fostering regional development and global competitiveness.

A market study has been undertake as part of the project, subsequently updated within the scope of the SoNorA study (see previous section), aimed at assessing the existing and future supply and demand of transport along the three identified itineraries, with reference to economic, as well as logistics and spatial planning developments (see list of critical issues below).

An analysis of the conditions of the institutional setting was undertaken also including the implementation of a Spatial Development Forum managed by the Central European Initiative, the development of pilot initiatives for the promotion of port-hinterland and port-to-port services, identifying administrative and operational barriers for the promotion of multimodal transport.

Critical issues

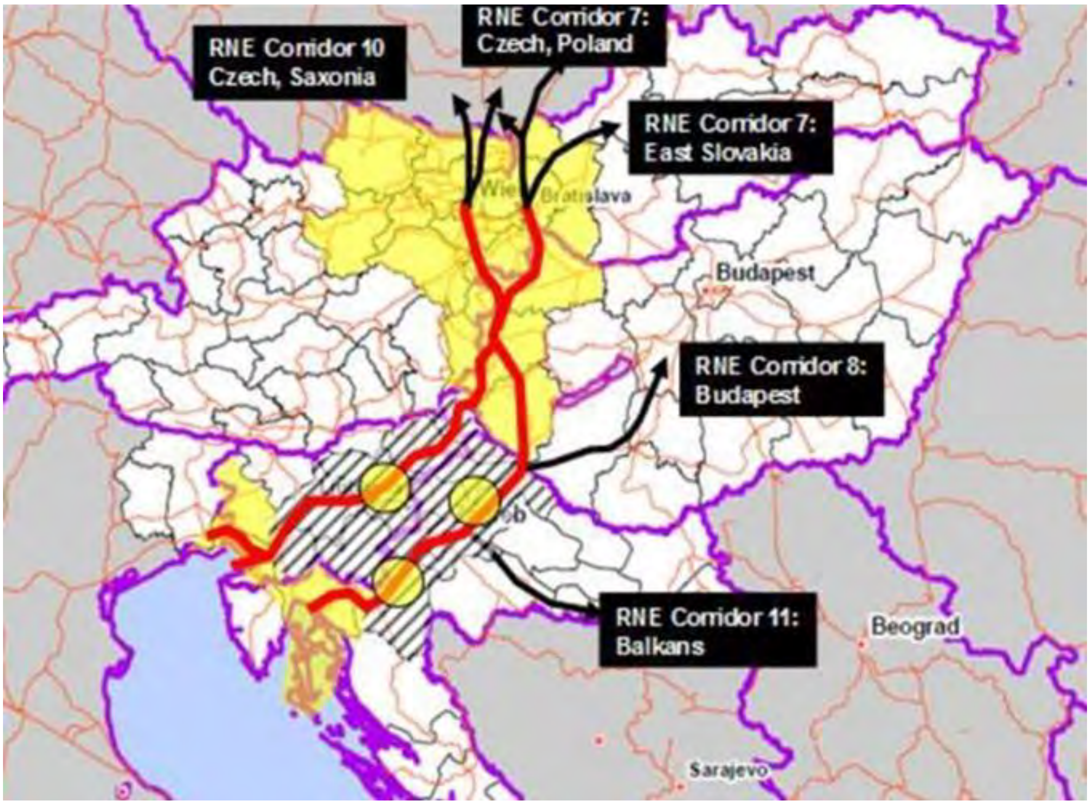
The following critical issues were identified as part of the study:

- *Cross-border to be upgraded:*
  - Villach-Ljubljana transnational rail connection – to be upgraded;
- *Identified bottlenecks and proposed measures:*
  - E 65 road – to be extended to the parameters of express road;
  - Rail network around Wien and the section Graz – Klagenfurt - to be modernised;
  - Single-tracked sections Graz-Maribor – to be upgraded;
  - Świnoujście/Szczecin Ports – new terminal (container) and quays, Ro-Ro ramp facility;
  - Gdynia - improve hinterland connection to support the development of the flows along the AB axis. The current state of Port of Gdynia infrastructures is sufficient to support initial deployment of the A-B Landbridge, however further improvements are planned and hinterland rail and road connections need to be improved;
- *Interoperability:*
  - Electrification issues in Czech Republic - two different electrification systems (DC 3 KV and 25 KV 50 Hz) thus requiring multisystem locomotives;
  - Discontinuity of line categories (UIC classification) – in Poland, Czech Republic and Slovenia;
  - ETCS system – to be implemented in all the railway lines of the AB Landbridge corridor;
  - Three different electrical system along the entire corridor;
- *Intermodality and interconnections to be developed:*
  - E 65/CE 65 railway line – modernisation of the line for intermodality with the Port of Gdynia;
  - New Westpomeranian Logistics Centre and a new LNG terminal in Świnoujście and upgrading of the rail connection between Świnoujście Port and Szczecin Port – intermodality railway/ports;
  - Road/rail connections to Venezia Port (Marghera) – improvements;
  - Port of Koper – new entrance, through a direct connection of the Port and the motorway (Sermin); new container terminal;
- *Operational and administrative barriers:*
  - Port of Koper - construction of a service building (customs, inspection service, etc.) for the needs of the international border crossing (Schengen border).

B.1.4. South East Transport Axis (SETA)

SETA is a Transnational Cooperation Programme aimed at providing efficient railway connection as well as enhancing the regional development in South East Europe. The project which partially overlaps with the BA Corridor study in terms of geographic and infrastructure network scope is aimed at implementing measures for the improvement of accessibility and logistic workflows as a basis for regional development in South East Europe. The countries involved into this study are Slovenia, Austria, Slovakia, Hungary, Italy, and Croatia. The figure below illustrates the railway network and project area of the SETA Corridor. The Northern Slovenia axis of SETA overlaps with the Slovenian branch of the BA Corridor.

Figure B6 SETA Network



Source: SETA 4.4.1 report – Bottleneck analysis

Critical issues and solution:

The SETA study is particularly relevant for the identification of critical issues particularly relevant for the operational and administrative barriers affecting the operation of interoperable, cross-border freight and passengers' services:

- *European railway Traffic Management System – ERTMS:*
  - The study emphasises how interoperability can be primarily achieved by implementing the respective EU regulations (decisions 2006/920/EG, 2006/679/EG and 2008/386/EG of the European Commission) by introducing compatible ERTMS based railway control systems in all countries.
- *Cross-border transit times:*
  - Traction:
    - Issue: If traction is different across the border (electric/diesel) a change of locomotive is required. Similarly, if the electrification and signalling/safety systems are different on either side of the border and no multisystem locomotives are available, locomotives need to be changed;
    - Suggested measure: Introducing trust based train handover procedures based on mutual agreements between train operators, in which the technical handover procedure is only carried out by one operator while the other operator (or operators) 'trust' the technical checks carried out;
  - Technical wagon inspection (e.g. breaks inspection):
    - Issue: inspection is carried out to ensure that the condition of the wagons entering a country conforms to national regulations, which requires administrative times;
    - Suggested measure: Harmonising operational and safety rules so that procedures to change the tail signal lamp, the breaking sheet and the wagon list can be avoided;

  - Documents concerning the train and the cargo are exchanged:
    - Issue: If it is not done electronically, this activity adds to the time needed for border procedures;
    - Suggested measure: Carrying out the detailed inspection only at the origin and the destination of the train;
  - Mutual acceptance of drivers:
    - Even when multi-system locomotives are available, the lack of mutual acceptance of drivers may prevent the same locomotive to travel across the border and hence border-crossing is delayed;
    - Suggested measure: Facilitating the mutual acceptance through the harmonised train driving licences introduced in the EU by Commission Regulation (EU) No 36/2010;
- *Demand for freight rail services:*
  - Issue: a market survey undertaken as part of this study has shown that there is considerable demand for reliable transport services towards Asia and America via major European ports. Competitive services can be offered through the Adriatic ports demand for train services;
  - Issue: The freight forwarding and transport market is quite volatile especially because road hauliers change their prices much more flexibly and in a more reactive way than railway operators;
  - Suggested measure: New competitive services can only be offered if clients can be convinced to change from a well-established route/method of transport to major European ports and try a new route via, for example, the Adriatic ports;
- *Operation of passengers' services:*
  - *Issues:* Since international cross-border passenger services are normally operated as commercial services, the connections that carry only few passengers across the border producing low revenue can hardly be justified;
  - Suggested measure: Funding opportunities for international train services should be investigated as international trains are not expected to be self-sustaining particularly at the beginning of their operation;
  - Suggested measure: Railway infrastructure managers and operators should also commit themselves to provide priority to international trains along the corridor over local and regional services in order to significantly reduce the travel time.

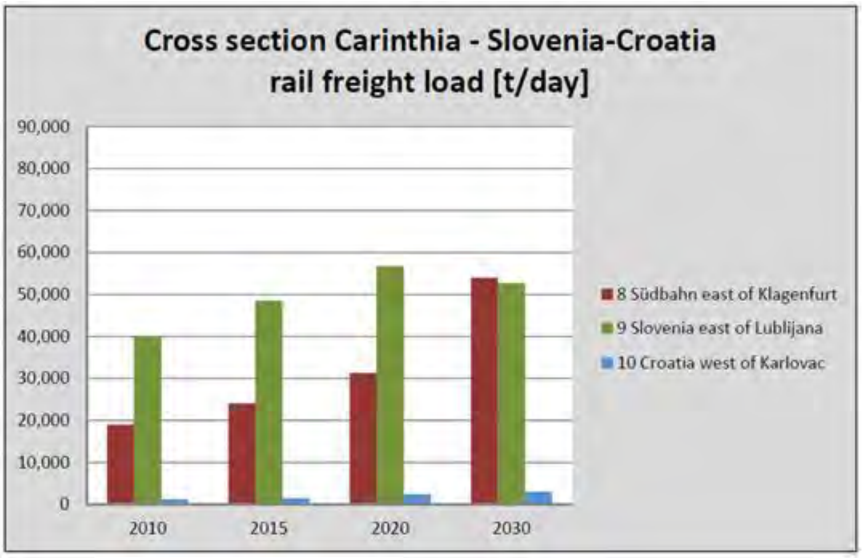
Market and demand analysis

The main conclusions of this study which are specifically related to our BA Corridor concern freight transport. The study emphasises the need to improve the SETA/BA Slovenian axis (Trieste – Ljubljana – Maribor – Graz) in order to avoid capacity issues on the BA Austrian axis (Udine - Tarvisio – Klagenfurt – Graz – Wien), expected until the improvements on the Austrian Alpine crossings will not be completed by mid of the next decade.

The need to improve the mentioned rail infrastructure is also deemed strategic in view of the possible increase in the cost of road transport due to policy measures (increase of direct or indirect charging or increase in the fuel price) which are also deemed strategic in this study to support modal shift. Particularly the extension and/or increase of road tolling should be supported by an increase in the quality and capacity of the existing railway infrastructure.

The figure below, summarises the findings from the SETA study for three main axis; the Austrian one (Südbanh East of Klagenfuhrt), the Slovenian one (Passing East of Ljubljana) and the Croatian one (passing West of Karlovac). The development of rail freight loads is expected to support the development of traffic flows along the three axis. This is deemed to happen due to a forecasted general increase of freight transport in the study area and to a shift from road transport to railway transport.

Figure B7 SETA study: Development of rail freight load



Source: SETA 4.3.1. report – Transport Model

As already mentioned in the short term until the infrastructure along the Austrian axis (Semmering Base Tunnel and Koralm Tunnel) is not completely operational, the freight volume on the Slovenian axis is expected to increase (year 2020). After completion (around 2025) a share of this East-West transport volume will be shifted from the Slovenian axis to the Austrian Axis. The Croatian axis is not influenced from the improved Austrian Axis.

B.1.5. Rail Freight Corridor n.5 (RFC 5)

Rail Freight Regulation 913/2010 concerning a European Rail Network for Competitive Freight requests Member States to establish international market-oriented Rail Freight Corridors (RFCs) to meet the following main challenges:

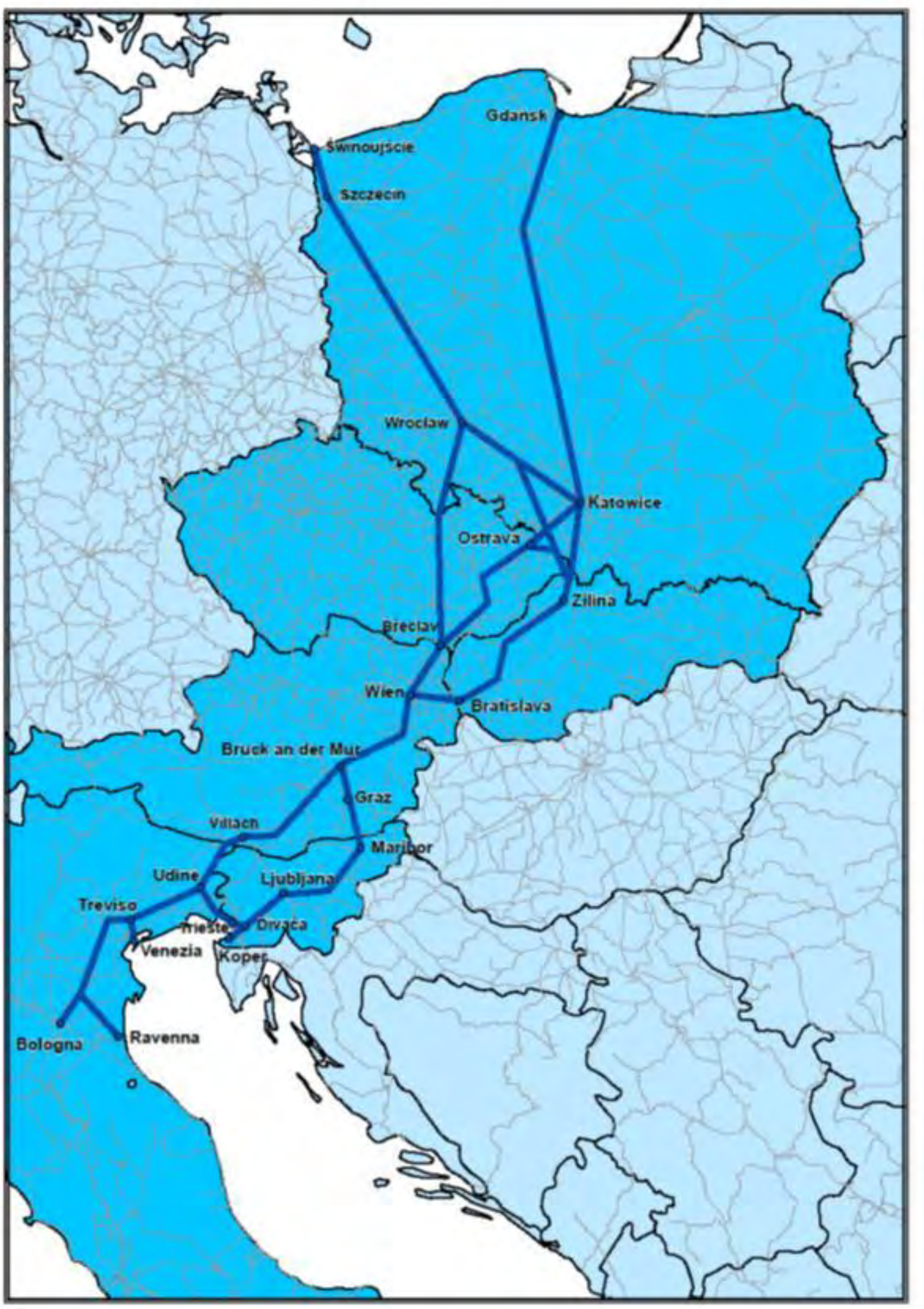
- Strengthening co-operation between Infrastructure Managers on key aspects such as allocation of paths, deployment of interoperable systems and infrastructure development;
- Finding the right balance between freight and passenger traffic along the Rail Freight Corridors, giving adequate capacity for freight in line with market needs and ensuring that common punctuality targets for freight trains are met;
- Promoting intermodality between rail and other transport modes by integrating terminals into the corridor management process;
- Enhancing the capacity dedicated for the international freight transport in the corridor and meeting the customers' needs;
- Contributing to the economic development of the EU.

In line with these objectives and in order to be compliant with the regulation, the infrastructure managers from Poland, Czech Republic, Slovakia, Austria, Italy and Slovenia received in 2012 TEN-T EU support for the *Preparatory studies and activities of organizational structures of Rail Freight Corridor 5*. The aim of this action is to elaborate a study to create the organisational, technical and operational conditions to make Rail Freight Corridor 5 operational by 10th November 2015. This includes elaboration of the dedicated Transport Market Study and Implementation Plan, as required by the Regulation. Under the organisational stand point the management of the activities of the RFC 5 are distinguished between the Executive Board of the Corridor, involving the Ministries of Transport of the concerned Member States; and the Management Board of the RFC 5, involving the infrastructure managers of the networks of the six Member States and the allocation body. The tasks of the

Management Board are that of creating conditions to make the corridor operational (prepare the offer for customers, also based on the transport market study) and prepare the RFC 5 Implementation Plan, to be submitted to the Executive Board by May 2015.

The map overleaf is a draft version of the schematic routing of the RFC 5. Studies, including market analyses are still on-going which could result in an amendment of the alignment during 2015. It is indeed a relevant legal condition of the RFC 5 that its sections and alignment can be designed and modified to meet specific needs of freight traffic flows, whereas the alignment of the BA Core Network Corridor is more rigid in terms of definition of the sections and nodes belonging to its route. These are set by Regulations EU 1315/2013 and EU 1316/2013 and cannot be easily modified.

Figure B8 RFC 5 alignment



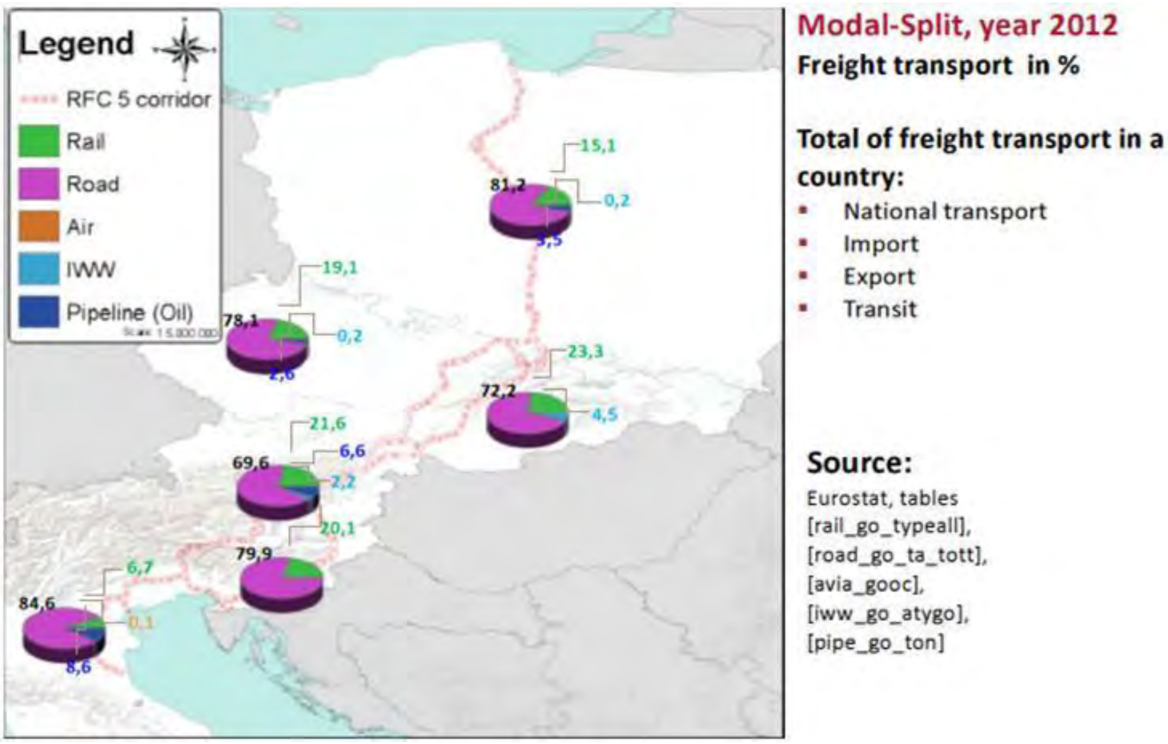
Source: RFC 5

Market and demand analysis
The transport market study for the RFC 5 is expected to be completed in December 2014 representing a key input for the Implementation Plan by the end of 2014. This plan is expected to be then consulted during 2015.

Based on Regulation EU 913/2010, the Market Study should describe the observed and expected changes in the traffic on the freight corridor, as a consequence of its establishment, should cover the different types of traffic, both regarding the transport of freight and the transport of passengers, and should assess the socio-economic costs and benefits stemming from the establishment of the freight corridor. Main targets of the study are 1) identifying limiting/supportive factors for rail use in RFC 5 area and approaches to promote RFC5 use; 2) identifying most likely reactions on establishment of RFC5; and 3) deriving parameters describing mode choice behaviour.

Several tasks are planned under the market study, including a survey of the freight transport market, customer needs and reactions of service providers. Determining factors of modal choice are being also considered, including the analysis of the relevant changes in technology, vehicles and economic trends, as well as in the legislation and policies possibly affecting the evolution of the different competing transport modes, particularly road and railways has been considered with reference to international, EU and national frameworks. Forecast of transport demand are development for the years 2015, 2020 and 2030. Origin/destination analysis of flows, details for quantities and type of traffic/cargo and service level are also foreseen to be part of the activities of this relevant study.

Figure B9 RFC 5 market study: modal split for freight transport



Source: RFC 5 – June 2014

As preliminary findings of this study the data regarding the modal share of traffic between transport modes along the corridor and the analysis of trade volumes at the EU level and between RFC 5 Member States and other EU areas are worth reporting in this review, these results are in line with what described at Section 4.3 in the main report and Appendix E below.

The modal split for freight transport, for the year 2012, ranges between 6.7% in Italy and 23.3% in Slovakia as respectively the minimum and maximum percentages. It registers it minimum values at the extremities of the Corridor, in Italy and Poland, setting itself around 20% in the remaining countries.

Figure D10 RFC 5 market study: intra-EU trade

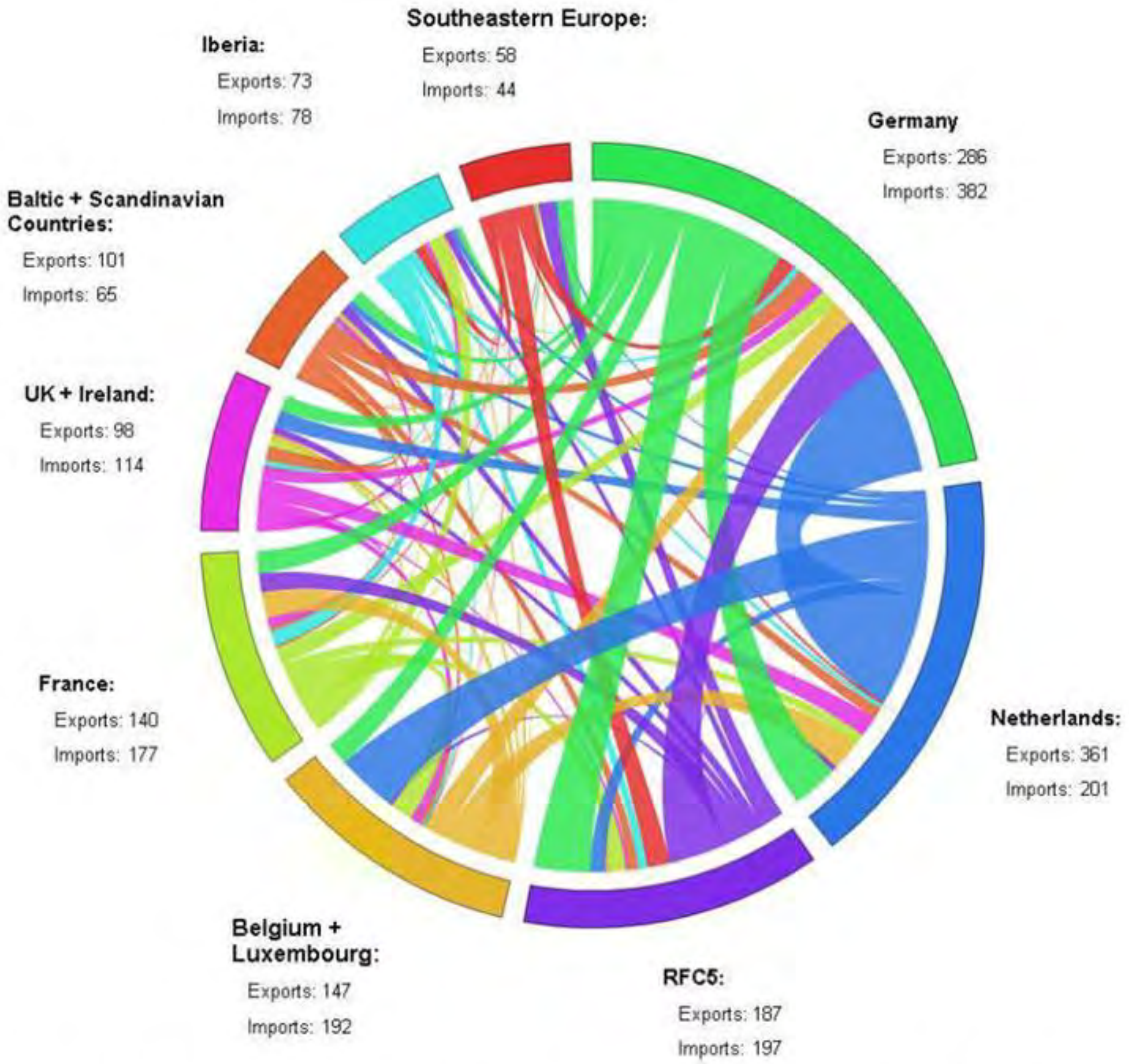


Figure 6: Intra-EU trade in million tons, 2012. Source: Comext Database. Note: Trade flows are coloured according to their country of origin. For graphical reasons the relation FR-NL had to be removed.

Source: RFC 5 - June 2014

The intra-EU trade in million tons shows that Germany is the main Import/Export destination for the RFC 5 Member States, the South-Eastern European countries ranking second as import partner and third as export partner, probably due to their proximity. The Netherlands are the biggest exporter this probably stemming from the predominance of their harbours.

B.2. Intelligent Transport Systems (ITS) and Information and Communication Technologies (ICT) for Interoperability

B.2.1. Railways

European Railway Traffic Management System

The ERTMS initiative was launched by the EU to create a single Europe-wide standard for train control and command systems to enhance cross-border interoperability and therefore contribute to completing the Single European Rail Area, improving the competitive position of rail transport and stimulating the single market of signalling equipment. On this basis in 1996 the Council agreed by unanimity that ERTMS should be a key part of European rail interoperability (Council Directive 96/48 on the interoperability of the trans-European high-speed rail system). Subsequent decisions have deepened Member States' commitment to ERTMS.

The ERTMS standard is one of the European railway technical standards and is prescribed in a Technical Specification for Interoperability ("CCS TSI", Commission Decision 2012/88/EU, adopted under Directive 2008/57/EC). Member States agreed in 2009 to deploy ERTMS (including GSM-R) on 6 key rail freight corridors with completion dates for either 2015 or 2020:
- By 2015, 10,000 km are due to be completed;
- By 2020 a total of 25,000 km are due to be completed.

19 Member States have been involved in these corridors. This European Deployment Plan (EDP) is mandatory following the adoption of Commission Decision 2009/561/EC, now replaced by the CCS TSI mentioned above.

With specific reference to the BA Corridor, none of the six above mentioned corridors identified for the implementation of ERTMS overlaps entirely with the BA Corridor. This is covered partially by ERTMS Corridor D from Padova (Italy) to Maribor (Slovenia) and by ERTMS Corridor E from Wien (Austria) to Brno (Czech Republic).

As part of the studies for the implementation of the ERTMS technology along the BA Corridor sections, the following TEN-T funded initiatives are worth mentioning:
- Project and development of ETCS Level 1 system at the section of the E 65, CMK, railway line Grodzisk Mazowiecki – Zawiercie (2009-2014; already completed; planned to be operational since December 2014, although GSM-R is not installed); Completion of the Action will contribute to the development of the first commercial application of ERTMS within the TEN-T network in Poland. It will in principle allow the speed of trains to increase to over 160 km/h, thus boosting the line's capacity, reducing travel time and increasing comfort for passengers. The tests of ETCS components to be carried out during verification and certification procedures will be made available to the European Railway Agency (ERA).
- ETCS deployment on Corridor VI: Žilina - Čadca - State Border SK/CZ (2010-2013; closed). The objective of this project, part of Priority Project 23 (railway axis Gdańsk-Brno/Bratislava-Wien) is the modernization of the rail section Žilina (station excl.)-Krásno nad Kysucou, in line with the interoperability requirements defined by EC Directive 2008/57. The project also aims at increasing the track speed up to 140 km/h (or 160km/h for tilting train sets). The project implements ERTMS (ETCS L2 system, SRS 2.3.0.d version) on the 37 km double track rail section Žilina-Čadca-State Border SK/CZ and encompasses the following activities: Implementation of the electronic signal box and electronic track block with radio-block centre (RBC) interface; Implementation of the radio-block centre (RBC) and establishment of reliable data connection between RBC and protection & control devices; Installation of Eurobalise to ensure reliable and safe detection of the actual train location;

- ERTMS deployment on Corridor E (Dresden-Constanta) Trackside equipment (2009-2013; on-going). The Action comprises the implementation of ETCS Level 2 with infill SRS 2.3.0d trackside equipment on the ERTMS Corridor E section between Břeclav and Wien Central Station, the upgrade to SRS 2.3.0d of the railway line between Wien Central station and Hegyeshalom (already in operation and currently equipped with ETCS Level 1 with infill SRS 2.2.2.) as well as development and implementation of Key Management System, ETCS Data Management Tool and ETCS Track Warning System.

The Commission services have recently issued a working document on the state of play of the European deployment plan of ERTMS. According to this deployment on corridors is behind schedule and results in an uncoordinated and patchy deployment. Additionally, the contribution of INEA to the working document on the state of play indicates that there is a very low absorption rate of EU funds. Delays of one Member State jeopardise the completion of corridors and investments made by other Member States on the same corridor. A lot of projects are delayed or even cancelled. Furthermore, frequent deviations from the standard have been identified in projects. This phenomenon is likely to undermine the interoperability objectives of ERTMS.

The ERTMS coordinator hold meetings with the Member States concerned and is now expecting from them revised plans for deployment and justifications for the delays. The Commission considers that a greater effort needs to be made to ensure that deadlines previously agreed are respected.

Whilst the importance of the implementation of ERTMS in support of the development of a Single European Railway has been identified as a priority in many of the above mentioned studies, including SoNorA, AB Landbridge and particularly SETA, no studies have been undertaken to systematically assess the status and plans of the deployment of ERTMS along the BA Corridor. As of the date of submission of this report, ERTMS (ETCS+GSM-R) is not deployed on the corridor railway infrastructure. However ETCS Level 1 is already installed in Poland on railway line E65, section Grodzisk Mazowiecki – Zawiercie and planned to be operational by end of 2014; sub-section connecting Bernhardsthal to Wien's main station in Austria will feature ETCS Level 2 by end of 2014.

ERTMS deployment is now clearly identified as a priority by the TEN-T regulation (cf. Article 12, Article 13, Article 39 of Regulation EU 1315/2013) which requires the deployment of ERTMS on TEN-T core and comprehensive networks by years 2030 and 2050, respectively. The priority of ERTMS deployment is also confirmed by the fact that part of the €26 billion allocated to the development of the TEN-T via the Connecting Europe Facility (CEF) will be used to support the implementation of the ERTMS via grants. The Commission's Communication of January 2014 clearly identifies ERTMS as one the CEF funding priorities. Relatedly, the CEF Multi-Annual Work Programme provides for the deployment of ERTMS with a view to improving and enhancing interoperability, especially alongside the 9 core network corridors. Within the scope of this communication, the Commission has recently launched a tender for the *Services of technical support for the deployment of ERTMS along the core network corridors*, to be co-financed under the CEF, recognising the importance of implementing this technology along the Core Network Corridors to support interoperability. The study will last for 72 months and is aimed at monitoring and supporting the harmonised and coordinated deployment of ERTMS along the Core Network Corridors.

ICT for the solution for operational and administrative barriers

In addition to the SETA already described in the above sections, the following studies are deemed relevant for the analysis and solution of possible critical issues affecting the operation and administrative activities relating to rail and maritime transport.

Path Coordination System (PCS)

The organisation and request of cross-border international trains requires contacting more infrastructure managers the time needed for the administrative procedures in addition to the operations relating to the inspection of the vehicles, possible changes in the locomotives and train drivers representing a possible administrative barrier to the development of intermodal and/or railway transport of passengers and freights.

The Path Coordination System (PCS, formerly PATHFINDER) is an international path request coordination system for path applicants. The system technologically consists in an internet-based application optimising international path coordination by ensuring harmonised path requests and offers between all involved parties.

According to the submission date of the request and the requested timetable period, PCS will automatically define whether the request is an ad hoc path request for the running timetable, a path request placed in time for the next annual timetable, or a request to be treated as a late path request for the next annual timetable.

Train Information System (TIS)

The Train Information System (TIS, formerly EUROPTIRAILS) 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 processed directly from the Infrastructure Managers' systems.

The application was developed by a consortium of 6 Infrastructure Managers (DB Netz, ÖBB, ProRail, RFF, RFI, SBB) and was co-financed by the European Commission. In 2007 RailNetEurope (RNE) took over the management of TIS and since then has been developing and improving the application.

17 IMs have already joined TIS, which is recognised as a useful tool also by RFC 5. The system is accessible by the rail operators. Reporting function for Train Performance Management (TPM) is already available, in the future it is expected that the system will include also national trains with international relevance.

Charging Information System (CIS)

Another relevant application for the simplification of administrative processes relating to the operation of cross-border trains is the European Infrastructure Charging Information System, also run by RailNetEurope.

The Charging Information System (CIS) is an infrastructure charge information system for Railway Undertakings (RUs) provided by Infrastructure Managers (IMs) and Allocation Bodies (ABs). The web-based application provides fast information on charges related to the use of European rail infrastructure and estimates the price for the use of international train paths within minutes. It is an umbrella application for the various national rail infrastructure charging systems.

At the moment CIS covers 21 European rail networks and is being enhanced continuously. Around 1300 users from all over Europe are making use of this advanced system with more than 200 routings per day.

B.2.2. Seaports

Numerous initiatives are being implemented at the wider European Union area, national or basin cluster level in order to support the promotion of Single Window initiatives to access ports, track flows of vessels and transported intermodal vehicles, rolling stock and goods entering and exiting port areas. ICT initiatives aimed at simplifying administrative procedures relating to custom, safety and security procedures – particularly impacting on transit times – have been also implemented at different scale to support the development of shared databases among the responsible authorities, institutions and operators, replacing paper based requests and processing of permits with electronic processes.

Ports are the nodes where road, rail, maritime and in many cases inland waterway transport intersect; they also host within their managed areas on in their proximity numerous manufacturing and particularly logistics plants. The initiatives described in this section usually require the involvement of more stakeholders from the intermodal logistic chain including the network of intermodal rail-road terminals in the ports' hinterland.

Some examples of relevant studies and initiatives with respect to maritime ITS and ICT initiatives are provided for reference below. Whilst progress has been made in this field, no initiatives have been so far implemented involving all Port Authorities along the corridor and/or the ports authorities and the rail road terminals and railway undertakings. Experience and pilot projects exist in any case involving some of these relevant stakeholders of the intermodal chain such as the ARTEMIS initiative reported in the Section below as an example of ICT project supporting intermodality (also involving the Bologna rail-road terminal and the Port of Venezia).

Vessel Traffic Monitoring System VTMIS (SafeSeaNet)

Critical issues and proposed solutions

SAFESEANET, a European Platform for Maritime Data Exchange between Member States' maritime authorities, is a network/Internet solution based on the concept of a distributed database.

Prevention of accidents at sea and marine pollution is an essential component of the European Union's transport policy. SAFESEANET's main objective is to aid the collection, dissemination and harmonised exchange of maritime data. The network assists communication between authorities at local/regional level and central authorities thus contributing to prevent accidents at sea and, by extension, marine pollution, so that the implementation of EU maritime safety legislation will be made more efficient.

The SAFESEANET network involves many maritime authorities across Europe, each with their own IT infrastructure and objectives. This invariably leads to varying data formats distributed across different systems throughout Europe.

Consequently SAFESEANET has implemented a Central Index System that stores only references to the data locations and not the actual data itself. It functions as a central hub for all communication between data requesters and data providers.

SAFESEANET has developed a Community vessel traffic monitoring and information system according to Directive 2002/59/EC. In addition, it incorporates data exchange requirements from other EU Directives such as those relating to:

- Port reception facilities for ship waste;
- Port state control inspections in ports of the European Union.

SAFESEANET covers EU Member States plus Iceland and Norway and involves a number of different authorities per country, both at local and central level. The system uses new IT technologies, but is flexible enough to cope with possible future technological developments as well as new categories of users.

e-Maritime (National Single Window for ship reporting - Prototype)

Critical issues and proposed solutions

The EU e-Maritime initiative aims to foster the use of advanced information technologies for working and doing business in the maritime transport sector, one of the most relevant targets under e-Maritime initiative sis that of deploying maritime single window services, as provided for Directive 2010/65/EU.

Maritime transport administrative procedures are complex, time-consuming and, even today, are often done on paper. Major European ports have advanced information systems (Port Community Systems), which deliver considerable quality and efficiency gains. However, the interoperability between port community information systems is practically non-existent limiting the potential for new services and economies of scale. Small ports might not be equipped with electronic data transmission at all. Normally In these cases, at each port call, shipping companies have to enter the same data repeatedly and often manually, resulting in duplication and errors.

The EU e-Maritime envisages promoting interoperability in its broader sense. It aims to stimulate coherent, transparent, efficient and simplified solutions in support of cooperation, interoperability and consistency between Member States and transport operators.

National Single Window (NSW) for ship reporting – Prototype

Directive 2010/65/EU establishes that Member States shall accept the fulfilment of reporting formalities in electronic format and their transmission via a single window as soon as possible and in any case no later than 1 June 2015. This single window shall be the place where all information is reported once and made available to various competent authorities and other Member States.

Action 3.1 of the Integrated Maritime Policy work programme (C(2012) 1447 final) regarding the "Evolution of the SafeSeaNet" aims at assessing the available options for the future evolution of SafeSeaNet (SSN) to support other user communities. One of the objectives of this action is to evaluate and demonstrate how SSN could support the Member States obligation to set up at national level a single window for reporting and exchanging formalities in accordance with Directive 2010/65/EU. The execution of this action, which has been delegated to EMSA by the Commission, is done through a demonstration project. This project consists in setting up a prototype of a National Single Window (NSW prototype)

The NSW prototype supports the following formalities referred to in Directive 2010/65/EU:

•Notification for ships arriving in and departing from ports of the Member States (Directive 2002/59/EC),

•Border checks on persons (Regulation (EC) No 562/2006),

•Notification of dangerous or polluting goods carried on board (Directive 2002/59/EC),

- Notification of waste and residues (Directive 2000/59/EC),
- Notification of security information (Regulation (EC) No 725/2004),
- FAL form 1: General Declaration,
- FAL form 3: Ship's Stores Declaration,
- FAL form 4: Crew's Effects Declaration,
- FAL form 5: Crew List,
- FAL form 6: Passenger List,
- FAL form 7: Dangerous Goods,
- Maritime Declaration of Health,

And the notifications required by Directive 2009/16/EC:
- Pre-arrival notification for ships eligible to expanded inspection,
- Notifications of actual arrival and departure.

Six Member States are participating in the project with a dedicated NSW prototype: Bulgaria, Greece, Italy, Malta, Romania and Norway. In addition, Denmark participates as an observer.

Other Member States may access a common NSW prototype to familiarize themselves with the implemented functionalities. Some Member States have already requested and have been provided with access to this common NSW prototype.

A second version of the NSW prototype is currently under development. This new version will allow re-using data between NSW systems via SSN (data of ship, port call, dangerous and polluting goods, waste notification, security notification, and optionally crew and passengers data). For that purpose the prototype will implement the new exchange messages of SSN version 3. Of the 259 data elements handled by the NSW prototype, 141 (54%) will be exchanged with SSN. The new version will also support additional formalities related to cargo information (FAL form 2, Entry Summary Declaration).

The European Maritime Safety Agency (EMSA) received requests from Member States for technical assistance to support them during the preparatory and design phase of complying with Directive 2010/65/EU, taking into consideration the experience gained by EMSA in developing the NSW prototype. The requests have been approved at the 39th meeting of the EMSA Administrative Board in June 2014.

The documentation developed so far for the NSW Prototype has already been provided to the Member States that have requested it. This documentation would serve as the basis for drawing up the design documentation for their NSW solutions. Providing the technical assistance and the NSW prototype documentation enhances the possibility of offering NSW solutions with similar interfaces and functionalities meeting the objective of the Directive of simplifying and harmonising the transmission of reporting formalities to reduce the administrative burdens of the shipping industry.

ITS Adriatic Multi-Port Gateway

Critical issues and proposed solutions

The Northern Adriatic Ports Association (NAPA) has agreed to develop a study, including a pilot action, focused on the future deployment of Information and Communication Technologies (ICT) solutions enabling an efficient information exchange between the NAPA ports, including eventually the port of Rijeka, and all the actors involved in the intermodal transport processes.

The ultimate aim of the study consists in the creation of a prototype of a common e-platform based on the development of a NAPA web portal for data sharing, integrated with enhanced NAPA port community systems and with an EDI application, in order to allow the interconnection among the ports' systems, according to common standards and technical requirements defined on the basis of a ports' process analysis.

The prototype will be the first step of a more complex system with a view to extending the system performance step-by-step, towards the concept of "one-stop-shopping". At full capacity, the NAPA portal will be able to provide a wealth of information, facilitating and speeding up the completion of formalities, thus serving as an example for other EU port clusters.

The aim is to implement a Northern Adriatic "Single Window" through the development of a common ICT platform enabling an efficient information exchange between the NAPA, and intermodal transport actors.

From a TEN-T perspective the project is particularly relevant for the following reasons: the multi-port cooperative approaches to ICT with a single entry point; linking port community systems; linking with other key actors (e.g. customs); contributing to increasing gateway efficiency; reduce transaction costs; improve intermodal transport.

A continuation of ICT activities started under this study has been recently initiated, also co-financed by the EU, aimed at extending automation of the authorization for the rail- entry process, subsequent to the already implemented system relating to road-entry process automation.

The Port of Ravenna, originally part of NAPA however currently not a member of the association, is undertaking a similar project called *Fast Corridor*. . Fast Corridor attempts to implement a telematics based system to manage customs declarations and other documents that are commonly used to track the transport of goods.

Market and demand analysis

As part of the ITS initiative a market study was also undertaken regarding the development of NAPA ports. In consideration of the growing needs from the countries of the Central Europe without access to the sea to import/export goods, several studies on the future of the Northern and Southern European Ports were carried out. According to some studies (i.e. *S.E. Newton, Y. Kawabata, R. Smith, „The Balance of Container traffic amongst European Ports.pdf", Zoetermeer, Netherlands, Report to: Port of Antwerp, Port of Rotterdam, Port of Hamburg, Oct. 2011*), the Northern Range Ports are expected to continue increasing their market share because the Alpine crossings and infrastructure constraints would disadvantage the Ports of the Southern European regions. On the other hand, the second scenario foresees a significant growth of the Port of the Southern European regions thus increasing their market share serving the Central European regions.

In support of this second scenario, the market study on the potential cargo capacity of the NAPA Ports (i.e. *Koper*, *Rijeka*, *Trieste*, *Venezia* and formerly *Ravenna*) in the container sector is intended to determine the future development of this seaports' system up to 2030.

Figure B11 NAPA Ports

Source: NAPA official web site – http://www.portsofnapa.com/

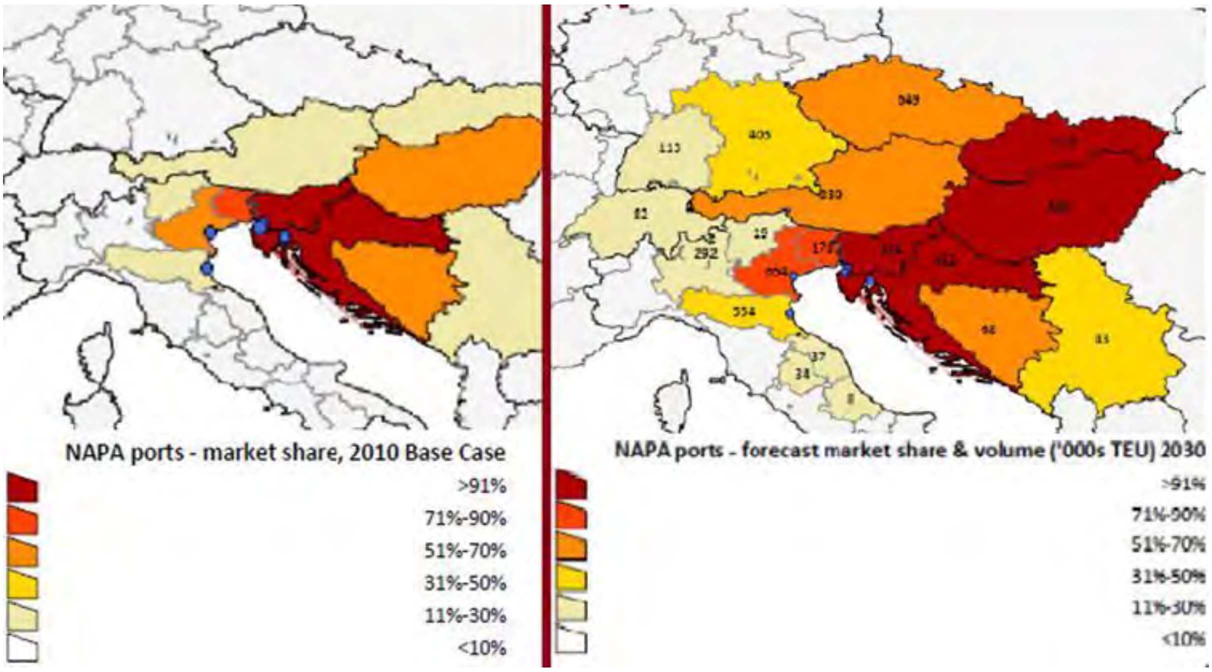
Regarding the development of the container market, the main action consists in establishing services with the international growth markets (Switzerland, Romania, Poland, Ukraine, Bosnia-Herzegovina and Kosovo) accounting for 1.57 million TEU.

The estimated size of NAPA's Polish market in 2010 would total 0.9 million TEU thus representing a major potential market for NAPA, while Switzerland and Romania are also relatively undeveloped markets (0.32 and 0.30 million TEU respectively).

Furthermore, the results of this study show that the major economic drivers of demand and market share through the NAPA ports are the introduction of ships of about 8,000 TEU making direct calls in the North Adriatic from 2020 (and their cost structures determining the market price charged to freight forwarders and shippers), and about 11,000 TEU from 2030, allied to efficient rail freight services for inland distribution (particularly being able to operate 750 metre long trains). In these circumstances the NAPA ports would be more competitive and secure significant additional market share.

The combination of direct calls by larger deep sea container ships in the North Adriatic plus efficient rail freight services to the Balkans, Central and Eastern Europe and North of the Alps to Germany and Austria would be highly competitive with traffic via the Northern Range ports (mainly *Rotterdam*, *Hamburg*, *Le Havre* and *Anvers* etc.).
The figure below shows the comparison between NAPA's country market share in the 2010 base case scenario and in the forecasted 2030 scenario also including the estimated traffic volumes in 2030.

Figure B12 NAPA Ports – market share scenarios comparison and 2030 traffic volumes



Source: NAPA report – Market study on the potential cargo capacity of the North Adriatic ports system in the container sector by MSD Transmodal Limited

The NAPA ports could serve 6.0 million TEU of traffic by 2030, representing 11.3% of the market; this would represent traffic growth of almost 350% over 20 years. The Northern Range Ports would lose some 7.7% of market share while still securing an additional 11.1 million TEU of traffic in 2030 compared to 2010.
More in detail, the table overleaf summarises the forecast market share in 2015, 2020 and 2030 scenarios for the main Port groupings including the NAPA Ports and the Northern Range Ports.

Table B3 Forecast market share

	2010	2015	2020	2030	Change 2010-2030
NAPA	4.3%	4.4%	9.4%	11.3%	+6.9%
Northern Range	66.0%	66.1%	60.0%	58.3%	-7.7%
Tyrrhenian	11.6%	11.2%	11.4%	11.3%	-0.3%
Black Sea	1.1%	1.1%	1.2%	1.3%	+0.2%
Other	17.0%	17.2%	18.0%	17.8%	+0.8%

Source: NAPA report, page 35

B.2.3. Inland ports

River Information Services (RIS)

Critical issues and proposed solutions

Among the activities implemented under the PLATINA II project (referred to a Section 2.6 of the main report), the RIS initiative is worth mentioning for its relevance in supporting the development of cross-border interoperable services and traffic management systems. River Information Services (RIS) are information technology (IT) related services designed to optimise traffic and transport processes in inland navigation, i.e. to enhance a swift electronic data transfer between water and shore through in-advance and real-time exchange of information. The development of RIS, in combination with cost-effective and environmentally friendly logistics operations, enhances the competitive edge of inland waterway transport in the supply chain. The policy importance of RIS is presented in various EU policy papers, i.e. EC White paper, TEN-T Guidelines, NAIADES, Logistics Action Plan.

An EU framework directive (EC/2005/44) provides minimum requirements to enable cross-border compatibility of national systems. Comprehensive and international guidelines for RIS are continuously developed to harmonise the existing standards for particular river information systems and services within a common framework.

Many institutions and RIS experts are involved to optimize and harmonize various information services. Numerous services relevant to RIS are already sustained particularly radiotelephone, traffic posts, Internet, and Inland ECDIS (Electronic Digital data Information Services).

The following is the summary of the situation of RIS Directive implementation in the BA Corridor Member States from the study by Panteia: RIS implementation survey and policy evaluation – Country Reports, July 2014. More information is provided in Appendix B specific studies aimed at supporting the implementation of RIS in the BA Member States:

- ***Poland*** The implementation of RIS in Poland reached its first initial stage. Pilot RIS implementation on Lower Odra was implemented in 2013 and it resulted in opening of RIS Centre in Szczecin in May 2014. The system will cover section from Szczecin (seawater border) to Ognica for a total length of 97.3 km. The pilot scheme aims to test an interoperable, reliable and safe RIS information system managed from a new Lower Oder RIS Centre to be constructed looking at the different technical specifications to reach European interoperability.
  Notices to Skippers is available and under operation ((FTM, WRM, WERM, ICEM) as well as Inland Electronic Navigational Chart (IENC) is ready to be used by Inland ECDIS (Inland Electronic Chart Display & Information System). Vessel Tracking and Tracing is available. Electronic Ship Reporting (ERI) is available via website and ERI communication is transmitted by electronic means to RIS Centre, where undergoes processing and is further delivered to appropriate recipients (http://szczecin.uzs.gov.pl/gdy96_ris_odrahtm.htm). Full implementation of RIS is

envisaged under the new Multiannual Reference Framework (2016 - 2019) and it will cover additional 30 km of Odra River section from Ognica to Hohensaaten;

- ***Czech Republic*** RIS directive 2005/44/EC has been partially transposed to Czech legislation by the amendment of the Inland Navigation Act No. 114/1995 and by establishment of the specific regulation no. 356/2009 on River Information Services in the Czech Republic. Basic RIS applications have been implemented. Law no. 114/95 was amended in 2008 adding §32a-d with regulations regarding RIS and §40, which determines the State Navigation Authority as RIS operator. Additional amendments have been recently considered regarding the provisions for international data exchange. Amendments are also still needed for the use of AIS. With regard to the technical implementation it can be mentioned that NtS are available according to standard, ERI is only available in a test operation (ERINOT and ERIRSP) and AIS is as mentioned not implemented yet. ENCs are available.
- ***Slovakia*** Directive 2005/44/EC was fully transposed into the Slovak legislation in the Inland Navigation Act No 179/2008 Z.z (entered into force on 1 June 2008). Slovakia provides the key RIS technologies with an acceptable level (with regard to the traffic density). A new Inland Navigation Act has been prepared in 2014 no. 35/2014 to extend and specify in more detail the provisions of the act related to RIS, e.g. definition of RIS users, access to information provided by RIS and the introduction of the AIS carriage requirement. The Ministry of Transport, Construction and Regional Development is also preparing an implementation regulation for usage of RIS. RIS is only implemented on the Slovak part of the river Danube, as on the other waterways (Váh, Morava and Bodrog) there is hardly any inland navigation;
- ***Austria*** RIS was first considered by amendments of the Austrian Navigation Act in 2005. Austria fully implemented the RIS Directive in paragraph 24 of the Austrian Navigation Act by 4 June 2008. Additional rules were added to cover other EU provisions. §24 of the navigation act states RIS applications covered by EU legislation and refers to standards as well as technical specifications determined by §5 of EU RIS directive and related regulations. The waterway traffic regulation complements the navigation act regarding RIS regulations. The regulation was amended in 2008 and covers a few RIS related regulations with focus on AIS and vessel tracking & tracing. Main component of the amendments were the implementation of AIS transponder carriage and use obligation for vessels with a length >=20m and/or 12 persons on board. The waterway operator Via Donau is in charge of the development and operation of the national RIS system, DORIS. The technical implementation of the RIS applications are all according the implementation scheme of the technical guidelines. It must be mentioned that AIS is obligatory in Austria which goes beyond the requirements of the Directive. Main reason for the AIS obligation is that the total benefit of AIS and its applications can only be realised - according the Austrian representatives - if the complete fleet is equipped. This in contrast with the use of ECDIS (which has not become obligatory) as it was assumed that each skipper/ship owner have only a direct benefit of its use so it is up to them to decide whether or not to purchase this equipment;
- ***Italy*** Italian inland waterways are not connected to the main TEN-T IWT network; as such there is no legal obligation to implement the RIS Directive in the Italian legal framework. However, Italy sees RIS as an opportunity for further developing the inland shipping sector on the Po River and is therefore currently working on the roll-out of RIS on the River Po, with initiatives supported with TEN-T funding
- ***Slovenia*** Does not include inland waterways and ports.

B.2.4. Airports

Single European Sky ATM Research (SESAR)

Critical issues and proposed solutions

SESAR is a performance-driven programme built around the ATM (Air Traffic Management - ATM) stakeholders' expectations for the new ATM system to be developed by 2020.

SESAR brings a new approach to ATM modernisation through a coherent programme which will provide guidance and leadership to all ATM-related initiatives in Europe with a view to achieve global interoperability.

The ultimate goal of SESAR is to ensure sustainable air transport development in Europe in a safe and efficient manner through a performance-driven approach.
The key performance targets are:

- Enabling a three-fold increase in capacity;
- Improving safety by a factor of 10;
- Reducing by 10 % the environmental impact per flight;
- Cutting ATM costs by 50 %.

The SESAR programme comprises three phases:

- The definition phase (2005-08) has produced the ATM master plan, which identifies the technological steps and the modernisation priorities necessary for implementing a new ATM concept.
- The development phase (2008-13), managed by the SESAR Joint Undertaking, has developed the new equipment and standards to ensure, through the regulatory mechanisms of the single European sky, the replacement of the existing ground and airborne systems and interoperability with those outside Europe.
- The deployment phase (2014-20) will consist of large-scale production, procurement and implementation of the new ATM infrastructure and of the corresponding aircraft equipment.

From the review of the research and project experience activities of this initiative, no other BA Core Network Corridor airports other than Wien has been significantly involved in the development of this relevant system with a possible need for promotion of the involvement of other Core Network Corridor Airports in the deployment phase of SESAR.

B.2.5. Roads

Concerning ITS/tolling, the following references are included in the regulations, which need to be considered both within the scope of infrastructure development projects and horizontal measures aimed at improving the quality of services and operation/management of the infrastructure network:

- ***ITS*** Use of ITS and their interoperability with other systems: Art. 18 (e). Any intelligent transport system deployed by a public authority on road transport infrastructure complies with Directive 2010/40/EU and is deployed in a manner consistent with delegated acts adopted under that Directive;
- ***Toll Collection systems*** Use of toll collection systems and their interoperability with other systemsArt. 18 (d). The interoperability of toll collection systems is ensured in accordance with Directive 2004/52/EC of the European Parliament and of the Council and with Commission Decision 2009/750/EC.

Pursuant to Article 17(1) of the Directive 2010/40/EU, the Member States had to submit to the Commission by 27 August 2011 with information on national ITS actions envisaged over the following five year period and a report on their national activities and projects regarding the priority areas referred to in Article 2 of and in Annex I to the Directive 2010/40/EU.

For the purpose of this Directive the following shall constitute priority areas for the development and use of specifications and standards:

- Optimal use of road, traffic and travel data;
- Continuity of traffic and freight management ITS services;
- ITS road safety and security applications;
- Linking the vehicle with the transport infrastructure.

Within the priority areas the following shall constitute priority actions for the development and use of specifications and standards, as set out in Annex I:

- (a) Provision of EU-wide multimodal travel information services;
- (b) Provision of EU-wide real-time traffic information services;
- (c) Data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users;
- (d) Harmonised provision for an interoperable EU-wide eCall;
- (e) Provision of information services for safe and secure parking places for trucks and commercial vehicles;
- (f) Provision of reservation services for safe and secure parking places for trucks and commercial vehicles.

Measures to be considered by The Member States in the elaboration of their Five Years Implementation Plans are the following:

- The interoperable EU-wide e Call;
- Public funding guidelines;
- Cooperative systems;
- ITS & Vulnerable Road Users;
- Intelligent Transport Systems for Urban Areas;
- Traffic and Travel Information;
- Intelligent Truck Parking;
- Open In-Vehicle Platform;
- Public data for digital maps;
- Availability and access to road data;
- Personal data protection and security aspects related to ITS applications;
- Liability issues pertaining to the use of ITS applications;
- Promotion of multimodal journey planners.

A review of the five years action plans developed by the BA Corridor Member States in compliance with Directive 2010/40/EU is provided in the ITS Action Plans dedicated section below, with the description of the initiatives identified with reference to the priorities and measures listed above.

The review of the plans reveals that activities are on-going with respect to many of the above listed measures with differences between the Member States about the priorities and actions under implementation or envisaged to be implemented. The TEN-T Core Network Corridor approach, may actually also help in supporting a more coordinated development of these initiatives, although many of them apply to units of infrastructure – regional, or national networks if not specific roads under concession – that differ from the one of the Core Network Corridor.

Specifically regarding the European Electronic Toll Collection system as per Directive 2004/52/EC and subsequent Decision 2009/750/EC, it is not yet implemented in the BA Corridor Member States.

ITS Action Plans

Pursuant to Article 17(1) of the Directive 2010/40/EU, the Member States had to submit to the Commission by 27 August 2011 with information on national ITS actions envisaged over the following five year period and a report on their national activities and projects regarding the priority areas referred to in Article 2 of and in Annex I to the Directive 2010/40/EU.

For the purpose of this Directive the following shall constitute priority areas for the development and use of specifications and standards:

- Optimal use of road, traffic and travel data;
- Continuity of traffic and freight management ITS services;
- ITS road safety and security applications;
- Linking the vehicle with the transport infrastructure.

Within the priority areas the following shall constitute priority actions for the development and use of specifications and standards, as set out in Annex I:

- (a) Provision of EU-wide multimodal travel information services;
- (b) Provision of EU-wide real-time traffic information services;
- (c) Data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users;
- (d) Harmonised provision for an interoperable EU-wide eCall;
- (e) Provision of information services for safe and secure parking places for trucks and commercial vehicles;
- (f) Provision of reservation services for safe and secure parking places for trucks and commercial vehicles.

With reference to the implementation of Directive 2010/40/EU we provide below a summary of the priority measures identified in the Directive with reference to the indicated priority areas and actions:

- The interoperable EU-wide e Call;
- Public funding guidelines;
- Cooperative systems;
- ITS & Vulnerable Road Users;
- Intelligent Transport Systems for Urban Areas;
- Traffic and Travel Information;
- Intelligent Truck Parking;
- Open In-Vehicle Platform;
- Public data for digital maps;
- Availability and access to road data;
- Personal data protection and security aspects related to ITS applications;
- Liability issues pertaining to the use of ITS applications;
- Promotion of multimodal journey planners.

The interoperable EU-wide e Call

The 112 eCall automatically dials Europe's single emergency number 112 in the event of a serious road accident and communicates the vehicle's location to the emergency services.

In 2012 around 28 000 people were killed and more than 1.5 million injured in 1.1 million traffic accidents on EU roads.

In addition to the tragedy of loss of life and injury, this also carries an economic burden of around EUR 130 billion in costs to society every year.

It is estimated that 112 eCall can speed up emergency response times by 40% in urban areas and 50% in the countryside and can reduce the number of fatalities by at least 4% and the number of severe injuries by 6%.

eCall is activated automatically as soon as in-vehicle sensors and/or processors (e.g. airbag) detect a serious crash.

Once set off, the system dials the European emergency number 112, establishes a telephone link to the appropriate emergency call centre (aka Public Safety Answering Points – PSAPs) and sends details of the accident (aka Minimum Set of Data – MSD) to the rescue services, including the time of incident, the accurate position of the crashed vehicle and the direction of travel.

An eCall can also be triggered manually by pushing a button in the car, for example by a witness to a serious accident.

Public funding guidelines

The 2011 White Paper on Transport calls for a concerted and interoperable roll-out of Intelligent Transport Systems and Services in direct support of the achievement of a pan-European co-modal and truly integrated transport system by 2050.

Developing awareness for the unleashed potential of ITS and documenting its pros and cons compared to just adding more hard infrastructure should boost acceptance of this type of investments as a valid option for mobility-related problem solving.

As investment decisions typically are steered by perceived benefits and costs and also require appropriate policies and frameworks, the Commission services have commissioned a study under the terms of the ITS Action Plan (Action 6.3) on existing (national) policies and procedures with regard to the funding of ITS in Europe and beyond. Community funding frameworks and applicable rules (e.g. cohesion funds, framework programmes, competitiveness and innovation programme…) however have not been assessed in detail.

The aim of the initiative completed in 2011 was:

- To screen existing frameworks for the deployment and operation of ITS from an economical and financial perspective in light of taking stock of best practices and indicators applied to judge effectiveness of the action, and
- To assess applicable mechanisms in light of, potentially, the identification of common elements and/or the minimum framework (requirements) to be put in place to support a correct positioning and consideration of ITS in mobility-related decision-making processes.

Finally the study provides recommendations to further enhance awareness and understanding of ITS and to foster harmonised approaches in Europe when it comes to funding, investment, deployment and evaluation.
In light of enhanced awareness for the potential and role of ITS the study results are made publically available.

Cooperative systems

It can be defined as a harmonised approach for the development and evaluation of cooperative systems, including the assessment of strategies for their deployment.
On-board driver assistance coupled with two-way communication between vehicles, with and between road infrastructure can help drivers better control their vehicle and hence have positive effects in terms of safety and traffic efficiency. Vehicles can also function as sensors reporting weather and road conditions including incidents, to be used for high-quality information services.

Enabling precisely this sort of interaction, this is where so-called "cooperative systems" come into play. The ITS Action Plan looks to further consolidate R&D results and to promote coordinated deployment.

Action 4.2 of the ITS Action Plan aims specifically at the "Development and evaluation of cooperative systems in view of the definition of a harmonised approach; assessment of deployment strategies, including investments in intelligent infrastructure".

EU-funded research projects on cooperative systems e.g. Coopers, CVIS, Safespot have delivered promising results that have notably contributed, under the coordination of the COMeSafety project, to the definition of communication architecture for cooperative systems. This work needs further consolidation and large-scale pilots such as EuroFOT and Drive C2X are aiming at validating the promising cooperative applications.

Co-operative Systems would notably require spectrum for short-range, low-latency communications. On 5 August 2008 the Commission has adopted Decision 2008/671/EC to reserve the 5.9 GHz band for safety related ITS applications. The Decision will harmonise the usage conditions for the availability and efficient use of this frequency band on a non-exclusive basis.

Standardisation is also an important element in the area of cooperative systems. ETSI and CEN are currently working to produce the minimum necessary standards for cooperative systems, as a response to the Standardisation Mandate of the Commission

ITS & Vulnerable Road Users

Vulnerable Road Users (VRU) are defined in the ITS Directive as "non-motorised road users, such as pedestrians and cyclists as well as motor-cyclists and persons with disabilities or reduced mobility and orientation".

ITS-based road safety and security applications have proved their effectiveness, but the overall benefit for society depends on their wider deployment.
At the same time there are some safety-related issues that require further attention, e.g. the Human-Machine Interface (HMI) deployed or the safe integration of Nomadic Devices. It is recommended to verify the impact of a broader roll-out of mainstream ITS services on the 'Vulnerable Road User' – a heterogeneous group that is disproportionately represented in statistics on injuries and road traffic casualties.

Deployment of the services that turn out to be beneficial should be accelerated whereas the potential negative effects should be mitigated as much as possible.
The challenge of action 3.4 of the ITS Action Plan is to identify, and in a second stage prioritise, those ITS applications and services that can have a most significant impact on the various categories of vulnerable road users.

The European Commission in 2011 completed a dedicated study to assess the application areas and services that either

- Demonstrate maximum benefits,
- Enclose potential risks, or
- Include issues that need further attention for the various categories of VRU.

The results of this study and the recommendations for follow-up action at European level provide valuable input for complementary analysis or research and evaluation. The outcome of this work provides a foundation for potential work towards specifications under the ITS Directive.

Intelligent Transport Systems for Urban Areas

Intelligent Transport Systems (ITS) supports urban policy goals in areas such as travel information, traffic and demand management, smart ticketing or urban logistics. An integrated approach is even more required in urban areas, including various transport modes and combining both technical and policy issues. The citizen should be in the centre of attention.

Good local initiatives exist but sometimes with limited scope. Cities welcome support from the European level if they can retain independence to decide on ITS deployment. Technical solutions exist and the main barriers to more integrated deployment are more organisational or financial.

Both Action Plans on ITS and on Urban Mobility include complementary activity on ITS for urban areas.

- The ITS Action Plan wants to set-up the ITS collaboration platform to promote ITS initiatives in the area of urban mobility;
- The Action Plan on Urban Mobility offers assistance on ITS applications for urban mobility, possibly in the form of a guidance document.

In 2010 the European Commission has therefore set up an Expert Group on ITS for urban areas with local authorities and their main partners to promote the deployment of ITS. The 24-month long mandate of the Expert Group ended in December 2012. During its mandate, the Expert Group developed guidance on deployment of three key applications of urban ITS (travel information, traffic management (incl. urban logistics) and smart ticketing), collected a number of related best practices and reflected upon the need for further standardisation in the domain of Urban ITS. The abovementioned documents are freely available below in the 'Related documents' section. The European Commission strongly encourages local decision-makers to consult and use the Guidelines for deployment, in order to strengthen interoperability and continuity of ITS deployment across European cities.

Traffic and Travel Information

Traffic and Travel Information is a key element of Intelligent Transport Systems (ITS) deployment. It can provide the European traveller with door-to-door information for well-informed travel decisions (pre-trip) as well as information during the journey (on-trip).

A key pillar of the ITS Action Plan is the optimal use of travel and traffic data to foster the development of Europe-wide real-time traffic and travel information services. There are two specific actions:

- Action 1.1: Definition of procedures for the provision of EU-wide real-time traffic and travel information services
- Action 1.4: Definition of specifications for data and procedures for the free provision of minimum universal traffic information services

With advancing technology and diversified data sources more data is in principle available. An important issue is the definition of the roles of the public and private sector especially on co-operation on data access and exchange. Due to different national policies and information markets across Europe these roles cannot be generalised.

A harmonisation of rules concerning data access and a free universal service will contribute to the following objectives:

- Continuity of services (across borders);
- Road safety: easier access to safety-related information;
- Use of public data: taking full advantage of public data for efficient information;
- Market development: feasible business models and lower costs (economies of scale).

The European Commission completed a study in 2011 on traffic and travel data access and on possible free road-safety related traffic information services, with a view to analysing the status quo in the EU and producing draft policy options. Specifications and procedures should be established for the use of public data, data availability, data formats, data exchange, (cross-border) procedures and legal issues (contracts, agreements, licenses, liability).

Specifications for Europe-wide services will be elaborated under the ITS Directive until the end of 2012 (free minimum traffic information services) and the end of 2013 (EU-wide real-time traffic information services).

Intelligent Truck Parking

Secure parking places for trucks and commercial vehicles is listed as a top priority in the ITS Action Plan and the ITS Directive 2010/40/EU. European truck drivers need to have access to information on the availability of secure parking places for their trucks as well as be able to make use of a timely pre- and on-trip reservation service.

This deployment action is mentioned in Action Area 3: ITS Road safety and security applications under: Action 3.5: Development of appropriate measures including best practice guidelines on secure parking places for trucks and commercial vehicles and on telematics-controlled parking and reservation systems

As an important step to achieve this objective, the European Commission is conducting a study on secure parking places for trucks, which included a workshop held on 23 June 2010.

The workshop aimed to validate and to discuss the recommendations of the "Study regarding secure parking places for trucks and commercial vehicles, telematics-controlled parking and reservation systems" within the ITS Action Plan.

In particular the questions:

- How should the public and private sector work together to create a high quality static and, where needed, dynamic information service (possibly including a reservation system) on truck parking spaces, which would essentially help tackle problems of truck parking overcrowding and support hauliers and truck drivers in their journey planning and decision making on where to safely park.
- How to build, in cooperation with the insurance industry, a European network of intelligent secure truck parking which would help reduce the huge social costs resulting from freight crime were examined.

The results of the study are now available as a basis for discussion and further work.

Open In-Vehicle Platform

Several road transport telematics applications have been regulated or imposed on all vehicles to improve road safety, prevent fraud and ensure interoperability. For instance the European Electronic Toll Service (EETS) was established by the interoperability of electronic road toll systems Directive. Another example is the digital tachograph installed in all new EU commercial vehicles since 1 May 2006 to record the driving times and rest periods of professional drivers.

Implementation of the interoperability of electronic road toll systems (Directive 2004/52/EC and Decision 2009/750/EC) is one of the goals of the ITS Action Plan. EETS and its components are dealt with in Action Area2: "Continuity of traffic and freight management ITS services on European transport corridors and in conurbations" as well as in Action Area 4: "Integration of the vehicle into the transport infrastructure". Action 4.1 aims for the "Adoption of open in-vehicle platform architecture for the provision of ITS services and applications, including standard interfaces".

The use of ITS components or systems is stipulated in several existing or planned legal acts and voluntary agreements. However, there are several barriers for implementing and enforcing them, such as security/privacy, data protection, harmonisation needs, interoperability, protection against fraud/abuse etc. Establishing common architecture and standards would allow tackling these barriers once and for all.

As an important step to achieve this goal, the European Commission has contracted a study on an Open In-Vehicle Platform Architecture.
As part of the study a workshop was held at the ITS Conference 2010 to inform the professional stakeholders about the action foreseen in the ITS Action Plan relative to the definition of an open in-vehicle platform architecture for the provision of ITS services and application and to collect their reaction on this topic.

Public data for digital maps
Accurate public road, traffic and travel data are key elements of ITS deployment especially to guarantee the availability of intelligent digital maps to allow the use of in-car navigation devices but also of travel planners and all kinds of traffic management applications.

An increasing number of ITS applications rely on the availability of accurate digital maps describing the road network geometry, topology and traffic related map attributes such as traffic regulations. However, these data are often unavailable, of uneven accuracy and reliability, while rules for their timely update in digital maps missing.

The main challenge is therefore to ensure a safe and easy access to digital road databases owned and maintained by thousands of road authorities in a standardised, non-discriminatory and transparent way.

This action is mentioned in Action Area 1: "Optimal use of road, traffic and travel data" under: Action 1.3: Definition of procedures for ensuring the availability of accurate public data for digital maps and their timely updating through cooperation between the relevant public bodies and digital map providers, taking into account the results and recommendations of the eSafety Digital Maps Working Group.

As a first step, the European Commission is in 2011 conducting a study on the state-of-the-art concerning the practice of road data collection for digital maps in the Member States across the EU, with the definition of possible optimal procedures of data exchange between Member States road authorities and digital map providers, taking into account the existing or planned National and European Spatial Data Infrastructures.

It is also worth mentioning the CROCODILE project, coordinated by AustriaTech and aiming at contributing to the exchange of traffic information between road managers in neighbouring countries, and through the implementation of the National Access Points provide traffic information that is required by delegated Regulations No. 885/2013*, and 886/2013. The scope of the project is to deploy Single Point of Access to traffic data from different road operators and other parties that own such data so it can be easily accessed and distributed to service providers. In the project there are 10 States: Austria, Cyprus, Greece, Germany, Poland, Czech Republic, Romania, Slovenia, Hungary and Italy. This project covers BA Corridor.

Availability and access to road data

Transport and logistics operations - be it traffic management, routing support or the physical delivery of goods - all require a good knowledge of the networks' characteristics and their boundary conditions for use.
At the same time authorities and managers increasingly rely on regulations and circulation plans to tackle inappropriate use of the most sensitive parts of the networks.

It is so, because of an ever increasing traffic demand, the fact that existing capacities are jeopardized by incidents and road works and also to cope with enhanced awareness concerning the negative impacts of emissions and noise.
With the aim of fostering effectiveness of operations and quality of related services Action 1.2 of the ITS Action Plan therefore investigates Europe-wide availability and access to road data, traffic regulations and circulation plans, with emphasis on restrictions for heavy goods vehicles and on the interurban/ urban interface.

The Action also addresses the development and operational use of Traffic Management Plans in an attempt to enhance and fuel structured cooperation among network managers and other actors involved, to balance the networks / make best use of existing capacities and to potentially strengthen the interconnection of the transport modes.

In 2012 the European Commission commissioned a study to assess the state of the art, to identify best practices and to recommend actions to enhance cooperation among all concerned stakeholders. According to the work plan the intermediate results of the study will be presented and discussed at an open stakeholder workshop.

Personal data protection and security aspects related to ITS applications

Despite the many potential benefits of Intelligent Transport Systems, the associated increase in vehicle/infrastructure electronics and communications raises security and privacy issues which, if left unaddressed, could jeopardise the wider deployment of ITS.

ITS technologies must ensure the integrity, confidentiality and secure handling of data, including personal and financial details, and show that citizens' rights are fully protected.

The objective of this action is therefore to assess the importance and impact of data protection and privacy aspects in the areas and actions of the ITS Action Plan and ITS Directive, and assess how those issues can be addressed.
This action is mentioned in Action Area 5: "Data security and protection, and liability issues" under: Action 5.1: Assess the security and personal data protection aspects related to the handling of data in ITS applications and services and propose measures in full compliance with Community legislation.

The European Commission is conducting in 2012 a study on the state-of-the-art concerning personal data protection aspects related to the handling of data in ITS applications and services in Europe. This work will include the identification of ITS applications which are the most subject to data protection issues and the assessment of potential measures (legal, technical, organisational) to guarantee the protection of personal data in ITS applications and services.

Liability issues pertaining to the use of ITS applications

Despite the many potential benefits of Intelligent Transport Systems, the rather unclear, imprecise or diversely understood legal liability regime for potential losses

caused by the use of ITS applications or services may be one of the most significant barriers to wide market penetration of those ITS services.
The objective of this action is therefore to identify the ITS applications for which liability constraints or issues are the most probable and assess how those issues can be addressed.

This action is mentioned in Action Area 5: "Data security and protection, and liability issues" under: Action 5.2: Address the liability issues pertaining to the use of ITS applications and notably in-vehicle safety systems.

As a first, the European Commission is in 2012 conducting a study on the legal state-of-the-art concerning liability aspects related to the deployment of ITS applications and services, including the identification of liability sensitive ITS applications and the definition of specific measures (legal, technical, organisational) that would be required to address liability issues in ITS applications and services.

Promotion of multimodal journey planners
Multi-modal travel planning is a key element of Intelligent Transport Systems (ITS) deployment. It provides the European traveller with comprehensive door-to-door information allowing for well-informed travel decisions. It seamlessly integrates information for different modes, based on a strong backbone of rail and local public transport.

A key pillar of the ITS Action Plan is the optimal use of travel and traffic data to foster multimodal travel, which is a key part of the European Commission's strategy for the future of transport. One specific action, 1.5, is related to the Promotion of multi-modal journey planners.

In 2011, the European Commission completed a study "Towards a European Multimodal Journey Planner", which aimed at supporting the development of national and regional multimodal journey planners, and links between the existing planners, with the ultimate target of enabling travellers to use door-to-door journey planning services at European level. This study was also a first step towards the preparation of functional, technical, organisational and service provision specifications in the domain of EU-wide multimodal information services that will be elaborated under the ITS Directive until the end of 2014.

Analysis of Five Years Action Plans

We provide below the summary of the initiatives identified by the Member States in their Action Plans; this information is currently not publicly available for Slovakia.

POLAND

Electronic toll collection system
The electronic toll collection system viaTOLL is currently the largest national road ITS project. The system has been in operation since July 2011, the first expansion of the system was planned for July 2012, to be followed by further expansion projects, when newly built road sections are put in operation. The viaTOLL system allows for the free flow of traffic and therefore vehicles are not required to stop to pay the toll. The electronic toll collection system viaTOLL is primarily a tool for toll collection on national roads for motor vehicles with MPW above 3.5 tonnes and buses, regardless of their MPW. In the electronic toll collection system, the amount of the toll depends on the actual number of kilometres travelled, and the toll is directly related to the cost of infrastructure construction and operation. The ViaTOLL system can serve as a tool for collecting data on the traffic of motor vehicles on national roads covered by the real

time system. In addition, the system can provide data on the structure of the transport fleet, the size of transport companies, traffic volume, viaBOX activity, kilometres travelled by a vehicle or company during a specified time, vehicle speed, etc. On the basis of collected data and upon an appropriate analysis, the system can be used for two purposes - for the purposes of public administration and private or commercial enterprises.

Public administration:

- Toll policy tool – sets the amount of applicable toll rates, selects roads for toll charging, verifies pricing as a stimulus for fleet replacement (the fleet replacement rate of the two cleaner EURO classes);
- Traffic management tool – traffic volume – toll rates can be differentiated in the case of excessive congestion, depending on the time of the day, day of the week, in the future a possibility for charging for external costs – noise and pollution, responding in the event of a road accident;
- Velocity measurement – in the future it may be used by the police to penalise drivers for exceeding the speed limit,
- Tracking suspect, dangerous cargo – it can be used by services such as the Customs to track smuggling;
- Driver tracking and monitoring by GITD;
- Interoperability with other fee collection systems in Europe - in accordance with Directive 2004/52/EC on the interoperability of electronic road toll systems; interoperability is standardised and interoperable platforms at the following levels: technical, contractual and operational. The electronic toll collection system is based on one of the technologies recommended by Directive 2004/52/EC and will be prepared to support the interoperability of services offered by the providers of a European Electronic Toll Service (EETS providers). The use of an electronic toll collection system assumes that in the future interoperability will enable the introduction of a European Electronic Toll Service. Thanks to this service, road users will be able to move freely within the European road network under a single contract with the EETS Provider;
- in the future, the electronic toll collection system may also interoperate with other fee collection systems such as a system of charging for entering the city centre.

Private companies:

- Fleet management;
- Tracking and monitoring of drivers;
- Optimal planning of routes, avoiding the unladen journeys;
- Tracking of dangerous goods;
- Control of travelled distance and a vehicle utilisation rate.

<u>National traffic management system</u>

In 2015-2020, the General Directorate for National Roads and Motorways will implement the National Traffic Management System (NTMS) on TEN-T Network project that involves the use of intelligent transport systems in the area of traffic management on national roads. Objectives of the project include:

- Improving the safety of road users;
- Shortening travel time;
- More efficient use of existing road infrastructure;
- Increasing the comfort of the journey;
- Improving the quality of road maintenance;
- Reducing the impact of road traffic on the environment;
- Improving cooperation with other road administration authorities;
- Improvement of traffic flows in trans-European transport and elimination of so-called bottlenecks.

Construction of the NTMS is treated as a long-term project, covering roads located throughout the country. Due to the high functional complexity, technical advancement, a vast area of implementation and financial and organisational issues, it was decided to implement the NTMS in stages. The project has been divided into several separate implementation projects, taking into account the possibility of obtaining funding, including from various EU funds, and the progress of the construction of the national road network.

These projects include implementation of:
- NTMS on the core TEN-T corridors, which forms part of the objectives of the "Connecting Europe Facility" (CEF);
- NTMS on the national road network not located on the core TEN-T network;
- NTMS as part of the construction of roads;
- NTMS in other projects.

Using the European experience, and on the basis of observations and the GDDKiA's own conclusions from pilot deployments of ITS, a comprehensive programme of project development management has been adopted. NTMS management has been based on the European Framework Architecture FRAME. The basis for each NTMS project will be an identical system architecture, and each of them will be divided into identical implementation modules standardised by the GDDKiA. Systems arising in individual projects will create one coherent whole in terms of functionality, organisation and communication. NTMS is divided into the following main components for the system master layer:
- National Road Traffic Management Subsystem;
- Data Collection and Archiving Subsystem;
- Simulation and Traffic Forecasts Management Subsystem;
- Road Maintenance Subsystem;
- Road Network Traffic Information Transmission Subsystem;
- Video Data Acquisition Subsystem;
- Car Data Acquisition Subsystem;
- RSA and Parking Information Subsystem;
- Environmental Information Management Subsystem.

The project includes the creation of a Traffic Data Warehouse, which will archive data collected by NTMS and process them for further transmission to entities that are competent to use them. NTMS will be equipped with telematics devices which are components of individual systems, and with application software. This investment includes the adaptation of buildings and equipping them for the needs of the Traffic Management Centres (TMC). It is assumed that access to the system functions will not be limited only to the TMS but depending on the competences and needs of individual organisational units of the GDDKiA, interfaces for individual system functions (with a defined authorisation level) will also be available from the level of, for example, GDDKiA branches, regions and districts. This will allow to dynamically changing the authorisations of the various TMCs in relation to the area of the road network which the given TMC will directly supervise. NTMS components will include a vehicle weighing system - "The important case of weight bridges (Wagi ważna sprawa)", the Electronic Toll Collection System, Roads Meteorological System and Roads Video Surveillance and Surface Condition Monitoring System operating within the already developed and planned traffic management systems, Information System for journeys on roads connecting Kraków and Zakopane, Motorway Information System on the section of the A8 motorway, so-called Wrocław Motorway Bypass.

In the context of previous work on NTMS, general functional assumptions of the system have been determined. A feasibility study has been developed, which showed high economic efficiency. The NTMS will fully cover the Baltic –Adriatic corridor in Poland.

Road traffic surveillance

The following projects are planned to be implemented as part of the activities of the Inspectorate of Road Transport (ITD) in the next 5 years:

- 1) Launching an automated system of administrative penalties for exceeding the standards relating to axle load and total vehicle weight, only on the basis of measurements of pre-selection scales;
- 2) Expansion of fixed equipment for speed recording;
- 3) Deployment of section speed controls;
- 4) Launching a system for imposing penalties for passing through a red light.

Tender procedures are currently underway for the purchase of measurement infrastructure, which is a component of the automatic traffic surveillance system (100 new speed cameras, 29 section control devices and 20 red light cameras should be deployed by the end of 2015). The completion of the majority of contracts is expected by the end of 2015.

The following procedures are underway:

- Mobile recorders;
- Fixed recording equipment;
- Equipment recording vehicles passing through red lights;
- Section speed control (installation expected to be completed by the end of 2015).

Furthermore, work is underway on part of the procurement procedure for a central processing system, which is an ICT system allowing for full automation of control functions and integration of equipment owned by ITD. Final version of CPD CANARD system has been deployed in May 2014.
The Chief Road Transport Inspector plans to introduce a corporate data model to consolidate data from all operating systems in order to use the mechanisms and analytical tools necessary to optimise management planning.

Emergency call system

Applicable regulations for the emergency call system are provided for in particular by the following legal acts:

- The Act of 24 August 1991 on fire protection (Journal of Laws of 2009 No 178, item 1380, as amended);
- The Regulation of the Minister of the Interior of 31 June 2009 concerning the organisation and functioning of the emergency call centres and provincial emergency notification systems (Journal of Laws No 130, item 1073, as amended).

Currently, the Ministry of Administration and Digitization is working on the new Regulation on the organisation and functioning of a system collecting and providing access to information and data on the location of the network termination, from which a call to the emergency number "112" is made or other emergency numbers with respect to the provisions of the emergency call system. At the same time preliminary work is in progress at the Ministry of Administration and Digitization over the new Regulation on the organisation and functioning of Emergency Call Centres / Provincial Emergency Call Centres (CPR/WCPR).

The Act of 13 July 2012 amending the Act on Government Administration Departments and certain other Acts was published in the Journal of Laws on 8 August 2012, item 908 and shall enter into force on 8 September 2012, therefore the control of the emergency call system was transferred from the competence of the Minister of the Interior to the minister responsible for public administration.

Emergency call centres have been launched in 4 provinces. These centres, however, do not offer full functionality. As further ICT projects are put into service, the functional range of centres and their territorial coverage will be progressively extended. Ultimately, emergency call centres will to handle calls to basic emergency numbers, such as 112 (the single European emergency number), 999 (State Emergency Medical Service), 998 (State Fire Service) and 997 (Police).
Until such centres are launched in a particular area, their tasks are carried out under the agreement referred to in Article 1(1) of the Act of 15 December 2011 amending the Act on amending the Act on fire protection and certain other Acts. Pursuant to this provision the Governor may delegate the duties of emergency call centres, including handling the service emergency number 112 to the State Fire Service or the local government units by way of an agreement until 31 December 2013.
Currently notification sent to emergency number 112 is received by Police dispatchers (most calls to which come from mobile networks) and the State Fire Service dispatchers (most calls to which come from landline networks). Receiving calls based on this model will be phased out, with the development of functional and territorial emergency call centres, which is to take place no later than by the end of 2013.

<u>The eCall system</u>
The Committee for European Affairs of the Ministry of Foreign Affairs at its meeting on 4 March 2011 decided not to sign the eCall Memorandum of Understanding, a document that may have been considered as a declaration of support for the implementation of this system in European countries.

The Emergency Call IT System (SIPR) being implemented by the Centre of IT Project MAD provides the functionality of receiving eCall signals. Ultimately SIPR is to be implemented in emergency call centres by 31 December 2013.

CZECH REPUBLIC
The following ones are the priority intervention areas and actions identified in the five years action plan:
- Priority Area 1 - Optimal use of road, traffic and travel data:
  - Provision of EU-wide multimodal travel information services;
  - Provision of EU-wide real time traffic information services;
  - Data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users;
- Priority Area 3 - ITS road safety and security applications:
  - Provision of an interoperable EU-wide eCall;
  - Provision of information services for safe and secure parking places for trucks and commercial vehicles;
  - Provision of reservation services for safe and secure parking places for trucks and commercial vehicles.

<u>AUSTRIA</u>

In [IVS Richtlinie 2010/40/EU], the Austrian Ministry on Transport, Infrastructure and Technology (BMVIT) provides information about implemented and planned measures in accordance with directive 2010/40/EU. National laws (IVS Gesetz - BGBl. I Nr. 38/2013) have been passed by the Austrian Parliament in January 2013 which provide a framework in line with the EU directive to plan and implement specific ITS measures.

<u>Provision of multimodal travel information:</u>
Building upon existing, sectors specific services of infrastructure, public transportation service providers and private operators - ŐBB Scotty, ASFINAG Roadpilot, quando (Wiener Linien) etc. "AnachB", a first intermodal service for the Wien,

Niederoesterreich and Burgenland provinces has been implemented. It provides real time information and route planning functions for public transport, road traffic, bicycles and walkers. This application has been expanded to include the other Austrian provinces: the VAO (Verkehrsauskunft Oesterreich) system provides standards for multiple services and partner organizations; the promoters - ASFINAG is the coordinator of the consortium - intend to include providers of similar services in neighbouring countries to encourage an expansion of the scope.

Provision of real time traffic information

About 800 kilometres of road - 19% of the entire Austrian network - is controlled with traffic control systems. TCS are made up of sensors and measuring instruments along the route as well as display gantries: traffic and carriageway conditions, weather and local data (noise pollution and pollutants) are measured and used to derive flexible and appropriate information about speed limits, overtaking bans, warnings and other information. Some of this information is shown on the display gantries more of it is prepared and broadcast by the operators.

Overhead gantry signs warn motorists about hazards, accidents, weather conditions and hold-ups. Eleven TCS are currently in operation across Austria, among them on the S1 and A2 motorway, two main sections of the BA Corridor's
Traffic Control System (TCS).

Efforts focused on the specification and implementation of a national, integrated network graph (GIP.gv.at) to enable the confluence and fusion of different sources (including "crowd sourcing", i.e. to include user generated content). Depending on use cases, specific services have been built upon the data integration platform:

- "On the move" - providing current information of traffic conditions via TMCPlus (see below) and smartphones;
- "Home" in provide traffic information in cooperation with public broadcasting and via SmartTV apps;
- "Office" provide detailed traffic situation on the main arteries used by commuters.

Free provision of road safety related information

RDM-TMC, a standard used by on board navigation systems has been use for more than 10 years to inform drivers about any adverse traffic situation in general and about traffic accidents in particular. TMCPlus, an extension of RDM-TMC is a new service by ORF and ASFINAG allowing (FM) broadcasting signals to be received by the navigation systems. The applicability of the new digital standards (DAB+) is investigated to disseminate relevant information using the TPEG protocol. Also on the horizon are advanced analytical and forecasting tools to prevent serious road accidents (research projects RISKANT, RAIDER).

eCall

Austria is a member of the European eCall implementation platform. BMVIT leads these efforts and represents also the position of the Ministry of Interior (BMI). Competences of the BMI include the implementation of emergency call services in cooperation with the regional operations centres. Research projects are planned to utilize eCall as a data source to identify potential dangerous traffic situations and to support pro-active traffic management decisions.

Information services for safe and secure parking

Austria has invested significantly in the expansion of secure and safe parking spaces along its major highways. As of the end of 2011 over 4700 parking spaces in safe areas have been provided and are communicated by ASFINAG (http://mobile.asfinag.at).

To improve the services provided to truckers, the degree of utilization of available parking places for heavy good vehicles (HGV) has been in operation since 2010 in the Linz and greater Wien area. It covers BA Corridor specific sections on the A2 South Motorway, and the S1 Wien Outer Ring Expressway.

The utilisation level of the HGV parking spaces is monitored by operators at the ASFINAG Traffic Control Centre in Inzersdorf. The information is displayed along the route by means of traffic control systems or changing text displays. If these are not available in a particular section, additionally installed information signs relay the status notices to the HGV drivers. The search for a parking space can also by assisted by the webcams of ASFINAG online.

European Cooperation & ITS Research Focus

Challenges common to all of the above described initiatives are data collection and integration efforts: crowd sourced information, cell phone data, data captured from vehicle based systems, data provided by monitoring devices etc. and ensuring a consistent, coherent and timely provision of the information requires R&D investments. Austria has recently funded and participated in projects in the area of

- Floating car data: in the model region Salzburg, FCD data is collected by participating fleets to provide real time location data (GPS) used to assess the current situation and provide forecast for the road network;
- Fusion of traffic and infrastructure data to improve the quality of the information obtained by combining different sources;
- Test the commercial, technical and organizational feasibility of collecting mobility data using smart-phones.

ITALY

The following ones are the priority intervention areas and actions identified in the five years action plan:

- Priority area 1 – Optimal use of road, traffic and travel data:
  - Priority Action 1: Databases on traffic and mobility information;
  - Priority Action 2: setting up of a Public Index of information on infrastructures and traffic;
  - Priority Action 3: Publication and deployment of certified information: new services;
- Priority area 2 – Continuity of traffic and freight management ITS services
  - Priority Action 1: to promote the setting up within logistics hubs of logistics platforms that are integrated and/or interoperable with the National Logistics Platform UIRNet;
  - Priority Action 2: to promote the use of ITS for the multimodal management of transport and logistics, in accordance with open and interoperable platforms;
  - Priority Action 3: to promote the use of ITS for the management of passenger mobility from a multimodal perspective (considering local public transport, private vehicles, alternative transport vehicles) in accordance with open and interoperable platforms;
  - Priority Action 4: to guarantee the continuity of services on the national network and along borders;
  - Priority Action 5: to promote the adoption of integrated and interoperable electronic ticketing for the payment of local public transport services;
  - Priority Action 6: to promote the use of ITS in local public transport;
  - Priority Action 7: enabling conditions for smart mobility in urban and rural areas;
- Priority area 3 – ITS road safety and security applications:
  - Priority Action 1: Development of the national eCall system;
  - Priority Action 2: to set up a Telematics archive of motor vehicles and trailers that are not covered by third-party insurance;

  - Priority Action 3: Deployment of ITS systems for the management and monitoring of hazardous freight;
  - Priority Action 4: Use of on-board devices that record vehicle activities (black box) for the extension of ITS services;
  - Priority Action 5: Promoting the deployment of enforcement systems;
  - Priority Action 6: Development of security services in local public transport and in transport hubs;
  - Priority Action 7: Promotion of advanced on-board systems:
- Priority Area 4 – Linking the vehicle with the transport infrastructure;
  - Priority Action 1: Monitoring the status of the infrastructure and of safe parking areas for freight transport;
  - Priority Action 2: Checking compliance with safety requirements in the haulage sector and vehicle speed;
  - Priority Action 3: Technical specifications and standardisation for the link between vehicles (V2V) and between vehicles and infrastructure (V2I) for cooperative driving;
  - Priority Action 4: Monitoring the status of the road infrastructure under adverse weather conditions and for maintenance purposes.

SLOVENIA
According to the transposition of Directive 2010/40 EU, a framework for the deployment of ITS in road transport and interfaces to other transport modes is provided. In accordance with the first paragraph of article 18 of Directive the member states must accept the legal and administrative provisions and regulations, which are necessary for the implementation of Directive. Complement of the Roads Act (ZCes-1), (Official Gazette of R.S., No. 109/2010, No. 109/2010, 48/2012) in the Slovenian legal order introduces Directive and creates framework for the deployment of intelligent transport systems (ITS) in Slovenia.

Directive empowers the European Commission to issue specifications as delegated acts. Member states are not obliged to introduce applications and services of intelligent transport systems on its territory, but if you decide to start, it must be in accordance with the specifications. With this document is to be achieved primarily to the specifications issued by the Commission, to develop a legal effect, whereby it is imperative to deal with the introduction of ITS. Directive 2010/40/ES is the framework guideline, which does not contain an obligation on member states to implement applications and services, and basically prescribes what mandatory in the event of the introduction, but only draws attention to the specification, which will be published by the Commission in the future.

In addition, the Roads Act governed by changes in the valuation of particular services and road safety evaluators in the competence of each body for action in the event of roadblocks and in making of investment documentation for projects that do not significantly affect the environment. They are also set basic questions regarding the establishment of the National Traffic Management Centre (in Slovene: NCUP). In this way, there was a beginning of operational procedures for the deployment. For the implementation of the legislation are competent Ministry for Infrastructure and Spatial Planning, Slovenian Road Agency and DARS d.d. (as national motorway operator and concessioner), Administration of the RS for Civil Protection and Disaster Relief ACPDR and Police, what will lead to centralisation and consolidation of services. Focus is laid on implementations with European dimension in order to ensure the efficiency in resource allocation using synergies and the European dimension assuring implementations at national level in a consistent way along the corridor.

Traffic control system (TCS) is currently implemented on 80 kilometres (fully covered by ITS services) of Slovenian motorways with plans to extend it to all critical road sections, 180 out of 600 kilometres of Slovenian motorway network.

Planned ITS activities for the period 2014-2030 regarding the implementation of ITS on state roads are:
- National Centre for TM Setup (NCUP);
- Upgrade of TIS Kažipot;
- Upgrade of ITS systems in tunnels;
- Upgrade of ITS on critical sections;
- Upgrade of traffic control and management centres;
- Cross-border cooperation and data exchange;
- Interfaces to urban areas and other transport modes (multimodality).

The initiatives are expected to be funded by the following sources: TEN-T, State (MZIP, DRSC, MO, and MNZ), Other sources (DARS). The investment costs is estimated at 200 € million (Estimated 12.5 € million per year based on past and current investments).

B.2.6. ICT for developing a smooth flow of information

Advanced Rational Multi-modal Transport and Evaluator Information System (ARTEMIS)

The Marco Polo Artemis action was conceived for evaluating, comparing and optimizing modal or multi-modal transport operations across Europe in view of the EU Corridors strategy. It could be classified as "a multimodal freight transport planner" (according to annex to CEF Annual work program 2014).

ARTEMIS is a web portal system allowing rationalising, improving and optimising working methods and procedures in the freight transport chain. The system is capable of considering and evaluating real logistic constraints, such as: availability of the transport services, routing times, schedule delivery plans, customer delivery and distribution requirements.

It weights the different possible alternatives in terms of performance, cost and environmental impact, and identifies, if required, the optimal solution according to previously stated criteria in comparison to other less competitive solutions. Advantages and disadvantages of alternatives are not only related to the internal costs of transport operations (i.e. door-to-door delivery time and shipment costs), but also to the external ones, being possible to identify the less impacting solutions with reference to environmental pollution. The system allows a complete mapped reporting of routing paths on the entire European network.

Whilst the initiative and pilot was very welcomed and appreciated by the numerous involved stakeholders including operators and infrastructure manages of the wider intermodal logistics chain, turning the system into a permanent tool is challenged by the need for updating in a continuative manner the system data base.

This critical aspect of this as well as other similar projects and initiatives, may be mitigated by the TEN-T Corridor approach possibly facilitating the funding as well as the coordinated development and maintenance of shared databases.

B.3. Promotion of intermodality and sustainable transport

B.3.1. Development of ports and logistic nodes

Ports are seen as a key component of the Core Network Corridors. They represent the gateway to the links and other nodes of the BA Corridor and an important element for the development of intermodal transport. In addition to ports rail-road terminals are also an essential infrastructure of the intermodal logistics chain.

Relevant investments at Ports are foreseen in the list of investments included in the BA Corridor work plan described in the following sections below, either supporting the development of Motorways of the Sea related infrastructures and services, as well as container or multipurpose terminals, all of them requiring adequate last mile quality connections or being the pre-condition of additional investments on the links of the corridor to increase network capacity or technological upgrading.

In this section we provide a review of the studies and implementation initiatives that have already received co-financing during the period 2007-2013, regarding the expansion and improvement of port infrastructures and rail road terminals.

Motorways of the sea

Transport White Paper of September 2001, the Commission proposed the development of "Motorways of the Sea" as a "real competitive alternative to land transport." To help these lines develop, the White Paper states that European funds should be made available. Motorways of the Sea are part of the Trans-European network (TEN-T) since 2004.

Ro-Ro and Ro-Pax services are already operated at all BA Corridor seaports; Ro-La services are also operated at Trieste.

Motorways of the Sea has supported a variety of projects and initiatives, not just related to infrastructure development but also to the promotion and use of Ro-Ro, Ro-Pax and Ro-La services as an intermodal, more sustainable alternative to road transport, particularly regarding the freights. We provide below some examples of co-financed initiatives:

- Strategic project for the development of the accessibility and hinterland connections from the port of Venezia to the TEN-T network (2010-2011; on-going). The Action is part of the Three-Year Operational Plan 2008-2011 (POT) approved in September 2008 by Venezia Port Authority. The priority objectives of the POT are the development of port infrastructures, including the creation of proper maritime access, the expansion of port areas and the improvement of hinterland connections. Some of these priorities include the conversion of the former Marghera industrial areas in new port and logistic infrastructures, the development of the Motorways of the Sea along the Adriatic Corridor and the development of inland waterways. To reach the objectives of the POT the Port of Venezia has launched a number of projects already supported under TEN-T, Structural Funds and own/other funds;
- Baltic Link Gdynia – Karlskrona. The objective of the Action is to implement the Motorways of the Sea project in the Baltic Sea region through the ports of Karlskrona (Sweden) and Gdynia (Poland) as well as to connect the Bothnian Green Logistic Corridor in Finland – with the BA Corridor – as well as establishing the maritime route parallel to the Via Baltica. The project will reduce the amount of freight using the Northern European motorways and will diminish the related road congestion. The Action will deliver high quality Motorways of the Sea infrastructure and services by combining the rail and sea modes of transport in order to eliminate the existing bottlenecks and to create a seamless intermodal transport chain. The project's result is expected to be an increase in the intermodal share of the corridor from the current 3% to 10% in 2015 and 36% in 2025. The activities of the Action will focus on the following particular objectives, namely to: increase the train capacity for goods on the Scandinavian and Polish sides; eliminate inadequate intermodal capacity on the Karlskrona-Gdynia link taking an important step towards an intermodal transport chain connecting Scandinavia with central Europe and the Adriatic Sea; develop transport nodes in Alvesta, Karlskrona and Gdynia that will concentrate transport flows and achieve rail bound volumes that are economically

profitable; promote intermodal solutions on their respective markets that can mitigate road congestion, particularly in Germany; eliminate conflict of interest between freight and passenger trains between Gothenburg and Karlskrona/Kalmar on the coast-to-coast line in Sweden; offer a missing link to TEN-T corridors by further connecting the Baltic Sea in a North-South dimension; harmonise the IT systems between the ports and other operators by further developing the Stena Line e-freight platform and move towards single window;

- Baltic link Świnoujście – Trelleborg. The maritime link Trelleborg – Świnoujście includes existing and newly established RoPax transport services between two TEN-T category A seaports – Trelleborg as the most Southern gateway in Sweden and Świnoujście as a major maritime transport node of Poland. The shipping operators Unity Line/Euro Africa and TT-Line, who explicitly support this proposed Action, operate the two services building this European Motorway of the Sea maritime transport network component. In the context of a growing intra-European transport demand on the respective route (plus 6-7% on an annual average basis in 2006-2012), the freight volumes using the maritime links Trelleborg – Świnoujście have been growing higher than the market (plus 11% per annum since 2007) and further growth is expected. Therefore, adequate port capacity and efficiency improvements are urgently needed. From a Swedish perspective high quality maritime links leading via the Port of Świnoujście into Poland and further to other South / South–East European countries forms a sea bridge-connecting core network transport corridors Baltic-Adriatic and Scandinavian-Mediterranean. On the other side the port of Trelleborg in the entry point of Polish cargo towards the Nordic markets and European transport corridors in Scandinavia, respectively. Main objectives of the Action include enhancement of integration of the relevant European transport corridors, development of intermodal transport along the transport chains, fulfilment of mandatory requirements and improvement of the sea port access, improvement of accessibility and connectivity of ports hinterlands and increase of cooperation and communication amongst stakeholders;
- Adriatic Motorways of the Sea (ADRIAMOS); The Action aims at enhancing a viable, regular and reliable sea-based transport service integrated in the logistic chain along the Adriatic-Ionian transport corridor between the port of Venezia and the Ionian Sea/West Greece port cluster (Igoumenitsa and Patras). The Action consists in infrastructure and facilities investments (works and studies) necessary to remove bottlenecks and to improve efficiency of the logistic chain on the Adriatic-Ionian corridor. It intends to support the transport of trucks, unaccompanied trailers and cars by Roll on-Roll off (RoRo) and Ro-Pax ships between the North Adriatic area and the cluster of Greek ports of Igoumenitsa and Patras. In the Port of Venezia the intervention regarded the realisation of a new RoRo terminal at Fusina.

Other seaports development studies

Other examples of studies and initiatives aimed at supporting the development of intermodal infrastructure at Ports are the following ones:

- Elaboration of the design documentation for the modernization of the quays and dredging the fairway at the internal Port of Gdańsk (2013-2015; on-going) (PL). The project looks at economic, environmental and technical designs for upgrading the quay and dredging of the fairway in the inner Port of Gdańsk. They specifically concern seven quays, and the studies will deliver environmental documentation, materials required to obtain building permits together with building designs and work plans, as well as a tender dossier for future follow-up construction works. The studies aim to lay the groundwork for works to dredge the fairway to 12 m in order to improve both navigation and mooring/berthing conditions — including the fenders, sanitary system and fire protection devices. This will bring the quays up to standard and improve their efficiency and capacity, which will in turn increase competitiveness of the Port of Gdańsk and enable its continued development;

- Analysis of demand for throughput of railway junctions in Śląsk and Tri-city agglomeration: elaborated by UTK (Urząd Transportu Kolejowego – Office of Rail Transport, June 2014). Various stakeholders (cargo operators, ports authorities, container terminals, logistics operators and Marshal Offices) raised the critical issue of limited throughput in freight railway transport in two Polish nodes: Tri-city and Katowice, therefore an analysis of the situation, identification of bottlenecks and potential solutions was undertaken by the Office of Rail Transport;
  The conclusions regarding the connection to the Port of Gdynia and Gdańsk are provided as follows: Demand in the Tri-city node is expected to grow, mainly due to the development of ports (Gdańsk and Gdynia) but also taking into consideration the development of passenger connections. Current infrastructure modernisation (aimed at increasing traffic) is likely to increase railway transport competitiveness and contribute to increased demand for line throughput. Thus it is expected that bottlenecks can appear limiting further growth of freight and passenger transport on the line no. 202/9 (Gdynia/Gdańsk/Tczew) and line no. 201 (section Gdynia - Kościerzyna). It is noted that the feasibility study for modernisation of railway line E65 on the section Warszawa – Gdynia was elaborated in 2004 and it does not take into consideration the dynamic growth of ports of Gdynia and Gdańsk, whereas the port of Gdynia almost doubled its transhipment indicators in the last decade and Port of Gdańsk grew by almost half. This situation results mainly from the fact that 4 container terminals are located in these two ports. Further growth of transhipment is expected, which will also arise from the development plans of the terminals. In addition to the expected freight growth, passenger traffic increase is also foreseen for the agglomeration origin as well as for long distance traffic. Another critical issue mentioned in the study is high diversity of speeds achieved by different types of passenger and freight trains as well as different number of stops. Due to the fact that according to Polish railway legislation, passenger trains are "privileged" during time-schedule settlement over freight traffic, the long distance international trains will constitute priority, so competition among different railway traffic is expected. Therefore, it is necessary that the above mentioned railway line modernisations are carried out. The Office of Rail Transport proved necessity for the coordinated and coherent actions aiming at modernisation of the complete length of line no. 201 to Maksymilianowo, including electrification, construction of additional tracks and rail stations network;
- Accessibility of Port of Gdynia by railway transport – diagnosis of problems and recommendations for assuring the appropriate throughput of the connection: elaborated by TOR (March, 2014) The aim of the study is to identify the most relevant problems occurring or expected to impact on the throughput of railway lines towards Port of Gdynia as well as to recommend solutions to overcome the identified problems. Three railway lines connect the Tri-city, each of which suffering from limited capacity:
  - Railway line no. 9 (Warszawa Wschodnia – Gdańsk Główny) strongly affected by passenger as well as freight traffic;
  - Railway line no. 201 (Nowa Wieś Wielka – Gdynia Port) on most of the section not electrified, connecting Tri-city and Bydgoszcz agglomeration; constitutes alternative route to the line 202 / 9 / 131 (Gdynia – Gdańsk – Tczew – Maksymilianowo / Bydgoszcz);
  - Railway line no. 202 (Gdańsk Główny – Stargard Szczeciński), electrified and single track on most of the section, strong use by passenger traffic but also by freight traffic.

  The conclusions of the study are similar to those concluded in the "Analysis of demand for throughput on railway junctions in Śląsk and Tri-city agglomerations" described above;
- Potentials and perspectives for the new intermodal services via the Port of Gdynia: elaborated as part of SoNorA project. The study presented a large potential of trade exchange between Scandinavian and SoNorA countries and thus perspectives for the

Port of Gdynia to handle it. Successful accomplishment of modernization of railway lines E-65 and CE-65 will allow to increase the speed at the Polish section to about 120km/h, which, in case of time differences in comparison to road transport, will make the transport time to SoNora countries shorter and the intermodal transport offer more attractive. Further development of maritime lines in the Port of Gdynia and accomplishment of the port infrastructure development plans presented in the study will increase the share of Gdynia in handling of transit cargo between Scandinavia (Finland, Norway and Sweden) and Central and Southern Europe (Wien, Bologna, Koper). The above-mentioned modernization works shall significantly improve the competitiveness of Polish railway transport and especially intermodal transport, which presents the most requirements in terms of quality and transport time. The analysis of trade exchange among Scandinavian (Norway, Sweden and Finland) and Central and Southern European countries (Czech Republic, Slovak Republic, Ukraine, Hungary, Austria, Italy and Slovenia) proves that the trade is relatively big;

- The implementation of logistic functions as an opportunity for development of the port of Świnoujście, the intermodal base influence on the development of the Port of Świnoujście: the Study was commissioned by the Szczecin-Świnoujście Port Authority JSC in the framework of the SoNorA Project (December 2010). It indicates the important conditions necessary for intermodal transport development in Europe. The European intermodal market segments are described and their growth factors are defined. Especially, the conditions for a new sea-land intermodal connection and the EU concept of "Motorways of the Sea" (MoS) are discussed in the study. The current state of intermodal transport services in Poland is described. The study shows the main strengths and weaknesses of the Polish intermodal market. The brief description of the development of intermodal transport in the period of 2000 - 2010 is divided into rail-road and sea-land intermodal operations. Further, the development of intermodal infrastructure in Poland is shown. The focused area of the study is the assessment of the development potential of the intermodal rail connections linking the Świnoujście Ferry Terminal with its hinterland, preceded by the analysis of: cargo flows serviced by this terminal, the TEN-T network in the North-South direction and the existing intermodal terminals in the focused area. The objective of this study has been to analyse the possibilities of development of logistic functions at the Świnoujście Ferry Terminal, Especially, to analyse the possibilities of servicing intermodal railway lines connecting Sweden with Central and Eastern Europe as well as the Balkans. Additionally, the influence of an intermodal terminal on the development of the Port of Świnoujście has been analysed. These objectives are consistent with the key aims of EU transport policy:
  - The aims of the "Transport Policy – Time to Decide";
  - The aims regarding better connections between different TEN-T systems in the Baltic Sea Region;
  - The aims regarding greater cohesion between new and old EU members;
  - The aims of the concept of "Motorways of the Sea" in the Baltic Sea Region;
- Future Socio-Economic Effects of the Deepening of the Szczecin-Świnoujście Fairway to 12.5m Study. As concluded in the study, public investments in technical, especially transport infrastructure should not be subject of one-dimensional economic effectiveness analysis, mainly because the investor is not directly beneficiary of such investments, it does not gain revenue from costs incurred. Society is the factual beneficiary. Benefits resulting from deepening of the Szczecin-Świnoujście Fairway will occur in households, enterprises, local government units, wherever the gross domestic product arises. Growth of income of these beneficiaries results in growth of taxes and indirectly macroeconomic benefits. Shortening of time was concluded as relevant economic factor for investment undertaking, as well as contribution towards development of transport corridors, especially connecting Scandinavia with Southern Europe. This type of investment will undoubtedly also

contribute to reduction of negative impact of transport on environment through changes in intermodal freight transport structure;

- Ravenna Port Hub: final detailed design and supporting technical analyses (2013-2015; on-going) (IT). The studies supported by this Action are part of a Global Project which concerns the overall development plan of the Port, and is linked to marine port infrastructure, side port infrastructure and port accessibility. The studies concern: dredging activities related to the front port area and to the main port canals achieving water depths varying from a minimum of 11.5 metres to a maximum of 14 metres, upgrading of at least 3,900 m of existing quays impacted by the proposed interventions, the construction of a new 600 metres long terminal container quay, and the upgrading of existing quays in the main port canal. This is supplemented by the necessary supporting technical analyses (environmental, archaeological, geological and geotechnical). The ultimate aim is to develop the Port in order to maximise its potential with regard to the evolution of maritime traffic by creating the necessary infrastructure to handle larger vessels and higher traffic volumes. This in turn will allow for improved port capacity along with other have significant socio-economic effects in the region;
- NAPAPROG - Acceleration of the terminal and multimodal facilities in the port of Koper towards an integrated North Adriatic Port system (2013-2015; on-going) (SI). The partners of the NAPA closely cooperate to increase the potential, the quality and the efficiency of the Northern Adriatic ports, transport infrastructures and related services. The Global project focuses on further developing the traffic and strengthen the role of North Adriatic region as an alternative gateway for cargo directed to Central and Eastern European markets. The proposed Action tackles concrete needs defined on the ports' infrastructure side in terms of improving terminals' facilities. The Action includes studies necessary for starting further works regarding the increase of the Koper port's (Slovenia) capacities, as well as strengthening freight co-modal transport supporting the transport route via the Southern gateway to the hinterland markets. This will contribute to the goals of NAPA, promoting the efficiency of the port's services and improved capacities in order to gain competitive advantages using North Adriatic port system: by extending the Container terminal in the port of Koper (based on the prolongation of Pier I).

In addition to the above mentioned studies, another relevant project is worth mentioning:

- Study of potential and spatial conditions for functioning of Green Transport Corridor on the North – South axis of Poland, elaborated by Actia Forum (April, 2012). The following key conclusions including critical issues were developed as a result of this study:
  - Lack of a coherent motorway and express road network constituting a basic complementary network;
  - Investments implemented on the remaining national road network are scattered and reflect the local need of specific Voivodships and financial constraints;
  - The technical condition of national road surface (other than motorways) is diverse, it is thus necessary to intensify the investment activities aimed at its improvement;
  - Railway infrastructure from the functional point of view is not entirely aligned with the requirements of the freight market;
  - High diversity of freight train speed is evident, which negatively affects travel time and elasticity of performed services;
  - Investment activities are concentrated on railway line E65, Gdynia – Warszawa, which is mainly used for passenger traffic;
  - Some revitalisation works are on-going on line no. 131 (CE65), which is aimed at increasing the maximum allowed train speed.

Currently the following Polish container terminals are listed among the largest: Deepwater Container Terminal Gdańsk (DCT), which achieved 48% of market share in 2011, followed by Baltic Container Terminal (BCT), Gdynia Container Terminal (GCT) and Gdański Terminal Kontenerowy (GTK). These terminals served 1.288.041 TEU in total in 2011, which equates to their average capacity usage at a level of 83%. In practical terms this means that development investments are needed, which are in fact planned in the case of almost all of the container terminals.

Other studies for the development of inland ports

The following study is worth mentioning regarding the expansion of the tri-modal inland Port in Wien:

- Studies for the expansion of the trimodal Port of Freudenau/Wien (2013-2015; on-going) (AT). Freudenau Port of Wiener Hafen, Gmbh & Co KG, a crossroad for international flows and transhipment between inland waterway, rail and road transport, is the only trimodal logistics location in the Greater Wien area. The proposed Action consists of studies aiming to plan and design the expanded Port of Wien Freudenau. The studies specifically look at extending the container handling capacities of the port. The Action includes all the necessary steps from preliminary planning to obtaining the building authorisations and publishing the works tenders. Works are currently on-going, also co-financed by the TEN-T.

For Poland the following study is relevant from the perspective of IWW Port in Szczecin:

- New transport opportunities arising from modernisation of Szczecin – Berlin Inland Waterway: challenges and development opportunities for port of Szczecin as an important nodal point for intermodal transport services; elaborated under SoNorA project. This study is aimed at an analysis of possibilities to increase the inland waterways’ share in the transport service to the port of Szczecin, in conjunction with modernisation of hydro technical development and improvement of the Szczecin-Berlin waterway. The scope of the study covers the inland waterways of the boundary and lower sections of the Odra River, as well as the Odra-Havel Canal together with its extension, i.e. the Hohensaaten-Friedrichsthaler-Wasserstrasse. According to the study analysis, service to the port of Szczecin by inland waterways navigation is limited, especially by deteriorating navigation conditions on the Odra River, low bridges on the West Odra River and on the Regalica River, meteorological conditions (specially wind and undulation) and simultaneous movement of sea and river going vessels on the Szczecin-Świnoujście fairway running through the Szczecin Lagoon, charging the inland waterway fleet with dues for usage of port infrastructure, difficulties encountered by barges in the port of Szczecin. Together with the improvement of exploitation parameters there wider involvement of navigation in container transport, which shows the biggest increase in turnovers of West European ports, should proceed. The improvement of the exploitation parameters of the Szczecin-Berlin waterway is expected to contribute to taking over of a significant mass of cargos from Berlin agglomeration, shifting some cargos from road and sea, in the Germany-Baltic States relations, to inland waterways navigation and stimulation of transport between Hamburg and Rotterdam ports and Szczecin and Świnoujście ports.

Other investments at rail-road terminals

The following studies are worth mentioning regarding the construction of two new rail-road terminals on the BA Corridor:

- Terminal Wien Inzersdorf. The action aims to develop the planning stage of an intermodal nodal point for freight transport consisting of facilities for combined transport, facilities for part-load traffic and facilities for conventional full load traffic including the required building, transport and operations facilities. The Inzersdorf terminal will be constructed in several development stages (modular implementation concept) according to the respective capacity requirements.

- Žilina Teplička Terminal. Žilina Teplička is a major Slovak marshalling yard in constant evolution since 2012. Adjacent to the marshalling yard a rail-road terminal is currently under development as a project of Železnice Slovenskej republiky (ŽSR) – national railway infrastructure manager with the support from EU Cohesion Fund. Once completed it is expected to be operated by Rail Cargo Operator - CSKD s.r.o. The terminal is to be completed during 2015 and it will be directly connected to the railway line on BA Corridor; the road connection will be via the road I/18 leading after 5 km to D3 motorway, also on the BA Corridor.

In addition to the above terminals the following four rail-road terminals are also worth mentioning, all of them under construction in Poland, their construction financed under the 2007-2013 OPIE: HHLA Intermodal Polska Sp. z o.o. in Kórnik (near Poznań), PKP Cargo – Poznań Franowo, HHLA Intermodal Polska Sp. z o.o. in Dąbrowa Górnicza (area of Katowice), HHLA Intermodal Polska Sp. z o.o. in Brwinów (near Warszawa) and one was recently opened: Container Terminal in Kąty Wrocławskie.

B.3.2. Promotion of alternative fuels

Alternative fuels are urgently needed to break the over-dependence of European transport on oil. Research and technological development have led to successful demonstrations of alternative fuel solutions for all transport modes. Market take-up, however, requires additional policy action.

LGN is considered one of the 'alternative clean fuels' which mean fuels such as electricity, hydrogen, biofuels (liquids), synthetic fuels, methane (natural gas (CNG and LNG) and biomethane) and liquefied petroleum gas (LPG) which serve, at least partly, as a substitute for fossil oil sources in the supply of energy to transport, contribute to its decarbonisation and enhance the environmental performance of the transport sector.

Regarding Maritime transport field, European Directive 1315/2013 states that Member States shall ensure the 'introduction of new technologies and innovation for the promotion of alternative fuels and energy-efficient maritime transport, including Liquid Natural Gas (LNG)'.

BA Corridor ports recognise the relevance of the important target set by the above directive; LNG implementation could be also implemented at Inland ports. Among the initiatives identified relating to the promotion of the use of alternative fuels the following TEN-T supported action is worth mentioning implemented in the Baltic Sea Ports, although not directly involving the BA Corridor Ports. This technology should also be applied by Inland Waterway Ports. At the present stage, except from the above initiative indirectly impacting on the Polish BA Corridor Ports on the Baltic we are not aware of other investments and studies concerning the implementation of LNG at sea or inland waterway ports subject of study. One of the projects included in the BA Corridor list of investments is about the construction of a new LNG terminal in Świnoujście, a facility to off-take and re-gasify liquefied natural gas; pipelines for the off-take of liquefied gas from ships shall be constructed, as well as LNG tanks and re-gasification facilities (planned to be handed over to operation by the end of 2014). At the beginning of its operation, it will not include facilities for the refuelling of vessels, however these are considered to be developed in the future, also allowing to contribute to the increase in number of LNG drive fleet, having in mind that Baltic Sea is a sulphur control area (EU Directive 2005/33/EEC and Emission Control Area).

The Regulation EU 1315/2013 also foresees availability of clean fuels at core network corridor airports by 2030; we are also not aware of initiatives on such developments on the BA Corridor at present.

LNG in Baltic Sea Ports

The aim of the proposed action is to develop a harmonised approach towards LNG bunker filling infrastructure in the Baltic Sea region. By sharing knowledge between 7 Baltic partner ports (Aarhus, Helsingborg, Helsinki, Malmö-Copenhagen, Tallinn, Turku, Stockholm) from 4 countries and their stakeholders, a more standardised process for planning and constructing LNG infrastructure shall be achieved.

The proposed action builds on previous activities and foresees pre-investment studies directly preparing for investments in LNG bunkering infrastructure in the ports. The actual infrastructure investments will be made at a later stage.

In addition, a stakeholder platform will be initiated to gather the key actors from the Baltic Sea but also from the North Sea around the same table and secure dissemination of the project process and results. The participating ports will build on existing knowledge in the field and will share their experience and findings. The practical outcome of this cooperation will be a guidebook that will function as a benchmark for other ports and stakeholders and for other regions in Europe.

The project is expected to contribute significantly to the implementation of the Baltic Sea Strategy (COM(2009)248) which underlines that the Baltic Sea region should turn into a model region for ‘clean shipping’ and a range of measures should be aimed at reducing the environmental impact of maritime transport.

The project is expected to be finalised by December 2014. The activity taking place in Helsinki, Stockholm and Copenhagen-Malmo have been completed. The activities in Turku and Tallinn will most probably be completed with a limited scope due to delays in procurement and other administrative reasons. Activities for the continuation of this initiative are also on-going at present; LNG in Baltic Sea Ports II is likely to see a major involvement of the Polish BA Corridor ports on the Baltic.

B.4. Horizontal issues

The TEN-T Regulation EU 1315/2013 also sets standards and targets with reference to issues that are not specific to transport modes or nodes, and can rather be considered horizontal for their implications on more modes of transport and intermodal nodes:

- Art. 34. Member States shall give due consideration to ensuring that transport infrastructure provides for safe and secure passenger and freight movements;
- Art. 37. Transport infrastructure shall allow seamless mobility and accessibility for all users, in particular elderly people, persons of reduced mobility and passengers with a disability;
- Art. 38 (1). The core network, […] shall reflect evolving traffic demand and the need for multimodal transport. It shall, in particular, contribute to coping with increasing mobility and ensuring a high safety standard […].

At this stage we are not aware of dedicated initiatives specific to horizontal issues, whilst it can be confirmed that the prescriptions in the directives are taken into consideration in the design and implementation of projects related to the development of the BA Corridor infrastructure.

For a more systemic development of the core network corridor infrastructure in compliance with the TEN-T Regulation and relevant EU Directives, particularly regarding the prescriptions in art. 37 and 34 it may be useful undertaking specific actions aimed at classifying and monitoring the implementation of standards and KPIs of existing and future infrastructure on the Core Network Nodes and services. Such actions may be coordinated at the level of the BA Core Network Corridor if not on the entire Core Network infrastructure.

Actions aimed at systematically collect, monitor and process traffic data along the Corridor, including market surveys, may be also identified, aimed at supporting the coordinated identification and prioritization of investments along the corridor regarding the need to increase capacity. Classification, monitoring and reporting of accidents and other related safety and security issues, may also be considered for the implementation and prioritization of technological improvements projects.

B.5. Feasibility and project implementation studies

The analysis of the feasibility and design studies of the infrastructure belonging to the BA Corridor is particularly relevant for the description of the critical issues affecting its development and the proposed solutions. A number of feasibility studies have been taken into consideration to comment on the analysis of the status and development of the BA Corridor links and nodes infrastructure. Studies for the development of intermodal infrastructure at Core Network Corridor nodes, including ports and railroad terminals have been already commented in the previous section dedicated to intermodality. In this section we focus on railways and road infrastructure, including cross-border sections. Feasibility and project implementation studies have been also recalled and commented in the description of the BA Corridor links and nodes in Appendix B to this report. More studies regarding the feasibility and implementation of the infrastructure belonging to the BA Corridor alignment are listed in Appendix B. The references reported in this section focus on the infrastructure commented in Section 4.4 on the critical issues affecting the implementation of the BA Corridor as a continuous interoperable infrastructure supporting long-distance cross-border intermodal traffic flows:

Rail infrastructure

- Feasibility Study for cross-border section Kędzierzyn-Koźle - Chałupki – State border (PL/CZ);
- Feasibility Study for cross-border section Czedchowice-Dziedzice – Bielsko-Biała – Zwardoń – State border (PL/SK);
- Modernization of corridor, state border CZ/SK- Čadca-Krásno nad Kysucou (outside) railway track (2009-2011; closed) (CZ/SK). This project involves studies for the modernisation of the Čadca-Krásno nad Kysucou rail section. The 15.5 km stretch is located in the Northern part of Slovakia, close to the border with the Czech Republic and Poland. The modernised electrified single track is designed for a maximum speed of 120 km/h and is expected to serve both passenger and freight trains. A new tunnel design is also included in the project. Completion of these initiatives aims to increase passenger and freight transport capacity, improve train speed and optimise the efficiency of the existing infrastructure. The project encompasses the two following activities: Environmental Impact Assessment (EIA) and documentation of construction permit, including delivery of documentation for the territorial decision;
- Cross-border Railway Line Trieste/Divača: study and design of the Trieste-Divača-Ljubljana-Budapest-Ukrainian Border (2008-2013 – on-going) (IT/SI): A first alignment parallel to the coastal line was developed at feasibility study level in 2008 (financed under INTERRG III A 2000-2006). However, the study showed that this alignment would have resulted in a considerable impact as far as karst geology and hydro-geology were concerned and, for this reason, the Italian authorities proposed to abandon it. In January 2011, agreement was found on a new alignment which runs through the karst highland in places where the presence of underground caves is lower compared to the 2008 solution. For this new alignment, known as the "high corridor", three different solutions were studied on the Italian and Slovenian side, all running not far from the route of the existing railway line which connects Bivio di Aurisina to Opicina, Sežana and Divača. At the end of June 2011, Italy and Slovenia decided on one optimised alignment for which the preliminary design will be elaborated by the new project promoter. The setting up of the organisational structure for the Trieste-Divača corridor, taking the form of a European economic

interest grouping (EEIG) were agreed in 2012 and the signature of the EEIG's statutes took place in May 2013. The elaboration of the preliminary design and other preparatory works required for the adoption of the National Spatial Plan on the Slovene section of Trieste-Divača line is on-going;

- Feasibility Study for the Modernisation and Extension of the Katowice Railway Junction (2010-2012; on-going) (PL). The Feasibility Study will help to determine modernisation variants for the partial projects defined in the first stage of the Global Project. Implementation of the tasks covered by the Action will form the basis for the completion of the pre-investment phase and commencement of the elaboration of design documentation with a view to acquire construction and detailed designs for works as well as the necessary administrative decisions (environmental decision, zoning decision, building permit); and subsequent construction works. The completion of the Action shall contribute to the development of the TEN-T network along the BA Corridor;
- Modernisation of the railway line Warszawa Włochy - Grodzisk Mazowiecki preparatory works (2013-2014; on-going) (PL). The proposed action concerns the elaboration of the documentation (construction designs, tender documentation, etc.) required for modernisation works on the railway line 447, section Warszawa Włochy - Grodzisk Mazowiecki (24 km). The completion of the action will contribute to increasing the capacity of the BA Corridor in a densely populated area of the country;
- Upgrading Railway Púchov-Žilina to 160 Kmh (2005-2009; closed) (SK). This project involved studies for upgrading the railway track Púchov-Žilina to a speed of 160 km/h, increasing passenger and freight transport capacity and optimising efficiency of the existing infrastructure. The design of two tunnels (Diel, Milochov) is also included in the project. The project encompassed the following activities: Drafting of preparatory study for state expertise, including documentation for territorial decision;
- Construction of a rail bridge at Stein, crossing river Drau (2013-2015; on-going) (AT). The Action fits into the Global Project of the BA Corridor on Austrian territory that includes the new Koralm railway line linking Graz and Klagenfurt. It consists of the construction of a railway bridge at Stein, crossing the Drau River. This 0.7 km long two-track line interconnects two tunnels – Lind (West) and Stein (East). The works encompass the construction of the bridge's foundation (including pillars and abutments), the support structure and equipment;
- New Venezia-Trieste High-Speed Line (IT): High Speed rail tracks are included in the TEN-T core passenger corridor between Venezia and the border with Slovenia. A detailed design of the new line has been completed in 2010, but the timing of the project implementation is currently not foreseen in the short/medium term, due to the high cost and environmental concerns. A new design is under study, envisaging the quadrupling of the existing line. As short-term initiatives, the improvement of the conventional line is currently under consideration: Mestre node (Linea dei Bivi), speed increase and the removal of level crossings between Mestre and Trieste;
- Bologna High Speed Junction towards Venezia (2012-2014; on-going) (IT). The Action envisages the construction of a new double-track rail stretch of an overall length of about 4.2 km. It will link the Bologna High Speed/High Capacity (HS/HC) underpass to ensure a smoother connection with the line to Venezia;
- New line Divača – Koper (SI). The modernisation of the existing track is at its implementation phase. Works are underway and expected to be finished by the end of 2015. For the new line, the project documentation and studies have been prepared, with funding from TEN-T budget. The construction of the railway line is envisaged to be co-financed by the EU within the new Multiannual Funding Framework 2014-2020;
- Working out of preliminary studies for the construction of the new line of high capacity/high speed Divača - Ljubljana and Ljubljana - Zidani most (2009-2011; on-going) (SI). This project, part of the Mediterranean Corridor aims to prepare the

necessary investment documentation for the spatial and project planning of the construction of the new Divača-Ljubljana high capacity/high speed line (160-250 km/h);

- Elaboration of the Executive design for upgrading of the section of the railway line Poljcane – Pragersko (2011-2012; closed) (SI). The Action covers the elaboration of i) the Project Design for the acquisition of the Building Permit and ii) Executive Design for the upgrade the Pragersko railway station, which is an important railway traffic hub situated at the double-track Zidani Most–Pragersko–Maribor–state border line;
- Elaboration of the Project for Building Permit and Executive Design for the arrangement of a hub by upgrading the Pragersko railway station (2013-2015; on-going) (SI). The Action covers the elaboration of i) the Project Design for the acquisition of the Building Permit and ii) Executive Design for the upgrade the Pragersko railway station, including track devices;
- Execution design for upgrading the existing main double-track electrified Zidani Most-Celje railway line (2013-2015; on-going) (SI). The action covers elaboration of the Executive design for upgrading the existing main double-track electrified Zidani Most–Celje (25 km) railway line. Completion of the action will enable commencement of the works aiming at increasing the speed and axle load of trains (to 225 KN/axle) as well as ensuring interoperability and security of the railway traffic;

Road infrastructure

- Motorway D1 (earlier D47 section 47092) Bohumín - state border Czech Republic / Poland (2009-2012; closed) (PL/CZ). This project follows a governmental agreement between Poland and the Czech Republic to connect the respective Polish A1 and Czech D1 motorways. It aims to construct section 47092 of the Motorway D47, renamed to D1 after works end within the municipalities of Bohumín and Dolní Lutyně near the Polish border. The project included works for one interchange (MÚK Bohumín), two diversions of primary roads ("category I") and five diversions of "category III" roads, nine motorway bridges, 13 other bridges and relocation of some roads and service utilities. This project is in operation for car use since November 2012 and for freight transport vehicles since May 2014.

B.6. Infrastructure investment plans

The project fiches of the investments currently planned by the national institutions and infrastructure managers on the BA Corridor alignment infrastructure as reported at Table 31 of this report is based on the consultation of the sources reported in the following sections.

B.6.1. Poland

The list of currently planned investments on the Polish section of the BA Corridor is based on the following sources of information:

- Implementation Document for Transport Development Strategy up to 2020 (with the perspective up to 2030) developed by the Ministry of Infrastructure and Development, dated September 2014 – hereinafter Implementation Document. The list of projects includes most of the infrastructure components of the TEN-T network (rail, road, maritime, inland waterways road) which are deemed relevant at the EU and/or national level; the Implementation Document was approved by the Council of Ministries in September 2014;
- List of railway investments (limited to some specific corridor sections) planned for implementation during 2014-2020, provided by PKP PLK S.A. (Railway Infrastructure Manager) including overall objectives, total projects costs and time-schedule (broadly consistent with the Implementation Document);
- List of maritime investments along the BA Corridor planned for implementation during the period 2014-2020, provided by the Maritime Ports Authorities, Maritime

Office in Szczecin and City of Szczecin (broadly consistent with the draft of Implementation Document);

- List of airport investments along the BA Corridor provided by Airport Managers. The Operational Programme Infrastructure and Environment including relevant investments for airports is under preparation and finalisation at the stage of completion of this study; more investments and/or revision of projects already included in the list, may result from this process.

B.6.2. Czech Republic

The list of currently planned investments on the Czech section of the BA Corridor is based on the Transport Sector Strategies (2nd phase) (*Dopravní sektorové strategie, 2. fáze, www.dopravnistrategie.cz*), adopted by Czech Government in November 2013. Another source of information is the newly elaborated Operational Programme Transport 2014 – 2020 (*Operační Program Doprava 2014 – 2020,* Ministry of Transport) which was adopted by Czech Government in June 2014. The information was updated according to State Fund for Transport Infrastructure Budget 2015-2017 approved by SFDI board in July 2014.

The list of projects included in the document covers the project upgrading the railway and inland water infrastructure, completing the network of motorways and expressways and developing the bypasses of the towns lying on 1st class national roads.

The priorities for the construction have been defined by the national institutions according to their analysis of traffic needs and economy efficiency, based on the methodology guidance by the Ministry of Transport and EU institutions (DG Regio), and taking into account the current and foreseen available financial resources.

B.6.3. Slovakia

The list of currently planned investments on the Slovak section of the BA Corridor is based on the review of road, railway, air, water and urban public transport investments included in the Strategic Plan of the Development of Transport Infrastructure till 2020 (*Strategický plán rozvoja dopravnej infraštruktúry do roku 2020*) elaborated by the Ministry of Transport, Construction and Regional Development in July 2013.

The Strategic Plan was also the basis for the development of the programme for infrastructure development - Operational Programme Integrated Infrastructure 2014 – 2020 (*Operačný Program Integrovaná infraštruktúra 2014 – 2020*) containing most of the short and mid-term Slovak infrastructure development, as EU Cohesion and Structural funds are main financial sources for 2014 – 2020 period. The operational programme was adopted by Slovak Government in April 2014.

The list of projects included in the two above mentioned documents includes the development of motorways and expressways based on the TEN-T network, upgrade of railway infrastructure, public transport infrastructure, inland ports and rail-road terminals and airport development.

B.6.4. Austria

This review of currently on-going and planned investments on the Austrian section of the BA Corridor is based on the Investment Plan of the Austrian Railways (ŐBB Rahmenplan 2014-2019 and the Investment Plan of the Austrian Road Operator (ASFINAG Rahmenplan 2013-2018). It has been complemented by interviews with the major stakeholders, foremost ŐBB Infrastrukur AG, ASFINAG and the Austrian Ministry for Transport, Innovation and Technology.

A six year infrastructure financing plan ("ŐBB Rahmenplan"), agreed between ÖBB-Infrastructure, the Austrian Ministry of Transport, Innovation and Technology and the Austrian Ministry of Finance, defines the portfolio of projects to be realised. This "ŐBB Rahmenplan" is the basis for a contract signed between the three institutions. The contract enables ÖBB- Infra to raise capital necessary to implement the projects. The state guarantees for the loans. A significant part of the annuities repaying the loan is paid by the Ministry of Transport, Innovation and Technology. Concerning the road projects of ASFINAG in principle a similar approach is chosen, however the annuities to repay the loan are fully financed by incomes of ASFINAG.

All costs are expressed as "valorised costs", showing the costs that will be incurring at the time of the realisation of the projects. For the time being, costs at current prices are valorised by 2.5% p.a.

The long-term strategy for the development of railway infrastructure in Austria is shown in the target network in 2025 + (www.oebb.at/zukunftbahn). This strategy involves additional, projects for the development of railway infrastructure in Austria. The mentioned strategic projects have been approved by the national council of ministers, but have not been funded yet.

Railway investments
Completing the South-bound connection via the Semmering and Koralmtunnel are the two major construction undertakings.

Section connecting Gloggnitz and Muerzzuschlag – the Semmering base tunnel is budgeted with 3,122 € million. This amount covers expected costs up to 2025. The project comprises a twin tube tunnel; two track electrified sections and ERTMS capabilities. Work is already in progress and expected to be completed by 2024. Speeds of up to 230 km/h will be possible, reducing the travel time for long distance passenger services by 30 minutes.

Construction of section 401, Werndorf – Klagenfurt comprising the Koralm tunnel is in process and expected to be completed by 2023. A budget of 5,367.3 € million (2014 to 2025) has been committed to develop this ERTMS compliant, two track electrified section, allowing speeds of up to 230 km/h, and reducing average transport times by 150 minutes. The low inclination of the section is also expected to increase operational efficiency.

Wien's main railroad station will be completed by 2015. Total investment amounted to 1,014.9 € million (238.6 € million from 2014 to 2019). This new station constitutes a major Central European hub, as it serves not only the Baltic-Adriatic, but also the Orient- East Mediterranean and the Rhine – Danube corridors. Not only is it a catalyst for the Wien urban node development, but will also reduce the average transit time of passenger and freight by 30 minutes.

Other planned investments concern the cross-border section Bratislava (SK) – Wien (AT). Routing via Marchegg (ŐBB section 117), connecting Bratislava/Devínska Nová Ves with Wien running North of the Danube: Plans call for commencement of work in 2015 to expand it towards a two track, electrified link on the Austrian side of the cross-border section. The project includes a second track in the Wien area (up to the Aspern airfield) as well as an expansion of the railroad station Marchegg. Costs for the period from 2014 to 2019 will account for 169.6 € million. Further investments (Zielnetz 2025+) in the order of approximately 380 € million are planned as part of „Zielnetz 2025+" to increase the capacity between Aspern and Marchegg as well as to allow trains speeds of 160km/h.

Wien-Wampersdorf (106) „Pottendorf Linie" will be upgraded from a single track to a two track electrified section with ERTMS level 2 by 2024. The section Blumenthal – Münchendorf will be ready by 2020; work on section between Müchendorf and Wampersdorf will commence in 2017. The total cost of this project is 871.8 € million. As a result of this investment trains will be able to travel at a speed of 200km/h. The construction of terminal Inzersdorf is budgeted with 300.3 € million.

Section 119, a single track electrified connection between Gramatneusiedl and Wampersdorf is part of the core network; however as capacity is considered sufficient to meet expected demand, no investments to upgrade the infrastructure are planned in the period 2014-2019 until 2025.

Road investments. Construction works for section Schrick – Poysbrunn, A5 Nordautobahn, will commence in 2014 and the motorway is expected to be in operation by 2016. The works for section Poysbrunn – national border CZ/AT (close to Drasenhofen) are expected to begin in 2016 and be finished in 2017.

The section Schwechat – Süßenbrunn is the only part of the S1 express road which is not constructed yet. It is intended to connect both nodes with a 19 km road section, including a Danube Lobau tunnel (8 km).

B.6.5. Italy

The list of currently planned investments on the Italian section of the BA Corridor is based on the following investment plans:

- National Programme of Strategic Infrastructure (*Documento di Economia e Finanza 2014. Allegato. Programma delle infrastrutture strategiche del Ministero delle Infrastrastrutture e dei Trasporti*), adopted by the Italian Government;
- Contratto di Programma Investimenti between RFI and italian Ministry of Infrastructure and Transport;
- Documentation provided by the National Highway Agency ANAS S.p.A.;
- Master Plans and Three Years Operational Plans of the Port Authorities of Trieste, Venezia and Ravenna;
- Master Plans of the Venezia Marco Polo and Bologna Guglielmo Marconi Airports.

In addition to the above plans, discussions with the stakeholders have been undertaken, including the regions, for a better definition of the list of investments included at Table 33 in the main report.

With reference to the list of investments at Table 33 of this report, the following projects are worth mentioning which have been identified in this study on the basis of the analysis of the plans of the concerned stakeholders, but which are not included in the BA Corridor list of investments as they are not listed in the relevant programmes of the infrastructure managers, owners of the infrastructure:

- Rail link interconnecting the Faenza-Granarolo-Ravenna railway line to the Faenza-Rimini railway line, aimed to improve of freight traffic to/from Ravenna Port;
- Rail infrastructure infrastructure and interconnections between the Ravenna Port terminals and the national railway network, 45 € million;
- Additional rail investments to develop infrastructure at the New Container Terminal under development at the Ravenna Port and its interconnection to the national railway line;
- Upgrading of the junction between roads SS16 and SS 67 Ravegnana trough the realization of a new split-level roundabout;
- Improvement of road SS67 between Classe and the port area;
- Widening of the lanes from 3,25 m to 3,75 m. on the SS16 Classicana and completion of the interchange between the roads SS16 Adriatica and the E45 and Dismano street;

- New connection between the road SS 67 and the Bassette area including a by-pass on the Candiano channel.

The above initiatives are under consideration/analysis for their possible inclusion in future updates of this report or of the BA Corridor work plan.

In addition to the above initiatives an additional project is worth mentioning aimed at eliminating two level crossings on the railway line providing accessibility to the Port of Ravenna, of total value €70 million as included in the National Programme of Strategic Infrastructure (*Documento di Economia e Finanza 2014. Allegato. Programma delle infrastrutture strategiche del Ministero delle Infrastrastrutture e dei Trasporti*), adopted by the Italian Government. This initiative is deemed to be now partially covered by project included in the list of investments at Table 33 in this report identified with ID code IT96. This project relates indeed to the elimination of one level crossing along the refered line. The elimination of the additional level crossing is deemed to be included in the scope of project IT12 listed at Table 33, although the exact definition of the technical solution and costs are under discussion at present, which may lead to the identification of an additional initiative in the future by the concerned stakeholders.

In addition to the above initiatives foreseen to improve interconnection and intermodality at the Port of Ravenna, the following two projects have been also identified by the Emilia Romagna Region which may be relevant to improve last mile connection to the Bologna Airport: Upgrading of the Rastignano Node, 2nd phase (works related to Motorway North By Pass of Bologna) and Road rail node of Casalecchio di Reno (work related to Motorway North By Pass of Bologna).

Regarding the analysis of the Italian investments deemed relevant for the development of the BA Corridor, the Venezia-Trieste high speed railway line is worth pointing out, of total value of more than € 7 billion, which is not included in the list of investments at Table 33 because already foreseen to be implemented only after 2030.

B.6.6. Slovenia

The Ministry of infrastructure and spatial planning of the Republic of Slovenia is currently working on the "*National program on transport and transport infrastructure strategy*". The document is being prepared and efforts have been made to provide good basis for development of priorities.

Several investments are expected, mainly related to the railway network, the most important being the following:

- The modernisation of the existing track between Koper and Divača is on-going expected to be completed by end of 2015. For the second track, the project is prepared, the environmental impact assessment is completed and the majority of land (99%) was already acquired;
- Construction of new berthing facilities, extension of Piers, construction of port new entry and supporting infrastructure, construction of additional connecting infrastructure network within the port, passenger terminal infrastructure, arrangement of port's back areas, dredging of port's basins and port's accessing canals according needs, construction of new Pier III in Port of Koper;
- The project for Zidani Most – Celje upgrade of axle load is done and upgrade is on-going;
- A new project proposal called "Tivoli arch" is the idea to build 4 kilometres of railway track bypassing Ljubljana railway station.

All financial data included in the table are estimates

B.7. List of studies

A detailed list of studies is provided in the tables in the following pages, classified according to the categories in the table below. This appendix does not include the sources consulted for the elaboration of the list of investments included in the investments plans and commented at previous Sections B6.

Table B4 Classification of EU funded initiatives, studies and projects

Funding Source	*Number of Projects/Initiatives*
TEN-T *multicounty and country initiatives and projects*	68
MARCO POLO	24
DG REGIO *cross-border and transnational projects*	61
DG REGIO *projects included in regional programmes*	148
CORDIS	8

B.7.1. TEN-T initiatives, studies and projects

The table overleaf includes a detailed list of TEN-T studies regarding the infrastructure belonging to the BA Corridor, prepared by INEA and updated at spring 2014. The list does not include the initiatives supported following the last call under the 2007-2013 programme, which due to their very initial stage of implementation have been inserted in the list of investments.

Table B5 TEN-T Studies on the BA Corridor

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
EU Projects										
2007-EU-06030-S	Crossborder Railway Line Trieste/Divača : study and design of the Trieste-Divača-Ljubljana-Budapest-Ukrainian Border	Study	CRAIL	IT,SI	€ 100,500,000	€ 50,700,000	30/12/2008	31/12/2013	Ongoing	The project concerns the cross-border railway line section between Italy and Slovenia, which is the nodal point between the Eastern and Western parts of Priority Project 6 (railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukrainian border). It aims to increase the capacity of the existing railway corridor by creating a direct Trieste-Divača connection, complementary to the existing line. The project consists of studies looking to complete the design documentation necessary for the procurement phase, and eventually to the launch of the tender for the construction works. At a regional level, the project is very significant, as this new line will help to relieve road freight traffic congestion through the Alpine region. It also aims to capture a significant part of the traffic that is handled through Adriatic ports, namely Trieste and Koper. At the European scale, the new line will interconnect the freight traffic originating from Portugal and Spain with that of Central and Eastern Europe, thus contributing to increase the potentiality of economic growth.
2010-EU-21106-S	ITS Adriatic multi-port gateway	Study	MOS	IT,SI	€ 2,885,000	€ 1,442,500	01/04/2010	30/06/2013	Ongoing	The Northern Adriatic Ports Association (NAPA) has agreed to develop a study, including a pilot action, focused on the future deployment of Information and Communication Technologies (ICT) solutions enabling an efficient information exchange between the NAPA ports, including eventually the port of Rijeka, and all the actors involved in the intermodal transport processes. The ultimate aim of the study consists in the creation of a prototype of a common e-platform based on the development of a NAPA web portal for data sharing, integrated with enhanced NAPA port community systems and with an EDI application, in order to allow the interconnection among the ports' systems, according to common standards and technical requirements defined on the basis of a ports' process analysis. The prototype will be the first step of a more complex system with a view to extending the system performance step-by-step, towards the concept of "one-stop-shopping". At full capacity, the NAPA portal will be able to provide

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
										a wealth of information, facilitating and speeding up the completion of formalities, thus serving as an example for other EU port clusters.
2012-EU-91176-P	NAPADRAG - Improving nautical accessibility in the ports of Koper and Venezia towards an integrated North Adriatic Port system	Work	PORT	IT,SI	€ 12,880,000	€ 1,288,000	01/03/2013	01/02/2015	Ongoing	The Action refers to specific works at the basic port infrastructure in the Port of Koper and Port of Venezia. There is a need for dredging the ports' access canals and basins. Only by properly arranging the ports' basic infrastructure and getting all NAPA ports navigation capacities' on a similar level, the North Adriatic multiport system can capitalise on its strategic position and take optimal advantage of it. The Action will support the realisation of the TEN-T Priority Projects 6 and 21, and the realisation of the Mediterranean and BA Corridor within the new Proposed TEN-T Guidelines. The proposed Action consists of infrastructural works for the dredging in the ports of Koper and Venezia in order to improve their nautical accessibility and provide the maritime access with adequate capacity. More specifically the proposed Action consists in the following technical activities: • Port of Koper: works of dredging in Basin I to reach a suitable depth of – 14 m (1st phase) and to be dredged up to – 15 m (2nd phase) on the container terminal quay side (Southern side of Pier I) • Port of Venezia: works of dredging of the West Industrial Canal to reach the depth of – 11.8 m in the West.
2012-EU-94126-S	Preparatory studies and activities of organizational structures of Rail Freight Corridor 5	Study	CRAIL	AT,CZ, IT,PL, SI,SK	€ 3,608,000	€ 1,930,000	01/03/2013	31/12/2015	Ongoing	The aim of the action is to elaborate a study documentation contributing to the successful implementation of the provisions of the Regulation (EU) No 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight (the Regulation) regarding the Rail Freight Corridor 5 "Gdynia–Katowice–Ostrava/Žilina Bratislava/Wien/Klagenfurt-Udine–Venezia/Trieste/Bologna/Ravenna/Graz-Maribor–Ljubljana–Koper/Trieste". Proposed Action has a general aim to create organisational, technical and operational conditions to make Rail Freight Corridor 5 operational by 10th November 2015. This includes elaboration of the dedicated Transport Market Study and Implementation Plan, as required by the Regulation.
POLAND										
2004-PL-92602-S	Preparation of project "Modernisation of E59 railway line on section Poznan-Szczecin-	Study	CRAIL	PL	€ 3,600,000	€ 1,800,000	01/03/2005	30/09/2006	Closed	The scope of the project covers: • Feasibility Study • Environmental Impact Assessment and Preliminary Design • Elaboration of Application for EU financial resources • Tender dossier

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
	Świnoujście"									• Preparation of photogrammetric maps Completion of the global project (covering the current study phase and following construction phase) will contribute to the development of the TEN-T network in Poland, increasing the capacity of the important railway line. This will create a reliable rail alternative linking the Baltic Sea with the Czech Republic. Once completed, this project is expected to take passenger and freight traffic off the road.
2004-PL-92610-S	Feasibility study for a stretch of a toll motorway A1 Stryków - Pyrzowice, including traffic analysis.	Study	ROAD	PL	€ 2,000,000	€ 1,000,000	01/03/2005	31/12/2006	Closed	Completion of global project (covering the current study phase and following construction phase) will contribute to the development of Priority Project 25 (Motorway axis Gdańsk-Brno/Bratislava-Wien) on the TEN-T network in Poland. The scope of the project covers: • Elaboration of the feasibility study • Geological documentation Once completed, this global project will provide for a modernised and easy connection between the ports in Baltic Sea and the Southern part of Poland, as well as with the Czech Republic and Slovakia. It is also expected to create a valid alternative for international freight in order to decongest the Warszawa area.
2005-PL-92601-S	Feasibility study of modernisation of railway line C-E 65 Gdynia-Bydgoszcz-Karsznice-Pszczyna	Study	CRAIL	PL	€ 4,580,000	€ 2,290,000	01/11/2005	31/12/2007	Closed	The scope of the project covers: • Elaboration of the feasibility study on the modernisation of the railway line C-E 65 • Elaboration of Environmental Impact Analysis • Elaboration of photogrammetric maps for the design purposes and monitoring of realised activity Completion of the global project (covering the current study phase and following construction phase) will contribute to the development of the TEN-T network in Poland, increasing the capacity of the important freight railway line. This will create a reliable rail alternative linking the Baltic Sea with the Czech Republic. Once completed, this project is expected to take international freight off the road.

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2005-PL-92602-S	Design studies for construction and tender documents for Motorway A1 - Section Pyrzowice-Sosnica	Study	ROAD	PL	€ 7,000,000	€ 3,500,000	01/03/2006	31/12/2007	Closed	This project was one of the first steps in the realisation of a section of the Polish A1 motorway linking the cities of Pyrzowice and Maciejów in the highly populated Polish region of Upper Silesia. Specifically, the TEN-T co-funded study looked into the elements necessary to prepare for the construction of the motorway section, such as detailed designs, geological documentation, environmental analysis and road traffic organisation. Following the study's successful completion in December 2008, the work phase began in July 2009 and the new section of motorway is on target to open by mid-2012.
2005-PL-92603-S	Feasibility studies for S-1 expressway section from Kosztowy II interchange in Myslowice to Suchy Potok interchange in Bielsko-Biala PP 25	Study	ROAD	PL	€ 3,400,000	€ 1,700,000	01/03/2006	30/06/2007	Closed	Completion of global project (covering the current study phase and following construction phase) will contribute to the development of Priority Project 25 (Motorway axis Gdańsk-Brno/Bratislava-Wien) on the TEN-T network in Poland. The scope of the project covers following 4 activities: 1. Initial project concept 2. Documents for the opinion on the application of the decision on the road location 3. Documents for the application of the decision on the road location 4. Proposed division of properties needed for application of the decision on road location. Once completed, this project will provide for a modernised and easy connection between the ports in Baltic Sea and the Southern part of Poland, as well as with the Czech Republic and Slovakia. It is also expected to create a valid alternative for international freight in order to decongest the Warszawa area.
2006-PL-92604-S	Building implementation design and tender documentation for the Southern Bypass of Gdanks	Study	ROAD	PL	€ 3,500,000	€ 1,500,000	01/09/2006	31/12/2008	Closed	The scope of this action covers: • Elaboration of the building and implementation design along with the tender documentation • Elaboration of the technical-economical-environmental study • Elaboration of the programme-location documentation Completion of the global project (covering the current study phase and the following construction phase) will contribute to the development of the TEN-T network in Poland, thus increasing the capacity of the road network and reducing bottlenecks in the region. It is also expected that the completion of

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										this project will significantly promote the development of ports in the Baltic Sea.
2006-PL-92605-S	COMPLETE TECHNICAL DOCUMENTATION INCLUDING INITIAL STUDY, PROGRAMME AND LOCATION STAGE, BUILDING AND TENDER DOCUMENTS FOR THE CONSTRUCTION OF S-69 EXPRESSWAY BIELSKO BIALA-ZYWIEC-ZWARDON - SECTION PRZYBEDZA-MILOWKA	Study	ROAD	PL	€ 4,900,000	€ 2,400,000	01/01/2007	30/11/2008	Closed	The scope of the action covers: • Elaboration of the technical-economical-environmental study • Elaboration of the documentation for decisions of environmental conditions of the investment realisation • Elaboration of the feasibility study • Elaboration of the road programme concept • Elaboration of the materials for decision on road building consent • Elaboration of the building design • Elaboration of the tender documentation along with the implementation design, and • Author's supervision during construction and guarantee period Completion of the global project (covering the current study phase and following construction phase) will contribute to the development of Priority Project 25 (Motorway axis Gdańsk-Brno/Bratislava-Wien) within the TEN-T network in Poland, in principle by reducing the bottlenecks and increasing the capacity of the road connection in the region.
2006-PL-92608-S	PREPARATION OF PROJECT - MODERNISATION AND EXTENSION OF WARSZAWA RAIL JUNCTION	Study	CRAIL	PL	€ 9,800,000	€ 4,900,000	01/07/2006	31/07/2009	Closed	The scope of the project covers elaboration of a study analysing options for the modernisation and extension of the Warszawa Railway Node, forming a group of interlinked projects. The projects identified within the study will be technically and financially independent with their own effectiveness. The project is composed of five activities: • Preliminary analysis • Options analysis and choice of the best option • Selected option - detailed analysis including environmental study • Preparation of the contract dossier • Preparation of application for EU financial support. Completion of the global project (covering the current study phase and the following construction phase) will contribute to the development of the TEN-T network in Poland and contribute to the completion of Priority Project 23 (Railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien) and Priority Project

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										27 ("Rail Baltica" axis: Warszawa-Kaunas-Riga-Tallinn-Helsinki). The expected increase of the node's capacity is extremely important due to its location at the crossroads of the priority projects and pan-European transport corridors.
2007-PL-92105-S	Studies on the long-term development of the International Airport "Katowice" in Pyrzowice	Study	AIRP	PL	€ 2,040,000	€ 810,000	01/08/2007	30/06/2010	Closed	The main objective of this project is the preparation of studies concerning the long-term development of the International Airport "Katowice". They consist of a master plan and studies on the infrastructure development. The overall aim is to raise the airport's category and strengthen its status both in Poland and abroad. The master plan concerns the analysis of the airport's capacity and future requirements, an economic analysis of the potential influence on the region, financial projections, environmental influences and access to the airport. The infrastructure development studies look at inter alia plans on a new apron design for airplane parking, a new passenger terminal, modernisation of the drainage system, a new cargo base design and a new technical hangar.
2008-PL-92001-S	Preliminary Feasibility Study for the task: Modernisation and expansion of the Katowice Railway Junction	Study	MRAIL	PL	€ 1,000,000	€ 500,000	01/12/2008	30/09/2010	Closed	This project, an important part of Priority Project 23 (railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien), aims to prepare a preliminary feasibility study for the modernisation and expansion of the Katowice railway junction. Completion of the action will be a first step towards improving the rail transport efficiency on this part of the Priority Project 23 axis. The action encompasses 2 activities: 1. Preliminary Feasibility Study on the modernisation and expansion of the Katowice Railway Junction 2. Geological survey and analysis within the major TEN-T railway transport corridors and in the vicinity of the city of Katowice Research and analysis will be carried out regarding the condition of the railway infrastructure including geological survey and analysis in the major TEN-T railway transport corridors and in the vicinity of the city of Katowice and the relevant social, economic and transport relations affecting the demand for transport services in the Upper Silesian agglomeration. Katowice junction, covering a highly urbanised area, is the most important railway junction in Poland.

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										By eventually developing and transforming the railway network layout, the growing transport needs of the region - especially for goods transport - will be addressed.
2008-PL-92004-S	Comprehensive study and technical documentation of development of an International Airport Wrocław	Study	AIRP	PL	€ 2,520,000	€ 1,260,000	01/01/2009	30/06/2010	Closed	The objective of the Action is to assist to the long-term development of the capacity of the Wrocław Airport by accurately identifying the airport's needs. The Action involves the preparation of a number of analyses on the potential number of future passengers and operators as well as drafting documents needed for the implementation of the investment project for the expansion of the airport (master layer map, GIS map, inventory of plans, technical documentation of the noise monitoring system construction, dendrological inventory, geological tests for the entire airport).
2008-PL-92005-S	Studies on the long-term adjustment of the International Gdańsk Lech Walesa Airport, a TEN-T node in the North Poland, for the air transport needs	Study	AIRP	PL	€ 2,240,000	€ 1,187,500	01/03/2009	30/04/2011	Closed	The objective of the Action is to assist the long-term development of the International Gdańsk Lech Walesa Airport (PLG) through the preparation of a Master Plan and the subsequent design studies in line with the priorities identified in it. The Action covers the upgrade and development of PLG with the purpose of creating the future capacity to serve the growing passenger traffic. The development of this airport is in compliance with the concept of creating the 6th Pan-European Transport Corridor Gdynia-Gdańsk-Warsaw-Katowice-Ostrava- Wien. In order to achieve the objectives identified in the Action, the following activities will be executed: • Master plan for the long-term development of PLG, a TEN-T node in North Poland, for the air transport needs • Design for construction of a rainwater drainage system • Design studies (construction and pre-construction designs based on the outcome of the Master Plan, e.g. studies on extension of runway, taxiway, aprons and intermodality) • External Audit
2009-PL-60151-P	Project and development of ETCS Level 1 system at the section of the E	Work	ERTMS	PL	€ 17,645,314	€ 8,822,657	01/08/2009	31/12/2013	Ongoing	The scope of the Action covers preparation and installation of the track side system ETCS Level 1 on the E 65 railway line section Grodzisk Mazowiecki-Zawiercie and the certification procedure for interoperability components and structural subsystem. The 224 km long section is located on Priority Project 23 railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien.

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	65, CMK, railway line Grodzisk Mazowiecki – Zawiercie									Completion of the Action will contribute to the development of the first commercial application of ERTMS (European Rail Traffic Management System) within the TEN-T network in Poland. It will in principle allow the speed of trains to increase to over 160 km/h, thus boosting the line's capacity, reducing travel time and increasing comfort for passengers. The tests of ETCS components to be carried out during verification and certification procedures will be made available to the European Railway Agency (ERA).
2009-PL-92003-S	Studies on the long-term development of Warszawa F. Chopin Airport	Study	AIRP	PL	€ 2,610,000	€ 1,305,000	15/05/2009	30/09/2011	Closed	The studies will identify possible optimisation in the airport's safety and security and how to reduce capacity bottlenecks by defining a long-term airport development strategy. More specifically, the studies will address areas related to safety of air operations affected by the existing location and infrastructure (2 crossing runways, proximity to the city centre,…) and will seek to analyse airport operating processes, taking into account business continuity and threats resulting from the natural environment (e.g. bird strike, weather conditions,…). The action also intends to reduce the negative impact of the airport's operations on the natural environment. This includes measures in the field of water and drainage management, electric energy management and analysis of bird migration and bird resting areas in the vicinity of the airport. Execution of the action will help to reinforce the role of the TEN-T node by increasing its efficiency, capacity and improving environmental impact.
2009-PL-92004-S	Elaboration of the technical documentation for S1 Expressway construction on the section from Kosztowy II Interchange in Myslowice to Suchy Potok Interchange in Bielsko-Biala	Study	ROAD	PL	€ 1,415,150	€ 707,575	01/04/2010	31/12/2011	Cancelled	The action covers preparation of the first stage of technical documentation for construction of S1 expressway between Kosztowy II Interchange in Mysłowice and Suchy Potok Interchange in Bielsko-Biała. It also includes preparation of stage 1 of documents necessary for obtaining decision for road investment realization permit. Completion of the studies will enable the construction of the S1 Expressway section of about 39 km long in the new alignment. The S1 Expressway Pyrzowice-Podwarpie-Dabrowa Górnicza-Tychy-Bielsko-Cieszyn will create future fast link between A1 Motorway (North-South), A4 Motorway (East-West) and Slaskie Agglomeration. Further the link will continue to the state border with Czech Republic in Cieszyn and through S69 Expressway, to the

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										state border with Slovakia in Zwardon-Myto. Completion of global project (covering the study and the following construction phase) will contribute to the development of the Priority Project 25 within the TEN-T network in Poland, in principle by increasing the capacity and reducing the bottlenecks of the road connection in the region.
2009-PL-92005-S	Elaboration of the project documentation for reconstruction of the national road No. 1 to an expressway on the section Podwarpie - Dabrowa Górnicza	Study	ROAD	PL	€ 630,000	€ 315,000	14/08/2009	31/12/2011	Cancelled	The scope of the Action covers preparation of technical documentation for reconstruction of the national road No 1 Podwarpie-Dąbrowa Górnicza to the expressway standard. It also includes preparation of environmental documentation, documents necessary for obtaining decision on road investment realisation permit, building design and detailed design. Completion of the Action will enable upgrading of a 6.5 km long section of national road No 1 Podwarpie-Dąbrowa Górnicza. The S1 Expressway Pyrzowice-Podwarpie-Dąbrowa Górnicza-Tychy-Bielsko-Cieszyn will create future fast link between the A1 Motorway (North-South), the A4 Motorway (East-West) and the agglomeration of Śląskie. Furthermore the link will continue to the state border with the Czech Republic at Cieszyn and through the S69 Expressway, to the state border with Slovakia at Zwardoń-Myto. Completion of global project (covering the current study phase and the subsequent construction phase) will contribute to the development of the Priority Project 25 within the TEN-T network in Poland, in principle by increasing the capacity and reducing the bottlenecks of the road connections in the region.
2010-PL-92245-S	Feasibility Study for the Modernisation and Extension of the Katowice Railway Junction	Study	CRAIL	PL	€ 6,360,000	€ 3,180,000	15/10/2010	31/12/2012	Closed	The Action represents the second stage of the pre-investment phase in the implementation of the Global Project: Modernisation and extension of the Katowice Railway Junction. This is a continuation of the Pre-feasibility Study (first stage of the pre-investment phase), 2008-PL-92001-S. The Feasibility Study will help to determine modernisation variants for the partial projects defined in the first stage of the Global Project. Implementation of the tasks covered by the Action will form the basis for the completion of the pre-investment phase and commencement of: • Elaboration of design documentation with a view to acquire construction and detailed designs for works as well as the necessary administrative decisions (environmental decision, zoning decision, building permit)

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										and • Construction works The completion of the Action shall contribute to the development of the TEN-T network and Priority Project 23 (Railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien) in particular.
2011-PL-91128-P	Extension of the Deepwater Container Terminal in Gdańsk	Work	MULT	PL	€ 17,760,000	€ 1,776,000	13/04/2012	31/12/2014	Cancelled	The objective of the Action is to increase the potential cargo handling capacity of the DCT Gdańsk terminal to nearly 1.4 million TEU annually and to promote intermodal transport. The Action promotes the role of the railways in cargo shipping, aiming to establish a viable alternative to road transport. By the purchase of modern equipment and the development of the widely available cargo handling infrastructure, this Action would have a positive impact on the share of intermodal transport in carrying cargo and containers. Completion of the Action would facilitate: • business expansion to European and Russian markets through the establishment of business networks, development of shipping and forwarding companies and logistics centres; • increase of social awareness regarding the potential of the terminal; • diversification and streamlining of shipping methods; • modal shift to rail transport; • increase of availability of rail infrastructure; • increase of the share of intermodal transport in carrying cargo and containers.
2011-PL-93141-S	Modernisation of the railway line Warszawa Włochy û Grodzisk Mazowiecki û preparatory works	Study	MRAIL	PL	€ 2,758,000	€ 1,379,000	31/03/2013	31/12/2014	Ongoing	The proposed action concerns the elaboration of the documentation (construction designs, tender documentation, etc.) required for modernisation works on the railway line 447, section Warszawa Włochy - Grodzisk Mazowiecki (24 km, part of PP23). The completion of the action will contribute to increasing the capacity of the PP23 in the densely populated area of the country.
2012-PL-91170-S	Elaboration of the design documentation for the modernization of the quays and dredging the fairway at the internal Port of	Study	PORT	PL	€ 1,116,000	€ 558,000	01/03/2013	31/12/2015	Ongoing	The project looks at economic, environmental and technical designs for upgrading the quay and dredging of the fairway in the inner Port of Gdańsk. They specifically concern seven quays, and the studies will deliver environmental documentation, materials required to obtain building permits together with building designs and work plans, as well as a tender dossier for future follow-up construction works. The studies aim to lay the groundwork for works to dredge the fairway to 12

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	Gdańsk									m in order to improve both navigation and mooring/berthing conditions — including the fenders, sanitary system and fire protection devices. This will bring the quays up to standard and improve their efficiency and capacity, which will in turn increase competitiveness of the Port of Gdańsk and enable its continued development.
CZECH REPUBLIC										
2004-CZ-92101-P	"Optimisation of the Railway Section Břeclav - Czech/Slovak State Border"	Work	CRAIL	CZ	€ 50,005,000	€ 5,000,000	01/10/2004	31/05/2007	Closed	The Břeclav (Czech Republic)–Slovak state border railway line section is a crucial part of the line connecting Stockholm–Berlin–Brno–Bratislava–Budapest. It also links to Priority Project 23, the railway axis Gdańsk–Warszawa–Brno/Bratislava-Wien. The aim of the project was to reconstruct the double-line electrified railway section between Břeclav and the border with Slovakia (10.4 km) in order improve safety, capacity and speed on the line. The activities included: • renovation of the railway substructure and superstructure: traction lines, overhead contact system, new over-crossings, interlocking systems, security installations, communication systems, heavy-current distribution lines • reconstruction of old railroad bridges and the construction of a new bridge • renovation of the transformation, feeding, and switching station in Břeclav, improving the current traction power station technology • building of new elevated platforms, including an isle-type elevated platform in Lanzhot, accessible via the subway station • construction of anti-noise walls
2006-CZ-92101-S	Studies concerning the modernisation of the railway track line Blazovice-Nezamyslice: Preliminary design, EIA, geotechnical documentation	Study	CRAIL	CZ	€ 4,665,210	€ 2,300,000	01/12/2006	31/12/2009	Closed	This project aims at preparing the preliminary design to upgrade the railway section between Blazovice and Nezamyslice with a double-track line, part of Priority Project 23 railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien. The study includes the preliminary design and the geotechnical documentation, assessment of the interoperability requirements and environmental impact assessment for the section Brno-Přerov. The project will contribute to improving safety and interoperability on Priority Project 23, and to increase the maximum line speed up to 160/200 km/h on this section.
2007-CZ-23020-S	Modernisation of the Blazovice - Nezamyslice line	Study	CRAIL	CZ	€ 14,140,000	€ 7,070,000	01/06/2010	30/11/2011	Cancelled	This project will provide the preparatory study for the modernisation of the Brno-Přerov railway line, part of Priority Project 23 railway axis Gdańsk-Warszawa- Brno/Bratislava-Wien.

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	section									The project will allow the conversion of the 36.5 km-long Blazovice-Nezamyslice section into a double-track line and with electrification (25kV-50Hz). Following this modernisation phase, trains on this line will be able to reach 160 km/hour. The studies include the preparation of the detailed technical design, taking into account the environmental impact assessment, the interoperability of conventional lines, and the results of geological and geotechnical reports.
2007-CZ-90501-S	Reconstruction of the Railway Station Přerov	Study	CRAIL	CZ	€ 3,690,000	€ 1,845,000	01/04/2008	31/01/2009	Closed	The project focuses on the modernisation of the Přerov station and railway junction, part of Priority Project 23 railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien. The Přerov junction is part of Czech II National Transit Railway Corridor, and connects Břeclav -Přerov-Petrovice u Karviné with the Polish border. The activities focus on the preparation of the detailed technical design and building permits, assessment of transportation and operation technologies and proposals for an optimal scope of railway infrastructure. It also includes the necessary operational, technical and financial documents for the construction phase. Supplemental geodetic measurements, geotechnical and civil engineering research and environmental impact research will be undertaken to propose technical solutions and determine the final budget.
2009-CZ-00079-E	Motorway D47 section 47092 Bohumín - state border Czech Republic / Poland	Work	ROAD	CZ	€ 102,730,000	€ 10,273,000	15/05/2009	31/12/2012	Ongoing	This project follows a governmental agreement between Poland and the Czech Republic to connect the respective Polish A1 and Czech D47 motorways. It aims to construct section 47092 of the Motorway D47 within the municipalities of Bohumín and Dolní Lutyně near the Polish border. The project includes works for one interchange (MÚK Bohumín), two diversions of primary roads ("category I") and five diversions of "category III" roads, nine motorway bridges, 13 other bridges and relocation of some roads and service utilities.
SLOVAKIA										
2004-SK-92804-S	Pre-investment study for the motorway D3 Svrcinovec - Skalité	Study	ROAD	SK	€ 7,730,000	€ 3,800,000	01/03/2005	31/12/2008	Closed	This project, part of Priority Project 25 (Motorway axis Gdańsk – Brno/ Bratislava - Wien), involves preparatory and design studies for the motorway D3, section Svrčinovec-Skalité. The 12,2 long section is part of the missing link that will connect Bratislava with Poland and Czech Republic, facilitating cross-border traffic and eliminating several bottlenecks. The design of two

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										tunnels (Svrčinovec, Poľana) is also included in the project. The project encompasses the following activities: • Preparation of documentation for building permission; • Drafting of tender documentation; • Drafting of engineering-geological survey; • Carrying out of exploratory excavation.
2005-SK-92802-S	Studies Railway connection PP with Bratislava Station	Study	CRAIL	SK	€ 23,225,000	€ 10,570,000	01/01/2006	31/07/2010	Closed	The objective of this project, part of the Priority Project 17 (railway axis Paris-Strasbourg-Stuttgart-Wien-Bratislava) is to facilitate the construction of an optimum connection to local and regional transport in and around Bratislava. The project consists of studies needed for the tender preparation in the three following key areas: • Connection of Bratislava's three main railway stations (Bratislava predmestie, Bratislava filiálka and Bratislava Petržalka); • Direct connection from Bratislava Airport to the existing railway network; • Electrification of railway track in the remaining section from Devínska Nová Ves/Austrian border with the connection to the Priority Project 17 in Marcheg (Austria).
2005-SK-92803-S	Preinvestment studies for Motorway D3 Čadca-Svrcinovec	Study	ROAD	SK	€ 2,910,000	€ 1,455,000	01/06/2006	31/08/2010	Cancelled	This project, part of Priority Project 25 (Motorway axis Gdańsk-Brno/Bratislava-Wien), involves preparatory and design studies for the motorway D3, section Čadca-Svrcinovec. The project encompasses the following activities: • Preparation of documentation for building permission; • Drafting of tender documentation; • Drafting of engineering-geological survey;
2005-SK-92804-S	Upgrading Railway Púchov-Zilinia to 160 KMH	Study	CRAIL	SK	€ 6,500,000	€ 3,250,000	01/04/2005	31/12/2009	Closed	This project, part of Priority Project 23 (railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien), involves studies for upgrading the railway track Púchov-Žilina to a speed of 160 km/h, increasing passenger and freight transport capacity and optimising efficiency of the existing infrastructure. The design of two tunnels (Diel, Milochov) is also included in the project. The project encompasses the following activities: • Drafting of preparatory study for state expertise, including documentation for territorial decision;

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										• Preparation of the documentation for building permission.
2008-SK-92307-S	Modernization of corridor, state border CR/SR û Čadca û Krßsno nad Kysucou (outside) railway track	Study	CRAIL	SK	€ 964,000	€ 480,000	01/03/2009	30/06/2011	Closed	This project, part of Priority Project 23 (railway axis Gdańsk-Warszawa-Brno/Bratislava-Wien), involves studies for the modernisation of the Čadca-Krásno nad Kysucou rail section. The 15.5 km stretch is located in the Northern part of Slovakia, close to the border with the Czech Republic and Poland. The modernised electrified single track is designed for a maximum speed of 120 km/h and is expected to serve both passenger and freight trains. A new tunnel design is also included in the project. Completion of these initiatives aims to increase passenger and freight transport capacity, improve train speed and optimise the efficiency of the existing infrastructure. The project encompasses the two following activities: • Environmental Impact Assessment (EIA) and documentation of Construction Intent, including delivery of Documentation for the Territorial Decision • State audit
2009-SK-60108-P	ETCS deployment on Corridor VI: Äilina û Čadca û State Border SK/CZ	Work	ERTMS	SK	€ 4,050,000	€ 2,025,000	01/01/2010	31/12/2013	Closed	The objective of this project, part of Priority Project 23 (railway axis Gdańsk-Brno/Bratislava-Wien) is the modernization of the rail section Žilina (station excl.)-Krásno nad Kysucou, in line with the interoperability requirements defined by EC Directive 2008/57. The project also aims at increasing the track speed up to 140 km/h (or 160km/h for tilting train sets). The project implements ERTMS (ETCS L2 system, SRS 2.3.0.d version) on the 37 km double track rail section Žilina-Čadca-State Border SK/CZ and encompasses the following activities: • Implementation of the electronic signal box and electronic track block with radio-block centre (RBC) interface • Implementation of the radio-block centre (RBC) and establishment of reliable data connection between RBC and protection & control devices • Installation of Eurobalises to ensure reliable and safe detection of the actual train location

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
AUSTRIA										
2004-AT-90103-S	Schienenverbindung Prag - Linz - Graz - Maribor: technische, konstruktive und Trassenplanung fur den zweigleisigen Ausbau des Abschnittes Werndorf S³d-Spielfeld (Sentilj)	Work	CRAIL	AT	€ 3,120,000	€ 1,000,000	23/04/2004	30/09/2007	Closed	The objective of the global project is the increase of capacity and speed to 120-130km/h of the Prague-Linz-Graz-Maribor section and contribute to the modal shift in freight transport from road to rail and the development and improvement of the passenger rail traffic in this region. The specific objective of this project is the development of technical, construction and alignment designs for the Werndorf-South-Spiefeld sub-section in order to upgrade the section to a double track. The Action covers 2 main sections: Werndorf-Lebrig: Drafting of plan designs, implementation of technical hydraulic engineering tests and environmental studies in relation with EIA are foreseen. Wagna-Spielfeld/state border: Two different variants and local sub-variants are to be drafted in order to analyse their advantages and disadvantages. In addition, technical hydraulic engineering tests are to be executed. On the basis of the results, forecasts will be made regarding the several variants. Given the crossing of the Natura 2000 area of Gamlitz, studies will be carried out in relation with EIA requirements. Finally, simulation studies for the different variants and platforms alignments in particular for Spielfeld station will be carried out.
2007-AT-17040-P	Works and Studies for upgrading the Wien-Bratislava railway line (6 sub-projects)	Study and Work	CRAIL	AT	€ 864,968,925	€ 129,850,000	01/01/2007	31/12/2013	Ongoing	This project is part of the Priority Project 17 railway axis Paris-Strasbourg-Stuttgart-Wien-Bratislava which targets the provision of a continuous new and upgraded high speed railway line from Paris to Bratislava for both freight and passenger transport. More specifically, the cross-border section Wien (Wien)-Bratislava aims to link the new Wien central railway station to the Wien and Bratislava airports – contributing to the connectivity of Central and Eastern Europe as a whole. This project includes both studies and works for each of the three sub-projects in greater Wien: • connection of new Wien's Central railway station to East, West and South railway stations (6 km), merging all of the railway lines (North, South, East, West) in a new through station, the Wien Central railway station • Kledering loop: connection between Wien's Central railway station and Wien Airport by connecting the East railway line to the airport suburban railway line (2 km)

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
										• Götzendorf clip: studies on the future double track construction connecting the airport to the East railway station and further to Bratislava (14.2 km)
2009-AT-60148-P	ERTMS deployment on Corridor E (Dresden-Constanta) Trackside equipment	Work	ERTMS	AT	€ 13,700,000	€ 6,850,000	18/05/2009	09/12/2013	Ongoing	The Action comprises the implementation of ETCS Level 2 with infill SRS 2.3.0d trackside equipment on the ERTMS Corridor E section between Břeclav and Wien Central Station, the upgrade to SRS 2.3.0d of the railway line between Wien Central and Hegyeshalom (already in operation and currently equipped with ETCS Level 1 with infill SRS 2.2.2.) as well as development and implementation of Key Management System, ETCS Data Management Tool and ETCS Track Warning System. The Action is subdivided in 6 activities: 1. Project management 2. Software deployment and configuration for trackside equipment 3. ERTMS hardware configuration and installation 4. Trackside certification, interoperability test, approval and commissioning 5. ERTMS Equipment 6. SRS upgrade on Wien-Hegyeshalom section
2010-AT-91136-S	Terminal Wien Inzersdorf û Planning, (PP 17 û Section: Wien-Salzburg)	Study	MULT	AT	€ 4,000,000	€ 2,140,000	01/09/2010	31/12/2012	Ongoing	The action aims to develop the planning stage of an intermodal nodal point for freight transport consisting of facilities for combined transport, facilities for part-load traffic and facilities for conventional full load traffic including the required building, transport and operations facilities. The construction of the terminal Wien Inzersdorf will contribute towards the realisation of Priority Project 17 (Railway axis Paris-Strasbourg-Stuttgart-Wien-Bratislava) and serves to increase the efficiency and capacity in rail freight transport. The project area is located in the Provinces of Wien (10th and 23rd municipal district) and Lower Austria (municipalities of Vösendorf and Hennersdorf), demarcated in the North by the Rosiwalgasse and in the South by the periphery of Hennersdorf. The Inzersdorf terminal will be constructed in several development stages (modular implementation concept) according to the respective capacity requirements. The action consists of the following studies: • an in-depth environmental impact assessment permit planning and draft construction plan • the management of the administrative procedures and • a cost estimate and a consolidated technical project to be elaborated on the basis of all findings from the administrative procedure and the involvement of the public as well as associated project adaptations

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
2012-AT-18070-P	Expansion of the tri-modal inland port by land recovery	Work	IWW	AT	€ 12,790,000	€ 2,558,000	01/01/2012	31/12/2015	Ongoing	Freudenau Port of Wiener Hafen, Gmbh & Co KG, a crossroad for international flows and transhipment between inland waterway, rail and road transport, is the only trimodal logistics location in the Greater Wien area and therefore offers key advantages for the intermodal transport of goods. Within the framework of the Global Project, the proposed Action consists of works aiming to expand the port, in order to increase the capacity for handling additional freight – especially in the light of recent increases of throughput. These works specifically concern the extension of the port's container handling capacities through land recovery and the construction of a new quay wall in order to optimise the areas of operation.
2012-AT-91099-S	Studies for the expansion of the trimodal Port of Freudenau/Wien	Study	IWW	AT	€ 5,764,000	€ 2,882,000	01/09/2013	31/12/2015	Ongoing	Freudenau Port of Wiener Hafen, Gmbh & Co KG, a crossroad for international flows and transhipment between inland waterway, rail and road transport, is the only trimodal logistics location in the Greater Wien area and therefore offers key advantages for the intermodal transport of goods. The proposed Action consists of studies aiming to plan and design the expanded Port of Wien Freudenau. The studies specifically look at extending the container handling capacities of the port. The Action will include all the necessary steps from preliminary planning to obtaining the building authorisations and publishing the works tenders.
2012-AT-91163-P	Future Baltic - Adriatic core network corridor, extending PP23 - construction of a rail bridge at Stein, crossing river Drau	Work	HRAIL	AT	€ 14,261,682	€ 1,526,000	28/02/2013	31/12/2015	Ongoing	The Action fits into the Global Project of the BA Corridor on Austrian territory that includes the new Koralm railway line linking Graz and Klagenfurt. It consists of the construction of a railway bridge at Stein, crossing the Drau river. This 0.7 km long two-track line interconnects two tunnels – Lind (West) and Stein (East). The works encompass the construction of the bridge's foundation (including pillars and abutments), the support structure and equipment.
ITALY										

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
2004-IT-90905-S	Progetto di sezioni della nuova linea ad Alta velocitÓ / Alta capacitÓ Venezia - Trieste - (Lublijana) in territorio italiano	Study	CRAIL	IT	€ 8,000,000	€ 3,000,000	01/06/2004	31/12/2010	Closed	The project covers the preliminary design for high speed track of the Venezia-Ronchi railway section. In detail, the Quarto d'Altino to Ponte Fiume Isonzo section is concerned, including the interconnections with the existing infrastructures. The project, closely correlated with project 2005-IT-90901-S concerning other sections on the same alignment, is part of Priority Project 6 (Railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukranian border). As such, it contributes to shorten travel times for high speed passenger traffic.
2005-IT-90901-S	Nuova linea ad Alta VelocitÓ/Alta CapacitÓ Venezia-Trieste-(Lubiana) in territorio italiano	Study	CRAIL	IT	€ 4,500,000	€ 2,000,000	01/12/2005	31/12/2010	Closed	The project concerns the preliminary design for high speed track of the railway section Venezia-Trieste. In detail, are concerned the following subsections: • from Venezia Mestre to the underground Venezia Airport station and Quarto d'Altino; • from Venezia Santa Lucia to Venezia Airport; • from the underground Venezia Airport station to Bivio Dese The project, closely correlated with project 2004-IT-90905-S concerning other sections on the same alignment, is part of the Priority Project 6 (Railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukranian border). As such, it contributes to shorten travel times for high speed passenger traffic.
2007-IT-06020-S	Tratta Ronchi sud - Trieste: Progetto Prioritario 6 - sezione Nazionale	Study	CRAIL	IT	€ 48,000,000	€ 24,000,000	01/10/2007	30/09/2012	Ongoing	This project, part of the Priority Project 6 (Railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukranian border) is focused on the new line between Ronchi Sud and Trieste. It supports the studies on this section which connects the new railway station at Ronchi Airport, and continues for 32 km towards Trieste through a series of deep tunnels divided by open zones. The railway section completes the last portion on Italian territory of PP 6 and the studies involved aim at modifying the preliminary project as well as drafting the final one.
2007-IT-91503-P	STRENGHTENING AND RESTRUCTURING OF THE RAILWAY FACILITIES AND NETWORK IN THE MARGHERA	Work	PORT	IT	€ 9,000,000	€ 900,000	01/09/2007	31/12/2009	Closed	This project aims to restructure and strengthen the existing railway facilities at the port of Venezia. Physically located in the centre of the port, the project's development focuses on new areas and facilities for freight trains and the development of a more effective interoperable railway system. Three specific activities are planned:

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
	AREA - COMPLETION OF THE PROJECT									• Preliminary works: including characterisation of the soil, demolition of existing buildings and excavation of 8,000 m³ of materials where the rail tracks will be placed • Construction and electrification of railway tracks: including construction of 7 parallel railway tracks (4,000 m total), implementation of the electrification system for 3 railway tracks of 1,500 m used for arrivals and departures • Final works: including extension of the remote control ACEI interlocking for three railway tracks used for arrivals and departures, extension of the anti-fire system, construction of a local road for the control area, extension of the rain water collection and drainage system, final testing
2008-IT-91407-P	Functional adaptation of both road and rail networks in the stretch Malcontenta-Fusina of "via dell'Elettronica" in the port of Marghera – Venezia	Study and Work	PORT	IT	€ 2,695,000	€ 398,000	01/12/2008	31/12/2010	Closed	The Venezia Port Authority (VPA) has planned the construction of new Motorways of the Sea (MoS) Terminal to the South of the industrial area of Marghera (called Fusina) in the Venezia harbour. This terminal will be part of the new logistics centre, the Fusina Logistics Platform. This action consists in strengthening and developing the existing road and rail infrastructures connecting the new area of Fusina (roll on, roll off) Ro-Ro Terminal with the main national and local road and rail networks in order to enhance the interconnections and achieve better quality of service in terms of capacity, frequency, safety, environmental protection, quality and cost. This action is part of a bigger project consisting of two main parts: • Widening the existing road from two to four lanes, thus enhancing the road connections of the area of Fusina with the national A4 highway situated on Corridor V • Doubling the existing railway by constructing 1,900 m of new tracks to improve the connections of the area of Fusina Ro-Ro Terminal with the national railway network Within this Action all the related functional interventions that are necessary before the construction of the widening of the lanes and the new railway tracks will be carried out. In addition the construction of approximately 900 m of two lane road and approximately 500 m of new tracks will be completed.

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
2008-IT-91408-S	Feasibility study of Marco Polo Venezia International Airport Intermodality Node	Study	MULT	IT	€ 5,000,000	€ 2,670,000	20/06/2008	30/06/2011	Closed	This project concerns the feasibility study for the creation of a multimodal hub for passenger transport at Venezia's Marco Polo International Airport. The study looks into issues that relate to the air terminal expansion and the airport's underground railway station connections with the regional railway system and a new high speed rail link to Milan and Trieste. The study also covers a series of infrastructure activities such as the metro line between the airport and the city, ground level and multi-storey car parks, pedestrian and road access to the airport and its car parks, bus terminal, walkways to the water terminal connecting the airport to the city of Venezia by boat, a new ferry terminal, areas for the exchange of different travel modes and facilities, ancillary and service buildings, and food and retail facilities. The output of this study will be used in the next phase of the implementation.
2009-IT-00073-E	Implementation of nautical accessibility in the port of Venezia-Marghera: operational and remedial dredging in two stretches of the West and South ship canals	Work	PORT	IT	€ 39,095,000	€ 3,912,000	23/07/2009	23/06/2011	Closed	This Action concerns the improvement of port accessibility in the port of Venezia-Marghera and consists of infrastructural works for the operational and remedial dredging in two stretches of the West Industrial canal and the South Industrial canal. More precisely, the Action aims at: • Increasing the port accessibility for cargo ships, allowing vessels of higher tonnage to access the port facilities • Reducing the environmental pollution of the lagoon, by removing the contaminated sediments from the canals The Action foresees the following activities: • Preliminary works including bathymetric profile, bomb clearing, sediment characterisation, dredging plan, briccole (old wooden mooring poles) removal and sheet piling • Removal of sediments in the West Industrial channel and South Industrial channel to reach the draught of 10.50 m according to the approved dredging plan • Characterisation of the sediments for evaluating final disposal (Tresse Island/Molo Sali/Moranzani Plants) on the basis of contamination
2009-IT-91406-S	Strategic project for the development of the accessibility	Study	PORT	IT	€ 2,500,000	€ 1,256,281	01/06/2010	30/06/2011	Ongoing	The Action is part of the Three-Year Operational Plan 2008-2011 (POT) approved in September 2008 by Venezia Port Authority. The priority objectives of the POT are the development of port infrastructures, including the creation of proper maritime access, the expansion of port areas and the

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
	and hinterland connections from the port of Venezia to the TEN-T network									improvement of hinterland connections. Some of these priorities include the conversion of the former Marghera industrial areas in new port and logistic infrastructures, the development of the Motorways of the Sea along the Adriatic Corridor and the development of inland waterways. To reach the objectives of the POT the Port of Venezia has launched a number of projects already supported under TEN-T, Structural Funds and own/other funds. The aim of the Action is to improve the accessibility of the dismissed industrial areas of Marghera in the port and its hinterland connections (railway connections) to the TEN-T network in order to achieve better performance in term of intermodality, efficiency, safety and environmental protection. The specific objective of this Action is the conversion of the dismissed industrial areas of Marghera for port and logistics purposes by studying the construction of a new railway system. The Action foresees the design for the construction of a new railway system and related rail connection for the new port Terminal and logistic centre planned in a dismissed port industrial area.
2011-IT-93098-P	Nodo ferroviario AV/AC di Bologna: realizzazione della linea di connessione fra gli impianti del Nodo e la linea per Venezia per la fluidificazione del traffico	Work	MRAIL	IT	€ 21,852,941	€ 2,229,000	13/04/2012	13/07/2014	Ongoing	The Action envisages the construction of a new double-track rail stretch of an overall length of about 4.2 km. It will link the Bologna High Speed/High Capacity (HS/HC) underpass to ensure a smoother connection with the line to Venezia. The HS/HC underpass was open to traffic in June 2012, whereas the new station in Bologna is expected to become operational in December 2012. They are both part of Priority Project 1 "Railway axis Berlin-Verona/Milano-Bologna-Napoli-Messina-Palermo", whilst the project being supported lies outside the PP. More specifically, the Action comprises the following works: 1- Embankments and noise barriers; 2- Civil works, including a 75m viaduct, a small tunnel and the upgrading of several underpasses; 3- Tracks, electricity, signalling and other necessary equipment. In addition to the major works, other interventions are included to ensure the connection with the existing Bologna-Padova line and the Bologna bypass, so as all the necessary technological adjustments.

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
2012-IT-91002-S	Ravenna Port Hub: final detailed design and supporting technical analyses	Study	PORT	IT	€ 4,394,000	€ 2,197,000	04/02/2013	31/12/2015	Ongoing	The studies supported by this Action are part of a Global Project which concerns the overall development plan of the Port, and is linked to marine port infrastructure, side port infrastructure and port accessibility. As a necessary component of the Global Project, the co-funded studies of the present Action concern the completion of the detailed design related to Stages I and II of the Global project. The studies concern: dredging activities related to the front port area and to the main port canals achieving water depths varying from a minimum of 11.5 metres to a maximum of 14 metres, upgrading of at least 3,900 m of existing quays impacted by the proposed interventions, the construction of a new 600 metres long terminal container quay, and the upgrading of existing quays in the main port canal. This is supplemented by the necessary supporting technical analyses (environmental, archaeological, geological and geotechnical). The ultimate aim is to develop the Port in order to maximise its potential with regard to the evolution of maritime traffic by creating the necessary infrastructure to handle larger vessels and higher traffic volumes. This in turn will allow for improved port capacity along with other have significant socio-economic effects in the region.
SLOVENIA										
2004-SI-92701-S	Technical documentation for the construction of the 2nd track of the railway line Divača - Koper	Study	CRAIL	SI	€ 19,400,000	€ 5,470,000	15/04/2005	31/12/2010	Closed	The project covers geological and geotechnical surveys and the preparation of design documentation with a view to obtaining the permission for the construction of the 2nd track of the railway line Divača-Koper. The second track on the railway line Divača-Koper is expected to: • promote the further development of the port of Koper and therefore improve the connection between the seashore freeway and the inland transport system • increase the transport capacity and safety of the line, so as to meet the expected traffic growth over the trans-European Corridor V.
2006-SI-92702-S	Master Plan at Ljubljana Airport including Railway connection to Ljubljana and Kranj	Study	AIRP	SI	€ 3,000,000	€ 1,500,000	01/01/2007	31/12/2010	Closed	The Ljubljana Airport Master Plan is a comprehensive airport study to obtain the short, medium and long term development plans to meet future aviation demand. It provides a plan to modernize and expand the existing Ljubljana Airport and establish development variants. The project includes a detailed analysis of the railway connection to the Ljubljana airport, a forecast of future levels of aviation and railway activity, a planning of the railway connection, airside development, landside development, fire-fighting services, airport operations, support facilities, security considerations, safety assessment, cost-benefit analysis and a

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
										business plan.
2006-SI-92704-S	Preparation of background documents and feasibility study of the railway infrastructure development in the area of Ljubljana hub	Study	CRAIL	SI	€ 2,150,000	€ 1,000,000	01/09/2006	31/12/2009	Closed	The project consists of upgrading the main infrastructure installations of the Ljubljana hub, including Ljubljana passenger station, Moste container terminal, Moste freight station, Moste central workshop hall, Zalog marshalling yard. The activities include: • background documentation; • a feasibility study for the pre-investment plan for Ljubljana railway hub
2008-SI-92400-S	Working out of preliminary studies for the construction of the new line of high capacity/high speed line Divača – Ljubljana	Study	HRAIL	SI	€ 700,000	€ 350,000	01/07/2009	30/04/2011	Ongoing	This project, part of Priority Axis 6 (railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukrainian border) aims to prepare the necessary investment documentation for the spatial and project planning of the construction of the new Divača-Ljubljana high capacity/high speed line (160-250 km/h). The foreseen length of the planned line is between 50-60 km, depending on the chosen variant. The eventual rail line will be part of an important East-West link involving four EU Member States (Hungary, Slovenia, Italy and France) and will be able to absorb part of the continuing growth of traffic flows between Southeast, central and South-West Europe. An important increase in rail freight capacity will be achieved and it will contribute to modal shift in sensitive Alpine regions.
2008-SI-92401-S	Working out of preliminary studies for the construction of the new line of high capacity/high speed line Ljubljana û Zidani most	Study	HRAIL	SI	€ 700,000	€ 350,000	01/07/2009	30/04/2011	Ongoing	Part of Priority Axis 6 (railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukrainian border), this project aims to prepare the necessary investment documentation for the spatial and project planning of the construction of the new Zidani Most-Ljubljana high capacity/high speed line (160-250 km/h). The line is planned for a length of 50-55 km, depending on the chosen variant. When completed, this section will be integrated in the important East-West link that includes four EU Member States (Hungary, Slovenia, Italy and France). It will help to facilitate the increasing rail traffic between Europe's Southeast, central and South-West regions. In addition, an important increase in rail freight capacity will be reached, contributing to modal shift in sensitive Alpine regions. This project covers the working out of the identification document of the

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
										investment project and the working out of the Feasibility Study.
2010-SI-92232-S	Elaboration of the Executive design for upgrading of the section of the railway line Poljcane – Pragersko	Study	CRAIL	SI	€ 2,200,000	€ 1,100,000	01/08/2011	31/12/2012	Closed	The project will finalise the executive design for upgrading the 14 km section of an existing double track of electrified line between Poljčane and Pragersko. This project is situated on Priority Project 6, the Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukrainian border axis. The implementation will improve the interoperability of the line, and will increase safety and speed of trains.
2012-SI-06083-S	Elaboration of the Project for Building Permit and Executive Design for the arrangement of a hub by upgrading the Pragersko railway station	Study	CRAIL	SI	€ 4,000,000	€ 2,140,000	01/05/2013	31/12/2015	Ongoing	The Action covers the elaboration of i) the Project Design for the acquisition of the Building Permit and ii) Executive Design for the upgrade the Pragersko railway station, including track devices. In accordance with the applicable construction act, both documents are the basis for the subsequent commencement of works. The Pragersko railway station is an important railway traffic hub situated at the double-track Zidani Most–Pragersko–Maribor–state border line and is a part or the TEN-T Priority Project 6.
2012-SI-06086-S	Execution design for upgrading the existing main double-track electrified Zidani Most-Celje railway line	Study	CRAIL	SI	€ 3,500,000	€ 1,750,000	01/12/2013	31/08/2015	Ongoing	The action covers elaboration of the Executive design for upgrading the existing main double-track electrified Zidani Most–Celje (25 km) railway line. Completion of the action will enable commencement of the works aiming at increasing the speed and axle load of trains (to 225 KN/axle) as well as ensuring interoperability and security of the railway traffic.
2012-SI-91117-S	NAPAPROG - Acceleration of the terminal and multimodal facilities in the port of Koper towards an integrated North Adriatic Port system	Study	MULT	SI	€ 526,000	€ 263,000	04/03/2013	30/04/2015	Ongoing	The partners of the NAPA closely cooperate to increase the potential, the quality and the efficiency of the Northern Adriatic ports, transport infrastructures and related services. The Global project focuses on further developing the traffic and strengthen the role of North Adriatic region as an alternative gateway for cargo directed to Central and Eastern European markets. The proposed Action tackles concrete needs defined on the ports' infrastructure side in terms of improving terminals' facilities. The Action includes studies necessary for starting further works regarding the increase of the Koper port's (Slovenia) capacities, as well as strengthening freight co-modal transport supporting the transport route via the Southern gateway to the hinterland markets. This will contribute to the goals of NAPA, promoting the efficiency of the port's services and improved capacities in order to gain competitive advantages using North Adriatic port system.

Project Code	Project Title	Type	Mode	States	Total Eligible Costs	EU Co-funding	Start Date	End Date	Status	Project Description
										The proposed Action's goal is the accomplishment of the project documentation in order to gain all permits, analysis and studies (supportive, preliminary and detailed design) necessary to realise the strategic improvements in Koper port's terminal infrastructure in the future: by extending the Container terminal in the port of Koper (based on the prolongation of Pier I).

B.7.2. MARCO POLO initiatives, studies and projects

Table B6 Marco Polo co-financed projects and initiatives 2003-2013

Project/Initiative	Web site
ADRIATIC	http://ec.europa.eu/transport/marcopolo/files/calls/docs/2012/26_successful_applications.pdf
Slovak Shuttle	http://ec.europa.eu/transport/marcopolo/files/calls/docs/2012/26_successful_applications.pdf
GYPSUM TRAIN	http://ec.europa.eu/transport/marcopolo/files/calls/docs/2012/26_successful_applications.pdf
Europe Asia Rail	http://ec.europa.eu/transport/marcopolo/files/calls/docs/2012/26_successful_applications.pdf
Agrotainer	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call11_projects_en.pdf
EU North-South Corridor	http://ec.europa.eu/transport/marcopolo/files/about/in-law/2010-projects/mod_eu_south-north_corridor_en.pdf
ARTEMIS	http://www.artemis-project.eu/index.php/links
Koka – Train	http://ec.europa.eu/transport/marcopolo/files/about/in-law/2010-projects/mod_kokatrain_en.pdf
Load Control Center platform LCC	http://ec.europa.eu/transport/marcopolo/files/about/in-law/2010-projects/tav_lcc_en.pdf
ACE Green	http://ec.europa.eu/transport/marcopolo/files/about/in-law/2010-projects/mod_ace_green_en.pdf
EURO Reefer Rail	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call08_projects_en.pdf
KOBALINK	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call08_projects_en.pdf
KTS	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call08_projects_en.pdf
S.C.AD.AE	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call08_projects_en.pdf
Synthesis	www.synthesis-project.gr
AGORA	www.intermodal-terminals.eu
OCRA	http://www.ocra.eu/
I.R.I.S.	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call06_projects_en.pdf
ITS-IT	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call06_projects_en.pdf
NePolExpress	http://ec.europa.eu/transport/marcopolo/events/docs/Gdańsk09/nepolexpress.pdf
INSECTT	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call04_projects_en.pdf
ACCESS; Advanced Contact Centre for the Enhancement of Short sea Shipping	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call04_projects_en.pdf
SINGER	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call04_projects_en.pdf
IT-POL-IT NET - Transport Network Project Italy - Poland - Italy	http://ec.europa.eu/transport/marcopolo/files/about/in-law/call03_projects_en.pdf

B.7.3. DG REGIO initiatives, studies and projects

Table B7 DG REGIO co-financed territorial cooperation projects and initiatives 2007-2013

Project/Initiative	Web site
CROSS-BORDER COOPERATION	
IPA Adriatic CBC Programme (Priority: Accessibility and Networks) (SI, IT)	www.adriaticipacbc.org
Developing of Motorways of Sea system in Adriatic region - ADRIATMOS	www.adriaticipacbc.org
Poland - Czech Republic (Priority: Strengthening of Accessibility, Environmental Protection and Risk Prevention)	www.cz-pl.eu
Poland - Slovakia (Priority: Development of Cross-border Infrastructure)	pl.plsk.eu
Increasing the transport accessibility in the Polish-Slovak border region of the Tripoint (triborder) area in Istebna and Čierne Municipalities	pl.plsk.eu/files/?id_plik=2227
Construction of the cross-border transport connection Jaworzynka – Čierne-Skalité. Stage 1 – road reconstruction in Jaworzynka and Cierne as part of the Tripoint (tri-border area) Development Programme	pl.plsk.eu/files/?id_plik=2227
Modernisation of the road infrastructure between Rajcza (PL) and Oščadnica (SK)	pl.plsk.eu/files/?id_plik=2227
Improvement of transport infrastructure accessibility in the Polish-Slovak border region	pl.plsk.eu/files/?id_plik=2227
Accessibility, safety and infrastructure improvement in the Polish-Slovak border region	pl.plsk.eu/files/?id_plik=2227
Modernisation of roads in Żywiec County in Rajcza and Ujsoły Municipalities (PL), as well as in Novot Municipality (SK) in order to improve the communication network on both sides of the Polish - Slovak border	pl.plsk.eu/files/?id_plik=2227
Czech Republic - Slovakia (Priority: Development of the cross-border region accessibility and environment) (No projects)	www.sk-cz.eu
Czech Republic - Austria (Priority: Regional Accessibility and Sustainable Development)	www.at-cz.eu
Transport model AT-CZ-SK-HU	www.ivv.tuwien.ac.at/forschung/projekte/international-projects/vkm-en.html
Slovakia-Austria(Priority: Transport and regional accessibility)	www.sk-at.eu
Twin City Rail	www.wien.gv.at/wirtschaft/eu-strategie/eu-foerderung/etz/projekte/twincityrail.html
Transport model AT-CZ-SK-HU	www.ivv.tuwien.ac.at/forschung/projekte/international-projects/vkm-en.html
Region BRAtislava - Wien: Study about MObility behavior - BRAWISIMO	www.sk-at.eu/sk-at/projekte/detail/en/beschreibung.php?we_objectID=226
Borderbridge Moravský Sv. Ján - Hohenau - BBMH	http://www.sk-at.eu/sk-at/projekte/detail/en/beschreibung.php?we_objectID=258

Cross Border Road Safety Managment - ROSEMAN	http://www.sk-at.eu/sk-at/projekte/detail/en/beschreibung.php?we_objectID=144
The bicycle tracks and a bridge to connect people - CYCLOMOST- I and II	http://www.sk-at.eu/sk-at/projekte/detail/en/beschreibung.php?we_objectID=95
Austria – Slovenia (No projects)	www.si-at.eu
Italy - Slovenia (Priority: Environment, transport and sustainable territorial integration)	*www.ita-slo.eu*
TIP - Transborder Integrated Platform	www.ita-slo.eu
Accessibility and development for the re-launch of the inner Adriatic area - ADRIA A	www.adria-a.eu
TRANSNATIONAL COOPERATION	
Alpine Space Programme (Priority: Accessibility and Connectivity) (AT, SI, IT)	*www.alpine-space.eu*
Alpine Mobility Check - Step 2	www.alpcheck2.eu
Polycentric Planning Models for Local Development in Territories interested by Corridor 5 and its TEN-T ramifications	www.poly5.eu
Sustainable Freight Transport - Now and Tomorrow	www.susfreight.eu
Transalpine Transport Architects	www.transitects.org
Central Europe (Priority: Sustainable public transport and logistics) (PL, CZ, SK, AT, SI, IT)	*www.central2013.eu*
Baltic-Adriatic Transport Cooperation	www.baltic-adriatic.eu
SOuth-NORth Axis	www.sonoraproject.eu
Chemical Logistics Cooperation in Central and Eastern Europe	www.chemlog.info
Tracking and Tracing solutions for improvement of intermodal transport of dangerous goods in CEE - ChemLog-T&T	www.chemlog.info
Knowledge-enabled Access of Central Europe SMEs to Efficient Transnational Transport Solutions – KESSETS	www.kassetts.eu
Freight and Logistics Advancement in Central Europe - Validation of processes, Improvements, Application of co-operation	http://www.th-wildau.de/en/forschungsgruppen/verkehrslogistik/projekte/projekteaktuell/flavia.html
SOL - Save Our Lives. A Comprehensive Road Safety Strategy for Central Europe	www.sol-project.eu
Transnational LOGistics' Improvement through Cloud computing and innovAtive cooperative business modeLs – LOGICAL	www.project-logical.eu
Improvement of CE regions' accessibility through air transport interconnectivity	www.champions-project.de
Enhancing Multimodal Platforms, Inland waterways and Railways services Integration in Central Europe – EMPIRIC	www.empiricproject.eu
Railway Hub Cities and TEN-T network	www.railhuc.eu
Upgrading of Inland Waterway and Sea Ports – INWAPO	www.inwapo-project.eu
South East Europe Transnational Cooperation Programme (Priority : Improvement of the Accessibility) (AT, SI, IT)	*www.southeast-europe.net*
Adriatic-Danube-Black Sea multimodal platform	www.adbmultiplatform.eu
Accessibility improved at border CROSsings for the integration of South East Europe	www.acrossee.eu

Green Intermodal Freight Transport	www.gift-project.eu
Rail Hub Cities for South East Europe	www.rail4see.eu
South East European Transport Axis Cooperation – SEETAC	www.seetac.eu
South East Transport Axis	www.seta-project.eu
Intelligent Transport Systems in South East Europe	www.seeits.eu
Transnational Network for the Promotion of the Water-Ground Multimodal Transport	www.watermode.eu
South East European Mobility Management Scheme	www.seemms.net
ROad safety in South East European regions - ROSEE	www.rosee-project.eu
Programme MED (Priority: Internal and external accessibility) (SI, IT)	*www.programmemed.eu*
FREIGHT4ALL Smart ICT networking solutions allowing accessibility 4 all	www.med-freight4all.eu
Freight and passengers sUpporting infomobiliTy systems for a sUstainable impRovEment of the competitiveness of port-hinterland systems of the MED area - FUTURMED	www.futuremedproject.eu
How can logistics and safety of chemicals' transport be improved in the Mediterranean area? - LOSAMEDCHEM	www.losamedchem.eu
Baltic Sea (Priority: Internal and external accessibility) (PL)	*www.eu.baltic.net*
Scandinavian-Adriatic Corridor for Growth and Innovation - SCANDRIA	www.scandriaproject.eu
TransBaltic	www.transbaltic.eu
Improved accessibility of the Baltic Sea Region by air transport - BALTIC BIRD	www.baltic-bird.eu
Bothnian Green Logistic Corridor	www.bothniangreen.com
Amber Coast Logistics - ACL	www.ambercoastlogistics.eu
Rail Baltica Growth Strategy	www.rbgc.eu

Table B8 DG REGIO relevant co-financed territorial cooperation projects 2000-2006

Project	Web site
A-B Landbridge	www.fpp.uni-lj.si/research/projects/2009072713420186/
Railway and canals for the port of Chioggia	http://ec.europa.eu/regional_policy/projects/stories/archive_search.cfm?LAN=EN&pay=IT&region=347&the=1&per=1

Table B9 DG REGIO co-financed National and Regional Programmes Including Transport Investments 2007-2013 and 2000-2006

Programme
Poland
Operational Programme 'Infrastructure and Environment'
Regional Operational Programme for Pomorskie Voivodship
Regional Operational Programme for Kujawsko - Pomorskie Voivodship
Regional Operational Programme for Mazowieckie Voivodship
Regional Operational Programme for Łódzkie Voivodship
Regional Operational Programme for Wielkopolskie Voivodship
Regional Operational Programme for Silasian Voivodship
Regional Operational Programme for Dolnośląskie Voivodship
Regional Operational programme for Zachodniopomorskie Voivodship
Regional Operational programme for Opolskie Voivodship
Regional Operational programme for Świętokrzyskie Voivodship
Regional Operational programme for Warmia and Mazury Voivodship
Regional Operational programme for Lubuskie Voivodship
Strategy for Cohesion Fund Development
Sectoral Operational Programme for Transprot 2004-2006
National Strategy for Transport Sector (ISPA Fund)
Czech Republic
Operational Programme 'Transport'
Operational Programme 'Prague'
Operational Programme 'North-East'
Operational Programme 'North-West'
Operational Programme 'Central Moravia'
Operational Programme 'Central Bohemia'
Operational Programme 'South-West'
Operational Programme 'Infrastructure'
Common Regional Operational Programme
Cohesion Fund 2004-2006
National ISPA Strategy
Slovakia
Operational Programme 'Transport'
Operational Programme 'Western Slovakia, Central Slovakia and Eastern Slovakia'
Operational Programme Basic Infrastructure
Cohesion Fund
National ISPA Strategy
Austria
Operational Programme 'Burgenland'
Italy
Operational Programme 'Veneto'
Slovenia
Operational Programme 'Development of environment and transport infrastructure'

Table B10 Selection of DG REGIO co-financed transport projects and major projects (2007-2013 and 2000-2006) included in the national and regional programmes

Poland
Operational Programme 'Infrastructure and Environment' 2007-2013
Preparatory works for selected investments planned for implementation during 2014-2020 financial perspective
„Roads of trust” – programme for people’s life and health protection on national roads
Development of infrastructure for air traffic management national agency
Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia in scope of superior layer of LCC, ERTMS, ETCS, GSM-R, DSAT and traction power supply system
Safety improvement and elimination of exploitation threats on railway crossings
Development of remote diagnostics system for the train automatic control and railway junctions on the railway lines E 65/C-E 65 also line 8 and line 64 – Preparatory works
Pomorskie
Purchase of airport rescue and fire protection vehicle for Gdańsk Airport
Construction of technical and control road (phase II) at Gdańsk Airport
Construction of technical base for winter equipment storage in Gdańsk Airport
Construction of express road S7, section Gdańsk (A1) - Koszwały (South By-pass of Gdańsk City)
Extension of OT junction (national road S-6) with Kartuska street (national road no. 7) – Karczemki junction in Gdańsk
Reconstruction of complex Gdynia Main Railway Station
Gdańsk Airport – modernisation of airport infrastructure on the airside - continuation
Gdańsku Airport – construction of second new passenger terminal together with infrastructure and extension and modernisation of airport and port infrastructure
Purchase of systems for passengers and luggage protection in Gdańsk Airport
Project of improvement of railway connection to Gdańsk Port (bridge + double track railway line)
Preparatory works for project of improvement of railway connection to Gdańsk Port (bridge + double track railway line)
Improvement of railway infrastructure access to the Port of Gdańsk – Preparatory works
Improvement of railway infrastructure access to the Port of Gdynia – Preparatory works
Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Iława, LCC Malbork
Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Gdańsk, LCC Gdynia
SEBTRANS- LINK: preparation of concept for new ferry terminal in East Port of Gdynia
BALTIC GATEWAY: Port Twinning Project Gdynia - Karlskrona
Project "ADRIATIC - BALTIC LANDBRIDGE"
Project Baltic Gateway Plus
Reconstruction of port canal in Gdynia Port
Extension of port infrastructure aiming at ro-ro ships servicing with road and railway access in Port of Gdynia
Construction of infrastructure and purchase of the equipment within II phase of container terminal construction GCT in Gdynia
Reconstruction of Port Canal in Port of Gdynia
Warmińsko-Mazurskie
Construction of express road S7, section Elbląg (S22) - Olsztynek (S51), sub-section Elbląg - Miłomłyn
Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Działdowo

Kujawsko–Pomorskie
Construction of A1 motorway, section Toruń-Stryków
Construction of Integrated Communication Centre in Bydgoszcz – phase I
Mazowieckie
Reconstruction of express road S8, section Powązkowska junction - Marki junction (Piłsudskiego str.)
Construction of S2 road, Konotopa junction – Puławska junction together with section Airport junction – Marynarska junction S79
Construction of express road S8, section Konotopa junction – Powązkowska junction
Safety programme for railway stations of Warszawa Railway Junction
Warszawa Airport – Construction / extension / reconstruction (modernisation) of airport infrastructure
Warszawa Airport – Construction of airside surface and roads
Purchase of operational equipment for Airport Fire Brigade at Warszawa Airport
Purchase of equipment for winter maintenance of Warszawa Airport
Modernisation of railway line E65/C-E 65 section Warszawa – Gdynia, area of LCC Ciechanów
Modernisation of railway line Warszawa – Łódź, phase II, lot A, section Warszawa Zachodnia – Skierniewice (Miedniewice)
Łódzkie
Increase of operational safety of Łódź Airport related to winter exploitation
Improvement of safety at Łódź Airport related to incidents prevention
Modernisation of railway line Warszawa – Łódź, phase II, flight B, section Widzew Łódź – Łódź Factory with railway station and the construction of the underground station departures and arrivals servicing of trains and passenger service
Modernisation of railway line Warszawa – Łódź, phase II, flight C – Other works
Wielkopolskie
Poznań-Ławica Airport – extension and modernisation of airport and port infrastructure
Improvement of Airport protection of Poznań-Ławica Airport
Extension of fire protection safety systems of Poznań-Ławica Airport
Modernisation of railway line E59 Wrocław – Poznań, phase II, section Wrocław – Dolnosląskie Voivodship border
Modernisation of railway line E59 Wrocław – Poznań, phase III, section Czempiń – Poznań
Śląskie
Construction of express road S69 Bielsko-Biała - Żywiec, section Mikuszowice (Żywiecka/Bystrzańska) – Żywiec
Construction of A1 motorway, section Pyrzowice-Maciejów-Sośnica
Airport in Katowice – modernisation and extension of airside and port infrastructure
Purchase of specific vehicles for safety improvement at Katowice Airport
Katowice Airport – extension and modernisation of airport and port infrastructure
Purchase of special vehicles for safety improvement at Katowice Airport
Preparatory works for modernisation of railway line E65 South, Grodzisk Mazowiecki – Kraków/Katowice – Zwardoń/Zebrzydowice – state border, phase II
Improvement of transport services through improvement of technical conditions of railway lines 1, 133, 160, 186, section Zawiercie – Dąbrowa Górnicza Ząbkowice – Jaworzno Szczakowa
Modernisation of railway line E30, phase II, section Zabrze – Katowice – Kraków
Construction of railway connection from airport Pyrzowice in Katowice to cities of górnośląskie agglomerations, section Katowice-Pyrzowice, preparatory works
Feasibility study pre-investment documentation for Modernisation of railway line E65/C-E 65 section Grodzisk Mazowiecki – Kraków/Katowice/Zwardoń/Zebrzydowice

– state border, railway sections: Czechowice Dziedzice, Zebrzydowice, Zwardoń
Opolskie
Construction of Wrocław Motorway By-pass A8
Improvement of transport services through improvement of technical conditions of railway line 132 section Błotnica Strzelecka–Opole Groszowice
Dolnośląskie
Reconstruction of historical antique Wrocław Main Railway Station together with reconstruction of railway technical infrastructure
Wrocław Airport – extension and modernisation of airport and port infrastructure
Safety and protection improvement at Wrocław S.A. Airport
Modernisation of railway line E30, phase II. Implementation of ERTMS/ETCS/GSM-R in Poland on section of Legnica-Wrocław-Opole
Construction of railway connection from airport Pyrzowice in Katowice to cities of górnośląskie agglomerations, section Katowice-Pyrzowice, preparatory works
Modernisation of railway line E59 Wrocław – Poznań, phase II, section Wrocław – Dolnosląskie Voivodship border
Lubuskie
Construction of express road S3, section Gorzów Wlkp. - Nowa Sól, sub-section Gorzów Wlkp.- Sulechów
Zachodniopomorskie
Construction of Miękowo by-pass within the national road no. 3
Construction of express road S3 Szczecin-Gorzów Wielkopolski
Reconstruction of railway station building Szczecin Main Station together with truck and platform infrastructure
Szczecin Goleniów Airport – extension and modernisation of airport and port infrastructure
Modernisation of luggage control system EDS and belt conveyors at Szczecin-Goleniów terminal
Extension of fire protection and exploitation safety systems of Szczecin-Goleniów Airport
Extension of port infrastructure in North part of the port in Świnoujście
Extension of port infrastructure in North part of the Ewa Peninsula in Szczecin port
Reconstruction of road infrastructure in Szczecin and Świnoujście ports
Reconstruction of railway infrastructure in Szczecin and Świnoujście ports
Improvement of railway infrastructure access to the Ports of Szczecin and Świnoujście – Preparatory works
Construction of port terminal infrastructure in Szczecin and Świnoujście – parking spaces
Strategy for Cohesion Fund Development 2004-2006
Mazowieckie
Modernisation of railway line E65 section Warszawa – Gdynia, phase II
Śląskie
Construction of A1 motorway, section Sośnica (Gliwice) – state border (Gorzyczki), phase II: Bełk – Gorzyczki
Technical assistance for preparation of modernisation of railway line E65 South, Grodzisk Mazowiecki – Kraków/Katowice – Zwardoń/Zebrzydowice – state border, phase I
National Strategy for Transport Sector (ISPA Fund) 2000-2004
En route for growth
Enhancement during preparation and implementation of projects co-financed from Cohesion Fund in road sector
Pomorskie
Strengthening of surface on the national road no. 7: Gdańsk - Warszawa - Chyżne, section Gdańsk - Jazowa

Łódzkie
Preparation of project: A2 motorway, section Stryków - Konotopa
Wielkopolskie
Modernisation of Poznań Railway Junction within the railway line E20
Modernisation of railway line E59 section Wrocław - Poznań, phase I
Śląskie
Construction of A4 motorway, section Kleszczów - Sośnica
Construction of express road S1 Bielsko Biała - Skoczów - Cieszyn
Reconstruction of A4 motorway, section: Krzywa - Wrocław
Preparation of project: construction of A4 motorway, section Zgorzelec - Krzyżowa
Construction of A1 motorway, section Sośnica-Gorzyczki (phase I)
Czech Republic
Operational Programme 'Central Moravia'
Safely to Pisek
Passenger terminal Rajhrad
Reconstruction of the road III/4335 Hradčany - Kobeřice
Operational Programme 'Transport' (2007-2013)
D1, section 0135 Kroměříž - Říkovice, R55 section 5503 Skalka - Hulín
Reconstruction of the road I/52 Brno - Rajhrad
Reconstruction and capacity upgrade of railway track Studénka - Mošnov
Leoš Janáček Airport rail connection
Reconstruction R110 kV TNS Nedakonice - 2nd stage
GSM-R in the section Ostrava - Slovak border and Přerov - Česká Třebová
GSM-R Břeclav - Přerov - Petrovice u Karviné
Reconstruction of the Railway junction Břeclav 1st stage
Reconstruction of the Railway junction Břeclav 2nd stage
GSM-R - completion of NŽK
Jihocesky kraj
Double track for safe, rapid rail travel
Jihovýchod
Electrifying the railways in Jihovychod region
Rail junction upgrade will enhance national and cross-border journeys
Bypass will take pressure off residential areas
Promoting trolleybuses as the future of urban transport
Jihozápad
Enhanced Czech rail connections to Germany
Top notch rail, ready to roll
Double track for safe, rapid rail travel
Railway optimisation in the Czech Republic
Fast track from Prague to Austria
Moravskoslezsko
Road enhancement brings smoother, faster traffic flow
Praha
Revamp on the cards for Prague station
Metro line extension increases access to public transport
Severovýchod

Electrifying the line between Letohrad and Lichkov
Simplifying life on Czech roads
Severozápad
Top notch rail, ready to roll
Four-lane highway will drive region's economic development
Střední Morava
First-rate facilities for regional rail hub
New roads will connect regional capital to motorway network
Upgrade to Zábřeh-Šumperk rail line to improve transport for citizens
Střední Čechy
Optimising the railway line between Benešov u Prahy and Strančice
European boost to travel between the Czech Republic and Austria
Ustecky kraj
Major motorway a step closer to completion
Slovakia
Operational Programme 'Transport' (2007-2013)
Modernisation of railway track Žilina - Krásno nad Kysucou
Modernisation of railway track Nové Mesto nad Váhom - Púchov, section Nové Město nad Váhom - Zlatovce
Modernisation of railway track Nové Mesto nad Váhom - Púchov, section Zlatovce - Trenčianska Teplá
Modernisation of railway track Nové Mesto nad Váhom - Púchov, section Trenčianska Teplá - Beluša
Žilina Teplička, marshalling yard
Completion of marshalling yard Žilina Teplička and related railway infrastructure in Žilina node, design - national project
Modernisation of railway track Nové Mesto nad Váhom - Púchov, section Beluša - Púchov
Modernisation of the track Púchov - Žilina; section Považská Teplá - Žilina
Electrification of the track Devínská Nová Ves - Marchegg - national project
D1 Sverepec – Vrtižer
D3 Hričovské Podhradie - Žilina, Strážov
D3 Svrčinovec – Skalité
D3 Čadca Bukov – Svrčinovec
D3 Kysucké N. Mesto – Oščadnica
D3 Žilina, Strážov – Žilina, Brodno
D3 Žilina, Brodno – Kysucké Nové Mesto
I/11 Čadca - road relocation
Design of motorway D3 (Kysucké Nové Mesto – Oščadnica – Čadca – Svrčinovec) - national project
Public intermodal freight terminal Žilina
Public intermodal freight terminal Bratislava
Public intermodal freight terminal Leopoldov
Slovak expressway
Bratislavský kraj, Východné Slovensko and Západné Slovensko
Smoother rail transport across Slovakia
Bratislavský kraj
Train marshalling concentrated at a single yard
New motorway improves links between Slovakia and neighbouring countries

Modernisation of railway line speeds up journey times on strategically important route through Northern Slovakia
Západné Slovensko
Motorway D1 Sverepec-Vrtižer
Slovenia
New passenger terminal to provide better passenger services

B.7.4. CORDIS initiatives, studies and projects

Table B11 CORDIS

Project/Initiative	Web site
7th Framework Programme for Research 2007-2013	**cordis.europa.eu/fp7/home_en.html**
European Transport policy Information System ETISplus	www.etisplus.eu
Desk study on goods flows in Europe (MOS 2005-2013)	www.maritime-transport.net
TRANSNEW	cordis.europa.eu/result/brief/rcn/10225_en.html
EIRAC and EIRAC II	www.eia-ngo.com/eirac.html
TelliBox – Intelligent MegaSwapBoxes for Advanced Intermodal Freight Transport	www.zlw-ima.rwth-aachen.de/webtellibox/
B2B LOCO (Baltic-to-Balkan network for logistics competence)	www.b2bloco.eu
Supporting EU's Freight Transport Logistics Action Plan on Green Corridors Issues SUPERGREEN	www.supergreenproject.eu
6th Framework Programme for Research 2002-2006	**cordis.europa.eu/fp6/**
TRANS-TOOLS ("TOOLS for TRansport Forecasting AND Scenario testing")	transtools3.eu

B.7.5. National initiatives and studies

Table B12 Poland

#	Source	Description	Web site
National			
01	Ministry of Infrastructure and Development	Transport Development Strategy by 2020 (with perspective by 2030)	https://cms-en.transport.gov.pl/files/0/1796136/130122TransportDevelopmentStrategyby2020withperspectiveby2030.pdf
02	Ministry of Infrastructure and Development	Implementation Document of Transport Development Strategy by 2020 (with perspective by 2030) – phase of	http://bip.mir.gov.pl/Dokumenty%20oficjalne/ogloszenia/Documents/Dokument_implement_SRT_do_konsultacji_122013.pdf

#	Source	Description	Web site
		public consultations	
03	Ministry of Infrastructure and Development	The National Road Construction Programme 2011-2015	https://www.mir.gov.pl/Transport/Infrastruktura_drogowa/Program_Budowy_Drog_Krajowych/Documents/ProgramBDK_2011_2015.pdf
04	Ministry of Infrastructure and Development	National Development Strategy 2007-2015	http://www.mir.gov.pl/english/regional_development/development_policy/srk/strony/srk.aspx
05	Ministry of Infrastructure and Development	National Development Strategy 2020	http://www.mir.gov.pl/english/Regional_Development/Development_Policy/NDS_2020/Documents/NDS%202020.pdf
06	Ministry of Infrastructure and Development	Operational Programme Infrastructure and Environment; The National Strategic Reference Framework for the years 2007-2013	http://www.funduszspojnosci.gov.pl/NR/rdonlyres/1CD85A6A-4E8A-47C5-8135-381EE503E555/46855/7122008_POIiS_ENG.pdf
07	Ministry of Infrastructure and Development	National Strategic Reference Framework 2007-2013 in support of growth and jobs; National Cohesion Strategy	http://www.funduszeeuropejskie.gov.pl/wstepdofunduszyeuropejskich/documents/nsro_an_20_07.pdf
08	Ministry of Infrastructure and Development	Master Plan for railway transport in Poland until 2030	http://bip.mir.gov.pl/Dokumenty%20oficjalne/Transport/Strategie/Documents/master_plan_transport_kolejowy.pdf
09	Ministry of Infrastructure and Development	Suistainable development plan for interregional and international rail transport	http://isip.sejm.gov.pl/Download?id=WDU20120001151&type=2
10	Ministry of Infrastructure and Development	National Road Construction Programme for the years 2011-2015	http://www.mir.gov.pl/Transport/Infrastruktura_drogowa/Program_Budowy_Drog_Krajowych/Documents/ProgramBDK_2011_2015.pdf
11	Ministry of Infrastructure and Development	National Programme of Road Safety 2013-2020	http://www.krbrd.gov.pl/download/pdf/NP%20BRD%202020_przyjety_przez_KRBRD.pdf
12	Ministry of Infrastructure and Development	Multiannual Railway Investment Programme till 2015	http://bip.mir.gov.pl/Dokumenty%20oficjalne/Transport/Programy/Strony/default.aspx
13	Ministry of Infrastructure and Development	Programme of develop for airports and ground-based equipment	http://www.pansa.pl/pliki/lotnictwo_cywilne/program_rozwoju_sieci_lotnisk/program_sieci_lotnisk_2007.pdf http://www.pansa.pl/index.php?lang=_pl&opis=prog_rozw_sieci_lotnisk_urzadzen_naziemnych

#	Source	Description	Web site
14	Ministry of Infrastructure and Development	Forecast of development of air transport in Poland	http://siskom.waw.pl/komunikacja/lotnisko/CPL/analiza_2010/cpl_analiza_2010_raport_czastkowy_2.pdf
15	Ministry of Infrastructure and Development	Strategy of development of sea ports until 2015	http://bip.mir.gov.pl/Dokumenty%20oficjalne/Gospodarka_morska/Strategie/Documents/Strategia_rozwoju_portow_morskich_do_2015%20roku.pdf
16	Ministry of Administration and Digitization	Long-term National Development Strategy – Poland 2030	https://mac.gov.pl/files/wp-content/uploads/2011/12/Polska2030_final_november2012.pdf
17	Polish State Railways (PKP Polskie Linie Kolejowe S.A.)	Network Statement 2014/2015	http://www.plk-sa.pl/files/public/user_upload/pdf/Reg_przydzielania_tras/Regulamin_2014_2015/P_14-15_Regulamin_w.0.pdf
18	Polish State Railways (PKP Polskie Linie Kolejowe S.A.)	Network Statement 2013/2015	http://www.plk-sa.pl/files/public/user_upload/pdf/Reg_przydzielania_tras/Regulamin_2013_2014/zmiana_10.02.2014/Network_Statement_2013-2014_v11_Internet.pdf
19	Civil Aviation Authority ULC (Urząd Lotnictwa Cywilnego)	The main directions of development of civil aviation in Poland 2007-2010	http://www.ulc.pl/_download/opracowania/starga0907.pdf
Regional			
20	Pomorskie Voivodeship	Regional Development Strategy for Transport in Pomorskie Voivodeship for the years 2007-2020	http://www.urzad.pomorskie.eu/res/umwp/dokumenty/regionalna_strategia_rozwoju_transportu_2007_2020.pdf
21	Pomorskie Voivodeship	Development Strategy for the Gdańsk City until 2015	http://www.Gdańsk.pl/strategia,1744.html
22	Warminsko-Mazurskie Voivodeship	The Strategy of Socio-Economic Development of the Warminsko-Mazurskie Voivodeship until 2020	http://strategia2025.warmia.mazury.pl/artykuly/65/strategia-2020.html
23	Kujawsko-Pomorskie Voivodeship	Regional Development Strategy for Transport in Kujawsko-Pomorskie Voivodeship until 2015	http://www.kujawsko-pomorskie.pl/files/sejmik/uchwaly/2006/US-2-06-624-str.pdf

#	Source	Description	Web site
24	Kujawsko-Pomorskie Voivodeship	Development Strategy for the Kujawsko-Pomorskie Voivodeship until 2020	www.kujawsko-pomorskie.pl/pliki/strategia/20131024_strategia/SRW.pdf
25	Mazowieckie Voivodeship	Development Strategy for the Mazowieckie Voivodeship until 2020	http://mbpr.pl/user_uploads/image/PRAWE_MENU/strategia%20rozwoju%20wojew%C3%B3dztwa%20mazowieckiego%20do%20roku%202020/SRWM/SRWM.pdf
26	Mazowieckie Voivodeship	Integrated Development Plan of public transport for the Mazowieckie Voivodeship	http://www.wrotamazowsza.pl/msip_main/atts/93/transport.pdf
27	Łódźkie Voivodeship	Development Strategy for the Łódźkie Voivodeship until 2020	http://www.strategia.Łódźkie.pl/images/srwl_2020_uchwalona_26_02_2013.pdf
28	Slaskie Voivodeship	Development Strategy for Transport in Slaskie Voivodeship	http://www.slaskie.pl/zalaczniki/2014/04/15/1397566654/1397566791.pdf
29	Slaskie Voivodeship	Development Strategy for the Śląskie Voivodeship	http://www.slaskie.pl/zalaczniki/2013/07/04/1372921202/1372921250.pdf
30	Swietokrzyskie Voivodeship	Development Strategy for the Swietokrzyskie Voivodeship until 2020	http://www.e-swietokrzyskie.pl/strategia_wojewodztwa/index.php/component/edocman/?task=document.download&id=216
31	Opolskie Voivodeship	Development Strategy for the Opolskie Voivodeship until 2020	http://opolskie.pl/docs/27x01_srwo_pl_zakladki.pdf
32	Dolnoslaskie Voivodeship	Development Strategy for the Dolnoslaskie Voivodeship until 2020	http://www.umwd.dolnyslask.pl/fileadmin/user_upload/Rozwoj_regionalny/SRWD/SRWD_2020-final.pdf
33	Lubuskie Voivodeship	Development Strategy for Transport in Lubuskie Voivodeship until 2015	http://rpo2020.lubuskie.pl/wp-content/uploads/2013/01/strategia_rozwoju_transportu.pdf
34	Lubuskie Voivodeship	Development Strategy for the Lubuskie Voivodeship until 2020	http://www.bip.lubuskie.pl/system/obj/14608_SRWL_2020_z_zalacznikami_1.pdf
35	Zachodniopomorskie Voivodeship	Development Strategy for Transport sector in Zachodniopomorskie Voivodeship until	http://www.wzs.wzp.pl/wrr/strategia_rozwoju_sektora_transportu_wojewodztwa_zachodniopomorskiego_do_roku_2020.htm

#	Source	Description	Web site
		2020	
Sub Regional			
36	Mazowieckie Voivodeship	Development Strategy for the City of Warszawa until 2020	http://www.um.warszawa.pl/sites/default/files/Strategia_Rozwoju_m.st_._Warszawy_do_2020_r..pdf
37	Łódźkie Voivodeship	Development Strategy for the Łódź City 2020	http://www.uml. Łódź.pl/miasto/strategia/
38	Slaskie Voivodeship	Development Strategy for the Katowice City until 2020	https://bip.um.katowice.pl/index.php?s=16&r=1221669663&id=1227080005
39	Dolnoslaskie Voivodeship	Development Strategy for the Wrocław City 2020 Plus	http://bip.um.wroc.pl/wps/portal/bip?WCM_GLOBAL_CONTEXT=/bip_pl/bip/umw/programy_miejskie/Strategia+rozwoju+Wroclawia&sitePath=/bip_pl/bip/umw/programy_miejskie/Strategia+rozwoju+Wroclawia

Table B13 Czech Republic

#	Source	Description	Web site
National			
01	Ministerstvo dopravy	The Transport Policy of the Czech Republic for 2014 – 2020 with the prospect of 2050	http://www.mdcr.cz/NR/rdonlyres/DB292074-62B4-4B09-9D43-9697A1A86FB0/0/B1300298_MINISTERSTVO_DOPRAVY_2014_2020_ENG05.pdf
02	Ministerstvo dopravy	Transport Sector Strategies 2nd Phase	http://www.dopravnistrategie.cz/en/menu-project/menu-downloads
03	Ministerstvo dopravy	National Transport Statistics	http://www.mdcr.cz/cs/Statistika_dopravy/default.htm
04	Správa železniční dopravní cesty	Network Statement 2015	http://www.szdc.cz/en/provozovani-drahy/pristup-na-zdc/prohlaseni-015.html
05	Správa železniční dopravní cesty	Technical Requirements For Development Of Ertms/Etcs L2 On the Czech Part Of Corridor E	http://www.szdc.cz/en/soubory/ertms/technicke-pozadavky.doc
06	Ředitelství silnic a dálnic ČR	Roads And Motorways In the Czech Republic 2013	http://www.rsd.cz/rsd/rsd.nsf/0/00712811179E3270C1257C08005CD18B/$file/RSD2013en.pdf

#	Source	Description	Web site
07	Ředitelství silnic a dálnic ČR	Planned Construction Progress On The Road And Motorway Network 2014	http://www.rsd.cz/rsd/rsd.nsf/26FA4423C0960AE5412566EB004569CC/F5C7C36AF0AF8D6AC1257B2C0054DEDF/$FILE/cz-stavba-2014-en.pdf
Regional			
09	Moravskoslezký kraj	Development Concept Of Transport Infrastructure Of Moravskoslezsky Region	http://verejna-sprava.kr-moravskoslezsky.cz/assets/doprava/dop_01_dopravnikoncepce_2009.pdf
10	Zlínský kraj	Master Plan Of Transport Of Zlínský Region	http://www.kr-zlinsky.cz/docs/clanky/dokumenty/227/02-zeleznicni-doprava-a-a0.pdf
11	Jihomoravský kraj	Master Plan Of Transport Of Jihomoravský Region	http://www.kr-jihomoravsky.cz/Default.aspx?pubid=6912&TypeID=7&foldid=6906&foldtype=7

Table B14 Slovakia

#	Source	Description	Web site
National			
01	Ministerstvo dopravy, výstavby a regionálneho rozvoja	Strategy of Transport Development till 2020	http://www.telecom.gov.sk/index/open_file.php?file=doprava/strategia/strategia_rozvoja_dopravy_2020/priloha_1.pdf
02	Ministerstvo dopravy, výstavby a regionálneho rozvoja	Transport Master Plan	http://www.mindop.sk/index/open_file.php?file=doprava/dopinfra/program/Dokumenty/fondyeu20142020/20140303/SPRDI_SR.zip
03	Ministerstvo dopravy, výstavby a regionálneho rozvoja	National Transport Statistics	http://www.telecom.gov.sk/files/statistika_vus/telekom_ang/index.htm
04	Železnice Slovenskej republiky	Network Statement 2015	http://www.zsr.sk/anglicky/railways-infrastructure/marketing/network-statement/network-statement-2015.html?page_id=2854
05	Národná diaľničná spoločnosť, a. s.	Map Of Motorways And Expressways In Slovakia	http://www.ndsas.sk/ext_dok-mapa_siete/44547c
06	Slovenská správa ciest	Road Network Of Slovak Republic	http://www.cdb.sk/files/img/zakladne-mapy-cs/anglicke/road-network_sr.jpg
Regional			
07	Verejné prístavy, a.s.	Annual Report 2012	http://www.vpas.sk/fileadmin/vpas/Profil/Vyrocna_sprava_za_rok_2012.pdf

Table B15 Austria

#	Source	Description	Web site
National			
01	Bundesministerium für Verkehr, Innovation und Technologie	Verkehrsmodell Österreich Endbericht	http://www.bmvit.gv.at/verkehr/gesamtverkehr/verkehrsprognose_2025/download/vpoe25_kap3.pdf
02	Bundesministerium für Verkehr, Innovation und Technologie	Verkehrsprognose Österreich 2025+	http://www.bmvit.gv.at/verkehr/gesamtverkehr/verkehrsprognose_2025/index.html
03	Bundesministerium für Verkehr, Innovation und Technologie	RAHMENPLAN 2013-2018 Investitionen und Instandhaltung Planquoten vorausvalorisiert	http://www.bmvit.gv.at/verkehr/gesamtverkehr/ausbauplan/downloads/rahmenplan_oebb_2013.pdf
04	Bundesministerium für Verkehr, Innovation und Technologie	ASFINAG Evaluierung der Strassenbauprojekte	http://www.bmvit.gv.at/verkehr/gesamtverkehr/ausbauplan/downloads/evaluierung_strasse.pdf
05	Bundesministerium für Verkehr, Innovation und Technologie	RAHMENPLAN 2014-2019 Investitionen und Instandhaltung Planquoten vorausvalorisiert	http://www.bmvit.gv.at/verkehr/gesamtverkehr/ausbauplan/downloads/rahmenplan_oebb_2014.pdf
06	ÖBB - Austrian Rail Infrastracture Manager	ÖBB Infrastruktur AG: 3_3_Schieneninfrastruktur"	http://www.oebb.at/infrastruktur/de/_p_3_0_fuer_Kunden_Partner/3_3_Schieneninfrastruktur/index.jsp
07	ÖBB - Austrian Rail Infrastracture Manager	GSMR Netzausbauplan	http://www.oebb.at/infrastruktur/de/_p_3_0_fuer_Kunden_Partner/3_3_Schieneninfrastruktur/3_3_7_Digitaler_Funk_GSM_R/02_DMS_Dateien/_GSMR_Netzausbauplan.jsp
08	ÖBB - Austrian Rail Infrastracture Manager	GSMR_Inbetriebnahmeplan	http://www.oebb.at/infrastruktur/de/_p_3_0_fuer_Kunden_Partner/3_3_Schieneninfrastruktur/3_3_7_Digitaler_Funk_GSM_R/02_DMS_Dateien/_GSMR_Inbetriebnahmeplan.jsp
09	ÖBB - Austrian Rail Infrastracture Manager	Streckenausrüstung mit ETCS	http://www.oebb.at/infrastruktur/de/_p_3_0_fuer_Kunden_Partner/3_3_Schieneninfrastruktur/3_3_8_ETCS/02_DMS_Dateien/_ETCS_Ausbauplan.jsp

Table B16 Italy

#	Source	Description	Web site
National			
01	Ministero delle Infrastrutture e dei Trasporti (MIT)	Il Piano Nazionale della Logistica 2011/2020	http://www.mit.gov.it/mit/mop_all.php?p_id=12956
02	Ministero delle Infrastrutture e dei	Il Piano Nazionale dei Trasporti 2001/2011	

#	Source	Description	Web site
	Trasporti (MIT)		
03	Ministero delle Infrastrutture e dei Trasporti (MIT)	Programma delle infrastrutture strategiche	http://www.mit.gov.it/mit/site.php?p=cm&o=vd&f=cl&id_cat_org=161&id=27 http://silos.infrastrutturestrategiche.it/ http://cantieri.mit.gov.it/Pagine/Mappa-nodi-logistici.aspx
04	Ministero delle Infrastrutture e dei Trasporti (MIT)	Piano generale della mobilità (Linee Guida)	http://www.astrid.eu/TRASPORTI/Documenti/mop_all.pdf
05	Ministero delle Infrastrutture e dei Trasporti (MIT)	Piano nazionale infrastrutturale per la ricarica dei veicoli alimentati ad energia elettrica	http://www.mit.gov.it/mit/site.php?p=cm&o=vd&id=2714
06	Ministero delle Infrastrutture e dei Trasporti (MIT)	Piattaforma Tecnologica Nazionale Marittima	http://www.mit.gov.it/mit/site.php?o=vh&id_cat=172
07	Ministero delle Infrastrutture e dei Trasporti (MIT)	I Sistemi di Trasporto Intelligenti (ITS)	http://www.mit.gov.it/mit/site.php?p=cm&o=vd&f=cl&id_cat_org=37&id=1375
08	Rete Ferroviaria Italiana (RFI)	Multi Annual Investment Plan	http://www.mit.gov.it/mit/site.php?p=cm&o=vd&id=116
09	Rete Ferroviaria Italiana (RFI)	PIR - Network Statement	http://www.rfi.it/
10	ANAS	Multi Annual Investment Plan	www.cipecomitato.it/it/il_cipe/delibere/download?f=E130009.doc
11	ENAC	National Airport Plan	http://www.enac.gov.it/La_Regolazione_per_la_Sicurezza/Infrastrutture_Aeroportuali/Piano_Nazionale_degli_Aeroporti/
12	UIRNET	National Logistics Platform	https://www.uirnet.it/uirnet/
13	Autostrade per l'Italia	Piano degli investimenti	http://www.autostrade.it/it/la-nostra-rete/lo-stato-di-avanzamento
Regional			
14	Regione Friuli Venezia Giulia	Piano regionale delle infrastrutture di trasporto, della mobilità delle merci e della logistica	http://www.regione.fvg.it/rafvg/cms/RAFVG/infrastrutture-lavori-pubblici/infrastrutture-logistica-trasporti/FOGLIA18/articolo.html
15	Regione Friuli Venezia Giulia	Piano Regionale del Trasporto Pubblico Locale (PRTPL)	http://www.regione.fvg.it/rafvg/cms/RAFVG/infrastrutture-lavori-pubblici/infrastrutture-logistica-trasporti/FOGLIA107/
16	Regione Veneto	Piano Regionale dei Trasporti (PRT)	http://www.regione.veneto.it/web/mobilita-e-trasporti/piano-regionale-trasporti
17	Regione Emilia Romagna	Piano Regionale Integrato Dei Trasporti (PRIT)	http://mobilita.regione.emilia-romagna.it/prit-piano-regionale-integrato-dei-trasporti
Sub Regional			

#	Source	Description	Web site
18	Autorità Portuale di Trieste	Master Plan	http://www.porto.trieste.it/eng/porto/port_masterplan
19	Autovie Venete	Third Line Investment Plan	http://www.commissarioterzacorsia.it/
20	Concessioni Autostrade Veneto (CAV)	Network Development Information	http://www.cavspa.it/index.php?option=com_content&view=article&id=24&Itemid=55
21	Venezia Airport	Master Plan	http://www.mit.gov.it/mit/mop_all.php?p_id=13761
22	Autorità Portuale di Venezia	Piano degli investimenti	https://www.port.Venezia.it/en/the-future-of-the-port-development-projects.html
23	Bologna Airport	Piano degli investimenti	http://www.bologna-airport.it/it/pagine-non-visibili/strategie-e-progetti/?IDFolder=1239&LN=IT
24	Autorità Portuale di Ravenna	Piano degli investimenti	http://www.port.ravenna.it/pagina-porto-1/documenti-di-pianificazione/

Slovenia

Regarding Slovenia, the primary source considered for this study is the draft presentation of the *National program on transport and transport infrastructure strategy*, currently under development by the Ministry of infrastructure and spatial planning of the Republic of Slovenia. Other relvant planning documentation is available at the following website of the Ministry of Infrastructure and Spatial Planning: http://www.mzip.gov.si/en/legislation_and_documents/, the most important studies are listed in the table E14.

Table B17 Slovenia (national studies)

#	Source	Description	Contractor
01	Slovenian railways	Increasing line speeds on the corridors V and X	Institute for Traffic and Transport Ljubljana l.l.c.
02	Slovenian railways	Analysis of the existing state of public infrastructure with proposed measures	Institute for Traffic and Transport Ljubljana l.l.c.
03	Ministry of infrastructure and spatial planning	Analysis of the opportunities and needs of the development of public infrastructure in the Republic of Slovenia	Institute for Traffic and Transport Ljubljana l.l.c.
04	SŽ infrastructure	Prediction of traffic by identifying bottlenecks and sought measures for their elimination	Institute for Traffic and Transport Ljubljana l.l.c.
05	Ministry of infrastructure and spatial planning	The design of alternative strategies, evaluation and proposal of a draft strategy Resolution on the National Programme for the Development of transport infrastructure in the Republic of Slovenia	PNZ consulting designing Ltd.
06	Ministry of infrastructure and spatial planning	Feasibility study of a new railway link Divača - Ljubljana and Ljubljana - Zidani Most	

Appendix C. BA Corridor Alignment

C.1. The alignment of the BA Corridor

The BA Corridor connects the Baltic ports in Poland with the ports of the Adriatic Sea in Italy and Slovenia. The annex 1 to the Regulation EU 1316/2013 provides the following definition of the alignment of the BA Core Network Corridor:

- Gdynia – Gdańsk – Katowice/Sławków;
- Gdańsk – Warszawa – Katowice;
- Katowice – Ostrava – Brno – Wien;
- Szczecin/Świnoujście – Poznań – Wrocław – Ostrava;
- Katowice – Žilina – Bratislava – Wien;
- Wien – Graz – Villach – Udine – Trieste;
- Udine – Venezia – Padova – Bologna – Ravenna;
- Graz – Maribor – Ljubljana – Koper/Trieste.

Figure C1 Schematic alignment of the BA Corridor

The backbone of the BA Corridor is the existing TEN-T core rail and road infrastructure linking the urban and transport nodes. Motorways of the Sea are the Northern and Southern extension of the corridor, widening its dimension to the Baltic and Mediterranean basins. Inland waterways are not an internal component of the BA Corridor, although interconnections with this mode are provided at the inland ports.

C.2. The nodes of the BA Corridor

Under a structural standpoint, the BA Corridor is defined by the two components of a transport or logistic infrastructure network: nodes and links. In line with the definitions of Regulation 1315/2013, the corridor nodes can be grouped into the following categories:

- Urban nodes, including their ports and airports;
- Passenger and freight airports;
- Seaports and inland waterways ports;
- Rail-road terminals.

The urban nodes are main nodes for passenger and freight traffic and include the capital city of each EU Member State and cities with EU capital function; in addition, other urban areas have been classified as TEN-T urban nodes based on socio-economic criteria (such as the "Metropolitan European Growth Area" in the ESPON9 Atlas 2006, all the conurbation or city cluster which exceed 1 million inhabitants and all the main city of an island or a of group of islands forming a NUTS 1 region with at least 1 million inhabitants).

In the framework of the new TEN-T approach, urban nodes play an important role within the multimodal Core Network, with regard to their infrastructure both for passengers and freight. They are particularly relevant in the following respect:

- They connect network links – both of the core and the comprehensive networks;
- They interconnect transport modes, thus enhancing multimodality;
- They connect long distance and/or international with regional and local transport (passengers and freight).

The quality of these connections contributes decisively to a well-functioning transport system, in particular to enhance public transport mobility chains and to achieve EU climate goals.

Table C1 Urban Nodes in the BA Corridor

Member State	Urban Nodes in the BA Corridor
Poland (PL)	Gdańsk, Warszawa, Łódź, Katowice, Szczecin, Poznań, Wrocław
Czech Republic (CZ)	Ostrava
Slovakia (SK)	Bratislava
Austria (AT)	Wien
Italy (IT)	Bologna, Venezia
Slovenia (SI)	Ljubljana

Source: Annex II of the Regulation EU 1315/2013

The list of nodes of the BA Corridor includes also the hubs of the transport and logistic infrastructure: airports, maritime ports, inland ports and rail-road terminals of the TEN-T Core network.

Table C2 Transport Nodes in the BA Corridor: airports, ports and rail-road terminals

MS	Node Name	Airport	Maritime Port	Inland Port	Rail-Road Terminal
PL	Gdynia, Gdańsk	Core (Gdańsk)	Core (Gdynia) Core (Gdańsk)		Core
PL	Warszawa	Core			Core
PL	Łódź	Core			Core (Łódź / Stryków)
PL	Katowice	Core (Pyrzowice)			Core (Sławków) Compr. (Gliwice / Pyrzowice)
PL	Szczecin, Świnoujście	Core (Szczecin)	Core (Szczecin) Core (Świnoujście)	Core (Szczecin) Core (Świnoujście)	Core (Szczecin) Core (Świnoujście)
PL	Poznań	Core			Core
PL	Wrocław	Core			Core
CZ	Ostrava	Core			Core
CZ	Přerov				Core
SK	Bratislava	Core		Core	Core
SK	Žilina				Core
AT	Wien	Core (Schwechat)		Core	Core
AT	Graz	Compr.			Core (Werndorf)
IT	Trieste	Compr.	Core	Core	
IT	Cervignano				Core
IT	Venezia	Core	Core	Core	
IT	Padova				Core
IT	Bologna	Core			Core
IT	Ravenna		Core	Core	
SI	Ljubljana	Core			Core
SI	Koper		Core		

Source: Annex II of the Regulation EU 1315/2013

At the current stage of our study, it is also worth mentioning that a number of transport infrastructure nodes exist along the route of the BA Corridor, but are not part of it under a legal standpoint, as they are not classified in the Core TEN-T network, due to their lower relevance at the EU scale. The list of such nodes is included in the table overleaf.

Table C3 Transport Nodes of the Comprehensive Network along the BA Corridor

MS	Node Name	Airport	Maritime Port	Inland Port	Rail-Road Terminal
PL	Bydgoszcz	Compr.			Compr.
PL	Police			Compr.	
CZ	Brno	Compr.			Compr.
SK	Leopoldov-Šulekovo				Compr.
AT	Klagenfurt – Villach	Compr. (Klagenfurt)			Compr. (Villach-Fürnitz)
IT	Chioggia		Compr.	Compr.	
IT	Forlì	Compr.			
IT	Monfalcone		Compr.	Compr.	
IT	Porto Levante		Compr.	Compr.	
IT	Porto Nogaro		Compr.	Compr.	
IT	Rovigo			Compr.	Compr.
IT	Treviso	Compr.			
SI	Maribor	Compr.			Compr.
SI	Portorož	Compr.			

Source: Annex II of the Regulation EU 1315/2013

C.3. The links of the BA Corridor

The second component of the BA Corridor is the multi-modal transport infrastructure links providing interconnections between the corridor nodes which are adequate for the long distance traffic. The transport links of the TEN-T core network cover the following infrastructure: inland waterways, railway and road. The land-based core network links are complemented by the "Motorways of the Sea", to give due access to insular Member States and to shortcut connections to or between peninsulas.

The BA Corridor does not include any inland waterway link; however, the Corridor interconnects with the inland waterway TEN-T Core Network at Bratislava, Wien (on the Rhine Alpine Core Network Corridor) and Szczecin (Core Network Corridor section Widuchowa – Odra River estuary on the Odra River, between Berlin and Szczecin, not belonging to any of the Core Network Corridors) where services are already in operation. Trieste, Venezia and Ravenna, also classified as inland ports, do not have connections at present although experiences and pilot projects have been already undertaken and are under consideration to promote the use of inland waterway transport in Italy. The backbone of the BA Corridor is therefore based on the railway and road routes described below.

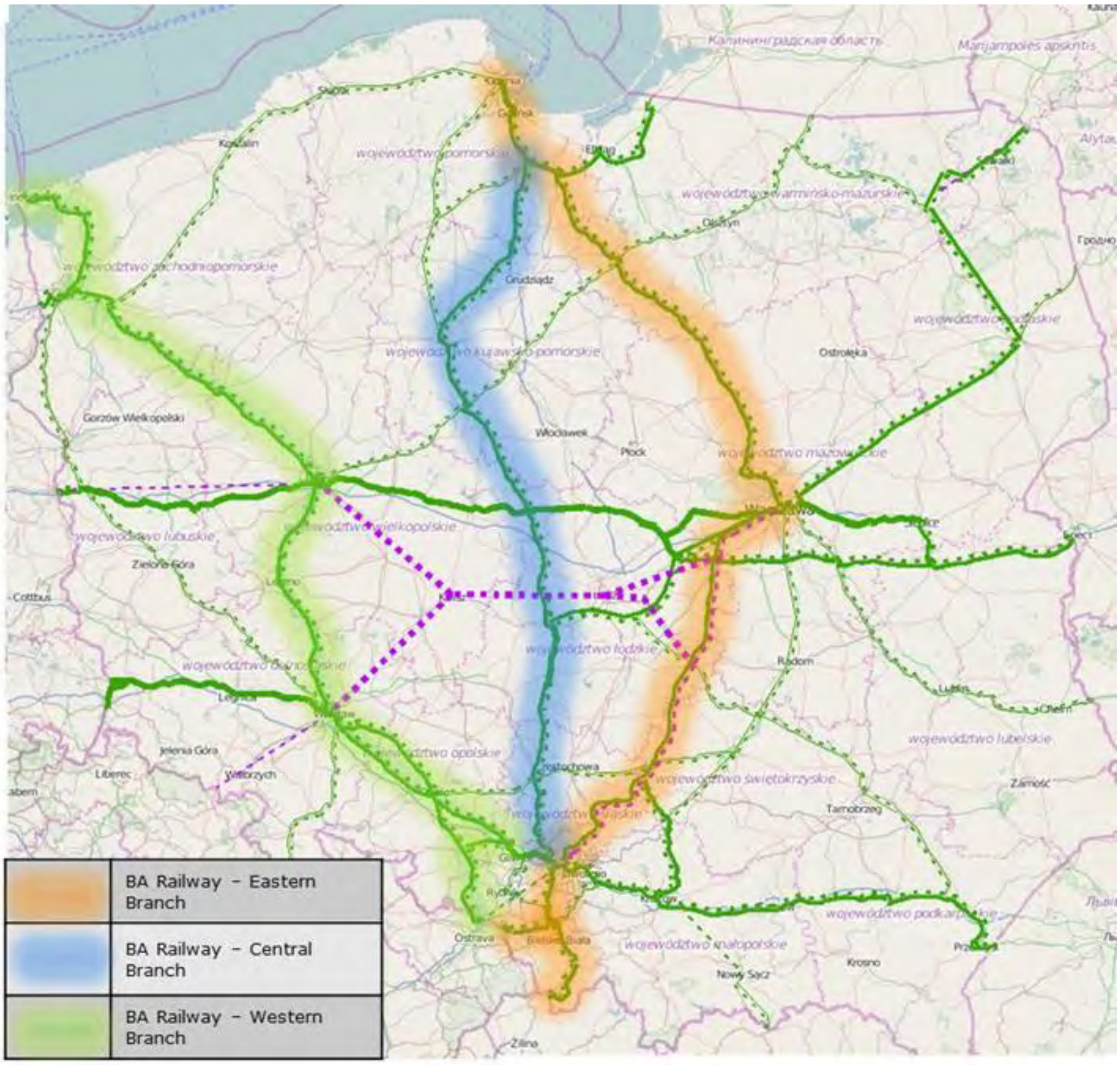
The definition of the corridor alignment for rail and road infrastructure is based on Regulations EU 1315/2013 and EU 1316/2013 and the information currently encoded in the TENtec system. The corridor route within urban nodes and "last mile" accessibility to transport nodes is not defined in detail in the regulation and TENtec database. Given the intermodal nature of the Core Network Corridors and the multimodal definition of the nodes, for the purposes of the work plan it may be assumed that the alignment within urban nodes may either be represented by the possible existing continuation of the links in urban areas or by other existing city or urban bypassing infrastructure. Similar approach could be considered for the last mile connection to the other nodes, including ports, rail road terminals and ports, particularly if located in urban nodes.

C.3.1. Railway infrastructure

In this section we provide an overview of the main Corridor railway infrastructure for each of the Member States. It should be noted that the corridor infrastructure also includes all the "last mile" connections to the corridor terminals, even if not explicitly mentioned in our description. The national codes for the rail lines are provided for reference.

Poland. The BA Corridor railway infrastructure in Poland is constituted of three main branches, one on the Western side of Poland and two (Eastern and Central branches) through Central Poland, as shown in the map overleaf.

Figure C2 Railway route of the BA Corridor (Poland)



Source: Own elaboration based on TENtec

The following main railway lines are included in the BA Corridor:

- Eastern branch (Central Poland):
  - 18654; (201, 202); [E65/C-E65]: Gdynia Port Centralny – Gdańsk Główny;
  - 140519155800000 (226); [E65/C-E65]: Gdańsk Port Północny – Pruszcz Gdański;
  - 18700, 18715, 18644, 18649, 18703; (9); [E65/C-E65]: Gdańsk Główny – Tczew – Malbork – Iława - Działdowo – Warszawa Wschodnia;

  - 140519161700000; (20, 509, 19, 1): Warszawa Praga – Warszawa Główna Towarowa – Józefinów – Piastów;
  - 18709; (1, 2); [E65/C-E65]: Warszawa Wschodnia – Warszawa Zachodnia;
  - 18723; (1); [E65/C-E65]: Warszawa Zachodnia – Grodzisk Mazowiecki;
  - 18658, 18667, 18721, 18659; (4); [E65/CE-65]: Grodzisk Mazowiecki – Szeligi – Idzikowice - Zawiercie;
  - 18751, 18752, 18727; (1); [E65]: Zawiercie – Dąbrowa Górnicza Ząbkowice – Katowice;
  - 18728, 2039653187, 18720, 18645; (139); [E65; C63]: Katowice – Czechowice Dziedzice (Most Wisła) – Żywiec - Zwardoń – (Skalité, SK);
  - 2039653185, 2039653188; (150, 93); [C-E65]: Czechowice Dziedzice (Most Wisła) – Zebrzydowice – (Petrovice u Karviné, CZ);
- Central branch (Central Poland):
  - 18718, 18731, 18676, 18725, 18655, 18688, 18753; (131, 201, 131, 741, 131); [C-E65]: Tczew – Bydgoszcz – Inowrocław - Ponętów – Tarnowskie Góry – Bytom - Chorzów Batory;
  - 18653; (137); [E30]: Chorzów Batory – Katowice;
  - 140604101200000; (164, 651, 141) [E59]: Chorzów Batory - Katowice Ligota.
- Western branch (Western Poland):
  - 18685, 18651; (401); [E59/C-E59]: Świnoujście – Goleniów – Szczecin Dąbie;
  - 18746, 140519160200000; (351, 855); [E59/C-E59]: Szczecin Dąbie – Szczecin Zdroje – Szczecin Port Centralny;
  - 18701, 18716, 18656; (351); [E59]: Szczecin Dąbie – Stargard Szczeciński – Krzyż Wielkopolski – Kiekrz – Poznań Główny;
  - 140519162700000; (395, 394, 352, 802); [E59]: Kiekrz – Zieleniec – Poznań Franowo – Poznań Starołęka – Luboń koło Poznania.
  - 18706, 18670, 18742; (271); [E59]: Poznań Główny - Leszno – Wrocław Popowice;
  - 18697; (271); [E59]: Wrocław Popowice – Wrocław Mikołajów;
  - Node of Wrocław 18647; (271, 132); [C-E30]: Wrocław Mikołajów – Wrocław Główny – Wrocław Brochów;
  - By-passing line in Wrocław 140519164500000; (756, 349): Wrocław Mikołajów – Wrocław Stadion – Wrocław Brochów;
  - 18646; (132); [C-E30]: Wrocław Brochów – Brzeg – Opole Główne - Opole Groszowice;
  - 18698, 18699; (277); [C-E30]: Wrocław Brochów – Jelcz – Opole Groszowice;
  - 18682; (136); [E30]: Opole Groszowice – Kędzierzyn Koźle;
  - 18748, 18744; (151); [E59]: Kędzierzyn Koźle – Chałupki – (Bohumín/Ostrava, CZ);
  - 18749, 18741, 18691; (137); [E30]: Kędzierzyn Koźle – Gliwice Łabędy – Chorzów Batory;
  - 21600017; (132, 135): Opole Groszowice – Pyskowice - Gliwice Łabędy.

In addition to the above lists, the relevant railway infrastructure in the main railway nodes and the interconnections to the passenger and freight terminals also belong to the Corridor as well as the "last mile connections" to the Ports like Gdańsk Główny – Gdańsk Zaspa Towarowa, as indicated by Port authorities.

It is worth noting that there are some railway sections that are part of the TEN-T comprehensive network and remain relevant bottleneck in terms of railway connection to the Baltic ports of Gdynia and Gdańsk:

- 21600016; 21600015; (201, 203) Comprehensive freight line Bydgoszcz - Trójmiasto, phase I, including line 201 and 203;
- 21600016; 21600015; (201, 203) Comprehensive freight line Bydgoszcz - Trójmiasto, phase II (together with electrification), including line 201 and 203.

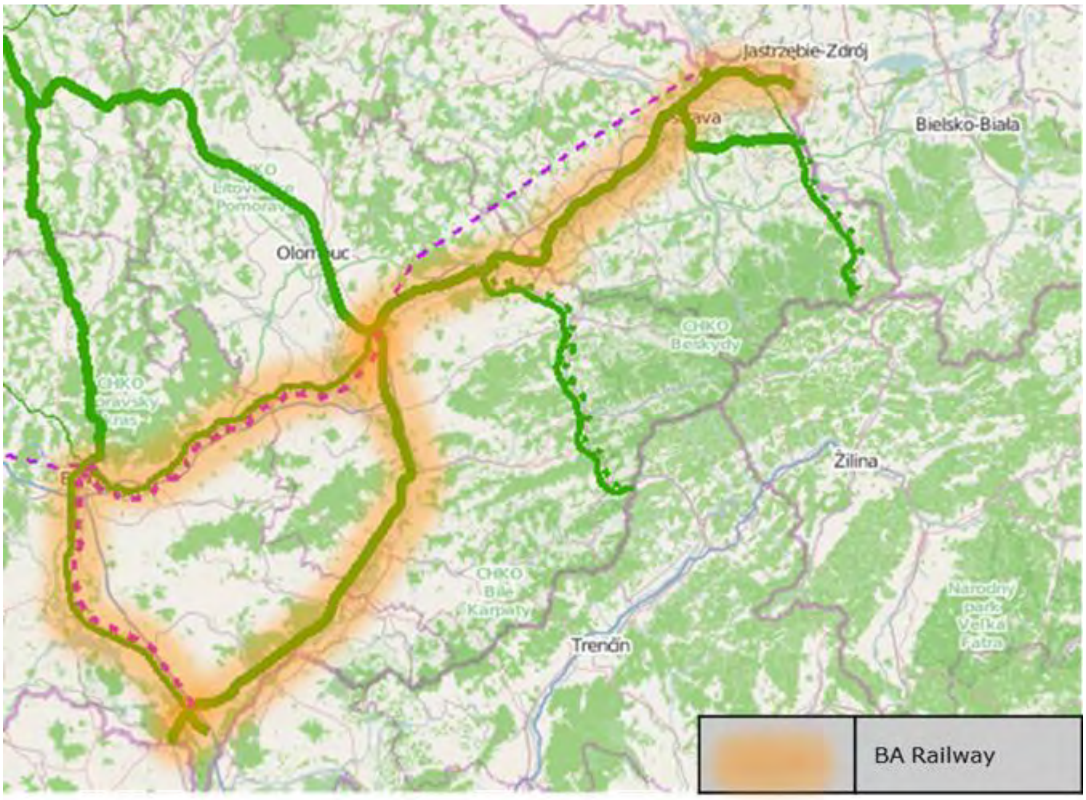
Both of these sections are foreseen to be implemented under the Multiannual Financial Framework 2014-2020. Our analysis takes into account these lines, which are relevant for the corridor multimodal integration, even if they are not included in the BA core network corridor alignment.

Czech Republic. The BA Corridor railway infrastructure in the Czech Republic includes the main line (Katowice) – Ostrava - Brno/Otrokovice – (Wien) and is composed of the following railway sections:

- 20392; (833): Petrovice u Karviné <--> Zebrzydowice;
- 20380; (320): Petrovice u Karviné <--> Detmarovice;
- 18808; (320): Dětmarovice <--> Bohumín;
- 18809; (836): Bohumín <--> Chałupki;
- 20298; (270): Bohumín <--> Ostrava;
- 20302; (270): Hranice na Moravě <--> Ostrava;
- 20301; (270): Hranice na Moravě <--> Přerov;
- 65435; (330): Přerov <--> Nedakonice (freight branch of BA Corridor only);
- 65351; (330): Nedakonice <--> Břeclav (freight branch of BA Corridor only);
- 20398; (300): Přerov <--> Holubice (passenger branch of BA Corridor only);
- 20404; (340): Brno <--> Holubice (passenger branch of BA Corridor only);
- 20300; (250): Brno <--> Břeclav (passenger branch of BA Corridor only);
- 18806; (801): Břeclav <--> Hohenau / Bernhardsthal (border CZ/A).

In addition to the above list, the Corridor also includes the relevant railway infrastructure in the main railway nodes and the interconnections to the rail-road terminals (Ostrava, Přerov) and airport (Ostrava - under construction).

Figure C3 Railway route of the BA Corridor (Czech Republic)



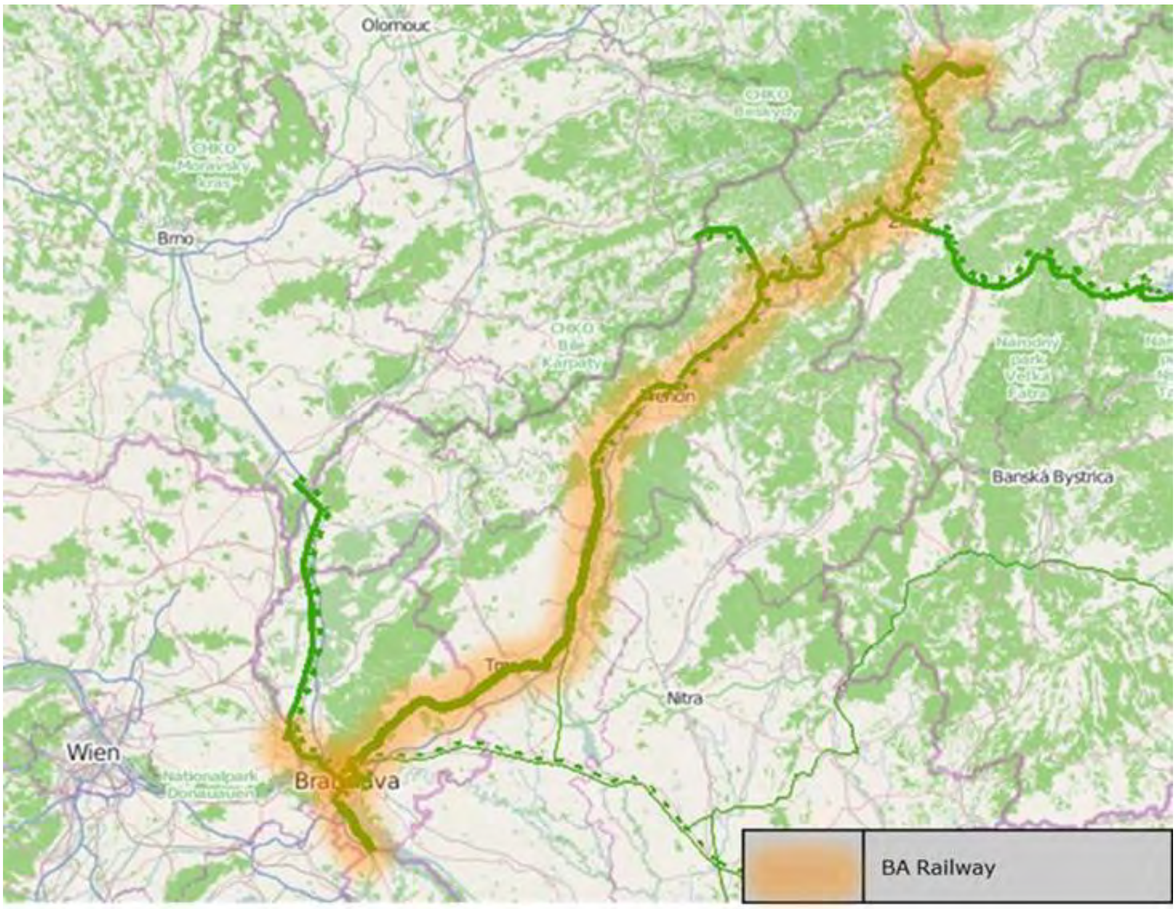
Source: Own elaboration based on TENtec

The double track section Brno - Blažovice is used by all trains to Uherské Hradiště and express trains to Přerov with no stops in this section (there are only three daily stop trains Brno - Vyškov and back together). The section from Holubice is used by trains Brno - Přerov using Holubice - Blažovice connecting line and passenger trains from Vyškov to Přerov. There is missing capacity to operate more passenger stop trains Brno - Přerov and bus service is organised instead. There are no passenger services on the section Bohumín - Chałupki.

Slovakia. The BA Corridor railway infrastructure in Slovakia includes the main line (Katowice) – Žilina - Bratislava – (Wien) and is created by these railway sections:

- 18509; (129) Skalité <--> Zwardoń;
- 18508; (129) Čadca <--> Skalité;
- 18477; (127) Žilina <--> Čadca;
- 140519173000000;Žilina <--> Žilina (RRT) (freight only, under construction);
- 18490; (120) Púchov <--> Žilina;
- 72600; (120) Nové Mesto Nad Váhom <--> Púchov;
- 72601; (120) Leopoldov <--> Nové Mesto Nad Váhom;
- 18499; (120) Bratislava <--> Leopoldov;
- 18479; (132) Bratislava <--> Petržalka (freight only);
- 18498; (110) Devínska Nová Ves <--> Bratislava (passenger only);
- 18506; (A) Marchegg <--> Devínska Nová Ves (passenger only);
- [Austrian TENtec ID 20520: (B) Kittsee <--> Petržalka (freight only)]

Figure C4 Railway route of the BA Corridor (Slovakia)



Source: Own elaboration based on TENtec

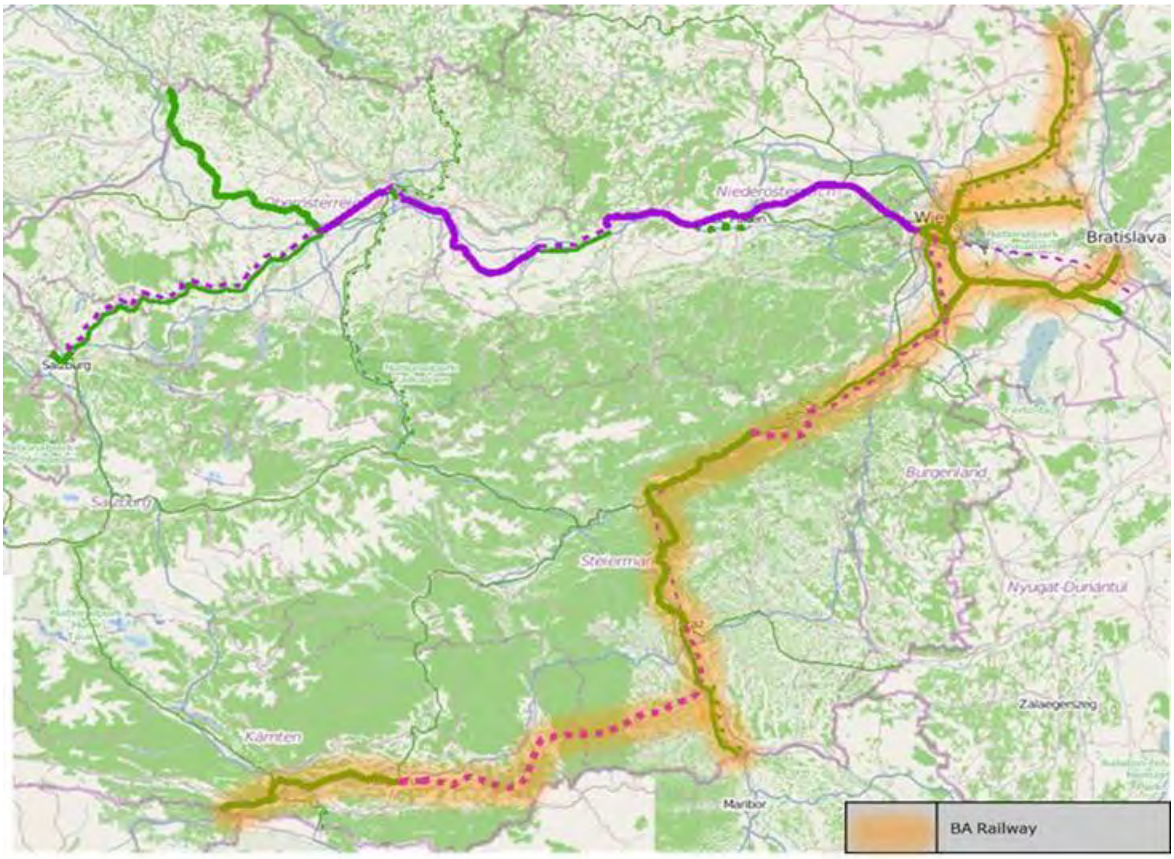
In addition to the above list, the Corridor also includes the relevant railway infrastructure in the main railway nodes and the interconnections to the rail-road terminals (Žilina, Bratislava), and inland port (Bratislava).

Track 129 and Track 127 are parallel in the section Svrčinovec – Čadca, only single track section Svrčinovec – Čadca belongs to BA corridor. There is no passenger service on the freight corridor branch section Bratislava – Bratislava, Petržalka. Passenger service towards Wien on Kittsee line starts in Bratislava at Petržalka station.

Austria. The BA Corridor railway infrastructure in Austria includes the following main lines:

- 19700055; (11401/11601): (Břeclav , CZ) - Bernhardsthal Fbf - Wien Hauptbahnhof;
- 20503/20519; (11801/19401): Wien Hauptbahnhof – Kittsee - (Bratislava Petržalka, SK);
- 20464; (10501): Wien Hauptbahnhof – Wien Meidling;
- 20487; (10601): Wien Meidling – Wiener Neustadt Hauptbahnhof;
- 190700005; (10501): Wiener Neustadt Hauptbahnhof – Spielfeld-Straß - (Sentilj, SI);
- 20466;[]:Graz – Klagenfurt (Koralm Tunnel) [under construction]
- 20457; (41301): Klagenfurt – Thörl-Maglern - (Tarvisio B., IT);
- 19700033;[]:Gloggnitz–Mürzzuschlag (Semmering Base Tunnel) [under construction];
- 20516; (11701): Stadlau (Wien) –Marchegg – (Devínska Nová Ves, SK);
- 19700010; (11901): Gramatneusiedl – Wampersdorf.

Figure C5 Railway route of the BA Corridor (Austria)



Source: Own elaboration based on TENtec

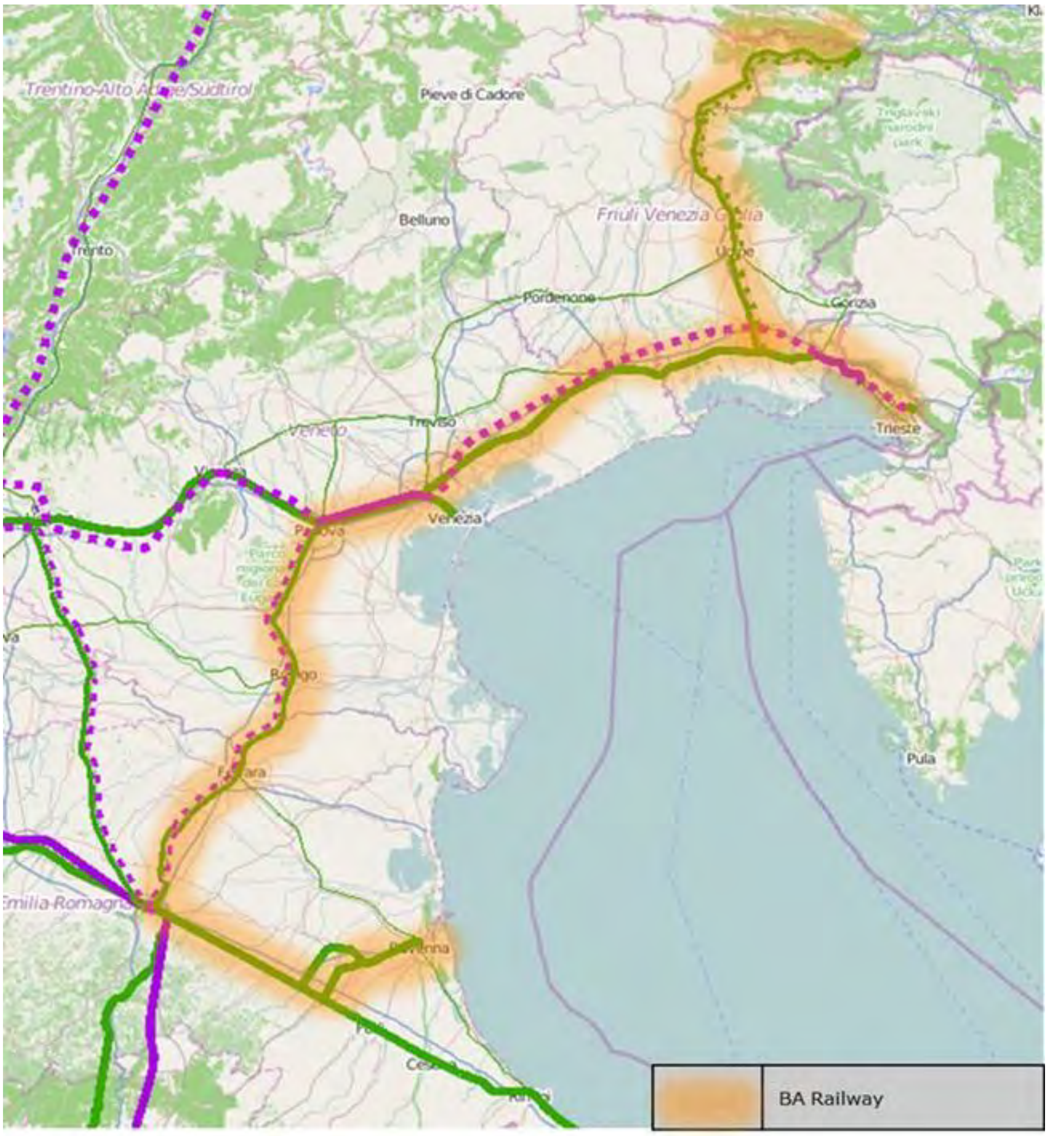
Based on the currently available information, we understand that the line Wien Meidling – Wiener Neustadt Hauptbahnhof (section of line number 10501) is not included in the corridor, although it is the main passenger traffic line for this connection.

Italy. The BA Corridor railway infrastructure in Italy includes the following lines belonging to the core network::

- 18947; (J37, J38): Tarvisio <--> Thoerl-Maglern (border A/I) / Border IT/AT II
- 22400030; (J37, J38): Tarvisio <--> Carnia
- 22400031; (J37, J38) Carnia <--> PM VAT
- 19251; (J37, J38) PM VAT <--> Udine
- 22400196; (K94, K95) Udine <--> Privano
- 22400197 (K94, K95) Privano <--> Cervignano A.G.
- 19032; (J35, J36) Border IT/SL I / Sežana II <--> Villa Opicina
- 19035; (J35, J36) Villa Opicina <--> Bivio Aurisina
- 22400033; (J35, J36) S.Polo Junction <--> Bivio Aurisina
- 22400032; (J35, J36) Ronchi dei Legionari Sud <--> S.Polo Junction
- 18953; (J35, J36) Cervignano A.G. <--> Ronchi dei Legionari Sud
- 18902; (J35, J36) Portoguaro <--> Cervignano A.G.
- 18962; (J35, J36) Venezia Mestre <--> Portoguaro
- 18785; (J35, J36) Venezia Mestre <--> Venezia S.L.
- 18954; (J35, J36) Padova <--> Venezia Mestre (high speed)
- 18989; (J35, J36) Padova <--> Venezia Mestre
- 22400143; (J31, J32) Padova <--> Monselice
- 22400144; (J31, J32) Monselice <--> Rovigo
- 22400142; (J31, J32) Rovigo <--> Ferrara
- 22400014; (J31, J32) Ferrara <--> San Pietro in Casale
- 22400012; (R5) San Pietro in Casale <--> Castel Maggiore
- 22400013; (R5) Castel Maggiore <--> Bologna Centrale
- 22400023; (R5) Bologna Centrale <--> San Vitale Junction
- 22400022; (R5, J63) San Vitale Junction <--> Castel Bolognese
- 22400027; (J63) Castel Bolognese <--> Faenza
- 22400026; (K106-7-8) Castel Bolognese <--> Ravenna
- 22400024; (K103) Granarolo <--> Faenza
- 22400025; (K108-9) Ravenna <--> Granarolo

It is worth mentioning that the BA passenger rail corridor include the planned high speed line between Venezia and Trieste, while the freight corridor follows the existing route along the conventional rail line. In addition to the above list, the Corridor also includes the relevant railway infrastructure in the main urban nodes and the interconnections to the passenger and freight terminals.

Figure C6 Railway route of the BA Corridor (Italy)



Source: Own elaboration based on TENtec

It is worth noting that there are some railway section that are part of the TEN-T comprehensive network and, until the realization of Venezia-Trieste high speed line and Udine-Cervignano doubling, represent the most utilized freight link to Venezia, Ravenna and Trieste ports:

- Udine-Gorizia
- Gorizia-Bivio S.Polo
- Udine-Treviso
- Venezia Mestre-Treviso
- Castelfranco - Treviso
- Caltelfranco - Camposampiero
- Camposampiero- Padova

Our analysis will take into account these lines, which are relevant for the corridor multimodal integration, even if they are not included in the BA core network corridor alignment.

Slovenia. The BA Corridor railway infrastructure in Slovenia includes the following main lines:

- 18189, 18186, 18177; (E67): (Spielfeld-Straß, AT) - Šentilj – Maribor – Pragersko – Celje - Zidani Most;
- 18190 (E70): Zidani Most – Ljubljana;
- 22000003, 2000002, 2000001, 18185, 18183, 18193, 18180; (E65): Ljubljana – Postojna – Divača/Sežana - (Villa Opicina/Trieste, IT);
- 18197; E69: Divača – Koper.

In addition to the above list, the Corridor also includes the relevant railway infrastructure in the main railway nodes and the interconnections to the passenger and freight terminals.

Figure C7 Railway route of the BA Corridor (Slovenia)

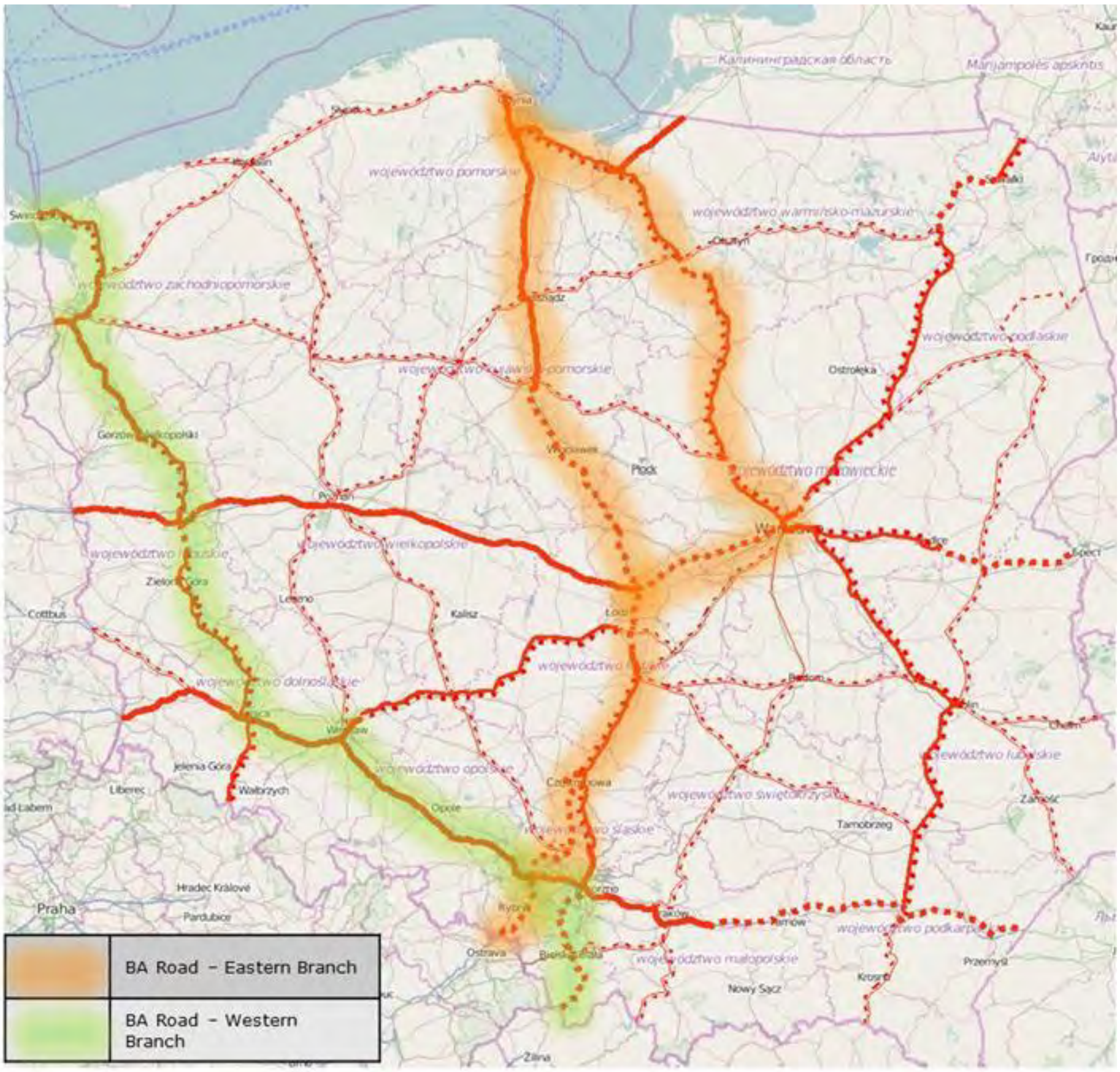
Source: Own elaboration based on TENtec

C.3.2. Road infrastructure

In this section we provide an overview of the main Corridor road infrastructure for each of the Member States, also including for reference the official national road codes. It should be noted that the corridor infrastructure also includes all the connections to the corridor terminals, although not explicitly mentioned in our description.

Poland. The BA Corridor road infrastructure in Poland includes two main routes, an Eastern branch one through Central Poland and one Western Branch through Western Poland, as shown in the map overleaf.

Figure C8 Road route of the BA Corridor (Poland)



Source: Own elaboration based on TENtec

The following express road and highways are included in the Corridor:

- Eastern/central branch (Central Poland):
  - 21600040; (S6): Gdynia – Gdańsk;
  - 24209, 24249, 24259, 24196, 24206, 24233; (S7, 7): Gdańsk – Elbląg – Ostróda – Olsztynek – Płońsk – Załuski – Warszawa;
  - 64585, 24202; (7, S8): Warszawa;
  - 24242; (A2): Warszawa (Konotopa) – Łódź (Stryków);
  - 21600041, 24231, 24218, 24274, 24275, 7, 24193, 24265, 14, 24237, 21, 24273, 24276; (A1, 1): Gdańsk (Rusocin) – Nowe Marzy – Toruń – Czereniewice – Bedlno – Stryków (Łódź) – Tuszyn – Piotrków Trybunalski – Częstochowa – Pyrzowice – Gliwice (Sośnica) – Gorzyczki – (Věřňovice, CZ);
- Western branch (Western Poland):
  - 24221, 24197, 21600034, 21600035, 3, 24247, 24211, 24208; (S3, 3, A6): Świnoujście - Goleniów – Szczecin – Gorzów Wielkopolski – Jordanowo – Świebodzin – Sulechów – Nowa Sól – Legnica;
  - 24226, 73201, 24228, 24222, 24229, 24257, 24238, 24264, 24212, 24220, 24213; (A4): Legnica – Bielany Wrocławskie – Gliwice (Sośnica) – Katowice (Kosztowy);

- 24272; (S1, 1): Katowice (Kosztowy) – Tychy – Bielsko-Biała;
- 24214; (S69, 69): Bielsko-Biała – Żywiec – Zwardoń – (Skalité, SK).

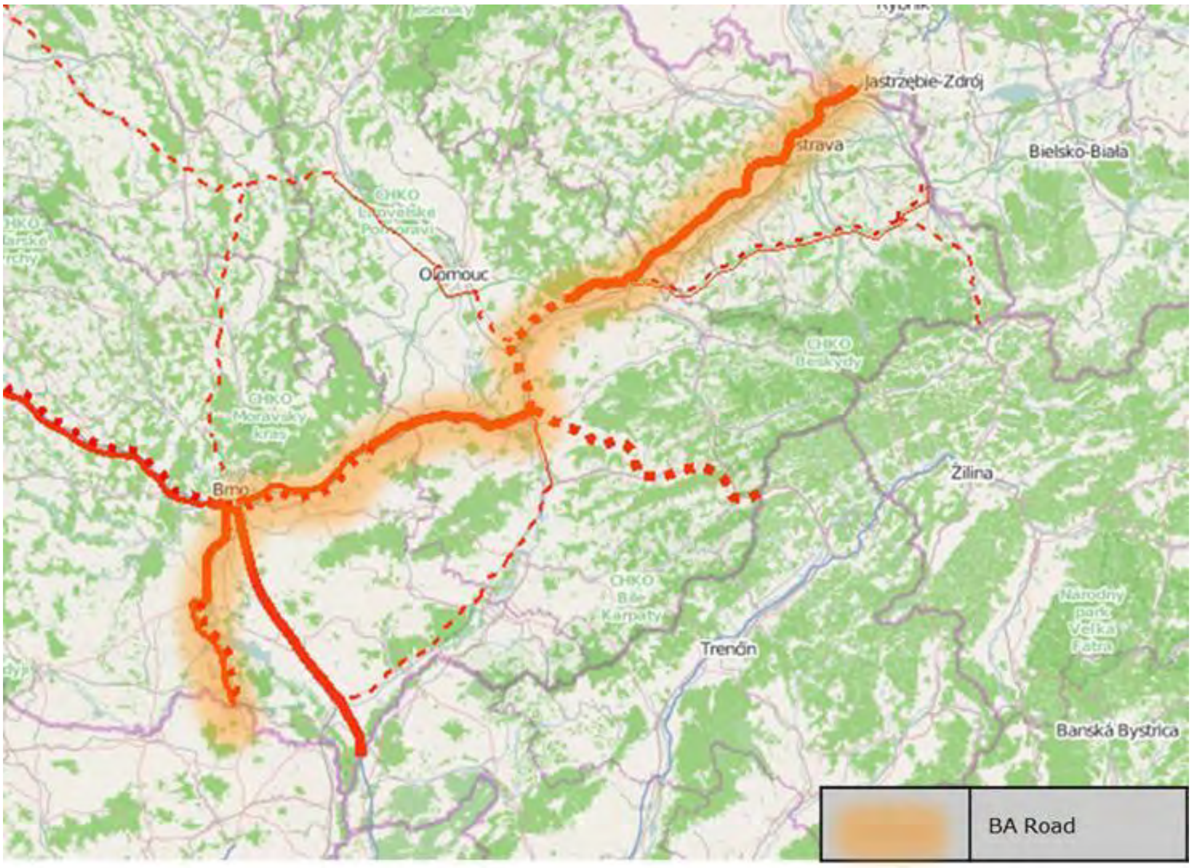
In addition to the above lists, the Corridor also includes the interconnections to the passenger and freight terminals. We note that the section Warszawa – Radziejowice of the S8, will be modernised during the 2014-2020 Multiannual Funding Framework. Section Warszawa – Piotrków Trybunalski (length of approximately 130 km, which contains section Warszawa – Radziejowice) as such is not part of the BA Corridor, it belongs to the TEN-T comprehensive network by legal definition (Reg. EU 1315/2013), but could be considered alterative road connection to A2 Warszawa – Łódź and A1 Stryków – Łódź – Piotrków Trybunalski. We also note that Polish authorities identified the need of including S1 express road starting from Pyrzowice (not Katowice) to Bielsko - Biała. The A1 and S1 meet in Pyrzowice, where from the A1 road splits into two directions into South: Czech Republic (via A1) and Slovakia (via S1 and S69). Section Pyrzowice – Katowice (Kosztowy) has a status of express road and partially belongs to the core network, but part if it - section Pyrzowice – Wojkowice Kościelne does not belong to the core network (not even comprehensive). This alternative connection from Pyrzowice towards South could be considered as functionally relevant for the traffic along the BA corridor to Slovakia, allowing for going straight forward through Śląsk area (without bypassing Gliwice).

Czech Republic. The BA Corridor road infrastructure in the Czech Republic on the mail line (Katowice) – Ostrava - Brno – (Wien) includes the following sections:

- 26012; (D1) Gorzyczki/Věřňovice <--> Bělotín;
- 26017; (D1) Bělotín <--> Lipník;
- 26038; (I/47, I/55) Lipník <--> Kroměříž;
- 26010; (D1) Kroměříž <--> Vyškov;
- 26037; (D1) Vyškov <--> Brno (jih);
- 26003; (D1) Brno <--> Brno (jih);
- 26006; (R52, I/52) Pohořelice <--> Brno;
- 26057; (I/52) Pohořelice <--> Mikulov / Drasenhofen (boarderline).

In addition to the above list, the Corridor also includes the interconnections to the freight terminals in Ostrava and Přerov and to Ostrava airport. Future D1 motorway in the section Lipník nad Bečvou – Říkovice is defined as the part of corridor, this part is in construction preparation planned to be finished till 2021 and it is bypassed using R35 and R46 expressways nowadays. Based on the current definition of the corridor infrastructure, the four lane express urban road I/52 with TEN-T core standards is part of corridor in Brno-Modřice section and express road I/52 in short section Modřice – Rajhrad. The two lane first class road I/52 with level junctions and pedestrian crossings is part of the corridor in the section Pohořelice – Mikulov (border to Austria), where the expressway is in preparation, Perná – Mikulov part of section is to be finished till 2020, the time horizon for the construction of the rest of section being still unclear.

Figure C9 Road infrastructure of the BA Corridor (Czech Republic)



Source: Own elaboration based on TENtec

Slovakia. The BA Corridor road infrastructure in Slovakia on the mail line (Katowice) – Žilina - Bratislava – (Wien) includes the following sections:

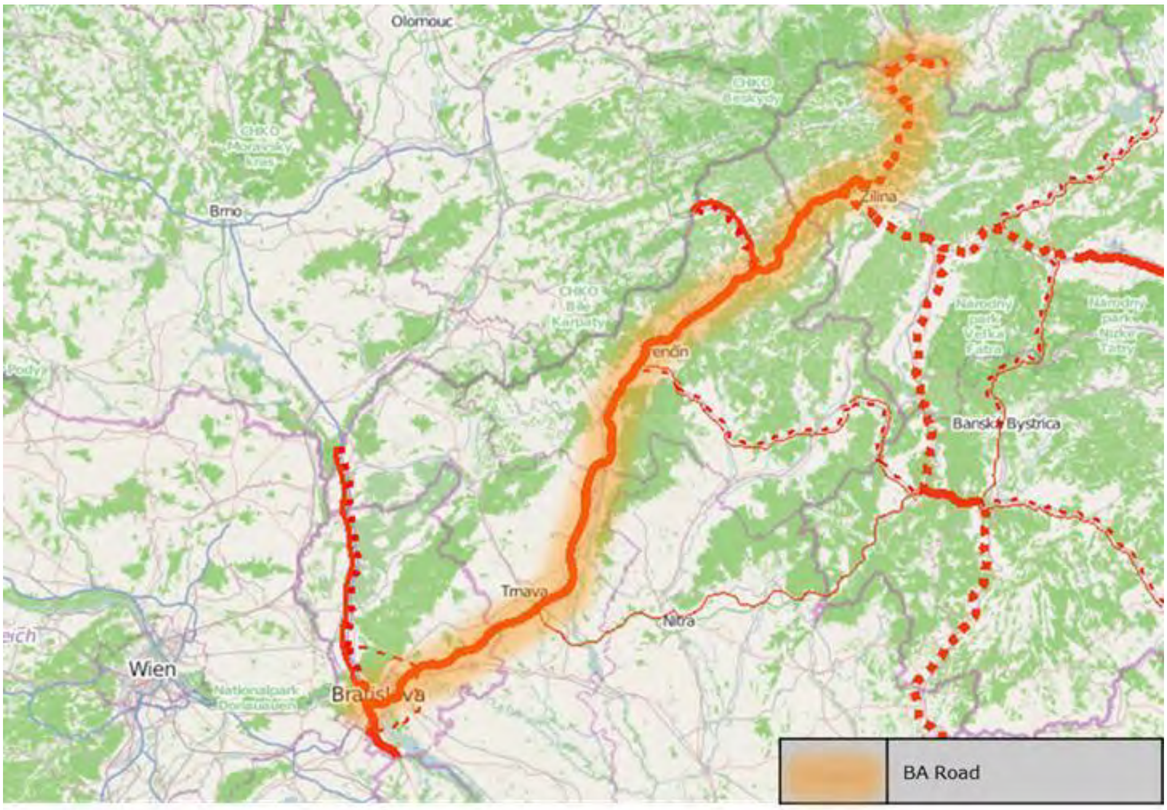
- 71462; (D3, I/12): Zwardoń (border PL/SK) <--> Skalité;
- 23867; (I/12): Skalité <--> Svrčinovec (D3 under construction);
- 71332; (I/11): Svrčinovec <--> Čadca (D3 in preparation);
- 73203; (I/11): Čadca <--> Oščadnica (D3 in preparation);
- 71340; (I/11): Oščadnica <--> Kysucké Nové Mesto (D3 in preparation);
- 23888; (I/11): Kysucké Nové Mesto <--> Žilina (Brodno) (D3 in preparation);
- 71476; (I/11,I/18): Žilina (Brodno) <--> Žilina (Strážov) (D3 under construction);
- 71455; (D3): Žilina (Strážov) <--> Hričovské Podhradie;
- 23892; (D1): Hričovské Podhradie <--> Vrtižer;
- 71232; (D1): Vrtižer <--> Sverepec;
- 71239; (D1): Sverepec <--> Ivanka pri Dunaji – sever;
- 71441; (D1): Ivanka pri Dunaji - sever <--> Petržalka/Berg (border SK/A);
- 21900015; (D2): Petržalka/Berg (border SK/A) <--> Jarovce/Kittsee (border SK/A);
- 21900013; (D4): Petržalka/Berg (border SK/A)* <--> Border (SK/A)

* Wrong name of the junction. It is Jarovce/Kittsee in relation to previous section.

In addition to the above list, the Corridor also includes the interconnections to the freight terminal under construction in Žilina, Teplička, to the inland port with rail-road terminal in Bratislava and to the airport in Bratislava.

Based on the current definition of the corridor, the future D3 motorway is defined as the part of corridor, although there are parts (Žilina, Strážov – Žilina, Brodno and Skalité – Svrčinovec) in construction and parts (Žilina, Brodno – Svrčinovec) in preparation, the plan being to complete it by 2020. The currently existing road infrastructure is not included in the corridor definition. The section Skalité - Svrčinovec is using narrow road I/12 with speed limits 40 km/h and no access of freight transport above 7.5 t.

Figure C10 Road infrastructure of the BA Corridor (Slovakia)

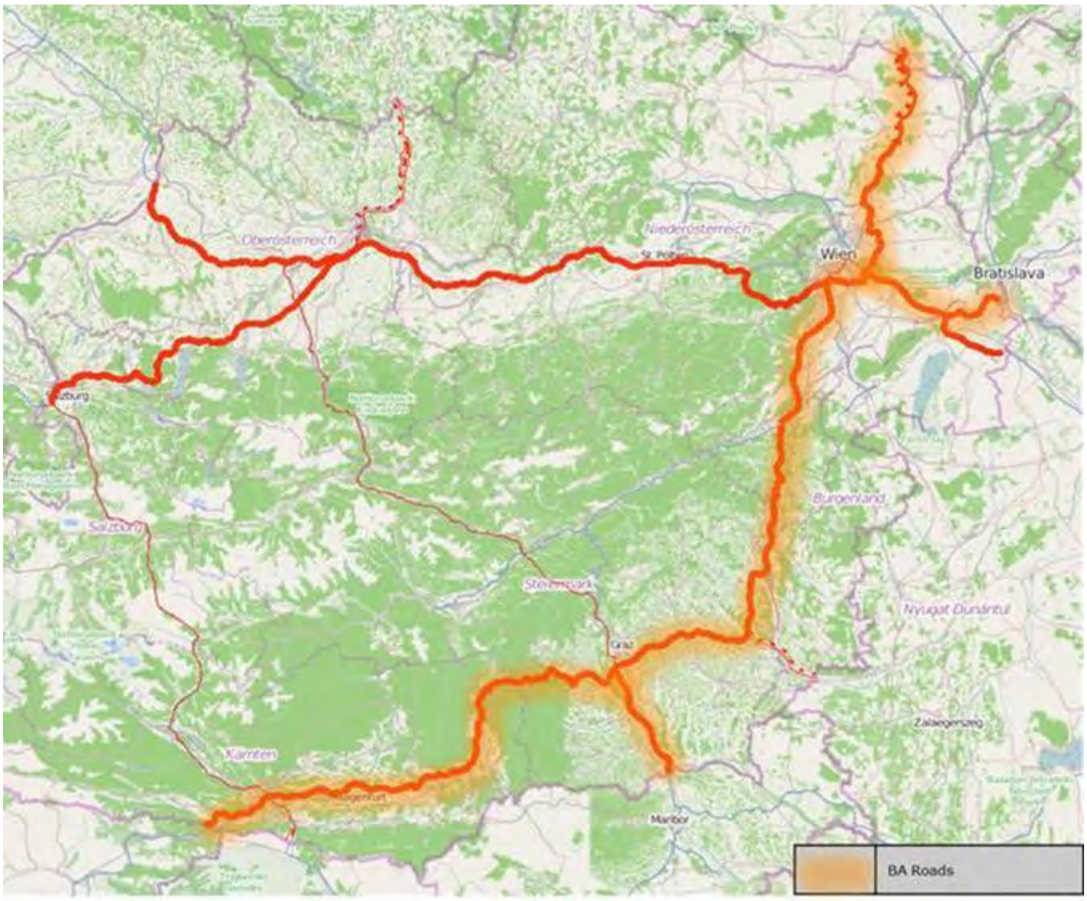


Source: Own elaboration based on TENtec

Austria. The BA Corridor road infrastructure in Austria includes the following main links:

- 26244; A5: Schrick – Drasenhofen - (Mikulov, CZ) [part of section under construction];
- 26247; S1: Süßenbrunn – Eibesbrunn;
- 26248; S1: Vösendorf - Schwechat – Süßenbrunn [part of section planned];
- 26246; A4: Bruckneudorf – Schwechat;
- 26242; A6: (Jarovce, SK) - Kittsee – Bruckneudorf;
- 26264; A2: (Tarvisio, IT) - Arnoldstein– Villach;
- 26262; A9: Graz West – Spielfeld-Straß – (Šentilj, SI).

Figure C11 Road infrastructure of the BA Corridor (Austria)



Source: Own elaboration based on TENtec

Italy. The BA Corridor road infrastructure in Italy includes the following highways:

- 24437, 24436, 24499; (A23): (Arnoldstein, AT) - Tarvisio – Udine – Palmanova [Cervignano];
- 24404, 22400334, 22400071; (A4): (Sežana, SI) - Trieste – Palmanova - Venezia;
- 24507, 22400319; (A57): Tangenziale di Mestre;
- 22400255, 24480; 22400181, 22400222, A13: Padova – Bologna;
- 24544, 22400004; (A14): Bologna – Ravenna;
- 24562 (RA13): Sistiana–Cattinara;
- 22400206 (RA14): Opicina – Fernetti.
- 22400047 7.9 14.490 km

In addition to the above list, the Corridor also includes the interconnections to the passenger and freight terminals. Based on the current definition of the corridor infrastructure, the highway sections of the Raccordo Autostradale Villesse – Gorizia (not included in the TEN-T network, part of the A4 concession) and the Passante di Mestre (comprehensive TEN-T network, also part of the A4 Concession) are not part of the Corridor, although they both serve long distance traffic and are functionally relevant for the international traffic flows. Similar consideration could also be done for the E55 between Venezia and Ravenna (at its planning development stage) and the E45 between Cesena and Ravenna. Part of the Core Network, but not included in the alignment of the BA Corridor is also the section Villa Opicina (J. RA13/RA14) – Padriciano (Trieste Porto R13) [TENtec Id 22400205]. These roads will be however taken into account in our analysis and in particular in the market study.

Figure C12 Road infrastructure of the BA Corridor (Italy)

Source: Own elaboration based on TENtec

Slovenia. The BA Corridor road infrastructure in Slovenia includes the following highways:

- 23837, 23851, 23848, 23843, 23841, 23847, 23853; (A1): (Spielfeld-Straß, AT) – Šentilj – Maribor – Celje – Ljubljana – Postojna – Razcep Razdrto - Razcep Gabrk – Koper;
- 23845; (A3): Razcep Gabrk – Sežana – (Trieste, IT).

In addition to the above list, the Corridor also includes the interconnections to the passenger and freight terminals. We therefore understand that the road section link to the airport Ljubljana – section A2: Ljubljana Kosece – Kranj-vzhod is also part of the BA Corridor.

Based on the current definition of the corridor infrastructure, the H4 highway Razcep Razdrto – Nanos – Ajdovščina - Vrtojba towards Gorizia is not part of the Corridor, although it currently serves long distance traffic.

Figure C13 Road infrastructure of the BA Corridor (Slovenia)

Source: Own elaboration based on TENtec

C.4. Cross-border sections

The table below summarizes the rail and road cross-border sections included in the BA Corridor, as identified on the basis of the criteria described in the main report, end of Section 4.2.1.

Table C4 Cross-border sections of the BA Corridor

Border		Railway	Road
PL	CZ	Opole (PL) – Ostrava (CZ); [Chałupki (PL) – Bohumín (CZ)]	Gliwice (Sosnica J. E040/E075) (PL) – Ostrava (CZ); [(Gorzyczki (PL) – Bohumín (CZ)]
PL	CZ	Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]	
CZ	AT	Břeclav (CZ) – Wien (Stadlau); (AT) [Břeclav (CZ) – Hohenau / Bernhardsthal (AT)]	Brno (CZ) – Wien (Schwechat) (AT); [Mikulov (CZ) – Mistelbach (AT)]
PL	SK	Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]	Katowice (PL) – Žilina (Brodno) (SK); [Zwardoń (PL) – Skalité (SK)]
SK	AT	Bratislava (SK) – Wien (Inzersdorf) (AT); [Petržalka (SK) - Kittsee (AT)]	Bratislava (Petržalka) (SK) – Wien (Schwechat) (AT); [Jarovce (SK) - Kittsee (AT)]
SK	AT	Bratislava (SK) – Wien (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]	
AT	IT	Villach (AT) – Udine (IT); [Thörl-Maglern (AT) - Tarvisio B. (IT)]	Villach (AT) – Udine (IT); [Arnoldstein (AT) – Tarvisio (IT)]
AT	SI	Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]	Graz West (AT) – Maribor Pesnica (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]
IT	SI	Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]	Trieste (IT) - Divača (SI); [Fernetti (IT) - Divača (SI)]

Appendix D. Characteristics of the BA Corridor

D.1. Overview and methodological remarks

In this Appendix we provide basic information and TENtec data on the current characteristics of the corridor infrastructure for the infrastructure belonging to the BA Corridor, namely rail and road links and transport nodes, namely: ports, airports and rail-road terminals.

The analysis of the rail and road links is commented with reference to the cross-border sections and to the wider national networks belonging to the BA Corridor. Particularly regarding the rail and road links, critical issues have been identified with reference to the physical and technical characteristics of the rail and road infrastructure, based on the analysis of the compliance to the requirements set by Regulation EU 1315/2013, as also presented in the main report, Sections 4.2.2 and 4.2.3 for rail and roads respectively. Issues have been also described based the review of available studies and consultation with the stakeholders. When possible, based on studies and information made available by the concerned infrastructure managers, the description of the BA Corridor critical issues has been presented divided into 3 main paragraphs:

- Analysis of the existing infrastructure including description of the critical issues, if applicable;
- On-going works; and
- Review of existing studies.

The analysis of the main characteristics of the transport nodes has been undertaken based on the review of available information from the operators and infrastructure managers. The description provided also includes information about the interconnection between

This Appendix does not include information on the implementation of ITS and ICT technology for interoperability and promotion of interoperable and intermodal transport solutions (except for RIS in the IWW dedicated section), as well as simplification of administrative procedures and processes aimed at reducing travel and transit times, particularly for freight transport. These elements have been commented at Appendix B as well as at Section 4.4.6 and 4.4.7 of the main report focussing on interoperability and operational and administrative barriers.

The alignment of the BA Corridor does not include inland waterway links. However the BA Corridor interconnects with inland waterways at its inland ports, particularly in Bratislava, Wien and Szczecin, where services are already in operation. Trieste, Venezia and Ravenna, also classified as inland waterway ports, do not have regular services at present.

Due to the relevance of Inland waterways for the development of intermodal transport, a brief description of the inland waterways networks per each of the five member states having inland waterways has been provided, primarily reporting the results from the study by Panteia: *RIS implementation survey and policy evaluation – Country Reports, July 2014*. This information has been included particularly to comment on the deployment of the RIS related technology. Comments received from the stakeholders have been reflected in this report; however no independent analysis of the inland waterway sections has been undertaken as part of this study. Only inland waterway core ports have been basically described also including their related investments.

D.2. Characteristics of the rail infrastructure

D.2.1. Cross-border sections

There are 9 cross-border sections in operation on the BA Corridor. The technical parameters for these sections as included in the TENtec database are included in tables below providing the data for the national sections.

Railway connections: Opole (PL) – Ostrava (CZ); [Chałupki (PL) – Bohumín (CZ)] and Katowice (PL) - Ostrava (CZ); [Zebrzydowice (PL) – Petrovice u Karviné (CZ)]

Analysis of the existing infrastructure. The corridor infrastructure between Poland and Czech Republic includes two rail cross-border sections: Raciborz (PL) – Bohumín/Ostrava (CZ) and Katowice (PL) - Petrovice u Karviné (CZ). On the Polish side, the first section is part of the line to Wrocław in the West of Poland, while the second line goes to the Central and Eastern part of the country. On the Czech side, these two rail lines interconnect in Bohumín and continue to Břeclav.

The short subsection Chałupki – Bohumín is composed of two different single tracks electrified lines. The state of infrastructure on the Polish side, specifically 20 km long section Racibórz-Chałupki (part of Opole-Chałupki) requires modernisation, due to speed limitations for freight and passengers traffic (50 km/h at almost 17 km) on one of the tracks. In addition to this, 80% of this section lacks the required axle load level (allowing only 206 kN/axle). Moreover, the section on the Polish side is available only for trains with maximum length up to 600 m. Two parallel single track sections right on the state border: Bohumín Vrbice / Bohumín - Chałupki allow a maximum speed of 100 km/h for passenger and freight transport, the optimisation of Bohumín station was finished in 2005 including switches to Chałupki.

The cross-border section Katowice–Czechowice-Dziedzice (Most Wisła)–Zebrzydowice – Petrovice u Karviné consists of double track electrified railway infrastructure. The total length of section from Katowice-Zebrzydowice is 74 km. Both tracks have the same speed limits for passenger and freight trains. The highest maximum speed on this section is 120 km/h., applying to 72% of the total section length. The lowest maximum speed on the section is 70 km/h, only applying to 12% of the total section length only. Additionally, 45% of this section lacks the required axle load level (196 kN/axle). The section on the Polish side allows traffic of trains with maximum length up to 600 - 650 m.

The section from the state border to Petrovice u Karviné and Ostrava (part of 2nd Czech national transit railway corridor) was modernised and since 2002 allows operating trains up to a maximum speed of 120 - 160 km/h. Construction works aimed at modernising the infrastructure on the Czech Republic side were undertaken and completed on the following sections:

- Modernisation of Czech 2nd national railway corridor section Polish border – Ostrava Břeclav 2001 – 2009;
- Modernisation of railway junction Bohumín 2003 – 2005.

Speed bottlenecks are still present at Petrovice u Karviné station (65 km/h) and Dětmarovice station (60 km/h). The maximum train length is up to 690-700 m. The line is equipped with GSM-R and ETCS is planned to be implemented by 2017.

On-going works. There are no on-going works on this cross-border section of the BA Corridor.

Review of studies. Feasibility Study for section Kędzierzyn-Koźle - Chałupki (state border) is planned to be completed in 2016. Objectives for the modernization of this section include improvement of international connections parameters, freight transport speed increase, and increase of axle load and train length as well as traffic safety and ERTMS.
Preparatory works for modernisation of railway line E65 South, Grodzisk Mazowiecki – Kraków/Katowice – Zwardoń/Zebrzydowice – state border are on-going; expected to be completed by 2015. Preparatory works includes elaboration of preliminary geotechnical design and conceptual documentation, elaboration of environmental decision, localisation decision, preliminary design and tender documentation for construction works contractor. Scope of works has been limited to sections Katowice Szopienice Południowe – Katowice; Katowice - Katowice Ligota; Tychy - podg. Most Wisła - Czechowice Dziedzice - Bielsko Biała Lipnik and Katowice - Katowice Ligota; Tychy - podg. Most Wisła - Zebrzydowice – state border (excluding section Katowice Ligota – Tychy).
In addition to the above, feasibility study and preliminary design documentation is currently under preparation for railway stations in Czechowice-Dziedzice, Zebrzydowice and Zwardoń; their completion expected by January 2015.
On section Będzin - Katowice - Tychy - Czechowice Dziedzice – Zebrzydowice it is expected to improve the infrastructure parameters to the TEN-T core network standards; i.e. increase of freight speed on the section Tychy – Zebrzydowice, increase of the axle load parameter to 221 kN and train length to 750 m.

Railway connection: Katowice (PL) – Žilina (SK); [Zwardoń (PL) – Skalité (SK)]

Analysis of the existing infrastructure. The section Katowice - Žilina (in particular:
Analysis of the existing infrastructure. The section Katowice - Žilina (in particular:
Czechowice-Dziedzice–Zwardoń), consists of one electrified railway line. The total length of the section is 70 km, but only 20 km (Czechowice-Dziedzice-Bielsko Biała-Wilkowice Bystra) has characteristics of double track railway line. The remaining of the section (about 49 km) is single track, this representing a significant bottleneck. Speed does also represent a problem as the maximum speed for passenger and freight trains on 72% of the section is 60 km/h. The highest maximum speed on the section is 100 km/h limited to 10% of the total section length. The maximum axle load on the whole section is 196 kN. Another relevant characteristic for this section is the maximum permitted length of trains, which is 400 m for 45% of section and only 350 m for the remaining part. It should be underlined that this section is located in mountainous area. Within the section Zwardoń - Žilina, the subsection Zwardoń – Čadca is a single track electrified line reconstructed between 1999 and 2002. The maximum speed is 100 km/h and the maximum train length is 650 m on the link Skalité - Čadca. The subsection between the borderline and Skalité, represents a bottleneck with maximum speed of 70 km/h and maximum train length limited to only 250 m. The section Čadca till Krásno nad Kysucou (35 % of the section Čadca – Žilina) is double track with speed limit at 120 km/h (expected to be modernised); the subsection Krásno nad Kysucou - Žilina was already modernised to the speed of 140 km/h. Construction works aimed at modernising the infrastructure on Slovak Republic side were undertaken and completed on the following sections:

- Electrification and modernisation of railway section Čadca – Skalité 1999 – 2002;
- Modernisation of railway section Žilina – Krásno nad Kysucou 2008 - 2011.

ERTMS deployment is planned in Slovakia till 2016 for the section Čadca – Žilina, there is no plan for ERTMS deployment for the section Čadca – Skalité – state border.

On-going works. There are no on-going construction works on this cross-border section of the BA Corridor. ERTMS deployment on the section Žilina – Čadca is on-going in the period 2014 – 2016.

Review of studies. Preparatory works for modernisation of railway line E65 South, Grodzisk Mazowiecki – Kraków/Katowice – Zwardoń/Zebrzydowice – state border were carried out. These included elaboration of preliminary geotechnical design and conceptual documentation, elaboration of environmental decision, localisation decision, preliminary design and tender documentation for construction works contractor. Other preparatory works are still on-going, expected to be completed in 2015. Scope of works has been limited to sections Katowice Szopienice Południowe – Katowice; Katowice - Katowice Ligota; Tychy - podg. Most Wisła - Czechowice Dziedzice - Bielsko Biała Lipnik and Katowice - Katowice Ligota; Tychy - podg. Most Wisła - Zebrzydowice – state border (excluding section Katowice Ligota – Tychy, Bielsko-Biała - Zwardoń).
In addition to the above, feasibility study and preliminary design documentation is currently being prepared for railway stations in Czechowice-Dziedzice, Zebrzydowice and Zwardoń (completion is also expected by January 2015). It is foreseen that separate study for the section Bielsko-Biała – Zwardoń will be undertaken.

According to current plans/studies by Slovak Authorities the modernisation of railway section Krásno nad Kysucou – Čadca is planned for the period 2019 – 2022. Deployment of ERTMS in Žilina – Čadca section is planned till 2016, from Čadca to state border to the Czech Republic in the period 2019 – 2022 (not part of BA). No study for ERTMS deployment in the section Čadca – Zwardoń exists and none is planned.

Rail connection: Břeclav (CZ) – Wien (Stadlau); (AT) [Břeclav (CZ) – Hohenau / Bernhardsthal (AT)]

Analysis of the existing infrastructure. The Czech section of Břeclav (CZ) – Wien (AT) railway line is the part of 2nd national transit railway corridor and was modernised in 1997 – 1998 to the speed 100 km/h. The operational train length is up to 650 m; ERTMS will be deployed by the end of 2015. The line is double track electrified by 25 kV AC till the border line. This cross-border section was already part of Priority Project 22 as well as of Priority Project 23, defined as a non-priority section between the Austrian border and Vienna, according to the 2004 Guidelines. Part of the (Prague-) Brno-Břeclav-Wien connection, this section plays an important role for both passenger and freight traffic. Reconstruction of railway junction Břeclav 1st stage was done in 2007 – 2010. This cross-border section is part of ERTMS Corridor E.

On-going works. On the Czech section no works, but in the Břeclav 2nd stage of junction reconstruction is going on till April 2015, ERTMS deployment is planned by 2015. On the Austrian side, there are no on-going works at present apart from instalment of ERTMS level 2 planned to be completed by December 2014.

Review of studies. Investments on this line on the Austrian side are planned as part of „Zielnetz 2025+" to increase the capacity in the border section as well as to allow train speeds of 160km/h. The bridge on the Czech side in km 80,930 is planned to be reconstructed to achieve 160 km/h speed in 2015.

Railway connections: Bratislava (SK) – Wien (Inzersdorf) (AT); [Petržalka (SK) - Kittsee (AT)] and Bratislava (SK) – Wien (Stadlau) (AT); [Devínska Nová Ves (SK) – Marchegg (AT)]

Analysis of the existing infrastructure. This cross-border railway connection is composed of two routes: the railway section Devínska Nová Ves (SK) – Marchegg (AT) and railway section Petržalka (SK) - Kittsee (AT):

- As of today, the routing via Marchegg (ŽSR section A and ŐBB section 117), connecting Bratislava, Devínska Nová Ves to Vienna, running North of the Danube, is a single track, non-electrified section used primarily for passenger traffic, with maximum 80 km/h speed on the Slovak part of the Marchegg line;
- The routing via Kittsee (ŽSR section B and ŐBB section 118 and 194) from Bratislava Petržalka to Kittsee and Parndorf/Bruck a.d. Leitha is single track electrified mostly compliant with TEN-T requirements (with the exception of maximum train lengths 650 m and no ERTMS in operation so far). The line 132 from Bratislava Predmestie to Petržalka is a double track electrified one with 80 km/h speed limit. The subsections connecting Bruck a.d. Leitha/Parndorf with Vienna Hauptbahnhof are double tracks and electrified.
- The following works aimed at network modernisation were recently undertaken:
  - Construction of second track Prístavný Bridge – Petržalka;
  - Petržalka station modernisation and electrification by 15kV AC;
  - Electrification and modernisation of the section Petržalka – state border.

On-going works. There are no on-going works on this cross-border section of the BA Corridor.

Review of studies. The routing via Kittsee, was already identified as a bottleneck in the Market Study on the potential cargo capacity of the North Adriatic ports system (NAPA). Particularly regarding section 194, according to Austria's traffic model VMÖ a single track electrified section connecting Parndorf to Kittsee/Petržalka is sufficient to meet the existing and future demand by 2025; no further investments are thus planned on this route. As a result this section is not mentioned in the published investment plan for 2014 – 2019 in Austria (ŐBB RAHMENPLAN 2014-2019 - Investitionen und Instandhaltung).

The routing via Marchegg was already identified as a bottleneck in the transnational cooperation project SoNorA (South North Axis) associating this bottleneck to the construction of the "neue Südbahn" project also including the new Semmering base tunnel and the Koralmbahn connecting Graz and Klagenfurt (see SoNorA, O3.3.1 Intermodal network: definition of development priorities for deployment). Future works (construction is planned to start 2014) include full electrification from Wien-Stadlau to the AT/CZ border next to Marchegg, a second track in the Vienna area (up to the Aspern airfield) as well as an expansion of the railroad station Marchegg.. The Austrian section is budgeted with € 169.6 Mio in the funding period 2014-2019. The project includes a second track in the Vienna area (up to the Aspern airfield) as well as an expansion of the railroad station Marchegg.

According to national transport development strategies the section Devínska Nová Ves – state border is under preparation and planned to be electrified in the period 2018 – 2019. ŽSR also prepares its upgrade to 100 km/h.

Railway connection: Villach (AT) – Udine (IT); [Thörl-Maglern (AT) - Tarvisio B. (IT)]

Analysis of the existing infrastructure. The section Villach-Tarvisio is a double track electrified line. On the Austrian side speed limitation is 120 km/h; power system is AC 15KV. On the Italian side, speed is up to 180 km/h, power system is DC 3KV. The Italian part of the railway corridor from the Alpine crossing from the border to Udine (Linea Pontebbana) was already upgraded in early 2000s to High Capacity standards. Train length is up to 625 m on the Italian side, 550 m on the Austrian section.

On-going works and review of studies. There are either no on-going works or no studies on this section.

Railway connection: Graz (AT) – Maribor (SI); [Spielfeld-Straß (AT) - Sentilj (SI)]

Analysis of the existing infrastructure. Two sub-sections on the link between Graz and Maribor, although electrified, are single track only. Interoperability issues are also present due to different signalling systems in Austria and Slovenia.

On-going works. There are no on-going works on this section.

Review of studies. The AB Landbridge Project identifies a bottleneck at section Graz-Spielfeld-Straß as a second track and construction of the connection rail to the new high speed railway Koralmbahn is necessary. In addition, a second track should connect Austria and Slovenia. The Austrian authorities have been evaluating the feasibility of the expansion to two tracks in the past. There are plans for a complete two-track upgrading (stage 2) after 2019 (See Zielnetz 2025+). One subsection is already in two-track operation (Lebring – Leibnitz). Studies on modernisation (upgrading) of existing line and building second track are on-going. First results of the feasibility analysis on the Slovenian side revealed that upgrading of the existing rail track is possible only after building the second track. Without a temporary line closure, upgrading is not possible due to certain sections with unstable soil.

Railway connection: Trieste (IT) - Divača (SI); [Villa Opicina (IT) – Sežana (SI)]

Analysis of the existing infrastructure. The interconnection between Italy and Slovenia is a dual track rail line though Bivio d'Aurisina (on the Venezia – Trieste line) - Villa Opicina (also connected with a secondary line to Trieste Campo Marzio) – Sežana - Divača (along the Koper – Lubljana line). The total length of this connection between Bivio d'Aurisina and Divača is around 33km. The technical standards of the line are quite poor, with maximum gradient of 15‰ and maximum allowed speed of 75km/h. Currently two pairs of regional passenger trains per day are operated from Sežana to Villa Opicina (Italy) by the Slovenian operator. There are instead no passenger train services operated on the Italian side between Bivio d'Aurisina and Villa Opicina. The line is used by freight trains (between 15 and 20 daily trains, according to the recent EU SETA study).

On-going works. There are no on-going works on this section.

Review of studies. A first alignment parallel to the coastal line was developed at feasibility study level in 2008 (financed under INTERRG III A 2000-2006). However, the study showed that this alignment would have resulted in a considerable impact as far as karst geology and hydro-geology were concerned and, for this reason, the Italian authorities proposed to abandon it. In January 2011, agreement was found on a new alignment which runs through the karst highland in places where the presence of underground caves is lower compared to the 2008 solution.
For this new alignment, known as the "high corridor", three different solutions were studied on the Italian and Slovenian side, all running not far from the route of the existing railway line which connects Bivio di Aurisina to Opicina, Sežana and Divača. At the end of June 2011, Italy and Slovenia decided on one optimised alignment for which the preliminary design will be elaborated by the new project promoter.
The setting up of the organisational structure for the Trieste-Divača corridor, taking the form of a European economic interest grouping (EEIG) were agreed in 2012 and the signature of the EEIG's statutes took place in May 2013. The elaboration of the preliminary design and other preparatory works required for the adoption of the National Spatial Plan on the Slovene section of Trieste-Divača line is on-going.

D.2.2. Poland

The rail network in Poland is characterised by constant development and on-going modernisation aimed at increasing capacity on the lines. Modernisation works were already undertaken – some of which already completed, others on-going on several relevant railway lines of the BA Corridor over the past years and especially within the previous EU financial perspective 2007-2013, however the network still suffers of the poor quality infrastructure in a number of sections, with technical issues due to insufficient capacity of stations; lack of separation between regional and long distance train traffic, especially within and close to agglomerations (North and South of Poznań, North of Wrocław, Upper Silesia region, North and central part of Warszawa); speed limitations, decreasing both quality of service and line capacity (Szczecin Dąbie – Świnoujście significant section of freight speed at a level of 70 km/h, limitations down to 30 km/h); axle load limitations below 221 kN/axle; and limited train length on individual sections (below 740 m).

The BA Corridor railway infrastructure in Poland consists of three main branches, one on the Western side of Poland and two (Eastern and Central branches) though Central Poland. A description of the characteristic of the railway infrastructure for each branch is provided in the following sections below.

Western branch (Western Poland): Świnoujście – Szczecin – Kiekrz – Poznań – Luboń koło Poznania – Wrocław Jelcz/Brzeg -– Opole - Kędzierzyn Koźle-Chałupki/Gliwice - Chorzów

This section covers railway lines 401-351-855-395-394-352-802-271-132-756-349-132-277-136-151-137-135 (E59).

Analysis of the existing infrastructure. The line is a double track, electrified railway line, continuous and in operation. Main critical issues in the section include:

- Railway line E59, section Poznań-Szczecin-Świnoujście:
  - Numerous sub-sections have freight trains speed limitations of 60-80 km, especially section Poznań-Krzyż; passenger trains speed limitations is 70-80 km/h;
  - The maximum acceptable length of trains ranges between 630 – 650 m;
  - Short part of the section (4%) is limited to 196 kN maximum axle load;
- Railway section Szczecin Zdroje – Szczecin Port Centralny:
  - Very low speeds on whole section for both types of trains – 50 km/h;
  - The maximum acceptable length of trains is 650 m;
  - Maximum axle load on the whole section is 221 kN;
- Railway section Kiekrz – Luboń koło Poznania:
  - Very low speeds on whole length of section especially for freight trains 30-60 km/h. Maximum speed on 24% of section length is 30 km/h;
  - The maximum acceptable length of trains is 650 m;
  - Significant length of the section (72%) lacks the required axle load level (allowing only 211-216 kN/axle);
- Railway line E59, section Wrocław-Poznań:
  - Very low speeds on most of section Poznań–Leszno (maximum 50-60 km/h) for freight and passenger trains;
  - The maximum acceptable length of trains ranges between 600 – 650 m;
  - Short part of the section (<5%) is limited by 205-211 kN of max axle load parameter;
- Railway section Wrocław Mikołajów – Wrocław Brochów (freight):
  - Very low speeds the whole length of the section 40-60 km/h. For one of the tracks on 28% of section length the maximum speed limit is 20 km/h;
  - The maximum acceptable length of trains on entire section is 600 m;

   - 86% of this section lacks the required axle load level (allowing only 205-211 kN/axle);
- Section Wrocław-Jelcz-Opole (line 277):
   - Low speeds on the 20% of the section length for passenger traffic and on the 78% for the freight traffic (maximum 60-80 km/h). There are also short segments of maximum speed 20-40 km/h;
   - Maximum axle load on the 26% of the section length is 200 kN;
   - Maximum train length on the section is up to 600 m;
- Section Wrocław-Brzeg-Opole (line 132):
   - Low speeds on 20% part of section (maximum 60-80 km/h) for freight and passenger trains;
   - Max axle load on 90% of section length ranges between 200-211 kN;
   - Maximum train length on the section is up to 600 m;
- Section Opole Groszowice – Błotnica Strzelecka – Gliwice (line 132/135):
   - Low speeds on approx. 65% of the section length (maximum 60-80 km/h) for freight and passenger trains. Speed limits on the rest part of section are in range of 80-120 km/h. This bottleneck will be eliminated once the on-going modernisation works will be completed (limits will be increased to the range of 100-120 km/h on the whole section);
   - Maximum train length on the section is up to 600 m;
- Section Kędzierzyn Koźle-Opole:
   - Low speeds on section Opole Groszowice-Kędzierzyn Koźle (maximum 60-80 km/h) for freight and passenger traffic;
   - Maximum train length on the section is up to 630 m;
   - Short part of the section (<5%) is limited to 206 kN of maximum axle load;
- Section Kędzierzyn Koźle-Chałupki (which is described also in the cross-border section above):
   - Kędzierzyn Koźle–Racibórz and Racibórz-Chałupki: the speed limits for freight and passenger trains are in range of 50-100 km/h. Maximum operational speed is 50 km/h on 63% of section length;
   - 30% of this section lacks the required axle load level (allowing only 206 kN/axle);
   - Maximum train length on the section is up to 600 m.

Table D1 BA Corridor Rail infrastructure: technical parameters of the Polish section, Western branch

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	NATIONAL LINE CODE	Len.(km)	Type	Number of tracks	Traction	Clearance or structure gauge	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	18685	Świnoujście <--> Wolin	Existing	401	31.24	Conventional	2	Electrified	Unselected	120	10.2	225*	3 000 Volts, DC	630	ATP	No
2	18651	Wolin <--> Szczecin Dąbie	Existing	401	68.32	Conventional	2	Electrified	Unselected	130	9	225*	3 000 Volts, DC	630	ATP	No
3	18746	Szczecin Dąbie <--> Szczecin Zdroje	Existing	351	2.7	Conventional	2	Electrified	Unselected	120	8,4	225	3 000 Volts, DC	630	ATP	No
4	140519160200000	Szczecin Zdroje <--> Szczecin Port Centralny	Existing	351, 855	4.6	Conventional	2	Electrified	Unselected	110	15	225	3 000 Volts, DC	650	ATP	No
5	18701	Stargard Szczeciński <--> Szczecin Dąbie	Existing	351	22.63	Conventional	2	Electrified	Unselected	130	3.5	225	3 000 Volts, DC	650	ATP	No
6	18716	Stargard Szczeciński <--> Krzyż	Existing	351	89.58	Conventional	2	Electrified	Unselected	140	6.7	225	3 000 Volts, DC	650	ATP	No
7	18656	Krzyż <--> Poznan Główny	Existing	351	83.73	Conventional	2	Electrified	Unselected	120	6.6	225	3 000 Volts, DC	650	ATP	No
8	140519162700000	Kiekrz <--> Luboń Kolo Poznania	Existing	395, 394, 352, 802	35.8	Conventional	2	Electrified	Unselected	90	9.3	225	3 000 Volts, DC	650	ATP	No
9	18706	Luboń k. Poznania <--> Poznan Główny	Existing	271	6.52	Conventional	2	Electrified	Unselected	60	9.3	225	3 000 Volts, DC	650	ATP	No
10	18670	Luboń k. Poznania <--> Leszno	Existing	271	62.13	Conventional	2	Electrified	Unselected	100	6.2	225	3 000 Volts, DC	650	ATP	No
11	18742	Leszno <--> Wrocław Popowice	Existing	271	92.1	Conventional	2	Electrified	Unselected	140	10.88	225	3 000 Volts, DC	600	ATP	No
12	18697	Wrocław Popowice <--> Wrocław Mikołajów	Existing	271	0.9	Conventional	2	Electrified	Unselected	60	4.5	211	3 000 Volts, DC	600	ATP	No
13	18647	Wrocław Mikołajów <--> Wrocław Brochów	Existing	271, 132	5.32	Conventional	2	Electrified	Unselected	100	3.12	200*	3 000 Volts, DC	600	ATP	No
14	140519164500000	Wrocław Mikołajów <--> Wrocław Brochów (freight)	Existing	756, 349	13.9	Conventional	2	Electrified	Unselected	60	5.4	225*	3 000 Volts, DC	600	ATP	No
15	18646	Wrocław Brochów <--> Opole Groszowice	Existing	132	77.32	Conventional	2	Electrified	Unselected	160	4.78	225*	3 000 Volts, DC	600	ATP	No
16	18698	Wrocław Brochów <-->	Existing	277	15.31	Conventional	1	Electrified	Unselected	120	7.07	225*	3 000 Volts, DC	600	ATP	No

		Jelcz Miłoszyce														
17	18699	Jelcz Miłoszyce<--> Opole Groszowice	Existing	277	70.26	Conventional	2	Electrified	Unselected	120	4.92	225*	3 000 Volts, DC	600	ATP	No
18	21600017	Opole Groszowice <--> Gliwice Łabędy	Existing	132, 135	61.00	Conventional	2	Electrified	Unselected	120	9.72	225*	3 000 Volts, DC	600	ATP	No
19	18682	Opole Groszowice <--> Kędzierzyn Koźle	Existing	136	37.72	Conventional	2	Electrified	Unselected	100	9.6	225*	3 000 Volts, DC	630	ATP	No
20	18748	Kędzierzyn Koźle <--> Raciborz	Existing	151	32.23	Conventional	2	Electrified	Unselected	100	12	225	3 000 Volts, DC	600	ATP	No
21	18744	Raciborz <--> Chałupki	Existing	151	20.34	Conventional	2	Electrified	Unselected	90	4	225*	3 000 Volts, DC	600	ATP	No
22	18749	Gliwice Łabędy <--> Kędzierzyn Koźle	Existing	137	31.18	Conventional	2	Electrified	Unselected	120	6.22	225*	3 000 Volts, DC	650	ATP	No
23	18741	Gliwice Łabędy <--> Gliwice	Existing	137	5.89	Conventional	2	Electrified	Unselected	120	6.12	225*	3 000 Volts, DC	650	ATP	No
24	18691	Gliwice <--> Chorzow Batory	Existing	137	20.93	Conventional	2	Electrified	Unselected	100	14.4	206	3 000 Volts, DC	380	ATP	No

** This data could be lower in some sub-sections*

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

On-going works. On the following sections of the Western branch of the BA Corridor in Poland, construction works aimed at network modernisation are on-going:

- Railway line E59 section Wrocław-Poznań; the following sections are under construction: Czempiń-Poznań (on-going), Czempiń-Dolnośląskie Voivodship border (foreseen), Wrocław-Rawicz (-Dolnośląskie Voivodship border) (on-going);
- Improvement of technical conditions of railway line 132 section: Błotnica Strzelecka – Opole Groszowice (approx. 37 km) will be completed by the end of 2014. Project name: Streamlining the core freight transportation network in the area of Śląsk, phase III. Maximum speed parameters will be increased as follows:
  - For passenger trains from 80 km/h to 120 km/h;
  - For freight trains from 70 km/h to 100 km/h.

  After completion of works only less than 5% of the section' length: Opole Groszowice – Błotnica Strzelecka – Gliwice will have speed limit below 100 km/h.

Review of studies. On few sections preparatory works for line modernisation were carried out; on most of the sections preparatory works are on-going; on some others are still to start:

- Railway line E 59 section Poznań Główny- Szczecin Dąbie: Feasibility Study for modernisation of railway line E59 section Poznań – Szczecin – Świnoujście was elaborated in 2007; it assumed filling in the interoperability criteria, i.e. increase of the passenger's speed up to 160 km/h and freight speed up to 120 km/h, modernisation of the control and command system and catenary. The Feasibility Study is expected to be updated in Q2 2014;
- Railway line E59 section Wrocław-Poznań: Feasibility Study was elaborated in 2004 and 2011 for section Wrocław-Poznań; it assumed modernisation of the section and bringing it up to the standards of international railway network; i.e. increase of the speed up to 160km/h, implementation of GSM-R, modernisation of the catenary; modernisation of the engineering structures; the old Feasibility Study is to be updated for section Dolnośląskie Voivodship border - Czempiń; expected completion date is Q2 2014;
- Feasibility Study for works on railway line C-E 30 section Opole Groszowice - Jelcz - Wrocław Brochów is expected in Q3 2015;
- Feasibility Study for works on railway line E 30 section Kędzierzyn Koźle - Opole Zachodnie is expected in Q4 2015;
- Feasibility Study for works on by-passing line in Poznań (section Poznań Górczyn - Poznań Starołęka - Poznań Franowo - Swarzędz/Zieliniec - Kiekrz) is expected in Q3 2015;
- Kędzierzyn Koźle – Chałupki is planned to be completed in 2016 as described in the cross-border-section above.

Central branch: Tczew – Bydgoszcz – Inowrocław – Ponętów - Zduńska Wola Karsznice - Tarnowskie Góry – Bytom - Chorzów Batory - Katowice/Katowice Ligota

This section covers railway lines 131-201-741-137-164-651-141 (C-E 65)

Analysis of the existing infrastructure. This is a double track, electrified railway line, continuous and in operation. Main critical issues in the section include:

- Railway line C-E 65 section Gdynia-Tczew-Bydgoszcz-Inowrocław-Zduńska Wola Karsznice-Tarnowskie Góry-Pszczyna- Zebrzydowice/Zwardoń;
  - Inconsistency in freight and passenger trains traffic speeds between two tracks;
- Section Inowrocław-Tczew:

  - Maximum freight speed of 100km/h with limitation at the level of 30-80 km/h on part of this section (24% of section length, line 201 – area of Bydgoszcz, line 741 – area of Inowrocław). This bottleneck will be eliminated once the on-going modernisation will be completed;
  - Part of the section (19%) is limited to 206 kN of maximum axle load (line 201 – area of Bydgoszcz);
- Section Inowrocław – Zduńska Wola Karsznice:
  - Speed limit for the freight train on whole section is 100 km/h;
- Section Zduńska Wola Karsznice – Rusiec Łódź:
  - Maximum freight and passenger speed on over 60% of the section length is 70-80 km/h. This bottleneck will be eliminated once the on-going modernisation will be completed. Maximum speed limit on the rest of section is 100-120 km/h;
- Section Rusiniec Łółdź – Tarnowskie Góry:
  - Maximum freight speed of 100 km/h on almost whole section (6% of section length the limit is 120 km/h);
- Section Tarnowskie Góry-Bytom:
  - Maximum freight speed of 100 km/h on almost 70% of section length, 50 km/h on remaining 30% of section length;
- Section Chorzów Batory-Bytom:
  - Average freight and passenger speed of 30-50 km/h on almost 70% of section length, on the rest part on the section the limit is 100 km/h;
  - Maximum train length on the section is up to 600 m.
- Section Chorzów Batory – Katowice:
  - Speed limit for the freight train on whole section is 100 km/h;
  - Maximum allowed train length on the section is up to 330 m;
- Section Chorzów Batory – Katowice Ligota:
  - Very low allowed speeds on the whole section (maximum 20-40 km/h);
  - Section contains only one track on 46% of the total length;
  - Maximum allowed train length on the section is up to 600 m.;
- Katowice Railway Junction. This junction provides services to the area of the Górnośląski Metropolitan Association (partially Śląskie Voivodship, partially Małopolskie Voivodship and partially Opolskie Voivodship). The critical issues affecting this line are the same as identified above for the following sections (or part of sections): Tarnowskie Góry-Bytom, Section Chorzów Batory-Bytom, and Section Tarnowskie Góry – Katowice – Czechowice-Dziedzice – Zwardoń. In addition to this, the problem identified for Katowice Railway Junction is the non-separation of long distance and local passenger traffic, as well as freight and passenger traffic, especially on most congested lines. Worth adding that the urban node is lacking of multimodal integration between rail and road transport. The airport (Katowice-Pyrzowice) is also not interconnected to the rail network. The airport is situated outside of urban area – about 30 km from the city centre. Taking into account the accessibility of the 2.5 mln pax/year airport, the rail connection between airport and Silesian Agglomeration being one of the most industrialized region in Poland, taking no longer than 30 minutes, is justified. The airport has potential to develop cargo and logistic area on the surrounding grounds, so the rail connection would fulfil the scope of BA Corridor in the field of multimodality and complementarity. The construction of the railway is foreseen in the draft of Implementation Document for Transport Development Strategy up to 2020 (with the perspective to 2030).

Table D2 BA Corridor Rail infrastructure: technical parameters of the Polish section, Central branch

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	NATIONAL LINE CODE	Len.(km)	Type	Number of tracks	Traction	Clearance or structure gauge	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	18718	Inowrocław <--> Tczew	Existing	131, 201, 741	172.97	Conventional	2	Electrified	Unselected	160	8.1	225*	3 000 Volts, DC	750	ATP	No
2	18731	Inowrocław <--> Ponętów	Existing	131	84.48	Conventional	2	Electrified	Unselected	120	6.4	225	3 000 Volts, DC	750	ATP	No
3	18676	Ponętów <--> Zduńska Wola Karsz.	Existing	131	71.65	Conventional	2	Electrified	Unselected	120	6.4	225	3 000 Volts, DC	750	ATP	No
4	18725	Rusiec <--> Zduńska Wola Karsz.	Existing	131	32.34	Conventional	2	Electrified	Unselected	120	6.5	225	3 000 Volts, DC	750	ATP	No
5	18655	Rusiec <--> Tarnowskie Gory	Existing	131	102.58	Conventional	2	Electrified	Unselected	120	8	225	3 000 Volts, DC	750	ATP	No
6	18688	Tarnowskie Gory <--> Bytom	Existing	131	16.52	Conventional	2	Electrified	Unselected	100	19.7	225	3 000 Volts, DC	600	ATP	No
7	18753	Chorzow Batory <--> Bytom	Existing	131	11.84	Conventional	2	Electrified	Unselected	100	10.4	225*	3 000 Volts, DC	600	ATP	No
8	18653	Chorzow Batory <--> Katowice	Existing	137	5.79	Conventional	2	Electrified	Unselected	100	5.7	225*	3 000 Volts, DC	330	ATP	No
9	140604101200000	Chorzow Batory <--> Katowice Ligota	Existing	164, 651, 141	7.8	Conventional	2	Electrified	Unselected	80	17.5	225*	3 000 Volts, DC	600	ATP	No
24	18691	Gliwice <--> Chorzow Batory	Existing	137	20.93	Conventional	2	Electrified	Unselected	100	14.4	206	3 000 Volts, DC	380	ATP	No

** This data could be lower in some sub-sections*

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

On-going works.
There are on-going works on the section in connection with following projects:
- Modernisation of railway line E 65/C–E 65 on section Warszawa – Gdynia – area of LCC Gdańsk, LCC Gdynia and Modernisation of railway line E 65, on section Warszawa – Gdynia, Phase I - Maximum speed limit for passenger trains from Tczew to Gdynia will be increased up to 200 km/h and for freight trains to 120 km/h;
- Revitalisation of railway line no. 131 Chorzów Batory - Tczew, section Bydgoszcz Główna – Tczew and Revitalisation of railway line no. 131 Chorzów Batory – Tczew, section Bydgoszcz Główna – Zduńska Wola Karsznice – Chorzów Batory - Maximum speed limits for passenger trains will be increased up to 120 km/h and for freight trains to 100 km/h;
- Revitalisation of railway infrastructure on the line no. 131, Chociw Łaski – Kozuby - Maximum speed limits for passenger trains will be increased up to 120 km/h and for freight trains to 100 km/h;
- Revitalisation of railway lines no. 134, 137 and 138 Gliwice Łabędy – Katowice – Sosnowiec Jęzor - Maximum speed limit for trains will be increased up to 100 km/h. Maximum permitted length of trains will be increased.

All mentioned projects will be continued under the Multiannual Funding Framework 2014-2020.

Review of studies. On most of the section Tczew – Katowice (Pszczyna) preparatory works (feasibility studies) for line modernisation were carried out, including:
- Railway line C-E 65 section Gdynia-Tczew-Bydgoszcz-Inowrocław-Zduńska Wola Karsznice-Tarnowskie Góry-Pszczyna- Zebrzydowice/Zwardoń;
- Katowice Railway Junction: Feasibility studies for modernisation and extension of Katowice Railway Junction (2010-PL-92245-S) covers the main objectives of the investment which are: adjustment of the railway infrastructure to the transport needs of passenger and freight traffic, separation of long distance and agglomeration traffic, elimination of bottlenecks, integration of railway transport with air, road and urban transport.

Eastern Branch: Gdynia – Gdańsk – Pruszcz Gdański – Tczew – Malbork – Iława – Działdowo – Warszawa – Grodzisk Mazowiecki – Szeligi – Idzikowice – Zawiercie – Dąbrowa Górnicza Ząbkowice – Katowice – Pszczyna – Czechowice Dziedzice – Zebrzydowice/Żywiec - Zwardoń

This section covers railway lines 201-202-227-226-9-2-20-509-19-1-4-139-150-93 (E65/C-E 65)

Analysis of the existing infrastructure. The line is a double track, electrified one, continuous and in operation. It is composed of the two railway lines E65 and CE65 that allow for the separation of passenger and freight traffic.

On some sections construction works aimed at network modernisation were undertaken/ or are still on-going:
- Railway line E65/C-E 65 section Warszawa – Gdynia (lines no. 9, 202): comprehensive modernisation of the railway line, including Local Control Centres for the following areas: Iława, Malbork, Gdańsk (on-going), Gdynia (on-going), Działdowo (works completed) and Ciechanów (works completed);

Main bottlenecks in the section include:
- Railway line E65/C-E 65 section Warszawa – Gdynia:
  - Inconsistency in freight and passenger trains traffic speeds between two tracks;
  - Axle load at the level below 221 kN (196 kN) on part of this section;

    - Section Tczew-Malbork: maximum freight speed of 100-120 km/h, with limitation at the level of 60km/h on part of this section (12% of section length); this bottleneck will be eliminated once the on-going modernisation will be completed;
    - 85% of this section lacks the required maximum train length (currently allowing only 600 m);
- Railway section Pruszcz Gdański – Gdańsk Port Północny:
    - Maximum speed limit on the 83% of section length is in range of 40-80 km/h;
- Railway section Warszawa Wschodnia – Warszawa Zachodnia - Grodzisk Mazowiecki:
    - Speed limits on the section are in range from 60 to 80 km/h. This bottleneck will be partly eliminated once the on-going modernisation will be completed;
    - Max axle load at the level below 221 kN (196-216 kN) on this section;
    - Improvement in case of maximum train length is needed on the whole section (currently 600 m).
- Railway section Zawiercie – Katowice:
    - Speed limits on the section are in range from 70 to 90 km/h;
    - Improvement in case of maximum train length is needed on the whole section (currently 600 m).
- Railway section Katowice – Czechowice Dziedzice (Most Wisła) - Zwardoń:
    - Maximum speed limit on the 63% of section length is in range of 40-70 km/h. The limit on the rest part of the section is in range of 100-120 km/h;
    - Maximum allowed length of trains is in range of 350 – 600 m;
    - 89% of this section lacks the required axle load level (allowing only 196 kN/axle);
    - Section contains only one track on 43% of the total length;
- Railway section Czechowice Dziedzice (Most Wisła) – Zebrzydowice:
    - Maximum allowed length of trains on the section is 650 m.

On-going works. On the following sections of the Eastern branch of the BA Corridor in Poland, construction works aimed at network modernisation were undertaken/ or are still on-going:

- Railway line E65/C-E 65 section Warszawa – Gdynia: comprehensive modernisation of the railway line, including Local Control Centres for the following areas: Iława (on-going), Malbork (on-going), Gdańsk (on-going), Gdynia (on-going), Działdowo (works completed) and Ciechanów (works completed);
- Railway line E65/C-E 65 section Warszawa – Gdynia in scope of superior layer of LCC, ERTMS, and traction power supply system (on-going);
- Railway line Warszawa – Łódź, phase II, lot A, section Warszawa Zachodnia – Skierniewice (Miedniewice; works on-going).

The section Warszawa – Katowice is a double track, electrified railway line, under operation. Preparation and implementation of ETCS system, level 1 on section E65 Grodzisk Mazowiecki – Katowice (Zawiercie) (line no. 4) has been already completed.

Review of studies.
For the section Warszawa – Działdowo – Gdynia Feasibility Study for railway line E65 modernisation was developed in 2004. Main objective of the Feasibility Studies was to define an optimal scope of works and economic effectiveness of railway line E65 section Warszawa-Działdowo-Gdynia including interoperability of this relevant Trans European Transport Network; the most favourable speed option was 120 km/h for freight and 200 km/h for passengers. It could be assumed that all of the currently occurring bottlenecks will be solved after on-going works completion; however this will be a subject of further investigation.

Table D3 BA Corridor Rail infrastructure: technical parameters of the Polish section, Eastern branch

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Clearance or structure gauge	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	18654	Gdynia Port Centralny <--> Gdańsk Gl.	Existing	201, 202	22.31	Conventional	2	Electrified	Unselected	100	11.27	225	3 000 Volts, DC	750	ATP	No
2	18700	Gdańsk Gl. <--> Tczew	Existing	9	31.55	Conventional	2	Electrified	Unselected	160	8.5	225	3 000 Volts, DC	750	ATP	No
3	140519155800000	Pruszcz Gdański <--> Gdańsk (Port)	Existing	226	15.6	Conventional	2	Electrified	Unselected	160	6.2	225*	3 000 Volts, DC	750	ATP	No
4	18715	Tczew <--> Malbork	Existing	9	18.36	Conventional	2	Electrified	Unselected	160	7.13	225	3 000 Volts, DC	600	ATP	No
5	18644	Malbork <--> Ilawa Gl.	Existing	9	68.91	Conventional	2	Electrified	Unselected	120	7.75	225*	3 000 Volts, DC	600	ATP	No
6	18649	Ilawa Gl. <--> Dzialdowo	Existing	9	60.75	Conventional	2	Electrified	Unselected	160	7	225*	3 000 Volts, DC	600	ATP	No
7	18703	Dzialdowo <--> Warszawa Wsch.	Existing	9	143.97	Conventional	2	Electrified	Unselected	160	15.33	225	3 000 Volts, DC	600	ATP	No
8	140519161700000	Warszawa Praga <--> Piastów	Existing	20, 509, 19, 1	22.44	Conventional	2	Electrified	Unselected	120	11.2	225	3 000 Volts, DC	700	ATP	No
9	18709	Warszawa Zach. <--> Warszawa Wsch.	Existing	1, 2	7.34	Conventional	2	Electrified	Unselected	70	12.4	216	3 000 Volts, DC	400	ATP	No
10	18723	Warszawa Zach. <--> Grodzisk Maz.	Existing	1	24.47	Conventional	2	Electrified	Unselected	120	11.9	216	3 000 Volts, DC	600	ATP	No
11	18658	Grodzisk Maz. <--> Szeligi	Existing	4	22.49	Conventional	2	Electrified	Unselected	160	6	225	3 000 Volts, DC	800	ATP	No
12	18667	Szeligi <--> Idzikowice	Existing	4	57.07	Conventional	2	Electrified	Unselected	160	6.2	225	3 000 Volts, DC	800	ATP	No
13	18721	Idzikowice <--> Psary	Existing	4	89.87	Conventional	2	Electrified	Unselected	160	6	225	3 000 Volts, DC	800	ATP	No
14	18659	Psary <--> Zawiercie	Existing	4	53.57	Conventional	2	Electrified	Unselected	160	8.83	225	3 000 Volts, DC	750	ATP	No
15	18751	Zawiercie <--> Dabrowa Gornicza Ząbkowice	Existing	1	18.67	Conventional	2	Electrified	Unselected	120	6.8	225	3 000 Volts, DC	600	ATP	No
16	18752	Dabrowa Gornicza Ząbkowice <--> Katowice Południowe Szopienice	Existing	1	20.01	Conventional	2	Electrified	Unselected	100	7	225	3 000 Volts, DC	600	ATP	No
17	18727	Katowice <--> Katowice Szopienice pld.	Existing	1	5.47	Conventional	2	Electrified	Unselected	90	8.4	225	3 000 Volts, DC	600	ATP	No
18	18728	Pszczyna <-->	Existing	139	35.54	Conventional	2	Electrified	Unselected	120	8.5	225*	3 000 Volts, DC	600	ATP	No

		Katowice														
19	2039653187	Pszczyna <--> Most Wisła	Existing	139	6.52	Conventional	2	Electrified	Unselected	120	10.1	196	3 000 Volts, DC	600	ATP	No
20	2039653185	Most Wisła <--> Zebrzydowice	Existing	150, 93	29.2	Conventional	2	Electrified	Unselected	120	9.7	225	3 000 Volts, DC	650	ATP	No
21	2039653188	Zebrzydowice <--> state border	Existing	93	4.36	Conventional	2	Electrified	Unselected	120	5.2	225	3 000 Volts, DC	650	ATP	No
22	18720	Żywiec <--> Most Wisła	Existing	139	34.04	Conventional	2	Electrified	Unselected	100	19.6	196	3 000 Volts, DC	400	ATP	No
23	18645	Zwardoń <--> Żywiec	Existing	139	36.88	Conventional	1	Electrified	Unselected	60	21.7	196	3 000 Volts, DC	352	ATP	No

** This parameter could be lower in some sub-sections*

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

D.2.3. Czech Republic

The Czech section of the BA rail corridor includes the 2nd National Transit Railway Corridor, which was modernised in the period 1997 – 2009. The alignment also includes the Brno passenger branch consisting of part of the modernised 1st National Railway Corridor and the section Přerov - Brno, which is partially single track line with speed limitation up to 80 - 100 km/h as well as limited axle load and train lengths. GSM-R was implemented on both corridor sections by 2013 (not on Přerov – Brno section). Capacity problems exist on Přerov –Brno single track line and due to high number of Prague – Ostrava express trains from Přerov to Ostrava and especially in Ostrava node in addition to low speeds at relevant junctions.

Line Ostrava – Přerov – (Brno) - Břeclav (CZ)

This section covers railway line 270 – 330 (-300-340-250) Ostrava – Přerov – (Brno) - Břeclav.

Analysis of the existing infrastructure. The Ostrava – Přerov – Břeclav railway line is one of the most important lines in the Czech Republic, it has two tracks and it is electrified with 3kV DC from Ostrava till Nedakonice and with 25kV AC from Nedakonice till Břeclav. The entire section was modernised in the period 1997 – 2009 to provide an operational speed of 160 km/h, axle load 221 kN and train lengths 690 – 700 m.

The Přerov – Brno section, part of the BA Czech Corridor alignment as part of its passenger branch, includes the single electrified track section Přerov – Holubice with 3kV AC power system, till Nezamyslice and 25kV AC power system from Chvalkovice na Hané (with speed limit 100 km/h), and double track electrified (25kV AC) section Blažovice – Brno (with speed limit 80 km/h) interconnected by short electrified (25kV AC) single section Holubice – Blažovice with speed limit 70 km/h. The double track section Brno - Blažovice is used by all trains to Uherské Hradiště and express trains to Přerov with no stops in this section. The section from Holubice is used by trains Brno - Přerov using Holubice - Blažovice connecting line and passenger trains from Vyškov to Přerov. The section Přerov – Brno was not part of any international or national line or corridor before it was defined as a part of Priority Project 23 of TEN-T. It is either not equipped with GSM-R or ETCS. It is planned to be upgraded to high speed (200 km/h) double track.

Another part of BA Corridor passenger branch, the Brno – Břeclav section is part of 1st Nation Transit Railway Corridor. The line was modernised between 1997 and 2001 to the speed 160 km/h and is used both for passenger and freight traffic. The line is equipped with GSM-R, deployment of ETCS is going on till 2015. This section is planned to be upgraded to 200-350 km/h after 2020.

Construction works aimed at network modernisation undertaken:

- Modernisation of 1st national railway corridor Brno - Břeclav 1997 - 2001
- Modernisation of 2nd national railway corridor Ostrava – Břeclav 1997 – 2004;
- 1st stage of modernisation of railway junction Přerov 2009 – 2014;
- Reconstruction of railway junction Břeclav 1st stage 2007 – 2010;

Main bottlenecks in the section include:

- Main line 270 Ostrava – Břeclav:
  - Major railway nodes: Ostrava railway node (60 km/h speed and capacity bottleneck), Přerov (after reconstruction 80 km/h), Břeclav (speed 40 km/h – currently under reconstruction);
  - Maximum train lengths 690 – 700 m;
  - Ostrava – Přerov part of section is heavily used by Praha – Ostrava express trains and has lack of spare capacity in peak hours for more freight transport.
- The passenger branch section 300 – 340 - 250 Přerov – Brno – Břeclav:

- Single track with lack of capacity from Přerov to Blažovice;
- Speed 70 – 80 km/h in the section Holubice – Brno;
- Axle load only 166 kN;
- Maximum train lengths 450 – 585 m;
- Brno junction is capacity and speed bottleneck 30 km/h;
- Max speed from Brno main station till the station Brno, Horní Heršpice 80 km/h.

On-going works. Construction works aimed at network modernisation still on-going:
- Reconstruction of railway junction Břeclav 2nd stage till April 2015
- Deployment of ETCS Brno – Břeclav – border to Austria 2012 - 2015.

Review of studies. The works identified to be implemented according to the Transport Sector Strategies (2nd phase), Operational Programme Transport 2014 – 2020 and State Fund for Transport Infrastructure Budget for 2015 and Middle Term Outlook for 2016 – 2017 are:
- Říkovice - increased performance of traction substation 2014 – 2015;
- 2nd stage of modernisation of railway junction Přerov 2016 – 2021;
- Modernisation of the railway section Modřice – Brno, Horní Heršpice 2015;
- Modernisation of the railway section Brno – Přerov including: 1) Blažovice – Nezamyslice subsection 2018 – 2022; 2) Nezamyslice – Přerov subsection 2020 – 2022; and 3) Brno – Blažovice subsection 2023 – 2024;
- Modernisation of railway junction Brno and 1st stage of new main station 2018 – 2022;
- Upgrade of the capacity of the railway junction Ostrava 2019 – 2021;
- ERTMS deployment 2015 – 2017;
- Completion of Brno main station till 2030;
- Upgrade of the section Břeclav – Brno to 200 – 350 km/h and higher capacity till 2030;
- Construction of parallel high speed line (250-350 km/h) Přerov – Ostrava – Polish border (by 2050).

Table D4 BA Corridor Rail infrastructure: technical parameters of the Czech Republic section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Load gauge (UIC type)	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	20392	Petrovice u Karviné <--> Zebrzydowice	Existing	833	6.2	Conv.	2	El.	C	120	4.76	225	3 000 Volts, DC	650	BiABS	Yes
2	20380	Petrovice u Karviné <--> Detmarovice	Existing	320	6.2	Conv.	2	El.	C	120	4.76	225	3 000 Volts, DC	700	BiABS	Yes
3	18808	Dětmarovice <--> Bohumín	Existing	320	8.5	Conv.	2	El.	C	160	17	225	3 000 Volts, DC	700	BiABS	Yes
4	18809	Bohumín <--> Chałupki	Existing	836	4.6	Conv.	2	El.	C	100	4.5	225	3 000 Volts, DC	700	ALBS	Yes
5	20298	Bohumín <--> Ostrava	Existing	270	8.6	Conv.	2	El.	C	160	9.66	225	3 000 Volts, DC	690	BiABS	Yes
6	20302	Hranice na Morave <--> Ostrava	Existing	270	55.5	Conv.	2	El.	C	160	9.66	225	3 000 Volts, DC	690	BiABS	Yes
7	20301	Hranice na Morave <--> Přerov	Existing	270	28.4	Conv.	2	El.	C	160	9.66	225	3 000 Volts, DC	690	BiABS	Yes
8	65435	Přerov <--> Nedakonice	Existing	330	51.4	Conv.	2	El.	C	160	4.7	225	3 000 Volts, DC	700	BiABS	Yes
9	65351	Nedakonice <--> Břeclav	Existing	330	48.9	Conv.	2	El.	C	160	4.7	225	25 000 Volts, 50Hz	700	BiABS	Yes
10	20398	Přerov <--> Holubice	Existing	300	61.8	Conv.	1	El.	C	100	7.7	196	25 000 Volts, 50Hz	585	ALBS	No
11	20404	Brno <--> Holubice	Existing	340	22.8	Conv.	2	El.	C	80	13.2	196	25 000 Volts, 50Hz	450	ALBS	No
12	20300	Brno <--> Břeclav	Existing	250	60.4	Conv.	2	El.	C	160	5.4	225	25 000 Volts, 50Hz	669	BiABS	Yes
13	18806	Břeclav <--> Hohenau / Bernhardsthal (border CZ/A)	Existing	801	18.3	Conv.	2	El.	C	100	2.3	225	25 kV, AC	700		Yes

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

Nodes of Ostrava, Přerov, Brno and Břeclav (CZ)

Analysis of the existing infrastructure.
Capacity and speed limitation problems exist in the main nodes of the BA Corridor in the Czech Republic. Particularly the Ostrava main station and the short section to Ostrava-Svinov are considered major capacity bottlenecks due to combination of high volumes of long distance, suburban and freight traffic on double track section. Reconstruction of Přerov junction was going on from 2009 till April 2014, it remains a minor speed bottleneck with the speed limit already being upgraded to 80 km/h. 2nd stage of upgrading Přerov junction is foreseen to be implemented in 2017-18 with expected CEF funding support. Břeclav junction was also a speed bottleneck, the first stage of its reconstruction already completed and second stage to increase the speed to 120 km/h is being finalised.

On-going works. The second stage of reconstruction works for the Břeclav junction is on-going and it will be finished till April 2015 with the resulting speed through the station 120 km/h.

Review of studies. Reconstruction of Ostrava railway junction with capacity upgrade is foreseen for the period 2019 – 2021. 2nd stage of reconstruction of the Přerov junction is planned for 2016 – 2021. Modřice – Brno, Horní Heršpice is to be modernised in 2015, Brno node is also planned to be modernised with the reconstruction of the main station in the period 2018 - 2022, the feasibility study is being elaborated. Feasibility study is also elaborated for Přerov – Brno modernisation which is to define the level to be achieved. The Study of Opportunities of Highs Speed Lines is being tendered in the Czech Republic, including the upgrade to high speed of the line Břeclav – Brno – Přerov (to be finished till 2030) and new high speed line Přerov – Ostrava – Polish border (till 2050).

As part of the redesign of the Brno railway hub whose feasibility study is expected to be completed by 2016, some initiatives are suggesting the opportunity of interconnecting the Přerov railway line to the North-South Diameter route to improve interconnection between the region and the TEN-T Corridor Network.

D.2.4. Slovakia

The Slovak section of the BA rail corridor mostly overlaps with the main Slovak railway corridors VI (Ostrava -) Žilina and Va. Bratislava – Žilina (- Košice), which have been already partially modernised.

Line Žilina-Bratislava

Analysis of the existing infrastructure. The section Žilina - Bratislava is a double track electrified main line with 3kV DC power system from Žilina to Púchov and 25 kV AC power system from Beluša to Bratislava. The line is fully operational for passenger and freight services.
Construction works aimed at network modernisation till 160 km/h were undertaken on the sections Bratislava, Rača – Nové Mesto nad Váhom – Zlatovce and Trenčianská Teplá – Beluša:

- Modernisation of the railway section Bratislava, Rača – Trnava 2000 – 2006;
- Modernisation of the railway section Trnava - Nové Mesto nad Váhom 2004 – 2009;
- Modernisation of the railway section Nové Mesto nad Váhom – Zlatovce 2009 – 2013;
- Modernisation of the railway section Trenčianska Teplá - Beluša 2009 – 2014;

There are no major bottlenecks in the section, the speed is 100 km/h or higher, axle load 221 kN and maximum train lengths is 650 – 750 m. ERTMS Level 1 is deployed in the Bratislava – Zlatovce section so far. Major speed bottlenecks remain however in the railway junctions of Žilina and Bratislava (40 km/h).

On-going works Construction works to progress to the completion of the line modernisation from Bratislava to Púchov are currently on-going, expected to be finished by 2015:

- Modernisation of the railway section Zlatovce – Trenčianska Teplá 2012 – 2015;
- Modernisation of the railway section Beluša - Púchov 2012 – 2015;
- Furthermore the construction of Rail-Road terminal Žilina, Teplička is going on by railway infrastructure manager ŽSR from 2012 by 2015.

Review of studies. According to Transport Master Plan and Operational Programme Integrated Infrastructure 2014 – 2020 the completion of line modernisation with the speed being increased to 160 km/h is expected by 2023 from Operational Programme Integrated Infrastructure 2014 – 2020 and CEF sources, including the following works:

- Modernisation of the railway section Považská Teplá – Žilina 2015-2016;
- Modernisation of the railway section Púchov - Považská Teplá 2015 – 2018;
- Modernisation of the railway station Žilina and finalisation of Žilina, Teplička freight station 2018 – 2020;
- Modernisation of railway junction Bratislava 2019 – 2021;
- Deployment of ERMTS by 2019.

Table D5 BA Corridor Rail infrastructure: technical parameters of the Slovak section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Load gauge (UIC type)	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	18509	Skalité <--> Zwardoń	Existing	129	7.1	Conv.	1	El.	A	70	28	225	3 000 Volts, DC	250	ABS	No
2	18508	Čadca <--> Skalité	Existing	129	13.5	Conv.	1	El.	A	100	14	225	3 000 Volts, DC	650	ABS	No
3	18477	Žilina <--> Čadca	Existing	127	30.5	Conv.	2	El.	A	140	6	225	3 000 Volts, DC	700	LS	No
4	14051917300000	Žilina <--> Žilina (RRT)	Planned	-	4.5	Conv.	1	El.	B	60	13	225	3 000 Volts, DC	700	ABS	No
5	18490	Púchov <--> Žilina	Existing	120	43.4	Conv.	2	El.	B	100	7	225	3 000 Volts, DC	650	LS	No
6	72600	Nové Mesto nad Vahom <--> Púchov	Existing	120	59	Conv.	2	El.	A	120	5	225	25 000 Volts, 50Hz	750	ABS	No
7	72601	Leopoldov <--> Nové Mesto nad Váhom	Existing	120	35.5	Conv.	2	El.	A	160	3	225	25 000 Volts, 50Hz	750	ABS	No
8	18499	Bratislava <--> Leopoldov	Existing	120	63.8	Conv.	2	El.	A	160	8	225	25 000 Volts, 50Hz	650	ABS	No
9	18498	Devinska Nová Ves <--> Bratislava	Existing	110	13	Conv.	2	El.	A	120	8	225	25 000 Volts, 50Hz	740	ABS	No
10	18506	Marchegg <--> Devínska Nová Ves	Existing	A	6	Conv.	1	Dies.	A	80	8	225	Others	700	ABS	Yes
11	18479	Bratislava <--> Petržalka	Existing	132	17	Conv.	2	El.	B	80	8	225	25 000 Volts, 50Hz	645	ABS	Yes

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

D.2.5. Austria

The Austrian section of the BA rail corridor includes the connection with the Czech Republic in the North (Břeclav / Bernhardsthal); in the East two lines connect with Slovakia: via Marchegg / Devínska Nová Ves and via Kittsee / Bratislava-Petržalka. The lines in the Southern part of Austria are linked with Slovenia (Spielfeld-Straß / Sentilj) and Italy (Thoerl-Maglern / Tarvisio).

Planned and on-going works to ensure short, efficient and fast connection for freight trains and passenger services include the construction of the Koralm Bahn (including the Koralm tunnel) connecting Graz with Klagenfurt, the Semmering Base Tunnel, the two-track upgrading of a sub-section of the "Pottendorfer" line and the electrification of the Northern connection of Wien and Bratislava via Marchegg.

New as well as upgraded lines will be equipped to comply with ERTMS level 2. Existing sections of the A-net (Austrian lines of prime importance) are planned to be equipped with ERTMS.Pre-projects have already been started. ERTMS is planned to be in operation between Wien and AT/CZ border (close to Bernhardsthal) by the end of 2014.

More details on the on-going works and critical issues on the Corridor are provided below per section.

Line Wien – Graz (Semmering Tunnel, AT)

On-going works. Although works on the Semmering base tunnel has been recently halted as a consequence of a verdict of Austria's supreme administrative court, the transportation ministry maintains its plans to complete works by 2024.

Review of studies. The BMVIT (Federal Ministry of Transport, Innovation and Technology) Study "The Baltic-Adriatic Axis" identified underperformance at the existing Semmeringbahn section (mountain route) due to long passenger travel time as well as tonnage and clearance gauge limitations. The railway traffic connection will be more attractive and more effective in terms of energy consumption, especially in freight traffic, optimized by the construction of the Semmering Base Tunnel.

Line Graz – Klagenfurt (Koralmbahn, AT)

On-going works. Work on the connection Graz-Klagenfurt (Koralmbahn) is in progress. The sub sections from Graz to Wettmannstätten as well as from Grafenstein to Klagenfurt are bottlenecks (single track, not electrified) which have to be upgraded. The sub section in the middle between Wettmannstätten and Grafenstein is a missing link. Funds have been earmarked for the period 2014-2019. Current plans extend the construction period till 2023. With the opening of the Koralmbahn the traffic will preliminary run over Werndorf as long as the existing double tracked line between Graz and Werndorf has enough capacity. As soon as capacity is no longer sufficient the new line between Weitendorf and Graz, which has already obtained all required approvals, will be needed. The section between Werndorf and Wettmannstätten is in operation since 2010 but only single tracked and not electrified.

Review of studies. The BMVIT (Federal Ministry of Transport, Innovation and Technology) Study "The Baltic-Adriatic Axis" refers to the fact that "the connection of the central regions of Graz and Klagenfurt by railway is currently only possible via Bruck/Mur and the Neumarkter Sattel. The Koralm railway line will close the existing railway gap between the two important Austrian central regions of Graz and Klagenfurt/Villach" by providing "a short, efficient and fast connection for freight trains and passenger services."

Line Blumental – Wampersdorf (AT)

Analysis of the existing infrastructure. The rail section Wien Inzersdorf-Wampersdorf is currently a conventional, single track connection. It is part of the "Pottendorfer Linie" and will be upgraded to a two track, electrified section with ERTMS level 2 by 2023. The subsection from Blumenthal to Münchendorf is expected to be operational by 2020; work on the subsection Münchendorf to Wampersdorf will begin in 2017. As a result, trains will be able to travel at a speed of 200 km/h.

Review of studies. The BMVIT (Federal Ministry of Transport, Innovation and Technology) Study "The Baltic-Adriatic Axis" considers this line will be expanded to TEN-T compliant two track connection and construction by 2023.

Node of Wien: Hauptbahnhof Wien (AT)

Analysis of the existing infrastructure. In order to improve traffic at the Wien Node, an interconnection between the Western and Southern Railway lines was deemed necessary.

On-going works On-going works. Hauptbahnhof Wien will be in full operation by the end of 2015.

Review of studies. The BMVIT (Federal Ministry of Transport, Innovation and Technology) Study "The Baltic-Adriatic Axis" emphasized that the a short, efficient and fast connection for freight trains and passenger services will be possible with a combination of the Semmering base tunnel, the Koralm railway line and the solution of the Hauptbahnhof Wien node bottleneck.

Table D6 BA Corridor Rail infrastructure: technical parameters of the Austrian section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Load gauge (UIC type)	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	19700055	Hohenau / Bernhardsthal (border CZ/A) <--> Industriegebiet Gerasdorf Sud	Existing	11401	66.4	Conventional	2	Electrified	Unselected	140	7	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
2	19700056	Industriegebiet Gerasdorf Sud <--> Wien Stadlau	Existing	11601	6.4	Conventional	2	Electrified	Unselected	120	7	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
3	20516	Wien Stadlau <--> Marchegg	Existing	11701	37.9	Conventional	1	Diesel	Unselected	120	13	225	Others	650	PZB	Yes
4	19700028	Wien Stadlau <--> Wien Landstrasse	Existing	11601	7.7	Conventional	2	Electrified	Unselected	120	13	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
5	19700025	Wien Landstrasse <--> Wien ZVB Nord	Existing	13101	3.6	Conventional	2	Electrified	Unselected	120	12	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
6	19700027	Wien ZVB Nord <--> Kledering	Existing	11801	3	Conventional	2	Electrified	Unselected	120	8	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
7	140519173500000	Kledering <--> Wien Freudenau Hafen	Existing	12401	6.7	Conventional	1	Electrified	Unselected	80	13	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
8	19700015	Kledering <--> Gramatneusiedl	Existing	11801	12.7	Conventional	2	Electrified	Unselected	140	5	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
9	19700016	Gramatneusiedl <--> Goetzendorf	Existing	11801	7.5	Conventional	2	Electrified	Unselected	140	4	225	15 000 Volts, 16.7 Hz	650	PZB	Yes

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Load gauge (UIC type)	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
10	19700010	Gramatneusiedl <--> Wampersdorf	Existing	11901	14.1	Conventional	1	Electrified	Unselected	120	5	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
11	20503	Goetzendorf <--> Parndorf	Existing	11801	22.2	Conventional	2	Electrified	Unselected	140	6	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
12	20519	Parndorf <--> Kittsee	Existing	19401	19.9	Conventional	1	Electrified	Unselected	160	13	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
13	20520	Kittsee <--> Petržalka	Existing	19401	4.2	Conventional	1	Electrified	Unselected	140	4	225	16 000 Volts, 16.7 Hz	650	PZB	Yes
14	19700029	Wien Suedbahnhof <--> Wien Landstrasse	Existing	11601	3.5	Conventional	2	Electrified	Unselected	120	13	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
15	19700026	Wien Suedbahnhof <--> Wien ZVB Nord	Existing	11801	3.6	Conventional	2	Electrified	Unselected	120	8	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
16	20464	Wien Meidling <--> Wien Suedbahnhof	Existing	10501	3.5	Conventional	2	Electrified	Unselected	100	8	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
17	20487	Wien Meidling <--> Wien Inzersdorf	Existing	10601	4.2	Conventional	2	Electrified	Unselected	90	18	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
18	19700021	Wien Inzersdorf <--> Wampersdorf	Existing	10601	25.7	Conventional	1	Electrified	Unselected	120	10	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
19	19700022	Wampersdorf <--> Ebenfurth	Existing	10601	7.1	Conventional	2	Electrified	Unselected	140	6	225	15 000 Volts, 16.7 Hz	650	PZB	Yes

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Load gauge (UIC type)	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
20	20502	Ebenfurth <--> Wr. Neustadt	Existing	10601	12.8	Conventional	2	Electrified	Unselected	140	8	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
21	19700035	Wr. Neustadt <--> Gloggnitz	Existing	10501	26.3	Conventional	2	Electrified	Unselected	160	10	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
22	19700033	Gloggnitz <--> Muerzzuschlag	Under construction	n.a.	25.8	Unselected	0	Electrified	Unselected	0	0	0	Others	0	0	No
23	19700036	Muerzzuschlag <--> Bruck/Mur	Existing	10501	41.2	Conventional	2	Electrified	Unselected	150	10	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
24	20492	Bruck/Mur <--> Graz	Existing	10501	53.5	Conventional	2	Electrified	Unselected	140	8	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
25	19700006	Graz <--> Werndorf	Existing	10501	18.1	Conventional	2	Electrified	Unselected	160	6	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
26	19700005	Sentilj / Spielfeld-Strass (border A/SLO) <--> Werndorf	Existing	10501	31.1	Conventional	1	Electrified	Unselected	160	7	225	15 000 Volts, 16.7 Hz	650	PZB	Yes
27	20466	Klagenfurt <--> Werndorf	Under construction	n.a.	107.8	Unselected	0	Unselected	Unselected	0	0	225	15 000 Volts, 16.7 Hz	0	0	No
28	20497	Klagenfurt <--> Villach	Existing	41301	38.1	Conventional	2	Electrified	Unselected	140	15	225	Others	650	PZB	Yes
29	20459	Villach <--> Villach Warmbad	Existing	41301	8.5	Conventional	2	Electrified	Unselected	100	10	225	15 000 Volts, 16.7 Hz	650	PZB	Yes

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Load gauge (UIC type)	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
30	20457	Villach Warmbad <--> Thoerl-Maglern (border A/I) / Border IT/AT II	Existing	41301	16.7	Conventional	2	Electrified	Unselected	120	21	225	15 000 Volts, 16.7 Hz	650	PZB	Yes

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

D.2.6. Italy

The Italian section of the BA Corridor railway infrastructure can be generally considered as well-performing, and with limited critical issues.

The rail infrastructure on the BA Corridor is equipped with national control and command systems, which in most cases was upgraded to a national digital system (SCMT) that uses the same infrastructure digital equipment of ETCS (Eurobalise). Planned investments on the Italian rail network include the upgrade of existing lines equipped with national signalling system to ETCS Level 1 or level 2, as appropriate. The whole Italian corridor is affected by restrictions to the maximum allowed train length.

In the short term, initiatives are aimed at improving the existing conventional line between Venezia and Trieste, including the Mestre node; the doubling of the railway line between Cervignano and Udine; the improvement of the railway node in Udine and Trieste (connection to the port and upgrade of Trieste Campo Marzio Station), the construction of a new rail link between the existing main line and the airport of Venezia Marco Polo Airport. On all the BA Corridor investments aimed at removing bottlenecks (also on the last miles connection to the Port of Ravenna) and increase of track length to allow operating 750 m long trains are planned. Another important project is the increase of line speed on Venezia-Trieste historical line and infrastructural and technological line upgrade with priority for Bologna-Padova-Venezia line.

Line Tarvisio – Udine (IT)

Analysis of the existing infrastructure. The Italian part of the railway corridor from the Alpine crossing to Udine (Linea Pontebbana) was already upgraded in early 2000s to High Capacity standards.

On-going works and review of studies. The feasibility study about the increase of track length to allow operating 750 m long trains is on-going.

Line Trieste – Venezia (IT)

Analysis of the existing infrastructure. The alignment of the BA corridor between Trieste and Venezia / Mestre includes two parallel routes: the existing conventional line is part of the core freight corridor, whereas a new planned high speed line is part of the passenger one.

The existing Mestre – Trieste line is a conventional double track electrified line. Whilst the line is generally well performing and of acceptable TEN-T standards, there are capacity issues related to the rail node in Venezia and the access to Trieste. There are also performance and safety limitations due to the existing level crossing on the line.

On-going works. The feasibility study about the speed increase and four tracks are on-going. The preliminary study about the increase of track length to allow operating 750 m long trains is on-going.

Review of studies. New High-Speed rail tracks are included in the TEN-T core passenger corridor between Venezia and the border with Slovenia. A detailed design of the new line has been completed in 2010, but the timing of the project implementation is currently not foreseen in the short/medium term, due to the high cost and environmental concerns. A new design is under study, envisaging the quadrupling of the existing line.

As short-term initiatives, the improvement of the conventional line is currently under consideration: Mestre node (Linea dei Bivi), speed increase and the removal of level crossings between Mestre and Trieste.

Line Udine - Cervignano and Node of Udine (IT)

Analysis of the existing infrastructure. The railway corridor infrastructure between Udine and Cervignano is currently a single track electrified line, used mainly for regional passenger traffic and international freight traffic to/from the Cervignano rail-road terminal. Improvement works at the Node of Udine are on-going, where the transit is affected by capacity constraints in access to the Northern part of the Urban Railway Node and partly on the belt-line which still is a single track one.

On-going works. Works for the first phase of the improvement of the Udine node are already on-going; the second phase is also planned, including the doubling of the existing urban belt-line. The feasibility study about the increase of track length to allow operating 750 m long trains is on-going.

Review of studies. The upgrade of the Udine – Cervignano rail line is considered of relevance to allow operating additional international passenger and freight services on the route Udine – Cervignano - Venezia/Mestre while today most passenger and freight trains are operated on the alternative routes Udine- Pordenone – Treviso – Venezia and Udine – Gorizia – Bivio San Polo – Trieste.

Line Venezia - Ravenna (IT)

The rail infrastructure on this section of the corridor is already at good standard. There are however restrictions to the maximum allowed train length on the two branches connecting the Ravenna Port and to the maximum gauge on the link to Ravenna Port.

On-going works. The feasibility study about the increase of track length to allow operating 750 m long trains is on-going.

Review of studies. Investments are planned for the technological upgrading of line (sections Padova-Bologna and Bologna-Castelbolognese) and to allow intermodal operation of PC 80 gabarit trains on the line. Removal of railway crossings in the urban area of Ravenna, along the last mile connection rail link to the Port are included in relevant plans; these are deemed to become a relevant bottleneck particularly in view of the entry into operation of the new container terminal at the Port of Ravenna.

Table D7 BA Corridor Rail infrastructure: technical parameters of the Italian section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Clearance or structure gauge	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	18947	Tarvisio <--> Thoerl-Maglern (border A/I) / Border IT/AT II	Existing	J37, J38	5.5	Conventional	2	Electrified	A	120	2.3	225	15 000 Volts, 16.7 Hz	0	PZB	Yes
2	22400030	Tarvisio <--> Carnia	Existing	J37, J38	49.1	Conventional	2	Electrified	PC80	160	19	225	3 000 Volts, DC	625	SCC	Yes
3	22400031	Carnia <--> PM VAT	Existing	J37, J38	35.2	Conventional	2	Electrified	PC80	160	10	225	3 000 Volts, DC	625	SCC	Yes
4	19251	PM VAT <--> Udine	Existing	J37, J38	4.5	Conventional	1	Electrified	PC80	140	7	225	3 000 Volts, DC	625	DC	Yes
5	22400196	Udine <--> Privano	Existing	K94, K95	17.9	Conventional	1	Electrified	PC80	120	9	225	3 000 Volts, DC	625	DC	Yes
6	22400197	Privano <--> Cervignano A.G.	Existing	K94, K95	10.4	Conventional	1	Electrified	PC80	120	9	225	3 000 Volts, DC	625	DC	Yes
7	18953	Cervignano A.G. <--> Ronchi dei Legionari Sud	Existing	J35, J36	12.7	Conventional	2	Electrified	PC80	150	7	225	3 000 Volts, DC	600	DC	Yes
8	22400032	Ronchi dei Legionari Sud <--> S.Polo Junction	Existing	J35, J36	2.2	Conventional	2	Electrified	PC80	105	13	225	3 000 Volts, DC	595	DC	Yes
9	22400033	S.Polo Junction <--> Bivio Aurisina	Existing	J35, J36	14.2	Conventional	2	Electrified	PC80	105	12	225	3 000 Volts, DC	600	DC	Yes
10	19035	Bivio Aurisina <--> Villa Opicina	Existing	J35, J36	14.2	Conventional	3	Electrified	PC80	80	15	225	3 000 Volts, DC	600	DC	Yes
11	19032	Border IT/SL I / Sežana II <--> Villa Opicina	Existing	J35, J36	-	Conventional	-	-	-	-	-	-	-	-	-	
12	18902	Portoguaro <--> Cervignano A.G.	Existing	J35, J36	42	Conventional	2	Electrified	PC80	150	9	225	3 000 Volts, DC	600	DC	Yes
13	18962	Portogruaro <--> Venezia Mestre	Existing	J35, J36	59.3	Conventional	2	Electrified	PC80	150	8	225	3 000 Volts, DC	650	DC	Yes
14	18931	Venezia Mestre <--> Ronchi dei Legionari Sud	Planned	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
15	18785	Venezia Mestre <-->	Existing	J35, J36	16.9	Conventional	2	Electrified	PC22	130	2	225	3 000 Volts, DC	-	DL	Yes

		Venezia S.L.														
16	18954	Venezia Mestre <--> Padova (HS)	Existing	J35, J36	28.5	High speed	2	Electrified	PC80	160	8	225	3 000 Volts, DC	625	DC	Yes
17	18989	Venezia Mestre <--> Padova	Existing	J35, J36	28.5	Conventional	2	Electrified	PC80	160	3	225	3 000 Volts, DC	625	DC	Yes
18	22400143	Padova <--> Monselice	Existing	J31, J32	22.8	Conventional	2	Electrified	PC80	160	5	225	3 000 Volts, DC	625-650	DC	Yes
19	22400144	Monselice <--> Rovigo	Existing	J31, J32	20.9	Conventional	2	Electrified	PC80	160	5	225	3 000 Volts, DC	625-650	DC	Yes
20	22400142	Rovigo <--> Ferrara	Existing	J31, J32	32	Conventional	2	Electrified	PC80	160	11	225	3 000 Volts, DC	625-650	DC	Yes
21	22400014	Ferrara <--> San Pietro in Casale	Existing	J31, J32	23	Conventional	2	Electrified	PC80	160	10	225	3 000 Volts, DC	625-650	DC	Yes
22	22400012	San Pietro in Casale <--> Castel Maggiore	Existing	R5	13.9	Conventional	2	Electrified	PC80	160	3	225	3 000 Volts, DC	625-650	DC	Yes
23	22400013	Castel Maggiore <--> Bologna Centrale	Existing	R5	9.9	Conventional	2	Electrified	PC80	150	3	225	3 000 Volts, DC	575	CTC	Yes
24	22400023	Bologna Centrale <--> San Vitale Junction	Existing	R5	4	Conventional	2	Electrified	PC80	150	6	225	3 000 Volts, DC	575	CTC	Yes
25	22400022	San Vitale Junction <--> Castel Bolognese	Existing	R5, J63	37.8	Conventional	2	Electrified	PC80	160	7	225	3 000 Volts, DC	600	CTC	Yes
26	22400027	Castel Bolognese <--> Faenza	Existing	J63	7.2	Conventional	2	Electrified	PC80	160	7	225	3 000 Volts, DC	600	SCC	Yes
27	22400024	Faenza <--> Granarolo	Existing	K103	8.9	Conventional	1	Electrified	PC32	100	5	225	3 000 Volts, DC	480-575	CTC	Yes
28	22400025	Granarolo <--> Ravenna	Existing	K108-9	24.5	Conventional	1	Electrified	PC32	135	11	225	3 000 Volts, DC	475-575	CTC	Yes
29	22400026	Castel Bolognese <--> Ravenna	Existing	K106-7-8	41.09	Unselected	1	Electrified	A	120	6	225	3 000 Volts, DC	475-575	CTC	Yes

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

D.2.7. Slovenia

The Slovenian section of the BA rail corridor represents parts of several international railway connections E67, E69 and E70. Despite of that, Slovenian railway infrastructure is at the very moment in considerably bad condition regarding physical level (technical parameters, infrastructure and capacity restrictions, tunnels, gauge, frequency of trains etc.), functional characteristic of network (axle load, loading gauge, gradient, train speed and length, power supply, signalling system etc.), economic status (costs and prices regarding other transport modes) and critical issues (safety increasing, nodes saturation, lack of capacities, bottlenecks etc.). For example, there are several sections between Zidani Most and Šentilj that are not compliant with the standard of 22.5 t/axle.

BA railway lines in Slovenia are classified as conventional. The electrification system of the Slovenian part of BA railway lines is 3 kV DC, except at the junction point with railway infrastructure of Austria with 15 kV AC, frequency 16.7 Hz. Two different command and control systems are present on the BA part of the railway network.

From Austrian border to Ljubljana trains are controlled locally, from Ljubljana to Koper and Sežana centralised command and control system is in place.

Slovenian rail network is not yet equipped with the ERTMS system. Interoperability issue is expected to be solved till the end of 2015, until than GSM-R and ETCS Level 1 should be in place on the entire rail network in Slovenia except on the section Pragersko-Maribor-Šentilj.

Line Divača – Koper (SI)

Analysis of the existing infrastructure. Current one-track line between Divača and Koper does not have sufficient transport and throughput capacity for freight transport between Adriatic and Central Europe (transport capability of the line is estimated to be saturated until 2018). Goal is to increase the capacity and transport strength of the track, to shorten the lines and duration of travels, to increase the running speed and degree of safety and efficient traffic conduction. Upgrade of the existing track (creation of siding, pax tracks, extra tracks) is on-going and construction of the 2nd track (new line, tunnels, bridges) is expected after 2020.

On-going works. The modernisation of the existing track is at its implementation phase. Works are underway and expected to be finished by the end of 2015.

Review of studies. A new line is planned to be constructed on this section of the BA Corridor; the project documentation and studies have been prepared, with funding from TEN-T budget. Currently, the acquisition of land is almost complete and the environmental impact assessment is already at its completion stage. The construction of the railway line is envisaged to be co-financed by the EU within the new Multiannual Funding Framework 2014-2020.

Table D8 BA Corridor Rail infrastructure: technical parameters of the Slovenian section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National line code	Len.(km)	Type	Number of tracks	Traction	Clearance or structure gauge	Max operating speed (km/h)	Max inclination ‰	Max axle load (kN)	Rail voltage (volt)	Maximum train length (m)	Control and command system	GSM-R
1	18189	Sentilj / Spielfeld-Strass (border A/SLO) <--> Maribor	Existing	30 (E67)	16.5	Conventional	1	Electrified	B	80	9	200	3 000 Volts, DC	560	PZB	No
2	18186	Maribor <--> Pragersko	Existing	30 (E67)	18.7	Conventional	2	Electrified	B	120	9	200	3 000 Volts, DC	597	PZB	No
3	18177	Zidani Most <--> Pragersko	Existing	30 (E67)	73.2	Conventional	2	Electrified	B	80	9	200	3 000 Volts, DC	597	PZB	No
4	18190	Zidani Most <--> Ljubljana	Existing	10 (E70)	63.9	Conventional	2	Electrified	B	100	4	225	3 000 Volts, DC	570	PZB	No
5	22000003	Postojna <--> Ljubljana	Existing	50 (E70)	67.1	Unselected	2	Electrified	B	100	12	225	3 000 Volts, DC	600	PZB	No
6	18183	Pivka <--> Ljubljana	Existing	50 (E70)	80	Conventional	2	Electrified	B	100	12	225	3 000 Volts, DC	600	PZB	No
7	22000002	Divača <--> Postojna	Existing	50 (E70)	36.8	Unselected	2	Electrified	B	80	8	225	3 000 Volts, DC	600	PZB	No
8	18193	Divača <--> Pivka	Existing	50 (E70)	23	Conventional	2	Electrified	B	80	8	225	3 000 Volts, DC	600	PZB	No
9	18197	Divača <--> Koper	Existing	60,62 (E69)	48	Conventional	1	Electrified	B	70	25	225	3 000 Volts, DC	525	PZB	No
10	18185	Divača <--> Sežana	Existing	50 (E70)	10.5	Conventional	2	Electrified	B	75	10	225	3 000 Volts, DC	600	PZB	Yes
11	22000001	Sežana (border IT/SLO) <--> Divača	Existing	50 (E70)	12.9	Unselected	2	Electrified	B	100	10	225	3 000 Volts, DC	600	PZB	No
12	18180	Sežana <--> Sežana (border IT/SLO)	Existing	50 (E70)	3.3	Conventional	2	Electrified	B	75	10	225	3 000 Volts, DC	600	PZB	Yes

Note: "Max operating speed" is not the same as for the compliance to the Regulation 1315/2013 related to the freight train operation; the above parameter refers to the maximum operating speed on the line (i.e. also considering passengers trains)

Line Divača-Ljubljana; Ljubljana-Zidani Most (SI)

Analysis of the existing infrastructure.

Section Divača–Ljubljana:

- Maximum axle load of the section Divača-Ljubljana is D3 (except Postojna–Prestranek and Gornje Ležeče–Divača); on majority of the track (92%) maximum operating speed is lower than 100km/h; GB profile is not assured, block system is not enabled on some parts of the track; utilisation of throughput is at 62%.

Section Ljubljana – Zidani Most:

- Maximum axle load on the track is D3 (except Zagorje–Sava (right track), Sava–Litija (right track), on 40% of the track, maximum operating speed is lower than 100km/h; GB profile is not assured, track is only partially equipped with block system; utilisation of throughput is at 42%.

For both sections, goal is to assure D4 down the whole track, increase of throughput and capability of the track to 180-190 trains per day, improvement of running speed, enable the use of trains up to 740m. Organizational measures and measures for increase of throughput and track upgrade is expected. Eligibility pre-study will encompass verification of operating conditions/principles of the current track, verification of organisational means and other urgent measures for existing tracks (energy supply, introduction of signalling and safety devices (for example: APB, ERTMS, DVP), reduction of locomotive journeys, aggregation of trains, increase of load of freight trains, etc.), reconstruction verification or upgrade of the track for future traffic needs. Pre-study of eligibility will also identify bottlenecks, needs for the period of three time intersections and suggest the most suitable measures.

On-going works. Works are underway on this section near Košana, where around five km of track, including three tunnels, is being modernised. The works should be finished by the end of 2015.

Review of studies. The feasibility study for the Ljubljana node was finished in 2009. The documentation is under preparation and is expected to be completed by 2018. Pre-feasibility study for the high speed rail connection Divača-Ljubljana and Ljubljana-Zidani Most was finished in 2013. The study concluded that the construction of a high speed line (250 km/h, TSI category I) would not be economically viable. For the next steps, the National authorities are considering the development of a rail core network with maximum speed of 200 km/h (TSI category IV-M).

Line Zidani Most-Pragersko (SI)

Analysis of the existing infrastructure. Double track electrified railway lines Slovenska Bistrica-Pragersko, Dolga Gora – Poljčane and Zidani Most – Celje (in the total length 25km) are in C3 category (200 kN/axle, 72kN/m) and presents a bottleneck on the corridor. Goal is to improve technical parameters and to ensure category D4, to increase the line permeability, to ensure the interoperability, to reduce travel time and to reduce maintenance costs.

At the Pragersko station, there is insufficient number of tracks with platforms, unsuitable platform lengths, track category is C3, levelled access and gateways, unsuitable loading gauge. The goal is to increase throughput and processing capabilities of the train station, to improve technical parameters, to ensure category D4, to ensure technical suitability commensurate with European standards and requirements for interoperability, to increase traffic safety, to eliminate and prevent negative influences on environment, to reconstruct the station and assure suitable connection to planned modernized station Pragersko–Ormož–Hodoš.

On-going works. On the Zidani Most-Pragersko section the following projects are at their implementation phase:

- Upgrade of the Poljčane railway station: this project comprises the upgrade of tracks and catenaries, renewal of the safety signalling and telecommunication devices, construction of new passenger platform including out-of-level access to the new platform. The project started in 2010 and is expected to be finished by the end of 2014;
- Upgrade of the Dolga Gora-Poljčane railway line: the design documentation has been prepared and the tender published. Works are expected to be completed by mid-2015. The project covers the radical upgrade of the section over a length of 7.5 km, including upgrading of tracks, renewal of the safety signalling and telecommunication devices, modernisation of the catenary, sanitation of dyke and retaining walls, settlement of out-of-level crossings, etc.
- Upgrade of the Poljčane-Pragersko railway line: the design documentation for the upgrade of the section is being prepared. The project, co-financed by the TEN-T budget, was finished in 2012. Upgrading work is scheduled to begin in 2014.

D.3. Characteristics of the road infrastructure

D.3.1. Cross-border sections

There are 6 cross-border sections in operation on the BA Corridor. The technical parameters for these sections as included in the TENtec database are included in tables below providing the data for the national sections.

In the following sections an analysis of the existing infrastructure is provided, commenting on presence of critical issues. The analysis of the on-going works is also provided, if applicable together with a review of the existing studies and information, as appropriate. The Chapter concludes with an assessment of the compliance of the sections with the regulation.

At the cross-border sections (PL-CZ, SK-AT, AT-SI, AT-IT, IT-SI), the road infrastructure is already operational and compliant with TEN-T standards. which does not however preclude additional investments to increase users' benefits (i.e. increase capacity and reduce congestion), reduce external costs from transport, improving safety and reducing pollution. ITS investments for users' information and traffic management may also be required to support these same targets. On two cross-border sections, between Katowice (PL) and Žilina (SK) as well as between Brno (CZ) and Wien (AT), bottlenecks exist as described in the following paragraphs.

Road connection: Katowice (PL) – Žilina (Brodno) (SK); [Zwardoń (PL) – Skalité (SK)]

Analysis of the existing infrastructure. The road infrastructure in the area of the **Poland – Slovakia** border is still under development. The corridor runs along the S69 express road which is partly under construction and/or the construction has not yet started. Total length of the road section between Bielsko-Biala and Zwardoń is 51 km. The following parts of the S69 express road are ready and opened for traffic (27 km in total):

- Bypass of Bielsko-Biała – Mikuszowice;
- Żywiec – Zwardoń (except bypass of Węgierska Górka).

Section of the S69 express road (Mikuszowice – Żywiec) is still under construction.
Section of the S69 express road (Mikuszowice – Żywiec) is still under construction.
The 15.5 kilometres long section is planned to be opened in 2014 or 2015. The most problematic stretch is the 8.5 km long section in the area of Węgierska Górka. Construction of the bypass of Węgierska Górka is under preparation and planned to be financed under the Multiannual Funding Framework 2014-2020. Until the new by-pass will be constructed, the traffic will use the national road (which on the section Żywiec-Zwardoń follows the itinerary of expressway S69, already modernized and meeting the axle loads requirements for TEN-T road infrastructure). The section crossing the border line is in operation with two lanes per direction. Short cross-border D3 motorway in full profile section following shortly as half profile two lanes D3 is temporarily connected in Skalité to the national road I/12 with very low quality, passing through the villages and accessible only by vehicles under 7.5 tons.
Completed section of D3 from the state border till Žilina:

- D3 was constructed in the short section Skalité – Zwardoń (1997 – 1999);
- D3 half profile section was constructed in the section Oščadnica – Čadca, Bukov in 1996 – 2005;

Section of D3 Skalité – Svrčinovec in Slovakia is under construction and D3 section Svrčinovec –Žilina, Brodno also in Slovakia, is at the stage of preparatory works with not completely confirmed plan to finish it by 2020. Most of cross-border transport uses currently Polish road S1 and Czech roads R48 and I/11 instead of S69 – D3. The section from Svrčinovec till Žilina is created by national road I/11 (with short half profile section of future D3 in operation from Čadca, Bukov till Oščadnica).

On-going works. Construction works aimed at network modernisation are still on-going on the following sections:

- D3 section Svrčinovec – Skalité is under construction as half profile with two lanes (2013 – 2016);
- Adjacent national section Žilina, Strážov – Žilina, Brodno is also under construction planned to be built in 2014 – 2017.

Review of studies. The following D3 four lane sections are included in the relevant operational programmes for construction: Čadca, Bukov – Svrčinovec (planned to be built in 2015 – 2018); Žilina, Brodno – Kysucké Nové Mesto (planned to be built in 2016 – 2020); Kysucké Nové Mesto – Oščadnica (planned to be built in 2016 – 2019); Oščadnica – Čadca, Bukov (planned to be built in 2018 – 2020, if there remain financial resources from Cohesion Fund according to Operational Programme Integrated Infrastructure).

Road connection: Brno (CZ) – Wien (Schwechat) (AT); [Mikulov (CZ) – Mistelbach (AT)]

Analysis of the existing infrastructure. The express urban road I/52 in Brno, express road I/52 Modřice – Rajhrad and the expressway R52 Rajhrad – Pohořelice on the Czech side was finished in 1997 and Austrian motorway A5-S1 from Schrick to Wien Süßenbrunn is in operation since 2010. The critical issue is the cross-border road section Pohořelice (CZ) - Schrick, (AT). Priority Project 25 included the construction of a new motorway with two lanes in both directions. However, project implementation is only gradually progressing since the last few years. In addition, environmental issues identified 4 years ago in the Annual Report of the Priority Project, namely that the cross-border section from Pohořelice (CZ) to the Austrian border (Mikulov/Drasenhofen) is situated in an environmentally sensitive area (Natura 2000) – are still not resolved. The Northern part of the Austrian A5 motorway from Schrick to the AT/CZ border (Drasenhofen) is a bottleneck as the current connection from Wien to Brno is a rural two-lane road (B7). The Southern part of the A5 motorway (Wien-Schrick) in Austria was completed in January 2010. On the Czech side two directional national road I/52 from Pohořelice to Mikulov with level junctions, speed limits, pedestrian and bicycle paths crossings and bus stops passing through Mikulov town is in operation.

Construction works aimed at network modernisation were undertaken on the following Czech sections: Express road I/52 Modřice – Rajhrad was constructed in 1992 – 1997; Expressway R52 Rajhrad – Pohořelice was constructed in 1992 – 1997. On the Austrian side of the border the motorway A5-S1 Schrick – Wien was constructed in 2007 – 2010. Partially completed A5 highway is planned to be in operation by 2017.

On-going works. The construction of the sub-section Schrick – Poysbrunn (25 km) is planned to be started end of 2014 / early 2015 (to be finished by 2017) and comprises two lanes in each direction. For the sub-section (Poysbrunn – Drasenhofen) the construction of the Drasenhofen by-pass (5 km, only one lane each direction!) is intended to be realized from 2016-2018. The expected construction period 2020-2025 envisages the completion of the part section Poysbrunn to Drasenhofen AT/CZ border (9 km) with two lanes in each direction (Upgrading Drasenhofen by-pass as well as upgrading the rural two-lanes road segments Poysbrunn – Drasenhofen Süd and Drasenhofen Nord – AT/CZ border). The start of the construction of that part depends on the CZ environmental review. The decision of the Austrian authorities is expected to be published by the end of 2014.

Review of studies.
Regarding the expressway R52, which also includes the Mikulov bypass, the design works were finished already in 2007 - 2011, but there are court trials open due to the citizen initiatives' complaints related to environmental issues. The section named Perná – Mikulov – state border consisting of two lanes Mikulov bypass only is currently planned to be constructed starting from 2016, if all approvals are available on time. There is no fixed time horizon for the construction commencement of the section consisting of two other subsections Pohořelice – Ivaň and Ivaň – Perná, but it is expected to finalise the construction till 2030. As of today environmental impact assessment procedures are in progress regarding the last 9 km between Poysbrunn and the Czech border. Construction of that route will probably begin in 2016 and should be completed by 2017. A two directional, one-lane bypass of Drasenhofen, which will essentially be part of that final section, is currently in the planning phase. A5 motorway section Poysbrunn – state border is planned to be constructed in a second phase, in coordination with the implementation of the Czech R52.

D.3.2. Poland

The highway and express road infrastructure along the corridor is largely completed and modernized. The S3 and S7 - respectively part of the Western and Eastern road alignments of the BA Corridor in Poland - are both expected to be modernized during the 2014-2020 Multiannual Funding Framework. We provide below detailed information on the status of the BA Corridor road sections in Poland.

S3, A4, S6, S7, A2, A1, S1, S69, Polish road network (PL)

Based on the information provided so far by the responsible authorities and our knowledge of the network, the following information about the relevant sections of the Polish road network belonging to the corridor is worth noting:

- ***S3 Świnoujście - Szczecin - Legnica (Sulechów – Nowa Sól and Nowa Sól – Legnica)***:
  - Most of the section Świnoujście-Szczecin is currently either under preparation or construction / for upgrading to the parameters of an express road (dual carriageway with one or two lanes, axle load 115 kN/axis, design speed 100 km/h); except Troszyn and Miękowo by-passes opened to traffic respectively in 2011 and 2012;
  - Section Klucz-Pyrzyce-Myślibórz-Gorzów Wielkopolski (approx.. 100 km) has already the parameters of an express road, including the partially completed Gorzów Wielkopolski by-pass;
  - Section Gorzów Wielkopolski – Międzyrzecz (approximately 40 km long) has been opened to traffic in May 2014);
  - 43 km long section Międzyrzecz-Sulechów is completed and opened to traffic;
  - Sections Sulechów-Nowa Sól with one line ready, as well as section Nowa Sól-Legnica are planned for completion under the Multiannual Funding Framework 2014-2020.
- ***A4 Legnica – Wrocław:*** The section Legnica-Wrocław of A4 motorway is in operation with some further development planned in the future.
- ***S6 "Trójmiasto Bypass"***: The S6 express road section "Trójmiasto Bypass" is in operation.
- ***S7 Gdańsk - Warszawa (Koszwały-Kazimierzowo-Elbląg, Miłomłyn by-pass-Olsztynek, Nidzica-Płońsk, Płońsk-Warszawa)***: The status of S7 express road is as follows: the whole section Gdańsk-Warszawa operates with a number of km still without the status of express road (dual carriageway, one – two lanes, axle load 115 kN/axis, design speed 100 km/h). The following sections are foreseen for modernisation / construction:
  - South by-pass of Gdańsk by-pass has been constructed and is under operation;

  - Section Koszwały-Kazimierzowo-Elbląg (40 km) is under preparation for reconstruction;
  - Section Elbląg-Pasłęk-Miłomłyn (60 km) is ready and in operation;
  - Section Miłomłyn by-pass-Olsztynek is currently subject to tender procedure, in preparation for modernisation;
  - Section Olsztynek-Nidzica is ready and operational;
  - Section Nidzica-Płońsk as well as Płońsk-Warszawa (approximately 180 km) are foreseen to be constructed under the Multiannual Funding Framework 2014-2020; except Płońsk by-pass, which has already been constructed.
- ***A2 Warszawa – Stryków:*** Continuing from Warszawa, the Corridor runs along the A2 motorway, section Warszawa – Stryków, which is operational and meets the highway parameters (dual carriageway with two lanes each direction; maximum axis load: 11.5 tons/axis; maximum available speed 140 km/h, design speed 120 km/h).

- ***A1 Gdańsk (Rusocin) – Stryków - Gorzyczki (Tuszyn – Pyrzowice, Bridge in Mszana):*** The status of A1 highway section Gdańsk (Rusocin) - Stryków – Gorzyczki is the following:
  - Section Rusocin – Stryków is under operation (including section Włocławek – Kowal recently opened in May 2014)
  - Section Stryków-Tuszyn is currently under construction (completion is expected in 2017);
  - Section Tuszyn-Pyrzowice is planned to be constructed; tender procedure was launched for section Częstochowa-Pyrzowice (in March 2014); currently the traffic goes via the national road no. 1;
  - Section Pyrzowice-Gorzyczki-Bohumín is completed, including bridge in Mszana on section Świerklany-Gorzyczki which was recently opened in May 2014.
- ***S1 Katowice – Kosztowy – Bielsko-Biała:*** Section of S1 Katowice (Kosztowy) – Bielsko-Biała, which has the status of express road (four lanes road with traffic lights junctions), and 6.5 km length segment of section Pyrzowice – Katowice (Kosztowy) is foreseen for modernisation under the Multiannual Funding Framework 2014-2020.
- ***S69 Bielsko-Biała - Żywiec - Zwardoń***: section has been completed with the exception of:
  - section Mikuszowice junction (Żywiec/ Bystrzańska) – Żywiec – which is under tender and planned to be completed in 2014/2015;
  - the by-pass of Węgierska Górka is considered a bottleneck (under preparation; first construction works commencement foreseen in 2015).

Table D9 BA Corridor Road infrastructure: technical parameters of the Polish section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
Eastern/Central branch												
1	21600040	Gdynia (J. S6/ 468) <--> Gdańsk (J. S6/501)	Existing	S6	23.4	Urban roads	2	2	Yes	0	0.13	No
2	24209	Gdańsk (J. E077/E075) <--> Elblag (J. 7/504)	Existing	S7, 7	56	Rural two-lane road	1	1	Yes	0	0.13	No
3	24249	Ostróda <--> Elblag (J. 7/504)	Existing	S7	72	Rural road with separate directions	2	2	Yes	0	0.13	No
4	24259	Olsztynek <--> Ostróda	Existing	S7, 7	26.3	Rural two-lane road	1	1	No	0	0	No
5	24196	Plonsk (J. 10/7) <--> Olsztynek	Existing	S7, 7	121	Rural two-lane road	1	1	Yes	0	0.1	No
6	24206	Załuski <--> Plonsk (J. 10/7)	Existing	7	14.3	Rural road with separate directions	2	2	Yes	0	0.1	No
7	24233	Załuski <--> Warszawa (J. 8/7)	Existing	7	41.7	Rural road with separate directions	2	2	Yes	0	0.1	No
8	64585	Warszawa (J. 8/7) <--> Warszawa (J. 2/8)	Existing	7, S8	4.2	Urban roads	3	3	Yes	0	0.13	No
9	24202	Konotopa <--> Warszawa (J. S2/8)	Existing	S8	7.4	Urban roads	3	3	Yes	0	0.13	No
10	24242	Strykow (J. A2/A1) <--> Konotopa	Existing	A2	91	Motorways	2	2	Yes	0,05	0.13	No
11	21600041	Gdańsk Jn. S6/501 <--> Jn. S6/A1	Existing	S6	14.8	Urban roads	2	2	Yes	0	0.13	No
12	24231	Nowe Marzy (J. A1/1) <--> Gdańsk (J. E077/E075)	Existing	A1	89	Motorways	2	2	Yes	0,05	0.11	No
13	24218	Nowe Marzy (J. A1/1) <--> Torun (J. A1/10)	Existing	A1	51.9	Motorways	2	2	Yes	0,05	0.11	No
14	24274	Torun (J. A1/10) <--> Czerniewice (J. A1/1/S10)	Existing	A1	9.7	Motorways	2	2	Yes	0,05	0.11	No
15	24275	Czerniewice (J. A1/1/S10) <--> Bedlno	Existing	A1	109.2	Motorways	2	2	Yes	0,05	0.13	No
16	7	Bedlno <--> Strykow (J. A2/A1)	Existing	A1	34.9	Motorways	2	2	Yes	0,05	0.13	No
17	24193	Tuszyn (J. 91/A1) <--> Strykow (J. A2/A1)	Under construction	A1	40	Motorways	2	2	Yes	0	0.13	No
18	24265	Tuszyn (J. 91/A1) <--> Piotrków	Existing	A1	14.1	Motorways	2	2	Yes	0,05	0.13	No

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
		Trybunalski (J. A1/8)										
19	14	Piotrków Trybunalski (J. A1/8) <--> Piotrków Trybunalski (J. 8/A1)	Existing	A1	2.9	Motorways	3	3	Yes	0,05	0.13	No
20	24237	Czestochowa-Rzasawa (J. A1/1) <--> Piotrków Trybunalski (J. 8/A1)	Existing	1	65.7	Rural road with separate directions	2	2	No	0	0	No
21	21	Czestochowa-Rzasawa (J. A1/1) <--> Pyrzowice	Planned	A1	56.3	Motorways	2	2	n.a.	n.a.	n.a.	n.a.
22	24273	Pyrzowice <--> Sośnica (J. E040/E075)	Existing	A1	44.4	Motorways	2	2	Yes	0	0.13	No
23	24276	Gorzyczki/Věřňovice <--> Sośnica (J. E040/E075) (J. E040/E075)	Existing	A1	47.9	Motorways	2	2	Yes	0,05	0.13	No
Western branch												
24	24221	Świnoujście/Ahlbeck <--> Goleniów	Existing	S3, 3	66.3	Rural two-lane road	1	1	No	0	0	No
25	24197	Szczecin <--> Goleniów	Existing	S3, A6	39	Rural road with separate directions	2	2	Yes	0	0.13	No
26	21600034	Szczecin <--> Gorzow Wielkopolski	Existing	S3	91.5	Rural road with separate directions	2	2	Yes	0	0.13	No
27	21600035	Gorzow Wielkopolski <--> Jordanowo	Existing	S3	55	Rural road with separate directions	2	2	Yes	0	0.13	No
28	3	Jordanowo <--> Świebodzin	Existing	S3	6.9	Rural road with separate directions	2	2	Yes	0	0.13	No
29	24247	Świebodzin <--> Sulechów	Existing	S3	20	Rural road with separate directions	2	2	Yes	0	0.13	No
30	24211	Nowa Sol <--> Sulechów	Existing	S3, 3	35.8	Rural two-lane road	1	1	Yes	0	0.1	No
31	24208	Legnica (J. A4/3) <--> Nowa Sol	Existing	S3 ,3	93.3	Rural two-lane road	1	1	No	0	0	No
32	24226	Legnica (J. A4/3) <--> Kostomloty (J. E40/5)	Existing	A4	33.2	Motorways	2	2	Yes	0,05	0.13	No
33	73201	Kostomloty (J. E40/5) <--> Nowa Wieś (J. A4/A8)	Existing	A4	25.1	Motorways	2	2	Yes	0,05	0.13	No
34	24228	Nowa Wieś (J. A4/A8) <--> Bielany	Existing	A4	5.5	Motorways	2	2	Yes	0,05	0.13	No

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
		Wrocławskie (J. E040/5/8)										
35	24222	Bielany Wrocławskie (J. E040/5/8) <--> Przylesie	Existing	A4	40.2	Motorways	2	2	Yes	0,02	0.13	No
36	24229	Przylesie <--> Sarny Wlk.	Existing	A4	26.2	Motorways	2	2	Yes	0,02	0.13	No
37	24257	Sarny Wlk. <--> Prady	Existing	A4	8.7	Motorways	2	2	Yes	0,02	0.13	No
38	24238	Prady <--> Nogawczyce	Existing	A4	56.1	Motorways	2	2	Yes	0,02	0.13	No
39	24264	Nogawczyce <--> Kleszczow	Existing	A4	18	Motorways	2	2	Yes	0,02	0.13	No
40	24212	Kleszczow <--> Sośnica (J. E040/E075)	Existing	A4	19.3	Motorways	2	2	Yes	0,02	0.11	No
41	24220	Sośnica (J. E040/E075) <--> Katowice	Existing	A4	20.6	Motorways	2	2	Yes	0,05	0.13	No
42	24213	Katowice <--> Kosztowy (J. E40/1)	Existing	A4	12.9	Motorways	2	2	Yes	0,07	0.19	No
43	24272	Bielsko Biała <--> Kosztowy (J. E40/1)	Existing	S1, 1	51.6	Rural road with separate directions	2	2	Yes	0	0.13	No
44	24214	Zwardoń PL/CZ <--> Bielsko Biała	Existing	S69, 69	57.5	Rural two-lane road	1	1	No	0	0	No

D.3.3. Czech Republic

The road infrastructure on the Czech part of the BA Corridor is mostly consisting of expressways and motorways in operation, with the exception of missing D1 section Lipník nad Bečvou – Říkovice by Přerov (another missing section is cross-border section Pohořelice – Mikulov). The missing D1 section is being bypassed using expressways R35 and R46 instead of using national roads I/47 and I/55 through Přerov town. There is D1 motorway section Věřňovice – Lipník nad Bečvou in operation from 2012 and Říkovce – Hulín – Brno, jih section includes again a section of motorway D1, its section Holubice – Brno, jih is overloaded in peak hours and the subject of preparation of upgrade to six lanes.

Gorzycki, PL/Věřňovice – Lipník nad Bečvou section of D1 is on operation, section Lipník nad Bečvou – Přerov is currently being tendered and is planned to be built by 2018. The section Přerov – Říkovice is planned to be constructed in the period 2017 – 2021. Říkovce – Hulín – Brno, jih section includes again a section of motorway D1. (Adjacent Brno, jih – Pohořelice section includes the express road I/52 from Brno to Rajhrad and expressway R52 from Rajhrad till Pohořelice, where it interconnects with cross-border road I/52).

Table D10 BA Corridor Road infrastructure: technical parameters of the BA Corridor section in the Czech Republic

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
1	26012	Gorzyczki/Věřňovice <--> Belotin	Existing	D1	64.8	Motorways	2	2	Yes	0	0.21	Yes
2	26017	Belotin <--> Lipník	Existing	D1	15.4	Motorways	3	2	Yes	0	0.21	Yes
3	26038	Lipník <--> Kroměříž	Existing	I/47	30.9	Rural two-lane road	1	1	Yes	0	0.1	No
4	26010	Kroměříž <--> Vyškov	Existing	D1	32	Motorways	2	2	Yes	0	0.21	No
5	26037	Vyškov <--> Brno (jih)	Existing	D1	33.2	Motorways	2	2	Yes	0	0.21	Yes
6	26003	Brno <--> Brno (jih)	Existing	D1	2.3	Motorways	2	2	Yes	0	0.21	Yes
7	26006	Pohořelice <--> Brno	Existing	R52	23.7	Motorways	2	2	Yes	0	0.21	Yes
8	26057	Pohořelice <--> Mikulov / Drasenhofen (boarderline)	Existing	I/52	23.3	Rural two-lane road	1	1	Yes	0	0.1	No

I/47 and I/55 (future D1) Lipník nad Bečvou - Říkovice (CZ)

Analysis of the existing infrastructure. The status of D1 section Lipník nad Bečvou - Říkovice is the following:

- D1 is in operation from Prague to Říkovice and from Lipník nad Bečvou to Věřňovice/Gorzyczki border crossing to Poland;
- There is national two lanes road I/47section in operation in the section Přerov – Lipník nad Bečvou section and two lanes national road I/57 in the section Přerov – Říkovice, the road is passing through the centre of Přerov town
- There is however no significant bottleneck, as the expressways R35 and R46 Lipník and Bečvou – Olomouc – Vyškov are used to bypass missing D1 part with no detour and only minor delay due to speed limits on R46.

On-going works. No construction works are going on, Lipník nad Bečvou – Přerov section is at the tendering stage and Přerov – Říkovice section is being prepared for construction.

Review of studies. The section Lipník nad Bečvou – Přerov is currently being tendered and is planned to be built in 2014 – 2018. The section Přerov – Říkovice is planned to be constructed in the period 2017 – 2021 according to Transport Sector Strategies (2nd phase), Operational Programme Transport 2014 – 2020 and State Fund for Transport Infrastructure Budget for 2015 and Middle Term Outlook for 2016 – 2017.

D1 Brno, Holubice – Brno, jih (CZ)

Analysis of the existing infrastructure. D1 section inside Brno city is heavily loaded by international, national and local traffic and is going to its capacity limit. There is speed limit 100 km/h implemented and the section can become capacity bottleneck in short future.

On-going works. There are no on-going construction works but maintenance going on.

Review of studies. The status of D1 section Brno, Holubice – Brno, jih is in operation with four lanes, its capacity is used near to 100% in the peak hours. It is planned to upgrade the motorway to six lanes and modernise the junctions Brno, centrum and Brno, jih till 2030 according to Transport Sector Strategies (2nd phase), this is not planned till 2020.

D.3.4. Slovakia

The Slovak road infrastructure on the BA corridor consists mostly of motorways, with the exception of unfinished Northernmost D3 cross-border section Skalité – Žilina, Brodno. The section of D3 Žilina, Brodno – Žilina, Strážov is currently under consutrtcion (€ 255 million), the roads I/11 – I/18 are used instead till 2017. The following section of D3 from Žilina, Strážov to Hričovské Podhradie is in operation and connected by D1 to Bratislava, Pečňa with following short connections via D2 to Bratislava, Jarovce and via D4 to the Austrian border Jarovce/Kittsee. D1 section Trnava – Bratislava, Vajnory is temporarily marked as six lanes with limited speed to 110 km/h and the upgrade to full six lane profile is being planned till 2018. The Bratislava bypass motorway D4 to Austria is ready to be constructed using PPP financing, the works are planned to be finished till 2020; this infrastructure is not however considered as a BA Corridor section, as it is part of the comprehensive TEN-T network.

Table D11 BA Corridor Road infrastructure: technical parameters of the Slovaki section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
1	71462	Zwardoń (border PL/SK) <--> Skalité	Existing	I/12	3.18	Motorways	1	2	Yes	0	0.18	No
2	23867	Skalité <--> Svrčinovec	Existing	I/12	12.28	Rural two-lane road	1	2	Yes	0	0.18	No
3	71332	Svrčinovec <--> Čadca	Existing	I/11	5.67	Rural two-lane road	1	2	Yes	0	0.18	No
4	73203	Čadca <--> Oščadnica	Existing	I/11	4	Motorways	1	2	Yes	0	0.18	No
5	71340	Oščadnica <--> Kysucké Nové Mesto	Existing	I/11	10.79	Rural two-lane road	1	2	Yes	0	0.18	No
6	23888	Kysucké Nové Mesto <--> Žilina (Brodno)	Existing	I/11	11.2	Rural two-lane road	1	1	Yes	0	0.18	No
7	71476	Žilina (Brodno) <--> Žilina (Strážov)	Existing	I/18, I/11	4.25	Rural road with separate directions	2	1	Yes	0	0.18	No
8	71455	Žilina (Strážov) <--> Hričovské Podhradie	Existing	D3	8.5	Motorways	2	4	Yes	0	0.23	No
9	23892	Hričovské Podhradie <--> Vrtižer	Existing	D1	12.9	Motorways	2	2	No	0	0.21	No
10	71232	Vrtižer <--> Sverepec	Existing	D1	9.6	Motorways	2	2	Yes	0	0.21	No
11	71239	Sverepec <--> Ivanka pri Dunaji - sever	Existing	D1	150.5	Motorways	2	2	Yes	0	0.23	No
12	71441	Ivanka pri Dunaji - sever <--> Petržalka/Berg (border SK/A)	Existing	D1	14.7	Motorways	2	2	Yes	0	0.23	No
13	21900015	Petržalka/Berg (border SK/A) <--> Jarovce/Kittsee (border SK/A)	Existing	D2	10.69	Motorways	2	2	Yes	0	0.206	No
14	21900013	Petržalka/Berg (border SK/A) <--> Border (SK/A)	Existing	D4	3.18	Motorways	1	2	Yes	0	0.18	No

I/18 (future D3) in Žilina (SK)

Analysis of the existing infrastructure. Urban express road I/18 bypassing Žilina centre is currently used for the connection of road I/11 (future D3) to existing section of D3 Žilin, Strážov – Hričovské Podhradie.

- D3 is in operation in further four lanes section Žilina, Strážov – Hričovské Podhradie (constructed 2005 – 2008).

On-going works.
The motorway D3 is being constructed in following sections:

- D3 section Žilina, Brodno – Žilina, Strážov (Žilina bypass) is under construction in full profile till 2017.

D1 Trnava - Bratislava (SK)

Analysis of the existing infrastructure. The status of D1 section Trnava - Bratislava is as follows:

- Section Trnava – Bratislava, Vajnory constructed as four lane motorway is in operation with six marked lanes and speed limit set at 110 km/h due to high traffic volumes in peak hours;
- D1 in the city of Bratislava from Vajnory to Prístavný Bridge with four lanes is severely congested during most of the working day. Temporarily solution via adding two more lanes without physical reconstruction is being prepared to be realised in 2015 on part of section.

On-going works. There are no on-going construction works but maintenance going on.

Review of studies. The following works are under consideration in the infrastructure development plans of the National Motorway Company, Národná dialničná spoločnosť:

- New D1 junction Triblavina is planned to be built in 2014 – 2016;
- New D1 junction Blatné is prepared to be built in 2015 – 2016;
- The D1 section Bratislava – Senec will be upgraded to six lanes in 2016 – 2019;
- The D1 section Blatné – Trnava will be upgraded to six lanes in 2016 – 2018;
- D4 motorway Eastern bypass of Bratislava (Rača – Ivanka pri Dunaji sever – Bratislava Jarovce) is to be built till 2020 as PPP project
- R7 expressway section Bratislava – Holice is to be put into operation in 2019 decreasing number of incoming traffic to D1 from the East.

The Bratislava bypass motorway D4 will connect D1 directly to D4-A6 to Wien bypassing congested D1 section. The works are planned to be finished till 2020 based on PPP financing. D4 should decrease the congestions on D1 from Vajnory till Prístavný Bridge, but it is not considered as a BA Corridor section, it is part of comprehensive TEN-T network.

D.3.5. Austria

The Austrian BA corridor road infrastructure, comprises the A5 motorway from the AT/CZ border (Mikulov/Drasenhofen) to Wien (Eibesbrunn)and the S1 ("Wiener Außenring Schnellstraße", a missing link in part) connecting Wien (Eibesbrunn) with the South of Wien (Vösendorf) where the A2 motorway starts. The latter is the route to the AT/IT border via Graz [Arnoldstein (AT) – Tarvisio (IT)]. The A9 motorway runs from Graz to the AT/SI border [Spielfeld-Straß (AT) - Sentilj (SI)]. Getting back to Wien (Schwechat) the A4 connects the capital with Bruckneudorf where the A6 motorway branches off to the North-East (AT/SK border, Kittsee/Jarovce).

B7 (Future A5) Drasenhofen - Schrick (AT)

Analysis of the existing infrastructure. There is national road B7 in operation from the Czech border to Schrick where it connects with the motorway A5 to Wien. The road B7 represents a major bottleneck in terms of speed, capacity (one lane in each direction), safety and environmental issues. A critical point is the traffic lights controlled junction of B7 and B219 in Poysdorf with waiting times in of up to ten minutes during peak hours.

On-going works. Start of construction works for Schrick – Poysbrunn will depend on the environmental impact assessment expected for the spring of 2015. The call for the tender has already been launched and contracts have been prepared (for details, see Chapter Cross-border sections).

Review of studies. As for Asfinag the construction of A5 section Schrick – Poysbrunn will begin in 2014 and should be completed by 2016. The section of the last 8.5 km between Poysbrunn and the Czech border is planned to be constructed as two lanes B7 bypass of Drasenhofen as the first phase from 2016 till 2017. The second phase, full motorway profile section till the border crossing will be prepared to be constructed together with Czech R52 from Mikulov towards Pohořelice, the earliest possible completion date of R52 border sections is considered in 2020.

Table D12 BA Corridor Road infrastructure: technical parameters of the Austrian section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
1	26243	Schrick <--> Mikulov / Drasenhofen (boarderline)	planned	A5	32.1	Rural two-lane road	1	1	No	0	0	No
2	26244	Eibesbrunn <--> Schrick	existing	A5	22.92	Motorways	2	2	Yes	0	0.34	No
3	26247	Schwechat <--> Eibesbrunn	existing / partly planned	S1	33.8	Motorways	2	2	No	0	0.34	No
4	26246	Schwechat <--> Bruckneudorf	existing	A4	31	Motorways	2	2	Yes	0	0.34	No
5	26242	Bruckneudorf <--> Bratislava / Kittsee	existing	A6	22	Motorways	2	2	Yes	0	0.34	No
6	26248	Voesendorf <--> Schwechat	existing	S1	16.2	Motorways	2	2	Yes	0	0.34	Yes
7	26250	Voesendorf <--> Seebenstein	existing	A2	52.7	Motorways	3	4	Yes	0	0.34	Yes
8	26269	Seebenstein <--> Riegersdorf	existing	A2	78.8	Motorways	2	2	Yes	0	0.34	No
9	26249	Riegersdorf <--> Graz West	existing	A2	50.1	Motorways	3	2	Yes	0	0.34	Yes
10	26262	Graz West <--> Spielfeld	existing	A9	40.9	Motorways	2	2	Yes	0	0.34	Yes
11	26266	Graz West <--> Klagenfurt West	existing	A2	132.5	Motorways	2	2	Yes	0	0.34	Yes
12	26265	Klagenfurt West <--> Villach	existing	A2	26.8	Motorways	2	2	Yes	0	0.34	Yes
13	26264	Villach <--> Border IT/AT / Arnoldstein	existing	A2	21.5	Motorways	2	2	Yes	0	0.34	Yes

D.3.6. Italy

The main recently completed initiatives on the Italian section of the BA Corridor were the construction of the external by-pass in Mestre (2009) and the upgrading to highway standards of the Villesse-Gorizia road link (2013).

Currently, the construction of the third lane along stretch of motorway A4 Venezia - Trieste between Quarto d'Altino (Venezia) and Villesse (Gorizia) is planned, with works already on-going on the Southern section (Quarto d'Altino - San Dona di Piave, 18 km), due to completion in 2015. The timing of the remaining 77km between San Donà di Piave and Villesse is uncertain due to funding issues.

Table D13 BA Corridor Road infrastructure: technical parameters of the Italian section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
1	24437	Tarvisio <--> Border IT/AT / Arnoldstein	Existing	A23	5	Motorways	2	2	Yes	0.08	0.15	Yes
2	24436	Udine <--> Tarvisio	Existing	A23	96.4	Motorways	2	2	Yes	0.08	0.15	Yes
3	24499	Palmanova (J. A4/A23) <--> Udine	Existing	A23	18.5	Motorways	2	2	Yes	0.07	0.14	Yes
4	22400206	Fernetti <--> Villa Opicina (J. RA13/RA14)	Existing	A4	1.7	Rural road with separate directions	2	2	No	0	0	No
5	24562	Sistiana-Visogliano <--> Villa Opicina (J. RA13/RA14)	Existing	A4	16.6	Rural road with separate directions	2	2	No	0	0	No
6	24404	Palmanova (J. A4/A23) <--> Sistiana-Visogliano	Existing	A4	31	Motorways	2	2	Yes	0.08	0.14	Yes
7	22400334	Palmanova (J. A4/A23) <--> Portogruaro	Existing	A4	39.6	Motorways	2	2	Yes	0.08	0.14	Yes
8	22400071	Portogruaro <--> Quarto D'Altino	Existing	A4	44.8	Motorways	2	2	Yes	0.08	0.14	Yes
9	22400271	(VE) Mestre <--> Quarto D'Altino	Existing	A4	6	Motorways	2	2	Yes	0.08	0.14	Yes
10	22400255	Mestre <--> (VE) Mestre	Existing	A57	4.5	Motorways	2	2	Yes	0.08	0.14	Yes
11	24480	Venezia (J. SS309/A4) <--> Mestre	Existing	A57	5.4	Motorways	2	2	Yes	0.06	0.11	Yes
12	22400181	Venezia (J. SS309/A4) <--> Bivio A4/A57	Existing	A57	10.9	Motorways	2	2	Yes	0.06	0.11	Yes
13	24507	Padova (J. A4/A13) <--> Bivio A4/A57	Existing	A4	10.1	Motorways	3	3	Yes	0.06	0.11	Yes
14	22400319	Ferrara <--> Padova (J. A4/A13)	Existing	A13	83.2	Motorways	2	2	Yes	0.07	0.12	Yes
15	22400222	Ferrara <--> Bologna	Existing	A13	33.6	Motorways	2	2	Yes	0.07	0.12	Yes
16	24544	Bologna <--> Imola	Existing	A14	42.3	Motorways	3	3	Yes	0.07	0.12	Yes
17	22400004	Ravenna <--> Imola	Existing	A14	29.3	Motorways	2	2	Yes	0.07	0.12	Yes

D.3.7. Slovenia

The construction or modernization of the main road infrastructure relevant for the BA Corridor has been completed in previous years under the National Motorway Construction Programme of the Republic of Slovenia. The implementation of the National Motorway Construction Programme began in 1994 when Slovenia had less than 200 km of motorways. Currently, there are about 680 km of well-maintained motorways and around 800 km of trunk roads.

The BA road corridor section in Slovenia includes the highways A1 (245 km) and A3 (12 km). The A1 was completed in 2009 with the construction of the Eastern Maribor by-pass, and now provides a continuous dual carriageways section with two lanes per direction. The A1 motorway is also providing accessibility to the Port of Koper although direct access to the Port of Koper is still to be developed together with the trucks terminal. The analysis of the compliance does not include last mile connection infrastructure, only the links. In these terms the road infrastructure in Slovenia is fully compliant.

Table D14 BA Corridor Road infrastructure: technical parameters of the Slovenian section

PROG.	TENtec SECTION ID	SECTION DESCRIPTION	Status	National code	Length of section (km)	Type	Lanes forward	Lanes backward	Part of a tolled road	Road toll for cars(euro per km)	Road toll for trucks(euro per km)	Intelligent Transport Systems
1	23837	Sentilj <--> Maribor Pesnica	Existing	A1	9.5	Motorways	2	2	Yes	0.2	0.28	No
2	23851	Maribor Pesnica <--> Maribor Slivnica	Existing	A1	14.6	Motorways	2	2	Yes	0.2	0.28	Yes
3	23848	Maribor Slivnica <--> Ljubljana Malence	Existing	A1	118.3	Motorways	2	2	Yes	0.2	0.28	No
4	23843	Ljubljana Kozarje <--> Ljubljana Malence	Existing	A1	7.5	Motorways	2	2	Yes	0.2	0.28	Yes
5	23841	Ljubljana Kozarje <--> Postojna	Existing	A1	40.1	Motorways	2	2	Yes	0.2	0.28	No
6	23847	Postojna <--> Divača	Existing	A1	25	Motorways	2	2	Yes	0.2	0.28	Yes
7	23853	Divača <--> Koper	Existing	A1	35.3	Motorways	2	2	Yes	0.2	0.28	Yes
8	23845	Fernetici / Trieste <--> Divača	Existing	A3	12.2	Motorways	2	2	Yes	0.2	0.28	No

D.4. Characteristics of the intermodal nodes

D.4.1. Maritime and Inland Ports

We provide below an overview of the core ports along the BA Corridor. For the ports also including core network rail-road terminals (RRT), a description of the terminals is also provided. The description of the infrastructure and issues relating to the interconnection between the ports and the BA Corridor links is included in the main report, Sections 4.2.4 and Section 4.4.5, respectively.

Port of Gdynia (Seaport)and related RRT

The Port of Gdynia is located in the Pomeranian Voivodship on the Western coast of Gdańsk Bay (Baltic Sea). As one of the main Polish seaports of fundamental importance to the national economy, the Port of Gdynia is a universal modern port specializing in handling general, mainly unitized cargo transported in containers and also using a Ro-Ro system, based on the well-developed network of multimodal connections. The latter include hinterland, regular Short Sea Shipping Lines as well as ferry connections (ferry terminal). The Port of Gdynia is an important link in the Corridor of the Trans-European Transport Network (TEN-T). Handling of the containerized cargo at the Port of Gdynia is the domain of two modern container terminals located in the Western Port, Gdynia Container Terminal S.A. (GCT), with maximum capacity of up to 600,000 TEUs and Gdynia's Baltic Container Terminal – BCT, with maximum capacity of up to 1.2 million TEUs. The Port supports transport from Europe and around the world and is connected with Sweden through Motorway of the Sea [2009-EU-21010-P Baltic Link Gdynia-Karlskrona].

The following are the main characteristics of the port:

- Port area: overall about 7.55 million sq.m; including 5.08 million sq.m land area
- Storage areas: about 630,000 sq.m of which about 230,000 sq.m is under cover;
- Total length of quays: 11 km;
- Number of berths: 40 (for conventional ships, multi-purpose vessels, container ships, Ro-Ro/ferries, oil tankers, chemical tankers, passenger ships etc.);
- Maximum depth: 13 m.

Table D15 TENtec parameters Port of Gdynia

Type of Port	Maritime
Maritime chamber lock (length m)	0
Maximum draught (m)-natural or dredged	13
Passenger Traffic Flow (pax per year)	589,863 (2013)
Freight Traffic Flow (tons per year)	17,658,700 (2013)
Connection with rail	Yes
Rail connection (no. of tracks)	3
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	2
Waterway connection (CEMT class)	Not applicable

Many investments are included in the Strategic Development Plan of the port, strictly bound to the EU Financial Programming Periods of 2014-2020 and 2021-2027, aimed at further expanding the capacity of the port also improving its interconnection to the BA Corridor.

Gdynia Container Terminal (GCT)

The Gdynia Container Terminal S.A. (GCT) is located within the Gdynia port area. Since 2005, owners of the terminal carried out a number of investment programs at the Port of Gdynia which has transformed the former shipyard company into a modern container handling facility. These developments are part of an on-going process to continuously enhance the capabilities of Gdynia Container Terminal (GCT).

The main technical parameters of the terminal are as follows:
- Total area: 19.6 ha;
- Maximum annual handling capacity: 429,000 TEU;
- Storage area: 7,500 TEU;
- Container yards area: 6.9 ha, enabling the storage of reefers (192 plugs) and containers with hazardous cargoes;
- Equipment in handling-reloading vehicles: cranes (14), reachstackers (3), forklifts (14) and other vehicles for storage and transport containers;
- Number of railway sidings: 1;
- Number and length of railway tracks for loading and unloading: 4X420 m;
- Total length of railway tracks: 475 m;
- Length of quays with facility for reloading: 450 m;
- Depth of quays: 11 m (maximum acceptable draft 10.5 m);
- Number of spaces for ships: 2X containers, 1X general cargo.

The Port of Gdynia Authority and Gdynia Container Terminal, each on their respective land, intend to construct a new berth at Bulgarskie Wharf. The new berth will have a length of 357 m and a maximum depth alongside of 15 m, which will enable GCT to handle vessels with capacities above 8,000 TEU. GCT will continue to develop stacking yards and invest in new handling equipment so as to match these with operational requirements. It is estimated that the new investments and modernizations will increase the maximum annual handling capacity of the terminal to 600,000 TEU.

Baltic Container Terminal Gdynia – BCT

The terminal is located in the Western part of the port in Gdynia. With a current annual handling capacity of some 750,000 TEUs and a potential capacity of 1.2m TEUs, the Port of Gdynia's Baltic Container Terminal – BCT is one of the largest in the Baltic region.

The technical parameters of the terminal are as follow:
- Maximum annual handling capacity: 750,000 TEU (completion of the investment process will increase annual handling capacity to 1,200,000 TEU);
- Number of electrical connections: 400;
- Storage area: 20,000 TEU;
- Equipment in handling-reloading vehicles: cranes, reachstackers, vehicles for storage and transport containers;
- Number of railway sidings: 1;
- Length of railway tracks for loading and unloading: 6X1,000 m;
- Number of rail cranes: 2;
- Area of parking space: 3 hectares;
- Length of quays with facility for reloading: 800 m;
- Depth of quays: max. 12.7 m.

Port of Gdańsk (Seaport) and related RRT

The port of Gdańsk is one of the main Polish seaports and is of fundamental importance to the national economy. The Port is located in the Pomeranian Voivodeship on the coast of Gdańsk Bay (Baltic Sea). The Port of Gdańsk is a major international transportation hub situated in the central part of the Southern Baltic coast, which ranks among Europe's fastest growing regions. According to the strategy of the European Union the Port of Gdańsk plays a significant role as a key link in the Trans-European Transport Corridor connecting the Nordic countries with Southern and Eastern Europe. The Port of Gdańsk comprises two principal sections with naturally diverse operational parameters: the inner port stretched along the Martwa Wisła River and the port canal, and the outer port affording direct access to the Gulf of Gdańsk.

The inner port offers a comprehensive range of terminals and facilities designed to handle containerised cargo, passenger ferries and Ro-Ro vessels, passenger cars and citrus fruit, sulphur, phosphorites and other bulk. The other quays are fitted with versatile equipment and infrastructure and are universal in use and enable the handling of conventional general as well as bulk cargo such as rolled steel products, oversize and heavy lifts, grain, artificial fertilizers, ore and coal. The outer port performs its operations on piers, quays and cargo handling jetties situated immediately on the waters of the Gulf of Gdańsk. This section of the port offers state-of-the-art facilities suited to handling energy raw materials such as liquid fuels, coal and liquefied gas. The outer port also accommodates a modern Deepwater Container Terminal which is the only one in the Northern part of the BA Corridor that handles direct calls of container ships (Direct call from Asia – Maersk Line AE10 and from Central America – Maersk Line CRX) and it is also the only port in the BA Corridor that handles ships of size of 18200 TEU (Triple-E class).

The following are the main characteristics of the port:

- Total land area: 6.52 million sq.m;
- Total water area: 4.13 million sq.m;
- Storage areas: 656,547 sq.m of which 107,022 sq.m under cover;
- Total length of quays: 23,7 km;
- Maximal draught of vessels: Inner port – 10.2 m; Outer port 15 m;

Cargo handling capacity: Inner port – 11.5 million t; Outer port 48.5 million t.

Table D16 TENtec parameters Port of Gdańsk

Type of Port	Maritime
Maritime chamber lock (length m)	0
Maximum draught (m)-natural or dredged	15
Passenger Traffic Flow (pax per year)	125,897 (2013)
Freight Traffic Flow (tons per year)	30,259,295 (2013)
Connection with rail	Yes
Rail connection (no. of tracks)	3
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	8
Waterway connection (CEMT class)	1/'2/3

The Port Authority has elaborated Development Plans for the Port of Gdańsk (http://www.portGdańsk.pl/about-port/infrastructure). The documents contain plans and projects which are actually under construction or planned to be implemented. We note that the Strategies cover investments listed in the investment list included in the main report above.

Gdański Terminal Kontenerowy S.A. – The Gdańsk Container Terminal

The Gdańsk Container Terminal Stock Company (GTK) has been operating at the Port of Gdańsk since September 1998. The terminal can handle ships of a maximum capacity of 20,000 DWT. The terminal is equipped with one ship-to-shore gantry crane, two shore cranes, one 100 t mobile harbour crane and two gantry cranes. The terminal quay can handle ships of Lo-Lo and Ro-Ro type. The yard can also store refrigerated containers (95 positions).

The technical parameters of the terminal are as follow:

- Total area: 6.7 ha;
- Maximum annual handling capacity: 70,000 TEU;
- Number of electrical connections: 95;
- Storage area: 4,000 TEU;
- Equipment in handling-reloading vehicles: cranes, reachstackers, vehicles for storage and transport containers;
- Number of railway sidings: 1;
- Length of railway tracks for loading and unloading: 2X257 m;
- Number of rail cranes: 2;
- Total length of railway tracks: 1 130 m;
- Number of parking spaces for trucks: 25;
- Length of quays with facility for reloading: 310 m;
- Depth of quays: maximum 9.8 m;
- Number of spaces for ships: 1.

There is a planned project for the expansion and modernization of the terminal. The implementation of the project will increase the capacity of the transhipment terminal by more than 100,000 TEU per year. The scope of the project relates to expanding the area of storage and modernization of the transport infrastructure within the terminal. The project will cost about 11 € million and it is expected to be completed by the end of 2015.

Deepwater Container Terminal Gdańsk (DTC Gdańsk S.A.)

The Deepwater Container Terminal Gdańsk DTC Gdańsk S.A. is the largest and still growing container facility in Poland, and the only deep-water terminal in the Baltic Sea Region having direct ocean vessel calls from the Far East. Phase one of the terminal construction was completed in October 2007. As a result, the terminal achieved an annual throughput capacity of 500,000 TEUs. In 2013 the terminal handled 1,150,887 TEUs. One of the berths is also equipped with a Ro/Ro ramp. Handling is provided by means of state-of-the-art IT system supporting EDI. DCT was the first terminal that attracted direct calls from Asia to the Baltic Sea and is today the destination for the largest vessels in the world departing from China, Korea and other Asian countries. This process initiated a split of the most important shipping trade-lane in the world, Asia – Europe, into Asia – North West Europe and Asia – Baltic. The terminal handles Polish import and export, transhipment and transit. With accessibility comprising of 17.0 m deep approach channel and up to 16.5 m depth along the berth, year-round ice-free access combined with modern operational systems, DCT is a natural gateway for all CEE containerized trade volumes.

The technical parameters of the terminal are as follow:

- Total area: 49 ha;
- Maximum annual handling capacity: 1,250,000 TEU;
- Number of electrical connections: 336;
- Storage area: 26,000 TEU;
- Warehouse Size: 7,200 m2;
- Equipment in handling-reloading vehicles: STS cranes (5), RTG cranes (17), vehicles for storage and transport containers;
- Number of railway sidings: 1;

- Number and length of railway tracks for loading and unloading: 4X618 m;
- Annual rail siding capacity: 780,000 TEU;
- Number of rail cranes: 1;
- Total length of railway tracks: 3,500 m;
- Number of parking spaces for trucks: 100;
- Length of quays with facility for reloading: 650 m;
- Depth of quays: 16.5 m;
- Number of spaces for ships: 2;
- Width of the Ro-Ro ramp: 40 m;
- Terminal Operating System: Navis.

Expansion works are foreseen allowing reaching by 2016 2,500,000 TEU handling capacity; additional expansion works of another 500,000 TEU are planned for 2017-2019. The overall targeted capacity is 4 million TEUs.

It is worth to mention that several Polish Stakeholders emphasize the relevance of constructing an inland logistics hub behind the ports of Gdynia and Gdańsk as main collecting and distribution centre, representing the beginning of the land supply chain. ICY in Zajączkowo Tczewskie is mentioned to this respect, which used to be a marshalling yard, now manoeuvring station from which all freight trains are departing.

Ports of Szczecin and Świnoujście (Sea and IWW port) and related RRTs

The ports in Szczecin and Świnoujście are the closest seaports for the areas of Western and South-Western Poland, which contain most important industrial areas such as Upper Silesia, the region of Wrocław and Poznan. Ports of Szczecin and Świnoujście are main Polish seaports of fundamental importance to the national economy. Port of Szczecin is an inland waterway port as well. The proximity of Eastern Germany is also significant, especially the region of Berlin, situated only 140 km from Szczecin, Brandenburg and Saxony. Furthermore, for many years now, both ports have been important bridge sea ports for the Czech Republic and Slovakia.

The ports in Szczecin and Świnoujście are one of the largest port groups in the region of the Baltic Sea. They are situated on the shortest path connecting Scandinavia with Central and Southern Europe. They also lie on the shortest Seaway connecting the Baltic Finland, Russia, Lithuania, Latvia and Estonia with Germany and Western Europe.

Port of Świnoujście is situated directly by the sea, whereas the port in Szczecin is 65 km inland. Passage through the seaway from Świnoujście to Szczecin takes 4 hours.

The location of the ports of Szczecin and Świnoujście make them complementary. Thanks to its location by the sea, Świnoujście can provide highly efficient ferry routes and offer access for larger vessels - with a draught up to 13.2 meters.

The ports of Szczecin and Świnoujście offer:

- Open storage yards: 860,047 m^2;
- Indoor area: 201,308 m^2;
- Warehouse area for the storage of dangerous goods: 2,380 m^2;
- Storage of cold goods: 30,000 m^2;
- Capacity of tanks: 75,000 m^2;
- Storage of agro-food goods: about 175,800 t.

The **Port of Szczecin** is located about 68 km from the sea. The trip by the waterway from Świnoujście to Szczecin takes about 4 hours. The port can handle vessels of draught up to 9.15 m and a length of up to 215 m. Port of Szczecin is universal and handles both general cargo and bulk cargo goods. It specializes in handling and storage of containers, steel products, oversized cargo, paper and cellulose. Port of Szczecin is the largest transhipment centre for granite blocks in Poland. It also handles dry bulk cargo - such as coal, coke, aggregates, grain, fertilizers and liquid cargo, including those requiring special storage conditions and handling, such as tar.

Table D17 TENtec parameters Szczecin Port

Type of Port	**Maritime and Inland Waterways**
Maritime chamber lock (length m)	n.a.
Maximum draught (m)-natural or dredged	9,15
Passenger Traffic Flow (pax per year)	10,020 (2013)
Freight Traffic Flow (tons per year)	8,715,000 (2013)
Connection with rail	Yes
Rail connection (no. of tracks)	4
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	6
Waterway connection (CEMT class)	3-Vb

Container Terminal - DB Port of Szczecin

The Container Terminal - DB Port of Szczecin Sp. z o.o. is specialized in transhipment operations. The terminal reloads all types of cargo, including containerized, general cargo, heavy loads and break-bulk cargo. It is connected with: road, sea, inland waterway and railway transport.

The DB Port of Szczecin offers the following three service areas:

- Container terminal: supports storage and transport of containers within the port and directs goods to multimodal transport. Container turnover at DB Port Szczecin increases dynamically every year – now, with new investments capacity of the terminal will be 120 000 TEU per year.
- General cargo terminal that supports loads like: paper, cellulose, steel plates, pallets, big bags, etc. For this kind of cargo Terminal provides 9 000 m² of storage space and over 37 000 m² of yards.
- Duty free zone enables reloading and manipulating of cargo without necessity of Customs clearance. DAF in Szczecin has yards of 52 500 m² and 25 600 m² of warehouses, including a separate warehouse of 2 400 m² for dangerous goods. In the Duty Free Area are stored especially granites. Granites are specialty of the terminal, therefore DB Port Szczecin is known as "the granite port". In 2012 terminal reloaded 140 000 tons of granite blocks.

The technical parameters of the terminal are as follows:

- Total area: 56.6 ha;
- Maximum annual handling capacity: 120 000 TEU;
- Number of electrical connections: 157;
- Storage area: 3,500 TEU;
- Equipment in handling-reloading vehicles: cranes STS+RTG (4), reachstackers (2), vehicles for storage and transport containers (18);
- Number of railway sidings: 2;
- Length of railway tracks for loading and unloading: 3 041 m;
- Number of parking spaces for trucks: 145;
- Length of quays with facility for reloading: 614+365 m;
- Depth of quays: 9.15 m;
- Number of spaces for ships: 4;
- Width of the Ro-Ro ramp: 25+21m

The **Port of Świnoujście** can handle vessels of draught up to 13.2 m and a length of up to 270 m. One of the main elements of this port is the large terminal for handling dry bulk cargo, mainly coal - both exports and imports, and imported iron ore for the Polish, Czech and Slovak steel companies. Another feature of the port in Świnoujście is the ferry terminal equipped with five stations to handle passenger-car ferries and car-railway ferries on the route to/from Sweden. In Świnoujście there is also a new terminal that specializes in handling agro-food products, equipped with a flat storage warehouses with a total capacity of 50,000 tons.

Table D18 TENtec parameters Świnoujście Port

Type of Port	Maritime and Inland Waterways
Maritime chamber lock (length m)	n.a.
Maximum draught (m)-natural or dredged	13,5
Passenger Traffic Flow (pax per year)	474,868 (2013)
Freight Traffic Flow (tons per year)	14,035,000 (2013)
Connection with rail	Yes
Rail connection (no. of tracks)	1
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	1
Waterway connection (CEMT class)	Vb

An undeniable advantage of the port of Świnoujście is its interconnectivity with both sea and inland waterway. It is also the only Polish sea port for inland waterway transport, which is recognized by the European Union as the most environmentally friendly port. Such accessibility to the waterways system of Western Europe is especially important for the German market. Barge transit directly reaches many important economic centres of the Berlin and Brandenburg region.

The Szczecin and Świnoujście Seaports Authority is the entity managing both the ports of Szczecin and Świnoujście. It was created under the law on ports and harbours of 29 December 1996. For the purpose of the strategy for development of ports in Szczecin and Świnoujście, the Ports Authority formulated the Vision, the Mission and Strategic objectives of the Szczecin and Świnoujście Seaports Authority. The Mission is: "Adjusting the ports of Szczecin and Świnoujście to the requirements of modern transport systems in the port and maritime trade and market requirements". Several investments have been identified to continue the modernisation of the port and further improve its interconnection to the BA Corridor.

Terminal OT Logistic Świnoujście (Port Handlowy Świnoujście)

Port Handlowy Świnoujście Sp. z o.o. container terminal. It is an intermodal container terminal connected with: road, sea, inland waterway and railway transport. It started its business in 1991, is the newest and most dynamically developing Polish port located at the estuary of Świna river on the Baltic Sea. Port Handlowy Świnoujście Sp. z o.o is also the largest centre of bulk cargo handling on the Polish seashore.

The main purpose of PHŚ is to serve bulk dry cargo. An annual cargo turnover is currently around 5-6 million tonnes, whereas handling potential equals 12 million tonnes of various cargoes (both loaded and unloaded). Coal and coke have accounted for the main loading group for a number of years, but other goods such as iron ore, manganese ore, concentrates, aggregates and minerals, fertilizers and others also play an essential role. General cargoes are also another relevant segment of the market for this terminal. The annual potential of the Terminal equals 1.5 million tons of various cargos and maximum handling values reach 10 000 tonnes per day.

PHŚ has its own Railway Department which services any works on the railway siding and a set of machines and devices servicing any bulk cargo.

The technical parameters of the terminal are as follows:

- Total area: 20 ha;
- Maximum annual handling capacity: 70 000 TEU;
- Number of electrical connections: 157;
- Storage area: 2 000 TEU;
- Equipment in handling-reloading vehicles: cranes (2), reachstacker - Kalmar (2), vehicles for storage and transport containers - Sisu (2), forklifts (17);
- Number of railway sidings: 1;
- Length of railway tracks for loading and unloading: 2 500 m;
- Total length of railway tracks: 24 000 m;
- Number of parking spaces for trucks: 100;
- Length of quays with facility for reloading: 660 m;
- Depth of quays: 13.2 m;
- Number of spaces for ships: 2-4.

Relevant development initiatives for the years 2015-2017 includes expansion of the container storage areas, modernization of railway infrastructure and modernization of quays to enable support for the larger ships.

Port of Bratislava (IWW port)

Public trans-shipment universal port Bratislava is situated in the location Pálenisko at international water course – Danube. It is owned by the state company Verejné prístavy, a.s. The port is located almost exactly in the middle of approximately 3600 km long waterway between the North and Black Sea (European waterway Danube-Mohan-Rheine) and nearby two other European capitals and important ports – Vienna and Budapest, at the South-Eastern edge of Bratislava on the left bank of Danube, approximately between the river kilometres 1,865 and 1,867.

Basic information about the inland waterway port in Bratislava:

- Total area 1,431,586 m^2;
- Number of pools: 3;
- Length of port shoreline: 2,540 m (total) 1,150 m (vertical) 1,390 m (oblique), Zimný prístav (winter port);
- Railroad connection to BA Corridor;
- Good connection to motorway D1 on BA Corridor; distance to motorway: 1.00 km;
- Number of parking positions for trucks: 50;
- Port facilities: 19 cranes;
- Surface of covered storage areas: 25,790 m^2;
- Surface area of open-air storage: 75,335m^2;
- Operation in port and rail-road terminal is provided by the company: Slovenská plavba a prístavy.

Table D19 TENtec parameters Port of Bratislava

Type of Port	Inland Waterways
Maritime chamber lock (length m)	0
Maximum draught (m)-natural or dredged	2,5
Passenger Traffic Flow (pax per year)	170 000 (2013)
Freight Traffic Flow (tons per year)	2 078 077 (2013)
Connection with rail	Yes
Rail connection (no. of tracks)	1
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	2
Waterway connection (CEMT class)	VIb

The port of Bratislava is a complex of water surfaces, hydro-technical facilities, port pools, associated shore facilities and storage surfaces, connected by a transportation-technical infrastructure to transport network (road and railroad). The port is located in the vicinity of major transport hubs (and capital cities) of Vienna and Budapest at another hub and capital, enabling an ideal connection using watercourse. At the same time the port provides direct road and rail connection to the economic and industrial facilities of the Slovak Republic and neighbouring Czech Republic and Austria/Hungary. These features and expected future development render the Bratislava port a very important player in the exchange and distribution of goods to all of the above mentioned directions.

Port of Wien (IWW port) and related RRT

The port of Wien covers a total area of 3.5 million square metres. The Wiener Hafen group is part of the Wien Holding group and with its subsidiaries it operates three large cargo terminals including the corresponding infrastructure: Freudenau harbour, Albern harbour and Lobau oil terminal. The passenger terminal close to the "Reichsbrücke"-bridge and Marina Wien are also part of the Wiener Hafen group.

The following are the main characteristics of the port:

- Port areas: about 3.5 million sq.m;
- Storage areas: about 270,000 sq.m of which of which about 200.000 sq.m are open-air storage spaces and 70.000 sq.m are covered storage spaces;
- Wharf length: 5 km;
- Crane facilities 6-160t;
- Heavy Load up to 160t;
- Car terminal 10,000 car spaces;
- Container terminal 8,000 TEU;
- Office rental space 14,000 m².

Table D20 TENtec parameters Port of Wien

Port of Wien	Inland Waterways
Maritime chamber lock (length m)	n.a.
Maximum draught (m)-natural or dredged	2,7
Passenger Traffic Flow (pax per year)	362.316(2013)
Freight Traffic Flow (tons per year)	1.160.000(2012)
Connection with rail	
Rail connection (no. of tracks)	7
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	6
Waterway connection (CEMT class)	VIb

The Danube River is used for the transport in particular of oil products, road salt, building materials such as cement, sand or steel products, and agricultural products such as grain and fertilisers. The majority of incoming freight from the major European maritime ports (Hamburg, Bremerhaven, Rotterdam, Antwerp, Koper and Triest) uses train connections. Throughput in the Freudenau harbour according to WIENCONT in 2013 was 484 thousand TEU; current capacity is limited to 600 thousand TEU.

The Freudenau port of Wien is interconnected with the A4 on the BA Corridor through national road 14 and motorway A 23. The port is also connected to the BA Corridor railway network by a direct link (national code 124) parallel to national road 14. Although the referred to electrified section is single track only and thus not compliant with regulation 1015/2013, its capacity is considered sufficient by the authorities as well as by the terminal operator WIENCONT.

From a functional perspective, the port of Wien's container terminal in Freudenau, operated by WIENCONT, is a tri-modal terminal. However, as inland waterway services for containers have been terminated for lack of demand from shippers and freight-forwarders the dominant modes are rail (120 trains per week) and road. Thus, although the port of Wien is categorized in 1316/2013 as a maritime port, it can be considered a tri-modal terminal by the stakeholders.

Investment plans emphasise the expansion of trimodal facilities and a modernization of the handling equipment (cranes), in an endeavour to provide adequate service level required to encourage modal shift from road to rail and inland waterways.

Limited space for containers constitutes a bottleneck. Container storage in terminal 1 and 2 is currently limited to 1000 containers. Thus studies and work, funded by TEN-T in 2012-2015 have been performed to expand the tri-modal inland terminal by land recovery. A new project to continue these expansions has been developed and will be implemented in the period 2015-2025 at a total cost of €57 Mio.

Port of Trieste (Sea and IWW port)

The Port of Trieste is located in the Friuli Venezia-Giulia region – in the North-East of Italy. The Port is at the intersection between the Baltic-Adriatic and Mediterranean TEN-T core network corridors, the Motorways of the Sea, with ferry services to and from Albania, Greece, Turkey and other countries bordering the Mediterranean; as well as international shipping routes interconnecting Europe with Northern Africa and the Far East. 90% of all freight loaded and unloaded in the Friuli Venezia-Giulia region is handled at this Port.
The following are the main characteristics of the port:

- Port areas: about 2.3 million m^2 of which about 1.8 million m^2 of free zones;
- Storage areas: about 925,000 m^2 of which about 500,000 m^2 covered;
- Length of docks: 12 km;
- Number of berths: 58 (for conventional ships, multi-purpose vessels, container ships, Ro-Ro/ferries, oil tankers, chemical tankers, passenger ships etc.);
- Maximum depth: 18 m;
- Length of rail track: 70 km.

Table D21 TENtec parameters Trieste Port

Type of Port	Maritime and Inland Waterways
Maritime chamber lock (length m)	0
Maximum draught (m)-natural or dredged	18
Passenger Traffic Flow (pax per year)	147,718 (2013)
Freight Traffic Flow (tons per year)	49,206,870 (2013) net of oil
Connection with rail	Yes
Rail connection (no. of tracks)	4
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	4
Waterway connection (CEMT class)	n.a.

Relevant investments are planned at the Port of Trieste, including the development of a logistics platform, expansion of the container terminal and construction of a new Ro-Ro terminal. Traffic studies developed as part of the activities for the preparation of the Port Master Plan (*Piano Regolatore Portuale*) adopted in 2009, and subsequently updated to consider the growing traffic trends, planned expansion and confirmed investments, are showing possible capacity issues in the mid-long term for both the road and rail infrastructure accessing the Port. Both road and rail investments are also included in the Master Plan and in the Three Years Operating Plan (*Piano di Rilancio Pluriennale Aggiornamento 2012*) in order to improve road and rail transport operations within the port area.

Port of Venezia (Sea and IWW port)

Strategically located at the intersection of the main European Mediterranean and Baltic Core Network Corridors and interlinked with the Motorways of the Sea (MoS), the Port of Venezia is the main port in the Veneto region and one of the largest ports in the Adriatic Sea operating as a European gateway for trade flows to and from Asia.

The Port of Venezia is one of the major European ports for project and general cargo, and one of the main ports in the Adriatic for the number of containers handled. In addition, it ranks as the first cruise homeport in the Mediterranean hosting 2 million passengers yearly. It is furthermore the only port in Italy to benefit from a river port providing freight transport by barge along the Po River.

Constituted of two port areas, Marghera and Marittima, the port offers 20 km of quayside where ships are berthed.

Table D22 TENtec parameters Venezia Port

Type of Port	Maritime and Inland Waterways
Maritime chamber lock (length m)	0
Maximum draught (m)-natural or dredged	11.5
Passenger Traffic Flow (pax per year)	2.072.642
Freight Traffic Flow (tons per year)	24.411.377
Connection with rail	Yes
Rail connection (no. of tracks)	1
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	2
Waterway connection (CEMT class)	V

The Port Authority is intended to start the process for the elaboration of the New Port Master Plan (*Piano Regolatore Portuale*) for the Port of Venezia in view of consideration of its expansion plans, also including the new off-shore multipurpose oil and container terminal, and need for finding a solution to the growing cruise traffic and its impact on the city architectural and water environment, associated to an increase in the dimension of the cruise ships, as well as recent land use development policies related to the conversion of industrial areas, associated to urban regeneration activities and port expansion (i.e. new Ro-Ro MoS terminal at Fusina).

Port of Ravenna (Sea and IWW port)

Ravenna is the main port of the Emilia-Romagna region in North-Central Italy; it is located on the Adriatic Sea coast, serving Northern Italy and central Europe, as well as Eastern Mediterranean and Black Sea markets. The port of Ravenna is the only largest Italian port-canal. In addition to oil and chemical products, traffic within the port involves raw materials and finished goods from the ceramics district, metallurgical products, timber and agro food production. Also significant is the growing share of containerised traffic handled within the port’s two terminals as well as the Ro-Ro segment.

Table D23 TENtec parameters Ravenna Port

Type of Port	Maritime and Inland Waterways
Maritime chamber lock (length m)	0
Maximum draught (m)-natural or dredged	10.5
Passenger Traffic Flow (pax per year)	101,819 (2013)
Freight Traffic Flow (tons per year)	22,486,318 (2013)
Connection with rail	Yes
Rail connection (no. of tracks)	2
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	6
Waterway connection (CEMT class)	n.a.

Today the port overall avails of: about 24 km of quays, of which 16 km of operational quays, with a canal bed depth of 11.50 metres, 2,800,000 sq. m of warehouses, 1,400,000 m2 of yards and 1,000,000 cm of tanks/silos and areas in the interior of the port perimeter measuring 2,080 hectares, of which over 1,500 already urbanised or in the process of being urbanised.

The Port Authority of Ravenna adopted in 2007 their new Master Plan (Piano Regolatore Portuale). The plan includes as main investment the Ravenna Port Hub global project which consists of an investment programme in the port of Ravenna, including capital dredging, rehabilitation and upgrade of existing quay walls and the construction of a new container terminal quay, in order to accommodate larger vessels in the port and increase the port's capacity, efficiency and productivity. The project benefited from EU funds for the preparation of design studies (http://inea.ec.europa.eu/en/ten-t/ten-t_projects/ten-t_projects_by_country/italy/2012-it-91002-s.htm).

The implementation of Stage I of this project was approved on 26.10.2012 by the CIPE (Interministerial Committee for Economic Planning) (Resolution no. 98), which granted the Port Authority a contribution of 60 million euro, while 140 € million are assumed to come from self-financing by the Port Authority and the terminal operator. The project will also benefit from EIB loans for its construction (http://www.eib.org/projects/pipeline/2012/20120636.htm). Stage I of the Ravenna Port Hub includes:
- Dredging activities related to the front port area and to the main port canals achieving water depths varying from a minimum of 11.5 metres to a maximum of 14.0 metres;
- Upgrading of at least 3,900 metres of existing quays impacted by the proposed interventions and construction of a new 600 metres long terminal container quay.

The second stage will consist in the upgrading of existing quays in the main port canal.

Port of Koper

The Port of Koper lies on Slovenia's South-Western coastline on the Adriatic Sea and is just five kilometres South of Slovenia's border with Italy and 10 kilometres South-West of the Port of Trieste. In the following table, we present the main characteristics of the port.

Maritime throughput of the Luka Koper Group stood at 18 million tonnes in 2013. Moreover, container throughput recorded record-high numbers in 2013, having exceeded 600,000 TEUs. The prevailing groups in the total structure of throughput were dry bulk cargoes (6.987.806 tons) following by containers (5,849,694 tons), liquid cargoes (2,840,588 tons) and cars (662,169). The port received 65,434 passengers at the Passenger Terminal in 2013.

Table D24 TENtec parameters for the Port of Koper

Type of Port	Maritime and Inland Waterways
Maritime chamber lock (length m)	0
Maximum draught (m)-natural or dredged	18
Passenger Traffic Flow (pax per year)	65,434 (2013)
Freight Traffic Flow (tons per year)	17,999,662 (2013)
Connection with rail	Yes
Rail connection (no. of tracks)	1
Transhipment facilities for intermodal transport	Yes
Road connection (no. of lanes)	2

Port of Koper is a multi-purpose port with basic activities implemented on specialised terminals, which are technically equipped and adequate in terms of organisation for the transhipment and storing of individual types of goods or product groups. Within the port, Luka Koper d.d. manages 12 specialized terminals, 11 of which are intended for the transhipment of goods, while one is intended for passenger transport. On freight terminals, the freight owners are offered the managing of numerous additional services.

The following specialised terminals are in operation at the port of Koper: Container and Ro-Ro Terminal, Car Terminal, General Cargo Terminal, Fruit Terminal, Timber Terminal Terminal for Minerals, Terminal for Cereals and Fodder, Alumina Terminal, European Energy Terminal, Liquid Cargoes Terminal, Livestock Terminal.

Numerous investments have been identified by the Port and Terminal Operators to further expand the capacity of the port, its basins and of terminals in the future; investments also aim at improving accessibility also within the port area.

D.4.2. Rail-Road Terminals

The following section provides a description of the rail-road terminals along the BA Corridor. These terminals are frequently located in the proximity of, or within core urban nodes and other transport nodes, like airports and particularly ports. Specifically regarding the core rail-road terminals included within ports' areas, their description has been included in the description of the ports, already provided in the previous section above. This solution also facilitates the encoding of TENtec data. It is also worth adding about this that problems of last mile connection to the rail-road terminals at ports, generally affect interconnection to the entire ports' areas, also including their terminals.

Regarding urban nodes, we notice that certain metropolitan areas have more than one rail-road terminal under their sphere of influence, i.e. Łódź, Poznan, Katowice, Warszawa, Wrocław and Wien. For these cities our analysis considers more than one terminal. To this respect it is in any case worth specifying that all the rail-road terminals described below are deemed relevant under the functional stand point for the BA Corridor; however only those that are strictly reconcilable with the list of the logistics nodes and corridor alignment respectively defined in the Regulations EU 1315/2013 and EU 1316/2013 and related annexes are considered part of the BA Corridor alignment.

On this basis, whilst the information provided below concerns more than the 19 rail-road terminals listed in the Annex II to Regulation 1315/2013 other rail-road terminals which may be relevant for the BA Corridor under the functional stand point may have been omitted at present. More attention is currently foreseen to be dedicated to rail-road terminals in future activities and studies about the development of the Core Network Corridor, including the BA Corridor; the inclusion of rail-road terminals in the Core Network is ruled by Regulation 1315/2013. Also based on their location and depending on traffic levels rail-road terminals currently not included in the alignment of the BA Corridor may be first become part of the comprehensive network (Art. 27 of Regulation EU 1315/2013) and subsequently identified as part of the Core Network Corridor as part of the revision process foreseen by 2023.

Warszawa

Warszawa (Główna Towarowa; Terminal Spedcont Warszawa)

The Container Terminal Warszawa Główna Towarowa is operated by SPEDCONT Co. Ltd. - a Polish operator of intermodal transport, dealing with transport of cargo in containers, swap bodies and trailers. Since the beginning of 1996 SPEDCONT has been owned by the Authorities of the Sea Port Gdynia and PEKAES SA The stock capital of the Company has become 100% publicly owned. The following are the main characteristics of the container terminal:

- Handling capacity: 41 ton;
- Number and lengths of rail tracks: 2 = 715 running metre;
- Terminal area: 18,600 square metre;

- Storage area: 17,500 square metre;
- Storage capacity: 1,000 TEU;
- Kind of UTI being handled and trucking services: containers, swap-bodies, trailers.

Table D37 TENtec parameters Container Terminal Warszawa (Główna Towarowa)

Parameter description	Parameter Value
Freight traffic flow (tons per year)	70,300 (2013)
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

Warszawa (Praga; TK Cargosped Warszawa)

CARGOSPED is a logistics operator belonging to the PKP CARGO S.A. Group operating a network of trans-shipment terminals in Poland (4 specialised intermodal terminals and one terminal near the border in Braniewo handling bulk cargo); one of these is CARGOSPED Terminal Warszawa Praga. It provides freight forwarding and logistics services in Poland and internationally. Terminal is specialized in freight transport by rail and the related logistics services.

Table D38 TENtec parameters Warszawa (Praga) Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	275,600 (2013)
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	1

Pruszków Polzug Container Terminal

The Container Terminal in Pruszków is operated by POLZUG Intermodal. The following are the main characteristics of the Pruszków terminal:

- Total area (sq. m): 33,000;
- Number of reach stackers/max. lifting capacity (tonnes):8, max. lifting capacity 45t;
- Number of tracks: 2 x 600m, 1 x 350m (empty depot);
- Total track length: 1,550 m;
- Number of chassis: currently 95;
- Types of chassis: 20', 30', 40' and 45', Tip chassis on request.

Table D39 TENtec parameters Pruszków Polzug Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

Another relevant terminal located within the Warszawa node influence area is the HHLA Intermodal Polska Sp. z o.o. in Brwinów, under construction and co-financed from the OPIE 2007-2013.

Łódź

Container Terminal Łódź Olechów

The Container Terminal Łódź Olechów is operated by SPEDCONT Co. Ltd. - a Polish operator of intermodal transport, dealing with transport of cargo in containers, swap bodies and trailers. Since the beginning of 1996 SPEDCONT has been owned by the Authorities of the Sea Port Gdynia and PEKAES SA. The stock capital of the Company has become 100% publicly owned.

The following are the main characteristics of the container terminal:

- Handling capacity: 41 ton;
- Number and lengths of rail tracks: 2 = 1,400 running metre;
- Terminal area: 84,000 square metre;
- Storage area: 42,800 square metre;
- Storage capacity: 5,000 TEU, 3 layers;
- Kind of UTI being handled and trucking services: containers, swap-bodies, trailers.

Table D25 TENtec parameters Container Terminal Łódź Olechów

Parameter description	Parameter Value
Freight traffic flow (tons per year)	638,740 (2013)
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	2

Although not directly listed in the Annex 1 to the Regulation 1315/2013, the following three terminals are worth mentioning within the Łódź node influence area: TK Cargosped Mława, Terminal PCC Kutno and Terminal Loconi Intermodal – Radomsko. All of them are located in the distance of approx. 70-120 km from the core network nodes.

Katowice

Sławków Rail-Road Terminal

The "Euroterminal in Sławków" Ltd is a logistics terminal situated at the junction of the Western-Most section of broad-gauge (1,520 mm) railway line and European standard-gauge (1,435 mm) railway line; due to this it fits perfectly into the development of container transport between the Far East/Asia and Western Europe. The Euroterminal is also located at the intersection of Pan-European Transport Corridors, connecting the East with the West (the North Sea - Baltic Corridor) and the North with the South (the BA Corridor). The terminal is situated at the outskirts of the Silesian Agglomeration whose unique location gives it access to the region's main transport routes, both in terms of road and rail transport.

The Euroterminal in Sławków has connections with the Transport Network on domestic and international rail connections: Direct broad-gauge LHS connection (ca. 400 km long) through the Izow/Hrubieszow border crossing and the Ukraine to the Far East; access to railway lines indicated in the AGTC Agreement (agreement on the main combined transport lines) through connections to the following lines: CE30: Zgorzelec-Wrocław-Katowice-Cracow-Przemysl-Medyka and CE65: Gdynia-Gdańsk-Warszawa-Katowice-Zebrzydowice. It also has access to transport corridors between Europe and Asia. The location of the Euroterminal provides a convenient connection to both Pan-European Corridors as well as to the region's rail network.

Road connections are available thanks to the vicinity of the country's main transport routes: A1 Warszawa – Bielsko-Biala, distance: 8 km; A4 Katowice – Cracow, distance: 10 km and E40 Katowice – Kraków, distance: 5 km. Distance to airport connections equals: 57 km to Kraków Balice and 44 km to Katowice Pyrzowice.

The Euroterminal in Sławków supports regular intermodal connections to the Polish Baltic ports (Gdańsk, Gdynia) and Port Koper (Slovenia). Under the scope of cooperation with partners from Western Europe and Russia, goods in containers are transported on the East side, not only to Moscow or Kiev but also to South Korea, Afghanistan, Kazakhstan and many other markets. Besides the terminal service attending to intermodal transport, Euroterminal also offers handling services, security and transport of palletized goods, bulk materials, steel products and non-standard goods in direct and indirect transfer (via unroofed storage, warehouses) from broad gauge wagons/European standard wagons/trucks.

Table D32 TENtec parameters Sławków Rail-Road Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	706,880 (2013)
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

Apart from Sławków which is a core RRT according to the Regulation 1315/2013, the following other terminals are worth mentioning within the Katowice node influence area.

Container Terminal PCC Gliwice

The Container Terminal in Gliwice is operated by PCC Intermodal. Terminal PCC in Gliwice is located in Silesian Logistic Center. It is a fully functional handling terminal, located about 35 kilometers from Katowice, that supports loads of Upper Silesia and surrounding areas.

The following are the current main parameters of the container terminal:

- Operating area of 30,000 square meters;
- Storage capacity: 1,650 TEU;
- 2 x 600 meters rail tracks;
- 21 power plugs;
- 3 reachstackers;
- Parking for 50 truck sets.

Table D33 TENtec parameters of Container Terminal PCC Gliwice

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

After completion of the on-going and planned investments parameters of the container terminal will increase as follows (target values):

- Working area: about 50,000 sq meters;
- Storage capacity: about 2,900 TEU;
- Depot for empty containers: 350 TEU;
- 4 railway tracks 600 m each;
- 40 electric power plugs;
- Truck parking: 50 places;
- 4 reachstackers;
- Empty handler;
- 2 gantry cranes.

Dąbrowa Górnicza Polzug Container Terminal

The Container Terminal in Dąbrowa Górnicza is operated by POLZUG Intermodal.

The following are the main characteristics of the Dąbrowa Górnicza terminal:

- Total area (sq. m): 225,000 (thereof 50% utilisation for intermodal transport, 50% expansion and logistic area);
- Number of reach stackers/max. lifting capacity (tonnes): 4, max. lifting capacity 45 t;
- Number of tracks: 3 x 625m (able to handle complete block trains), 1 x 100m, 1 x 400m (shunting track);
- Total track length: 2,375 m;
- Number of chassis: currently 42;
- Types of chassis: 20', 20' tip chassis, 30', 40' and 45'.

Table D34 TENtec parameters Dąbrowa Górnicza Polzug Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	2

Sosnowiec Poludniowy Spedcont Container Terminal

The Container Terminal Sosnowiec Poludniowy is operated by SPEDCONT Co. Ltd. The following are the main characteristics of the container terminal:

- Handling capacity: 40 t;
- Number and lengths of rail tracks: 3 x 690 running metre;
- Terminal area: 9,500 square metre;
- Storage area: 6,900 square metre;
- Storage capacity: 800 TEU, 3 layers;
- Kind of UTI being handled and trucking services: containers, swap-bodies, trailers.

Table D35 TENtec parameters of Spedcont Container Terminal Sosnowiec Poludniowy

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	1

Container Terminal Cargosped Gliwice

This container terminal in Gliwice is operated by the CARGOSPED. The following are the main characteristics of the Gliwice Cargosped Terminal:

- Total area (sq. m): 65,000;
- Capacity (TEU): 1,800;
- Expansion possibilities: YES;
- Number of tracks: 2;
- Length of the loading track (m): 2 x 450;
- Equipment with lifting capacity: 3 x KALMAR drf 450 (42 tonnes), forklift (7,7 tonnes), container crane Q40 (40 tonnes), SMV (45 tonnes);
- Direct access to the road: A4, A1, national road no. 88 and access to the railways: E30, E59.

Table D36 TENtec parameters Gliwice Cargosped Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	1

Another terminal – HHLA Intermodal Polska Sp. z o.o. in Dąbrowa Górnicza is under construction, co-financed from the OPIE 2007-2013.

Poznań

Poznań (Swarzędz) Rail-Road Terminal (CLIP Container Terminal)

CLIP Logistics is a logistics service provider which offers services to small, medium and large companies. The logistics centre comprises of three modern A class warehouses, it has its own railway siding and a container terminal situated right by the trans-European E20 Paris - Moscow railway corridor and near the A2 Berlin - Warszawa motorway. CLIP Container Terminal is located within the Special Economic Zone. The Terminal is equipped with two modern KALMAR reach stacker container lifts, each with a 45 T capacity. The Terminal is also equipped with private truck units and container trailers. The Terminal uses a modern, dedicated IT system for recording movements and tracking container storage location. CLIP Container Terminal is lighted and protected 24/7, monitored by CCTV.

Table D26 TENtec parameters Poznań (Swarzędz) Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	239,617 (2013)
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

HUB Terminal Polzug Poznań

This Container Terminal in Poznań is operated by POLZUG Intermodal.

The following are the main characteristics of the HUB Poznań Polzug Container Terminal:

- Total area (sq. m): 320,000 (thereof 50% utilisation for intermodal transport, 50% expansion and logistic area);
- Number of reach stackers/max. lifting capacity (tonnes): 6, max. lifting capacity 45 t;
- Number of tracks: 4 x 610m (able to handle complete block trains), 1 x 610m (shunting track);
- Total track length: 2,440 m;
- Number of chassis: currently 32;
- Types of chassis: 20', 30', 40' and 45'.

Table D27 TENtec parameters HUB Poznań Polzug Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

Terminal Loconi Intermodal Poznań

This Container Terminal in Poznań is operated by Loconi Intermodal specialized in intermodal transport. It was established in 2011 as the alternative solution to the conventional means of transport. The intermodal project is carried out by company with the use of combined means of rail and road transport.

The following are the main characteristics of the Loconi Intermodal Terminal in Poznań:

- Operating storage space allows to store containers up to 1,200 TEU;
- Side track of total length of 900m, allowing for entry of 45 SGS trucks.

Table D28 TENtec parameters of Loconi Intermodal Terminal in Poznań

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	1

Poznań (Gądki) Rail-Road Terminal

CARGOSPED is a logistics operator belonging to the PKP CARGO S.A. Group operating a network of trans-shipment terminals in Poland (4 specialised intermodal terminals and one terminal near the border in Braniewo handling bulk cargo); one of these terminals is CARGOSPED Terminal Gądki. It provides freight forwarding and logistics services in Poland and internationally. The terminal is specialized in freight transport by rail and related logistics services.

Table D29 TENtec parameters Poznań (Gądki) Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	187,200 (2013)
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	1

Container Terminal Cargosped Kobylnica

This container terminal in Kobylnica is operated by the CARGOSPED. The following are the main characteristics of the Kobylnica Cargosped Terminal:

- Total area (sq. m): 9,300;
- Capacity (TEU): 500;
- Expansion possibilities: YES – to over 12,000 sq. m;
- Number of tracks: 3;
- Length of the loading track (m): 3 x 300;
- Equipment with lifting capacity: FANTUZZI (45 tonnes), KALMAR;
- Direct access to the road no. 5 (Poznań- Gdańsk and Poznań- Wrocław), close to the Poznań-Franowo marshalling yard.

Table D30 TENtec parameters of Container Terminal Cargosped Kobylnica

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

Terminal Spedcont Poznań Garbary

The Container Terminal Poznań Garbary is operated by SPEDCONT Co. Ltd. The following are the main characteristics of the container terminal:

- Handling capacity: 42 t;
- Number and lengths of rail tracks: 3 x 450 running metre;
- Terminal area: 6,200 square metre;
- Storage area: 5,700 square metre;
- Storage capacity: 600 TEU, 2 layers;
- Kind of UTI being handled and trucking services: containers, swap-bodies, trailers.

Table D31 TENtec parameters of Container Terminal Spedcont Poznań Garbary

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

In addition to the above listed terminals, two more terminals are worth mentioning within the Poznań node influence area, which are under construction benefiting from co-financing under the Operational Programme Infrastructure and Development 2007-2013: HHLA Intermodal Polska Sp. z o.o. in Kórnik and PKP Cargo – Poznań Franowo, stage Ia.

Wrocław

Wrocław Container Terminal (Terminal Polzug Wrocław)

The POLZUG Intermodal is a rail operator running a container service between the Northern European container ports of Hamburg, Bremerhaven and Rotterdam and their hinterland of Poland and Eastern Europe. The POLZUG network, with its terminals, offices, subsidiaries and agents in Poland, Russia, Ukraine, Georgia and Azerbaijan, extends even beyond the CIS to Mongolia and Afghanistan. Representative offices in South Korea, the United States and South America allow POLZUG Intermodal to identify new trends in container source markets, respond to them quickly and position itself appropriately.

In Poland POLZUG Intermodal serves eight terminals, four of them under its own management in the main economic centres. POLZUG Intermodal is part of Hamburger Hafen und Logistik AG. The following are the main characteristics of the Wrocław terminal:

- Total area (sq. m): 45,000;
- Number of gantry cranes/maximum lifting capacity (tonnes):2, maximum lifting capacity 32t;
- Number of reach stackers/maximum lifting capacity (tonnes):4, maximum lifting capacity 45t;
- Number of tracks: 2 x 300m, 1 x 250m, 1 x 190 m;
- Total track length (metres): 1,040 m;
- Number of chassis: currently 31;
- Types of chassis: 20', 30', 40' i 45', Tip chassis on request.

Table D40 TENtec parameters Wrocław Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

Container Terminal PCC Brzeg Dolny

The Container Terminal in Brzeg Dolny is operated by PCC Intermodal. Terminal in Brzeg Dolny is a functional transhipment terminal, which operates cargos in Dolny Śląsk. Terminal is located in PCCs Rokita Chemical plants, about 38 km from Wrocław. Directly from terminal in Brzeg Dolny, PCC organizes links with marine ports in Gdańsk and Gdynia, also with terminals on ports in Hamburg, Bremerhaven and Rotterdam.

The following are the current main parameters of the container terminal:

- Operating area of 14,000 square meters;
- 50,000 TEU annual handling capacity;
- Storage capacity up to 1,000 TEU;
- 2x300 metres rail trucks (2 x 600 meters rail track under construction);
- 3 reachstackers.

Table D41 TENtec parameters of Container Terminal PCC Brzeg Dolny

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

After completion of the on-going and planned investments parameters of the container terminal will increase as follows:

- Surface of the terminal plate: about 28,000 sq meters;
- Storage capacity: about 2,500 TEU;

- Area of wagons rep air hall: 358 sq meters;
- Gate with two sets of lanes;
- Truck parking: 20 places;
- Cars parking: 20 places;
- Container trailer parking: 6 places;
- 4 railway tracks 650m each + siding tracks;
- 72 electric power plugs.

Another relevant terminal located within the Wrocław node influence is the Container Terminal in Kąty Wrocławskie, which has been recently opened, its construction co-financed from the OPIE 2007-2013.

Ostrava Rail-Road Terminal

The Rail-Road terminal Ostrava is a private combined transport terminal at Ostrava – Paskov. Owned and operated by international group Advanced World Transport A.S., it is in operation since 2007. The total investments for the constructionof the terminal amounted to 5.5 million Euro. The last improvements happened in 2012. The Ostrava - Paskov terminal has the following main features:

- Close to important industrial zones and the Polish and Slovak borders;
- Trains and individual consignment dispatching;
- Total space 76,000 m^2;
- Open-air warehousing – the terminal's capacity is 2,400 TEU; terminal warehousing and handling area 31,000 m^2;
- 10 transport siding tracks up to 590 m long and 3 manipulation terminal tracks each 270 m long;
- Reloading, collection and distribution of 20', 30', 40' and 45' ISO containers;
- Container, semi-trailer and swap body reloading;
- Kalmar DRF 450-60S5X reach stacker, two Hyster 45-24 IH and Hyster 46-36 CH semi-trailer and swap body reach stackers;
- Short-term and long-term container depositing;
- Container repairs and cleaning;
- Located 6km from the Staříč relief yard with a capacity of 600 TEU and 280 m of available track;
- Three terminal handling tracks, each 270 m long;
- Adjoining railway station owned and operated by AWT: nine transportation rail tracks, the longest of which is 610 m.

Table D42 TENtec parameters Ostrava Rail-Road Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	2

Přerov Rail-Road terminal

The rail-road terminal in Přerov – Horní Moštěnice is privately owned and operated by Rail Cargo Operator - CSKD s.r.o.

It was originally developed ad a public logistic centre and combined transport terminal during the 1970s. It was then substantially upgraded between 2013 and 2014. The manipulation area was enlarged to 15 000 m^2, new connections to railway and road infrastructure were built and new building erected. The storage capacity is currently 1650 TEU.

Table D43 TENtec parameters Přerov Rail-Road Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	2

Bratislava-Pálenisko Tri-modal terminal

The rail-road terminal Bratislava – Pálenisko is part of Bratislava inland port infrastructure. The terminal is owned by Verejné prístavy, a.s. and operated by Slovenská plavba a prístavy.

Table D44 TENtec parameters Port of Bratislava

Type of Port	Inland Waterways
Freight Traffic Flow (tons per year)	2 078 077 (2013)
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	2

This is the only tri modal container terminal in Slovakia operated on 24,000 m^2; storing capacity is 2,400 TEU. The terminal has portal cranes and frontal manipulation cranes Hyster and Kalmar. The container terminal in Bratislava has a direct railway connection by means of container block and shuttle trains: Bratislava - Mělník and vice versa, Bratislava - Bremerhaven and vice versa, Budapest - Bratislava.

Žilina Rail-Road Terminal

Žilina Teplička is a major Slovak marshalling yard developed from 1976 till 2012. Adjacent to the marshalling yard the rail-road terminal Žilina – Teplička is under construction as part of the project of Železnice Slovenskej republiky (ŽSR) – national railway infrastructure manager with the funding from EU Cohesion fund. Once completed, it will be operated by Rail Cargo Operator - CSKD s.r.o.

The terminal is expected to start its operations during 2015; it will be directly connected by railway to the BA Corridor; the road intercoconnection to the BA Corridor will be ensured via the road I/18, leading after 5 km to the D3 motorway. The following are the main indicators for the terminal:

- Planned capacity 70 000 TEU/year;
- Storage capacity 3598 TEU;
- 2 portal cranes;
- 1 frontal crane;
- Repair shop: 768 m^2.

Wien Rail-Road Terminals

Two main rail-road terminals are located within the node of Wien, the Wien Nordwestbahnhof (Container Terminal Wien Nord-West) and a new one in the South of the metropolitan area, at Inzersdorf, which is currently under construction and planned to be completed by 2017.

The "Container Terminal Wien Nord-West" is accessible via the A22 motorway, but has limited capacity (maximum train length of 500m, 2 trains maximum in parallel). The new Inzersdorf terminal is expected to increase the propensity towards a modal shift from road to rail, by providing loading/unloading facilities at the crossing of three major European corridors.

Table D45 TENtec parameters RRT Wien (Nordwestbahnhof)

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	1

In addition to the above, the new Wien Hauptbahnhof warrants mentioning, which officially opened in October 2014 and is already partially in operation, will be completed by the end of 2015. This new central station will serve as a major Central European interconnection between the BA Corridor, the Rhine-Danube and the Orient-East Mediterrean corridors. As a benefit to passenger and freight trains, the urban transit time is expected to be reduced by 30 minutes.

Graz-Süd/ Werndorf Rail-Road Terminal

The following are the main characteristics of the Wien RRT Graz-Süd/ Werndorf rail-road terminal:

- Terminal areas: 25.000 sq.m;
- Storage capacity: 3.200 TEU;
- Line capacity: 4x700m;
- Crane facilities 2x45t, 1x41t with spreader;
- Repair shop: 650 sqm;
- Container washing, steam cleaning;
- Main destinations: Germany, Benelux, Slovenia, Austria.

The terminal is both interconnected to the main road and railway networks.

Table D46 TENtec parameters GRAZ Werndorf

Parameter description	Parameter Value
Freight traffic flow (tons per year) (capacity)	1.277.500
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	2

Cervignano Rail-Road Terminal

The Cervignano Rail-Road Terminal is located in the Friuli Venezia-Giulia region, in a strategic position as to the most important regional centres: Udine (29 km), Trieste (48 km), Gorizia (29 km) and Pordenone (62 km). The terminal is located on both the Baltic-Adriatic and Mediterranean Core Network Corridors.

The main stakeholder of the terminal is the Regione Friuli Venezia-Giulia through its financial subsidiary Friulia. The terminal is equipped with:

- No. 6 tracks with maximum length of 750 m;
- No. 2 tracks with maximum length of 500 m;
- Storing capacity (m2) 160,000 m^2;
- No. 2 stackers, 6 forklifts, 2 overhead rail mounted cranes RMC.

Table D47 TENtec parameters Cervignano Rail-Road Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	n.a.
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	2

The terminal is well interconnected with the national road, motorway and railway networks; it is located at 9 km from the A4 Motorway and is linked to the national railway line from the nearby Cervignano Scalo station. A project is currently under consideration by RFI S.p.A. regarding the improvement of the accessibility by railway to the Cervignano Core Network Rail Road Terminal.

Intermodal operations at the terminal are currently suffering from the economic recession and industry dynamics affecting the logistics and freight railway transport.

These have caused the gradual decline of the traffic over recent years from about 5,000 wagons to less than half this figure. No more detailed traffic data are available.

Padova Rail-Road Terminal

The Padova Rail-Road Terminal is located in the Veneto region. The terminal area is situated in the South side of the Padua Industrial Zone; it is very well interconnected to the national motorway network through the Padova East toll gate on the A4 motorway (Turin – Milan – Venezia – Trieste) and the Padova Z.I. – Interporto toll gate on the A13 motorway (Padua – Bologna). The site is linked to the national railway network along a 4 km electrified track that links the Container Terminal and Goods Station in Padova Interporto to Padova Central Station, which is then linked to the main national and international networks. The link is single track with possibility of upgrade adding one track in case of traffic increase in the future.

Functionally the area of Padova rail-road terminal covers a total of more than 2 million square meters, 1 million being owned by Interporto Padova Spa, and it includes rail and container terminals, numerous logistics operators, hauliers and couriers. The basic performance indicators for the terminal for 2013 are:

- TEU 2013: 263,500;
- Total freight handled: 4,390,000 t;
- Goods handled in the warehouses: 2,480,000 t;
- Goods handled in the container terminal: 1,910,000 t;
- Turnover in the freight village area: 8,310,000,000 €.

Table D48 TENtec parameters Padova Rail-Road Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	4.390.000
Rail connection (no. of tracks)	1
Road connection (no. of lanes)	4

The rail and terminal infrastructures occupy approximately 350,000 square meters and include the New Grand Terminal owned by Interporto Padova Spa, the FS Container Terminal owned by the Italian State Railway and the State Railway goods station:

- The New Grand Terminal owned by Interporto Padova Spa occupies a total of 220,000 square meters. It has two sets of three tracks each and another set of two tracks, each track being 750 meters long, in line with the European standard for this type of structure. The Terminal also has a mechanical workshop for maintaining the containers, and plants for ordinary washing and physical-chemical cleaning. 15 reach stackers are used for handling the containers (8 for handling empty containers and 7 for handling loaded containers), which load and unload lorries and trains;
- The Combined Transport Terminal and the Goods Station are both owned by the Italian State Railway Incumbent. Altogether these two structures occupy around 153,000 square meters. The Italian State Railway goods station in Padova Interporto has a set of 21 exchange tracks, enabling the composition of complete block trains. Alongside these shunting yard there are further 7 tracks for the loading of wagons on road trailers and other acceptance and delivery operations on standard goods wagons. In the Italian State Railway Intermodal Terminal, which is adjacent to the Interporto Padova Terminal, the swap bodies and the semitrailers are loaded and unloaded. It is equipped with two tracks, each being 450 meters long.

Bologna Rail-Road Terminal

The *Interporto di Bologna* Rail-Road Terminal is located in the Regione Emilia Romagna in the North-Central side of Italy in a strategic position on the national rail and road network, with a dedicated toll gate on the Bologna-Padova toll road, and directly linked to the national rail network through the Bologna-Padova-Venezia main line. It is located along 3 EU TEN-T corridors: Baltic-Adriatic, Mediterrean and Scandinavian-Mediterrean.

Table D49 TENtec parameters Bologna Rail-Road Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	9,177,300 (2012)
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	2

The main traffic data for 2013 are as follows: the total number of transited trucks is 1,179,067 (Inbound: 594,368; Outbound: 584.699). The total number of trains is 3,657 (Inbound: 1,844; Outbound: 1,813). The total number of swap bodies was 53,823 (Inbound: 26,775; Outbound: 27,048).

The following companies operate 42 trains per week from the Bologna Interporto to national and international destinations: Trenitalia Cargo, ISC – Interporto Servizi Cargo, GTS, OCEANOGATE, CFI – Compagnia Ferroviaria Italiana, RTC, RAIL ITALIA, NORD CARGO, SERFER.

More than 100 companies (freight forwarders, road haulers, couriers, intermodal operators, rail companies, customs brokers and logistics operators), included the leading international operators (DHL, DB Schenker, Geodis, CEVA, Gefco, Sifte Berti among others), are also active at this Rail-Road Terminal.

Ljubljana Container Terminal

The Container terminal Ljubljana is located in the vicinity of the transport logistics centre BTC Ljubljana. It is directly connected to both the national and international highway and railway network, while the distances from the nearest airport (Ljubljana Airport) and port (Port of Koper) are 25 km and 152 km, respectively.

The Container Terminal in Ljubljana was developed in 1983 as the first specialised inland (container) terminal in the former Yugoslavia. With 110.000 m^2 of manipulation area, an additional 10.000 m^2 of container storage area, and equipped with a gantry crane moving along a 500 m long track, this terminal was important at the time not only for Slovenia, but for the whole Yugoslavia. Today, the Container Terminal Ljubljana is one of the two Slovenian intermodal terminals (together with the Port of Koper) where international intermodal transport is concentrated and is the most important Slovenian terminal for combined transport. The terminal is classified as a railway terminal, specialized in handling road and rail transport.

The terminal operates on an area of 10,250 m2. It is capable of handling road and rail vehicles in combined transport as well as containers. The terminal's total handling capacity is 150,000 TEU/year, and the total storage capacity is 100,000 TEU/year. Total transhipment in 2013 was estimated to 69.817.000 TEU.

Table D50 TENtec parameters Ljubljana Container Terminal

Parameter description	Parameter Value
Freight traffic flow (tons per year)	492.955
Rail connection (no. of tracks)	2
Road connection (no. of lanes)	2

Dangerous goods can also be handled at the terminal. The terminal operates with a gantry crane (capacity 37 tons, 24 m span), and several reach stackers and (heavy) fork lift trucks. The gantry crane operates along the 4 loading tracks, each of them is 500 m long.

The present capacities of the equipment are not sufficient to handle the operating needs of the terminal; therefore, according to information provided by the Slovenian Railways, modernization of the terminal is foreseen by 2015, primarily the installation of new gantry cranes. Additional equipment has been procured in 2014 including a manipulation elevator and a reach stacker. Ground surface renovation is foreseen for 2015, together with the acquisition of additional new equipment and assets. The estimated investments until 2020, amount to 45 million EUR, and are going to be partially supported by EU funds. The present terminal location is also planned to form a part of the new logistics centre to be developed in Ljubljana Moste.

D.4.3. Airports

This section provides information about the Core Network Aiports that have been identified in Annex II to Regulation 1315/2013 as belonging to the BA Corridor. Other airports are at present under development i.e. Warszawa Modlin and Klagenfurt – currently subject of relevant investmenst by the respective regional authorities, which may become relevant in the future for the development of passengers and freight traffic along the BA Corridor.

Łódź Airport

The Łódź Wladyslaw Stanislaw Reymont international airport is located in central Poland and is well connected to the junctions of main motorways in Poland, A1 and A2. The airport is located in the South-Western part of Łódź city, 6 km away from the city centre. Approximately 3.9 million people live within 100 km distance from the airport.

The Łódź airport has scheduled regular flights to the following European cities: Dublin, Nottingham, London, Munich and Oslo. Łódź was ranked 8th among Polish airports in 2013 in passenger numbers.

Table D51 TENtec parameters Łódź Airport

Parameter description	Parameter Value
Number of runways	1
Length of the longest runway (m)	2500
Connection with rail	No
Passenger traffic flow (pax per year)	353,633 (2013)
Freight traffic flow (tons per year)	3,162 (2013)

The airport is still at a phase of development. Currently a new Terminal, no. 3, is under construction. Increasing the capacity of the airport, through the construction of passenger terminal No. 3, will allow for further dynamic growth in the number of passengers, which is one of the most important factors enabling the inclusion of the Łódź port in the TEN-T and, consequently, increase the development potential of the region. The project will increase the share of air transport in the external relations transport of the Łódź region.

Gdańsk Rębiechowo Airport

The Gdańsk Lech Wałęsa Airport (other name Rębiechowo) is an international airport located 12 km West/Northwest of Gdańsk, not far from the other city centres of the Tri-city metropolitan area: Sopot (10 km) and Gdynia (23 km). The airport is well connected to the S6 Express Road.

Table D52 TENtec parameters Gdańsk Airport

Parameter description	Parameter Value
Number of runways	1
Length of the longest runway (m)	2800
Connection with rail	No
Passenger traffic flow (pax per year)	2,843,737 (2013)
Freight traffic flow (tons per year)	4,918 (2013)

The Gdańsk Airport offers regular flights to domestic destinations: Warszawa, Krakow, Wrocław, Lublin and also to the following European countries: Germany, Great Britain, France, Italy, The Netherlands, Spain, Belgium, Switzerland, Croatia, Slovakia, Denmark, Sweden, Finland and Norway.

In 2012 the construction of a new passenger terminal was completed, and is still subject of further extension works. The passenger terminal is a modern four-storey building with complete infrastructure, designed in line with contemporary architectural trends. The terminal has three floors above ground and an underground floor. The capacity of the building is 38,500 cubic metres. It has 7,260 square metres of usable area. The estimated handling capacity of the terminal is 3 million passengers per year.

Katowice Pyrzowice Airport

The Katowice Pyrzowice International Airport is located in Pyrzowice, 30 km North of the centre of Katowice. The airport ranks fourth in Poland for passengers traffic. The airport features two passenger terminals A and B and a cargo terminal. Terminals are capable of handling about 3.6 million passengers annually. There is currently no passenger rail link to the airport but it is well connected to the road network. Airport is easily accessible from A1 Motorway and S1 Express road.

The main destinations offered by the Katowice Airport are: Warszawa (domestic), Great Britain, Germany, Spain, France, The Netherlands, Italy, Norway, Sweden, Ukraine, Bulgaria, Greece, Israel and Georgia.

Table D53 TENtec parameters Katowice Pyrzowice Airport

Parameter description	Parameter Value
Number of runways	1
Length of the longest runway (m)	2800
Connection with rail	No
Passenger traffic flow (pax per year)	2,544,198 (2013)
Freight traffic flow (tons per year)	10,873 (2013)

Currently the airport is in a phase of intensive development. The airport infrastructure is being modernized and a new runway is under construction. The new runway will replace the current runway and will measure 3,200 m long and 45 m wide.

Poznań Ławica Airport

The Poznań–Ławica Henryk Wieniawski Airport is one of the oldest airports in Poland. It is located 5 km (3.1 mi) West of Poznań city centre. It takes its name from the neighbourhood of Ławica, part of the city's Grunwald district (the airport lies in Jeżyce district). The most convenient way to get to the airport from the East, West and South is by the Poznan A2 highway, turning right at road interchange Poznan-Zachod and, through express road S-11, to national road 307 directly to Poznan Airport. The most convenient way from the North is express road S-11 and then, at Poznań-Ławica interchange, via national road 307 directly to Poznan Airport.

Table D54 TENtec parameters Poznań Airport

Parameter description	Parameter Value
Number of runways	1
Length of the longest runway (m)	2,504
Connection with rail	No
Passenger traffic flow (pax per year)	1,355,330 (2013)
Freight traffic flow (tons per year)	n.a. (2013)

The Poznań Ławica Airport serves the following destinations: Warszawa–Chopin, Düsseldorf, Frankfurt, Munich, Bristol, Dublin, Girona, Liverpool, London–Stansted, Moss/Rygge, Rome–Ciampino, Copenhagen, Barcelona, Beauvais, Doncaster/Sheffield, Eindhoven (begins 20 June 2014), London–Luton, Sandefjord, Stockholm–Skavsta and seasonally: Hurghada, Sharm el-Sheikh, Corfu, Antalya, Marsa Alam, Sarajevo, Antalya, Bodrum, Burgas, Dalaman, Dubrovnik, Heraklion, Enfidha, Fuerteventura, Gran Canaria, Heraklion, Izmir, Kos, Monastir, Palma de Mallorca, Rhodes, Thessaloniki, Tenerife–South, Varna, Zadar.

The following investments were undertaken under the 2007-2013 programming period:

- Airport Expansion: the most important part of the expansion has been completed including the new airside infrastructure, expanded terminal and new car park areas;
- Development of fire protection systems of Poznań–Ławica Airport;
- Improvement of safety protection system of Poznań-Ławica Airport.

Szczecin Goleniów Airport

The Szczecin-Goleniów Airport is an international airport situated 33 km North-East of the centre of Szczecin next to national road no. 6 (Goleniów – Gdynia) near the village of Glewice. The population of its catchment area is 1.6 million people.

Today the Szczecin-Goleniów Airport provides 9 scheduled services to Warszawa, Oslo Gardemoen, Stavanger, Oslo Torp, London Stansted, Dublin, Liverpool, Edinburgh and Bristol. 4 chartered services to Hurghada, Sharm El Sheikh, and Antalya and the new service of the 2013 season to the Greek island of Crete.

Table D55 TENtec parameters Szczecin Airport

Parameter description	Parameter Value
Number of runways	1
Length of the longest runway (m)	2,500
Connection with rail	Yes
Passenger traffic flow (pax per year)	347,744 (2013)
Freight traffic flow (tons per year)	n.a. (2013)

The Arrivals Terminal was built under the INTERREG III A 2004-2006 programme co-funded from the European Regional Development Fund. Moreover "Development of security systems for fire protection and operations at Szczecin-Goleniów Airport" has also been implemented under financial perspective 2007-2013 (OPIE) as well as "Development of security systems for fire protection and operations at Szczecin-Goleniów Airport".

Warszawa Okęcie Airport

The Warszawa Fryderyk Chopin Airport is an international airport located in the Włochy district of Warszawa, Poland. As Poland's busiest airport, Warszawa Chopin handles almost 40% of the country's air passenger traffic. Warszawa Chopin handles approximately 300 scheduled flights daily and an ever rising number of charters.

London, Chicago, Frankfurt, Paris, and Amsterdam are the busiest international connections, while Kraków, Wrocław, and Gdańsk are the most popular domestic ones.

Table D56 TENtec parameters Warszawa Airport

Parameter description	Parameter Value
Number of runways	2
Length of the longest runway (m)	3,690
Connection with rail	Yes
Passenger traffic flow (pax per year)	10,683,706 (2013)
Freight traffic flow (tons per year)	48,219 (2013)

The 'Polish Airports' State Enterprise is a beneficiary of the Operational Programme Infrastructure and Environment 2007-2013 (under Priority Axis VI and VIII), the TEN-T (Trans-European Transport Network) Community Programme as well as the Regional Operational Programme of the Mazowieckie Voivodeship (ROP MV) 2007-2013 (under Priority Axis I).

The following investments were undertaken under the 2007-2013 programming period:

- "Warszawa Airport – Construction/extension/redevelopment (modernization) of airport infrastructure" including Modernization of T1 area and its integration with T2; Construction of RWY1 taxiways; Resurfacing and modernization of RWY3 and taxiways; Work on aprons no. 2, 4 and 6; Construction of a railway fuel terminal and a long-distance pipeline;
- "Purchase of winter maintenance equipment for Warszawa Airport";
- "Study works related to long-term development of Warszawa F. Chopin Airport".

Also in operation in the Warsaw area is the Warszawa-Modlin aiport that in the period January-October 2014 registered nearly 1.4 mllion passengers, more than one million more than 2013. Although not included in the TEN-t core and comprehensive networks the airport is expected to increase its traffic in the future with reference to both passengers and freight traffic. It is indeed worth noting that the airport is used by the low cost carrier Ryanair and has been also identified by the local regional authorities as future hub for aviation cargo services due to its better location outside the urban area compared to the Chopin Aiport. The Modlin Airport is also well located in terms of road and rail accessibility; although missing a direct interconnection to the railway line, the airport is located few miles from the railway line interconnecting to the Chopin Airport and to Warszawa city centre (bus+rail services are already in operation at this port).

Wrocław Strachowice Airport

The Wrocław Nicolaus Copernicus Airport is located in the South-Western part of Wrocław, about 10 km away from the city centre, near the Wrocław motorway bypass, which makes the airport easily accessible for passengers driving from Warszawa along the S8 road, from Poznań along national road no. 5, as well as for those driving to the airport from the South, along national road no. 8 and for passengers driving along the A4 motorway.

Since 2003 the airport has recorded a rapid increase in passenger traffic. Within 5 years the number of passengers has increased five times. The airport provides its services to network carriers which offer flights to the major hubs in Europe, low-cost carriers, like Ryanair and Wizz Air, which have their operational bases at the Wrocław Airport, and also charter airlines hired by tour operators as a part of a package deal which includes accommodation, rentals, and other activities for an entire holiday. On 11th March 2012 a new passenger terminal was opened. Its capacity is almost 4 million passengers per year and in the future it is expected to reach as much as 7 million.

Table D57 TENtec parameters Wrocław Airport

Parameter description	Parameter Value
Number of runways	1
Length of the longest runway (m)	2,500
Connection with rail	No
Passenger traffic flow (pax per year)	1,920,179 (2013)
Freight traffic flow (tons per year)	5,100 (2013)

The Wrocław Airport has scheduled regular flights to the following European countries: Germany, Denmark, Netherlands, Belgium, UK, Ireland, France, Spain, Italy, Switzerland, Malta, Norway and the Greek island of Crete.

The following investments were undertaken under the 2007-2013 programming period:

- Wrocław Airport – extension and modernization of airside and landside infrastructure (POIS.06.03.00-00-001/09-00); construction of a new passenger terminal with airside and landside infrastructure which provides for an increase in capacity of up to 3.3 mln passengers per year. The airport is located in the TEN-T network and the improvements increase the capacity of Polish airspace as well as providing higher quality of services;
- Comprehensive study and technical documentation of development of an International Airport Wrocław (2008-PL-92004-); The project which has been prepared by Wrocław Airport was a response to the urgent need for a diagnosis of its situation and for defining the directions of its development;
- Improvement of safety and guards at Wrocław Airport Co (POIS.08.04.00-00-001/09).

Ostrava Leoš Janáček Mošnov Airport

The Ostrava airport is located in Mošnov and has got the name Leoš Janáček Airport Ostrava in 2006. The former military airport is in civil operation from 1959; it was operated as fully civil airport by the Czech airport authority from 1989. It is owned by the Moravskoslezský region from 2004 and operated by Letiště Ostrava, a.s.

The construction of a new terminal started in July 2005. It costed 320 million CZK (approx. 10.66 million EUR) and was open on 13 December 2006. It is fully equipped for international transport and is used for the regular line to Prague and Vienna, low cast carries' lines and charter flights.

Table D58 TENtec parameters Ostrava Leoš Janáček Airport

Parameter description	Parameter Value
Connection with rail	Yes
Passenger traffic flow (pax per year)	259,167 (2013)
Freight traffic flow (tons per year)	2,096 (2013)

The transport output was 260,000 passengers and 15 thousands movements in 2013. 2000 tons of cargo was handled in 2013.

The connection of the airport to local railway line is currently under construction, 8 km long railway will connect to Studénka station on main railway line Ostrava – Přerov on the BA Corridor. The 9 km long intercoconnection to the D1 motorway, also on the BA Corridor is possible via regional road II/464.

Bratislava M.R. ŠtefánikŠtefánik airport

The Bratislava M.R Štefánik airport is located near Ivanka pri Dunaji. This is the largest international airport in Slovakia and is in operation since 1923. It is owned by state and operated by Slovak airport authority. Construction of a new terminal was finished in 2010. The airport has three terminals and has direct lines to Prague, Košice, and Moscow and many low cost airlines flights (United Kingdom, Ireland, Norway, Spain, Italy) and many charter flights.

Table D59 TENtec parameters Bratislava M.R.Štefánik Airport

Parameter description	Parameter Value
Connection with rail	No
Passenger traffic flow (pax per year)	1,373,078 (2013)
Freight traffic flow (tons per year)	20,530 (2011)

The transport output was 1.4 million passengers and 22.5 thousands movements in 2012.

The airport is connected to the motorway D1 on the BA Corridor; it has no railway connection.

Wien International Airport

Thanks to its geographical position in the centre of Europe, it is one of the most important hubs for the growing number of destinations in Central and Eastern Europe. Its growth strategy is also based on the positive development of demand for flights to destinations in Asia and the Middle East as well as the expansion of the low-cost segment. Wien Airport was the point of arrival or departure for some 22.0 million passengers in 2013.

Table D60 TENtec parameters Wien International Airport

Parameter description	Parameter Value
Connection with rail	Yes
Passenger traffic flow (pax per year)	22,000,000(2013)
Freight traffic flow (tons per year)	256,200 (2013)

The railroad station at the Wien airport is currently being reconstructed. In conjunction with the Wien Main Station regular passenger service connecting Salzburg and the airport are planned for 2015. Southbound passenger services connecting Graz – Wien - Prague are in place, however passengers bound for the airport have to change trains at the Wien Main Station.

Although the airport is already connected with Wien and with the Western cities and regions in Austria, its accessibility from the Eastern and Northern regions including Czech Republic and Slovak cities has to be considered a capacity induced bottleneck.
From the airports perspective, train passenger services connecting Prague via Brno to the Wien Main Station will be required to meet the expected passenger growth from 22 Mio in 2013 to 31 Mio in 2020. Expected growth rates also call for passenger train connections between Bratislava and Wien in addition to the current freight train connection between the two cities ("Marchegger" line). In this context ÖBB is currently evaluating technical and economically feasible alternatives to connect the Wien airport with the Eastern agglomerations Bratislava and Budapest.

The presented initiatives are not only expected to address the forecasted passenger growth, but also to provide environmentally compatible access to the airport and supporting the strategy of the airline industry to substitute short flights by fast train connections.

Air cargo volumes are also expected to grow from 256 thousand tons in 2013 to 405 thousand tons in 2020. Thus the airport authority plans to build new air cargo terminals South of the current runway (11/29).

To allow the environmentally sustainable growth of the air cargo business, rail connections between the air cargo terminal and the existing rail infrastructure will be necessary.

Additional information on the interconnection of the Wien airport to the BA Corridor road and rail links is provided in the main report, Sections 4.2.5 and 4.4.5.

Another relevant investment planned at the airport is the third runway. Two runways are currently in operation at the Wien International Airport:

- Runway 16 / 34: length 3,600 metres, width 45 metres, 2 shoulders 7.5 metres, approaching lights with sequence flashing lights in both directions, centreline- and runway edge lights in both directions, touchdown one lights for the runway 16, PAPIS on both runway sides, ICAO category III B on Runway 16, ICAO category I on runway 34, 12 taxiways, 7 of them rapid exit taxiways;
- Runway 11 / 29: length 3,500 metres, width 45 metres, 2 shoulders 7.5 metres approaching lights with sequence flashing lights in both directions, centreline- and

runway edge lights in both directions, touchdown one lights for the runway 16, PAPIS on both runway sides, ICAO category III B on Runway 29, ICAO category I on runway 11, 12 taxiways, 5 of them rapid exit taxiways.

A third runway is currently under study to support the long-term developments in international aviation as these are deemed not to be effectively handled with the current system of two intersecting runways nor would this solution be acceptable for local inhabitants. An additional take-off and landing runway would also reduce delays, fuel consumption and noise eliminating holding patterns and queued aircraft during busy periods.

Venezia Marco Polo Airport

The Venezia Marco Polo Airport is the main airport serving the city of Venezia in the Regione Veneto, North-East of Italy. It is located 4.3 nautical miles from the city. The airport has one terminal with 3 levels, 70 check-in desks and 2 runways.

With more than 8 million passengers per year, it was the fifth busiest airport in Italy in 2013. More than 40 airlines have regular flights to other destinations, with more than 1000 flights per week covering national, European and international routes. The airport is operated by SAVE S.p.A. who also operates the airport of Treviso; the two airports together register more than 10 million passengers.

The Venezia Marco Polo Airport is Italy's third largest intercontinental gateway with direct scheduled flights to New York, Philadelphia, Atlanta, Dubai, Doha, Montreal, Toronto and Tokyo.

Table D61 TENtec parameters Venezia Marco Polo Airport

Parameter description	Parameter Value
Connection with rail	No
Passenger traffic flow (pax per year)	8,327,899 (2013)
Freight traffic flow (tons per year)	45,662 (2013)

The airport is very well connected to the Italian highway and motorway network having direct access to the A27. Road works are currently planned by ANAS S.p.A. on the national road SS 14, for the construction of the bypass at Campalto and Tessera, providing access to the Venezia Marco Polo Airport. The airport is connected by public transport services to the train station at Mestre, 10 km far from the terminal.

In December 2012, after negotiations with the Italian Aviation Regulatory Agency ENAC, the Italian Government approved the new economic regulatory framework 2013-2021 for the Venezia Marco Polo Airport. A total of €576M investments are planned for the period, of which €392M will be borne by SAVE, the airport operator. Within this period the traffic at the airport is assumed to reach about 10 million passengers.

Preliminary studies have been already completed for the construction of a double track railway link between the railway line Venezia-Trieste and the airport, also including a rail station at the airport with 4 tracks. A people mover and a multimodal terminal are also under implementation at the Airport. Detailed design studies for the link are assumed to start during 2014.

In addition to the conventional railway link between Venezia Mestre and the Marco Polo Airport, studies have also been undertaken in the past and additional ones are under implementation for the identification of the optimal infrastructural/operational solutions to allow high speed trains serving directly the Venezia Airport.

Bologna Marconi Airport

The Bologna Airport is the largest airport in the Emilia-Romagna region, North-East/Central Italy. The airport area covers a total of 2.450.000 m2 of land and boasts a newly extended 2,800 metre-long runway, which was opened in July 2004. Flights destinations cover Europe, Middle East, North America, the Caribbean, South Africa and the Indian Ocean.

With more than 6 million passengers per year, it was the seventh busiest airport in Italy in 2013. The current capacity is 7 million passengers, planned to reach 10 million passengers by 2023.

The 40 years concession agreement signed between the Operator of the Bologna Airport SAB and ENAC started in 2006. In line with the investments included in the plans at the basis of the concession agreement and the on-going traffic trends, significantly supported by the start of the operations of Ryanair at Bologna (since late 2008), land-side infrastructure is being improved to increase the capacity of the terminal.

Table D62 TENtec parameters Bologna Marconi Airport

Parameter description	Parameter Value
Connection with rail	No
Passenger traffic flow (pax per year)	6,193,783 (2013)
Freight traffic flow (tons per year)	44,149 (2013)

The Airport is directly interconnected to the national highway and motorway network. It is also located only 6 Km far from the Bologna central railway station, one of the most important railway stations in Italy also served by high speed railway services. A dedicated bus shuttle service between the Airport and the railway station is currently in place – also calling at some city centre stops – and studies are on-going for the construction of an automated people mover interconnecting the railway station to the airport under a PPP scheme. A contractor for the development of the scheme – Marconi Express – has already been appointed in 2009. According to recent information the construction of the People Mover is expected to be completed by 2017. In addition to the railway link between the airport and the Bologna city central railway station, an airport terminal station is planned to be constructed. The People Mover will provide direct access to both regional and intercity train services as well as to high speed services already operating at the Bologna Central railway station.

Ljubljana Airport

The Ljubljana Jože Pučnik Airport, also known as Brnik Airport or Aerodrom Ljubljana, is the only airport in Slovenia with regular air connections. It is positioned 26 km from the capital Ljubljana, close to Spodnji Brnik. Regular bus connections are established with the city of Kranj and Ljubljana.

In the last 6 years, it averagely transported 1.4 million passengers a year. Majority of flights are still operated by the national air carrier Adria Airways d.d, with 170 scheduled flights a week.

Beside Adria Airways, there are 7 international carriers flying from Ljubljana. Regular flights are mainly bound to the European and South-Eastern cities, namely to Amsterdam, Belgrade, Brussels, Copenhagen, Wien, Frankfurt, Istanbul, London, Moscow, Munich, Paris, Podgorica, Prague, Pristina, Sarajevo, Skopje, Tirana, Warszawa and Zürich.

Table D63 TENtec parameters Ljubljana Jože Pučnik Airport Traffic

Parameter description	Parameter Value
Connection with rail	No
Passenger traffic flow (pax per year)	1,321,153 (2013)
Freight traffic flow (tons per year)	17,777 (2013)

The airport is well connected to the Slovenian highway and motorway network, with only few kilometres to the E61 motorway exit. There are also two regular bus carriers, first connecting the airport with nearby cities such as Kranj, Bohinj, Bled and Kamnik, whereas the second carrier transfers passengers to Klangefurt, Austria. The most common types of transport are still shuttles or private transfer with cars.

The interconnection of the airport to the national railway network is currently under evaluation as part of the feasibility study for the upgrading of the Ljubljana-Jesenice railway line.

The strategic business plan for the 2014–2020 period was adopted in February 2014. The preparation of the new documented encompassed fundamental changes in the sphere of infrastructural development, including consideration of:

- Airport enlargement on the Northern side of the runway;
- Newly planned and enlarged facilities of both passenger and cargo terminals;
- Change of the current road Kranj-Mengeš to assure necessary space for development of airport and accompanying commercial activities and never the less, to improve airport accessibility;
- Arrangement of internal traffic system and parking areas by the airport.

In total, €119,5 M investments are planned for the period up to 2020, financed from private (Aerodrom Ljubljana d.d.) and public (national and EU) founds.

D.5. Inland waterways and RIS implementation

D.5.1. Poland

Network description

Poland is an important node of the European East-West transport corridor. Inland waterway transport is only a very small market due to the weak infrastructure. However, in Poland, about 5 million tons are shipped by inland waterway transport annually. The Polish fleet consists of 71 self-propelled barges and the towing fleet consists of 193 units, and there are still considerable potentials to improve these results.

The modal share of inland waterway transport is below 1%. International transport accounts for 65% of inland waterway transport. In this segment the market share is 1%. Bulk commodities account by far for the majority of inland waterway transport. Alone, 60% of barge transport refers to ores and coal.

The inland waterway network in Poland has a length of 3.650 km. Only 200 km belong to CEMT class IV+ and are of international importance. The number of Polish enterprises in inland waterway transport is approximately 50. Apart from one very large company, the majority are small enterprises with only one vessel (owner-operator). The employment on vessels is estimated at 700 employees.

National Projects

In October 2010, the national EU TEN-T project for pilot implementation of RIS on the Lower Oder was launched. The project lasted from 2010 to 2013 and focused on the initial RIS development in Poland. The project budget of 7.3 € million included an EU contribution of 1.6 € million. Objective of the TEN-T action was to accelerate RIS deployment on Polish waterways and implement the required RIS applications. First in the project, a RIS feasibility study and a functional utility study has been carried out. These studies were used for the tender documents. The tender for the RIS system development has been closed recently. System development is the key component of the RIS implementation project. Moreover, equipment has been purchased. This includes a special vessel for elaboration of electronic navigational charts, AIS base stations and IT-equipment.

The tender was limited to the system implementation using the purchased equipment. An external evaluation is scheduled for 2014. One task of the external evaluation will be to show, if the implementation fulfil EU requirements.

For the future, a follow-up project to implement additional functionalities and improvements such as better facilities for the RIS centre is considered for 2016/2017.

Poland has joined the EU co-financed RIS implementation activities of the IRIS project series. Poland is one of the seven participating countries in the IRIS III project. Additionally, seven countries are cooperating partner of the project. The 10.5 € million project, with an EU co-financing of 50%, runs from 2012 to 2014. The Ministry of Transport, Construction and Maritime Economy is beneficiary and the Inland Navigation Office Szczecin the implementing body.

General objectives of the IRIS III project are:

- Continuation of RIS implementation;
  - International data exchange;
  - RIS applications and enhancements (e.g. FIS, Traffic and Transport information services, information services for logistics and authorities);
- Implementation of Quality of information Services for RIS.

For Poland the project is regarded as supplement to the national RIS implementation project, which focuses on the establishment of the RIS infrastructure. The IRIS III project allows enhancing know-how by studies and participation in international RIS expert groups. This allows Polish experts to be in touch with expert knowledge on European level.

Poland participates in activity 3 regarding quality of RIS and activity 4 regarding international data exchange. It is expected to achieve improvements regarding general collection and use of information. With respect to international data exchange the focus is on the establishment of the national hull database and its interconnection with the European Hull Database. Moreover, a study has been carried out regarding international data exchange.

D.5.2. Czech Republic

Network description

The Czech Republic belongs to European East-West transport corridor. Inland waterway transport has due to the limited network only a minor relevance. About 2 million tons are carried annually and approximately 130 vessels belong to the Czech fleet.

The share of inland waterway transport in modal split is below 1%. International transport accounts with almost 75% by far for the majority. The market share achieves 1% in this segment. Bulk commodities such as ores and agricultural goods are most important.

The inland waterway network has a length of 680 km. Navigable waterways of Labe and Vltava account for 315 km. About 20 companies provide inland waterway transport services. Approximately half of enterprises are small with only one vessel. The employment in the Czech inland waterway transport is certainly more than 1.000 people.

National Projects
Czech RIS activities started with a national project for the development of LAVDIS and implementation of selected RIS applications on Labe and Vyltava waterways. The implementation of LAVDIS was financed by the State Transport Infrastructure Fund (SFDI) and EU grants via the European Development Programme Funds (ERDF).

Another national project related to RIS was the implementation of DGPS system with installation of a DGPS reference station. Currently, there are no national RIS projects on-going in the Czech Republic.

The Czech Republic participated as cooperation partner in the IRIS I project. In the finished IRIS II the Czech Republic was an active partner. The Czech budget was planned with 2 M€, but only 1.7 € million was spent. 50% of the budget was granted by the EU using TEN-T funds. The distinction of tasks determines the participating party in the IRIS projects. The Ministry of Transport is in general the beneficiary. IRIS II applications in the Czech Republic focus on investment measures only, so that the Waterway Directorate is the implementing partner. The IRIS II project contributed in the Czech Republic to the development of: Implementation and upgrade of Notices to Skippers services; Electronic reporting applications; Integration of depth data in electronic navigational charts; Interconnection of Czech vessel register with the European Hull database; International data exchange; Installation of WLAN hotspots for access to RIS services.

There have been additional evaluations of the IRIS II project by the EU, as regards the execution of intended activities. However, more evaluation is expected to follow. Following to IRIS III and the implementation of AIS the Czech Ministry plans to do separate evaluation of AIS.

The Czech Republic participates also in the successor project IRIS III. It is planned to spend 1.3 € million in the Czech Republic. It is co-financed with 50% by the EU using TEN-T funds. IRIS III includes investment and non-investment measures in the Czech Republic, so that both the Waterways Directorate and the State Navigation Authority are implementing partner. As investment measures the project plans to launch AIS and provide an interface for electronic processing of statistical data. The State Navigation Authority focus on qualitative measures to improve services related to ECDIS, Notice to Skippers and electronic reporting. Moreover, the maintenance of RIS index and its connection to the European Reference Data Management Service is planned. As already mentioned the timeframe of the IRIS III project is 2012-2014.

D.5.3. Slovakia
The network of commercially navigable Slovak waterways amounted to 261 km on the rivers Danube, Vah and Bodrog:
- Danube waterway: 172 km;
- Lower Vah waterway: 80 km; and the
- Bodrog, Latorica and Laborec waterway 36 km lengths.

The main waterway of Slovakia is the Danube along which also three ports are situated: Port of Bratislava, Port of Komarno and Port of Sturovo.

According to the Slovak Ministry of Transport approximately 1.5 million tons of goods were reloaded in Slovak ports on the Danube in 2005, 2.5 million tons were reloaded in

2012. 6 – 8 millions of goods are transported on Slovak section of Danube annually (including transit). According to the CCNR (Rhine's Market Observation for European Inland Navigation) 205 freight vessels registered under Slovak flag were operated on European inland waterways in 2012. The fleet consists of:

- 39 tugboats (pushers);
- 20 motor cargo vessels (including tank ones);
- 146 barges (including tank ones - those number is 28).

National Projects

The following improvements are foreseen regarding the implementation of RIS in Slovakia to be implemented through specific actions and projects:

- In IRIS III project the FTM will be improved, the application of the NTS is being adjusted within which (also) reports of type FTM are issued. In the project, analysis of publishing reports of the NTS at the national level is being made in order to improve the level of service;
- A national FIS portal will be established;
- Provision of new ENCs;
- Information on shallow water sections is to be included in the national FIS portal;
- Enhanced interconnection with fire brigades by using calamity abatement services;
- Motivation of electronic reporting by changing relevant regulation;
- Achieve 7/24 technical support of the contractor;
- International data exchange to be improved and operational with at least the neighbouring countries.

There are no national RIS-related projects in Slovakia, RIS is/was implemented in the international projects and initiatives and co-funded partly from national budget and partly from EU resources:

- COMPRIS: (total budget. 10 € million – time frame: 9/2002 – 8/2005) aimed at providing specification and recommendations on cross-border traffic and transport information; implementing first temporary AIS shore base station at SPS in Bratislava; testing of AIS, electronic reporting (BICS) including cross-border data exchange within the "Operational Test Platform Upper Danube"; developing the first prototype of Inland ECDIS chart for the river Danube and the first prototype of NtS application was developed;
- IRIS Europe (total budget: 4.1 € million – time frame: 1/2006 – 12/2008) focussing on the implementation of pilot infrastructure for traffic management and vessel tracking and tracing – AIS network on the river Danube (r.km 1880 – 1708); Analysis of AIS equipment on Slovak vessels and proposal for AIS equipment programme; implementing electronic ship reporting infrastructure and hull data management infrastructure (in line with new requirements resulting from Directive 2006/87/EC and RIS operation); developing infrastructure for international data exchange of AIS, ERI and hull data, including the legal (TAA) and technical (R2D2) framework. It also included a waste management feasibility study and the analysis of national waste management processes, the implementation of calamity abatement service and a preliminary environmental study (assessment of environmental impacts of RIS infrastructure)
- IRIS Europe II (total budget: 10.6 € million – time frame: 1/2009 – 12/2011), including the development of a pilot water level model for the Danube between Devin and Bratislava (r.km 1880 – 1868,75), generating and sending water level corrections to WLM server at via Donau; implementation of new, enhanced NtS application according to the latest standard, including web service interface for exchange of NtS; instalment of wireless access hotspots in the port of Bratislava and the Gabčíkovo lock for users to access the RIS services; updating of national RIS Index; implementation of national RIS reference data management system, including interface to ERDMS; enhancement of pilot infrastructure on board – installation of 45 mobile and 15 portable AIS transponders, and 12 Inland ECDIS viewers on Slovak vessels;

enhancement of pilot infrastructure on shore – interconnection of radar system with AIS at the Gabčíkovo lock; pilot implementation of lock management system at the Gabčíkovo lock; enhancement of CAS module in SlovRIS system; pilot implementation of Safety Related Message distribution via AIS; implementation of module for generating statistic reports within the RIS system for purpose of the Statistics Office of the Slovak Republic (in line with the EC regulation 425/2007); implementation of Single Sign-On in the RIS system; enhancement of data gateway for international data exchange; pilot operation of international RIS data exchange, incl. electronic reporting; interconnection of national hull database with EHDB; interconnection of national reference data management system with ERDMS; interconnection with EPIS in test environment; definition of minimum requirements towards the quality of information services for RIS;

- IRIS Europe 3 (running) (total budget: 10.5 € million – timeframe: 2012-2014) is to be finished in December 2014, see details for Poland, Czech Republic and Austria in the previous and following sections;
- RISING (budget for Slovakia: 186,200 € – time frame: 2/2009 – 7/2012) aimed at developing specification for event management services, water level service and vertical clearance service; developing specification for RIS TLS services – positioning services and setting up the "RISING OTP" test platform for RIS TLS; defining RIS service performance profile for RIS TLS;
- DANewBE (Budget for Slovakia: 668,300 € – time frame: 1/2005 – 12/2007) focussing on implementation and setting of the D4D infrastructure on SK level (adjusting issues and development of national database in Oracle, establishment of production process for ENC charts), production of ENC chart in IE standard 1.02; collection of data for ENC maps; testing survey of signal coverage on SK stretch of Danube; establishing cooperation with GIS FORUM DANUBE expert group and data exchange between the partners;
- NEWADA (Budget for Slovakia: 394,500 € – time frame: 4/2009 – 4/2012) preparing status reports in field of hydrology and hydrography and in field of waterway maintenance, implementation of WFD; developing the FIS portal; updating D4D infrastructure; installation of a web portal and development of new functions in maintenance portal, production of ENC charts in IE standard 2.1;
- NEWADA Duo (running) (Budget for Slovakia: 221,150 € – timeframe: 10/2012 – 9/2014) aimed at preparing status reports in field of water level, water gauges, water level forecast; producing ENC chart with depth information, production of Atlas of Berth, production of Paper charts; developing and upgraded FIS portal development; optimization of the waterway maintenance and management processes; preparing status reports in flied of waterway maintenance and management.

D.5.4. Austria

Network description

Austria is an important gateway between the Western and Eastern European transport network. Along the Danube inland waterway transport is a relevant mode. The Austrian fleet is rather small with 20 vessels and push boats. However, along the Danube push convoys account for a large share of waterway transport. 70 non-propelled barges belong to the Austrian fleet. 11 million tons are carried by inland waterway transport annually.

Inland waterway transport accounts for 2% of Austrian transport volume. International traffic dominates on the Danube. In this segment inland waterway transport has a stronger position with a market share of 5%. Inland waterway transport achieves significantly higher market shares beyond 10% only for bulk ore transport.

The Danube accounts for almost the complete network of navigable waterways with a length of 360 km. In contrast to other European countries, there are only a few small and medium sized Austrian enterprises in the market. Main Austrian service providers are four larger shipping lines.

National Projects

In Austria, a large number of RIS projects have been carried out and are on-going. A milestone of RIS development in Austria was the implementation of DORIS in 2006. The national DORIS development was co-financed by EU TEN-T funds. This included the AIS transponder equipment programme.

Currently running is the National Action Plan Danube. Since 2007 the measures are part of the transport policy programme of the Federal government. The National Action Plan considers one pillar related to RIS. In 2008 and 2010, progress reports were published. The RIS related aims of the project are: Continuation of RIS implementation; User-orientated RIS development; Development/Enhancement of RIS applications; Implementation of RIS along Danube. Measures include: Installation AIS infrastructure and equipment of vessels with transponders; Application of international standards; Continue operation of RIS test centre; Communication of RIS to existing and potential users; Support for implementation of Transport Management services.

The programme "i2 key project – innovative inland navigation" supported RIS development between 2003 and 2007. The focus of sub activities was coordinated by the Federal Ministry of Transport, Innovation and Technology. Among others, as pilot some value added services were implemented. For instance, use of RIS data to improve logistics and RIS integration of inland ports.

IDEAL is another relevant project, which analysed opportunities regarding non-motorised barge position identification. Also legal aspects of the use of RIS were analysed in one of the programme's projects.

Another national framework programme with connection to RIS is the IV2Splus "Intelligent traffic systems and services plus". The project was managed by the Federal Ministry of Transport, Innovation and Technology. TRIUMPH (Trimodal Transhipment centre Port) is a subproject with application of RIS, which runs from 2011 to 2013. The focus is on information management of ports to facilitate intermodal transport chains. Via Donau and Port of Ennshafen are among the four partners in this research-orientated project. The main objective with respect to RIS is the optimisation of intermodal logistics and transhipment using DORIS and other mode's IT-systems. Static and dynamic vessel information should be transmitted to contribute to more efficient port operation and better information of logistic service providers regarding empty container positioning by barge.

In 2008, the project "DoRIS + IALA (Beacon) DGPS Performance Monitoring" with EU TEN-T contribution implemented DGPS Performance Monitoring in Austria according to IALA standard.

Apart from projects regarding the implementation and operation of RIS, on national level also technology orientated studies and research are carried out. via Donau was involved in the projects NAVWAT, SATVeC and ARIADNA. The project NAVWAT - Future High Precision Navigation System for Inland Waterways (2009-2010) focused on the requirements of positioning system for support of skippers in critical areas. The project was funded by national support programme. The project SATVeC (2008-2009) focused on requirements for GNSS supported automatic vehicle control. ARIADNA (2009-2012) aimed to investigate the application of a new volumetric navigation system based on aviation know-how for collision avoidance and efficiency enhancements.

The participation of Via Donau in multinational RIS projects has tradition. Austria was among participants of the Compris technology project between 2002 and 2005, which contributed to implementation and harmonisation of RIS in Europe. A focus of Austrian activity was the harmonisation of its RIS applications with other Danube and Western

European countries. The projects are agreed on by the Supreme Navigation Authority and Via Donau.

Austria is very active in the harmonised implementation of RIS in the Danube states according to the RIS Master plan. Several projects with Danube and other countries were carried out for RIS implementation. The international activity of Austria is related to objectives of the National Action Plan Danube. The plan includes the following measures: Maintain Via Donau as European RIS know-how platform and transfer know-how to other (Danube) countries in order to support RIS development; Support of non-EU Danube countries to acquire funding for RIS development; Implementation of twinning projects with authorities of other Danube countries.

The TEN-T IRIS projects under the lead of via Donau and the Austrian Federal Ministry of Transport, Innovation and Technology are the most important projects regarding RIS implementation. IRIS I and IRIS II EU TEN-T co-financed projects, which contributed to RIS implementation and standardisation in Austria and other European countries. IRIS I run over 36 months between 2006 and 2008. The 4.1 € million project with 50% co-financing by EU TEN-T focused on several aspects of RIS implementation in the six participating countries. Austrian parties are the Ministry of Transport, Innovation and Technology as beneficiary and via Donau as the implementing partner. Austrian achievements include: Electronic reporting standard (input via BICS or graphical web user interface); National hull data management infrastructure according to directive 2008/87/EC; ENI number assignment; Infrastructure for international exchange of RIS data (AIS, ERI, hull data); First steps towards technical and administrative agreement regarding international data exchange; Traffic data exchange with Hungary and Slovakia; Innovative calamity abatement: implementation of NOT_Emergency message; Feasibility of AIS transmission and Tracking & Tracing barge identification (pilot service).

The project activities were extensively communicated by different means to stakeholders and the European RIS community. The project activities were evaluated internally. The European commission evaluated the project work with respect to the intended activities.

IRIS II was the successor project. This 11.6 € million EU TEN-T project with 50% co-financing by the EU run from 2009 to 2011. The Austrian Federal Ministry of Transport, Innovation and Technology as beneficiary and via Donau as implementing body were among the partners from 9 participating countries and 4 partner countries.

Activities of IRIS II include: Pilot implementation of selected Fairway information services; Provisioning of actual depth information and water levels; Enhancement of Notices to Skippers; Wireless RIS service; Additional Traffic Information Services; Pilot implementation of selected Traffic Information Services; Heading information; Enhancement of pilot infrastructures (on shore / on board); Calamity Abatement Service; Advanced Services for governmental and logistics RIS users; Interconnection to European Hull Database; International RIS Data Exchange among Governmental Services; European Position Information Service Reference data management and international exchange (R2D2); Legal agreements; Quality of RIS applications.

The focus of IRIS II for Austria was on international data exchange, standardisation and technical specification of applications. Austria worked on the following: Improvements for depth data provision in ENC; Enhancement of NtS applications, e.g. user survey; International exchange of NtS; Enhancement of electronic reporting standard; Web service interconnection to European Hull database; Interconnection of national hull database with EHDB; Pilot operation of international data exchange with Hungary and Slovakia (AIS, ERI, hull data); National reference data (Inland ENC – RIS index converter) and interconnection to European reference Data Management Service (ERDMS); Pilot infrastructure for calamity abatement support; Pilot implementation of additional services transmitted by AIS, e.g. water level, light signals, emergencies, convoy; Technical and administrative agreement for data exchange.

IRIS II project activities were evaluated internally and the EU evaluated the work programme.

Recently started the EU TEN-T project IRIS III, which is another successor project of the IRIS initiative. This 10.5 € million project with 50% EU co-financing, started in 2012 and is envisaged to be completed by 2014. 7 countries participate actively and further 7 countries are cooperating in activities. Austria is represented by the Federal Ministry of Transport, Innovation and Technology as beneficiary and via Donau as implementing partner. General objectives of the IRIS III project are:

- Continuation of RIS implementation;
  - International data exchange;
  - RIS applications and enhancements (e.g. FIS, Traffic and Transport information services, information services for logistics and authorities);
- Implementation of Quality of information Services for RIS.

Austrian partners participated in the RISING (RIS Services for Improving the Integration of Inland Waterway Transports into Intermodal Chains) project between 2009 and 2012. The focus of the EU framework programme FP-7 (TREN) was on transport-logistic services including seamless traffic and transport-related information and interfaces. 5.3 € million of the 7.5 € million project budget was granted by the EU. River information services assisting logistic enterprises, port and terminal operators and fleet operators were addressed regarding the following applications: Event management; Voyage planning; RIS services for transport and logistics.

RISING activities in Austria include the development of logistic applications such as the facilitation of transport monitoring by integration of RIS traffic information in internal logistic application.

Via Donau was involved in several projects focusing on the development of the Danube corridor. The Transnational cooperation programme project NEWADA (Network of Danube Waterway Administrations) aimed to strengthen the collaboration between waterway authorities along the Danube corridor between 2009 and 2012. The project volume of 2.9 € million was co-financed with 85% by ERDF of the EU. Among others RIS activities were included in the project. RIS related achievements focused on the development of a Danube FIS portal with multinational information such as FIS data and harmonised ENC. The work is continued in the successor project NEWADA Duo. Harmonised RIS development along the Danube corridor is also considered in the DAHAR project, which is supported by the EU under the South East Europe Transnational Cooperation Programme. The project with a focus on ports runs from 2011 to 2014. Port of Ennshafen is participating Austrian partner and via Donau is associated strategic partner.

Already between 2001 and 2006 the EU Interreg project D4D (Data Warehouse for Danube Waterways) contributed to the development of electronic navigational charts along the Danube and their provision on an inland ENC web portal. Moreover, D4D contributed to the installation of GPS transmitters.

The EU Interreg project DANewB Data (Digitally Advanced New Cross Border Exchange of Data) contributed to the implementation of RIS along the Danube corridor, too. It focused on a coordinated RIS implementation of Danube countries with harmonised cross-border applications.

Via Donau participated in some international technology projects related to the development of RIS technologies. Between 2005 and 2007 M-Trade (Multimodal

TRAnsportation supporteD by EGNOS) investigated multimodal tracking & tracing opportunities by the European DGPS system EGNOS. Moreover, they participated in projects such as Mar-Use to analyse the potential by implementation of EGNOS and Galileo in inland navigation. Another project focuses on the opportunities to apply long wave systems for RIS. The technology orientated projects were co-financed by ESA and EU (FP6, FP7, Interreg 3B).

D.5.5. Italy

National Projects

The following project is relevant for the development of RIS in Italy: *Development of the RIS Operability along the Northern Italy Waterway System (NIWS)*, total budget of the initiative: 5.1 € million, of which 2.5 € million TEN-T financing. Project activities included: drafting of a plan for the implementation of RIS along the entire NIWS; testing and implementation of RIS pilot project along a defined stretch of the NIWS, that will be used for the future application of the RIS system along the entire NIWS, increase NIWS efficiency through vessels tracking and tracing, locks remote control, increase NIWS competitiveness and convenience for operators making navigation quicker and safer, increase NIWS safety for barges and vessels by monitoring their locations, loads, journeys, reducing environmental hazards and improving transport sustainability, implement a training system for skilled operators in the use of RIS technology. Specific identified project goals were: developing the Northern-Italy waterway system as a part of a global multimodal network supporting and completing corridors I and V; creation of a Trans-European multimodal axis including waterway and sea transport interconnected with road and rail transport reinforcing the East-West connection of Northern Italy and Balkan Area towards the Danube and Black sea; creating an efficient and sustainable connection of continental Europe with the Mediterranean sea ports by rail (Brenner) – waterway – short-sea-shipping / Motorways of the sea; reducing road traffic congestion and CO2 emissions in the Po Plain through a modal shift from road transport to the more environmentally friendly waterway transport.

Appendix E. BA Corridor Market Study

E.1. Scope and approach

This Appendix illustrates the methodology and results of our recognition of the transport market along the BA Corridor, also including the outline of the socio-economic conditions in the study area (i.e. population, GDP, employment). Our Transport Market Study (TMS) pursues a threefold propose 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 work plan investments;
- Supporting the definition of the critical issues on the BA Corridor, complementing the analysis of the compliance and quality of the infrastructure with a view on the possible issues related with the transport infrastructure capacity on the road and rail networks.

In order to fulfil these objectives of our TMS, we have developed a comprehensive multi-modal passenger and freight 4 stage model (generation, distribution, modal split and assignment) covering the study area. The methodology adopted for the model development is also described in this Appendix.

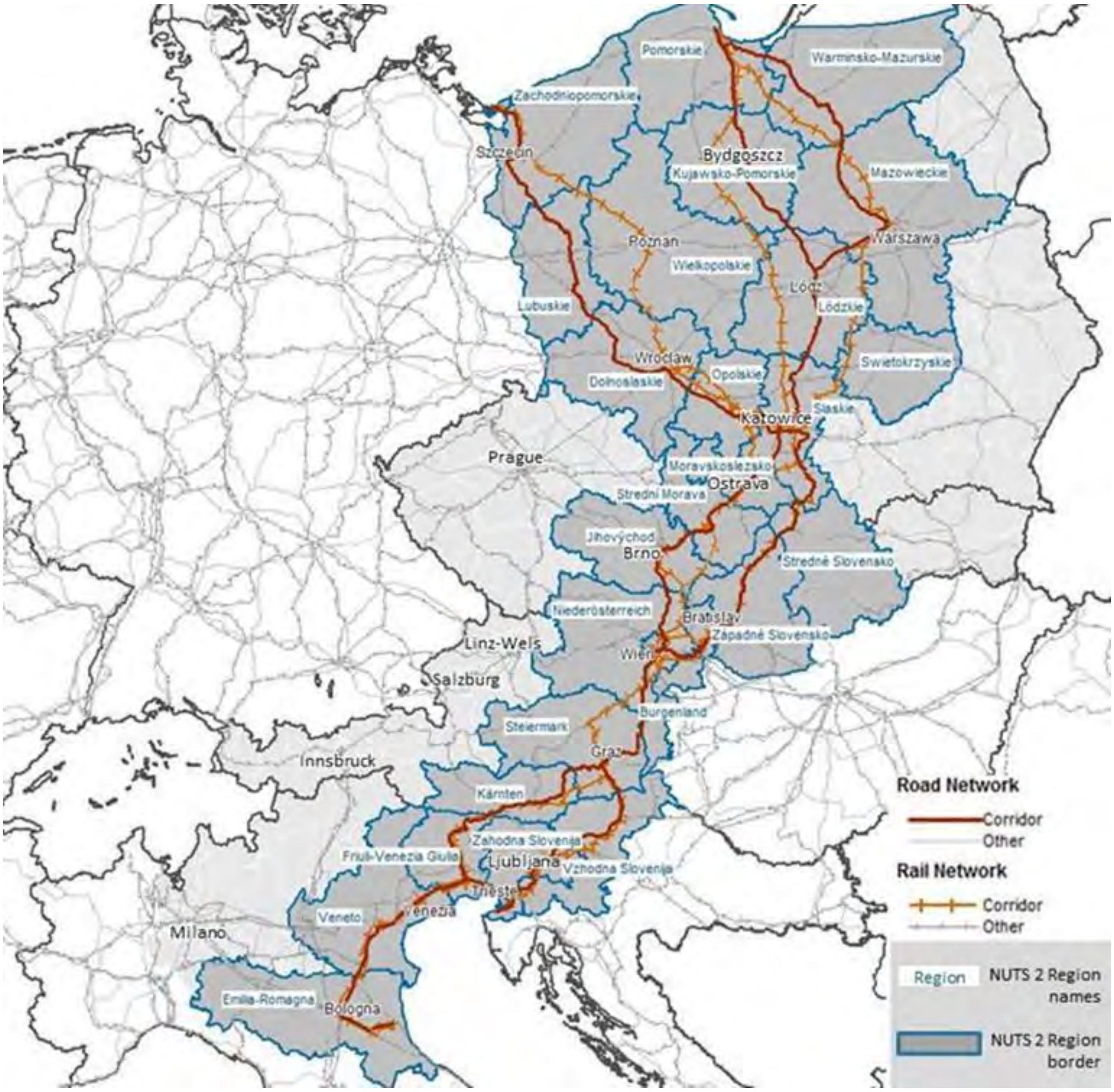
E.2. Socio-economic analysis

The BA Corridor crosses six countries with different and specific characteristics revealed by the socio-economic parameters such as population, GDP, employment rate etc. This section presents the socio-economic indicators with data and graphs as well as a summary of the trends for both the historical background up to 2014 and the forecasts until 2030. The figure overleaf shows the study area of the BA Corridor highlighting in red and orange the road and rail BA corridor network respectively.

Demographic background and projection trends

In this paragraph we analyse the current demographic profile of the BA Corridor Member States – looking both at the current situation and also back to the trends observed from 2000 – as well as the forecasts until 2030 supplemented by illustrative maps related to the years 2014, 2020 and 2030. With respect to the national historical data, the main source adopted is the International Monetary Fund (*IMF*) statistics; regional data rely mainly on Eurostat and ETIS+, which is a research project financed by the EU to set up a comprehensive database on transport and socio-economic indicators covering the years 2005 and 2010. The primary sources for the socio-economic projections are the IMF and the OECD.

Figure E1 BA Corridor area



Source: BA Corridor study consortium

As a general overview, the population of the six countries is summarised in the table below and is compared with the total inhabitants living in the countries of the BA Corridor – around 125 million – and also with the total population of the 28 European countries – around 507 million.

As shown, Italy is the most populated country along the BA Corridor, followed by Poland and then, with significant lower percentage shares, the Czech Republic, Austria, Slovakia and Slovenia. It is also worth adding that the countries along the BA Corridor represent the 25% of the total population living in Europe, which is a representative share.

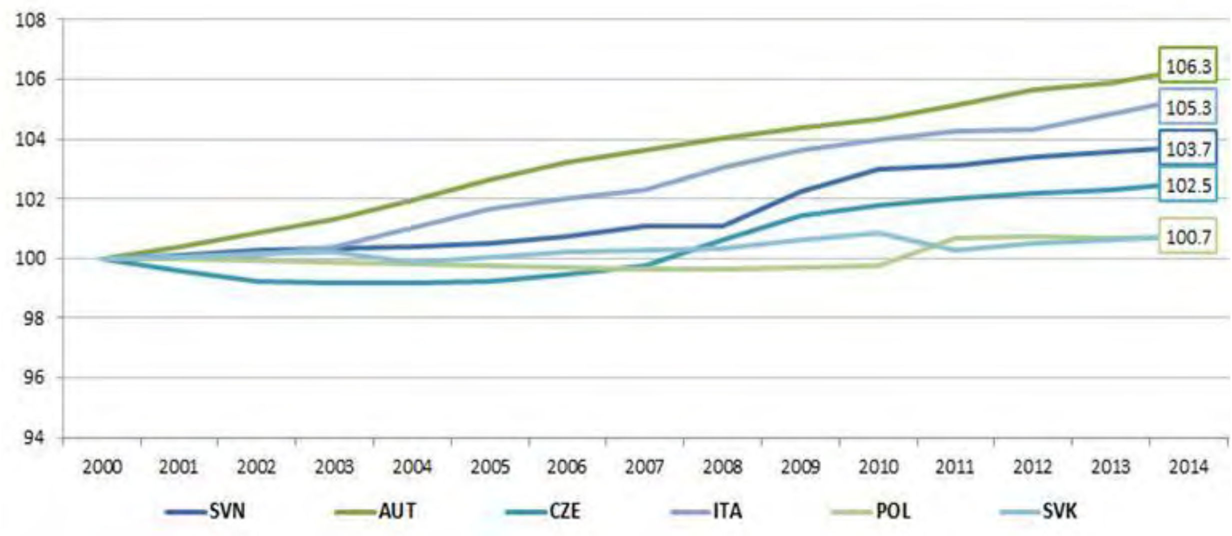
Table E1 2014 Population in the BA Corridor's countries

Countries	Total Population (million) – 2014	% Share over BA Corridor Population	% Share over the total EU28
Slovenia (SVN)	2.06	1.6%	0.41%
Austria (AUT)	8.52	6.8%	1.68%
Czech Republic (CZE)	10.54	8.4%	2.08%
Italy (ITA)	59.96	48.0%	11.83%
Poland (POL)	38.54	30.8%	7.60%
Slovakia (SVK)	5.42	4.3%	1.07%
Total BA Corridor	125.03	100%	24.66%
Total EU28	506.99		100%

Source: IMF May 2014

The population historical trends are positive overall; particularly in Italy and Austria, the growth rates are higher than in the rest of the countries on the BA Corridor (see figure below).

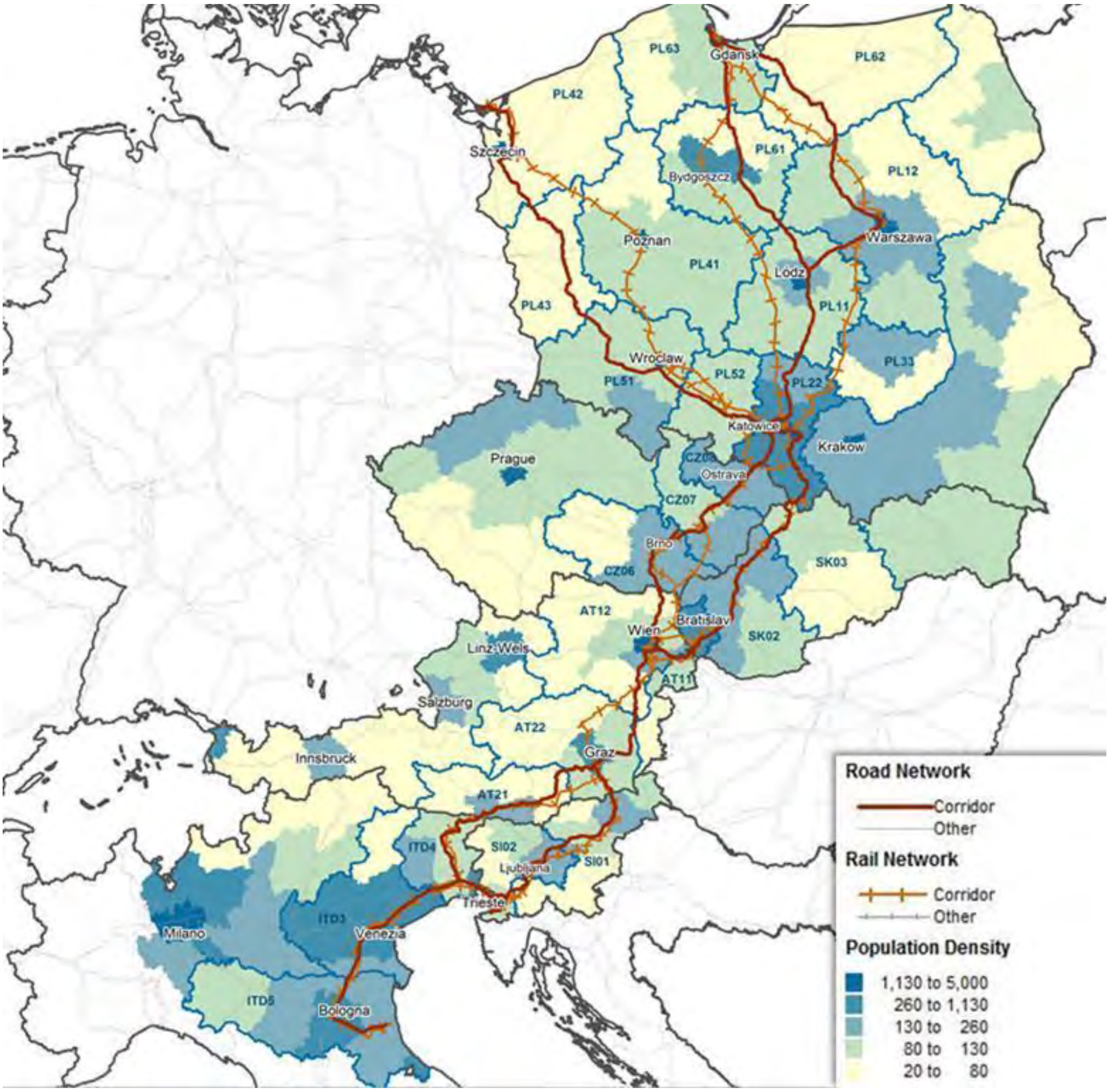
Figure E2 2000-2014 Population historical trend



Source: BA Corridor study consortium based on IMF

The figure overleaf highlights the 2010 population density along the BA Corridor (on the basis of the *ETIS+* data), suggesting the regions in the Poland-Czech Republic-Slovakia cross-border and the main provinces in Poland as well as Wien and Graz in Austria, Bratislava in Slovakia, and the North-Eastern area of Italy (e.g. Venezia, Trieste, Padova, Bologna etc.) represent the key generator/attractor sites in the Corridor; which has significant impact on the distribution of passengers and goods.

Figure E3 Population Density along the BA Corridor (2010)



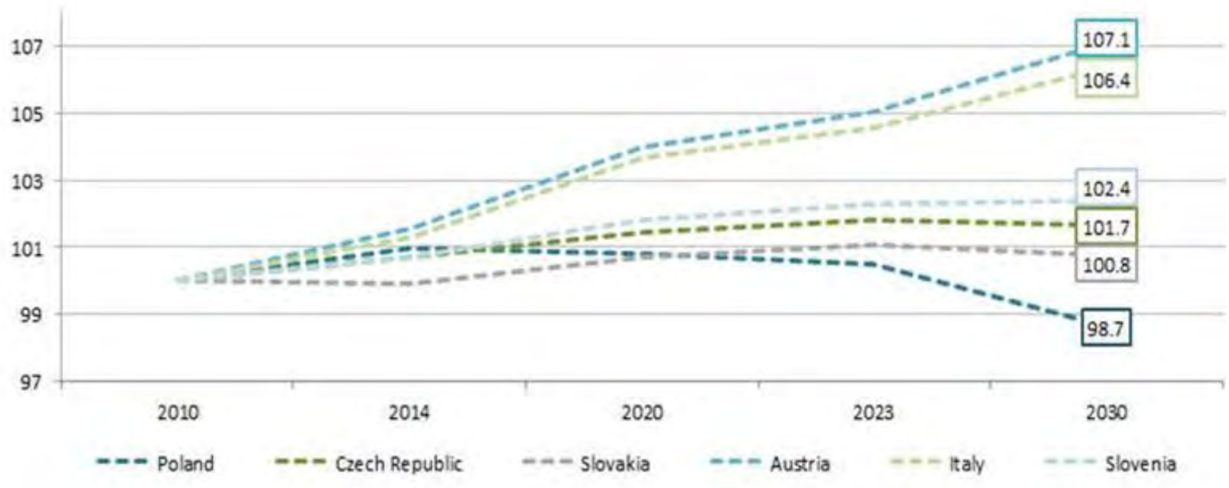
Source: BA Corridor study consortium based on ETIS+ data

With regard to the population projections for the BA Corridor market study, these are based on the *IMF* statistics until 2019 data and on the Organisation for Economic Co-operation and Development (*OECD*) database – as updated on May 2014 – for the country related data until 2030.

The graph below shows the population forecast trends for the BA Member States which are positive overall, increasing year over year constantly with the exception of Poland and Czech Republic particularly in the 2020-2030 period; in line with the historical trend, in Italy and Austria the growth rates are higher than in the rest of the countries on the BA Corridor.

In line with the conclusions included in the 2013 *Long-term Growth Scenarios* published by the OECD Economics Department (Working Papers No. 1000), these projections assume continuity of the existing national trends: in such case, the positive contribution of net migration is projected to either mitigate the decline in population in some European countries or even offset the reduction in native population, notably in Italy and Austria (since 2000 the share of immigrants in the population has increased on average by 2½ percentage points with particularly strong growth in Austria).

Figure E4 2010-2030 Population projections for the BA Member States

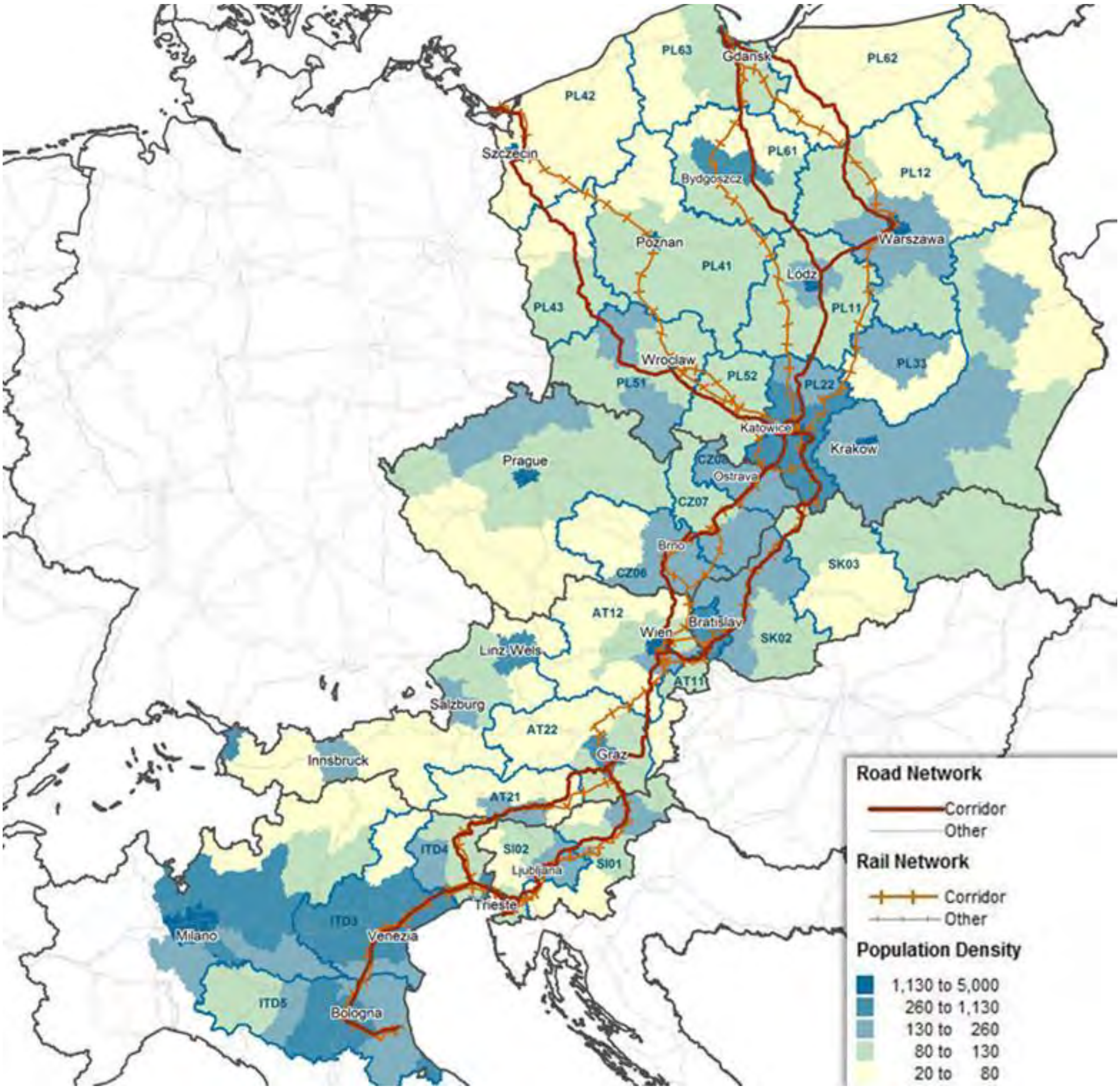


Source: BA Corridor study consortium based on IMF (until 2019 data) and OECD data

At a second stage, the allocation of the population growth (or decline) at the regional level (NUTS2) is based on the "EUROPOP2008" report from Eurostat. Indeed, in line with the 2010 population figures and 2030 population forecasts from "EUROPOP2008", we also calculated the 2014 and 2020 regional population growths by using the weight of each NUTS 2 region with respect to the total country data – obtained by linear interpolation – then multiplied per the 2014 and 2020 population growths of the related country from the *OECD* data.

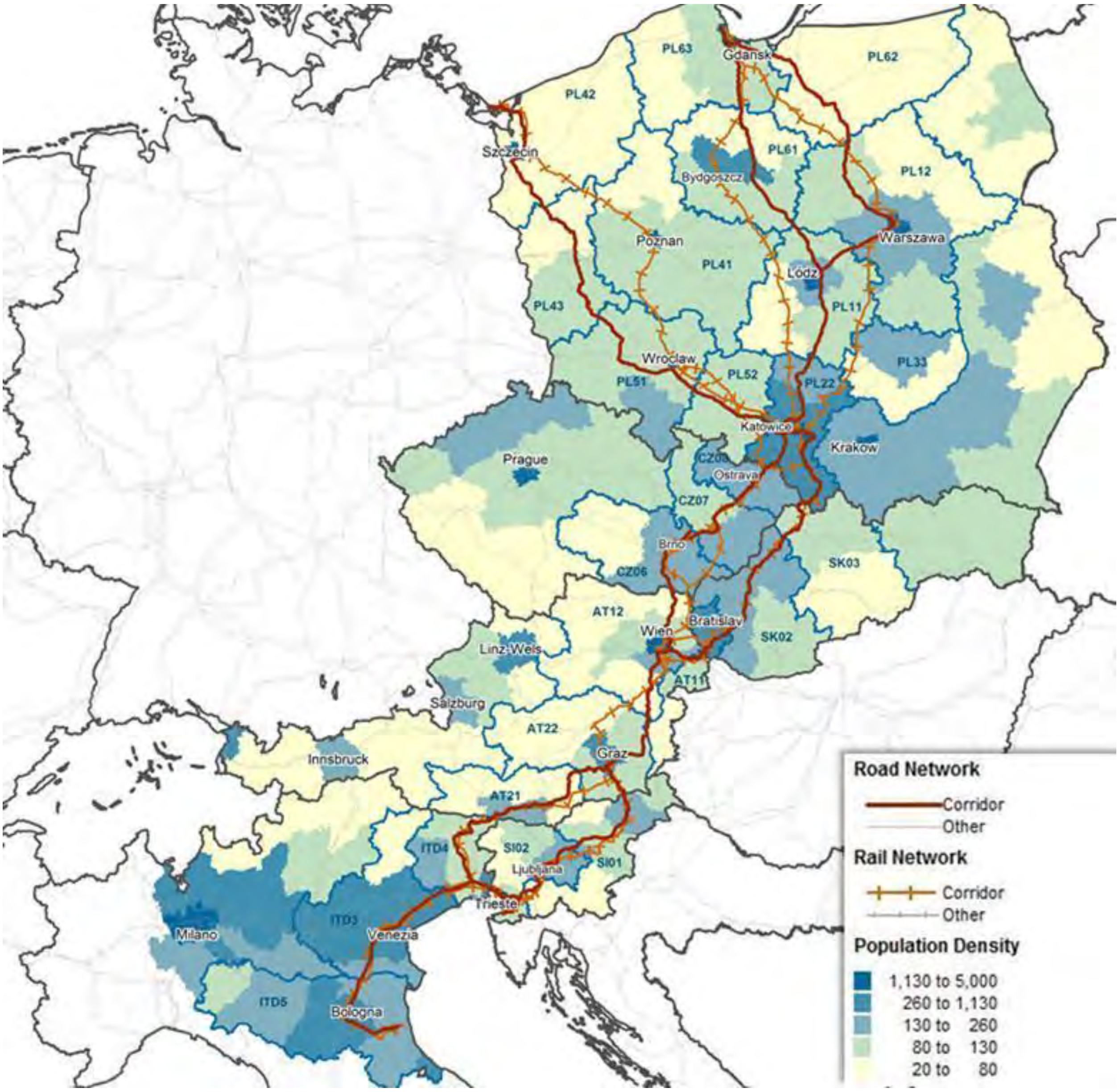
The maps overleaf compare the population density in the 2014, 2020 and 2030 years obtained from the 2010 ETIS+ data (both the information on the population and area of the NUTS 3 territories) by applying the NUTS 2 population growth rates calculated with the methodology explained above. As shown in these figures and in line with the population projections, over the 2014-2030 the population density will not vary significantly in Czech Republic, Slovakia and Slovenia; it is expected to grow in the Emilia-Romagna region in Italy (2020) and in the Wien South-Western area (2030) whereas in the *Lubuskie* region in Poland will decrease in 2030.

Figure E5 Population Density along the BA Corridor (2014)



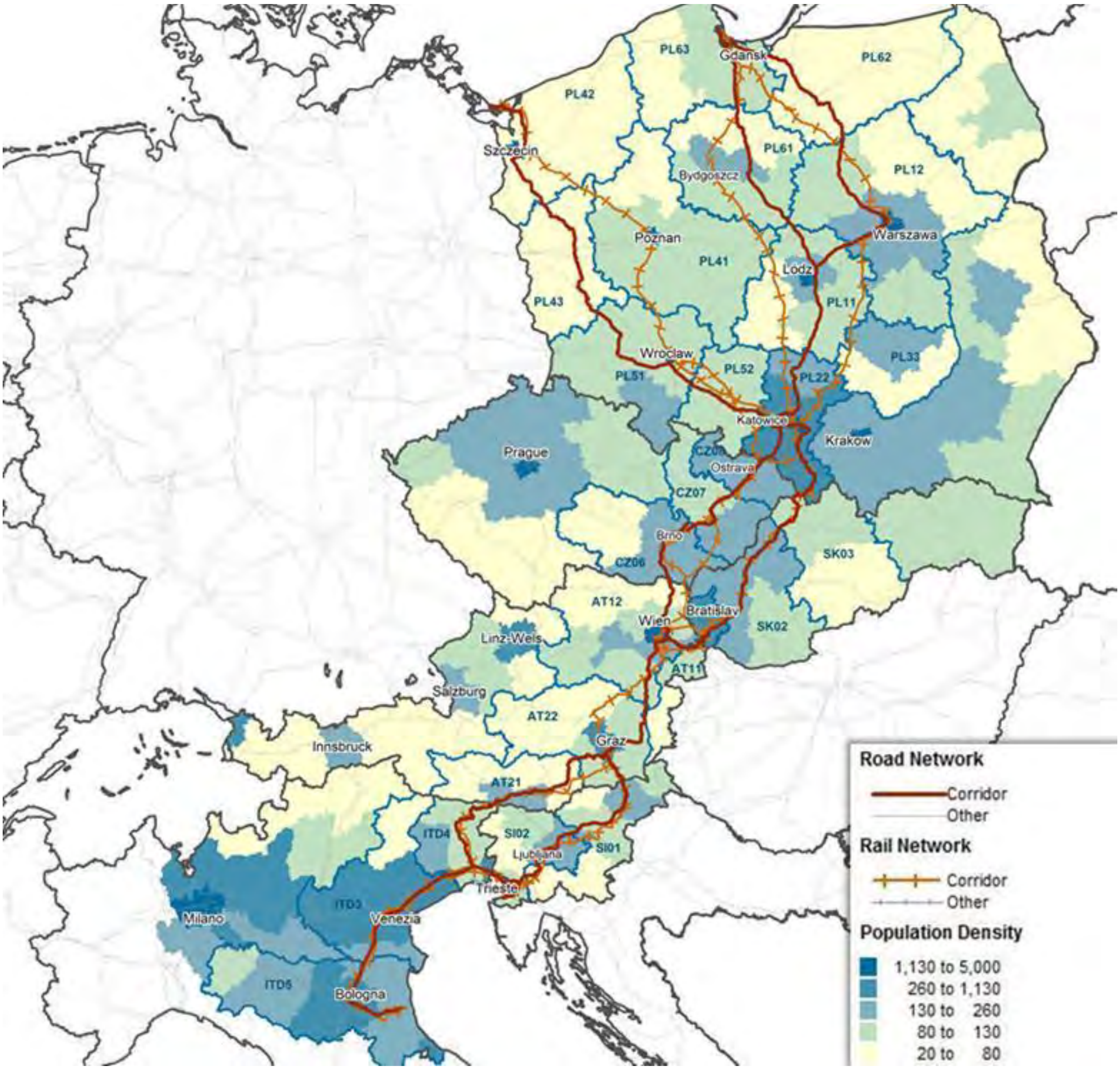
Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

Figure E6 Population Density along the BA Corridor (2020)



Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

Figure E7 Population Density along the BA Corridor (2030)

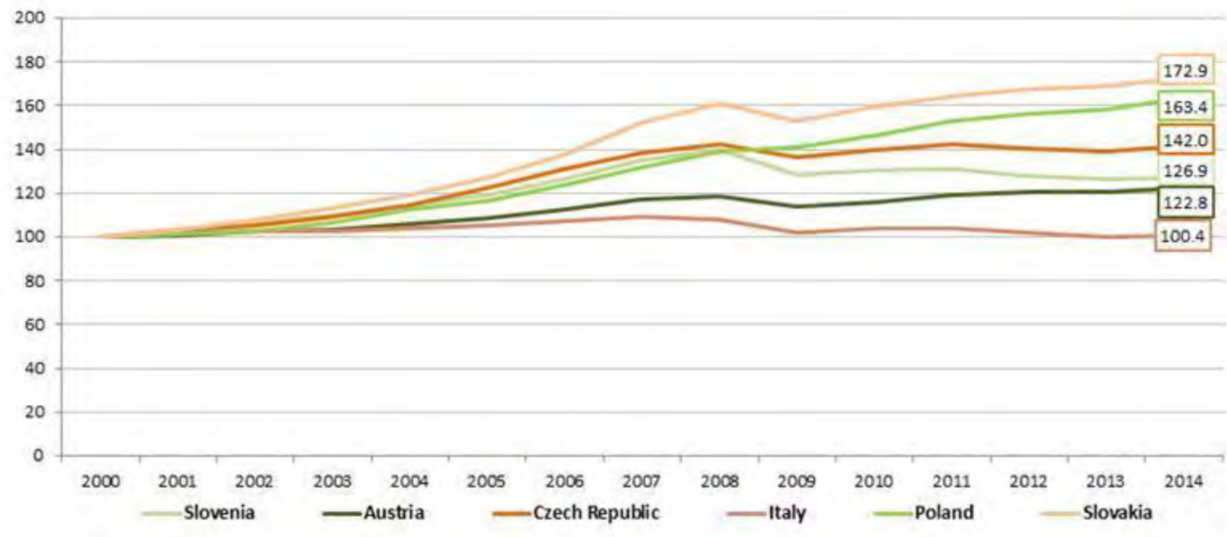


Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

Economic background and projections

In correlation with the positive population trend and according to the *IMF* statistics, the national real Gross Domestic Product – GDP – (shown in the figure overleaf) is also generally increasing for the countries in the BA Corridor, with a slowdown and decline in the 2008-2012 period due to the international economic crisis. Some countries such as Italy, Austria and Slovenia are facing a stronger economic recession in the recent years and the forecasts present a lower positive emphasis with respect to Czech Republic, Poland and Slovakia. This is particularly the case for Italy which has been highly affected by the economic crisis thus reaching in 2014 around the same GDP level as in 2000 year. On the other hand, Poland seems relatively unaffected by the recent economic crisis and presents the highest GDP growth rates amongst the six countries along the BA Corridor.

Figure E8 2000-2014 Real GDP historical trend



Source: BA Corridor study consortium based on IMF

It is in any case worth adding that the economic gap between the Northern European countries of the BA Corridor (i.e. Poland, Slovakia and Czech Republic) is considerably high with respect to the Southern area of the BA Corridor (Italy and Austria) as also confirmed by the figures included in the table below.

Table E2 GDP in current US dollar prices in the BA Corridor Member States (billions)

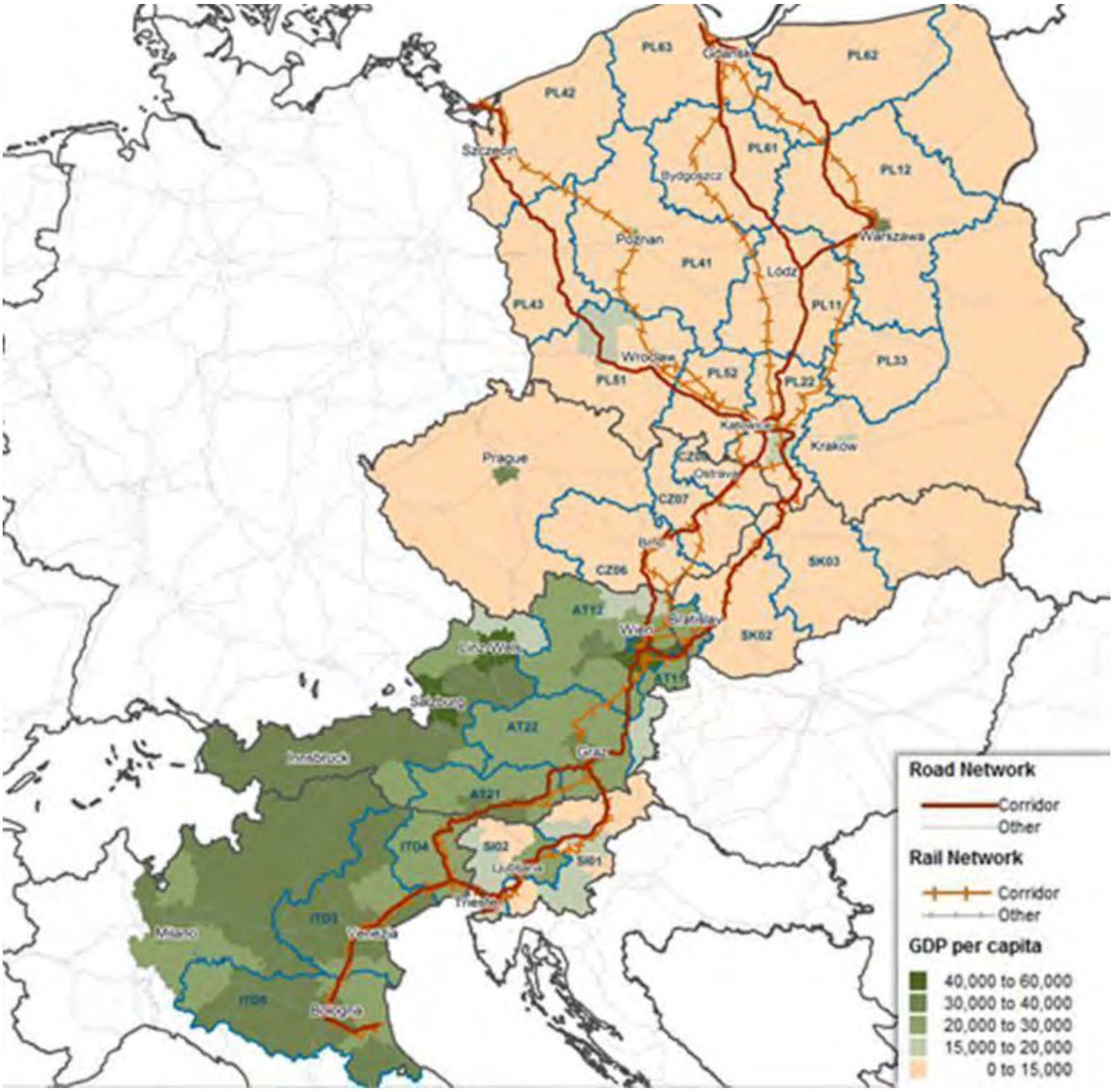
Countries	2014 GDP (US billion dollars)
Poland	544.75
Czech Republic	198.54
Slovakia	101.81
Austria	444.87
Italy	2,171.48
Slovenia	48.88

Source: BA Corridor study consortium based on IMF

Also, the map overleaf, illustrating the distribution of the 2010 GDP per capita in the countries along the BA Corridor (ETIS+ data), shows the Southern area of the BA Corridor as the richest region.

More in detail, according to the 2010 ETIS+ data, the GDP per capita is highest in Italy and in Austria; particularly Bologna province in Italy, and Klagenfurt-Villach, Graz and Wien provinces in Austria are the richest ones crossed by the BA Corridor.

Figure E9 GDP per capita along the BA Corridor (2010)

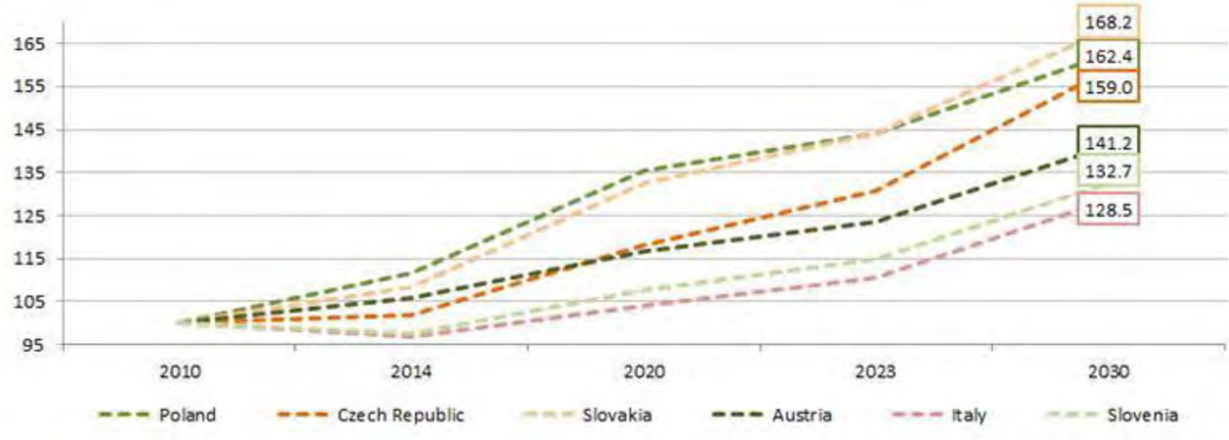


Source: BA Corridor study consortium based on ETIS+ data

As for the population projections, the data for the GDP forecasts are based on the *IMF* statistics until 2019 data and on the Organisation for Economic Co-operation and Development (*OECD*) database until 2030.

The graph overleaf shows the GDP forecasts for the countries of the BA Corridor countries.

Figure E10 2010-2030 GDP trend for the BA Member States



Source: BA Corridor study consortium based on IMF and OECD database

Based on the forecasts as shown on the figure above, the GDP of the BA Member States is expected to continuously grow in the next years. Particularly, the 2030 Italian GDP will be 28.5% greater than in 2010 which however represents the lowest growth compared to the other BA countries. In line with this most recent negative trends and with the 2013 *Long-term Growth Scenarios* published by the OECD Economics Department (Working Papers No. 1000), the GDP growth in Italy is projected to be persistently weak; on the other hand, renewed policies also including fiscal consolidation could boost the economy in the long-term projections.

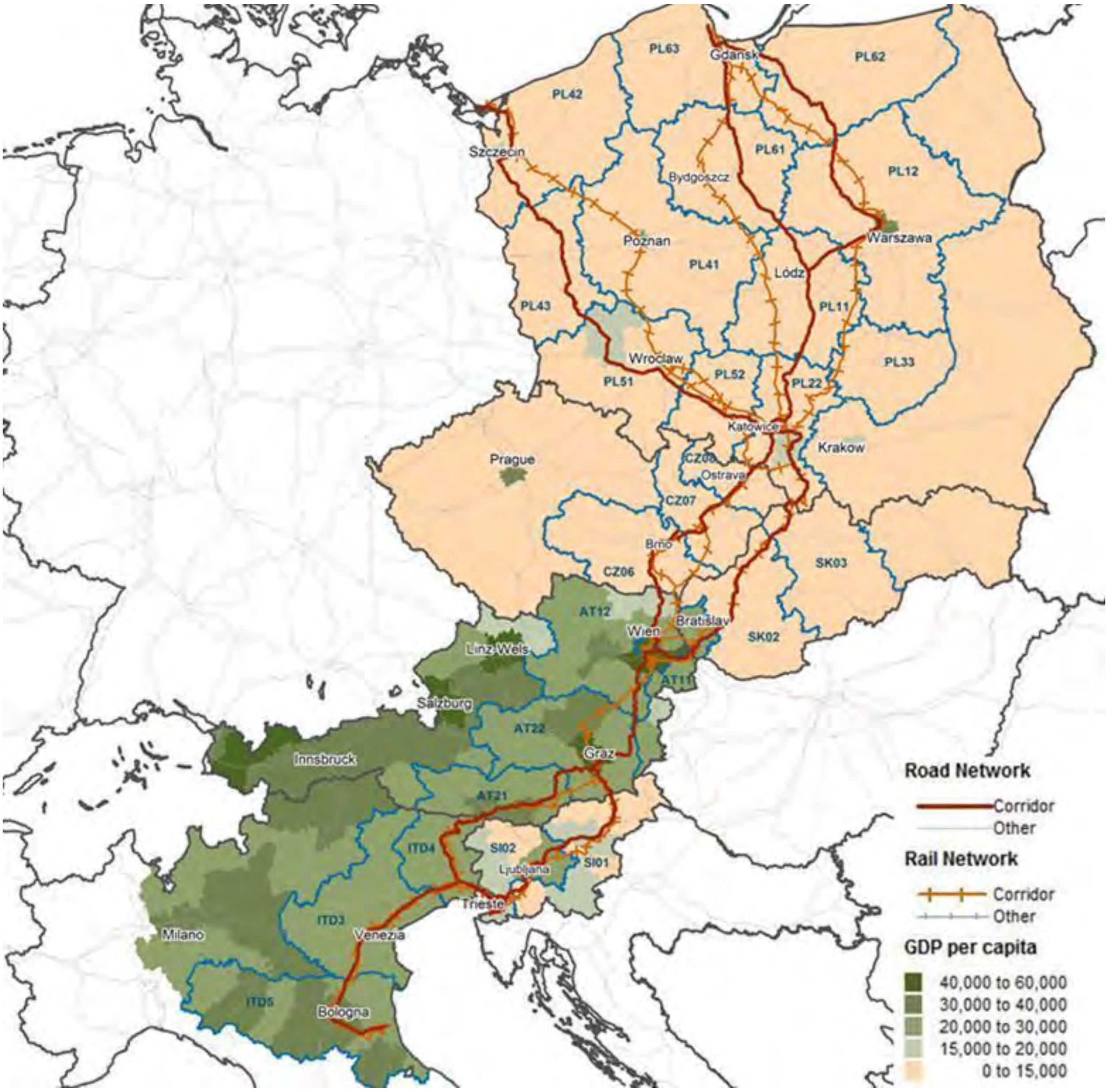
The GDP long-term projections for Poland and Slovakia seem acting the best performance amongst the BA Member States. According to the Economist Intelligence Unit (*EIU*), the productivity growth (labour productivity growth is forecast to be 3.4% over the next two decades) in Poland will continue to be strong also thanks to an improving policy background and the gradual adoption of modern technology, including a boost to investment for research and development (R&D). With regard to Slovak Republic, the GDP forecasts are very positive as well, despite slower average growth rates than in the 2000s. Also in line with the *EIU,* the decline in the working-age population will affect the potential for faster growth as average incomes and productivity increase and the economy matures.

The figure above also shows the GDP for Czech Republic is expected to have a very positive growth in the 2020-2030 period. In accordance with the *EIU long-term outlook*, in the medium term, the high rates of unemployment will hold back labour productivity whereas over the longer term a steady expansion of economic output is expected.

Slovenia and Austria have also positive GDP growth rates although lower than the ones for Poland, Slovakia and Czech Republic. More in detail, the annual real GDP growth of Slovenia will accelerate in the medium term also following the Italian 2010-2030 GDP forecasts. With regard to Austria and in line with the *EIU,* the long-term growth prospects could be affected by the ageing demographic profile; also the GDP growth will depend on productivity trends and R&D activities.

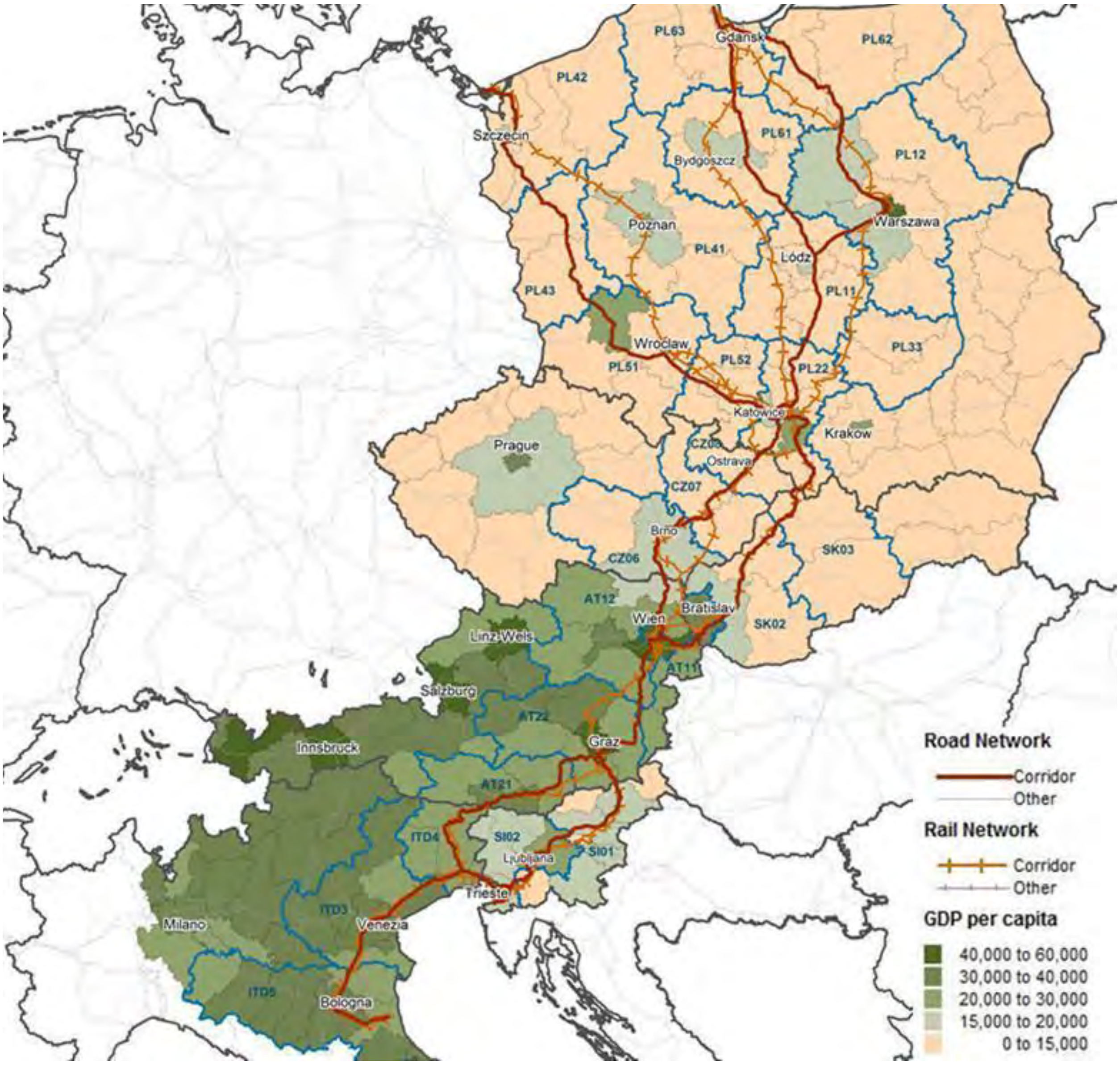
Also relevant to the scope of our study, the GDP per capita trends for the 2014, 2020 and 2030 years are also presented in the figures overleaf.

Figure E11 GDP per capita along the BA Corridor (2014)



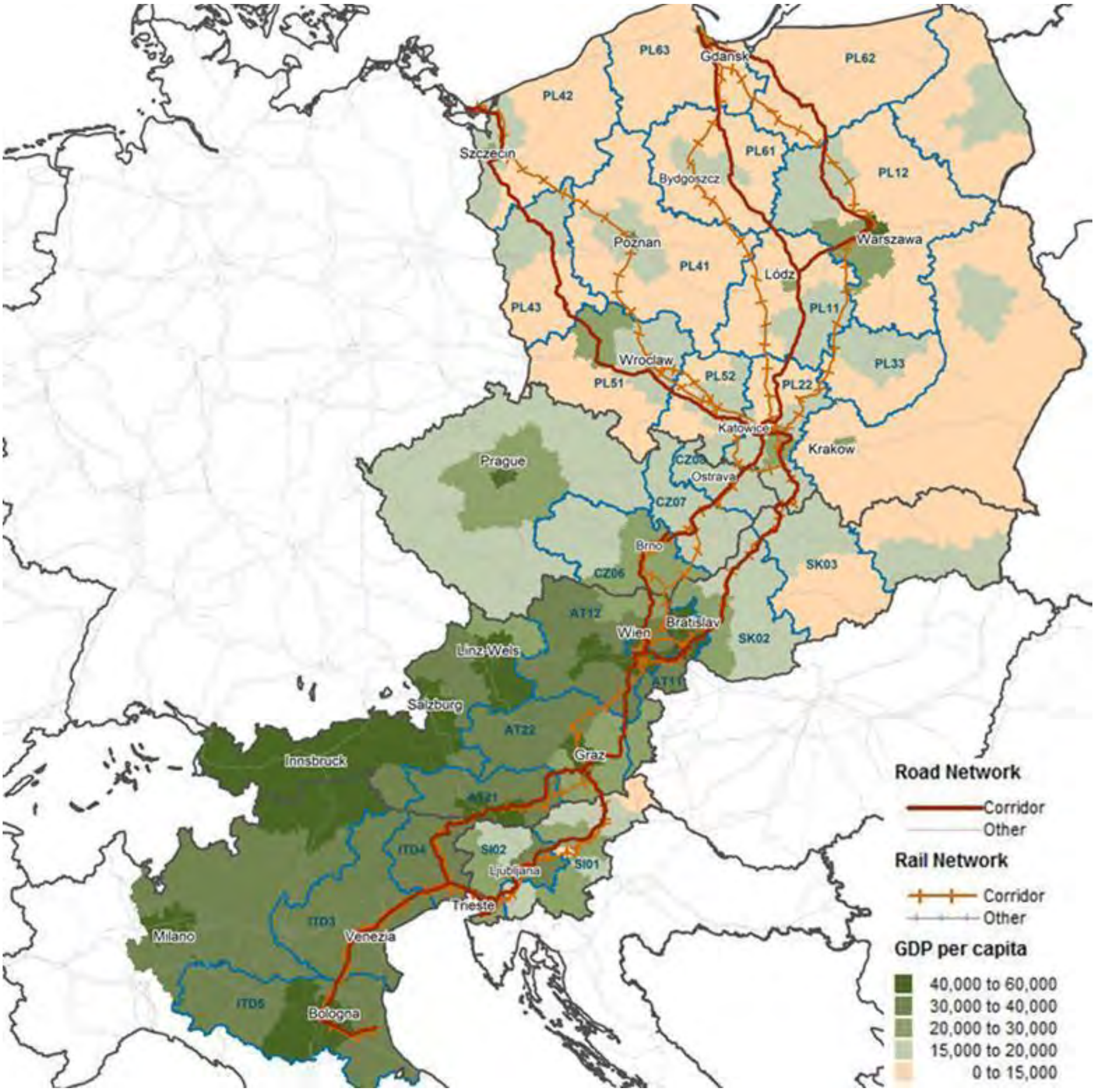
Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

Figure E12 GDP per capita along the BA Corridor (2020)



Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

Figure E13 GDP per capita along the BA Corridor (2030)

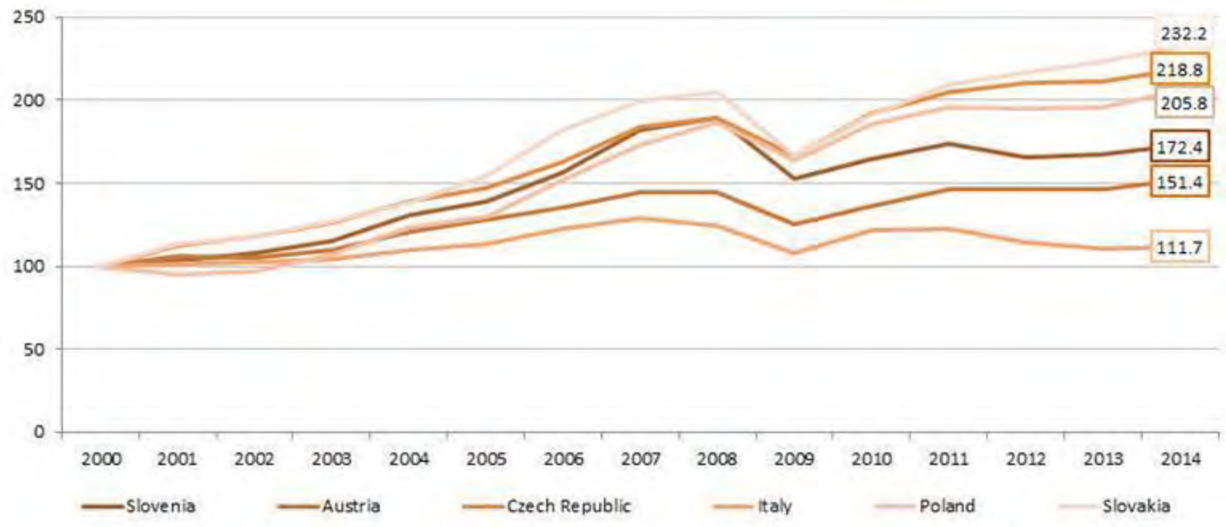


Source: BA Corridor study consortium based on ETIS, EUROPOP2008 and OECD data

As shown in the figures above, the GDP per capita continues growing in the Southern richest area of the BA Corridor – particularly in Austria and in Italy – but with high income areas expanding from South to North. In particular, in the Czech Republic the GDP per capita is expected to grow with more emphasis in the 2020-2030 overall the country. Also, in the regions surrounding the main cities in Poland as well as in the area around Bratislava, the income per head will significantly increase.

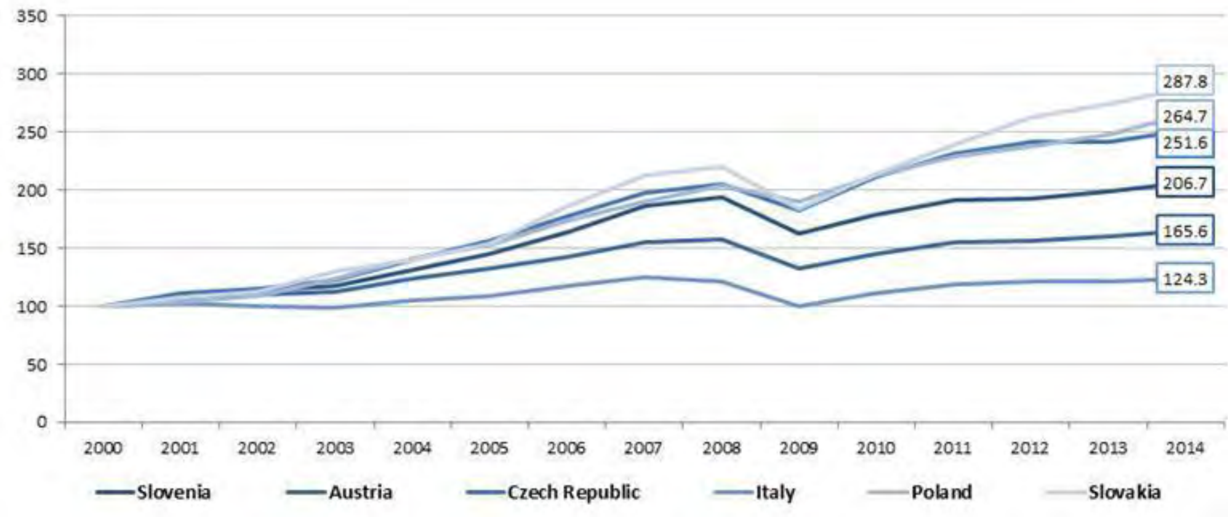
Regarding the trade volumes in the six countries along the BA Corridor, the import and export figures are presented in the graphs overleaf.

Figure E14 2000-2014 Trend of export of goods and services



Source: BA Corridor study consortium based on IMF

Figure E15 2000-2014 Trend of import of goods and services

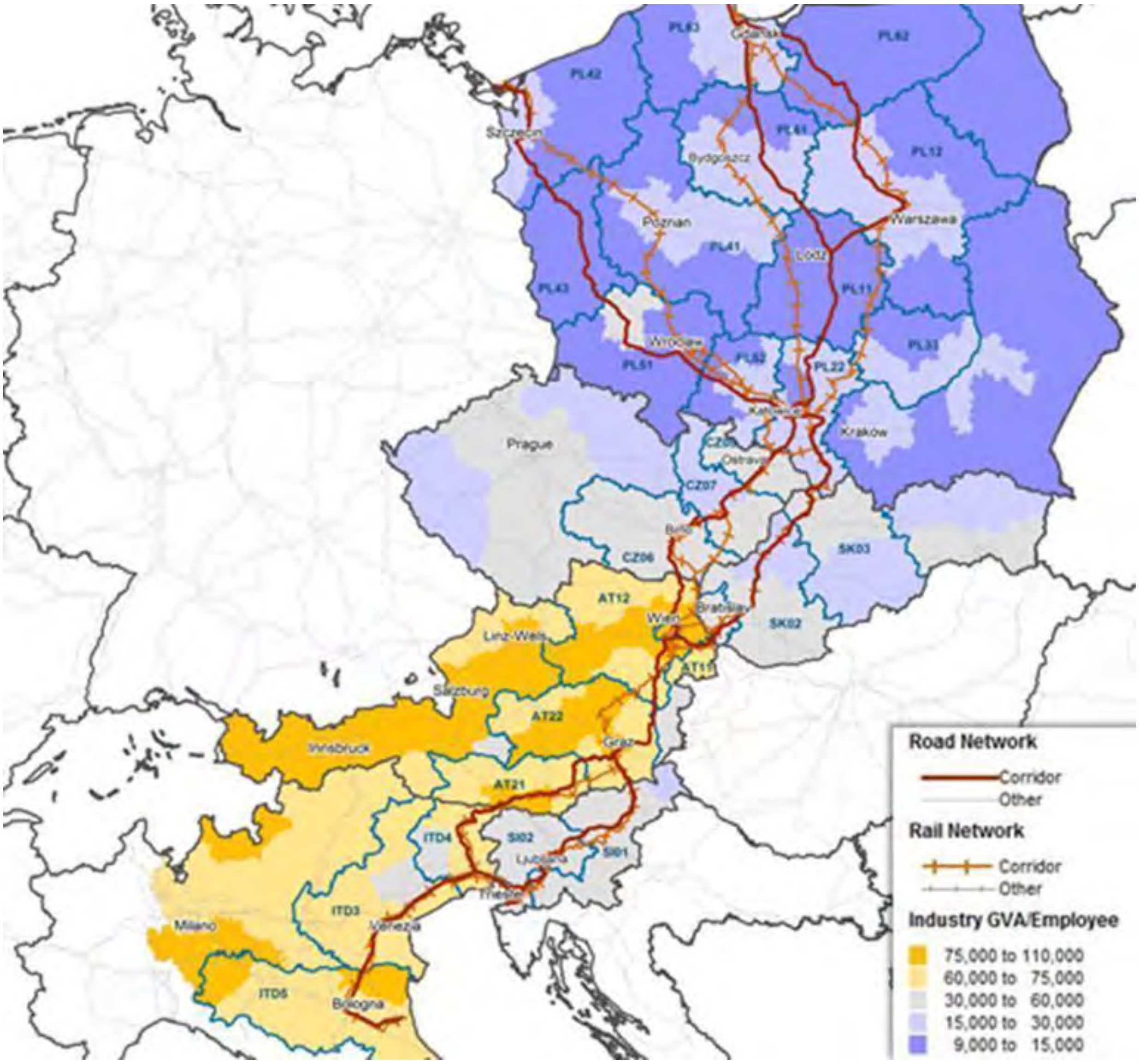


Source: BA Corridor study consortium based on IMF

As shown in the previous figures, from 2009 the historical trends of the import and export volumes are considerably positive for Slovakia, Poland and Czech Republic whereas in the case of Slovenia, Austria and more significantly for Italy the trends are weaker even though positive.

Also relevant to the scope of our study is the industry sector which significantly influences the flows of goods. The geographic distribution of the gross value-added (GVA) per employee in the industry sector, as illustrated in the picture below, displays the most prominent data are in the regions of Italy and even more in Austria. This is likely to be due to specialization in industrial sectors with higher added value in Italy and Austria.

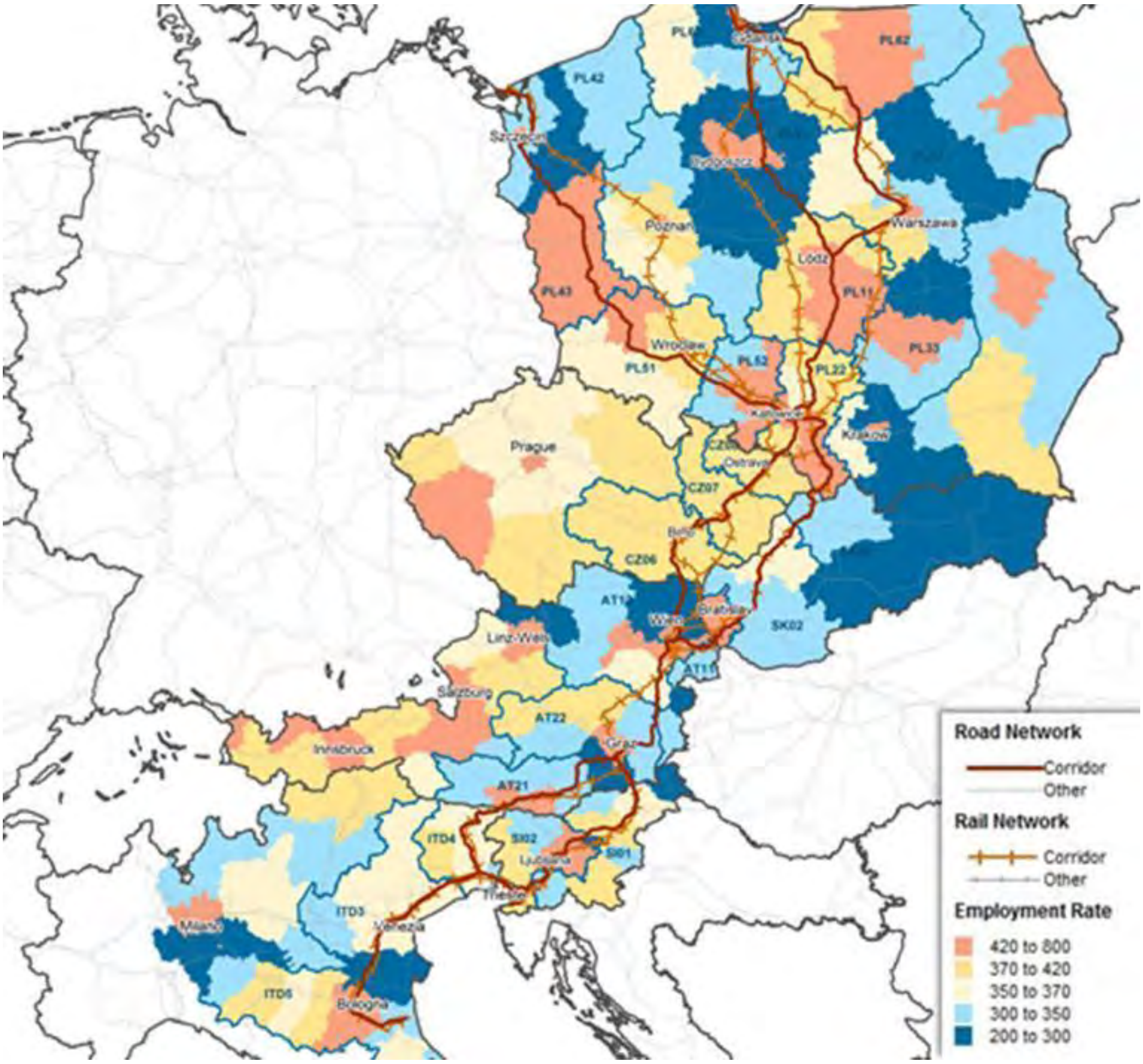
Figure E16 GVA per Employee in the Industry sector (2010)



Source: BA Corridor study consortium based on ETIS+ data

The figure below shows the employment rate which is homogenously distributed in the areas of the BA Corridor.

Figure E17 Employment rate along the BA Corridor (2010)

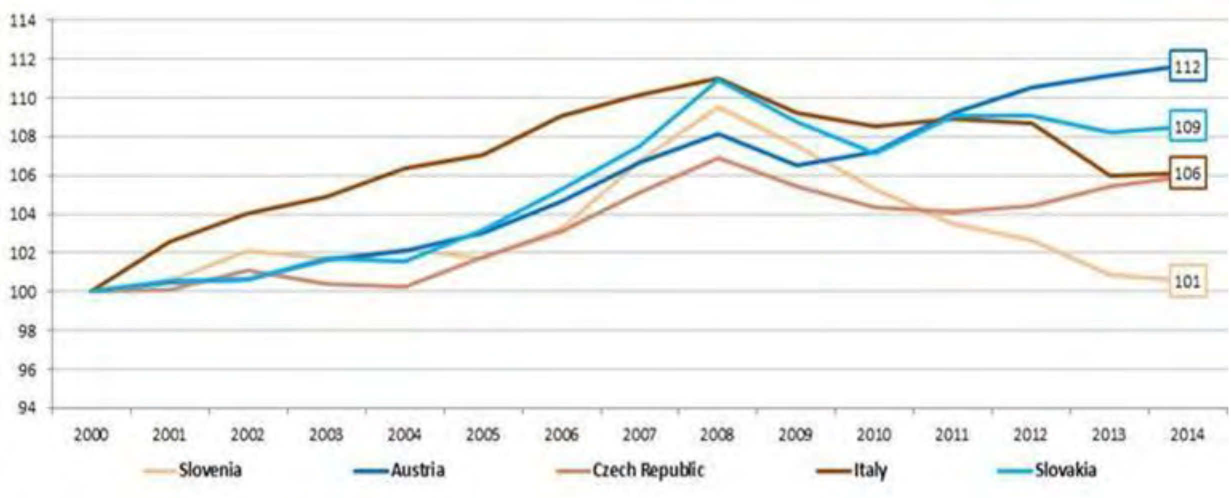


Source: BA Corridor study consortium based on ETIS+ data
N.B. Employment Rate is in Employee per 1000 inhabitants

Comparing the employment rate, the historical trends are very similar amongst the BA Member States. In fact, this was overall positive from 2000 to 2008, when it lost momentum diminishing until 2010.

From 2010, some countries such as Austria and Slovakia had a positive recovery; in the recent years, the employment rate also increased in Czech Republic. On the other hand, with regard to Italy and Slovenia, the employment rate trend was negative; particularly, in Slovenia the 2014 figure reached the same level as the one in 2001.

Figure E18 Employment trend



Source: BA Corridor study consortium based on IMF. Data is not available for Poland

E.3. Recognition of the current corridor transport performance

E.3.1. Railway train services

As part of the information relevant to the development of our transport market study, we undertook recognition of the assessed international passenger rail services along the BA Corridor. A brief overview of the freight railway services is also included, based on the limited data publicly available, as most of these services are operated by private operators, and information on services and flows are considered commercially sensitive and often not distributed.

Trains flows on the corridor infrastructure

The table below shows that average traffic on the rail sections belonging to the BA Corridor is 87 trains/day on the two directions. Traffic is significantly more dense in Austria and Czech Republic (both above 120 trains/day) and lower in Poland and Italy (both below 80 trains/day).

In average, around one third of the train traffic is due to freight transport, but this share greatly differ by Member State. At the top and bottom ends of the range, rail freight traffic - by number of trains - is higher than passenger traffic in Slovenia, while account only for 16% in Italy. However, it should be noted that this values are not entirely representative of the real use of the rail infrastructure, but also are the results of the definition of the corridor alignment, which in some cases includes main rail lines that are primarily dedicated to passenger transport, while lines dedicated to freight transport have been generally included in the rail freight corridor (this situation is for instance common in Italy and Poland).

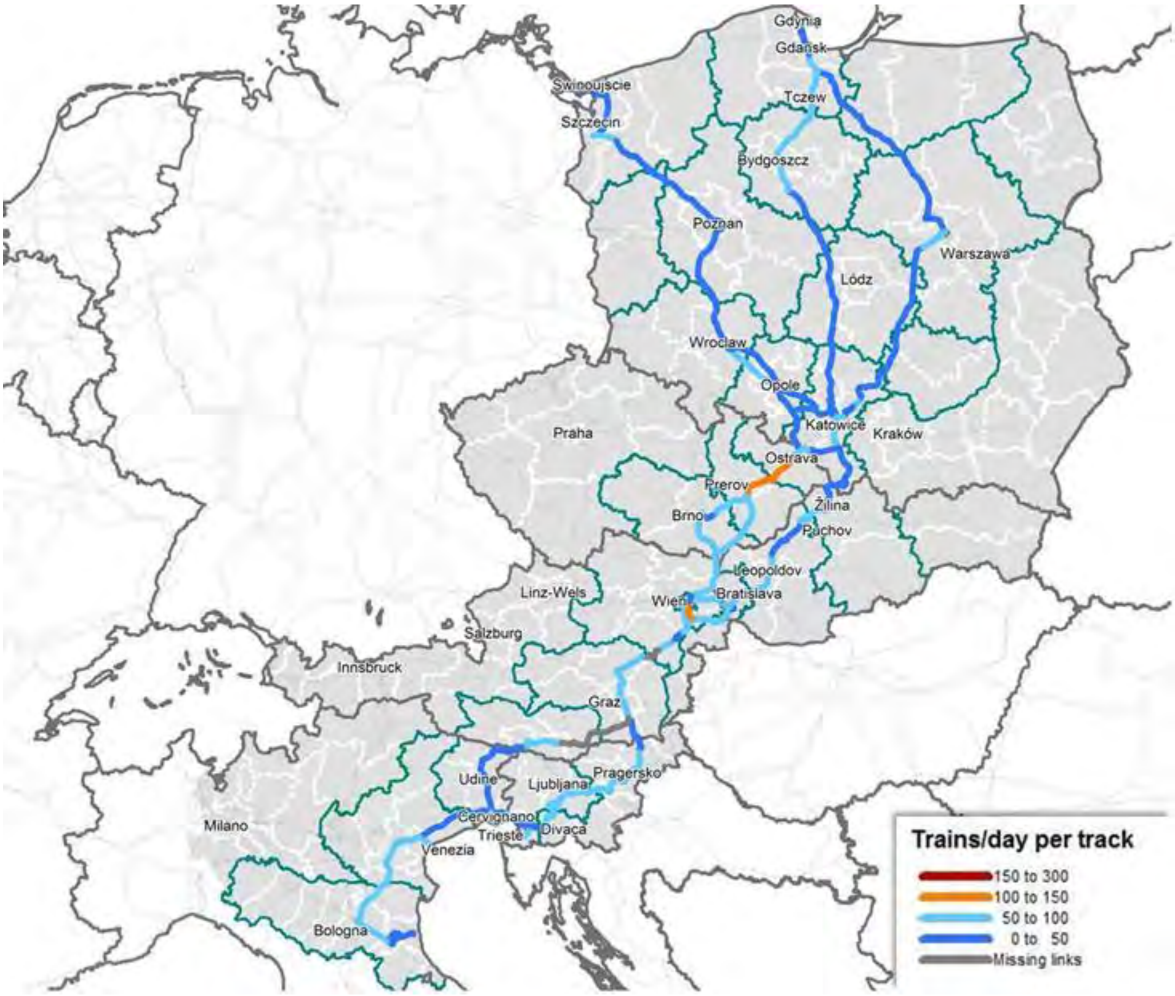
Table E3 Average daily train flows on the BA Corridor (trains/day, 2014)

Country Section	Passenger	Freight	Total
Poland	43	24	67
Czech Republic	79	46	125
Slovakia	73	29	102
Austria	84	47	130
Italy	66	13	79
Slovenia	55	56	111
Entire corridor	**57**	**30**	**87**

Source: LF elaboration based on TENtec data

Indicatively, assuming on the entire corridor an average load of 120 passenger/train and 650 net tons/train, the total transport volume along the corridor is around 11 million passenger*km/year and 31 million tons*km/year.

Figure E19 Train traffic flows on the BA Corridor (trains/day, 2014)



Source: BA Corridor study consortium elaboration based on TENtec data and sections

As illustrated in the map, the higher level of traffic on the BA corridor infrastructure is in the central section between Graz and Ostrava, with traffic volumes peaking in the urban area of the Wien node and between the Přerov junction and Ostrava, close to the border between Czech Republic and Poland. High train traffic is also recorded in the Warszawa, Bratislava and Venezia nodes and between Ljubljana and Pragersko.

International long distance passengers rail services

The analysis described in this section is aimed at presenting a clear picture of the international passengers' rail services along the BA Corridor. The first step consisted in narrowing the analysis to a restricted but representative number of major nodes. The criterion used considers the selection of capital cities of NUTS 2 regions crossed by the Baltic-Adriatic railway corridor, with a population exceeding 200,000 inhabitants. The resulting sample is a list of 17 cities as follows (North-Southbound direction):

- Gdańsk (Poland – Eastern Branch);
- Gdynia (Poland – Eastern Branch);
- Szczecin (Poland – Western Branch);
- Bydgoszcz (Poland – Eastern Branch);
- Poznan (Poland – Western Branch);
- Warszawa (Poland – Eastern Branch);
- Wrocław (Poland – Western Branch);
- Katowice (Poland);
- Ostrava (Czech Republic);
- Brno (Czech Republic);
- Bratislava (Slovakia);
- Wien (Austria);
- Graz (Austria);
- Ljubljana (Slovenia);
- Trieste (Italy);
- Venezia (Italy);
- Bologna (Italy).

Further to the identification of the main cities subject of the analysis, we gathered all the data on the number of trains, changes and duration of the trips according with the public available information on the Deutsche Bahn web site for a week-day at June 2014 (www.bahn.com).

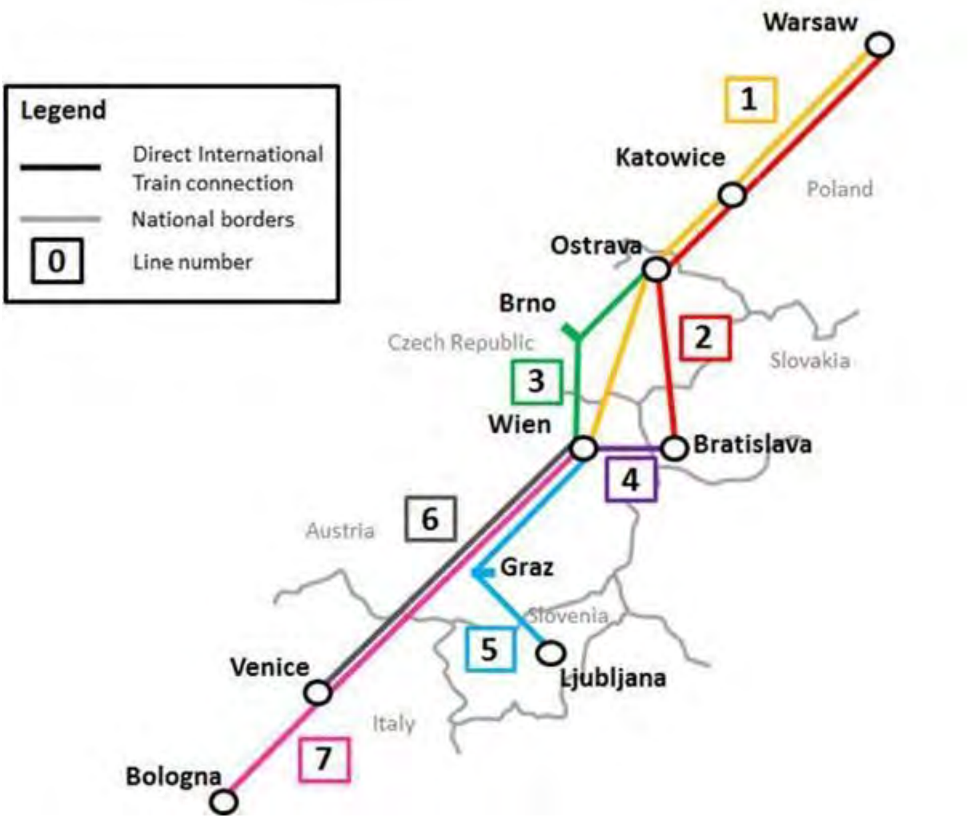
It is worth mentioning that this review revealed that all the long-distance international train connections along the Baltic-Adriatic railway corridor are operated by a single Train Operating Company (TOC), which is ŐBB (Austrian Rail TOC).

The tables and figures overleaf show the overall results of this analysis. Particularly, as shown in the map overleaf, we notice that Wien is the railway node of the BA Corridor from/to which all the train services pass through and connect to the main cities of the network.

Indeed, the figure below exemplifies the direct international train connections along the BA Corridor. As shown, the seven direct international connections – of which six interconnecting with Wien – are as follows (in pair of daily trains):

- Line 1 – Yellow: Warszawa-Katowice-Ostrava-Wien (3 connections);
- Line 2 – Red: Warszawa-Katowice-Ostrava-Bratislava (1 connection);
- Line 3 – Green: Ostrava-Brno-Wien (8 connections);
- Line 4 – Violet: Wien-Bratislava (30 connections);
- Line 5 – Blue: Wien-Graz-Ljubljana (1 connection);
- Line 6 – Grey: Wien-Venezia (3 connections);
- Line 7 – Magenta: Wien-Venezia-Bologna (1 connection).

Figure E20 Map of the Direct International Rail Services in the BA Corridor

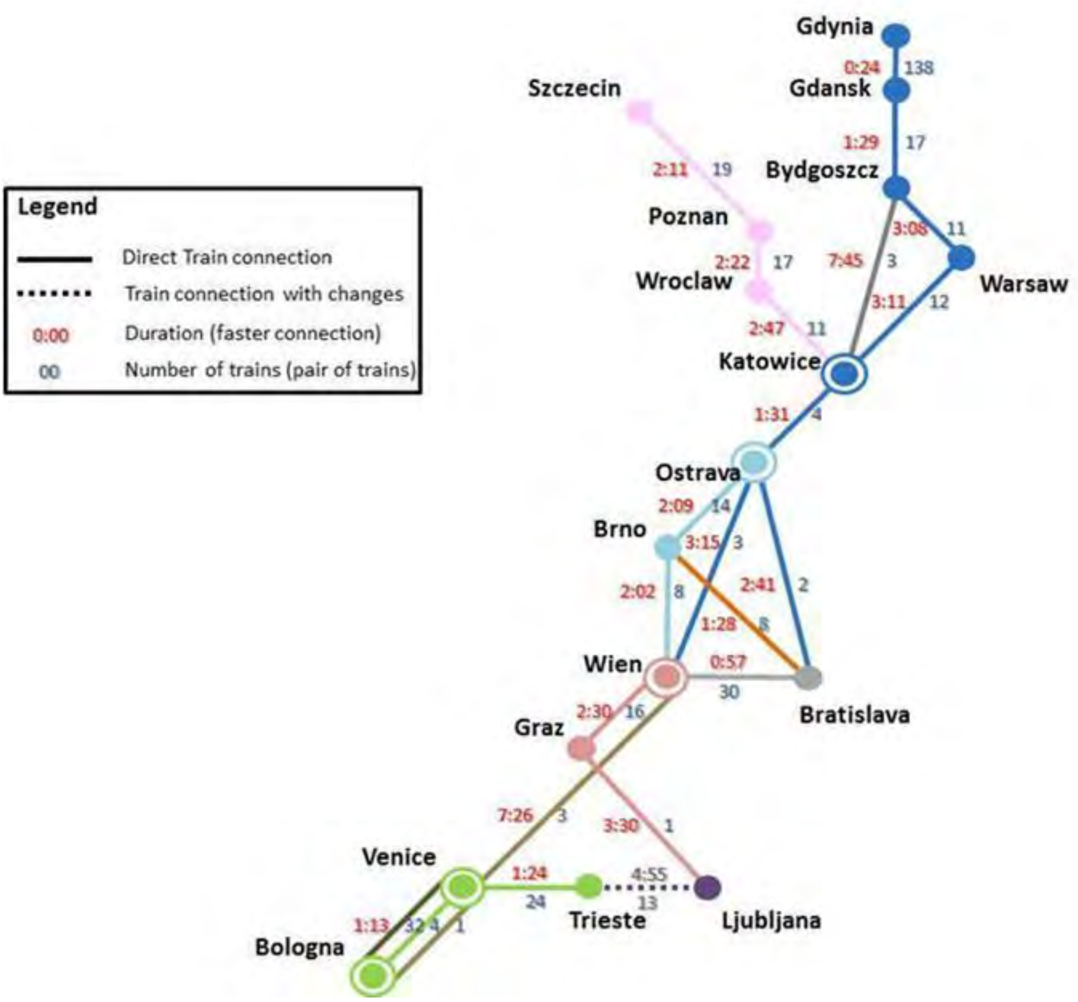


Source: BA Corridor study consortium

Taking into account also the national services, the figure overleaf illustrates all the direct train connections – except for the Trieste-Ljubljana one with changes and also partially operated with bus services – between the 17 major cities in the Baltic-Adriatic railway corridor; also, it shows the duration (in red) and the number of trains per direction (in blue). We also include the direct connection between Brno and Bratislava, although not operated along the BA Corridor infrastructure.

Katowice is the node for the two different branches of the railway corridor in Poland to the ports of Gdynia/Gdańsk in the North-East and Szczecin on the other side. From the Eastern Branch in Poland – Gdynia-Gdańsk-Bydgoszcz-Warszawa-Katowice – to Czech Republic, Slovakia and Austria, Ostrava represents the rail station hub. Further South, from Wien – which is the major railway node in the BA corridor as above explained – the train services (pair of trains) connect to Italy (Venezia and Bologna) and Slovenia (Ljubljana).

Figure E21 Map of the National and International Direct Rail Services in the BA Corridor study area



Source: BA Corridor study consortium

More in detail, the first two tables overleaf present the origin/destination matrix of the main direct train connection services (pair of trains) also distinguishing the two branches of the Poland railway corridor. It is worth adding the colours in the rows and columns correspond to the ones shown in the map above in order to easily compare the figures included on the number of trains.

Finally, the last table overleaf summarises the total number of train connections also including the ones with changes thus providing a complete overview of the railway services along the BA Corridor. Worth mentioning that at the border crossing, the link between Trieste and Ljubljana is operated through bus services.

Table E4 Origin/Destination Matrix of the main direct train connection services (pair of trains) – Poland Eastern Branch

ORIGIN	DESTINATION													
	Gdynia	Gdańsk	Bydgoszcz	Warszawa	Katowice	Ostrava	Brno	Bratislava	Wien	Graz	Ljubljana	Trieste	Venezia	Bologna
Gdynia (PL)		138	17	7	3	0	0	0	0	0	0	0	0	0
Gdańsk (PL)			17	7	2	0	0	0	0	0	0	0	0	0
Bydgoszcz (PL)				11	3	0	0	0	0	0	0	0	0	0
Warszawa (PL)					12	4	0	2	3	0	0	0	0	0
Katowice (PL)						4	0	2	3	0	0	0	0	0
Ostrava (CZ)							14	2	3	0	0	0	0	0
Brno (CZ)								8	8	0	0	0	0	0
Bratislava (SK)									30	0	0	0	0	0
Wien (AT)										16	1	0	3	1
Graz (AT)											1	0	0	0
Ljubljana (SI)												0	0	0
Trieste (IT)													24	4
Venezia (IT)														37
Bologna (IT)														

Source: BA Corridor study consortium extrapolation based on Bahn web site (www.bahn.com) and ŐBB web site (http://www.oebb.at/en/#)

Table E5 Origin/Destination Matrix of the direct train services (pair of trains) in the Poland Western Branch

ORIGIN	DESTINATION			
	Szczecin	Poznan	Wrocław	Katowice
Szczecin	0	19	3	3
Poznań	0	0	17	6
Wrocław	0	0	0	11
Katowice	0	0	0	0

Source: BA Corridor study consortium extrapolation based on Bahn web site (www.bahn.com) and ŐBB web site (http://www.oebb.at/en/#)

Table E6 Origin/Destination Matrix of the total train services (including direct services and changes) in the North-Southbound direction

	DESTINATION															
ORIGIN	**Gdańsk**	**Szczecin**	**Bydgoszcz**	**Poznan**	**Warszawa**	**Wrocław**	**Katowice**	**Ostrava**	**Brno**	**Bratislava**	**Wien**	**Graz**	**Ljubljana**	**Trieste**	**Venezia**	**Bologna**
Gdynia	138	9	19	13	14	9	12	13	14	6	8	10	11	9	10	13
Gdańsk	0	13	19	13	14	9	12	12	16	6	8	10	9	9	9	15
Szczecin	0	0	19	20	15	13	11	12	12	9	13	17	10	9	10	11
Bydgoszcz	0	0	0	15	14	11	22	7	13	9	6	11	9	7	9	4
Poznan	0	0	0	0	19	19	13	14	11	8	8	12	8	6	14	13
Warszawa	0	0	0	0	0	18	13	4	4	4	6	7	5	3	5	8
Wrocław	0	0	0	0	0	0	25	13	9	7	7	8	6	4	7	12
Katowice	0	0	0	0	0	0	0	6	8	4	6	7	4	3	4	12
Ostrava	0	0	0	0	0	0	0	0	35	11	12	16	9	13	14	24
Brno	0	0	0	0	0	0	0	0	0	16	21	19	10	14	8	12
Bratislava	0	0	0	0	0	0	0	0	0	0	32	25	13	15	15	23
Wien	0	0	0	0	0	0	0	0	0	0	0	24	12	7	9	15
Graz	0	0	0	0	0	0	0	0	0	0	0	0	14	12	8	10
Ljubljana	0	0	0	0	0	0	0	0	0	0	0	0	0	13	19	17
Trieste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	32
Venezia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
Bologna	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: BA Corridor study consortium extrapolation based on Bahn web site (www.bahn.com) and ŐBB web site (http://www.oebb.at/en/#)

International short distance passengers rail services – MI.CO.TRA

Following the analysis of the international railway services along the BA Corridor, this section concerns the regional rail service between *Villach Hbf* in Austria (*Land Carinthia*) and *Udine* station in Italy (*Friuli-Venezia Giulia* Region), a railway trans-national connection namely *MI.CO.TRA*.

The project "*Miglioramento dei collegamenti transfrontalieri di trasporto pubblico" (MI.CO.TRA)* – i.e. improvement of cross-border public transport links –is in line with EU policy on transport and aims to create conditions for sustainable development in the public transport sector also according to the 2007-2013 Operational Programme for the European territorial cooperation ("*Sostegno alla collaborazione transfrontaliera per le zone di confine Italia - Austria Interreg IV*"), Priority Axis 2 "*Territorio e sostenibilità*".

The MI.CO.TRA regional service (single ticket cost at € 13) has ten intermediate stops: *Gemona del Friuli (Italy), Venzone (Italy), Carnia (Italy), Pontebba (Italy), Ugovizza (Italy), Tarvisio Bosco Verde (Italy), Thörl-Maglern (Austria), Arnoldstein (Austria), Villach Warmbad (Austria), Villach Westbf (Austria)*. The train is operated by a joint venture of ÖBB and Ferrovie Udine - Cividale, a regional Italian TOC.

In 2013, according to public available information on the official MI.CO.TRA web-site (http://www.ferrovieudinecividale.it/progetto-mi-co-tra), the number of total annual passengers in this train service was 59,257 in two pair of trains (1880/1882 and 1881/1883); with regard to the cross-border passengers, these are split in the two directions as follows:

- 17,932 cross-border travellers in the direction Udine – Villach per pair of trains in 2013 (57.46% of the total passengers incoming to Austria – 31,209);
- 14, 397 travellers in the direction Villach – Udine per pair of trains in 2013 (51.32% of the total passengers out coming from Austria – 28,408).

More in detail, if considering the train number 1880 – *Udine- Villach* direction – with departure time at 7:07 a.m., the cross-border passengers are 6,911 (2013 data); in the other train number 1882 with departure time at 5:17 p.m. in the same direction *Udine-Villach*, the cross-border patronage is 8,014 (2013 data). On the other direction, *Villach -Udine*, the train number 1881 with departure time at 9:45, the cross-border passengers are 6,851 (2013 data); the passengers on the train number 1883 at the *Tarvisio Bosco Verde- Thörl-Maglern* border (departure time at 7:29 p.m.) is 8,763 (2013 data).

It is worth adding that from *Udine* to *Villach* the cross-border passengers are 249 whereas from Villach there are no passengers who get off at the *Udine* station; on the other hand, a number of 3,871 travellers get off at *Gemona del Friuli* station from *Villach*.

Rail freight services

We analysed the intermodal freight rail services from/to the core and comprehensive ports and rail/road terminals of the BA Corridor, based on the information made available to us by the infrastructure managers of the Ports of Trieste and Koper and the Rail-Road Terminals of Gdańsk, Bologna, Padova and Ljubljana. We also include information about the frequency of the train service and on the information regarding the rail freight operators.

The following list summarises the regular rail international connections from the Adriatic Ports to the core and comprehensive BA rail/road terminals. Worth adding the information on the frequency of the trains is related to a round trip service.

Adriatic Ports to BA Corridor rail/road terminals – International Connection:

- *Trieste* (Core BA Corridor port in Italy) with:
  - *Ostrava/Paskov* (Core BA Corridor rail/road terminal in Czech Republic), 3 trains/week operated by BohemiaKombi and 1 train/week operated by Alpe Adria;
  - *Ostrava/Paskov* (Core BA Corridor rail/road terminal in Czech Republic), 3 trains/week operated by BohemiaKombi and 1 train/week operated by Alpe Adria;
  - *Wien N.W. Bahnhof* (Core BA Corridor rail/road terminal in Austria), 5 trains per week operated by ImsCargo – connection to Bratislava is also available;
  - *Graz* (Core BA Corridor rail/road terminal in Austria), 5 trains per week operated by ImsCargo;
  - Villach (Comprehensive BA Corridor rail/road terminal in Austria), 4 trains per week operated by ImsCargo;
- *Koper* (Core BA Corridor port in Slovenia) with:
  - *Katy Wroclawskie* (Core BA Corridor rail/road terminal in Poland), 1 train per week operated by Baltic Rail;
  - *Ostrava/Paskov* (Core BA Corridor rail/road terminal in Czech Republic), 4 trains per week operated by AdriaKombi and 5 trains/week operated by RCO;
  - *Žilina* (Core BA Corridor rail/road terminal in Slovakia), 6 trains per week operated by AdriaKombi;
  - *Bratislava ÚNS* (Core BA Corridor rail/road terminal in Slovakia), 2 trains per week operated by BohemiaKombi and 5 trains operated by Adria Kombi;
  - *Graz* (Core BA Corridor rail/road terminal in Austria), 5 trains per week operated by Adria Transport;
  - *Graz* area (Core BA Corridor rail/road terminal in Austria) via Maribor (Comprehensive BA Corridor rail/road terminal in Slovenia), single wagons or trucks from Maribor onwards/daily operated by Adria Kombi;
  - *Villach* (Comprehensive BA Corridor rail/road terminal in Austria), 5 trains per week operated by Adria Kombi together with RCA Intermodal ("CAPRIS" service);
  - *Padova* (Core BA Corridor rail/road terminal in Italy), 1-2 trains per week operated by Adria Kombi;
  - Daily from Port of Koper has dispatched over 25 train of general and bulk cargo, liquids and cars;
- *Venezia* (Core BA Corridor ports in Italy) with:
  - *2 /3 Trains per week via Tarvisio Boscoverde*
- *Ravenna* (Core BA Corridor ports in Italy) with:
  - *1 / 2 trains per week via Tarvisio Boscorverde*

The list of rail freight services below is related to the national connections from the ports of the Adriatic Sea to the core and comprehensive rail/road terminals in the BA Corridor.

Adriatic Ports to BA Corridor rail/road terminals – National Connections:

- *Trieste* (Core BA Corridor port in Italy) with:
  - *Padova* (Core BA Corridor rail/road terminal in Italy), 9 trains per week – one connection per week is via Cervignano (Core BA Corridor rail/road terminal in Italy);
  - *Bologna Interporto* (Core BA Corridor rail/road terminal in Italy), on spot basis;
- *Koper* (Core BA Corridor port in Slovenia) with:
  - *Maribor* (Comprehensive BA Corridor rail/road terminal in Slovenia), 10 trains per week operated by AdriaKombi;
  - *Ljubljana* (Core BA Corridor rail/road terminal in Slovenia), 6 trains per week operated by AdriaKombi;

Furthermore, we have also analysed the continental rail freight services connecting the core and comprehensive rail/road terminals of the BA Corridor as follows:

Train services between BA rail/road terminals – National Connections:

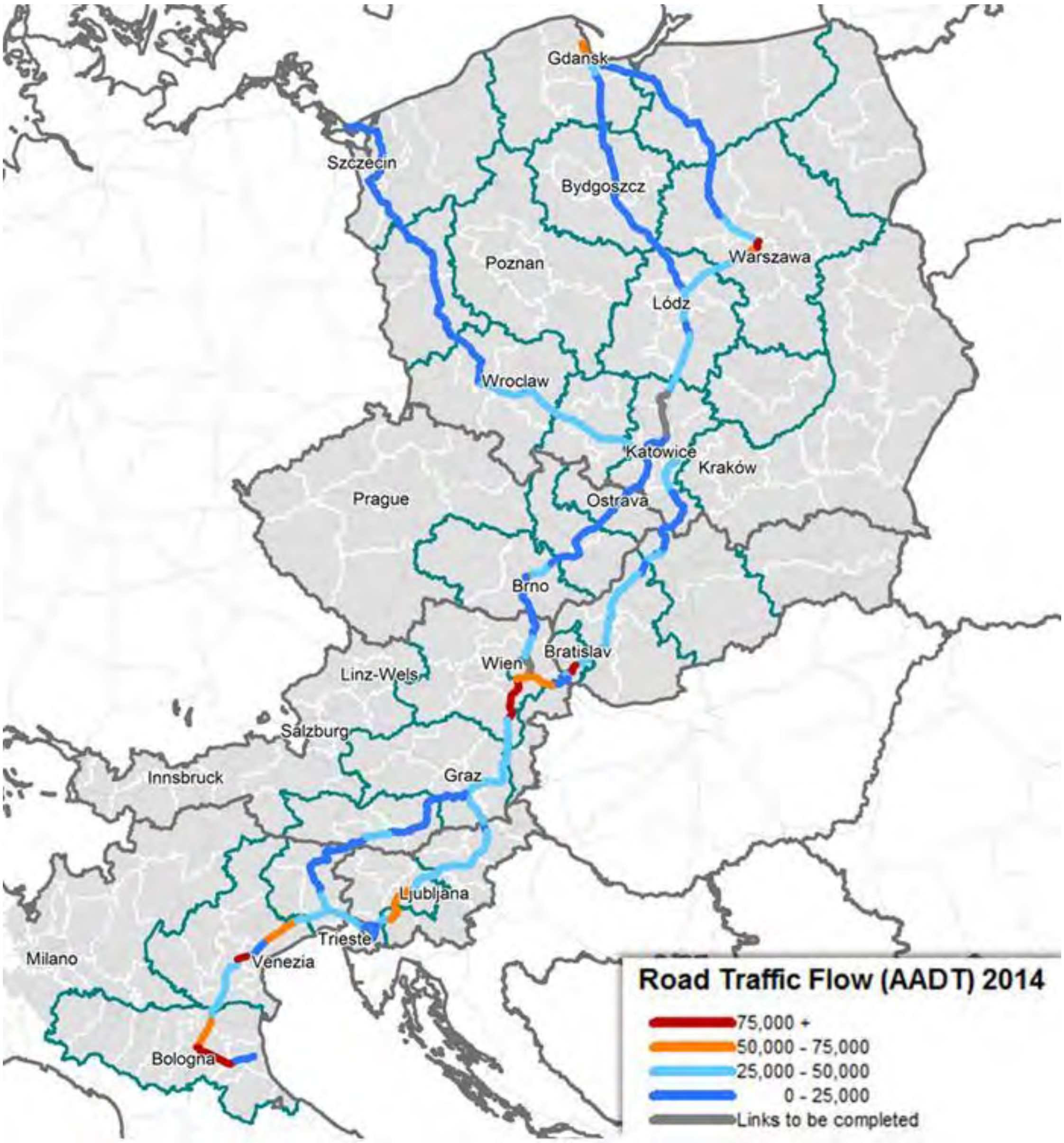
- Gdańsk (Core BA Corridor rail/road terminal in Poland) with:
  - Gdynia (Core BA Corridor rail/road terminal in Poland), 4 trains per week
  - Szczecin (Core BA Corridor rail/road terminal in Poland), 3 trains per week
- Padova (Core BA Corridor rail/road terminal in Italy) with:
  - *Bologna Interporto* (Core BA Corridor rail/road terminal in Italy), 3 trains per week operated by Trenitalia Cargo;
  - *Cervignano* (Core BA Corridor rail/road terminal in Italy), 2 trains per week

Finally, the "rolling road" freight service from Villach (Comprehensive BA Corridor rail/road terminal in Austria) to Maribor (Comprehensive BA Corridor rail/road terminal in Slovenia) consists in 10 trains per day.

E.3.2. Road vehicle flows

Current road traffic volumes on the BA Corridor infrastructure are relatively constant in the sections belonging to Slovakia, Austria, Italy and Slovenia, where traffic exceeds 30 thousands vehicle/ day. Lower volumes are currently recorded in Poland and Czech Republic, also because the road corridor infrastructure is still to be completed.

Figure E22 Vehicle traffic flows on the BA Corridor (vehicles/day, 2014)



Source: BA Corridor study consortium elaboration based on TENtec data and sections

Table E7 Average daily vehicle flows on the BA Corridor (vehicles/day)

Country Section	Cars	Trucks	Total
Poland	18,700	3,800	22,400
Czech Republic	13,800	4,200	17,900
Slovakia	27,200	6,400	33,600
Austria	33,500	4,000	37,500
Italy	31,300	11,200	42,400
Slovenia	31,500	9,100	40,600
Entire Corridor	**23,900**	**5,400**	**29,300**

Source: LF elaboration based on TENtec data

At a finer scale, as observed in the previous map, road traffic volumes are higher in the approach and within the main urban nodes along the corridor, and in particular Gdańsk, Warszawa, Brno, Bratislava, Wien, Ljubljana, Venezia and Bologna.

On the basis of an average load of 1.4 pax/car and 7 tons/truck, the total annual road transport volume is around 44 million passenger*km/year and 51 million tons*km/year, which in both cases is higher than the corresponding performance of the rail corridor infrastructure – although the two systems cannot be directly compared in terms of total transport, given their different extension and alignment.

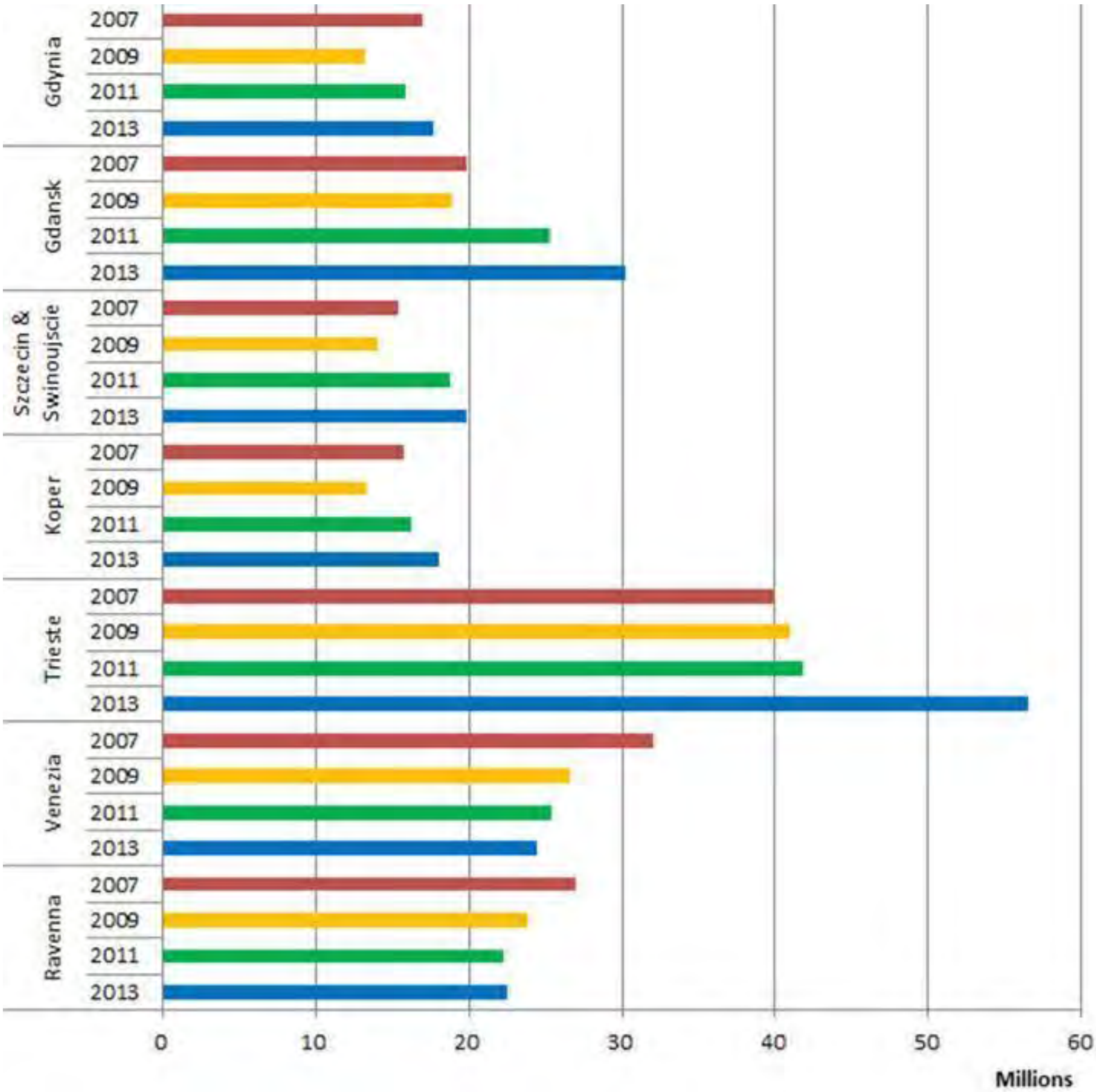
E.3.3. Freight flows at seaports

In this Chapter the cargo related data of the core seaports of the Baltic – Adriatic Corridor have been analysed, in order to identify the main routes interconnecting ports to the other commercial parties. The Baltic-Adriatic seaports recognised as "core" are:

- Gdynia (PL);
- Gdańsk (PL);
- Szczecin and Świnoujście (PL);
- Koper (SI);
- Trieste (IT);
- Venezia (IT);
- Ravenna (IT).

For the core seaports mentioned above, the next figures and tabs show the cargo trends expressed in terms of general tonnes and TEUs (Twenty-foot Equivalent Units) from 2007 to 2013.

Figure E23 Cargo trend of core seaports in tonnes



Source: BA Corridor study consortium based on the ports website.

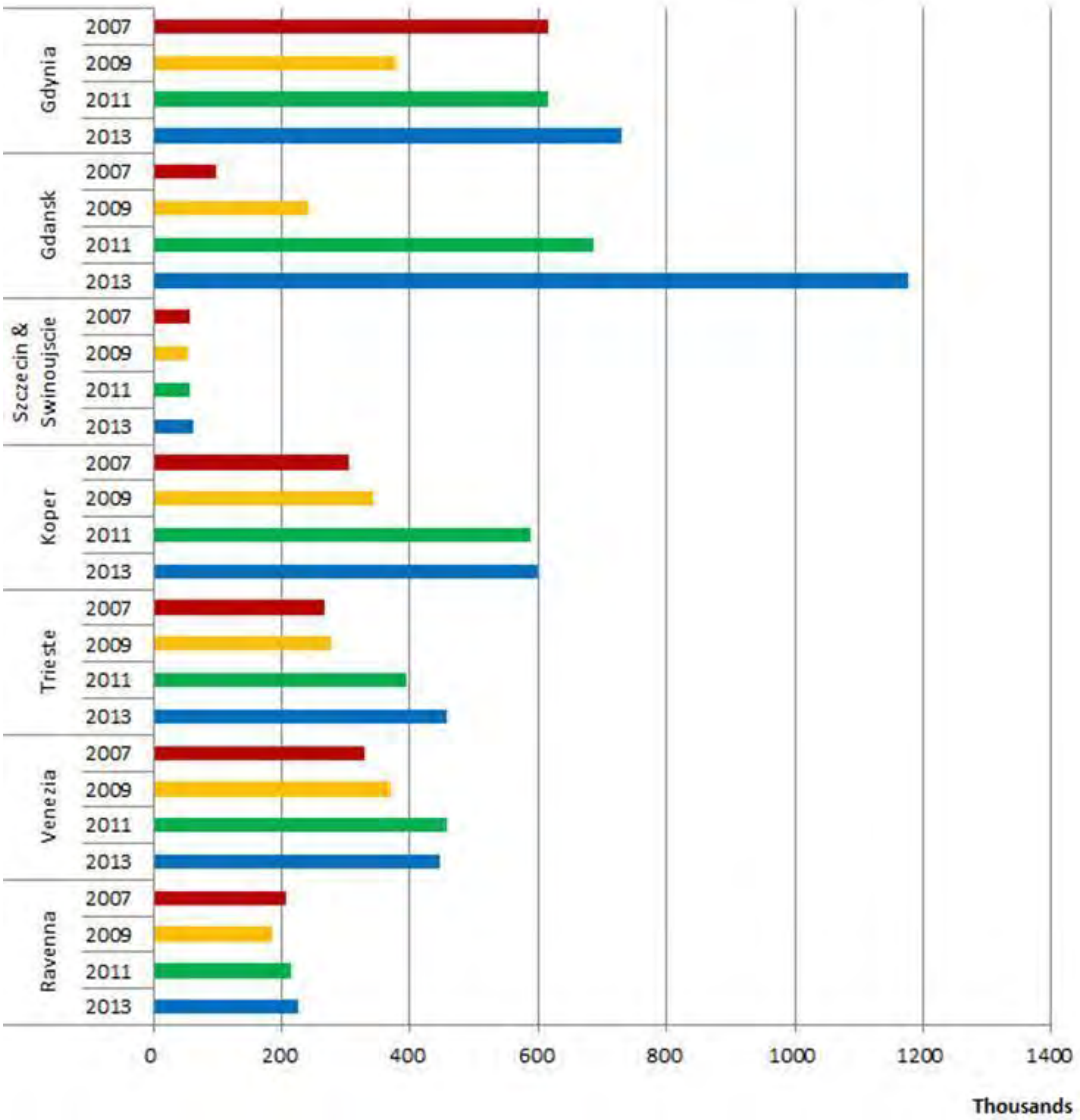
Except Venezia, from 2011 to 2013 the cargo trend increased for any core seaport both in terms of tonnes and TEUs.

Table E8 Cargo trend of core seaports in 1000 tonnes

	2013	2012	2011	2010	2009	2008	2007
Gdynia	17659	15809	15911	14735	13257	15467	17025
Gdańsk	30259	26898	25305	27182	18862	17781	19826
Szczecin & Świnoujście	19910	18870	18744	18652	14030	16630	15393
Koper	17999	16907	16198	14591	13322	16499	15805
Trieste	56585	42144	41803	40557	40986	37195	39833
Venezia	24411	24598	25457	26212	26640	29920	32042
Ravenna	22486	22402	22281	22186	23848	30075	27008

Source: BA Corridor study consortium based on the ports website.

Figure E24 Cargo trend of core seaports in terms of TEUs



Source: BA Corridor study consortium based on the ports website.

The main seaport for tonnes is Trieste while Gdańsk has the supremacy for number of TEUs. This is due to the different kind of goods in which the seaports are specialised.

Table E9 Cargo trend of core seaports in terms of TEUs

	2013	2012	2011	2010	2009	2008	2007
Gdynia	729607	676349	616441	485255	378340	610767	614373
Gdańsk	1177623	928905	685643	511876	240623	185661	96873
Szczecin & Świnoujście	62300	52178	55098	56503	52809	62913	56321
Koper	600441	570744	589314	476731	343165	353880	305648
Trieste	458497	411247	393186	281643	276957	335943	265863
Venezia	446591	429893	458363	393913	369474	379072	329512
Ravenna	226760	208152	215336	183577	185022	214324	206786

Source: BA Corridor study consortium based on the ports website.

E.3.4. Airline passenger services

In this section we present the results of our recognition of the passenger services operated by commercial airlines between the airports located along the BA Corridor. Following the TEN-t Regulations, these airports are divided in three categories: "core" airports, "comprehensive" airports and "other" airports. Within the core airports the following ones are included:

- Gdańsk (PL);
- Szczecin (PL);
- Poznan (PL);
- Warszawa (PL);
- Łódź (PL);
- Wrocław (PL);
- Katowice (PL);
- Ostrava (CZ);
- Bratislava (SK);
- Wien (AT);
- Ljubljana (SI);
- Venezia (IT);
- Bologna (IT).

The comprehensive airports are as follows:

- Bydgoszcz (PL);
- Brno (CZ);
- Graz (AT);
- Klagenfurt – Villach (AT);
- Maribor (SI);
- Portoroz (SI);
- Trieste (IT);
- Treviso (IT);
- Forlì (IT).

Furthermore, taking into account also other airports has been considered significant in order to better analyse the passenger traffic situation since their catchment areas are within the BA Corridor limits. The following airports are the ones included in this category:

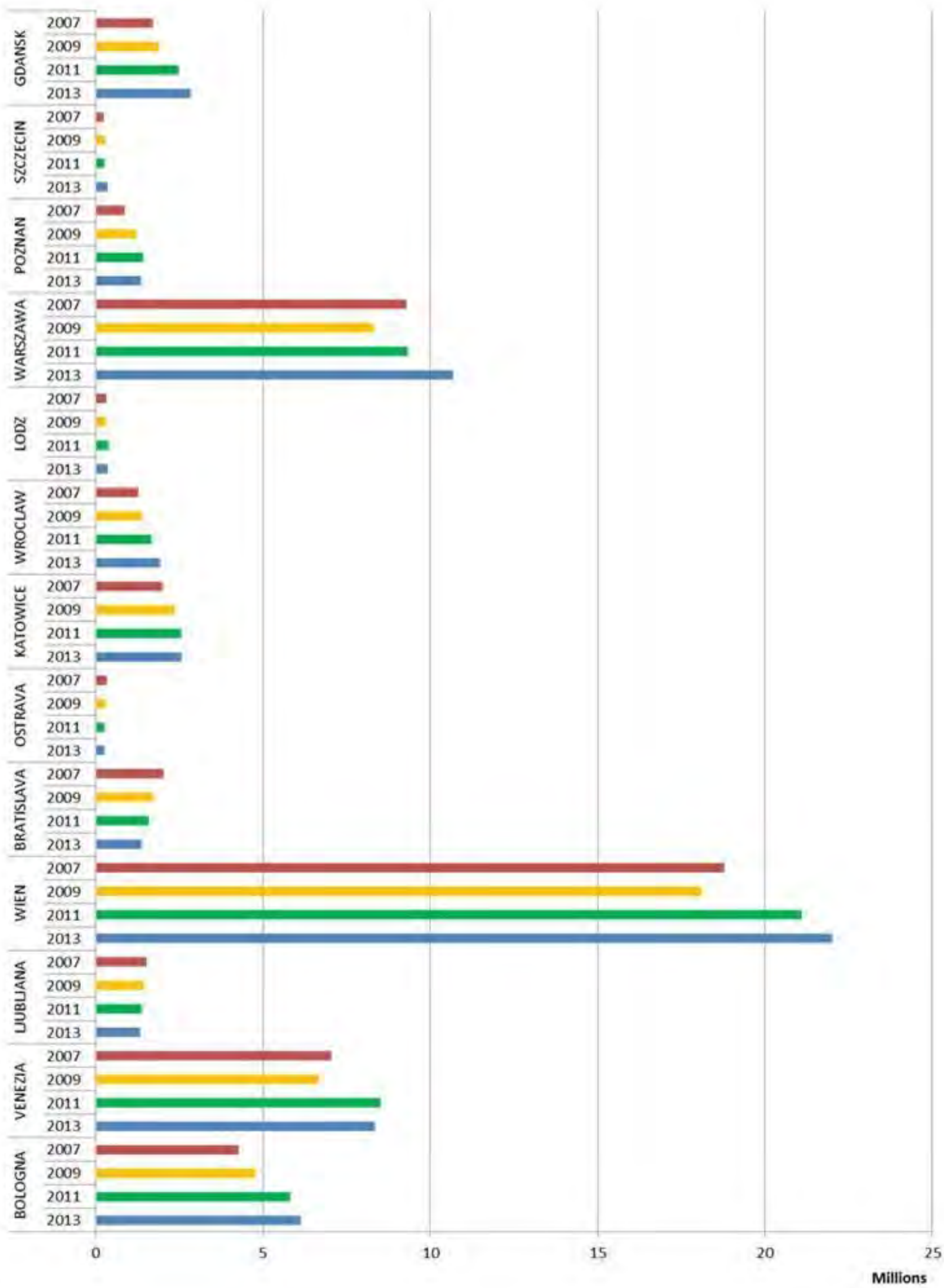
- Warszawa Modlin (PL);
- Lublin (PL);
- Zielona Gora (PL);
- Krakow (PL);
- Prague (CZ);
- Pardubice (CZ);
- Verona (IT);
- Parma (IT);
- Rimini (IT).

In the following chapters, the passenger traffic trends of the Core BA Corridor airports will be shown and commented. Then direct flights involved into the Baltic – Adriatic Corridor will be studies by means of Origin – Destination Matrices.

Passenger traffic trend of Core BA Corridor airports

The next figure and tab show the trends of passenger traffic for the core airports mentioned above.

Figure E25 Passenger traffic trend of core airports



Source: BA Corridor study consortium

Table E10 Passenger traffic trend of core airports

Core Airport	2013	2012	2011	2010	2009	2008	2007
Gdańsk	2843737	2906000	2483000	2232590	1890925	1954166	1708739
Szczecin	347744	360000	258217	268563	276582	300000	228071
Poznan	1355330	1600000	1425865	1383656	1235942	1270000	863018
Warszawa	10683706	9587842	9337734	8712384	8320927	9460606	9268476
Lodz	353633	460000	390261	413392	312197	340000	312365
Wrocław	1920179	1996552	1657472	1654439	1365456	1486442	1270825
Katowice	2544198	2550848	2544124	2403253	2364613	2426942	1995914
Ostrava	259167	288393	273563	279973	307130	353737	332266
Bratislava	1373078	1416010	1585064	1665704	1710018	2218545	2024142
Wien	21999926	22165794	21106291	19691206	18114427	19747289	18768563
Ljubljana	1321153	1198911	1369485	1388651	1433855	1673050	1524028
Venezia	8327899	8110520	8507691	6801941	6655612	6848244	7032499
Bologna	6127221	5879627	5815971	5432248	4765232	4124298	4253198

Source: BA Corridor study consortium extrapolation based on the airports website.

By looking at the table, it is possible to see that the main airport is Wien Airport with more than 20 million of passenger in 2013. The gap with the second busiest BA Corridor airport is significant since Warszawa Airport last year had just more than 10 million of passenger.

Generally all airports have increased in terms of passengers in the last years with the only exception represented by Bratislava Airport.

International and domestic flights among BA Corridor Member States

Data from flight schedules of any airport located along Baltic – Adriatic Corridor have been retrieved in order to create three Origin – Destination matrices representing:

- Number of flights per week between "core" airports ("comprehensive" and "other" airports excluded)
- Number of flights per week between "core" and "comprehensive" airports ("other" airports excluded)
- Number of flights per week between any kinds of airports.

In order not to consider summer and holiday traffic peak, the period from 25th September 2014 to 25th October 2014 has been chosen for the analysis.

If the airports and the related values are grouped by country, analysing the air traffic along BA Corridor in terms of national air traffic is possible. The three matrices by country represent the number of flights among BA Corridor countries whose origin and destination airports are respectively:

- Core only,
- Core and comprehensive, and
- All types of airports.

Table E11 OD matrix between core airports (1 way connections shown)

	Gdańsk	Szczecin	Poznan	Warszawa	Wrocław	Katowice	Wien	Ljubljana	Venezia	Bologna
Gdańsk				48	9					
Szczecin				12						
Poznan				23						
Warszawa					42	16	35	3		
Wrocław										2
Katowice										
Wien								14	21	18
Ljubljana										
Venezia										
Bologna										

Source: BA Corridor study consortium extrapolation based on the airports website.

Table E12 OD country matrix between core airports

	Poland	Czech Rep.	Slovakia	Austria	Slovenia	Italy
Poland	300			35	3	2
Czech Rep.		0				
Slovakia			0			
Austria				0	14	39
Slovenia					0	
Italy						0

Source: BA Corridor study consortium extrapolation based on the airports website.

Table E13 OD country matrix between core and comprehensive airports

	Poland	Czech Rep.	Slovakia	Austria	Slovenia	Italy
Poland	346			35	3	2
Czech Rep.		0				
Slovakia			0			
Austria				108	14	39
Slovenia					0	
Italy						0

Source: BA Corridor study consortium extrapolation based on the airports website.

Table E14 OD country matrix between all types of airports

	Poland	Czech Rep.	Slovakia	Austria	Slovenia	Italy
Poland	522	43		48	3	10
Czech Rep.		26	6	32	4	4
Slovakia			0			
Austria				108	14	39
Slovenia					0	
Italy						0

Source: BA Corridor study consortium extrapolation based on the airports website.

From the above tables, it is possible to notice that Poland is the country with more flight connections in terms of number. However, whichever kind of airport is taken ("core", "comprehensive" or "other"), a large majority of polish flights are domestic. By looking at the diagonal of the first matrix, it is possible to see that only Poland has domestic connections. By referring to the second and third matrices, also Austria and Czech Republic had domestic connections but significantly lower with respect to 522 out of 626 Poland's domestic flights. If the diagonal values are excluded and only international connections are considered, the main character of the air passenger traffic is Austria. Indeed Austria is the country with more international connection with the other BA Corridor countries, since it has 88 international flights among "core" and "comprehensive" airports and 133 among all types of airports. Without domestic flights, Poland instead has 40 and 104 international flights among "core "airports only and all airports respectively.

E.4. The Baltic-Adriatic Multimodal Model

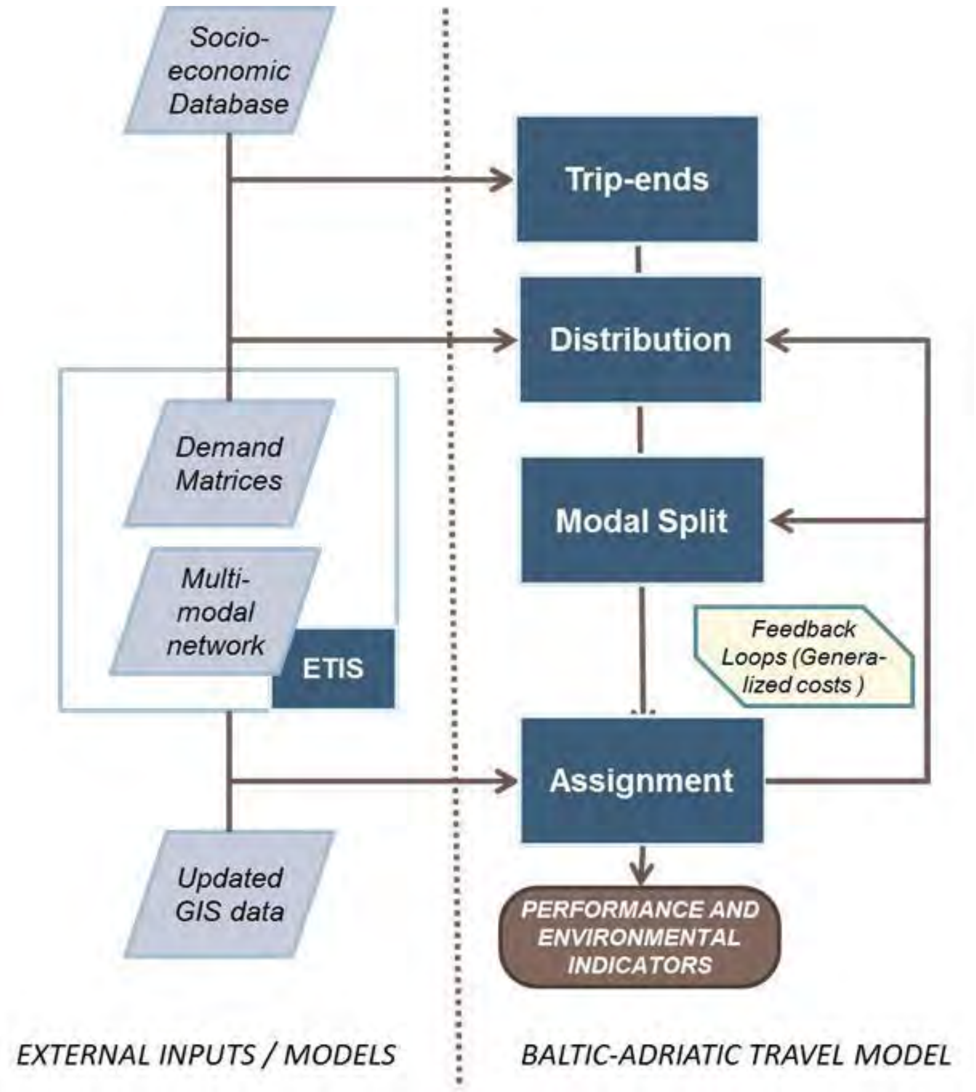
In this section, we describe the Baltic – Adriatic Multimodal Model (BAMM) that was developed within the scope of this corridor study. The summary provides an overview of the methodological approach adopted to develop the model and of the main sourced adopted to develop the model database..

E.4.1. Overview

Model structure and main processes

The figure below provides an overview of the structure of BAMM, together with the elements of the existing EU datasets (ETIS+ being the main one, but also including Trans-tools and Eurostat) that are incorporated in the model, namely the network data and the base year demand matrices. The key function of BAMM is to predict changes in a series of traveller or freight operator decisions (frequency, destination, mode choice, routes), which are mostly expressed in the form of forecast matrices and are then assigned to the multimodal networks.

Figure E26 BAMM Travel Demand Model: Main Components and Data Flows



The model is developed as a 'marginal' (or 'incremental') model that predicts changes relative to the base situation as a function of variations in the Level-of-Service (or generalised cost) for the different alternatives. We adopted an incremental approach as we deem it allows reducing errors: as the base matrix can be estimated based on observed data, hence with greater accuracy than can be achieved by a purely theoretical model, it makes sense to use the base matrix to predict 'most' of the trips, using the model to predict the changes relative to that.

Due to data availability in the main statistical sources (Eurostat and ETIS+), the model base year is 2010. All data required to set-up, calibrate and validate the model therefore refer to this date. The assessment of the future transport demand scenarios focuses on the corridor work-plan time horizon (2030). In terms of mode, the complete modelling chain (generation, distribution, modal split and assignment), is applied to rail and road modes, while a more simplified approach is adopted for the air mode, mainly focussing on the projection of the corridor demand to the future time horizons. Inland waterways are treated in terms of contribution to the rail and road flows at the multi-modal nodes.

The results of our market study are subject to a number of limitations, mainly due to data availability issues, especially (but not only) in the domain of rail transport, where very few data are available of current transport flows at the level of granularity required by the corridor market study.

We are implementing the BAMM in the CUBE/VOYAGER modelling suite, which is a well-established and proven modelling package. The following sections describe more in detail the four main components of the BAMM travel demand model.

Zoning system and demand segmentation

The zoning system has been defined in order to allow a very granular description of the corridor and its neighbouring countries: at this level, zones have been defined at the NUTS 3 level, which is the most detailed available in most of the multi-country statistical sources (including Eurostat).

The model then comprises the description, at a lower detail, of the neighbouring countries and the whole Europe: the total number of transport zones is 316, as shown in the table below.

Table E15 BAMM Zoning system

Country	Number of Zones
Poland	66
Czech Republic	14
Slovakia	8
Austria	35
Italy	42
Slovenia	12
External Zones	139
Total Zones	**316**

The BAMM is based on a segmentation of passengers by trip purpose, in line with the approach adopted by previous EU-wide models and studies, such as TRANS-TOOLS and ETIS+. The trip purpose classification is shown in the table overleaf.

Table E16 Passenger demand segmentation by trip purpose

ID	Name	Description
01	Business	Trips for working purposes with different destination than the usual workplace
02	Private	Non business related trips with duration of up to 4 days
03	Vacation	Non-business trips with duration of more than 4 days
04	Commuting	Daily trips for working or studying purposes

Freight classification is based on NST/R (1 digit – 10 groups) – which was defined on physical characteristics of goods. Although in 2007 another classification was introduced by Eurostat (NST 2007), we have preferred using the former, in line with the main sources (TRANSTOOLS, ETIS+) we are using in our study.

Table E17 Freight demand segmentation by commodity group (NST/R 1 digit)

ID	Description
00	Agricultural products and live animals
01	Foodstuffs and animal fodder
02	Solid mineral fuels
03	Petroleum products
04	Ores and metal waste
05	Metal products
06	Crude and manufactured minerals, building materials
07	Fertilizers
08	Chemicals
09	Machinery, transport equipment, manufactured articles and miscellaneous

Multimodal transport network

Transport networks for the various transport modes have been set up describing the main technical parameters of the infrastructure. The datasets have been developed on the basis of the existing ETIS+ 2010 data, which was further refined along the corridor.

The maps overleaf show the rail and road network along the corridor. The rail network also shows the encoding of the Core Network Corridors, which are used in our analysis to classify the flows. Both maps also show the zoning system and the centroids. The road network currently includes around 120.000 links, covering the entire Europe and its neighbouring countries.

Figure E27 BAMM rail network showing encoded CNC alignments

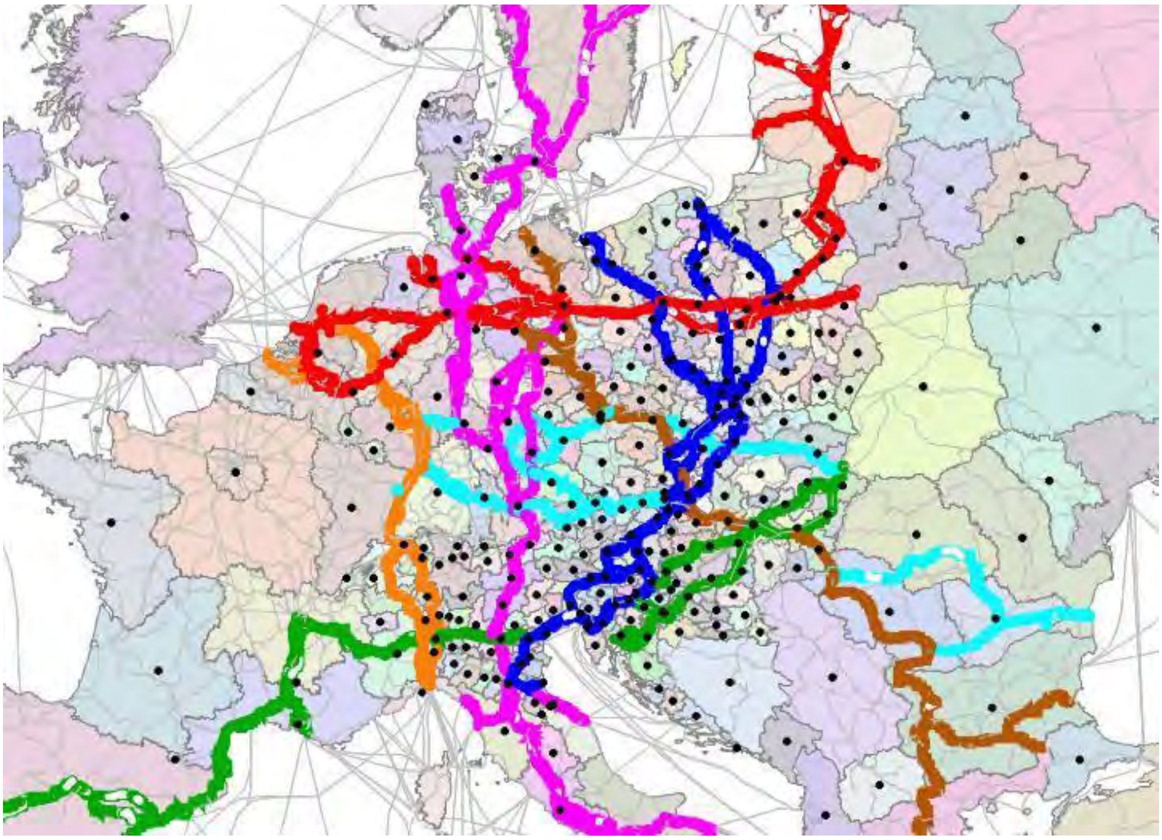
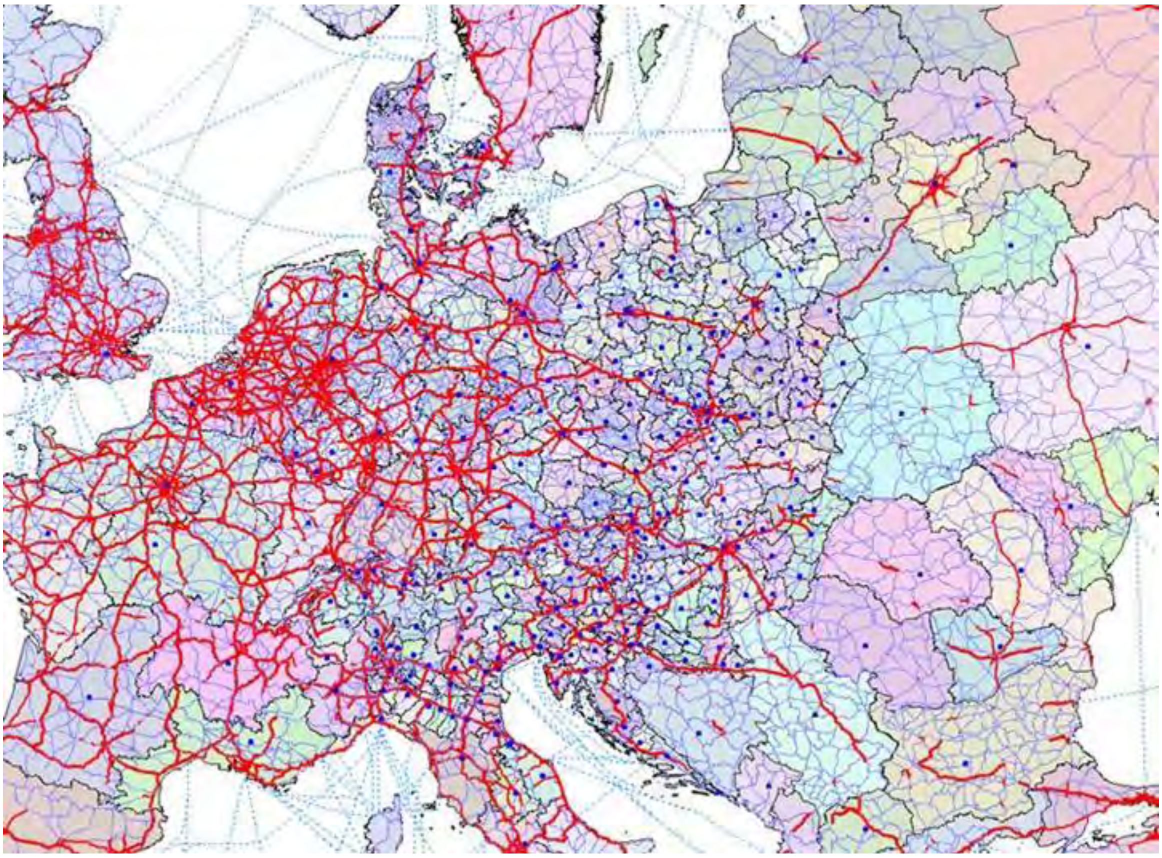


Figure E28 BAMM road network



E.4.2. Base year demand

Passenger matrices

Data sources - We have assembled 8 different matrices ((rail, road) x trip purpose) for the model base year (2010). Traffic between regions is expressed in (annual) personal trips from generation to attraction zones (G/A format); hence return trips are not included in the matrices, but only added in prior of the assignment stage (conversion from G/A to O/D matrices).

For a primary source we have used the ETIS+ "modelled" datasets for 2005 and 2010 and reconciled it with the 2005 TRANS-TOOLS matrices, according to the procedure summarized below.

Methodological approach – All the available demand matrices have been loaded the in the MS SQL Database. Appropriate tables were developed for transcoding matrices to a common structure in terms of zoning and trip purpose, in order to allow comparing the matrix cell values. The comparison of the matrices and also on the results of network assignment tests, we have finally developed the initial BAMM passenger road and rail matrices

- The ETIS+ 2010 matrices were adopted as the starting point of the estimation process;
- The matrices marginal values (generated and attracted trips) were then scaled based on the ratio between TRANSTOOLS and ETIS+ matrices at 2005, in order to incorporate the adjustment already made by Trans-tools developers to improve the model calibration (which was not part of the ETIS+ tasks);
- The matrices were then updated by distributing proportionally the total trip adjustments to each cell matrix, by means of a standard FRATAR algorithm.

The table overleaf compares the total trips in the original matrices to the final matrices estimated on the basis of the procedure described above (*BAMM (PRIOR)*) and to the final BAMM model base year matrix (*BAMM (CALIBRATED)*), following the adjustment process described in the next section.

Table E18 Total inter-zonal annual passenger trips in the corridor study area by source

Rail trip matrix

SOURCE	YEAR	WORK	VACATION	OTHER	TOTAL
TRANSTOOLS	2005	14.6	48.7	67.4	131
ETIS+	2005	31.3	10.5	97.7	140
ETIS+	2010	25.3	9.6	83.1	118
BAMM (PRIOR)	2010	27.0	9.4	86.1	123
BAMM (CALIBRATED)	2010	33.1	11.5	82.7	127

Road trip matrix

SOURCE	YEAR	WORK	VACATION	OTHER	TOTAL
TRANSTOOLS	2005	160.7	166.6	748.2	1,076
ETIS+	2005	188.9	219.2	1,119.7	1,528
ETIS+	2010	143.9	175.8	928.4	1,248
BAMM (PRIOR)	2010	136.5	177.6	825.5	1,140
BAMM (CALIBRATED)	2010	144.4	200.8	780.1	1,125

Total passenger trip matrix and rail modal share

SOURCE	YEAR	WORK	VACATION	OTHER	TOTAL
TRANSTOOLS	2005	175.3	215.3	815.6	1,206
ETIS+	2005	220.2	229.7	1,217.4	1,667
ETIS+	2010	169.2	185.4	1,011.5	1,366
BAMM (PRIOR)	2010	163.5	187.0	911.6	1,262
BAMM (CALIBRATED)	2010	177.5	212.3	862.8	1,253

Total passenger trip matrix an Rail modal share

SOURCE	YEAR	WORK	VACATION	OTHER	TOTAL
TRANSTOOLS	2005	9.1%	29.2%	9.0%	12.2%
ETIS+	2005	16.6%	4.8%	8.7%	9.1%
ETIS+	2010	17.6%	5.5%	9.0%	9.5%
BAMM (PRIOR)	2010	19.8%	5.3%	10.4%	10.7%
BAMM (CALIBRATED)	2010	22.9%	5.7%	10.6%	11.3%

Source: BA Corridor study consortium elaboration on ETIS+, TRANS-TOOLS (v 2.5) and own data. For comparison purposes, trip purposes have been classified as Work related (Business and Commuting, Vacation and Other (Private). Transtools definition of purposes is not entirely comparable to the other datasets.

Freight matrices

Data sources - We have assembled 20 different matrices ((rail, road) x commodity group (NST/R 1 digit)) for the model base year (2010). Traffic between regions is expressed in (annual) tons from generation to attraction zones (G/A format).

For a primary source we have used the ETIS+ "modelled" dataset (downloaded from the web) and reconcile the data with ETIS+ "observed" and "harmonized" datasets (2010), EUROSTAT (2010), CAFT (Vehicle and Commodity records from CAFT survey 2009 – Alpine Crossing traffic by commodities); preliminary information made available from the rail Freight Corridor 5 have also been analysed , although the RFC5 market study was not yet completed at the moment of developing our analysis.

Having signed a non-disclosure agreement with the Austrian Ministry of Traffic, Innovation and Transport (BMVIT), we have also analysed the data developed for the Austria's Traffic Model (VMOE), the SETA Model data (2010) and the 2009 freight volumes by commodities (NST/R) reported by Austrian railroad carriers.

Methodological approach – All the available demand matrices have been loaded the in the MS SQL Database. Appropriate tables were developed for transcoding matrices to a common structure in terms of zoning and goods classification, in order to allow comparing the matrix cell values. Based on the comparison of the matrices and also on the results of network assignment tests, we have finally retained as a base matrices:

- For road transport, the ETIS+ matrix was improved based on the more detailed information available concerning flows in Austria. As this information not only cover internal transport, but also exchange and crossing, this lead to a significant improvement of the quality of the base year matrix.
- For rail transport, the original ETIS+ matrix was used, but adjusted to address specific issues, including the presence of empty cells affecting the quality of the dataset especially in Poland.

Matrix adjustment

The original matrices set up as described above (*prior matrices*) were then adjusted on the basis of the available information on traffic flows on the rail and road network.

Data sources and preparation – A comprehensive database of traffic flow information for passenger and freight transport was set up based on the following data sources:

- ETIS+ traffic volume database (reference year 2010);
- SETA traffic volume database and base year flows (base year 2010);
- TRANSTOOLS traffic volume database and base year flows (base year 2005);
- Traffic volumes encoded in the TENtec database (latest update 2014);
- Cross-alpine freight traffic flows (AlpInfo, 2010-2012);
- National traffic flow information on highway corridor sections (various years).

These sources were harmonized in terms of reference year, vehicle classification and unit of measures; the most relevant ones were then coded on the BAMM network to allow the comparison between the observed and modelled flow at the base year.

In order to maximise the reliability of the matrix adjustment procedure (as described in the following paragraphs), and reduce the risks of distorting the matrices as a result of specific network/assignment issues, traffic counts are grouped in screenlines. Screenlines are defined as the set of count sites which intercept traffic/passenger flows between sets of zones which share the same general corridors of movement (across which the screenlines are suitably located).

The extent of a screenline is determined by the number of alternative (reasonable) paths which are available and also on the granularity of the model zoning system. In our study, we have defined screenlines based on the boundaries of the NUTS2 regions along the corridor. A total number of 135 screenlines were thus identified, as shown in the figure overleaf.

Figure E29 Corridor screenlines defined for matrix adjustment (NUTS2 level)

Table E19 Number of road and rail links included in the NUTS2 screenlines

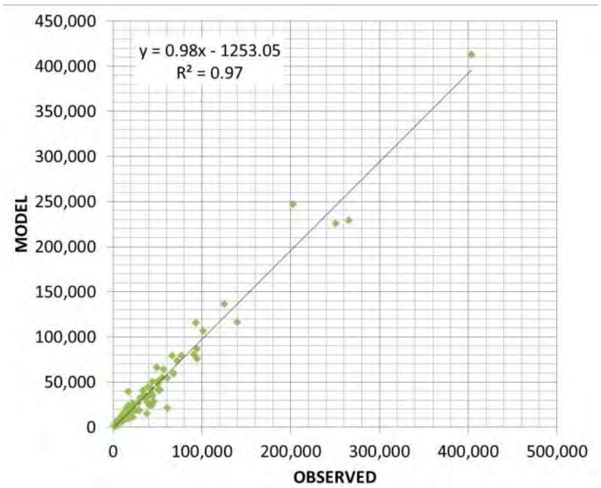
COUNTRY	RAIL LINKS	ROAD LINKS
Poland	71	170
Germany	10	27
Czech Republic	32	83
Austria	39	124
Slovakia	10	22
Hungary	8	20
Slovenia	7	22
Switzerland	0	2
Italy	17	54
Croatia	2	9
TOTAL	**196**	**533**

Methodological remarks and goodness of fit – The standard procedure available in Cube Analyst was used to adjust the base year passenger (road and rail) and freight (road) to the observed traffic flows. For the road traffic, the procedure was applied after converting the matrices from the G/A to the O/D format, transforming passenger and freight flows to vehicle movements by means of standard load factors. The corrections were then imported in the original G/A matrices. The procedure was applied to the rail freight matrix, as the geographic flow data coverage was deemed not adequate.

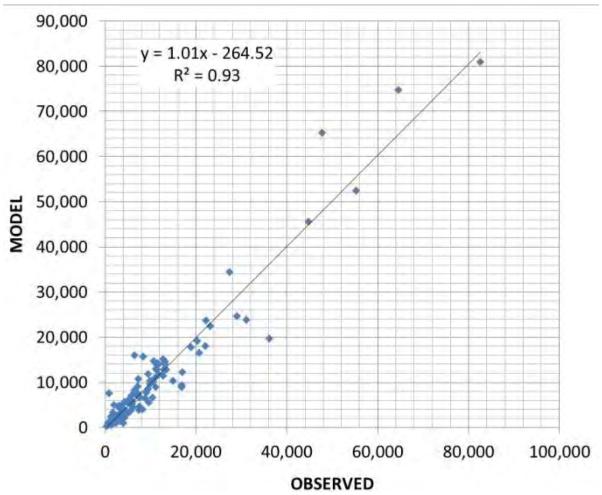
The basis of Cube Analyst's calculations is an application of the standard statistical approach known as the maximum likelihood method. This method allows estimates of a set of inputs to guide the estimates of a corresponding set of outputs; the estimates of the set of inputs are obtained from likelihood functions, which are expressions of probability distribution functions (pdfs) associated with the user's input data. The outputs are calculated from an estimation equation, which in the case of traffic matrices describe the values of the network flows as a linear combination of the matrix cells, based on the network paths identified at the assignment stage.

The figure below shows the goodness-of-fit of the adjusted matrices to the available NUTS2 screenline volumes, covering the entire corridor.

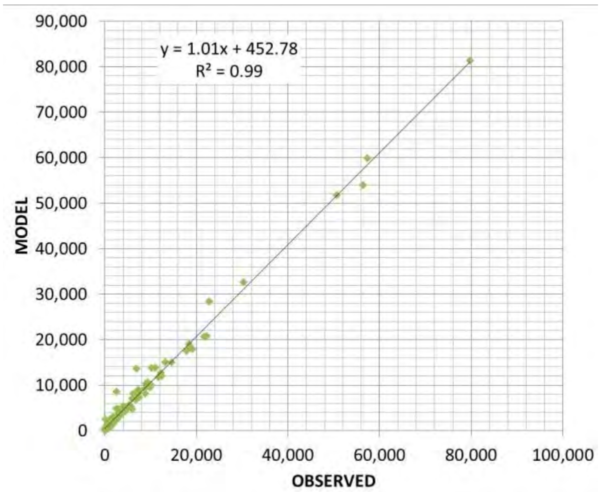
Figure E30 Comparison of observed and modelled rail and road screenline volumes



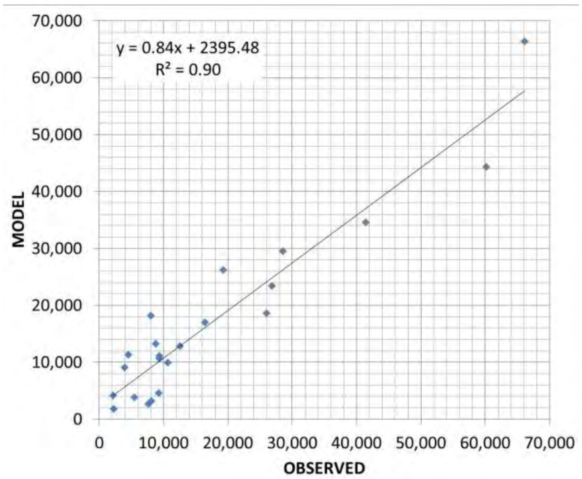
Road Passenger Transport (vehicle/day)



Road Freight Transport (vehicle/day)



Rail Passenger Transport (pax/day)



Rail Freight Transport (tons/day)

Note. No statistical adjustment was made on rail freight volumes, due to the scarcity and uneven geographic coverage of screenline observed values at our disposal

E.4.3. Trip-ends modelling

In this step, the total quantities of trips and goods transported from the various regions of origin to the various destination regions are determined. For passenger transport, the demand is segmented by four trip purposes (business, private, vacation and work); trips originated and destined in each zone are related to its main socio-economic drivers (population, employment, income, car ownership). With a similar approach, freight transport is estimated by commodity groups (NSTR) through structural equations, which relate the volume of products exchanged with other regions (exports and imports) to a set of economic indicators such as sector employment and GDP. Generation and production equations are based on the results of national passenger and freight surveys for the countries within the corridor and validated against the original 2010 matrix margins.

Once the base year matrices are estimated, the Trip-end model is applied incrementally to estimate future year demand, applying relative changes to the base year trip-ends in each zone. Marginal totals of the projected O-D matrices are balanced to derive the total number of trips.

Passenger trip-end model

Structural equations – In order to develop our Baltic-Adriatic Multimodal Model we produced estimates of the passenger trips in the BA Corridor area as explained above. Taking into account that population projections are available, this actually requires that we develop projections of the annual trip rates (trips / inhabitants).

To this purpose we adopted a S-shaped saturation curve, modelling trip rate as function of the national GDP per capita, for the generated trips from each BA Corridor zone at the NUTS 3 level (provinces) whereas for the attracted trips we used a linear regression based on the elasticity to the GDP per capita. These inbound and outbound trips were calculated taking into account four trip purposes – i.e. business, private, vacation and commute trip purposes. More in detail, the S-shaped saturation curve model for the generated trips has been developed according to the following formulation:

$$TR = \frac{\alpha_{TR}}{(1 + e^{(\alpha GDP + \gamma)})}$$

Where:

TR	trip rate (trips / inhabitants / year)
GDP	GDP per capita
α,β,γ	model coefficients

Worth adding the saturation level was set to different values per each BA Member States and per each trip purpose as shown in the table below.

For what concern the attracted trips, a linear regression has been adopted trips thus using the following formulation:

$$TR = \mathrm{I} + (GDP * Sl)$$

Where:

TR	trip rate (trips / inhabitants / year)
GDP	GDP per capita
Sl, I	model coefficients

Both for the generation and attraction models, a set of country-specific parameters were estimated by means of standard OLS (Ordinary Least Square) regressions.

Model estimation – The estimation of the parameters of the structural equations was based on a consistent set of input data such as population, GDP and employment by provinces at NUTS3 level which have been obtained by adopting the values form ETIS+ (2010 data). GDP per capita has been calculated using GDP and population data.

The tables below summarize the estimation statistics for the generated passenger trips (S-shaped saturation curve model), which are in most cases acceptable.

Table E20 Trip rates regression statistics – R Square parameter

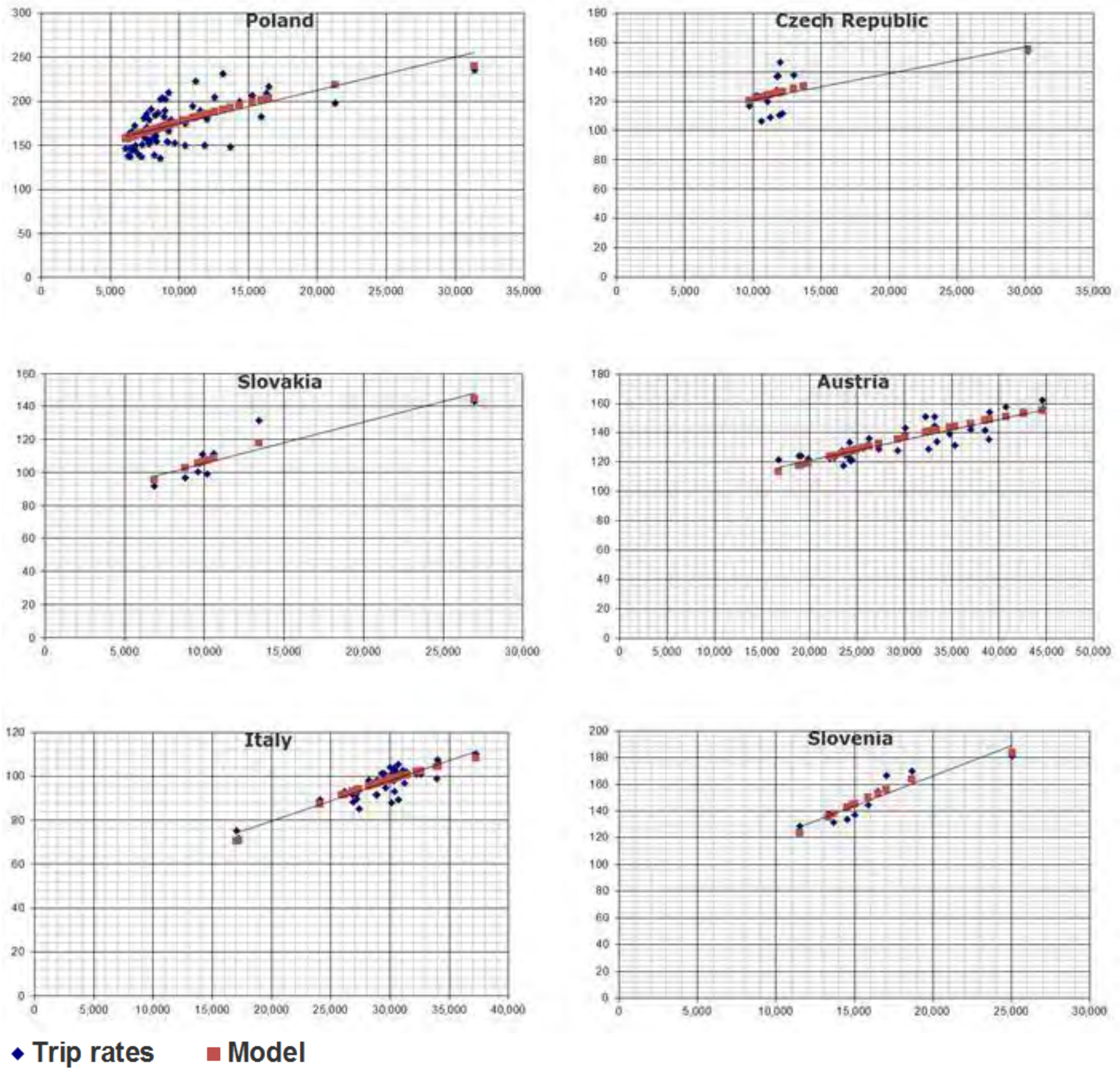
	Business	Private	Vacation	Commute
Poland	0.56	0.21	0.05	0.45
Czech Republic	0.70	0.28	0.65	0.50
Slovakia	0.94	0.78	0.98	0.86
Austria	0.75	0.66	0.62	0.73
Italy	0.60	0.43	0.02	0.70
Slovenia	0.90	0.81	0.73	0.90

Table E21 Trip rates model parameters – Commute Trips

Countries	A	β	γ
Poland	236	-8.22e-05	6.34e-02
Czech Republic	154	-7.24e-05	18.7e-01
Slovakia	143	-10.0e-05	25.6e-01
Austria	162	-4.80e-05	25.7e-01
Italy	110	-8.83e-05	11.8e-01
Slovenia	181	-14.3e-05	11.6e-01

As an example, the figure in the following page illustrates the scatter plot of the trip rates for commute purpose as a result of the S-shaped saturation curve model. As shown, the influence of GDP per capita on generated trips is significant.

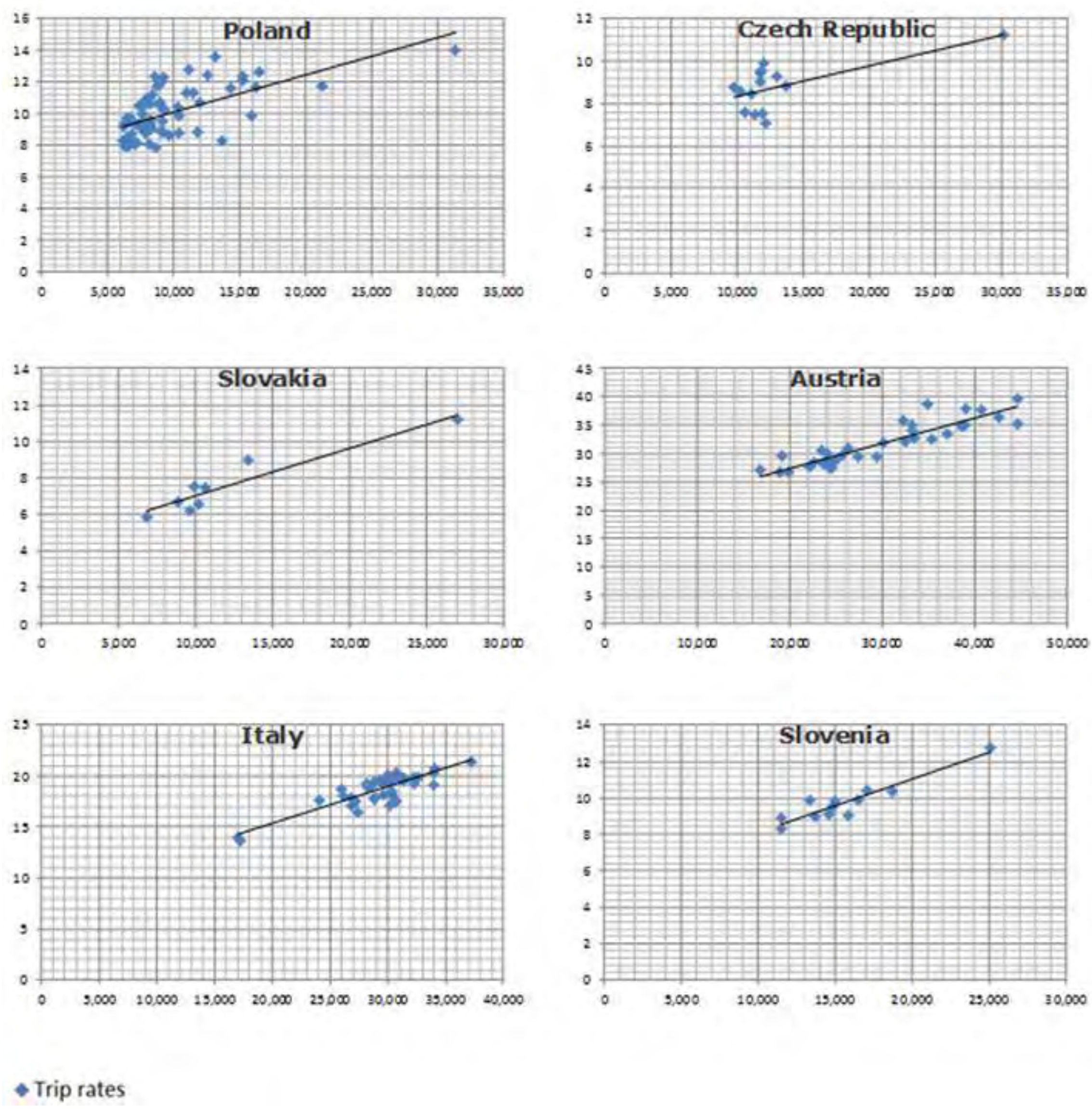
Figure E31 BAMM Passenger Trip-end Model: Influence of GDP per Capita on generated trips for commute purpose



Due to the progressive saturation of the trip rates, GDP elasticity actually declines with increasing GDP per capita. In order to cross-check the soundness of the estimated models, we have calculated the model's trips elasticity to GDP, which goes from 0.45 (Austria) to 0.56 (Italy). These values are sensible and in line with the values we would expect in terms of relationship of the trip growth in relationship to GDP in countries with low or negative population growth.

With regard to the inbound passenger trips, the linear regression model is also based on the elasticity to the GDP per capita. AS an example of the analysis undertaken, the figure below shows the scatter plot of the attracted trips over thousand inhabitants on the BA Corridor Member States.

Figure E32 BAMM Passenger Trip-end Model: Influence of GDP per Capita on attracted trips for business purpose



Freight trip-end model

Structural equations - Following the current sector practice, we assumed outgoing and incoming transport volumes per region and commodity F^{G}_{ict} to be determined by the region's gross domestic product GDP_{it}, its total population POP_{it}, the number of establishments $EST_{its}$and the number of employees EMP_{its}in the economic sector s , where the considered commodities are being produced.

Assuming a Cobb-Douglas type of relationship, we estimated the structural parameters $\propto_k$and $\beta_l$using OLS, maximum likelihood or other suitable estimators.

$$\ln F^{G}_{ic} = \propto_0 + \propto_1 \ln GDP_i + \propto_2 \ln POP_i, + \propto_3 \ln EST_{is} + \propto_4 \ln EMP_{is} + \varepsilon_{ic}$$

Where:

F^{G}_{ic}	represents the volume of transported commodities C, from/to (G) region i
GDP_i	denotes the regional GDP

POP_i denotes the average population of region i

EST_{is} stands for the number of local units in sectors s, considered of relevance to commodity C

EMP_{is} stands for the employment in sectors s, considered of relevance to commodity C

Model estimation – The first step to estimate the parameters of the structural equations was to set up a consistent set of input data.

GDP and total population by region have already been obtained by accessing EUROSTAT's published datasets named nama_r_e3gdp and nama_r_e3popgdp respectively. These datasets provide the subject measures at NUTS3 level for 2010 and have been aggregated to NUTS2 for the purpose of the estimation.

Employment and number of establishments by sector have been obtained by accessing EUROSTAT's published dataset named sbs_r_nuts06_r2. This datasets contains the necessary structural indicators by NUTS2 region and NACE Rev.2 classified industrial sectors. In order to proceed with the estimate, we had to fill in the missing values in this dataset. To this purpose, we built a log-linear model to explain observed values for employees and local units by means of the industry, the geographic region and the year. Calculated values were subsequently forced to meet boundary conditions where available at the country level. Thus we ensured that the sum of employees for a NACE in NUTS2 regions did not exceed levels reported at the corresponding member state level.

The resulting completed structural business statistics are combined with GDP and Population data which had been obtained from EUROSTAT's web site. Combination of the two sets of data required a mapping of the industry classification NACE to the commodity classification NSTR. To that end we developed our own correspondence table.

Table E22 NST/R codes and relevant production sectors used to model transport demand generation

NST/R Code	NST/R description	NACE Rev 2 code	NACE Rev 2 description
0	Agricultural products and live animals	A	Agriculture, Forestry and Fishing
1	Foodstuffs and animal fodder	C10	Manufacture of food products
		C11	Manufacture of beverages
2	Solid mineral fuels	B05	Mining of coal and lignite
3	Petroleum products	B06	Extraction of crude petroleum and natural gas
		B09	Mining support service activities
		C19	Manufacture of coke and refined petroleum products
4	Ore and metal waste	B07	Mining of metal ores
		B08	Other mining and quarrying
5	Metal products	C25	Manufacture of fabricated metal products, except machinery and equipment
6	Crude and manufactured minerals, building materials	C23	Manufacture of other non-metallic mineral products
7	Fertilizers	C20.2	Manufacture of pesticides and other agrochemical products
8	Chemicals	C20	Manufacture of chemicals and chemical products
9	Machinery, transport equipment, manufactured articles and miscellaneous articles	C28	Manufacture of machinery and equipment n.e.c.

GDP per capita has been calculated using GDP and POPULATION data; productivity has been proxied using the ratio of GDP over sector employment. Employment rate has been proxied using the ratio of sector employment over population.

The tables below summarize the estimation results showing the values of the coefficients rounded to two digits. Only statistically significant coefficients have, with few exceptions, been included in the equations.

Table E23 F-Test and R-Square statistics of attracted (inbound) transport demand equation per commodity group

NST/R Code	Intercept	GDP	GDP per capita	Population	Sector Employmen t	Sector establishme nts	Agricultural ly used land	Productivity	Employmen t Rate	Rho	PRMSE
0	4.14			0.96		0.2		0.16	4.10	4.14	
1	3.02	0.24		0.78				0.10	1.93	3.02	0.24
2	9.96		-0.99	0.78		0.23				0.45	6.12
3	0.54			0.78						0.19	3.21
4	-0.53			0.81		0.43				0.20	3.89
5	-2.34	0.32			0.73					0.30	2.94
6	4.98	0.24		0.37						0.14	2.52
7	3.23				0.21		0.28			0.58	5.40
8	0.10			0.81	0.09					0.17	2.98
9	-1.96	0.41		0.47						0.28	2.31

Table E24 F-Test and R-Square statistics of generated (outbound) transport demand equation per commodity group

NST/R Code	Intercept	GDP	Population	Sector Employment	Sector establishme nts	Poland Dummy Variable	Rho	PRMSE
0	2.90			1.02			0.21	4.79
1	2.89	0.17		0.87			0.1	2.22
2	-7.62		0.79		0.21		0.69	6.30
3	-2.39	0.30	0.90				-0.1	4.44
4	-2.70		0.86		0.38		0.30	
5	-3.30	0.35		0.76			0.31	3.40
6	5.23	0.29		0.49			0.13	2.80
7	3.63		0.71			2.01	-0.10	6.14
8	0.24		0.80	0.10			0.16	2.85
9	-2.14	0.38	0.52				0.27	2.73

For most of the equations Moran's I and similar tests have suggested the use of a spatial correlation model [1], [2]. Thus models of the type

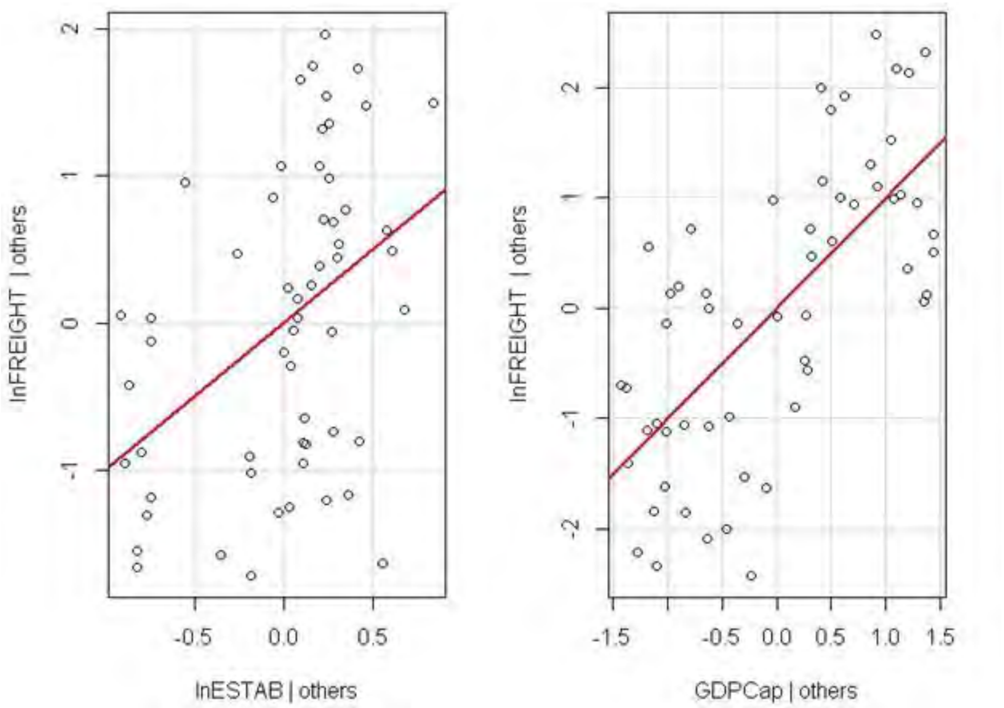
$$\ln F_{ic}^{G} = \propto_0 + \propto_1 \ln GDP_{ic} + \propto_2 + \cdots + \propto_4 \ln EMP_{ic} + \rho \, W \ln F_{ic}^{G} + \varepsilon_{ic}$$

have been estimated. The spatial lag matrix W of neighbouring regions has been built using shape files for NUTS2 regions, published on EUROSTATS web site. Significant values for ρ, the parameter for the spatially lagged exogenous variables have been obtained for all commodities, except for NSTR 3 (generation and attraction) and NSTR 5 (attraction)

Experimenting with different structural forms and estimation methods, we decided to estimate equations for attracted and generated freight volumes specifically for the corridor. This decision was based on the realization, that industry structures in the European Union were too different to allow the modelling of transport patterns in the BA Corridor.

In relation to fertilizer (NSTR 7) attracted freight volumes, the degree of agricultural land use was a determining factor. As Poland seems to be responsible for a large part of the transported fertilizers, the choice of a "dummy variable" proved advantageous.

Figure E33 BAMM Freight Trip-end Model: Influence of GDP per Capita and number of sector establishments on inbound freight



GDP per capita has a measurable influence on inbound Solid mineral fuels (NSTR 2); the sign of the estimated coefficient can be economically interpreted to mean that the use of solid fuels (i.e. coal) and advancing societies (productivity) are inversely related.

Tripends at maritime ports – The structural equations with the parameters estimated above have been estimated with reference to NUTS2 regions, and then applied to identify the natural evolution of the generated and attracted demand by zone. Our analysis also included the specific assessment of the additional growth component to be associated to maritime ports, as a result of the effect of the increase in trade with third commercial parties. This is included as a multiplier of the natural growth of the port zone, which has been estimated by linear regression based on the EU-wide trend in maritime and land transport.

E.4.4. Variable demand modelling

Overview

One of the key features of a travel demand model is the representation of passenger and freight demand response to cost changes. Generally speaking, there are three broad approaches to representing travellers' response to cost:

- a fixed demand approach, in which demand is independent of cost, and the trip matrix is adjusted using trip ends and no behavioural model is required;
- an own cost elasticity approach where demand in each cell of the trip matrix can vary, but the source of any variation is limited to the corresponding cell of the cost matrix only; or
- a full variable demand approach where demand in each cell of the matrix can vary according to demand in other cells of the trip matrix and costs in all cells of the cost matrix.

Fixed demand approaches have the quickest run times as they do not require the demand and assignment models to be run alternately. However, their use is only valid where it can be demonstrated that changes in cost will not generate a noticeable change in demand (commonly called induced traffic). As such, fixed demand models are inadequate for the analysis of large scale investment plans (such as the BA Corridor work plan), where relevant effect are expected in the use of transport modes.

Own-cost elasticity models do not constrain total demand according to the size of the population or the economy. This means they are not adequate for representing the transport market as a whole, which is a requirement in the case of BAMM, where the total multi-modal demand has to be constrained based on the socio-economic inputs.

Finally, variable demand models assume that (travel costs notwithstanding) the passenger trip rate for any given demographic segment is constant through time. A number of national surveys (for instance the UK National Travel Survey) support the validity of this assumption in terms of total trip rates.

With respect to freight, the assumption is that the volume of outgoing and incoming total freight volume are not dependent on costs, but rather only on the economic performance of the zone. In this case, this assumptions is actually an approximation, as freight movements are often part of a complex logistic chain, which means that the volume of loaded and unloaded units can vary based on the logistic model implemented at a certain time. However, variable model can still be applied, under the assumptions that no major logistic changes will be implemented in the manufacturing industry.

Based on the above considerations, the BAMM was developed as a variable demand model, where, under a constrained amount of passenger and freight demand (as determined by the tripend models described above), the values of each modal matrix are influenced by modal costs in a twofold way:

- the modal share between rail and road transport in each demand matrix cell is influenced by the respective generalized costs – this process is described in the **modal split model**;
- the structure of the total number of trips and freight movements between two zones is influenced by the combined modal proximity (measured by the logsum of the rail and road modal costs) of those two zones compared to the other zones – this process is described in the **distribution model**.

In a variable demand model, the performance of each transport system is described by means of a generalized cost function, which describe the users' perception of transport costs.

Generalized cost formulation

Passenger model – The generalized costs for passenger trips is the linear combination of the travel time and the monetary cost (including vehicle operating costs and tolls or user charges). In the BAMM, due to the predominance of travel time in the modal choice decisions, generalized costs for passengers are expressed in time units. Monetary costs are therefore converted to time units by means of appropriate value of times, which have been defined separately for each trip purpose in line with the HEATCO guidelines[5].

Vehicle operating costs for the passenger model only include variable costs (fuel and vehicle maintenance), while fixed costs (such as the vehicle purchase) are not included, as these are believed not to influence travel decisions at the trip level.

Freight model – For the freight variable demand modelling, only internal costs are included in the generalized costs (which are therefore expressed in monetary units), as they are considered to be dominant in the mode choice decisions.

For the definition of monetary freight transport costs, the formulation proposed by Janic (Modelling the full costs of an intermodal and road freight transport network, Transportation Research, 2007) was adopted. Internal costs include private operational costs and time costs of goods in the network.

Under the proposed approach, a transport network consists of two geographically separated areas, a shipping and a receiving area. In each area, several nodes represent places of respectively shipping and receiving. In both areas a terminal is situated. Throughout the network, goods are transported by means of standardized loading units like containers or swap bodies. An intermodal transport activity consists of five stages: pre-haulage, transhipment, main haulage by train, transhipment and post-haulage. A mono-modal road transport activity consists of three stages: a collection tour, transport from one area to the other and a distribution tour. No transhipment is needed. Total internal costs are defined as the sum of costs for each individual stage.

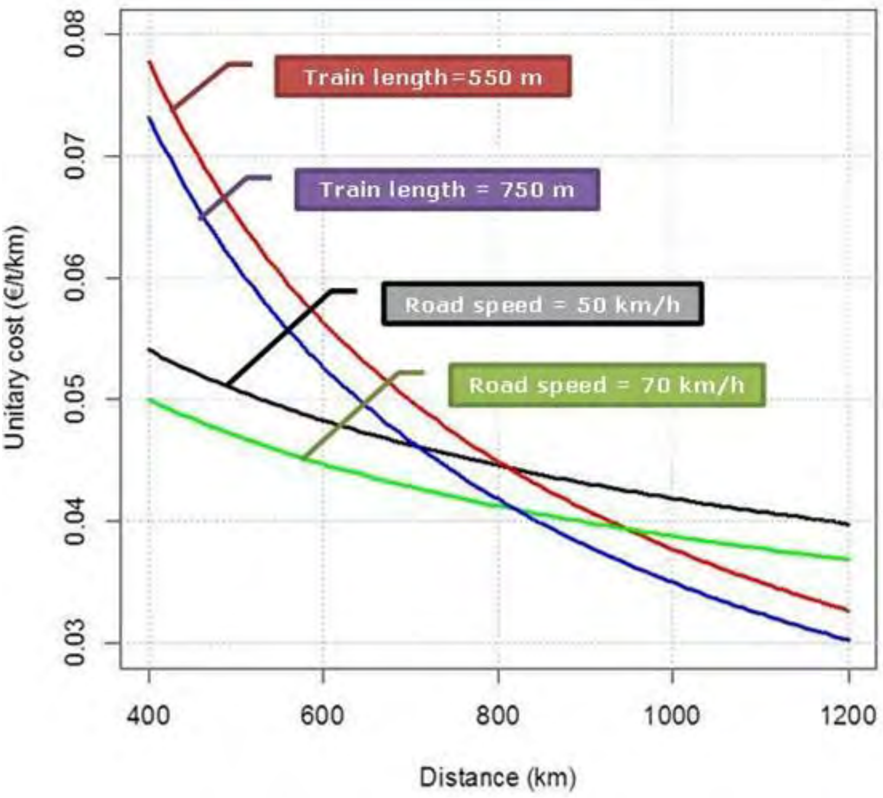
In our implementation of this model, the original formulation proposed by Janic with respect to intermodal rail transport was adopted as a measure of the rail transport as a whole. In the calibration of the modal split and distribution model, however, the cost function was scales to approximate the different competitive advantage of rail for the different commodity groups, also taking into account the relevance of traditional rail freight segment.

The figure overleaf provides an indicative comparison of rail and road unitary shipping costs curves as a function of transport distance. Two curves are shown for road, depending on the average network commercial speed (which influences driving costs, which are of high relevance for road transport); two curves are also shown for rail transport, in order to show the estimated effect of the network maximum operational train length.

In the figure, the break-even point of the two curves varies between 700 and 900 km, depending on the road network speed and the network maximum operational train length.

[5] See http://heatco.ier.uni-stuttgart.de/

Figure E34 Unitary rail and road transport cost curve



Source: BA Corridor study consortium adaptation of the model proposed by Janic (2007)

Modal split

Structural equations - In the modal split step, we allocate the passenger and commodity flows to the road and rail modes. Once base year matrices will be calibrated, future mode shares are calculated with an incremental binomial logit equation:

$$p_i = \frac{p_i^0 \exp(\Delta U_i)}{\sum_j p_j^0 \exp(\Delta U_j)}$$

Where:

- p_i is the forecast probability of choosing alternative i
- p_i^0 is the reference case probability of choosing alternative i (calculated from the input reference demand)
- ΔU_i is the change in the utility of alternative i, which is based on the change in the generalized costs, multiplied by the dispersion parameter that will be calibrated on the observed base year modal matrices.

Model calibration – Both for passenger and freight transport, the modal parameters were estimated with regression against the base year matrix values.

In the passenger model, the trip purpose segmentation was included by means of the different values of time included in the generalized cost formulation and different modal constant, whilst a unique dispersion parameter was estimated for all purposes. In fact, the statistical analysis revealed that no statistically different scale parameters could be estimated by purpose.

The passenger model was also corrected introducing a cost dampening effect, dividing the modal generalized cost difference by a function[6] of the average road and rail transport cost. Cost dampening is introduced to avoid overestimating users 'sensitivity to marginal cost changes in long distance trips.

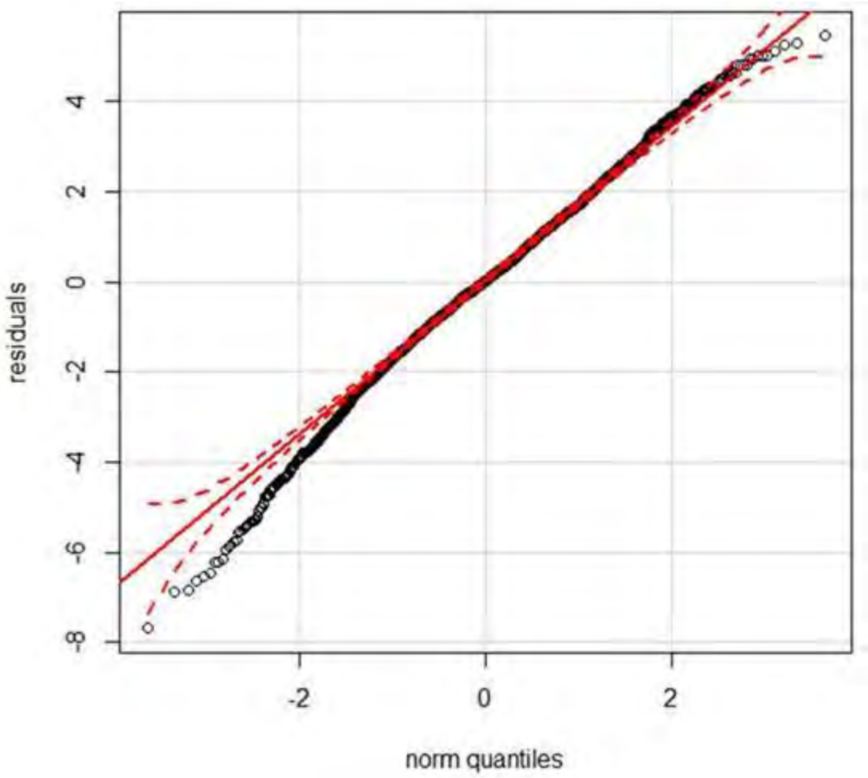
The parameters were estimated through non-linear least squares regression of the logarithms of the modal odds; the estimated values and the associated statistics are reported in the following table, which shows that both estimates were statistically different than zero.

Table E25 Regression statistics of the passenger modal split parameters

Parameter	Estimate	Standard Error	t-value	Pr(>|t|)
Dispersion	-0.026	0.00166	-15.765	< 2e-16
Cost dampening scale	0.00030	0.000090	3.375	0.000747

The graph below shows the Q-Q plot of the residual of the regression, which reasonably well matches the normal distribution required by the estimation method.

Figure E35 Quantile-quantile plot of the residual of the passengers' modal split model



The following table shows the overall fit of the model, aggregating the base year and modelled number of rail trips over all purposes by country of origin. The difference between the target and model values is always below 10%.

[6] 1 + exp(scale *average_travel_time(rail, road))

Table E26 Target and modelled inter-zonal rail trips (Mtrips/year) by country of origin

MGROUP	Model	Target	Difference
Poland	14.1	14.8	-5%
Czech Republic	8.2	8.8	-7%
Slovakia	3.1	3.4	-9%
Austria	16.8	17.6	-5%
Italy	19.3	20.9	-8%
Slovenia	1.0	1.1	-4%

For freight transport, different dispersion parameters were estimated for each commodity group, in order to capture the different cost sensitivities. As shown in the table below, some commodity groups were grouped in combined models to improve the statistical significant of the estimated parameters.

Table E27 Regression statistics of the freight modal split cost coefficient

NST/R Code	Regression R-squared	Dispersion parameter			
		Estimate	Standard Error	t-value	Pr(>|t|)
0	0.679	-0.111	0.012	-9.05	<2e-16
1 (*)	0.819	-0.141	0.024	-5.86	1.89E-07
2 (**)	0.741	-0.195	0.007	-26.49	<2e-16
3	0.791	-0.089	0.026	-3.41	0.00144
4	0.649	-0.127	0.008	-16.39	<2e-16
5 (*)	0.819	-0.141	0.024	-5.86	1.89E-07
6	0.633	-0.148	0.005	-30.01	<2e-16
7 (**)	0.741	-0.195	0.007	-26.49	<2e-16
8 (*)	0.818	-0.141	0.024	-5.86	1.89E-07
9	0.669	-0.154	0.015	-10.16	<2e-16

Note. Freight classes marked with asterisks were grouped in the modal split step

The following table shows the overall fit of the model, aggregating the base year and modelled number of rail freight movements over all purposes by country of origin. The difference between the target and model values is always below 10%.

Table E28 Target and modelled inter-zonal rail freight demand (Mtons/year) by country of origin

MGROUP	Model	Target	Difference
Poland	152.3	163.3	-7%
Czech Republic	39.7	40.3	-2%
Slovakia	14.9	16.2	-8%
Austria	36.9	37.2	-1%
Italy	27.1	29.5	-8%
Slovenia	8.7	9.4	-7%

Demand distribution

Structural equations - In the distribution step, the flows in passengers and goods transported between pairs of regions of origin and destination regions are estimated. Distribution for the base year is derived from the estimated matrices ; future matrices are estimated applying the projected trip-end to the base matrix trough a double-constrained gravity algorithm, applied incrementally:

$$T_{ij} = O_j \frac{B_j T_{ij}^0 \exp(\Theta \Delta U_{ij})}{\sum_k B_k T_{ik}^0 \exp(\Theta \Delta U_{jk})}$$

Where:

T_{ij} is the forecast number of trips travelling from zone i to zone j

T_{ij}^0 is the reference case number of trips travelling from zone i to zone j (calculated from the input reference demand)

ΔU_{ij} is the change in the utility of trip from zone i to zone j, which is based on the change in the logsum of the modal generalized costs (estimated in the modal split at the bottom of the hierarchy)

O_i is the number of trips travelling from zone i

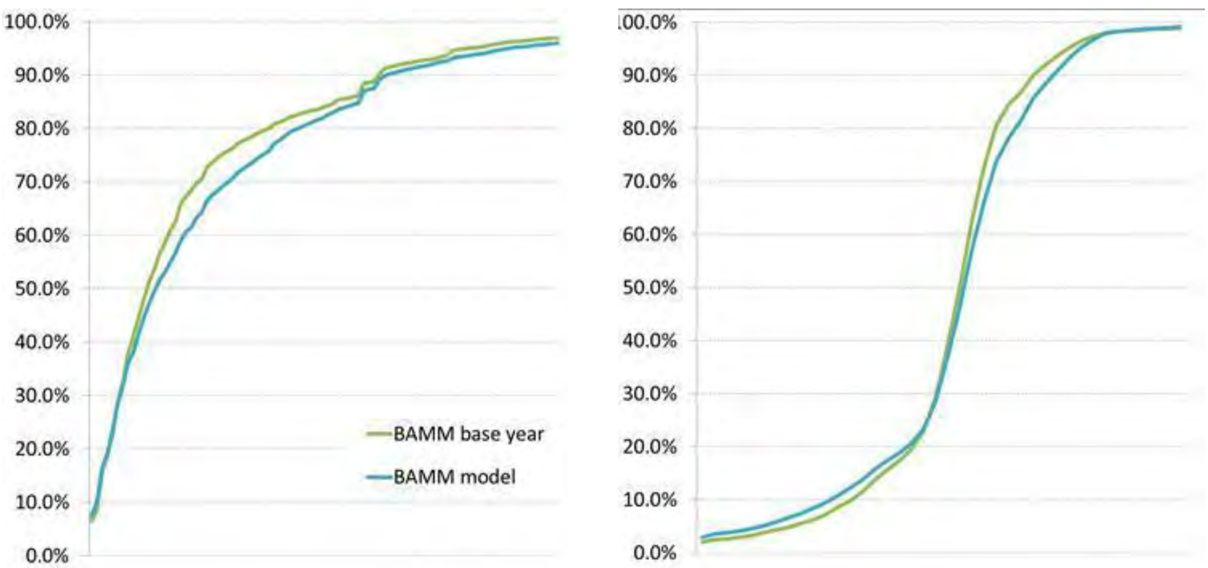
B_j are destination-based constants, normalized so that their sum is equal to the number of zones

Θ is the scaling parameter

Model calibration – Both for passenger and freight, the scaling parameter are estimated separately for each demand segment iteratively, ensuring that the target average utility (observed in the total base year matrices) is replicated by the model.

The graphs in the figure below shows that the calibrated models is able to fit well with the target cumulated trip cost distribution.

Figure E36 Target and modelled passenger and freight cumulated trip cost distribution



Passenger trips *Freight transport*

Note: Values on the X-axis are not shown as not meaningful – representing the logsum of the modal generalized costs

E.4.5. Network assignment and model validation on the corridor

Modal matrices are assigned separately to the each of the correspondent modal or combined networks describing the infrastructure that can be used by that mode of transport. Preloads were used to account for intra-zonal flows along the BA corridor, especially within the large urban areas.

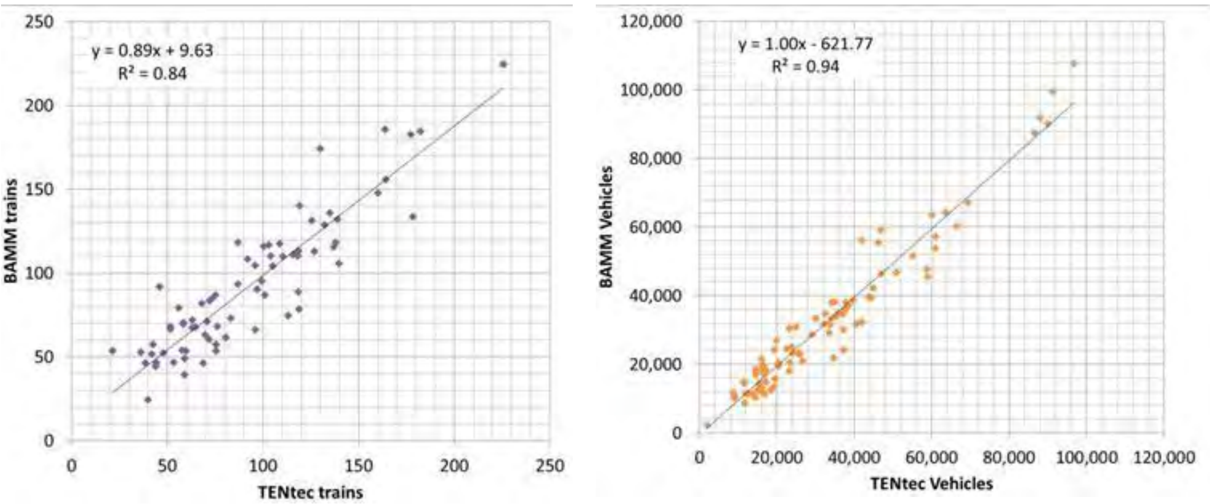
Taking into account the complexity and size of the study area, all assignments are link based (without explicitly coding time-table information), based on the following approach:

- Road assignment procedure takes into consideration a number of vehicle classes, which are assigned simultaneously within the traffic model. Prior to the assignment, G/A passenger and freight matrices are converted to O/D vehicle matrices, adopting unitary average load. The road assignment algorithm considers congestion (Stochastic User Equilibrium).
- Rail assignment is also based on stochastic procedure, based on average route cost and time. Passengers and freight trips are assigned separately. In order to develop infrastructure capacity analysis, passenger and freight flows are also converted to equivalent train flows, by means of unitary average load.

Each modal assignment produces link flows of passenger and commodities and mode-specific Level-of-Service (times, lengths and costs) on a zone-to-zone level. These indicators are then respectively used in the capacity analysis of the corridor infrastructure and in the overall assessment of the corridor performance.

As the TENtec sections were encoded in the assignment network, the average road and rail flows were computed at the 2014 forecasting year and compared to the flows encoded in the TENtec database and provided by the Infrastructure Managers. The graphs included in the figure below shows that the model replicates well the observed link flows.

Figure E37 Comparison of modelled and observed rail and road flows on the BA Corridor Corridor in 2014 by TENtec section

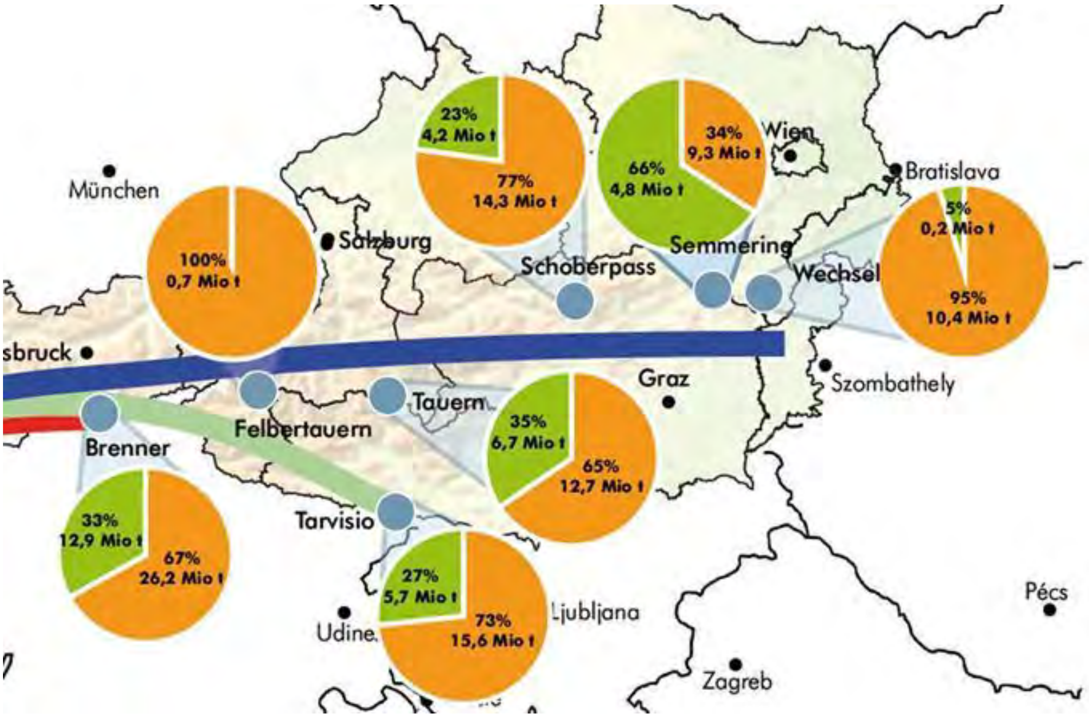


Total daily trains (passenger and freight) *Total daily vehicles (cas and trucks)*

It is worth mentioning that, in the analysis of the corridor infrastructure, observed train and vehicle flows were used, and that similarly future capacity issues were analysed applying incremental modelled growth rates to the base year observed flows.

A second validation of the full BAMM was undertaken with respect to cross-alpine rail and road freight flows monitored by the AlpInfo annual survey.

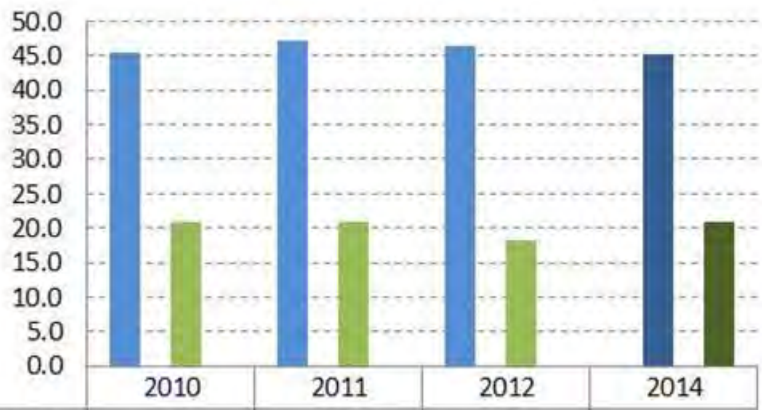
Figure E38 Cross-alpine traffic survey locations (AlpInfo)



Source: Austrian Ministry of Transport – Transport in figures (Ed. 2011, 2009 data)

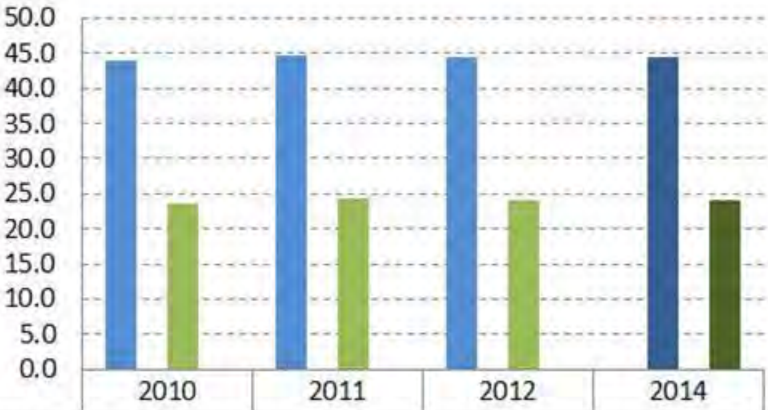
The two following figures shows that the model projections at 2014 is in line with the historical observed modal flows both for Sector A and Sector B corridor screenlines.

Figure E39 Observed and modelled cross-alpine freight flows by mode - Sector A (Feberltauern, Tauern, Schoberpass, Semmering, Wechsel)



	2010	2011	2012	2014
Road (Observed)	45.5	47.1	46.5	
Road (Model, 2014)				45.1
Rail (Observed)	20.8	21.0	18.3	
Rail (Model, 2014)				20.8

Figure E40 Observed and modelled cross-alpine freight flows by mode - Sector B (Brenner, Tarvisio)



	2010	2011	2012	2014
Road (Observed)	44.1	44.8	44.6	
Road (Model, 2014)				44.4
Rail (Observed)	23.7	24.4	24.2	
Rail (Model, 2014)				24.0

E.4.6. Environmental impact modelling

Databases containing external unitary emission factors and monetary costs for rail and road transport in function of country, vehicle type, fuel and railway-area/road type have been created. The databases correspond to time-horizons 2010, 2014 and 2030.

The external costs considered in our analysis cover the transport impacts on air pollution, noise and climate change. All these impacts are expressed in monetary terms (€/vehicle kilometre) with climate change and air pollution being expressed also in terms of grams per vehicle kilometre of C02 and each of the relevant pollutant (NOx, NMVOC and SO2) respectively.

The 2010 databases has been constructed through an aggregation of data retrieved from "Update of the Handbook on External Costs of Transport" (Ricardo-AEA, 2014) commissioned by the European Commission DG MOVE.

With respect to road transport mode, the 2030 database has taken into account two main hypotheses:

- The EURO emission class share (equal for all BA Corridor countries) will change moving substantially towards EURO 6 for cars and EURO VI for HGV. The quantitative forecast is retrieved from "Projection of SO2, NOx, NMVOC, NH3 and particle emissions 2012 -2035" made by Danish Centre for Environment and Energy and Aarhus University.
- The 2030 fuel type share is the result of linear interpolation between the current fuel type share (different from country to country) and the 2050 fuel type share which is assumed equal for all Member States. The 2010 fuel type share is retrieved from "Dieselisation in EEA" in the European Environment Agency website while the 2050 one from "EU energy, transport and GHG emissions: trend to 2050" (European Commission, 2013).

Noise costs have been assumed constant – which is considered a conservative assumption, as it might be lower in the future scenarios thanks to technology innovation.

In terms of grams per vehicle-kilometre a decrease of pollution and CO_2 emissions occurs thanks to two principal factors:

- Introduction of vehicles using green fuels than diesel and petrol such as hybrid and electric vehicles which will obtain larger and larger portion in the vehicle type share;
- Evolution of EURO emission class share with regard to diesel and petrol vehicles where EURO 6 cars and EURO VI HGVs will subtract relevant portion share from the elder EURO emission classes.

Concerning rail transport mode, vehicle innovation has not been considered since no information about train consumption innovation has been available.

The fields and related alternatives of the rail definition of emission factors are:
- Country:
  - Poland;
  - Czech Republic;
  - Slovakia;
  - Austria;
  - Italy;
  - Slovenia;
- Vehicle type:
  - Passenger Locomotive;
  - Freight Locomotive;
- Fuel type:
  - Diesel;
  - Electricity;
- Area type:
  - Rural.

The road aggregation instead are as follows:
- Country:
  - Poland;
  - Czech Republic;
  - Slovakia;
  - Austria;
  - Italy;
  - Slovenia;
- Vehicle type:
  - Cars;
  - Heavy Goods Vehicles;
- Road type:
  - Interurban roads;
  - Motorways.

All the possible combinations of the variables above have been computed. Therefore for both time-horizons (2010 and 2030) output tables have been built.

Finally possible has been to express the results in function of passengers kilometres and tonnes kilometres in spite of vehicle kilometres. To do this, it has been assumed an average occupancy of 1,4 persons per car, 9 tonnes per heavy vehicle. For freight, the standard valued already provided in the Handbook have been used.

E.5. Scenario modelling and results

E.5.1. Scenario definition

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 and the current corridor infrastructure (as in scenario 2014);
- **2030WP** (Work Plan scenario at 2030) – describing the interaction of the travel and transport demand at 2030 (as in scenario 2030T) and the corridor infrastructure improved based on the major rail and road investments included in the corridor work plan;
- **2030RP** (Rail Policy scenario at 2030) – describing the interaction of the travel and transport demand at 2030 and the corridor infrastructure improved based on the major rail and road investments included in the corridor work plan (as in scenario 2030WP), combined with policy and administrative measures aimed at reducing by 20% the generalized transport cost of the rail mode compared to the road transport (such as the internalization of the total transport costs, the promotion of more attractive rail services, the effect of the on-going liberalization process in railways and the IV railway package, the removal of administrative and operational barriers); this last assumptions does not constitute an assessment of the likely impact of these measures, but it is only aimed to provide an indication about the magnitude of the possible modal shift and its implication on the available rail capacity on the corridor.

E.5.2. Generated and attracted transport demand

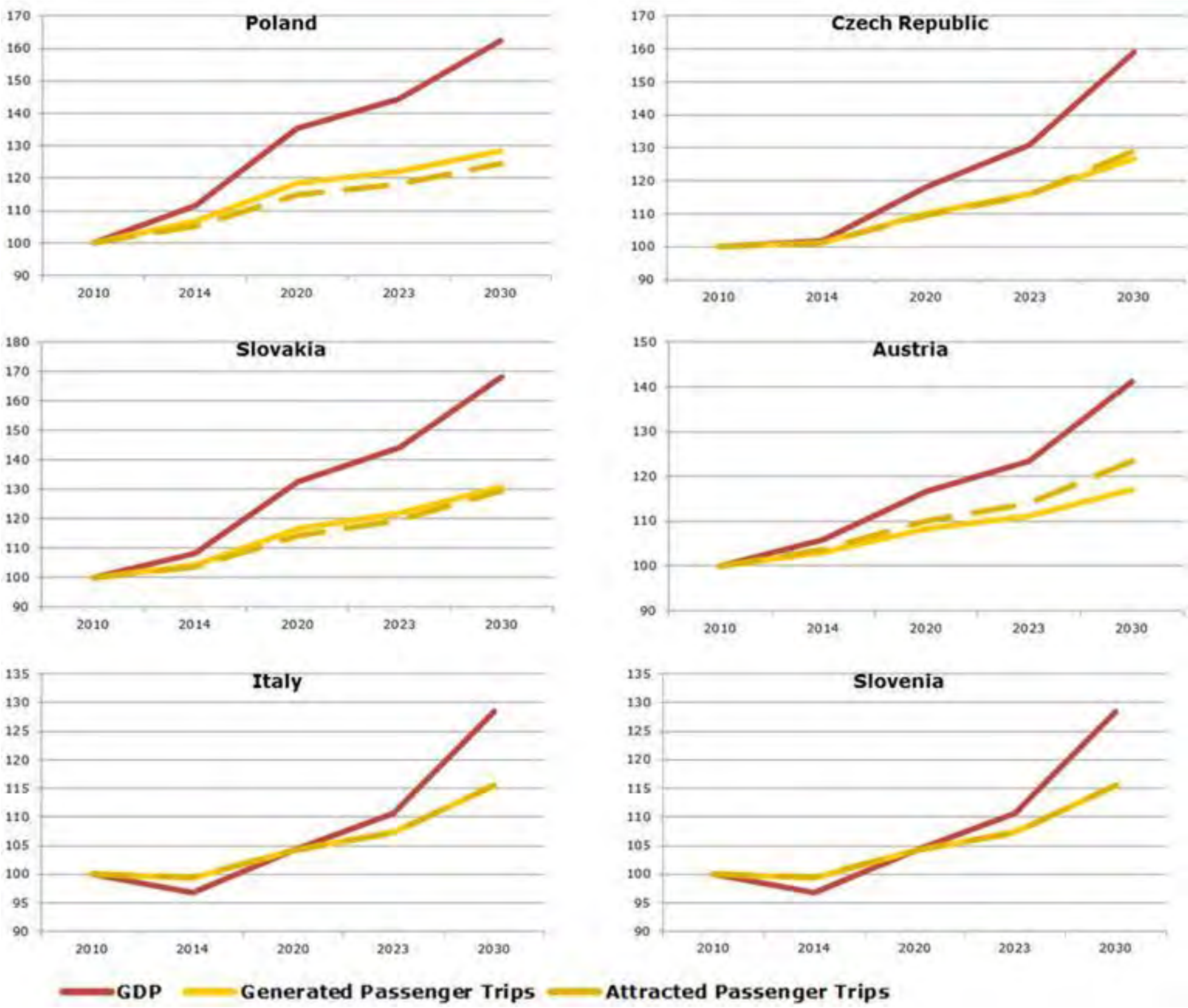
The results of our BAMM model for both passengers and freight tripend growth are illustrated in the sections below. Worth adding here that the BAMM model takes into account the trip rates (i.e. individual trips) based on the GDP per capita growth whereas the total trips depend on the population growth.

Passengers' Trips

As a result of the BAMM demand model as explained in the previous section, the following figures show the 2010-2030 trend of the passenger trips along the BA Corridor per each country.

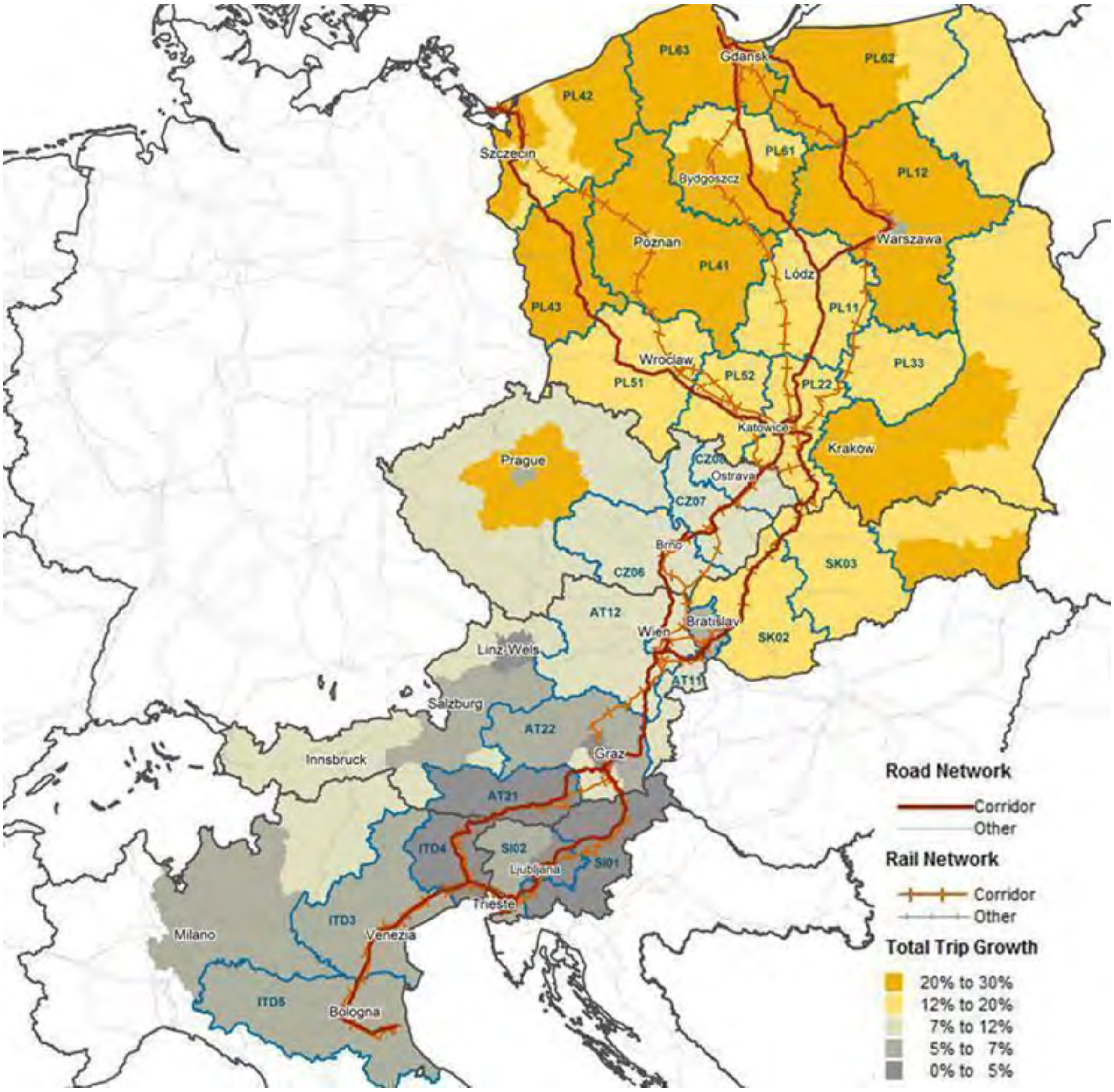
The passenger trips forecasts are also compared to the GDP 2010-2030 trend based on the data from the *OECD statistics*. As shown, the growths of the passengers trips are in line with the GDP ones; the trend is positive, particularly for Poland, Czech Republic and Slovakia.

Figure E41 Passenger trips growth forecasts



The maps below and overleaf show our forecasts on the passengers' trips growths along the BA Corridor. These growths can be explained on the basis of the socio-economic drivers (population and GDP per capita) we used to generate the model as also mentioned above. More in detail, the figure below represents the 2010-2020 medium term outlook passengers' trips growth.

Figure E42 2010-2020 Passengers trips growth

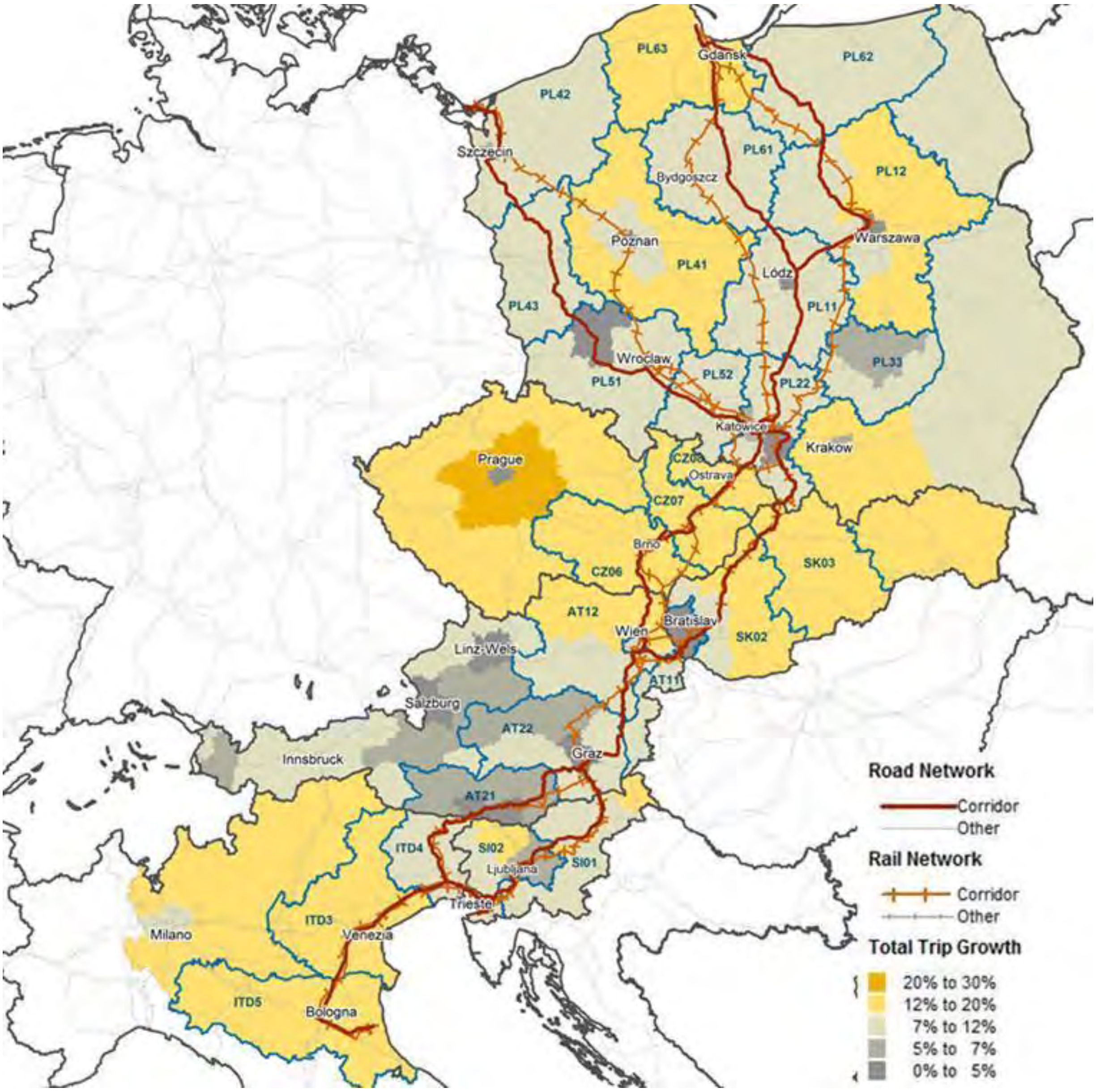


Source: BA Corridor study consortium

As shown in the map above, the figures are in line with the GDP per capita growth trends; indeed, in Poland and in Slovakia the passengers' trips will have the higher growth rates.

In the 2020-2030 period, in Italy and Czech Republic there will be a very high growth of passengers' trips between 12%-20%. This could be explained by the positive long-term GDP projections for these countries and particularly for Italy also the population trend. In Austria the trips rates will be almost stable as in the 2010-2020 period (around 5%-12%) reflecting the ageing demographic profile which could impact on the productivity growth, whereas in Slovenia will generally increase in line with the boost of the GDP growth from 2020 as presented above; more in detail, in the area surrounding the Capital City, Ljubljana, the trips growth rates will significantly grow.

Figure E43 2020-2030 Passengers trips growth



Source: BA Corridor study consortium

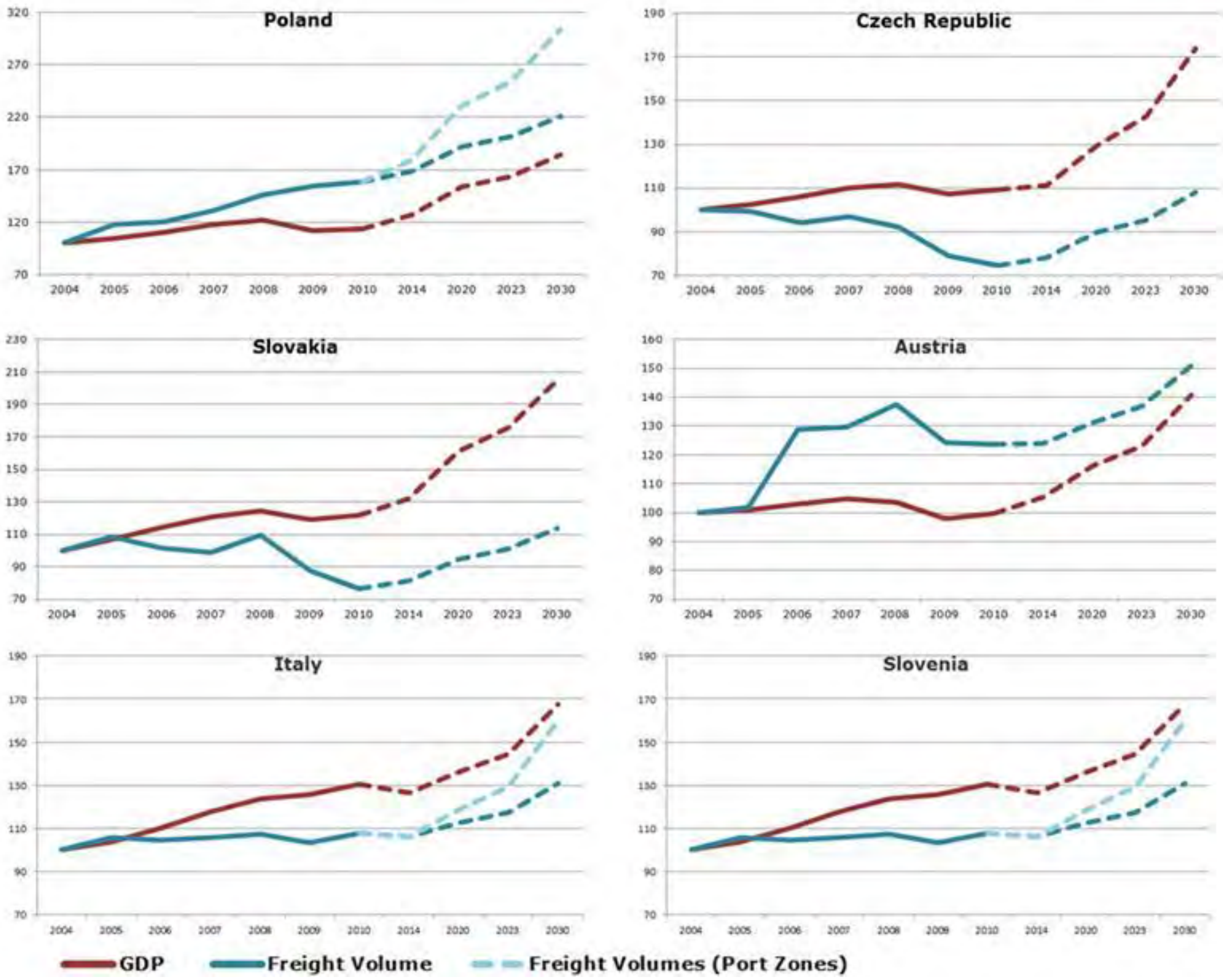
Freight demand

The graphs below show the historical and future trend of the freight volumes grouped by member state also compared to the GDP trend.

As also mentioned above, the forecasts are based on the historical Eurostat data (2004-2010 period) then applying the appropriate growth rates for the 2014-2030 period. These growth rates have been obtained by adopting the forecasts at the NSTR and NUTS2 level from the freight model.

It is worth adding that the effect of the foreseen increase of goods in the core maritime port areas have been also considered in our freight forecasts; it is particularly the case for Poland, Italy and Slovenia as shown in the following figures (freight volumes (port zones) in dashed cyan line).

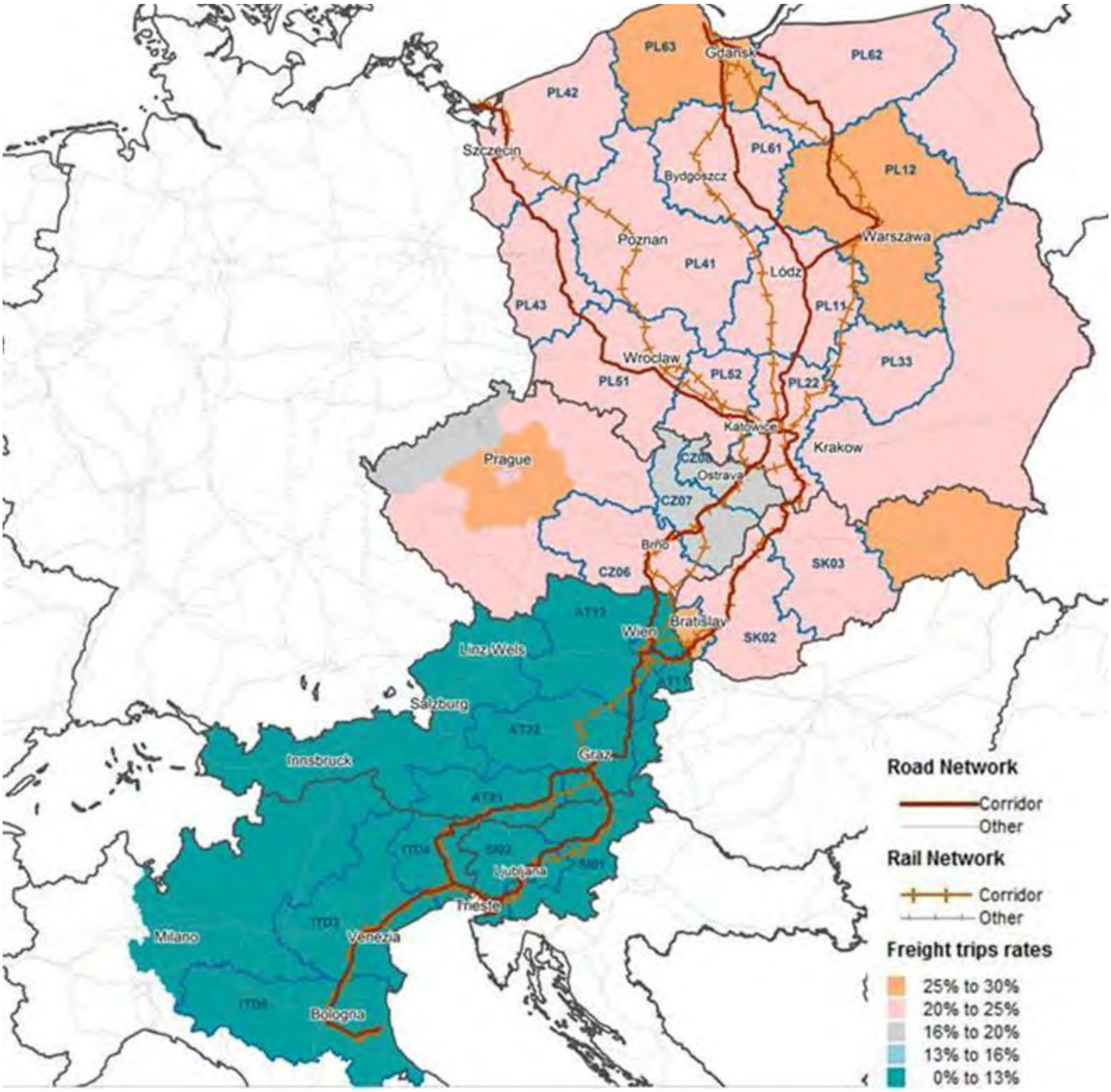
Figure E44 Freight loaded/unloaded volumes growth forecasts



Note. Historical trend (2004-20100 is based on Eurostat data

The figures below show the 2010-2020 freight growth along the BA Corridor. As for the passengers trips growth, freight growth can also be partly explained on the basis of the socio-economic drivers (GDP in particular). The most significant freight growth during the 2010-2020 period is expected to be in Poland, Czech Republic and Slovakia also accordingly to the positive GDP trends of these countries.

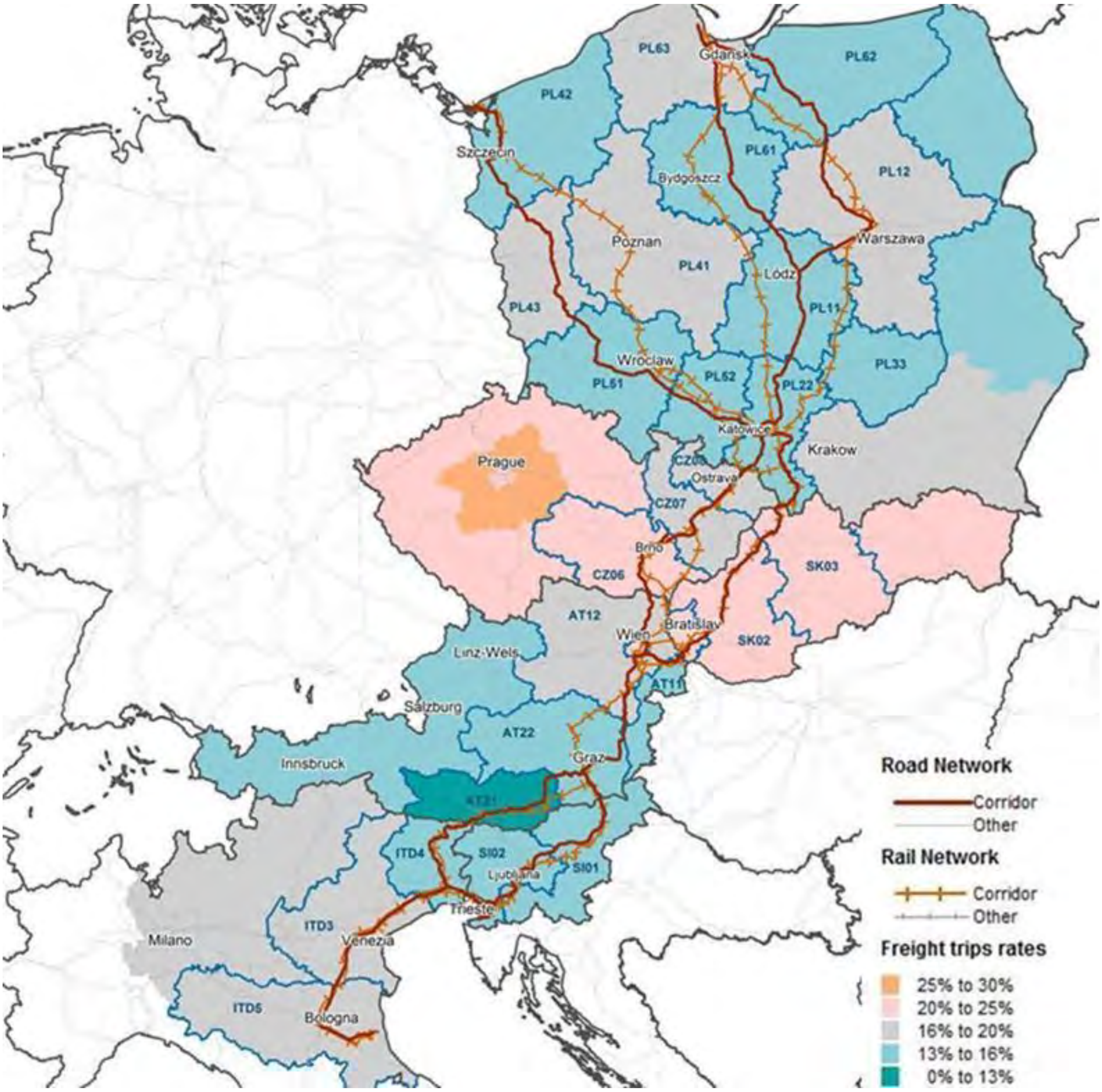
Figure E45 2010-2020 Freight trips growth



Source: BA Corridor study consortium

With regard to the 2020-2030 period, freight growth is higher in the Czech Republic and Slovakia. Growth in the other countries of the BA Corridor will be generally lower, in line with the long-term GDP projections for these countries.

Figure E46 2020-2030 Freight growth



Source: BA Corridor study consortium

E.5.3. Key performance indicators

In the interpretation of the results of our TMS, the scope of our 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 quantities.

Notwithstanding these limitations, by comparing the outcomes in the different scenarios, the analysis provide some clear indications concerning the main trends in the transport performance by mode and the potential effects of the rail and road transport investments included in the work plan, also combined with policy measures aiming at supporting the use of railway and environmentally friendly transport systems.

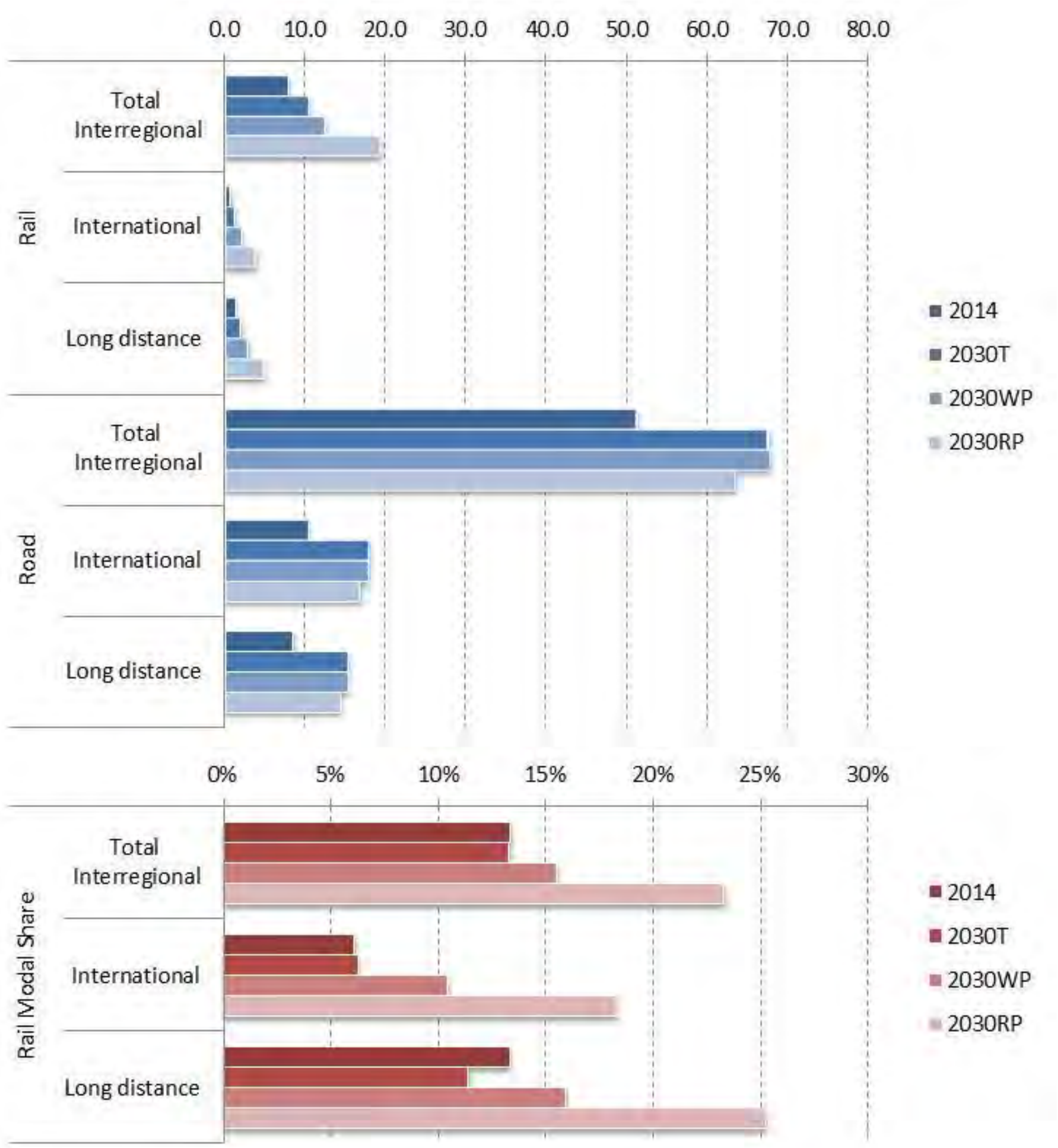
Transport performance indicators

The results presented in the following charts are focused on the interregional[7], 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 model share is around 13% for passengers (measured in pax*km) and 19% for freight (in tons*km); the rail modal share is significantly higher for long distance freight transport (39%); it is worth noting in this respect that the corridor already satisfy the 2030 freight modal share target of the 2011 White Paper (30% rail share on transport longer that 300 km);
- The transport demand is expected to grow significantly by 2030, both on rail and road, although with a reduced pace that the historical observed trends. In the do-nothing scenario, the growth in the total inter-regional demand along the corridor is around 32% for passenger and 33% for freight;
- Without any significant investment, rail share is expected to be stable for passengers (13%) and slightly decline for freight (18%), due to a combination of increasing car ownership (especially in the Eastern European countries) and the pattern of regional demographic development;
- The investments in rail and road infrastructure, as included in the corridor work plan, have a positive, although limited, effect in counterbalancing this trend, with rail demand overcoming the current market shares (15% for passengers and 21% for freight), with major increases in the international and long distance segments;
- The results of the last scenario (2030RP) show that additional policy and administrative measures could contribute to a great extent in the promotion of rail transport, with market shares rising to 23% of interregional demand for passenger and 24% for freight (43% for long distance transport). While these changes may appear limited in terms of modal shift, the combination of this shift and the natural growth of the rail market will lead, under this scenario to double the rail volumes compared to the current situation – which, as further discussed in the final section of this Chapter, may induce potential capacity issues on the BA corridor.

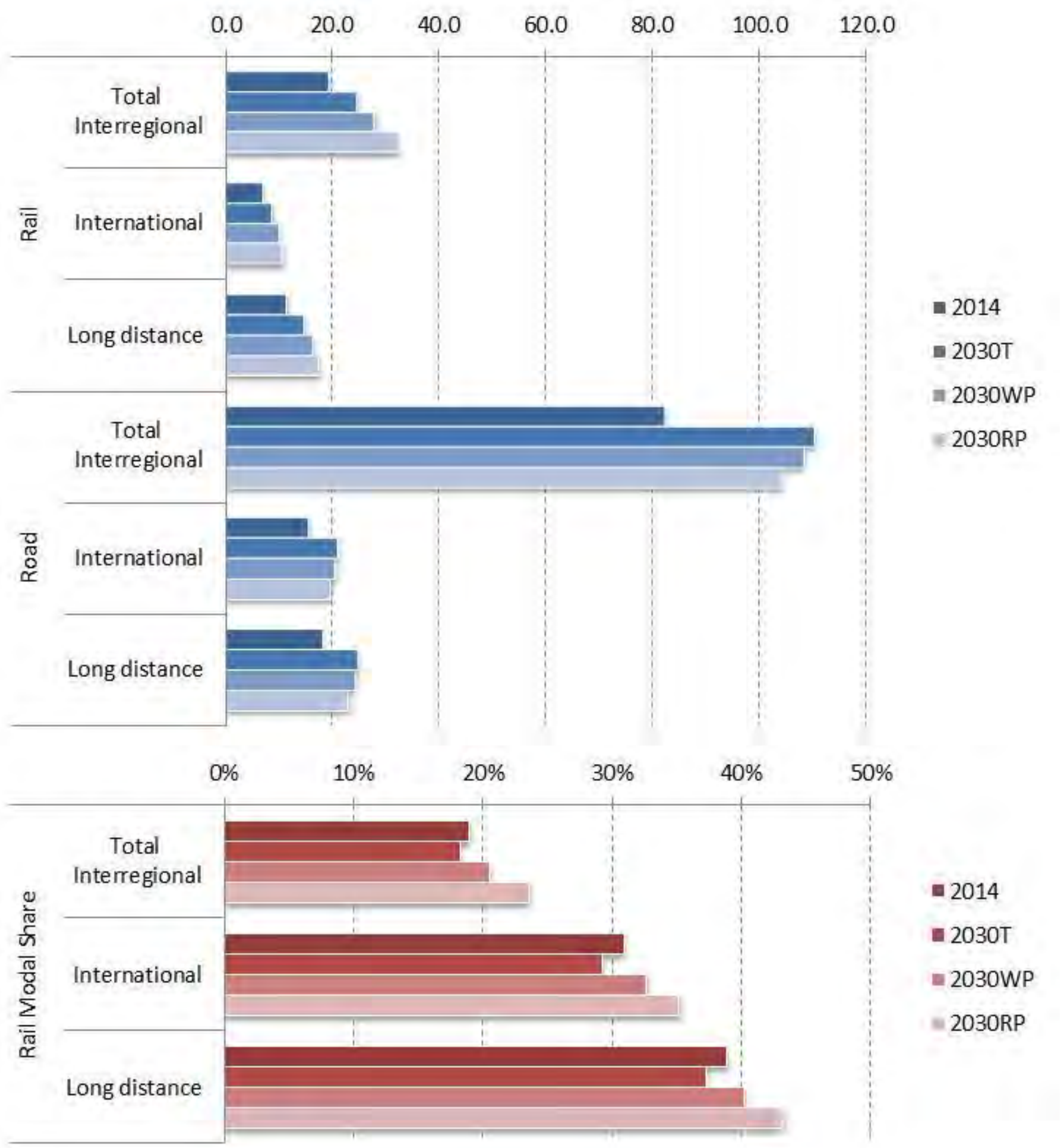
[7] The inter-regional demand include only trips occurring between two distinct NUTS2 regions both located along the BA corridor alignment. The long distance demand includes inter-regional trips longer than 300 km.

Figure E47 Performance and modal share of the BA transport modes (millions of pax*km/year)



Source: BA Corridor study consortium

Figure E48 Performance and modal share of the BA transport modes (millions of tons*km/year)



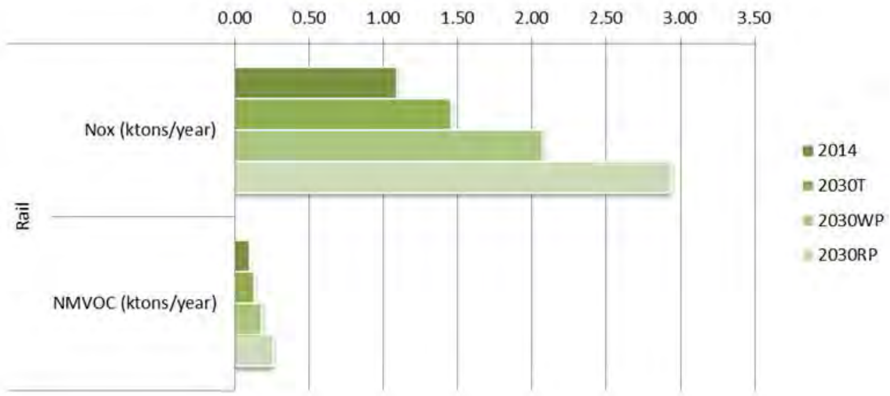
Source: BA Corridor study consortium

Environmental benefits for long distance flows

Once the rail and road traffic are computed, the external costs are obtained by multiplying passengers-kilometres and the tonnes-kilometres by the aggregated unitary external costs based on the country and the time-horizons(2010 unitary costs for 2010 and 2014 scenarios, 2030 unitary costs for 2030 Trend, Plan and White Paper scenarios). For those rail and road traffic values whose the origin region is in a different country than the destination region, the external unitary cost will be related to the origin region (i.e. passengers-kilometres from Wien (AT) to Emilia-Romagna (IT) will be multiplied by the unitary external costs of Austria).

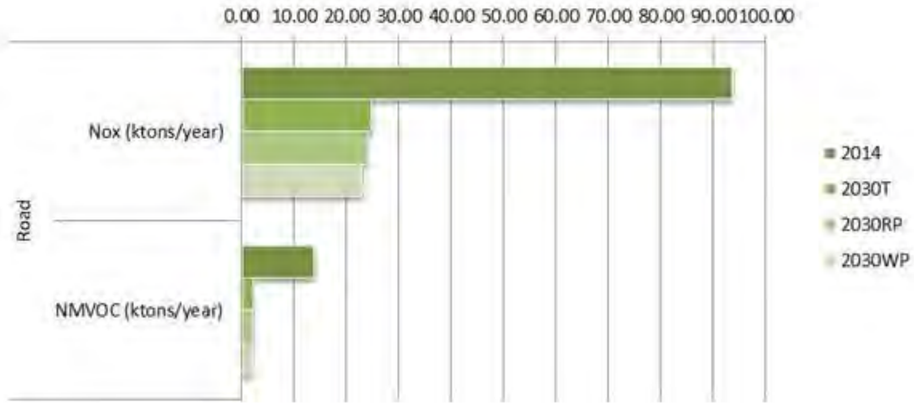
The following graphs show the amount of pollutants and CO2 emissions for rail and road for each scenario.

Figure E49 Rail pollutant emissions



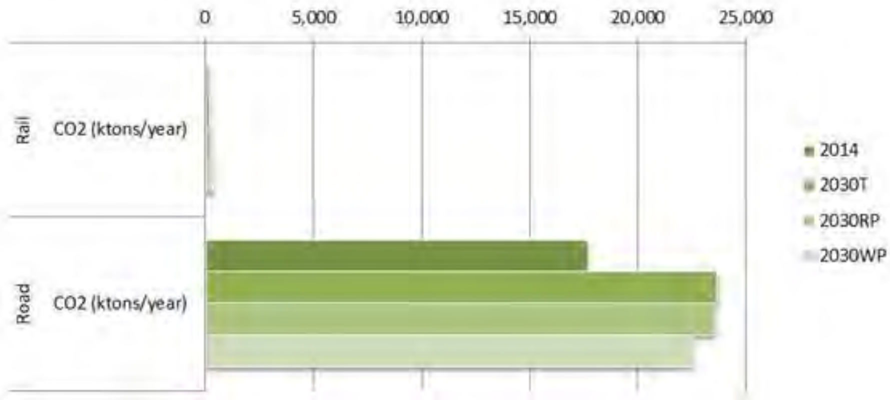
Source: BA Corridor study consortium

Figure E50 Road pollutant emissions



Source: BA Corridor study consortium

Figure E51 Co2 emissions



Source: BA Corridor study consortium

It is worth noting the effects of modal shift in 2030 scenarios: rail pollutant emissions generally increase while road pollutant emissions decrease. Given that the latter have substantially higher emission factors (notwithstanding the technological improvements), the net result is a decrease in emissions.

By focusing the three 2030 scenarios, in the Rail Policy scenarios the modal shift is even more significant. Also with regards to CO2 emissions in this scenario the situation improves.

E.5.4. Passenger and freight flows on the network

In this section, we provide graphical diagrams showing the distribution of traffic flows on the corridor network, separately for rail / road and passenger/freight traffic.

Rail transport flows along the corridor

The map overleaf illustrates the results of the assignment model at the base year, showing the qualitative distribution of rail passenger using the BA corridor in 2010. The colour code highlights transport flows exchanged with other EU corridor or the rest of the rail network (in grey). We note that rail passenger flows along the corridor are higher on the corridor sections in Italy and Austria.

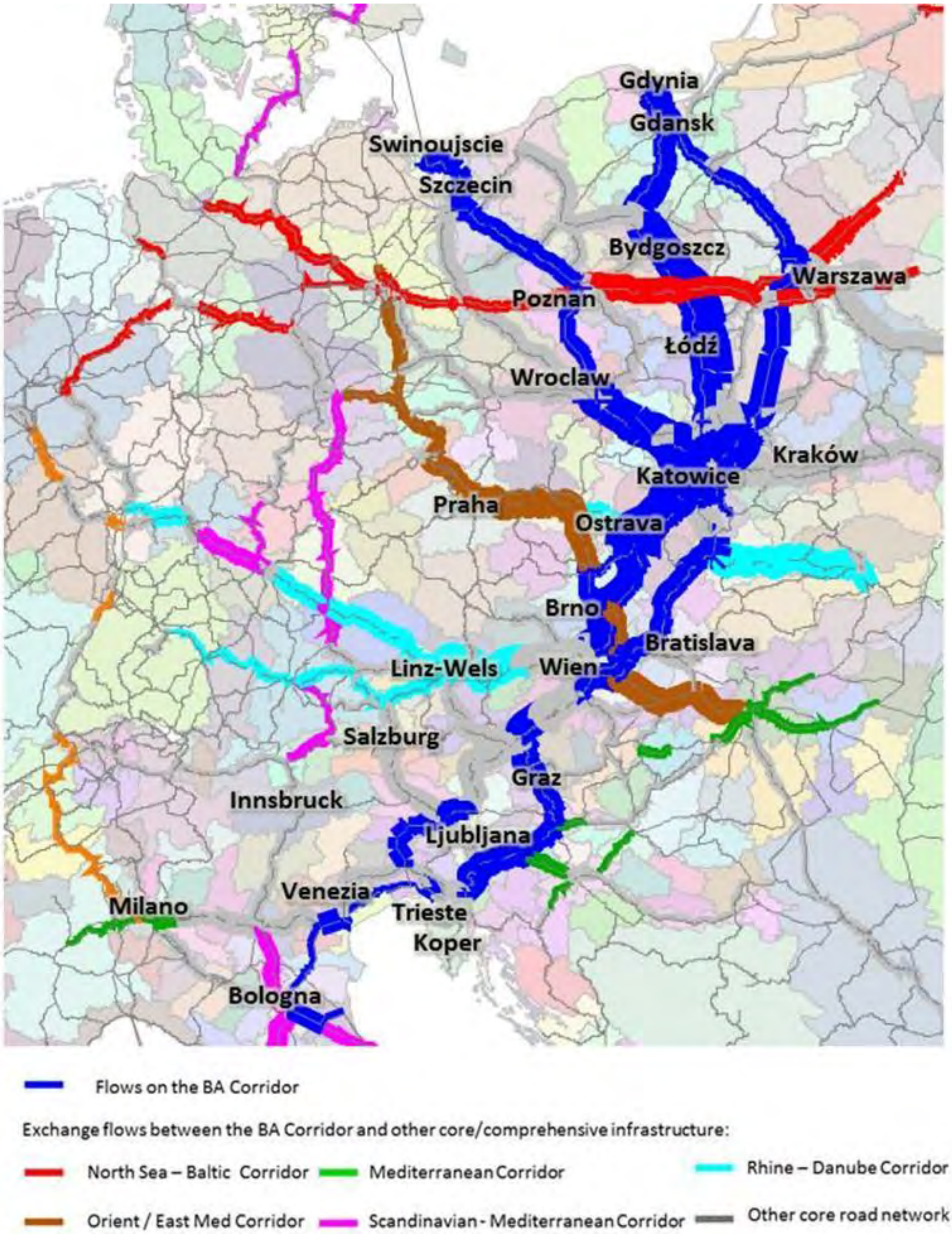
The key functional interconnections in terms of transport flows are in Italy with the Mediterranean and Scandinavian-Mediterranean Corridor, in Austria, Czech Republic and Slovakia with the Rhine – Danube corridor and the Orient / East Med Corridor and in Poland with the North Sea – Baltic corridor.

Figure E52 2014 Rail passenger flows along the BA corridor

Note. The width of the band is proportional to the traffic (pax/day)

With respect to freight traffic, rail flows are more relevant in the Northern section of the corridor, due to the high volumes of internal transport in Poland between ports on the Baltic and the densely populated and industrial areas in Silesia.

Figure E53 2014 Rail freight flows along the BA corridor



Note. The width of the band is proportional to the traffic (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic flow

Road transport

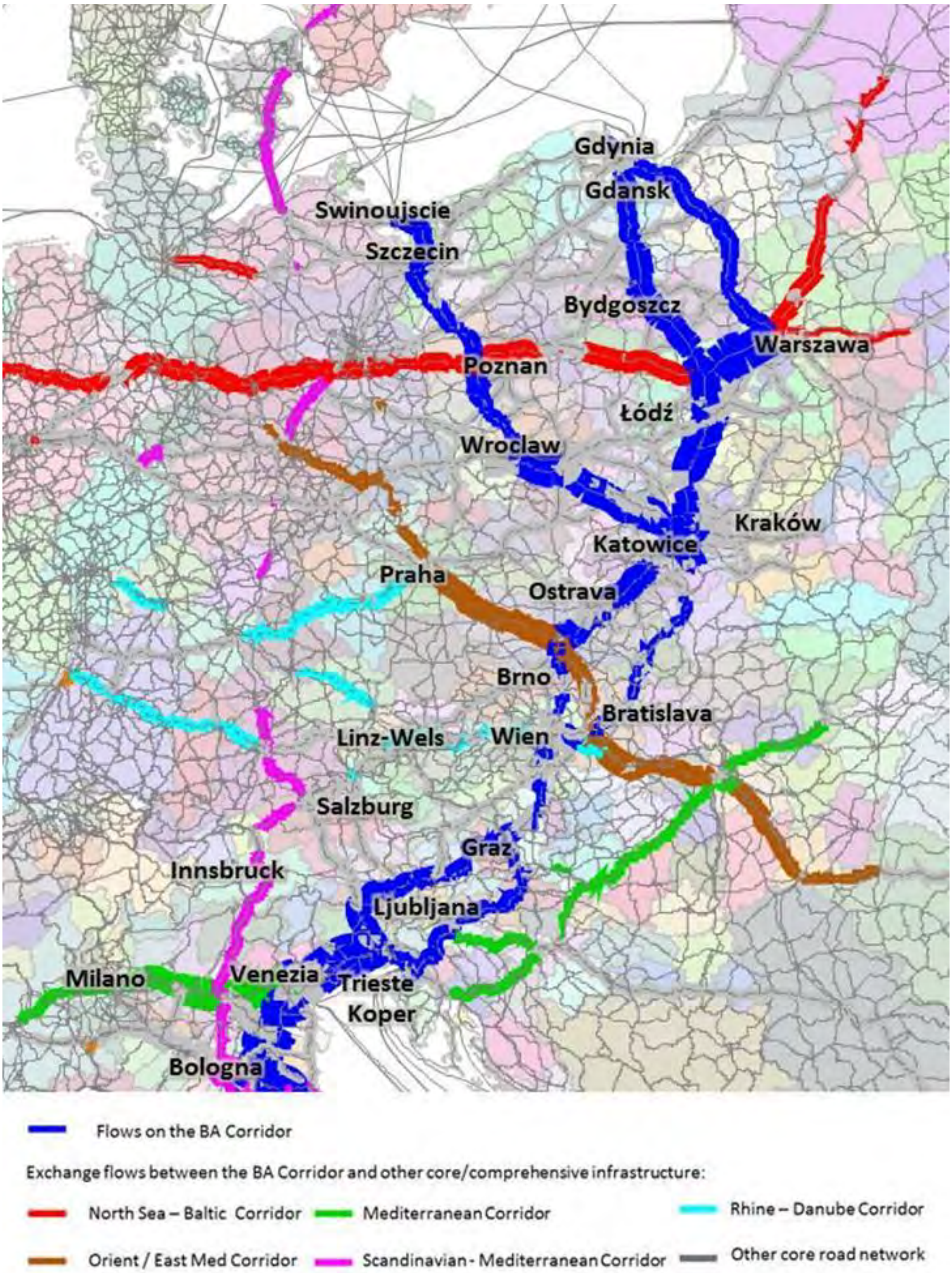
Passenger flows are quite evenly distributed along the corridor, with volumes below the average along the alpine crossings and on the road links in Northern Poland (North of Warszawa and Wrocław). Networks effects are specifically relevant for road traffic, with high volumes exchanged both with the interconnecting EU core network corridors and the rest of the core, comprehensive and secondary network.

Figure E54 2014 Road passenger flows along the BA corridor

Note. The width of the band is proportional to the traffic (pax/day); no appeareance of the bandwidth on the map does not mean that there is no traffic flow

Road freight flows along the corridor reaches the highest volumes in the Southern Italian sections (especially for internal transport, where rail freight has a relatively low market share)

Figure E55 2014 Road freight flows along the BA corridor



Note. The width of the band is proportional to the traffic (tons/day); no appearence of the bandwidth on the map does not mean that there is no traffic flow

Growth in rail transport flows

In this section we show how the predicted growth in the transport demand between 2010 and 2030 is distributed in the network. These results correspond to the *do-nothing* scenario, i.e. we do not include any effect of the planned improvements on the transport networks or services. Therefore, growth is only due to the projected growth of the originated and attracted demand of personal travel and freight.

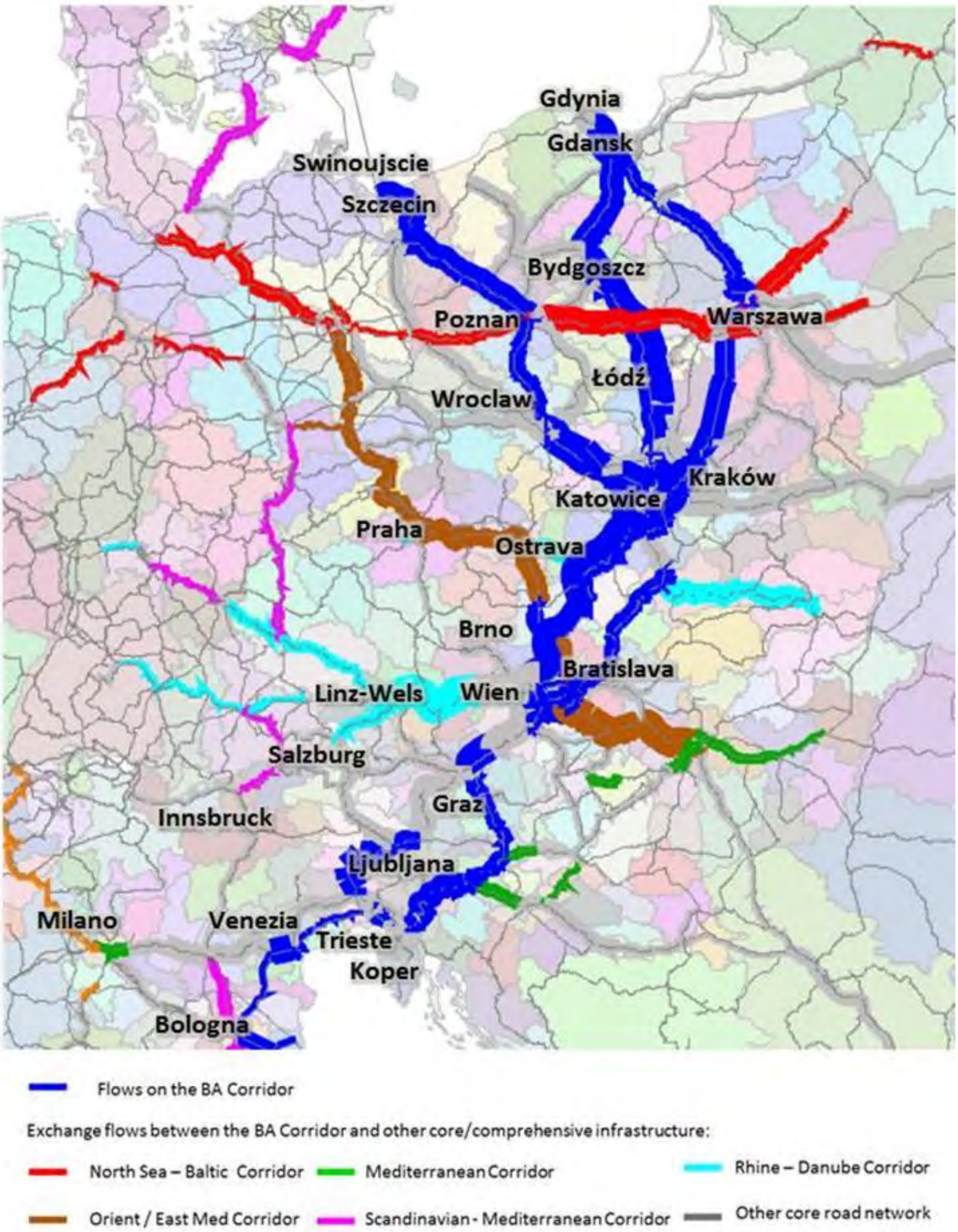
Figure E56 2010-2030 Growth in rail passenger flows along the BA corridor (*do-nothing* scenario – 2030T)

Note. The width of the band is proportional to the absolute traffic growth (pax/day); no appeareance of the bandwidth on the map does not mean that there is no traffic flow

Growth in the passenger rail transport flows along the corridor is distributed on most links; in absolute terms, flows increase in the most densely populated areas in all corridor countries.

The absolute growth in freight transport flows is again concentrated mostly in Northern Poland, in line with the currently observed distribution.

Figure E57 2010-2030 Growth in rail freight flows along the BA corridor (*do-nothing* scenario – 2030T)

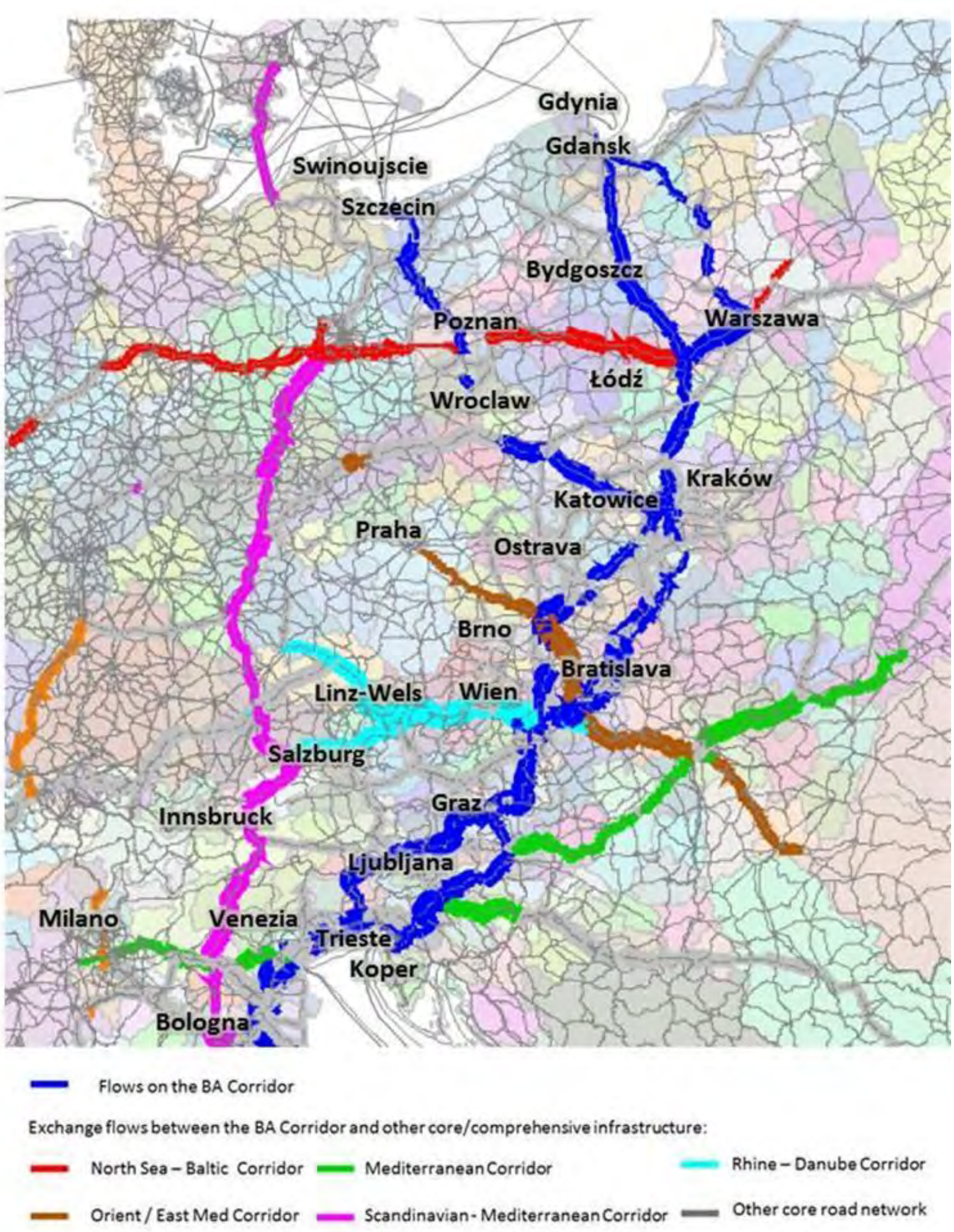


Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic flow

Growth in road transport flows

Absolute growth of transport volumes for passenger and freight is in line with the current distribution of traffic flows and with the expected projected growth.

Figure E58 2010-2030 Growth in road passenger flows along the BA corridor (*do-nothing* scenario – 2030T)



Note. The width of the band is proportional to the absolute traffic growth (pax/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

Figure E59 2010-2030 Growth in road freight flows along the BA corridor (*do-nothing* scenario – 2030T)

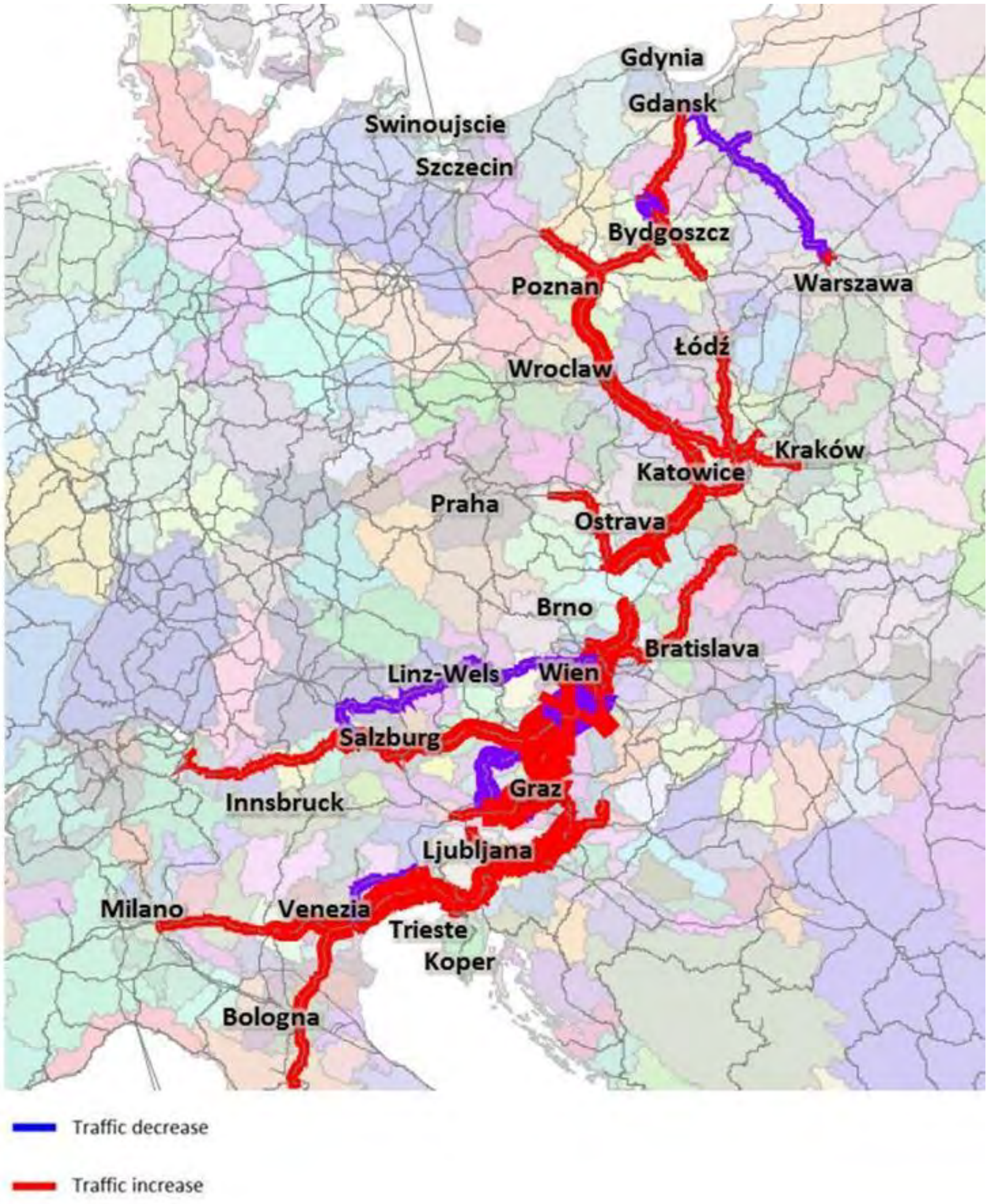
Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

Over the entire period 2010-2030, the results of the *do-nothing* scenario shows that the evolution of the transport market confirms the current situation, both in terms of modes and geographic distribution.

In relative terms, growth is faster in the Northern countries, due to progresses in the socio-economic catch-up of Poland to the Western European countries and the further development of Slovakia and Czech Republic.

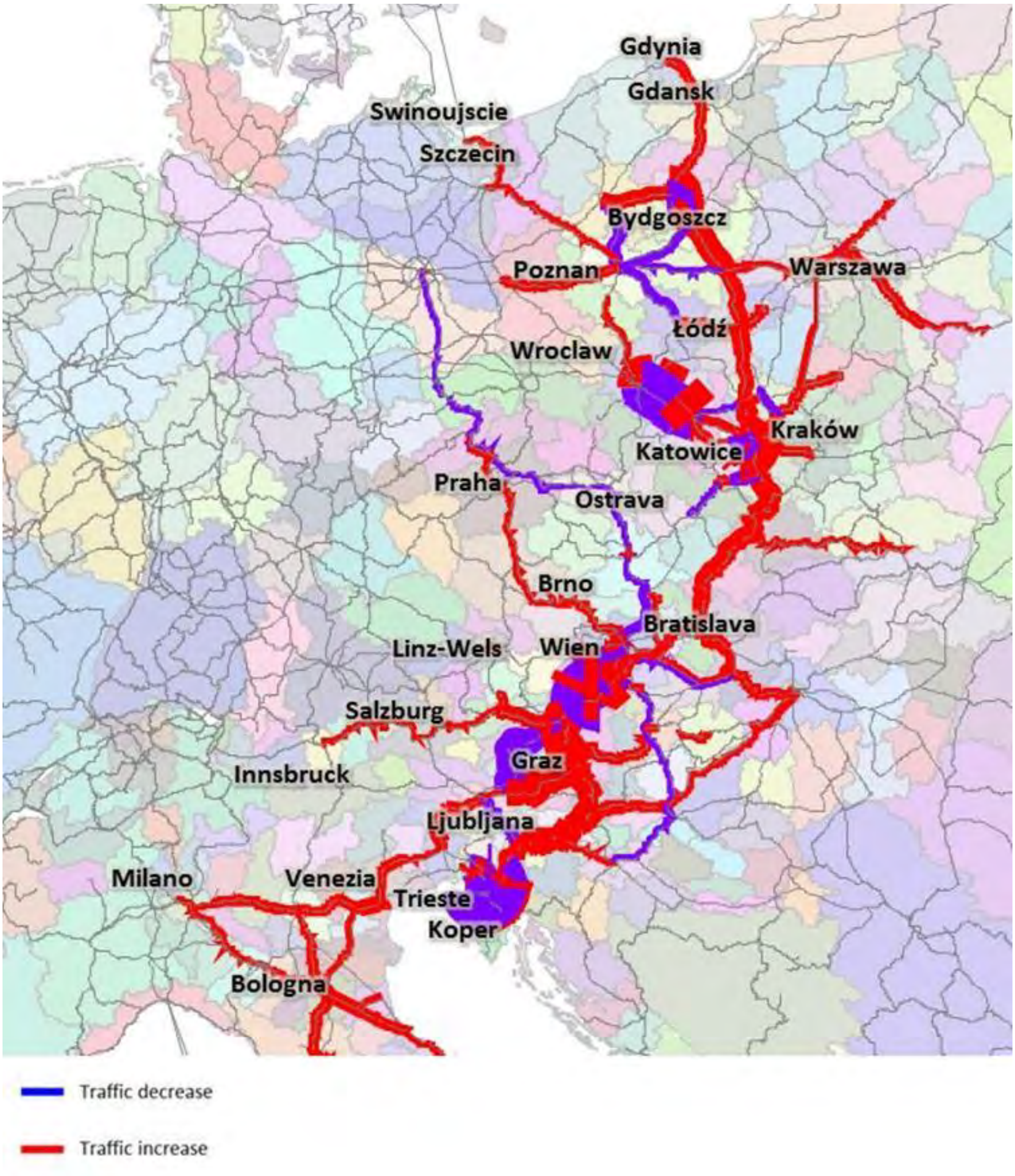
The following diagrams shows the step-by step changes in passenger and freight flows moving from the 2030 trend scenario to the work plan scenario and the rail policy scenario.

Figure E60 Changes in rail passenger flows along the BA corridor (*2030WP-2030T*)



Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

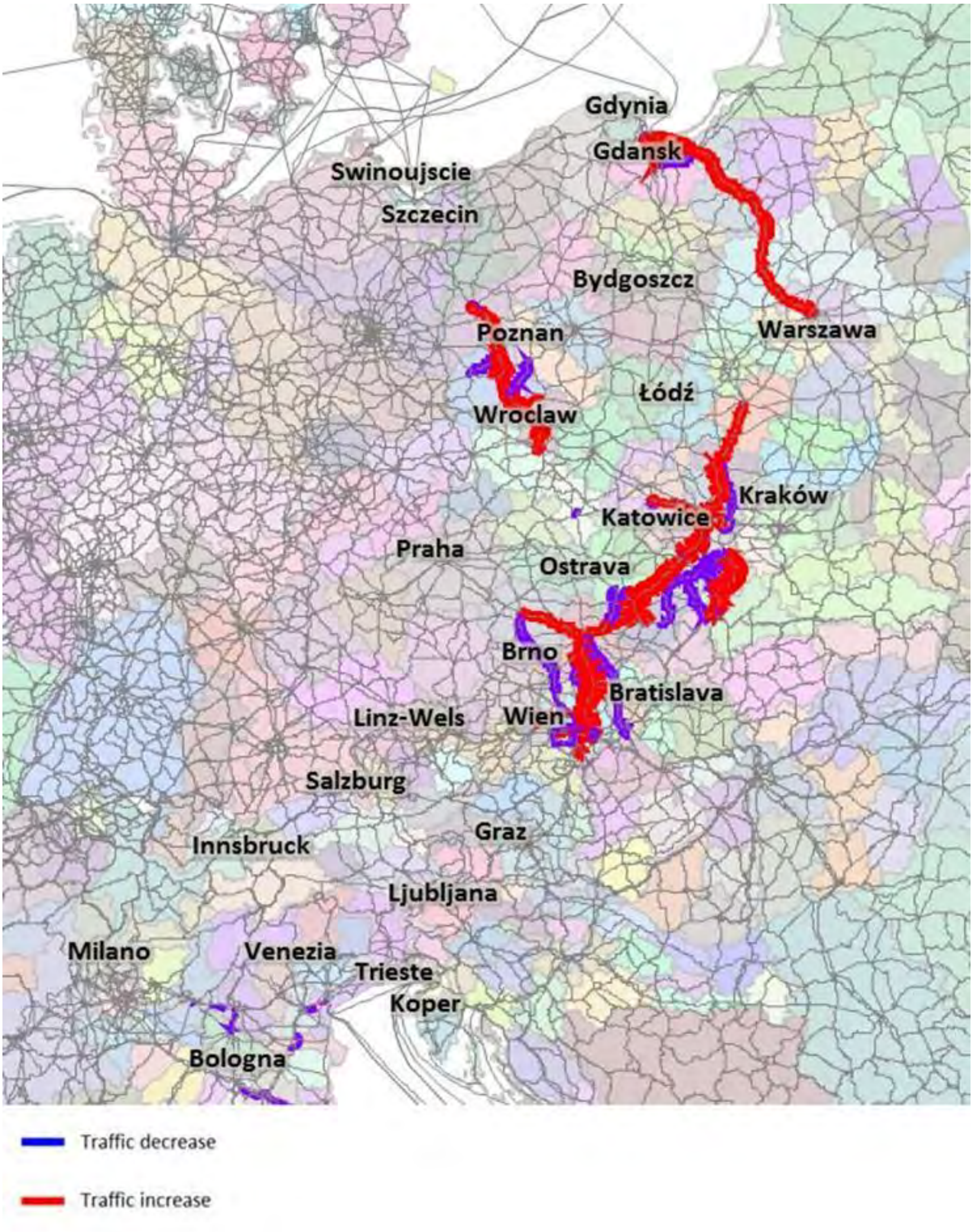
Figure E61 Changes in rail freight flows along the BA corridor (*2030WP-2030T*)



Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

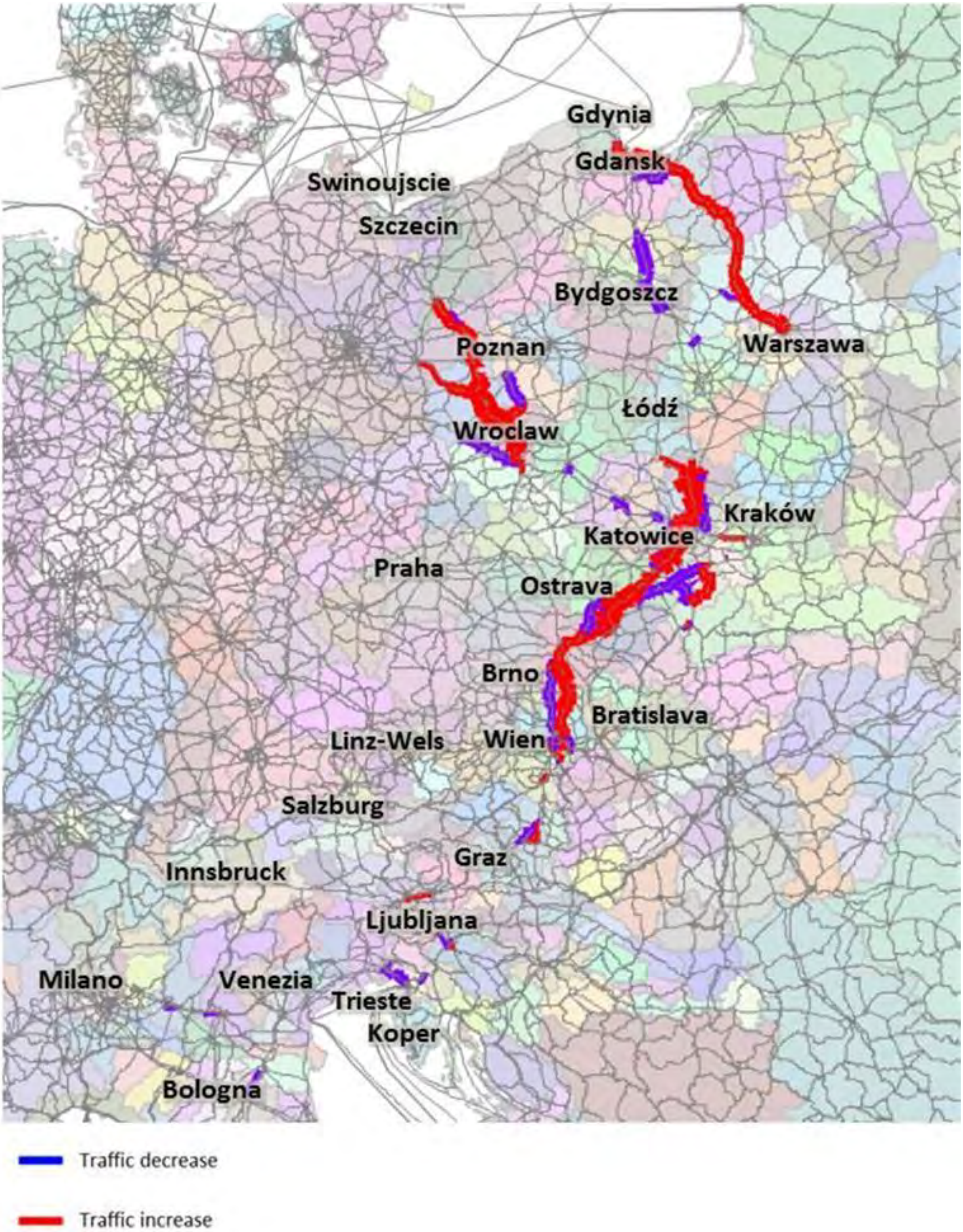
As shown in the following maps, changes in flows on the road network are more concentrated on sections where road improvements projects are located. In other sections, traffic reductions due to modal shift generally occur, but it is not visible at this scale, as is of a lower scale than traffic diversion due to improved corridor performance compared to alternative road routes.

Figure E62 Changes in road passenger flows along the BA corridor (*2030WP-2030T*)



Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

Figure E63 Changes in road freight flows along the BA corridor (*2030WP-2030T*)



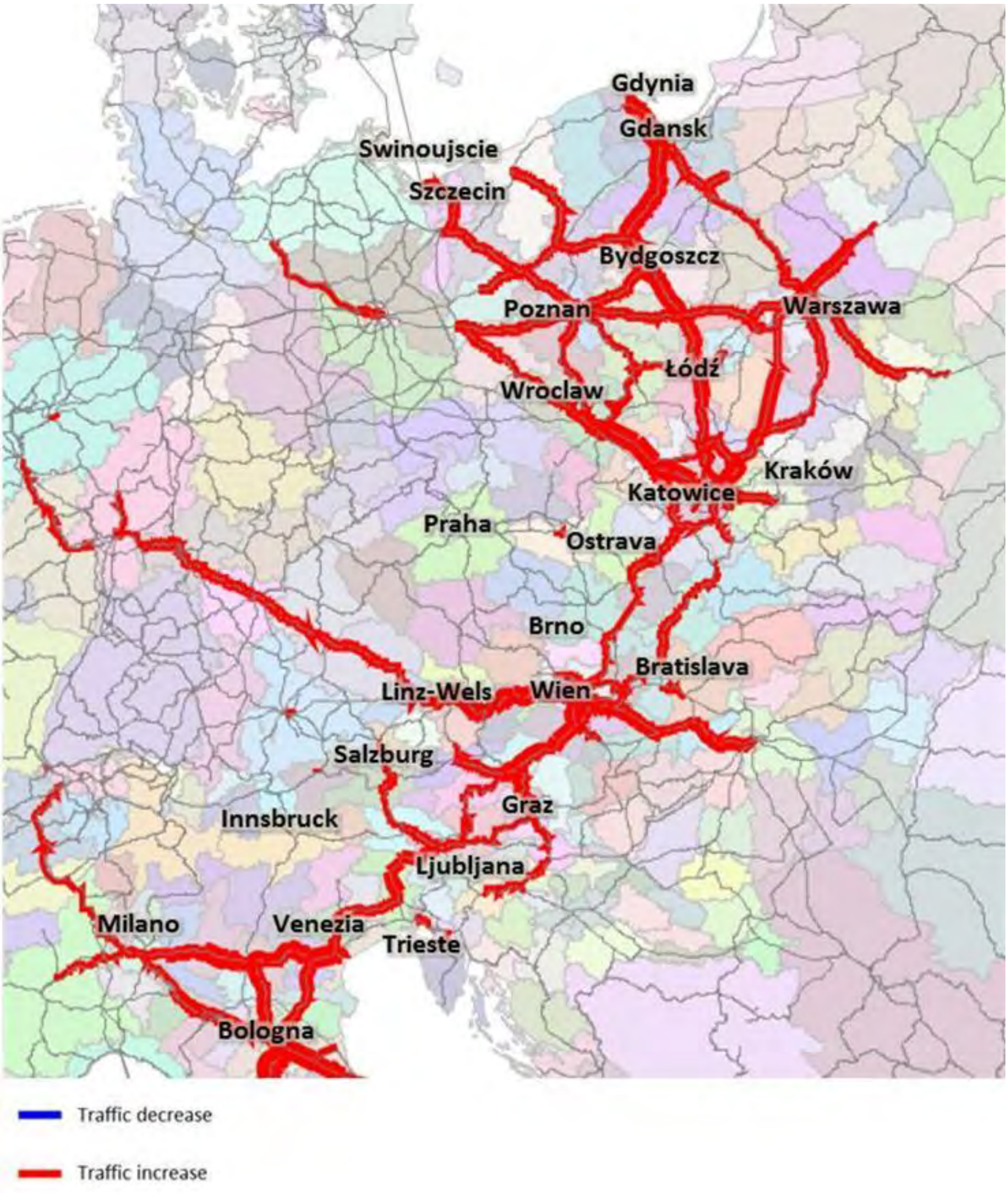
Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

As shown in the following diagrams, the implementation of rail policy measures has a more network-wide effect, which allows maximizing the use of the corridor rail infrastructure.

Figure E64 Changes in rail passenger flows along the BA corridor (*2030RP-2030WP*)

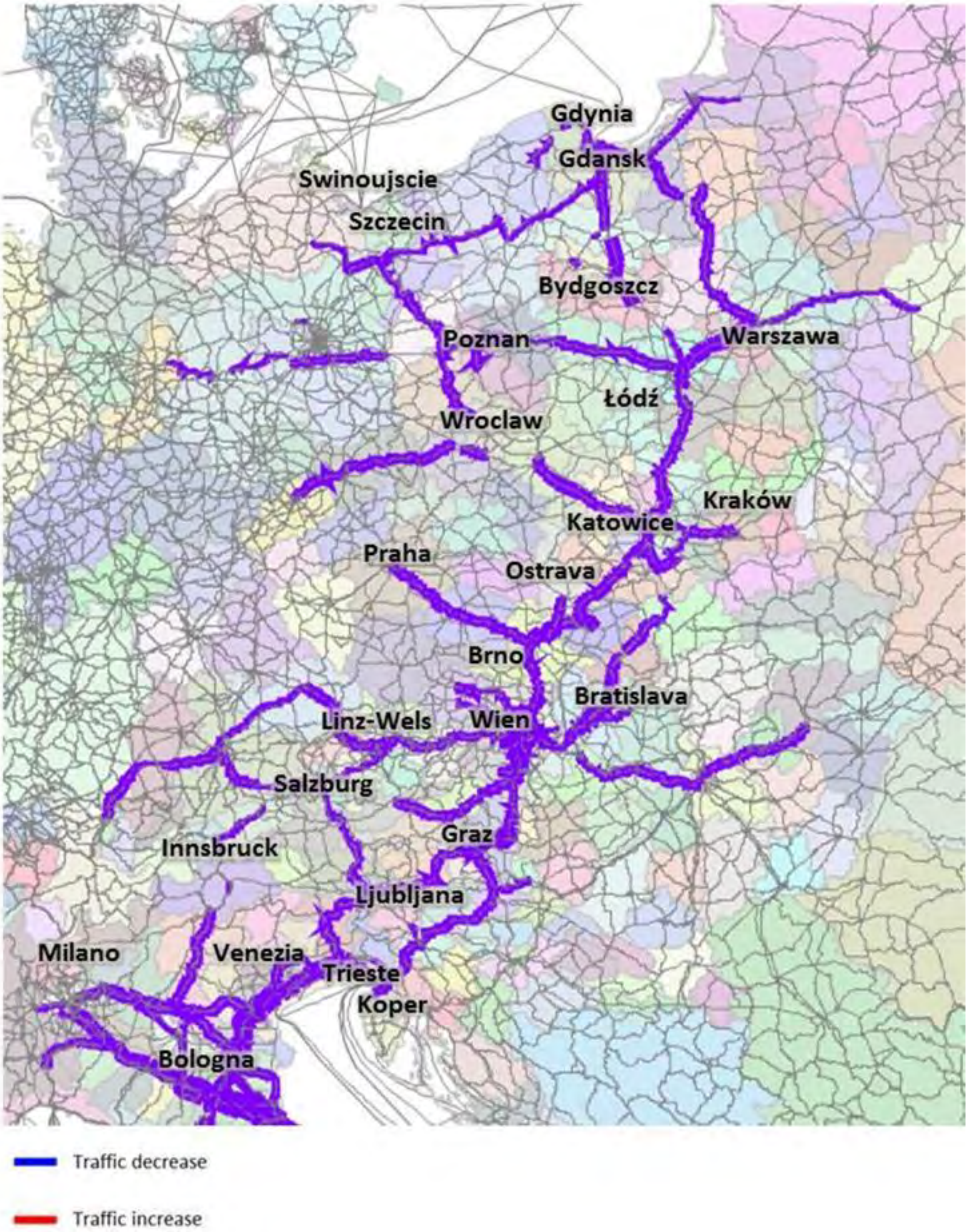
Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

Figure E65 Changes in rail freight flows along the BA corridor (*2030RP-2030WP*)



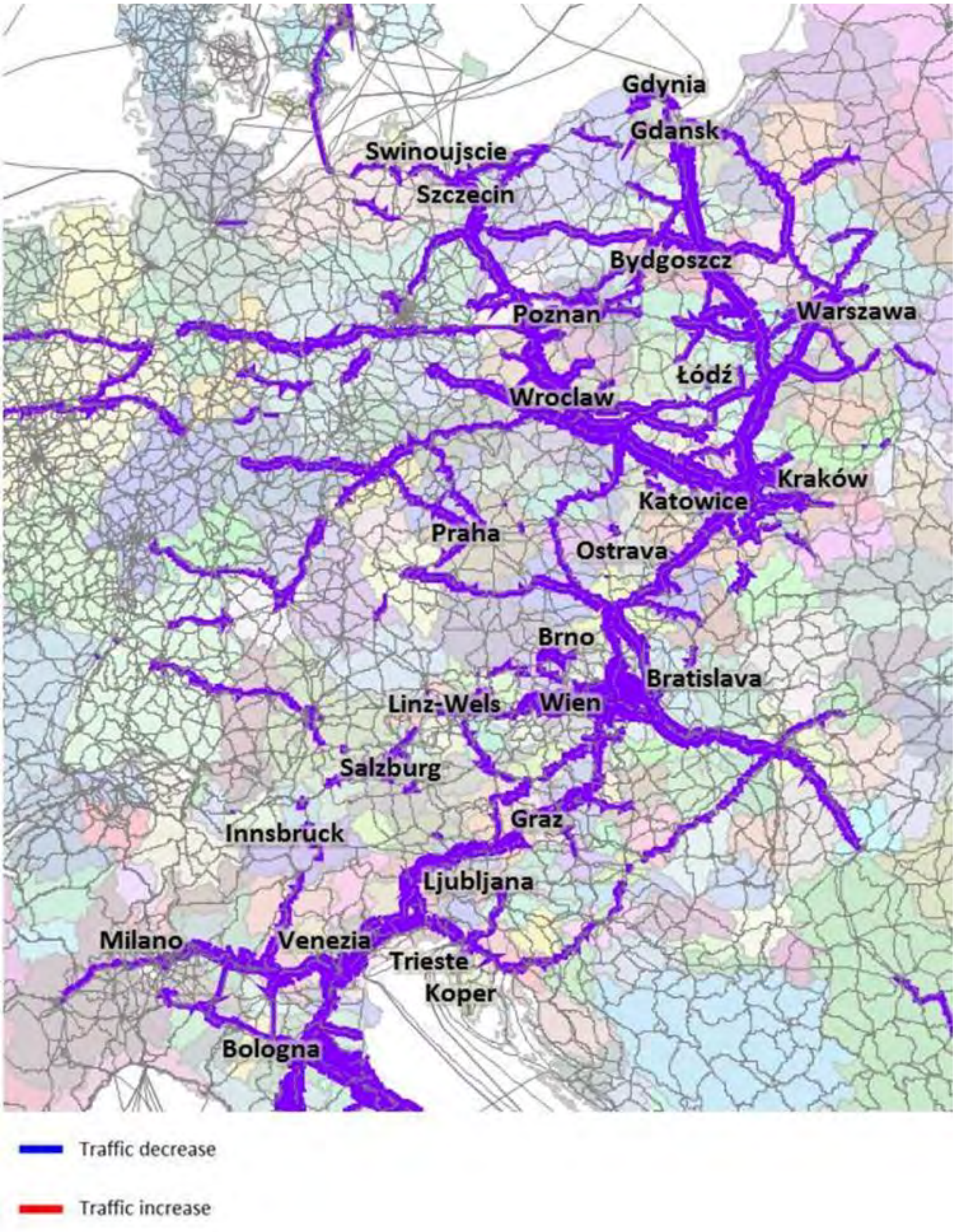
Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

Figure E66 Changes in road passenger flows along the BA corridor (*2030RP-2030WP*)



Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

Figure E67 Changes in road freight flows along the BA corridor (*2030RP-2030WP*)



Note. The width of the band is proportional to the absolute traffic growth (tons/day); no appeareance of the bandwidth on the map does not mean that there is no traffic growth

E.5.5. Evolution of the rail and road vehicle flows on the corridor

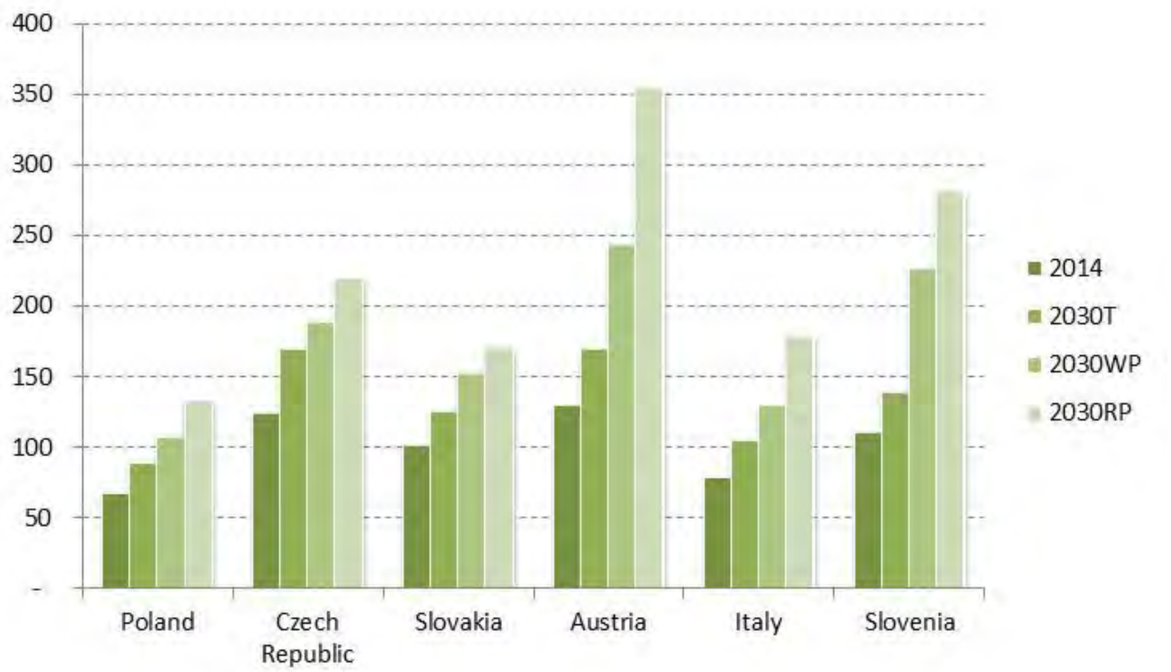
Flows and capacity on the rail network

In the medium and long term, the improvement of the railway infrastructure will induce a significant growth in the corridor rail transport volumes, which will be even higher in case of effective implementation of significant modal shift measures.

It should be noted that, under our approach, the growth in the corridor train traffic is also due to re-routing of services from alternative lines to take advantage of the improved infrastructure. Of course, this is 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, our assessment is likely to identify an upper limit in the increase in train flows on the corridor, in line with the scope of our analysis, which is to provide a first assessment of potential capacity issues limiting the functionality of the corridor– and not to identify their solutions, which require developing specific and detailed analysis.

Figure E68 Average train flows along the corridor (trains/day)

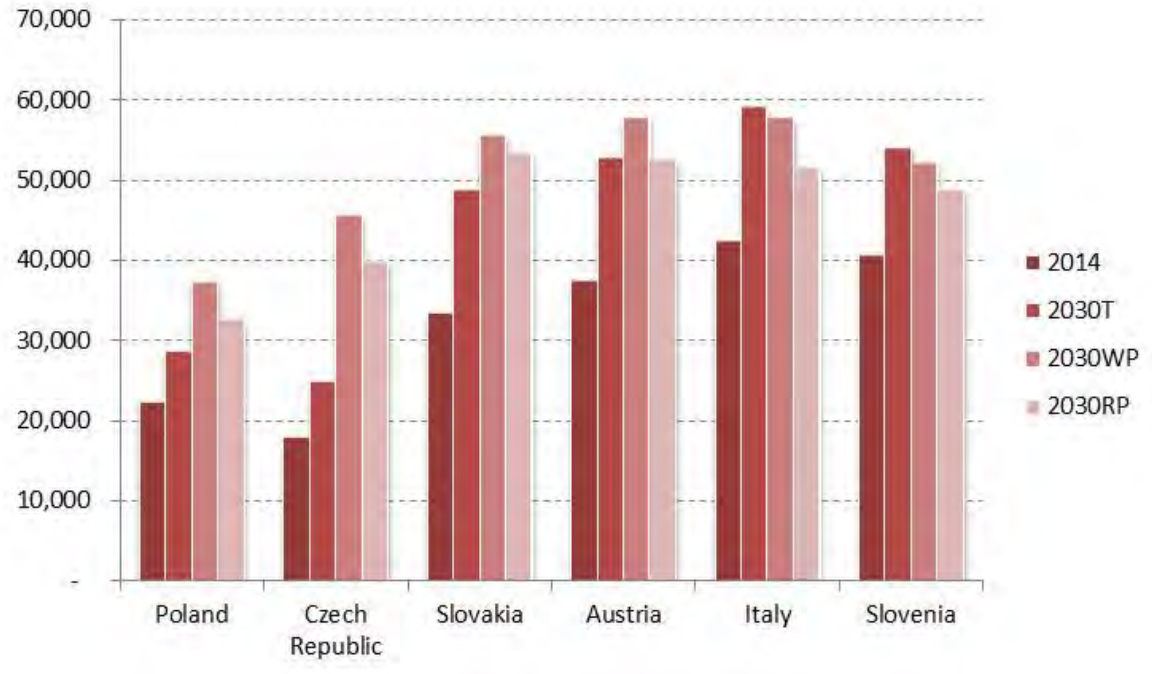


Source: BA Corridor study consortium

Flows and capacity on the road network

The following figure 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 E69 Intensity of road transport (vehicles/day)



Source: BA Corridor study consortium