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Orient East Med

Second Work Plan of the European Coordinator

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This report represents the opinion of the European Coordinator and does not prejudice the official position of the European Commission.

Contents

1 Towards the Orient / East-Med corridor updated work plan

European Transport policy reached a major milestone in 2014 with the adoption of the TEN-T and CEF Regulations leading to a more efficient transport policy. The **core network approach** linking urban nodes, ports, airports and rail road terminals may be considered as the backbone of a European transport area, which guarantees a connection to the comprehensive network with all European regions.

This **multimodal network** approach supported by financial instruments can contribute to boost the competitiveness of the European economy, contribute to sustainable growth and development of the internal market. This new concept of TEN-T core network corridors underlines the need to go further than national visions for transport and to encompass a trans-border vision on the way people and goods can cross Europe.

Further than the importance of creating a real European transport area, the setting-up of a modern and performing TEN-T is a key element for EU growth, the creation of jobs and the fight against climate change.

The main interest of the Orient / East-Med corridor (in short: OEM corridor), crossing nine Member States, including seven Member States benefiting from the Cohesion funds support, is based on the absolute necessity for cooperation between states independently of their current socio-economic trends. Any investment on the corridor in any of the nine countries will immediately bring an **added value** along the entire corridor.

In June 2014, I was given the mandate as **European Coordinator** for the Orient / East-Med Corridor. Regulation (EU) 1315/2013 defines that *each European Coordinator shall, by 22 December 2014, submit to the Member States concerned a work plan analysing the development of the corridor. After it has been approved by the Member States concerned, the work plan shall be submitted for information to the European Parliament, the Council and the Commission. The work plan shall include, in particular, a description of the characteristics, cross-border sections and objectives of the core network corridor*.

In December 2014, the draft of my first Work Plan was sent to the Member states for consultation. After its approval in May 2015, the Work Plan was presented to a wider public during the TEN-T days 2015 in Riga and in the internet. I also was invited to present the Work Plan in my annual hearing at the TRAN committee of the European Parliament in May 2015.

On 29 June 2015, the EU Transport Commissioner Ms Bulc announced the outcome of so far the biggest CEF Call for Proposals launched in 2014. In total, 16 projects located on the main corridor of the Orient/East-Med Corridor have been proposed for funding by the European Commission with a global grant of 840 million €. For 13 projects, grant agreements were signed, for which CEF grants of 812 million EUR are enabling investments of 1.118 million EUR in Bulgaria, Cyprus, the Czech Republic, Greece, Hungary and Romania.

Out of the 13 funded projects, most of them under the priority I, 11 are railway projects (85%) for construction, rehabilitation or feasibility studies and ERTMS, one is a MoS project and one a Multimodal logistic platform project.

The intensive analysis work realised since 2014 has only been possible through the setting-up of a **Corridor Forum**. This forum is regularly meeting (seven times until today) and includes the growing and active participation of representatives of the involved ministries of the Member States, the infrastructure managers (public and private) for railways, RRTs, ports, inland navigation, airports and roads, as well as representatives from the regions along the corridor. This also includes the RFC management. Different services of the European Commission are actively **supporting** the staff of DG MOVE, e.g. DG REGIO and INEA, and the European Investment Bank also participated in the dialogue and exchange process.

Two **ad-hoc working groups** in 2014 met in order to analyse in more depth the specific expectations and proposals of the European ports as well as those of the regions along the OEM corridor. This is planned to continue during 2016 and 2017.

In March 2016, a workshop on the potentials to accelerate rail transport at border crossings took place in Budapest, becoming the starting point for an ambitious joint action with the members of RFC 7 for this pertinent issue. In June 2016, a joint ministerial declaration on effective improvements eliminating the bottlenecks and facilitating international traffic on the Orient/East-Med Rail Freight Corridor has been signed between the Ministers responsible for transport of Austria, Bulgaria, the Czech Republic, Germany, Greece, Hungary, Romania and Slovakia in Rotterdam. The main objective is to significantly reduce the average border-crossing times of freight trains, with the target of maximum 2 hours waiting time, except for waiting times due to border procedures specific to Schengen external borders, as soon as possible and at the latest by 30 June 2018. To reach this target, a specific detailed action plan is under elaboration in close cooperation with the Rail Freight Corridor 7 Executive and Management boards.

The **study which analyses in detail the characteristics** of the Orient / East-Med Core Network Corridor is being conducted by a group of international transport consultants, which consists of iC consulenten ZT GesmbH, Austria; Panteia B.V., Netherlands; Railistics GmbH, Germany; ITC Institute of Transport and Communication OOD, Bulgaria; SYSTEMA Transport Planning and Engineering Consultants Ltd., Greece; and PricewaterhouseCoopers Advisory SpA, Italy.

The very constructive debates and exchanges I had the pleasure to chair since 2014, being it in the corridor forum meetings, the ad-hoc working groups or during my official visits to the countries and regions along the OEM corridor, combined with the content of the overall study of the corridor characteristics have given me a good **insight into the strengths and weaknesses** of the corridor.

2 Characteristics of the Orient / East-Med Corridor

2.1 Corridor alignment

The **Orient / East-Med Corridor** is a long north-west to south-east corridor which connects Central and South East Europe with the maritime interfaces of the North, Baltic, Black and Mediterranean seas. It runs from the German ports of Bremen, Hamburg and Rostock via the Czech Republic and Slovakia, with a branch through Austria, further via Hungary and Romania towards the Bulgarian capital of Sofia, with links to the port of Burgas and to Turkey, then to the Greek ports of Thessaloniki, Igoumenitsa, Patra and Pireas and has a "Motorway of the Sea" link to Cyprus.

It comprises railways, road, airports, ports, rail-road terminals and the Elbe-Vltava waterway (IWW) system (Brunsbüttel – Mělník – Praha/ – Pardubice; Germany and Czech Republic) and the IWW links from Magdeburg to Bremerhaven (Mittellandkanal and River Weser) and from Lübeck to Wolfsburg (Elbe-Seitenkanal and Elbe-Lübeck-Kanal in Germany). In Cyprus, no rail infrastructure is deployed. Maritime infrastructure exists in 4 countries, namely Bulgaria, Cyprus, Germany and Greece.

The Orient / East-Med Core Network corridor includes sections of former **TEN-T Priority Projects** (PP 7, PP 22 and PP 21, PP 23, PP 25 partly) and of ERTMS Corridors (D and parts of B, E, and F).

Two Rail Freight Corridors have been adapted to the same alignment, the RFC 7 “Orient / East-Med” on the central and southern section Praha – Budapest – Sofia – Athina and branches of the RFC 8 “North Sea Baltic” along the northern section between Bremerhaven / Wilhelmshaven / Hamburg and Praha.

Several segments of the Orient/East-Med Core Network Corridor are coinciding with others of the 9 Core Network Corridors, such as the Rhine-Danube Corridor (approx. 1000 km) and on shorter sections, the North Sea - Baltic Corridor, the Scandinavian-Mediterranean Corridor and the Baltic - Adriatic Corridor.

The **9 Member States** involved are (in alphabetical order): Austria, Bulgaria, Cyprus, Czech Republic, Germany, Greece, Hungary, Romania, and Slovak Republic.

According to the Regulation No. 1316/2013[1] and clarifications agreed with the Member States the **alignment** of the Orient / East-Med Corridor consists of the following parts:

[1] Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013

- Rostock – Berlin
- Brunsbüttel – Hamburg – Berlin – Dresden
- Bremerhaven / Wilhelmshaven – Magdeburg – Leipzig/Falkenberg – Dresden
- Dresden – Ústí nad Labem – Mělník/Praha – Kolín
- Kolín – Pardubice – Brno/Přerov – Wien/Bratislava – Győr – Budapest – Arad – Timişoara – Craiova – Calafat – Vidin – Sofia
- Sofia – Plovdiv – Burgas
- Plovdiv – Svilengrad – BG/TR border
- Sofia – Thessaloniki – Athina – Pireas
- Athina – Patra / Igoumenitsa
- Thessaloniki / Palaiofarsalos – Igoumenitsa
- Pireas / Heraklion – Lemesos – Lefkosia – Larnaka

Figure 1: Alignment and nodes of the Orient/East Med corridor

The **length of the corridor** infrastructure sums up to approximately 5,800 km of rail, 5,400 km of road and 1,700 km of IWW. The number of core urban nodes along the Orient/East-Med corridor is 15, with the majority located in Germany (5) and Greece (3), as well as one per other Member State. The same number applies for core airports, from which 6 are dedicated airports to be connected with high-ranking rail and road connections until 2050. Furthermore, 10 Inland ports and 12 Maritime ports are assigned to the corridor, as well as 25 Road-Rail terminals.

In comparison, to the first work plan of 2014, these distances were slightly adapted. It is expected, that the corridor length will further slightly change in the future, e.g. with the construction of new by-pass roads, for instance, the length will increase.

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

2.2.1 The OEM Railways Network and Rail Road Terminals

The infrastructure of the railway network along the OEM corridor is in considerable parts of the alignment not compliant with some of the technical characteristics thresholds set out by Regulation No. 1315/2013, in particular regarding the key infrastructure parameters train length and control system (ERTMS). For other technical characteristics such as operational speed (line speed), axle load, electrification, the non-compliance along the corridor is around or below 20%.

Concerning **gauge and number of tracks**, all OEM corridor lines have a **gauge** of 1435 mm (except Kiato-Patras will be replaced by a 1435mm gauge in the future). Most lines are at least double-tracked (approx. 71%). Single line sections are as follows:

- in Germany:
  - Rostock Hbf – Kavelstorf,
  - Rostock Seehafen – Kavelstorf,
  - Sande – Wilhemshaven/Jade Weser Port
- in Slovakia and Hungary:
  - Bratislava Petržalka – SK/HU border – Hegyeshalom,
  - Békéscsaba – Lökösháza - HU/RO border,
- in Romania:
  - Arad – Strehaia (Carpathian Mountains),
  - Craiova – Calafat RO/BG border,
- in Bulgaria:
  - RO/BG border – Vidin – Vratsa
  - Sofia – Kulata – BG/EL border,
  - Dimitrovgrad – Mihaylovo, Kalitinovo – Kermen and Yambol - Zavoy
  - Krumovo – Svilengrad – BG/TR border,
- in Greece:
  - BG/EL border – Promahonas – Thessaloniki –Thessaloniki Port
  - Tithorea - Lianokladi – Domokos
  - Palaiofarsalos – Kalambaka
  - Kiato – Patras (change on-going from metric to UIC)

Regarding **operational speed**, there are small sections along the OEM Corridor in the Czech Republic (freight link Děčín - Ústí nad Labem), in Slovakia (Bratislava main station – Rajka, SK/HU border), in Hungary (Kelenföld–Köbanya-Kispest within Budapest node) and few sections in Greece, where line speed is between 60 and 90 km/h. Low maximum operating speed is particularly an issue, if this occurs on longer sections, as in Bulgaria, where 75% of the sections permit operational speeds lower than 100 km/h and the weighted average operational speed is 90 km/h. Specifically along the section Vidin – Sofia, the speed is 70/80 km/h, while part of the lines Sofia – Kulata has speed limits of only 60 km/h (Pernik – Radomir). Along the Bulgarian rail section Mihaylovo – Dimitrovgrad the operational speed is only 40 km/h. In further sections, the speed is restricted temporarily due to ongoing modernisation works. Romania is, except for the section Craiova – Calafat, deemed to be fully compliant for this particular technical characteristic. In total, approx. 25% of the OEM rail network is not compliant with the requirements of the Regulation.

The operation of **740 m trains** is not possible due to infrastructural, administrative or timetable-related/operational reasons, on the half of corridor rail sections. Non-compliant with this parameter are all corridor sections in the Czech Republic, Slovakia and Austria. On the Hungarian network only one section is not compliant, Hegyeshalom – Rajka, while in Greece several short sections are not matching this criterion: Thessaloniki – Promahonas, Domokos – Tithorea, SKA – Pireas and Korinthos – Thriasio – SKA.. In Romania only the sections HU/RO border – Arad, Filiaşi – Craiova and Golenti –RO/BG border are compliant, the same applies for the Bulgarian sections RO/BG border– Vidin, Plovdiv – Burgas and Svilengrad – Turkish Border. Longer parts of Bulgarian and Romanian OEM rail network are non-compliant with this parameter. Germany is fully complying with this technical requirement. In total approx. 53% of the OEM rail network is not compliant.

In contrast, 77% of the rail network along the OEM corridor is compliant with the minimum **axle**

load threshold of 22.5 t. Exception in this regard are the entire rail network in Romania, and a number of line sections in Greece (Promahonas – Thessaloniki, Domokos – Tithorea and Inoi – SKA - Pireas) and in Hungary (Kelenföld-Köbanya-Kispest and Békéscsaba – Lökösháza). Additionally, in Hungary, there is a special situation on the line Budapest – Hegyeshalom, where an axle load of 22.5 t is permitted with a speed restriction of 120 km/h (above the limit of 100 km/h).

Most of the OEM rail network is **electrified** (approx. 86%), having three different current systems in use: AC 15 kV / 16.7 Hz (Germany and Austria), AC 25 kV / 50 Hz (Southern Czech Republic, Slovakia, Hungary, Romania, Bulgaria and Greece) and DC 3 kV (Northern Czechia). Diesel traction is required only on the sections Oldenburg - Sande – Wilhelmshaven in Germany, Craiova – Calafat in Romania, and Promahonas – Thessaloniki, Domokos – Tithorea – Inoi, Tris Gefyres - Pireas and Palaiofarsalos – Kalambaka in Greece.

Regarding **railway control systems**, at present, the national systems are still predominantly used on the OEM rail network. There is a considerable lack of **ERTMS implementation**, with differences between Member States. Regarding ERTMS, currently 12% of the OEM network is compliant with the required characteristics.

Not meeting the requirement of the Regulation regarding the technical characteristics of rail infrastructure leads to both national and cross border issues. **Cross-border issues** are one of the most challenging topics for enabling seamless transport flows along the multimodal transport network of the corridor. To improve the situation and to discuss possible options for improvement, a Working Group on Cross-Border issues in Rail Transport has been set up.

Regarding **Rail Road terminals**, there are in total 24 existing Core Rail Road terminals along the OEM corridor, most of which are located in Germany (9), Czech Republic (5), Austria (2) and Greece (2). All existing rail-road terminals on the OEM corridor are linked with the national road and rail networks, although there is in some cases as identified in the overall corridor study, a need to improve the quality of “last mile” connection or to solve capacity problems. Regarding the state of development of Rail Road terminals, there are differences between the northern and southern corridor parts, ranging from a lack of development to a dense network of terminal locations, with limited capacities both in the terminals and the connecting rail and road network. New Terminals are planned to be built in the southern part of the OEM Corridor, in Romania (2).

Table 1: Status of Rail infrastructure non-compliance on Orient/East-Med corridor (2015)

Parameter	Length share of non-compliant sections
Operational speed	25%
Train length	53%
Axle load	23%
Electrification	14%
Number of tracks (at least double track)	26%
Signalling systems (ERTMS)	88%

2.2.2 The OEM IWW Network and the Ports

The analysed OEM inland waterway network comprises of the rivers Elbe (Labe), Weser and Vltava as well as the canals Elbe-Seitenkanal, Elbe-Lübeck-Kanal, Mittellandkanal. River Danube is exclusively addressed in the analysis of the Rhine-Danube Corridor.

With regard to the requirements of Regulation No. 1315/2013, the compliance of IWW infrastructure to the following parameters was examined: compliance to the requirements of CEMT class IV vessels, RIS implementation, permissible draught, and permissible height under bridges. Furthermore, in order to provide a better overview of the current situation along the OEM IWW network, two additional parameters were analysed going beyond the TEN-T requirements: the good navigation status and the reliability of locks.

Overall, 537 km of IWW are compliant to all requirements, representing 32% of OEM IWW network.

The requirement for the **minimum draught of 2.5 m** is fulfilled on 670 km (40%) of OEM IWW network. The minimum draught is not preserved on any of the sections located in the Czech Republic (rivers Labe and Vltava). For some sections, planned projects aim to increase the draught. In particular, a number of projects are scheduled for the coming years on sections Týnec nad Labem – Pardubice, Ústí nad Labem - CZ/DE border and Třebenice – Mělník. However, the required draught of 2.5 m will not be achieved through these projects, as not considered to be economically efficient.

On German territory, the non-compliant sections are Trave – Lübeck – Lauenburg (Elbe-Lübeck-Kanal). The project for expansion of the Elbe-Lübeck-Kanal is listed in the German National Transport Plan (BVWP 2030) under the category "Vordringlicher Bedarf" (prioritized investment need; i.e. highest category for realisation), however, its realisation date is unclear as financing needs to be secured first. Furthermore, on the Elbe sections Lauenburg - Wittenberge – Magdeburg – Schmilka (DE/CZ border), the minimum draught depends on water level, which is unstable and a subject to natural fluctuations. All-season stable navigation conditions cannot be guaranteed. The interventions can be suggested for this section only in case it is environmentally and economically viable.

The requirement for **minimum height under the bridges** (>5.25 m) is fulfilled on 993 km of waterways, representing 60% of the OEM IWW network. The non-compliant sections for the Czech Republic are Týnec n.L. – Pardubice (Labe) and Třebenice – Mělník (Vltava). There are projects scheduled on both sections and their compliance is expected to be achieved by 2020. On German territory, in case of the highest navigable water level, the minimum height under bridges is not preserved on the sections Bremen – Minden (Weser), Lübeck – Lauenburg (Elbe-Lübeck-Kanal) and Magdeburg – Schmilka (Elbe). On the section Bremen – Minden, a project is currently ongoing and compliance is expected to be achieved by 2017.

The majority of the IWW network fulfils the requirement for **CEMT class IV vessels**, in particular 1.627 km (98%) comply with CEMT class IV or higher classes. The non-compliant sections are located in Czech Republic (Týnec n.L. – Pardubice). There is already a project planned to address this problem and by 2018 the compliance will be achieved. It shall be noted that all other Czech sections, according to the Directorate of Waterways (RVC), are considered as compliant with CEMT class IV, although its permissible draught is less than 2.5 m.

The **RIS systems** are deployed on 1627 km of waterways, which represents 98% of the OEM IWW network. RIS contribute among others, to higher transport safety and reliability as well as to smoother IWT operation e.g. through reduction of waiting times before locks, bridges and ports. The non-compliant section is Týnec n.L. – Pardubice. The implementation of RIS on this section would become reasonable once the other projects planned for this section would be realised.

The parameter **good navigation status** is used for free-flowing rivers and considered to be fulfilled on a certain day in case the water depth is more than 2.5 m. This implies that for the Czech Republic, where the majority of rivers are canalised and also have the draught less than 2.5 m, none of the IWW sections have a good navigation status. The number of days with good navigation status for the German free-flowing river Elbe belonging to OEM corridor varies from 130 to 341 days per year.

In terms of **locks reliability,** the main problem defined in Germany refers to the lift Lüneburg-Scharnebeck, while in the Czech Republic the main problematic locks are located on the Vltava sections Mělník – Praha Holešovice - Praha/Jiráskův bridge and the Elbe between Mělník – Týnec n.L. – Chvaletice – Přelouč. According to the monitoring conducted by German and Czech waterway information systems (ELWIS and LAVDIS), in 2015, maintenance was the main reason for locks to be out of service.

At present, no infrastructure for the supply with **alternative fuels** is available along the Elbe and Vltava. In general, Liquefied Natural Gas (LNG) is considered as the forward-looking alternative fuel for inland waterway transport. The planning for the construction of supply infrastructure for LNG takes place along the Unterelbe, and more specifically, in the Port of Hamburg.

An additional issue for the river Elbe to be mentioned is **flooding**, which has considerable economic, social and ecological impacts. There are various environmentally sensitive areas located along the Elbe (alluvial forests and floodplains), which are partly listed as NATURA 2000 protected areas.

Goods transported and transhipped in **the inland ports** are heterogeneous including all types of general cargo, dry and liquid bulk cargo, containers and heavy cargo. Most of the inland ports offer tri-modal services and have sufficient capacity to handle all transport volumes.

The **compliance check for IWW ports** showed that none of the nine existing core OEM inland ports, namely Hamburg, Bremerhaven, Bremen, Hannover, Braunschweig, Magdeburg, Děčín, Mělník and Praha-Holešovice, is fully compliant with the requirements set out in Regulation 1315/2013, regarding the connection with rail, connection with road, the availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges as well as the availability of alternative clean fuels.

In addition, the core inland port of Praha-Holešovice is deemed to be out of operation for freight handling and could lose its connection with rail. Major parts of the port area are subject to conversion into a residential housing zone. Also, the planned core inland port of Pardubice does not exist yet, while its implementation is delayed and works have not been started.

2.2.3 The OEM Maritime Infrastructure and Motorways of the Sea

The OEM seaports include 12 core ports, the German Ports of Hamburg, Bremerhaven, Bremen, Wilhelmshaven and Rostock, the Port of Burgas in Bulgaria, the Port of Lemesos in Cyprus and the Greek Ports of Pireas, Heraklion, Thessaloniki, Igoumenitsa and Patra. All the above constitute maritime ports, apart from the Ports of Bremerhaven, Bremen and Hamburg, which also constitute core inland ports according to the Regulation. In addition, all ports have transhipment facilities and related equipment facilitating intermodal transport. The OEM Corridor also includes one Motorways of the Sea (MoS) link in the Eastern Mediterranean Sea connecting the hinterland of the Greek Port of Pireas to that of the Port of Lemesos in Cyprus via the Port of Heraklion in Greece.

A key requirement of the Regulation No. 1315/2013 is a maritime **port connection with the road and rail network**. The Ports of Igoumenitsa and Patra in Greece are currently lacking connections to the country’s railway network. The latter constitutes a substantial intermodality bottleneck, hindering the seamless intermodal transportation with the use of road/rail and maritime modes along the supply chain of the OEM Corridor. These missing rail connections have been taken into consideration by the country. The railway connection to the port of Patra is being addressed by a project with expected date of completion in 2023, albeit with no secured financing. The connection of the Port of Igoumenitsa to the country’s rail network is being addressed by two projects that include the completion of required studies and the construction of works, however, with no secured financing and estimated completion date for the works in year 2030. An additional issue is the highly congested road connection of the Lemesos port, which is addressed by the construction of a new link road to improve the port’s hinterland connection.

Other interoperability and organisational bottlenecks are created by the lack of **Traffic Management System** (TMS) deployment at the ports of Thessaloniki, Patra, Heraklion and Igoumenitsa in Greece. The five German ports operate the National Single Window system. The same applies to the Port of Burgas in Bulgaria and the Port of Lemesos in Cyprus. Basic applications of Port Community Systems (PCS) are operational at the ports of Thessaloniki and Lemesos. Further upgrades are foreseen. From the remaining ports, the Greek ports of Pireas, Patra and Igoumenitsa have already developed certain PCS modules of considerable maturity and plan to implement these in the near future.

With regard to **handling capacity** and utilisation, the threshold of annual freight transhipment stipulated by the Regulation is exceeded by all OEM Corridor seaports. Capacity bottlenecks have been identified in Hamburg, Lemesos and the Greek ports of Thessaloniki, Patra and Igoumenitsa. In general, on-going and/or planned investment projects are targeted at increasing significantly the handling capacity of several OEM ports (Hamburg, Lemesos, Thessaloniki, Igoumenitsa, Heraklion and Patra).

An additional requirement of the Regulation is the provision of publicly accessible **Liquefied Natural Gas** (LNG) refuelling points for maritime transport by all maritime core ports until 2030. Such facilities are currently missing from all OEM ports. Projects addressing the provision of alternative fuels have been identified for the Ports of Hamburg, Rostock, Bremen, Thessaloniki and Lemesos.

Regarding other key requirements of the Regulation, all seaports were found fully compliant with the requirement to offer at least one **terminal open** to users in a non-discriminatory way applying transparent charges. In addition, all ports also provide **port waste reception facilities**.

The **Motorways of the Sea** (MoS) development is particularly relevant to the OEM seaports in Greece and Cyprus, in order for these to become MoS port nodes along potential viable MoS connections by complying with the MoS quality criteria and key priorities set for 2014-2020 in terms of maritime integration with ports' hinterland connections and deployment of Traffic Management Systems and e-maritime services. Reference is made to the Work Plan of the European Coordinator for MoS.

Given that very few maritime projects have been completed (2), the general conclusion is that key bottlenecks are still related mainly to the ports' rail hinterland connections (whether existing or missing). With regard to the infrastructure and services within the ports themselves, handling capacity may become a bottleneck for a number of ports. Nevertheless, the southern OEM ports do require modern technologies in terms of single window/e-maritime services deployment in order to improve port performance, while the majority of the Corridor's ports require the provision of alternative fuels' facilities to steer them towards the desired future direction of green ports.

2.2.4 The OEM Road Infrastructure

The road infrastructure covers all the nine OEM countries with a total length of road network of 5416 km. The biggest part of the Corridor road length is either of motorway or express road class (87%).

Nevertheless, the main non-compliant issues along the OEM Road network are still related to the required high quality of the roads, which shall not cross rail or tram lines at level and be accessible primarily from interchanges or controlled junctions.

It should be noted that in 2014 and 2015 several important motorway projects were completed in Hungary, Romania, Bulgaria and Greece (over 270 km of new motorways in total). The outstanding non-compliant roads include short sections in the Czech Republic (77 km in total), Austria (32 km) and Cyprus (6 km); whereas the issue is particularly prominent in Romania (256 km in total) and Bulgaria (278 km). In these two countries there are Corridor sections that cross railway lines at grade.

Missing links are determined in Austria (Schwechat – Grossenzersdorf – Süssenbrunn), Czech Republic (parts of Praha Ring Road and Lovosice - Ústí nad Labem), Hungary (Budapest Ring), Bulgaria (Lot 3 of Struma Motorway) and Cyprus (Lefkosia South Orbital Motorway).

Current or potential capacity problems are identified along 13 sections with a total length of 512 km. In many cases capacity problems refer only to short parts of these sections. Although the traffic saturation of the existing roads in and around all the large cities is high, the average utilisation rate in the northern part of the Corridor is higher compared to that in the south parts.

Congestion is observed in Germany, at Slovak/Hungarian border, in Bulgaria (Blagoevgrad – Sandanski) and in Praha, Sofia, Lefkosia and Lemesos urban node areas. The main reasons for the latter are either the missing links or the low capacity of existing ring or by-pass roads sections. The German Federal Infrastructure Plan 2030 foresees improvements in and around the urban areas of Bremen, Hamburg and Berlin.

A particular problem with high number of road accidents exists at the above congested sections and/or along the conventional two-lane one-carriageway road sections, as well as at the Austrian border crossings with the Czech Republic and between Slovakia and Hungary.

The Regulation No. 1315/2013 sets up a list of **alternative fuels** that substitute (at least partly) the fossil oil sources in the supply of energy to transport. At least one type of alternative fuel is available along the almost 5000 km of OEM Corridor or at no more than 10 km distance from its road junctions, which is 93% of the total OEM length.

LPG and CNG are widely available in all OEM countries except Cyprus, although the density of the stations along the Corridor differs from country to country. The number of infrastructure systems of publically accessible charging stations and battery swap stations to recharge electric vehicles is steadily increasing. Such facilities are generally available in the cities in Germany, Czech Republic, Austria and - since recently - in Cyprus. In Slovakia, Hungary and Bulgaria the number of stations is low and these are concentrated in several urban areas.

The Regulation No. 1315/2013 sets also a specific requirement with regard to the provision of sufficient **parking** areas (at least every 100 km) with an appropriate level of safety. The analysis shows reasonable supply of parking facilities in Germany, Czech Republic, Slovakia, Austria and Hungary. In Romania, Bulgaria and Greece, there are still long road sections without any suitable facility.

The Regulation No. 1315/2013 also sets up requirements for interoperability of the **electronic toll** collections systems, where such are in place. Road user charging systems are in force in all OEM countries but Cyprus, five of which are fully electronic (in Germany, Czech Republic, Slovakia, Austria and Hungary). In Greece, an Interoperable Tolling Systems (GRITS) has been established in 2013. This allows for the use of the same transponder at all electronic toll lanes of the participating motorways. Relevant sections of the OEM Corridor, where the service is operational, are Raches – Klidi, Athina – Patra, and the Rio – Andirrio Bridge. A successful cross-border cooperation is existing between Germany and Austria, where heavy goods vehicles only need one on board unit – the TollCollect OBU – to pay toll charges in both countries. Crossing the corridor, would mean having 4 different toll OBU's and three different stickers on the window

Regarding the requirements of Directive 2010/40/EU setting the framework for the deployment of **Intelligent Transport Systems** in the field of road transport and interfaces with other modes of transport, at moment, the existing systems do still not sufficiently provide real-time traffic and weather information (RDS-TMC), facilitating seamless corridor road traffic. Within the CROCODILE project, traffic information service providers of seven OEM countries (Austria, Cyprus, Czech Republic, Germany, Greece, Hungary, and Romania plus the associated members Bulgaria and Slovakia) have set up a data exchange infrastructure with the goal to provide harmonized cross-border real-time traffic information services along the whole corridor. A specific focus within the CROCODILE project lies on safety-related and truck parking information services. Two Memoranda of Understanding on improvement of information exchange were signed in 2014 and 2015 among Austria, Hungary, Romania and other MS.

A priority should be given to improving the quality of the non-compliant road sections in terms of capacity and safety, implementation of sufficient secure parking areas and the interoperability of toll collecting systems and real-time traffic information along the corridor.

2.2.5 The OEM Air Transport Infrastructure

There are 15 core airports along the OEM Corridor (Hamburg, Berlin, Bremen, Hannover, Leipzig/Halle, Praha, Wien, Bratislava, Budapest, Timisoara, Sofia, Athina, Thessaloniki, Heraklion, and Larnaka). Out of these 15 airports, 6 (Hamburg, Berlin, Praha, Wien, Budapest and Athina) have to be connected to the TEN-T rail network according to the Regulation. To date, Hamburg, Praha and Budapest are currently not complying with this requirement. However, rail links are planned for construction in the airports of Praha and Budapest: works are planned to start in 2018 for the Budapest airport (depending on the available financing), while for the Praha airport connection, works are expected to start in 2021. Hamburg is connected with suburban electrified (1200V DC) rail only, but a technical feasibility study has been planned for the realisation of a new rail link.

Airports located in high population density areas should be connected in priority to railway networks to improve mobility. Furthermore, according to Article 41 (3) of the TEN-T regulation, dedicated Main Airports are to be also **connected to** the TEN-T **road network** by 2050. To date, the only airport without a high-ranking road connection is the Timişoara airport.

Concerning availability of alternative clean fuels, currently no fixed storage tank facilities for **aviation biofuel** are reported to be in use in the OEM airports.

Regarding the availability of **alternative clean fuels for airport ground services** (e-mobility, hydrogen, CNG, LPG) certain airports have recently introduced charging or fuelling stations. Natural gas (CNG) and liquid gas (LPG) are already being used at Hamburg Airport as low-emission fuels, while a Hydrogen Project was introduced earlier. In 2013, a charging station for e-cars and a LPG fuelling station for the operation of 37 natural gas-powered vehicles were introduced in Wien. Similar actions are envisaged to be implemented at airports committed to become ecologically friendly in their operation (e.g. Budapest airport by 2020), however, no specific projects are known to present.

2.3 Progress of Corridor Development (KPI)

In order to assess and monitor the evolution of the OEM corridor and the potential effects of individual projects or groups of projects upon infrastructure interoperability and performance, several Key Performance Indicators (KPIs) were introduced in the corridor study.

The KPIs are calculated for the years 2013-2015 and allow the evaluation of compliance levels against the infrastructure quality targets set out in the Regulation 1315/2013.

The KPIs are provided in two main categories: supply side KPIs and demand side KPIs.

2.3.1 Demand related Corridor performance

Table 2: Demand related key performance indicators for OEM corridor (2014)

Mode	KPI	Unit	Baseline value (2013)	2014	Index 2014 (2013: 100)	2015
OEM IWW network	Total inland waterway freight flows	index (2013=100) (ton-km)	t.n.a.	t.n.a.	t.n.a.	For 2015 data is not fully available yet
Core Seaports of OEM corridor	Total passenger flows	index (2013=100) (passengers)	12.716.095	13.201.484	103,8	
	Total freight flows	index (2013=100) (ton)	346.248.554	360.761.964	104,2	
Core Inland waterway ports of OEM corridor	Total passenger flows	index (2013=100) (passengers)	t.n.a.	t.n.a.	t.n.a.	
	Total freight flows	index (2013=100) (ton)	t.n.a.	t.n.a.	t.n.a.	
Core Airports of OEM corridor	Total passenger flows	index (2013=100) (passengers)	123.416.672	132.511.980	107,4	
	Total freight flows	index (2013=100) (ton)	1.516.645	1.568.631	103,4	

t.n.a. ... temporarily not available data

Table 3: Background regional statistic indicators for OEM corridor (2015)

Scope	Unit	Baseline value (2010)	2013	2014	2015
GDP (of crossed NUTS3 areas)	**Million EUR (in current prices)**	1.393.925	1.430.375	t.n.a.	t.n.a.
Employment (of crossed NUTS3 areas)	**Persons**	29.935.910	29.267.597	29.671.950	t.n.a.
Population (of crossed NUTS3 areas)		67.918.633	67.580.032	66.910.636	t.n.a.
OEM Rail Network	**km of alignment**	-	5.851	5.851	5.850
OEM Road Network		-	5.430	5.432	5.416
OEM IWW Network		-	1.659	1.659	1.659
		Defined by Reg. 1315/2013 Annex 2	**Nodes in operation**		
Core Seaports of OEM corridor	**Amount**	12	12		
Comprehensive Seaports of OEM corridor		7	7		
Core Inland waterway ports of OEM corridor		10	9		
Comprehensive Inland waterway ports of OEM corridor		16	16		
Core Airports of OEM corridor		15	15 (thereof 6 major airports acc. to Art. 41)		
Comprehensive Airports of OEM corridor		7	7		
Core RRTs of OEM corridor		25	24		
Comprehensive RRTs of OEM corridor		11	11		

2.3.2 Supply related Corridor performance

Table 4: Supply related key performance indicators for OEM corridor (2015)

#	Mode	KPI	Definition	2013	2014	2015
1	Rail network	**Electrification**	Electrified rail network km as a proportion (%) of relevant CNC rail network km.	83%	83%	86%
2		**Track gauge 1435mm**	Standard (1435mm) track gauge as a proportion (%) of relevant CNC rail network km.	100%	100%	100%
3		**ERTMS implementation**	Length of Permanent Operation (excluding operational test lines) of both ERTMS and GSM-R on rail network, as a proportion (%) of relevant CNC rail network km.	11%	11%	12%
4		**Line speed>=100km/h in accordance with art. 39 para. 2. Item a) (ii) of the Regulation 1315/2013**	Length of Freight and combined line with allowing for a maximum operating speed greater than or equal to 100 km/h, as a proportion (%) of relevant CNC rail network km without load restriction.	75%	75%	75%
5		**Axle load (>=22.5t)**	Length of Freight and combined line with a permitted axle load greater than or equal to 22.5 tonnes, as a proportion (%) of relevant CNC rail network km.	77%	77%	77%
6		**Train length (740m)**	Length of Freight and combined line with a permitted train length greater than or equal to 740m, as a proportion of relevant CNC rail network km.	47%	47%	47%
7	Inland waterway network	**CEMT requirements for class IV IWW**	Length of Inland waterways classified as at least CEMT class IV, as a proportion (%) of CNC waterway network km.	98%	98%	98%
8		**Permissible Draught (min 2.5m)**	Inland waterway network km permitting a vessel of 2.5m draught, as a proportion (%) of CNC waterway section km.	40%	40%	40%
9		**Permissible Height under bridges (min. 5.25m)**	Inland waterway network km with vertical clearance of at least 5.25m under bridges, as a proportion (%) of CNC waterway section km.	60%	60%	60%
10		**RIS implementation (% of km on which the minimum requirements set out by the RIS directive are met)**	Inland waterway network km on which the minimum technical requirements of the RIS directive are met, as a proportion (%) of CNC waterway section km.	98%	98%	98%
11	Road network	**Express road/ motorway**	Road network km classified as motorway or express road, as a proportion (%) of CNC road section km.	81%	82%	87%
12		**Availability of alternative clean fuels (stations)**	Number of fuel stations offering plug-in electricity, hydrogen, liquid biofuels, LNG/CNG, bio-methane or LPG along CNC road sections or within 10km from its junctions.	n/a	n/a	1081
13	Airports	**Connection to rail**	Number of core airports in CNC with a rail connection as a proportion (%) of the number of relevant core airports in the CNC.	46% (50% - for main core airports)	46% (50% - for main core airports)	54% (50% - for main core airports)
14		**Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges.**	Number of airports with at least one open access terminal, as a proportion (%) of the total number of core airports in the CNC.	100%	100%	100%
15		**Availability of alternative clean fuels**	Number of airports offering liquid biofuels or synthetic fuels for aeroplanes, as a proportion (%) of the total number of core airports in the CNC.	0%	0%	0%
16	Seaports	**Connection to rail**	Number of seaports in CNC with a rail connection as a proportion (%) of the number of relevant core seaports in the CNC.	80%	80%	80%
17		**Connection to IWW CEMT IV**	Number of seaports in CNC with a (hinterland) inland waterway connection of at least CEMT IV class, as a proportion (%) of the number of relevant core seaports in the CNC.	100%	100%	100%
18		**Availability of alternative clean fuels**	Number of seaports offering (at least one of) LPG, LNG, liquid biofuels, or synthetic fuels as a proportion (%) of the total number of seaports in the CNC.	0%	0%	0%
19		**Availability of at least one**	Number of seaports with at least one open	100%	100%	100%

#	Mode	KPI	Definition	2013	2014	2015
		freight terminal open to all operators in a non-discriminatory way and application of transparent charges	access terminal, as a proportion (%) of the total number of core seaports in the CNC.			
20		Facilities for ship generated waste	Number of seaports offering facilities for accepting PRF mandatory (MARPOL Annexes I, IV, and V) categories of ship-generated waste, as a proportion (%) of the total number of core seaports in the CNC.	100%	100%	100%
21	Inland ports	Class IV waterway connection	Number of inland ports in CNC with an inland waterway connection of at least CEMT IV class, as a proportion (%) of the total number of core inland ports in the CNC.	100%	100%	100%
22		Connection to rail	Number of inland ports in CNC with a rail connection as a proportion (%) of the total number of core inland ports in the CNC.	89%	89%	89%
23		Availability of alternative clean fuels	Number of inland ports offering (at least one of) LPG, LNG, liquid biofuels, synthetic fuels or hydrogen as a proportion (%) of the total number of inland ports in the CNC.	0%	0%	0%
24		Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	Number of inland ports with at least one open access terminal, as a proportion (%) of the total number of core inland ports in the CNC.	89%	89%	89%
25	Rail Road Terminals (RRT)	Capability for Intermodal (unitised) transhipment	Number of road rail terminals with the capability of handling intermodal units, as a proportion (%) of the total number of core RRTs in the CNC.	79%	79%	79%
26		740m train terminal accessibility	Number of road rail terminals with the capability of handling 740m trains (without decoupling), as a proportion (%) of the total number of core RRTs in the CNC.	25%	25%	25%
27		Electrified train terminal accessibility	Number of road rail terminals with the capability of handling electrified trains, as a proportion (%) of the total number of core RRTs in the CNC.	46%	46%	46%
28		Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	Number of RRTs with at least one open access terminal, as a proportion (%) of the total number of core RRTs in the CNC.	67%	67%	67%

The given KPI compliance rates of table 4, relate to the recently operated parts of the OEM network

3 Results of the Multimodal transport market study (MTMS)

The MTMS, performed in 2014, described the transport market characteristics of the OEM corridor in its present condition and in the future. It essentially intends to analyse the OEM Corridor-related transport system and assess the capacity and traffic flows on the respective parts of the infrastructure, covering the time period from 2010 to 2030. The time horizon of 2030 was selected as it represents a major milestone for European policy and at the same time, provides a reliable basis for future results.

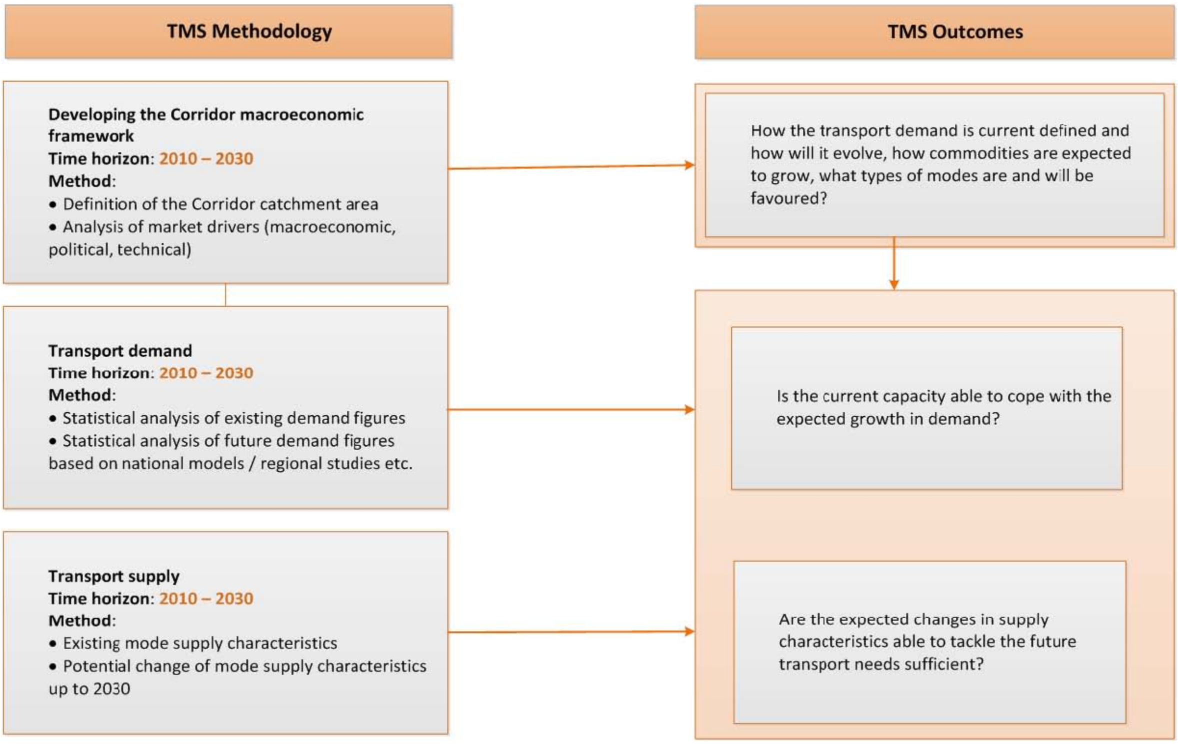
With the update of the Work plan in 2016, it was analysed if the same premises still hold compared to the figures of the MTMS of 2014. Therefore, the latest transport figures and the trend from 2010 are included.

The MTMS concept was developed for the present report in order to have a clear integrated view of the process as well as its expected outcomes. Data from national sources such as national forecasting models and regional studies, as well as European sources such as the EU Reference scenario and the ETISplus databases has been used.

The MTMS provides information on the macroeconomic framework as well as the Corridor-related demand flows creating the basis for the MTMS.

3.1 The Transport Market Study Methodology

Figure 2: Scheme of the Transport Market Study Methodology



Source: Consortium

The following four key activities were carried out.

Step 1: Analysis of the Macroeconomic framework of the OEM corridor for the period 2010 – 2030.

- Definition of the catchment area. The NUTS 2 regions that are crossed by any infrastructure of the OEM corridor were selected for further analysis for the purpose of the transport market study.
- Analysis of the market drivers. This analysis describes a number of socio economic characteristics of the OEM corridor countries and OEM regions, in particular Gross Domestic Product (GDP), population and urbanisation. Also, a preliminary forecast for the GDP and population was given on the basis of an EU encompassing study. Besides the source Eurostat, national figures on GDP and population were presented.

Step 2: Analysis of the transport demand for the period 2010 – 2030.

On the basis of national sources, the analysis of the current volumes and future demand scenarios developed by national models for each of the Corridor countries are presented. These scenarios describe the prospect of transport demand for a certain time horizon (e.g. 2030) based on a set of macroeconomic and policy assumptions. This analysis has been carried out for each country in the OEM corridor.

- Transport description of the OEM corridor in 2010 covering both the passenger and freight transport using the ETISbase as source. It can be stated that ETISbase covers comprehensive data for passenger and freight that is derived from Eurostat and national sources. This analysis describes the transport for the catchment area on the corridor, i.e. on the first level, with origins and destinations inside the catchment area.
- Integrated freight transport demand scenarios. In this analysis, the second level (origin and destination in the corridor) and third level (transit) of corridor traffic for rail and road transport has been considered. For both road and rail freight transport the base year 2010 and the forecast for the year 2030 are presented. These forecasts are based on the available PP22 study. In this PP22 study, the European reference scenario as presented in the socio economic section is used. Also for inland waterways and maritime transport the forecasts are presented for 2030, based on 2010. These forecasts are, just as for rail and road, based on the European reference scenario. The advantage of this approach is that all countries are treated in a comparable way with a common base year 2010.
- Integrated passenger transport demand scenarios. In this analysis, the long distance passenger rail transport in million passenger kilometres in 2010 and 2030 on the OEM corridor has been considered.

Step 3: Analysis of transport supply.

On the basis of the review in which key bottlenecks and critical issues in the infrastructure were identified, an outlook to the future (2030) is presented for rail and inland waterway. This outlook is based on the forecasts for the demand side and the identified bottlenecks and critical issues. Where possible, the future projects were assessed for their impact on the elimination of these bottlenecks.

Step 4: Analysis of trend 2010-2013

In the table below, the volumes of transport in the OEM countries are shown. These are figures that are valid for the OEM countries in total. No transport-related isolation per Corridor's NUTS regions could be carried out, as this would require an update of the transport model that was used earlier. Therefore, an analysis of the national transport volumes for the entire territories nine OEM countries has been carried out. The table below shows that since 2010, the volumes in the OEM countries in passenger and freight are stable; thus transport volumes in the OEM countries have been stable since 2010. Transport figures up to 2013 are the latest that could be obtained from Eurostat.

Table 5: National total traffic volumes for 2013 (total of OEM countries)

Parameter	Volume	Trend since 2010	Source
Road freight (bn tkm)	531.5	Stable	Eurostat
Rail freight (bn tkm)	180.5	Stable	Eurostat
Inland Waterway freight (bn tkm)	83.0	Stable	Eurostat
Passenger cars (bn Pkm)	1351.2	Stable	Eurostat
Coach (bn Pkm)	153.8	Stable	Eurostat
Passenger Railways (bn Pkm)	126.4	Stable	Eurostat
Tram, metro (bn Pkm)	43.7	Stable	Eurostat

3.2 Results

The outcomes of the above three activities led to the following results.

Gross Domestic Product (GDP) and population

For population forecasts there are mixed results, since a decline is expected for 4 Member States. The development of GDP in the period 2010 – 2030 shows that for all countries in the OEM corridor a positive growth is expected.

The national transport volumes and demand scenarios

National forecasts and national transport figures are available through the project sources, as well as official national sources from the corridor countries. One of the main conclusions is that forecasts, if available, are on a regional level within the country considered (for example Austria, Germany, Bulgaria), but lack the regional detail in other countries. At best a differentiation is obtained between domestic, import/export and transit traffic. This means that on the basis of this information, the OEM corridor cannot be isolated from other corridors and any further analysis cannot be made at this stage.

Also, one may consider that there is no uniform scenario used in case of forecasts being available. At best, the scenarios of the German "Bundesverkehrswegeplan" (BVWP) are taken into account in the Austrian "Verkehrsprognose Österreich 2025+". Nevertheless, the timing is different; the Austrian plan is developed in 2009. The recent update of the German BVWP forecasted for 2016-2030 a more moderate transport growth in Germany, compared to the 2007-2025 growth. For both, freight and passenger transport, especially road transport has a more moderate growth. This is resulting in a lower volume, but also in a more favourable modal split compared to previous forecasts. For a number of countries, forecasts are either not available or are given in qualitative figures. This limits the scope of the potential for an overall in-depth analysis.

Transport description of the OEM corridor in 2010

The first level of corridor traffic, that is transport within the Corridor catchment area, has been described for the base year 2010. For freight transport, the domestic transport has been included. Notably for road transport the domestic transport is carried out on short distances. This is one of the reasons why the volumes for road are relatively high. The short distance transport by road is explained by a high share of building materials, foodstuffs, agricultural products and final products.

This also concerns the last- or first mile transport related to long distance transport by rail or inland waterways, for example container transport. In the description and analysis, the short distance transport has been separated from long distance transport. On the longer distance there is more competition between road versus rail and inland waterways.

Integrated freight transport demand scenarios

The second level (origin and destination in the corridor) and the third level (transit) of corridor traffic for rail and road transport have been considered, in both, tonnes and tonne-kilometres. For rail, the first level traffic is subdivided in domestic and international traffic, and the second level in imports and exports. For road, the first level domestic traffic has been further split into domestic short distance and domestic long distance. The short distance transport is in general applicable for distances shorter than 80 kilometres.

Also for inland waterways and maritime transport, forecasts for 2030 have been presented for land-land flows in the OEM corridor. For inland waterways, in total, a growth of 25% is expected in the period 2010-2030, and a 14% for maritime transport.

The results for the forecasts are summarized in the table below.

Table 6: Freight transport volume between the OEM regions for 2010, 2030 reference scenario; in 1,000 tonnes

Mode	2010	2030 reference
Road	415,483	746,158
Rail	189,711	379,966
Inland waterway	18,694	23,361
Maritime	74,995	85,578
TOTAL	**698,884**	**1,235,063**
Rail share	*27.1%*	*30.8%*
IWW share	*2.7%*	*1.9%*

In the European reference scenario, the share for rail is expected to grow from 27.1% in 2010 to 30.8% in 2030, whilst the share of inland waterways is expected to decrease from 2.7% in 2010 to 1.9% in 2030. In view of the decrease for inland waterway transport in the reference scenario, particular attention needs to be given to support this mode of transport. These percentages increases are relative and represent the share of the global volume increasingly transported. If full compliance with TEN-T standards is achieved by 2030, the share of rail and inland waterways may be expected to increase.

The trend analysis of the annual transport volumes since 2010 shows a stable development for freight transport in the OEM countries for road, rail and inland waterway.

Investment in rail and inland waterway infrastructure is needed in order to attain a shift from road transport towards more environmental modes of transport.

Integrated passenger transport demand scenarios

The passenger demand for the period of 2010 to 2030 remains almost stable with a growth rate of 0.05% per year.

Most of the countries demonstrate slightly positive growth rates with the exception of the Czech Republic and Hungary. These two countries have negative growth rates of 0.58% and 0.39% annually.

The analysis of the trend of 2010-2013, confirms the stable development of passenger transport, there is a slight increase in car mobility which is expected with increasing welfare levels.

3.3 Analysis of transport supply

For rail and inland waterway, the identified bottlenecks and critical issues have been analysed using the forecast of the demand side. Where possible future projects were assessed for their impact on the elimination of these bottlenecks. Results are given in the following section.

4 Capacity issues on the Orient / East-Med Corridor

4.1 Rail network and Rail road terminals

Capacity utilization of the OEM rail network differs highly along the corridor. In the northern part the OEM rail network is partly used to full capacity, where capacity is even exceeded for some sections.

Capacity issues or potential future capacity bottlenecks exist on several sections of the OEM rail corridor, while the most important bottlenecks are:

- The section Dresden – Czech border is already highly used and its increase for freight transport in the Elbe Valley was between 6,5–11% during 2014 and 2015. Out of the maximum 280 train slots per day, on average 126 freight trains, 17 long distance passenger trains and 56 regional trains are passing on this section. Mainly because of growth in freight and passenger transport, the coordinator considers that there is a high probability that this section will be a bottleneck in 2030;
- The rail hinterland traffic from/to Hamburg and also the hinterland traffic from/to Bremerhaven/Bremen and Wilhelmshaven are already deemed to form bottlenecks today, as lines are currently run at full capacity or are overburdened. For this reason, this is expected to become a serious bottleneck in the future if the situation is not improved. The German Federal Infrastructure Plan 2030 has identified the need for improvements ("Y route, Alpha E") which are subject to further studies.
- The Praha – Česká Třebová line is at full capacity in 2010, and for the year 2030, a doubling of the freight transport is expected, which confirms that this section is really a bottleneck;
- For the rail sections to/from Budapest, a doubling of freight transport is expected. According to the Hungarian railways the improvements that will be made, will be sufficient.
- The urban node of Budapest which suffers from a lack of capacity, and overlapping of different types of rail traffic, will be improved in this respect by the southern railway bridge and the connected railway line that shall be widened to 3 tracks.
- The cross-border section Békéscsaba – Thessaloniki. This section is rather long (1168 km, or about 20% of the total OEM Corridor length) and runs on the territories of Hungary, Romania, Bulgaria and Greece. Currently, the characteristics of the railway lines are rather heterogeneous and many sections do not meet the requirements set by the Regulation No. 1315/2013, the technical barriers being often problematic, specifically regarding train lengths and axle load or lack of ERTMS. According to the reference scenario for this section, growths for subsections are expected in 2030 between 70% and 160%. The biggest growth is expected for the section Filiaşi – Arad in Romania. For the subsections in Bulgaria and Greece, a more modest growth (70%) is forecasted. Therefore, the Hungarian section Békéscsaba – Lökösháza HU/RO border and the Greek sections Domokos – Tithorea and Inoi – Athina SKA (*Sidirodromiko Kentro Acharnes*) are lacking of capacity.

Apart from expected demand there are other factors that influence the future availability of capacity on rail infrastructure.

Average **border waiting times** in rail freight transport. The users of rail freight services are still confronted with considerable waiting times at various border crossing points along the corridor, e.g. approx. 20 hours for freight trains at RO/HU border near Curtici, which is related to change of locomotives and their availability as well as border procedures. To tackle this issue, as described in chapter 1, a dedicated working group has been set up and a Ministerial Declaration including an action plan have been agreed upon in June 2016.

The issue of capacity on **mixed traffic lines** and practices to resolve conflicts between trains is a subject for extensive research and development. This concerns the implementation of ERTMS level 3, introducing a system of gradual timetabling and computer assisted train operation systems that are targeted in a long term future to be realised well beyond 2020.

Single track sections do not necessarily imply capacity problems as long as the number of trains does not exceed the line capacity leading to unsatisfying operational conditions.

Existing and/or potential capacity issues are partly **tackled by projects** for the sections Ústí nad Orlici - Chocen, Bernhardsthal (CZ/AT) – Wien Süssenbrunn and Wien Stadlau - Wien Simmering, Budapest Southern bridge, Békéscsaba – Lökösháza, HU/RO border – Curtici – Arad and Tithorea – Domokos and Inoi – Athina SKA. In addition, some projects will remove single track sections along the OEM (Békéscsaba – Lökösháza, HU/RO border – Curtici – Arad and Tithorea – Domokos) having positive effects on rail capacity.

Further problems not having direct impact on rail capacity but hindering the smooth rail freight transport along the OEM as they influence rail operations are **strong incline** and limitations of **clearance gauge**. Along the OEM corridor, there are some rail sections with strong incline, in particular in Romania, Bulgaria and Greece. Besides the impact on rail operations (increase of operational costs), this has also impact on infrastructure investments needed to minimise the incline. The **limitations for container transport** due to restrictions of the clearance gauge of some tunnels affect certain sections in the Czech Republic and Bulgaria.

All OEM **Rail Road terminals** are linked with national rail and road networks, although the quality of “last mile” connections needs partly to be improved and capacity problems solved. Regarding the state of development of Rail Road terminals, there are differences between the northern and southern corridor parts, ranging from a dense network of terminal locations, with limited capacities both in the terminals and the connecting rail and road network to a lack of modern and efficient terminals with adequate capacity.

4.2 Inland Waterway and ports

The main bottleneck on the OEM IWW network is related to the ship lift Lüneburg-Scharnebeck. Due to the limitations in the length of lock chambers only the barges which have a maximum length of 100 m can pass. The pushed convoys have to be decoupled for the passage and lifted or lowered individually. Furthermore, there is a problem with lock reliability, as at the moment there are basic maintenance operations ongoing, that least to longer waiting times.

Currently, there is a project for the construction of a **new lock in Lüneburg-Scharnebeck** listed in the German National Transport Plan (BVWP 2030) under the category ‘Vordringlicher Bedarf’ which would solve the above problems. However, realisation date is unclear as the lack of human resources calls for prioritisation of all inland waterways infrastructure projects even if they are included in "Vordringlicher Bedarf".

One more problem identified refers to insufficient capacity of the Praha-Smíchov lock chamber, however there is a project planned for 2018, which would address this issue.

4.3 Ports and Hinterland connection

The issue of limited port handling capacity remains prevalent at the ports of Hamburg and Lemesos. The hinterland connections for Bremen, Bremerhaven and Hamburg ports require capacity improvement. Regarding Greek ports, capacity has become an issue at the ports of Thessaloniki, Patra, and Igoumenitsa. Capacity bottlenecks are being addressed by several projects for the above ports; these mainly include expansions and/or construction of terminals and additional facilities to accommodate increasing demand. No significant capacity bottlenecks are currently identified for the ports of Burgas, Pireas and Heraklion.

With regard to the ports' hinterland connections, capacity issues have been identified at the Port of Hamburg's road and rail connections, with a substantial number of projects addressing the upgrade of both road and rail port and hinterland infrastructure. Similarly, the current road connection to the port of Lemesos faces severe congestion issues resulting from its use by port traffic and also other urban traffic within the area. A new link road is being constructed to improve access to the port and redirect port traffic from congested urban roads. As a result of the reconstruction and extension of existing terminals for combined transport in the port of Rostock between 2012 and 2014, with support of TEN-T, the transport of trailers by rail to and from the port has increased every year since then.

Finally, hinterland connection capacity bottlenecks have been identified at the port of Thessaloniki for both road and rail connections. These are being addressed by related projects to improve both the last mile connections, as well as the road and rail network within the port zone itself.

4.4 Road networks

As a general rule, traffic congested road sections are located in urban agglomerations and problems are due to the overlay of international, regional and local traffic flows. Capacity bottlenecks are observed along several OEM corridor sections with a total length of about 500 km, out of which some 40% are saturated motorway sections located in Germany, Czech Republic, Austria, Hungary and Cyprus. The remaining single-carriageway congested sections are in Czech Republic, Hungary and Bulgaria. No capacity problems were reported anymore in SK, RO, and EL.

Capacity issues are addressed by planned projects for completion of ring-roads (Praha, Wien, Budapest, Sofia, and Lefkosia) and upgrading or construction of new motorway sections in Czech Republic (D1), Austria (A5), Hungary (M15), and Bulgaria (A3 Struma).

5 The identified planned projects (works and studies)

The OEM Corridor study, provides an extensive list of all on-going and planned projects by 2050 (infrastructure works and studies) known at present (2016), as obtained by National Ministries, the Infrastructure Managers and Regional Authorities. Hereafter, the project list is briefly analysed according to primary categories (i.e. mode of transport and other categories); costs; typologies (i.e. bottlenecks, cross-borders and last-miles) projects maturity.

The list is composed by 358 projects.

5.1 General Overview

Project categories

Roughly half of the projects concern linear land transport infrastructures: rail (121) and road (73). Punctual infrastructures contribute with 77 projects for maritime ports; 29 for airports and 16 for Rail-Road terminals. Projects involving Inland Ports and Inland Waterways are 21. 14 projects account for the Rail ERTMS category. Finally, 7 projects fall under the innovation category.

Project Typologies

52 projects (13% of the total) solve bottlenecks issues. It should be noted though, that this figure only applies to rail projects, thus representing the 40% of the category's total. 54 projects (14%) are located in a cross-border section. Finally, there are 41 projects (11%) which relate to last-mile connections.

Maturity

272 projects (73%) simultaneously indicate a value for implementation timing (start, end date) and cost. This has been assumed as a basic criterion to assess a basic level of maturity. 66 projects (18%) have been officially approved by relevant governmental and administrative authorities.

Cost

The global cost for the entire set of projects is roughly 60 billion EUR. However, cost is defined for only 90% of the projects. Out of this set of projects with defined costs, 65% also have a secured funding source to cover the costs, partially or totally.

Projects could be divided by cost classes, thus having:

- 12 projects for a >1 B € value;
  - New railway line DE/CZ border – Usti n.L., CZ, 2020-2030; 2.5 B€,
  - Upgrading railway line Leipzig – Dresden, DE, 1993-2020, 1.45 B€,
  - New railway line Lovosice/Litomerice – Praha, CZ, until 2030+, 2.0 B€,
  - Construction of new railway line Kalambaka –Igoumenitsa, EL, 2021-2030, 1.73 B€
  - Rehab and double tracking of railway Craiova – Caransebes (226 km), RO, 2025-2030, 1.2B€
  - Modernization of Radomir – Kulata railway line, BG, no year, 1.1 B€
  - Introduction and Development of Road ITS and Toll system, CZ, 2014-2023, 1.3 B€,
  - Expressway Vienna Ring, constr. of Danube Tunnel, AT, 2003-2025, 1.6 B€
  - Expressway Lugoj – Caransebes – Orsova - Drobeta T.S., RO, 2029-2030; 1.3 B€
  - Motorway Korinthos – Patra , EL, 2008 – 2017, 2.49 B€
  - Motorway Athina – Thessaloniki, section Skotina – Evagelismos, EL, 2008 – 2017, 1.67 B€
  - Motorway Patra – Igoumenitsa, section Andirrio - Ioannina, EL, 2008 – 2017, 1.45 B€

- 19 projects for a 550M to 1B € value;
- 77 projects for a 100M to 500M € value;
- 36 projects for a 50M to 100M € value;
- 94 projects for a 10M to 50M € value;
- 83 projects for a 1M to 10M € value;
- 40 projects with no info on the cost.

For small projects under 10M € value, 36% of them are essentially design studies, feasibility studies, assessment and preparation of works for all modes of transport (maritime, airport, road, rail and RRT) in all countries mainly until 2020. The remaining 64% of the projects are works projects for rail, RRT, airports, roads and IWW.

5.2 Overview by mode of transport

Rail & RRTs

The investment projects for Rail and Rail-Road Terminals are expected to address the majority (30 out of 50) of existing bottlenecks in the OEM rail network by 2030.

Nevertheless, there are still certain critical ones that will not be alleviated before 2030, particularly with regard to the technical non-compliance of certain sections in Bulgaria, Czech Republic and Romania. A minor share of the projects though, does not have an indicated timing, thus representing an element of uncertainty which would hinder an implementation in the short-term.

Inland Waterways

In the Czech Republic, mitigation measures have been identified to alleviate the main bottleneck of the non-compliance of River Elbe. However, planning of projects and progress towards compliance with TEN-T requirements will require a close follow-up.

In Germany, the mitigation measures are not defined yet and are expected as a result or follow-up of the German study “Gesamtkonzept Elbe”. Also the implementation timing of various projects is still unspecified. A jointly coordinated schedule is expected with the German study “Gesamtkonzept Elbe”. Additional open issues are the unspecified timing and projects for the deployment of alternative fuels in all inland ports.

In Germany, the RIS directive has been legally transposed and obligatory technical requirements have been implemented.

Seaports

Bottlenecks identified for the OEM Seaports will be partly alleviated until 2030. The missing rail connections to the Greek ports of Igoumenitsa and Patra are addressed by projects that are expected to be completed by 2030, however, with no secured financing. Persisting bottlenecks constitute the provision of alternative fuels for maritime transport for 7 out of the 12 OEM ports, as well as the deployment of operational single window/e-maritime services in a number of Greek ports to improve their performance and achieve interoperability.

Road

Most road projects entail the construction of new or upgrading of existing motorway sections, which are expected upon completion to increase the relative share of motorway/express road sections to 92% of the total Corridor length. In addition, 80% of the projects planned to be completed after 2020 will address capacity problems in urban areas. Other related projects will only partially contribute to achieving interoperability of ITS and tolling systems along the Corridor, while there are very few projects aiming at introducing or extending the supply of alternative fuels and improving the efficiency of energy use.

Airports

Connection of main airports with rail network is fundamental to achieve the intermodality and interoperability objectives set by the TEN-T regulation. Half of the Core network major airports (3 out of 6), belonging to the Orient-East-Med Corridor, are currently not connected with heavy rail.

Hamburg is connected with suburban electrified (1200 V DC) rail only; however a technical feasibility study has been planned for the realisation of a new rail link. As for Praha and Budapest, rail links are planned for construction: works are subject to available funding for the Budapest airport, while for the Praha airport connection works are expected to start in 2021.

Accordingly for the corridor airports, the “open issue” is: The progress to provide capacity for alternative fuels for aircrafts shall be monitored in all corridor airports, as no project is in place yet.

5.3 The ERTMS deployment along the Orient/East-Med

In December 2014, the European ERTMS Coordinator started a consultation with Member States about ERTMS implementation of the Core Network Corridors, with the aim to review the current European Deployment Plan (EDP) of 2009. This activity launched a close dialogue in all TEN-T corridors with the Member States. The Coordinator had numerous bilateral discussions with high-level representatives of the Transport Ministries and Infrastructure Managers. This review process has been closed and the new EDP will be part of the Work Plan for ERTMS 2016. The reviewed ERTMS deployment plan shall cover all the TEN-T Corridors alignments and will be then subject to a Commission adoption procedure to be finalised by the end of 2016.

5.4 The RIS Deployment Plan

Germany has implemented a wide range of RIS applications (ELWIS system), which in general are of high quality. In the Czech Republic, basic RIS applications have been implemented (LAVDIS system), but some LAVDIS services such as provision of Notices to skippers suffer from the lack of reliability of their operation. Operational improvements are needed.

In the Czech Republic, a barrier for RIS development is sufficient funding. The progress with the implementation of a few applications or its roll-out to the complete waterway network will be delayed, as cost-benefit evaluations of certain applications regarding data collection, storage and use were considered and personnel resources are limited at the national IWW administrations responsible for RIS implementation.

Apart from RIS, other IWW related investments are required, which are regarded as more important. In addition, the vessel fleet operated at the Elbe has outdated equipment and low transport performances, which reduces potential RIS benefits.

In Germany the legal obligation to carry and use AIS and ECDIS on river Elbe is expected starting from 1st of January 2017

While basic systems are almost fully in place (Notices to Skippers, Electronic Nautical Charts), the deployment of further RIS services needed will have to be decided on according to the specific demands of the corridor.

The international data exchange between the two riparian countries is planned but still hampered by different technological applications The missing interconnection between Czech Republic and Germany, as well as the lack of reporting obligations is regarded as a barrier for the wider use of electronic reporting.

In the frame of the CEF funding a project of common interest for wider RIS deployment in 12 member states, including the Czech Republic and Germany, plus Serbia will be started in 2017. Based on the outcome of previous EU funded projects, further RIS services needed in certain corridors will be defined and implemented. Furthermore the project will address the issues of international cooperation on development and implementation of central services, improvement of quality of monitoring and information on the waterway situation, finalisation of coverage of IWW by AIS stations and deployment of advanced instruments for solving emergency situations.

Another challenge is the RIS implementation in inland ports. A number of inland ports have still not set out the necessary steps for the RIS implementation. However all the Orient/East-Med Corridor core network ports in Germany both maritime and inland ports (Hamburg, Bremerhaven, Bremen, Hannover, Braunschweig and Magdeburg) provide ENCs. In addition the ports of Hamburg, Bremerhaven and Bremen directly give input to Notices to Skippers if needed. The other ports only provide information via the waterways and shipping administration or via the river police concerned

Finally, no further RIS development plans are known for the Czech core network ports (Děčín, Mělník and Praha).

5.5 Other Elements (Resilience, Environmental Issues)

The practice established by the EC of continuously sharing with the Member States the state of project progress has proven to be very effective and thus should be maintained in the future. Furthermore, the various projects presented by the Member States could be accompanied by traffic forecasts, CBA, accompanying measures necessary to meet the traffic targets and alternative solutions to the proposed projects.

The definition of the investments required should take in proper consideration the freight-oriented nature of the Corridor.

In addition to the above elements, mitigation and adaptation measures should be taken in advance by Member States and local agencies to reduce impacts of climate change and extreme weather events in the long-term, since these may negatively affect transportation systems increasing the risk of damages, delays and failures on roadways, railways, air and marine transport infrastructures.

6 Infrastructure funding and innovative financial instruments

The development of Core Network Corridors requires, inter alia, a critical mass of investment to take place within a short time- framework; therefore a careful examination of the potential financial sources has to accompany the corridor planning. Some key criteria to be appraised are reported in this section of the work plan.

The projects to be developed can be ranked in three different categories from the point of view of funding and financing needs:

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

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

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

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

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

For all these 3 different categories of projects, the public intervention with the different degree of intensity is justified on the ground that these projects of high socio-economic and EU added value, substantially address overall public service obligations, suboptimal investment level, market failures and distortion due to externalities (positive, for the projects supported, including in terms of strategic added-value, and negative for competing modes), and therefore call for the transfer of resources.

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

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

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

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

7 Critical issues on the Orient / East-Med Corridor

The key critical issues are identified by the study review, infrastructure compliance analysis and Transport Market Study and constitute rail cross-border and capacity issues, horizontal issues in terms of interoperability and intermodality, IWW bottlenecks and, finally, seaports integration into the Corridor. The critical issues largely coincide with the objectives of the CEF pre-identified projects provided in Annex I of the Regulation.

Traffic Management Systems

The ITS Directive No. 2010/40/EU and its Delegated Regulations 885/2013, 886/2013 and 2015/962 needs to be implemented especially covering the TEN-T road network. In some Member States, the related actions have not started yet. The works in accordance to the MoUs between Austria, Hungary and others as well as between Hungary and Romania regarding „Cooperation for traffic management and traffic information exchange" should be continued. Both actions will be supported by implementations in CROCODILE II (CEF funding 2014).

River Elbe

Being widely a free flowing river, the River Elbe is characterised in general by insufficient navigability conditions. Problems hindering seamless transport are heterogeneous and include unreliable draught conditions, incomplete network, limited underpass clearances, non-compliant lock chambers, capacity deficiencies, etc. Due to the involvement of two Member States, Germany and the Czech Republic, this also constitutes a cross-border border issue.

The Elbe-Lübeck-Kanal between Lauenburg and Lübeck constitutes a similar problem.

Figure 3: Forecasted compliance of the Corridor IWW network by 2030

Rail cross-border and capacity

The overview of the OEM railway corridor identified three critical cross-border sections. The existing **Dresden – Praha** rail line (DE-CZ) is already highly used. Several studies for pre-planning services have been conducted in the last years in joint action of Saxony and Czech Republic. In April 2016, a European grouping of territorial cooperation (EGTC) has been founded by Saxony, Czech Republic and EU in order to promote the planning.

A clearer picture might be given after the finalisation of the German Federal Transport Plan (BVWP) by end 2016, as well as through other studies' results. In the German Federal Transport Plan 2030 (BVWP 2030), the project is listed under category 'potentially required measure', while its project scope is not fully defined yet.

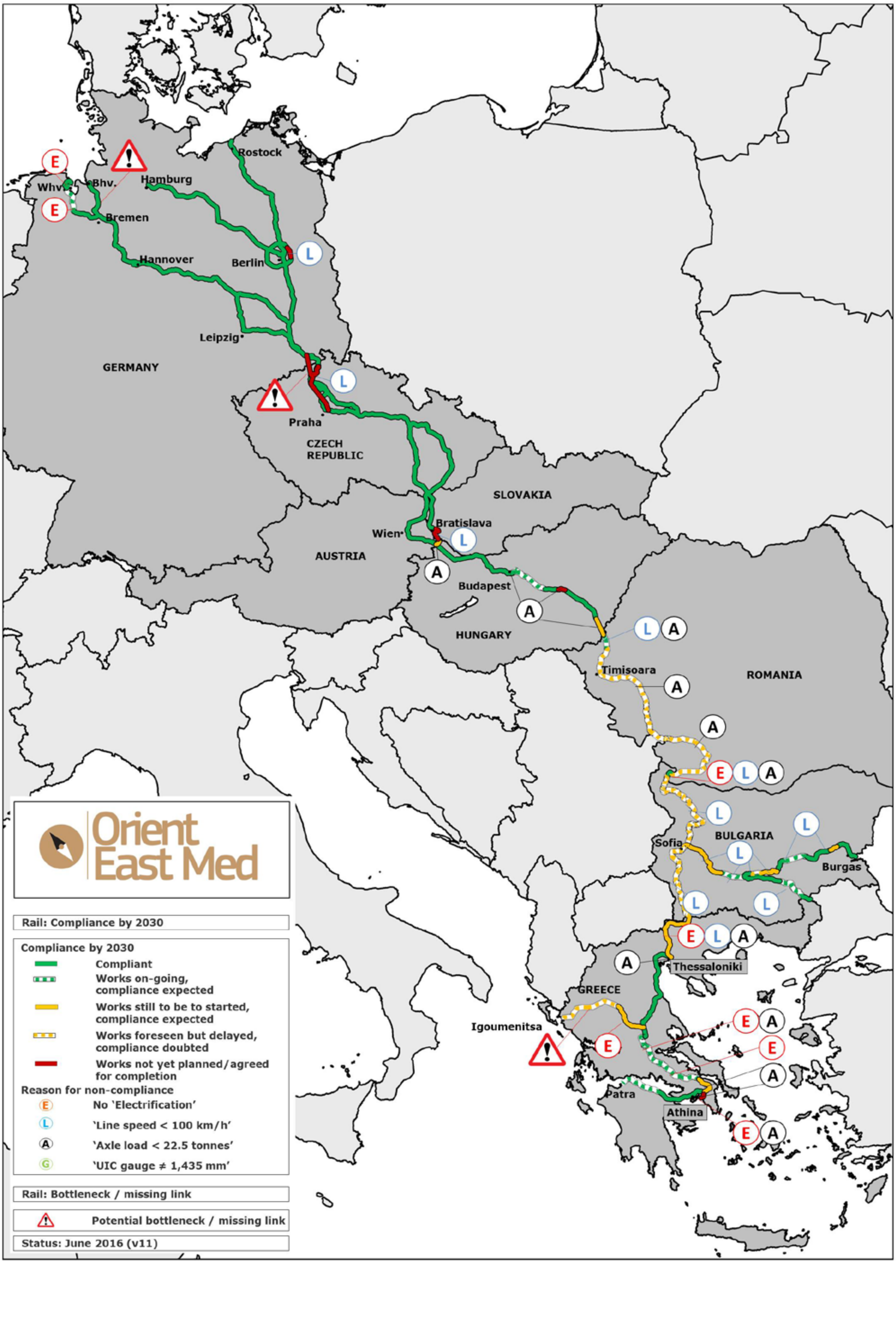
Finally, there are interoperability issues along the long section **Békéscsaba – Thessaloniki (HU-RO-BG-EL)**, which also exhibits rather heterogeneous technical characteristics, while many sections do not meet the requirements set by the Regulation.

Apart from the above, the capacity utilisation analysis in conjunction with the results of the MTMS identified potential critical capacity bottlenecks at the hinterland transport to/from the Port of Hamburg, along the Praha – Česká Třebová line and along the rail sections to/from Budapest.

Maritime Ports

Intermodality constitutes a key critical issue for ports in terms of providing the necessary connections to the land networks to ensure the seamless intermodal transport along the supply chain of the OEM corridor. The latter is particularly relevant in the case of the Greek ports of **Igoumenitsa and Patra,** which are currently lacking connections to the rail network. In Cyprus, this also regards the need for improved road connections to the seaport of Lemesos (both terminals 1 and 2). Another critical issue is interoperability in terms of deployment of e-maritime services and vessel traffic management systems, which are currently missing from a number of Greek ports. Finally, port infrastructure capacity may become a bottleneck for certain ports, while also the necessary steps should be adopted towards the provision of alternative fuels currently lacking from all OEM ports.

Figure 4: Forecasted compliance of Rail network by 2030 (electrification, load, speed)



8 Recommendation and outlook

The analysis of the corridor has shown that the corridor faces multiple challenges. This is particularly true as transport on the corridor should evolve towards environmentally friendly modes of transport (rail and inland waterways).

In the northern part of the corridor, one of the key issues is congestion which may hamper the efficiency of transport operations. In the southern part, one of the key issues is the lack of (interoperable) infrastructure which would basically allow for efficient transport operations. The corridor development needs also to take into account the developments outside the EU.
Measures to solve the identified 'critical issues' on the corridor are estimated at approximately 25 billion €. Knowing that available CEF funding for all corridors is currently limited to 26.2 billion €, a respect of priorities improving the corridor efficiency is essential. In all cases, strong coordination between the Member States involved, but also between the different transport modes, is crucial to guarantee that maximum benefits are achieved from the investments made.

The results of the CEF call 2014 show that all funded projects were in line with my recommendations for priorities. The first elements available for the call 2015 are going in the same positive direction. Nevertheless, important priorities still need to become reality before 2030 and the question of their funding is becoming crucial.

It is crucial to maintain direct funding as a priority for rail and inland navigation in order to improve the modal split. This can only be achieved through direct financing, as mentioned in chapter 6 on IFI's. CEF financing is an additional mean to EFSI which will render EFSI even more efficient.

a) Continuity of the Corridor alignment:
The added value of the corridor will depend inter alia on its "continuity" and its "interoperability" between and across different modes of transport technical standards.

b) Priority to inland navigation, railways and border-crossing improved practices:
On the basis of the state of play and recent evolution of transport infrastructures, inland navigation and railway transport are, compared to other modes of transport (mainly transport by roads), increasingly suffering from passenger and freight flows discontinuities. Therefore, priority should be given to these modes and more particularly to the efficiency of cross-border sections.
A common corridor methodology should address those cross-border challenges, including for other corridors, without prejudice for existing particularities of specific cross-border sections.

c) Coordination of the transport development plans:
The nine national transport and mobility plans of the countries concerned by the OEM corridor, including the "Transport Master plans" requested by the European Commission, should in particular make provisions for the needed investments on the corridors.
It is fundamental for the work of the Coordinator to be informed about the evolution of the different national transport plans as well as the projects' national or EU financial status
The use of cohesion funds should be oriented towards the logic of the transport core and comprehensive network development aiming at an efficient inter-modality approach.

d) Maintain a multimodal transport network:
In view of the evolving demand for mobility in highly populated and intense economic development areas, it is important to maintain and promote multimodal transport infrastructures for people and goods. The current and future congestion of the road networks, as well as the decarbonisation policy of transport and an efficiency in-line with the expectations of the users are main drivers for the promotion of the use of railways and inland navigation.
Abandoning existing rail or inland waterways infrastructure could compromise the added value of the European Corridors approach for countries and regions concerned.

e) Projects evaluation:
The evaluation of projects must be based on socio-economic criteria including financial returns on investments, but also on the impacts on employment rates, the environment, congestion problems, increase of the regional GDP etc. Further in-depth analysis of the impact of these criteria should be encouraged.

f) Operational and administrative bottlenecks:

Special attention should be paid to all types of bottlenecks that may hamper the efficiency of investments by hindering transport speed and efficiency. A specific analysis of the administrative bottlenecks on the borders and along the corridor should be part of the priorities and methodology of the management of cross-border projects. An analysis of transport time lost due to administrative/technical burden has to be put in perspective with the gains/benefits of certain infrastructure investments. The objectives of the Railway Cross border issues working group could be expanded towards the entire OEM corridor and to other Rail Freight corridors.

g) Links to third countries:

The important need for an efficient and fast action to improve the functioning of the corridor should include the links with third countries such as the Western Balkan states. Our attention should also go after the adoption of the Work Plan to a better understanding and analysis of the needs to connect the OEM corridor. One should explore possibilities in the framework of the MoS projects.

h) Communication and promotion:

It is important to inform and involve a maximum of stakeholders and citizens about the objectives and projects on the corridor. A partnership with the European Parliament and with concerned MEP's, the regions and municipalities but also with operators, infrastructure managers and specific organisations would be the basis for an efficient information dissemination system and for a smooth acceptance and support principle. This will be an important task for me over the years 2015 and 2016.

When analysing the situation of the OEM corridor from the north to the south of its location through Europe, I came to main conclusions about the priority areas, where most efforts should be dedicated under the CEF and EFSI funds financial support.

Cross-border and main bottlenecks issues on the corridor alignment are of major importance and should receive sufficient support for their implementation.

As foreseen by the TEN-T Regulation, I would propose to continue/setup the following working groups:

- 1. on cross-border cooperation issues in railway,
- 2. on regional cooperation,
- 3. on maritime ports efficiency and use of new technologies.

i) Influence on climate change:

Work is on-going to appraise the mutual impact of climate change and the corridor, and to characterise its overall contribution of safeguarding the environment from local pollution and noise.

Due attention will therefore be paid from the next Work Plan version in

- assessing the potential contribution to climate change mitigation (reduction of Greenhouse Gas emissions) of the corridor through a more effective multimodal transport pattern;
- mapping specific needs, opportunities and projects linked to the adaptation to climate change (e.g.: extreme events risk increase, variability of water level and flows in river basins);
- identifying the Corridor and corridor's projects effects on local environment (including biodiversity) and noise;
- highlighting best practices along the Corridor that have a potential for cross-fertilisation and transferability for
    - o climate change mitigation,
    - o adaptation to climate change ,
    - o reduction of environmental negative impacts / enhancement of the quality of the environment and biodiversity,
    - o tackling (rail) noise.

Beyond the positive effects on climate change, investing in projects will have a direct impact on sustainable job creation as indicated by the Fraunhofer study on the cost of non-completion the TEN-T (2015). The different projects promoted in the frame of a EU transport area should clearly mention and be evaluated on their added value in terms of employment, socio-economic impact as well as reduction of GHG emissions.

My recommendations by mode are the following:

1. Railway network improvements:

a. The northern entry doors of the corridor are subject to heavy congestion when it comes to an efficient management of the entry/exit flows of the maritime/inland ports. The need to upgrade the railway infrastructure capacity and quality of the port of Bremerhaven allowing a better connection to its hinterland should be evaluated in the final National Transport Plan (BVWP 2030). This could also have positive impacts on the transit of goods via the city of Bremen. The same applies for improving the rail connection to the port of Hamburg.

b. The existing railway line between Dresden, Ústí nad Labem and Praha is highly used and could be saturated in future years according to assumptions of some studies. A new line could be an option to improve the operations of both passengers and freight trains and might allow for a smoother interconnection between Germany and the Czech Republic. The construction of a new high speed line and the upgrade of the existing line have to be considered. The results of a preliminary study have been jointly presented by the Czech Republic and the German State of Saxony in May 2016. Germany and the Czech Republic should continue with an ambitious project pipeline of the high speed rail connection from Dresden to the Czech Republic, by giving highest priority to the cross-border section from Dresden towards Ústí nad Labem.

c. The capacity issues on some sections of the Czech line Praha – Česká Třebová have to be considered. The section Praha main st.– Praha Hostivar is under upgrade (CEF 2014) as well as the section between Pardubice and Česká Třebová (CEF 2015).

d. The upgrade of the Brno – Břeclav railway link as a high speed line will also increase the needed transport capacity between the Czech Republic, Austria and Slovakia.

e. The Budapest node is expected to become a significant bottleneck in the future. The track developments in the Budapest region are recommended.

f. The lack of a second track between Hungary and Romania may become an important bottleneck. The track improvement is recommended. The design and study of the Hungarian section between Békéscsaba and the Romanian border of Lökösháza/Curtici is ongoing (CEF 2014) as well as on the section Hegyeshalom –Rajka near the SK/HU border (CEF 2015).

g. The rehabilitation at TEN-T standards of the Craiova – Calafat link in Romania to connect with the Bulgarian border is necessary. The section between Craiova – Drobeta Turnu Severin – Caransebes is under analysis for rehabilitation (CEF 2014) as well as the section between Craiova and Calafat (CEF 2014). The connecting link from the Romanian/Bulgarian border to Sofia via Vidin, Medkovets and Ruska Byala should be speeded-up. The link Sofia – Voluyak and Sofia – Elin Pelin are under modernisation (CEF 2014). Works will start in the near future between Kostenets and Septemvri (CEF 2015). The Rail Road terminal in Plovdiv is under construction and should start operations by end 2016.

h. The Bulgarian railway section leading to Greece via Radomir and Kulata needs modernisation as well as its cross border link between Kulata (BG) and Promahonas (EL).

i. The new construction of the double track high speed railway between Tithorea and Domokos in Greece (CEF 2014), which will complete the connection of the port of Thessaloniki with Athina, as well as the construction of the missing links between Athina and Patra (from Kiato to Patras) are part of the completion of the southern access to the corridor via the Greek ports. The sections Kiato – Rododafni, Rododafni - Psathopirgos (CEF 2014) and Psathopirgos – Patras (CEF 2015) are under upgrade.

j. ERTMS deployment is at an advanced stage in the middle of the OEM axis, but in the German and Bulgarian/Romanian part it is lagging behind. Detailed ways, how to accelerate ERTMS equipment along the core network corridors, will be described in a separate European Deployment Plan by the European ERTMS Coordinator.

k. Greece has been heavily investing in its corridor section for many years and might be able to complete ERTMS by 2025.

l. The "Vienna hub" in Austria is the frontrunner and will most probably finalise the deployment by 2017 that will significantly contribute to the development of this area.

m. Concerning the Southern section of the Corridor: Romania should intensify the simplification of border-crossing procedures towards Hungary and by modernizing its railway law. The ongoing cross-border cooperation between Bulgarian and Greek railway infrastructure managers is highly welcomed. The remaining sections shall be finalised as third step. This cross-border cooperation along the OEM Corridor has been initiated by the Coordinator via the setting-up of a specific working group. It involves at the same time Ministries, Infrastructure Managers, National Safety Authorities, railway undertaking and final users.

2. Maritime ports improvements:

a. The northern German ports should persevere in the implementation of alternative fuels. Southern ports should follow in that direction.

b. Greek ports require modern technologies in terms of e-maritime services deployment in order to improve port performance. Greece should implement the National Single Window.

c. The Greek port of Heraklion must increase its efficiency by implementing VTMIS and port community communication state of the art infrastructure.

d. The intermodal efficiency of the Greek ports of Thessaloniki and Patra needs a modern and efficient rail connection to the OEM core network corridor.

e. The port of Igoumenitsa needs to complete its rail connection and maritime infrastructure improvements by 2030.

f. The Cypriot port of Lemesos terminals 1 and 2 would greatly benefit from expanding its cargo storage capacity. The use of financial instruments may be explored to finance suitable parts of it.

g. Greek ports and their links with Crete and Cyprus need to implement MoS standards to improve maritime transport, which constitutes the main transport connection between the continent and the islands.

h. I will initiate in priority a specific working group in agreement with the MoS Coordinator to exchange best practices for the implementation/use of alternative fuels in the OEM ports.

3. Inland waterways improvements:

a. Inland waterways are key elements to ensure an essential and effective hinterland connection from the northern ports of the corridor to central European countries on already heavily congested roads and railway links.

b. The main efforts in this field are to be oriented to an improved navigability of the Elbe River in conjunction with the environmental aspects.

c. The German Upper- and Middle Elbe areas as well as the State border part between Germany and the Czech Republic need an in-depth analysis and construction planning to give an economical and environmental impetus to a respectful use of the natural Elbe river capacities. The "Gesamtkonzept Elbe" is a key element to reach this objective.

d. Along the Czech Elbe/Labe part between Děčín, Ústí nad Labem, Mělník and Pardubice studies and infrastructure works shall be continued to increase capacity and performance, e.g. a future Děčín Weir lock complex and the erection of the Pardubice inland port. Ongoing activities as the Srnojedy and Přelouč, lock chamber modernisations and draught improvements are contributing to a better navigation status.

e. The non-sufficient parameters of the Czech Vltava navigation from/to Praha need to be further addressed, lock upgrades (e.g. Praha Stare Mesto or Stvanice (under progress)) are intended and the functionality of the Praha inland port needs to be safeguarded.

f. It is obvious that developments in both countries need the continuation of the existing regular dialogue between the two countries in order to achieve a waterway without bottlenecks.

g. There is an urgent need for clear and efficient consultation between Germany and the Czech Republic allowing for a common positioning on the navigability of the Elbe as a credible alternative to congested roads in this section of the OEM Corridor. The positioning of the DE and CZ inland waterway as part of the multimodal corridor will have a direct influence on the CBA of major investments.

4. Airports intermodality improvements:

Priority should be given for the development of heavy rail connection to the airports rail nodes of Budapest (Preliminary studies and works started under CEF 2014), Praha and Hamburg.
In Cyprus, the construction of an Interurban multimodal terminal near to the Airport of Larnaka may be a good candidate for the use of financial instruments or PPP. The initiative started with the support of CEF 2014.

5. Roads projects improvements:

a. The Hungarian motorway M15 between the Slovak border station at Rajka and the junction with motorway M1 near Hegyeshalom needs upgrading. Studies and works will start under CEF 2015 on this border section.
b. The road connection between the Czech Republic and Austria (A5 / D52) needs a clear finalization date (studies and works were supported by CEF 2014)
c. The Lefkosia South Orbital ring motorway in Cyprus and the bottlenecks on the Lemesos - Lefkosia Motorway need additional capacity. With its implementation the core network in Cyprus will be completed and fully functional.

In conclusion, the analysis of the corridor status is refining compared to the first work plan. It is obvious that the challenges and the identified priority projects will not change fundamentally. A stability of the objectives is essential to realise the EU TEN-T corridors. By their own nature, projects' implementation will take time.
It is nevertheless important to underline that we can obtain "quick wins" by removing e.g. administrative bottlenecks or "non-sense" rules hampering the quality of freight and passengers transport. Those "administrative bottlenecks" and "non-sense" practices may annihilate in some cases the positive effects and the added value of EU investments fundamental for the corridor. The importance of the small projects along the OEM corridor should not be underestimated.

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