



Orient East Med



Final Report

European Coordinator

Mathieu Grosch



This document is a short overview on the situation on the TEN-T Core Network Corridor Orient-East-Mediterranean. I prepared this report at the end of my mandate in November 2023 based on the work and preparations for many years by my consultants team under the leadership of Mr. Albrecht Malcherek and my advisers former and current Mr. Patrick Vankerckhoven and Ms. Lotte Lankveld.

Introduction



For the past 10 years, we have been witnessing a number of important developments leading to a fully-fledged EU transport infrastructure policy. 2014 marked the beginning of a new era in European infrastructure policy. Nine Core Network Corridors were established, a robust governance system headed by European Coordinators was created and a solid financing mechanism was adopted through the Connecting Europe Facility (CEF).

Since that moment, the adoption of the new Regulation on the trans-European transport network, combining individual cross-border projects into real multimodal corridors, with horizontal topics of sustainability, modal shift, intelligent transport systems, and a clear EU investment planning through CEF and the other instruments the EU disposes, we can think of a truly European infrastructure policy.

We are now at the brink of a new evolution and continuation of the European infrastructure policy. With the adoption of the revised TEN-T regulation, and 9 revised Core Network Corridors into European Transport Corridors (ETC), taking into account the Green Deal and other key developments over the recent years, we are ready to realise an efficient, sustainable and resilient TEN-T network and contribute to the decarbonisation and digitalisation of the transport system.

In this report, I want to underline the specificities of the Orient/East-Mediterranean Corridor (OEM), describe the main issues at stake and equip my successors, as the Orient/East-Mediterranean Corridor will be taken up by the new Rhine-Danube, Baltic-Black-Aegean Seas and Western Balkans – Eastern Mediterranean European Transport Corridors, as well as the European Institutions that formulate, shape and implement the TEN-T policy, with a set of strategic recommendations necessary to move forward on the important TEN-T objectives.

From the very first day of my mandate, I have been focusing on the challenge of the corridor approach necessary for a fully functioning and operational transport corridor. My principal role was to support the cross-border, bilateral and multi-lateral cooperation towards a corridor approach and not only an addition of national priorities. These key projects are:

- **Dresden – Prague High speed rail:** the construction of a new high speed railway line between Dresden (DE) and Prague (CZ) with Germany's longest rail tunnel between Heidenau (DE) and Chabarovice (CZ) of about 25 km length to increase the freight transport capacity between Czechia and Germany and substantially reduce travel and transport times in national and international long-distance passenger and freight transport. The line will also connect the Czech Republic to the European high speed rail network.
- **“Gesamtkonzept Elbe (GKE)”:** the strategic concept for the Elbe inland waterway adopted in 2017 by two German federal ministries and the nine German federal states located in the Elbe River Basin aiming at harmonizing the requirements of water resources management, the conservation of the river and floodplains nature, as well as those of inland navigation. The impacts of the GKE were also accepted by the Czech Republic in 2021.
- **“T-K-A-B-V-R”:** the proposed multimodal land corridor that connects the Aegean Sea to the Black Sea, linking by rail the ports of north-east Greece (Thessaloniki – Kavala – Alexandroupoli) with the Bulgarian ports of Burgas and Varna, the port of Constanta in Romania, and further on with the River Danube (riverport of Ruse) (with a possible extension to Moldova), providing an alternative route to the congested Bosphorus strait. The project aims to further develop Bulgaria's and Greece's transport services as a cheaper, safer, and environmentally friendly alternative to unstable Black Sea maritime corridors.

- **The 2-hour dwelling time goal for border-crossing freight trains:** This Working Group has met 6 times between March 2016 and October 2022, always in cooperation with the representatives of the Rail Freight Corridor “Orient/East-Med” (RFC7), and in its last edition also with the Rail Freight Corridor “Rhine-Danube” (RFC9), comprising rail infrastructure managers as well as the speakers of the Railway Undertakings.
- **Other accomplished cross-border road projects:**
 - the construction of the E461 Austrian Northern Motorway A5 from Poysbrunn to AT/CZ border near Drasenhofen incl. bypass until September 2019;
 - the widening of the E60 Austrian Eastern Motorway A4 to 6 lanes in the section Fischamend – Bruck West in December 2020 and August 2022;
 - the widening of the E65/E75 Motorway Autópálya M15 from M1/M15 Mosonmagyaróvár Junction to the HU/SK border near Rajka to 4 lanes in December 2019;
 - the E68 Motorways Autópálya M43 (Hungary) and Autostrada A1 (Romania) connecting Budapest and Bucharest in the section Szeged (HU) – Arad (RO) since July 2015;
 - the Upgrade of the E79 National Road Craiova - Maglavit – Calafat to EuroTrans standard until December 2021;

Moreover, with time I have been focussing on additional challenges that rose. The implementation of the Green Deal with the climate challenges and an increased focus on synergies between policies, as well as the unforeseen challenges such as the COVID pandemic and the war of aggression in Ukraine, all asking for a more resilient approach.

The characteristics of the Orient-East-Mediterranean

The Orient/ East-Mediterranean Corridor (OEM) Corridor is one of the nine TEN-T Core Network Corridors (CNC), depicted in Figure 1, spanning across 9 Member States, namely Austria, Bulgaria, Cyprus, Czech Republic, Germany, Greece, Hungary, Romania, and Slovak Republic.

The level of development across the Corridor knows fundamental differences with 7 out of 9 countries being cohesion countries. The Corridor aimed to make connections between Member States that were separated for decades.

The length of the Corridor infrastructure sums now up to approximately 6,100 km of rail, 6,000 km of road and 1,700 km of inland waterway (IWW). It constitutes a key north-south intermodal transport corridor for Europe, connecting the North and Baltic Seas through road, rail, IWW and nodal infrastructure, across Central Europe and the Danube ports, with the seaports of the Black Sea, the Aegean Sea and the East Mediterranean. Several segments of the OEM Corridor overlap with other CNCs, especially with the Rhine-Danube Corridor and on shorter sections, the North Sea - Baltic Corridor, the Scandinavian-Mediterranean Corridor and the Baltic - Adriatic Corridor.

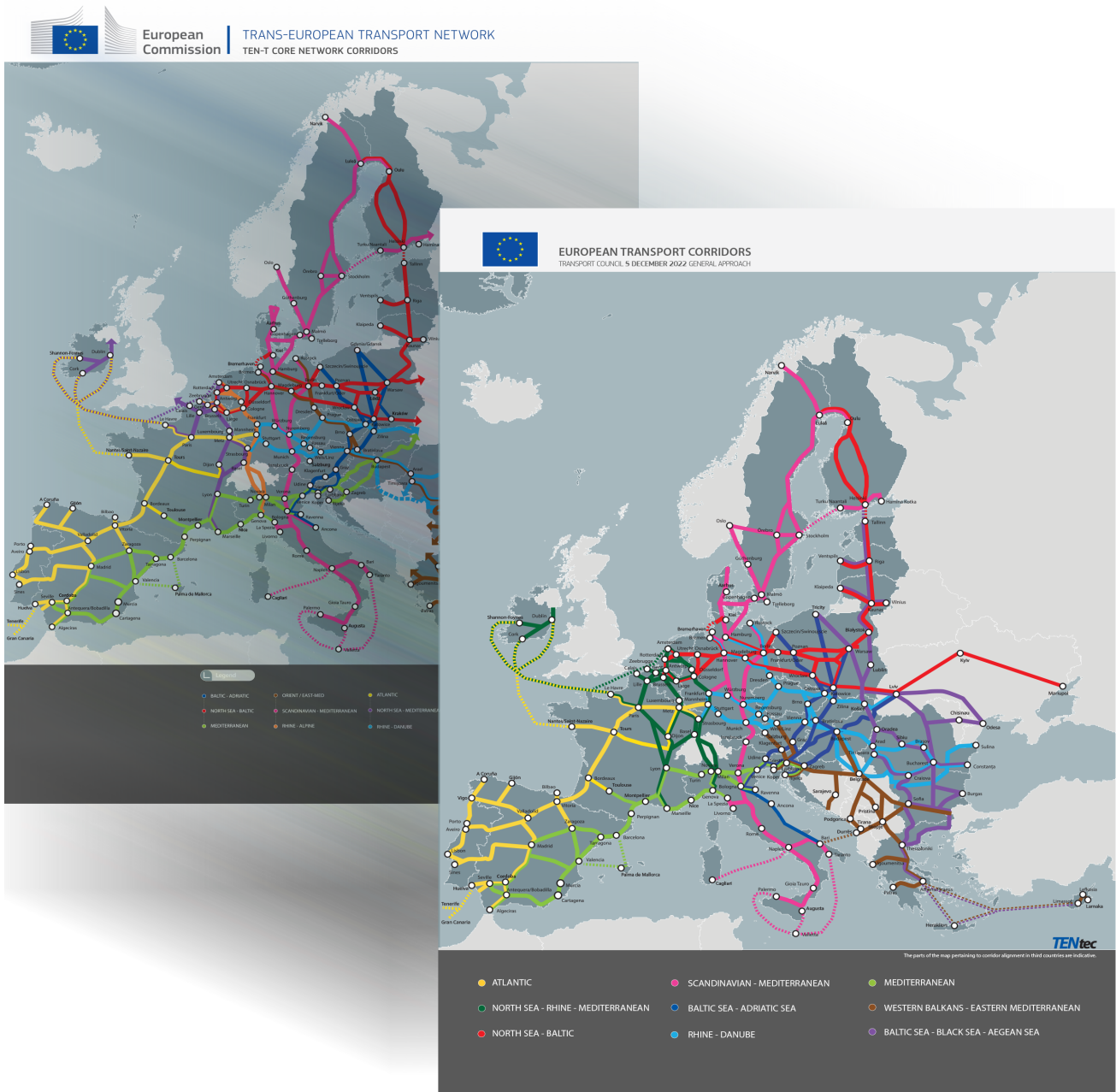
The TEN-T Regulation (EU) 1315/2013 designates to the OEM Corridor 15 urban nodes and airports, 10 Inland ports, 12 Maritime ports, as well as 23 hubs with Rail-Road Terminals (RRTs). The revised CEF Regulation (EU) 2021/1153 opted among other to add to the configuration of the Core Network’s Corridors with a view to develop cross-border links between Member States and third countries and ensure a better connectivity between core nodes and cross-border projects.

In the case of the OEM, new sections made up of 1,220 kilometres of road and rail extensions in Member States Bulgaria and Greece. In Bulgaria, the OEM rail network was extended towards the borders with the Republic of Serbia (Sofia – Dragoman – BG/RS border) and the Republic of North Macedonia (Radomir – Gyueshevo – NMK border). Three new sections exist and are operational, while section Gyueshevo – MK border constitutes a missing link. Accordingly, the OEM road network in the Bulgarian territory was extended towards Serbia via Dragoman and North Macedonia via the Dupnitsa – Kyustendil – Gyueshevo link. In Greece, the new alignment for rail provided for a long extension to Turkey following largely the existing alignment of the so-called “Eastern Egnatia Railway” and connecting the country’s northern ports of Thessaloniki, Kavala, and Alexandroupoli, before ending in Pithio. The latter includes the missing link Thessaloniki – Amphipolis – Kavala/Toxotes. An additional extension to North Macedonia was included from Thessaloniki to Idomeni. In a similar manner, the road network was

extended from Thessaloniki towards the border with Turkey (Kipi), as well as North Macedonia (Evzoni). Finally, a direct connection via road to Albania was included, from Ioannina to Kakavija (Albania) at the border.

A much needed review of the TEN-T Regulation to account for the developments since 2013, has now led to the adoption of a new regulation, whereby the Orient/ East-Mediterranean Corridor will be mainly taken up by three European Transport Corridors. As was the case previously, there also remains overlap between these three Corridors and the Scandinavian – Mediterranean Corridor and the Baltic Sea – Adriatic Sea Corridor.

Figure 1: From Current CNCs as of 2021 towards new European Transport Corridors



Source: European Commission

Achievements

The approach I followed since 2014 is based on a continuous appeal to all involved stakeholders for stable and logic programming of actions that lead to a full completion of the Corridor.

In my exchanges with Ministers, regional and local governments, infrastructural managers and European citizens, I shared my words of encouragement for continuity, cross-border cooperation, joint planning and the strong belief that 2030 is a realistic date for achieving the completion of the Corridor.

Considerable progress has been made:

- There is a **clear picture of the investments needed** on the Corridor for all modes to reach the EU targets of 2030;
- The **definition of a Corridor project list** offers a first indication of the individual measures to be taken, together with timing, financial requirements and funding sources;
- A **detailed overview of the state of compliance** of the Corridor infrastructure with the TEN-T requirements has been conducted;
- An active cooperation with the RFC OEM with the **analysis of delays at border crossings** and the implementation of measures and Task Forces led to notable time savings in an effort to reach the **maximum 2-hour set goal for freight train border crossing at all cross-border points** (Joint Ministerial Declaration by the Transport Ministers of the Orient/East-Mediterranean CNC, Rotterdam 2016);
- The **“Gesamtkonzept Elbe”** agreement for the maintenance and operational strategy for the Elbe IWW was endorsed by Germany and accepted by the Czech Republic within the Corridor’s general framework of cooperation;
- **Military Mobility** was included in the latest Work Plan, as owing to synergies between civilian and military transport needs, actions aiming to complete TEN-T Corridors can also improve military mobility.
- Next to CEF grants, **innovative financial instruments**, such as the blending approach backed up by the EIB, budget guarantees (e.g. EFSI) and other were set up to support the vast investment needs of the OEM Corridor implementation. Additional sources include the Recovery and Resilience Facility (RRF), the Alternative Fuels Infrastructure Facility (AFIF) budget to support the deployment of alternative fuel supply infrastructure and the Military Mobility budget. A good percentage of Corridor projects (in cases up to 50%) have been identified as financially sustainable;
- **Five Work Plans** were developed that highlight achieved progress, signal delays, identify critical issues and make an effort to prioritise and plan the most pertinent projects on the Corridor.

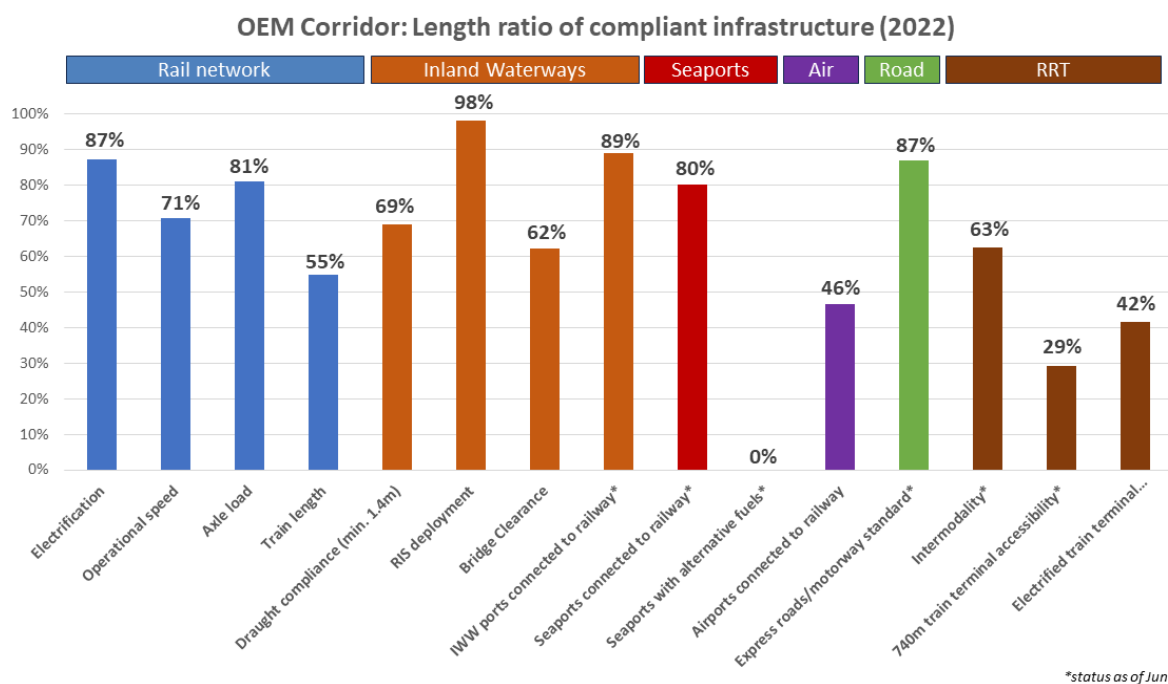
In terms of implementation progress, a considerable number of projects has been completed since 2014 (338 until June 2023). Within the last five years, indicative finalised projects that contributed at the same time to the achievement of Key Performance Indicators (KPI) include the following:

- Extension of railway line Rostock – Berlin (DE)
- High speed railway line Kiato – Diakopto-Rododafni, part of the missing link Athens – Patras (EL)
- Electrification along the Athens – Thessaloniki main rail artery (EL)
- Three rail-road terminals (RRT) in Germany, including the “Megahub” Hannover-Lehrte terminal and the Thriasio Pedio Complex in Greece
- Vertical Port road connecting Port of Lemesos with the Cyprus Motorway network (CY)
- Second lane on motorway section between Hegyeshalom and Rajka (HU/SK border)
- Modernization of road I-8 “Kalotina - Sofia ring road” and reconstruction of Plovdiv – Burgas railway line (BG)
- Improvement of navigability status on the Vltava Lateral channel (Vraňany – Hořín, near Mělník) including the increase of bridge height on Vltava River & Hořín lock (CZ)

Current state of implementation

The state of implementation of the Corridor’s infrastructure was defined via Key Performance Indicators (KPIs) value calculations per section and node, according to the infrastructure targets and definitions set out in Regulation No. 1315/2013. Figure 2 summarizes the rates of current compliance (as of December 2022) of key technical parameters with regard to the explicit target values set to be met by 2030.

Figure 2: OEM Corridor compliance rates of selected TEN-T parameters (12/2022)



Source: OEM CNC Study 2023

In more detail, the following issues are identified on a modal basis:

Railway network

All railway lines along the Orient/East-Mediterranean Corridor feature the standard track gauge of 1,435 mm. Non-electrified parts are located in Romania, Bulgaria and Greece in the south. The required minimum line speed of 100 km/h for freight lines is achieved on nearly the entire northern part of the Corridor. Maximum operating speed is a barrier for freight trains in short sections in Slovakia, Czech Republic and Hungary (Budapest area), in almost the entire network in Romania and also along long sections in Bulgaria and Greece.

With regard to axle load, the current state of compliance shows a similar north/south diversification: the northern part is compliant up to Slovakia, while Hungary shows several, albeit rather short, incompliant parts. The entire part of the Corridor in Romania only allows for 20 t/axle, whereas Bulgaria is almost entirely compliant. In Greece, there are a number of sections in the north that remain non-compliant.

Train length is a major issue along the entire Corridor, except for Germany, Austria and Hungary, where 740 m train operation is permitted on all Corridor freight lines under specific conditions.

Finally, continuous train operation with at least a P/C 70/400 structure gauge profile is already possible today from Germany to Curtici in Romania. On this Corridor part, only the Czech section Kolín – Pardubice does not fulfil in all situations this international standard. In contrast, the Corridor network south of Curtici is not compliant with P/C 70/400 (exception: sections on the Plovdiv – Burgas line in Bulgaria).

Figure 3: OEM Northern railway network - Compliance December 2022

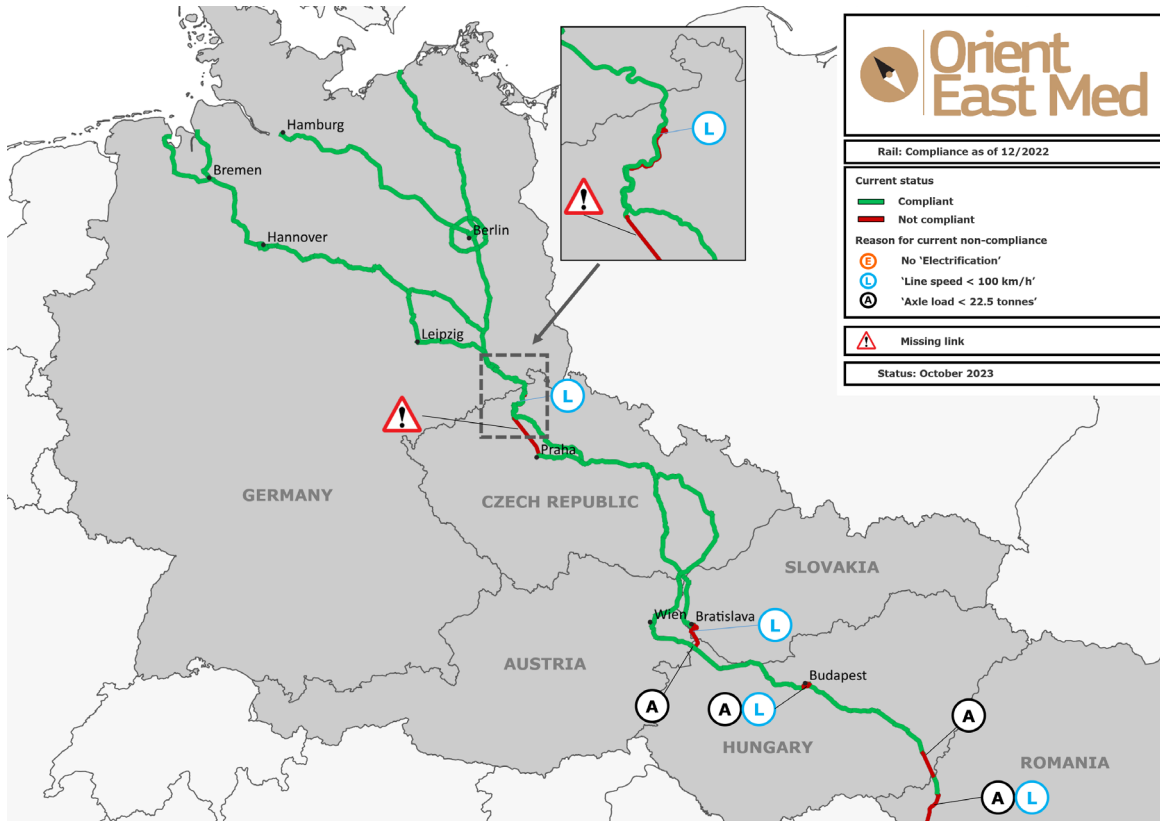
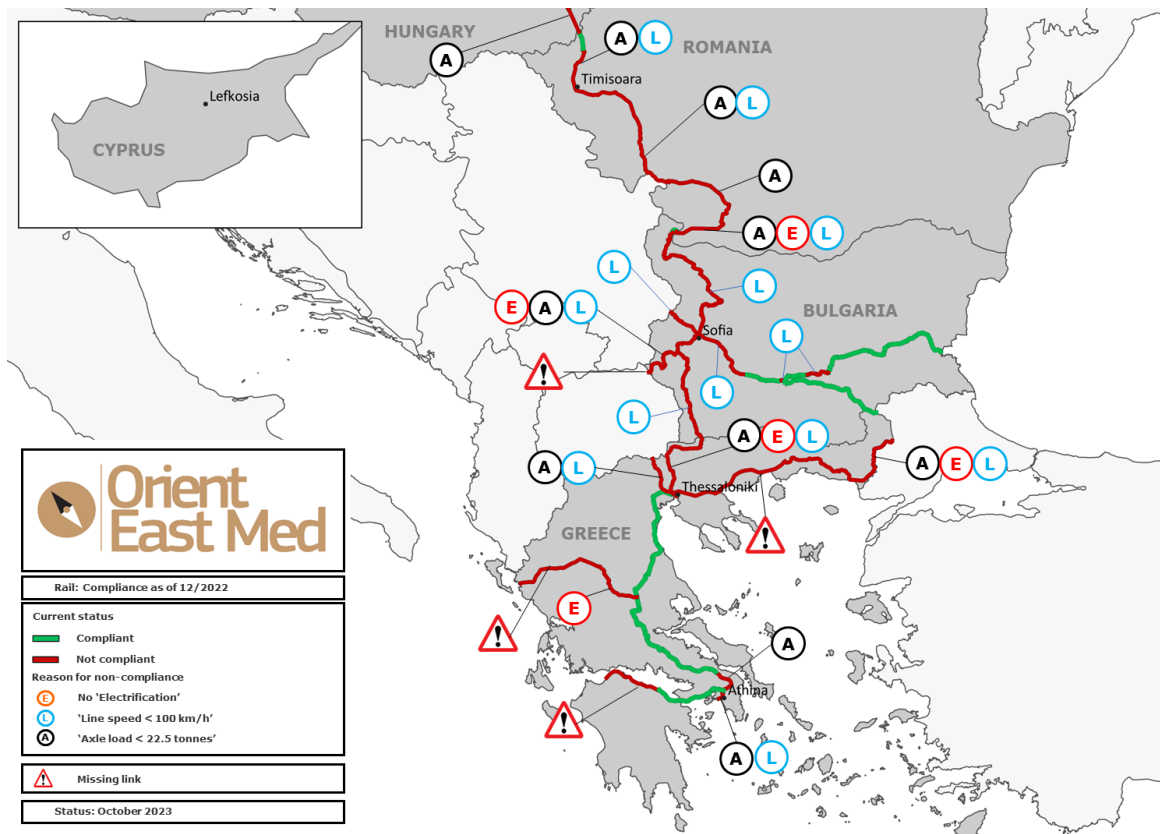


Figure 4: OEM Southern railway network - Compliance December 2022



Source: OEM CNC Study 2023

Airports

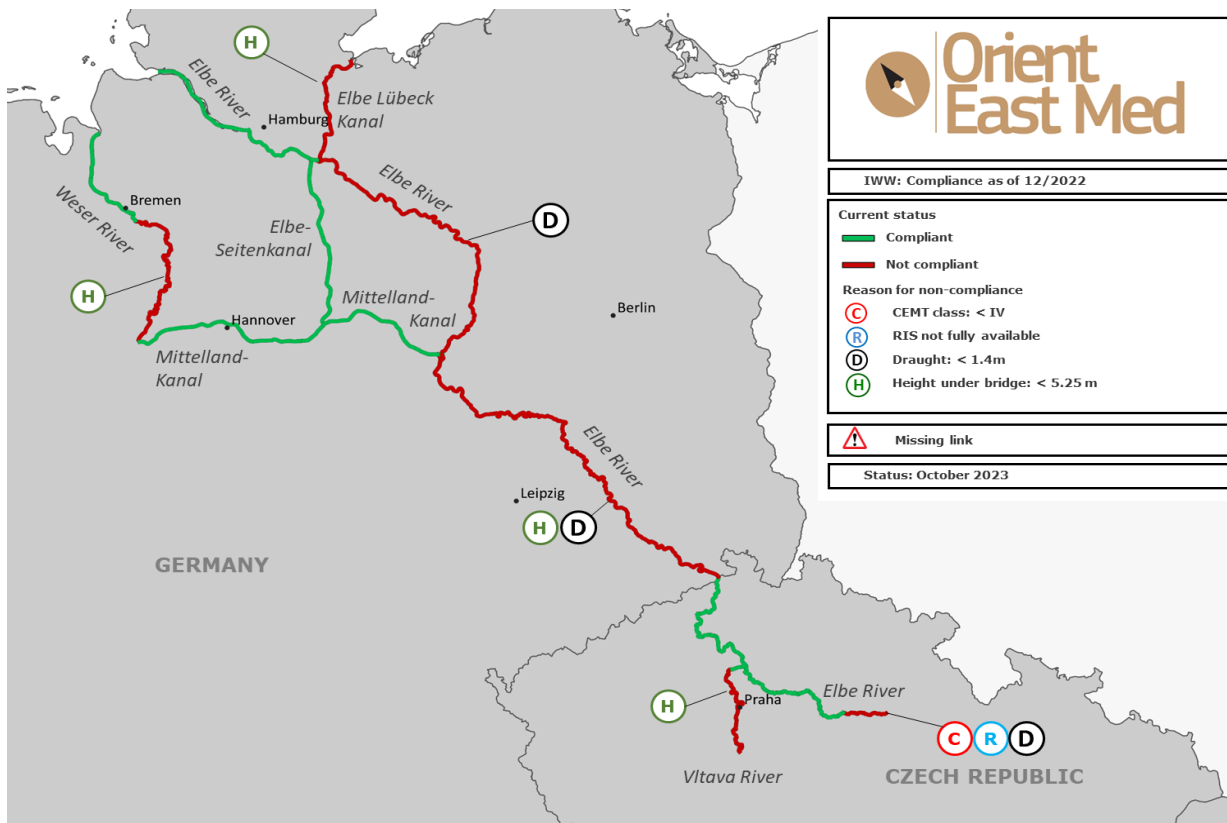
Out of the six major core airports, namely Hamburg, Berlin, Praha, Wien, Budapest and Athina, two, Praha and Budapest are not connected to “heavy rail”, i.e., not capable to operate high-speed passenger trains. In Budapest, a freight connection is operational. Also, Bratislava, Timișoara, Sofia and Thessaloniki airports miss entirely a direct connection to the railway network.

Inland Waterways

Non-compliant sections are found in the uppermost river section of Elbe / Labe between Týnec n.L. and Pardubice. In more detail, the OEM IWW network is allowed for vessels of CEMT class IV, based on the requirement of navigability for ships of 9.5 m horizontal width and a length of 80-85m, disregarding other parameters that are not necessarily to be met. The implementation of RIS in the Czech Republic is now reaching 90%. Regarding the minimum height under the bridges (>5.25 m), this is fulfilled on 1,015 km of waterways, representing 61% of the OEM IWW network.

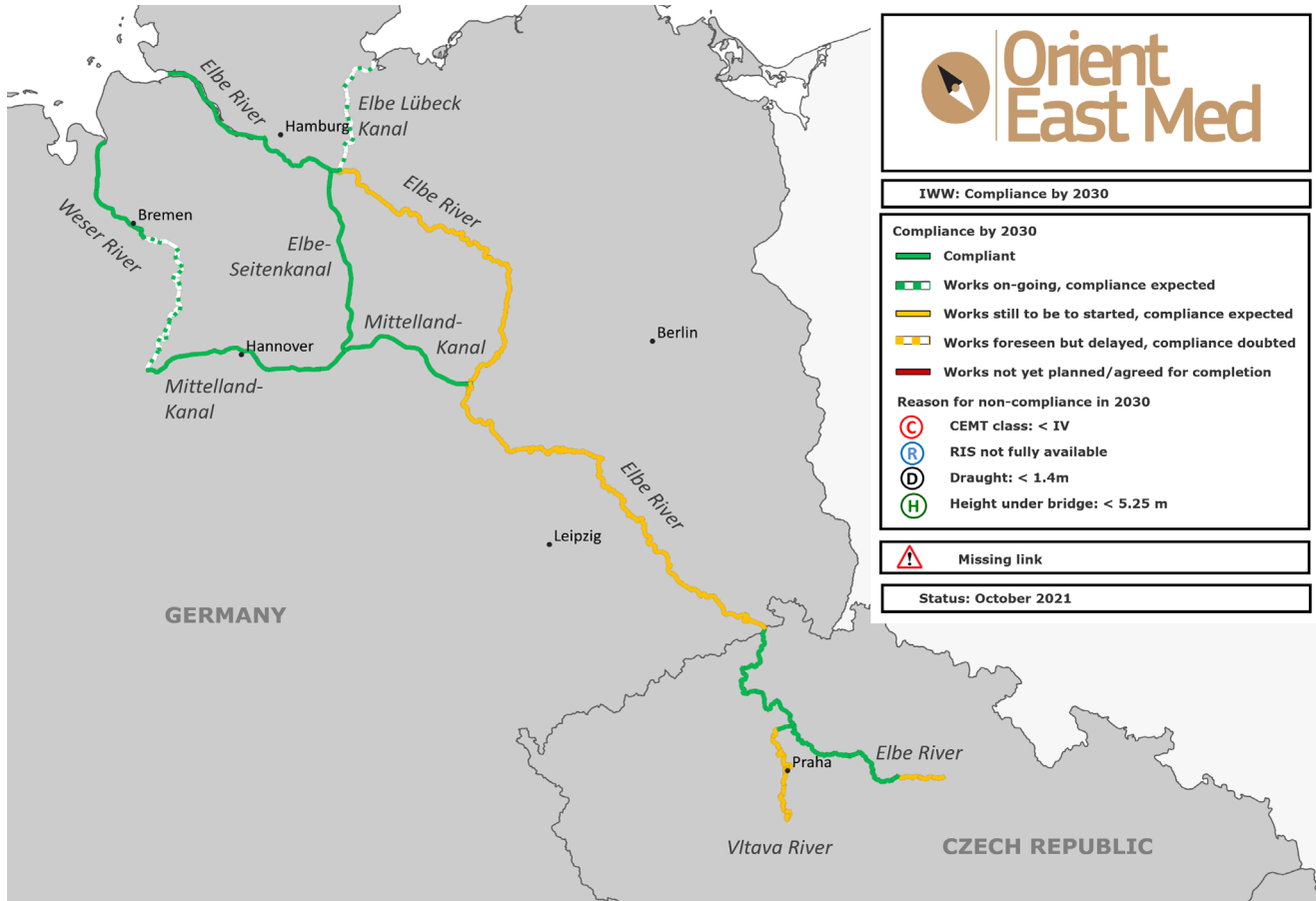
A minimum draught of 2.5 m is fulfilled on 670 km (40%) of the OEM IWW network, whereas the free-flowing parts of Elbe are located between Ústí n.L./Střekov and Geesthacht near Hamburg. Based on the ambitions set in the Gesamtkonzept Elbe (GKE), both riparian states consider it sufficient to improve the fairway depth on the non-tidal Elbe to at least 1.40 m below the 2010 Equivalent Water Level on a long-term average of 345 days.

Figure 5: OEM IWW network - Compliance 2022



Source: OEM CNC Study 2023

Figure 6: OEM Inland waterway network – Situation of vessel draught by 2022 *



Seaports and inland ports

The seaport of Patra in Greece provides currently only access to passengers via suburban rail, while the other Greek port of Igoumenitsa remains to be connected to the country's railway network through a TEN-T defined missing rail link.

The planned core inland port of Pardubice does not exist yet, while the core inland port of Praha Holešovice is out of operation for freight handling. Finally, RIS development plans are pending for the Czech CNC ports at Elbe/Labe and Vltava rivers (Děčín, Mělník and Praha-Holešovice).

With the exception of pilot solutions, all ports are lacking the provision of alternative fuels refuelling points.

Road network

Non-compliant sections with regard to motorway/express road standards are located predominantly in Bulgaria and Romania. Alternative fuels are widely available along OEM motorways; however, the level of supply varies from country to country, with certain Electric Charging supply lack in southern OEM countries (see Figure 7 until Figure 9).

Intelligent Transport Systems (ITS) deployed along the Corridor for road traffic and interface with other modes of transport are providing relatively limited real-time traffic and weather information, while there is a clear lack of Safe and Secure Truck Parking Areas (SSTPA) along the entire OEM Corridor.

* #4056 Scharnebeck Lock – unknown project start, planned finalization by 2030 #4659 Decin-Pardubice Underbridge heights – start date 01/2030, unknown project end (even if a typo, it is problematic) #4660 GKE implementation – unknown project start, planned finalization by 2030

Rail-Road terminals / Multimodal Freight terminals

Only 4 terminals (2 located in Germany, one in Hungary and one in Greece) are fully compliant with all market driven requirements (intermodality, 740m train access, electrified access).

Figure 7: OEM Northern road network — Compliance December 2021

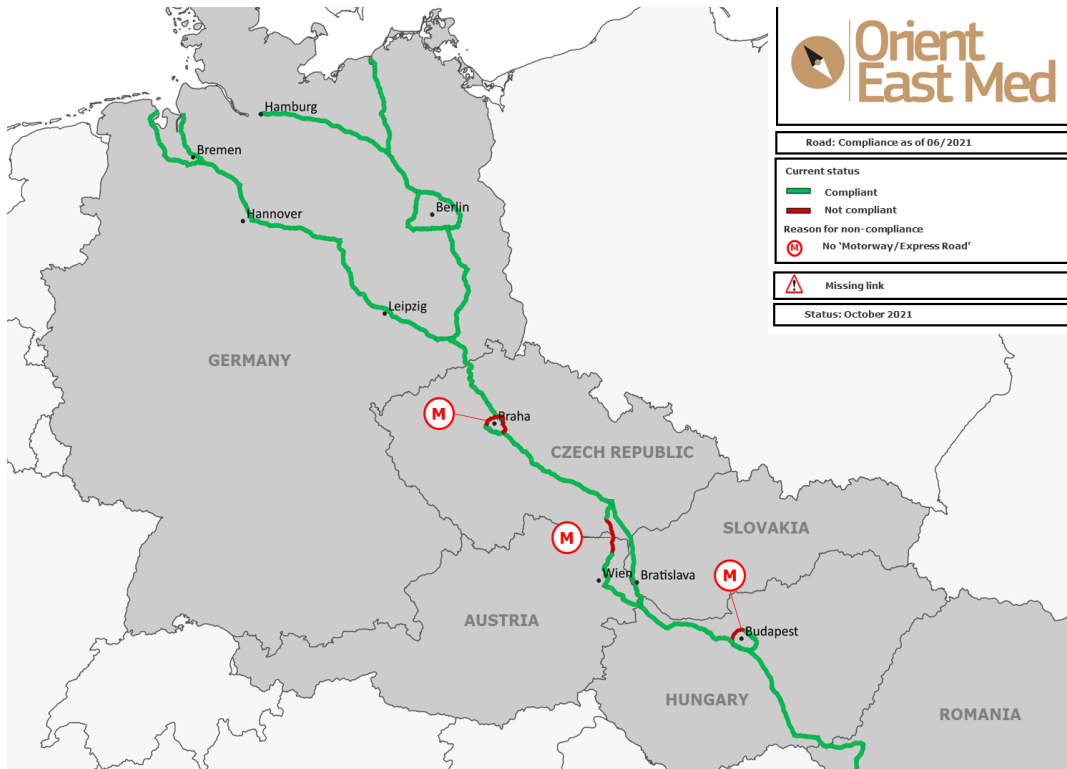


Figure 8: OEM Southern road network – Compliance December 2021

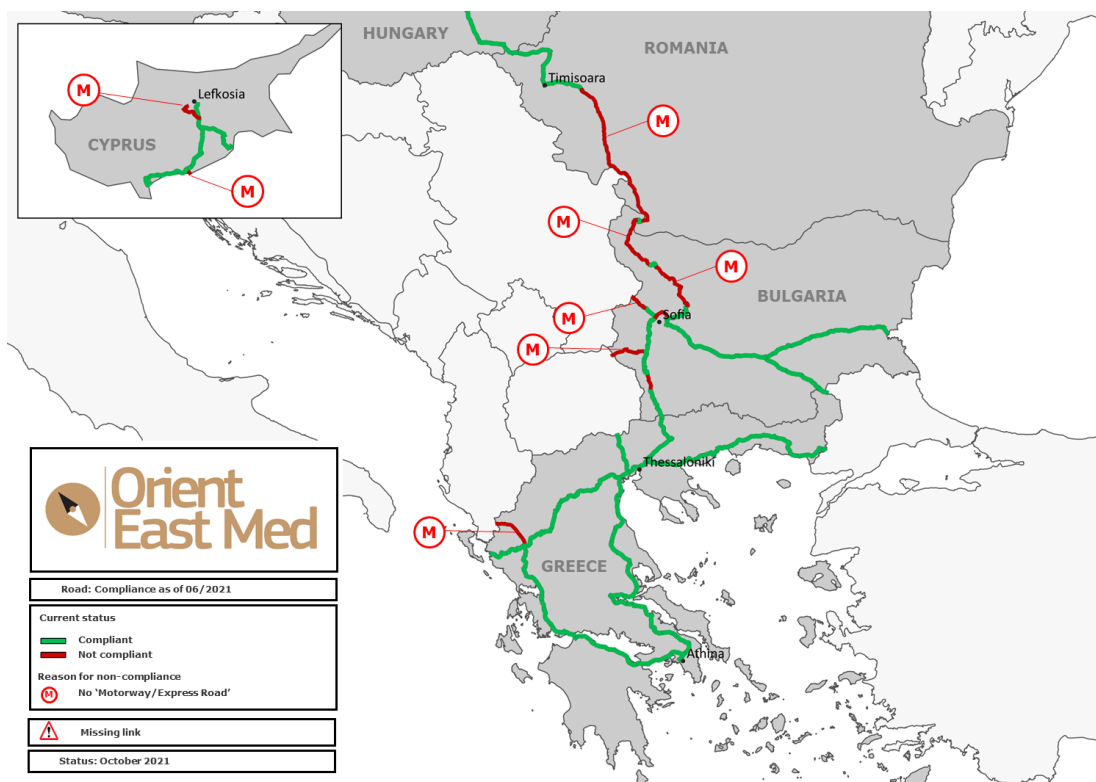
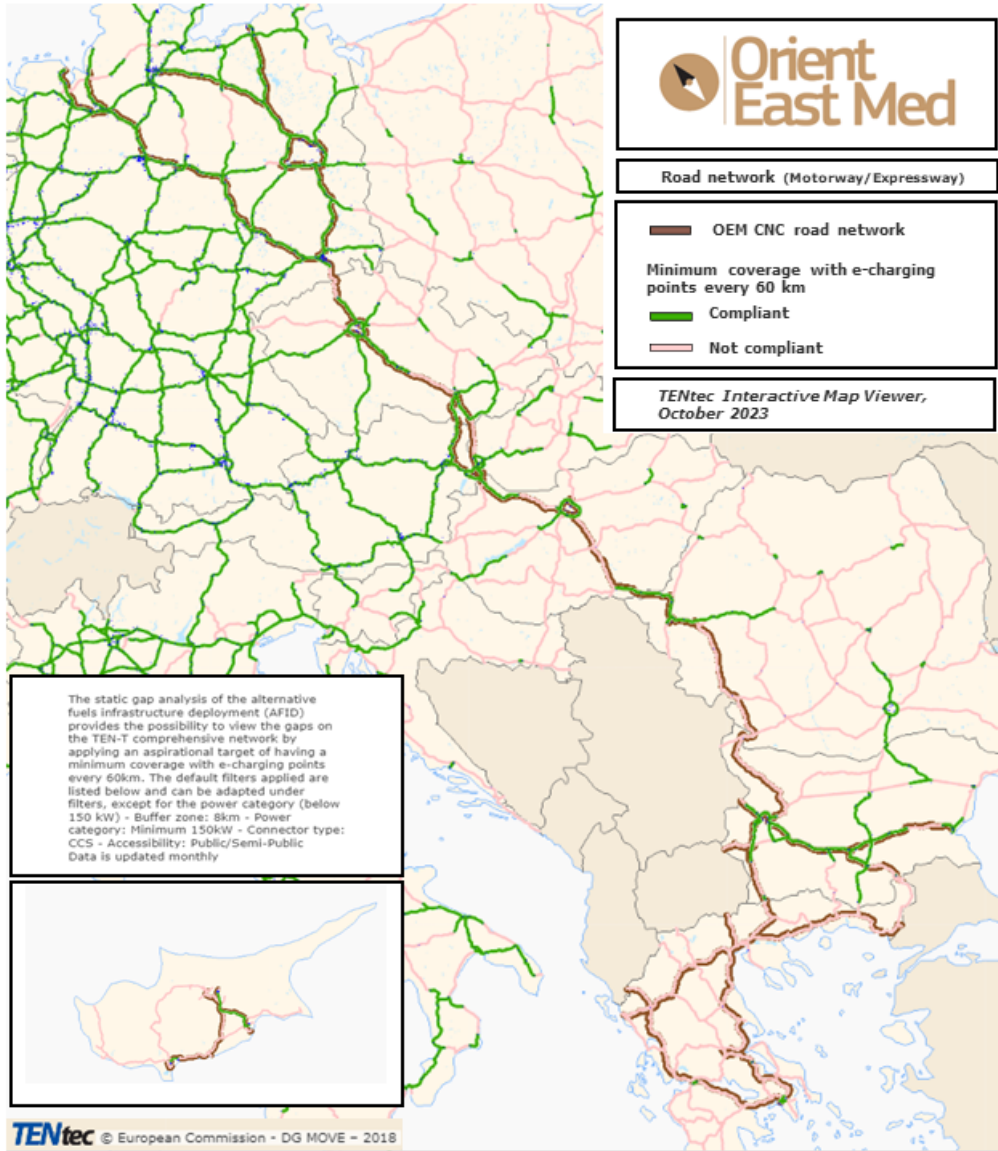


Figure 9: OEM road network – E-mobility charging supply compliance (October 2023)



Source: European Commission, TENtec

What is still at stake?

For my colleagues who will be responsible for the revised European Transport Corridors containing parts of the Orient/East-Mediterranean Corridor, I would like to highlight the following elements that would require a particular attention in the future. They are all explained, in detail, in my last Work Plan.

- **Railway network:** existing missing links, uneven achievement of the various infrastructure technical standards and slow/non-existent implementation of ERTMS, particularly in the southern part of the Corridor. In accordance also with the Rail Commercial Delivery Time analysis, the biggest challenges remain on Romanian and Bulgarian sections, and more specifically, from non-Schengen HU/RO border near Curtici to the BG/EL border near Kulata, as well as the missing link between Bulgaria and North Macedonia.
- **Maritime ports:** missing/poor hinterland road and rail last-mile connections as well as insufficient inter-modal infrastructure and level of services (parking facilities, information, etc.).
- **Inland waterways:** poor reliability of free-flowing River Elbe due to climate change and importance to derogate the Elbe for a fairway depth of 1.40 m.
- **Road network:** lack of secure parking areas and deployment of a cross-border compliant ITS.
- **Rail – road (multimodal) aspects:** poor prospect and clear absence of rail-road terminals for developing a modern and robust network of freight terminals that facilitate modal shift from road in the southern part of the Corridor.
- **Airports:** lack of heavy rail connections in a number of airports.
- Administrative bottlenecks as in non-harmonised and standardised data exchange, shortage of qualified personnel, fragmented rules and standards, as well as operational bottlenecks, i.e. theoretical vs commercial speed.
- **Urban nodes:** seamless connection between long-distance TEN-T infrastructure and access points with poor last-mile connections, inability of freight traffic to by-pass urban centres.
- **Alternative fuels:** insufficient infrastructure for road transport at parts of the OEM road Corridor, in OEM ports a slow progress on the provision of clean fuels and onshore power supply and no availability of clean fuels for aircrafts in the entire Corridor.
- **Capacity bottlenecks:** on roads and railways within the Corridor mainly related to its urban nodes and agglomerations, but also at border-crossings points.
- **Multimodality:** is not fostered given the poor offer of efficient last-mile connections and, most importantly, multimodal freight terminals, hindering any modal shift potential.

The OEM 2-hour dwelling time goal for freight trains: Situation 2023

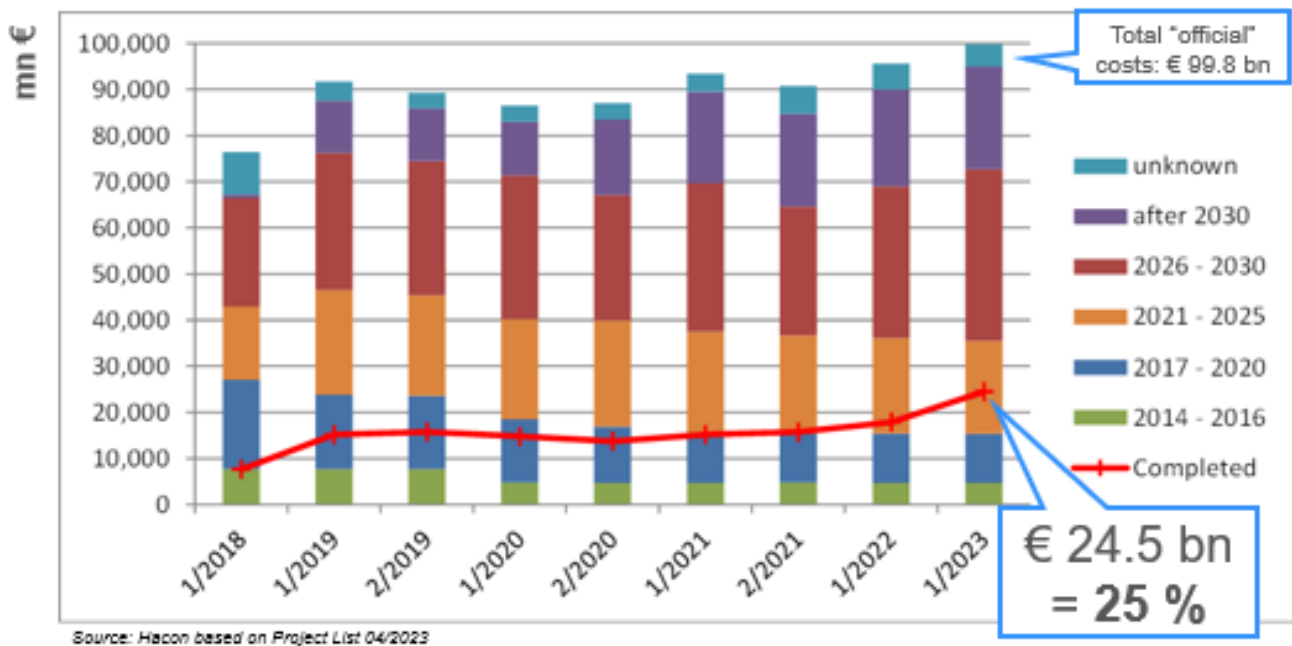
In line with my proposal for a 2-hour goal as a maximum dwelling time of freight trains at a border-crossing point, successful joint work was being done for more than 5 years by local rail experts under the governance of RFC7, which, in 2017, implemented Task forces at twelve OEM border stations.

Until Q3/2023, 7 out of 12 border stations achieved compliance with the two-hour goal in yearly average in both directions. Continuous progress was achieved in all border crossings except for those stations, where border police control at the outer borders of Schengen area borders is required. The HU/RO border station of Lőkösháza – Curtici is still a hotspot with up to 800 minutes dwelling time in 2022 average towards Hungary and 180 minutes towards Romania, followed by HU/SK border stations, affecting also negatively the running time on the adjacent hinterland railway lines. As a general trend, dwelling times are longer on the north-south directions.

The Task forces have worked out tailored strategies to eliminate the hampering factors. The overall goal is a higher modal share of freight trains, enabled by smoother transit through the border crossing points and by a more competitive speed of trains that still equals to 20-30 km/h. By thorough analysis among multiple actors (IM, RU, MoT, Border police), one has identified both, necessary dwelling times and non-necessary waiting times. The new TEN-T regulation 2024 will include this parameter to the compulsory TEN-T parameters.

Delayed projects - The big investments are still ahead

Figure 10 - OEM Infrastructure investments – cumulated overview April 2023



The OEM CNC Study is monitoring since 2018 the implementation of all Corridor-related infrastructure projects and investments (cf. Figure 8). By April 2023, the total cost of finalised OEM projects number reached 25% of total expected OEM investments. It was evident that “low cost” projects were finalised, while the large-scale projects (with the respective higher impact) are still to be concluded.

Moreover, a vast number of projects are delayed, as visualized in investment shifts from intended finalization periods (e.g. 2017-2020) to subsequent time clusters.

As the TEN-T Regulation requires the compliance by December 2030, the completion of the OEM core network corridor is highly doubted and related activities in design, permission and implementation must be intensified through improved legislation and efficient input of human resources. Still, the success of a functioning Corridor might be at risk through limited capacities of project promoters to design mature projects, of authorities to grant the necessary approvals, of the construction industry, but also of the infrastructure managers to run upgrade projects in parallel to actual network operations (especially in rail and inland waterways). Delays may also cause the loss of financing sources, which surpass the above-mentioned challenges.

The way forward

Within the context specified above, and based on the analysis of the Corridor and consultations with a multitude of stakeholders, I would like to give a few final recommendations, which represent those areas on which the efforts to develop the Corridor shall be primarily concentrated.

- 1.** Priorities to investments with Corridor impact: investments should be set where the most congestion is experienced, where infrastructure is lacking and where upgrade is required, especially when it comes to cross-border sections on the network.
- 2.** It must be ensured that national investment plans are in line with the Work Plan of the European Coordinator. A multi-annual planning and financial perspective in combination with an annual budget would provide for the long term required financial foundation. In this context, it is necessary to invest further in the national transport infrastructure of Member States along the Orient/East-Mediterranean Corridor, such as the Western Carpathians crossing in Romania, the River Elbe, the Bulgarian North-South axis and “Rail Egnatia” in Greece. All these sections are essential for a seamless functioning of the Corridor.
- 3.** High-speed rail and safe road connections between the urban nodes in the centre and the southeast of the Corridor (incl. links to Istanbul) should be completed and further developed in order to increase the average speed of rail cargo and passenger rail and substitute short-distance flights.
- 4.** “Rail breakthroughs” are required in the form of accelerated actions leading to improvements of the functioning and efficiency of the railway transport sector at lowest possible cost, complementing large-scale investments in infrastructure and rolling stock. In this respect, efficient operational rules are required to eliminate nonsense rules causing delays.
- 5.** Close cooperation should be fostered with the horizontal priorities of the ERTMS and European Maritime Space (EMS) to ensure coherence of investments needs with a view to expedite ERTMS implementation as well as optimally integrate the EMS with the landside corridors, focusing particularly on the seaports’ last-mile connections.
- 6.** A high alert on project implementation delays that is characterising the progress of the OEM Corridor is needed, while the institutional and human resources capacity in all project phases should be strengthened. Projects should also be spread in time in a coordinated way to maintain Corridor usefulness during the period before and after 2030; coordination with neighbouring countries is necessary.
- 7.** The need for efficient freight multimodality and optimisation of the performance of multimodal logistic chains, as originally identified by the White Paper in 2011, is still very relevant today.
- 8.** A multimodal transport network should be maintained that complies with EU legislation, and one that accelerates the application of innovative solutions, creating a viable network for alternative fuels and intelligent transport systems that improve life of EU citizens.
- 9.** Corridor development should also take into account the requirements of military mobility in support of civilian-military dual-use transport infrastructure modernisation.

10. The destruction caused by the recent catastrophic floods in Greece is a vivid example of the infrastructure's vulnerability to the effects of climate change; the adaptation of measures to develop climate resilient infrastructure is, therefore, of the utmost importance.
11. The evolution of the Corridor should capitalise on the opportunities arising from rapidly emerging technologies that hold great promise in their offered solutions for the increasing challenges the transport sector is facing. In this respect, adapting for example road infrastructure to accommodate a cleaner fleet of passenger and commercial vehicles to combat congestion would be a more effective and far less costly solution than building a new railway line where it is practically not needed.
12. Cooperation is key and at the same time the main challenge. On the corridor and between corridors. I express my hope that we will also in the future strive to keep a network approach, between Core Network Corridors and Rail Freight Corridors and between the European Transport Corridors.

Brussels, 15 November 2023

The European Coordinator for the Orient / East-Mediterranean Corridor



Mathieu Grosch



Contact details:

European Commission – Directorate General for Mobility and Transport
Directorate B – European Mobility Network
Unit B1 – Trans European Network

Offices:

Rue Demot 28
1049 Brussels Belgium

NOVEMBER 2023