



Study on Orient / East-Med TEN-T Core Network Corridor

EN
Executive Summary

May 2020

Abstract

The Study on the Orient/East-Med TEN-T Core Network Corridor (OEM) contributes to the Corridor Work Plan according to the Regulations 1315/2013 (TEN-T Guideline) and 1316/2013 (CEF) for one of the 9 TEN-T Core Network Corridors (CNC). It was elaborated between 2018 and 2020 by a Consultant team on behalf of the European Commission (DG MOVE), comprising of iC consulenten (Austria), HaCon (Germany), ITC (Bulgaria), Panteia (Netherlands), PwC Advisory (Italy), Railistics (Germany) and SYSTEMA (Greece).

The results of the study formed the major input to the Fourth Work Plan of the European Coordinator and were presented and discussed with the OEM Corridor Forum.

In a 1st phase of the 3rd comprehensive CNC study, the existing and expected future gaps in the Corridor's multimodal transport infrastructure against the Regulations' stipulations were again identified. A new focus was placed this time on monitoring the progress of CNC implementation by regular stakeholder surveys. Moreover, new meeting formats and ad-hoc analyses were held to support the Coordinator's work.

Besides an integrated Multimodal transport market study, which provides data for decarbonization impacts, the previously established methods to estimate socio-economic impacts of Corridor investments and also to cluster mature projects and projects suitable for sustainable financing sources were also applied.

Disclaimer

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Scope and Structure of the 3rd Study

The present study is the actual monitoring document on the state of evolution of the TEN-T Core Network Corridor "Orient/East-Med" (OEM) in compliance with TEN-T Regulation No. 1315/2013¹, taking also into consideration the CEF Regulation No. 1316/2013². It was elaborated during 2018-2020 by a European multi-national study team led by iC consultants on behalf of the Directorate-General Mobility and Transport of the European Commission. The study builds up on the 2nd study on the OEM CNC, conducted during 2015-2017.

The results of the study established the basis for the European Coordinator for the OEM Corridor, Mathieu GROSCH, to draw up the Corridor's Fourth Work Plan, benefiting also from the support mechanism of the OEM Corridor Fora and dedicated Working Groups' meetings, whereby interim results and topics of specific interest to the Corridor were presented and discussed on a regular basis.

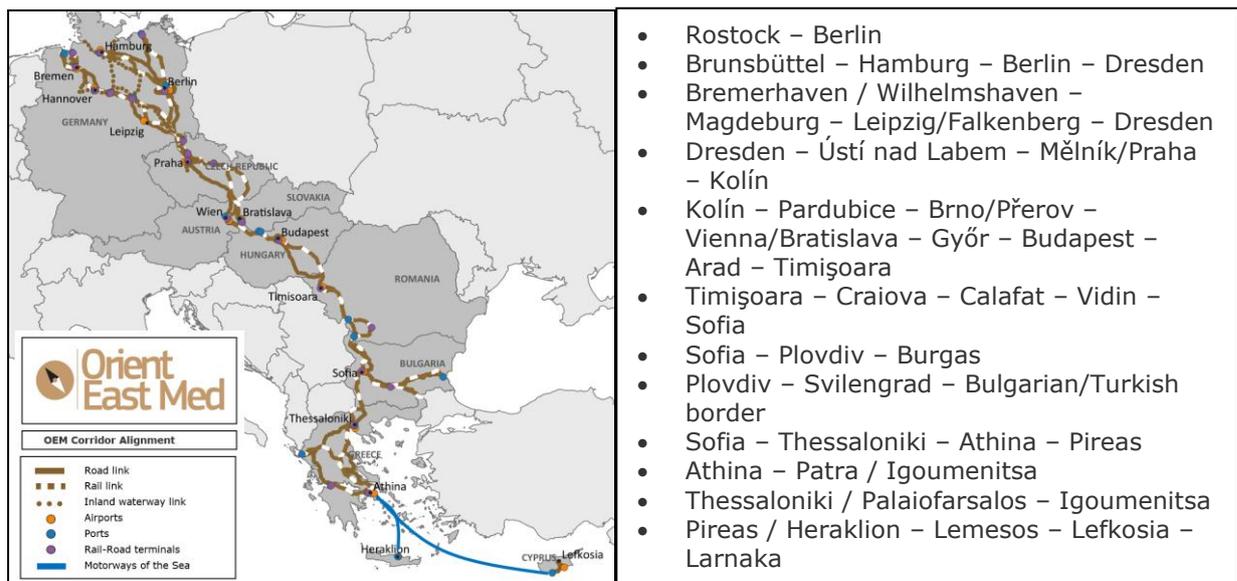
Being a comprehensive corridor study, it primarily entailed the identification and description of the Corridor's characteristics, a demand forecast (Multi-modal transport market study) and a compliance check of the Corridor's technical parameters with the standards set by the TEN-T Regulation, in order to identify bottlenecks that actually hamper the operational efficiency and seamless functionality of the Corridor. These were subsequently compared against a project list of accomplished, on-going and planned projects, leading to the identification of persisting gaps by 2030. Corridor related project lists also allowed the projects' clustering according to their maturity.

In addition to the previous project phases, the scope of the current project has been enriched by semi-annual monitoring of the projects' implementing stages and their financing.

The Alignment of the Orient/East-Med Corridor

According to Regulation No. 1316/2013 and clarifications agreed with Member States, the Orient/ East-Med Corridor, as depicted below, consists of the following multi-modal parts:

Figure 1: OEM Corridor Alignment



¹ REGULATION (EU) No 1315/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 on Union guidelines for the development of the trans-European transport network...

² REGULATION (EU) No 1316/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 establishing the Connecting Europe Facility...

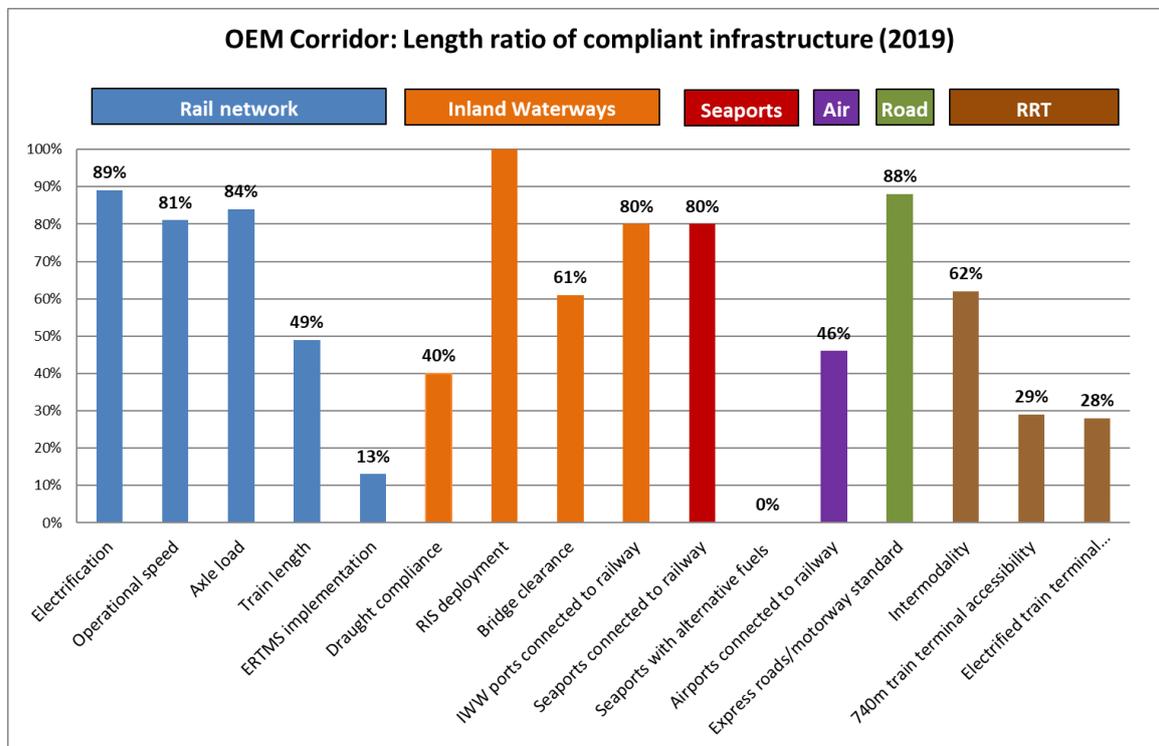
The **length of the Corridor** infrastructure sums up to approximately 5,800 km of rail, 5,400 km of road and 1,700 km of inland waterway (IWW). It is expected that the Corridor length will further adapt, e.g. with the construction of new by-pass roads, the length will increase. The OEM Corridor is tangent to 15 urban nodes and 15 core airports of the core network, from which 6 are main airports to be connected with high-ranking rail and road links until 2050. Furthermore, 10 Inland ports and 12 Maritime ports are assigned to the Corridor, as well as 25 Rail-Road Terminals (RRTs). In Cyprus, no rail infrastructure is deployed. OEM related maritime infrastructure exists in 4 countries, namely Bulgaria, Cyprus, Germany and Greece. The Danube IWW and its ports were analysed in the Rhine-Danube CNC study.

Several segments of the OEM Corridor are coinciding with other of the 9 Core Network Corridors, such as the Rhine-Danube Corridor (approx. 1000 km) and on shorter sections, the North Sea / Baltic, the Scandinavian-Mediterranean and the Baltic-Adriatic Corridors. Finally, the OEM Corridor includes sections of ERTMS Corridors³. The partially overlapping main routes of Rail Freight Corridors "Orient/East Med", "North Sea / Baltic" and "Amber" are defined through Annex II of Regulation No. 1316/2013⁴.

Status of the Orient/East-Med Core Network Corridor 2019

Summarizing the information on the multimodal OEM 2019 infrastructure, Figure 2 depicts the rate of compliance for key technical parameters with regard to the explicit target values set to be met by 2030 in accordance with Regulation No. 1315/2013. Low compliance rates can be observed for the ERTMS and train length criterion (740 m), while the underdeveloped availability of alternative fuels is an issue in all modes of transport. Rail-Road terminals also still lack of competitive characteristics.

Figure 2: OEM compliance rates of selected TEN-T parameters (2019⁵)



³ Commission Implementing Regulation (EU) 2017/6 of 5th of January 2017 on the European Rail Traffic Management System European Deployment Plan (ERTMS EDP)

⁴ For RFC alignments, see <http://rne.eu/rail-freight-corridors/rail-freight-corridors-general-information/>

⁵ The KPI calculation bases on infrastructure projects' information of September 2019 and the Corridor characteristics of December 2017.

In more detail, the following deficiencies are identified on a modal basis for 2019:

- Railway network: ERTMS non-compliance on 87% length of the OEM rail network; train length is a major issue along the entire Corridor (except Germany); minimum axle load of 225 kN is an issue for Romania and Greece; maximum operating speed of lower than 100 km/h is a barrier for freight trains in Slovakia and Bulgaria; non-electrification at small parts in Germany, Romania and Greece, as well as traction system breaks.
- RRTs: only 1 RRT (located in Germany) is fully compliant with all market driven requirements (Intermodality, 740m train access, Electrified access).
- IWW network and ports: The OEM IWW network is allowed for vessels of CEMT class IV or higher, based on the requirement of navigability for ships of 9.5 m horizontal width, disregarding other parameters (such as draught and underpass height) that are not necessarily to be met; River Information services (RIS) not completely implemented in Czechia; lack of facilities for the provision of alternative fuels at all ports.
- Maritime: missing rail connection at Ports of Igoumenitsa and Patra (EL); lack of facilities for the provision of alternative fuels at all seaports, with the exception of pilot solutions; non-operational MoS link with Cyprus.
- Road network: ITS (southern part of the Corridor: RO, BG and EL) fail to transmit cross-border data; fragmented road charging schemes; slow deployment of alternative fuel for freight vehicles; uneven density of safe and secure parking areas with long sections missing suitable facilities in the southern part of the Corridor.
- Airports: three major core airports (Hamburg, Praha and Budapest) missing connection to "high speed passenger rail"; Bratislava, Timisoara and Thessaloniki airports missing connection to rail; no fixed storage tank facilities for aviation biofuel in use in OEM airports.

Future demand for the Corridor

The Multimodal Transport Market Study analysed the OEM Corridor-related transport system by providing an estimation of the prospective traffic flows on the Corridor in 2030. The forecasting study was done using three scenarios while also offering a view on the associated effects on the economy and the environment.

In the 2030 Reference Scenario⁶, freight volumes on the OEM are estimated to increase on average by 29% by 2030. Rail transport experiences the largest growth with an increase in traffic with 64% between 2016 and 2030, whereas road transport grows by 16% and IWW transport with a modest 9%. Growth rates for passenger transport are similar, with an increase of 29% in passenger-kilometres expected during the study period. All OEM Member States will benefit from the multimodal CNC Corridor implementation in terms of jobs and economic growth. However, the positive impact to society/economy will be in Slovakia (+4.9% GDP), Bulgaria (+3.6% GDP), Romania (+3.2% GDP), higher than in Greece, Hungary and Germany (below 1% GDP), while employment impacts range between 0.9% and 0.1%, accordingly.

When comparing the Baseline scenario⁷ to the Reference scenario, on average 28% of potential rail freight volumes will not be realised, while road and IWW freight volumes will stay approximately the same. Investment in rail is therefore important to attain a shift from road transport towards more environmentally friendly modes of transport.

In addition, a third scenario was forecasted, which assesses the maximum of 2 hours of rail freight dwelling time at each **rail-border crossing point** on the OEM Corridor (as per the Joint initiative with the RFC OEM). According to the above scenario, the MS along the OEM rail network could not enjoy an accumulated total of additional € 730

⁶ Assumes that all the projects of the OEM Project list from 2017 will be implemented until 2030.

⁷ Assumes none of the planned projects of the OEM Project list from 2017 are implemented by 2030

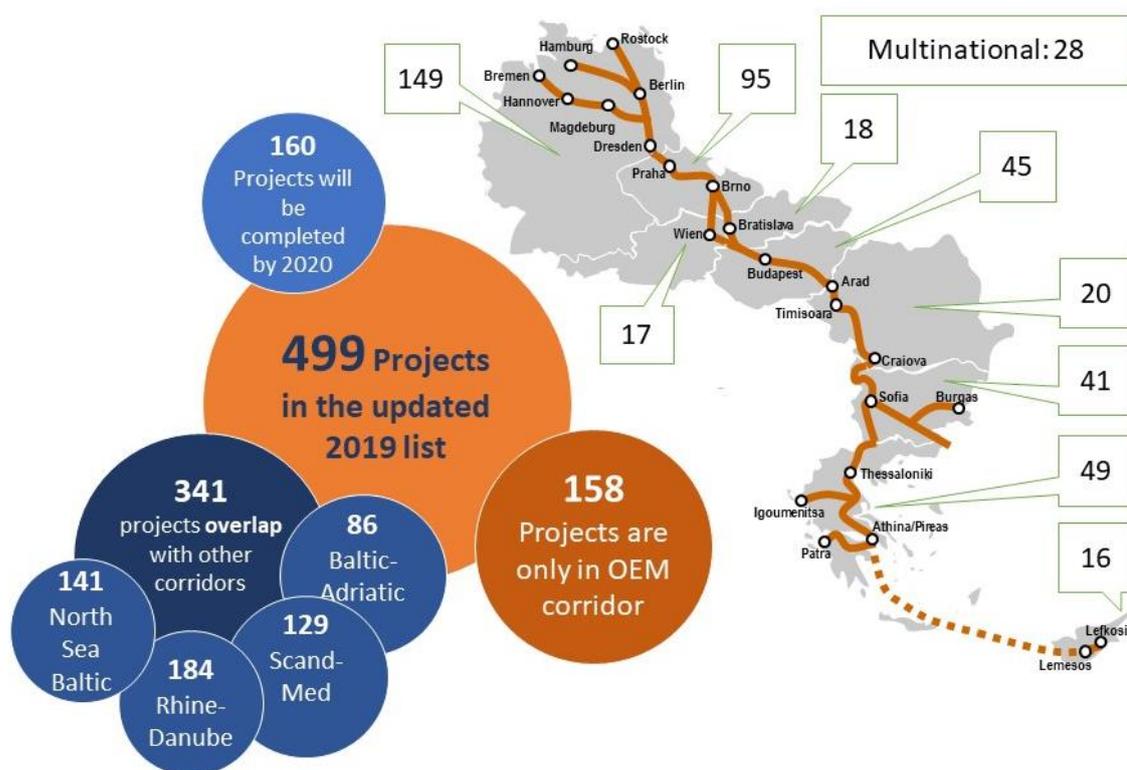
million GDP and 3609 Job-Years between 2016 and 2030 if rail freight dwelling times will not reduce to max. 2 hours and remain as high as in 2017.

In terms of environmental effects, a reduction in GHG emissions is expected in the OEM countries. In 2015, the transport sector in the OEM Member State⁸ emitted in total around 267 million tonnes of CO₂. While transport volumes are forecasted to increase over the period 2015–2030, modal shift and efficiency gains are outweighing traffic growth. CO₂ emissions are estimated to fall by 10.2% in 2030.

Project Pipeline of the Corridor

For 2019, the respective updating of the project list revealed 649 projects allocated to the OEM Corridor, thereof 150 already concluded and 499 planned or on-going (see figures).

Figure 3: Overview of OEM projects per Member State

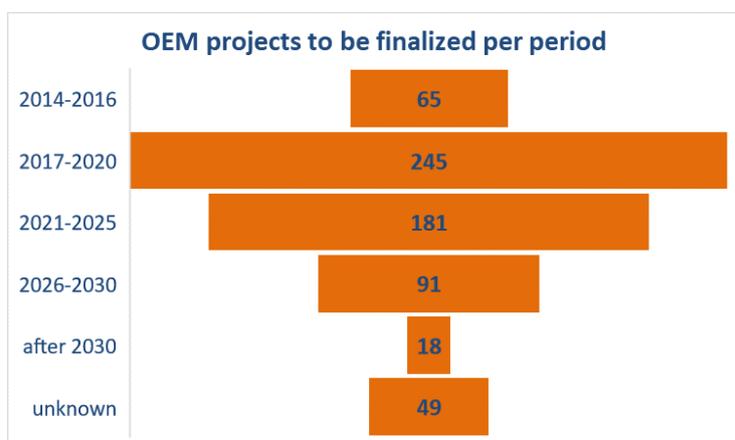


Based on semi-annual monitoring campaigns, a tendency is visible to shift finalisation of projects from 2017-2020 to subsequent time clusters, in particular to 2021-2025.

The projects on the OEM Corridor account for costs of € 89.3 bn (including finalised projects). This figure represents “official” values of 568 projects, verified and approved by Member States and stakeholders. In turn, the project costs for several projects are still unknown. Estimates have shown that the actual total costs are likely to be around 15-20% higher than the officially known costs.

⁸ Values reflect the sum of total emissions coming from the transport sector in each OEM MS and thus not only limited to corridor related traffic.

Figure 4: Number of projects by completion time cluster (status September 2019)



Funding needs of the OEM Infrastructure Project Pipeline

During the OEM CNC study, again information on the projects' cost, maturity and financial viability were assessed. The financial analysis started with an assessment of the maturity status of the project pipeline by clustering active projects through different metrics, such as their contribution to Regulation's KPIs, their timing and the availability of an official cost figure. It turned out that 6% of the projects still don't have information on cost.

The analysis moreover determined the projects' funding sources, focusing on the economic efforts of the EU. For almost two thirds (64.1%) of the project pipeline, a complete information on funding sources is existing, accounting for € 52.2 billion: of those, € 13.7 billion (26.2%) come from EU funding, with a quasi-equal split between CEF/TEN-T grants and ESIF grants, while only 41% (€ 5.6 billion) of the EU funding has already been approved by Grant or Loan agreements⁹. Thus, the remaining share was still listed as "potentially funded". Finally, the OEM projects able to generate returns from the market (to cover the operating and possibly a share of the capital expenditure) were determined and assessed. Consequently, more than 25% of projects are deemed potentially financially sustainable. More specifically:

- 19.7% of projects, for a total value of € 29.2 bn, are financially sustainable.
- 7.1% of the project list, for a total value of € 10.9 bn, present good potential for financial sustainability.
- 73.2% of the project list, for a total value of € 41.3 bn, have low to non-existent potential for financial sustainability.

Future challenges

The list of on-going and planned infrastructure projects defines the prospects for the compliance with Regulation No. 1315/2013 and the alleviation of other identified key barriers related to cross-border issues, intermodality, interoperability, etc. Table 1 summarises the expected bottlenecks per mode in 2030, for which further actions (additional to Project List) would be required.

⁹ Only CEF/TEN-T grants marked as approved have been evaluated and confirmed by the EU. Amounts listed as potential have no assurance of being secured, and in some cases, they only represent the intention of the project promoter to submit the request for funding.

Table 1: Selection of expected bottlenecks and network gaps in 2030

Mode	Section	Bottleneck / Network Gap
Rail	Dresden – Praha (DE, CZ)	Capacity bottleneck (New high-speed railway line not be operable before 2035)
	Connection of JadeWeserPort (DE), Bratislava - Petržalka – Rajka (SK)	Technical non-compliance with freight line speed standard
	Majority of rail corridor sections in AT, CZ and SK; Plovdiv - Dimitrovgrad/Burgas (BG)	Technical non-compliance with 740m train length standard
	Rail corridor sections in RO, BG, EL, also parts of CZ and SK.	Technical non-compliance regarding intermodal profile P70/400 (not obligatory as per TEN-T regulation)
	Various sections	Delayed ERTMS deployment
	Urban Nodes	Capacity bottlenecks, technical incompliance on various last-mile sections
IWW	Elbe River (DE, CZ)	Non-compliant draught (<2.5 m)
Sea ports	Igoumenitsa (EL)	Missing rail connection
	Greek ports	Missing fully developed Port Community Systems
	Bremerhaven, Wilhelmshaven (DE), Burgas (BG), Thessaloniki, Igoumenitsa, Patra (EL)	Non-availability of alternative clean fuels
Air ports	Hamburg (DE)	Missing connection with high speed pass. rail ¹⁰
	All 9 OEM core airports	Non-availability of alternative clean fuels ¹¹
Road	Lugoj – Drobeta Turnu Severin - Calafat	No motorway / expressway standard
	Various sections	Capacity bottleneck, lack of safe parking areas

Administrative & Operational barriers to be alleviated

Rail: Principal identified persisting administrative and operational barriers along OEM CNC include a low level of ERTMS implementation and long waiting times in border stations for both passengers and freight trains due to operational issues; unnecessary double border police and technical controls; lack of harmonised operational rules, normative differences between Member States; lack of coordination of operations at current modernisation and rehabilitation works along the Corridor; lack of a consistent and updated information exchange system allowing for capacity planning, train operations and document transfer across borders; information gaps and barriers in communication largely affecting the planning of activities, personnel and rolling stock, as well as current operation of international freight trains.

During the 3rd study phase, additional actions were taken by extending the organisation of annual **Rail cross-border issues OEM CF Working Group** meetings with the RFC OEM, to include the European Union Agency for Railways and other DG MOVE railway units.

The support and progress follow-up were continued for the implementation of measures towards permanently reaching the **maximum 2-hour set goal for freight train border crossing** at all cross-border points.

¹⁰ Connection with rail is only required by 31 December 2050 according to TEN-T regulation no. 1315/2013 Art. 41 (3).

¹¹ The regulation requires from core airports by 31 Dec 2030 only the capacity to make alternative clean fuels available.

The 3rd TEN-T CNC studies deployed a new parameter to measure the increase of the Corridor's railway transport efficiency from the view of customers' needs. A special **analysis on Rail Freight Commercial delivery times** is conducted as a regular, long-term monitoring of commercial delivery time and the punctuality between origin and destination of cargoes for selected international freight trains, deemed representative for the Corridor.

IWW: Three main groups of barriers are distinguished: RIS implementation, shortage of qualified personnel and the lack of harmonisation in terms of national/international standards of their qualification and licencing.

Maritime: Key barriers still prevailing are related to the multiplicity of actors involved and the related fragmentation of responsibilities and jurisdictions, as well as the critical issue of information exchange and documentation. There is need for better information flow together with better planning of intermodal transport operations between ports and their respective hinterlands.

Road: Road tolling systems along the Corridor remain fragmented and non-harmonized. The provision of safe and secure parking areas for freight vehicles is scarce and affects the supply chain in various aspects, incl. shortage of drivers and increasing cargo thefts. The systems for the provision of real-time traffic and weather information are not yet capable of offering cross-border traffic information. An additional issue is the long waiting time for heavy goods vehicles at border crossings in the southern part of the OEM CNC due to inefficient organization of procedures.

Environmental and socio-economic effects / innovation

The implementation of the OEM Corridor is expected to yield cumulative effects to the *environment, economy and society*. Firstly, the implementation of the OEM projects will lead to an increase of GDP over the period 2016-2030 of € 572 bn in total, while investments will also stimulate additional employment in terms of 1,704,000 additional job-years created over the same period.

In the "1st Joint Working Group Meeting of the Orient/East-Med and Rhine-Danube Core Network Corridor Fora on Economic Aspects of Transport", in June 2019 in Brussels, we started looking for a dialogue with the scientific sector to better define the socio-economic dimension of infrastructure projects.

As a result of modal shift and various decarbonisation initiatives, energy efficiency is predicted to increase, while related emissions are expected to decrease. The OEM Corridor is susceptible to various climate change effects. Nevertheless, adaptation measures are taken by a number of countries to develop climate resilient infrastructure (e.g. new rail alignments in Greece, review of design guidelines in Bulgaria and Hungary). Finally, there is a clear need to further roll out innovation on all parts of the Corridor in order to further stimulate adaptation to climate change, decarbonisation and modal shift.

Vienna, 29th May 2020.