



**Study on
the Orient/East-Med
TEN-T Core Network Corridor
and support to Coordinator**

3rd Phase

Final Report

May 2020

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Disclaimer

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Version

The version 1.0 was finalized on the 29th of May 2020.

Abbreviations

bn	Billion
CDT	Commercial delivery time (Rail freight)
CEF	Connecting Europe Facility
CNC	Core Network Corridor
DG MOVE	European Commission – Directorate General for Mobility and Transport
EC	European Commission
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ERTMS	European Rail Traffic Management System
ERDF	European Regional Development Funds
EU	European Union
GDP	Gross Domestic Product
INEA	Innovation and Networks Executive Agency (EU)
IWW	Inland waterway
km	kilometre
KPI	Key performance indicator
m	metre
mn	Million
MFF	Multi-annual financial framework of the EU
MoS	Motorway(s) of the Sea
MoT	Ministry of Transport
MTMS	Multimodal Transport Market Study
MS	Member States of the European Union
n.a.	not available / not applicable
OEM	Orient / East-Med (Corridor)
p.a.	per year / annual
RDC	Rhine-Danube Corridor
RFC	Rail Freight Corridor
RU	Railway undertaking
SSTPA	Safe and Secure Truck Parking Area
TEN-T	Trans-European Transport Network
TMS	Traffic Management System
WG	Working Group
WP	Work Plan

Country Codes after ISO 3166:

AL	Albania
AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
EL	Greece
FR	France
HR	Croatia
HU	Hungary
MK	North Macedonia
NL	the Netherlands
RO	Romania
RS	Republic of Serbia
SK	Slovakia
TR	Turkey

1 Introduction and scope

1.1 Outline

The present report constitutes the **Final Report I** of the 3rd Phase of the **Study on the Orient/East-Med Core Network Corridor**.

In accordance with the tender specifications, it shall contain *“all the elements provided for in the descriptions of tasks 1, 2 and 3, and shall take due account of the contributions made in the meetings of the Corridor Forum. It shall also contain a summary of the activities carried out under tasks 4 and 5”* and the efforts, results and progress of the Contractor’s work in the period June 2018 - May 2020. Where deemed useful, reference is made to deliverables and other results presented in the Appendix of this document.

The elements included in this progress report are:

- **Task 1 Further elaboration of the Corridor knowledge base;**
- **Task 2 Further refining of the Project List;**
- **Task 3 Monitoring Project implementation and reporting;**
- **Task 4 Providing the elements for the updates of the work plan**
- **Task 5 Corridor Forum and WG meetings;**
- **Task 6 Project and Quality Management;**

1.2 Objectives of the Study

Considering the objectives of the CNC study as outlined in the Tender specification, the main tasks of this assignment are:

Support to the Commission/DG MOVE and the European Coordinator.

Analysis and reporting of the progress made on the Corridor and monitoring its evolution, including:

- Analysis of Corridor’s evolution with respect to compliance with technical requirements and changes in the Corridor’s KPIs based on the completed projects;
- Consideration of proposed changes in the CEF Regulation in relation to Corridor alignment;
- Ensuring the structures supporting the Corridor’s evolution – its Working Groups and Corridor Forums – work in a smooth and continuous way.

To propose a refinement of the CNC Work Plan. This objective includes:

- An enhancement and deepening of its knowledge base, including the assessment of its implementation by updating information on markets, technical compliance, bottlenecks, innovation projects and progress made on pilot initiatives;
- An identification of additional projects contributing to further technical compliance and shift to environmentally friendly transport modes and removal of bottlenecks.

1.3 Consortium Information (OEM)

The study on the Orient/East Med Core Network Corridor is conducted by a group of international Consultants, led by **iC consulenten**. The Experts involved are listed below:

Table 1 – Consortium members of OEM3 study team

iC consulenten Ziviltechniker GesmbH	AT	Albrecht MALCHEREK (Head of Study Team), Sebastian STEINBRECHER
HaCon Ingenieurgesellschaft mbH	DE	Niklas GALONSKE, Jan HILDEBRANDT
ITC Institute of Transport and Communication OOD	BG	Kristiana CHAKAROVA
Panteia B.V.	NL HU	Arnaud BURGESS, Ivo HINDRIKS, Maria RODRIGUES Peter KRAUSZ
PricewaterhouseCoopers Advisory SpA	IT CZ	Diego ARTUSO, Federico PERCIACCANTE Silvia KOFRONOVA
Railistics GmbH	DE RO	Wolf-Dietrich GEITZ Raluca ATANASSOV
SYSTEMA Consulting SMLtd	EL	Panayota MORAITI

This Study is elaborated for and in close cooperation with:

The European Coordinator for the Orient/East-Med Core Network Corridor:

- Mr. Matthieu GROSCH;

and the European Commission, DG MOVE, Unit B.1, Brussels, Belgium, represented by:

- Mr. Patrick VANKERCKHOVEN, Advisor of the Coordinator;
- Mr. Jean-Louis COLSON, Head of Unit MOVE B1;
- Mr. Herald RUIJTERS, Director DG MOVE B.

1.4 Harmonized and coherent elaboration of CNC study

In order to achieve the requested coherent approach of the analyses and obtain coherent results, the various Consultants' consortia, based on the instruction of DG MOVE, have established **two cross-Corridor Working Groups** with the other 8 CNC study consortia, in order to elaborate joint methodologies. Their work has begun in July 2018 and is permanently continued until the end of this study contract.

During the inception phase, two cross-Corridor Working Groups were established:

- MTMS Working Group working on the joint approach for the Transport Market Study (Panteia, Prognos, Setec, Tplan), as well as Mrs Gudrun Schulze (MOVE B1) and Maria Cristina Mohora (MOVE A3);
- Task 2/3 Working Group addressing issues related to the project list and the project implementation reporting (KombiConsult, HaCon and all study team leaders).

Reference is made to the deliverables, the Inception Report Phase 1 and the Intermediate Report Phase 1.

- ⇒ See Annex 01: Inception Report (revised version 22 October 2018)
- ⇒ See Annex 25: Intermediate Report (May 2019)

2 Task 1 – Further elaborating the Corridor knowledge base

2.1 Overview on Task 1 efforts

The key objective of Task 1 was to update the Corridor knowledge base and, where relevant, to expand it. Task 1 included also the Kick-off of the Corridor study work for 2018 – 2022.

During the first period 2018 – 2020, this task has been performed between **June and November 2018**¹, stepping further from the 2014-2017 Corridor knowledge base, where a large number of analyses and data are existing. In order to visualize the Corridor's development and evolution, a consistent and comparable methodology with respect to the previous studies had to be applied. It provided inputs for the Tasks 2 and 4, which fed into the 4th Work Plan of the Coordinator.

The results were presented in the relevant deliverable, the Corridor Study Update 1, provided in November 2018 and approved in December 2018.

⇒ See Annex 2 Corridor Study Update 1

In order to improve the Corridor's knowledge base, four subtasks were identified.

- 1.1 Multimodal Transport market study for the Corridor,
- 1.2 Update of Corridor characteristics, the state of the infrastructure with respect to Article 39 of the Guidelines, as a result of the on-going Corridor infrastructure projects,
- 1.3 Identification and analysis of other EU studies and relevant policy actions.
- 1.4 Review of the main national policy documents of the Corridor Member States and assessment of the impact on CNC development.

The following sections describe those results, which were elaborated and achieved after the presentation of the above-mentioned deliverables.

2.2 The Multimodal Transport Market Study

For the Task 1.1 MTMS, the relevant cross-corridor Working Group has, in close coordination with DG MOVE, developed a more sophisticated approach than foreseen in the ToR and proposal, aiming for an integration of on-going EU Transport forecast projects.

As specified in the tender specifications, the Study shall include an update of the Multimodal Transport Market Studies (MTMS) elaborated as part of the 2014 and 2015-2017 Core Network Corridor studies. The update of the MTMS shall consider the

¹ As an exemption, the activities related to subtask 1.1, the Multimodal Transport Market study, were performed in cooperation with a parallel study (conducted by TRT and M-Five) and finalized in October 2019.

most recent available data and shall be based on a common macro-economic framework (e.g. GDP projections, fuel price projections), drawing on the EU Reference scenario 2016 or its potential updates.

Additional requirements set in the tender specifications concern the adoption of a common approach for all corridors to ensure consistency, based, as appropriate, on any newly available Europe-wide methods for demand analysis as well as for the identification, assessment and prioritisation of projects.

As a consequence of the request of a common approach for this task, the scope and methodology of the MTMS update was discussed during the kick-off meeting of the 2018-2022 corridor studies. The organisation of a dedicated Working Group (WG) was proposed by the European Commission and the Consortia involved in the delivery of the studies. This involves representatives of the 9 consortia and the European Commission.

2.2.1 MTMS methodology

Based on the TOR and the bilateral discussions held during and after the CNC kick-off meeting, two requirements for the 2018-2022 updates of the market study have been identified:

Requirement #1 - Collect real data on transport flows, assess the level of service of the CNC infrastructure.

Requirement #2 - Assess the impact of the Work Plan project list (in full or partially) in terms of user's benefits and environment & decarbonisation relative to a scenario which does not assume the implementation of the Work Plan projects (i.e. Baseline scenario). The macro-economic framework of this Baseline scenario should draw on the EU Reference scenario 2016. The same approach for all corridors should be used, to ensure consistency.

The calculations of requirement #2 were, therefore, carried out by a TRT/MFive consortium using the TRUST/ASTRA transport forecasting model, based on the inputs from the Corridor Consultants' teams.

Requirement #1 Base year

The main objective was to obtain per country and per mode the key parameters of Table 2. 2016 is the common base year. Where data was unavailable, data from 2017 or 2015 was used. For this requirement, European, national and (some) regional sources have been consulted.

Responsibility for data collection was split by country amongst the MTMS WG. National experts have been asked to provide information on data sources. Where gaps occurred, Corridor stakeholders or other data experts have been consulted. This resulted in a mix of sources that were brought together in a database and shared in the WG. Where needed, data gaps were filled in using assumptions or extrapolation.

Table 2 – MTMS Parameters of the base year data collection

Rail traffic (trains per year)	Passenger traffic flow: Number of passenger trains per year using each section	Average train occupancy (pax/train)	Freight traffic flow: Number of freight trains per year using each section	Average cargo weight (gross tons)
Road traffic (vehicle per year)	Car traffic flow: Number of cars per year using each section	Average car occupancy (pax/car)	Freight traffic flow: Number of trucks per year using each section	Average cargo weight (gross tons / truck)
IWW traffic (ships and tons per year)	Ship traffic flow: Total annual number of commercial ship passages		Freight flows (tons/year): Total annual cargo flows per section in weight (gross tons)	

Requirement #2 Corridor scenario

The nine Corridor specific scenarios (one per Corridor), which will be analysed with the TRUST/ASTRA model by TRT/MFIVE shall be identified based on the following criteria:

- Corridor specific scenarios shall highlight key risks or opportunities in the development of seamless multi-modal core network corridors, thereby providing a solid ground for the European Coordinators to support the timely implementation of the corridor priorities and the projects with high European Added Value;
- Corridor-specific scenarios shall not focus on individual projects, but rather on groups of projects, in order not to duplicate project-specific assessments previously undertaken and to rather focus on the corridor dimension;
- In order to maximise the added value of the on-going exercise, it would be beneficial to identify a mix of corridor-specific scenarios, some focusing on infrastructure (and potential non completion of key projects) and some on other issues, such as technology or operational measures.

⇒ See Annex 29: Methodology of MTMS study (07 Oct 2018)

2.2.2 MTMS working meetings

The first WG meeting took place in June 2018. In **November** 2018, the **second WG meeting** was held. During the meetings, the methodology, tasks, planning and cooperation with the consortium TRT/MFIVE were discussed, as the latter contracted by MOVE A3 for the European Transport Forecast model under the TRIMODE project.

In order to bridge the on-going activities under the CNC studies under the MTMS task and the a.m. TRIMODE project, a separate contract with TRT/MFIVE has started in May 2019 and a **joint kick-off meeting** was held with MOVE, the TRT/MFIVE team and the Corridor consultants of task 1.1.

During that meeting, the definitions of the modelling scenarios were discussed, i.e. the base year, as well as the definition of reference and corridor-specific scenarios.

2.2.3 Macro sections

Macro sections were discussed. The model outputs concerning traffic volumes on the corridor alignment will be provided by corridor macro-sections. Since detailed analysis at local level or at project level are outside the scope of the models, the TRUST and ASTRA models will provide outputs at macro-sections level (groups of TENtec corridor links), per corridor; these are around 8 sections, applicable for all modes of transport.

The rail, road and IWW macro sections are shown in the following figures.

Figure 1 – Rail Network Map of MTMS macro-sections for OEM

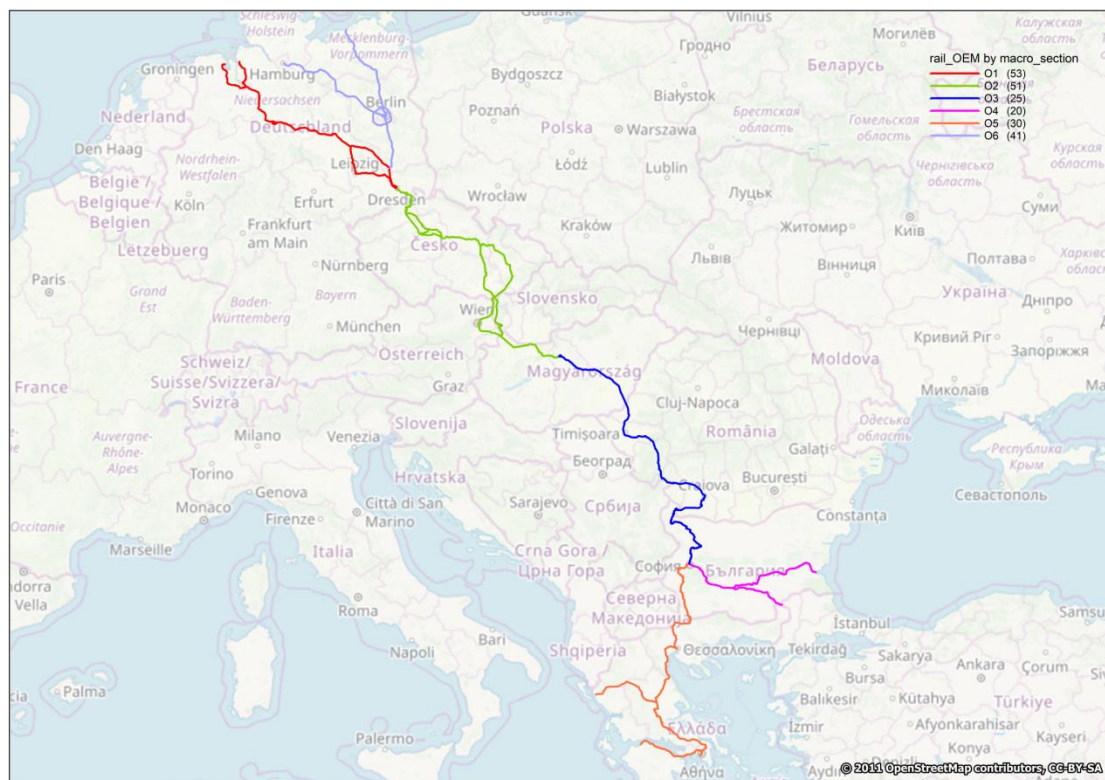


Figure 2 – Road Network Map of MTMS macro-sections for OEM

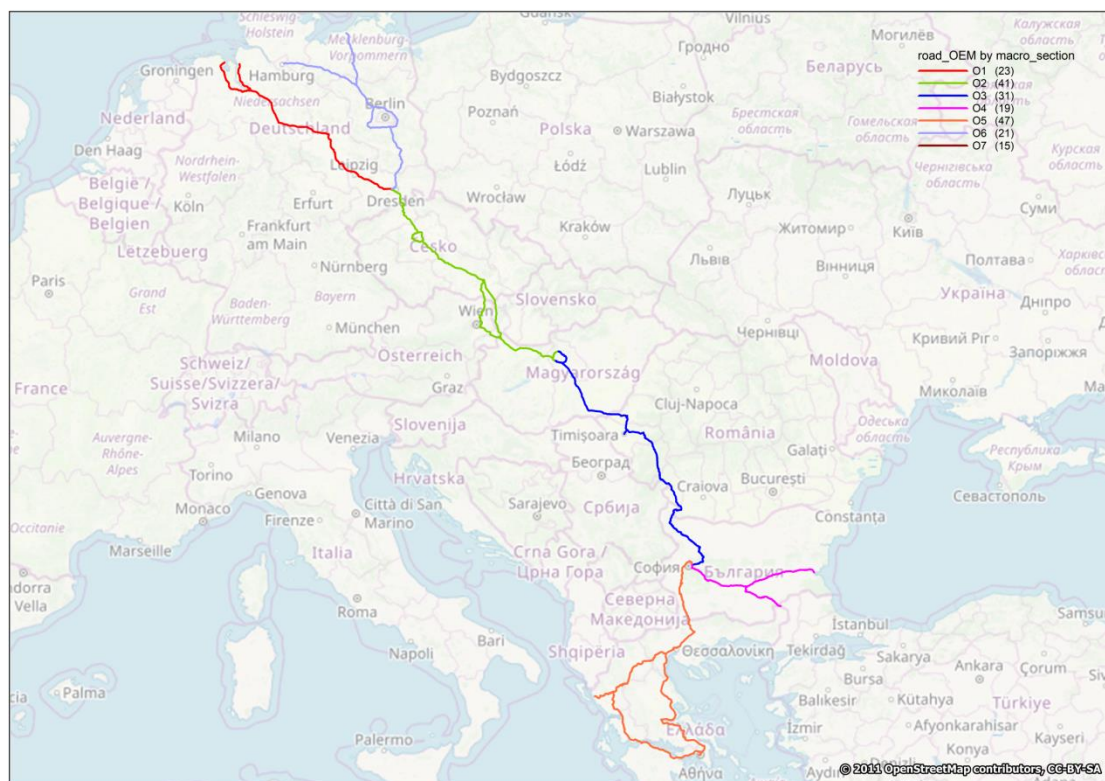
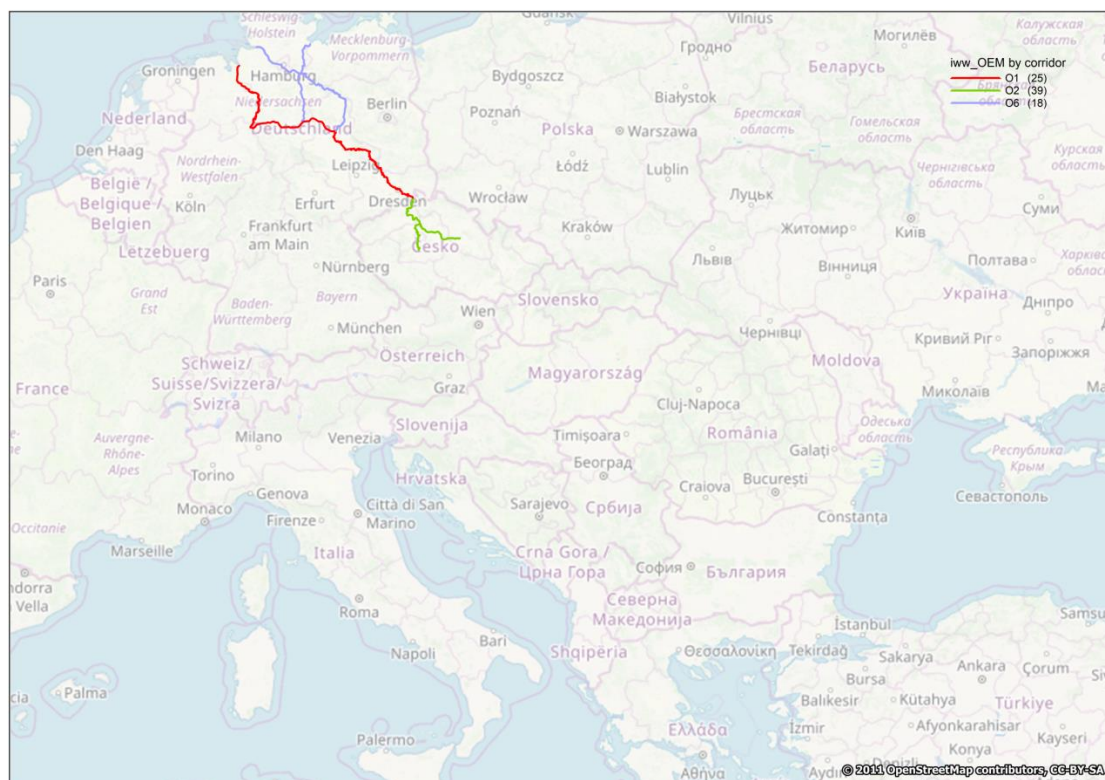


Figure 3 – IWW Map of MTMS macro-sections for OEM



The expected inputs to be provided by the CNC study consortia to the TRT/MFIVE consortium (data or information extracted from the project list or in any case strictly

related to projects in the project list) and the model outputs (traffic growth rates and absolute volumes, modal split, economic and environmental outputs) were confirmed in line with previous discussions.

2.2.4 Corridor Scenario

In addition to the Baseline and Reference Scenario, a third scenario is defined, unique to each Corridor. This is referred to as the *Orient/East-Med Corridor Scenario*. The following scenario has been approved by the Corridor Advisor.

- **Name:** *OEM rail cross border benefits*
- **Rationale:** A potential scenario focusing on the reduction of operational delays at rail border crossing points with reference to the Orient/East-Med corridor
- **Modes of transport:** Rail
- **Macro-sections:** Entire corridor, except CY

Description: Pessimistic scenario with unusual delays at the rail border of 8 border points DE – EL. Dwelling times of 2 hours are assumed in this scenario (in accordance with the Joint initiative with the RFC OEM).

Base year results

As of October 2019, the data collection exercise for the base year has been completed.

- ⇒ See Annex 13: Presentation on the MTMS method for OEM, 13th Corridor Forum

2.2.5 Results: Reference & Baseline scenario, Jobs & Growth

In the end of October 2019, the TRT and M-Five Modelling team delivered the MTMS results in the form of the following reports.

- *Economic modelling exercise in support of the multi-modal transport market studies for nine core network corridors. Progress Report, dated 24.10.2019,*
- *Economic modelling exercise in support of the multi-modal transport market studies for nine core network corridors. WP2 – Modelling approach and preliminary results for selected CNCs, dated 31.10.2019.*

Based on the latter report, the MTMS Working Group has sent a list of 22 questions to the TRT/M-Five Modelling Team, asking for further clarifications on the MTMS results. The reports did not include the results on the OEM Corridor Specific Scenario yet. The initial results were received on the 11th of December 2019, with the following final report being received shortly after:

- ⇒ *See Annex 26: Economic modelling exercise in support of the multi-modal transport market studies for nine core network corridors. WP2 – Modelling approach and results for six selected CNCs, dated 21.12.2019.*

Over the course of January and February 2020, several bilateral talks between members of the MTMS Working Group and the EC have taken place to discuss how the MTMS results should be presented in the upcoming fourth Work Plan. It was agreed that the results should be presented in terms of jobs and growth forecasts, with the traffic results being left out. The reason for this is that the sources of the traffic

changes in the Trust Model are difficult to track down. Moreover, the linkages between the Trust and Astra models are non-optimal, for example the macro-section results may not reflect the modal share and emissions results.

The EC proposed a common structure for the reporting on the MTMS in the 4th Work Plan, which each Corridor was free to follow. Some of the traffic results were included in the 4th Work Plan of the OEM Corridor.

The main results of the *Baseline and Reference Scenario* are as follows:

- Those OEM CNC projects for which cost estimates are available and that are planned to be implemented over the period 2016 to 2030 amount to an investment of €83 bn.
- The implementation of these projects might lead to a total € 572 bn increase of GDP over the period 2016-2030.
- Further benefits could also occur after 2030. The investments are likely to also stimulate additional employment.
- The direct, indirect and induced job effects of these projects might amount to 1,704,000 additional job-years created over the 2016 – 2030 period.
- Further increase in job-years could also be expected after 2030.

The main takeaway from the *Orient/East-Med Corridor Scenario* is as follows:

- The OEM rail network could not enjoy an accumulated total of additional € 730 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.

The results of the corridor specific scenario are described in detail in the 4th Work Plan of the OEM Corridor.

- ⇒ See Annex 27: 4th Work Plan of the European Coordinator of the OEM CNC (12 May 2020)

2.3 Long-term analysis on Rail Freight Commercial delivery times

Following the **Guidelines to the CNC Consultants - Special KPI on Commercial delivery times** (by DG MOVE, 17 September 2018), the Consultant has implemented a methodology to measure for railway transport the progress of the Corridors with respect to business users, customers' needs, the commercial delivery time and the punctuality between origin and destination of cargoes.

⇒ See Annex 28: Presentation on the Rail Freight CDT analysis until May 2020

2.3.1 Methodology

The four main steps of the methodology are described in this paragraph. The intermediate results of the analysis were processed and shall be used for the long-term comparison.

- **Identified major industrial companies**, around CNC hubs (RRTs) that are typically prone to using rail freight for the regular product flows (input/output);
- Approached key stakeholders and identified their **cross-border rail services above 800 km, with at least 500 km on the relevant Corridor**, and identified rail freight centres used for these services by use of the mandate letter.
- A **set of regularly operated trains** with the same O/D per industrial company were selected to be monitored for the next 4 years, and
- **Main interfaces were established** with the support of relevant stakeholders and an agreement was reached for a periodical data collection with updates based on defined data interfaces (XLS table twice per year).

Contacting stakeholders as data providers

Efficient monitoring requires strategic data collection guidelines; therefore, the Consultant set-up strong cooperation bridges with all stakeholders and continues approaching other possible sources for data gathering. The process for review and assessment of information received is in line with the Guidelines.

The analysis is based on data provided by railway operators, logistics service providers, shippers and manufacturers active in the following Member States:

BE, NL, DE, CZ, AT, SK, HU, RO, BG, EL

Many of the relevant players have only recently started to collect relevant performance data required for the analysis. Thus, future analysis will continue to report on the relations in hand and will be complemented by further O/D relations and providers.

Currently, the Consultant is in contact with 11 companies which have expressed their willingness to contribute for 2019, but have done so only on a very limited scale, partially due to the very basic fact, that trains on the eastern part have been cancelled, changed routes or have been lost to road, while increasing corporate policies issues and confidentiality agreements with clients make it even more difficult to gain data also on the western segment.

Train Links analysed for Commercial Delivery Time

The following sections are currently under monitoring and constitute the basis for the presented analysis, as representative of major cross-border freight transport flows between large cities/logistic centres through the EU. Due to their geographical overlap, the OEM and RDC links are shown jointly.

Table 3 – Overview on OEM/RDC rail links analysed on Commercial Delivery Time

CNC	Rail Freight Link	MS	Distance on CNC [km]
OEM1	Antwerp Area – Praha Area	NL, DE, CZ	496
OEM2	Rhine/Ruhr – Praha Area	DE, CZ	495
OEM3	Hamburg Area – Praha Area	DE, CZ	576
RDC1	Antwerp Area - Arad Area	NL, DE, AT, HU, RO	1207
RDC2	Rhine/Ruhr – Linz Area	DE, AT	555
RDC3	Rhine/Ruhr – Linz Area	DE, AT	555
RDC4	Rhine/Ruhr – Linz Area	DE, AT	575
RDC5	Antwerp Area - Craiova	NL, DE, AT, HU, RO	1589
RDC6	Palatia – Linz Area	DE, AT	606

Additionally, the Consultant performed a detailed analysis for three OEM and four RD shuttle trains over the period 2016 – 2019.

These include average speed and delay developments for container shuttles between the Rhine/Ruhr and Linz Areas (RD) and connections to the Praha Area (OEM).

Confidentiality of data

During the activities, the Consultant identified a number of stakeholders requiring strict confidentiality which provided relevant data for the **base year 2018 and partially for 2019**.

The Consultant guarantees the confidentiality of data; therefore, no information is disclosed on the type of goods transported, the names of clients, railway operators, final O/D stations, etc.

The Consultant has kept the final destination station confidential as requested by the stakeholders.

2.3.2 Intermediate results

The analysis is based on a large collection of information on the train travels in various periods of time and from various sources. This is quantitative information with differing degrees of data quality; therefore, it constitutes both a first diagnosis of current commercial delivery time performance and a basis for future analysis.

It should be noted that all data collected is stored by the Consultant in order to make the “commercial delivery times” evolution comparable over the planned time period of 4 years.

The Consultant processed the available data and created different Excel spreadsheets (depending on the data structure provided by the cooperating partners) for the overall analysis, in order to:

- Enable future benchmarking of the commercial delivery times of specific sections against comparable evaluations (e.g. RNE systems, such as TIS or RFC’s internal analysis);
- Accurately measure specific train delivery times;
- Statistically determine the average speed on specific sections, given their characteristics.

The analysis can thus support the monitoring of the evolution of delivery times based on historical data on the specific link.

The database contains the following key elements:

Corridor, place of origin and destination, departure time, arrival time, length of link, calculation of net delay on journey.

Specific ID numbers were internally assigned to all monitored trains for easy tracking purposes.

As a result, for each of the selected sections, average data was calculated, and information was compiled as follows:

Table 4 – Results Parameters of Commercial Delivery Time analysis

	Results Parameter	Measure unit	Comment
A	Departure delay	minutes	
B	Arrival delay	minutes	
C	Delay on journey	minutes	C=A+B
D1	Distance on corridor infrastructure	kilometre	
D2	Distance on corridor infrastructure	%	D2=D1/E
E	Overall distance	kilometre	
F	Arrival delay per 100 km	minutes	F=B/E/100
G	Calculated Average speed	Kilometre/minutes	G=E/(H+C)
H	Regular scheduled time	minutes	
I	Number of trains covered	amount	

More specifically, the transport journey of goods on specific routes has been analysed (in hours/minutes) as the one from the requested delivery hour at the departure railway station and the time authorising the pick-up at the destination station.

The registered **net delays are delays incurred en-route**, i.e. arrival delay deducting departure delay, and do not include “last mile” transport (shunting or other) that could jeopardise the exercise.

Obstacles and open issues

The Consultant is currently taking action towards **improving data sets** of eastern parts of the OEM Corridor. According to our participants, there are currently not many Corridor links located south of Romania, due to the bad quality provided through Bulgaria and Romania that does not fulfil the requested definition of commercial trains, as well as due to the existing construction works on the rail infrastructure in Hungary and Romania, which do not allow for a regular service. Trains scheduled on this route have been diverted through Serbia for the time being.

For the limited number of trains existing on the eastern part of the Corridor, data expected from the contacted parties was not received due to internal policies or procedures and/or due to the fact that beneficiaries of transport do not have the information on the real commercial time. The Consultant is also following trace with shippers from the oil and the automotive industry, which both transport goods in the south-eastern parts of OEM CNC. So far there is no response; any extra support for this action will be appreciated.

The **clear separation of delays departure/arrival and delay on journey** has been discussed internally and with the RUs, forwarders and intermodal operators in the past year.

In intermodal traffic, there is available information on fixed data of latest delivery and pick-up authorised times. These times are usually kept and stored (if they are) by the terminal operators, not the railway undertakings. The respondent intermodal operators have chosen to provide the train arrival times in terminals as the relevant ones, as terminal handling is in ownership of the terminal facilities.

The recorded non-intermodal trains are trains between storage facilities, such as oil tanks, export parking areas for cars, etc. The typical waiting time of commodities in these areas is days to weeks, whereby neither delivery nor pick-up times are relevant for the quality of transports (according to the respondent forwarders). Loading and unloading is also not in the hands of railway undertakings. Some exceptions from the rule may apply to just-in-time deliveries e.g. for automotive industry, but, also, in such cases, the loading/unloading schedule is not decided by the RU.

Next steps

The Consultant regularly contacts stakeholders in order to find agreement with the intermodal operators and forwarding companies on reporting data on delivery and pick-up times. Also, for this action, any extra support by Brussels would be most welcome, as it might require additional effort ² for data collection on behalf of the stakeholders.

The Consultant has regular contact with the Logistics providers in order to check for new or re-started trains after completion of Hungarian construction works and/or changed attitudes towards their data publication policy. New opportunities with trains from Eastern to Northwest Europe is in focus.

The Consultant permanently checks for valuable relevant indirect information from projects for shippers, ports and terminals.

² Shippers and forwarders often only know the storage pick-up and storage delivery times and not any train days, forwarders and intermodal companies may know a pick-up time but not the delivery time at terminals, etc.

3 Task 2 – Further refining of the project list

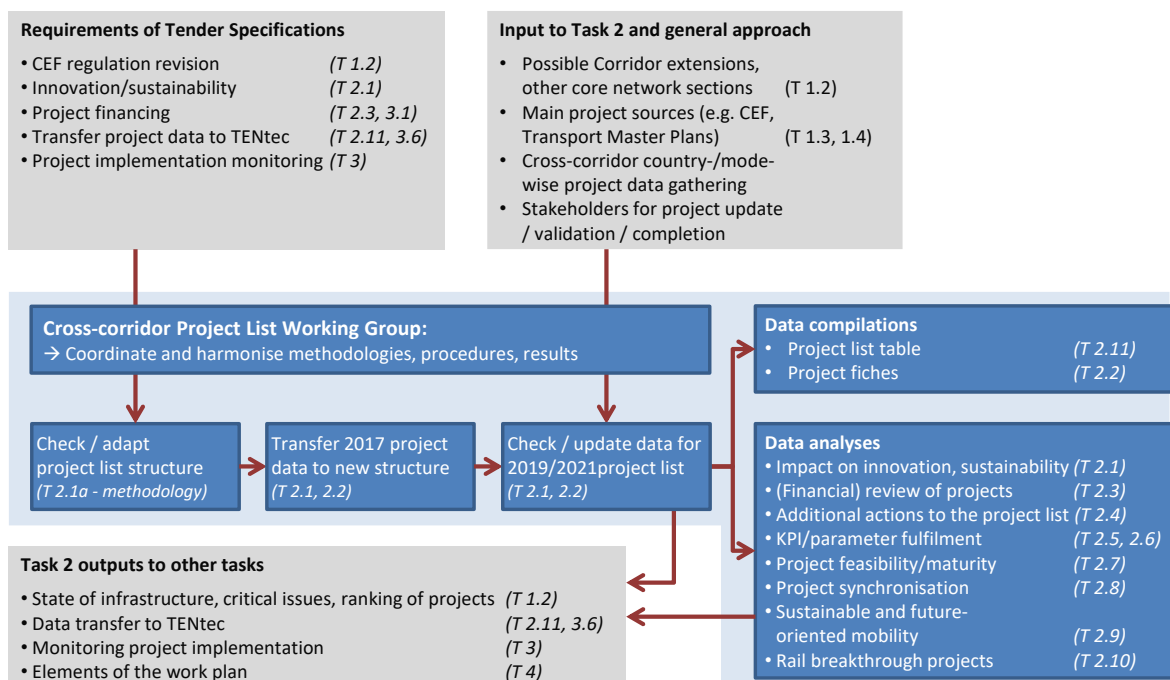
3.1 Overview on Task 2 efforts

In the first two TEN-T corridor studies (2014–2018), it became apparent that the project list is the key tool for monitoring and coordinating the further development of the Corridor. This includes the technical analysis of projects with respect to their contribution to the Corridor objectives (cf. the “KPI” columns of the project list). Moreover, it allows mirroring the projects and their impact against the Corridor’s bottlenecks and non-compliant sections according to Regulation (EC) 1315/2013 (gap analysis).

In the current study phase, the activities related to the project list have been continued and expanded in several respects. Figure 4 provides an overview on the main work steps as well as the interrelations within the subtasks and with other tasks. They can be assigned to the following groups of subsequent activities:

1. Organisation of work,
2. Adaption of the project list structure (sub-task 2.1),
3. Completion and update of project data (sub-tasks 2.1, 2.2, 2.9, 2.10, 2.11, 3.6),
4. Analysis and exploitation of the project list (sub-tasks 2.3-2.10).

Figure 4 – Task 2 – main process steps and interrelations



Source: HaCon

3.1.1 Organisation of work

Already in the 2nd CNC Study, cross-corridor coordination turned out to be necessary to ensure harmonised methodologies and procedures, consistent project data (particularly in overlapping sections), as well as common understanding and interpretation of results. For this purpose, the cross-corridor Working Group from the second phase with respective project list lead partners from all consortia has been re-established. It tackles all project list related issues of task 2 and task 3. The cross-corridor Working Group was jointly led by HaCon (in relation to Task 2) and

KombiConsult (in relation to Tasks 3.1-3.3). The main activities of this Working Group were:

- Kick-off meeting on 12 July 2018 in Brussels (together with DG MOVE);
- Quarterly cross-corridor web meetings;
- Several OEM-consortium web meetings to transfer the cross-corridor agreements to all participants involved in task 2 works;
- Additionally, participation in dedicated working meeting on structure/clearance gauges upon invitation of DG MOVE.

The main results of these Working Group activities consisted in:

- Agreement on a common list structure, including its amendments (see section 3.1.2);
- Replacement of nine single, corridor-related project lists with individual bi-/tri-/multi-lateral data coordination by a common project list comprising all projects of the nine corridors (see section 3.1.3);
- Cross-corridor work-sharing of data collection, update and consolidation in order to optimise work efficiency, to ensure data consistency and to enable one-face-approach of Member States and stakeholders (see section 3.1.3);
- Development of a harmonised methodology for project list analysis and presentation of results (see section 3.1.4).

3.1.2 Adaption of the project list structure

The modification of the project list structure was principally based on the requirements of the Tender Specifications. Thus, the adapted project list structure includes the following additional information parameters:

- Project for sustainable and future-oriented mobility;
- Geo-coordinates: to enable reference to TENtec maps;
- TENtec section: for update of technical parameter data in TENtec;
- Additional rail KPIs: Structure gauge, Intermodal gauge;
- Rail breakthrough project;
- Implementation difficulties: Corridor Forum Members were asked in the course of the project list update to state any difficulties hindering the completion of the Core Network Corridor and requesting action by the European Coordinator (see section 4.1.2);
- Total costs (estimated): In case no official costs were available, the consultants were to provide estimated costs instead.

In addition, experiences from the previous project phase were considered in order to improve data consistency and statistical analysability (with Excel tools) as well as to facilitate the handling of the project list by the stakeholders. This led to the following modifications of existing parameters:

- Scope of work: "Study" to be filled by selection list (Study only, Study + works) instead of y/n-ticking;
- Maturity parameters: Only selection list entries allowed (no free text), additional entry in selection lists: "Not necessary";
- Total costs (official): renamed (formerly: "total costs") to point out difference to estimated costs (see above);
- Project with potential revenues: Only selection list entries allowed (no free text);
- Funding source "EU": Only selection list entries allowed (no free text).

Output/deliverables: Annex 3: "The project list – a short introduction and guideline"

3.1.3 Completion and update of project data

The following work steps are based on the 2017 (phase II) Orient/East-Med project list, including modifications of the table structure, as described above. In a first step, the data status was updated by adding further projects from 2016/2017 CEF calls, from new versions of the Member States' Transport Master Plans, as well as from Member States' input from the previous project phase, which were received after deadline of the final reports of phase II. Such works steps were performed for all other corridor project lists as well.

The nine corridor lists were then merged to one overall, cross-corridor list (HaCon with input of all corridor consortia) in January 2019. This version of the overall project list has been used as basis for update by Member States/stakeholders. The respective work steps were:

- Splitting of the overall project list into some 40 sub-lists (by country, project promoter). Each of these sub-lists was assigned to one consultant company being responsible for approaching the project promoters included in the respective sub-list – January 2019;
- Data gathering at project promoters; merging of all contributions to one corridor list – January/February 2019;
- Coordination with Member States, other stakeholders and European Commission in different check/validation loops; after each loop merging to one cross-corridor project list – February-May 2019;
- Finalisation of the cross-corridor overall project list: several consistency checks (HaCon), whereas responsibility of contents remained with the indicated responsible partner. This list served as input for the user-friendly tool (developed and implemented by Panteia);
- Modification of Project Fiche layout and data feeding mechanisms;
- Check, gathering and creation of project maps (all, coordinated by HaCon);
- Creation of Project Fiches and provision in a cloud server – 31 May 2019.

In parallel, the consultants completed project data for the new information parameters (see section 3.1.2) – March-September 2019:

- Cost estimations (sub-task 2.2): based on M-Five cost factors, performed for projects without official costs and with KPI achievement;
- Projects for sustainable and future-oriented mobility (sub-task 2.9): calculated from "scope of work entries". The condition is fulfilled, if the project's scope covers "Clean fuels" and/or "Telematics application" and/or "Sustainable freight transport services";
- Rail breakthrough projects (sub-task 2.10): classification based on EC guidelines;
- Geo-coordinates (sub-task 2.11): In order to enable reference of the projects by the TENtec system, one pair of geo-coordinates (latitude, longitude) has been added to the project data sets. The coordinates relate to the middle of the project length. The exercise was performed for all projects with a clear geographical location (section or node);
- TENtec section (sub-task 3.6): Assignment of TENtec sections to each project completed in 2016 and 2017 that shows at least one entry "KPI achieved" (see also section 4.3 **Fehler! Verweisquelle konnte nicht gefunden werden.**).

The combination of updates by the Member States/stakeholders with the data completion by the consultants resulted in the final Project List update 2019.

More details on these work steps are included in Annex 3: "The project list – a short introduction and guideline" (see above).

Output/deliverables:

- ⇒ Annex 3 Guidance document (Project list-short introduction.pdf)
- ⇒ Annex 4 Final status of the OEM project list (EC) 2019 (incl. User-friendly tool and List of additional projects)
- ⇒ Annex 5 Project fiches OEM (May 2019)

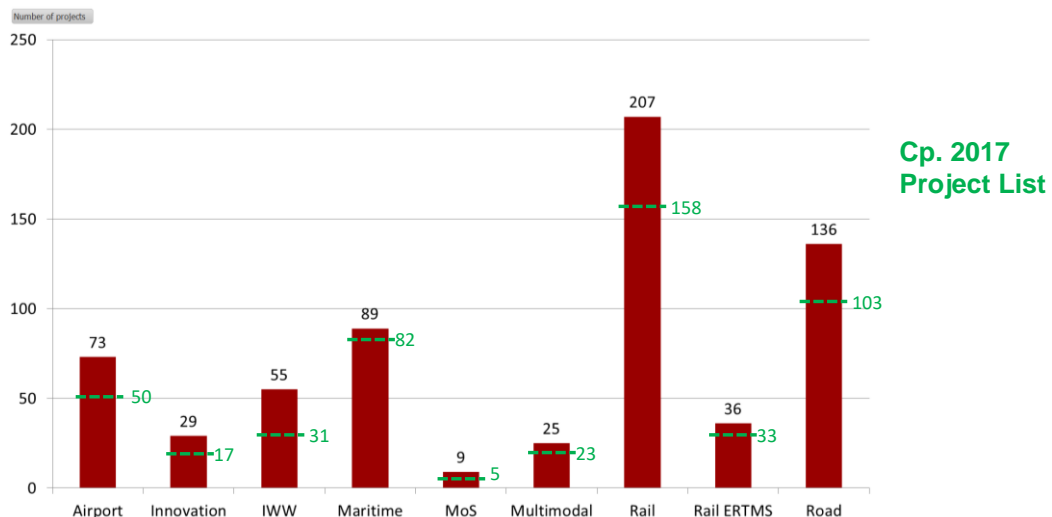
3.1.4 Analysis and exploitation of the project list

The following paragraphs summarise the most important results from the analysis of the updated project list, as delivered in May 2019 and supplemented by additional data for the new parameters by September 2019 (see section 3.1.3). These - and further - results have been presented before on the 13th Corridor Forum (20 June 2019) and on the 14th Corridor Forum (21 November 2019) or were published in the "Final charts on the project list" (see "output/deliverables" at the end of this section).

Sub-tasks 2.1 + 2.2: "2019 CNC Project List update"

The main key figures of the updated projects list, including comparison to the final list of the 2nd CNC Study (2017), are displayed in Figure 5.

Figure 5 – OEM 2019 corridor projects at a glance



- Total: 659 corridor projects (+31%) 502 projects
- Thereof: 129 projects (20%) completed in 2014-2018 298 projects (59%) with end date 2014-2020
175 projects (27%) with end date in 2019-2020
- Investments: € 91.7 bn (official costs) (+20%) € 76.4 bn
- Thereof: 38.7 (DE), 16.9 (CZ), 12.7 (EL), 8.9 (BG), 5.8 (AT)

Source: HaCon analysis based on 2019 Project List of CNC Orient/East-Med, status: May 2019

In total, 659 projects were included in the OEM project list of May 2019. In comparison to the 2017 project list, this updated project list shows an increase of 157 projects or of 34%. The main origins for this increase are the 2016 and 2017 CEF calls as well as additional projects provided by the Member States. Concerning project categories, the main increase comes from projects in the categories Rail (+49), Road (+33), IWW (+24) and Airport (+23). The total official projects costs increased by € 15.3 bn to € 91.7 bn, compared to the 2017 project list, representing an increase rate of 20%.

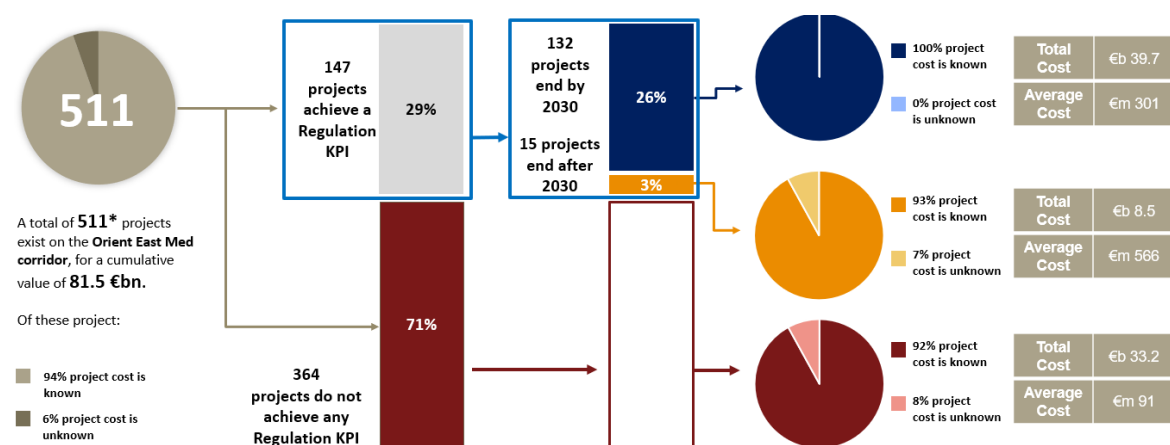
Sub-task 2.3: “Critical review of projects”

This section of the document accounts for the economic and financial aspects of the projects included in the OEM project list, including information on the projects’ cost, maturity and financial viability.

The project list can be analysed through a series of lenses, in order to shine a light on different aspects of the projects composing it. The first step in performing the financial analysis has been an assessment of the maturity status of the project pipeline, summarised in the following figure. This exercise included counting the number of active projects and clustering them through different metrics, such as their contribution to at least 1 Regulation KPI, their timing and the availability of an official cost figure.

As depicted in the diagram below, the vast majority (94%) of the projects have information on cost, and this high share is also reflected through the three subcategories.

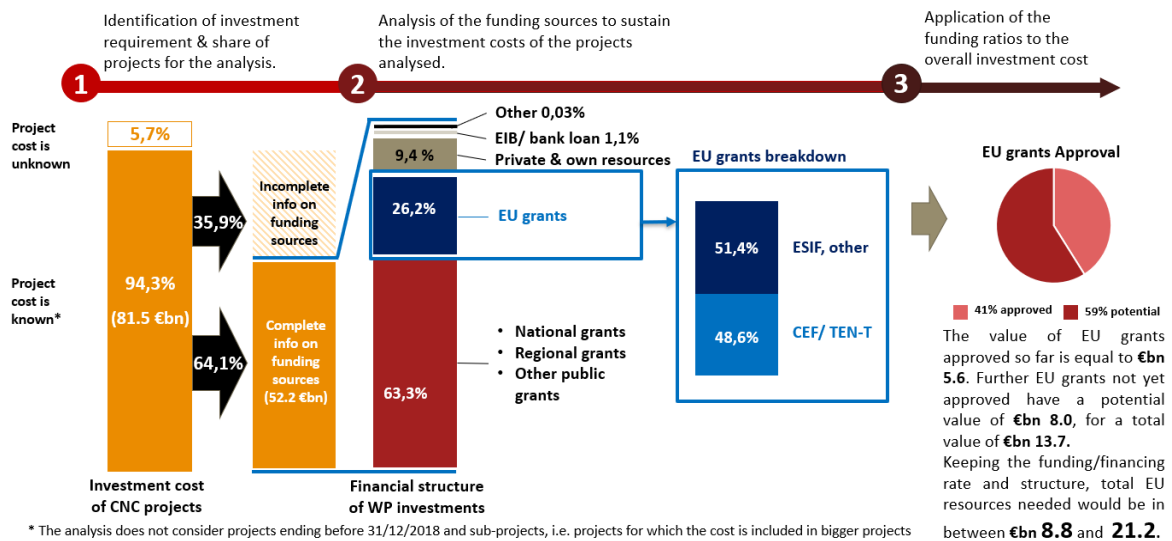
Figure 6 – Assessment of OEM Projects on cost information



* The analysis does not consider projects ending before 31/12/2018 and sub-projects, i.e. projects for which the cost is included in bigger projects

The following step in the analysis consisted in determining the funding sources of the projects, with particular reference to the economic effort of the European Union. As observed in the diagram below, as of now we have clear and complete information on the funding sources of projects accounting for € 52.2 billion, or 64.1% of the list’s value; of those, € 13.7 billion (26.2%) come from EU funding, with a quasi-equal split between CEF/TEN-T grants and ESIF grants. It should also be noted that only 41% (€ 5.6 billion) of the EU funding has already been approved ³, with the remaining share of funding still listed as “potential”, i.e. yet to be applied and confirmed by Grant or Loan agreements.

³ 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.

Figure 7 – Potential analysis for Funding sources according to CNC method


The final step of the analysis consists in determining the number and value of OEM projects able to generate returns from the market to cover the operating and possibly a share of the capital expenditure. According to our findings, more than 25% of the projects are potentially financially sustainable. More specifically:

- **19.7%** of the projects, for a total value of **€ 29.2 bn**, are **Financially sustainable**. Projects fall in this group following either a direct assessment from the project owner promoter or a subsequent analysis of the consultants.
- **7.1%** of the project list, for a total value of **€ 10.9 bn**, present **Good potential for financial sustainability**. Projects included in this category, are considered appropriate for it based on consultants' assessment.
- **73.2%** of the project list, for a total value of **€ 41.3 bn**, have **Low to non-existent potential for financial sustainability**. This was based either on a direct assessment from the project owner or on a subsequent analysis of the consultants.

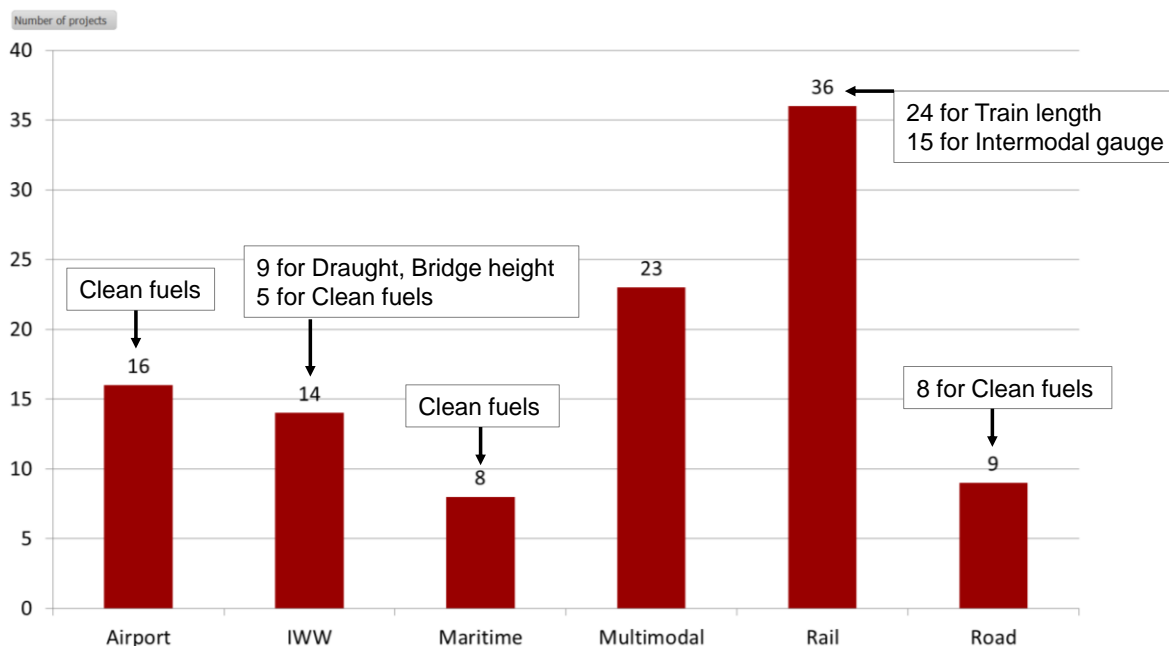
Financially sustainable projects are relevant because they can be developed with less - or no - impact on public finances, and/or supported with softer support measures (i.e. soft loans, blending instruments, de-risk instruments, etc), as detailed below. The more infrastructure is developed through projects generating returns from the market, the less the amount of grants and national public finance is needed to complete the TEN-T network.

Sub-tasks 2.4 ("Proposal for additional projects") + 2.8 ("Synchronisation of projects")

Additional projects have been proposed by the consultants for each Corridor (sub-task 2.4). They are the result of the compliance analysis (existing compliance gaps vs. on-going/planned projects in the project list) and shall fill remaining compliance gaps on the Corridor until 2030. These proposals should be understood as basis for discussions between the European Commission and the Member States.

For the Orient/East-Med corridor, 106 additional projects (all modes) were proposed (see Figure 8). They show a clear focus on dedicated transport modes (Rail, Multimodal) and on KPIs (Train length, Intermodal gauge, Clean fuels, Terminal KPIs).

Figure 8 – Proposed additional projects on the Orient/East-Med corridor (total: 106 projects)



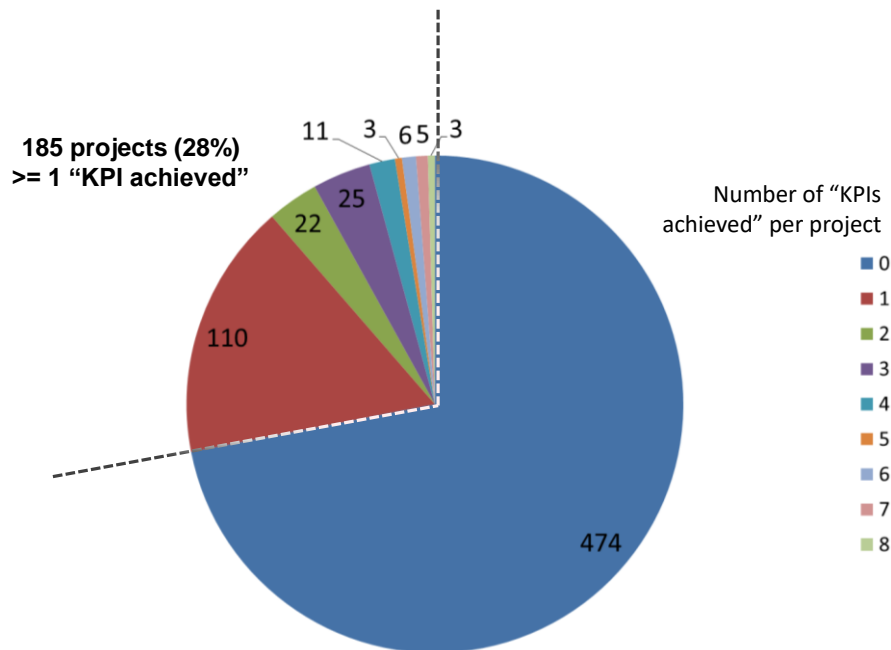
Source: HaCon analysis based on 2019 Project List of CNC Orient/East-Med, status: May 2019

Within sub-task 2.8, the additional projects have been synchronised with the finalisation of existing projects in the same or neighbouring sections/nodes with the aim to have similar completion times. This will allow the European Coordinator to make appropriate suggestions to the Member States as regards the scheduling and timing of individual infrastructure projects.

Sub-tasks 2.5 (“Information on obtained parameters and realised KPIs”) + 2.6 (“Project contribution to additional indicators”)

185 out of 659 OEM projects (28%) provided achievement of at least 1 KPI (TEN-T parameter, see Figure 9). In most of these cases (110 projects), only one KPI was achieved; only in exceptional cases, more than three KPIs were achieved by one project (note: the number of theoretically achievable KPIs also depends on the mode: more than three KPIs are assigned only to Rail and IWW modes).

Figure 9 – OEM projects and their number of achieved KPIs (total: 659 projects)



Source: HaCon analysis based on 2019 Project List of CNC Orient/East-Med, status: May 2019

In turn, 72% of the projects in the OEM project list did not contribute to the compliance of the TEN-T parameters. This is partially due to the nature of the project (pure study). In most cases however, these projects contribute to the development of the Corridor outside the KPIs of the Regulation.

Such impacts have been analysed in sub-task 2.6 in the form of "additional indicators". Such indicators are no KPIs according to Regulation, but important for smooth operation:

- Elimination of current or potential future capacity bottleneck (rail);
- Elimination of strong incline (rail);
- Removal of single-track section (rail);
- Contribution to good navigation status (IWW).

96 OEM projects (15% of all OEM projects) contributed to these indicators, particularly to the alleviation of capacity bottlenecks (62 projects) and to good navigation status (14 projects).

Sub-task 2.7: "Projects' feasibility/maturity"

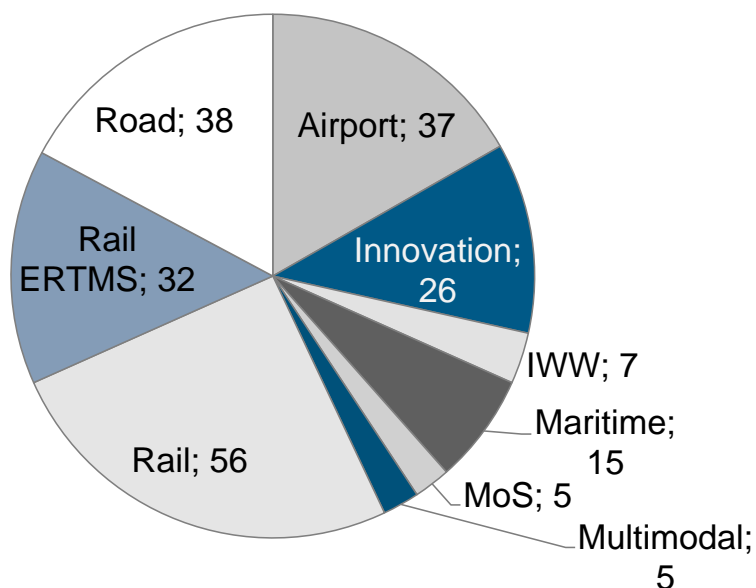
This topic is covered by Task 3 (Project Implementation Reports), see section 4.

Sub-task 2.9: "Projects for sustainable and future-oriented mobility"

Projects for sustainable and future-oriented mobility are projects with innovation elements. They are characterised by impacting on alternative clean fuels, telematics applications or sustainable freight transport services. The project list allows filtering for these characteristics.

In total, 221 corridor projects fulfil these conditions (= 34% of all OEM projects). The largest share of the sustainable projects is assigned to Rail (56 projects), followed by Road (38 projects), Airport (37 projects) and Rail ERTMS (32 projects), see Figure 10.

Figure 10 – OEM projects for sustainable and future-oriented mobility (total: 221 projects)



Source: HaCon analysis based on 2019 Project List of CNC Orient/East-Med, status: May 2019

Regarding geographical allocation, 47 sustainable projects take place in several countries. Specific countries with many sustainable projects are Czech Republic (41 projects), Hungary (27 projects), Germany and Greece (each 25 projects).

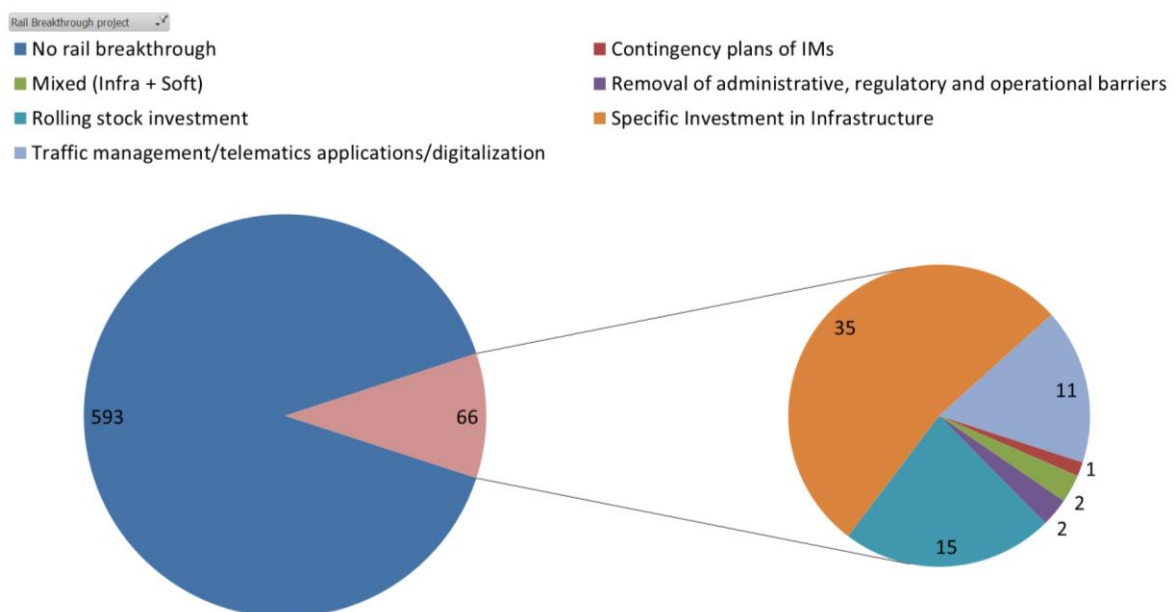
The overall investments of the sustainable projects sum up to € 23.1 bn; thus, they represent 25% of the total official costs of the OEM projects.

Sub-task 2.10: "Rail Breakthrough projects"

Rail breakthrough projects have been defined in a DG MOVE Paper elaborated by Coordinators GROSCH (OEM) and VINCK (ERTMS) in November 2017. Such projects aim at "Quick Wins" to support pure infrastructure investments. Their implementation shall take place until 2023.

The analysis of the updated project list revealed 66 projects to be classified as "Rail breakthrough" (10% of all OEM projects). As Figure 11 visualises, most of these projects are of type "Specific investments in infrastructure" (35 projects), followed by "Rolling stock investment" (16 projects) and "Traffic management" (11 projects).

Figure 11 – OEM Rail breakthrough projects



Source: HaCon analysis based on 2019 Project List of CNC Orient/East-Med, status: May 2019

The Rail breakthrough projects represent total investments of € 3.5 bn, which is 4% of the OEM overall official project costs. They are particularly allocated to Czech Republic (15 projects), Hungary (13 projects) and multiple countries (10 projects).

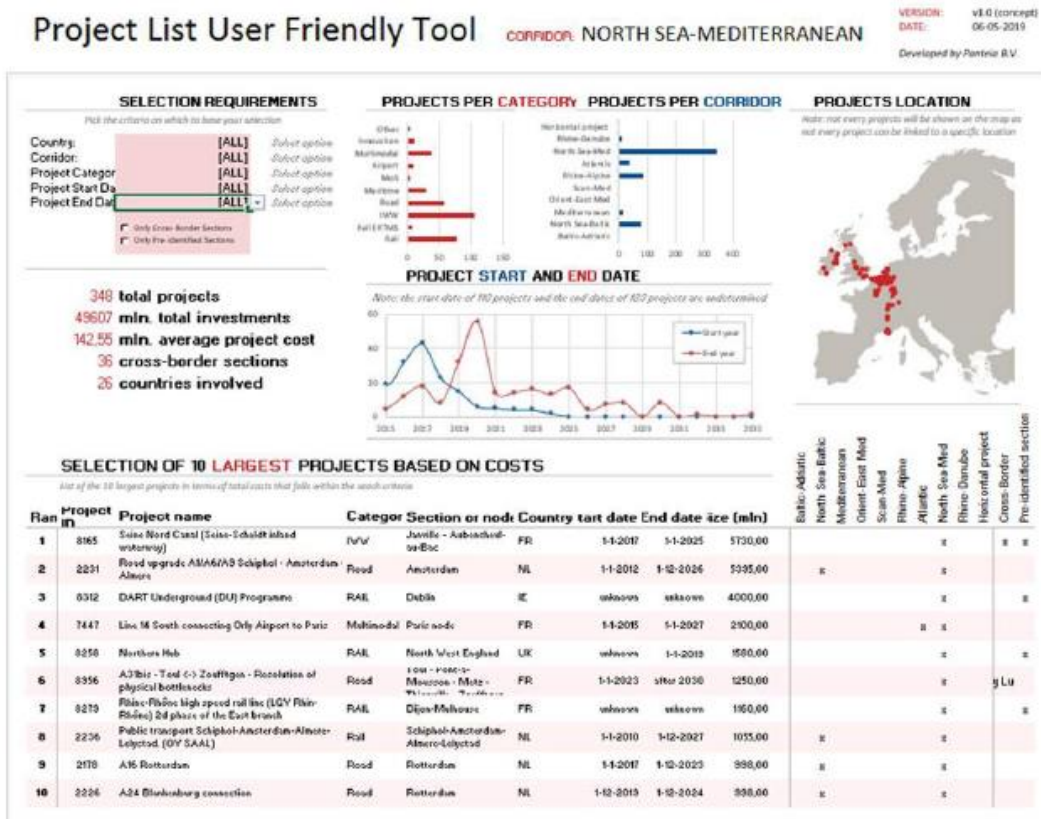
Output/deliverables:

- Annex 13: "13th Corridor Forum – Orient/East-Med: 2019 CNC Project List update (Task 2)"; Brussels, 20 June 2019
- Annex 14: "Final charts on the project list - Supplement to the charts presented on 13th CF 06/2019, supplemented by charts presented on the 14th Corridor Forum 11/2019"
- Annex 04: Final status of the OEM project list (EC) 2019 (incl. User-friendly tool and List of additional projects)

Additional Sub-task: "User-friendly tool" for the Project list

A so-called 'user friendly tool' for simplified handling of the project list based on a front searching and demonstration mask was elaborated by Panteia on request of Mr Patrick Vankerckhoven as a special MS EXCEL macro. It was finalized in June 2019 and delivered by HaCon to the European Commission.

Figure 12 – User friendly tool – demonstration picture



Output/deliverable:

- Annex 04: Final status of the OEM project list (EC) 2019 (incl. User-friendly tool and List of additional projects)

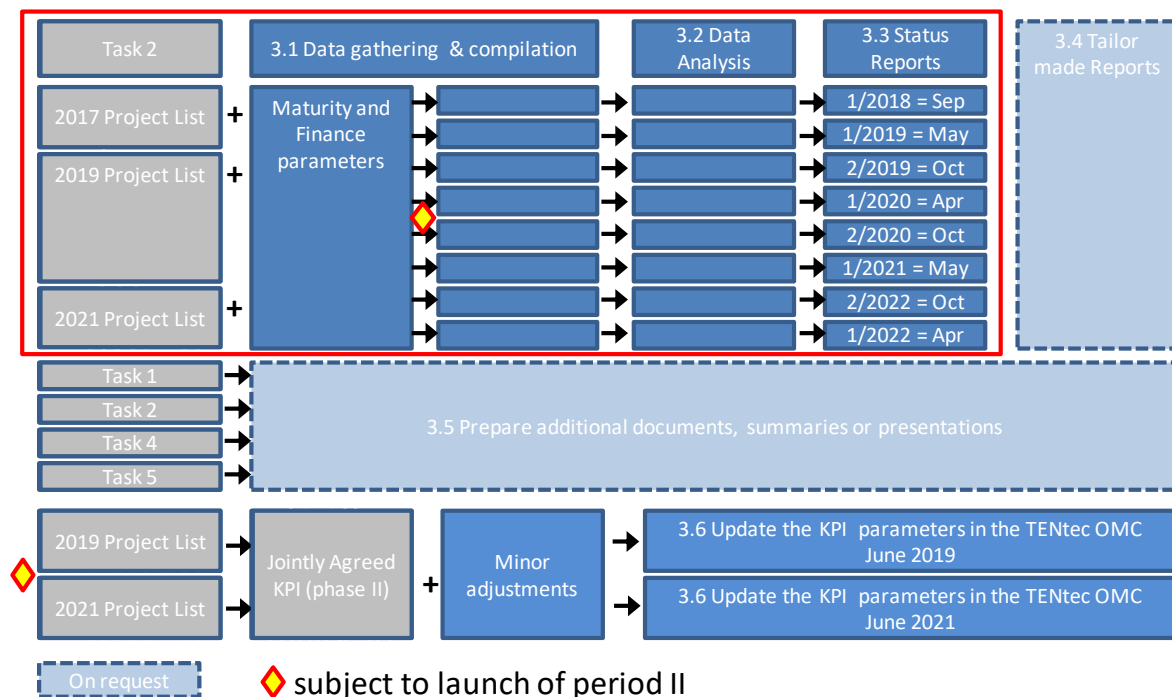
4 Task 3 – Monitoring and analysing the state of project implementation and reporting

4.1 Overview on efforts for Project implementation monitoring

4.1.1 Introduction and overview

The project implementation monitoring builds on the requirement that the biannual updating of the entire project list (see section 3) as well as the Work Plan of the European Coordinators (see section 5) should be accompanied by a more frequent status analysis of the projects. This shall allow the Commission and the Coordinator to counteract in case of inconsistencies and delays. This project monitoring relates to sub-tasks 3.1-3.3 (see Figure 13, red frame).

Figure 13 – Task 3 - Detailed work programme and interrelations



Source: Consultant's presentation at Kick-off meeting, updated for Working Group Meeting on 12 July 2018

For this purpose, "narrow updates" of the project list are performed every six months between the regular complete updates (2019 and 2021) in order to trace the implementation progress of existing projects. "Narrow update" means that Member States and other stakeholders are requested to update the following selected project parameters, which are particularly relevant for the semi-annual monitoring:

- Project maturity and implementation;
- Project costs and financing/funding.

The complete and the "narrow" updates of the project list are then analysed within Project Implementation Reports (PIRs). By end of project phase III (May 2020), the following "narrow" updates and PIRs have been performed:

- PIR 1/2018, submitted by 27 September; basis: final project list of the 2nd CNC study (2017);

This Project implementation report includes a common approach for all nine CNCs, which had been jointly elaborated in the Tasks 2/3 cross-Corridor Working Group and was provided by KombiConsult on behalf of all consortia on

29 August 2018 to DG MOVE. It includes a detailed approach of analysis, results and detailed structure to be applied in each subsequent PIR.

- PIR 1/2019, submitted by 29 May 2019; basis: complete project list update 05/2019 (see section 3);
- PIR 2/2019, submitted by 3 December 2019; basis: narrow project list update 10/2019;

This “narrowly updated” version of the project list has also been used as basis for Work Plan IV (see section 5);

- PIR 1/2020, submitted by 24 April 2020; basis: narrow project list update 04/2020.

4.1.2 Main results of the Project implementation monitoring

The following paragraphs comprise the most important results from the Project Implementation Reports. The detailed outcomes of the analyses are available in the PIR documents attached (see listing at the end of this section).

Project maturity - Completion time clusters:

Figure 14 and Figure 15 visualise the number of projects per completion time cluster, as absolute figures and as relative shares, cumulating to 100%.

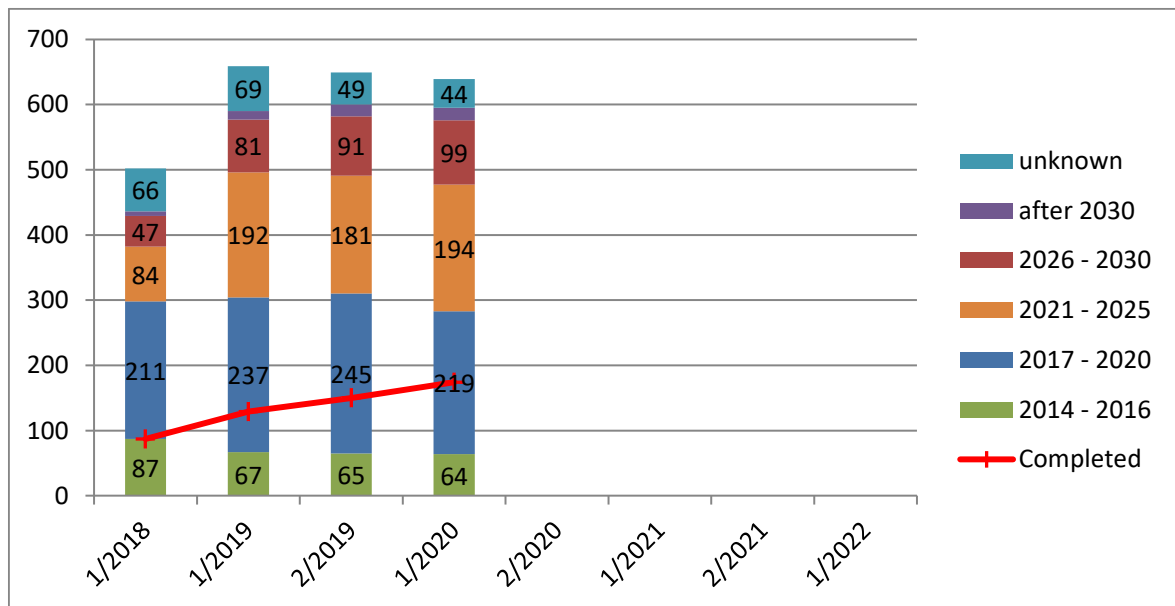
Compared to the complete project list update in 05/2019 (see section 3), the number of OEM projects has decreased from 659 to 639 in PIR 1/2020. This development is mostly due to deactivation of projects not pursued any more.

At the same time, the number of completed projects increased from 129 (PIR 1/2019) to 179 (PIR 1/2020). In consequence, the share of completed projects in the total number of projects increased from 20% (PIR 1/2019) via 23% (PIR 2/2019) to 27% (PIR 1/2020). These completed projects are still included in the PIRs in order to document the progress made on the Corridor since the implementation of EU Regulations 1315/2013 and 1316/2013.

The allocation of the projects to the completion time clusters shows a slight tendency to shift the finalisation of projects from 2017-2020 to subsequent time clusters, in particular to 2021-2025. In consequence, the number of projects, which have been already concluded or shall be finished by 2020, has decreased: from 304 (PIR 1/2019) to 283 (PIR 1/2020). In the “critical” time window 2026-2030, 15% of the projects are still to be finalised.

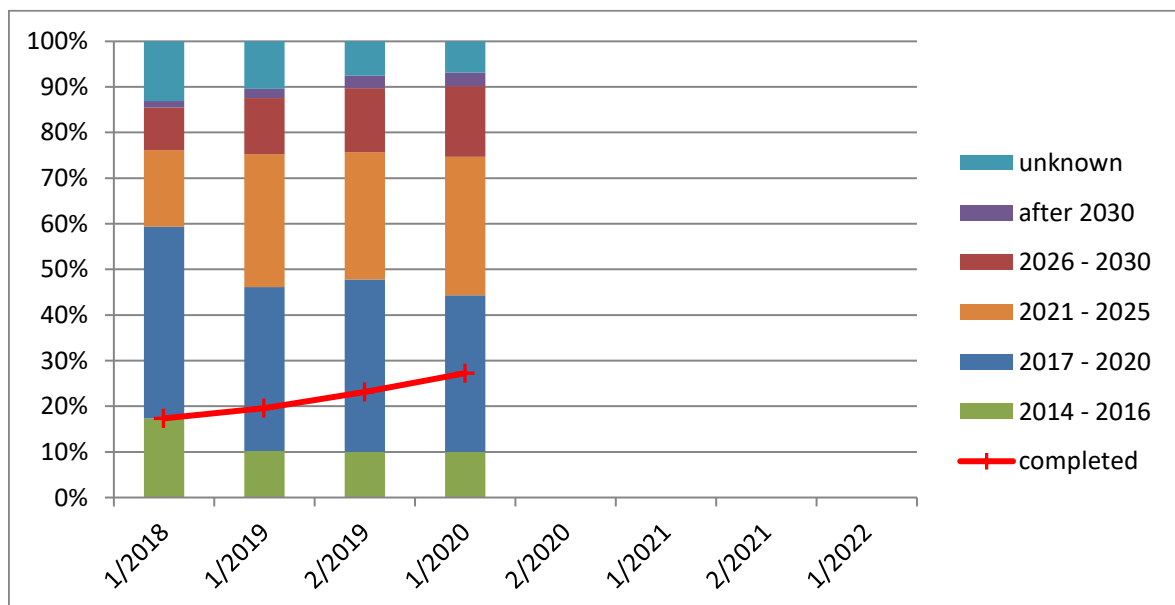
In total, it can be stated that by PIR 1/2020, 90% of the projects are expected to be completed by end of 2030, against 88% in PIR 1/2019 and 90% in PIR 2/2019. However, 19 projects have a finalisation date after 2030.

Figure 14 – Diagram of maturity criterion “expected completion time” in the Implementation Reports [N° of projects]



Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates)

Figure 15 – Diagram of maturity criterion “expected completion time” in the Implementation Reports [share of projects]



Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates)

Project maturity - Detailed project maturity parameters:

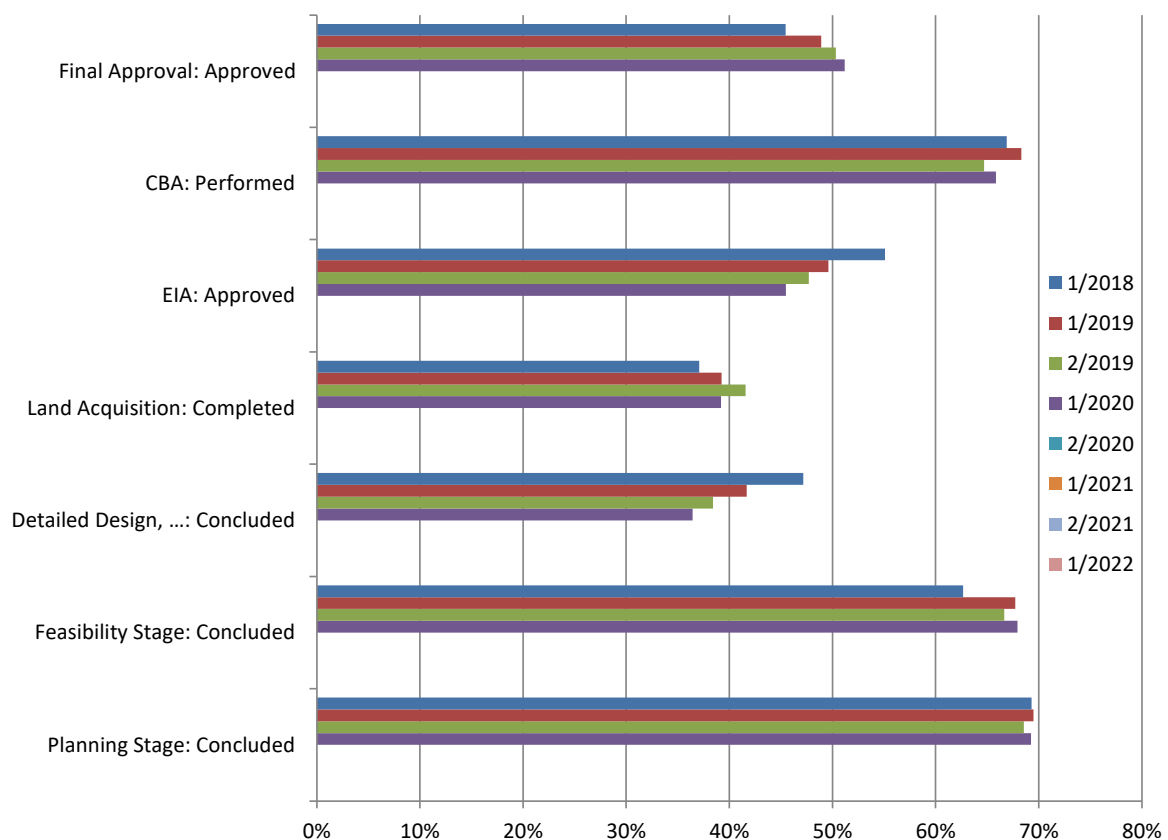
For the detailed monitoring of implementation progress, the highest implementation level of the maturity parameters is of particular relevance (“Concluded”, “Completed” etc.). Moreover, a standardised display is requested in order to allow comparing maturity levels of different parameters. This standardisation is realised by referring to the number of “relevant” projects. The “relevant” projects consider that not all maturity parameters are necessary for each project (indicated by “not necessary” or [empty]). Moreover, finalised projects are excluded from this analysis, as they cannot show any further development of maturity.

Figure 16 displays the maturity parameters and the share of relevant projects with highest maturity level. Most of the parameters show only slight variations since the first PIR. "Planning stage" "Feasibility stage" and "CBA", which often are prerequisites for the "Final approval", show particularly high maturity grades. The low maturity level of "Land acquisition" is due to the fact that this issue tends to be long-lasting and complicated in many projects. Reasons for this might be unclear land ownerships, negotiations about land purchase or even court proceedings on land expropriations, which often extend over long periods of time.

The "Final project approval by relevant governmental & administrative authorities" remains at some 50%. A cross-check with the planned start-date of the projects with a lower maturity level revealed that about 60% of these projects have indeed not started yet; pending final decisions by the authorities are therefore plausible.

Generally, there is no continuous increase of the maturity levels, as one could have expected. However, such an assessment does not take account of the fact that completed projects - with naturally very high maturity degrees - drop out of the calculation with the subsequent PIR. Projects that follow in completion time only partially equalise this effect by increasing their maturity levels. Newly added projects often even have a contradictory impact, because they are introduced into the project list with a low "entry maturity value". Therefore, a more or less constant overall picture is plausible. This overall picture can also be observed in other Corridors.

Figure 16 – Status and evolution of maturity parameters (share of relevant projects with highest maturity level by parameter)



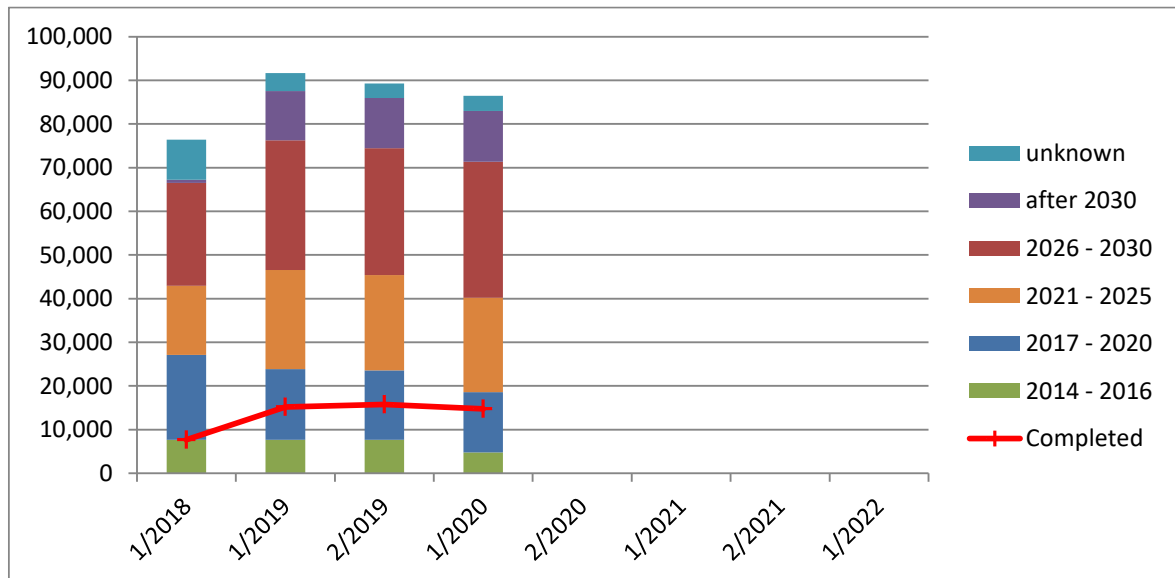
Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates), Status March 2020

Project finance – Official costs by completion:

Figure 17 and Figure 18 visualise the number of official project costs (i.e. cost figures verified by the project promoters) per completion time cluster, as absolute figures and as relative shares, cumulating to 100%.

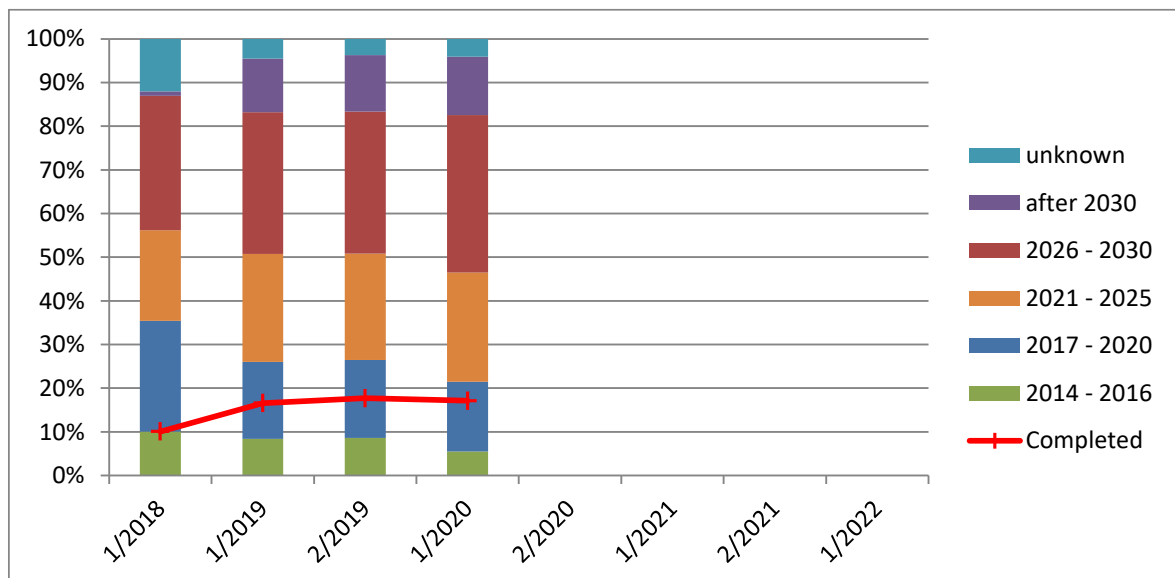
Since the complete project list update in 05/2019 (related to PIR 1/2019), the overall official projects costs have decreased from € 91.7 bn to € 86.5 bn. Considering cost estimations for projects without known official costs, the actual investment need of all projects might exceed the official values by 15-20%.

Figure 17 – Diagram of finance criterion “project costs (official)” by completion time in the Implementation Reports [€ mn]



Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates), Status March 2020

Figure 18 – Diagram of finance criterion “project costs (official)” in the Implementation Reports [share of completion time clusters]



Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates), Status March 2020

Summarising, the PIRs show the following main developments:

- Same as the number of projects, also the investments show a tendency of shifting from short-term (2017-2020) to the subsequent time clusters.
- This tendency is also confirmed by the fact that in the recent PIR 1/2020, 74% of the known official costs are expected to incur by 2021 or later, against the 70% observed in PIR 2/2019, 69% PIR 1/2019 and 53% in PIR 1/2018.

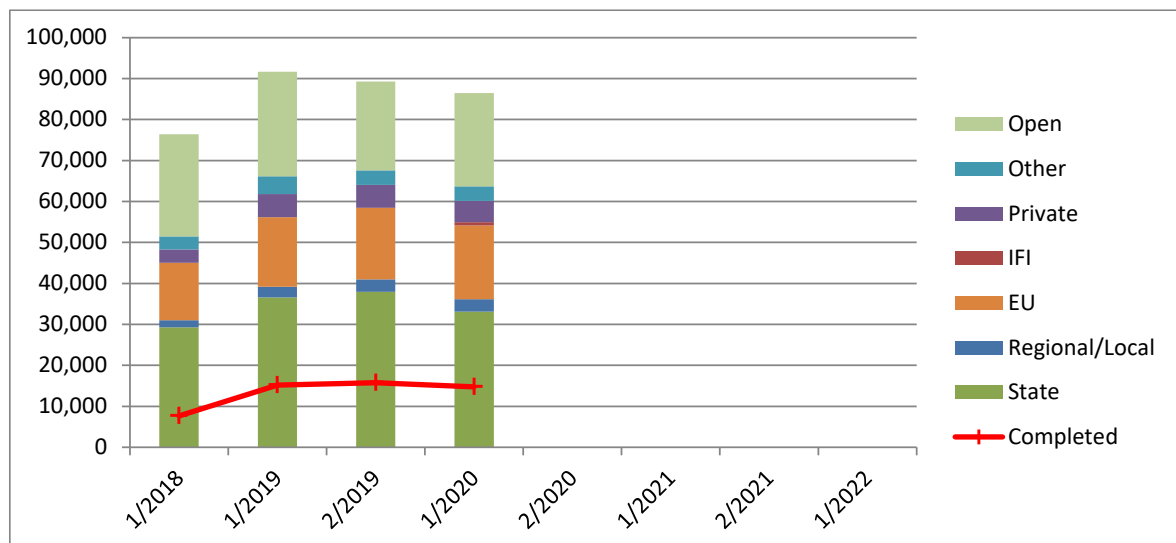
- Costs allocated to projects with a rather late finalisation date (2026-2030, after 2030) predominantly refer to Rail (68% share), Road (12% share) and Maritime (11% share) categories.
- Compared to the number of projects by completion time (Figure 14), the peak values of the cost diagram occur about ten years later. This is according to expectation, since expensive projects normally show longer project durations.
- Completed projects accounted for 17% of the overall costs in PIR 1/2020, compared to 18% in PIR 2/2019, 17% in PIR 1/2019 and to 10% in PIR 1/2018. These figures are below the share of completed project numbers (see above), confirming the general trend that investment needs are not evenly distributed over time, but more and more investments are shifted towards 2030.
- Costs of projects, for which the completion time is not known, show a clear decreasing tendency: from formerly € 9.2 bn (PIR 1/2018) to € 3.5 bn (PIR 1/2020); the share of these projects on the total costs decreased from 12% to 4% in PIR 1/2020. This indicates improvement of data completeness and quality.

Project finance – Financing sources:

Figure 19 and Figure 20 allocate the official project costs to the financing and funding sources in absolute and relative figures, regardless if this financing has been classified as “approved”, “potential” or “unknown”.

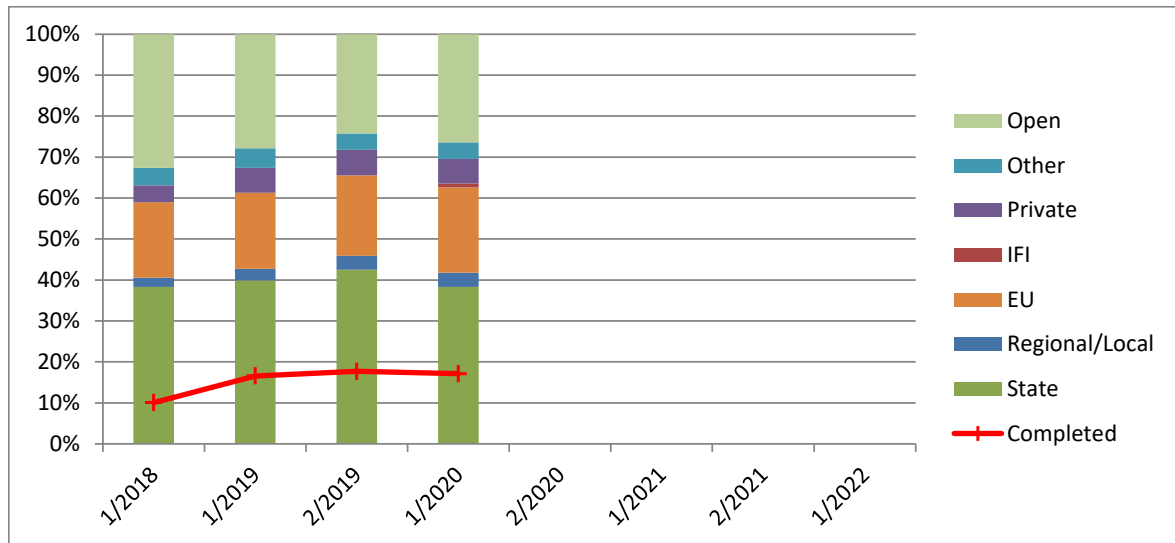
State budgets and EU funding are the main contributors to the project cost coverage in all Project Implementation Reports. Next to these main funding sources, only “Private” financing” has nameable importance and accounts for another 6% share of the overall financing. In contrast, “Regional/local”, “IFI” and “Other” financing play only a minor role. In PIR 1/2020, 26% of the official project costs were not assigned to any financing source, decreased from formerly 33% in PIR 1/2018.

Figure 19 – Evolution of project financing sources and value of completed projects (official costs only) [€ mn]



Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates), Status March 2020

Figure 20 – Shares of project financing sources [shares] and value of completed projects (official costs only)



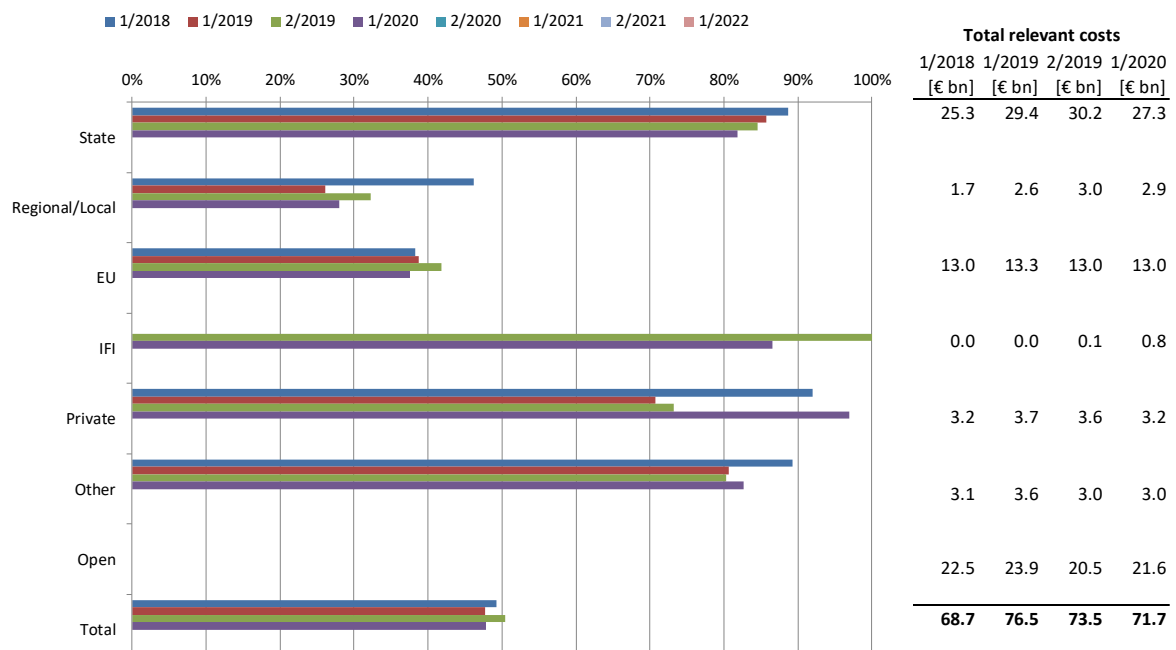
Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates), Status March 2020

Project finance – Levels of financing commitment:

The level of financing commitment is an important indicator for the evaluation of the project implementation. This is expressed by the share of “approved” against “potential” and “unknown” financing. This analysis includes official costs of on-going and planned projects only; they are basis for the calculation of “relevant costs”. In contrast, finalised projects are excluded, as these projects must have already been financed completely.

Figure 21 shows the development of the highest financing level (“approved”) since the first PIR.

Figure 21 – Evolution of share of “approved” financing by source on the CNC Orient/East-Med



Source: HaCon analysis based on CNC Orient/East-Med project list (respective updates), Status March 2020

The overall “relevant” project costs increased from € 68.7 bn (PIR 1/2018) to € 76.5 bn (PIR 1/2019). In PIR 2/2019 and 1/2020, they showed a decrease to € 73.5 bn and further to € 71.7.

The development of approved financing is heterogeneous: increasing approval rates (“Private”, “Other”) are offset by stagnating/falling approval rates (“State”, “EU”). The high approval rate of “IFI” funding should not be over-estimated, as this takes place on a very low absolute cost and funding level. In total, the approval rate of the project financing remains nearly unchanged at about 50%.

Project implementation difficulties:

Based on the methodology provided in PIR 1/2018, Corridor Forum Members were asked in the course of the project list update to state any difficulty in the implementation of a specific project by answering the following questions:

“Does this project show any difficulties, which jeopardize the completion of the Corridor by 2030?”

“If yes: Please describe the nature of the difficulties and explain why they jeopardize the completion of the Corridor. Please indicate, if and what kind of support you may need from the European Coordinator. Please describe the nature of the difficulty, why it jeopardizes the completion of the Corridor as well as why and how the European Coordinator should act.”

In PIR 1/2020, the first question was answered with “yes” for four projects, one more than in the previous PIRs. However, support by the European Coordinator was not requested in any of these cases.

In addition to these explicit statements by the stakeholders, projects deserve special attention, if their expected end date is “unknown” or “after 2030” and if they have particular relevance for the completion of the Corridor. The latter condition is expressed by at least one “KPI achieved”. In total, 16 projects were on this “critical list” in PIR 1/2020; this number shows a slightly increasing tendency against the previous PIRs.

Output/deliverables:

Annex 6: OEM Project Implementation Report 1/2018

Annex 7: OEM Project Implementation Report 1/2019

Annex 8: OEM Project Implementation Report 2/2019
based on project list (narrow update 10/2019)

Annex 9: OEM Project Implementation Report 1/2020
based on project list (narrow update 04/2020)

4.2 Overview on efforts supporting the Coordinator

4.2.1 Mission Dossiers

According to the tender specification, on specific request, additional deliverables shall be elaborated under Task 3.4 and 3.5:

- Ad-hoc implementation status reports;
- Tailor-made information dossiers, background documents, e.g. for the Coordinators meetings or missions;
- Additional documents, summaries or presentations based on the existing outputs or results of Tasks 1-4.

For various missions and meetings of the Coordinator, dossiers were prepared, providing background information and containing maps, press clips, web links and similar info, with up to 20 pages in the English language. The table below provides an overview.

Table 5 – Overview on Mission Dossiers prepared until May 2020

Delivery Date	MS	Mission to	Modes	Background on
27 Sept 2018	DE	MoT / DB Netz	all	OEM relevant items on German network
08 Feb 2019	all	-	road	Availability of safe and secure rest areas (SSTPA) on OEM
15 Mar 2019	RO	MoT	all	OEM relevant items on Romanian network, Press Clip, Project information, Delay issue
06 May 2019	DE	Hamburg	all	Project list, Urban Transport, Maritime Port Innovation, Hinterland Rail Bottlenecks
17 May 2019	DE	Elbe Canals	IWW	Ship lift Scharnebeck, Elbe-Lübeck-Kanal, Elbe-Seitenkanal
17 May 2019	DE	MoT Mr Scheuer	all	Update of Dossier 27-09-2018 New Dossier on General Policy Topics
14 Oct 2019	CZ	MoT	all	OEM relevant items on Czech network. CV of new minister
06 Mar 2020	RO, BG, EL	-	all	Country Fiches, Priority list of investments for CEF2 period
26 May 2020	all	-	Rail	Analysis of Passenger Rail Travel times 2019 / 2030

⇒ See Annex 10 Volume of Ad-hoc dossiers prepared for the Coordinators missions

4.2.2 Monthly Press Clips

Based on request, since February 2019, the Consultant is collecting and compiling Monthly Press Clips, with news on CNC relevant items in the networks and the transport policies of the riparian Member States of the CNC.

Sorted by MS, each individual extract is provided with headline, date, web link (URL) and a short summary in the English language. The review sums up to approx. 15 pages for the 9 countries.

This report is thus also providing background information for missions of the Coordinator, but also extends the activities conducted in late 2018 under task 1.4 (Assessment of related main MS policy documents) and task 2.2 (completion of project list).

⇒ See Annex 11 Volume of Monthly Press reports (Feb 2019 – April 2020)

4.3 Overview on efforts regarding the Use and update the technical parameter data in TENtec OMC

The upload of compliance data for TEN-T parameters for the years 2016/2017 was technically prepared by the TENtec unit with compliance maps and XLS tables since the 3rd Management meeting. The Consultant's service to transfer existing compliance data of these years into prefabricated XLS files was performed in August 2019. This included the following activities:

1. Identification of projects that were finalised in 2016 and 2017 and have at least 1 "KPI achieved".
2. Reference of projects identified under item 1 to TENtec sections that were completely covered by the respective project. These sections were entered into the project list.
3. Adaption of TENtec parameters in the Excel data tables according to the impact of projects identified under item 2.
4. Checking "critical" (i.e. in compliant) sections in the compliance maps provided by EC against compliance maps and associated KPI tables from the Task 1.2 report. Adjustment of TENtec parameters in the Excel data tables, if necessary.

Filling sections in TENtec data tables without existing values. Basically, the values were taken from the task 1.2 KPI tables. In case of doubt, other sources were analysed.

The Consultant has also in May 2019 reviewed the EU study on labelling Safe and Secure Truck parking areas along Motorways and Express roads of the Core Network on the feasibility for a new indicator for the CNC study. In the Management meeting, a decision on the former exercise method has been made (IRU mapping).

5 Task 4 – Providing the elements for the updates of the work plan

The key objective of Task 4 was the further update of the Coordinator’s Work Plan into its fourth consecutive edition scheduled for delivery in the end of year 2019. According to the requirements of the ToR, Task 4 should have included the following sub-tasks:

- 4.1 - Plan for removal of technical and physical bottlenecks (incl. deployment of interoperable transport systems)
- 4.2 - Identification of administrative and operational barriers
- 4.3 - Analysis of state and future potential of innovation deployment
- 4.4 - Impact of climate change on existing infrastructure and measures to enhance resilience
- 4.5 - Impact on emissions, noise and mitigation
- 4.6 - Ex-post economic impact evaluation of accomplished projects

The above tasks were similar to those elaborated in the preceding 3rd Work Plan (2018) and, therefore, the relevant information on markets, technical compliance, bottlenecks, innovation projects, economic impact and progress made on the pilot initiative were to be updated according to the work carried out during the third phase of the Corridor study-first period 2018-2020.

Nevertheless, the present timing called for the refined Work Plan to go a step further from solely outlining the “Corridor knowledge basis” towards a comprehensive assessment of the Corridor implementation and the analysis of the evolution and delivery of the financed projects. Another new element introduced was the identification of additional projects contributing to further technical compliance and switch to environmentally friendly transport modes and removal of bottlenecks.

5.1 Overview on Task 4 efforts

The new common 4th Work Plan’s draft structure was originally sent to the 9 CNC consortia by Mr P. Vankerckhoven, on behalf of all advisors, in July 2019, together with the expected harmonised presentation of the “political corridor maps” and the request this time round for a shorter, more “political” document, whereby technical details are kept to a minimum and focus is shifted to the key issues and messages that need to come across.

Subsequently, the draft structure was discussed at the 4th Management Meeting on the 10th of October 2019 in Brussels, where further clarifications were given by DG MOVE. Following further discussions among the 9 consortia and with the Corridors’ advisors, the final draft structure was approved by the EC in the end of October 2019.

Pointing out that certain items of the ToR did not fully fit into the six sections’ structure received from the Commission, the Consultant proposed to primarily follow the WP structure agreed (see Table 6).

Table 6 – Task 4 Activities and Structure of Work Plan IV

Task 4 Activities	Work Plan sections
4.1 Removal of physical and technical barriers	2.2 / 2.3
4.2 Identification of potential administrative and operational barriers along the Corridor and proposed measures to cope with them	2.3.7
4.3 Analysis of the Corridor's current state of and its future potential for innovation deployment, and its impact on the Corridor's overall performance;	4.7: Partly with a focus on the deployment of alternative fuels infrastructure.
4.4 Identification of possible impacts of climate change on the existing infrastructure and possible measures to enhance its climate resilience;	6.5: Climate change adaptation highlighted as one of the priorities in the recommendations section.
4.5 Identification of possible impact of the corridor deployment on health impairing emissions/ noise/ other negative impacts on the environment and of measures to mitigate them;	3.2: CO ₂ emissions impact from TMS
4.6 Ex-post evaluation of the economic impact which the implementation of corridor projects had on the local or regional economy in terms of growth and of employment created.	6.4

In addition, the following external inputs were sent to the Consultant:

- Inputs for TMS & decarbonisation from the external team (Section 3)
- ERTMS Corridor specific analysis & MoS analysis per sea basin from parallel studies (Section 4)
- Innovative financial tools from DG MOVE (Section 5)
- Military mobility text & CEF2 from DG MOVE (Section 6)

Task 4 was elaborated at the end of 2019, with a first draft of the Work Plan submitted to the advisor on the 13th of December 2019. The activity required contributions from all partners of the consortium. Following a round of revisions based on comments received from the Corridor Coordinator and advisor as well as INEA, a finalised draft was submitted on the 12th of February 2020. The latter was approved by DG MOVE and sent to the representatives of the Member States in the Orient East-Med Corridor Forum for comments on the 13th of February 2020. At present, a finalised version was sent in early May 2020 to relevant Ministries for approval.

5.2 The new 4th Work Plan of the European Coordinator

The Work Plan presents first the technical and financial basis for the development and realisation of the Corridor, as per the outcomes of the analyses performed by the consultants during the period 2018-2019 under Tasks 1-3, and more specifically, drawing upon the:

- Project list 2019 (status June 2019 & narrow update September 2019)
- KPIs (status December 2017)
- Corridor Fora, Working Groups and Coordinator's missions
- Literature review and collection of monthly press clips

A short summary of its main contents per individual Section is provided below.

- Section 1 provided a critical insight into the Corridor's progress, including completed projects and key success stories. In addition, it outlined the main issues hampering its development and other related difficulties encountered.
- Section 2 presented the results of the compliance analysis for each individual transport mode in terms of both current compliance levels as well as those expected by 2030. Persisting bottlenecks and missing links were also analysed herein.
- Section 3 was dedicated to the key results of the Transport Market Study for all three scenarios considered, including a reference to the modal split and decarbonisation challenge.
- Section 4 presented the OEM CNC identified projects to be realised by 2030, introducing also the compiled list of "additional" projects. It also included short analyses on ERTMS deployment, the complementarity with the MoS Coordinator Implementation Plan, and the innovation deployment of alternative fuels infrastructure.
- Section 5 dealt with the funding needs of the Corridor, analysing the economic and financial aspects of the projects included in the OEM project list. A short explanatory text on the concept of innovating financing instruments and the respective financing framework together with the presentation of related aggregate results was also included.

In the conclusion (Section 6), the consultants assisted the Coordinator into drafting his recommendations targeted at future priorities and challenges.

- ⇒ See Annex 27 4th Work Plan of the European Coordinator of the OEM CNC (13 May 2020)

6 Task 5 – Preparing, supporting and following up of the meetings of the Corridor Forum and its Working Groups

6.1 Meetings of the Corridor Forum

The meetings of the OEM Corridor Forum were regularly held on Thursdays, as half-day meetings at the premises of the European Commission in Brussels, in a similar setup to 2015-2017.

Based on the list of stakeholders and official representatives of Member States (Ministry of Transport or Infrastructure), which is regularly updated by the Contractor, invitation and agenda had been elaborated and sent out, after approval of the Advisor.

A pre-meeting information package, i.e. PowerPoint presentations illustrating the key content and findings, were also distributed to the participants in advance, as requested by the ToR.

A short flash report was elaborated for the Coordinator and Advisor within 24 hours.

The minutes of meetings were drafted by the Contractor and were sent out following the Advisor's approval to all participants. Any incoming requests for amendment were inserted after advisor's agreement and presented at the next CF meeting.

The OEM Corridor Forum met as follows within this term:

Table 7 – Meetings of the OEM Corridor Forum (overview)

Date	No.	Participants	Special issues
22 Nov 2018	12 th	40	Lecture by Prof Dimitriou on Economic appraisal of Impacts of Transport Infra projects
20 Jun 2019	13 th	40	Study Findings; Joint WG on Economic aspects; European IWT Platform
21 Nov 2019	14 th	50	Infra needs of RFC 7, Status of CED-funded projects; JASPERS activities
14 May 2020	-	25	1 st Virtual conference on state of COVID19 crisis in the Member states and EU mitigation measures (MS representatives only)

- ⇒ See Annex 12 Minutes of 12th Corridor Forum meeting
- ⇒ See Annex 13 Minutes of 13th Corridor Forum meeting
- ⇒ See Annex 14 Minutes of 14th Corridor Forum meeting
- ⇒ See Annex 15 Minutes of 1st Corridor Online meeting with MS representatives

6.2 Working Group Meetings of the Corridor Forum

Under the umbrella of the OEM Corridor Forum, a number of half-day Working group meetings were conducted in the reporting period with interested CF members and other invited stakeholders relevant for the topic in hand.

Table 8 – Meetings of the OEM Working Groups (overview)

Date	Working Group	No	Place	Participants
09 Oct 2018	Rail cross-border issues	4th	Bratislava	42
17 Jan 2019	Inhouse Seminar on Rail-cross border activities	-	Brussels (MOVE)	16
19 Jun 2019	Economical Aspects of Transport (with RD CNC)	1st	Brussels (INEA)	47
20 Nov 2019	Inhouse Meeting with JASPERS on OEM activities and implementation delays	-	Brussels (MOVE)	10
12 Dec 2019	Visit of the Rail Laboratory of Aachen RWTH university	-	Aachen	4

- ⇒ See Annex 16 Minutes of WG meeting on Rail cross-border issues (09 October 2018)
- ⇒ See Annex 17 Minutes of MOVE In-house seminar on Rail cross-border issues (17 January 2019)
- ⇒ See Annex 18 Minutes of Joint WG meeting on Economical Aspects of Transport (19 June 2019)
- ⇒ See Annex 19 Minutes of Joint meeting with JASPERS on the OEM activities (20 November 2019)
- ⇒ See Annex 20 Minutes of Coordinators Meeting in Aachen Rail Lab with Railistics

Finally, representatives of the CNC study team attended the following conferences as observers:

- Conference on TEN-T & CEF on OEM and R-D corridors, in Bucharest on the 28th of March 2019
- High Level Meeting of the Rail Freight Corridor “Orient/East-Mediterranean” (RFC OEM / 7) on the 29th of October 2019 in Budapest
- Conference on “OEM Spatial and Territorial Development Conference”, on the 17th of January 2020 in Vienna (invited by Dr. Ana Peric, ETH Zurich).

7 Task 6 – Project and quality management

7.1 Overview on PM/QM efforts

Project management and coordination activities are a continuous activity in order to fulfil the subtasks of each work package. Reference is made to the QM criteria set out in the Technical offer. Main Efforts in this field are:

- Regular communication of team leader and senior experts with the Policy Advisor at DG MOVE by phone and eMail and through management meetings;
- Permanent knowledge and information exchanges within the CNC study team by means of Video and Phone conferences, emails and joint Cloud servers;
- Regular checks of quality, timeliness and language quality of analyses and deliverables;
- Active participation in cross-Corridor working groups resp. follow-up and discussion of intermediate results achieved;
- Integration of Senior Experts for internal supervision of quality and efficiency.

Besides the present Final Report (incl. executive summary), further main results of this activity are:

- The Inception Report (provided end-July 2018, updated 22nd of October 2019).
- The regular Monthly progress report issued by the CNC study team leader for the interest of and discussion with the Policy Advisor.
- Participation and follow-up of the **Management meetings** and connected bilateral meetings between study team leader and political Advisor.
- The Intermediate Report (provided 31st May 2019)

7.2 Management Meetings

Management meetings of the 2018-2022 Core Network Corridor Studies (CNC) are scheduled by DG MOVE and are jointly prepared by the Contractors responsible for the 9 CNCs (plus ERTMS and MoS) and the DG MOVE and held as one-day meetings in Brussels at the premises of DG MOVE.

The pre-noon meetings are attended by the technical Advisors of the European Coordinators of the CNCs, MoS and ERTMS, other representatives from the units of DG MOVE, as well as the team leaders and representatives of the consortia involved in the delivery of the 9 Core Network Corridor Studies plus other relevant participants, e.g. the MoS & ERTMS study team. The Consultants are also in charge to record the minutes of the meetings. Afterwards, a bilateral afternoon meeting between team leader and Policy advisor is held, in order to clarify on-going issues regarding the CNC exclusively.

Table 9 – Management Meetings (overview)

Date	No	Special Topic	Rapporteur for MoM
15 Jun 2018	1	Kick-off, Overall methodology, Expert groups	HaCon
24 Oct 2018	2	MTMS methodology, Project list, TENtec update	Panteia
21 May 2019	3	MoS integration, MTMS	T-Plan
10 Oct 2019	4	ERTMS integration, Military mobility	iC consulenten

- ⇒ See Annex 01 Minutes of Kick off Meeting (15 June 2018; in Inc. Report)
- ⇒ See Annex 21 Minutes of Management Meeting 2 (21 October 2018)
- ⇒ See Annex 22 Minutes of Management Meeting 3 (21 May 2019)
- ⇒ See Annex 23 Minutes of Management Meeting 4 (10 October 2019)
- ⇒ See Annex 24 Volume of Monthly Reports

7.3 Communication with RFC OEM

Based on the cooperation model, the Consultant is regularly exchanging information on the Orient/East-Med Corridor evolution in the Rail sector.

RFC OEM is present in all rail relevant meetings of the OEM CNC. A major cooperation was shown in the inhouse seminar in January 2019 and the High-Level Meeting in October 2019, on the issue of the state of play in reducing border dwelling times for freight trains towards the 2-hour goal, as stated in the 2016 Rotterdam Ministerial declaration on cross-border rail freight transport.

8 Summary and next steps

The first 24 months-period of the 3rd phase of the Studies on the TEN-T CNC and the support of the Coordinators have shown a highly professional conduct regarding the analysis and reporting on behalf of the Consultants, laying at the same time solid ground for a smooth operation of the Corridor Forum and the Work of the Coordinator. All agreed tasks were successfully performed, and all outputs were delivered in a timely manner as well as in the foreseen quality.

The first year was characterised by the set-up of internal structures and by big efforts to extend the coherent methodological approach among the 9 CNCs, especially by providing harmonized deliverables to the Coordinators and their Advisors, via shared elaboration of inputs and joint utilization of results throughout the various consortia using high levels of communication and scheduling.

The set-up of expert groups on the main tasks (MTMS; Task 2+3 and other) has proven a successful approach.

The above made it possible for the second year to rely on the approach chosen and to focus on new items, such as the scoping of additional analyses (intermodal gauge, SSTPA, CDT), the bridging of parallel studies' results (ERTMS, MoS, MilMob), new approaches for Joint working groups, and the deepening of working relations with other multinational bodies, such as the RFC OEM and the EIB/JASPERS.

The European political and strategical happenings such as open decisions of the Union on the new MFF, the CEF 2 regulation, questions regarding the accession of the Western Balkan states and the COVID crisis of 2020 have brought some unexpected changes in the conduct of the Support of the Coordinators. The finally applied methodology for the MTMS (Task 1.1.) constitutes a significant change from the original offered approach, in order to integrate results with on-going EU Transport Forecasts thus exceeding the forecasted efforts (and budget), especially in the first 12 months. The update of MTMS can therefore not be repeated in the upcoming study phase. Also, for a number of new topics such as the requested analysis of additional KPIs (Rail Freight CDT, Intermodal/Structural Gauge, etc.) and the extension of the CNC alignment, these will need to be thoroughly scrutinized, whether feasible.

The next steps to be conducted under this study will be the repetition of the 2018 – 2020 exercise, before the background of CNC implementation difficulties in many of the relevant Member States. As already stated, and according to prior agreement, the sophisticated MTMS exercise will not be repeated.

It may happen that through the COVID19 restriction, different formats for meetings will be implemented. The Consultants will thoroughly support the organisation of any such new format.

Without doubt, the majority of tasks will require a continued close cooperation and harmonization of methods and results with the other CNC consortia and moreover with MoS and ERTMS consultant teams.

Finally, it is expected that Consultants might contribute to consultations, on-going and planned, for the revision of the TEN-T guidelines (Reg. 1315/2013) and CEF guidelines (Reg. 1316/2013) without further gratification.

9 Appendix

- Annex 1 Inception Report (October 2019) incl. Minutes of Kick-off Meeting
- Annex 2 Corridor Study Update 1
- Annex 3 Guidance document (Project list-short introduction.pdf)
- Annex 4 Final status of the OEM project list (EC) 2019
(incl. User-friendly tool and List of additional projects)
- Annex 5 Project fiches OEM (May 2019)
- Annex 6 Project Implementation Report 01/2018 (Sept 2018)
- Annex 7 Project Implementation Report 01/2019 (May 2019)
- Annex 8 Project Implementation Report 02/2019 (Oct 2019)
- Annex 9 Project Implementation Report 01/2019 (April 2020)
- Annex 10 Volume of Ad-hoc Dossiers prepared for the Coordinators missions
- Annex 11 Volume of Monthly Press reports (Feb 2019 – April 2020)
- Annex 12 Minutes of 12th Corridor Forum meeting
- Annex 13 Minutes of 13th Corridor Forum meeting incl. Presentations
- Annex 14 Minutes of 14th Corridor Forum meeting incl. Presentations
- Annex 15 Minutes of 1st Corridor Online meeting with MS (14 May 2020)
- Annex 16 Minutes of WG meeting on Rail cross-border issues (09 Oct 2018)
- Annex 17 Minutes of MOVE seminar Rail cross-border issues (17 Jan 2019)
- Annex 18 Minutes of Joint WG meeting on Economic Aspects of Transport
(19 June 2019)
- Annex 19 Minutes of Joint meeting with JASPERS on the OEM activities
(20 November 2019)
- Annex 20 Minutes of Coordinators Meeting in Aachen Rail Lab with Railistics
- Annex 21 Minutes of Management Meeting 2 (21 October 2018)
- Annex 22 Minutes of Management Meeting 3 (21 May 2019)
- Annex 23 Minutes of Management Meeting 4 (10 October 2019)
- Annex 24 Volume of Monthly Reports (June 2018 – April 2020)
- Annex 25 Intermediate Report (May 2019) without Annexes
- Annex 26 Economic modelling exercise in support of the multi-modal
transport market studies for nine core network corridors. WP2 –
Modelling approach and results for six selected CNCs,
(21 December 2019).
- Annex 27 4th Work Plan of the European Coordinator of the OEM CNC
(13 May 2020)
- Annex 28 Presentation on the Rail Freight CDT analysis (May 2020)
- Annex 29 Methodology of MTMS study (07 Oct 2018)