



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

2nd Phase

*Final Report on the related
Core Network in the Western Balkan countries*

4th of December 2017



Table of content

Table of content	2
Figures.....	4
Tables.....	4
Abbreviations.....	6
Disclaimer	7
1 Introduction	8
1.1 Background of this analysis	8
1.2 Outline of this report	8
1.3 Consortium information.....	9
1.4 Executive Summary on Main Findings	10
2 Stakeholders identification	14
2.1 SEETO	14
2.2 The Western Balkan states	16
2.3 The neighbouring EU member states	21
3 Existing studies review	23
3.1 SEETO Multi-Annual Plan 2016.....	23
3.2 The SEETIS Database	23
3.3 SEETO Flagship Report.....	24
3.4 Update of the Regional Balkans Infrastructure Study (REBIS)	24
3.5 WBIF Gap Analysis	25
3.6 Western Balkans Intermodal Study.....	26
3.7 National Infrastructure Project Pipelines	28
4 Characteristics of the Network	32
4.1 Alignment of the analysed corridor	32
4.1.1 Alignment	32
4.1.2 Statistical Information on the Corridor	35
4.1.3 Core Network Nodes of the OEM related WB Core Network	35
4.1.4 Corridor sections belonging to several corridor studies/consortia	37
4.2 Description of the Technical Parameters of the Corridor Infrastructure	38
4.2.1 Rail infrastructure of the OEM related WB Core Network.....	38
4.2.2 Rail Road Terminals.....	48
4.2.3 Maritime Transport: Seaports	53
4.2.4 Corridor road infrastructure	55
4.2.5 Corridor airport infrastructure	62
5 State of Play of WB6 Networks	66
5.1 Introduction	66
5.2 List of Infrastructure Works and Preparations	68
5.2.1 Implementation of Rail Infrastructure including RRT	68
5.2.2 Implementation of Road Infrastructure	69
5.2.3 Implementation of Maritime and Airport Infrastructure.....	72
5.3 Environmental impacts, Decarbonisation and Climate Change Adaptation	72
5.3.1 Mitigation of environmental impacts	72
5.3.2 Climate Change Resilience.....	73
6 Potential Administrative and Operational Barriers and Measures	75
6.1 Introduction	75
6.2 Rail	78
6.3 Roads	83
6.4 Deployment of ITS solutions	85
7 Urban Nodes Analysis	87
7.1 Scope	87
7.2 The Analysed Urban Nodes	87
7.3 Methodology of the Analysis	87

7.4	Beograd	89
7.5	Skopje	90
7.6	Podgorica	91
7.7	Prishtine/Priština	92
7.8	Summary and Main Conclusions	93
8	Key Performance Indicators	94
8.1	Scope and Methodology	94
8.2	Rail	96
8.2.1	Realistic scenario	96
8.2.2	Optimistic scenario	102
8.2.3	Summary of both scenarios	107
8.3	Ports.....	107
8.4	Roads	107
8.4.1	Realistic scenario	108
8.4.2	Optimistic scenario	110
8.4.3	Summary of both scenarios	111
8.5	Airports.....	112
Annex 1	Relevant Project Fiches	113
Annex 2	Identified projects per transport mode.....	125
Annex 3	Urban Nodes Analysis	133

Figures

Figure 1:	Schematic overview map of the Orient / East-Med Corridor indicative extension in the WB Region (brown colour).....	32
Figure 2:	Alignment of the Orient / East-Med Corridor related WB core network (Road network).....	33
Figure 3:	Alignment of the Orient / East-Med Corridor related WB core network (Rail network).....	34
Figure 4:	Overview on core network urban and traffic/logistic nodes on the OEM Corridor related WB Core Network	36
Figure 5:	Overlapping of the analysis networks in the Western Balkan countries with other corridor studies	37
Figure 6:	Rail alignment of the Western Balkan	38
Figure 7:	Maximum operating speed on the OEM WB rail network (2014)	40
Figure 8:	Maximum train length on the OEM WB rail network (2014)	41
Figure 9:	Maximum axle load on the OEM WB rail network.....	42
Figure 10:	Electrification on the OEM WB rail network.....	43
Figure 11:	Core Rail Road terminals in the Western Balkan.....	49
Figure 12:	The layout of the Bar port along with its terminals	53
Figure 13:	Alignment of the Orient / East-Med Corridor related WB core road network	56
Figure 14:	Compliance to motorway or express road in good condition criterion	59
Figure 15:	Beograd transport infrastructure	89
Figure 16:	Skopje transport infrastructure.....	90
Figure 17:	Podgorica transport infrastructure.....	91
Figure 18:	Pristine/Priština transport infrastructure.....	92
Figure 19:	Maximum operating speed on the OEM related railway core network in WB6 - Realistic scenario (2030)	98
Figure 20:	Train length on the OEM related railway core network in WB6 - Realistic scenario (2030).....	99
Figure 21:	Maximum axle load on the OEM related WB6 corridor - Realistic scenario (2030).....	100
Figure 22:	Electrification on the OEM related railway core network in WB6 - Realistic scenario (2030).....	101
Figure 23:	Maximum operational speed on the OEM related railway core network in WB6 - Optimistic scenario (2030)	103
Figure 24:	Train length on the OEM related railway core network in WB6 - Optimistic scenario (2030).....	104
Figure 25:	Maximum axle load on the OEM related railway core network in WB6 - Optimistic scenario (2030)	105
Figure 26:	Electrification on the OEM related railway core network in WB6 - Optimistic scenario (2030).....	106
Figure 27:	OEM related core road network in WB6, compliance in Realistic scenario (2030).....	109
Figure 28:	OEM related core road network in WB6, compliance in Optimistic scenario (2030).....	111

Tables

Table 1:	SEETO Steering Committee Members.....	15
Table 2:	SEETO Secretariat	16
Table 3:	National Institutions / Ministries	17
Table 4:	Road Transport Stakeholders	18
Table 5:	Rail Transport Stakeholders	19
Table 6:	Air, Maritime and IWW Transport Stakeholders	20

Table 7:	Transport Stakeholders in Hungary and Greece.....	21
Table 8:	List of National Master Plans and related national documents of OEM WB6 countries	28
Table 9:	Total length of OEM Corridor related WB Core Network by countries and modes.....	35
Table 10:	Urban and traffic/logistic nodes of the OEM related WB core network	35
Table 11:	Status of Rail infrastructure compliance on Western Balkan part of Orient/East-Med corridor (2014).....	44
Table 12:	Status of Rail infrastructure compliance (2014)	44
Table 13:	OEM related WB Core Rail sections with capacity constraints (2012)	47
Table 14:	Rail-road terminals in the Western Balkan.....	48
Table 15:	Accessibility of Core Rail-Road Terminals	50
Table 16:	Port of Bar - Passenger and Freight Flows (2014)	55
Table 17:	Compliance of seaport (2014)	55
Table 18:	OEM related WB road sections not compliant with Motorway or express road in good condition criterion	58
Table 19:	Status overview of road network (2014)	59
Table 20:	Capacity bottlenecks in 2014.....	61
Table 21:	Status overview of road network (2014)	62
Table 22:	Airport Characteristics	63
Table 23:	Road connection status of Airports on the OEM related WB Core Network (2014).....	64
Table 24:	OEM related WB Airports: Passenger and Freight Flows (2014)	64
Table 25:	Compliance of Airports of the OEM WB6 corridor (2014)	65
Table 26:	Rail projects addressing technical compliance/bottlenecks.....	68
Table 27:	Road projects addressing technical compliance/bottlenecks, interoperability or capacity issues	70
Table 28:	Seaport and Airport projects addressing technical compliance/bottlenecks and interoperability issues	72
Table 29:	Overview of Climate impacts and threats to transport modes (based on bibliography).....	73
Table 30:	Soft Measures (Vienna Summit 2015)	77
Table 31:	Rail reform measures progress	80
Table 32:	Implementation of EU Freight Corridors progress	81
Table 33:	Improvement of Road Safety.....	84
Table 34:	ITS Solutions for the Road Network.....	85
Table 35:	ITS Solutions for the Rail Network	85
Table 36:	ITS Solutions for the Maritime Network	86
Table 37:	ITS Solutions for the IWW Network	86
Table 38:	Overview of OEM related WB6 Urban Nodes	87
Table 39:	OEM related Road and Rail arteries in WB6 urban nodes	93
Table 40:	Supply related Rail KPIs for OEM corridor (2014)	94
Table 41:	Supply related road KPIs for OEM corridor (2014)	95
Table 42:	Supply related airport KPIs for OEM corridor (2014).....	95
Table 43:	Supply related seaport KPIs for OEM corridor (2014).....	95
Table 44:	Status of Rail infrastructure compliance on Orient/East-Med corridor related Core network in WB6	97
Table 45:	Status of Rail infrastructure compliance on OEM related railway core network in Western Balkan.....	102
Table 46:	Status of Rail infrastructure compliance per scenario.....	107
Table 47:	Compliant OEM related core road network in WB6, Realistic scenario (2030)	108
Table 48:	Compliant OEM related core road network in WB6, Optimistic scenario (2030)	110
Table 49:	Status of the OEM related core road infrastructure on per scenario	111

Table 50: Compliance of Airports of the OEM WB6 corridor (2014)	112
Table 51: Status of the OEM related core road infrastructure on per scenario	112
Table 52: Identified Rail Projects on the OEM related WB Core Network	126
Table 53: Identified Road Projects on the OEM related WB Core Network	130
Table 54: Pre-identified RRT, Seaports and Airports Projects on the OEM WB6 corridor	132

Abbreviations

CCP	Common Crossing Points
CEB	Council of Europe Development Bank
CNC	Core Network Corridor
CNG	Compressed Natural Gas
DG MOVE	European Commission – Directorate General for Mobility and Transport
EC	European Commission
EIA	Environmental Impact Assessment
ERTMS	European Rail Traffic Management System
ESIA	Environmental and Social Impact Assessment
EU	European Union
FS	Feasibility Study
IBM	Integrated Border Management
IPA	Instrument for Pre-accession Assistance
IWW	Inland waterway
km	kilometre
KPI	Key Performance Indicator
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
m	metre
MAP	Multi-Annual Plan
mIn	million
MoS	Motorway(s) of the Sea
MS	Member States of the European Union
n.a.	Not applicable
OEM	Orient / East-Med (Corridor)
p.a.	per year / annual
PFS	Pre-Feasibility Study
PD	Project Documentation
REBIS	Regional Balkan Infrastructure Study
RFC	Rail Freight Corridor
SEETO	South-East European Transport Observatory
SEETIS	South-East Europe Information system
TEN-T	Trans-European Transport Network
TEU	Twenty-foot Equivalent Unit
TMS	Traffic Management System
UIC	International Union of Railways
VTMIS	Vessel Traffic Management Information System
WB	West Balkan
WBIF	West Balkan Investment Framework
WB6	The 6 West Balkan states (AL, BA, XK, MK, ME, RS)

Country Codes after NUTS (EU):

AL	Albania
AT	Austria
BA	Bosnia and Hercegovina
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
EL	Greece
HU	Hungary
XK ¹	Kosovo*
MK ²	the former Yugoslav Republic of Macedonia
ME	Montenegro
RS	Republic of Serbia
RO	Romania

Disclaimer

The information and views set out in the present Report are those of the author(s) and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for any potential use which may be made of the information contained herein.

¹ XK is a code used for practical reasons and not an official ISO country code

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

² MK is a provisional code which does not prejudice in any way the definitive nomenclature for this country, which will be agreed following the conclusion of negotiations currently taking place on this subject at the United Nations.

1 Introduction

1.1 Background of this analysis

The present report constitutes a separate deliverable produced in parallel to the 2nd study phase of the Orient/East-Med (OEM) Core Network Corridor Study, in accordance with the extension of the service agreement from 31st December 2015 regarding the analysis of the major alignment of the Western Balkan Core Network related to the Orient/East-Med corridor.

It is based on the Contractor's work in the period July 2016 – December 2017. More specifically, it integrates the first two Deliverables presented to the DG MOVE Unit B1 in June 2016 and December 2016, respectively, the major results of the analysis of recent compliance of transport infrastructure with the requirements set out in the Regulation 1315/2013 and a list of surveyed infrastructure projects.

The aim of all three reports is to serve as a description of the status quo of infrastructure development, as per the most recent available data, and comparable to the parallel CNC corridor study.

The work on this report consisted of the compilation of existing information in the form of an analysis and assessment of SEETO databases, available reports and inventories, network statements and public sources.

Main tools for the subject report were the SEETIS mapping and listing tool of SEETO, the national infrastructure registries and network statements on the recent state of the network, as well as the inventory and the list of network-relevant investment projects (works and designs/studies), which was derived from the WBIF gap analysis.

1.2 Outline of this report

The report is structured as follows:

- Chapter 1 lays out the main information on the Study and summarizes the progress achieved so far.
- Chapter 2 includes all the information collected with regards to the involved Stakeholders.
- Chapter 3 presents an overview of the existing relevant studies.
- Chapter 4 includes the main analysis of the OEM Corridor related WB Core Network for all transport modes and also presents the TEN-T standards (KPIs) compliance exercise results.
- Chapter 5 includes a list of the identified projects that are already planned or on-going, as well as some main technical information on these projects. Moreover it comprises a short discussion of environmental impacts and climate hazards.
- Chapter 6 presents a preliminary analysis of the administrative and operational barriers of the examined networks. Furthermore, information on the horizontal measures for the elimination of administrative bottlenecks is also presented.
- Chapter 7 includes a preliminary analysis of the urban nodes (Beograd, Skopje, Prishtine/Priština and Podgorica)
- Chapter 8 presents the TEN-T standards (KPIs) analysis of the OEM Corridor related WB Core Network for all transport modes and also includes forecasts for the compliance rates of the examined networks.

In the Annexes, the following information is included:

- Annex 1 presents the projects fiches prepared for each of the analysed relevant studies.
- Annex 2 presents detailed information on the identified planned or on-going projects on the OEM Corridor related WB Core Network.

- Annex 3 presents the three layer analysis of the examined urban nodes in the Western Balkans region.

1.3 Consortium information

This part of the study on the Orient / East-Med Core Network Corridor is conducted in parallel to the main study by the same group of international consultants, led by iC consulenten. The experts involved in this report are listed below:

iC consulenten Ziviltechniker GesmbH	AT	Albrecht MALCHEREK (Head of Study Team)
Panteia B.V.	HU	András TIMAR
Railistics GmbH	DE	Raluca Maria ATANASSOV Matic PROSEN
ITC Institute of Transport and Communication OOD	BG	Kristiana CHAKAROVA
SYSTEMA Transport Planning and Engineering Consultants Ltd.	EL	Natalia TSELENTI (Head of Reporting team)

This Study is elaborated for and in close cooperation with the European Coordinator for the TEN-T Orient/East Med Core Network Corridor:

- Mr. Mathieu GROSCH

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

- Mr. Patrick VANKERCKHOVEN, Advisor of the Coordinator
- Mr. Herald RUIJTERS, Head of Unit B.

1.4 Executive Summary on Main Findings

The connection of the Orient/East-Med Corridor with selected Western Balkan regions will ensure a better connection between Serbia, Montenegro, Kosovo and the former Yugoslav Republic of Macedonia and with the EU countries (Hungary, Greece).

In more detail, the WB 6 core transport network to be connected with the Orient/East-Med Corridor will comprise the following main axes:

- Szeged (Hungary) – Beograd (Serbia) – Niš (Serbia) – Skopje (the former Yugoslav Republic of Macedonia) – Thessaloniki (Greece)
- Beograd (Serbia) – Podgorica (Montenegro) – Bar (Montenegro)
- Beograd (Serbia) – Prishtine/Priština (Kosovo) – Skopje (the former Yugoslav Republic of Macedonia)

Using the Pan-European Corridor codification, this alignment comprises of sections of the multimodal corridors X and Xb, the routes R4, R6, R7 (road) and 4 and 10 (rail). The above-mentioned sections form part of the WB6 core network, which also includes the port of Bar in Montenegro, as well as the urban nodes (incl. airports) of Beograd, Podgorica, Prishtine/Priština and Skopje. In total, this comprises approx. 1600 km of roads and rail each.

The compliance with the TEN-T technical standards (preliminary figures without HU, EL) is rated with:

- 83% of alignment length for electrified railways,
- 79% of alignment length for rail axle load 22.5 t
- 44% of alignment length for rail operating speed 100 km/h

as well as

- 63% of road alignment length classified as either motorway or express road, while
- 25% of road alignment length with motorway standard in (very) good condition.

The biggest bottlenecks are mainly referring to the non-compliant road sections in unsatisfactory pavement condition and/or existence of rail level crossings, e.g.

- Beograd – Bar (Serbia, Montenegro; 421 km)
- Road section Grdelica – Preševo (Serbia, 95 km)
- Road section Doljevac – Prokuplje - Kuršumlija – Merdare (Serbia, 84 km)
- Road section Lipjan/Lipljan – Stenkovec (Kosovo, FYROM)

and on rail sections non-compliant in terms of electrification, axle load and line speed, e.g.

- Stalać – Kraljevo – RS/XK border near Donje Jarinje (150 km, not electrified)
- Donje Jarinje – Leshak – Hani i Elezit / Dj. Jankovic (Kosovo, 170 km, not electrified)
- Beograd Resnik – Velika Plana (Serbia, 76 km, non-compliant in load and speed)

The EU connectivity agenda has listed 9 projects “of common interest” for this this main alignment, comprising 4 road related projects (incl. studies and works) in Serbia, Montenegro and Kosovo and 5 rail-related projects in the four WB6 countries. Further 30 projects (17 of rail, 13 of road) are analysed, whereas their strong focus lies on rehabilitation and modernization of existing infrastructure.

Taking into account these projects and based on the TEN-T technical standards, two different scenarios were developed in order to forecast the evolution of the Key Performance Indicators (KPIs) (target year 2030), which will allow the evaluation of the compliance levels against the infrastructure quality targets set out in the Regulation 1315/2013.

The two scenarios are:

1. The "Realistic Scenario", in which projects that have already secured financing have been included. Also, a project to project analysis was also undertaken, taking into account the results of the Connectivity Networks Gap Analysis (May 2016) in terms of the projects' maturity. For the Realistic Scenario, the KPIs are forecasted, assuming that all the projects with secured financing and/or high maturity levels will be completed by 2030.
2. The "Optimistic Scenario", in which all identified planned projects are taken into account. More specifically, for the Optimistic Scenario, the KPIs are forecasted, assuming that all identified planned projects will be completed by 2030.

The results of the analysis are summarised as follows:

KPI	Definition	2014	2030 Realistic	2030 Optimistic
Rail Network				
Electrification	Electrified rail network km as a proportion (%) of relevant rail network km.	83%	90,9%	98,9%
Track gauge 1435mm	Standard (1435mm) track gauge as a proportion (%) of relevant rail network km.	100%	100%	100%
ERTMS implementation	Length of Permanent Operation (excluding operational test lines) of both ERTMS and GSM-R on rail network, as a proportion (%) of relevant rail network km.	0%	unknown	unknown
Line speed ≥ 100 km/h in accordance with art. 39 para. 2. Item a) (ii) of the Regulation 1315/2013	Length of Freight and combined line allowing for a maximum operating speed greater than or equal to 100 km/h, as a proportion (%) of relevant rail network km without load restriction.	44%	76,1%	95,4%
Axle load (≥ 22.5 t)	Length of Freight and combined line with a permitted axle load greater than or equal to 22.5 tonnes, as a proportion (%) of relevant rail network km.	79%	87,5%	99,6%
Train length (740m)	Length of Freight and combined line with a permitted train length greater than or equal to 740m, as a proportion of relevant rail network km.	13%	42,1%	95,4%
Road Network				
Express road/ motorway	Road network km classified as motorway or express road, as a proportion (%) of CNC road section km.	63%	85.5%	100%
Availability of clean fuels (stations)	Number of fuel stations offering plug-in electricity, hydrogen, liquid biofuels, LNG/CNG, bio-methane or LPG along CNC road sections or within 10km from its junctions.	unknown	unknown	unknown

Ports				
Connection to rail	Number of seaports in CNC with a rail connection as a proportion (%) of the number of relevant core seaports in the CNC.	100%	100%	100%
Connection to IWW CEMT IV	Number of seaports in CNC with a (hinterland) inland waterway connection of at least CEMT IV class, as a proportion (%) of the number of relevant core seaports in the CNC.	n.a.	n.a.	n.a.
Availability of clean fuels	Number of seaports offering (at least one of) LPG, LNG, liquid biofuels, or synthetic fuels as a proportion (%) of the total number of seaports in the CNC.	0%	unknown	unknown
Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	Number of seaports with at least one open access terminal, as a proportion (%) of the total number of core seaports in the CNC.	100%	100%	100%
Facilities for ship generated waste	Number of seaports offering facilities for accepting PRF mandatory (MARPOL Annexes I, IV, and V) categories of ship-generated waste, as a proportion (%) of the total number of core seaports in the CNC.	0%	unknown	unknown
Airports				
Connection to rail	Number of core airports in CNC with a rail connection as a proportion (%) of the number of relevant core airports in the CNC.	0%	0%	25%
Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges.	Number of airports with at least one open access terminal, as a proportion (%) of the total number of core airports in the CNC.	100%	100%	100%
Availability of clean fuels	Number of airports offering liquid biofuels or synthetic fuels for aeroplanes, as a proportion (%) of the total number of core airports in the CNC.	0%	unknown	unknown

Moreover, based on the urban nodes analysis, it is evident that for the majority of the cities with the exception of Skopje, the OEM related road corridor transits the urban nodes. However, for the Beograd urban node, the construction of the Beograd bypass is planned and parts of the bypass are already constructed. Furthermore, the Podgorica bypass is also planned. It is therefore, assumed, that once these are completed, an uninterrupted flow would be achieved along the OEM related road Corridor by-passing the urban centres, with the exception of Prishtine/Priština, for which no planned project is identified.

Regarding the core/nodes and last-mile connections, the following persisting bottlenecks (not covered by projects) are identified:

- missing rail connection of Beograd airport
- missing rail connection of Podgorica airport

- missing rail connection of Skopje airport

Finally, the administrative barriers at border-crossing points between the WB6 countries and towards the EU member states shall be facilitated under one priority of the soft measures, identified in the SEETO Strategic Work Programme 2012-2014, requiring continuous efforts and external support. Other priorities are the Railway Reform and Road Safety Auditing.

In March 2015 an "ACTION PLAN TO ESTABLISH SOUTH EAST EUROPEAN TRANSPORT FLAGSHIP CORRIDORS" was published. The basic objectives of this plan were to identify:

- Actions to establish an organisational structure the aim of which is to implement specific activities, the "Horizontal Actions" and
- Corridor related Actions the aim of which is to improve the attractiveness and competitiveness of the SEETO FLAGSHIP CORRIDORS, the "Corridor related Action".

The Action plan consists of 33 actions, for which 21 are relevant to the OEM Corridor related main alignment, e.g. joint border infrastructure (single window) installations at the road border control between Serbia and Montenegro; Cooperation with EC DG Customs to seek for simplification the goods transit procedures from Central Europe to Greece, based on model agreements Switzerland/EU.

2 Stakeholders identification

For the analysis of the OEM Corridor related Networks of the Western Balkans region, the Consultant identified all involved stakeholders primarily based on:

- Geographical scope and Corridor alignment within the WB6;
- Consultant's knowledge, networks and working experience in all countries along the OEM Corridor related WB6 Networks, as well as the neighbouring EU Member States (Greek and Hungary);
- Additional desktop research;
- Analysis of relevant studies and considering the current initiatives, such as:
 - SEETO Multi Annual Plans and other Strategic Documents and reports;
 - The Regional Balkans Infrastructure Study (REBIS) Update;
 - The Western Balkans Intermodal Study – Support to the Transport Dimension of the SEE 2020 Strategy.

The above exercise resulted in a data base of relevant stakeholder entities per country classified into the following main groups:

- Transport mode (rail, road, maritime, air, intermodal)
- All modes or no mode specific:
 - National administration
 - Regional administration and bodies

For each of the identified stakeholder entities, the Consultant collected a standardized set of data that includes:

- Institution/entity name;
- Postal address;
- Website;
- Representative/s, for which the following information was collected:
 - Name and position/ department within the entity
 - E-mail address
 - Telephone and fax numbers.

The identified stakeholders are presented in the following sub-chapters. It is noted that during the present Study Phase, the Study Team only collaborated with SEETO Steering Committee Members and SEETO Secretariat.

2.1 SEETO

The South East Europe Transport Observatory (SEETO) is the regional transport organization, which aims to promote cooperation for the development of the main and ancillary infrastructure on the multimodal SEETO Comprehensive and Core Network and to promote and enhance local capacity for the implementation of investment programs, management and data collection and analysis on the Network. It was established in 2004 by the Memorandum of Understanding (MoU) on the Development of the South East Core Regional Transport.

Information on the SEETO Steering Committee Members for each Regional Participant (WB6 Countries) is presented in the following Tables.

Table 1: SEETO Steering Committee Members

Country	Name	Position	Organization	Telephone/Fax	Email
AL	Thimjo Plaku	General Director of Policies	Ministry of Transport and Infrastructure "ZOGUI"	+ 355 4 23 80 715	Thimjo.Plaku@transporti.gov.al
	Argita Totozani	General Director of Integration	Scanderbeg 5 Tirana	+355 42 380 717	Argita.totozani@transporti.gov.al
BA	Zoran Andrić	Assistant Minister	Ministry of Communications and Transport	+387 33 707 610 + 387 33 707 694	zoran.andric@mkt.gov.ba
	Adis Sehic	Deputy Steering Committee member	Trg Bosne i Hercegovine 1 71000 Sarajevo		Adis.Sehic@mkt.gov.ba
MK	Jasminka Kirkova	State Counsellor	Ministry of Transport and Communications	+ 389 2 3145423 + 389 2 3145491	kirkova@mtc.gov.mk
	Darko Spiroski	Head of EU Department	Dame Gruev 6 1000 Skopje	+ 389 2 3145493 + 389 2 3145532 + 389 2 3117012	darko.spiroski@mtc.gov.mk
ME	Angelina Živković	Assistant Minister	Ministry of Transport and Maritime Affairs	+ 382 20 234 062 + 382 20 234 331	angelina.zivkovic@msp.gov.me
	Adis Pepic	Secretary of the Ministry of Transport and Maritime Affairs	Rimski trg 46 (zgrada Vektre) 81000 Podgorica	+382 69 019 010 +382 20 482 125	adis.pepic@msp.gov.me
RS	Tatjana Jovanović	Assistant Minister SC Chairperson	Ministry of Construction, Transport and Infrastructure	+381 11 3616 358	tatjana.jovanovic@mgsi.gov.rs
	Saša Stojanović	Assistant Minister	22-26 Nemanjina Street 11000 Beograd	+381 11 269 14 32	sasa.stojanovic@mgsi.gov.rs ana.sovljanski@mgsi.gov.rs
XK	Kris Pierre Litiere	A/Head Economic Affairs Co-ordination Office	UNMIK	+377 44 500 003 / 164 240	litiere@un.org
	Gjyneit MUSTAFA	Multimodal transport demand expert	Ministry of Infrastructure Zyra C204 Kati II Ndertesa Ish Germija Prishtine/Priština		gjyneit.mustafa@rks-gov.net
EC	N.N.	Multimodal	DG MOVE		
	Alain Baron	DG MOVE, Head of Sector - International Transport Affairs		+32 2 29 91527 +32 2 29 54349	alain.baron@ec.europa.eu

SEETO is supported by the Secretariat based in Beograd (SIV III Omladinskih Brigada 1, 5th Floor office 555, P.Fah (P.O. Box) 14, 11198 Beograd, Serbia). Its task is to support with the development of the South East Core Regional Transport and the implementation of MoU. Information of the SEETO Secretariat members is presented in the following Table.

Table 2: SEETO Secretariat

Name	Position	Telephone/Fax	Email
Dejan Lasica	General Manager	+381 (0) 11-3131799 / +381/11-3131800	dlasica@seetoint.org
Nerejda Hoxha	Transport Planning Manager	+381 (0) 11-3131799 / +381/11-3131800	nhoxha@seetoint.org
Nedim Begović	Transport Planning Manager	+381 (0) 11-3131799 / +381/11-3131800	nbegovic@seetoint.org
Liljana Čela	Information Resources Manager	+381 (0) 11-3131799 / +381/11-3131800	lcela@seetoint.org
Mate Gjorgjievski	Transport Law and Policy Expert	+381 (0) 11-3131799 / +381/11-3131800	mgjorgjievski@seetoint.org
Jordana Fićović	Financial and Human Resources Expert	+381 (0) 11-3131799 / +381/11-3131800	jficovic@seetoint.org
Sanja Dodig	Transport Economist Officer	+381 (0) 11-3131799 / +381/11-3131800	sdodig@seetoint.org
Milica Kovačević	Administrative Assistant	+381 (0) 11-3131799 / +381/11-3131800	mkovacevic@seetoint.org

2.2 The Western Balkan states

The OEM identified stakeholders for Serbia, the former Yugoslav Republic of Macedonia, Montenegro and Kosovo, are presented in the following Table per country for each transport mode. It is noted that during the present Study Phase, the Study Team did not communicate with the identified stakeholders in the WB6, apart from SEETO Steering Committee Members and SEETO Secretariat.

Table 3: National Institutions / Ministries

Country	Name	Position	Organization	Telephone/Fax	Email
MK	Jasminka Kirkova	State Counsellor	Ministry of Transport and Communications Dame Gruev 6 1000 Skopje	+ 389 2 3145423 + 389 2 3145491	kirkova@mtc.gov.mk
	Darko Spiroski	Head of EU Department		+ 389 2 3145493 + 389 2 3145532 + 389 2 3117012	darko.spiroski@mtc.gov.mk
	Ljupka Siljanoska	State Counsellor		+389 2 3145 405 +389 2 3126228	ljupka.siljanoska@mtc.gov.mk
ME	Angelina Živković	Assistant Minister	Ministry of Transport and Maritime Affairs Rimski trg 46 (zgrada Vektre) 81000 Podgorica	+ 382 20 234 062 + 382 20 234 331	angelina.zivkovic@mzp.gov.me
	Zoran Vukašinović	Head of the Department of the normative-legal affairs		+382 20 482 206 +382 20 234 342	zoran.vukasinovic@mzp.gov.me
ME	Savo Paraca	Director	Transport Directorate IV proleterske 19, 81000, Podgorica, Montenegro	+382 20 655 095	direkcijazasaobracaj@dzs.gov.me
RS	Tatjana Jovanović	Assistant Minister	Ministry of Construction, Transport and Infrastructure 22-26 Nemanjina Street 11000 Beograd	+381 11 3616 358	tatjana.jovanovic@mgsi.gov.rs
	Saša Stojanović	Assistant Minister		+381 11 269 14 32	sasa.stojanovic@mgsi.gov.rs ana.sovljanski@mgsi.gov.rs
	Mirjana Jovanović	Head of the Department for EU Funded Projects		mirjana.jovanovic@mgsi.gov.rs	
	Jasmina Radonjic	Head of the Group for Programming of EU Funded Projects		jasmina.radonjic@mgsi.gov.rs	
XK	Kris Pierre Litiere	A/Head Economic Affairs Co-ordination Office	UNMIK	+377 44 500 003 / 164 240	litiere@un.org
	Gjyneit MUSTAFA	Multimodal transport demand expert	Ministry of Infrastructure Zyra C204 Kati II Ndertesa Ish Germija Prishtine/Priština		Gjyneit.mustafa@rks-gov.net
	Lulzim Rama	Director Department for European Integration and Policy Coordination	Ministry of Infrastructure Germia Building Mother Theresa Str. 10000, Prishtine/Priština, Kosovo	+381 38 213 090 +377 44 899 596	lulzim.rama@ks-gov.net
	Flutura Fera	Senior Officer		+381 38 200 28 005 +381 38 200 28 009	flutura.fera@rks-gov.net

Table 4: Road Transport Stakeholders

Country	Name	Position	Organization	Telephone/Fax	Email
MK	Stevco Jolakoski	Head of Road Transport and Infrastructure	Ministry of Transport and Communications Dame Gruev 6 1000 Skopje	+ 389 2 3145 484	jolakoski@mtc.gov.mk
	Joze Jovanovski	Head of Unit	Public Enterprise (PE) for State Roads Dame Gruev Str., No. 14, 1000 Skopje, the former Yugoslav Republic of Macedonia	+389 2 3118 044 +389 2 3220 535	j.jovanovski@roads.org.mk
	Perica Spasevski	Manager of Public Procurement Department		+389 2 3118 044 +389 2 3220 535	spasevski@roads.org.mk
ME	Dalibor Milosevic	Directorate for Road Traffic	Ministry of Transport and Maritime Affairs Rimski trg 46 (zgrada Vektre) 81000 Podgorica	+382 20 234 563	dalibor.milosevic@msp.gov.me
	Angelina Živković	Directorate for State Roads			angelina.zivkovic@msp.gov.me
RS	Biljana Vuksanovic	Head of department for Strategy, Designing and Development	Public Enterprise Roads of Serbia Bulevar kralja Aleksandra 282 PO Box 17, 11050 Beograd 22, Serbia	+381 11 3040 742 +381 11 3040 692	biljana.vuksanovic@putevi-srbije.rs
XK	Rame Qupave	Director of Road Infrastructure Department	Ministry of Infrastructure Germia Building Mother Theresa Str. 10000, Prishtine/Priština, Kosovo	+381 38 211494	rame.qupeva@rks-gov.net
	Burim Krasniqi	Director of Land Transport Department	Ministry of Infrastructure Germia Building Mother Theresa Str. 10000, Prishtine/Priština, Kosovo	+381 38 200 28 597 +377 44 356 973	burim.r.krasniqi@rsk-gov.net
	Martin Halilaj	Head of Division of road and rail passengers transport	Ministry of Infrastructure Germia Building Mother Theresa Str. 10000, Prishtine/Priština, Kosovo	+381 38 212 256 +381 38 211 546	martin.halilaj@rsk-gov.net

Table 5: Rail Transport Stakeholders

Country	Name	Position	Organization	Telephone/Fax	Email
MK	Biljana Zdraveva	Head of Railway Department	Ministry of Transport and Communications Dame Gruev 6 1000 Skopje	+ 389 2 3145 502	biljana.zdraveva@mtc.gov.mk
ME	Milan Bankovic	Directorate for Railways	Ministry of Transport and Maritime Affairs Rimski trg 46 (zgrada Vektre) 81000 Podgorica	+38220482432	milan.bankovic@msp.gov.me
	Savo Paraca	Director	Transport Directorate IV proleterske 19, 81000, Podgorica, Montenegro	+382 20 655 095	direkcijazasaobracaj@dzs.gov.me
	Nebojsa Obradovic	Director	Railway Directorate Hercegovačka 75, Podgorica, Montenegro	+38220232127	nebojsa.obradovic@dzzcg.me
	Milan Colakovic	Director	Railway Infrastructure Company Trg golootockih zrtava 13, Podgorica, Montenegro	+382 20 44 14 03	izvrnidirektor@zicg.me
	Milojica Zindovic	Director	Railway Transport of Montenegro Trg golootockih zrtava 13, Podgorica, Montenegro	+38220441100	milojica.zindovic@zpcg.me
	Milivoje Pavicevic	Director	Montecargo Trg golootockih zrtava 13, Podgorica, Montenegro	+382 20 441 303	kabinet@montecargo.me
RS	Mirjana Trifunovic	Head of Dept., Sector for Railways and Intermodal Transport	Ministry of Construction, Transport and Infrastructure 22-26 Nemanjina Street 11000 Beograd		mirjana.trifunovic@mgsi.gov.rs
	Milijan Milic	Sector for Railways and Intermodal Transport			milijan.milic@mgsi.gov.rs
XK	Burim Krasniqi	Director of Land Transport Department	Ministry of Infrastructure Germia Building Mother Theresa Str. 10000, Prishtine/Priština, Kosovo	+381 38 200 28 597 +377 44 356 973	burim.r.krasniqi@rsk-gov.net

Country	Name	Position	Organization	Telephone/Fax	Email
	Martin Halilaj	Head of Division of road and rail passengers transport	Ministry of Infrastructure Germia Building Mother Theresa Str. 10000, Prishtine/Priština , Kosovo	+381 38 212 256 +381 38 211 546	martin.halilaj@rsk-gov.net
	Xhevat Ramosaj	Deputy Chief Executive Officer	Infrastructure of Kosovo Railways (INFRAKOS) Sheshi I Lirise p.n. Fushë Kosovë Kosovo	+381 38 550 550-520 +381 38 550 550 -501	xhevat.ramosaj@kosovorailway.com

Table 6: Air, Maritime and IWW Transport Stakeholders

Country	Name	Position	Organization	Telephone/Fax	Email
MK	Zivko Poposki	CEO and Director of Technical Division	Macedonian Air Navigation Bosfor Nr 7, Mralino Ilinden the former Yugoslav Republic of Macedonia	+389 (0) 2 3148214 +389 (0) 2 3148239	office@MEavigation.mk
ME	Vladan Radonjic	Directorate for Maritime Transport		+382 20 482 192	vladan.radonjic@msp.gov.me
	Nebojsa Krstajic	Directorate for Air Traffic		+382 20 482 204	nebojsa.krstajic@msp.gov.me
	Savo Paraca	Director	Transport Directorate IV proleterske 19, 81000, Podgorica, Montenegro	+382 20 655 095	direkcijazasaobracao@dzs.gov.me
	Dejana Nikovic	Department for Development	Luka Bar (port of Bar)	+382 30 300-400	dejana.nikovic@lukabar.me
	Milovan Đuričković	Executive Director	Airports of Montenegro AD Podgorica Airport 81000 - Podgorica	+382 20444222 +382 20444221	info@apm.co.me
RS	Mirjana Cizmarov	Director general	Civil Aviation Directorate Skadarska 23 11000 Beograd	+381 11 292 71 12 +381 11 311 75 62	mcizmarov@cad.gov.rs
	Ljubisa Mihajlovic	Director	Directorate for IWW Francuska 9, 11000 Beograd	+381 11 30 29 801	ljmihajlovic@plovput.rs
XK	Dritan Gjonbalaj	Director	Civil Aviation Authority Arbëria District,	+381 (0)38 248 629	dritan.gjonbalaj@caa-ks.org

Country	Name	Position	Organization	Telephone/Fax	Email
	Burim Dinarama	Director of Airports Department	Ahmet Krasniqi St. 10000 Prishtine/Priština, Kosovo	+381 (0)38 248 629	burim.dinarama@caa-ks.org

2.3 The neighbouring EU member states

In the present section, the identified stakeholders for the road and rail transport sectors in the Greece and Hungary are presented. It is noted that these stakeholders were identified during the first OEM Corridor Study.

Table 7: Transport Stakeholders in Hungary and Greece

Country	Name	Position	Organisation	Telephone / Fax	Email
HU	TÓTH Péter	Deputy Head of Department	Ministry of National Development, Department for Transport Infrastructure		peter.toth@nfm.gov.hu
HU	ANDÓ János	Head of the Network Development Department	MÁV Hungarian State Railways Private Company by Shares		andoja@mav.hu
HU	TULIK Károly	Director of Development and Investment			tulikk@mav.hu
HU	KÖVESDI Szilárd	CEO	GySEV - Győr-Sopron-Ebenfurt Railways		szkovesdi@gysev.hu
HU	MOSOCZI Andrea	International Relations Expert			amosoczi@gysev.hu
HU	PÓSALAKI László	Head of Rail Capacity Allocation Department	Rail Capacity Allocation Office (VPE)		posalakil@vpe.hu
HU	KONDÁSZ Dóra	International Relations Officer			kondaszd@vpe.hu
HU	MÁZSI Attila	Director General	Hungarian Public Road Non-profit Private Company Limited		info@kozut.hu
EL	DIONELIS Christos		Ministry of Infrastructure, Transport & Networks		c.dionelis@ergose.gr
EL	LOGOTHETIS George		Ministry of Development and Competitiveness		glogothesis@mnc.gr
EL	THEOFANOPOULOS Panayotis	Chairman and CEO	Hellenic Railways Organisation (OSE)		a.della@osenet.gr
EL	SAMPATAKAKIS Grigorios	Director of the Department of Strategic planning and Development of OSE SA Member of RFC-7 Management Board			g.sampatakakis@osenet.gr

Country	Name	Position	Organisation	Telephone / Fax	Email
EL	LEFAKI Maria	Department of Strategic planning and Development of OSE SA			m.lefaki@osenet.gr
EL	SPILIOPOULOS Konstantinos	Chairman and CEO	ERGOSE S.A. (Rail Infrastructure Development)		info@ergose.gr
EL	TZITZIKOSTAS Apostolos	Head of the Region Central Makedonia	Periferia Kendrikis Makedonias		a.tzitzikostas@pkm.gov.gr

3 Existing studies review

Overviewing the existing studies for the Western Balkans Region, it is evident that one of the main issues identified is the integration of the transport network with the TEN-T networks. Although substantial progress has been made during the past years, especially in 2015 when the Core Transport Network for the Western Balkans was agreed upon, it is evident that due to the complex political, economic and operating environment of the region, there are still many issues that need to be addressed.

In the following sub-chapters an overview of the relevant studies is presented, while a more detailed project fiche for each one of the analysed studies is presented in Annex 1.

3.1 SEETO Multi-Annual Plan 2016

According to the MoU on the development of the Core Regional Transport Network (2004), the South-Eastern Europe Transport Observatory (SEETO) was established as a joint secretariat and technical back-up facility, in order to monitor and develop the Core Network. Its main objectives are to develop the SEETO Core Network up to the TEN-T standards and to further integrate the South East European Transport System in the European, to improve and harmonize regional transport policies and technical standards, and to maintain an effective coordination and communication network. Among the responsibilities of the SEETO is to prepare annual and multi-annual plans, focusing on the analyses of the overall transport system, the presentation of the up to date achievements, as well as the evaluation of the main priority projects on the network.

The most recent SEETO plan is the Five Year Multi Annual Plan (MAP) 2016 which was published in 2015 and presents the SEETO Comprehensive and Core Network Priority Project List. The rating methodology used by SEETO (SEETO Priority Projects Rating Methodology, 2012) for the prioritization of the projects is applied only on priority projects eligible for funding, that is mature projects for which a comprehensive evaluation is available based on a completed feasibility study. It is noted that SEETO puts emphasis on the quality of the projects included in the priority project list, rather than on the number of the projects. The main criteria based on which SEETO decides on the prioritization of the projects cover issues such as the economic, social, regional, environmental and technical sustainability.

3.2 The SEETIS Database

In order to provide necessary analyses and information on transport activities, the SEETO developed a data management system – the South East Europe Information System (SEETIS). This system is an internet based GIS application which provides access and tools to geographical and other information on the Network. It is embedded in the SEETO website and acts as a portal for remote users and public to submit and obtain information on the current condition, traffic and investment projects of the Network. The application is currently fully operational and is used for transport analysis. The SEETIS database includes data on infrastructure characteristics and traffic flows for all WB Countries and all transport modes, however, there are no data available on the SEETIS with regards to trade flows between different zones, or any forecasting estimations. The data collection process is based on questionnaires sent yearly to all regional Participants and the data collected are:

- Road transport data (on a link basis): infrastructure (length, design speed, etc., no data available on costs, travel time or average speed) and traffic data (passenger cars, buses and trucks).
- Rail transport data: infrastructure (electrification, number of tracks, gradient, average operating speed) and traffic data (number of trains per day, number of passengers and tonnes of freight per year).
- Maritime and inland waterways ports data: infrastructure (port capacity, depth, number of berths, type of ships serviced) and traffic data (TEUs, number of passengers, tonnes of cargo).
- Airport data: infrastructure (airport capacity) and traffic data for airports (number of passengers, tonnes of cargo on an annual basis).

It is noted that SEETIS is one of the main sources of information for the present analysis.

3.3 SEETO Flagship Report

The SEETO Flagship Initiative mainly focuses on the non-physical barriers of the WB Networks and aims at proposing a coherent set of measures that would enhance the efficiency performance of the networks and would address the analysed barriers and harmonization of the procedures. The project's results, among others, include:

- The description and analysis of the railway lines and terminals on the flagship corridor (Corridor X, Corridor Vc, Corridor VIII and Route 7, Route 4, Danube River)
- The analysis of the socioeconomic costs and benefits stemming from the establishment of the freight corridor
- The assessment of the quality of service on the entire corridor and terminals
- The identification of non-physical barriers which affect transport flows
- The identification best practice methods and measurable performance indicators regarding for enhancing transport quality.

It is noted that for the OEM Corridor Study, particular interest is placed on the analysis of Corridor X (from Beograd to the MK/Greek Border and further to Thessaloniki), Route 4 (from Beograd to Podgorica and then further to the port of Bar), as well as part of Route 7 from Niš to Prishtine/Priština.

3.4 Update of the Regional Balkans Infrastructure Study (REBIS)

The main project objective was to develop a Priority Action Plan for enhancing the efficiency of the South East Europe Transport Observatory (SEETO) Comprehensive Network and identifying priority physical investments, as well as non-physical improvements including regulatory, institutional and managerial changes that would eliminate bottlenecks and barriers affecting the network's performance. Based on the Action Plan, and beyond the scope of this study, feasibility studies will then be conducted for the identified interventions on the basis of which economically viable ones could be included in the SEETO Multi Annual Plan along with other eligible priority projects.

Within the above framework, the general work plan for the project included:

- The development of a transport demand model for the Western Balkans region, including all transport modes.
- The identification of the main corridors/routes on the SEETO Comprehensive Network based on the EU TEN-T criteria, which among others, promote the alleviation of bottlenecks and missing links on major routes, regional integration, mobility and sustainable development and meet the required social and economic criteria, and determine main regional transport links.
- The analysis of the physical and non-physical barriers to the efficient operation of the SEETO Comprehensive Network and the identification of potential efficiency-enhancing investments and measures.
- A preliminary-level economic analysis to assess the viability of the proposed investments and measures.

Based on the analysis undertaken within the framework of updating REBIS, it seems that regarding the physical limitations of the Networks, priorities should be placed on these road/railway sections, airports and ports of the network that are expected to have capacity constraints by 2030, most of which are included in the SEETO MAP. This plan should be updated to include all interventions until 2030 based on sound socioeconomic criteria. Furthermore, special attention should be paid to the non-physical bottlenecks, in order to enhance the Network's capacity and reliability. While there have been significant improvements in the past decade in eliminating non-physical bottlenecks impeding trade and transport in the region, unpredictability of border-crossing times remains an issue in the region. This applies to both passengers and freight.

3.5 WBIF Gap Analysis

The Connectivity Gap Analysis identified the compliance gaps of the entire Western Balkans (WB) Core Network against the TEN-T standards. Focus was also placed on the Core Corridors (Mediterranean, Orient/East Med and Rhine-Danube) extension in the Region. It is noted that within this study, only the road, rail and IWW networks were examined.

The analysis for the transport networks produced an inventory of the gaps for the Mediterranean, Orient/East Med and Rhine-Danube Core Corridors. The gaps are identified in relation to the TEN-T standards required for each of the road network, the rail network and the IWW system. The compliance with each of these criteria was shown graphically on maps using a GIS application that is developed within the framework of this Study.

The main objective of the Study was to identify a list of projects for the WB Core Network that will improve the existing networks and will fill in the existing connectivity gaps. All identified projects were thoroughly analysed and their level of maturity was estimated. More specifically, detailed studies and reviews of all available documentation, together with an assessment as to each project's preparedness for construction for each of the identified segments were carried out. A project fiche was produced for each one of the identified and analysed projects, which summarises the available project documentation.

It is noted that the Study began in December 2015 and was completed in May 2016.

3.6 Western Balkans Intermodal Study

The Western Balkans intermodal study is related and aims to encourage the long term sustainable development of logistics infrastructure and multimodal transport in the Western Balkan countries and presents the basis for further development of the region. Within the objectives of the study was the understanding of market requirements, the assessment of main logistic corridors, the analysis of main bottlenecks and the identification of possible interventions using a preliminary economic analysis.

The study identifies several locations within the region, with 46 multimodal facilities; 15 facilities have attributes of intermodal terminals, whereas 11 of them are identified as the main holders of intermodal transport services:

- Three terminals sea-rail-road (Port Durres/Albania, Port Bar/Montenegro, Port Ploče)
- Two terminals river-road-rail (Beograd/ Serbia, Port Novi Sad /Serbia)
- Six terminals type Rail-road (Intereuropa RTC, Alipasin most, Bosnia & Herzegovina, Container terminal Tovarna / Skopje / the former Yugoslav Republic of Macedonia, Container terminal Donje Dobrevo (Miradi) /-Kosovo, Logistics Centre Beograd ZIT / Serbia).

The study also encompasses the analyses regarding the following related projects Intermodal International Studies, Intermodal National Studies, Regional Transport Studies and National Transport Studies.

The main finding of the study is that the intermodal transport in SEETO region is underdeveloped. Some of the critical issues that were identified to be causing this were:

- Deficiencies of the supply system (infrastructure and technical means),
- Inadequate links to offer freight services and interconnection between
- Poor ability of suppliers and lack of appropriate marketing strategies,
- Poor operating conditions and low level of service of railway network,
- Insufficient investment into basic maintenance on the railways,
- Low level of containerization.

The foreseen improvement of intermodal transport involves the implementation of a large number of measures which are individually listed in the study, such as legislative, regulatory, administrative, organisational and technological, monitoring procedures, etc. More specifically, among the high priority measures, that can also be implemented quickly are and represent initial steps in the process of development of intermodal transport in SEETO region, are:

- Making planning documents (intermodal studies, strategies, national programmes);
- Establishing the status of intermodal transport as an activity of special economic importance;
- Start creating the project of information system, database, statistics of intermodal transport;
- Obligation of submitting data to create statistical reports and databases and procedures of information flows,
- Liberalisation of the railway sector,
- Inclusion of the intermodal projects in the priority projects for the use of pre-accession EU funds,
- Internal transport-transshipment places must be ready for accepting TEU units,
- Solutions for border crossing
- Use of modern IT equipment
- Infrastructure development in the rail sector

The document does not contain an investment strategy; however, budget estimations for three pilot actions are given:

- € 250,000 for a new system that works as a statistical tool.
- € 650,000 for a training centre development to provide training services on different issues regarding intermodality.
- € 2.5 – 3.0 mln for development of networked and efficient intermodal clusters within the Balkan region.

3.7 National Infrastructure Project Pipelines

Within this section, an overview of the available and analysed relevant national documents is presented.

Table 8: List of National Master Plans and related national documents of OEM WB6 countries

	National Transport Master Plans	Issued by	Related investment documents	Related Transport Flow Models	Corridor relevant modes considered
RS	Development of Transport Sector - Annual Action Programme For Serbia 2015	EC under Instrument for Pre-Accession Assistance (IPA II)	loans from the International Financial Institutions (IFIs), bilateral creditors and national budget resources	Not existing	<ul style="list-style-type: none"> ▪ Road ▪ Rail ▪ Multimodal
RS	Indicative Strategy Paper For Serbia (2014-2020)	EC under Instrument for Pre-Accession Assistance (IPA II)	IFI loans and IPA II grants Projects of common interest on the TEN-T core network will be financed under CEF	Not existing	Assessment of general transport needs
RS	General Master Plan For Transport In Serbia 2009 -2027	Developed Under EU Funded Project	Grants from the European Union Grants from other countries Loans from international financial institutions Loans from national banks Participation by private investors	Multi-modal transport model	<ul style="list-style-type: none"> ▪ Road ▪ Rail ▪ IWT ▪ Aviation ▪ Multimodal
RS	Strategy Of Railway, Road, Inland Waterway, Air And Intermodal Transport Development In The Republic Of Serbia, 2008 - 2015	Government Of The Republic Of Serbia	The Strategy implementation will be financed partially from the Republic of Serbia budget and from National Investment Plan, and partially from long term credits of international financial institutions, IPA program, bilateral grants and PPP	Not existing	<ul style="list-style-type: none"> ▪ Road ▪ Rail ▪ IWT ▪ Aviation
ME	Indicative Strategy Paper for Montenegro (2014-2020)	Instrument for Pre-Accession Assistance (IPA II)	IFI loans and IPA II grants through the Western Balkans Investment Facility (WBIF) for strategically relevant and technically viable priority project Additional technical assistance will be provided under the IPA II multi-country programme, including	Not existing	Assessment of general transport needs



	National Transport Master Plans	Issued by	Related investment documents	Related Transport Flow Models	Corridor relevant modes considered
			through the continuation of the "Joint Assistance to Support Projects in European Regions" (JASPERS)		
ME	Montenegro Development Directions 2013-2016	Ministry of Finance	Implementation funds: state budget, donations, loans and EU funds	Not existing	General measures planned for the period 2013-2016 for: <ul style="list-style-type: none"> ▪ Road ▪ Rail ▪ Aviation
ME	Transport Development Strategy of Montenegro - Final	Ministry of Transport and Maritime Affairs	This is the first document determining a long-term development of the transport in Montenegro. This document represents a good base for efficient use of funds of international financial institutions and private resources.	Not existing	General vision for development of all transport related aspects
ME	Spatial Plan of Montenegro Until 2020	Ministry of Economic Development		Not existing	Concept for infrastructure development of: <ul style="list-style-type: none"> ▪ Road ▪ Rail ▪ IWT ▪ Aviation
ME	Strategija Razvoja I Održavanja Državnih Puteva (Development Strategy of Public Roads)	Ministry of Transport and Maritime Affairs	Basis for future planning, projects designs and implementation using adequate financing system	Road network and road traffic in 2007	<ul style="list-style-type: none"> ▪ Road
XK	INDICATIVE STRATEGY PAPER FOR KOSOVO (2014-2020)	Instrument for Pre-Accession Assistance (IPA II)	IFI loans and IPA II grants through the Western Balkans Investment Facility (WBIF) for strategically relevant and technically viable priority project Additional technical assistance will be provided under the IPA II multi-country programme, including through the continuation of the "Joint Assistance to Support Projects in European Regions" (JASPERS)	Not existing	Assessment of general transport needs



	National Transport Master Plans	Issued by	Related investment documents	Related Transport Flow Models	Corridor relevant modes considered
XK	Support in the Implementation of Transport Community Agreement EU-TCA - Multimodal Transport Strategy (2012-2021) and Action Plan (2012-2016)	EU-funded project	Financial sources: <ul style="list-style-type: none"> Government resources External (IFIs) loans Grants PPP 	<ul style="list-style-type: none"> Road and rail networks Road traffic model - cars in 2011 Road traffic model - buses in 2011 Road traffic model - trucks in 2011 	<ul style="list-style-type: none"> Road Rail Multimodal
XK	Technical Support to the Ministry of Transport and Communications to continue the development of Multi-Modal Transport Strategy and Action Plan - ACTION PLAN AND INVESTMENT PLAN for the Railway Transport in Republic of Kosovo	EU-funded project European Commission Liaison Office to Kosovo	IFI loans and EU grants	<ul style="list-style-type: none"> Kosovo Railway Network in 2025 Daily trains both ways in the reference case in 2025 Kosovo Railway Network in 2030 	<ul style="list-style-type: none"> Rail Railway Investment Projects – identification and Macro-Schedule
XK	Technical Support to the Ministry of Transport and Communications to continue the development of Multi-Modal Transport Strategy and Action Plan - ACTION PLAN and INVESTMENT PLAN for the Roads Sector	EU-funded project	IFI loans and EU grants	<ul style="list-style-type: none"> Main and Regional Road Network AADT on the main and regional network, 2007, situation without network development Map of projects modelled Road Traffic models (HDM4) - input data and results – base year, 2012, 2015 and 2025 forecasts by scenario 	<ul style="list-style-type: none"> Road Road Priority Investment Projects – identification, Financial Plan, Investment Programme and Macro-Schedule
MK	Indicative Strategy Paper for the former Yugoslav Republic of Macedonia (2014-2020)	Instrument for Pre-Accession Assistance (IPA II)	IFI loans and IPA II assistance; WBIF and JASPERS can be used to support investment related activities	Not existing	Assessment of general transport needs
MK	Programme of the former Yugoslav Republic of Macedonia for the Period 2014 - 2018; Section: Infrastructure	the former Yugoslav Republic of Macedonia Government	IFI loans and EU funds	Not existing	<ul style="list-style-type: none"> Road Rail
MK	Sector Operational Programme for Transport 2014-2020	the former Yugoslav Republic of Macedonia Government	EU grants (IPA II), IFI loans and PPP	Not existing	<ul style="list-style-type: none"> Road Rail IWT Aviation
MK	Transport Strategy 2007-2017	Ministry of Transport and Communications	State budget; IFI loans, EU grants	Not existing	<ul style="list-style-type: none"> Road Rail Aviation Multimodal



	National Transport Master Plans	Issued by	Related investment documents	Related Transport Flow Models	Corridor relevant modes considered
HU	National Transport Strategy – National Transport Policy Concept (Nemzeti Közlekedési Stratégia – Nemzeti Közlekedési Konceptió) 2013/2014	Hungary – Ministry of National Development	Operative Programme of Integrated Transport Development (Integrált Közlekedésfejlesztési Operatív Program – IKOP 2014-2020)	Multimodal traffic model	<ul style="list-style-type: none"> ▪ Road ▪ Rail ▪ IWT ▪ Aviation ▪ Others
EL	Strategic Framework of Transport Investments for 2014 – 2020 (draft August 2014)	NSRF, Ministry of Infrastructure, Transport and Network	Operational Programme 2007-2013 Operational Programme YMEPRAA 2014 – 2020	Not existing.	<ul style="list-style-type: none"> ▪ Road ▪ Rail ▪ Aviation ▪ Maritime

4 Characteristics of the Network

4.1 Alignment of the analysed corridor

4.1.1 Alignment

Within the framework of the Connectivity Agenda (WB Summit, Vienna 2015), the proposed alignment for the OEM Corridor related Core Network within the Western Balkans Region was presented. More specifically, the OEM Corridor related WB core network alignment is:

Road Network:

- Section: Szeged – Horgos/Subotica – Beograd – Niš – Skopje – Gevgelija/Evzoni – Thessaloniki
- Section: Niš – Prishtine/Priština – Skopje
- Section: Beograd – Podgorica – Bar

Rail Network:

- Section: Budapest – Subotica – Beograd – Niš – Skopje – Gevgelija – Thessaloniki
- Section: Stalać – Kraljevo – Prishtine/Priština – Skopje (Trubarevo)
- Section: Beograd (Resnik) – Podgorica – Bar

Figure 1: Schematic overview map of the Orient / East-Med Corridor indicative extension in the WB Region (brown colour)



Source: European Commission; Connectivity Agenda – Co-financing of Investment Projects in the Western Balkans in 2015

Figure 2: Alignment of the Orient / East-Med Corridor related WB core network (Road network)



Source: Regulation No.1315/2013 (Amendment of 4, February 2016), Modified by Consortium

Figure 3: Alignment of the Orient / East-Med Corridor related WB core network (Rail network)



Source: Regulation No.1315/2013 (Amendment of 4, February 2016), Modified by Consortium

The specific corridor alignment as depicted in Figure 2 is a summary based on the findings of the analysis of core network links and core networks nodes, as included in the SEETIS Database.

4.1.2 Statistical Information on the Corridor

Table 9 shows the modal and country specific length of the corridor, summing all main and parallel lines identified as parts of the corridor.

Table 9: Total length of OEM Corridor related WB Core Network by countries and modes

Orient/East-Med Corridor, infrastructure total length in [km]								
Mode	RS	ME	XK	MK	WB4	HU	EL	Total
Rail	1061 57%	159 9%	152 8%	246 13%	1618 87%	158 9%	77 4%	1853 100%
Road	975 57%	180 11%	109 6%	220 13%	1484 87%	16 9%	62 4%	1563 100%

Source: Consortium, based on SEETO data and network statements

As presented in the above table, four WB countries, as well as two EU Member States are to be considered within the scope of this study, regarding line infrastructures, as follows:

- 2 countries include rail, road and IWW (RS, HU),
- 2 countries include rail, road and sea shipping (ME, EL)
- 2 countries include rail and road only (XK, MK)

Furthermore, all countries include at least one core network airport.

4.1.3 Core Network Nodes of the OEM related WB Core Network

The urban/traffic/logistic core network nodes on the OEM Corridor related WB Network are presented in the following table, grouped per country and node type.

Table 10: Urban and traffic/logistic nodes of the OEM related WB core network

	Urban nodes of the core network along corridor**		Airports		Maritime ports To be connected to TEN-T rail and road by 2030		Inland core network ports*		Rail-road terminals**		Σ
HU	(Budapest)	1	(Budapest)	1			Komárom Budapest-Csepel		(Budapest-Soroksár)	1	3
RS	Beograd	1	Beograd	1			Novi Sad Beograd	2	Beograd	1	5
ME	Podgorica	1	Podgorica	1	Bar	1					3
XK	Prishtine/ Priština	1	Prishtine/ Priština	1					Prishtine/ Priština	1	3
MK	Skopje	1	Skopje	1					Skopje	1	3
EL	(Thessaloniki)	1	(Thessaloniki)	1	(Thessaloniki)	1			(Thessaloniki)	1	4
Σ		6		6		2				5	

Source: Consortium, based on Annex 1 to Regulation No.1315/2013

*) Inland core network ports with brown layer are connected to the inland waterway assigned to the Rhine-Danube Corridor

***) The Amendment of TEN-T Regulation 1315/2013 Annex III – Core Network maps by COMMISSION DELEGATED REGULATION (EU) 2016/758 of 4 February 2016 on the indicative Extension of the Core & Comprehensive Network in Western Balkan Region does not show any further network nodes than the airports and the seaport.

Figure 4 shows the assignment of the listed nodes to the corridor infrastructure and provide an indication of the spatial distribution of traffic/logistic core areas along the corridor.

Figure 4: Overview on core network urban and traffic/logistic nodes on the OEM Corridor related WB Core Network



Source: Regulation No.1315/2013 (Amendment of 4, February 2016), modified by Consortium

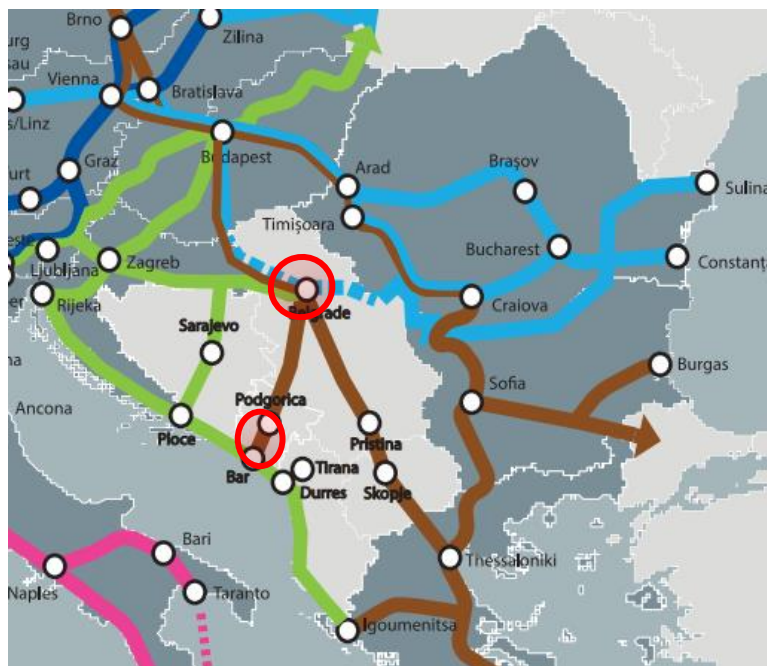
4.1.4 Corridor sections belonging to several corridor studies/consortia

Several segments of the examined Core Network relate to the other two corridors, which will also be connected with the WB Networks, namely the Mediterranean Corridor and the Rhine-Danube Corridor:

- The Port of Bar in Montenegro, which consists of a node for both, the OEM and the Mediterranean Corridors, as well as the Montenegrin road section (coastal road) from Misici to Bar. It is noted that the analysis of the Port of Bar is included in the present report (please refer to chapter 5.2.3)
- The city of Podgorica, which consists of an urban node for both the OEM and the Mediterranean Corridors. It is noted that for the Mediterranean Corridor, the urban node of Podgorica is only part of the railway network (railway line Podgorica to Tuzi, further on to Albania).
- The city of Beograd, which consists of an urban node for both the OEM and the Mediterranean Corridors.

Note: The Hungarian and Serbian IWW branches from Budapest to Novi Sad further to Beograd, including the IWW ports of Novi Sad and Beograd (Rhine-Danube corridor) will be analysed in the respective Rhine-Danube Corridor Study, only.

Figure 5: Overlapping of the analysis networks in the Western Balkan countries with other corridor studies



Source: European Commission; modified by Consortium

4.2 Description of the Technical Parameters of the Corridor Infrastructure

4.2.1 Rail infrastructure of the OEM related WB Core Network

4.2.1.1 Alignment

A schematic layout of the Western Balkan (WB6) rail network which is related to the OEM corridor is displayed in Figure 6.

Figure 6: Rail alignment of the Western Balkan



Source: Consortium (based on the Connectivity Agenda – Vienna WB Summit, 2015 and TEN-T Regulation, as amended on February, 4th 2016)

This rail network covers all 4 analysed countries (Serbia, Montenegro, the former Yugoslav Republic of Macedonia and Kosovo), including 2 “orphan” links to Hungary and towards Greece. The total distance of the Western Balkan railway lines is 1853.3 kilometres. The biggest part of the entire distance is allotted in Serbia (1061.5 km or 57% of the overall distance), followed by the former Yugoslav Republic of Macedonia (246 km, 13%), Montenegro (159 km, 9%) and Kosovo (152.4 km, 8%) with the smallest part of the rail network among 4 analysed countries. The network consists of “orphan” links in Hungary (158 km, 9%) and Greece (77 km, 4%) that are the connectors between the OEM Core network corridor and the Western Balkan rail network.

4.2.1.2 Compliance of the Infrastructure with TEN-T requirements

Of particular relevance for the rail characteristics are the standards set by the Regulation No. 1315/2013. Concerning rail, the following core parameters and standards are defined:

- Electrification: Core network to be electrified by 2030 (including sidings where necessary)
- Axle load: Core freight lines 22.5 t axle load by 2030
- Line speed: Core freight lines 100 km/h by 2030 (no speed requirement is set for passenger lines)
- Train length: Core freight lines to allow for 740 m trains by 2030
- ERTMS / signalling system: Core network to be equipped with ERTMS by 2030
- Track gauge: New lines to be built in UIC standard gauge (1435 mm), except in certain circumstances

All the key infrastructure parameters set in the Regulation were examined and analysed into details, such as axle load, train length, operating speed, electrification and signalling. Additionally, where information available, also number of tracks was considered.

Based on the subject analysis of the Western Balkan railway network infrastructure along the OEM corridor, there are considerable parts of the alignment, whose technical characteristics **do not comply** with the rules, set out in the EU Regulation 1315/2013.

At the same time, track gauge along the Western Balkan part is fully compliant with TEN-T requirements (1435 mm). It needs to be pointed out, that information on the train length, train speed and axle load are not available for all lines in Serbia and the former Yugoslav Republic of Macedonia. Therefore, certain estimates have been conducted based on the Network statements of the Infrastructure managers.

Operational speed:

Figure 7: Maximum operating speed on the OEM WB rail network (2014)



Source: Consortium (based on TEN-T Regulation)

The original maximum design speed on most of the rail lines of the Western Balkan was designed for speeds over 100 km/h (with the exception of Montenegro).

Due to safety reasons, a current maximum line speed of 100 km/h can be achieved on approximately 44% or 813 km of the rail network. A sufficient operational speed for freight trains is achieved in Serbia (708 km or 67% of the section) and at the orphan link in Hungary between Kunszentmiklós - Tass - Kiskunhalas - Kelebija (HU/RS border). However, it has to be noted that even though based on the reported operating speed for 2014, the railway section Užice - Border with Montenegro in Serbia is compliant, more recent information show that the operating speed on this section is less than 100 km/h (Source: SEETO Secretariat).

Among the lines that are compliant with the speed requirement in Serbia is the line Novi Sad - Beograd - Niš (with the exception of short part Beograd - Resnik - Velika Plana).

The issue of operational speed is most prominent in Kosovo and Montenegro, where speed on all analysed sections is limited to 70 or 80 km/h. This is also the case for the former Yugoslav Republic of Macedonia, where the operational speed is below 100 km/h.

Although, according to the available information from the official statistics, many sections of the network may be compliant with the Regulation, the railway infrastructure in several parts of the network is in bad condition, due to insufficient maintenance of the railway infrastructure.

Therefore, the concern arises that despite the official values from SEETO database, the maximum operational speed cannot be achieved in real train operations. For example,

the rail connection Bar-Beograd used to have a design speed of 100 km/h allowing a freight train to make the section within 7 hours, due to non-maintenance (and border control) today 12 hours are needed. Thus, to retain the designed capacities of the 1980's; without necessarily meeting the TEN-T compliance criteria/standards of 2030, lots of rehabilitation work is needed.

Train length:

Figure 8: Maximum train length on the OEM WB rail network (2014)



Source: Consortium (based on TEN-T Regulation)

The train length determined in the Regulation 1315/2013, should enable to operate 740 meter long freight trains, but in most of the analysed rail sections are not compliant with this requirement (1618 km or 87% of the network).

This applies to the entire part of the Western Balkans rail network related to the OEM Corridor. It is noted, however, that for operational reasons of the Port of Bar, a very small section between the Port of Bar and Virpazar in Montenegro allows 800 metre trains. The "orphan" links in Hungary and Greece are compliant and allow length of up to 750 meters.

The operational train length is significantly influenced by the infrastructure parameters of the respective line, in particular with regard to the length of sidings of the operational programme applied.

Additional factors are the traction power of the locomotive(s), the load hauled, braking power of the train and also related to these aspects, as well as to the respective operational programme, the inclination of the line either allowing, restricting or prohibiting operations for trains exceeding a dedicated length on certain lines.

Axle load:

Trains with single axle loads of 22.5 tonnes are fully operable on most of the sections of the analysed Western Balkan rail network (1464 km or 79% of the rail network).

Limited sections exist mainly in Serbia, between:

- Resnik – Velika Plana (76 km) and
- Stalać – Rudnica – Donje Jarinje (RS/XK border) (155.5 km)

where 22% or 232 km are not compliant with the minimum axle load. Also, the Hungarian section Budapest – Kiskunhalas – Kelebija (HU/RS border) of 157.8 km length does not allow for trains with axle load of 22.5 tonnes.

On the above identified non-compliant parts of the network, heavy trains can however operate with a reduced maximum speed (e.g. in the former Yugoslav Republic of Macedonia current conditions of the railway infrastructure allow axle load of 22.5 tonnes, but at the limited maximum speed of 80 km/h).

Figure 9: Maximum axle load on the OEM WB rail network



Source: Consortium (based on TEN-T Regulation)

Electrification:

Electrification is one of the key issues in the TEN-T requirements. The current voltage systems used along the Western Balkan rail network, as well as in HU and EL, is AC 25 kV, 50 Hz. Most parts of the analysed Western Balkan railway network are electrified, apart from:

- the Serbian sections, Stalać - Kraljevo - Raška - Rudnica - Stajaliste Donje Jarinje – Donje Jarinje (RS/XK border);
- the entire analysed section in Kosovo;
- the section Gjorce Petrov – Skopje (main station) – Trubarevo in the former Yugoslav Republic of Macedonia.

The non-electrified sections make up approximately 17% (322 km) of the entire OEM related Western Balkan rail network.

The latest design for rail rehabilitation in Kosovo foresees electrification of all the network sections with the above mentioned voltage system.

Figure 10: Electrification on the OEM WB rail network



Source: Consortium

Track gauge

Along the entire rail section of Western Balkan, the track gauge of 1435 mm is fully established.

Number of tracks:

Most parts of the rail network of Western Balkan consist of only single lines which occupy approximately 89% or 1651 km of the network. Double tracks (11% or 202 km) are located only in Serbia in the following sections:

- Stara Pazova – Novi Beograd
- Novi Beograd – Beograd
- Beograd – Resnik
- Resnik – Velika Plana
- Velika Plana – Lapovo
- Lapovo – Stalać
- Stalać – Niš

Signalling and telecommunication:

ETCS as interoperable railway supervision system has not been installed on any of the sections of the Western Balkan railway network. At the same time, there is little or no information about the GSM-R implementation; therefore, it must be supposed that GSM-R is not implemented in any part of the network.

Thus, we can conclude that the status of implementation of ERTMS, consisting of the two technical components ETCS and GSM-R, is underdeveloped and is not compliant with ERTMS deployment on any part of the Western Balkan rail network.

It needs to be mentioned, that the status of some lines still remains unclear at this stage. As the equipment of railway lines of the core network is an essential requirement of Regulation No.1315/2013, an overview on the deployment of ERTMS along the Western Balkan is of importance, taking into account the current state of play and measures foreseen in the future.

Table 11: Status of Rail infrastructure compliance on Western Balkan part of Orient/East-Med corridor (2014)

Parameter	Length share of non-compliant sections
Operational speed	56%
Train length	87%
Axle load	21%
Electrification	17%
Number of tracks (at least double track)	89%
Signalling systems (ETCS)	100%
Telecommunication system (GSM-R)	Non identified

Table 12: Status of Rail infrastructure compliance (2014)

#	Mode	KPI	Definition	2014
1	Rail network	Electrification	Electrified rail network km as a proportion (%) of relevant CNC rail network km.	83%
2		Track gauge 1435mm	Standard (1435mm) track gauge as a proportion (%) of relevant CNC rail network km.	100%
3		ERTMS implementation	Length of Permanent Operation (excluding operational test lines) of both ERTMS and GSM-R on rail network, as a proportion (%) of relevant CNC rail network km.	0%

#	Mode	KPI	Definition	2014
4		Line speed ≥ 100 km/h in accordance with art. 39 para. 2. Item a) (ii) of the Regulation 1315/2013	Length of Freight and combined line with allowing for a maximum operating speed greater than or equal to 100 km/h, as a proportion (%) of relevant CNC rail network km without load restriction.	44%
5		Axle load (≥ 22.5 t)	Length of Freight and combined line with a permitted axle load greater than or equal to 22.5 tonnes, as a proportion (%) of relevant CNC rail network km.	79%
6		Train length (740m)	Length of Freight and combined line with a permitted train length greater than or equal to 740m, as a proportion of relevant CNC rail network km.	13%

4.2.1.3 Technical Bottlenecks / Missing Links / Interoperability Issues

From the TEN-T compliance analysis, it is evident that most of the sections of Western Balkan rail network do not meet the requirements set by the EU Regulation 1315/2013.

The major non-compliance is observed with regard to **the train length**, where only one part of the line complies with requirements of 740 meters. Also, there are big problems regarding the **operational speed**, which is in the most sections well below the required 100 km/h. Single tracks are predominant.

Finally, most of the sections of the Western Balkan railway network are, due to lack of any information, deemed not to have any ERTMS system deployed,

Single track lines are predominant within the analysed network.

Several **on-going and planned rail infrastructure projects** in the four Western Balkan countries aim to upgrade certain parts of the rail sections in order to meet the TEN-T requirements. The major projects are described in Chapter 5.1, as well as Annex 2. Another problem, apart from the pure technical non-compliances, is also the discontinuity of technical characteristics which result in bottlenecks and interoperability issues. Bottlenecks are created both within individual national networks, but also across cross-border sections, causing significant interoperability issues.

Regarding cross-border operation and interoperability, it has to be considered that not all of the parameters presented above have direct impact on rail interoperability along the OEM corridor (e.g. number of tracks, max. speed). Relevant parameters are for example maximum train length, maximum axle load, change of traction/electrification system and signalling and communication systems. At present, there is no cross-border section without any change of relevant parameters.

The main interoperability issues on the Western Balkan rail network are:

- Differences between the allowed maximum train lengths
- Differences in the maximum axle load
- Lack of electrification
- Lack of ERTMS availability

The standard for maximum train length between the individual countries is one of the interoperability issues. Several of the relevant railway lines are not designed to allow the operation of trains with a length of 740 meters; in some cases they do not even achieve 600 meters. The same applies to the different maximum axle loads among certain sections of the WB6 countries.

Another issue in interoperability comes from the fact that some lines are not electrified. The power supply used on each side of the border or more specifically, switching between electrified and non-electrified parts of the lines, can cause several different issues and additional costs. The need for changing locomotives and systems has the knock-on effect of reducing available capacity and efficiency, increasing journey times and costs, and bringing the need for further equipment to be available.

This aspect together with the identified differences in control systems and the lack of ERTMS availability along the Western Balkan network leads to another key interoperability issue. The use of varying safety and signalling systems in WB 6 can be a factor affecting the efficiency and cost effectiveness of providing cross border rail-freight solutions. A standardisation of these that can be achieved with ERTMS, will lead to one unified system throughout Europe.

4.2.1.4 Capacity Utilisation

The capacity utilisation along the OEM related WB Core Rail Network Corridor is highly relevant to the overall performance of train services and to the identification of bottlenecks. Line sections with high or even critical capacity utilisation tend to show decreasing service quality, due to their sensitivity to train delays, which, in case of occurrence, are likely to be transmitted to other trains. These delays often cannot be reduced within short term, since operational flexibility on the line is not available. Furthermore, line congestions make it difficult or even impossible to attract additional rail traffic on the network, at least if no countermeasures are taken. All these capacity related issues are also affected by the fact that the majority of the OEM related WB Core Rail Network lacks of proper maintenance and significant operational constraints are detected.

It is noted that the following analysis is based on the REBIS Study (The World Bank, 2014) for which 2012 traffic data were used for the entire WB6 Core Network.

The capacity utilization of the OEM related Core Rail Network is mainly concentrated on the North-South Axis (Corridor X) from Budapest (HU) to Beograd (RS) and then further down to Niš (RS), Skopje (MK) and finally Thessaloniki (EL). Based on the REBIS Study, the OEM related Core rail sections that are found to have capacity limitations are presented in the following table. It is noted that the capacity limitations are categorised as follows:

- Rail sections with no capacity constraints related to infrastructure. These rail sections refer to links with less than 40% utilization, thus no improvements are needed.
- Existence of minor capacity constraints in infrastructure that can be improved with some minor rehabilitation. These are assumed to be for the links with average utilization 40-65%. These in peak periods may present perturbations of traffic with impact to capacity, and thus a combination of solutions can be proposed (e.g. improve the condition of line, manage the no. of subsections, provide additional tracks for over takings, arrange stations in a more efficient way, upgrade control and signalling, etc)
- Significant capacity constraints in infrastructure that need major rehabilitation. These are links with utilization of 65-80%. For them a combination of solutions can be proposed, following a site inspection and interview with the railways (e.g. increase the no of tracks, improve alignment, upgrade block and signalling system etc).
- Significant capacity constraints in infrastructure that needs the construction of new line: links with utilization above 80%, for which the above solutions are already introduced, a new line is needed.

Table 13: OEM related WB Core Rail sections with capacity constraints (2012)

Country	Rail section	Length (km)	No of tracks	Capacity ³ Utilisation
Minor capacity constraints in need of rehabilitation				
RS	Resnik to Požega (R4)	133	1	51%
ME	Mojkovac to Trebaljevo (R4)	11	1	47%
RS	Novi Beograd to Beograd (X)	5	2	47%
RS	Beograd to Resnik (X)	14	2	49%
RS	Resnik to Velika Plana (X)	76	1	53%
MK	Kumanovo to Tabanovci (X)	19	1	50%
MK	Kumanovo to Trubarevo (X)	36	1	52%
MK	Trubarevo to Veles (X)	51	1	47%
Significant capacity constraints in need of major upgrade				
RS	Nis to Tabanovci (X)	157	1	70%
RS	Subotica to Novi Sad (Xb)	106	1	78%
Significant capacity constraints in need of the construction of new line				
RS	Novi Sad to Stara Pazova (Xb)	37	1	97%

Source: REBIS study

It is noted that for the above sections, the trains with common characteristics and optimisation of schedules can improve capacity operationally.

4.2.1.5 Integration of RRT, Airports, Seaports, Inland Waterway Ports

A key condition to ensure interoperability of the airports, seaports and RRTs along the OEM corridor is their connection to the railway network. The RRTs are naturally all in compliance (cf. 4.2.2).

Regarding seaports and inland ports along the OEM Corridor related WB Core Network, the port of Bar in Montenegro, as well as the Danube ports of Novi Sad and Beograd in Serbia all comply with the Regulation's requirement.

Regarding the airports in the examined region, it is noted that no airport is connected to the railway network, thus no airport is compliant with the Regulation's requirements. One project is identified in Kosovo (see Chapter 6.2) which refers to the construction of the railway line between Prishtine/Priština -Fushë Kosovë and the Prishtine/Priština Airport. However, the implementation timeframe of this project is not known yet, as funding is yet to be secured.

4.2.1.6 Organizational Bottlenecks

Bottlenecks on the examined railway network are mostly the consequence of non-compliance with EU standards, especially in terms of train speed, train length, electrification issues, the number of rail tracks (single lines) and noncompliance with the ERTMS deployment TEN-T standard. These factors, accompanied by insufficient maintenance in the past years and the current condition of the railway infrastructure on the whole part of the network, have led to several bottlenecks that are also present on the cross-border sections between analysed countries.

There are reports on the long waiting times on the cross-border sections which represent one of the biggest challenges in railway operations. The biggest problems are a consequence of switching between electrified and non-electrified parts of the rail network, different maximum train lengths between cross-border sections and a limited quantity of tracks available (limited capacity). Additionally, waiting times are also

³ 2012 Traffic as % of UIC Capacity: Estimates of capacity based on an application of UIC formula for capacity calculation (Prof. Pyrgidis et al.). the UIC formula is used to estimate macroscopic capacity based on several characteristics of the railway network.

increased due to the internal procedures of rail operators and insufficient communication between involved parties, such as long waiting time for locomotive, staff and technical control. Among potential issues, we can also count language barriers in the border stations and even different rules and procedures between stations.

4.2.2 Rail Road Terminals

4.2.2.1 Location

Rail-road terminals are intermodal terminals connecting points allowing the transfer of goods between rail and road, especially important for the combined transport. The following chapter reflects all the relevant terminals in the Western Balkan region from the view of bimodal (consist of at least 2 transport modes) and one trimodal terminal (at least 3 transport modes). It needs to be pointed out that the information on Rail-road terminals in the Western Balkan countries is very limited and a lot of potential terminals are operating on a very low volume. Some terminals are still in the development/planning phase.

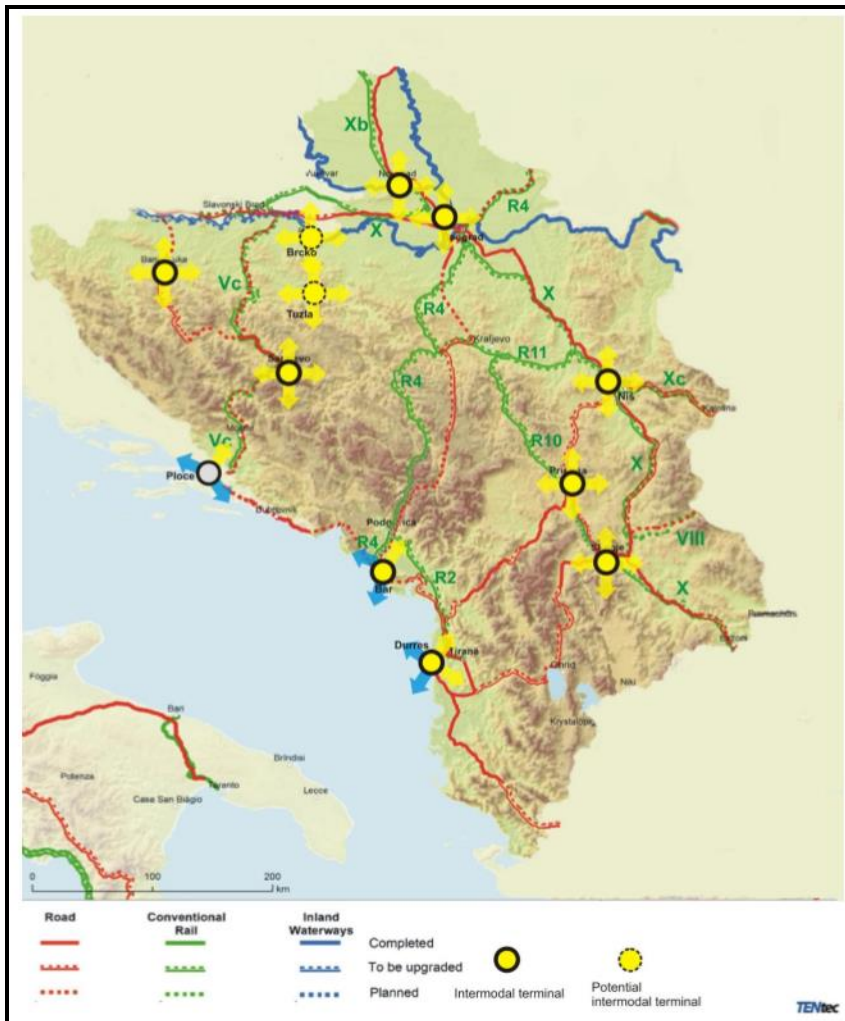
In total there are 6 core Rail-road terminals identified along the WB network, 3 in Serbia and one per other country (Kosovo, the former Yugoslav Republic of Macedonia, Montenegro) Serbia has more active terminals, but since the ports and the inland waterways terminals along the rivers Danube, Tisa and Sava in Serbia are analysed under the "Study on the Rhine-Danube TEN-T Core Network Corridor" and they will therefore not be reflected hereunder.

Table 14: Rail-road terminals in the Western Balkan

	Rail-road terminals	Transport connection	Type
RS	Beograd Batajnica ⁴	Rail and road	Bimodal
	ZIT Beograd	Rail and road	Bimodal
	Niš	Rail and road	Bimodal
XK	Donje Dobrevo (Miradi)	Rail and road	Bimodal
MK	Skopje (Tovarna)	Rail and road	Bimodal
ME	Port of Bar	Road-rail-sea-transport	Trimodal

⁴ A modern intermodal terminal Beograd-Batajnica is planned to start operating at the end of 2019

Figure 11: Core Rail Road terminals in the Western Balkan



Source: Western Balkans intermodal study

The Rail-road terminals along the Western Balkan network are identified according to Commission delegated regulation (EU) 2015/758 of 4 February 2016 amending Regulation (EU) No. 1315/2013 of the European Parliament and of the Council as regards Annex III as indicative extension to neighbouring countries in Core network regarding railways.

4.2.2.2 Compliance of the Infrastructure with TEN-T requirements

The Rail-road terminals along the Western Balkan network are key components of the intermodal transport chain, since they must ensure an efficient and safe interchange between road, rail and other transport modes, such as sea/inland waterways. This applies also to article 12 of the Regulation No.1315/2013, which requires that the core RRTs of the core network shall be connected with the road infrastructure or, where possible, the inland waterway infrastructure of the comprehensive network. With regard to a road, rail, river port and seaport connection, the table below depicts the existing and planned situation among the potentially most interesting rail-road terminals in the Western Balkan region.

Table 15: Accessibility of Core Rail-Road Terminals

	Rail-road terminals	Rail Connection	Road connection
RS	Beograd Batajnica ⁵	Planned (Electrified – the existing railway lines going through Batajnica are an integral part of the Orient/East Med Corridor (CX))	Planned (next to the motorway A1 - Hungary near Horgoš - Novi Sad - Beograd - Niš - Vranje - Border of the former Yugoslav Republic of Macedonia near Preševo)
	ZIT Beograd	Electrified, part of the Orient/East Med corridor	Close to the Motorway A1 (Novi Sad – Beograd – Niš)
	Niš	Planned (Electrified)	Close to the Motorway A1 (Novi Sad – Beograd – Niš)
XK	Donje Dobrevo (Miradi)	Rail-route 10, non-electrified (Kraljevo-Prishtine/Priština -Gjorce Petrov)	Federal road Road-Route 7 (E851)
MK	Skopje (Tovarna)	Rail corridor 8 (Federal road (motorway A2 in X km)
ME	Port of Bar	Rail route 4 (Vršac-Beograd-Bar)	Federal road (E851) – motorway Bar – Beograd (Serbia) is planned

As specified in the table above, the Rail Road terminals in the Western Balkan are already in a certain way connected to their respective national road and rail networks or waterways, although most of the are underdeveloped and there is a need to improve the quality of “last mile” access or to solve capacity problems. The capacity of the Rail Road terminals along Western Balkan is determined by a couple of factors, which can only partly be influenced by the terminal operators. The primary ones are the position of the terminal within the rail and road network, the size and shape of the location area, the length of the handling tracks, and the number and capabilities of the handling equipment.

At this point it needs to be mentioned that the analysis regarding the requirements set out in the Regulation 1315/2013 of:

- Capability for Intermodal (unitised) transshipment, 740 meter train terminal accessibility,
- Electrified train terminal accessibility and
- Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges,

was not conducted at this stage. The main problem is the lack of consistent information about the required parameters. The estimation of non-compliance of all the identified RRT terminals can be made, since it is not reasonable to expect that the parameter of 740-meter train terminal accessibility is achieved, if the lines around the terminals on the railway network do not allow trains in this length.

⁵ A modern intermodal terminal Beograd-Batajnica is planned to start operating at the end of 2019

4.2.2.3 Capacity Utilisation

The performance of the terminals as the interface between rail and road is mandatory for the development of intermodal transport and such performance is readable through adequate capacity utilisation. The problem on the Western Balkan network is the fact that the facilities and consequently access to Rail-road terminals are just partly developed which does not enable sufficient transshipment, even though we can estimate that there is a huge potential for increased volume in the future.

Serbia

Currently, the largest generator of intermodal transport in Serbia is public enterprise "Railway intermodal transport-ZIT". It is estimated that the average container traffic in the terminal is approx. 10,000 TEU/year. Taking into account the level of reloading equipment and the space for manipulation and storage capacities, it is estimated that the average capacity utilisation in this period was about 50-60%.

The new terminal in Batajnica will be located in the main industrial/service area of Beograd, at the crossroads of major international combined transport routes. The existing railway lines going through Batajnica are an integral part of the OEM Corridor (CX). The capacity of the intermodal terminal will be 80,000 TEU/year with the possibility of adding capacity if needed. The Intermodal terminal will have an area of 13 hectares.

The container volume in the Terminal Niš is not significant; the average transshipment is estimated at around 500 TEU's per year. One of the reasons for low transshipment is the fact that the container transshipment is not the primary business focus, but renting reloading equipment.

The former Yugoslav Republic of Macedonia

The former Yugoslav Republic of Macedonia has a relatively small container terminal positioned in Skopje – Tovarna, near the main railway station of Skopje. Although it is positioned on the axis Beograd-Skopje-Thessaloniki, the overall value of container transshipment is low, according to estimations around 2000 TEU's per year. Based on the available data, this means the utilisation factor is in the range from 60-70%.

Montenegro

Port of Bar has the largest transshipment volume of containers among the analysed countries. The "pre-crisis" number of the container transshipment amounted around 44.000 TEU's/year, but this number has decreased afterwards due to the unfavourable economic circumstances, and it amounted to an average of around 32.000 TEU's per year. Bearing in mind that the overall capacity is estimated at 50.000 TEU's, the utilisation factor is ranging around 65%.

Kosovo

The numbers regarding the overall transshipment in Kosovo in the last years are low, also because of the unfavourable economic situation in this developing country. Container transport comes from the direction of the Port of Thessaloniki, through the former Yugoslav Republic of Macedonia and to Kosovo, Donje Dobrevo. The estimated values of TEU transshipments are around 2000 TEU's per year. Due to poor equipment for loading/unloading containers, manipulation space and storage capacities, the estimated utilisation factor values range around from 60% to 70% (Western Balkan Intermodal study, 2016)

4.2.2.4 Technical Bottlenecks

Rail-road terminals along the Western Balkan corridor suffer due to the several bottlenecks in different transport modes (especially rail, road and inland waterways). This has a consequence on the effective implementation of intermodal transport. Bottlenecks on the Western Balkan network can be categorised and based on several factors such as

- Legislative
- Regulatory
- Administrative
- Organisational
- Technical and technological
- Monitoring and data collection
- The inappropriate state of transport infrastructure
- Personnel staff
- Misbalance of transport volume.

The most prominent problems influencing the quality of the intermodal transport in the WB6 are related to technical and technological issues, such as:

- The means of transport for Ro-Ro, Ro-La, Lo-Lo, piggy-back technology are insufficient (lacking wagons and road transport units for transport of containers and swap bodies);
- Non-existent or underdeveloped infrastructure in intermodal facilities and terminals. Reloading places, terminals, shipping centres, industrial terminals (places where transport units are formed) and shopping centres are not equipped and adapted for the carriage technologies
- Poor IT equipment.

Bottlenecks are also caused by an insufficient transport infrastructure; in particular, this applies to the railway and some extent road infrastructure, which has not been appropriately maintained in the past. Problems and weaknesses are reflected in the lack of planning of building and interconnection of railways, inland waterways, roads and terminals into a single intermodal transport system on the transport corridors. Besides the problems on the railway network, described in the chapter 4.1.2.3 Technical Bottlenecks it should be taken into account that the permissible maximum weight of lorries can cause bottlenecks at some stage. The maximum permissible weight of lorries in the analysed countries may differentiate: in The Former Yugoslav Republic of the former Yugoslav Republic of Macedonia 40t; in Kosovo n.a.; in Montenegro 40t or 44t and Serbia 40t or 44t (Western Balkan intermodal study, 2016).

4.2.3 Maritime Transport: Seaports

4.2.3.1 Alignment

The maritime infrastructure of the Orient / East-Med corridor within the WB Region includes the port of Bar in Montenegro.

The port of Bar is Montenegro's main port. The port is primarily cargo oriented but also serves passenger traffic. It consists of 5 terminals: Dry bulk cargo, grain, liquid, Ro-Ro and general cargo terminal. Containers can also be handled, though the container terminal. The main port operators are: Port of Bar, 54% state-owned, Global Ports, a Turkish company, partly state-owned that manages the container and general cargo terminals, Liquid cargo terminal, property of Hellenic Petroleum (not just operators).

The two major commodities handled at the port of Bar are:

- Vehicles (FIAT Industry): vehicles are manufactured in Serbia and are exported through the port of Bar to the USA (the vehicles are transported between Serbia and Bar via rail).
- Quarry products: exports to Malta (over 800000 tonnes/year, currently over 200000 tonnes/year).

Figure 12: The layout of the Bar port along with its terminals



Currently, there are no on-going projects (apart from the implementation of Phase II of the VTMIS).

4.2.3.2 Compliance of the Infrastructure with TEN-T requirements

The characteristics of the port of Bar were recorded mainly on the basis of their technical parameters, as well as the compliance with the following two Regulation No.1315/2013 requirements:

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

Connection to road and railway networks

The port of Bar is connected to both rail and road networks and thus is compliant with the TEN-T requirements. It is noted that the rail connection available is electrified, while the road connection is a two-lane national road.

Availability of Alternative Fuels

The EU-Regulation No.1315/2013 and other related EC guidelines on sustainability, energy efficiency and CO₂ reduction are requiring publicly accessible Liquefied Natural Gas (LNG) refuelling points for maritime transport to be provided by all maritime core ports until 2030 with the scope to reduce CO₂ emissions from maritime bunker fuels by 40% by 2050.

For the Port of Bar, there is no available information with regard to the availability of alternative fuels.

4.2.3.3 Deployment of Traffic Management Systems

In addition to the above requirements, the Regulation stipulates the necessity for ports to deploy e-Maritime services, including in particular Vessel Traffic Management Information Systems (VTMIS), single-window, Port Community Systems (PCS) and relevant customs information systems, as advanced and interoperable information technologies to simplify administrative procedures and to facilitate the throughput of cargo at sea and in port areas.

A VTMIS is a marine traffic monitoring system that only keeps track of vessel movements and provides navigational safety in a limited geographical area, whereas the PCS is the most advanced method for the exchange of information within a sea port infrastructure conglomerate. It is a neutral and open electronic platform enabling intelligent and secure exchange of information between public and private stakeholders, mainly optimising, managing and automating port and logistics processes through a single submission of data, connecting both transport and logistics supply chains.

Regarding the Port of Bar, some sub systems of VTMIS are already implemented (Very High Frequency (VHF), Global Maritime Distress and Safety System (GMDSS), Automatic Identification System (AIS), Long Range Identification and Tracking (LRIT), Adriatic Mandatory Reporting System (ADRIREP) etc.), while there is a planned project for the completion of the VTMIS implementation (Phase II).

4.2.3.4 Capacity Utilisation

Table 16 presents the latest available annual passenger and freight flows of the Port of Bar.

Table 16: Port of Bar - Passenger and Freight Flows (2014)

	Maritime port	Passenger Traffic Flow (pax p.a.) 2014	TEUs 2014	Freight Traffic Flow (tonnes p.a.) 2014
ME	Bar	55,000	34,700	1,640,000

Source: SEETO Secretariat

It is noted that the declared port capacity is 200,000 passengers per year and 5,000,000 tonnes per year for cargo. Based on this, it seems that the current traffic is well below capacity and no significant capacity limitations are detected.

4.2.3.5 Technical Bottlenecks / Interoperability Issues

The key bottlenecks and interoperability issues related to the port of Bar consist mainly of the necessary full deployment of VTMISS.

4.2.3.6 Organizational Bottlenecks

On the organizational aspect of ports, special focus should be placed on the need for these to become efficient intermodal "interfaces", alleviating related bottlenecks, such as different regulations between transport modes, linguistic difficulties with administrative documents, non-acceptance of electronic manifests and other documents, etc. The deployment of e-maritime and single-window systems would contribute considerably to the above objectives.

Table 17: Compliance of seaport (2014)

#	Mode	KPI	Definition	2014
16	Seaports	Connection to rail	Number of seaports in CNC with a rail connection as a proportion (%) of the number of relevant seaports.	100%
17		Connection to IWW CEMT IV	Number of seaports in CNC with a (hinterland) inland waterway connection of at least CEMT IV class, as a proportion (%) of the number of relevant seaports.	n.a.
18		Availability of clean fuels	Number of seaports offering (at least one of) LPG, LNG, liquid biofuels, or synthetic fuels as a proportion (%) of the total number of seaports.	n.a.
19		Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	Number of seaports with at least one open access terminal, as a proportion (%) of the total number of seaports.	100%
20		Facilities for ship generated waste	Number of seaports offering facilities for accepting PRF mandatory (MARPOL Annexes I, IV, and V) categories of ship-generated waste, as a proportion (%) of the total number of core seaports in the CNC.	n.a.

4.2.4 Corridor road infrastructure

4.2.4.1 Alignment

The road alignment of the OEM Corridor related Western Balkan core network is presented in Figure 13. Its total length between Budapest and Thessaloniki is 1701 km. This length excludes core network urban section in Beograd, which is subject to the Urban nodes' analysis.

Figure 13: Alignment of the Orient / East-Med Corridor related WB core road network



Source: Consortium (based on Commission Delegated Regulation (EU) 2016/758 and Vienna Summit decisions)

The road infrastructure covers all the six countries. The biggest part of this total distance is allotted to RS (975 km = 57%), followed by MK (220 km = 13%), ME (180 km = 11%) and XK (109 km = 6%). The length of the “orphan” links in HU and EL accounts for 78 km in total (16 km or 1% in HU and 62 km or 4% in EL).

The current total length of the motorway sections is 816 km that is 48% of the total roads length, split per countries, as follows:

- RS 461 km (47% of total RS roads’ length)
- ME 0 km (construction works are ongoing)
- XK 28 km (26%)
- MK 156 km (71%).

The entire “orphan” link in HU (16 km) is a motorway, and in EL 17 km out of 62 in total, or 27%, is a motorway.

4.2.4.2 Compliance of the Infrastructure with TEN-T requirements

The physical and technical characteristics of the OEM related BW core network road sections were recorded on the basis of their compliance with the transport infrastructure requirements set in Article 17 of the Regulation No. 1315/2013, as well as the requirements for core network infrastructure listed in Article 39 (c), namely: the roads shall be specially designed and built for motor traffic, and shall be either motorways or express roads.

In respect to the road quality, the definitions adopted are those stated in Article 17 of the Regulation:

- A **motorway** is a road specially designed and built for motor traffic, which does not serve properties bordering on it and which:
 - (i) is provided, except at special points or temporarily with separate carriageways for the two directions of traffic, separated from each other by a dividing strip not intended for traffic or, exceptionally, by other means
 - (ii) does not cross at grade with any road, railway or tramway, bicycle path or footpath and
 - (iii) is especially sign-posted as a motorway.
- An **express road** is a road designed for motor traffic, which is accessible primarily from interchanges or controlled junctions and which:
 - (i) prohibits stopping and parking on the running carriageway; and
 - (ii) does not cross at grade with any railway or tramway track”.

It shall be underlined that the Regulation does not impose strict requirements roads along the core network to meet motorway standards or to have segregated carriageways or even to have more than one lane per direction. Having in mind that all the international E-roads as defined by the United Nation Economic Commission for Europe, are accessible either from interchanges or junctions regulated with traffic signs, and the stopping and parking on their carriageways is prohibited, the main important restriction is not to cross at grade any railway or tram track.

Due to the above, the road compliance check was first performed for motorway or express road requirement only. This resulted in 94% compliance with this parameter: railway level crossings were identified in only two sections with a total length of 103 km, one in RS (Grdelica (A1-438) - Preševo (Border RS/MK) and one in XK (Junction (R7, M25-M25.2) - Lipjan (M2-M25).

Considering however the specific situation in the Western Balkan countries, the Consultant included in the analysis one more criterion – the quality of road pavement. This was applied only in respect to the road sections that meet express road requirement. The reason for adding this is the stipulation set in the Regulation (Art. 17), i.e. the road to be of high quality. Obviously, a section with bad quality of the road pavement could not qualify, because the pavement condition has important impact on the vehicles’ operational speed and travel comfort. Even more important is that the unsatisfactory pavement condition reduces the road carrying capacity and could cause road accidents. Road pavement quality was analysed based on SEETO data for 2015.

The conclusion of compliance check in respect to the first criterion is that 63.0% of the road section is compliant with the parameter “motorway or express road”. The total length of road sections currently complying is 1068 km. This is fully met by the road infrastructure in HU and EL. In all the four Western Balkan countries there are sections that do not meet the Regulation requirements. Table 18 presents the sections, which currently do not comply.

Table 18: OEM related WB road sections not compliant with Motorway or express road in good condition criterion

MS	Road section	Ongoing construction/ upgrading works	Length (km)
RS	Beograd by-pass road (Ostružnica – Orlovaca – Bujanj potok)		20
RS	Grdelica - Preševo (Border RS/MK)	Yes, partial sections have met already motorway standard	95
RS	Orlovaca - Užice	Yes, Obrenovac – Ub and Lajkovac – Ljig sections	185
RS	Balajnac - Prijepolje - Gostun (Border RS/ME)		57
RS	Prokuplje - Merdare (Border RS/XK)		60
	Total RS		416
ME	Dobrakovo (Border RS/ME) - Mojkovac	Yes, Mateševo - Podgorica (Smokovac) section	45
ME	Kolašin - Podgorica		71
	Total ME		116
XK	Lipjan - Hani i Elezit/Dj. Jankovic (Border XK/MK)	Yes	54
	Total XK		54
MK	Demir Kapija - Smokvica	Yes	34
MK	Blace (Border XK/MK) -Skopje junction Stenkovec		14
	Total MK		48

Source: Consortium

Figure 14 depicts the schematic layout of the not compliant sections of the road network.

Figure 14: Compliance to motorway or express road in good condition criterion



Source: Consortium, based on SEETO database

Table 19: Status overview of road network (2014)

#	Mode	KPI	Definition	2014
11	Road network	Express road/ motorway	Road network km classified as motorway or express road, as a proportion (%) of CNC road section km.	63%
12		Availability of clean fuels (stations)	Number of fuel stations offering plug-in electricity, hydrogen, liquid biofuels, LNG/CNG, bio-methane or LPG along CNC road sections or within 10km from its junctions.	n.a. (please see more information below)

In addition to road class/ quality criterion, the Regulation sets two more requirements in respect to the core network road infrastructure, as follows:

- availability of alternative clean fuels and
- availability of rest areas on motorways approximately every 100 km.

The Regulation sets up a list of alternative fuels that substitute (at least partly) the fossil oil sources in the supply of energy to transport. This includes electricity, hydrogen, biofuels (liquids), synthetic fuels, methane (natural gas (CNG and LNG) and bio methane) and liquefied petroleum gas (LPG).

The worldwide commercial synthetic fuels production capacity is still rather limited and thus, has very limited practical importance. No evidence were found about possible availability of synthetic fuels in RS, ME, XK and MK, or in HU and EL.

The issue of electric vehicle networks as infrastructure systems of publically accessible charging stations to recharge electric vehicles is a matter of discussion for the time being. The establishment of such networks requires the setup of market-friendly framework conditions, which are corresponding to market needs. Along the OEM Corridor related to Western Balkan core network public charging station⁶ available in Beograd and in Skopje.

The other alternative fuels (LPG and LNG⁷) are much wider available in all Western Balkan countries, although the density of the stations along the Corridor related core network defers from country to country. It should be pointed that the Regulation 1315/2013 does not set any specific requirement in this respect. Art. 39 (2c) states alternative fuels shall be available along the core road infrastructure (incl. areas within 10 km from the junctions).

The availability of LPG⁸ and CNG⁹ stations per OEM country and/or along the corridor is as follows:

- In RS there are over 550 LPG stations and many of these are located along the analysed route; there are also 13 CNG stations, part of which in Novi Sad, Beograd, and Niš
- In ME there are 23 LPG stations in total, part of which are along the related core network route
- In XK there are eight LPG stations, out of which two are in Prishtinë/ Priština area
- In MK there are 86 LPG stations, many of which are located along the core network; there are two CNG stations: one in Skopje and one in Kumanovo.

In HU and EL dense networks of LPG supply exists (438 in total in HU and 845 in EL) exists, incl. along the routes under analysis. The number of CNG stations is much lower than the one of LPG stations: nine stations in total in HU as well as in and EL. Such facilities are available along the examined network in Kecskemet and Szeged (HU) and one in Thessaloniki.

The overall conclusion is that along the OEM corridor related Western Balkans core network there is a reasonable supply of alternative fuels. Still, there are some sections that miss facilities for alternative fuel/s.

In respect to the rest areas, the Regulation requires such to be developed "*on motorways approximately every 100 km in line with the needs of society, of the market and of the environment, in order inter alia to provide appropriate parking space for commercial road users with an appropriate level of safety and security*". The broad definition in respect to both the needs and the safety and security level makes the evaluation against this criterion difficult and disputable. Here under are listed parking areas that are registered in TransPark¹⁰, a platform under the International Roads Union (IRU) and the International Transport Forum:

- RS: three parking areas: two on Beograd by-pass and one on the motorway close to Mladenovac; the last one is self-assessed as safe
- ME: two parking areas, both in Podgorica area

⁶ European Map available under: www.lemnet.org and <https://chargemap.com/>

⁷ Biodiesel availability is not further analysed due to different product definitions.

⁸ <http://www.mylpg.eu/stations/>

⁹ <http://cngeurope.com/>

¹⁰ <https://www.iru.org/apps/transpark-app>

- MK: four parking areas in total (in the areas of Kumanovo, Skopje, Veles and Kavadarci).

No facilities in XK are registered in TransPark. It should however be underlined that information presented by TransPark is not exhaustive.

4.2.4.3 Capacity Issues

Assessment of the current and future potential capacity constraints along the OEM related core road network in RS, ME, XK and MK is done based on two main sources, as follows:

- Data on annual average daily traffic per road section for 2014 from SEETO database and
- Traffic forecast for 2030 done within the Regional Balkan Infrastructure Study (REBIS) Update.

The 2014 AADT figures were compared to the road capacity, estimated based on a practical methodology set up in REBIS. This is based on "ideal" values for the "ideal" base conditions suitably downgraded due to specific deficiencies such as sub-standard road widths/ number of carriageway/s and lanes, pavement deterioration, difficult terrain/gradients and/or significant heavy vehicle (HGV) traffic.

According to SEETO traffic data the highest traffic was observed, quite naturally, on the urban sections in Beograd (50 000 to 130 000 vehicles/day), which are not considered part of the OEM related core network. Road sections on which the 2014 traffic exceeded 70% of the road capacity are shown in Table 20.

Table 20: Capacity bottlenecks in 2014

Country	Road section	Saturation ratio under	
		Current capacity	Idle capacity
RS	Dobanovci (bypass) /A1-A3/<-->Ostružnica (bypass) /A1-26/	101%	101%
RS	Orlovaca (bypass) /A1-22/<-->Bubanj Potok (bypass) /A1-A3/	93%	83%
RS	Bubanj Potok (bypass) /A1-A3/<-->Mali Pozarevac /A1-25/	87%	71%
RS	Grdelica /A1-438/<-->Preševo (Border RS/MK)	85%	55%
RS	Orlovaca /A1-22/<-->Lazarevac /22-27/	152%	97%
RS	Lazarevac /22-27/<-->Ljig /22-150/	73%	53%
RS	Ljig /22-150/<-->Rudnik /22-152/	71%	46%
RS	Rudnik /22-152/<-->Gornji Milanovac /22-177/	104%	67%
RS	Gornji Milanovac /22-177/<-->Cacak /22-23/	139%	90%
RS	Cacak /22-23/<-->Požega /21-23/	108%	69%
RS	Požega /21-23/<-->Užice /23-28/	114%	73%
RS	Prijepolje /23-200/<-->Gostun (Border RS/ME)	149%	56%
RS	Prokuplje /216-35/<-->Kuršumlija /35-213/	109%	41%
ME	Dobrakovo (Border RS/ME)<-->Ribarevina (Bijelo Polje) /2-21/	144%	54%
ME	Ribarevina (Bijelo Polje) /2-21/<-->Mojkovac /2-P4/	144%	54%

Source: Consortium based on SEETO Database and REBIS

In 2014, major capacity bottleneck were observed on Beograd by-pass road and along the road connecting Beograd with Podgorica/ Bar. It should however be noted that in many cases the high saturation rate is result of deteriorated pavement condition and could be solved by rehabilitation/ maintenance works without immediate necessity of upgrading/ new construction works. This is the case with the following sections:

- Lazarevac - Gornji Milanovac
- Prijepolje - Gostun (Border RS/ME) and
- Prokuplje - Kuršumlija /35-213/.

Similar is situation with Grdelica - Preševo (Border RS/MK) and Dobrakovo (Border RS/ME) - Mojkovac sections, where however upgrading works are under way.

According to SEETO MAP 2016, there are two more sections with low level of services (F). These are Besi – Luzhane/ Lužane (13 km) and Luzhane/ Lužane (16 km) with saturation ratios of 104% and 112% respectively.

Future possible capacity constrains were identified based on 2030 forecast in Do nothing network scenario (2012 network, which does not reflect the ongoing projects) and on the Moderate/High economic scenario.

The 2030 traffic projections were assessed against the (current) capacity of the networks to identify bottlenecks where interventions need to be considered. The results are summarized in the following Table. Under the Moderate/High economic scenario and without implementing any new construction or upgrades of the current infrastructure capacity issues will be observed on about 480 km, or some 45% of the OEM related WB core road network.

Table 21: Status overview of road network (2014)

Country	Road section	Forecasted AADT	Saturation ratio
RS	Dobanovci (bypass) /A1-A3/<-->Ostružnica (bypass) /A1-26/	14 451	131%
RS	Ostružnica (bypass) /A1-26/<-->Orlovaca (bypass) /A1-22/	16 752	112%
RS	Orlovaca (bypass) /A1-22/<-->Bubanj Potok (bypass) /A1-A3/	6 367	71%
RS	Bubanj Potok (bypass) /A1-A3/<-->Mali Pozarevac /A1-25/	37 872	86%
RS	Orlovaca /A1-22/<-->Lazarevac /22-27/	17 089	122%
RS	Lazarevac /22-27/<-->Ljig /22-150/	10 682	71%
RS	Ljig /22-150/<-->Rudnik /22-152/	10 862	78%
RS	Rudnik /22-152/<-->Gornji Milanovac /22-177/	16 377	117%
RS	Gornji Milanovac /22-177/<-->Cacak /22-23/	16 377	117%
RS	Cacak /22-23/<-->Požega /21-23/	14 309	102%
RS	Požega /21-23/<-->Užice /23-28/	13 987	100%
RS	Užice /23-28/<-->Knejevici /23-28/	6 899	86%
RS	Knejevici /23-28/<-->Nova Varos /23-29/	6 899	86%
RS	Nova Varos /23-29/<-->Prijepolje /23-200/	6 899	86%
ME	Ribarevina (Bijelo Polje) /2-21/<-->Mojkovac /2-P4/	8 587	107%
ME	Mojkovac /2-P4/<-->Kolašin /2-9/	8 491	106%
ME	Podgorica /M2-M18/<-->Virpazar /M2-P16/	12 890	92%
ME	Virpazar /M2-P16/<-->Sotonici /M2-E65,E80/	12 890	92%
XK	Merdare (Border RS/XK)<-->Luzhane/Lužane /M25-R125/	16 000	114%
XK	Luzhane/Lužane /M25-R125/<-->Trude /M25-R7/	22 728	162%
XK	Bergen /R6-R7/<-->Junction R7 - M2/M25.2	44 220	101%
XK	Junction R7 - M2/M25.2<-->Lipjan /M2-M25/	44 220	101%
XK	Lipjan /M2-M25/<-->Gerlice/Donja Grlica /M2-R122/	34 746	232%
XK	Gerlice/Donja Grlica /M2-R122/<-->Kacanik	14 857	99%

Source: Consortium based on SEETO Database and REBIS

4.2.5 Corridor airport infrastructure

4.2.5.1 Location

There are in total 4 airports along the OEM Corridor related WB Core Network: Beograd Airport, Podgorica Airport, Skopje Airport and Prishtine/Priština Airport. A brief overview of the four examined airports is presented as follows:

Beograd Airport (BEG)

The Beograd airport mainly serves international traffic. Traffic recorded a strong 5.9% p.a. growth since 2007 and even though it was slightly hit by the 2008/2009 crisis, immediately bounced back in 2010 (source: REBIS Study).

The level of direct services reaches 79% (percentage of passengers flying on a direct flight), which is adequate for an airport of this size, while at the same time, in terms of capacity, no infrastructural limitations are detected.

Skopje Airport (SKP)

The Skopje airport serves international traffic. Traffic recorded a strong 7.7% p.a. growth since 2007. The level of direct services reaches 66% (percentage of passengers flying on a direct flight), which is low for an airport of this size. With regards to infrastructural limitations, current traffic exceeds the declared terminal capacity, which indicates that an extension should be considered. Other airport infrastructure seems adequate given the characteristics of traffic.

Podgorica Airport (TGD)

The Podgorica Airport serves exclusively international traffic. Traffic recorded a strong 7% p.a. growth since 2007. The level of direct services reaches 80% (percentage of passengers flying on a direct flight), which is good for an airport of this size. Regarding infrastructural limitations, the airport infrastructure seems adequate given the traffic characteristics.

Prishtine/Priština Airport (PRN)

The Prishtine/Priština Airport traffic is purely international. Traffic recorded a strong 6.9% p.a. growth since 2007 which proved to be very resilient through the 2008/2009 crisis. The level of direct services reaches 83% (percentage of passengers flying on a direct flight), which is good for an airport of this size. In terms of infrastructural limitations, the current runway length (2501m) is too short for most of code E aircraft. Although current demand may not justify the use of such aircraft, the possibility of extending the runway should be studied for long-term development. Furthermore, the number of parking stands seems on the low side and may limit the potential for further growth.

Table 22: Airport Characteristics

Airport Characteristics	Beograd	Skopje	Podgorica	Prishtine/Priština
Runway				
Number of runways	1	1	1	1
Designator	12/30	16/34	18/36	17/35
Approach Aids	n.a./I	n.a./I	n.a./I	II/n.a.
Surface (Asphalt / Concrete / Bacalyte)	ASPH/CONC	ASPHALT	ASPHALT	ASPHALT
Strength (PCN)	65/F/C/X/T	76/F/D/W/T	55/R/A/X/T	100/F/B/X/T
Length	3400	2950	2500	2501
Width	45	45	45	45
Configuration	NA	NA	NA	NA
Parallel taxiways	FULL	PARTIAL	FULL	FULL
Apron				
Number of parking stands	23	22	6	7
Parking stand size / aircraft type	not disclosed	17 C, 2E, 1D, 2B	not disclosed	not disclosed
Contact (equipped with a bridge)	12	6	0	0
Semi-contact (close to terminal but no bridge)	3	0	2	2
Remote	8	16	4	5
Terminal				
Number of gates	12	11 (6 + 5 bus gates)	10	not disclosed
International / domestic status	INT	INT	INT	INT
Design capacity (in million pax)	5	3	1	5
ARFF				
Level	7	7	6	8
Annual Traffic vs Annual Declared Capacity (2014)	71%	40%	111%	28%

Source: SEETO Secretariat, REBIS Study

4.2.5.2 Compliance of the Infrastructure with TEN-T requirements

A key condition to ensure interoperability of the airports of the OEM Corridor related WB Core Network is their connection to the railway network. Currently, no airports have direct railway connection.

Table 23 lists the examined airports (core) with their related high ranking road connection.

Table 23: Road connection status of Airports on the OEM related WB Core Network (2014)

	Airports	Connection to Rail	Connection to Motorway/Expressway
RS	Beograd BEG	No	Yes, via motorway E-70 and E-75
MK	Skopje SKP	No	Yes, via motorway E-75
ME	Podgorica TGD	No	Yes, via E-80
XK	Prishtine/Priština PRN	No	Yes, via E851

The following airport rail project is currently planned:

- Prishtine/Priština (XK): Construction and modernisation of a Railway Line Prishtine/Priština - Fushë Kosovë -Prishtine/Priština Airport "Adem Jashari"; Financing not yet secured; (Status: Feasibility Study)

For the other main corridor airports, no projects are known.

4.2.5.3 Availability of alternative fuels

Currently, no fixed storage tank facilities for aviation biofuel are reported to be in use in the analysed airports.

Regarding the availability of alternative clean fuels for airport ground services (e-mobility, hydrogen, CNG, LPG); no information is available for the four examined airports.

4.2.5.4 Capacity Utilisation

The following Table presents the latest available annual passenger and freight flows for the OEM related WB Airports.

Table 24: OEM related WB Airports: Passenger and Freight Flows (2014)

	Airport	Passenger Traffic Flow (pax p.a.) 2014	Freight Traffic Flow (tonnes p.a.) 2014	Declared Capacity (pax p.a.)	Capacity Utilisation (%)
RS	Beograd BEG	3,543,194	7,679	5,000,000	71%
MK	Skopje SKP	1,208,379	3,580 fton	3,000,000	40%
ME	Podgorica TGD	1,105,009	955	1,000,000	111%
XK	Prishtine/Priština PRN	1,404,775	1,008	5,000,000	28%

Source: SEETO Secretariat

Based on the design capacity of the examined airports, it seems that only the airport of Podgorica seems to have currently exceeded its capacity, whereas the utilisation rates for the remaining three airports are well below capacity and thus no capacity limitations are detected.

Table 25: Compliance of Airports of the OEM WB6 corridor (2014)

#	Mode	KPI	Definition	2014
13	Airports	Connection to rail	Number of airports with a rail connection as a proportion (%) of the number of relevant airports	0%
14		Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges.	Number of airports with at least one open access terminal, as a proportion (%) of the total number of airports.	100%
15		Availability of clean fuels	Number of airports offering liquid biofuels or synthetic fuels for aeroplanes, as a proportion (%) of the total number of airports.	n.a.

5 State of Play of WB6 Networks

5.1 Introduction

Being the “link” between the Western Balkans region and the EU, the Berlin process, a concept that was initiated in August 2014 (High Level Conference on the Western Balkans), prepared the ground for the Vienna, Paris and Trieste Summits in 2015, 2016 and 2017, respectively and the Connectivity Agenda itself.

During the last WB Summit in Trieste in July 2017, the Transport Community Treaty was signed, aiming at the deeper integration of the region with the EU transport market and also setting the grounds for common standards, in terms of transport services’ quality and efficiency. The Transport Community will harmonise transport legislation in line with EU acquis and at the same time enhance the efficiency and connectivity of the underlying transport systems. The establishment of the Transport Community will focus on:

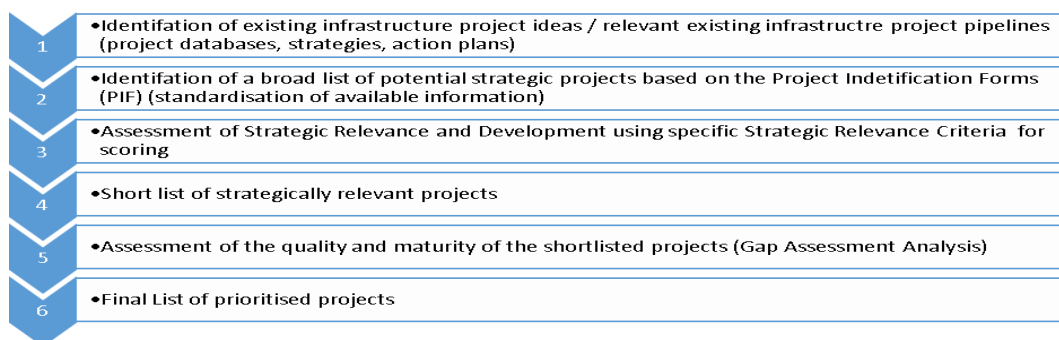
- The early integration of the WB transport market with the EU transport market
- Supporting the path of the Western Balkans for accession to the EU
- Increasing competitiveness of the transport sector within the WB region and beyond and also increasing connectivity
- Supporting the business community in the region
- The economic growth and tourism of the region
- Increasing attractiveness for investments in the region
- Reducing travel time and costs
- Facilitating cross-border projects that will enable smooth transport flow
- Ensuring safer and better transport services for the residents of the region and the EU citizens who visit the area.

The EU, being the biggest donor in the Western Balkans Region, has set aside €1 billion for connectivity projects and for technical assistance over the period 2014-2020. Since 2014, the EC has committed € 500 mln in total for both energy and transport projects. More than half of this amount, € 394 mln, was allocated to transport projects within all 6 Western Balkans countries.

Together with IFI loans and through the Western Balkans Investment Framework (WBIF), the EU continues to support the region and invest in high maturity transport projects on the identified Core Network (EC Regulation 2016/758/04.02.2016). The EU criteria and conditions applied for identifying potential co-financing eligible transport projects are:

- Projects must be of high maturity, both in terms of financial and technical readiness
- Projects must be subject of the Connectivity Agenda (TEN-T core network for transport);
- National strategy papers agreed, and the national policies should be in line with EU standards;
- Projects must be confirmed by a first draft of prioritized Single Project Pipeline (SPP) and discussed by a National Investment Committee (NIC).

Regarding the National Investment Committees in particular, their role includes planning, prioritising, approving large and significant investments in terms of their Connectivity and Strategic relevance, as well as assessing the financial support potential for each country. The main steps involved in identifying the high priority projects to be included in the National SPPs are:



At the same time, the WBIF which was launched in 2009 by the EU, EBRD, EIB and CEB, is aiming at blending grants with loans to finance priority infrastructure projects and strengthening coherence and synergies in donor support to the region. The WBIF pipeline has been developed through sixteen successive rounds of grant approvals by the Steering Committee, undertaken every six months building to support a total of 179 projects up to now, 51 of which in the transport sector. The investment value of the 51 transport projects adds up to approximately € 7 billion.

Apart from the EU support in the region, China has also been an active player in the Western Balkans, raising many discussions and concerns over the past years. More specifically, the Chinese Government has announced a \$10 billion credit line to support Chinese investment in the Central and Eastern Europe, as well as a secretariat to facilitate cooperation and a commitment to two-way trade. In addition, the Chinese government has stated its aim to establish a \$3 billion investment fund for the broader region, including the Western Balkans (source: European Union Institute for Security Studies (EUISS), Brief Issue, February 2017 – China’s Road: into the Western Balkans).

Currently, China has already invested or plans to invest in many transport infrastructure projects, especially in Serbia and Montenegro, such as the Belgrade-Budapest high-speed railway line in Serbia and the Bar-Boljare motorway in Montenegro. Usually, a direct lending scheme for infrastructure projects is used which involves a loan covering up to 85% of the investment, while the rest is financed by national funds. These loans are based on favourable financial terms with long maturity periods and low investment rates. However, they also come with other conditions regarding the equipment and labour used for the construction of the projects. A good example is the agreement between the Montenegrin and Chinese Governments for the construction of the Bar – Boljare motorway. More specifically, a € 689 mln loan has been granted to Montenegro with the condition (among others) that the Chinese construction company involved in the project is exempted from taxes and custom fees (source: European Union Institute for Security Studies (EUISS), Brief Issue, February 2017 – China’s Road: into the Western Balkans).

However, the real question remains: Will the Chinese investment plans in the Western Balkans have a significant impact on EU plans and programmes, including on the TEN-T? The EU invests in transport projects aiming at enhancing the transport networks’ efficiency and capacity and building new infrastructure compliant to the TEN-T standards. Will the Chinese built infrastructure follow the EU policies and TEN-T standards?

In the two previous reports, all on-going and planned infrastructure projects known to date, as obtained from the Connectivity Agenda (Vienna, Paris and Trieste Summits, 2015, 2016 and 2017, respectively), the National Single Project Pipelines (SPPs), as well as the SEETO MAP 2016, as well as the Connectivity Network Gap Analysis (May 2016) were recorded.

The maturity status of some of the identified on-going and planned projects has changed over the past months. In the following Table, a list of all identified projects per mode is presented, along with their updated status (i.e. 2017).

The majority of the projects listed herein regard the new construction or substantial upgrade of the technical infrastructure, while others tackle organizational and

administrative issues. However, projects which are related to maintenance without any extension of existing capacities are not listed as Corridor projects.

5.2 List of Infrastructure Works and Preparations

5.2.1 Implementation of Rail Infrastructure including RRT

Rail sections non-compliant to the parameters set out in the Regulation are the main bottlenecks identified along the OEM Corridor related WB Core Rail network.

In HU, RS, ME, XK, MK, EL there are in total 16 on-going or planned projects.

Most of these projects consist of the construction of new or upgrading of existing rail sections in order to achieve compliance with the technical requirements of the Regulation.

The costs for the implementation of the projects of this category amount to € 2.9 billion (as far as costs are known).

In the following Table, an overview of the identified projects is presented.

Table 26: Rail projects addressing technical compliance/bottlenecks

No.	Location	Project name	Timing	Cost € mln	Financing sources	Status
1	RS	Modernisation of the Niš - Preševo (border with MK) railway line	2025	165	Russian Government Loan, EBRD	PFS, FS, PD, ESIA are ongoing
2	RS	<i>Reconstruction, modernisation and construction of the second track on the section Stalać-Djunis of the railway line Beograd-Niš</i>	<i>2025</i>	<i>150</i>	<i>Funding not yet secured</i>	<i>PFS completed</i>
3	RS	Modernisation for the contemporary double track traffic of the single track section of the railway line Resnik - Klenje - Mali Pozarevac - Velika Plana	2030	n.a.	Funding not yet secured	PFS is completed
4	RS	Modernization and Reconstruction of the Railway Line Velika Plana - Stalać	2030	n.a.	Funding not yet secured	PFS is completed
5	RS	<i>Reconstruction and modernisation of the railway line Novi Sad - Subotica - border with Hungary (Kelebija)</i>	<i>2020</i>	<i>541</i>	<i>Chinese EXIM bank, Russia Government Loan</i>	<i>PFS, FS, PD, ESIA are completed</i>
6	RS	Reconstruction and Modernization of the railway line Stalać - Kraljevo - Rudnica	2030	202.5	Funding not yet secured	PFS is ongoing
7	ME	<i>Reconstruction and Modernization Railway Line (Beograd) - Vrbnica - Bar</i>	<i>2025</i>	<i>40 (for part of the works)</i>	<i>EIB, EBRD and CEB Loans</i>	<i>Works Tender Launched for part of the works. DD is ongoing for the rehabilitation of concrete bridges</i>
8	MK	Reconstruction of the railway section along the corridor X Dracevo - Veles	2025	n.a.	n.a.	

No.	Location	Project name	Timing	Cost € mln	Financing sources	Status
9	MK	Rehabilitation and modernisation of the railway section along Corridor X Tabanovci - Dracevo	2020	n.a.	EBRD Loan	Works completed
10	MK	Rehabilitation and modernisation of the railway section along Corridor X Veles-Gevgelija	2025	n.a.	n.a.	
11	XK	<i>General Rehabilitation of Railway Route 10 (admin. line with Serbia Leshak –Fushë Kosovë – Hani i Elezit – Border with MK)</i>	<i>2020</i>	<i>194</i>	<i>EIB, EBRD Loans, Austrian Government</i>	<i>PFS and FS are completed Works Tender Launched</i>
12	EL	Construction of new deviation of the existing line Thessaloniki-Idomeni, in Polikastro-Idomeni, section	2019	96	ERDF	Under construction
13	EL	Installation of ETCS level 1 in Thessaloniki-Polikastro, section	2019	10.6	Cohesion Fund	Preparatory
14	EL	Installation of GSM-R in Thessaloniki-Idomeni section	2020	6	Cohesion Fund	Preparatory
15	HU	Modernisation and upgrading of the 165 km long Hungarian section of the Budapest-Beograd railway line (No. 150 of MÁV Hungarian State Railways between Budapest-Ferencváros and Kelebija HU/RS border crossing)	2018	1,500	Chinese sovereign loan	Under construction
16	RS	<i>Intermodal Terminal in Beograd</i>	<i>2019</i>	<i>15.5</i>	<i>Co-financed</i>	<i>Works Tender Launched</i>

Note: The projects in blue italics are projects included in the list of the OEM pre-identified projects in the Connectivity Agenda (Vienna Summit, 2015, Paris Summit, 2016 and Trieste Summit, 2017)

The total cost for the above listed 16 studies and works is € 2.9 billion.

In conclusion, the investment projects for the rail Network Rail and Rail-Road Terminals are expected to be completed by 2030 and will address the majority of the existing technical compliance and capacity bottlenecks in the OEM Corridor related WB Core Rail Network. However, it should be noted that there is little information on whether or not the train length criterion will be met after the implementation of the previously identified railway projects. Furthermore, it seems that ERTMS is also not included in most of the above railway projects. Also, the undefined source of funding for many of these projects is deemed problematic, as it would hinder their implementation in the short-term, especially given the fact that railway projects involve high construction costs.

5.2.2 Implementation of Road Infrastructure

For the Road Network, 18 projects were identified. These projects either refer to the technical compliance of the network (missing links in expressway/motorway network), interoperability systems (ITS deployment) and capacity upgrades to address existing capacity bottlenecks and/or rehabilitation related issues of the network. Out of the 17 identified projects:

- 14 address technical compliance/ bottlenecks
- 1 addresses interoperability and
- 2 address capacity issues.

In the following Table, an overview of the identified road projects is presented, while a more detailed description of the projects is included in Annex 2.

Table 27: Road projects addressing technical compliance/bottlenecks, interoperability or capacity issues

No.	Location	Project name	Timing	Cost € mln	Financing sources	Status
1	RS	<i>Completion of Beograd bypass, Sector 6: Strazevica-Bubanj Potok (7.4 km)</i>	2022	143	<i>Funding not yet secured negotiations about potential borrowing from Azerbaijan under way</i>	<i>PFS, FS, ESIA are completed</i>
2	RS	Reconstruction and upgrade of road section between Ostružnica and Strazevica (Sectors 4 and 5)	2020	60	Funding not yet secured	PFS, FS, PD, ESIA are completed
3	RS	Construction of road section between Grdelica and Preševo	2017	n.a.	EIB, EBRD and The World Bank	Under Construction
4	RS	Požega-Boljare road (border with ME)	2030	1,885	n.a.	PFS is completed
5	RS	Construction of the road sections Požega-Beograd	2020	1,098	n.a.	PFS, FS, PD, ESIA are completed, Some sections under construction
6	RS	<i>Construction of highway section Merdare-Kuršumlija - Prokuplje bypass - Merosina - Niš</i>	2022	512	<i>Funding not yet secured</i>	<i>PFS is completed FS and PD are ongoing</i>
7	ME	<i>Completion of Road Route 4, section Mateševo-Andrijevića</i>	2025	295	<i>Funding not yet secured</i>	<i>PFS is completed</i>
8	ME	<i>Construction of bypass Podgorica (Capital-Smokovac-Farmac)</i>	2025	233	<i>Funding not yet secured</i>	<i>PFS is completed</i>
9	ME	Route 4: Highway Bar - Boljare, section Mateševo-Podgorica (Smokovac)	2019	810	Chinese EXIM Bank	PFS, FS, PD, ESIA are completed
10	ME	Route 4: Highway Bar-Boljare, section Djurmani - Farmaci	2030	n.a.	n.a.	PFS is completed
11	ME	Route 4: Highway Bar-Boljare, section Andrijevića - Boljare	2030	n.a.	n.a.	PFS is completed

No.	Location	Project name	Timing	Cost € mln	Financing sources	Status
12	MK	Reconstruction of road section between Demir Kapija and Udovo	2016	287	EIB Loan, IPA Funds, EBRD Loan	Under construction
13	MK	Rehabilitation of the road section between Kumanovo and Miladinovci	2017	35	n.a.	Under construction
14	MK	Construction of road section Skopje - Kosovo border	2025	131	n.a.	PFS, FS, PD, ESIA are completed
15	XK	<i>Construction of the road section Prishtine/ Priština – Border with MK</i>	<i>2018</i>	<i>660</i>	<i>n.a.</i>	<i>Under construction</i>
16	XK	<i>Construction of the motorway section Prishtine/ Priština - Merdare</i>	<i>2022</i>	<i>150</i>	<i>Funding not yet secured</i>	<i>PFS, FS, ESIA are completed</i>
17	MK	Implementation of ITS on the Road Corridor X	n.a.	20	n.a.	n.a.

Note: The projects in blue italics are projects included in the list of the OEM pre-identified projects in the Connectivity Agenda (Vienna Summit, 2015, Paris Summit, 2016 and Trieste Summit, 2017)

The total cost of the previously listed road investments, for which cost estimates are available, amounts to € 6.3 billion. Most of these projects refer to the construction motorways in RS, XK, and ME, which will address the compliance missing links in the network.

All the OEM related WB core road network sections that are not compliant with Motorway/express road criterion are covered by projects planned to be completed till 2030. However, funding is secured only for the projects that are under implementation, i.e. for:

- the construction of road section between Grdelica and Preševo in RS and
- the reconstruction of road section between Demir Kapija and Udovo in MK.

All the other projects have not secured financing.

If implemented in due course, the identified projects will solve the current and potential future capacity problems with one exemption: Dobanovci (bypass) - Ostružnica (bypass), which according to the Moderate/High economic scenario will need upgrading to full motorway standard (currently one carriageway is operational). The motorway section Bubanj Potok (bypass) - Mali Požarevac is forecasted to have saturation rate as of 2030 of 86%, which does not require immediate actions. Same refers to motorway sections under construction from Prishtinë/Priština by-pass to Lipjan, or which very high traffic growth is forecasted (3 times current levels). In this case traffic evolution should be observed and if needed extension from 2x2 to 2x3 lanes might be need.

5.2.3 Implementation of Maritime and Airport Infrastructure

Two project already planned were identified for maritime and air transport. The first project refers to the implementation of a Vessel Traffic Monitoring and Information System (VTMIS) in the port of Bar (ME), whereas the second will address the compliance gap for the Airport of Prishtine/Priština (XK) with the construction of a railway link between Prishtine/Priština and the Prishtine/Priština Airport. An overview of these two projects is presented in the following Table.

Table 28: Seaport and Airport projects addressing technical compliance/bottlenecks and interoperability issues

No.	Location	Project name	Timing	Cost € mln	Financing sources	Status
1	ME	Implementation of a Vessel Traffic Monitoring and Information System (VTMIS) Phase II	NA	5	NA	NA
2	XK	Construction and modernisation of a Railway Line Prishtine/Priština - Fushë Kosovë - Prishtine/Priština Airport "Adem Jashari"	2020	40.2	Funding not yet secured	FS is completed

5.3 Environmental impacts, Decarbonisation and Climate Change Adaptation

5.3.1 Mitigation of environmental impacts

Looking at the previously identified and analysed projects, it is of great importance to examine whether and to what extent these will contribute towards the mitigation of environmental impacts in the area. A common set of guidelines has been developed within the OEM CNC Study which focuses on the projects along the OEM CNC. Based on these guidelines, different categories of projects in respect to their contribution to decarbonising transport and their ability to tackle other environmental impacts in the TEN-T core network corridors are identified. The different categories of projects influence in different ways the environmental impact mitigation, depending upon whether they target actual transport volumes, the load factors, aspects to do with the consumption of fuels, or by directly reducing emissions.

The projects are mainly grouped into four categories:

1. Alternative fuels (Type 1): Projects that promote electricity or hydrogen in transport (for which emission factors are very close to zero, and that may fall within the policy scope of the EU Emissions Trading System).
2. Alternative fuels (Type 2): Projects that promote Natural Gas or Biofuels in transport.
3. Efficiency: Projects that promote energy efficiency or improved operations, leading to more efficient routes (i.e. less pkm or tkm) and/or improved load factors (i.e. less vkm).
4. Modal shift: projects that promote shift towards more efficient modes of transport, i.e. with higher load factors, better energy efficiency and lower emission factors.

The previously identified projects (Chapter 5.2) fall under project categories 3 and 4, as they mainly promote improved transport operations (higher railway speed, increased axle load for the railway network, higher quality road infrastructure) and modal shift. Regarding the modal shift in particular, the identified railway projects in the region will result in higher quality and reliable railway services. At the same time, the increased capacity of the entire railway network in the region and the increased regional

connectivity (increased axle load, construction of missing links) will contribute in making railways a competitive and attractive transport mode, especially for the freight transport market.

5.3.2 Climate Change Resilience

The most important climate change-related threats which may impact transport systems are presented in the following Table:

Table 29: Overview of Climate impacts and threats to transport modes (based on bibliography)

Climate Impact	Modes of transport	Regions affected
Increased Summer Temperatures	Road, Rail, Inland Waterways	All
Increased Winter Temperatures	Road	All
Increased Precipitation and Floods	Road, Rail, Inland Waterways, Aviation	Winter: all regions Summer: Northern WB region
Increased summer droughts	Inland Waterways	Summer: Serbia
Increased and more frequent extreme winds	Road, Rail, Maritime, Aviation	Storms are likely to become more frequent in Central and Southern Europe.
Sea Level Rise and sea storm surges	Road, Rail, Maritime	Coastal areas of Montenegro
Change in frequency of Winter Storms	Road, Aviation	More extreme snow precipitation in Serbia, Kosovo Positive impacts (i.e. less snow) throughout Europe
Permafrost degradation and thawing	Road, Rail, Aviation	Mountainous areas in WB region

Source: PESETA II project¹¹, the work of Nemry and Demirel (2012)¹² and the FP7 WEATHER project¹³

Currently, there are national strategies for climate change, as well as other related studies, in all examined countries:

- Serbia: "Climate Change Strategy and Action Plan"¹⁴ which, among others, identifies and analyses climate change adaptation options in priority sectors for 2030 and 2050. A strategic framework is established for future projects, policies and measures for adaptation.
- The former Yugoslav Republic of Macedonia: "Support to the Government of Macedonia: Transport Sector Green Growth & Climate Change Analytical", World Bank, October 2012. This study focused on assessing the impacts of climate change, climate variability and extreme weather events on road and rail, infrastructure assets and road and rail services; developing and appraising adaptation measures, and providing a prioritized adaptation action plan; producing a set of adaptation guidelines, for use in future risk assessments. This

¹¹ Ciscar JC, Feyen L, Soria A, Lavalle C, Raes F, Perry M, Nemry F, Demirel H, Rozsai M, Dosio A, Donatelli M, Srivastava A, Fumagalli D, Niemeyer S, Shrestha S, Ciaian P, Himics M, Van Doorslaer B, Barrios S, Ibáñez N, Forzieri G, Rojas R, Bianchi A, Dowling P, Camia A, Libertà G, San Miguel J, de Rigo D, Caudullo G, Barredo JJ, Paci D, Pycroft J, Saveyn B, Van Regemorter D, Revesz T, Vandyck T, Vrontisi Z, Baranzelli C, Vandecasteele I, Batista e Silva F, Ibarreta D (2014). Climate Impacts in Europe. The JRC PESETA II Project. JRC Scientific and Policy Reports, EUR 26586EN.

¹² Françoise Nemry, Hande Demirel, 2012. Impacts of Climate Change: A focus on road and rail transport infrastructures. European Commission. Joint Research Centre. Institute for Prospective Technological Studies.

¹³ Enei, R., C. Doll, S. Klug, I. Partzsch, N. Sedlacek, J. Kiel, N. Nesterova, L. Rudzikaite, A. Papanikolaou, V. Mitsakis (2011):, – Vulnerability of transport systems- Main report, Transport Sector Vulnerabilities within the research project WEATHER (Weather Extremes: Impacts on Transport Systems and Hazards for European Regions) funded under the 7th framework program of the European Commission.

¹⁴ <http://www.serbiacclimatestrategy.eu/serbia-climate-change-strategy-and-action-plan/>

study offers valuable information on all vulnerabilities of transport infrastructure (assets) and services to the impacts of climate change.

7. Montenegro: "National Climate Change Strategy" adopted in 2015, which defines the wider strategic framework and action plan of Montenegro for sustainable development, including vulnerability assessment for different regions within the country (coastal area, mountains). However, it is noted that currently there is no National Strategy for adaptation to climate changes.
8. Kosovo: "Climate Change Framework Strategy (CCFS) for Kosovo", 2014, which examines mitigation and adaptation measures within the general sustainable development process.

6 Potential Administrative and Operational Barriers and Measures

6.1 Introduction

Addressing the non-physical barriers is critical for enhancing connectivity in Southeast Europe and for better integrating WB6 networks into the EU. In addition to requiring significantly lower financial resources to alleviate, the economic returns to removing non-physical obstacles are relatively high. Moreover, the economic development benefits expected from investment in costly transport infrastructure will not be fully realized if non-physical barriers and regulatory and procedural constraints at the borders and along the corridors are not removed.

The list of administrative measures in transport is based mostly on the findings and analysis in the Regional Transport Study (REBIS) carried out by the World Bank, as well as the Flagship Axes Action Plan, developed by EC TA to SEETO. These two studies prove the need to focus on non-physical barriers, in order to be able to improve the network's efficiency.

The identified non-physical barriers contribute to an increase in transport costs and reduction in reliability of supply chains ultimately diverting potential business from the region. The REBIS study provides a crude order of magnitude of total logistics costs in the Western Balkans, as well as an estimate of how much of these could potentially be avoided if the operational environment reaches average EU levels.

The key areas of intervention necessary to alleviate non-physical barriers in customs and transport policy, according to the REBIS Study are:

- Administrative and institutional capacity in the regulatory and implementing agencies
- Adoption and implementation of inter-operable Information Technology (IT) systems in trade and transport
- Inter-agency cooperation both in trade and transport operations
- In transport: safety regulation and enforcement in all modes, especially in road transport
- In transport: access to markets, especially in rail but also in air transport
- In customs: risk management systems and simplified customs procedures
- In customs: adoption of inter-connected IT systems, such as the New Computerized Transport System (NCTS) in transit operations

Moreover, within the SEETO Flagship Axes initiative, in the period 2014-2015, an EC Technical assistance has been granted to assist SEETO in identifying potential short-term investments and measures that would enhance the efficiency performance of the flagship corridors, and to elaborate substantial measures and recommendations for addressing barriers and for harmonisation of procedures.

Under the Flagship Axes Initiative, in March 2015 an ACTION PLAN TO ESTABLISH SOUTH EAST EUROPEAN TRANSPORT FLAGSHIP CORRIDORS was published. The basic objectives of this plan were to identify:

- Actions to establish an organisational structure the aim of which is to implement specific activities, the "Horizontal Actions" and
- Corridor related Actions the aim of which is to improve the attractiveness and competitiveness of the SEETO FLAGSHIP CORRIDORS, the "Corridor related Action".

The Action plan contains the following actions/administrative measures, relevant to all or to specific OEM routes only, are as follows:

- Action No. 1 Establish the Transport Facilitation Working Group (TF WG);
- Action No. 2 Establish corridor management on selected flagship corridor that have a Sub-group on a pilot basis by using the model of the corridor management for the European Corridors;
- Action No.3 Support Rail Market opening for the SEETO region
- Action No. 4 Ensure that the electronic transmission system of the road sector (e.g. SEED or NCTS) or rail-specific systems (e.g. RAILDATA, RNE systems, etc.) are applied to the railway sector
- Action No. 6 Harmonise the axle load charges between the SEETO participants and the EU member states
- Action No. 7 Study the possibility of division of labour between geographically close road BCPs in order to reduce queuing and procedure times at the borders
- Action No. 8: Transpose into national law the Regulation 913/2010/EU to establish international market-oriented Rail Freight Corridors (RFCs)
- Action No. 9 Prepare the application and become a member of RNE and join RNE international Working Groups
- Action No. 10 Enhance rail operations in the entire port operations of the ports on SEETO Flagship Corridors Bar, Durres and Ploče¹⁵ by improving the railway infrastructure, the efficiency of rail operations and the logistics between maritime and rail transport
- Action No. 11 Actively involve the ports (authorities and operators) of the SEETO Flagship Corridors in the promotion and management of the respective flagship corridors where they are located
- Action No. 12 Conclude negotiations on all rail BCAs between Hungary and Serbia based on the models for the border crossing agreements
- Action No. 14 Find a solution to render possible the signature of the border crossing agreement between the former Yugoslav Republic of Macedonia and Greece according to the model agreement of SEETO
- Action No. 16 Initiate meetings with the competent EC DG Customs to discuss the possibilities of simplifying the transit procedures for goods to and from EU member states to and from Greece, based on model agreements Switzerland/EU, Norway/Sweden or EU/Russia for the corridor Kaliningrad – Lithuania
- Action No. 17 Install a fully functional border police office at the Greek border station (BCP Idomeni – Corridor X) to shorten delays for international passenger trains
- Action No. 18 Support the competent Ministries in Serbia and the former Yugoslav Republic of Macedonia to implement the border crossing agreement
- Action No. 22 Initiate research on the present legal status of the terminal in Serbia at the Serbian- the former Yugoslav Republic of Macedonia border in order to find out why the terminal has not been used for its original purpose
- Action No. 27 Provide one parking lane on each side of joint crossing point Merdare in order to avoid the occupation of the normal road by waiting lorries and busses and to increase the safety

¹⁵ Durres and Ploče seaport are not relevant to OEM.

Action No. 29 Improve the competitiveness and attractiveness of the flagship Corridor Bar – Beograd and Eastern Europe by improving the communication among the border stakeholders/railways by means of electronic transmission

Action No. 30 SEETO initiates the respective steps with both Montenegro and Serbia border police and customs authorities to render possible the installation of the respective office space at the rail border stations in order to enable joint controls on moving trains between the two countries

Action No. 31 Adapt the existing rail BCA between Serbia and Montenegro based on the model for the border crossing agreement

Action No. 32 Provide joint border infrastructure (single window) installations at the road border control on Route 4 between Serbia and Montenegro

The monitoring of the Action Plan implementation is going to be carried out by a Transport Facilitation Working Group (TFWG), which is developed under auspices of SEETO. SEETO and the TFWG will put a special emphasis on the involvement of the private sector (operators, ports, freight forwarders), thus making possible a market-oriented approach in the extended TEN-T Network to the Western Balkans and Core Corridors Flagship Axis implementation. At the same time, the Action Plan distributes the responsibilities among various state institutions and agencies, which need to commit and prove to the market that there is a willingness to improve supply chains using the corridors.

On the basis of this wider priority list of soft measures (based on Flagship, REBIS and SEETO documents), at the Western Balkan 6 summit (Vienna) in August 2015, the WB6 countries have committed to implement several policy measures until 2020. The measures are presented in the Table below.

Table 30: Soft Measures (Vienna Summit 2015)

Medium-term Regional Actions (2020 Goals)	Short-term Regional Actions (2016 Goals)
1. Opening of the transport market	
1.1 Implementation of rail reform strategy	<ul style="list-style-type: none"> Rail market opening on the pilot basis on the Orient/East Med corridor Definition of a framework for implementation of EU Freight corridors extended to the Western Balkans
2. Establishment of competitive, reliable and safe transport system	
2.1 Improvement of road safety Targeting the reduction of fatalities by 20% compared to reference year 2014	<ul style="list-style-type: none"> Adoption of Road Safety inspection (RSI) guidelines and curriculum and delivering of training
2.2 Trade and Transport Facilitation	<ul style="list-style-type: none"> Development and implementation of System of Exchange Excise Data (SEED) Plus to support the CEFTA Framework Agreement on exchange of data and simplification of inspections Signature of a legally binding document-protocol on an exchange of transport data in cooperation with CEFTA
2.3 Intelligent Transport System (ITS) deployment on the Core Network	<ul style="list-style-type: none"> Definition of strategic framework for implementation of ITS on the Core Network
2.4 Establishment of functioning maintenance system ensuring no section in poor/very poor condition	<ul style="list-style-type: none"> Adoption of Maintenance Plan for 2016-2020 for the entire Core Network

3. Increasing effectiveness of Border Crossing Procedures	
3.1 Effective Border Crossing Agreements	<ul style="list-style-type: none"> • Implementation of the BCA between Serbia and the former Yugoslav Republic of Macedonia • Conclusion of negotiations between Bosnia and Herzegovina and Croatia for all BCPs • Implementation of BCA between Montenegro and Albania as a part of Adriatic-Ionian highway project
3.2 Implementation of Integrated Border Management (IBM) strategy	<ul style="list-style-type: none"> • Implementation of IBM at Common Crossing Points (CCPs) between Serbia and Kosovo <ul style="list-style-type: none"> ◦ Provide one parking lane on each side of the CCP of Merdare

Source: Connectivity Agenda 2015 (Vienna Summit)

Moreover, the Technical Assistance to Connectivity in the Western Balkans (CONNECTA) which was launched in January 2017, will focus on bringing high priority transport infrastructure projects to maturity for investment co-financing and also assist in the preparation and implementation of short and medium terms regional transport reform measures. Currently, within CONNECTA's project pipeline, the following assignments are included:

- Strategic framework for implementation of ITS on TEN-T core network in Western Balkans all transport modes and interfaces (ongoing)
- Preparation of 5 year maintenance plan for the indicative extension of TEN-T Road/Rail core networks in Western Balkans roads and railways
- Preparation of road safety Inspection and Audit plans for the core/comprehensive road networks in Western Balkans and Pilot roads

Finally, it should be noted that the European Commission intends to reflect progress in soft measures implementation in future funding decisions on infrastructure co-financing. More specifically, the EC will give higher priority for co-financing of the infrastructure projects to those WB6 countries which have implemented/ are closer to full implementation of the soft measures. In practical terms this means that if there is a sufficiently large pipeline of relevant, mature, priority projects to choose from, EC will favour investment projects in the sector and country where progress is most visible/tangible.

Overall, it seems that during the past few years significant progress has been made in terms of addressing the non-physical bottlenecks in the region. However, further effort is needed for the implementation of all identified mitigation (soft) measures, especially at national level. Furthermore, lack of institutional capacity has many times become an obstacle in efficiently achieving the required results. In the following sub-sections, an overview of the existing situation in terms of non-physical barriers and measures is presented for the railway and road sectors, as these two sectors are the only ones represented in the previously mentioned list of soft measures.

6.2 Rail

The bottlenecks on the railway network of the Western Balkans Region are mostly the consequence of non-compliance with EU Regulation 1315/2013, especially from the view of train speed, train lengths, electrification issues, a number of rail tracks (single lines) and non-compliance with ERTMS deployment. These factors, accompanied by insufficient maintenance in the past years and the current condition of the railway infrastructure on the whole part of the network, have led to several bottlenecks that are also present on the cross-border sections between analysed countries. There are reports on the long waiting times on the cross-border sections which represent one of the biggest challenges

in railway operations. The most significant problems are a consequence of switching between electrified and non-electrified parts of the rail network, different maximum train lengths between cross-border sections and a limited quantity of tracks available (limited capacity). Additionally, waiting times are also increased due to the internal procedures of rail operators and insufficient communication between involved parties, such as long waiting time for locomotive, staff and technical control. Among potential issues, we can also count language barriers in the border stations and even different rules and procedures between stations.

These are bottlenecks, caused by physical barriers, which are a consequence and cause of administrative/non-physical barriers. During railway operations, there are also several barriers that disable efficient cooperation among stakeholders involved in rail operations. For the case of OEM WB6 extension, several potential administrative and operational non-physical barriers can be identified. Current issues observed consist of:

- **Market liberalisation (opening national rail market for passenger and freight transport)**

Opening up national freight and passenger markets to cross-border competition is one of the major steps towards creating an integrated European railway area and a genuine EU internal market for rail. The markets in Serbia, Montenegro, Kosovo and the former Yugoslav Republic of Macedonia are still far from being opened, as their railway network is operated by national operators.

According to a SEETO Report on the implementation of the soft measures, presented during the Paris summit in July 2016 ("Soft Measures Monitoring Progress report, September 2015-June 2016", SEETO), it is one of the most complex policy reforms in the transport sector for which the WB6 countries efforts started way before the WB6 process. In fact, it is one of the regular sectoral priorities within SEETO and a commitment taken by the countries for creating a regional rail market since the signing of the Railway Addendum to the SEETO MoU in 2008.

Table 31: Rail reform measures progress

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Rail market opening on the pilot basis on the OEM Corridor	SA. 1 Legislative changes to allow market opening to domestic carriers	Ministries of Transport (MoT) supported by the Railway Regulatory bodies	1	3	3	2
	SA. 2 Regular consultation platforms with forwarders and shippers established	Infrastructure managers (IM) consulting their users	3	1	3	3
	SA. 3 Mutual recognition of train driver license	Safety authorities	2	2	2	2
	SA. 4: Review of national technical rules and safety rules for elimination or later reporting to ERA	Safety authorities	1	1	2	1
	SA. 5 Network statement for the main infrastructure manager published	Infrastructure managers	3	3	3	3
	SA. 6 Networks statements for rail freight terminals, including in sea ports and river ports published	Terminal operators	1	1	1	2
Total scoring			61%	61%	78%	72%

Source: "Soft Measures Monitoring Progress report, June 2017", SEETO

Consequently, it is one of the most difficult measures to achieve, encompassing currently 6 sub-actions (see Table above). Despite the fact that good dynamics can be tracked in the reporting period, the region as a whole is not sufficiently ready to open the rail market, with the exception of Serbia where the first private railway operator signed a Contract with the Infrastructure Manager (IM) for the use of the railway infrastructure on 25 March 2017 (source: Connectivity Reform Measures Monitoring, Progress Report, SEETO, June 2017). It is noted that this measure should be extended to Albania and Bosnia and Herzegovina, in order to create equal footing to all WB6 countries and necessary conditions for a market opening on a regional level, as well as for improving the attractiveness and competitiveness on the Mediterranean corridor, too. The measure also needs to be devised to make distinction of the situations where there is and where there is not a potentially interested new entrant and perhaps to accommodate some rail safety aspects, too.

- **Establishment of necessary railway bodies**

In order to have an efficient and fair competition when the markets are open, it is necessary to have a strong regulatory body in place to monitor railway markets and to act as an appeal body for rail companies, if they believe they have been unfairly treated.

- **Long border crossing procedures**

One of the problems that disables efficient transport among the countries lies in the planning of the long border crossing procedures. The planning of the administrative, communication, customs clearance, communication and information technology processes is inevitable at the modernised border crossing points. The technical capacities of those points shall be harmonised with the requirements put by the commodities to be handled as well.

- **Communication among rail stakeholders**

The smooth transfer of data along with effective and efficient communication between all parties and stakeholders is essential for effective railway transport. This includes information sharing between infrastructure managers of all countries on the OEM WB6 corridor.

- **Data sharing - rail-specific systems (e.g. RAILDATA, RNE systems, etc.) are applied to the railway sector**

Data sharing between all stakeholders is vital; a continuous flow of information regarding the current and foreseen situation on the line is necessary. The format of this information must be understandable to logistic managers as opposed to experts in the rail industry. This information flow could then be developed into a tool that allows for the creation of reliable ad-hoc slots at short notice for trains crossing the border. A further problem related to communication is the language skills of the dispatchers. Employees in these positions should be bilingual.

- **Inefficient resource utilisation**

During the modernisation/rehabilitation phases there are several cases of disruption and all necessary measures have to be taken to ensure that the maximum use is made of all resources, equipment and facilities. This includes fully utilising other available routes and corridors, sidings, freight yards, locomotives and wagons.

- **Market oriented rail freight corridors**

According to the SEETO report "*Soft Measures Monitoring Progress report, June 2017*", there have been some delays in all WB6 countries regarding the implementation of the EU Freight corridors. Even though the consultations are completed at national level, there is a clear lack of proper coordination between the countries and the neighbouring EU Member States in adhering to a joint letter of intent for a Rail Freight Corridor. The only exception is Serbia which has concluded all these tasks.

In the following Table the progress made so far in each OEM related WB6 country is presented.

Table 32: Implementation of EU Freight Corridors progress

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Definition of a framework for implementation of EU	SA.1 Consultation on the national level, between the IM and MoT on the willingness for inclusion in Rail Freight Corridors	MoT, IM	3	3	3	3

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Freight Corridors, extended to the Western Balkans	SA.2 Consultation between the regional participants and the EU neighbouring countries on the Rail Freight Corridor passing through Western Balkans	Regional MoT, IM, EU neighbouring countries MoT and IM	2	2	3	2
	SA. 3 Joint letter of intent sent to the EC	Regional MoT, IM, EU neighbouring countries Mo and IM	0	0	3	0
	SA.4 Consultant contracted	Consultants	3	3	3	3
	SA.5 Rail Freight implementation plan drafted	Consultants	1	1	1	1
	SA.6 Inventory of rail facilities along the rail freight corridor prepared	Consultants	1	1	1	1
	SA.7 Market study in accordance with Regulation EU No 913/2010 drafted	Consultants	1	1	1	1
	SA.8 Finalization of TA services and decision on next activities based on the results and recommendations	DG NEAR and DG MOVE, MoT	n.a.	n.a.	n.a.	n.a.
Total scoring			52%	52%	71%	52%

Source: "Soft Measures Monitoring Progress report, June 2017", SEETO

• Rail border-crossing agreements

Simplifying border crossing procedures for both passengers and freight is one of the most significant initiatives that will eventually reduce travel times (target is a 50% travelling time reduction). The ultimate goal is to enhance railway services efficiency and competitiveness for international traffic. To this end, it is of great significance for the WB6 countries to sign bilateral agreements, in compliance with the EU acquis, in particular with Directive 2012/34/EU. At the same time, it is evident that there is a clear need for modernised equipment at border control points and also improving the coordination between the different rail border agencies.

Based on the SEETO Soft measures Monitoring Progress Report (June 2017), separate rail Border Crossing Points (BCP) agreements between the former Yugoslav Republic of Macedonia and Serbia, and between Albania and Montenegro are sufficiently advanced, as they are signed together with all relevant protocols. However, it is noted that these agreements are yet to be implemented. The rest of the BCP agreements are currently under negotiations.

• Rail Maintenance System

There is a need for developing a rail maintenance system in all WB6 countries that will ensure reliable and safe railway networks. Based on the SEETO Soft Measures Monitoring Progress Report (June 2017), it seems that the entire region is at an initial stage in establishing a proper maintenance system for the railway network. SEETO Secretariat contributed substantially in identifying the underlying issues in the field and in preparing Terms of Reference for assisting the countries in putting in place a solid rail asset management system and in defining proper maintenance five year plan. Currently, little progress has been made towards establishing a functioning maintenance system ensuring no rail section in poor/very poor condition by 2022.

6.3 Roads

The identified potential administrative and non-physical barriers causing bottlenecks on the road network of Western Balkan corridor are mainly connected with market liberalisation issues and border crossing procedures.

- **Market liberalisation**

The divergent permits quotas and restrictions are a major source of inefficiencies and costs reflecting on the road transport in WB in general and along OEM related core network in particular which results in low competitiveness and attractiveness. These concern difference in requirements and in duplicated controls on drivers, passengers, vehicles, and the transport operation itself.

- **Harmonisation of customs legislation**

The lack of common or bilateral agreements causes absence of cooperation between different national control bodies and duplicating of actions. The above concerns are relevant to the goods going to or coming from EU member states and transiting the non-EU member states, and the related documentations.

- **Border crossing procedures**

Currently there are no joint border crossing installations for road or provision of "single window" system allowing parties involved in trade and transport to lodge standardised information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements. Border crossing consist of a series of procedures being undertaken from the border police, customs, phytosanitary, and sanitary authorities from the one country, then moving several kilometres of distance to the border of the other country and start similar procedures again.

The border control and revision procedures, as well as limited throughput capacity, are time consuming and cost increasing, which results in long travel times for passengers and inefficient freight services.

Road safety and sanitary risks are identified as another border crossing issue. Not enough parking capacity or suitable parking space on each side of border crossing points, as well as the lack of extra parallel lanes for lorries, results in congested road lanes or blocked motorways, causing longer waiting times and impacting negatively on road safety.

Some of the identified bottlenecks are caused by physical barriers, but are directly consequence and cause of administrative/non-physical barriers.

- **Improvement of Road safety**

The road safety targets for the Western Balkans region are zero road fatalities, improved data collecting (statistics) and reporting, inspection and further treatment of black spots and improving the decision making processes in all countries.

The actions identified are:

- (i) Adoption of Road Safety Inspection (RSI) guidelines and curriculum and delivering of trainings
- (ii) Prepare three-year RSI plan for the core and comprehensive network and pilot RSIs on high accident sections
- (iii) Carry road safety audits as per the Directive 2008/96/EC on all projects on the core and comprehensive network
- (iv) Establish a national system for continuous road crash data collection (by 2018)

In the following Table the progress made so far in each OEM related WB6 country is presented for the adoption of RSI guidelines and trainings. It is noted that regarding the other three actions listed above, the progress made so far is only limited to Serbia, where a national system for road crash data collection has already been established. Furthermore, The Public Enterprise Roads of Serbia (PERS) is working in the ranking of road sections for RSI that will be based on the data available on traffic accidents and they recently completed a three-year RSI plan for the Core and Comprehensive networks in Serbia.

Table 33: Improvement of Road Safety

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Adoption of Road Safety Inspection (RSI) guidelines and curriculum and delivering of trainings	SA. 1 Assess the current legislation and practices including existing capacity and resources for the implementation of Road safety Inspection in SEETO Regional Participants and its alignment with relevant EU legislation;	SEETO Secretariat, SEETO Road Safety Working Group, Experts from the MoT and National Road Authorities	3	3	3	3
	SA. 2 Prepare the ToR for CONNECTA	SEETO Secretariat, SEETO Road Safety Working Group, Experts from the MoT and National Road Authorities	3	3	3	3
	SA. 3 Contract the consultants for providing the updated version of RSI Guidelines for SEETO Region	DG NEAR	3	3	3	3
	SA. 4 Develop a training curricula based on the common RSI Guidelines delivered under \$A.3 sub-action	Consultants	3	3	3	3
	SA.5 Organize and deliver training of the RS Experts of all regional participants based on the harmonized approach for the inspection of roads and in the curricula developed.	SEETO Road Safety Working Group, Experts from the MoT National Road Authorities SEETO	3	3	3	3
	SA.6 Finalization of the TA services and decision on the next activities based on the results – trained experts and curricula:	DG MOVE and Ministries of Transport	1	1	1	1
Total scoring			89%	89%	89%	89%

Source: "Soft Measures Monitoring Progress report, June 2017", SEETO

• Road Maintenance System

There is a need for developing a road maintenance system in all WB6 countries that will ensure high quality and safe road networks. Based on the SEETO Soft Measures Monitoring Progress Report (June 2017), it seems that the entire region is at an initial stage in establishing a proper maintenance system for roads. SEETO Secretariat contributed substantially in identifying the underlying issues in the field and in preparing Terms of Reference for assisting the countries in putting in place a solid road asset management system and in defining proper maintenance five year plan. Currently, little progress has been made towards establishing a functioning maintenance system ensuring no road section in poor/very poor condition by 2022.

6.4 Deployment of ITS solutions

Regarding the implementation of ITS on the Core Network in particular, it seems that currently the WB6 countries are on different levels of introducing ITS systems, without coherent introduction of the ITS even on a national level (different transport modes), usually without necessary interconnection between modes and between different systems on national and international level. The strategic framework for ITS implementation, which is currently being prepared by CONNECTA, will focus on the deployment of ITS (ERTMS, ITS, RIS, VTMS, e-freight) and IT system (e-documents, interfaces etc.) in the region for all transport modes. Furthermore, this framework will also include regional and national roadmaps for future implementation of the ITS and corresponding IT systems in the region according to the EU rules, also taking into account the current implemented systems. The strategic framework is expected to be completed by mid-July 2018.

In the following Tables, the progress made so far for the deployment of ITS solutions in all transport modes is presented.

Table 34: ITS Solutions for the Road Network

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Definition of strategic framework for implementation of ITS on the Core Road Network	SA.1 Transposition of the Directive 2010/40/EU into the national legislation	MoT, road transport agency	0	1	1	0
	SA.2 Adoption of ITS strategy together with an Action/implementation plan	MoT, road transport agency (with the support of donors and TAs, such as CONNECTA)	n.a.	n.a.	n.a.	n.a.
Total scoring			0%	33%	33%	0%

Source: "Soft Measures Monitoring Progress report, June 2017", SEETO

Table 35: ITS Solutions for the Rail Network

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Definition of strategic framework for implementation of ITS on the Core Rail Network	SA. 1 - Transposition of the relevant EU legislation (interoperability directive) into the national legislation	MoT, railway regulatory bodies	3	3	3	0
	SA. 2 - Adoption of the EU technical specifications and requirements (TSI CCS control, command and signalling including ERTMS)	MoT, railway regulatory bodies	1	0	3	0
	SA. 3 -Adoption of ITS strategy together with an Action/implementation plan	MoT, railway regulatory bodies, (with the support of donors and TAs, such as CONNECTA)	n.a.	n.a.	n.a.	n.a.
Total scoring			67%	50%	100%	0%

Source: "Soft Measures Monitoring Progress report, June 2017", SEETO

Table 36: ITS Solutions for the Maritime Network

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Definition of strategic framework for implementation of ITS on the Core Maritime Network	SA. 1 -Transposition of the relevant EU legislation (Directive 2002/59/EC) into the national legislation	MoT, maritime transport agency	n.a.	3	n.a.	n.a.
	SA. 2- Adoption of ITS strategy together with an Action/implementation plan	MoT, maritime transport agency (with the support of donors and TAs, such as CONNECTA)	n.a.	n.a.	n.a.	n.a.
Total scoring			n.a.	100%	n.a.	n.a.

Source: "Soft Measures Monitoring Progress report, June 2017", SEETO

Table 37: ITS Solutions for the IWW Network

MEASURE 2016	SUB-ACTIONS 2016	IMPLEMENTING BODY	OEM related WB6 countries			
			MK	ME	RS	XK
Definition of strategic framework for implementation of ITS on the Core IWW Network	SA. 1 -Transposition of the relevant EU legislation into the national legislation	MoT, IWW transport agency	n.a.	n.a.	3	n.a.
	SA.2 Adoption of ITS strategy together with an Action/implementation plan	MoT, IWW transport agency (with the support of donors and TAs, such as CONNECTA)	n.a.	n.a.	n.a.	n.a.
Total scoring			n.a.	n.a.	100%	n.a.

Source: "Soft Measures Monitoring Progress report, June 2017", SEETO

Specific actions undertaken independently by each country with regards to ITS solutions include the ongoing Detailed Design for ITS in the former Yugoslav Republic of Macedonia which is financed by national funds. This study is ongoing and its expected completion date is beginning of 2018. Furthermore, the government of Montenegro is currently drafting the new Law on Roads which aims at transposing the Directive 2010/40/EU within the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport. Finally, the Public Enterprise Roads of Serbia (PERS) has drafted the special Road Sector Strategy up to 2025 which defines strategic framework for ITS development in the road sector in Serbia. It is planned that this Strategy will be adopted in 2017.

7 Urban Nodes Analysis

7.1 Scope

The urban nodes analysis includes the study of the integration of the traffic in the urban node areas (as referred to in articles 30 and 41 of the TEN-T Regulation), with the perspective of identifying physical and technical barriers to the full development and functioning of the Corridor.

More specifically, the main objective is to identify 'urban bottlenecks' along the main arteries of the OEM Corridor related WB network within the urban nodes that either involve missing links and non-compliant OEM sections or hinder the integration and seamless connection of the OEM long distance traffic with the urban leg of TEN-T journeys. Moreover, since the interconnection of the intermodal points in urban areas is a priority in order to ensure smooth last mile connections, the analysis will also focus on last mile connections and interconnections between modes for both passengers and freight transport. The identification of missing links, bottlenecks and other barriers within and between transport modes in the urban nodes will be compared against the list of projects, and, where necessary, further viable solutions/interventions for resolving these will be proposed. The geographical boundary of urban nodes has been defined as the city (urban) area (often NUTS3 unit), while other Core nodes and sections in peri-urban zones have been taken into consideration, perceived as part of the urban structure (nodes/access points, motorway ring roads, etc.).

7.2 The Analysed Urban Nodes

Within the present report, 4 urban nodes were analysed. An overview of these nodes is presented in the following Table:

Table 38: Overview of OEM related WB6 Urban Nodes

Country	Urban Node	Corridors affected	Modes			Nodes/Access points			
			Rail	Road	IWW	Airp.	Mar. ports	IWW ports	RRTs
RS	Beograd	OEM, MED, RD	x	x	x	x	-	x	x
ME	Podgorica	OEM, MED	x	x	-	x	-	-	-
XK	Prishtine/ Pristina	OEM	x	x	-	x	-	-	-
MK	Skopje	OEM	x	x	-	x	-	-	x

7.3 Methodology of the Analysis

For the purpose of the urban nodes analysis, the following are considered: a study of the OEM related Corridor WB6 infrastructure within the wider urban node boundaries together with a focus on last mile connections.

In summary, the methodology adopted herein examines the urban node accessibility from the OEM, as well as last mile interface infrastructure, following a three-step approach:

- **1st step/Layer:** Overview of the urban node with all OEM Corridor infrastructure
- **2nd step/Layer:** Analysis of the OEM Corridor lines, including compliance with Reg. 1315/2013 requirements and comparison against projects that improve non-compliant sections and enhance intermodality.
- **3rd step/Layer:** Analysis of "last-mile" connection of nodes/access points (terminals, seaports, airports) to the corridor lines, including projects that improve non-compliant connections and enhance intermodality.

The above steps are presented graphically against a background map (as obtained from TENtec) for each OEM related WB6 urban node in Annex 2 of the present report.

More specifically, the **1st Layer** depicts:

- Corridor lines for rail, road and inland waterway with respective rail national line/road numbers and waterway appellations:
 - Allocation to different corridors is marked by different colours;
 - In case of overlapping rail or road segments, only one of these alignments is visible. In these cases, the overlap is denoted by multi-colour rail/road labels.
- Nodes/access points according to Reg. 1315/2013 belonging to the urban node area:
 - Intermodal terminals, differentiated between rail/road and trimodal (i.e. rail/road/inland waterway) terminals;
 - Maritime/inland ports: Inland ports that are part of an intermodal terminal (trimodal terminal, see above) are not marked separately. In contrast, ports with substantial functions besides intermodal traffic, receive a dedicated symbol;
 - Airports.
- Additional nodes/access points of importance:
 - Key passenger stations (criterion: regular stop of high-speed, long-haul passenger trains to/from other urban nodes);
 - Shunting yards as train composing stations for single wagon/wagon group traffic.

The **2nd Layer**, analysis of the OEM Corridor lines, includes the following:

- A presentation of the compliance check of the Corridor lines with the requirements of the Regulation (KPIs), to the extent that these are relevant/applicable for urban node areas. This is depicted as follows:
 - Line sections non-compliant are highlighted in red and labelled with a short description of the failure;
 - An overview table summarising the compliance check per modal specific parameters. Complete compliance of the entire urban node is marked with "✓", partial compliance with "(✓)" and complete non-compliance with "X".
- A presentation of related projects (from the OEM Corridor Project List) and their location:
 - With reference to the non-compliant sections of the lines;
 - With particular relevance for the development of the urban node in terms of Regulation 1315 and of "Issues Paper on Urban nodes/mobility", i.e. projects designed to enhance intermodality and capacity.

The **3rd Layer** involves a compliance check of the connection of the nodes/access points to the OEM Corridor's lines, i.e. last mile (including sections of the comprehensive network, where applicable), in order to examine whether a continuous, seamless traffic from the Corridor line via the last mile connection to the respective node/access points (and vice versa) is feasible. Similar to the above, non-compliant last mile sections are highlighted in red and labelled accordingly, while the compliance check is summarised in the respective table on the basis of criteria obtained from the Regulation and the KPI list, and narrowed down to those aspects that are relevant for the interoperability of the last mile. It should be noted that the criteria refer to the last mile segments and *not* to the infrastructure within the ports/terminals/airports.

Moreover, the dedicated check is performed for rail exclusively as similar road criteria do not exist. It can be safely assumed that road traffic is more flexible than rail, so that seamless road connection from the nodes/access points to the Corridor network via the last mile is always possible.

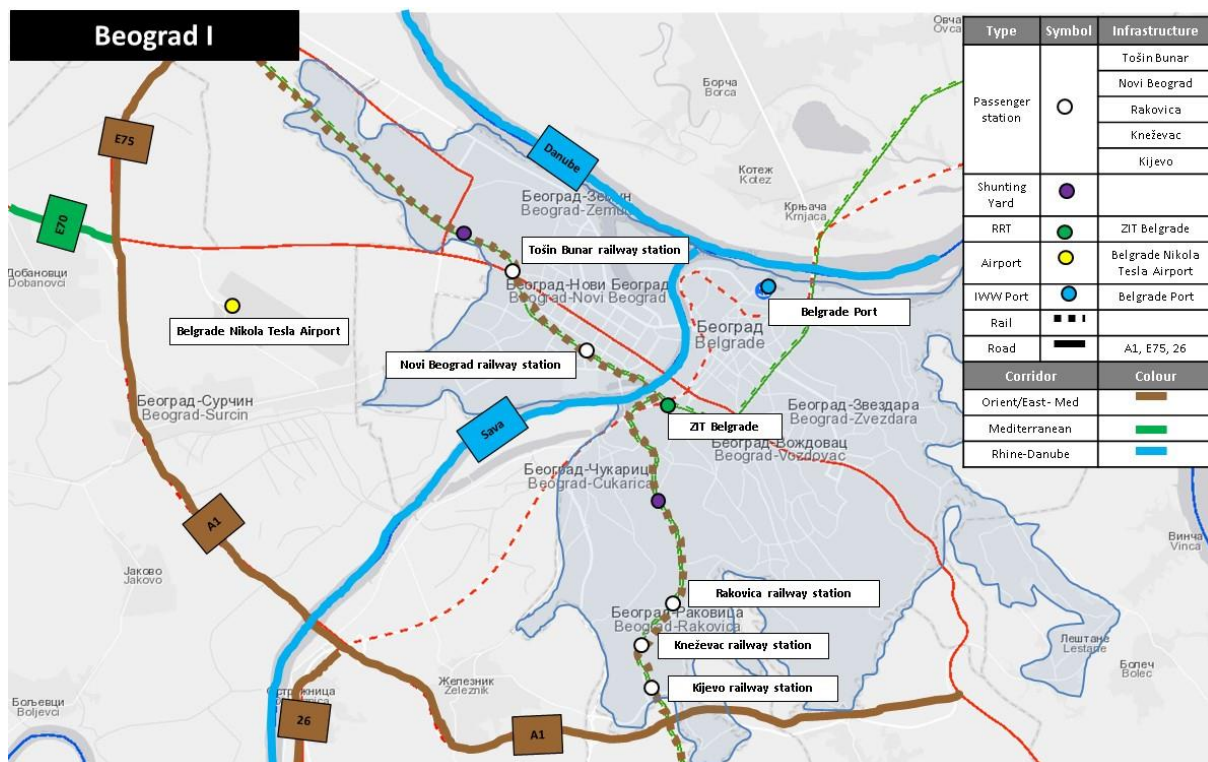
Relevant projects are also depicted, as follows:

- Projects with reference to the non-compliant last mile connections.
- Projects with particular relevance for the development of the urban node in terms of Regulation 1315/2013 and of "Issues Paper on Urban nodes/mobility", i.e. projects designed to enhance intermodality and capacity on the last mile;
- Road projects for the improvement of the last mile connection.

7.4 Beograd

Beograd is the capital of Serbia and also its biggest city with approximately 1.2 million inhabitants. The city covers an area of 359.96 km².

Figure 15: Beograd transport infrastructure



Source: Consortium based on TEN-TEC database

The graphical representation of the three layers approach for Beograd is presented in Annex 2.

Layers 1 and 2:

Road: The OEM related road network is not fully compliant with the TEN-T requirements, as sections between Dobanovci and Bubanj Potok (part of Beograd bypass) are neither motorway nor expressway. The completion of the Beograd bypass is one of the planned projects included in the Serbian SPP for which financing is secured.

Rail: Beograd is a rail node connecting passenger and freight flows in the north-south and west-east directions. The OEM related rail network within the urban node of Beograd is not compliant with the TEN-T requirements, as it does not allow for 740 m. trains.

Furthermore, the section between Beograd and Resnik allows for rail speed lower than 100 km/h. The reconstruction and modernisation of the railway line Beograd-Novi Sad-Subotica-Kelebija, part of which is in the Beograd urban node is the most significant project.

Air: The Beograd airport is located west of Beograd, outside the city boundaries. The airport is not connected to the rail network.

Multimodal: There is currently one RRT in Beograd (ZIT Beograd), while it is planned for a new terminal to be developed. This project is included in Connectivity Agenda 2015 (Vienna Summit).

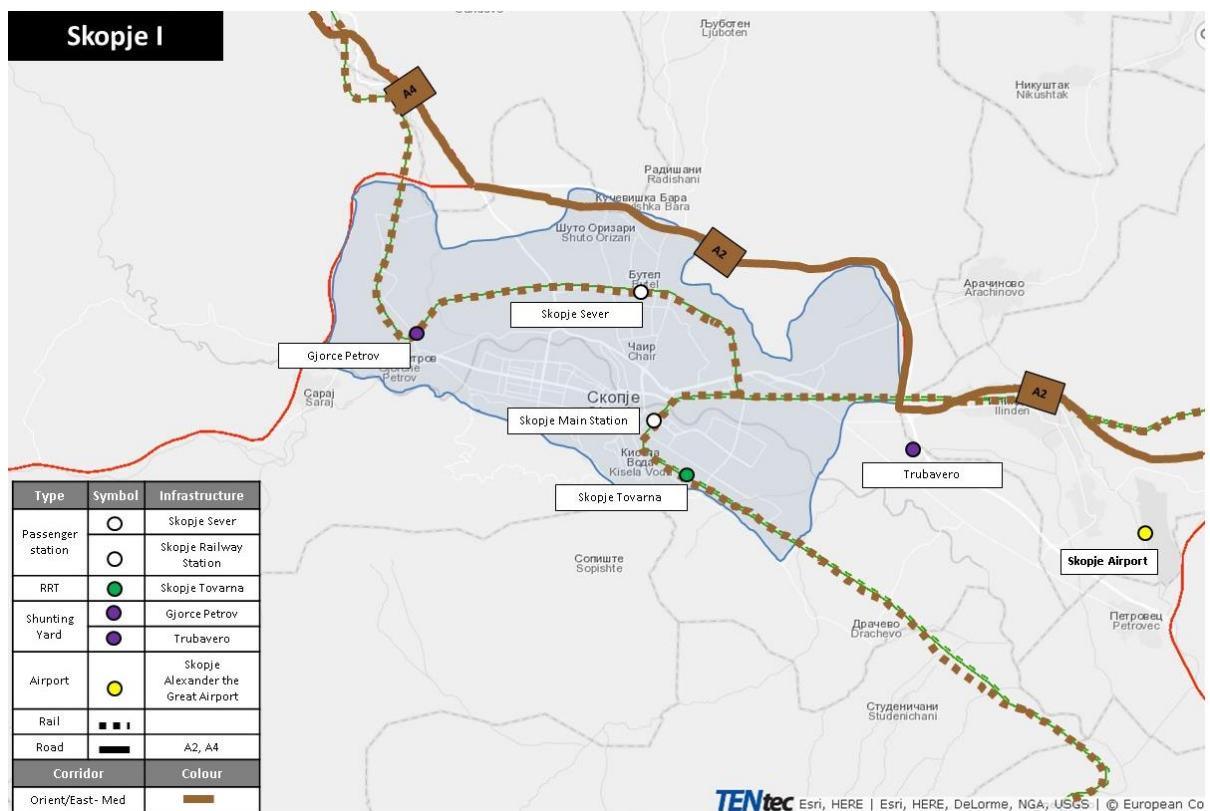
Layer 3:

While the IWW port of Beograd is connected to the railway network, the Beograd airport is not. The Beograd airport, thus, is not compliant with the TEN-T requirements.

7.5 Skopje

Skopje is the capital of the former Yugoslav Republic of Macedonia and also its biggest city with approximately 0.5 million inhabitants. The city covers an area of 571.46 km².

Figure 16: Skopje transport infrastructure



Source: Consortium based on TEN-TEC database

The graphical representation of the three layers approach for Skopje is presented in Annex 2.

Layers 1 and 2:

Road: The OEM related road network is not fully compliant with the TEN-T requirements, as section between Skopje (junction Stenkovec) and Blace (Border with Kosovo) is neither motorway nor expressway. The construction of a new motorway for this road section is planned, but financing is yet to be secured.

Rail: The OEM related rail network within the urban node of Skopje is not compliant with the TEN-T requirements, as it does not allow for 740 m. trains, or 100 km/h train speed. Furthermore, part of the railway line within the Skopje urban node is not electrified. The rehabilitation and modernisation of the railway section Blace-Gjorce Petrov (Skopje) is planned, however, it is not in a mature phase.

Air: The Skopje airport is located east of Skopje, outside the city boundaries. The airport is not connected to the rail network.

Multimodal: There is currently one RRT in Skopje (Tovarna).

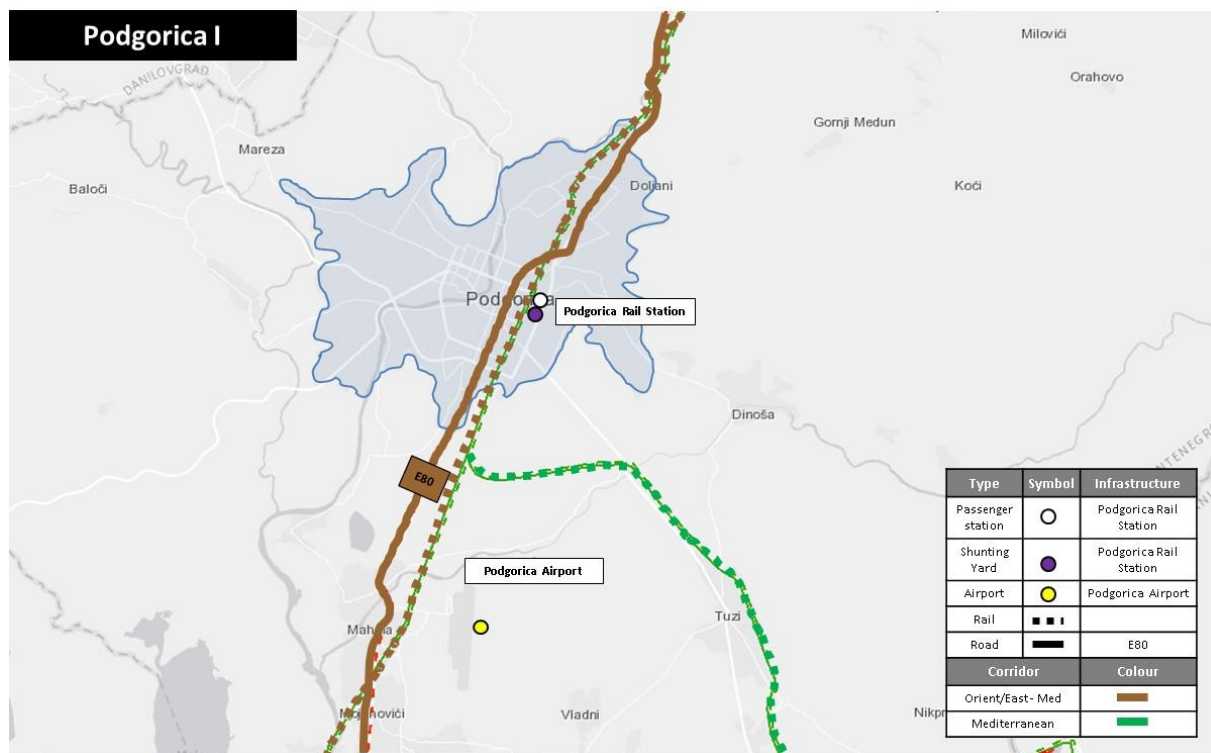
Layer 3:

The Skopje airport is not connected to the railway network, thus, it is not compliant with the TEN-T requirements.

7.6 Podgorica

Podgorica is the capital of Montenegro and has approximately 190.000 inhabitants. The city covers an area of 108 km².

Figure 17: Podgorica transport infrastructure



Source: Consortium based on TEN-TEC database

The graphical representation of the three layers approach for Podgorica is presented in Annex 2.

Layers 1 and 2:

Road: The OEM related road network within the urban node of Podgorica is not compliant with the TEN-T requirements. The construction of the Bar – Boljare motorway is one of the most significant planned projects in Montenegro. Part of the motorway is the construction of the Podgorica bypass (Capital-Smokovac-Farmaci). Financing is yet to be secured for this road section.

Rail: The OEM related rail network within the urban node of Podgorica is not compliant with the TEN-T requirements, as it does not allow for 740 m. trains, or 100 km/h train speed. Furthermore, the railway section Podgorica – Tuzi (part of the Mediterranean Corridor) is not electrified. The rehabilitation and modernisation of the railway line Vrbnica – Bar (Route 4), part of which crosses the city of Podgorica is already planned. The project is in a mature phase and also included in Connectivity Agenda 2015 (Vienna Summit).

Air: The Podgorica airport is located south of Podgorica, outside the city boundaries. The airport is not connected to the rail network.

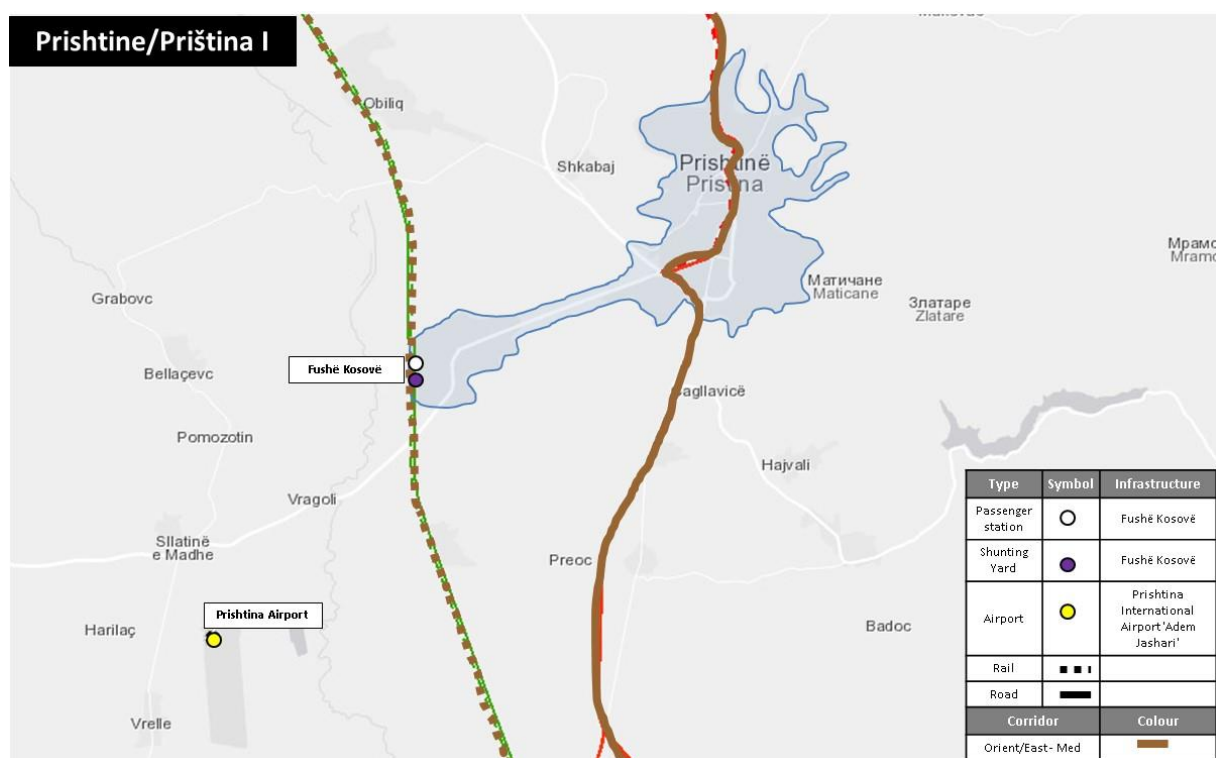
Layer 3:

The Podgorica airport is not connected to the railway network, thus, it is not compliant with the TEN-T requirements.

7.7 Prishtine/Priština

Prishtine/Priština is the capital of Kosovo and has approximately 200.000 inhabitants. The city covers an area of 572 km².

Figure 18: Prishtine/Priština transport infrastructure



Source: Consortium based on TEN-TEC database

The graphical representation of the three layers approach for Prishtine/Priština is presented in Annex 2.

Layers 1 and 2:

Road: The OEM related road network within the urban node of Prishtine/Priština is compliant with the TEN-T requirements.

Rail: The OEM related rail network within the urban node of Prishtine/Priština is not compliant with the TEN-T requirements, as it does not allow for 740 m. trains, or 100 km/h train speed and it is also not electrified. The general rehabilitation of the railway route 10, part of which crosses the city of Prishtine/Priština is already planned. The

project is in a mature phase and also included in Connectivity Agenda 2015 and 2016 (Vienna and Paris Summits, respectively).

Air: The Prishtine/Priština airport is located southwest of Prishtine/Priština, outside the city boundaries. The airport is not connected to the rail network. However, a project is planned which includes the construction of a railway line between Prishtine/Priština and the airport (Construction and modernisation of a Railway Line Prishtine/Priština - Fushë Kosovë -Prishtine/Priština Airport "Adem Jashari"). The project is included in the national SPP, however financing is not secured. The project is of low maturity.

7.8 Summary and Main Conclusions

The Table below summarises the integration of the OEM Corridor within the 15 urban nodes with regard to whether its road and rail arteries by-pass and/or transit the urban conglomeration.

Table 39: OEM related Road and Rail arteries in WB6 urban nodes

Urban Node	OEM: Road		OEM: Rail	
	By-pass	Transit	By-pass	Transit
Beograd	Missing parts to be completed	✓	X	✓
Podgorica	Planned	✓	X	✓
Prishtine/Priština	X	✓	X	✓
Skopje	✓	✓	X	✓

It can be observed that for the majority of the cities with the exception of Skopje, the OEM related road corridor transits the urban nodes. However, for the Beograd urban node, the construction of the Beograd bypass is planned and parts of the bypass are already constructed. Furthermore, the Podgorica bypass is also planned. It is therefore, assumed, that once these are completed, an uninterrupted flow would be achieved along the OEM related road Corridor by-passing the urban centres, with the exception of Prishtine/Priština, for which no planned project is identified.

Regarding OEM related rail arteries; these transit all urban nodes, where railway infrastructure exists, while bypassing is not possible. In general, the compliance check of the road and rail arteries within the urban nodes identified several issues of non-compliant parameters and capacity bottlenecks, mainly with regard to rail infrastructure. The majority of these, however, are being addressed by on-going or planned projects.

Regarding the core/nodes and last-mile connections, the following persisting bottlenecks (not covered by projects) are identified:

- missing rail connection of Beograd airport
- missing rail connection of Podgorica airport
- missing rail connection of Skopje airport

8 Key Performance Indicators

8.1 Scope and Methodology

In order to assess and monitor the evolution of the OEM related corridor WB6 networks and the potential effects of individual projects or groups of projects upon infrastructure interoperability and performance, several Key Performance Indicators (KPIs) were introduced in the main corridor study and also used in the present analysis.

The KPIs are calculated for the year 2014, while two different scenarios were developed in order to forecast the evolution of the KPIs (target year 2030), which will allow the evaluation of the compliance levels against the infrastructure quality targets set out in the Regulation 1315/2013. The two scenarios are:

3. The "*Realistic Scenario*", in which projects that have already secured financing have been included. Also, a project to project analysis was also undertaken, taking into account the results of the Connectivity Networks Gap Analysis (May 2016) in terms of the projects' maturity. For the Realistic Scenario, the KPIs are forecasted, assuming that all the projects with secured financing and/or high maturity levels will be completed by 2030.
4. The "*Optimistic Scenario*" in which all identified planned projects is taken into account. More specifically, for the Optimistic Scenario, the KPIs are forecasted, assuming that all identified planned projects will be completed by 2030.

An overview of the KPIs used for this analysis (demand side KPIs) is presented in the following Tables.

Table 40: Supply related Rail KPIs for OEM corridor (2014)

#	Mode	KPI	Definition	2014
1	Rail network	Electrification	Electrified rail network km as a proportion (%) of relevant CNC rail network km.	83%
2		Track gauge 1435mm	Standard (1435mm) track gauge as a proportion (%) of relevant CNC rail network km.	100%
3		ERTMS implementation	Length of Permanent Operation (excluding operational test lines) of both ERTMS and GSM-R on rail network, as a proportion (%) of relevant CNC rail network km.	0%
4		Line speed ≥ 100 km/h in accordance with art. 39 para. 2. Item a) (ii) of the Regulation 1315/2013	Length of Freight and combined line with allowing for a maximum operating speed greater than or equal to 100 km/h, as a proportion (%) of relevant CNC rail network km without load restriction.	44%
5		Axle load (≥ 22.5 t)	Length of Freight and combined line with a permitted axle load greater than or equal to 22.5 tonnes, as a proportion (%) of relevant CNC rail network km.	79%
6		Train length (740m)	Length of Freight and combined line with a permitted train length greater than or equal to 740m, as a proportion of relevant CNC rail network km.	13%

Table 41: Supply related road KPIs for OEM corridor (2014)

#	Mode	KPI	Definition	2014
11	Road network	Express road/ motorway	Road network km classified as motorway or express road, as a proportion (%) of CNC road section km.	63%
12		Availability of clean fuels (stations)	Number of fuel stations offering plug-in electricity, hydrogen, liquid biofuels, LNG/CNG, bio-methane or LPG along CNC road sections or within 10km from its junctions.	unknown

Table 42: Supply related airport KPIs for OEM corridor (2014)

#	Mode	KPI	Definition	2014
13	Airports	Connection to rail	Number of core airports in CNC with a rail connection as a proportion (%) of the number of relevant core airports in the CNC.	0%
14		Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges.	Number of airports with at least one open access terminal, as a proportion (%) of the total number of core airports in the CNC.	100%
15		Availability of clean fuels	Number of airports offering liquid biofuels or synthetic fuels for aeroplanes, as a proportion (%) of the total number of core airports in the CNC.	0%

Table 43: Supply related seaport KPIs for OEM corridor (2014)

#	Mode	KPI	Definition	2014
16	Seaports	Connection to rail	Number of seaports in CNC with a rail connection as a proportion (%) of the number of relevant core seaports in the CNC.	100%
17		Connection to IWW CEMT IV	Number of seaports in CNC with a (hinterland) inland waterway connection of at least CEMT IV class, as a proportion (%) of the number of relevant core seaports in the CNC.	n.a.
18		Availability of clean fuels	Number of seaports offering (at least one of) LPG, LNG, liquid biofuels, or synthetic fuels as a proportion (%) of the total number of seaports in the CNC.	0%
19		Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	Number of seaports with at least one open access terminal, as a proportion (%) of the total number of core seaports in the CNC.	100%
20		Facilities for ship generated waste	Number of seaports offering facilities for accepting PRF mandatory (MARPOL Annexes I, IV, and V) categories of ship-generated waste, as a proportion (%) of the total number of core seaports in the CNC.	0%

8.2 Rail

Several rail sections on the OEM WB6 corridor are not compliant with the requirements of the European Union and the parameters set out in the Regulation 1315/2012. However, countries on this corridor have several on-going or planned projects that have a potential to be implemented by 2030. Focus of the projects is mainly on the construction of new and upgrading existing sections that would achieve compliance with technical requirements in particular train speed, axle load, and maximum operating speed.

In transport infrastructure, there can be several delays, that prolong the final construction dates and start of the operations. Among the reasons we can count different political, financial and other factors that may extend project finalisation. So, as previously mentioned, the compliance analysis is based on two scenarios for rail network compliance until 2030.

The first scenario is "Realistic scenario", which includes projects that will be most likely implemented until 2030; the second one is the "Optimistic scenario" which includes an assumption that all on-going and planned infrastructure projects will be implemented until 2030.

Both future scenarios are based on the Regulation 1315/2015 and standards that countries need to follow by 2030. Both scenarios include the following parameters:

- Electrification: Core network to be electrified by 2030 (including sidings where necessary)
- Axle load: 22.5 t axle load on core freight lines by 2030
- Line speed: 100 km/h by 2030 on core freight lines (no speed requirement is set for passenger lines)
- Train length: Core freight lines to allow for 740 m trains by 2030

However, two other relevant factors were not included in the analysis, such as:

- ERTMS / signalling system: Core network to be equipped with ERTMS by 2030
- Track gauge: New lines to be built in UIC standard gauge (1435 mm), except in certain circumstances

An assumption has been made that ERTMS implementation will not happen until 2030 in most of the parts of OEM WB6. In all the analysis that served as a basis for identification of potential projects, ERTMS implementation projects are not particularly exposed, therefore it is assumed that it will not be implemented until 2030.

The second parameter not included in the future scenarios is track gauge (1435 mm) – all countries on the OEM WB6 already have tracks with 1435mm, therefore it is estimated that this parameter is 100% fulfilled.

8.2.1 Realistic scenario

By 2030, the TEN-T Core network in all EU Member states has to follow the standards set by the Regulation No 1315/2013. This is of particular importance for both current Member states relevant for the analysis (Greece and Hungary). In respect to the WB6, the realistic scenario includes projects that are most likely to be implemented until 2030 due to high level of projects' maturity and secured financing.

The analysis of "Realistic scenario" is based on the following sources:

- Connectivity Network gap analysis, 2016 (Mott MacDonald)
- Connectivity agenda projects, 2015, Vienna (EU Commission)
- EU Regulation 1315/2013

Results of the analysis in comparison to the current status of rail infrastructure compliance on OEM related core network in WB6 are presented in the table below. It is noted that regarding ERTMS, no project is included in the National Single Project Pipelines of the countries. Thus there is available information, based on which the future infrastructure compliance can be estimated.

Table 44: Status of Rail infrastructure compliance on Orient/East-Med corridor related Core network in WB6

Parameter	Length share of non-compliant sections	
	2014	Realistic scenario, 2030
Operational speed	56%	24%
Train length	87%	58%
Axle load	21%	12%
Electrification	17%	9%
ERTMS	100%	unknown

Operational speed:

Most of the rail lines of the Western Balkan were designed for speeds over 100 km/h (with exception of Montenegro), however, due to safety reasons, the current maximum operational speed that is compliant with the Regulation on approximately 44% or 813 km of the rail network. Results of non-compliant sections show that the biggest improvement intends to be achieved in operational speed (from 56% of non-compliance to 24% or 443 km). This is mainly a consequence of three high priority projects on RS, MK and ME railway network:

- Rehabilitation projects in the former Yugoslav Republic of Macedonia section along Corridor X (Tabanovci - Dracevo) and
- Modernisation project of Serbian line (Beograd - Novi Sad - Kelebija) and
- Rail Route 4 - Port of Bar to Vrbnica

Figure 19: Maximum operating speed on the OEM related railway core network in WB6 - Realistic scenario (2030)



Source: Consortium

Train length:

The train length determined should allow the operation of 740-meter-long trains, but currently in the most sections of the Western Balkan part of rail network this is not compliant with the requirements (1598 km or 86% of the network). The above mentioned projects in Serbia, the former Yugoslav Republic of Macedonia and Montenegro are going to influence also the maximum train length, however it not clear from the available information what the final allowed train length will be. This information will only be available when the detailed designs for all rehabilitation works are completed. Nevertheless, for producing forecasts under the realistic scenario, we assumed that the train length criterion will be met after the implementation of the examined projects. The non-compliance of train length sections of OEM related core network in WB6 is supposed to be reduced from 86% (1598 km) in 2014 to 58% (1074 km) by 2030.

Figure 20: Train length on the OEM related railway core network in WB6 - Realistic scenario (2030)



Source: Consortium

Axle load:

Trains with single axle loads of 22.5 tonnes are fully operable on most of the sections of the Western Balkan rail network (1464 km or 79% of the rail network). Sections with limited exceptions exist mainly in Serbia, where 22% or 232 km of the line sections between:

- Resnik – Velika Plana (76 km)
- Stalać – Rudnica – Donje Jarinje (Border XK/RS) (155.5 km).

Major improvement from axle load point of view are expected in the orphan link in Hungary, on the section stretching over 157.8 km between Budapest – Kiskunhalas – Kelebija which will allow trains with an axle load of 22.5 tonnes according to the EU Regulation 1315/2013.

It needs to be pointed out, that axle load of 22.5 tonnes can be achieved on identified parts of the network, but on the other side these section is limiting the speed of the maximum train operations (e.g. in the former Yugoslav Republic of Macedonia current conditions of the railway infrastructure allow axle load of 22.5 tonnes, but at the limited maximum speed of 80 km/h).

Figure 21: Maximum axle load on the OEM related WB6 corridor - Realistic scenario (2030)



Source: Consortium

Electrification:

Electrification is one of the key TEN-T requirements and most of the lines on OEM WB6 corridor have an electrified railway network, apart from sections in Serbia, Stalać-Kraljevo, Kraljevo - Raška, Raška - Rudnica, Rudnica Stajaliste - Donje Jarinje, Stajaliste Donje Jarinje – Donje Jarinje (RS – XK border) and short section in the former Yugoslav Republic of Macedonia from Gjorce Petrov – Skopje (main station) to Trubarevo.

The only system used along the Western Balkan rail network is AC 25 kV, 50 Hz voltage system.

The major improvements are expected in Kosovo, with a project for General rehabilitation of the railway route 10, which aims to electrify the section from Donje Jarinje (Serbian-Kosovo border) – Leshak – Hani I Elezit.

The non-electrified sections after the implementation of projects in the realistic scenario will make up approximately 9% (170 km) of the entire OEM WB6 corridor.

Figure 22: Electrification on the OEM related railway core network in WB6 - Realistic scenario (2030)



Source: Consortium

8.2.2 Optimistic scenario

The optimistic scenario includes all projects from the Connectivity network gap analysis 2016. Beside projects marked with high maturity level, which are supposed to be implemented or are in early implementation phase, projects with medium and low maturity level were added. In this scenario, we estimate that all projects will be implemented until 2030.

The analysis of optimistic scenario, in comparison to the current state (and realistic scenario) is shown in the table below. It is noted that regarding ERTMS, no project is included in the National Single Project Pipelines of the countries. Thus there is available information, based on which the future infrastructure compliance can be estimated.

Table 45: Status of Rail infrastructure compliance on OEM related railway core network in Western Balkan

Parameter	Length share of non-compliant sections		
	2014	Realistic scenario 2030	Optimistic scenario 2030
Operational speed	56%	24%	4,6%
Train length	87%	58%	7,5%
Axle load	21%	12%	0,4%
Electrification	17%	9%	1,1%
ERTMS	0%	unknown	unknown

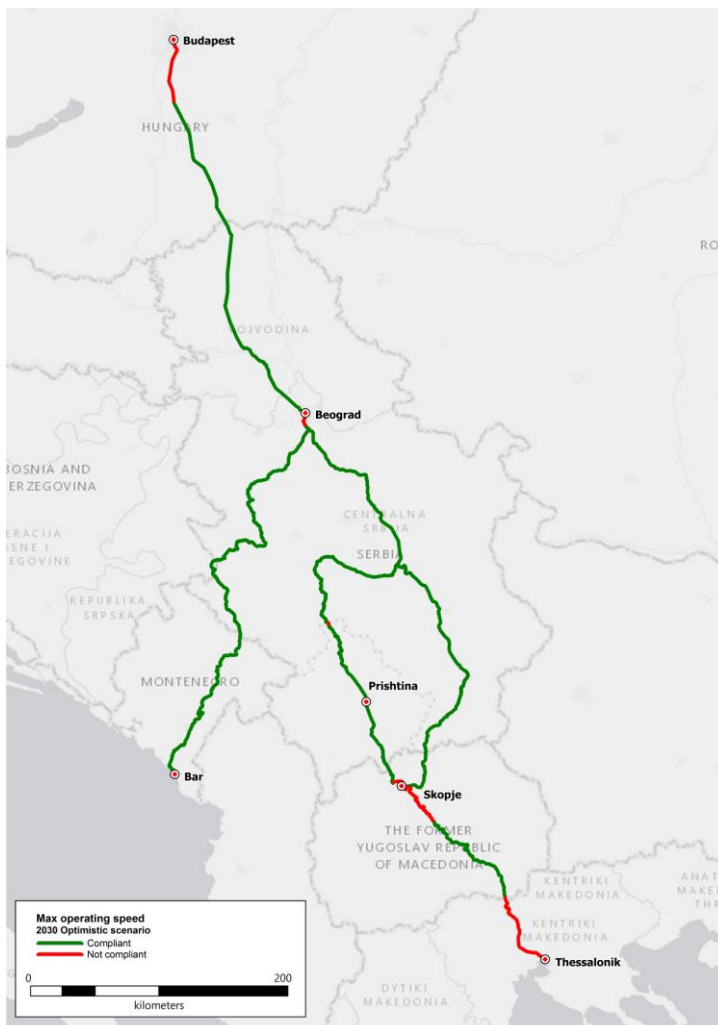
Operational speed:

The current state of rail infrastructure of OEM WB corridor shows that 56% of the OEM WB6 corridor is non-compliant in terms of operating speed, meanwhile the future optimistic scenario reduces it to only 4,6% (86 km) of the rail network. Sections which remain to be problematic are:

- Skopje (Trubarevo) – Veles (51 km)
- Beograd – Resnik (14 km)
- Rudnica – Donje Jarinje (7 km)
- Gjorce Petrov – Skopje (Trubarevo) (14 km)

However, it needs to be pointed out that design speed of many non-compliant sections is over 100 km/h, which is the threshold for compliance. It needs to be considered that many lines on the corridor are not compliant with operational speed due to insufficient maintenance; therefore we should not overestimate the current calculations. If the maintenance of the initial rail infrastructure will not be sufficient until 2030, it might happen that some sections will suffer to lower operational speed than required in the Regulation.

Figure 23: Maximum operational speed on the OEM related railway core network in WB6 - Optimistic scenario (2030)

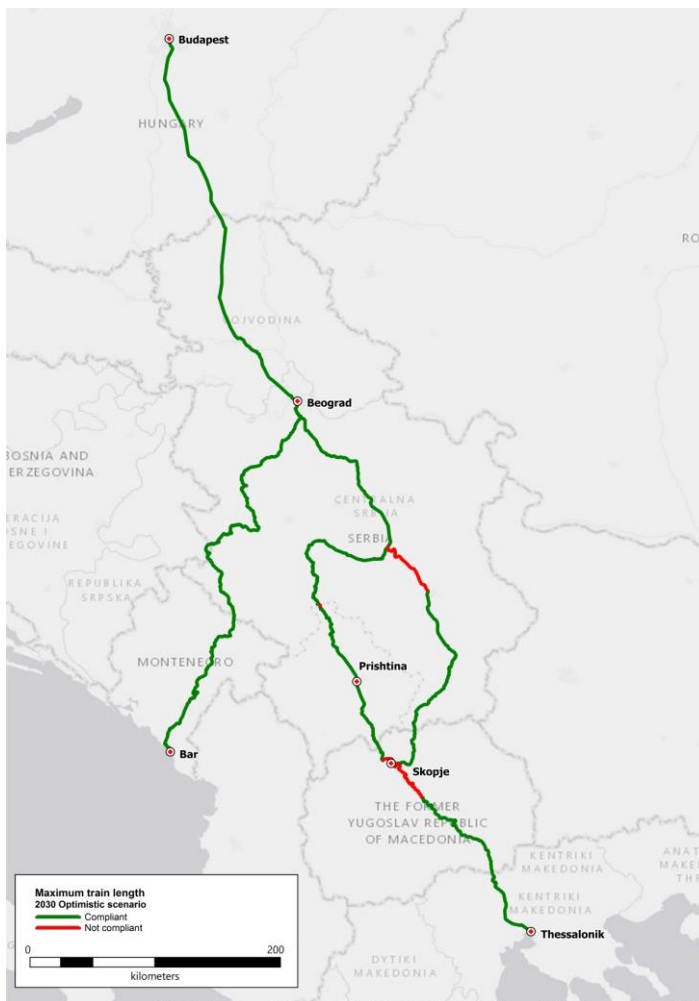


Source: Consortium

Train length:

Train length is one of the main factors of the modernisation and rehabilitation projects in all countries of the OEM WB6 corridor. If the current status of rail infrastructure is that 87% of sections are not compliant in terms of train length, this percentage will be only 7.5% (135 km) in 2030, based on the optimistic scenario. Problematic sections, besides Gjorce Petrov – Skopje (Trubarevo) and Rudnica – Donje Jarinje include also section Stalać – Nis (67 km).

Figure 24: Train length on the OEM related railway core network in WB6 - Optimistic scenario (2030)



Source: Consortium

Axle load:

In terms of axle load, in 2014 21% (389 km) of the freight lines do not allow 22.5 tonnes. However, with rehabilitation and modernisation projects in Serbia, this percentage is estimated to be only 0.4% (7 km) of the line in 2030, according to the optimistic scenario. The only problematic part is in the short section of the line between Rudnica and Donje Jarinje (border with Kosovo). So far, there are no plans of improvement for this short section.

Figure 25: Maximum axle load on the OEM related railway core network in WB6 - Optimistic scenario (2030)



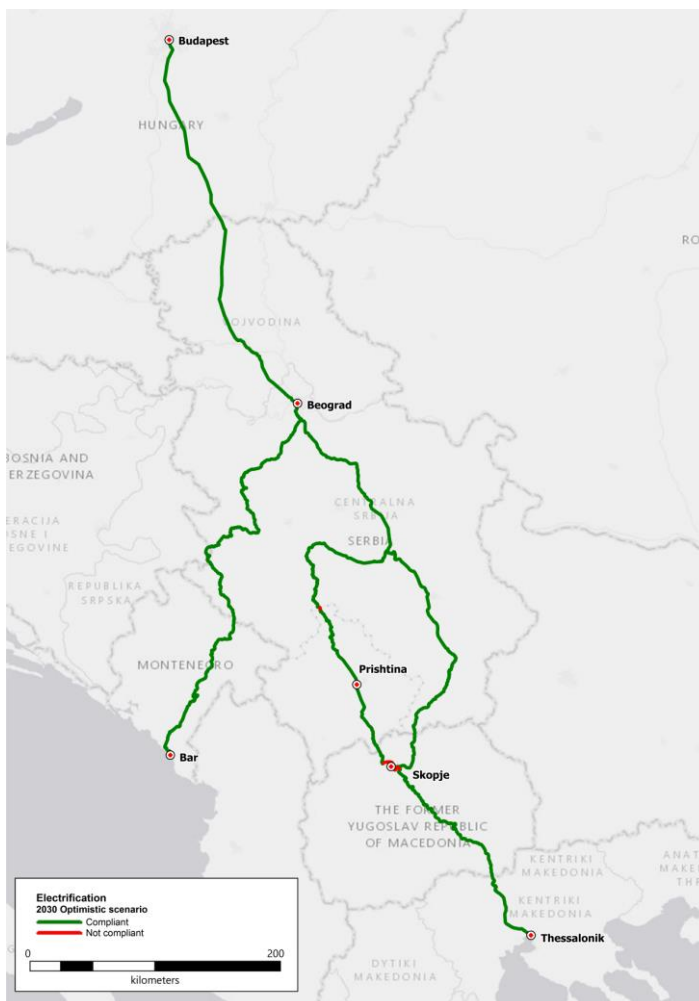
Source: Consortium

Electrification:

In terms of electrification, the non-compliance shall be reduced to 1.1% (21 km), mainly due to the planned projects in Serbia, the former Yugoslav Republic of Macedonia and Kosovo.

However, it has to be noted that most unified approach among all the three involved countries must be considered. Even though electrification is currently included in the project designs in all mentioned countries, its implementation will follow a phased approach, according to the coordination among the Beneficiaries and decision making processes followed by each country.

Figure 26: Electrification on the OEM related railway core network in WB6 - Optimistic scenario (2030)



Source: Consortium

8.2.3 Summary of both scenarios

An overall summary of the compliance realistic and optimistic scenarios is presented in the following table.

Table 46: Status of Rail infrastructure compliance per scenario

#	Mode	KPI	Definition	2014	2030 Realistic	2030 Optimistic
1	Rail network	Electrification	Electrified rail network km as a proportion (%) of relevant rail network km.	83%	90,9%	98,9%
2		Track gauge 1435mm	Standard (1435mm) track gauge as a proportion (%) of relevant rail network km.	100%	100%	100%
3		ERTMS implementation	Length of Permanent Operation (excluding operational test lines) of both ERTMS and GSM-R on rail network, as a proportion (%) of relevant rail network km.	0%	unknown	unknown.
4		Line speed ≥ 100 km/h in accordance with art. 39 para. 2. Item a) (ii) of the Regulation 1315/2013	Length of Freight and combined line allowing for a maximum operating speed greater than or equal to 100 km/h, as a proportion (%) of relevant rail network km without load restriction.	44%	76,1%	95,4%
5		Axle load (≥ 22.5 t)	Length of Freight and combined line with a permitted axle load greater than or equal to 22.5 tonnes, as a proportion (%) of relevant rail network km.	79%	87,5%	99,6%
6		Train length (740m)	Length of Freight and combined line with a permitted train length greater than or equal to 740m, as a proportion of relevant rail network km.	13%	42,1%	95,4%

8.3 Ports

The OEM related WB6 seaport is the port of Bar which is already compliant with the TEN-T requirements, as it is connected to the railway network. No further analysis was undertaken for this port.

8.4 Roads

The assessment of the compliance of the OEM related road sections of the WB6 core network is based on the criteria set out in Articles 17 and 39 (c) of the Regulation No. 1315/2013, namely:

- Roads shall be specially designed and built for motor traffic, and shall be either motorways or express roads:
 - A motorway is a road specially designed and built for motor traffic, which does not serve properties bordering;
 - An express road is a road designed for motor traffic, which is accessible primarily from interchanges or controlled junctions;
- rest areas on motorways shall be available approximately every 100 km in line with the needs of society, of the market and of the environment, in order inter

alia to provide appropriate parking space for commercial road users with an appropriate level of safety and security;

- alternative clean fuels shall be available.

As a part of the scoping phase, for the road sections of the OEM Corridor, 18 projects in total were identified taking into account the National Single Project Pipelines (SPPs) and the SEETO Multi-Annual Plan (MAP) 2016. Based on the gap analysis undertaken, eight of these road projects were found to be of high maturity level and most likely implemented before 2020. Furthermore, additional research has been made in order to update the current projects' status. Having in mind financial, political and other factors, influencing the road transport infrastructure development and leading to possible delays of the projects implementation, two scenarios have been elaborated as of 2030:

- Realistic scenario – comprising the projects classified with high maturity level, secured financing and on-going projects.
- Optimistic scenario – includes all identified projects and presumes their completion as scheduled.

8.4.1 Realistic scenario

The realistic scenario is elaborated taking into account on-going projects and ten of the previously identified and analysed projects, with high maturity level and secured financing, all of which expected to be completed by the 2030.

Summary of the results by country, length and share of fully compliant road network is presented in the table below:

Table 47: Compliant OEM related core road network in WB6, Realistic scenario (2030)

Country	Length of road sections	Motorway		Motorway/ express road compliant		Non-compliant length	
		Length	Share	Length	Share	Length	Share
RS	925.36	816.86	88.3%	816.86	88.3%	108.50	11.7%
ME	168.39	41.00	24.3%	81.60	48.5%	86.79	51.5%
XK	105.07	78.66	74.9%	78.66	74.9%	26.41	25.1%
MK	207.82	194.16	93.4%	194.34	93.5%	13.47	6.5%
EL	62.00	17.00	27.4%	62.00	100.0%	0.00	0.0%
HU	16.00	16.00	100.0%	16.00	100.0%	0.00	0.0%
All	1484.64	1163.68.59	80.2%	1249.46	85.5%	235.17	14.5%

Due to the new motorway sections assumed to be constructed under the Realistic scenario, which will replace part of the currently used roads, the total length of the OEM related road core network will decrease from 1700 km as of 2014 to 1 621.5 km in 2030, 85.5% out of which will meet the TEN-T criterion for motorway/ express road. The main projects due to the implementation of which the share of 85.5% compliant network would be possible, are as follows:

- Serbia - Construction of the road sections Požega<-->Beograd (151.7 km), Construction of highway section Merdare<-->Kuršumlija<-->Prokuplje bypass <-->Merosina<-->Niš (79.8 km), Construction of road section between Grdelica and Preševo (94.4 km), Reconstruction and upgrade of road section between Ostružnica and Strazevica (about 8 km) and Completion of Beograd bypass, Sector 6: Strazevica-Bubanj Potok (11 km);
- Montenegro – Construction of Route 4: Highway Bar<-->Boljare, section Mateševo<-->Podgorica (Smokovac) (41 km);

- Kosovo - Construction of the road section Prishtine/Priština<-->Border with MK (64.14 km), Construction of the motorway section Prishtine/Priština<-->Merdare (14.5 km);
- The former Yugoslav Republic of Macedonia - Reconstruction of road section between Demir Kapija and Udovo (28 km) and Reconstruction and upgrading of the motorway section Smokvica<-->Gevgelija as part of Corridor X (16.8 km).

The total costs estimation for these projects implementation amounts to € 3.3 billion.

Kosovo and Montenegro are the countries for which a relatively high share of non-compliant network is expected to persist in 2030. The reason is that for these road sections the respective projects are identified and classified with medium or low maturity level with no secured financing.

The corridor route/alignment in realistic scenario is presented in the following figure:

Figure 27: OEM related core road network in WB6, compliance in Realistic scenario (2030)



Source: Consortium

There is no information or projects planned aiming to insure the availability of alternative clean fuels along the OEM related core road network, so this KPI could not be estimated.

Same is the situation in respect to the rest areas, as required by Regulation.

8.4.2 Optimistic scenario

For the identified infrastructural compliance gaps, all necessary projects in order for the existing infrastructure to meet with the TEN-T standards have been listed and thoroughly analysed. Having in mind projects' implementation timeframe and assuming all of them will be completed by the 2030, the OEM road network will meet the ultimate goal to be fully compliant thus enhancing connectivity with the WB region, in optimistic scenario.

Table 48: Compliant OEM related core road network in WB6, Optimistic scenario (2030)

Country	Length of road sections	Motorway		Motorway/ express road compliant		Non-compliant length	
		Length	Share	Length	Share	Length	Share
RS	923.86	923.86	100.0%	923.86	100.0%	0.00	0.0%
ME	165.20	165.20	100.0%	165.20	100.0%	0.00	0.0%
XK	105.07	105.07	100.0%	105.07	100.0%	0.00	0.0%
MK	207.82	190.84	91.8%	207.82	100.0%	0.00	0.0%
EL	62.00	17.00	27.4%	62.00	100.0%	0.00	0.0%
HU	16.00	16.00	100.0%	16.00	100.0%	0.00	0.0%
ALL	1479.95	1417.97	96.2%	1479.95	100.0%	0.00	0.0%

The projects of which completion depend the fully compliance of the OEM related road network in the optimistic scenario are:

- Serbia - the construction of section Pozega<-->Boljare with length of 107 km;
- Montenegro - the Construction of sections Boljare<-->Andrijevica (52 km), Andrijevica<-->Mateševo (21) km, Smokovac<-->Farmaci (17.2 km) and Farmaci<-->Virpazar (32 km), all of them part of Route 4: Highway Bar-Boljare.
- Kosovo - the Construction of sections Merdare (Border RS/XK) <-->Luzhane/Lužane /M25-R125/ (16 km) and Luzhane/Lužane /M25-R125/<-->Trude /M25-R7/ 914 km) under the implementation of the project Construction of the motorway section Prishtine/Priština<-->Merdare.
- the former Yugoslav Republic of Macedonia - the construction of Blace (Border XK/MK) <-->Skopje junction Stenkovec part of the Construction of road section Skopje<-->Kosovo border project.

The total amount of investment costs for these projects is estimated at about € 3.9 billion.

The corridor route/alignment in optimistic scenario is presented in the following figure:

Figure 28: OEM related core road network in WB6, compliance in Optimistic scenario (2030)



Source: Consortium

8.4.3 Summary of both scenarios

Overview of the current status of the OEM related WB6 compliant road network and estimations by scenario are presented in the table below.

Table 49: Status of the OEM related core road infrastructure on per scenario

Status	Length of corridor's sections	Motorway		Motorway/ express road compliant		Non-compliant length	
		Length	Share	Length	Share	Length	Share
2014	1700.80	818.80	48.0%	1067.80	62.78%	633.00	37.22%
Realistic 2030	1621.54	1300.59	80.2%	1386.37	85.50%	235.17	14.5%
Optimistic 2030	1616.85	1554.87	96.2%	1616.85	100.00%	0.00	0.00%

8.5 Airports

Currently, no airport in WB6 region is connected to the railway network. The compliance rates for the examined airports are presented in the following Table.

Table 50: Compliance of Airports of the OEM WB6 corridor (2014)

Mode	KPI	Definition	2014
Airports	Connection to rail	Number of airports with a rail connection as a proportion (%) of the number of relevant airports	0%
	Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges.	Number of airports with at least one open access terminal, as a proportion (%) of the total number of airports.	100%
	Availability of clean fuels	Number of airports offering liquid biofuels or synthetic fuels for aeroplanes, as a proportion (%) of the total number of airports.	0%

The following airport rail project is currently planned: Prishtine/Priština (XK): Construction and modernisation of a Railway Line Prishtine/Priština - Fushë Kosovë - Prishtine/Priština Airport "Adem Jashari". Given that financing is not yet secured this project is only included in the "Optimistic Scenario".

For the other main corridor airports, no projects are known.

The compliance rates for all scenarios are presented in the following table.

Table 51: Status of the OEM related core road infrastructure on per scenario

Mode	KPI	Definition	2014	Realistic Scenario	Optimistic Scenario
Airports	Connection to rail	Number of airports with a rail connection as a proportion (%) of the number of relevant airports	0%	0%	25%
	Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges.	Number of airports with at least one open access terminal, as a proportion (%) of the total number of airports.	100%	100%	100%
	Availability of clean fuels	Number of airports offering liquid biofuels or synthetic fuels for aeroplanes, as a proportion (%) of the total number of airports.	0%	unknown	unknown

Annex 1 Relevant Project Fiches

Title of the study	Multimodal Flagship Axes Initiative & Multi Annual Development Plan
Author	South-East Europe Transport Observatory
Year	2014
Member State	Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Montenegro and Serbia and the United Nations Mission in Kosovo *
Corridor sections	OEM and MED connection with the Western Balkans (WB) Region
Mode	Road, Rail, Airport, Inland Waterway, Seaport
Type of source	Infrastructure Study / Action Plan
Confidential	No

Map



Description of main findings

The objective of the “Multimodal Flagship Axes Initiative” is the identification of physical and non-physical barriers for selected multimodal axes (corridors/routes) from the SEETO Comprehensive Network. In particular the report:

- presents physical bottlenecks that have been identified together with the midterm development plans on the selected SEETO Comprehensive Network Flagship axes.
- serves as a first step towards a broader study to be elaborated in the second stage with support from the ongoing EC Technical Assistance and which will also encompass the non-physical barriers on the flagship axes.
- ensures regional harmonisation and corridor planning that is extremely important to create common technical standards and market conditions among the Regional Participants which will have a significant impact on transport operations and quality of services.

The main objective of the Multi Annual Development Plan is to develop a Priority Action Plan for enhancing the efficiency of the indicative extension of the TEN-T Comprehensive Network to the Western Balkans, by developing a transport demand model, identifying the main corridors/routes on the TEN-T Comprehensive Network in the Western Balkans based on the EU TEN-T criteria, analysing the physical and non-physical barriers to the efficient operation of the Network and identifying potential efficiency-enhancing investments and measures.

Identification of the critical issues

Relevance for Corridor Study Activities

The following infrastructure aspects have been analysed.

- Description of road characteristics (bottlenecks, poor condition, speed limits, number of lanes, etc.) on the following axes: Road Corridors Vc, VIII and X as well as Road Routes 7 and 4.
- Description of rail characteristics (bottlenecks, poor condition, speed limits, number of tracks, etc.) of Rail Corridors Vc, VIII and X.
- Description of the characteristics of ports and terminal facilities (capacity, equipment, etc.), in particular ports of Durres and Bar

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence

Assessment of Corridor measures

The Multi Annual Development Plan tries to capitalize the assessments made of various policy measures, cost-benefit analysis of non-physical measures and recommendations provided by the following different sources:

- i. Regional Transport Study (REBIS update)- led by the World Bank (Chapter 2- Non-physical barriers to transport and trade)
 - ii. OECD Competitiveness Outlook (Chapter Transport)
 - iii. SEE2020 Annual Report on Implementation (Dimension Transport)
- Special emphasis is given to the Vienna Summit conclusions and soft measures.

Assessment of the investment strategy

The Multi Annual Development Plan presents an investment review of projects executed in the indicative extension of the TEN-T Comprehensive Network to the Western Balkans from 2004. In particular, the study presents an overview of investments per corridor/route, mode of transport and source of financing. In addition, a prioritization of proposed priority projects for the next five years with their detailed description is provided.

Two types of priority projects are considered and presented in two separate lists:

1. Priority projects eligible for funding – advanced projects for which a comprehensive evaluation is available, based on a completed feasibility study and, if available, all of the project documentation.
2. Priority projects for preparation – projects which require full project preparation and project evaluation to determine their feasibility. These projects are not ready for implementation but funding is required to carry out the necessary preparatory work.

The estimates presented on the preparatory project list were derived from pre-feasibility studies and preliminary designs while funding is required for the preparation of feasibility studies and detailed designs.

Priority projects are ranked according to the SEETO rating methodology. In particular, the rating mechanism was applied to 21 submitted priority projects eligible for funding that have a completed feasibility study and are sufficiently advanced to be analysed and rated. Additionally, 27 priority projects that require preparatory activities are presented on a separate list.

The estimated investment required for the implementation of these 48 priority projects is approximately €9.64 billion: a) eligible for funding: €2.67 billion, and b) preparatory: €6.97 billion. The number of priority projects has increased compared to the previous year's list (17 projects more) which is reflected in the higher amount of required investment. Out of 21 projects eligible for funding, 12 projects are completely mature for implementation.

Title of the study	South East Europe: Updating of the Regional Balkans Study
Author	The World Bank
Year	10/2013 – 06/2015
Member State	Serbia, Montenegro, Bosnia and Herzegovina, Albania, the former Yugoslav Republic of Macedonia, Kosovo*
Corridor sections	OEM and MED connection with the Western Balkans (WB) Region
Mode	Road, Rail, IWW, Maritime, Intermodal
Type of source	Infrastructure Study / Action Plan
Confidential	No

Map



The main project objective was to develop a Priority Action Plan for enhancing the efficiency of the South East Europe Transport Observatory (SEETO) Comprehensive Network and identifying priority physical investments, as well as non-physical improvements including regulatory, institutional and managerial changes that would eliminate bottlenecks and barriers affecting the network’s performance. Based on the Action Plan, and beyond the scope of this study, feasibility studies will then be conducted for the identified interventions on the basis of which economically viable ones could be included in the SEETO Multi Annual Plan along with other eligible priority projects.

Within the above framework, the general work plan for the project included:

Description of main findings

- The development of a transport demand model for the Western Balkans region, including all transport modes.
- The identification of the main corridors/routes on the SEETO Comprehensive Network based on the EU TEN-T criteria, which among others, promote the alleviation of bottlenecks and missing links on major routes, regional integration, mobility and sustainable development and meet the required social and economic criteria, and determine main regional transport links.
- The analysis of the physical and non-physical barriers to the efficient operation of the SEETO Comprehensive Network and the identification of potential efficiency-enhancing investments and measures.
- A preliminary-level economic analysis to assess the viability of the proposed investments and measures.

Based on the analysis undertaken within the framework of updating REBIS, it seems that regarding the physical limitations of the Networks, priorities should be placed on these road/railway sections, airports and ports of the network that are expected to have capacity constraints by 2030, most of which are included in the SEETO MAP. This plan should be updated to include all interventions until 2030 based on sound socioeconomic

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence

criteria. Furthermore, special attention should be paid to the non-physical bottlenecks, in order to enhance the Network's capacity and reliability. While there have been significant improvements in the past decade in eliminating non-physical bottlenecks impeding trade and transport in the region, unpredictability of border-crossing times remains an issue in the region. This applies to both passengers and freight.

Identification of the critical issues

The REBIS study identified the critical issues of the transport networks in the Region, identifying the capacity limitations for road, rail, IWW and maritime transport. All physical bottlenecks are listed for all transport modes (current bottlenecks and future bottlenecks, based on the traffic forecasts for 2030). Furthermore, all soft measures for the alleviation of the non-physical bottlenecks are thoroughly analysed.

Assessment of Corridor objectives

The main objective of the REBIS study is to develop a Priority Action Plan for enhancing the capacity of the SEETO Comprehensive Network, eliminating thus both physical and non-physical limitations.

More specifically, the REBIS study aims to:

- i. Identify all SEETO Comprehensive Network impediments
- ii. Identify a coherent set of measures for all transport modes which will enhance the Network's capacity.
- iii. Provide a preliminary economic analysis for the identified investments.

The Study provides a comprehensive description of the Western Balkans Comprehensive Network (Road, Rail, IWW, and Maritime Transport).

Assessment of Corridor measures

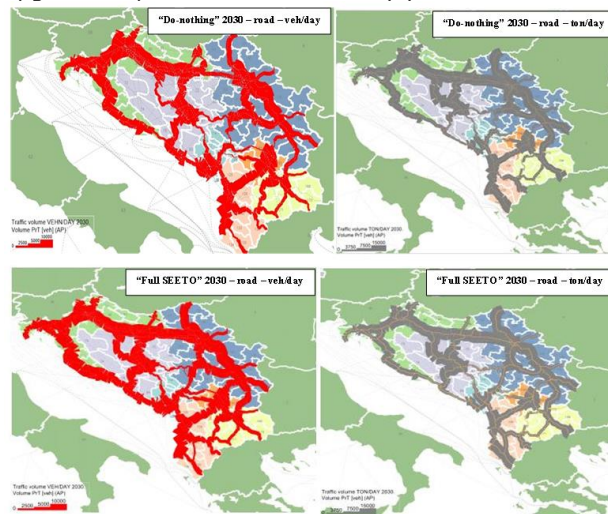
- iv. The proposed investments aim to upgrade the transport infrastructure promoting a better and efficient transport system in the region.
- v. The proposed investments will also increase the interoperability of the network.

Gathering information for market study

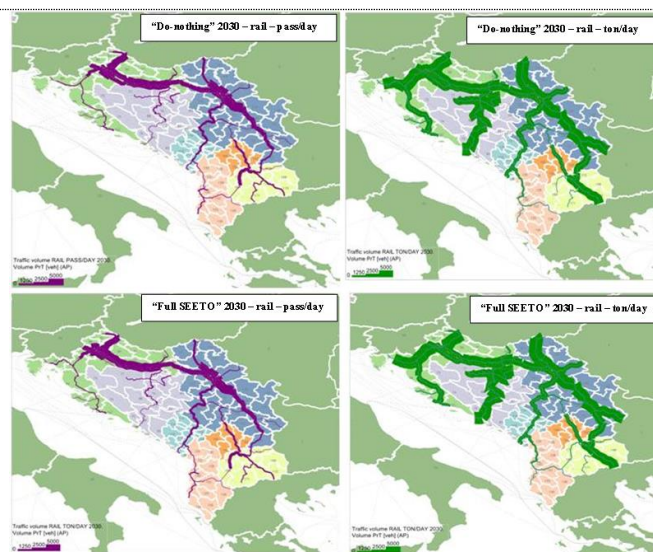
- i. **Detailed information about current and forecasted traffic flows for 2030.**

Within the framework of the REBIS study, a transport demand model was developed. More specifically, the Study offers traffic information and forecast for both passenger and freight flows for all transport modes in the Region, for two alternative growth options (Low/Moderate and Moderate/High Scenarios). Regarding the road and rail networks, for each of the two economic growth scenarios, two network scenarios were considered: 'the do-nothing' scenario (existing network) and the 'full SEETO' scenario. The 'full SEETO' scenario is based on the SEETO Comprehensive Multi Annual Development Plans 2014 and 2015 which presents a set of infrastructure developments and network upgrades expected to be initiated by year 2020.

Relevance for Corridor Study Activities



Source: VISUM model output
Figure 2. Model results for the road network for the low/moderate economic growth scenario



Source: VISUM model output
Figure 3. Model results for the rail network for the low/moderate economic growth scenario

Assessment of the investment strategy

- i. The REBIS study includes a **financial analysis of the proposed investment plan**. The analysis also includes regulatory, institutional and managerial changes (mainly trade facilitation issues at border crossing points) that would reduce barriers impeding the performance of the Network.
- ii. The REBIS also includes a preliminary estimation of Unit Costs for road and rail projects in each examined country.

Table 13. Unit Costs for Road Projects (motorways)

Country	Unit costs (Euros/km) 2013					
	Rehabilitation	Minor upgrade (no major structures)	Minor Upgrade (with major structures)	Major Upgrade (no major structures)	Major Upgrade (with major structures)	Widening
ALB	300,000	1,000,000	1,900,000	3,500,000	4,200,000	6,400,000
BIH	300,000	1,000,000	1,900,000	3,300,000	4,200,000	6,240,000
MKD	330,000	1,100,000	2,000,000	3,600,000	4,300,000	6,480,000
CRO	390,000	1,300,000	2,400,000	4,100,000	5,400,000	7,760,000
KOS	300,000	1,000,000	1,900,000	3,500,000	4,200,000	6,400,000
MNE	360,000	1,200,000	1,400,000	3,000,000	3,800,000	7,200,000
SRB	360,000	1,200,000	2,100,000	3,500,000	4,600,000	7,200,000

Source: Unit Costs: Consultant's estimates based on available references⁹

Table 14. Unit Costs for Railway Projects

Country	Unit costs (Euros/km) 2013					
	Minor interventions	Minor rehabilitation (no major structures)	Minor rehabilitation (with major structures)	Major rehabilitation (no major structures)	Major rehabilitation (with major structures)	Construction of second line
ALB	390,000	1,300,000	2,100,000	4,000,000	4,600,000	6,000,000
BIH	420,000	1,400,000	2,700,000	4,200,000	4,500,000	5,900,000
MKD	480,000	1,600,000	2,500,000	4,400,000	5,100,000	5,900,000
CRO	600,000	2,000,000	3,600,000	4,800,000	6,000,000	6,500,000
KOS	390,000	1,300,000	2,000,000	4,000,000	4,000,000	6,000,000
MNE	510,000	1,700,000	2,800,000	4,700,000	5,400,000	6,200,000
SRB	510,000	1,700,000	2,900,000	4,300,000	5,400,000	6,100,000

- iii. For soft measures, an analysis of the costs for implementing the proposed measures is also included.

Table 17. Estimated Cost of Alleviating the Non-physical Impediments
(up to year 2020 -million €)

Intervention/Action	Type	ALB	BH	MKD	KOS	MNE	SRB	Total*
Strengthening the CEFTA Committee on Trade Facilitation; with SEETO participation	C/BC	0.3	0.3	0.3	0.3	0.3	1	2.5
Collecting and monitoring comparable data on process times at Border Crossing Points	C/BC	1	1	1	0	1	2	6
Implementing the NCTS Transit Convention	C/BC	1	4	4	1	4	8	22
Improving Customs IT systems	C/BC	3	1	3	1	2	6	16
Implementing efficient risk management, post control audit & simplified procedures	C/BC	8	8	4	2	7	16	45
Supporting Single Window procedures	C/BC	4	4	2	2	2	8	22
Establishing AEO status procedures and providing capacity building	C/BC	2	2	1	1	2	4	12
Enabling better use of inter-modal transport	IM	2	2	2	1	2	6	15
Strengthening the administrative capacity in Road Transport & Safety Agencies	Road	8	6	10	4	8	20	56
Facilitating admission to road haulage market & profession	Road	4	4	2	1	4	8	23
Implementing legislation regarding dangerous goods	Road	1	1	1	1	1	3	8
Strengthening the administrative capacity in Rail Safety & Regulatory Agencies	Rail	3	4	4	1	4	6	22
Separating operations from infrastructure management	Rail	1	4	1	1		8	15
Opening up the rail market to competition	Rail	1	4	4	0.5	2	12	23.5
Strengthening administrative and technical capacity of Maritime Administrations	M/TWW	6	2			2	4	14
Developing Sava and Danube waterways and related IT systems	IWW		2				4	6
Strengthening the administrative capacity of Civil Aviation Authorities	Air	3	3	1	2	1	10	20
Total*		48	52	40	19	42	126	327

Legend:

Air transport Air Customs and border crossing C/BC
 Inter/multimodal transport IM Road transport Road
 Rail transport Rail Maritime and/or Inland Waterways M/TWW

* Totals may not add up due to rounding.

Source: Costs for each measure/country based on Consultants' estimates; measures largely follow those in the EC reports: (i) *Enlargement Strategy and Main Challenges 2014-15*, October 2014, available at: http://ec.europa.eu/enlargement/pdf/key_documents/2014/20141008-strategy-paper_en.pdf; and (ii) *Country-Specific*

Title of the study	Connectivity Networks Gap Analysis (IPA 2011-WBIF-Infrastructure Project Facility-Technical Assistance 3 EuropeAid/131160/C/SER/MULTI/3C)
Author	DG NEAR
Year	2016
Member State	Serbia, Montenegro, Bosnia and Herzegovina, Albania, the former Yugoslav Republic of Macedonia, Kosovo*
Corridor sections	OEM, MED and Rhine-Danube connection with the Western Balkans (WB) Region
Mode	Road, Rail, IWW, Maritime Transport
Type of source	Gap Analysis
Confidential	No

Map

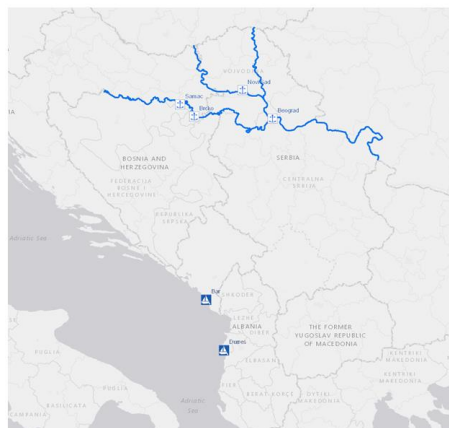
Figure 2.1 The Core Corridors proposed alignment for the Road Network



Figure 3.1 The Core Corridors proposed alignment for the Rail Network



Figure 3.1 Core IWW Network and Core River and Maritime Ports



The geographic coverage of the Connectivity Gap Analysis is the six countries of the Western Balkans that are eligible for grants under the WBIF, and the IPA programme. The Analysis also covers the connectivity of the Western Balkans with neighbouring countries along the TEN-T and TEN-E networks.

Description of main findings The strategic objectives of the study are:

- To identify the gaps in the connectivity networks – Energy and Transport – and define the segments of infrastructure required to close the gaps.
- To review the present status of project identification, planning and

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence

preparation for each segment and assess the maturity of each segment.

- To identify the programme timeline, activities and budget for each segment to move the status from project preparation to project implementation.
- To prepare an overall prioritised programme of segments, with identified project preparation and other actions, required to allow construction activities to commence.

The Study began in December 2015 and was completed in May 2016.

The Connectivity Gap Analysis identified the compliance gaps of the entire Western Balkans (WB) Core Network against the TEN-T standards. Focus was also placed on the Core Corridors (Mediterranean, Orient/East Med and Rhine-Danube) extension in the Region. It is noted that within this study, only the road, rail and IWW networks were examined.

The analysis for the transport networks produced an inventory of the gaps for the Mediterranean, Orient/East Med and Rhine-Danube Core Corridors. The gaps were identified in relation to the TEN-T standards required for each of the road network, the rail network and the IWW system. The compliance with each of these criteria was shown graphically on maps using a GIS application that was developed within the framework of this Study.

**Relevance for
Corridor Study
Activities**

The main objective of the Study is to identify a list of projects for the WB Core Network that will improve the existing networks and will fill in the existing connectivity gaps. All identified projects were thoroughly analysed and their level of maturity was estimated. More specifically, detailed studies and reviews of all available documentation, together with an assessment as to each project's preparedness for construction for each of the identified segments was carried out. A project fiche was produced for each one of the identified and analysed projects, which summarises the available project documentation.

Title of the study	Western Balkan Intermodal study
Author	City Net Scientific Research Center
Year	2016
Member State	Western Balkan
Corridor sections	Western Balkan related to OEM
Mode	Rail, road, waterways
Type of source	Support to the Transport Dimension of the SEE 2020 Strategy
Confidential	Y

Map



The Western Balkan intermodal study is related and aimed to encourage the long term sustainable development of logistics infrastructure and multimodal transport in the Western Balkan countries and presents the basis for further development of the region. Within the main objectives of the study are the understanding of market requirements, the assessment of main logistic corridors, the analysis of main bottlenecks and the identification of possible interventions using a preliminary economic analysis.

Description of main findings

The study identifies several locations within the region, with 46 multimodal facilities; 15 facilities have attributes of intermodal terminals, whereas 11 of them are identified as the main holders of intermodal transport services:

- Three terminals sea-rail-road (Port Durrës-Albania, Port Bar-Montenegro, Port Plöče)
- Two terminals river-road-rail (Beograd-Serbia, Port Novi Sad-Serbia)
- Six terminals type Rail-road (Intereuropa RTC-Alipasin most-Bosnia & Herzegovina, Container terminal Tovarna-Skopje- the former Yugoslav

Republic of Macedonia, Container terminal Donje Dobrevo (Miradi)-Kosovo, Logistics Centre Beograd ZIT-Serbia).

The study also encompasses the analyses regarding the following related projects:

- Intermodal International Studies (Imonode, ADB Multiplatform, Acrossee, Alpfrail & Transitects, Sonora Interim, FLAVIA, COSMOS, MEDNET, WATERMODE, Marco Polo – Project AGORA, INERMODAL TERMINALS).
- Intermodal National Studies (Study for Intermodal Transport in Bosnia and Herzegovina, Facilitating Intermodal Transport in Serbia, Feasibility Study for development of Strategic Multimodal Transport Nodes in the former Yugoslav Republic of Macedonia).
- Regional Transport Studies (Regional Balkans Infrastructure Study, Multimodal Flagships Axes Initiative, South East Europe (SEE) 2020 Strategy, Dimension Transport).
- National Transport Studies

The document provides a deep and comprehensive overview of the project, including:

- Legal and institutional framework for Intermodality in the Western Balkans
- Description of current transshipment point
- Market study for potential intermodal transport
- Capacity analysis of intermodal terminals
- Roadmap on intermodal Transport for SEETO Regional Participants
- Identification of Main Intermodal Corridors
- Gap analysis in the main Logistic Corridors
- SWOT analysis of Intermodal Transport System
- Identification of Efficiency-Enhancing Measures

Identification of the critical issues

- The main conclusion is the underdeveloped intermodal transport in the SEETO region. Some of the critical issues that were identified to be causing this were:
 1. Deficiencies of the supply system (infrastructure and technical means),
 2. Inadequate links to offer freight services and interconnection between modes,
 3. Poor ability of suppliers and lack of appropriate marketing strategies,
 4. Poor operating conditions and low level of service of railway network,
 5. Insufficient investment into basic maintenance on the railways,
 6. Low level of containerization.

Assessment of Corridor objectives

The main objective of the Western Balkan Intermodal study is to identify the main issues that are hindering the full development of intermodal services in order to propose measures that will contribute to the long-term development of logistics infrastructure and multimodal transport.

More specifically, the study aims to:

- i. Integrate transport sector
- ii. Increase the possibility to ensure cargo mobility, efficient application of means of transport and the quality of logistics
- iii. Improve Attractiveness and competitiveness of the whole SEETO Region
- iv. Enhance the better use of national and regional resources
- v. Reduce cargo carriage costs
- vi. Reduce the environmental impact of heavy duty vehicles by switching freight transport to the railroad.

Assessment of Corridor measures

The foreseen improvement of intermodal transport involves the implementation of a large number of measures which are individually listed in the study, such as legislative, regulatory, administrative, organisational and technological, monitoring procedures, etc.

More specifically, among the high priority measures, that can also be implemented quickly are and represent initial steps in the process of development of intermodal transport in SEETO region, are:

- i. Making planning documents (intermodal studies, strategies, national programmes);
- ii. Establishing the status of intermodal transport as an activity of special economic importance;
- iii. Start creating the project of information system, database, statistics of intermodal transport;

- iv. Obligation of submitting data to create statistical reports and databases and procedures of information flows,
- v. Liberalisation of the railway sector,
- vi. Inclusion of the intermodal projects in the priority projects for the use of pre-accession EU funds,
- vii. Internal transport-transhipment places must be ready for accepting TEU units,
- viii. Solutions for border crossing
- ix. Use of modern IT equipment.
- x. Infrastructure development in the rail sector.

Gathering information for market study

- i. Information on traffic flows, TEU, modal split and corridors were obtained from other studies. These studies had to be analysed under a level of interpretation, since they were given by different institutions with diverse interests, who provided information that didn't coincide with one another. This matter made the statistical analysis extremely difficult.
- ii. Trade flows indicate that all SEETO participants have a big surplus of import over export. However the inter-regional flows give a different conclusion.
- iii. Container flows were hard to estimate due to lack of official statistical data. However there was the possibility to make container flows estimations.
- iv. Export and import trade flows in SEETO region are mostly realized through the ports located near the region. The utilization rates of these ports vary between 30% and 80%.
- v. Containerisation potential of the SEETO region is relatively significant and has not been achieved so far.

Identification of on-going / planned project and related characteristics

- i. The proposed intermodal terminals that are planned or the construction is ongoing is described into details, illustrating all the relevant characteristics and future estimated traffic flows.
- ii. Based on the identified short and long term measures, some pilot actions are proposed in a manner to have domino catalytic effect on other industries.

Assessment of the investment strategy

- i. The document does not contain an investment strategy. However budget estimations for three pilot actions are given:
 - 1. € 250.000 for a new system that works as a statistical tool.
 - 2. € 650.000 for a training centre development to provide training services on different issues regarding intermodality.
 - 3. € 2.5 – 3.0 million for development of networked and efficient intermodal clusters within the Balkan region.

Annex 2 Identified projects per transport mode

Rail Projects

For the railway sections on the OEM WB6 corridor, 15 projects, which are on-going or planned, were identified, taking into account the Connectivity Agenda (Vienna Summit, 2015), the National Single Project Pipelines (SPPs), as well as the SEETO MAP 2016. An overview of these projects is presented in the following Table.

Table 52: Identified Rail Projects on the OEM related WB Core Network

Project	Country	General Description	Status
Modernisation of the Niš - Preševo (border with MK) railway line	RS	The Project includes reconstruction and modernization of the track, with upgrading of the track elements to traffic speeds up to 120 km/h, permissible axle load of 225kN and permissible load per linear metre of 80 kN/m (Class D4); installation of the rails type UIC 60, reconstruction, rehabilitation and replacement of the bridges and culverts, reconstruction and rehabilitation of the tunnels, provision of the UIC-GC gauge, securing of level crossings, revitalization of the existing signalling and interlocking devices and of the contact line, as well as digitalization of the telecommunications.	PFS, FS, PD, ESIA are ongoing
<i>Reconstruction, modernisation and construction of the second track on the section Stalać - Djunis of the railway line Beograd-Niš</i>	RS	<i>The Project includes construction of a new double-track railway line. This includes reconstruction and modernization of the part of the existing track and construction of the second track for double-track operation, construction of the new double-track railway alignment for the traffic speeds of up to 160 km/h, permissible axle load of 225 kN, and permissible load per linear metre of 80 kN/m (D4 Class), together with installation of the rails type UIC 60, provision of the UIC-C gauge, construction and reconstruction of the contact line, signalling & interlocking and telecommunications installations, construction and reconstruction of the structures (tunnels, bridges and viaducts), reconstruction and modernization of the station capacities, possible regulation of the river South Morava, delevelling of the level crossings, digitalization of the telecommunications along the whole railway line, and modernization of the system for the security of property and video monitoring.</i>	<i>PFS completed</i>
Modernisation for the contemporary double track traffic of the single track section of the railway line Resnik - Klenje - Mali Pozarevac - Velika Plana	RS	The Project consists of 3 subsections: - Section Resnik-Klenje, reconstruction of 10.8 km single-track railway line and construction of the second track to enable two-way traffic (this section effectively serves and is contained within both major alternatives, as they separate after the station Klenje); - Section Klenje-Mali Pozarevac (15.6 km) of which approx. 8 km for new double-track electrified railway line construction (part after Klenje to Mala Ivanca), and remaining 7.6 km for reconstruction of the single-track and construction of the second in-parallel track to enable two-way traffic (though with significant changes with respect to the existing single-track layout); - Section Mali Pozarevac-Mala Krsna-Velika Plana, 58.9 km of the single-track reconstruction and construction of the second in-parallel track to enable two-way traffic. (Re)constructions will also involve installation of the track elements for the traffic speeds of up to 160 km/h, installation of ICT system, permissible axle load 225kN, permissible load per linear meter of 80 kN/m (Class D4), and installation of 60E1 rails. on the whole railway line, and modernization of the system for the security of property and video monitoring.	PFS is completed



Project	Country	General Description	Status
Modernization and Reconstruction of the Railway Line Velika Plana - Stalać	RS	The Project includes reconstruction and modernization of the double-track railway line for the traffic speeds of up to 160 km/h and permissible axle load of 225 KN, as well as permissible load per linear metre of 80 KN/m (D4 Class), together with installation of the rails type UIC 60, reconstruction, rehabilitation and replacement of the bridges and culverts, provision of the UIC-GC gauge, securing of the level crossings, revitalization of the existing signalling and interlocking devices and of the contact line, digitalization of the telecommunications along the whole railway line, and modernization of the system for the security of property and video monitoring. Works currently ongoing on the single-track railway subsection over the length of 10.2 km, along the section Gilje – Cuprija – Paracin (incl. the construction of the Velika Morava Bridge and on the lacking parts of the left-hand track such as construction of a second track on the existing single-track part in the length of 2 km, along the section Gilje – Cuprija). Completion of these works is planned in 2016.	PFS is completed
<i>Reconstruction and modernisation of the railway line Novi Sad - Subotica - border with Hungary (Kelebija)</i>	RS	<i>Section Novi Sad-Subotica, in its present state, is single-track line, electrified and designed for speeds up to 120 km/h. However, owing to poor condition of the track in certain parts, the speed has been substantially reduced. The Project includes reconstruction and modernization of the existing track over the length of around 107 km and construction of the second track, with upgrading of track elements for the traffic speeds of up to 160 km/h and permissible axle load of 225 KN, as well as permissible load per linear metre of 80 KN/m (D4 Class), together with installation of the rails type UIC 60. The Project also includes reconstruction, rehabilitation and replacement of the bridges and culverts, with provision of the UIC-C gauge, as well as reconstruction of the tracks and structures in the stations and rehabilitation of the existing signalling and interlocking devices and the contact line. Complementary project is related to the adjacent section Stara Pazova-Novı Sad for which construction (double-track elements for speeds of up to 200 km/h, and electro-technical facilities in the first phase, for speeds of up to 160 km/h) pending to start in 2016 (funded by the Russian Government loan).</i>	<i>PFS, FS, PD, ESIA are completed</i>
Reconstruction and Modernization of the railway line Stalać – Kraljevo - Rudnica	RS	Railway line Stalać-Kraljevo-Rudnica is a single-track non-electrified railway line, length of 149 km, and actually consisted of two sections. Due to the poor condition of the line, the maximum allowed speed for the trains is 40 km/h, on the 72 km long main section from Stalać to Kraljevo (SEETO Route 11), and 50 km/h on the regional rail line from Kraljevo to Rudnica (SEETO Route 10). The Route 11 section (Stalać-Kraljevo) is of category C3 from Stalać to Krusevac and B2 on segment from Krusevac to Kraljevo (B2 - the allowed axle load being nominally 180 kN, and the allowed load per meter of length is 64 kN/m) and the Route 10 section (Kraljevo-Rudnica) is of category C3 (the allowed axle load being nominally 200 kN, and the allowed load per meter of length is 72 kN/m). Alternatives to improve the railway line will be studied. Reconstruction of the railway line consists of overhaul of 149 km of the line, with the increase of the allowed axle load to 225 kN, and weight per metre of length to 80 kN/m, and upgrading of the alignment elements for the traffic speed of up to 120 km/h. The line is to be electrified with the AC 25 kV, 50 Hz system, construction of the fixed electric traction facilities, equipping of the line and station tracks with modern signalling-safety and telecommunication devices, upgrading of the level- crossings safety level, providing of the UIC-C free profile for electrified lines, and enabling usage of all intermodal transport technologies without limitations.	PFS is ongoing



Project	Country	General Description	Status
Reconstruction and Modernization Railway Line (Beograd) - Vrbnica - Bar 1) Rehabilitation of Train Track (superstructure), Culverts, Regulation of watercourse, reconstruction of steel bridges 2) Rehabilitation of Slopes 3) Rehabilitation of landslides, tunnels, concrete bridges i electrical works	ME	The project aims to rehabilitate the north to south main axis railway line in Montenegro, E-79 from Vrbnica (state border with Serbia)-Podgorica-Bar (167.4 km electrified line). The design speed on the line is 80 km/h, but currently not more than 55 km/h (in average) can be achieved on some sections for safety reasons and line condition, due to lack of regular maintenance and rehabilitation. It is expected that the maximum speed can be increased to 80 km/h following reconstruction of the entire line. It should be kept in mind that, on the section from Vrbnica to Kolašin, rehabilitation of superstructure is completed and speed increased to 80 km/h, while bridges and tunnels are the next segments waiting for rehabilitation. The reconstruction/rehabilitation of the line Vrbnica-Bar is subdivided into numerous tenders and works contracts, largely funded from EIB, EBRD, IPA and national funds (national co-financing). This involves renewing tracks to increase safety and speed, rehabilitating or reconstructing bridges and tunnels, removing and stabilising landslides as well modernisation of signalling including remote control and equipment for maintenance of the electro technical infrastructure. State budget funds are currently not used to finance railway infrastructure investment and maintenance. Hence, this project envisages rehabilitation of 13 steel bridges (rehabilitation of the three steel bridges are in progress), rehabilitation of slopes, landslides and tunnels, as well as five concrete bridges, whose repairs urgent.	
Reconstruction of the railway section along the corridor X Dracevo - Veles	MK	Corridor X railway infrastructure is stretched 215 km across the territory of the former Yugoslav Republic of Macedonia and runs north - south direction. It is electrified with a single - phase system of AC 25 kV/50 Hz and starts from the north - border crossing Tabanovci (to Serbia) and ends with the south border crossing near Gevgelija (to Greece). Also, the branch Xd of the Corridor X starts in Veles and ends at the border crossing Kremenica, near Bitola	
Rehabilitation and modernization of the railway section along Corridor X Tabanovci - Dracevo	MK	The project aims to rehabilitate railway subsection from Kumanovo to Dracevo, as subsection Tabanovce-Kumanovo (11.6km) is already renewed to meet the TEN-T standards (works started in Sept 2012 and completed October 2013) and for operating speed up to 100 km/h (Red FIDIC, Investment costs € 7 mln, with support of EBRD loan in amount of € 4 mln). Works included track renewal, substructure works, replacement of the existing rails with new type 49 E1; L=120m, replacement of the existing wooden sleepers with new concrete type MP 94, replacement of OCL masts, safety improvement on level crossings.	Works completed
Rehabilitation and modernization of the railway section along Corridor X Veles - Gevgelija	MK	The total section Veles-Gevgelija (115 km long) consists of several subsections which in different stages of project preparation while some under implementation. For the subsection Nogaevci - Negotino (approx. 31 km), overhaul works ongoing (started early 2014 and to be completed in 2016, financed with EBRD loan, in amount of € 9.4 mln). Also, overhaul works on the subsection from Miravci to Smokvica (13 km) to meet the TEN-T standards completed in 2013 (with EBRD loan, in amount of € 3.5 mln). Hence, project preparation documentation to be prepared for subsections Veles-Nogaevci, Negotino-Miravci (42.7 km), Smokvica-Gevgelija (9.2 km).	
<i>General Rehabilitation of Railway Route 10 (admin. line with Serbia Leshak -Fushë Kosovë - Hani i Elezit - Border with MK)</i>	XK	<i>General rehabilitation of the Railway Route 10, in length of 148 km, is as precondition for development of the railway sector in Kosovo. This existing line is under operation. As it is related to rehabilitation of the existing line, there were no alternative analyses related to the alignment. However, alternative options explored for telecommunication, signalling and electrification options.</i>	<i>PFS and FS are completed</i>
Construction of new deviation of the existing line Thessaloniki-Idomeni, in Polikastro-Idomeni, section	EL	The project includes the construction of a new line (deviation) in the section Polykastro - Idomeni, approximately 21 km long, of the Thessaloniki - Idomeni line, with signalling, ETCS level 1, telecommunications and electrification.	Under construction



Project	Country	General Description	Status
Installation of ETCS level 1 in Thessaloniki-Polikastro, section	EL	The project includes the modernization of existing signalling system and the installation of ETCS level 1	
Installation of GSM-R in Thessaloniki-Idomeni section	EL	Installation of GSM-R system	
Modernisation and upgrading of the 165 km long Hungarian section of the Budapest-Beograd railway line (No. 150 of MÁV Hungarian State Railways between Budapest-Ferencváros and Kelebija HU/RS border crossing)	HU	Construction of an electrified, double track (maximum axle load 22.5 kN) railway line permitting 160 km/h operating speed and running 740 m long trains. Estimated cost is HUF 472.000 million (approx. 1500 mln €) from which 15% will be paid by the Hungarian State, the remained 85% should be covered by a Chinese sovereign loan. Expected deadline of the completion of works is end of 2018.	

Note: The projects in blue italics are projects included in the list of the OEM pre-identified projects in the Connectivity Agenda (Vienna Summit, 2015, Paris Summit, 2016, Trieste Summit, 2017)

Road Projects

For the road sections on the OEM WB6 corridor, 17 projects, which are on-going or planned, were identified, taking into account the Connectivity Agenda (Vienna Summit, 2015), the National Single Project Pipelines (SPPs), as well as the SEETO MAP 2016. An overview of these projects is presented in the following Table.

Table 53: Identified Road Projects on the OEM related WB Core Network

Project	Country	General Description	Status
<i>Completion of Beograd bypass, Sector 6: Strazevica-Bubanj Potok</i>	RS	<i>On the OEM Core Corridor - Corridor X, and also part of the Beograd bypass ring road (between Dobanovci and Bubanj Potok), this being only remaining section missing, while sections from Dobanovci to Ostružnica will be completed in full motorway profile by end of April 2016. Sections from Ostružnica bridge to Strazevica tunnel (inclusive) exist in semi-motorway profile (completed in 2012). The Beograd ring road consists of 3 (implementation) sectors. While Sector A and parts of Sector B (1, 2, and 3) are almost completed in full motorway profile, and Sectors B4 and B5 are constructed in semi-motorway profile, Sector B6 is missing (Strazevica-Bubanj potok) in length of 9.57 km (km 588+916.30-km 598+489.89) as well as the Sector C (Bubanj Potok - Pančevo). As the motorway section is missing, traffic bypassing Beograd uses existing single carriageway dual lane road</i>	<i>PFS, FS, ESIA are completed</i>
Reconstruction and upgrade of road section between Ostružnica and Strazevica (Sectors 4 and 5)	RS	The two sections from Ostružnica-Orlovaca interchange-Tunnel Strazevica are part of the Beograd Bypass ring road (Sector B4 and B5) and currently exist only in the semi-motorway profile, which constructed under Stage I in 2008 and June 2012, respectively.	PFS, FS, PD, ESIA are completed
Construction of road section between Grdelica and Preševo	RS	The project - construction of the remaining motorway sections (Corridor X) from Grdelica to Levosoje is underway. Several sections of the E-75 motorway (south) are already in operation (opened for traffic in full motorway profile in Aug 2013, Nov 2015, April 2016) and construction of the remaining sections is due to be finished in 2016 and by April 2017.	Under Construction
Požega-Boljare road (border with Montenegro)	RS	This section of the motorway Beograd – South Adriatic Sea (E-763) between Pozega and Boljare (border with Montenegro) will be 107 km long (22 km of bridges and 27 km in tunnels).	PFS is completed
Construction of the road sections Požega-Beograd	RS	This motorway project is actually consisted of several sections implemented and financed separately (with total length of some 151 km): Section 1 - Surčin - Obrenovac (17.6 km, two LOTs); Section 2 - Obrenovac-Ub (26.23 km); Section 3 - Ub-Lajkovac (12.5 km); Section 4 Lajkovac-Ljig (24 km); Section 5 - Ljig-Preljina (40.36 km, in three LOTs); Section 6 - Preljina-Požega (30.96 km, in three LOTs). With exception of the Sections 1, Surčin-Obrenovac and 6, Preljina-Požega, sections from Obrenovac to Preljina are in advanced stages of implementation.	PFS, FS, PD, ESIA are completed, Some sections under construction
<i>Construction of highway section Merdare- Kuršumlija - Prokuplje bypass - Merosina - Niš</i>	RS	<i>The new motorway will improve road connection between Bulgaria, Serbia, Albania and the former Yugoslav Republic of Macedonia through Kosovo.</i>	<i>PFS is completed</i>



Project	Country	General Description	Status
Completion of Road Route 4, section Mateševo-Andrijevica	ME	<i>The motorway Bar – Boljare (Serbian border), approximately 169 km long, intersects transversely the entire Montenegro, and will link Montenegro, from the Adriatic coast, across the Capital Podgorica to the border with Serbia, and onwards via the motorway Požega - Beograd with TEN-T core corridor to Romania and Central Europe. The Section Mateševo - Andrijevica, approximately 21 km long is to be constructed in the Phase II of the Bar-Boljare motorway implementation. It extends across the mountainous part of Montenegro, between Mateševo (at an altitude of 1,200 m) and Andrijevica (at an altitude of 730 m), in full profile (2x2), and in continuation of the Smokovac-Mateševo section, which is under construction (being part of the Phase I).</i>	<i>PFS is completed</i>
Construction of bypass Podgorica (Capital-Smokovac-Farmacij)	ME	<i>This section in length of 17.2 km is to complement urban transit route through Podgorica - western bypass as the key remaining bottleneck in Montenegro on the motorway to the Adriatic Sea. However, the section is planned for implementation together with the section Mateševo – Andrijevica, in the second phase of Bar – Boljare motorway construction, following construction of the section Smokovac – Mateševo (for which construction about to start).</i>	<i>PFS is completed</i>
Route 4: Highway Bar - Boljare, section Mateševo-Podgorica (Smokovac)	ME	This section Smokovac (Podgorica) – Mateševo, approx. 41 km long (including tunnel Vjeternik 3 km long and Moracica bridge 1 km long), is considered of highest priority and is already tendered for construction in 2015 (construction contract signed). Therefore this being first section (Phase I) of this motorway route to be implemented in Montenegro.	PFS, FS, PD, ESIA are completed
Route 4: Highway Bar-Boljare, section Djurmani - Farmaci	ME	This section Djurmani (Bar) – Farmaci (Podgorica), approx. 32 km long (Djurmani-Virpazar 11.2 km, Virpazar-Farmacij 20.8 km), is planned to be constructed under Phase IV, and therefore as the last section to be implemented. However, it is noted that part of this section is built (existing and under operation) as semi motorway link, in the length of approx. 10 km, from Djurmani to intersection with M2 state road, including tunnel Sozina (4.2 km long).	PFS is completed
Route 4: Highway Bar-Boljare, section Andrijevica - Boljare	ME	This section Andrijevica – Boljare (Serbian border), approx. 52 km long (subsection 4B Andrijevica-Berane 11 km, subsection 5 Berane-Boljare 41 km), is planned to be constructed in Phase III, following sections Smokovac – Mateševo (that is currently under construction), and section Mateševo – Andrijevica that is planned to be constructed in Phase II.	PFS is completed
Reconstruction of road section between Demir Kapija and Udovo	MK	The Project includes works on construction of the new, motorway section from Demir Kapija to Smokvica in a length of 28.18 km and in accordance with European standards, thus completing the main axis of the Corridor X in the former Yugoslav Republic of Macedonia.	Under construction
Rehabilitation of the road section between Kumanovo and Miladinovci	MK	The project relates to pavement rehabilitation/reconstruction, replacement of traffic signalisation and equipment.	Under construction
Construction of road section Skopje - Kosovo border	MK	The Project relates to construction of motorway A4 Skopje- Blace, section: Interchange "Stenkovec" – Blace (in length of 12,5km), located in the north-eastern part of the former Yugoslav Republic of Macedonia, Skopje region.	PFS, FS, PD, ESIA are completed
Construction of the road section Prishtine/Priština – Border with MK	XK	<i>Construction of 4-lane Motorway from the south of Prishtine/Priština, Lipjan-Ferizaj-Doganaj-Kacanik (65 km) in Phase I (LOTs 1 and 2) and further from Kacanik to Hani i Elezit (on the Kosovo and the former Yugoslav Republic of Macedonia border).</i>	<i>Under construction</i>
Construction of the motorway section Prishtine/Priština - Merdare	XK	<i>The project includes construction of a new motorway from Prishtine/Priština to Merdare (admin. crossing to Serbia). The section variants considered are yet to be confirmed/revised (new motorway subsections from Prishtine/Priština - Podujeve - Besi and/or upgrade of existing road from Podujeve-Merdare, etc) under the WBIF technical assistance (WB11-KOS-TRA-02) currently ongoing.</i>	<i>PFS, FS, ESIA are completed</i>



Project	Country	General Description	Status
Implementation of ITS on Road Corridor X (the former Yugoslav Republic of Macedonia)	MK	Implementation of ITS on all road sections of Corridor X in the former Yugoslav Republic of Macedonia	

Note: The projects in blue italics are projects included in the list of the OEM pre-identified projects in the Connectivity Agenda (Vienna Summit, 2015, Paris Summit, 2016, Trieste Summit, 2017)

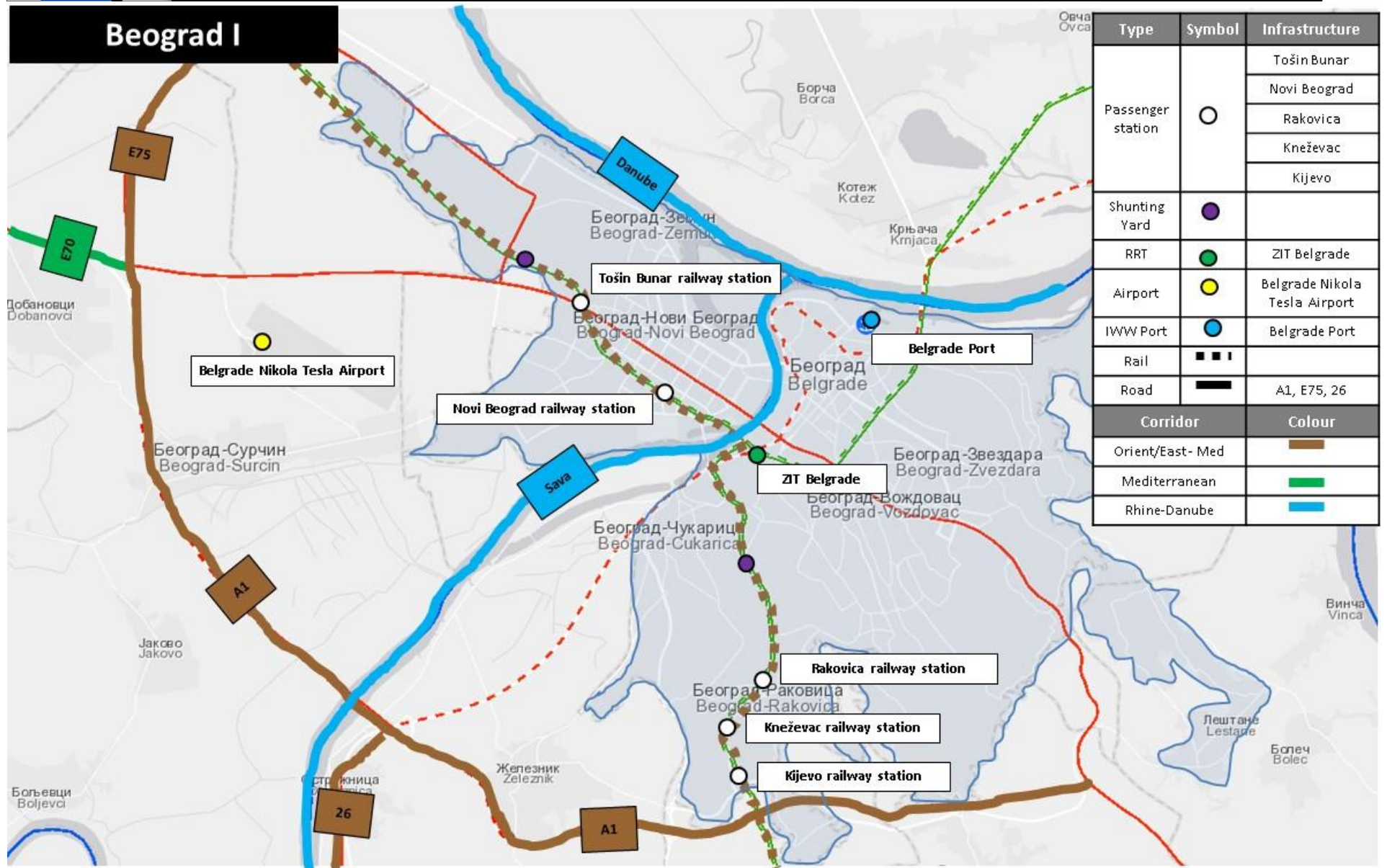
RRT, Seaports and Airports Projects

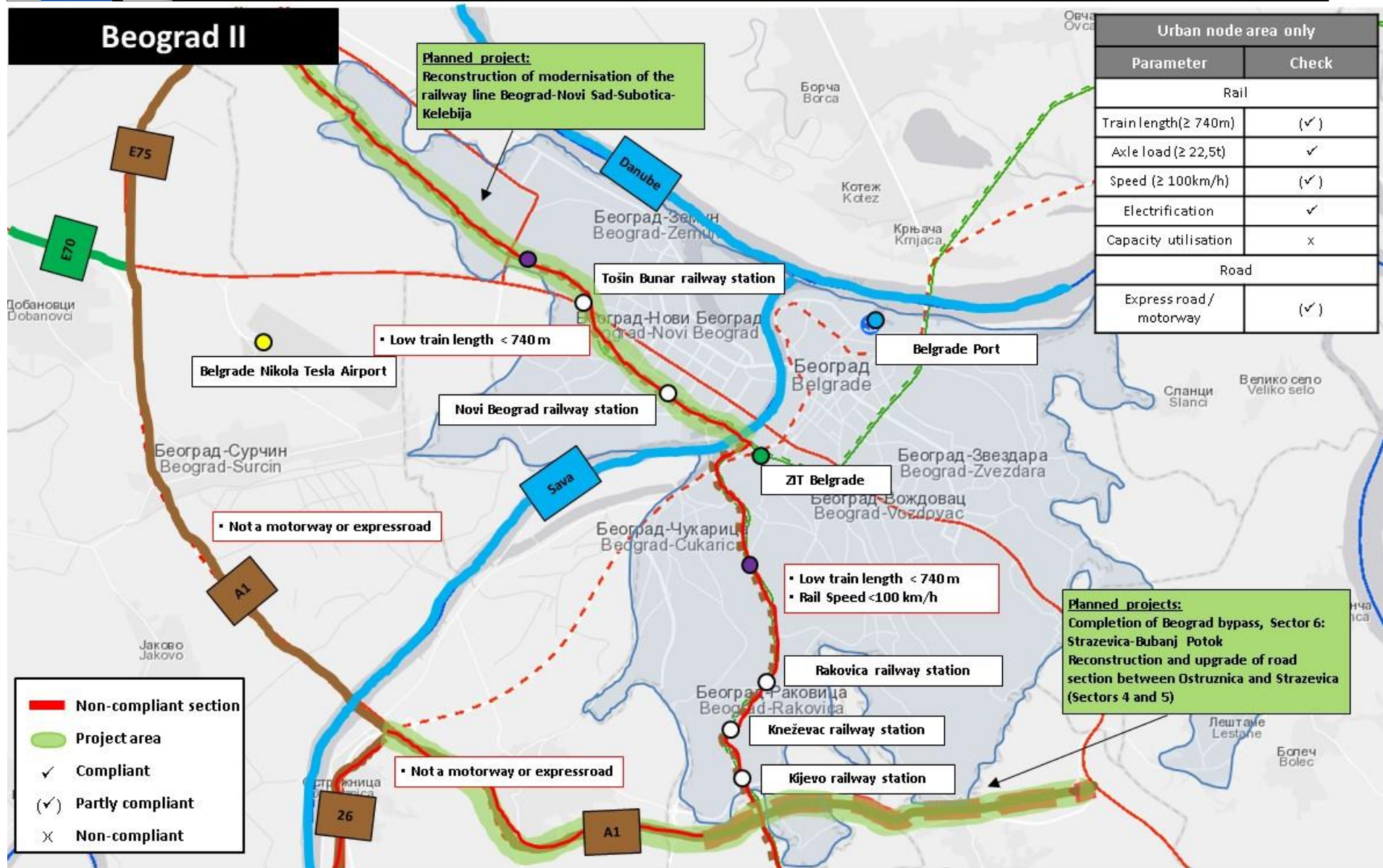
For the RRT, Seaports and Airports on the OEM WB6 corridor, 3 projects, which are on-going or planned, were identified, taking into account the Connectivity Agenda (Vienna Summit, 2015), the National Single Project Pipelines (SPPs), as well as the SEETO MAP 2016. An overview of these projects is presented in the following Table.

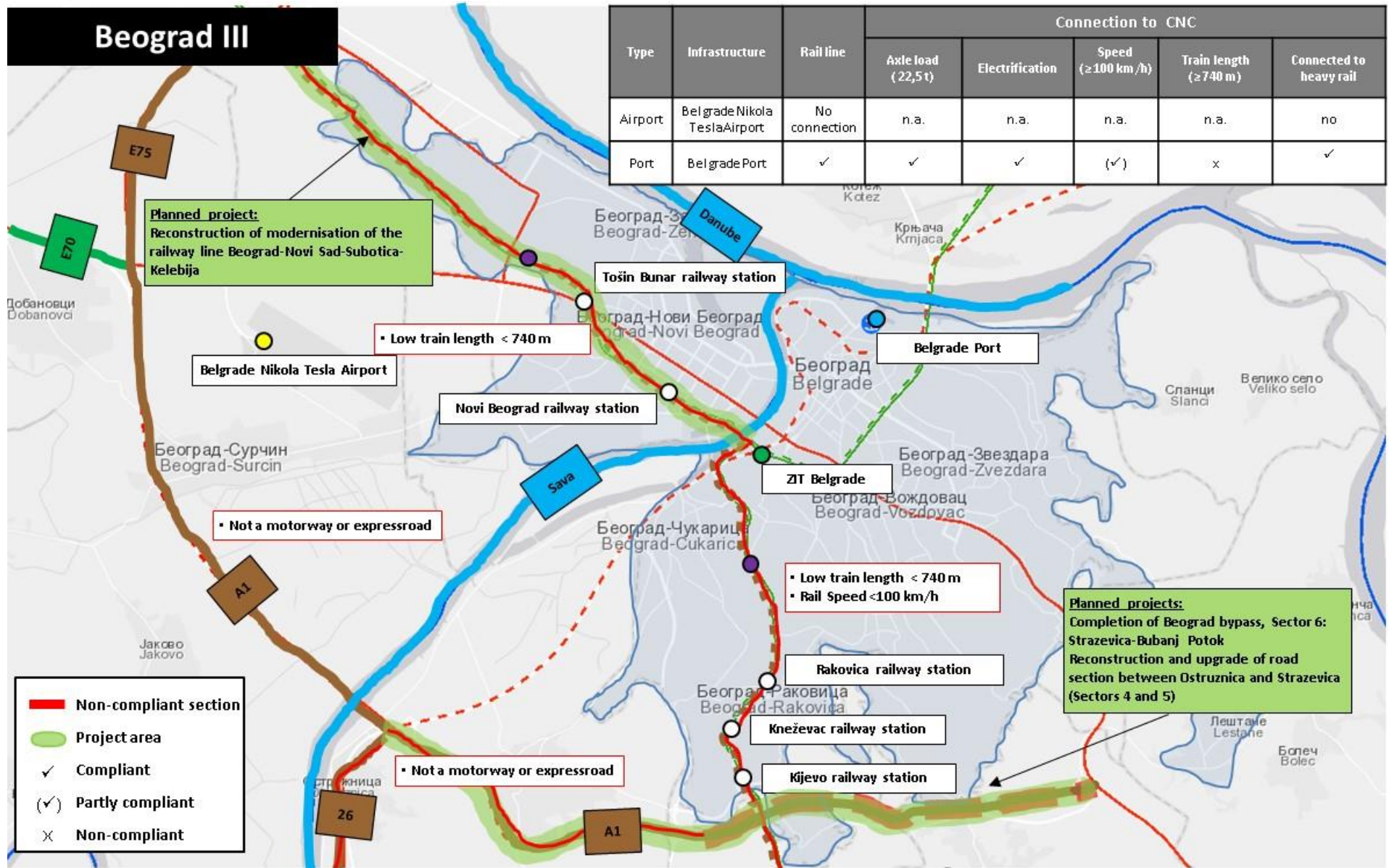
Table 54: Pre-identified RRT, Seaports and Airports Projects on the OEM WB6 corridor

Project	Country	General Description	Status
Intermodal Terminal in Beograd	RS	The project involves the construction of an intermodal terminal in Batajnica, Beograd with rail access, road access, and storage area for intermodal transport units, buildings for the terminal operator and customs authority, as well as parking places for road freight vehicles.	Fully prepared
Implementation of a Vessel Traffic Monitoring and Information System (VTMIS) Phase II	ME	Implementation of the second phase of VTMIS	
Construction and modernisation of a Railway Line Prishtine/Priština - Fushë Kosovë -Prishtine/Priština Airport "Adem Jashari"	XK	General rehabilitation and modernization of the line in order to achieve projected speed (80 km/h up to 120 km/h).	FS is completed

Annex 3 Urban Nodes Analysis









Skopje I

