

Study on Rhine - Danube TEN-T Core Network Corridor

2nd Phase

Western Balkans Final Report

Date: December 2017

Prepared by the Joint Venture of



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Abbreviations

bln	Billion
CBA	Cost/Benefit Analysis
CEMT class	Classification of Inland Waterways
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
EU	European Union
GDP	Gross Domestic Product
IM	Infrastructure Manager
IU	Infrastructure User
IWW	Inland waterway
KPI	Key Performance Indicator
LPG	Liquefied petroleum gas
mio	Million
MoS	Motorway(s) of the Sea
MoU	Memorandum of Understanding
MS	Member States of the European Union
MTMS	Multimodal Transport Market Study
n.a.	not available / not applicable
NGO	Non-governmental organization
RD	Rhine Danube (Corridor)
PAX	Passengers
p.a.	per year / annual
PP	Priority Project
RA	Regional Authority
SEETO	South-East Europe Transport Observatory
TBD	to be defined
TEN-T	Trans-European Transport Network
P	Passenger
F	Freight
WB 6	Western Balkans Six
WP	Work Package

Country Codes after ISO 3166:

AT	Austria
BG	Bulgaria
CZ	Czech Republic
DE	Germany
FR	France
HR	Croatia
HU	Hungary
RO	Romania
SK	Slovakia
BA	Bosnia and Herzegovina
RS	Serbia
UA	Ukraine

Executive Summary on Main Findings

This report deals with the analysis of the IWW and relevant port infrastructure on the Danube, Sava and Tisa river in Serbia and Bosnia and Herzegovina, which supplements the study on the Rhine – Danube Core Network Corridor. The TEN-T Regulation 1315/2013 set out the transport infrastructure requirements for the IWW transport mode and the connected port infrastructure components. A set of Key Performance Indicators has been defined and agreed at measuring the progress of the deployment of the Core Network Corridors in terms of compliance with Regulation 1315/2013.

Freight transport volume on IWW varied nonlinearly since 2009 but remains with 38.3 million tonnes transported on the entire Danube in 2015 more than 10 million tonnes below the level before the financial crisis. Container transport on the Danube amounts to only 0.5%, which is compared to 13.5% on the Rhine a particularly low level. Passenger transport on the Danube steadily increased, due to the sharp raise of cruise vessels on the Upper Danube between Passau and Budapest. Even if comprehensive statistics on Inland Waterway Passenger Transport for the whole Corridor are scarce, steady increases in cruise vessels have been reported at several spots in the last years: For example, between 2010 and 2016 river cruise vessel passengers increased by 40% in Passau (314,000 passengers in 2016) and by 70% in Vienna (415,000 passengers in 2016). In particular, the number of cruising vessels increased from 70 vessels (2010) to 170 vessels (2015).¹

The Rhine Danube corridor demonstrates available shift capacity towards waterways. Potential market uptake of environmental friendly transport mode with underutilised capacity was therefore analysed by an in-depth analysis of specific promising commodity groups. Commodity groups showing a moderate (some renewables and steel) to a high (the other commodity groups) IWT potential are: Renewable resources, chemical products, mineral resources, building material, energy raw material (diesel and gasoil), recycling products and high & heavy cargo. Attested potentials result from the present transport volumes, demand prospects, handling and storage facilities in ports, transport and storage requirements, stowage factors and time sensibility.

Assessed inland waterway infrastructures along the Danube, the Tisa and the Sava in Serbia and Bosnia and Herzegovina show a high level of compliance measured by selected Key Performance Indicators. Improvements are still required related to the CEMT classification of the Sava River. On the Danube, the targeted fairway depth was not reached at the critical section Futog, in Serbia. Information on the effectively provided depths along the Tisa and the Sava are not available. River Information Services are not available along the Tisa. Also the Iron Gate I and II locks have been identified as bottlenecks due to the obsolete infrastructure and operational schemes that favour energy production but significantly impact inland navigation and the environment further downstream.

Despite the positive developments, the Key Performance Indicators remained stable in the past and further activities will be needed in order to reach compliance with Regulation 1315/2013 before 2030. Both of the sections that currently do not fulfil the requirements of Regulation 1315/2013 are expected to remain incomplete by 2030, as

¹ *Danube Commission: Market observation report 2016*

no activities related to the Tisa are known and the rehabilitation and upgrade of the Sava River is at risk to be delayed.

The following ports are subject of the compliance analysis in this report:

- Brčko and Šamac in Bosnia and Herzegovina
- Novi Sad and Beograd in Serbia

Most of the ports in the Western Balkan comply with the majority of Key Performance Indicators (KPI), except in the case of the availability of alternative clean fuel supply facilities, where no port reported either existence of such facilities or plans to acquire them by 2030 and in the case of one port not having at least one freight terminal open to all operators.

In terms of port related projects, 7 projects were reported by Bosnia and Herzegovina and 1 by Serbia.

As regards to ports projects, no projects influence any of the KPI, but they are focused on the improvement of port infrastructure and their hinterland connections.

1 Background

The present report constitutes an additional deliverable within the 2nd Phase of the Rhine - Danube Core Network Corridor Study, in accordance with the extension of the service agreement from 31st December 2015 regarding the analysis of the major IWW alignment of the Western Balkan Core Network and Inland ports related to the Rhine – Danube Corridor.

It is based on the Contractor’s work in the two years of 2016 and 2017. More specifically, it presents the results of the analysis of recent and expected future compliance of IWW and port infrastructure with the requirements set out in the TEN-T Regulation 1315/2013 and a list of surveyed infrastructure projects collected in 2016 and updated in 2017. In June 2016, an interim report within the Preliminary Report on the elements of the Work Plan has been submitted. The Second Progress Report was submitted as draft report in December 2016 and the final version approved by 30th January 2017 by DG MOVE.

The aim of the Final Report is to serve as a description of the status quo of inland waterways and inland ports development as per the end of 2016, similar to the ongoing Rhine -Danube corridor study and to provide an overview on the gaps in the infrastructure, whether the identified projects will remove the physical and technical bottlenecks or not.

The work on this report consisted of the compilation of existing information in the form of a corridor analysis and assessment of South-East Europe Transport Observatory (SEETO) databases, available reports and inventories, public sources and direct contacts with the stakeholders.

1.1 Study on the Core Network Corridors

Adopted by the EU in 2013, the new TEN-T Regulation 1315/2013² forms the current legal basis for the development of the Trans-European Networks (TEN-T) in the Member States. In order to organize efficiently the future development of the Core Network towards its 2030 key completion milestone, nine (multimodal) Core Network Corridors (CNCs) were defined, each led by a European Coordinator. An integral task specified by the Regulation for each Coordinator is the development of a Work Plan for the implementation of the Core Network based on a detailed analysis of each Corridor. To support each Coordinator in the preparation of the Corridor Work Plan, the European Commission launched nine Corridor studies.

The first part of the implementation of the Regulation 1315/2013 and the CEF Regulation 1316/2013³ for the new TEN-T Core Network Corridor “Rhine - Danube” (R-D) was awarded to the consortium led by iC consulenten by the Directorate-General Mobility and Transport of the European Commission in December 2013, and was elaborated between January and December 2014.

The main outcomes of the 2014 Study entailed the identification and description of the Corridor’s characteristics, i.e. the multimodal transport infrastructure and the market-related transport flows, as well as their compliance with the Regulations’ stipulations. This led to an identification of critical issues, which hinder an efficient and seamless operation of the Corridor, and the definition of Corridor development objectives.

² REGULATION (EU) No 1315/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 on Union guidelines for the development of the trans-European transport network...

³ REGULATION (EU) No 1316/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 establishing the Connecting Europe Facility...

Finally, the study included a record of all on-going and planned infrastructure projects making up a Corridor Implementation Plan.

The results of the study established the basis for the European Coordinator for the R-D Corridor, Ms. Karla Peijs, to draw up the First Corridor's Work Plan by the 22nd of December 2014 and issue its finalised version in May 2015. The Work Plan paid particular attention to the priorities of the guidelines: cross border bottlenecks, interoperability and multimodality. It also focused on the characteristics of the Corridor, the results of the multimodal Transport Market Study, the critical issues and objectives, concluding in a general outlook, as well as a number of key recommendations.

Given its one calendar year duration, several aspects of the Corridor were not entirely developed in this first stage of analysis. To this end, DG MOVE published an invitation to tender on the 17th of April 2015 entitled "Studies on the TEN-T core network corridors and support of the European Coordinators", MOVE/B1/2014-710, for the follow up of the original work. The continuation of the Study (2nd Phase) was awarded to the same consortium and is to be elaborated between September 2015 and December 2017. By Contract Amendment No 1 the Commission (dated 28. 12. 2015) entrusted the study team to take into account the pre-identified projects of the Rhine - Danube Corridor into the analysis and to present the results in the present report.

Subsequently the work on the updating and refinement of the First Work Plan started in September 2015 with the support of the same external consultants for the second phase of the Corridor study aiming to achieve further development of the study. Seven further meetings of the consultation Forum were held between September 2015 and December 2017 presenting and discussing the next steps in the updating of the study and the Work Plan. The Second update of the Work Plan was discussed with the Member States and issued in its final version in December 2016. During 2017 study work continued and was presented and discussed in further meetings of the Corridor Forum, thus forming the basis for the Third Work Plan of the Coordinator to be discussed with the Member States end of 2017 and to be issued in its final version beginning of 2018. In particular in this phase representatives of SEETO and the Western Balkan countries were invited to the meetings of the Rhine-Danube Corridor Forum.

1.2 Characteristics and alignment of the Rhine-Danube Corridor

The Rhine-Danube Corridor is the main east-west link between continental European countries connecting France and Germany, Austria, the Czech Republic, Slovakia, Hungary, Croatia, Romania and Bulgaria all along the Main and Danube rivers to the Black Sea by improving (high speed) rail and inland waterway interconnections.

Also, the non-EU countries Serbia, Bosnia and Herzegovina, Moldova and Ukraine are included in the analysis of the Corridor with regards to inland waterways. As regards to non-EU ports, only Bosnia and Herzegovina and Serbia ports were analyzed in the Rhine-Danube Corridor Study.

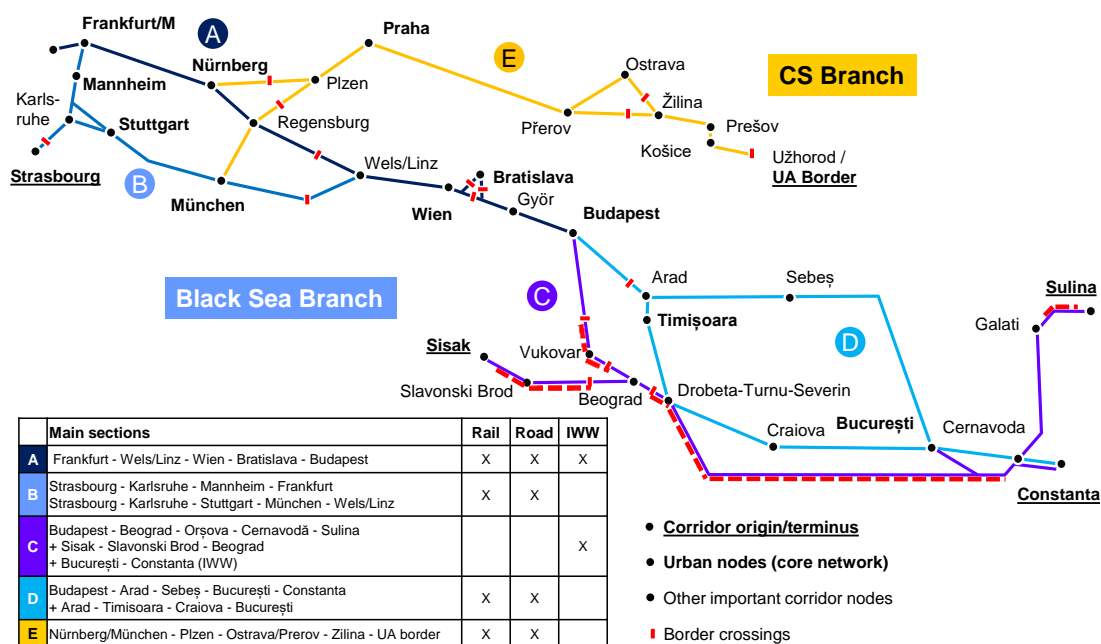
As reported in the maps of the core and comprehensive network of the TEN-T Guidelines (Regulation 1315/2013) and according to Annex 1 of the CEF Regulation (Regulation 1316/2013) the Rhine-Danube Corridor consists of the following main connections and pre-identified sections:

- Strasbourg – Stuttgart – München – Wels/Linz;
- Strasbourg – Mannheim – Frankfurt – Würzburg – Nürnberg – Regensburg – Passau – Wels/Linz;
- München/Nürnberg – Praha – Ostrava/Přerov – Žilina – Košice – UA border
- Wels/Linz – Wien – Bratislava – Budapest – Vukovar;

- Wien/Bratislava – Budapest – Arad – Brasov/Craiova – București – Constanța – Sulina;

Figure 2 shows the full alignment of the Corridor, split in two branches and five main sections. In total, the Corridor consists of 5,715 km rail network, 4,488 km roads and 3,656 rkm inland waterways that cross nine EU-Member States and four Non-Member States. The 19 inland ports outnumber one single seaport. 11 airports form part of the Corridor, out of which four are located in Germany. The Corridor counts 16 trimodal freight terminals and 27 dedicated to rail and road only. In total this amounts to 43 terminals. 13 urban nodes are part of the Rhine-Danube CNC.

Figure 2: Alignment of the Rhine-Danube Corridor (all modes)



Source: Hacton

1.3 Connectivity Agenda

Following the Vienna Summit of the Western Balkans 6 Initiative ("Berlin process") on 27 Aug 2015 and the "Connectivity Agenda on improving the connectivity within the Western Balkans, as well as between the Western Balkans and the European Union", three Core Network Corridors have been identified to be extended in their analytical scope to the Western Balkans as well as to priority projects for possible EU funding.

Subsequently the scope of the Corridor studies on the

- Mediterranean Corridor,
- Orient/East-Med Corridor and the
- Rhine-Danube Corridor

was broadened and now also covers the core infrastructure of the six Western Balkan countries.

Improving connectivity within the Western Balkans, as well as between the Western Balkans and the European Union, is a key factor for growth and jobs and will bring clear benefits for the region's economies and citizens. However, it is not only infrastructure that will enhance connectivity. Similarly important is the implementation

of technical standards and soft measures such as aligning and simplifying border crossing procedures, information systems, safety and maintenance schemes.

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 EUR for connectivity projects and for technical assistance over the period 2014-2020. Since 2014, the EC has committed 500 mio EUR in total for both energy and transport projects. More than half of this amount, 394 mio EUR, 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).

1.4 Stakeholder identification

For the analysis of the Core Network 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 RD Corridor related WB6 Networks, as well as the neighbouring EU Member States;
- 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.

In order to develop the relevant data base for the compliance analysis the following groups of stakeholder entities in Serbia and Bosnia and Herzegovina were contacted:

- Inland Waterway Authorities
- Port Authorities
- Administrations:
 - National administrations
 - Regional administrations and bodies

Furthermore contact was made with the International Sava River Basin Commission.

1.5 Outline of this report

The present report constitutes the Final Deliverable within the 2nd Phase of the Rhine - Danube (R-D) Core Network Corridor Study, in accordance with the extension of the service agreement from 28th December 2015.

The report is structured as follows:

- Chapter 1 lays out the main information on the Western Balkans report and the CNC Study
- Chapter 2 presents the corridor alignment for the Western Balkan countries
- Chapter 3 presents an overview of the existing relevant studies
- Chapter 4 provides brief results of transport market analysis
- Chapter 5 presents the compliance of infrastructure with technical parameters
- Chapter 6 reviews the actions already accomplished
- Chapter 7 summarises the identified projects on IWW and ports
- Chapter 8 reviews the plan for removal of physical and technical barriers
- Chapter 9 reviews the administrative and operational barriers of the examined networks

In the Annexes, the following information is included:

- Annex 1 presents the list of identified projects for IWW and ports
- Annex 2 presents the compliance check for 2016 and 2030 for IWW and ports.

1.6 Consortium information

The study on the Western Balkans report is conducted by the same group of international consultants, led by iC consulenten as the CNC study with the following experts involved:

iC consulenten Ziviltechniker GesmbH	AT	Karl Matousek (Head of Study Team), Saša Jovanović (port expert), Sebastian Steinbrecher (transport analyst)
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Via donau	AT	Katja Rosner, Andreas Baeck (IWW experts)
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This report is elaborated for and in close cooperation with the European Coordinator for the Rhine – Danube Corridor and the European Commission, DG MOVE.

2 Corridor alignment – Western Balkan countries

With regards to the Rhine-Danube Corridor two of the Western Balkans Six countries are included in the analysis of the waterway network⁴. To ensure continuity within the Rhine-Danube Corridor the inland waterways and ports of Serbia and Bosnia Herzegovina are of uttermost importance. Therefore neighbouring third countries have already been included in the first phase of the Corridor studies.⁵

On basis of the indicative extension following the Western Balkans 6 meeting in April 2015, the Western Balkans report covers the following infrastructures in the Western Balkans:

Inland waterways:

- Danube in Serbia
- Sava in Serbia and Bosnia and Herzegovina
- Tisa in Serbia and Hungary

Ports:

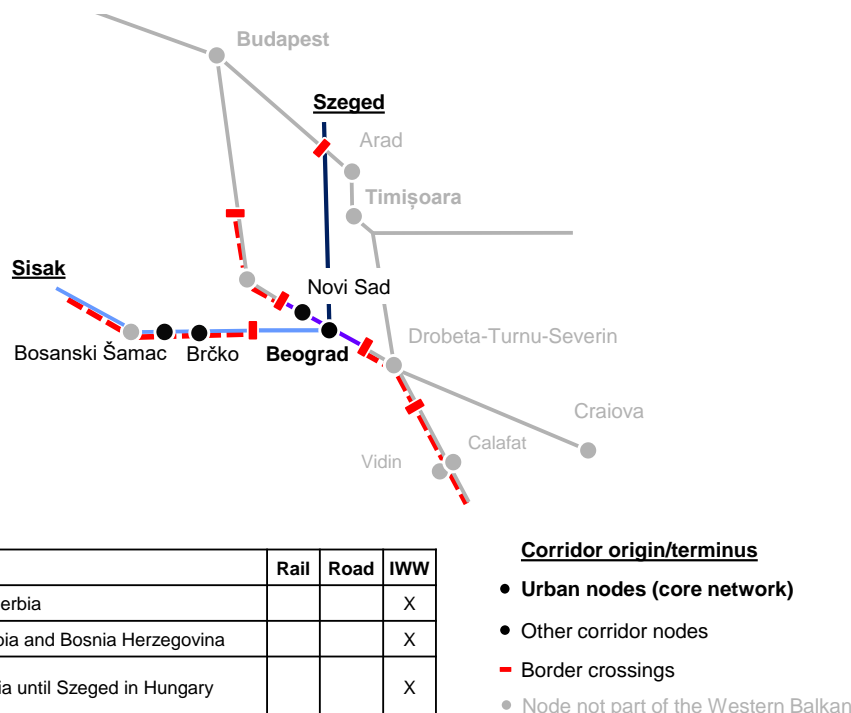
- Brčko and Šamac in Bosnia and Herzegovina
- Novi Sad and Beograd in Serbia

In connection with the Tisa, Hungary asked to include the river up to Szeged into the analysis.

⁴ The cooperation with third countries is described in Article 8 of the TEN-T Guidelines. Projects of common interest in order to connect the TEN-T network with networks of neighbouring countries may be supported, including financially, by the Union. The TEN-T Guidelines include maps of the indicative extension of the TEN-T to the neighbouring countries; IWW map is included for the Western Balkan countries.

⁵ The cooperation with third countries is described in Article 8 of the TEN-T Guidelines. Projects of common interest in order to connect the TEN-T network with networks of neighbouring countries may be supported, including financially by the Union.

Figure 3: Alignment of the Rhine-Danube Corridor in the Western Balkans



Source: viadonau

2.1 Compliance with technical infrastructure requirements

Regulation 1315/2013 sets out the transport infrastructure requirements for each of the transport modes and the connected infrastructure components. The comprehensive set of core parameters analysed during the first Corridor study was reduced to a limited set of Key Performance Indicators (KPI), which aim at measuring the progress of all nine Core Network Corridors in a comparable way. Corridor specific characteristics have been added in order to present a more complete picture of the Corridors' development. In the following table the **Key Performance Indicators for the IWW and port infrastructure** in the Member States and the relevant Western Balkan countries (Serbia and Bosnia and Herzegovina) are presented for the year 2013, 2015 and 2016.

Table 1: Supply side Key Performance Indicators –2013, 2015 and 2016

Mode	KPI	Baseline value 2013	Status 2015	Status 2016
Inland waterway network ¹	CEMT requirements for class IV IWW	85%	85%	85%
	Permissible Draught (min 2.5m)	77%	77%	77%
	Permissible Height under bridges (min. 5.25m)	86% (5)	89% (4) ³	89% (4) ³
	RIS implementation (minimum requirements set out by the RIS directive are met)	95%	95%	95%
	Targeted depth according to waterway manager reached ²	45%	42%	40%
Seaport	Connection to rail	100%	100%	100%
	Connection to IWW CEMT IV	100%	100%	100%
	Availability of clean fuels	0%	0%	0%

	Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	100%	100%	100%
	Facilities for ship generated waste	100%	100%	100%
Inland ports ⁴	Class IV waterway connection	100%	100%	100%
	Connection to rail	92%	92%	92%
	Availability of clean fuels	0%	4%	4%
	Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	96%	96%	96%

¹ Member States and Western Balkans

² Corridor specific indicators

³ The recalculation of the High Navigable Water Level in Hungary revealed its decrease and lead to a higher bridge clearance of the Margit-híd in Budapest in compliance with Regulation 1315/2013.

⁴ Member States and Western Balkans

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, there are still many issues and non-compliant infrastructure sections that need to be addressed.

In the following sections an overview of the relevant studies and initiatives is presented.

3.1 SEETO Multi-Annual Plan 2016

According to the MoU on the development of the Core Regional Transport Network (2004), the South-East Europe Transport Observatory (SEETO) was established as a joint secretariat and technical back-up facility, in order to monitor and develop the indicative extension of TEN-T Comprehensive Network to the Western Balkans 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 in order to identify possibilities for funding.

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 only limited information on IWW and ports are available for the analysis.

3.3 SEETO Flagship Report

The SEETO Flagship Initiative mainly focuses on the non-physical barriers 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.

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. 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 transport.

3.5 Western Balkans Investment Framework - Gap Analysis

The Connectivity Gap Analysis will identify the compliance gaps of the entire Western Balkans (WB) Core Network against the TEN-T standards. Focus will also be 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 are examined.

The analysis for the transport networks will produce 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 will be shown graphically on maps using a GIS application that is developed within the framework of this Study.

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 are thoroughly analysed and their level of maturity is 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 is carried out. A project fiche is produced for each one of the identified and analysed projects, which summarises the available project documentation.

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 Durrës/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,
- 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.

Potential market uptake

3.7 Brief market survey

A brief overview on the transport volumes in the Western Balkans is provided by statistical data on cargo and passenger flows in the four ports that are part of the study. Statistical data in these ports reflect waterside handling only (inland waterway transport only), since the waterside handling (ship loading/unloading) data is seen as the core job of ports in Bosnia and Herzegovina and Serbia.

Port statistics are not publicly available. Below table is a result of the port survey completed by the Consultant. Figures for cargo and passenger flows were obtained from direct inquiries to the respective port authorities, where available.

Table 2: Cargo and passenger flow statistics for the Western Balkan ports

PORT	Total freight throughput (in tons)			Total passenger throughput (in passengers)		
	2013	2014	2015	2013	2014	2015
Novi Sad	748,236	985,240	1,001,683	35,000	35,000	36,014
Beograd	202,000	169,000	236,000	65,285	68,000	66,760
Bosanski Šamac	n/a	n/a	n/a	n/a	n/a	n/a
Brčko	n/a	120,200	n/a	n/a	160	n/a

Source: iC consulenten, based on direct inquiry to port authorities

In particular, the strengths of the inland navigation include the ability to convey large quantities of goods per vessel unit, the low transport costs, especially the case for bulk goods and its environmental friendliness. For transports of high & heavy cargo such as wind turbines, cranes, large engines are especially suitable for Danube navigation due to the availability around the clock, with no prohibition on driving at weekends or during the night. Inland navigation also has a high level of safety and low infrastructure costs.

In total, nearly 38.3 million tons of goods were carried on the Danube waterway and its tributaries in the year 2015. The largest transport volume was achieved by Romania, accounting to 19.9 million tons, followed by Serbia with more than 12.6 million tons and Austria with over 8.9 million tons in 2015 (see Table 3).⁷

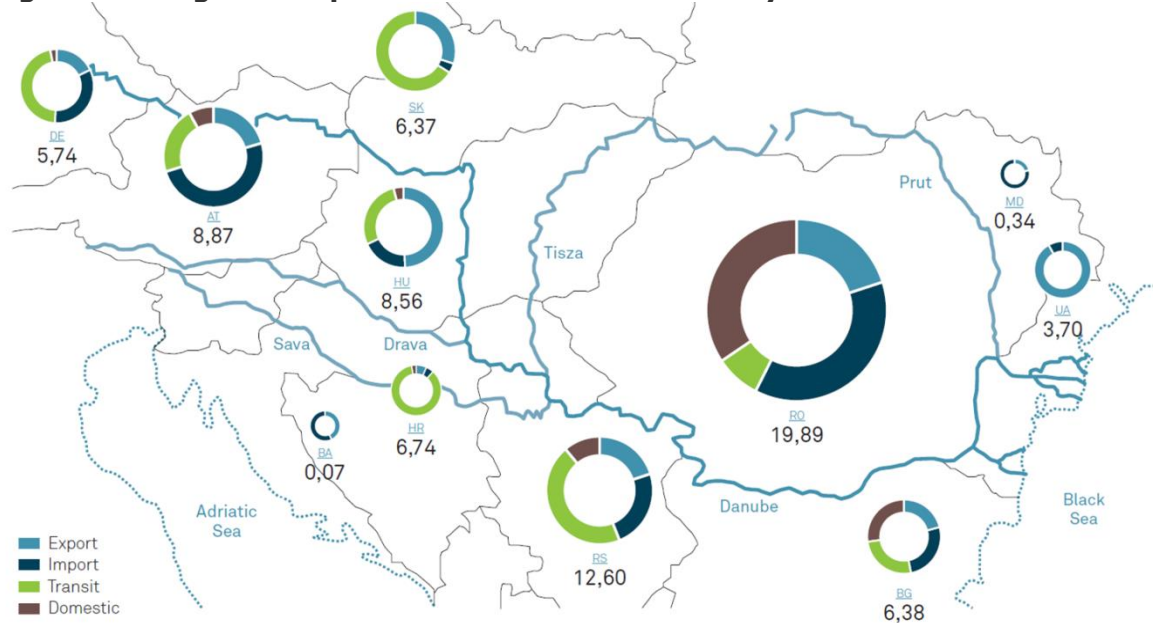
Table 3: Freight transport (export, import, transit and domestic) on the entire Danube in year 2015

In millions of tons	DE	AT	SK	HU	HR	BA	RS	RO	BG	MD	UA
Export	1,03	1,85	2,07	4,29	0,34	0,03	2,46	3,98	1,34	0,07	3,38
Import	1,91	4,43	0,10	1,61	0,17	0,04	3,06	7,45	1,66	0,27	0,31
Transit	2,64	1,91	4,18	2,44	6,18	0,00	5,71	1,68	1,68	0,00	0,00
Domestic	0,16	0,68	0,02	0,22	0,05	0,00	1,37	6,78	1,70	0,00	0,01
Total	5,74	8,87	6,37	8,56	6,74	0,07	12,60	19,89	6,38	0,34	3,70

Source: viadonau, Annual Report on Danube Navigation in Austria 2016

⁷ viadonau (2017)

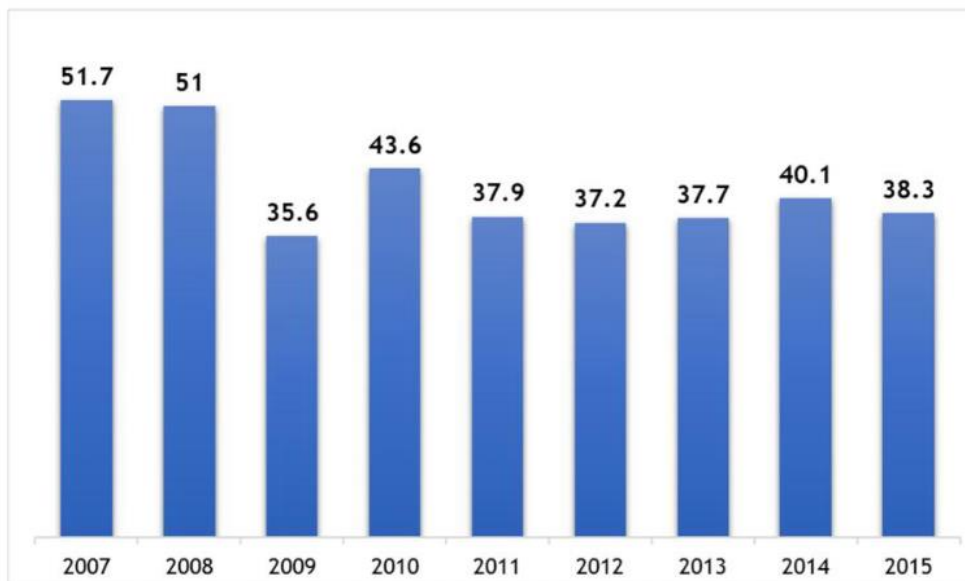
Figure 4: Freight transport on the entire Danube in year 2015



Source: viadonau, Annual Report on Danube Navigation in Austria 2016

During the period 2007 and 2015 (Figure 5) the total cargo transport volume on the Danube River was varying nonlinearly. While in 2015 the total volume of cargo transport reached 38.3 million tons, and 40.1 million tons had been transported in 2014. In the previous three-year period from 2011 to 2013, the total volume was more similar to the 2015 value. A considerable decline of around 10 million tons was recorded from the starting value in 2007, which was the highest: 51.7 million tons. After 2008 the financial crisis became obvious also in terms of inland waterway transport statistics.

Figure 5: Danube cargo transport volume period 2007-2015



Note 1: Data in Million Tons

Note 2: Data for 2015 are the latest cargo transport volume data available for all countries

Source: Danube STREAM consortium, Common Danube Report 2016 based on national statistics offices

The total cargo turnover of all Danube ports was – according to statistics of the Danube Commission - around 65 million tons in year 2015 which is an increase of 18 million tons compared to 2014 (+ 27.7 percent) as shown in Table 4. The highest cargo turnover share took place in Romania (around 10 million tons), followed by Austria and Serbia (7.4 and 6.5 million tons). The only figures regarding transshipment volume in the entire Danube region are provided by the Danube Commission. Consequently, deviations from national recorded transshipment volumes might occur due to different calculation methods.

Table 4: Total cargo turnover of the Danube Ports for 2014-2015 (based on statistical data forms ST-12)

in thous.t

Country	Loaded			Unloaded			Total cargo turnover		
	2015	2014	in % to 2014	2015	2014	in % to 2014	2015	2014	in % to 2014
UA	4 433,0	4 335,0	102,3	358,0	212,0	168,9	4 791,0	4 547,0	105,4
MD	..	..	..	..	..	..	..	..	..
RO (2014=2013) ¹	5 090,0	5 483,0	92,8	5 030,0	4 523,0	111,2	10 120,0	10 006,0	101,1
BG	1 180,0	1 491,0	79,1	3 367,0	3 020,0	111,5	4 547,0	4 511,0	100,8
RS	2 622,0	3 589,0	73,1	3 880,0	3 674,0	105,6	6 502,0	7 263,0	89,5
HR	347,0	205,0	169,3	146,0	236,0	61,9	493,0	441,0	111,8
HU	4 190,0	3 572,0	117,3	1 788,0	1 420,0	125,9	5 978,0	4 992,0	119,8
SK	1 624,0	1 937,0	83,8	113,0	184,0	61,4	1 737,0	2 121,0	81,9
AT	2 444,0	2 832,0	86,3	5 005,0	5 782,0	86,6	7 449,0	8 614,0	86,5
DE ²	1 202,0	1 225,0	98,1	2 055,0	2 806,0	73,2	3 257,0	4 031,0	80,8
TOTAL	23 132,0	24 669,0	93,8	21 742,0	21 857,0	99,5	44 874,0	46 526,0	96,4
RO (2014=2013) ³	..	5 483,0	..	..	4 523,0	..	30 020,0	10 006,0	300,0
TOTAL							64 774,0	46 526,0	139,2

¹ Data for 2015 by five ports: Galați, Brăila, Tulcea, Giurgiu and Harsova.

² Ports on the German section of the Danube, see "Binnenschifffahrt in Bayern im Dezember und im Jahr 2015 (2014)".

³ Data from Romania for 2015 in total for all Danube ports (ST-12).

Source: Danube Commission, Danube Navigation Statistics 2014-2015 (2016)

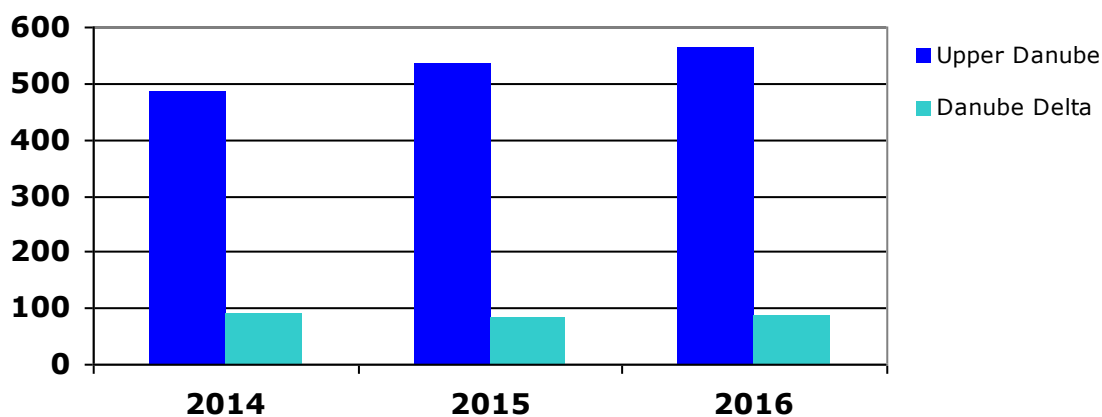
Container transport volumes on the Danube remain marginal and made up only 0.5% in 2016, while container transport on the Rhine amounts to 13.5% of total transport volume. Several attempts have been started to establish container lines from Constanța in the direction of Beograd, Budapest, Wien and Krems but proved not to be competitive compared to rail transport. The critical mass of container volumes could not be reached due to uneven transport relations resulting in empty journeys in one direction and the low density of Container Terminals along the Danube, but also unreliable fairway conditions and cumbersome administrative red tape, etc.

Comprehensive statistics on Inland Waterway Passenger Transport for the whole Corridor are scarce. Steady increases in cruise vessels have been reported at several spots in the last years: For example, between 2010 and 2016 river cruise vessel passengers increased by 40% in Passau (314,000 passengers in 2016) and by 70% in Vienna (415,000 passengers in 2016). In particular, the number of cruising vessels increased from 70 vessels (2010) to 170 vessels (2015).

The steep rise in passenger transport is observed mainly for the Upper Danube with the most popular short trips of 5, 7 or 8 days at the relations Passau-Wien-Bratislava-Budapest-Passau and Wien-Bratislava-Budapest. Also the share in total turnover

retrieved from passenger transport is remarkably high in Austria with 66%. In Hungary the share of goods transport makes up the predominant part: 73%.⁸

Figure 6: Dynamics of passenger traffic on the Danube, in 1000 passengers



Source: Danube Commission, *Marktbeobachtung der Donauschifffahrt: Bilanz 2016*

3.8 Market potential of specific commodity groups

The analysis of market potential of Inland Waterway Transport, as an environmental friendly transport mode with underutilised capacity, consists of an in-depth analysis of selected promising market segments focusing on production respectively trade volumes, on the evaluation of the market potential in the Danube riparian countries and on the special transport requirements for the selected commodity groups. Following commodity groups are discussed in detail: Renewable resources, chemical products, mineral resources, building material, energy raw material (diesel and gasoil), recycling products and high & heavy cargo.

At the moments, cruise vessels operators offer tours on the Danube and on the Sava. Passenger transport in the Western Balkan also has potential to increase but has been neglected within the further analysis, as it seems to be taken-up by the market without further supporting measures. Thus the analysis of market potential strongly focusses in freight transport.

Besides the transport price the shipper's modal choice depends especially on the characteristics of the transported goods, e.g. dimension of the cargo, the stowage factor and the potential risks. On the other hand, the modal choice for logistic providers depends on the quality of the transport service: reliability, door-to-door transit time, flexibility, safety/security, frequency, network coverage availability of loading units, information exchange, etc. These factors are particularly defined by the location of shippers, recipients, availability and quality of transport network infrastructure as well as legal and political framework.

3.8.1 Renewable Resources (RES)

Renewable resources are agricultural and forestry products which are intended for material, energetic use or as food as well as feedstuffs.

Agricultural and forestry products make up to 20% of the total volume of goods transported annually on the Danube. Despite their dependency on weather conditions

⁸ CCNR, *Market Observation, Annual Report 2017*.

(precipitation, temperature and days of sunshine per year) and the resulting production fluctuations, agricultural goods were and are one of the most important cargo types for inland navigation for the vast majority of the Danube countries.

The following advantages of Danube navigation can be highlighted for agricultural and forestry products, according to their typical characteristics and special transport requirements:

- Cost efficient transport solution, especially for bulk cargo
- High volume of renewable resources along the Danube axis, vast agricultural areas in the vicinity of ports and terminals
- High loading capacity of Danube vessels compared to truck and railway
- Reliable partners in Danube navigation with many years of experience in establishing transport chains for these products
- High density of Danube ports with efficient handling and storage facilities for agricultural and forestry products along the Danube. From Kelheim (Germany) to the Black Sea there are more than 50 transshipment locations with adequate equipment, either ports or sites, for agricultural and forestry products.

More than 50 Danube ports have appropriate handling equipment for agricultural products and forestry (transshipment services for renewable resources) as shown in the figure below. The majority of handling locations is located in the Upper and Middle Danube. It is also notable that transshipment locations along the Danube correspond to the areas of cultivation (as illustrated in Figure 7).

Figure 7: Danube ports and transshipment sites for renewable resources



Source: viadonau

Agricultural products in the Danube region

Renewable resources are traded in great quantities by Danube countries: Large importers of agricultural goods are Austria and Germany while countries in the Middle and Lower Danube (Hungary, Serbia, Romania, Bulgaria and Ukraine) are predominantly exporting these goods.

A huge share of European growing areas of agricultural goods is located within the vicinity of the Danube as shown in the map below.

Figure 8: Growing areas of agricultural goods and forestry products



Source: viadonau

Starchy agricultural products such as wheat or maize are processed in the food and fodder industry as well as in the paper and pulp industry. Further application areas are the chemical and textile industry, pharmaceutical industry and the bioethanol production. In total, eight bioethanol plants with a production capacity of round 1 million m³ are located in the vicinity of the Danube River. Inland navigation has the potential to become an important transport mode for the delivery of starchy agricultural products.

Oilseeds such as sunflower, soya and rape are also used in various industries: chemical, bio-based synthetic materials, lubricants, pharmaceutical and biofuel industry. Rape and sunflower are the base products of biodiesel with press cake or seed meal as important by-products which can be used as feed, the catalyser as fertilizer and the glycerol can be used as an important substance in the pharmaceutical industry.

The production of biodiesel in all Danube countries accounted for more than 6.3 million tonnes in 2014⁹ - an increase of 100% compared to 2013 - and the transport of the oilseeds as well as biodiesel and by-products can be easily facilitated by inland navigation.

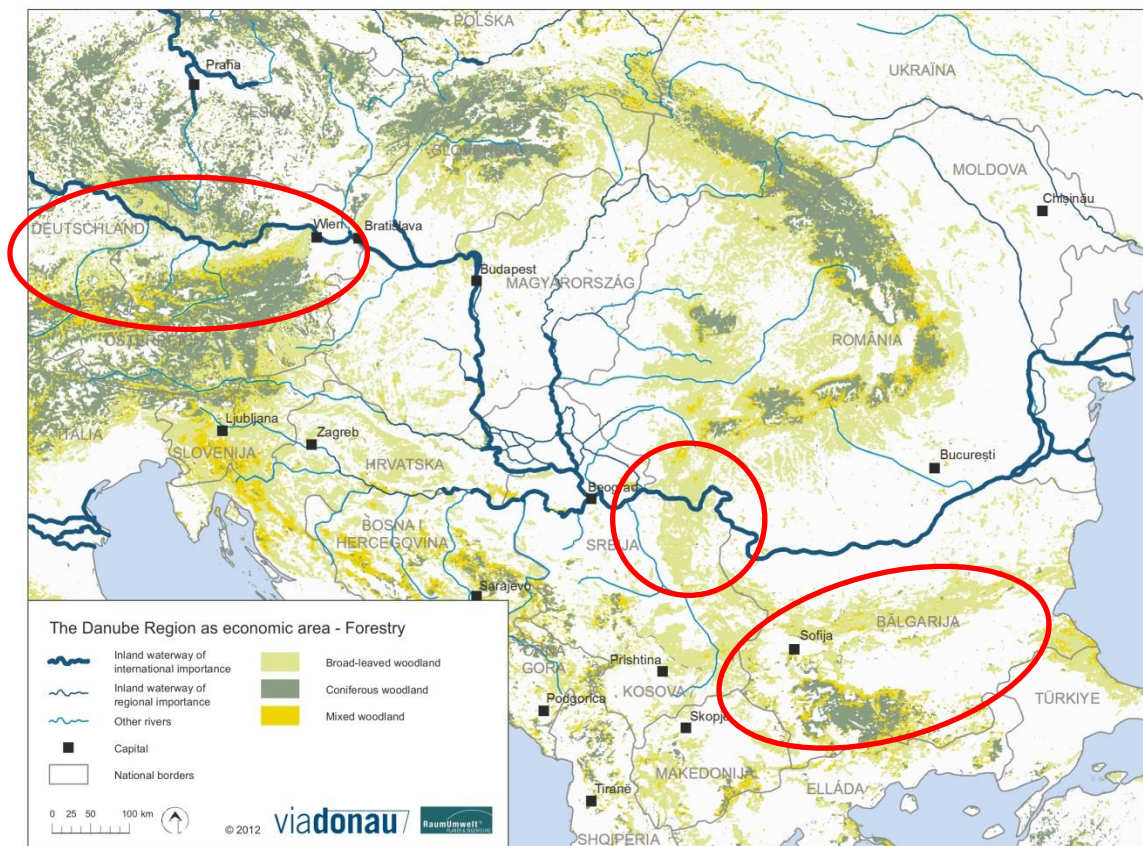
Having in mind the target of a 10% share of renewable resources in transport according to the EU "Directive on the promotion of the use of energy from renewable sources" but also the diversified utilization possibilities of esp. bioethanol, biofuels production companies will become increasingly important in the future.

Forestry products

Forestry products are used for material (wood-based panels, plywood, construction material and furniture) as well as for energy production (pellets, fuel wood and chips). Since 1990 forestry areas increased between 13% and 20% (or stayed stable) in the Danube region. There are three important forest areas which are located in the vicinity of the Danube River: Austria/Bavaria, Serbian/Bulgarian/Romanian border area and in Bulgaria, in the south of the river (circled in red, see Figure 9).

⁹ *European Biodiesel Board (2017)*

Figure 9: Forest areas in Danube region



Source: viadonau

Wood based products for material and for energetic use are traded in large volumes in the Danube region. The basic wood product is round wood which is used as raw material for the sawn industry, industrial wood and for energy purposes. Wood for energetic use such as wood briquettes and pellets play also an important role when evaluating the potential of inland waterway transports.

The EU2020 goals towards increased use of renewable resources are supported by the advantages of pellets as energy source.

There are more than 300 pellets producers in the Danube countries with a total capacity of more than 8 million tonnes per year. The capacity is however not exploited since the actual production accounted for 4 million tonnes in 2012. The greatest demand for pellets is given in Germany (esp. Bavaria) and Austria. The reason for that might be the large imports to Europe from the US, which are transported to Central European countries via ARA (Amsterdam-Rotterdam-Antwerp) ports. Nevertheless, there is a great unused potential in the sector due to existing forest areas in the vicinity of the Danube, the great number of producers and growing demand in the European Union.

3.8.2 Chemical products

Another major sector of promising commodity groups constitutes the fertilisers which are currently being transported in large quantities on the Danube. These account for example approximately 10% of the total transport volume on the Austrian stretch of the Danube. Plants from the petrochemical industry are often found in the immediate vicinity of refineries; these plants manufacture plastics and other oil-based products from the oil derivatives. Due to its great bulk freight capacity Danube navigation is

also the ideal solution for this market segment. However, economical concepts for pre- and end-haulage are required here. Combined transport represents an attractive alternative for integrating the inland vessel into the logistics chain of the chemical industry in addition to the construction of warehouses for bulk cargo.¹⁰

In respect to inland waterway transports, fertilizers are one of the suitable cargo groups for inland navigation transport and are already transported on the Danube in respectable volumes.

The European Chemical Industry Council (CEFIC)¹¹ conducted a survey among large chemical companies and logistics service providers in order to identify main chemical transport corridors and volumes as well as bottlenecks and barriers in terms of intermodal transport. According to the survey about 1.4 million tonnes may be shifted towards intermodal transport solutions, if the requirements were met.

With regard to Danube navigation the identified intermodal flows of more than 200,000 tonnes per year towards Turkey and Russia are relevant and should be considered as a great opportunity for IWT.

3.8.3 Mineral resources and mineral oil products

This group covers a wide range of different products which are applicable in a wide range in business sectors:

- Non-metallic mineral resources;
- Metallic mineral resources.

Non-metallic mineral resources

The commodity group non-metallic mineral resources consist of aggregates (sand, sandstone, limestone, etc.) and derived products (such as cement) which are mainly used in the building industry for foundations, roads, drainage, asphalt, etc.

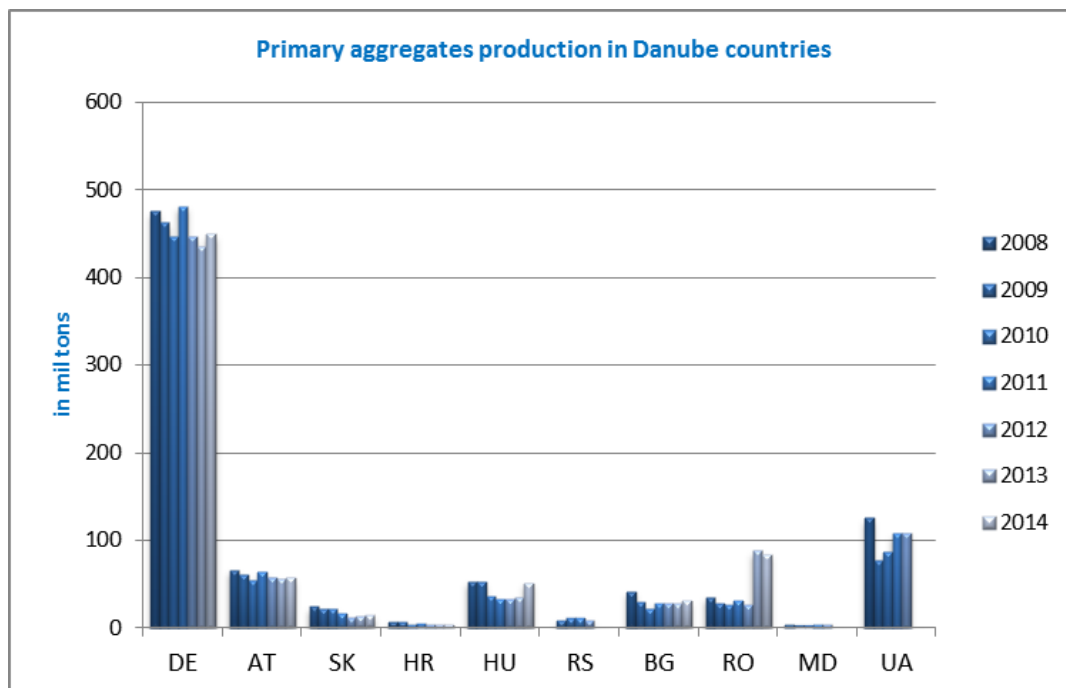
The building industry in the Danube region is characterized by stable production volumes, as illustrated below. It is expected that construction activities in Central and South East Europe will increase and will lead to a higher demand for construction materials in the Danube region. This is due mainly to the high demand for rehabilitation and upgrading of the infrastructure, although structural and civil engineering as well as residential construction also play a significant role.¹²

¹⁰ viadonau (2013)

¹¹ CEFIC (2014)

¹² viadonau (2013)

Figure 10: Primary aggregates production in Danube countries



Note: no data available for RS, MD and UA in the years 2013 & 2014.

Germany's aggregates production of more than 400 million tonnes covered more than half of the total output in the entire Danube region, followed by Ukraine with 100 million tonnes in 2012. Germany is also the largest importer and exporter of aggregates, whereby Ukraine is mainly dominating the exports of these goods.

Cement is a mineral-based product which is primarily used in the production of mortar and concrete. Numerous production sites are located in the vicinity of the Danube River.

Although transport of aggregates via inland waterways is nowadays common practise there is still great potential due to the large unused trade volumes of this cargo group.

Imports of raw material such as magnesia and bentonite from Turkey to Central Europe offer great opportunities for the inland navigation sector as well.

Road transport still plays a predominant role for this cargo while benefits in terms of costs deriving from the bulk capacity of inland vessels offer unused possibilities. Inland vessels could be used here for both bulk cargo (e.g. bentonite, limestone, cement, etc.) as well as general cargo (e.g. construction machinery, cranes, etc.).

Metallic mineral resources

In this section, metallic mineral resources comprise following product groups: metallic raw material, iron ore and semi-finished steel products such as blooms, ingots and billets.

Iron ore is predominantly used for steel production. Approximately 98% of the mined iron ore is processed in blast furnaces, together with scrap metal, limestone and coal.

The iron ore deposits in the Danube region are centred in Ukraine, since Ukraine has about 30 billion tonnes of iron ore deposits which represent the largest extraction potential worldwide. Ukraine is also the leading European iron ore producer and

outlines Ukraine as a major player on the global scale (Ukraine holds 4% in the total world production and is the sixth largest iron ore conveyer).¹³

In total, Ukraine exported round 35 million tonnes iron ore of which 9 million tonnes were shipped to Danube countries in 2012. The most relevant target markets were Austria and Slovakia with a share of 70%.

The largest Austrian steel producer "voest alpine" receives iron ore to a large share from Ukraine and to a small share from Romania via inland navigation.

In Slovakia, the transshipment of iron ore between rail and waterway plays also a big role.

3.8.4 Steel products

The largest crude steel producers are Germany, Ukraine and Austria. The export activities of steel semi-products such as ingots, coils, plates are focused on Ukraine as the most important exporter with an average share of 80% in the entire Danube region. Imports are mainly realized through Germany while the remaining Danube countries import varying annual quantities.

In addition, steel products are also used in the manufacturing industry e.g. in automobiles, trucks, trains.

3.8.5 Energy raw materials - diesel and gasoline

In the Danube region, the total output of diesel production is accounted for 60 million tonnes in 2012. Production in the remaining markets did not exceed 4 million tonnes in the same year.

Petroleum products which are intended for export or import are mostly stored in tank farms for some time after being distributed via pipeline or trucks to gas stations or industrial plants. Only in Germany, there are 40 tank farms which are located in the vicinity of a waterway (Danube, Rhine and Main).

3.8.6 Recycling products

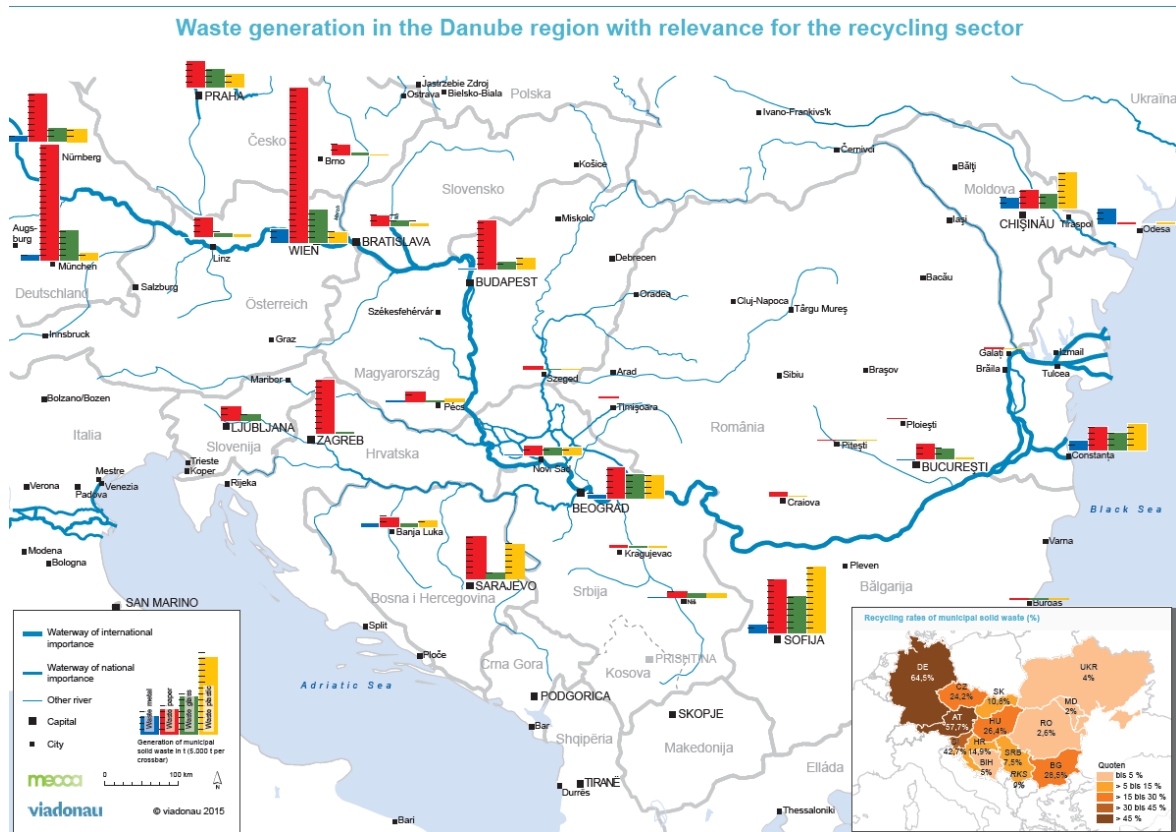
Recycling products such as used materials and waste are bulk goods of relatively low value and inland navigation is a very promising alternative to road and rail for waste management. According to the EC legislative proposal recycling rates should reach 90 % for paper by 2025, 60% for plastics, 80% for wood and 90% of ferrous metal, aluminium and glass by the end of 2030.

There are several reasons for inland navigation to be considered as a suitable means of transport for these goods:

- Growing demand for secondary raw materials,
- Recycling products are globally traded goods,
- High cost sensitivity of recycling products and little time-sensitive transportation,
- Ability to convey large quantities of goods per unit,
- Environmental performance of inland navigation.

¹³ US Geological Survey

Figure 11: Waste generation in the Danube region with relevance for the recycling sector



Source: viadonau, 2017

Recycling products in general are especially suitable for inland waterway transport due to several favourable characteristics of the cargo group: Recycling products are of low value and therefore, require low transportation costs in order to ensure economic efficiency. On the other hand, recycling products are mostly destined for primary storage and for that reason no time-sensitivity of the product group is given, which would otherwise question the suitability of inland navigation. Finally, there is a huge potential for increase of recycling rates in all Danube countries with the exception of Germany and Austria and it can be expected that the efficient collection, processing and transportation of recycling products will become more and more important in these countries in future.

The major urban areas located directly on the Danube (e.g. Wien, Bratislava, Budapest and Beograd) are reliable suppliers of waste metal, household refuse and other waste materials.

For example, numerous Austrian recycling companies (with focus on recycling of metal, glass, plastic and paper) are located within vicinity of the Danube River. Energetic utilisation by waste power plants is also leading to an additional demand for the transport of waste.¹⁴

¹⁴ viadonau (2013)

3.8.7 Scrap metal

Round 15 million tonnes of scrap metal were exported from Danube countries in total in 2012 while imports reached amounted 7.2 million tonnes. These quantities prove that inland navigation does have large potential especially in regard to its characteristics and its suitability for inland waterway transports. It has to be mentioned that the scrap metal market is volatile and that supply and demand are exposed to frequent changes. Nevertheless, this does not minimize the possibilities which are offered to inland navigation in this sector.

An interesting target market for scrap metal is Turkey, the largest worldwide importer with 19 million tonnes in 2014. More than 3 million tonnes were exported to Turkey from the Danube countries in 2014, however inland navigation is not used in a satisfactory amount for these transports. The main reason might be the difficult bundling possibilities of small amounts in order to achieve the adequate quantity for inland waterway transports. Scrap is mainly collected regionally all over the countries where without achieving sufficient volumes for IWT. For that reason information and knowledge transfer and cooperation between the stakeholders in this sector is essential and is performed through conferences like the Danube Business Talks.¹⁵

Figure 12 shows the locations of all primary steel making locations in the entire Danube region.

¹⁵ Report on market potential and up-take measures for the Danube Region

Figure 12: Primary steel making locations in the entire Danube region



Source: viadonau

3.8.8 Waste paper

Germany and Austria are the dominating traders of this commodity in the Danube region with shares up to 70% of the total trade volume (4 million tonnes of exports and 6 million tonnes of imports). These two countries are the most relevant trading partners for each other among all Danube countries, however despite of the high volumes, IWT does not have the relevance as one might assume.

The reason for this circumstance can be surely compared to scrap metal and other recycling products namely the missing bundling possibilities due to regional or local collection across the entire countries. Cooperation platforms for the recycling business should be established in order to demonstrate the potential and provide platforms for positioning of inland navigation.

As for all recycling products, not only collection but also delivery of the cargo to the processing sites should be cost-effective.

3.8.9 Used Glass

From 1990 to 2012 European glass products consumption rose by nearly 40% however, glass recycling even increased by 130% in the same period of time. Consequently, more than 189 million tonnes raw materials were saved and 138 million tonnes of glass waste did not end up in landfills. In the entire EU-28 region 22 million tonnes of used glass are recycled and reused per year.

The leader in glass collection for recycling in the Danube region was Austria with 93% followed by Germany with 88% while Hungary's rate accounted for 32% which was one of the lowest rates in the whole European Union.¹⁶ Used glass is suitable to be transported by IWT, at the moment transport volumes are small but may be increased if recycling rates rise.

3.8.10 Plastic Waste

The average yearly trade volume amounts to around 650.000 tonnes which shows the great potential for transports of plastic waste on inland waterways. The largest share of plastic waste is assigned to Germany and Slovakia.

3.8.11 High & Heavy cargo

High & Heavy (H&H) cargo is not allocated to a specific economic sector but refers to the specific characteristics of the product and the transport. High & Heavy goods can be defined as cargo which cannot be transported as regular load, but requires special measures resulting from its weight and /or big dimensions. Examples of such cargo are power transformers, building machines, engines, wind power plants and tanks, etc. Inland vessels are ideally suited for special transport of H&H cargo due to their size and the available infrastructure.¹⁷

The advantages of IWT of High & Heavy cargo compared to rail and road are:

- In terms of space, there are almost no limitations. A typically used pushed lighter on the Danube is 76.5 meters long, 11 meter wide and has a load capacity of 1,700 tonnes. The dimensions of the cargo hold of a typical motor vessel varies, depending on the type, from 67 to 87 meters length, 8.2 to 8.7 meters width with loading capacities up of 2,400 tonnes and more;
- Inland waterways transports of H&H do not require special cost-intensive transit permissions are as for road transports;
- There are no obstructions through traffic lights, signs, tunnels and bridge passages;
- No detailed routing needed compared to road transport;
- Little transport restrictions compared to road (e.g. weekend bans).

Inland navigation is becoming increasingly important for the High & Heavy sector nevertheless, there is still a great potential for shifting products from road to inland navigation.

¹⁶ *The European Glass Container Federation – FEVE (2015)*

¹⁷ *Report on market potential and up-take measures for the Danube Region*

Figure 13: High & Heavy ports in the Danube region



Source: viadonau

In the future the growing markets in South East Europe and the Black Sea region will bring a big increase of H&H transports especially for the construction industry (e.g. bridges) and energy supply (e.g. wind energy). Furthermore there is a trend towards larger cargo. At the same time the maximum sizes allowed on roads and motorways could be potentially reduced to improve the safety on the road. This could lead to an additional shift of oversized and heavy cargo to inland navigation.

4 Compliance with the technical infrastructure parameters for IWW and ports

4.1 Inland Waterways of the Western Balkan countries

For the IWW compliance analysis the following core parameter of the Regulation were selected as Key Performance Indicators:

- CEMT requirement for class IV
- Permissible draught of minimum 2.5m
- Permissible height under bridges of minimum 5.25m
- Minimum implementation of River information Services (RIS)
- Targeted depth according to waterway manager reached

Compared to the Inland Waterways of the Rhine-Danube Corridor, the degree of compliance with Regulation 1315/2013 is lower in the Western Balkan countries Serbia and Bosnia and Herzegovina. Low compliance values mainly result from the classification of the Sava below class IV and the non-availability of RIS at the Tisa.

Table 5: Generic and specific Inland Waterway KPI (Western Balkan)

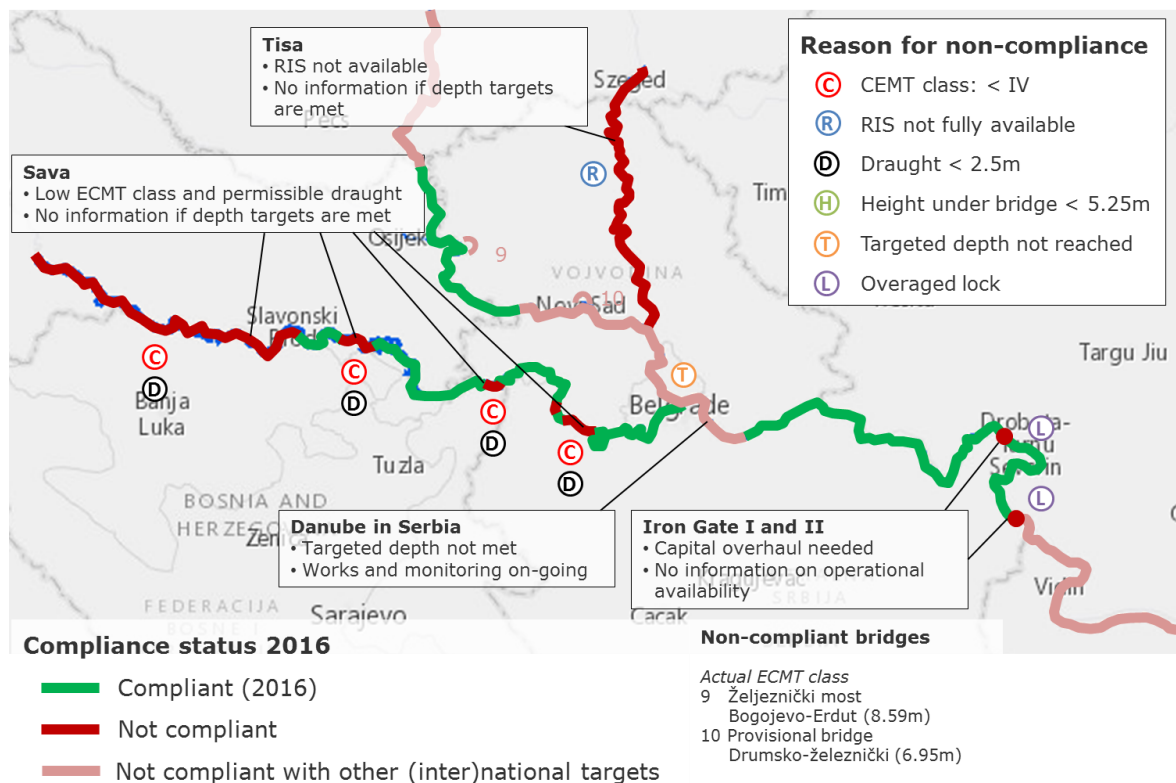
IWW KPI	Baseline 2013	Status 2015	Status 2016
CEMT requirements for class IV IWW	65%	65%	65%
Permissible Draught (min 2.5m)	65%	65%	65%
Permissible Height under bridges (min. 5.25m)	100%	100%	100%
RIS implementation (minimum requirements set out by the RIS directive)	71%	71%	71%
Targeted depth according to waterway manager reached	17%	36%	17%

Information if and where the targeted depth according to the waterway manager was met is not available for the Sava or the Tisa. Thus the indicated value only relates to the Danube in Serbia which amounts to 36% of the waterways of the Western Balkan. In 2013, the targeted fairway depth was not reached at the critical section Futog on 130 days, therefore the targeted depth was reached at 17% of the waterways' length only. On the Danube, the targeted fairway depth was not reached at the critical section Futog (SR) on 0 days in 2014, on 5 days in 2015 and on 38 days in 2016. In 2012 and 2014 the targeted depth was available along the entire stretch of the Serbian Danube.

The KPI 'targeted depth according to waterway manager' was reached by 17% percent in 2013. In 2015 the KPI increased to 36% percent and decreased back to 17% in 2016. It is important though, to look at the development of the waterway over a longer period. As long sections, water levels and maintenance activities are crucial for the situation of the waterway, annual fluctuations may occur. In 2012 and 2014 the targeted depth according to the waterway manager was met along the entire stretch of the Serbian Danube. In 2016 the targeted depth according to the waterway manager was not reached along the entire stretch of the Serbian Danube.

Figure 14: IWW current compliance – status 2016

Western Balkan: IWW current compliance – status 2016



Source: viadonau, status June 2017

Two bridges at the Serbian Danube do not comply with the bridge clearance foreseen by the respective CEMT class. Željeznički most Bogojevo-Erdut (rkm 1,366.44) has a height of 8.59m over high navigable water level, while 9.1m would be required for a class IVc waterway. In Novi Sad the provisional bridge Drumsko-železnički (rkm 1,254.29) has a clearance of 6.95m at the same time the construction of the new bridge is ongoing.

The Iron Gate I and II locks situated on the border between Romania and Serbia have been identified as bottlenecks and need a capital overhaul. Whereby the Iron Gate I lock is older and restoration is urgent, the Iron Gate II lock may be improved at a later stage. Statistics on the operational availability of the Iron Gate locks are not available. The rehabilitation of the Iron Gate I navigational lock is now secured according to ANNEX to the Commission Implementing Decision establishing the list of proposals selected for receiving EU financial assistance under the Connecting Europe Facility (CEF)-Transport sector following the calls for proposals launched on 13 October 2016 based on the Annual Work Programme 2016.

4.2 Ports of the Western Balkan countries

Amongst the inland ports of the Western Balkans countries (Bosnia and Herzegovina and Serbia) current incompliances are summarized below:

- (KPI) Connection to rail: all ports compliant;
- (KPI) Availability of clean fuels: no ports have supply facilities for alternative clean fuels nor such projects have been reported by 2030;
- (TP) Availability of intermodal facilities: only one port, Šamac (BA) does not offer any intermodal facilities;
- (TP) Shore-side electricity supply facilities: only one port, Šamac (BA) does not offer any shore-side power supply facilities;

General overview of technical compliances is given in Table 6 below.

Table 6: Compliance with inland port infrastructure requirements of the Western Balkan countries

Criteria	Min. draft	Road connection	Rail connection	Alternative clean fuel up to 2030	Shore-side power supply	Min. 1 common user terminal	Intermodal facilities	Waste reception facilities	VTMIS, SafeSeaNet, e-Maritime
Regulation 1315/2013	15(3a)	15(1)	15(1)	39(2b)	14(3)	15(2)	28	22(2)	22(3)
Port									
Šamac (BA)	Y	Y	Y	N	N	N	N	n/a	n/a
Brčko (BA)	Y	Y	Y	N	Y	Y	Y	n/a	n/a
Novi Sad (RS)	Y	Y	Y	N	Y	Y	Y	n/a	n/a
Beograd (RS)	Y	Y	Y	N	Y	Y	Y	n/a	n/a

Source: iC consulenter, based on information provided from port authorities and third sources

5 Plan for the removal of physical and technical barriers

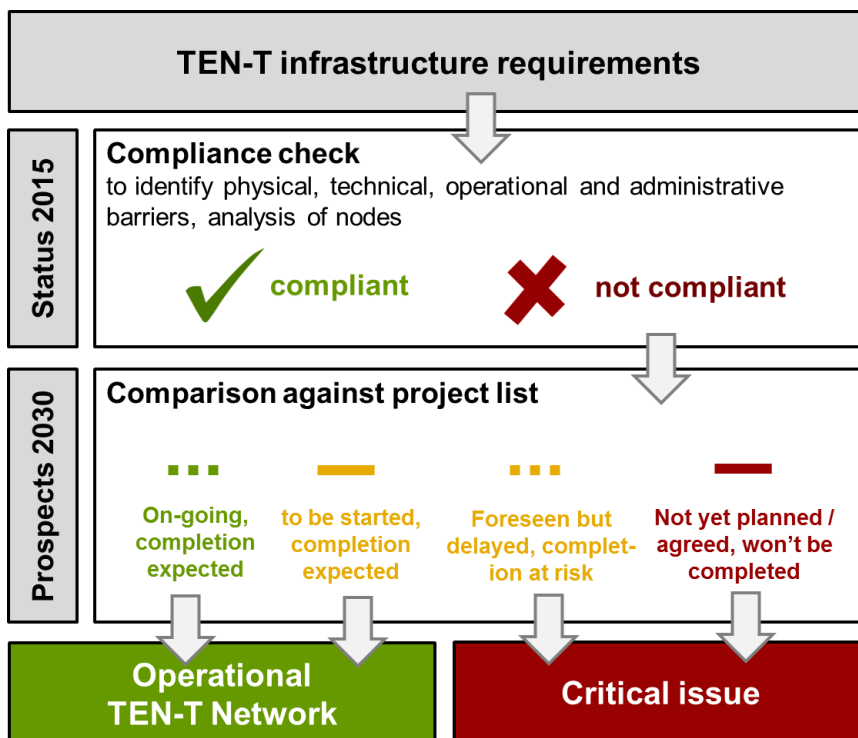
By means of a project list, activities planned by Member States, infrastructure managers and other stakeholders have been collected. Further details on the methodology and the information obtained from the project list can be found in the Final Report on the Project List.

Within the Final Report on the Elements of the Work Plan the contribution of those projects to the Corridor's development is of primary interest. Whereby the objectives are to:

1. Identify the projects that are required in order to reach compliance with regulation 1315/2013 by 2030;
2. Reveal critical issues, which demand counter-measures, if a section is doubted or unlikely to be compliant with regulation 1315/2013 by 2030.

The planned projects and their impact on the Corridor's development have been analysed according to the following methodology:

Figure 15: Approach for the analysis of identified planned projects








As a result of the compliance check presented in chapter 5 on the compliance with technical infrastructure parameters, sections that do not meet the requirements set out by Regulation 1315/2013 have been identified. Subsequently the non-compliant sections were compared against the project list and planned improvements have been analysed. Finally, the sections which are expected to be operational in 2030 in line with the stipulations of Regulation 1315/2013 as well as remaining critical issues were extracted.

A critical issue was attested if a section of the TEN-T network will not be completed according to current knowledge, due to the delay of activities or if no activities have been planned or agreed yet.

The outcome of the analysis is presented in maps and tables showing the assumed level of operation as foreseen by regulation 1315/2013 by 2030.

(1) Corridor compliance maps

For each infrastructure parameter and mode, maps with the infrastructure of the corridor are displayed, highlighting sections or nodes of the following categories:

	Compliant (Status 2016)
	Works on-going, compliance expected
	Works still to be started, compliance expected
	Works foreseen but delayed, compliance doubted
	Works not yet planned/agreed for completion

(2) Tables of projects and non-compliant sections

All sections that are expected to be improved and finally reach compliance by 2030 as well as all critical issues (yellow dotted and red) are listed in tables. The reasons for non-compliance by 2030 are stated in order for Member States, Infrastructure Managers and Corridor Coordinators to initiate appropriate measures. If reasonable measures cannot be identified, exemptions from the regulation may be an option.





If relevant, the tables provide details per Corridor section or node regarding

- Extracts from project description relevant to the specific infrastructure parameters analysed;
- Geographical coverage of project;
- Contribution to KPI (=infrastructure requirements according Regulation 1315);
- Project start date and end date;
- Project costs and financing.

Critical points as identified during the analysis are written in bold letters. At the same time, these details indicate necessary actions, e.g.

- "No project" → Additional project to be defined for specific section and obstacle;
- "Project start/end date: not defined/open" → reliable schedule for project implementation to be defined.

Projects and non-compliant sections are allocated to the same categories as displayed in the maps:

	Works on-going, expected to be completed by 2030
	Works still to be started, expected to be completed by 2030
	Works foreseen but delayed, completion by 2030 doubted
	Works not yet planned/agreed by authorities for completion by 2030

Finally, the chapter on the identified planned projects includes:

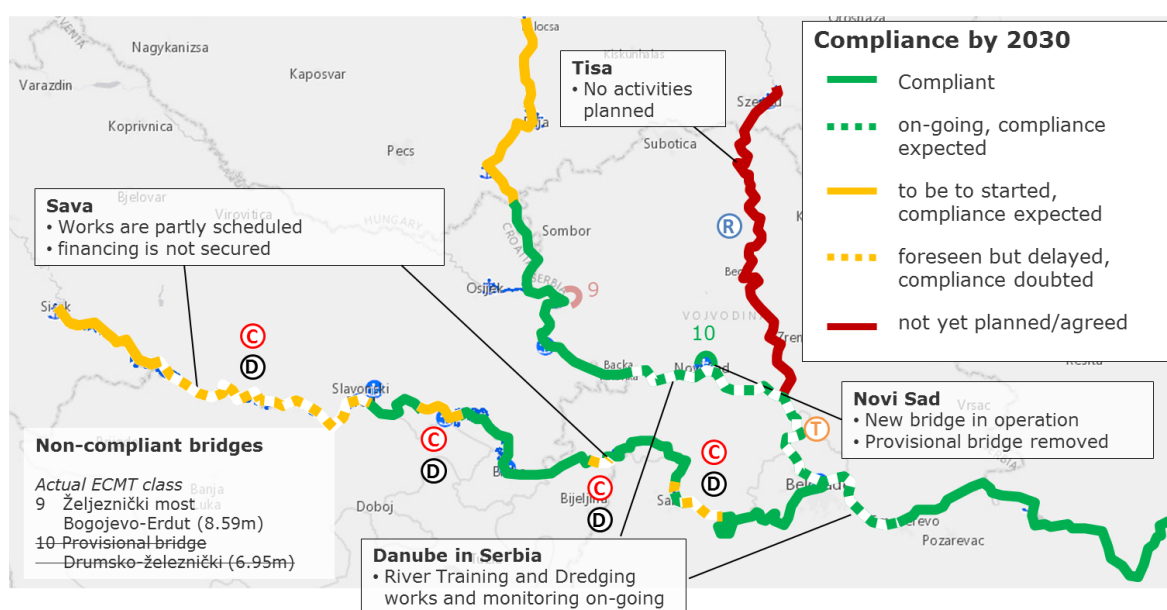
- Summarized description of projects which are expected to contribute to the Corridor's development;
- Comparison of non-compliant sections against the project list;
- A list of sections with critical issues;
- Reasons for non-compliance by 2030 and options for interventions by the Member States and/or Corridor Coordinators if available.

5.1 Inland Waterways of the Western Balkan countries

Both of the sections that currently do not fulfil the requirements of Regulation 1315/2013 are expected to remain incomplete up to 2030. No activities related to the Tisa are known and the reconstruction and improvement of the Sava River is at risk to be delayed.

Figure 16: Critical issues map for IWW - Western Balkan

Western Balkan: IWW compliance by 2030 (Status 2017)



Source: viadonau, status June 2017

Table 7 summarizes the reasons for the expected non-compliance by 2030 of the Tisa and the Sava.

Table 7: IWW sections of the Western Balkan at risk or not planned to be completed by 2030

Critical issues	Reason for risk of non-compliance by 2030	Options for interventions
Croatia / Bosnia and Herzegovina / Serbia		
Sava (Slavonski Brod – Sisak, Slavonski Šamac – Oprisavci)	Croatia, Bosnia and Herzegovina and Serbia prepared a feasibility study and preliminary designs and plan to reconstruct and improve the Sava River (ID 9271, 9273 and 9503). In May 2014 the EU and the World Bank cancelled the agreement for financing of the projects between Brčko	The International Sava River Basin Commission supports the cross-border coordination. The project may be split into smaller sections in order to apply a stepwise

Rit kanal, Mlinsko ostrvo - Sremska Rača, Šabac – Kalovica, Kamičak – Mišar)	and Beograd, as Serbia chose to stop the negotiations with the World Bank on financing the infrastructure works. Currently the timing for continuation is unclear and financing is not secured. If financing is approved, the detailed design and Environmental Impact assessment for the reconstruction of the sections Jaruge – Novi Grad and Puska –Preloščica (ID 9509 and ID 9508) may be prepared in the next years. Works activities are foreseen but delayed; the compliance with regulation 1315/2013 by 2030 is at risk.	approach and to reduce interdependencies. Secure financing for the detailed design and EIA of the sections Jaruge – Novi Grad and Puska – Preloščica and implement subsequent steps.
Serbia		
Tisa: Slankamen - Border HU-RS	Activities to implement RIS at the Tisa are not yet planned. Statistics on the achievement of targeted depths are not available.	The need to implement RIS strongly depends on the transport demand. Figures on transport volumes could not be obtained yet.
Hungary		
Tisa: Border HU-RS - Szeged	Activities to implement RIS at the Tisa are not yet planned. Statistics on the achievement of targeted depths are not available.	The need to implement RIS strongly depends on the transport demand. Figures on transport volumes could not be obtained yet.

5.2 Ports of the Western Balkan countries

None of the currently planned projects in the ports of the Western Balkans countries tackle any improvements of the KPI, but they contribute to the elimination of the operational bottlenecks, thus improving the ports' efficiency. Moreover, a determined number of projects are related to the Corridor objectives for ports, which will be positive in terms of contribution to the Corridor development, once the Corridor is extended. Most of these projects are related to the improvement of the quality of ports' infrastructure, improvements of the ports' existing connections to the railway network and improvement of intermodality.

The compliance check is made for

- CEMT Class IV connection
- Rail connection to port
- Availability of alternative clean fuel supply facility
- Availability of at least one freight terminal open to all operators
- Minimum draft
- Availability of shore-side power supply facility
- (Availability of ship-generated waste facilities in seaports)
- Availability of intermodal facility

The following map shows the predicted (2030) level of compliance of the Rhine-Danube Core Network Corridor ports with the KPI and technical parameters of importance for the Corridor development. The map includes the 4 ports of the Western Balkan countries (Šamac and Brčko in Bosnia and Herzegovina, and Novi Sad and

Beograd in Serbia), as well as the ports in all Member States of the Rhine-Danube CNC.

Figure 17: Port compliance (EU+WB6) – overall situation (2030)



Source: iC consulenten, based on port survey and project list analysis

Connection to rail

Although all ports of the WB6 are connected to the railway network, constant improvement of such railway connections seems to be a constant effort of the port administrations. For example, the Port of Brčko (BA) currently develops a project of “Direct connection of the quayside railway tracks with the railway station Brčko Novo” (TEN-T project ID: 9702). Construction of this direct railway track would enable the port of Brčko to have direct railway link between the quayside tracks and the reception railway track number 2 in the railway station Brčko Novo. This connection would enable quicker manoeuvring of the incoming/outgoing wagons to/from the quayside tracks in the port.

Quality infrastructure

In its intentions to provide safer and more quality handling of dangerous goods, the Port of Brčko plans a project (TEN-T project ID: 9714) of liquid cargo terminal in a separate port basin. This project will involve the construction of the isolated liquid cargo terminal for direct transshipment of cargoes to road and rail vehicles.

In addition to this, the Port of Beograd is currently in its study phase (TEN-T project ID: 9710) for the relocation of the entire port from the central downtown area to the outskirts of Beograd so as to provide safer, quicker and less congested access to the port.

Integration of inland ports into the multimodal logistic chains

The Port of Brčko is planning a project (TEN-T project ID: 9712) involving the construction of the container terminal for the distribution of containerized cargoes to/from neighbouring container hub terminals.

Overview of Western Balkan sections/nodes not to be compliant by 2030

The following tables present the overview on incompliances for KPIs.

Table 8: Non-compliant WB ports in 2030 – alternative clean fuels availability

Sections/nodes with a need for action	Reason for non-compliance by 2030	Options for interventions
Bosnia and Herzegovina, Serbia		
Ports of Šamac (BA), Brčko (BA), Novi Sad (RS) and Beograd (RS)	No projects tackling the provision of alternative clean fuel supply facilities	<p>No targets in terms of numbers of refuelling points have been established. The decision on the location of the LNG refuelling points at ports should be based on a cost-benefit analysis including an examination of the environmental benefits. In this view, an action towards the realistic assessment of the demand and prospects of utilization of LNG-powered vessels is strongly recommended, following a cost-benefit and environmental analyses.</p> <p>Directive 2014/94/EU imposes only the time horizon (31 December 2030) for the provision of an “appropriate” number of refuelling points for LNG for inland and maritime vessels (Article 6), while the TEN-T Regulation 1315/2013 does not venture into the determination of the number of such refuelling stations.</p> <p>Further actions to be aligned with the national legislation.</p>

Source: iC consulenten, based on port survey and project list analysis

Table 9: Non-compliant WB ports in 2030 – multiple incompliances

Sections/nodes with a need for action	Reason for non-compliance by 2030	Options for interventions
Bosnia and Herzegovina		
Port of Šamac (BA)	No planned projects related to provision of at least one freight terminal open to all operators	Proposed measure: assess the demand and prepare a project mature enough to be potentially co-funded by appropriate financial instruments dedicated to EU candidate countries. Consider an update of legislative framework for port governance and operation.
	No planned projects related to provision of intermodal facilities of any kind.	Proposed measure: undertake feasibility studies and cost-benefit analyses so as to assess the demand and available option and, eventually, consider a co-funding application to the appropriate financial instruments dedicated to EU candidate countries.
	No planned projects related to provision of shore-side electricity supply facilities .	Proposed measure: assess the need for shore-side electricity supply in national policy frameworks (Directive 2014/94/EU). In case of significant demand, include the provision of shore-side electricity supply facilities in port development project and submit a

		proposal for co-financing by appropriate financial instruments dedicated to EU candidate countries
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Source: iC consulenten, based on port survey and project list analysis

6 Actions already accomplished

Adopted on 20.12.2013 Regulation 1315/2013 sets the objectives and requirements for the development of the core and comprehensive network of major European transport connections – the Trans-European Transport Network. Within this chapter the progress in reaching the objectives and infrastructure requirements since the adoption is described. In order to compare the situation in the year 2016 to the starting point in 2013, the development of the Corridor is analysed by means of Key Performance Indicators.

In this analysis, priority is given to finalized projects, whereby activities were considered irrespective of the financing source (e.g. EU, state, private etc.).

6.1 Inland Waterways of the Western Balkan countries

Having a look at the IWW KPI of the Western Balkan countries separately, the progress made through the implementation of projects from 2013 to 2016 is not visible in the indicators, which remained stable. Either way, Serbia as well as Bosnia and Herzegovina made steps forward related to the development of Inland Waterways.

Nevertheless, progress was made through the realization of a number of activities, which mostly relate to the improvement of the fairway availability, the reliability of locks and the coordination of national approaches towards the provision of a concerted infrastructure quality. Implementation of RIS at the Sava was finalized by the end of 2016. River Training and Dredging Works between Bačka Palanka and Beograd (Serbia) have been prepared and approved in 2014; works and their supervision have been contracted in 2017. The on-going preparatory study "Fairway Danube" aims at an increased transparency on navigation conditions and is paving the way for well-founded improvement measures.

The new construction of the Žeželj Bridge in Novi Sad (Serbia) is delayed but ongoing. River Training and Dredging Works at six critical sectors between Backa Palanca and Beograd (Serbia) have been prepared and approved in 2014 and are scheduled to start in June 2017. Environmental monitoring and supervision will be an important activity alongside the implementation of river engineering works.

Both countries actively participate in the activities of the EUSDR PA1a. Serbia expressed its consent with the contents of the "Conclusions on effective waterway infrastructure rehabilitation and maintenance" and Bosnia and Herzegovina signed them. In addition the Serbian waterway administration was a highly esteemed partner in cooperation projects dealing with the service oriented management of waterways through the Network of Waterway Administrations (NEWADA duo) and the improvement of River Information Services. Serbia is currently involved in eight common projects - six of which are on-going and two planned – including Danube STREAM, Danube SKILLS, DANTE and Green Danube.

Table 10: Evolution of generic IWW KPI in the Western Balkan countries

IWW KPI	Baseline 2013	Status 2015	Status 2016	Target 2030
CEMT requirements for class IV IWW	65%	65%	65%	100%
Permissible Draught (min 2.5m)	65%	65%	65%	100%
Permissible Height under bridges (min. 5.25m)	100%	100%	100%	100%
RIS implementation (minimum requirements set out by the RIS directive)	71%	71%	71%	100%
Targeted depth according to waterway manager reached	17%	36%	17%	100%

Source: viadonau, based on desk research and own survey

6.2 Ports of the Western Balkan countries

Key performance indicators for ports in the Western Balkan countries show high values, except for the availability of alternative clean fuel supply facilities.

All ports have railway connection to the network and they are all located on waterways of at least CEMT Class IV. Two ports on the Sava River (Šamac and Brčko, both in Bosnia & Herzegovina) are located on the sections of the Sava River having the CEMT Class IV. However, various sections of the Sava River fail to comply with the CEMT Class IV requirements, as elaborated in the chapters related to inland waterways, thus limiting the accessibility of the two Bosnian inland ports.

In addition to this, the port of Šamac is a fully privately owned, managed and operated port, and as such serves only to the needs of the private operator. This has been confirmed to the Consultant during the 7th Corridor Forum by the Bosnian representative, Mr. Izet Bajrambašić, Assistant Minister in the Ministry of Communications and Transport of Bosnia and Herzegovina. Such confirmation has also been received by the South-East Europe Transport Observatory (SEETO), a body supported by the European Union, with its headquarters in Beograd, Serbia. Taking this into consideration, it can be concluded that the Port of Šamac (BA), does not comply with the KPI of "Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges", which has its basis in the Article 15(2) of the EU Regulation 1315/2013.

No direct or indirect contact could be established with the operators of the Port of Šamac, while no publicly available data have been found for this port.

Table 11: KPI and TP for inland ports in the WB6 countries only

Inland ports KPI and TP (WB6 countries only)	Baseline 2013	Status 2015	Status 2016	Target 2030
CEMT Class IV waterway connection	100%	100%	100%	100%
Connection to rail	100%	100%	100%	100%
Availability of clean fuels	0%	0%	0%	TBD
Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	75%	75%	75%	100%
Intermodal facilities (TP)	75%	75%	75%	100%
Minimum draft (TP)	100%	100%	100%	100%
Shore-side power supply facilities (TP – non-compulsory)	75%	75%	75%	N/A

Source: iC consulenten, based on desk research and own survey

There were no recently accomplished port projects tackling the Key Performance Indicators and Corridor objectives in the Western Balkan countries. In fact, based on the information received from the port managers in Bosnia and Herzegovina and Serbia, no infrastructure projects have been done in ports for more than 20 years due to lack of funds. Therefore, there are no "actions already completed" in the Western Balkans ports.

7 Identified projects

7.1 Pre-Identified projects

The Connectivity Agenda on co-financing of investment projects in the Western Balkans in 2015 includes the following list of pre-identified projects for IWW and ports:

- Sava River (IWW): Studies and works for rehabilitation of the Sava River Waterway (Sisak – Brčko – Beograd)
- Sava River (IWW): Works for demining of the Sava River right bank from the confluence of Drina River to the confluence of Una River
- Port of Brčko (inland port): Reconstruction and upgrading of functional facilities in the port,
- Danube River (IWW): Studies and works for river training and dredging works on critical sectors of the Serbian/Hungarian joint stretch,
- Danube River (IWW): Works for river training and dredging works on 6 critical sectors on the Danube River including supervision and environmental monitoring of works between Bačka Palanka and Beograd.

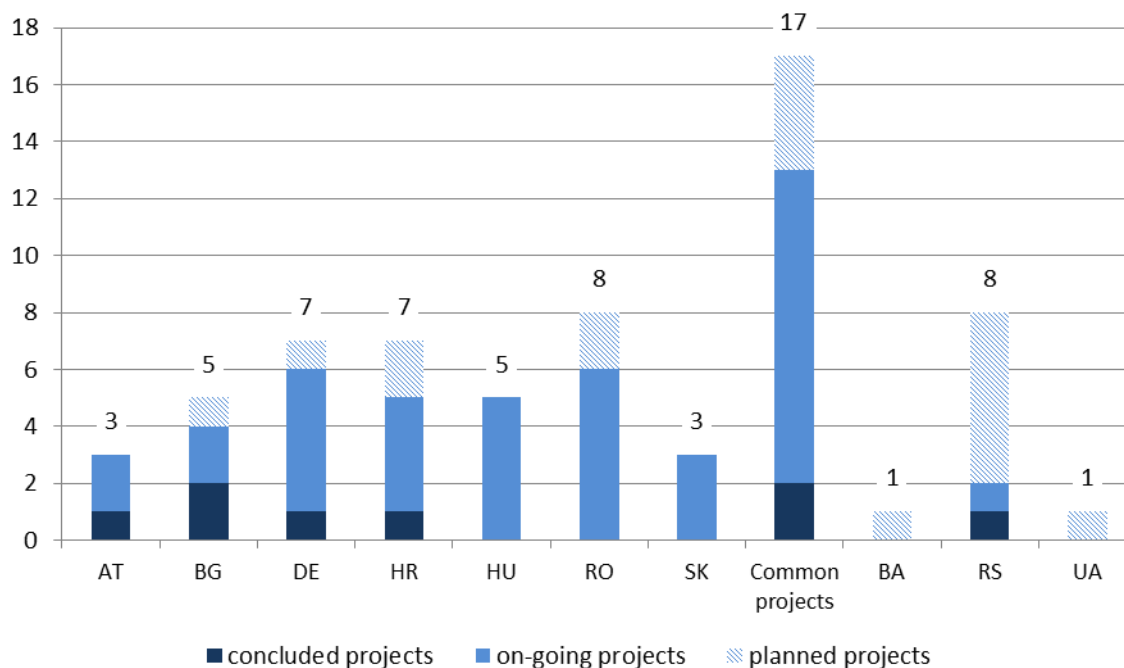
7.2 Overview on IWW projects along the Rhine-Danube Corridor

According to the project list for the Rhine-Danube Corridor, 65 projects contribute to the development of inland waterways. This number increased compared to last year's report, when only 59 projects contributed to the development of inland waterways. Out of the overall sum, ten projects relate to activities in Non-EU Member States. Nine of them are projects of the Western Balkan countries Serbia and Bosnia-Herzegovina, which are analysed in this report. The number of IWW projects of Western Balkan countries did not change compared to last year's report. One project deals with the Ukrainian stretch of the Danube.

For the purpose of the statistical analysis of the project list, the projects of EU Member States and the Ukraine have only been included in the overview. Details concerning EU Member States have been analysed separately and are not part of this report.

Figure 18 shows the number of projects per country and common projects with the involvement of more than one country. Projects related to the development of ports have been excluded from this chapter and are analysed separately.

Figure 18: 'IWW (without ports)' projects by country, total = 65 projects



Source: viadonau, based on Rhine-Danube project list, status: 28/04/2017

A high share of the 65 projects has already been started and is still on-going. Serbia implements one on-going project, while Bosnia and Herzegovina has no on-going project. For the non-EU member Serbia a number of six planned projects has been identified. Serbia is thus the country with the highest number of planned projects to develop the inland waterways of the corridor. Bosnia and Herzegovina plans to implement one IWW project.

The large number of common projects (two concluded, eleven on-going and four planned) is due to the fact that 42% of the navigable Danube constitutes a state border. The number of common projects increased compared to last year's report by four (from 13 to 17).

Serbia is involved in eight common projects (six projects are on-going and two planned):

- For the critical sectors from Bezdan (RS) – Batina (HR) to Backa Palanka (RS) – Ilok (HR) an integrated project considering transport needs, environmental needs and constraints etc. is planned. It includes a study phase as well as mathematical modelling of the river, establishment of a stakeholder's forum, monitoring and planning activities, preparation of project documentation and assessments. Compared to the 1st Update of the Report on the Project List, the timeframe for the project is still unknown but a preliminary project analysis has been conducted and project costs have been estimated to be 48 Million EUR.
- Danube Ship Wreck Removal (planned): In this common project by Serbia, Bulgaria and Romania ship wrecks and unexploded ordnances will be removed on the Danube between Apatin and Constanta (km 1,433 - km 0). The starting and finalisation dates have not been obtained.
- *RIS COMEX: RIS enabled IWT corridor management (two on-going projects)*
RIS COMEX is a CEF funded multi-Beneficiary project aiming at the definition, specification, implementation and sustainable operation of Corridor RIS

Services following the results of the CoRISMa study. The project area covers altogether 13 different European countries having 15 partners joined their forces under the coordination of the Austrian Waterway Administration viadonau with the common goal to realise Corridor RIS Services. RIS COMEX started in the course of 2016 and will last until the end of 2020. The RIS COMEX project aims for implementation and operation of cross-border River Information Services based on operational exchange of RIS data. These RIS-based Corridor (information) services shall allow for traffic management by the authorities and transport management by the logistics sector. They make use of available national infrastructure and services. The project aims specifically at better planning of inland waterway transports and reduction of waiting and travel times.

- Four new cooperation projects with Serbian involvement started at the beginning of 2017:

Danube STREAM Smart Integrated and Harmonized Waterway Management: The objective of the project is to establish and maintain an efficient and environmentally friendly transportation network (Danube and its navigable tributaries) by further developing effective waterway infrastructure management). *Danube SKILLS* aim is to increase institutional capacity in Danube navigation by boosting joint transnational competences and skills in education and public development services. The project *DANTE* aims at identifying and eliminating administrative barriers for inland waterway transport (IWT) on the Danube and its navigable tributaries as a joint initiative of the private sector and the national public authorities responsible for these barriers. The *Green Danube* project addresses the environmental pollution caused by the inland waterway transport. The following countries are involved in at least one of the projects: AT, BE, BG, CZ, DE, FR, HU, HR, MD, NL, SK, RO, RS, and UA. Serbia is involved in all four of them. These four projects together with the port projects *DAPhNE*, *DBS Gateway Region* are pooled in Thematic Pole 7 – Waterways of the Danube Transnational Programme.

Bosnia and Herzegovina is involved in one common project together with Croatia:

- *Reconstruction of the critical part of the Sava River waterway in the section Jaruge – Novi Grad*

In January 2014 the feasibility study and the preliminary design for the rehabilitation and development of the Sava River Waterway have been completed. Two critical sections of the Sava River waterway are planned to be reconstructed: Jaruge – Novi Grad and Puska-Preloščica. The reconstruction of the Jaruge – Novi Grad section is a common project of Croatia and Serbia. The Puska-Preloščica section is a project of Croatia.

For the Jaruge – Novi Grad section the reconstruction project will start in January 2018 and end by December 2020 if the application for CEF call 2016 is successful. The project will provide the detailed design and Environmental Impact Assessment.

Not only the number of common IWW projects is comparably high but also the number of projects located on a cross-border section. Out of the total number of projects of 65 the vast majority of 49 projects deal with the improvement of cross-border sections. In addition most projects (47) are situated on pre-identified sections as identified by the CEF regulation, Annex I.

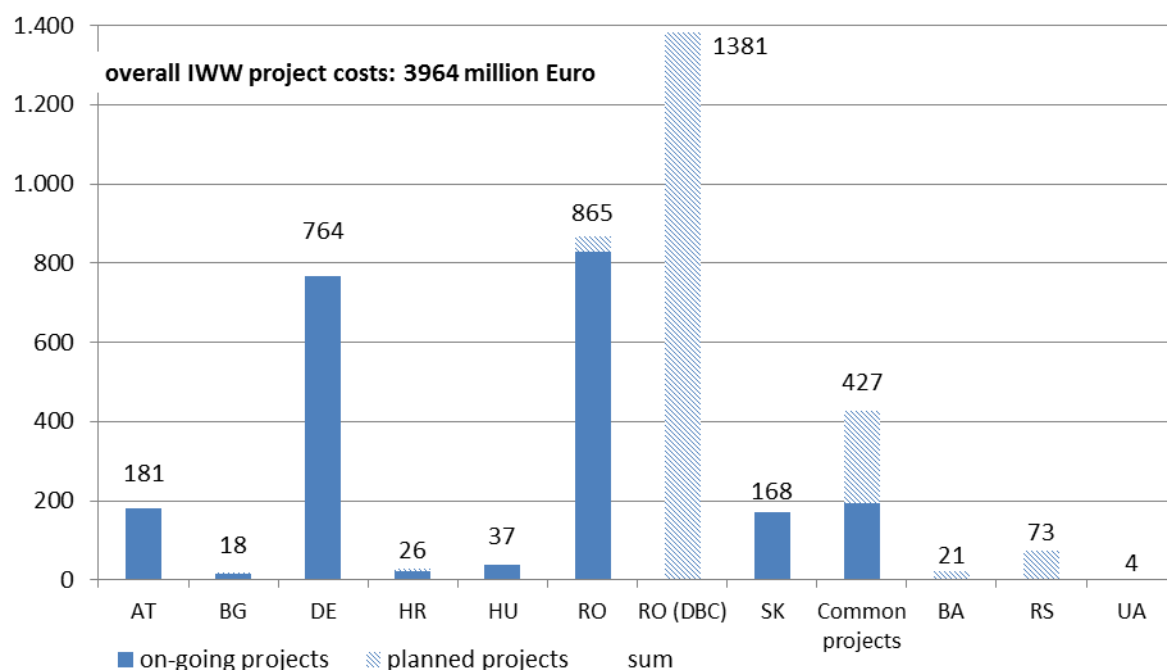
Serbia is active in implementing and planning projects along the Danube and Sava and has also already concluded one project.

Including the costs of already completed projects of 192 Mio EUR the overall sum amounts to some 4.2 bn EUR (compared to 3.9 bn EUR according the previous year's report). The total costs of on-going and planned projects related to the development of inland waterways of the Rhine-Danube Corridor sum up to 4 bn EUR (see Figure 19). This sum increased by 235 Mio EUR compared to last year, when the project costs of on-going and planned projects summed up to 3.7 bn EUR. 3.9 bn EUR relate to projects of EU Member States (including common projects), 94 Mio EUR to the Western Balkan countries and 4 Mio EUR are estimated for the Ukrainian project.

Excluding the Danube-Bucharest Canal (which will be implemented after 2030 only), the average project costs in the EU Member States are 39.3 Mio EUR and lie way below the average project costs of rail projects. In the Western Balkan countries average project costs are even lower and amount to 15.4 Mio EUR. This number increased by more than 4 million EUR during the last year, when the average project costs in Western Balkan countries were 11.2 Mio EUR.

In comparison to the high number of common projects the aggregated costs of such projects are relatively low.

Figure 19: Project costs of on-going and planned 'IWW (without ports)' projects by country [Mio EUR], total = 3 964 Mio EUR



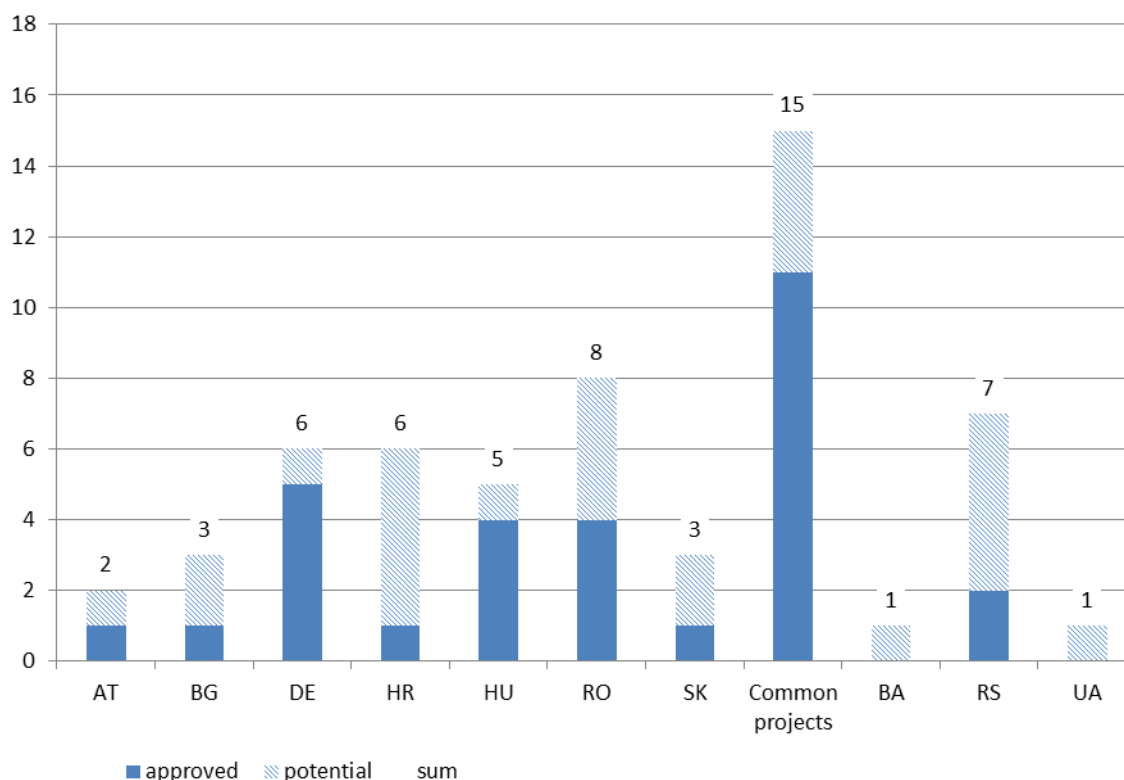
Source: viadonau, based on Rhine-Danube project list, status: 28/04/2017

Figure 20 shows the share of projects per country with approved funding. For slightly more than half of the planned and on-going projects (30 out of 57) financing has been approved. 27 on-going and planned projects remain with unclear financing sources, which have been marked as potential only. This may also relate to projects which already started, as preparatory studies are on-going but funding for the implementation works is not secured. Compared to the Final Report on the project List of 2016, the number of projects with funding approved doubled (twelve approved projects in 2016 compared to 30 as of 08/05/2017).

Most projects, for which funding was approved are common projects. The category comprises the DTP funded projects Danube STREAM, Danube SKILLS, DANTE and Green Danube. Serbia is active in all four of these projects.

In Serbia River Training and Dredging Works on critical sectors between Backa Palanca and Beograd and the Implementation of AtoNs is supported through IPA. Five Serbian projects and one Bosnian project remain with unclear financing sources. Compared to last year's report, no additional financing sources were approved for projects of Western Balkan countries.

Figure 20: 'IWW (without ports)' on-going and planned projects with approved and potential financing by country, total = 57 projects



Source: viadonau, based on Rhine-Danube project list, status: 27/04/2017

The projects cover different thematic fields and scopes. Therefore, the number of projects gives only a vague indication of the commitment of a country.

Inland waterway projects contribute to ten "scope clusters". While in some cases a larger project includes a study phase and the realisation of works, in others a separate project has been designed for each of the phases. For that reason, projects may be assigned to more than one scope cluster. Thus the related figures show the contribution of project phases to the multiple categories.

The EU member countries and the Ukraine have been excluded from the charts related to the scope of activities. Projects related to EU member countries are described in a separate report.

7.3 IWW projects in the Western Balkan countries

Serbia and Bosnia-Herzegovina, although not Member of the EU, have been included in the study on the Rhine-Danube Corridor and therefore are part of the analysis within this report.

One concluded and eight planned or on-going projects contribute to the development of the Western Balkan inland waterways. Bosnia-Herzegovina has no concluded project yet but one planned. By the end of 2015 the construction of the new bridge in Novi

Sad was planned to be completed. Works have not been finished as planned, however a new finalisation date could not be obtained.

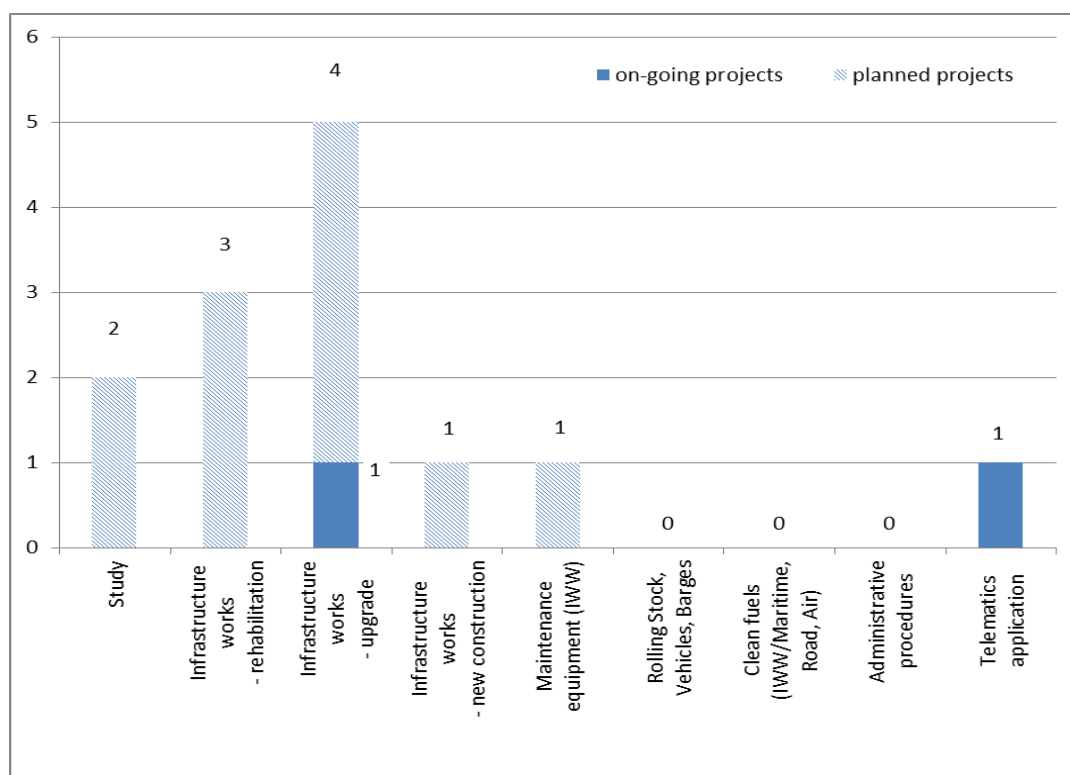
Again, the number of projects gives only a vague indication of the commitment of a country and no indication on the thematic field of the project.

Like the projects of EU Member States, Serbia's and Bosnia-Herzegovina's inland waterway projects contribute to six "scope clusters". While in some cases a larger project includes a study phase and the realisation of works, in others a separate project has been designed for each of the phases.

a.) Scope of planned and on-going IWW projects in the Western Balkan countries

In Serbia and Bosnia-Herzegovina the focus is clearly on infrastructure works, as all of the planned and on-going projects include infrastructure works of some type: One on-going and four planned projects have upgrades of infrastructure as a focus. Three planned projects focus on infrastructure rehabilitation and one planned project has new construction of infrastructure as scope. Two projects included studies (compare Figure 21).

Figure 21: Scope of on-going and planned 'IWW (without ports)' projects (Western Balkan countries)



Source: viadonau, based on Rhine-Danube project list, status: 10/04/2017

b.) Completion time of concluded, on-going and planned IWW projects (Western Balkan countries)

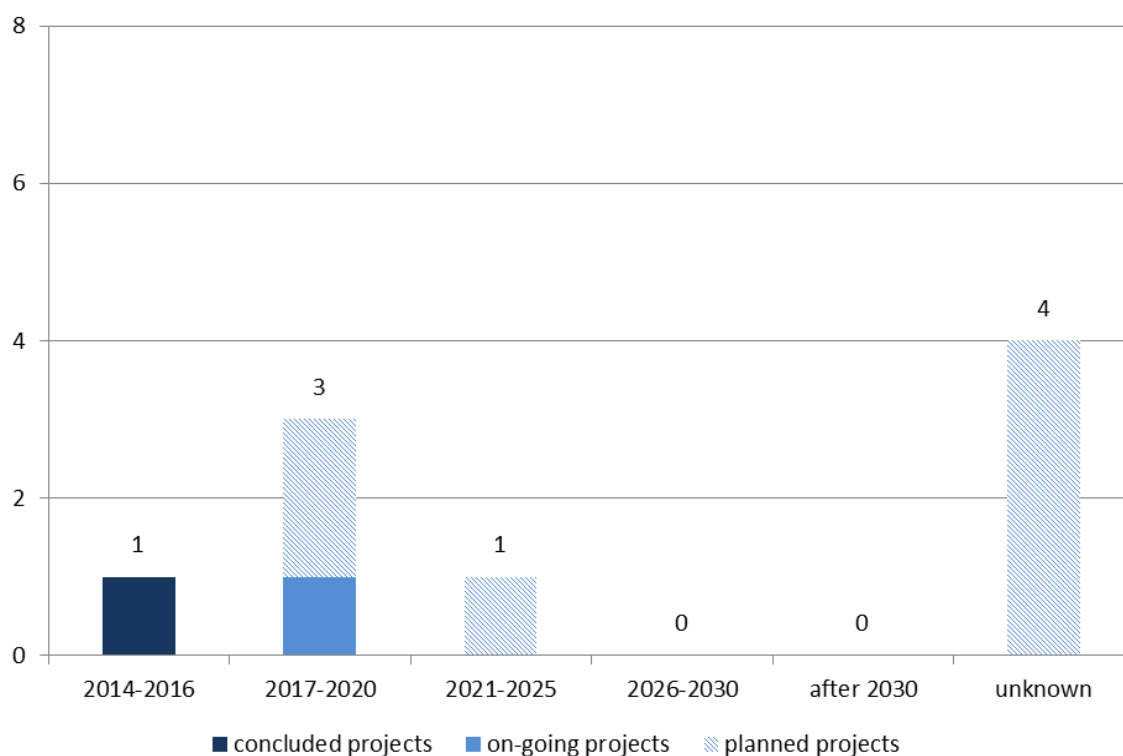
Figure 22 shows the envisaged finalisation years of inland waterway projects in the Western Balkans. For four planned inland waterway projects (44%) no finalisation date is known yet. This means that the project has not been defined in detail; the realisation may still depend on preliminary steps or national decisions on the

implementation. Among those projects are the activities of Serbia and Bosnia-Herzegovina to rehabilitate and improve the Sava River for navigation. Unfortunately the projects are suspended; their continuation and financing sources are still unclear. In some cases the project simply consists of several smaller activities, the realization of which is not yet determined.

One project (11%) was planned to be concluded in 2015, the construction of the new bridge in Novi Sad. Works have not been finished until now, the envisaged finalisation is unknown.

Out of the remaining projects, three projects are envisaged to be finalised by 2020, which coincides with the end of the EU financial period, and one project is planned to be finalised between 2021 and 2025.

Figure 22: 'IWW (without ports)' projects (Western Balkan countries) by completion time class, total = 9 projects

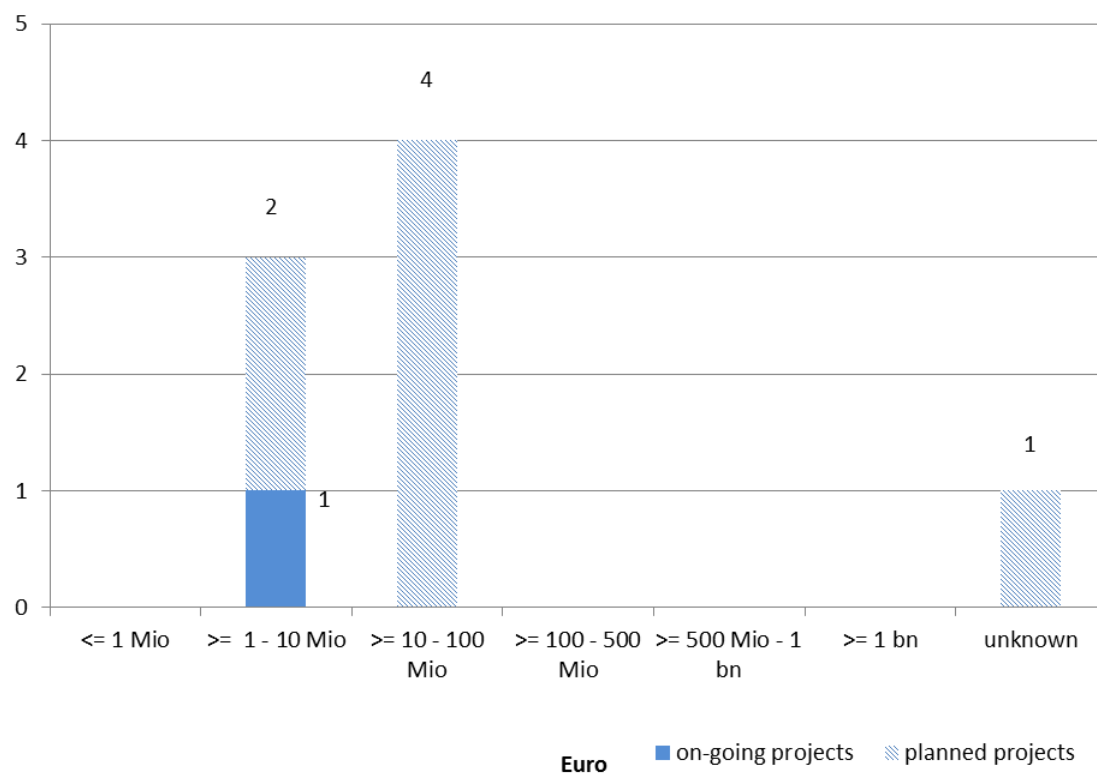


Source: viadonau, based on Rhine-Danube project list, status: 10/04/2017

c.) Costs of on-going and planned IWW projects (Western Balkan Countries)

Figure 23 shows the number of on-going and planned inland waterway projects per cost class. The already concluded projects are not shown in this figure, as their costs are not relevant for further budget planning. Of the on-going and planned projects three have a volume of between 1 and 10 Mio EUR. Four projects (all of them planned) are estimated to cost between 10 and 100 Mio EUR, and for one project - the establishment of winter port facilities in Serbia - no costs have been determined yet.

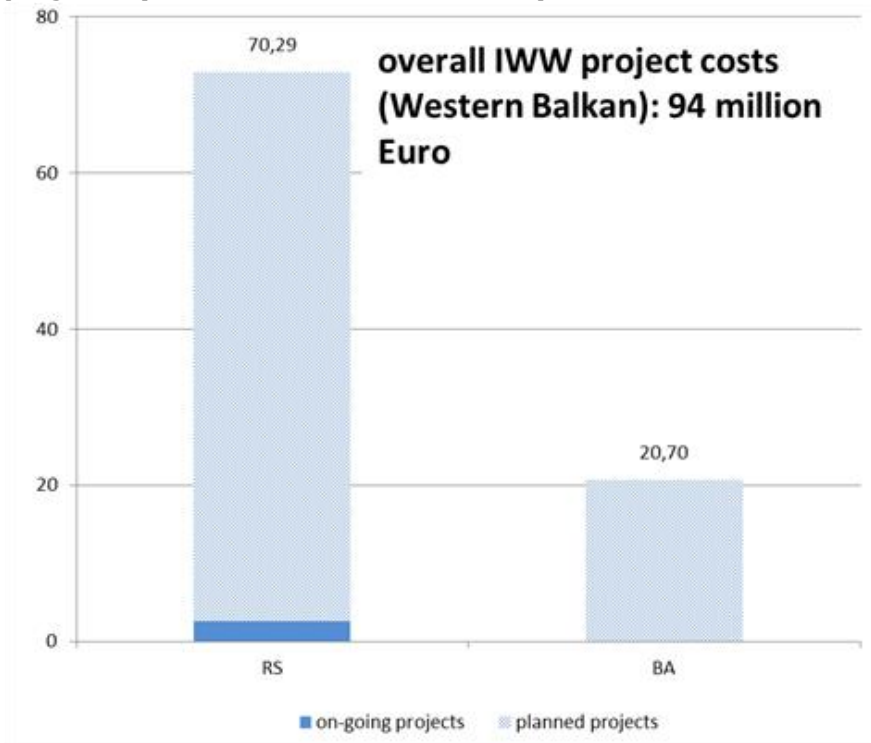
Figure 23: On-going and planned 'IWW (without ports)' projects (Western Balkan countries) by cost class, total = 8 projects



Source: viadonau, based on Rhine-Danube project list, status: 22/05/2017

Figure 24 shows the overall IWW (without ports) project costs in Western Balkan countries. With about 70 million EUR Serbia accounts for 78 percent of project costs, while Bosnia and Herzegovina accounts for approximately 21 million EUR project costs (or 22 percent of total project costs in Western Balkan). The Hungarian part of the river Tisa from the border with Serbia up to Szeged has been excluded from the calculation, as there is no project planned.

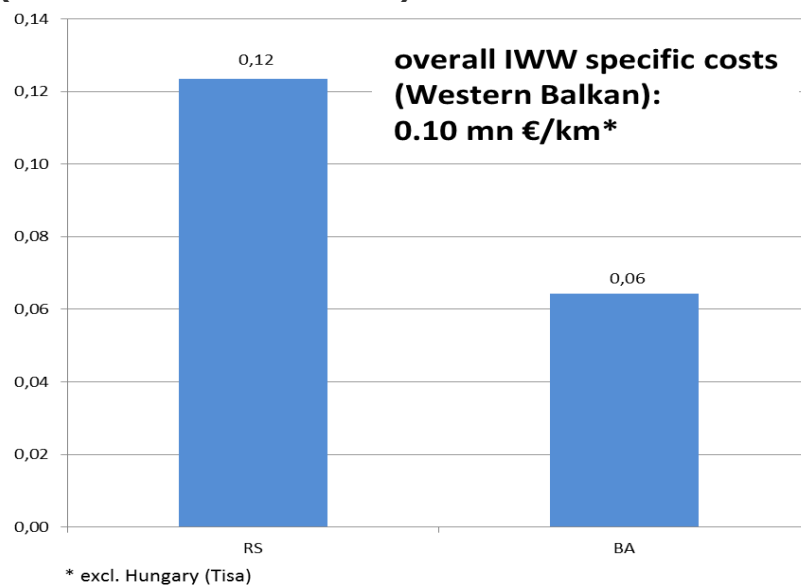
Figure 24: Overall costs of on-going and planned 'IWW (without ports)' projects (Western Balkan countries)



Source: viadonau, based on Rhine-Danube project list, status: 22/05/2017

The specific costs show the costs in relation to the share of the corridors inland waterway network (see Figure 25). The Tisa (Hungary) has been excluded from this calculation also, as there is no project planned.

Figure 25: Specific costs of 'IWW (without ports)' projects per country (Western Balkan countries)



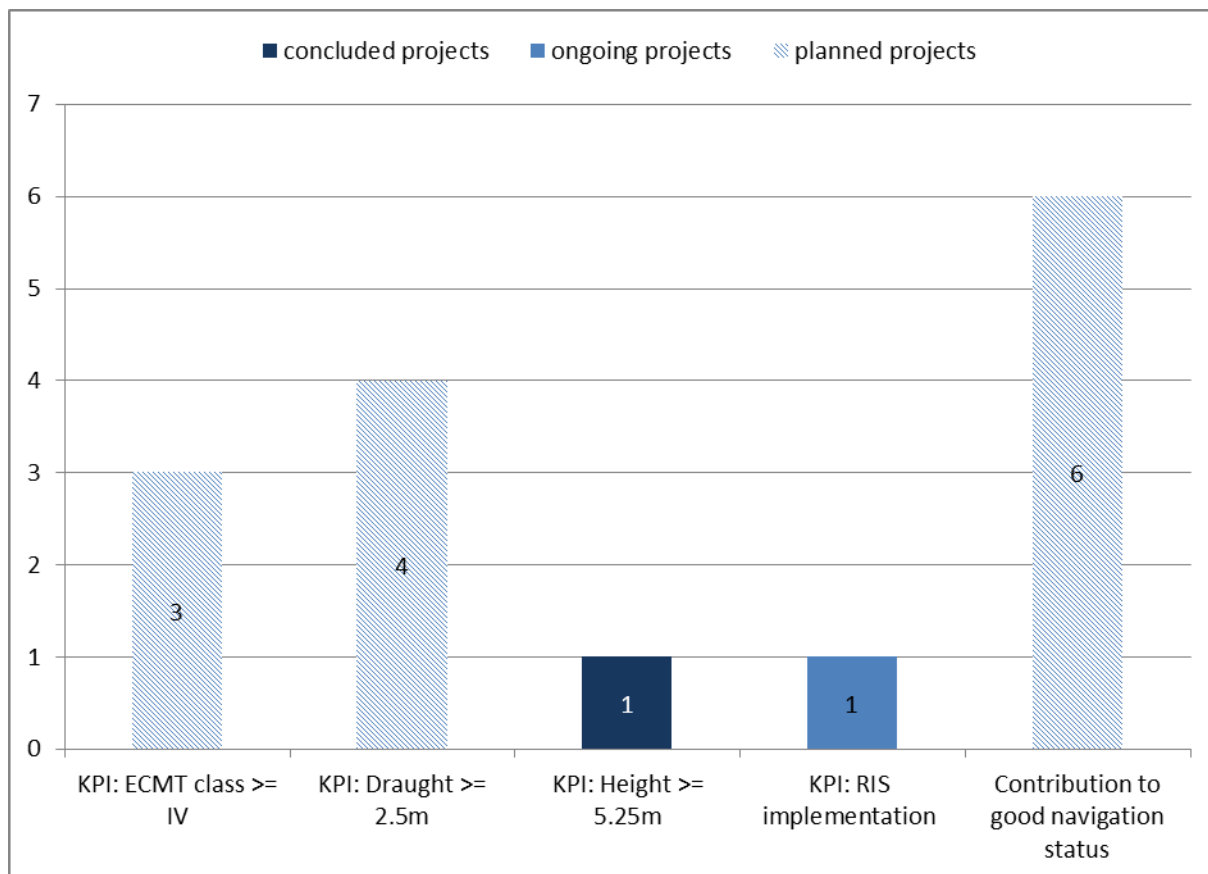
Source: viadonau, based on Rhine-Danube project list, status: 10/04/2017

Serbia plans to invest about 0.12 Mio EUR per river-km. Large sums are invested in the acquisition of equipment to monitor the fairway. Bosnia-Herzegovina plans to invest 0.06 Mio EUR per river-km for the rehabilitation project on the river Sava.

d.) Contribution of IWW projects to the Key Performance Indicators (KPI)

Figure 26 shows the contribution of inland waterway projects to Key performance Indicators (KPI) and to good navigation status. The only on-going project contributes to RIS implementation. 6 planned projects are going to contribute to good navigation status. Four planned projects contribute to a minimum draught of 2.5m. Three projects contribute to the KPI: ECMT class \geq IV. The concluded project contributes to the KPI Height \geq 5.25m.

Figure 26: Contribution to Key Performance Indicators of 'IWW (without ports)' (Western Balkan countries)



Source: viadonau, based on Rhine-Danube project list, status: 10/04/2017

e.) Projects suitable to generate revenues

Inland navigation on the Danube and the Sava River is free of charge based on international conventions. An increase in inland waterway transport has socio-economic benefits and does not generate revenues for the waterway managers. No project in Serbia or Bosnia and Herzegovina is suitable to generate revenues.

In most cases barrages consist of a revenue-generating hydropower plant and the navigational locks. Revenues might be used to finance the renewal of locks. However,

energy producers do not benefit from investments in navigational locks and therefore have no incentive to do so.

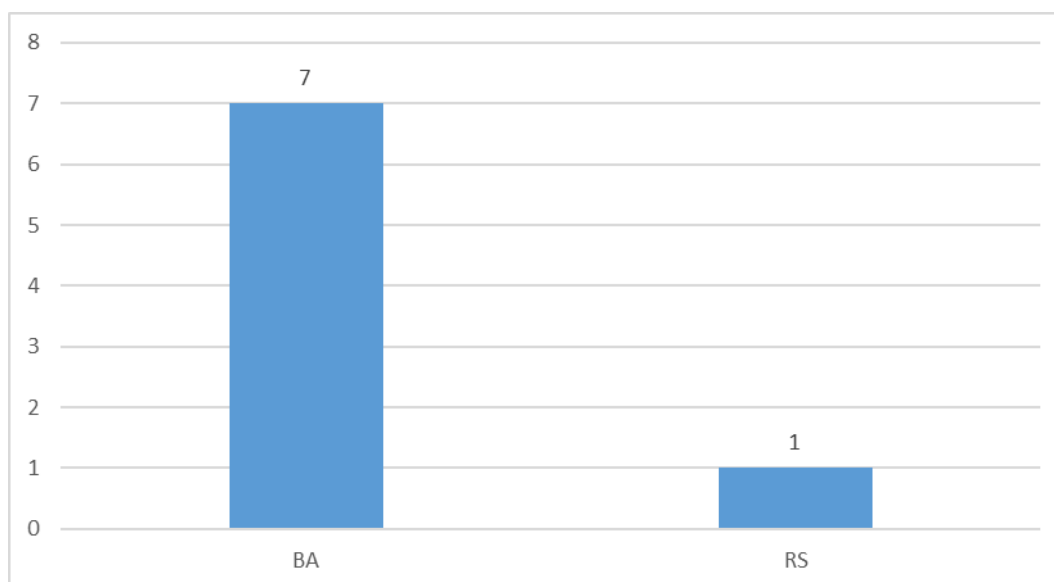
7.4 Ports projects in the Western Balkans countries

As regards to port related projects, Bosnia and Herzegovina reported 7 projects, all planned in the Port of Brčko on the Sava River, whilst Serbia reported only 1 project of the new Port of Beograd, but no further data were known at the moment of writing of this report (no info on costs and no info time planning).

All projects in both countries are only planned, while a number of projects in Bosnia and Herzegovina are significantly more mature, some even having the building permits needed for the construction phases.

Following graphs depict the situation on port projects in these two countries (only 2 countries out of 6 Western Balkan countries have ports).

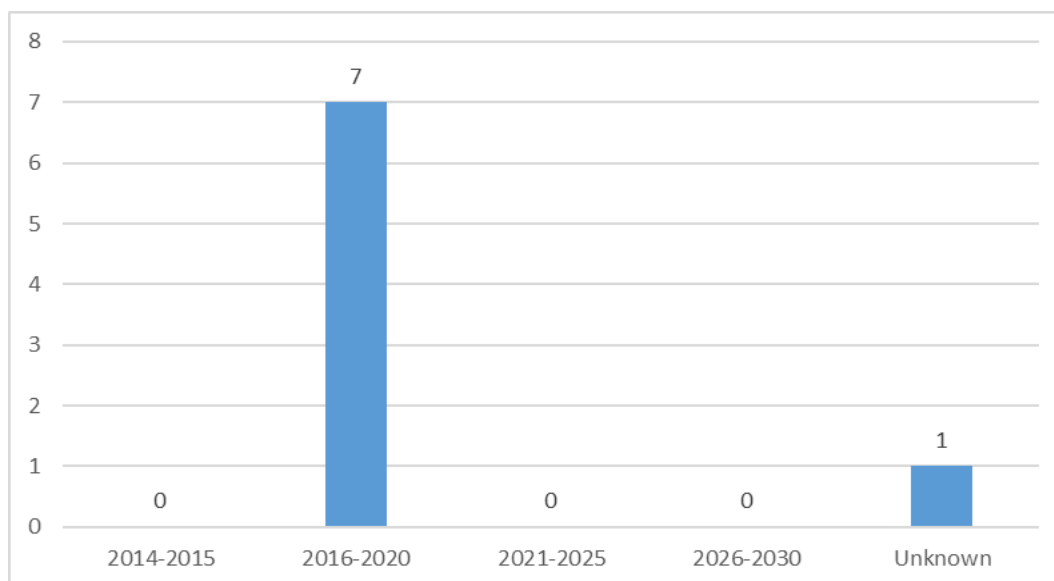
Figure 27: 'Port' projects by country, total = 8 projects (WB only)



Source: iC consulenten, based on Rhine-Danube project list, status: 28/03/2017

All port related projects in Bosnia and Herzegovina are planned to be completed before 2020, while the only port related project in Serbia did not have either the commencement or completion year available.

Figure 28: 'Port' projects by completion time class, total = 8 projects (WB only)



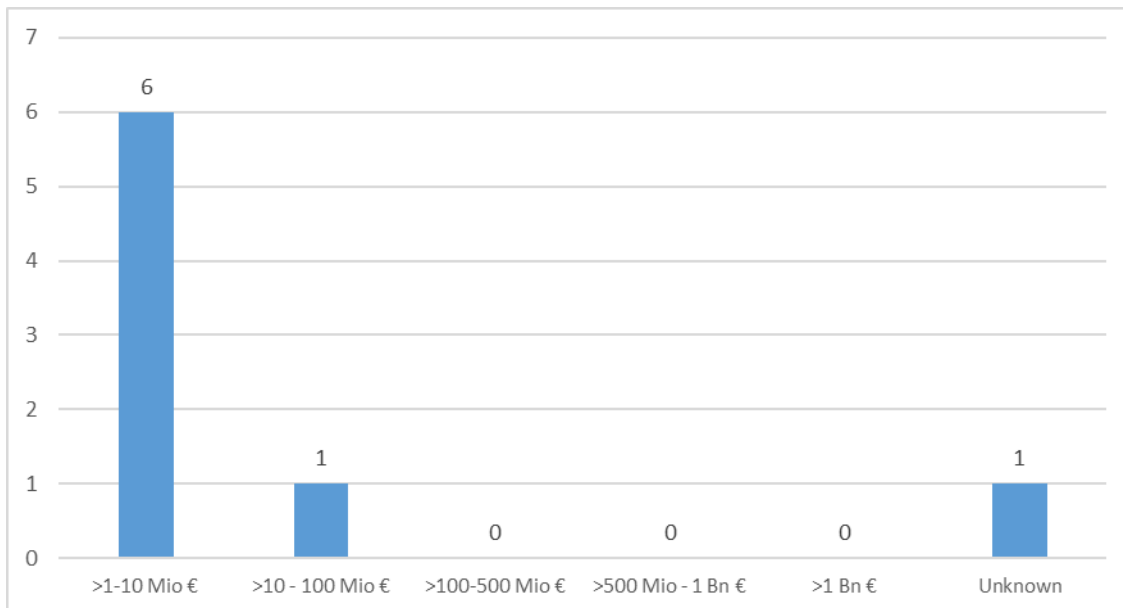
Source: iC consulenten, based on Rhine-Danube project list, status: 28/03/2017

The costs of all port related projects in the Western Balkan countries fall in the category between 1 and 100 Mio EUR, just like the costs of the majority of port projects in all EU countries. However, this needs to be taken with reserve, as the costs of the only port project in Serbia was unknown at the moment of writing of this report. Considering the nature and scope of the project, it is likely that this project will be in the scope between 100 and 500 Mio EUR.

In Bosnia and Herzegovina, all reported projects are located in the Port of Brčko. These projects are related to the improvement of the existing railway connection of the port with the nearby railway station and the adjacent industrial zone, improvement of the existing road connection with the major intercity road, as well as the construction of the container and liquid cargo terminals. More details on the projects in the Port of Brčko are given in Annex I.

A single port project in Serbia (as reported) encompasses activities related to the construction of the new port. The new port will be located further upstream from Belgrade, since the current port is located in one of the central urban areas where the port operations and cargo flows to/from the port are causing congestion and safety issues in a densely populated city area. No further info was available on this project.

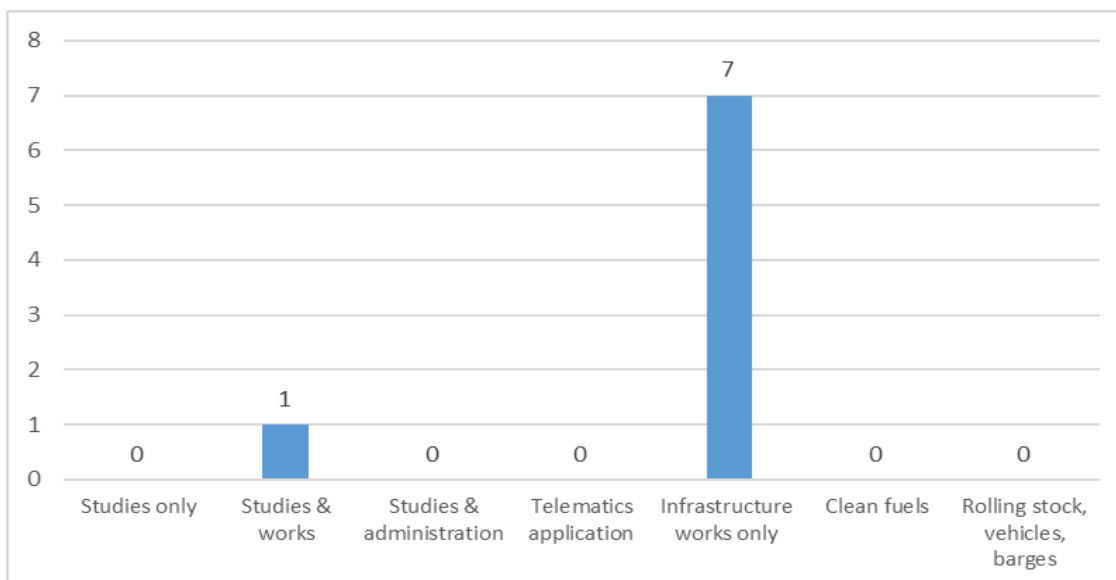
Figure 29: 'Port' projects by cost class, total = 8 projects (WB only)



Source: iC consulenten, based on Rhine-Danube project list, status: 28/03/2017

Out of 8 port projects in the Western Balkan countries, 7 projects in Bosnia and Herzegovina are related to infrastructure works, while 1 project in Serbia comprises of both studies and infrastructure works.

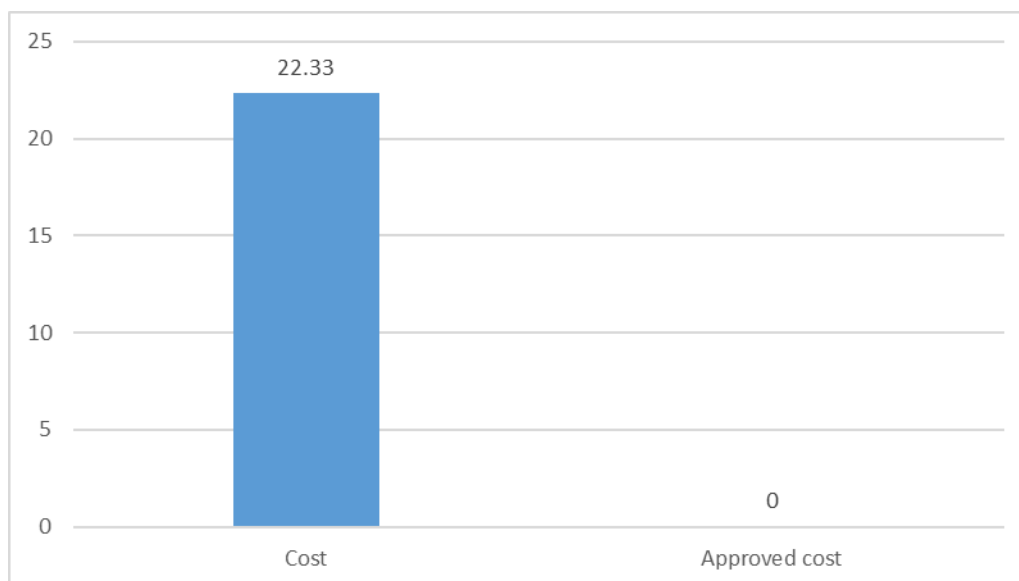
Figure 30: Scope of 'Port' projects, total = 8 projects (WB only)



Source: iC consulenten, based on Rhine-Danube project list, status: 28/03/2017

None of the reported 8 projects in both Serbia and Bosnia and Herzegovina have their costs approved by relevant national or international institutions. Both countries are still looking for adequate sources of financing for their projects. Based on the information collected by the Consultants, Bosnia and Herzegovina will likely seek for assistance from the European Bank for Reconstruction and Development, while Serbia will more likely look for various Design-Build-Finance concession options. As mentioned earlier, below costs should be taken with reserve, as the costs of a capital port project in Serbia were unknown at the time of writing of this report.

Figure 31: Project costs (Mio EUR) of on-going and planned 'Port' projects vs 'Port' projects with approved financing, total = 8 projects (WB only)



Source: iC consulenten, based on Rhine-Danube project list, status: 28/03/2017

Revenue generating "Ports" projects

According to the definitions and clarifications provided by DG MOVE (e-mail Günther Ettl, 9 Jan 2017), virtually all "Ports" projects can be considered suitable to generate revenues as all of them do charge port fees for usage of their basic infrastructure and/or navigation services. In general, all 118 port projects, including 8 projects in the Western Balkan countries could therefore be considered as revenue generating projects. Given the scarcity of data (authorities could not provide relevant data) needed for any detailed assessment of financial sustainability according to the given methodology, only a very rough categorization of projects can be provided at this stage. In this view, none of the reported Western Balkanports projects in the final version of the project list have been marked as projects with potential revenues.

7.5 Key IWW and ports projects in the Western Balkans

The following table lists the key projects for IWW and ports.

Table 12: Key Projects – ‘IWW’, ports

Country	Project name	Location	Completion Time	Total costs
RS	Construction of New Žeželj Bridge in Novi Sad	Danube: Novi Sad, rkm 1,254.29	12/2015	45,30
RS	Rehabilitation and upgrade of the Iron Gate I navigational lock	Danube: Djerdap 1, rkm 943	12/2020	28,51
BA	Reconstruction and Improvement of the Sava River in Bosnia and Herzegovina	Sava from the confluence of Drina River to the confluence of Una River rkm 178-rkm 515 - right bank - B&H territory	n.a.	20,70
RS	River Training and Dredging Works on critical sectors between Backa Palanka and Beograd	Danube: critical sectors between Backa Palanka and Beograd, rkm 1,297 - rkm 1,170	06/2020	14,10
RS	Removal of sunken vessels in sector Prahovo	Danube: Prahovo, rkm 845.5	n.a.	13,00
RS	Infrastructure upgrade, Reconstruction and Improvement of the Sava River in Serbia	Sava from Drina River Confluence to Beograd, rkm 178 - km 0	06/2021	9,30
RS	Rehabilitation and Maintenance Equipment Serbia	Danube: Serbian Danube	n.a.	5,38
RS	Implementation of navigation monitoring system on the Danube River (AtoNs) - 3 contracts	Danube: Serbian Danube	12/2018	2,70
RS	Establishment of Winter port facilities in Serbia	Danube: Serbian Danube	n.a.	n.a.
HR, RS	Improving navigation conditions on the Danube River from Bezdán(RS) - Batina(RH) to Backa Palanka(RS) - Ilok (RH) 1295,5 rkm -1433,1 rkm) - Eliminating bottlenecks on the Croatian/Serbian part of Danube River	Danube: critical sectors from Bezdán(RS) - Batina(RH) to Backa Palanka(RS) - Ilok (RH), rkm 1,433.1 - rkm 1,297.5	n.a.	48,00
AT, BE, BG, CZ, DE, FR, HR, HU, LU, NL, RO, RS, SK	RIS COMEX	Danube, Rhine, etc.	12/2020	26,50
AT, SK, HU, HR, BG, RO, RS	Danube STREAM Smart Integrated and Harmonized Waterway Management	Danube: rkm 2.223.15 - rkm 0, Danube-Black Sea Canal	06/2019	2,08
AT, BE, BG, CZ, DE, FR, HU, HR, NL, SK, RO, RS	Danube SKILLS	Danube	06/2019	2,02
AT, BG, DE, HU, HR, MD, SK, RO, RS, UA	DANTE	Danube	06/2019	1,98
AT, BG, DE, HU, HR, RO, RS	Green Danube	Danube	06/2019	1,59
RS, RO, BG	Danube Ship Wreck Removal	Danube: Apatin - Constanta, km 1,433 - km 0	n.a.	0,70

Country	Project name	Location	Completion Time	Total costs
BA	Construction of the container terminal	Port of Brčko	07/2019	14.45
BA	Construction of industrial railway tracks from the railway station Brčko Novo - Port of Brčko and reconstruction of industrial railway tracks	Port of Brčko	07/2019	3.67

Source: iC consulenten, viadonau

8 Potential administrative and operational barriers

In addition to physical and technical barriers, also administrative and operational barriers hinder the development of the Rhine-Danube Corridor. Both have an important impact on the attractiveness of transport routes and modes and thus influence transport demand and modal share.

Presented results are based on available studies. For each mode most important, existing obstacles are named. Recommended solutions and potential implementing bodies are cited if available.

Administrative and operational barriers mostly consist of changing infrastructure standards at borders, extensive border waiting times and diverging and intransparent charging systems.

But not only transport itself has to cope with administrative and operational barriers, also hindrances within responsible organisations effect the progress in the Corridor's development. Inefficient organisational structures, a lack of human and financial resources often impede the successful implementation of already approved projects.

8.1 Inland Waterways barriers

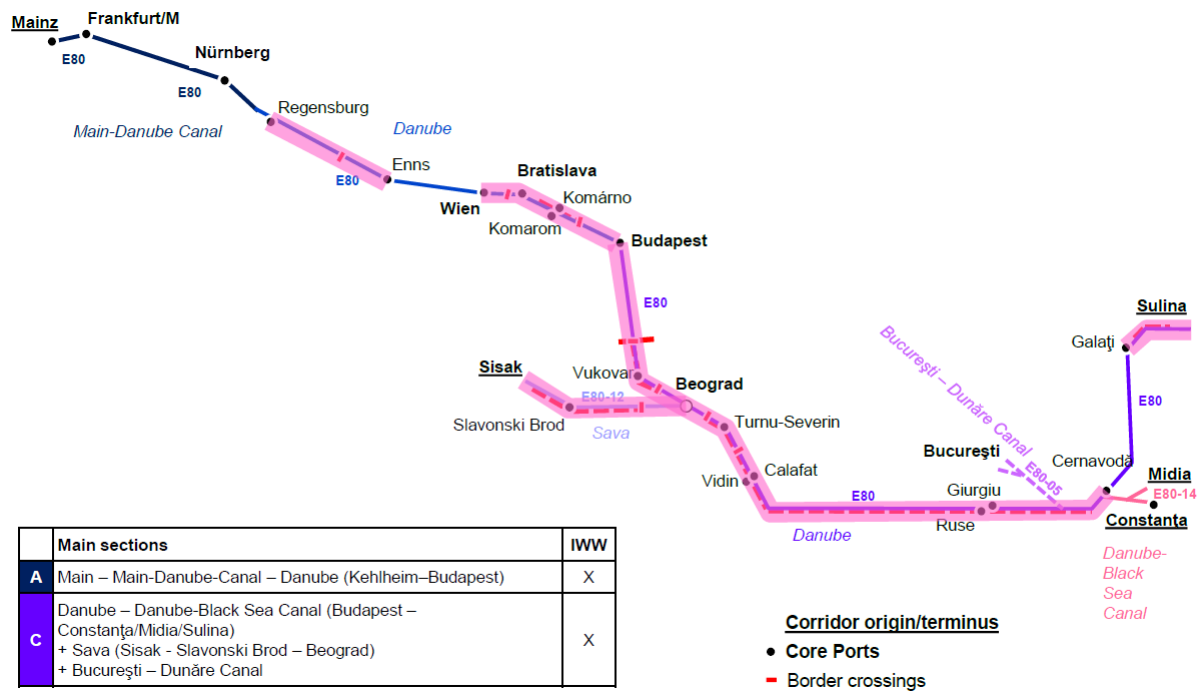
Potential administrative and operational barriers described in this chapter are also valid for the inland waterways of the Western Balkans countries, as the harmonization through common European approach is only at its starting phase.

The Inland Waterways of the Rhine-Danube Corridor cross or follow ten country borders. It has been investigated that cross-border sections according to Regulation 1316/2013, Article 2 ("...the section which ensures the continuity of a project of common interest between the nearest urban nodes on both sides of the border...") sometimes relate to very long infrastructure parts far beyond the border (e.g. Vienna – Budapest, Budapest – Bucharest) and would cover almost the entire corridor. For the purpose of this analysis the definition has been therefore further specified and narrowed, concluding a discussion with all other corridor teams in March 2017. As a result, the following criteria for the determination of the nearest relevant node on each side of the border have been applied in the following order:

- Nodes named in Regulation 1315/2013 Annex II, List 1 'Urban Node of the core network';
- Nodes named in Regulation 1316/2013 Annex I, Part I, List 2 'Core network corridors Alignment';
- Nodes named in Regulation 1315/2013 Annex II, List 2 'Airports, maritime port, inland ports and Rail Road Terminal' in which at least one of the elements is "core" (thus we disregard from the comprehensive ones);
- Other nodes not already included in steps 1-3 where the corridor is divided or merged ("junction in the alignment") or where another corridor is crossing, a significant transport functional change takes place (disregarding the border crossing station itself) and nodes fulfilling similar requirements in third countries agreed upon in the alignment in the Work Plan already;
- In addition: where the border is "along" a river or canal (on either side or in the middle) the respective river or canal is also defined as "border crossing section" (only relevant for project category "IWW").

With respect to inland waterways the corridor contains four cross-border sections, covering large parts of the Inland Waterways which coincide with borders over significant distances.

Figure 32: Cross-border sections on the Rhine-Danube corridor (IWW)



Source: viadonau (May 2017)

At border crossings the administrative procedures connected to customs, passenger and other vessel inspections notably affect inland waterway transport. In addition the coordination of priorities, maintenance and investment approaches along the most international waterway are challenging and the riparian countries steadily work on aligning their activities.

On the entire Rhine-Danube Corridor, 75% of inland waterway projects are located on cross-border sections. Whereas 100% of inland waterway projects on the Western Balkan part of the corridor are located on cross-border sections.

Lack of budgets for national rehabilitation and maintenance duties

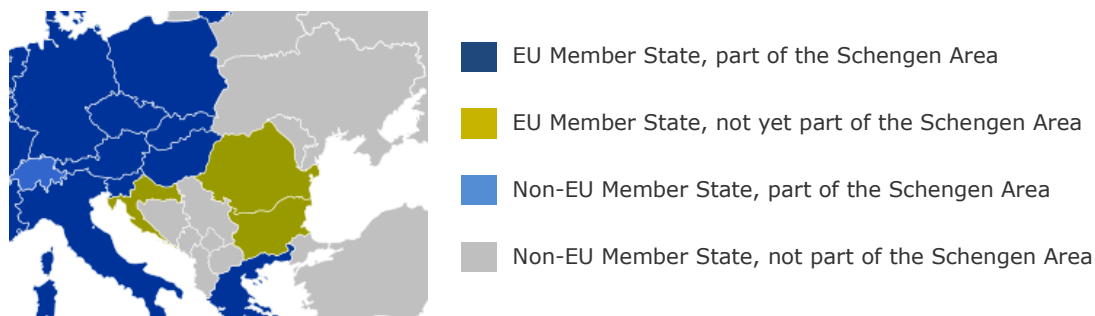
Published in October 2017, the latest edition of the National Action Plans as prepared under the lead of FAIRway Danube reveals that national budgets for required everyday maintenance works is lacking in Slovakia, Hungary¹⁸ and Bulgaria. Serbia actively contributes to the preparation of the National Action Plans and reports the actual situation. Bosnia and Herzegovina signed the Conclusions on effective waterway infrastructure rehabilitation and maintenance on the Danube and its navigable tributaries, but could not contribute to the October 2017 update of the National Action Plans.

Inefficient and ineffective border controls²⁰

Administrative processes and paperwork are seen as a competitive disadvantage for inland waterway transport on the Rhine-Danube Corridor as they cause time losses and operational costs. Besides differences between national rules, it has to be taken into account that not all Danube riparian states are EU Members and not all EU states are part of the Schengen area.

The Danube waterway crosses borders of Germany, Austria, Slovakia and Hungary which are European Union Member States part of the Schengen Area; Croatia, Romania, Bulgaria which are EU-Member States not yet part of the Schengen Area as well as to Serbia, Moldova and Ukraine which are no members of the EU. The Sava crosses borders of Croatia, Bosnia and Herzegovina and Serbia, from which only Croatia is an EU-Member State. The Tisa crosses Hungary and Serbia.

Figure 33: EU and Schengen member countries



Therefore, for instance, border checks for passengers and crews are necessary, as well as required customs clearance procedures for imports and exports. Especially on the external EU-borders (e.g. Mohács / Bezdan), administrative procedures for freight transport on water were found to take long and consequently cause additional costs for operators. An analysis of administrative forms in use by a dedicated EUSDR PA1a Working Group demonstrated that more than 15 forms are to be filled in for a single transport. On many occasions multiple data entry of the same data is required.

Throughout the last years shipping companies and ship brokers repeatedly raised the issue of organising border controls more efficiently and less time consuming. Given the fact that Danube navigation is working with a low profit margin and often has to deal with fierce competition from other modes of transport, the reduction of additional costs caused by unpredictable and long-winded administrative processes can be a

²⁰ See "Results of the survey on border controls along the Danube and its navigable tributaries" and the "Manual on border controls along the Danube and its navigable tributaries" issued by the EUSDR PA1a and available under <http://www.danube-navigation.eu>.

major contribution to support a modal shift towards inland waterways. This is in line with European and national transport policy objectives to increase the modal share of inland navigation.

As the involved control authorities are currently urged to increase the effectiveness of controls along the EU's external borders, the time seems promising to jointly set up a more efficient control system which will reduce adverse effects on the transport companies' everyday business to a minimum meaning that the control processes are organised in a time-saving, transparent and predictable manner. At the same time the harmonisation of control processes along the Danube would help to speed up the administrative work for those vessel operators who comply with the applicable law and fulfil international obligations.

Most important measures can be summarised into the main areas: harmonisation, simplification and digitalisation of border controls in order to increase both, effectiveness and efficiency.

Three on-going initiatives currently deal with this issue:

- Working group on „Administrative Processes“ of the Priority Areas 1a and 11 of the EU Strategy for the Danube Region in combination with the project „Removal of administrative barriers along the Danube“ (nationally financed within the Austrian Action Programme on Danube Navigation) pursue the simplification, harmonisation and digitalisation of the border control processes and forms along the Danube.
- DANTE project: the DTP financed project DANTE (Improving administrative procedures and processes for Danube IWT) has started in January 2017 and will end in June 2019. The main objective of DANTE is to improve administrative procedures and to reduce time losses and costs by eliminating redundant administrative processes. DANTE will feed the PA1a/PA11 working group by identifying further administrative barriers and proposing viable solutions for their elimination.
- RIS COMEX project: the CEF-funded RIS COMEX project explores further possibilities for digitalisation and the effective use of River Information Services in administrative processes in Danube navigation.

8.2 Port barriers

Charging practices in ports

Charging practices in the Western Balkans ports are in function of the applied port management/governance/administration model. Some ports are charging their infrastructure fees on the basis of the quantity of cargo a vessel is loading/unloading, while some ports are charging the same fees based on the vessel capacity, vessel length, sometimes including the time component in the fee calculation. In Bosnia and Herzegovina, Port of Šamac is a fully private port and is managed and operated by a private company, while the Port of Brčko is a public port, managed and operated by a public company. No “cap” governing organizations (such as “port authorities, common in most European countries) exist in Bosnia and Herzegovina. Both infrastructure fees and services charges are determined autonomously by each port and no regulation governs the fees and charges in any way. In Serbia, Port of Belgrade is operated by a private company, while the Port of Novi Sad is operated by a public company. Both ports (and all other ports in Serbia) are governed by central (national) port authority – “Port Governance Agency”. Infrastructure fees are determined by the Port Governance Agency, while the service charges are set autonomously by each port operator. Due to various port governance and port operating systems along the Danube and the Sava in the Western Balkan countries, port charges are based on different bases.

It has been noted that the various charging systems sometimes cause confusion and losses in profits of ship operators and/or shippers/receivers of cargoes, due to insufficient information on port charges needed for various freight and voyage calculations, including the pricing of transport services.

During the earlier Corridor Fora, a proposal for basing the port fees on actual load has been suggested by Mr. Cesare Bernabei from DG MOVE. Currently, no EU legislation covering the setup of the charging system exists. Moreover, no initiatives for such legislation have been identified so far. Community legislation has so far been focused on market access to port services, without regulating the market itself.

Since it is not likely that any future EU legislation will aim at harmonization of port charges across the Union, let alone imposing the charging bases, a higher transparency of public port charges is recommended, so as to avoid different interpretations and confusion in commercial decision-making of the port users. A supra-national (EU-wide) legal obligation for ports to publish their publicly charged tariffs on their web sites could be considered.

Port administrative procedures for vessels

Vessels calling various inland ports in the Western Balkan countries are subject to compulsory administrative procedures, imposed by customs, immigration and/or port authorities, like in EU ports along the Danube and Sava. Documents that are used for vessel clearance at borders or vessel reporting in ports (such as bills of lading, cargo manifests, crew lists, passenger lists, personal effects list, vessel provisions list, etc.), as well as requirements for such documents, are not harmonized.

Non-harmonized processes and different documents related to the vessel, its cargo, crews, passenger and vessel provisions in a number of cases cause additional administrative work by vessel operators and skippers, thus delaying and prolonging the process of vessel reporting at borders or in ports, especially when loading/unloading or just transiting third (non-EU) countries.

It is recommended that the Corridor Coordinator initiates a dialogue process which, eventually, could result either in appropriate EU legislation and/or multilateral agreement with the Western Balkan countries. Such legislation, agreement or any

other adequate measure could mirror the provisions of the Convention on Facilitation of Maritime Traffic (a.k.a. the FAL Convention).²³

Table 13: Overview of potential administrative and operational barriers in ports

Potential administrative & operational barriers	Description	Impacts	Possible solutions
Charging practices in ports	<p>Depending on the governance model in each country, ports usually charge their infrastructure fees based on:</p> <ul style="list-style-type: none"> the load a vessel is loading/unloading, vessel capacity, vessel length, sometimes including the time component in the fee calculation. 	<p>Confusion and losses in profits of ship operators and/or shippers/receivers of cargoes, due to insufficient information on port charges needed for various freight and voyage calculations, including the pricing of transport services.</p>	<p>Possible harmonization?</p>
Port administrative procedures for vessels	<p>Vessels calling inland ports are subject to compulsory administrative procedures, imposed by:</p> <ul style="list-style-type: none"> customs, immigration, port authorities. <p>Unharmonized documents and procedures for vessel clearance at borders or vessel reporting in ports:</p> <ul style="list-style-type: none"> bills of lading, cargo manifests, crew lists, passenger lists, personal effects list, vessel provisions list, etc. 	<p>Additional administrative work by vessel operators and skippers, thus delaying the process of vessel reporting at borders or in ports, especially when loading/unloading or just transiting third (non-EU) countries.</p>	<p>Multilateral convention similar to Convention on Facilitation of Maritime Traffic (a.k.a. the FAL Convention).</p>

Source: iC consulenten, based on desk research and own survey

²³ The Convention was adopted by the International Conference on Facilitation of Maritime Travel and Transport on 9 April 1965. The purpose of the FAL Convention is to facilitate maritime transport by reducing paper work, simplifying formalities, documentary requirements and procedures associated with the arrival, stay and departure of ships engaged on international voyages.

ANNEX I – Western Balkan Extension of the Rhine-Danube CNC - List of Projects

TEN-T Project ID	Project name	Project category	Member States / Countries involved	Short Project Description	Total costs
9503	Reconstruction and Improvement of the Sava River in Bosnia and Herzegovina	IWW	BA	Demining of the potential worksites at the right bank of the Sava River from the confluence of Drina River to the confluence of Una River; Reconstruction and Improvement of the Sava River in B&H - Execution of Works	20,70
9701	Construction of industrial railway tracks from the railway station Brčko Novo - Port of Brčko and reconstruction of industrial railway tracks	IWW	BA	Connection of the port railway tracks with the railway station Brčko Novo and reconstruction of the existing railway lines between the port and industrial zone in Brčko with the purpose of increase of capacity and safety for users	3,67
9702	Direct connection of the quayside railway tracks with the railway station Brčko Novo	IWW	BA	Construction of this direct railway track would enable the port of Brčko to have direct railway link between the quayside tracks and the reception railway track number 2 in the railway station Brčko Novo. This connection would enable quicker manoeuvring of the incoming/outgoing wagons to/from the quayside tracks in the port.	0,95
9703	Reconstruction of the access road from the Bijeljina road to the Port of Brčko	IWW	BA	Connection of the port of Brčko to the Bijeljina road on the eastern side	0,77
9704	Port of Brčko Construction of the operational yard	IWW	BA	Construction of the new operational yard for cargo handling in the port 225x40m	1,15
9712	Port of Brčko Construction of the container terminal	IWW	BA	Construction of the container terminal for the distribution of containerized cargoes to/from neighbouring container hub terminals	14,45
9713	Port of Brčko Capital dredging of the port area	IWW	BA		1,05
9714	Port of Brčko Construction of the liquid cargo terminal	IWW	BA	Construction of the isolated liquid cargo terminal for direct transshipment of cargoes to road and rail vehicles	0,29
9273	Infrastructure upgrade, Reconstruction and Improvement of the Sava River in Serbia	IWW	RS	Preparation of Documentation (designs, EIA), Execution of reconstruction and improvement works on the Sava River	9,30






TEN-T Project ID	Project name	Project category	Member States / Countries involved	Short Project Description	Total costs
9275	River Training and Dredging Works on critical sectors between Backa Palanca and Beograd	IWW	RS	River training and dredging works on 6 critical sectors: Susek, Futog, Cortanovci, Arankina ada, Beska, Preliv, and Supervision and environmental monitoring of river training and dredging works	14,10
9276	Implementation of AtoNs	IWW	RS	Deployment of remote and virtual Aids to Navigation system integrated in the existing AIS network within the implemented RIS system	2,70
9277	Construction of New Žeželj Bridge in Novi Sad	IWW	RS	Construction of the new bridge for road and rail transport to increase the fairway width of the Danube, supervision of construction works	45,30
9278	Rehabilitation works at HPP Djerdap I	IWW	RS	Rehabilitation of the navigation lock and replacement of the electrical and hydraulic systems	24,50
9279	Cleaning the Danube River bottom from sunken vessels, sector Prahovo	IWW	RS	Lifting sunken vessels from the riverbed, storing and shipping and scrapping them	13,00
9280	Rehabilitation and Maintenance Equipment Serbia	IWW	RS	Acquisition of equipment to monitor the fairway, to plan and execute rehabilitation and maintenance works and to provide information to users Trainings to become acquainted with the use of the new equipment	5,38
9281	Establishment of Winter port facilities in Serbia	IWW	RS	Preparation of documentation, Implementation of works	n.a.
9710	Construction of the new Port of Beograd	IWW	RS	New port construction. Current port is now in the urban environment. Appropriate documentation for establishing the port area, construction and development of a new Beograd port needs to be elaborated and adopted according to national legislation. Construction of port facilities, vertical quay, road, railway and communal infrastructure.	n.a.
9274	Danube Ship Wreck Removal	IWW	RS, RO, BG	Removal of wrecks and unexploded ordinances; Preparation, classification of vessels, contracting, implementation	0,70

ANNEX II – Compliance check and critical issues

Compliance with regulation 1315/2013 (Key Performance Indicators and complementing parameters)²⁴

 Compliant  Not compliant  Data not available / not applicable

Compliance by 2030

-  Work activities completed²⁵ satisfying the parameters
-  Activities on-going³³, expected to be completed by 2030
-  Activities to start yet, expected to be completed by 2030
-  Activities foreseen but delayed, will not be completed by 2030
-  Activities not yet planned/agreed by authorities for completion by 2030

²⁴ Reflects the situation in 2015, according to the consultants' best knowledge. Values based on data collected within the first study on the Rhine-Danube Corridor (reference year 2013) and were partially updated with information on actions already accomplished.

²⁵ Status May 2015

Inland Waterways of the Western Balkan countries – current compliance 2016

Inland Waterway Sections			Length of section	Waterway type	Current compliance with regulation 1315/2013					
					CEMT class	Permissible draught	Permissible height	RIS	Number of days below targeted depth according to waterway manager (2014)	Number of days below targeted depth according to waterway manager (2016)
Country	From	To	[km]			[m]	[m]	Y/N	[d]	[d]
Danube										
RS	Ilok	Beograd	120.5	free flowing	Vlc	2.5	6.95	Yes	0	32
RS	Beograd	Baziaş	100.0	impound river	VII	3.5	9.15	Yes	0	0
Sava										
HR	Sisak	Krapje	61.0	free flowing	III	2	no bridge	Yes	n.a.	n.a.
HR	Krapje	Slavoski Brod	161.8	free flowing	III	2	6.16	Yes	n.a.	n.a.
HR	Slavoski Brod	Brcko	143.0	free flowing	III	1.6	6.46	Yes	n.a.	n.a.
HR	Brcko	Border HR	17.4	free flowing	IV	2.5	no bridge	Yes	n.a.	n.a.
RS	Border HR	Beograd	210.8	free flowing	III	2	6.96	Yes	n.a.	n.a.
Tisa										
RS	Slankamen	Novi Bečej	63.4	impound river	Va	2.5	no bridge	No*	n.a.	n.a.
RS	Novi Bečej	Border HU-RS	96.6	free flowing	Va	2.5	7.76	No*	n.a.	n.a.
HU ¹	Border HU-RS	Szeged	13.0	free flowing	IV	2.5	6.48	No	n.a.	n.a.

¹ Hungary is not part of the Western Balkan Countries, however the Tisa river was only included in the study in the course of the extension to the Western Balkan countries.

Inland Waterways of the Western Balkan countries – compliance by 2030

Inland Waterway Sections			Length of section	Waterway type	Expected compliance by 2030				
					CEMT class	Permissible draught	Permissible height	RIS	Number of days below targeted depth according to waterway manager
Country	From	To	[km]			[m]	[m]	Y/N	[d]
Danube									
RS	Ilok	Beograd	120.5	free flowing	Vlc	2.5	n.a.	Yes	max. 22
RS	Beograd	Baziaş	100.0	impound river	VII	3.5	9.15	Yes	0
Sava									
HR	Sisak	Krapje	61.0	free flowing	IV	2.5	no bridge	Yes	max. 22
HR	Krapje	Slavoski Brod	161.8	free flowing	IV	2.5	6.16	Yes	max. 22
HR	Slavoski Brod	Brcko	143.0	free flowing	IV	2.5	6.46	Yes	max. 22
HR	Brcko	Border HR	17.4	free flowing	IV	2.5	no bridge	Yes	max. 22
RS	Border HR	Beograd	210.8	free flowing	IV	2.5	6.96	Yes	max. 22
Tisa									
RS	Slankamen	Novi Bečej	63.4	impound river	Va	2.5	no bridge	No	n.a.
RS	Novi Bečej	Border HU-RS	96.6	free flowing	Va	2.5	7.76	No	n.a.
HU	Border HU-RS	Szeged	13.0	free flowing	IV	2.5	6.48	No	n.a.

¹ Hungary is not part of the Western Balkan Countries, however the Tisa river was only included in the study in the course of the extension to the Western Balkan countries.

Ports of the Western Balkan countries, current status - 2030

Ports		Current compliance with regulation 1315/2013								Expected compliance by 2030							
		Connection to rail ⁽¹⁾	ECMT Class IV waterway connection ⁽¹⁾	Minimum draft ⁽²⁾	Availability of clean fuels ⁽¹⁾	Facilities for ship generated waste (Seaports) ⁽¹⁾	Availability of at least one freight terminal open to all operators ⁽¹⁾	Intermodal facilities ⁽²⁾	Shore-side electricity supply facilities ⁽²⁾	Connection to rail ⁽¹⁾	ECMT Class IV waterway connection ⁽¹⁾	Minimum draft ⁽²⁾	Availability of clean fuels ⁽¹⁾	Facilities for ship generated waste (Seaports) ⁽¹⁾	Availability of at least one freight terminal open to all operators ⁽¹⁾	Intermodal facilities ⁽²⁾	Shore-side electricity supply facilities ⁽²⁾
Country	Port	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
BA	Šamac	Y	Y	Y	N	N/A	N	N	N	Y	Y	Y	N	N/A	N	N	N
BA	Brčko	Y	Y	Y	N	N/A	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y	Y
RS	Novi Sad	Y	Y	Y	N	N/A	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y	Y
RS	Beograd	Y	Y	Y	N	N/A	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y	Y

Note: (1) – Key Performance Indicators (KPI); (2) – non-KPI technical parameters