KONRAD ADENAUER STIFTUNG

Blue Connectivity: Maritime and Inland Waterways in the Balkans Peninsula

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Coordinator:
Ardian Haçkaj

Design&Layout:
Grafika Elzana

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Contents

Waterborne Connectivity in Western Balkans

Following the study "Next Stop Europe: Railways in the Western Balkans", the "Blue Connectivity: Waterborne Transport in the Balkans Peninsula" examines another critical and overlooked avenue of communication in the Western Balkans: its inland and maritime waterways. Western Balkan Waterway connectivity rests on two pillars: the Danube with its network of tributary rivers, and the Adriatic Sea. Unlike railroads, waterways are natural phenomena and cannot be as easily compartmentalized into manmade categories.

While we initially envisioned that the study should only explore the Western Balkans countries it quickly became apparent that waterways in the Western Balkans do not stop at the borders, nor do they simply connect two countries. They connect them with one another, with EU and the world. The European Commission has given a strong signal to the region that it is indeed a part of EU transport network. In December 2021, the EU Commission published a planning methodology for the trans-European transport network (TEN-T) reviewing and updating the 2013 text. The new TEN-T introduces the Western Balkan Transport Corridor, which connects portions of Greece, Bulgaria, Romania, and Croatia along with the WB6. Thus it felt only natural that the study explores the state of waterborne transportation as well as relevant policy and legislation concerning inland and maritime waterways, not just in the Western Balkans, but also in the above-mentioned countries. Including the EU member states allowed us to see the full picture and holistically examine the state of waterborne connectivity, particularly the Danube and Adriatic.

The overarching aim of this study is to provide a modest but impactful contribution to the wider agenda of connecting the region itself, as well as bringing it closer to the EU. The EU has been connected with the region intensively for decades. Complementary to the Enlargement, a systemic hallmark of EU engagement with the Western Balkans is the Berlin Process. The Berlin Process framework has proved to be effective and resilient over the years and has been bringing the region closer together.

One of the tangible contributions of the Berlin Process is the Transport Community, which since its establishment in 2017 has proved instrumental in forging and improving links in the region as well as "greening transport" the European Green Deal has become central to the public discourse. However, there are many facets to a durable and sustainable green transition. Exploiting navigable rivers and sea lanes is one such aspect, which would contribute greatly to a reduction in greenhouse emissions. However the sector is dominated by oil-intensive trucking transportation, whose reduction is necessary both for environmental, demographic, and commercial reasons. This is something that the EU, the Western Balkan states, and the Transport Community are acutely aware of. For this reason, the 4th Ministerial Meeting of the Transport Community has endorsed the Action Plan for Waterborne Transport and Multimodality in July 2021.

As a German and European foundation built on the values of freedom, peace, and solidarity, we strongly believe that the Blue Connectivity study is one of the best ways in which we could contribute substantially to the betterment of the Western Balkan region. The Konrad Adenauer Foundation is committed to offer ist contribution in furthering and fostering the interconnectedness of the Western Balkans.

The study presents a comprehensive and unique picture of the state of waterborne connectivity in the region and within the wider Western Balkan Transport Corridor. It also provides suggestions for policy improvements, which would facilitate greater connectivity within the region.

All of this would not have been possible without the authors, who with their insights and expert knowledge, give this study validity and credence. We thank them for their respective contribution. We would also like to extend our gratitude to the Permanent Secretariat of the Transport Community, whose support was invaluable for the study and the research process leading up to it. Furthermore, the entire project would not have been possible without the coordination of the Cooperation and Development Institute, in particular Mr. Ardian Hackaj, whose creative vision fundamentally influenced the study and steered it in the right direction.

Norbert Beckmann-Dierkes
Konrad-Adenauer-Foundation
Serbia and Montenegro

Dr. Tobias Rüttershoff
Konrad-Adenauer-Foundation
Albania

Foreword

As announced in the Green Deal communication, one of the main elements of the Annex to the green Deal was the EU Smart and Sustainable Mobility Strategy, which was published in December 2020. As integral part of the green deal, it also marks an important milestone in terms of transport planning and sets unprecedented ambitions for all transport modes, including waterborne transport.

Regarding Waterborne transport, in his new approach, sea ports are seen as potential new clean energy hubs for integrated electricity systems, hydrogen and other low-carbon fuels, and testbeds for waste reuse and the circular economy. In addition, Short-sea shipping and efficient zero-emission vehicles can also contribute to greening freight transport in Europe and beyond. The Motorways of the sea as the maritime dimension of the TEN-T will continue to boost more cargo to be transported via short-sea shipping. As per the strategy, a milestone which will indicate the necessary ambition for the future EU policies, transport by inland waterways and short sea shipping should increase by 25% by 2030 and by 50% by 2050.

In addition to the green deal, the European Commission embarked on the revision of the TEN-T regulation In 2021, which will have significant implications for the Western Balkans, namely the creation of a new European transport corridor – Western Balkans. The proposal for this new Corridor sends a strong signal of the EU's ambitions to further integrate the reginal partners into the most important European transport flows. According to the proposal, a new deadline for finishing the extended core network has been set to 2040, which would in practical terms mean that the Western Balkan reginal partners would be given 10 additional years to fully comply with the key performance indicators of the TEN-T including the ones for Inland waterways, maritime and inland ports.

The new Western Balkan European Transport Corridor will be multimodal and open to the inclusion of all transport modes. It will act as an instrument to facilitate the coordinated implementation of

parts of the TEN-T Network and are intended in particular to improve the cross/border links and remove bottlenecks in the respective EU members states and western Balkan regional partners. In terms of the governance, the Corridor Coordinator be the key interlocutor for efficient corridor implementation and completion. This will give the western Balkan regional partners additional boost in planning their transport strategies and incentive to cooperate and coordinate their efforts focusing on cross border dimension and impact.

Due to these new challenges and ambitions of the EU, the need to have a professional, analytical study of the state of play of waterborne transport in the Western Balkans was necessary. The study done by KAS on the Blue Balkans and the significance of Waterborne transport, including Inland waterways and maritime transport is a proof of perfect continuation of the focus on environmentally friendly modes of transport after last year focus on rail in the Western Balkan region.

The study done for relevant western Balkans regional partners together with the neighboring countries gives an exquisite overview of where each of the reginal partners stands and their potentials for future development of the waterborne transport.

Though analytical approach encompassing the most important elements of waterborne dimension including traffic data, multimodal/ intermodal connectivity with European Corridors, good governance data, coherence and complementarity with EU funds and very pertinent topic of impact of change to waterborne transport, this study is a valuable and very useful document that will be used by many stakeholders in the region. The TEN-T indicators which have been assessed show satisfactory level of compliance, but at the same time much more work has to be done in relation of sustainability and availability of alternative fuels in inland and maritime ports in the Western Balkans. The inevitable element of the Impact of Ukraine conflict to IWW and maritime connectivity has been well elaborated in the study which gives it additional value and significance, as the conflict is severely disrupting waterborne supply chains.

This study will be a perfect entry point for future research and development of waterborne transport in the Western Balkans which should further focus on tackling the green transition of the Western Balkan waterborne transport following the best practices and examples of the EU member states.

Matej Zakonjšek
Director of Transport Community Permanent Secretariat

Executive Summary

In 2021 KAS Beograd coordinated a collective effort to produce an innovative and groundbreaking paper on rail transport in the WB6[1]. It provided a base study on the state of affairs and the development prospects of the railways in the six WB countries. Its innovative angle provided a much-useful information on the role that the Berlin Process has played in rail infrastructure development in the region.

Fast forward in 2022 it is the maritime and inland waterways the next transport vector that constitutes the aim of the 2nd paper. Waterborne transport has been among the first documented transport modes used in the Balkans peninsula. The mountainous barriers that cut the region from North-East to South-West have rendered seas, rivers and lakes optimal transport modes for the mobility of people and freight. This blue connectivity has shaped Western Balkans urban configurations, its production centers as well as city culture and architecture. Being a peninsula, waterborne transport has been one of the most important vectors of mobility and exchanges with the neighbors.

While Danube, Tisa and Sava rivers have provided the first "highways" connecting the region to central Europe and to Balkans hinterland, the Adriatic and Black Sea ports (as well as the Ionian and Egeus maritime ports) have connected the region with the rest of the world.

Waterborne transport in EU

Compared with road, rail and airborne, the waterborne transport has clear benefits in terms of environmental impact, reduced congestion, lower costs and increased efficiency of transport operations. But the "... *investments in waterborne transport in the Western Balkans so far have been significantly lower compared to investments in other modes of transport*"[2].

[1] Next Stop: Europe! Railways in the Western Balkans, KAS Beograd 2021

[2] Action Plan for Waterborne Transport and Multimodality, Transport Community Permanent Secretariat, 2021

In 2013, the EU Regulation 1315/2013 described the EU inland waterways transport infrastructure together with maritime transport infrastructure and Motorways of the Sea, as main vectors of EU transport network. It also classified them in a dual structure: comprehensive and core. The peninsula's inland waterways and maritime ports were presented in an Indicative Extension to Neighboring Countries Comprehensive Network[3]. They were further detailed in 2016 into Core and Comprehensive Western Balkans Region after the Vienna Summit of the Western Balkans in the framework of the Berlin Process[4].

In December 2021, the EU Commission published a planning methodology for the trans-European transport network (TEN-T)[5] reviewing and updating 2013 and 2016 texts. It aims to improve sustainability by reducing congestion, transport emissions and impact on climate change; boost cohesion by connecting EU cities and regions, including rural areas and remote regions; increase efficiency by removing bottlenecks and gaps on the transport network; and enhance user benefits through better transport services to citizens and freight customers.

Based on interoperability and multi-modality, the EU Commission proposal provides a new network structure composed by core (to be completed by 2030), extended core (to be completed by 2040) and comprehensive (to be completed by 2050) network that together form the TEN-T.

The new European Transport Corridors (ETC) integrate core network corridors and rail freight corridors, and are composed of most strategic parts of core network *AND* of the extended core network.

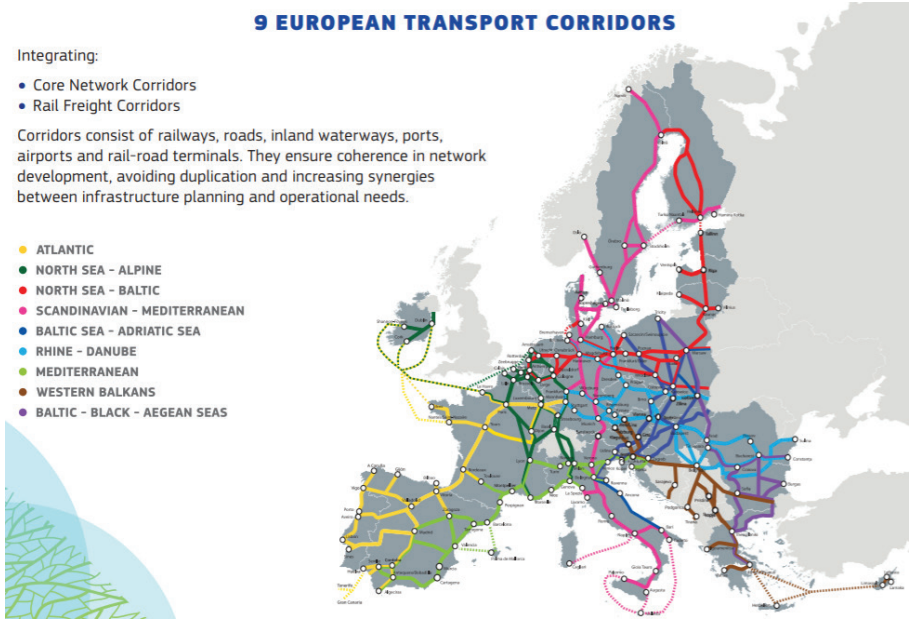
The novelty concerning the Balkan peninsula is the addition of a new TEN-T corridor combining rail and road: the Western Balkans European Transport Corridor (in brown color in the map). The Adriatic ports of

[3] Annex 13.1. Indicative Extension to Neighboring Countries Comprehensive Network: Inland waterways and ports, Western Balkans Region, 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 and repealing Decision No 661/2010/EU, Official Journal of the European Union, L 348/1

[4] COMMISSION DELEGATED REGULATION (EU) 2016/758 of 4 February 2016 amending Regulation (EU) No 1315/2013 of the European Parliament and of the Council as regards adapting Annex III thereto

[5] COMMISSION STAFF WORKING DOCUMENT, on the planning methodology for the trans-European transport network (TEN-T), European Commission, Strasbourg, 14.12.2021 SWD(2021) 471 final

Durres and Bar are nodes of this corridor while its inland waterways links and nodes are part of the Rhine – Danube corridor (in light blue in the map).



Source: European Union

During 2022 European Commission, DG MOVE has been negotiating with the SEE6 countries with regard to the review of the classification of nodes and links as proposed in December 2021. Today the region is an integral part of the EU transport map and of its transport policies.

Waterborne transport in South East Europe

The December 2021 EU draft regulation opens the way for the maritime ports of Bar in Montenegro and Durres in Albania, to be classified as Core Network ports, joining the already confirmed core inland ports of Novi Sad and Belgrade in Serbia and of Brcko and Bosanski Samac in Bosnia and Herzegovina.

In the new EU regulation, the proposed Core network of inland waterways includes parts of the rivers Danube and Sava in Serbia as well as parts of the Sava river in Bosnia and Herzegovina, and a section of the Tisa river in Serbia. To be noted is the absence of Western

Balkans lake connectivity – in Shkodra or in Ohrid - in the 2013 and/or 2016 EU Commission regulations.

With regard to maritime transport, the 2021 methodology aims to promote the Short Sea Shipping and hinterland connectivity in the Balkans. As for the rivers, it automatically upgrades the inland waterways in the core network. Moreover, it focusses on upgrading and promoting the good navigation status of Balkan rivers so as to ensure satisfactory levels of service, as well as underlining multi-modality & connectivity road / rail. Role of ports is becoming increasingly important as testbeds for circular economy and as energy hubs.

After its publication by the EU Commission, during the whole 2022 the revised TEN-T Regulation including the European transport corridors has been subject to negotiations in the Council. In the case of the proposed Western Balkans corridor, a total revision of nodes and links has been open for assessment. Being brought to the fore by climate change and the war in Ukraine, the Waterborne component has received special attention.

The latest amendment from the European Commission updating the initial TEN-T proposal to reflect impacts on infrastructure of Russia's war of aggression against Ukraine[6], reflects just that. By extending four European Transport Corridors to the territory of Ukraine and Moldova – including the ports of Mariupol and Odesa – the EU Commission underlines its commitment to improve transport connectivity of these two countries with the EU, as well as facilitating economic exchanges and better connections. These corridors will also be a key priority in rebuilding the transport infrastructure of Ukraine once the war ends.

Supported by Transport Permanent Secretariat, all SEE6 governments have been actively engaged in preparing and maturing the required dossiers to sustain their claims of confirming and/ or upgrading key nodes and / or links into Core Network. The upgrade of ports or river links into core (or extended core) corresponds to a more advanced project maturity which is subsequently translated into quicker and more favorable financing conditions from EU and its IFI partners. The negotiations are

[6] Commission amends TEN-T proposal to reflect impacts on infrastructure of Russia's war of aggression against Ukraine, EU Commission, Directorate General for Mobility and Transport, July 2022, at: https://transport.ec.europa.eu/news/commission-amends-ten-t-proposal-reflect-impacts-infrastructure-russias-war-aggression-against-2022-07-27_en

expected to last during all 2022, with the final version of the regulation - maps included - forecasted to be published by mid-2023.

Responding to this policy-making dynamic, the current project has extended its initial scope as defined in the previous rail study, by adding the new EU TEN-T policy-making layer, and increasing the geographic coverage through the inclusion of three neighboring member states (Croatia, Bulgaria and Greece).

Salient features of Waterborne transport in the Balkans

The policy paper has been organized to fulfil a double role: provide detailed information on main ports and waterborne links in the Southeast Europe, as well as come up with an up-to-date overview of the situations in those ports and links in relation with the compliance indicators required for their upgrade into Core category.

For each country the authors have provided an overall view of the waterborne nodes and links, complemented with an assessment of main components of the EU compliance indicators for each of them. The next part delves into ports and links providing detailed information about infrastructure, main equipment, inter-operability, connection with road and rail, and good governance.

While the document provides a comprehensive and detailed picture, the following highlights help build up the context of waterborne transport in the Balkans.

First, Balkans waterways and ports serve more than one country. Ports are gravitational centers while links are connecting vectors that bring together people, businesses and administrations in a daily basis. The ports are millennial, and the waterborne links run through historical routes embedding the history into daily operations. As such, waterborne connectivity provides the perfect example of cross-border and regional cooperation in the Balkans peninsula.

Balkans ports and waterways are well integrated into regional, EU and world-wide sectoral and other waterborne specialized cooperation frameworks and/or structures. By its very nature, together with airborne connectivity, waterborne transport governance is one of the most internationally connected in all aspects: legal, policy-making, technical, safety, and even managment.

Throughout the region we observe a pressing need for investments in infrastructure, especially with regard to the Green Transition. But while EU ports can rely on the EU funds, the SEE6 ones are calling on private funding and / or loans from international financial institutions (IFI). Added to the need to move towards inter-operability and inter-mobility, the Green Transition requirements as well as the mitigation of the climate change impact, will put many ports in front of huge financing needs.

The legal framework, especially the technical standards are harmonized or in the way of being harmonized with the EU legislation. National policy-making mirrors EU regulations, while good governance rules are also built up based on EU standards. Here an irreplaceable role is played by the Transport Permanent Secretariat.

Finally, the war in Ukraine has brought the waterborne transport to the fore. Landlocked countries in the region such as Kosovo or North Macedonia have doubled their efforts to be linked with waterborne nodes, and / or develop dry ports facilities in their own territory.

The project has been coordinated by Ardian Hackaj CDI, in close cooperation with Norbert Beckmann-Dierkes, KAS Belgrade and Tobias Ruettershoff, KAS Tirana.

For each country covered, a national expert specialized on Maritime and Inland Waterways has prepared the country profile based on a shared methodology underlining the importance of compliance indicators. EU member states of Bulgaria, Greece and Croatia have been covered through a slightly different methodological angle. The paper concludes with an oversight of the European Union policy in the Balkans in the Waterborne sector. Special thanks go to the Transport Permanent Secretariat for its support and guidance during all the stages of this paper.

Ardian Hackaj
Coordinator of Tirana Connectivity Forum
Director of Research at Cooperation & Development Institute

Albania

Elson Thana

Contents

With its maritime façade, Albania provides a main maritime node in the South Adriatic. Among its main ports the most important by far is Durres port. In the map below there is a visual presentation of IWW ports and links in Albania.

Map 1. Main Albanian ports

1. Maritime compliance indicators

- **Connection to rail**

Only Durres Port is connected to the rail network. The railway service is accessible at the Durres Port Eastern Terminal providing 24 hours of active operating system in freight transportation and hauling cargo. Located at the Durres Central Train Station, the Gate Nr. 3 overpass is the recommended itinerary for passengers and tourists bounding the railway platforms to the major maritime gate of the country to Europe and the rest of the world.

- **Connection to road**

Access to all service and processing centers such as seaports, logistics centers, industrial areas and agricultural bases are located along the road network and are supported by the development of their infrastructure connections with the main transport network. All Albanian ports are connected to the road network.

- **Availability of clean fuels**

There are no available facilities in Albanian Ports concerning clean fuels. Durrës Port is currently envisaging to undertake the necessary studies to make available facilities on clean fuels in the actual port and in the same time in the new port in Porto Romano.

- **Availability of discriminatory way and application of transparent charges**

There are no discriminatory charges in the maritime ports of Republic of Albania. The port tariffs of the Albanian are approved with the common legal act of Ministry[1] responsible for the maritime transport and ministry responsible for finance. The same tariffs apply for all port operators without discriminatory use of them.

[1] Article 84 of the law No 9251, dated 08.07.2004 "Maritime Code of Republic of Albania" as amended.

- **Facilities for ship generated waste**

The protection of marine environment from the discharge of waste and cargo residues in the Albanian territory is regulated with the Council of Minister Decision (CMD) no. 1104 -dated of 28.12.2015.

According to this regulation, all vessels calling in Albanian port are obliged to provide 24 hours prior arrival all information regarding the wastes on board of the vessel to the Harbor Master officer.

There are eight active companies providing the Port Reception Facilities services in Albania from out of which three companies operate in Port of Durres. These companies collect wastes defined in MARPOL Annex I, IV, and V. Hazardous operational wastes from MARPOL Annex V, such as batteries and incinerators ashes, are not accepted, as the collectors are not licensed for these types of waste. Furthermore, Albania does not have treatment facilities for these types of wastes.

2. State of Affairs of waterborne transport in Albania

2.1 Durres Port (core)

2.1.1 Traffic data

Passengers

The passengers in port of Durres are embarked and disembarked in the passengers' terminal. The passengers are embarked/disembarked in the Ro-Ro Pax vessels (Ferries) that are involved in the international ferry lines between Durres and Italy (Bari & Ancona). In this terminal are embarked/disembarked the cruise vessels, other touristic boats and pleasure crafts. The table below shows the total number of passengers traveling by ferries and touristic boats.

Table 1. Passenger traffic

Port of Durres	Passengers (embarked & disembarked)				
Year	**2016**	**2017**	**2018**	**2019**	**2020**
Passengers	839.598	879.905	879.905	878.687	311.302

Processing of cargo

Port of Durrës is the main port in Republic of Albania processing of almost 80% of goods imported/exported in Albania, and It also a very important gate for the cargo imported/exported from Kosovo, North Macedonia and Republic of Serbia. Port of Durres processes bulk cargo in the East Terminal and General cargo in Western Terminal.

The table below shows the quantity in thousand tons of bulk and general cargo processed for the last five years:

Table 2. Cargo porcessing

Port of Durres	Processing of Cargo (loaded & unloaded)				
Year	**2016**	**2017**	**2018**	**2019**	**2020**
VolumeTonnes	3.464	3.684	3.615	4.073	3.882

Containers

The container terminal in Port of Durres is the only container processing terminal in Albania. The containers are mainly coming from the container hub ports like Port of Piraeus, Malta and "Gioia Tauro" Italy. The containers

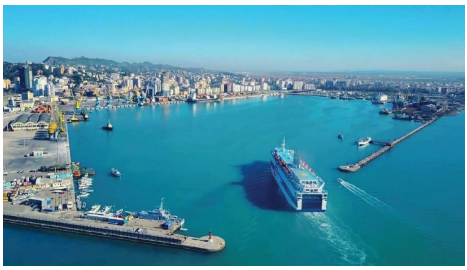
that are unloaded in Albania are mainly for Albania and Kosovo, but also for North Makedonia and Republic of Serbia.

Table 3. Container processing

Port of Durres	Processing of Containers (loaded & unloaded)				
Year	2016	2017	2018	2019	2020
Number	88,181	85,469	96,268	102,134	97,184
TEU	118,828	118,270	134,526	145,762	138,477
Tons (000)	1,578.78	1,480.46	1,501.55	1,727.13	1,549.20

2.1.2 Update on infrastructure

Port infrastructure



Considered as the second city with 2nd higher population and economic importance, served by the largest seaport of the country, Durres sist on the main commercial axis connecting the Balkans to the European Union. Today with the reputation as an attractive city for tourism, Durres is making use city's cultural values and civilization, its' fascinating historical palimpsest and the extraordinary archaeological heritage Durres that make an attractive modern city with unrivalled charm. Located in a flat alluvial plain on the southeastern Adriatic Sea opposite the cities of Bari and Brindisi in Italy, Durres lies mostly between latitudes 41° and 19' N and longitudes 19° and 27'E.

The Port of Durres is located at the north end of the Durres Bay and south of the Adriatic Sea. The port covers an area of 80 ha of which only the basin has an area of 67 ha. The port has a total pier length of about 2,205 meters, including 11 different piers with an individual length varying from 30 ml to 292 ml and a depth ranging from -7.35 m to -11.5 m.

In the port of Durrës ships enter and exit through the canal which has a length of about 6.7 km and a width of up to 115 m.

Albania is a member of the Pan-European Corridor system. The Pan-European Corridor VIII starts from the port of Durrës on the Adriatic Sea in the west of Albania, continues East across Albania; joins the Republic of North Macedonia on the north of Ohrid lake and after joining Skopje continues to Bulgaria. It ends at Varna / Burgas at the Black Sea in the east.

The Port of Durres serves as the Corridor VIII West Gate linking Albania, with Italy and securing flawless access through Puglia ports in Italy to the existing Scandinavian – Mediterranean corridor and to the newly planned Baltic Sea – Adriatic Sea Corridor. Through the Port of Durres, Corridor VIII closes the connections between Three Seas: North Sea, Mediterranean Sea and Black Sea. On the regional scale, the Port of Durres is the main gate of the goods and passengers imported/ exported for Kosovo and North Macedonia.

Port of Durrës is also an important part of the Adriatic and Ionian Highway. While missing from the new draft TEN-T regulation of 2021, the Adriatic-Ionian Highway stretches for 1,550 km along the coast of the Adriatic and Ionian Seas, from Trieste in Italy to Kalamata in Greece. The WBIF awarded a €3,500,000 EU grant for the preparation of the Feasibility Study and associated designs in December 2015. The study is ongoing.[2]

Port of Durrës is the entrance point of the Durrës – Kukës Highway named as A1. The highway is commonly known as "Autostrada Shqipëri – Kosovë" and starts in Port of Durrës, Albania, passes through Kukës, enters Kosovo as R7, and ends in Prishtina, Kosovo. As part of the South-East European Route 7, the highway will connect the Adriatic Sea ports of Durrës and Shëngjin in Albania via Prishtina, with the E75/ Corridor X near Niš, Serbia.

In 2010, the Port of Durrës reorganized its operations towards the specialization of the terminal as below:

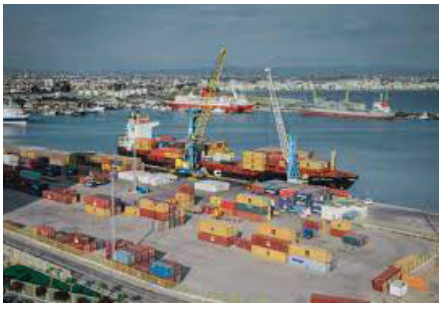
1. Western terminal, including quays 1 to 5 (loads of goods and cereals);
2. Container terminal, at pier 6;
3. Ferry terminal, at pier 9;
4. East terminal, on quays 7, 8, 10 and 11 (bulk cargo).

[2] https://www.wbif.eu/project/PRJ-MULTI-TRA-002

Western Terminal

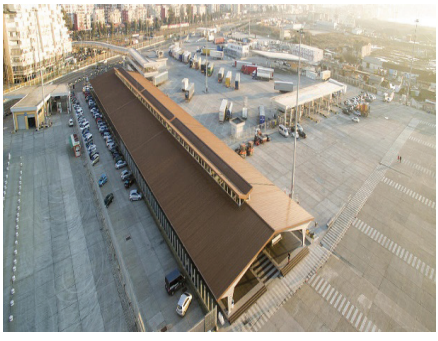
The Western Terminal is under the administration of the Durres Port Authority, a state owned company. It consists of five piers with a total length of 700ml. The depth near the piers is about -7.5m. This terminal processes general and palletized, semi-palletized goods, with bags, cereals, chemicals and heavy loads. Five cranes with a capacity of 5 tons, and two cranes of 120tons and of 60 tons operate in it. In quay one are located five silos with a total capacity of 1,500 tons. Currently the processing capacity of the terminal is about 1,500,000 tons per year.

Container terminal



The container terminal is positioned in front of the port entrance. With a length of 395ml it has a carrying capacity of 4 tons/m^2 and a depth of -9.5m. It operates with two cranes with a capacity of 100 tons and of 150 tons. The square behind the pier is used for container processing and has a total area of 60,682m^2. In recent years, there has been a constant increase in processing volumes at the terminal. In 2016 it has reached up to 120,000 TEU with a constant annual growth of 7% and with the record in 2019 with more than 145,000 TEU.

Ferry terminal



Pursuant to the concession contract, the German-owned company named Albanian Ferry Terminal Operator operates this terminal since 2013. This pier has a length of 580ml and a depth that goes up to -10m. In optimal conditions in

this pier can accommodate up to four ferries at a time. The surface of the square that accompanies the terminal is 87,000 m^2.

The processing peak in this terminal was reached in 2019, when 878,678 motor vehicles of which about 100,000 were trucks and about 260,000 passengers were processed.

Eastern Terminals

The Eastern terminal is operated by a German company named EMS – Albanian Port Operator (EMS-APO) implementing a concession contract concluded in 2013. In this terminal are processed cargo ships mainly with bulk cargo. The quay has a length of 442 ml with a depth of up to -10m. In this quay, operate five cranes with a capacity that varies between 15 to 27 tons. This terminal has a processing capacity of 1.8 million tons per year but currently uses about 45% of capacity because of the EU strict rules that cargo posing danger to the environment must be transported in close containers.

This terminal reached the largest processing capacity in 2017 when it processed about 740,000 tons. In the following years, there has been a progressive decline in commodity processing.

2.1.3 Railway Connection

Durres Port is connected by railway to the national railway network and its local lines. This is an alternative and additional mode of transportation for stakeholders, port operators and potential maritime shippers to benefit from the efficiency, cost reduction and facilities at their disposal by the port-rail access when planning and scheduling their cargo traffic. The railway service is accessible at the Durres Port Eastern Terminal providing 24 hours of active operating system in freight transportation and hauling cargo. Located at the Durres Central Train Station, Gate No 3 overpass is the recommended itinerary for passengers and tourists bounding the railway platforms to the major maritime gate of the country to Europe and the rest of the world.

2.1.4 VTMIS and clean fuel availability

There is no VTMIS system operable in Port of Durres.

The establishment of the VTMIS in Albania is planned to be financed soon according to the Loan Agreement between the Republic of Albania and IBRD for the Project on Facilitation of Trade and Transport in Western Balkans. The Loan Agreement has been ratified with the Law No 62/2019 of 19.09.2019 "On the ratification of the loan agreement between the Republic of Albania and the International Bank for Reconstruction and Development for the Western Balkans Trade and Transport Facilitation Project Using the Multiphase Programmatic Approach".

Following its ratification, and the establishment of the project implementation unit (PIU) the Feasibility Study for the establishment of the VTMIS was drafted, completed and approved in September 2021.

The second stage – tender procedure for "Review of the Implementation plan for the VTMIS System, Detailed Design and Technical Specifications aligned with the recommendations from the Feasibility Study and Supervision of the Provision, Installation and Commissioning of ITS Equipment" me No. Ref. WBTTF-ALB-211B is in process, and foreseen to be completed with the completion of the overall project in 2024.

The third and final phase of purchase of the VTMIS equipment and establishment of the system will start in September 2022 and is foreseen to be operational on 2024

Regarding clean fuel availability in Durres Port Terminals there are no such equipment and facilities. With the growing importance of the implementation of the MARPOL Annex VI and the strategy of EU for the reduction of GHG emission from ships up to 50% up to 2030 and 80% up to 2050 Port of Durres, in cooperation with Center of Excellence (CEMA), Ministries responsible for maritime transport (MIE) and Ministry responsible for Environment (MTM) are working on starting some analysis feasibility studies for the establishment of clean fuel facilities in Port of Durres and in Porto Romano.

2.1.5 Governance

Durres Port is a legal entity administered by the Durres Port Authority (DPA)

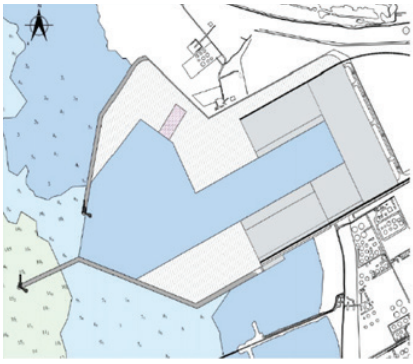
Durres Port Authority Governing Bodies consist of:

1. The Governing Council; and
2. The Executive Board headed by the Chief Executive Officer in the leading position of the main governing actor operating at the center stage level regarding daily port governance configuration.

2.2 Integrated Port of Porto Romano

With Decision no. 1, dated 14.20.2020 The National Council of the Territory approved the National Sectoral Plan of Maritime Transport and Port Infrastructure, which contains:[3]

a. Sectoral strategy accompanied by sectoral and territorial analysis, vision and strategic objectives; and
b. Sector development plan, proposals for territorial designations, action plan and plan regulation.[4]



The strategy proposes that the port area of the port of Durres and the port of Porto Romano will become strategic seaports of Albania. In the same time, the Port of Durres will be transformed into a passenger and tourist port, and will to accommodate cruise ships and pleasure crafts, while the processing of goods will be transferred to the new port in Porto Romano.

In accordance with the decision of Council and the provisions of the "National Sectoral Plan of Maritime Transport and Port Infrastructure" for the development of port infrastructure in Durrës and Porto Romano, Durrës Port Authority (APD) implemented the necessary measures to draft the Master Plan of the port areas Durrës - Porto Romano following a three-stage planning methodology.[5]

[3] https://planifikimi.gov.al/index.php?id=1120

[4] https://planifikimi.gov.al/index.php?eID=dumpFile&t=f&f=5958&token=d-8c693ddf0f1dff6faf413a7ebc78a520595c2c8

[5] https://shqiptarja.com/Ripostiglio/oggetti/202106/60c21ca0eb16b5%20Shtoj-ca%20Masterplan%20Shqip.pdf

Phase 1 involves the development of a Master Plan for the Construction, Improvement and Expansion of Porto Romano infrastructure, aiming at the creation of a new Cargo Port with the functions of an integrated logistics hub.

Phase 2 is dedicated to updating the Master Plan of the Urban Port Area in Durrës, providing for the transformation of the current Port of Goods into a port facility for passenger transport.

Phase 3 envisages the expansion of the Port Infrastructure in Porto Romano and the interconnection of the new terminals with intermodal transport (rail and land logistics terminals).[6]

During the last few months the Master Plan for the Construction, Improvement and Expansion of Porto Romano infrastructure has been completed. Currently the Detailed Design is under preparation by Royal Haskoning[7], a Dutch engineering company.

According to the first draft of this document, it is important to mention two important points:

The first important point is that the project of the new port in Porto Romano will be designed to fulfil the parameters required to be classified as a:

- world class, technologically advanced and efficient deep water, multipurpose port that handles seaborne cargo for Albania and the wider region in a sustainable manner;
- center for logistic and port related commercial development in the area of Durres and Tirana, and a hub for hinterland transit cargoes;
- accelerator for Albania's national market connectivity, competitiveness and socio-economic growth potential.

[6] Decision of National Council for the Territory No 1, dated 14.10.2020, article 4 https://planifikimi.gov.al/index.php?eID=dumpFile&t=f&f=5546&token=696fa-665559c35af916463cb508c6bf1d9ff0152

[7] https://www.durresport.al/index.php/2022/02/28/apd-hartimi-i-projektit-te-de-tajuar-teknik-te-portit-te-ri-tregtar-ne-porto-romano-ben-bashke-institucionet-publike-dhe-grupet-e-interesit-28-shkurt-2022/

The construction of the new port will include:

- construction of the breakwater for sheltered port operations;
- construction of the infrastructure for liquid bulk;
- construction of the automated Container Terminal with the capacity of non-less than 500,000 TEU;
- construction of the Ro-Ro terminal.

The second important point of this project is the planning for the construction of the "Durres Dry Port in Prishtina". This terminal in Prishtina, Kosovo will be used for the transfer of the cargo from port of Durrës with destination Kosovo and / or other destinations in the region.

The integrated Port of Durrës – Porto Romano will be the center of logistic and port related commercial activities in Albania and has the potential to become the gateway to the West of South Europe Six region. The development of the port offers a great opportunity for Albania in terms of national and regional market connectivity and socio-economic growth.

Lastly, in May 2021 the Port of Durres, Cooperation & Development Institute in Tirana and University Aleksander Moisiu in Durres, supported by the Ministry of Infrastructure and Energy and by Transport Permanent Secretariat established the Center of Excellence in Maritime Affairs (CEMA). Being a unique initiative in the region, CEMA's goal is to be the point of reference for capacity building, applied research and innovative practices impacting maritime affairs in the Western Balkans[8].

2.3 Port of Vlora (comprehensive)

2.3.1 Traffic data

Passengers [9]

The traffic of passengers can be observed below:

[8] https://www.durresport.al/index.php/cema/

[9] http://www.instat.gov.al/al/temat/industria-tregtia-dhe-sh%C3%ABrbimet/trans-porti-aksidentet-dhe-karakteristikat-e-mjeteve-rrugore/#tab2

Table 4. Passenger traffic

Port of Vlora	Passengers (embarked & disembarked)				
Year	**2016**	**2017**	**2018**	**2019**	**2020**
Passengers	198,079	184,917	186,043	179,220	62,193

Processing of cargo

Table 5. Cargo processing

Port of Vlora	Processing of Cargo (loaded & unloaded)				
Year	**2016**	**2017**	**2018**	**2019**	**2020**
Volume (000 ton)	54.61	75.84	34.77	53.99	102.48

Port of Vlora has no container processing facilities.

2.3.2 Infrastructure

Vlora Seaport is the second most important port in Albania, located about 90 km south of the port of Durres and is defined as the second port of entry of Corridor VIII.

This port receives passengers and goods covering about 10% of import-export goods. Every day ferries depart from this port to Italy, as the sea distance between them is only 72 km.

The processing capacity of the port of Vlora reaches up to 600 thousand tons per year.

The port of Vlora as well as the port of Durrës are part, of the VIII Pan European corridor. Together they will withstand the volumes of cargo and passengers that will depart at the ports of Bari and Brindisi, will pass through the Albanian ports of Durres and Vlora and will end at the Bulgarian ports of Bourgas and Varna.

The port of Vlora is located in the bay of Vlora and has a total area of 5.3ha, with an aquarium of 5ha. The Port of Vlora has two quays.[10]

The Eastern quay

The Eastern Quay that was built in 1973 has a length of 339ml and has a depth of up to -10.5m where boats weighing up to 6,000 tons can be processed.

The Eastern Quay is used to load / unload bulk cargo. Ships must be self-loading as there are no loading / unloading facilities (cranes etc.). Currently during the summer season, this pier is used to process tourist boats that make daily trips within the bay of Vlora to the island of Sazan.

This pier offers a service length of 360 ml of which 180 ml inner side and 180 ml outer side.

The Western quay

The Western Quay that has been substantially reconstructed during the last 5 years, is mainly used to process passenger ships and Ro-Ro vessels for the transport of passengers and / or vehicles. Traffic is divided between trucks, cars and passengers. Ro-Ro ferries process passengers and vehicles through the last part of the ship by lowering their ramps over the quay.

This quay has sufficient capacities to process up to three Ro - Ro ferries simultaneously, despite the fact that the road infrastructure on the quay, although recently reconstructed, does not allow the passage of more than two parallel cars.

The western quay has a length of 330ml and is usable only on the inner side of the quay as the outer side serves as a breakwater. The

[10] https://www.portivlore.com/

maximum depth is -9m at the head of the quay that is decreasing towards the ground.

With Decision no. 1, dated 14.20.2020 The National Council of the Territory approved the National Sectoral Plan of Maritime Transport and Port Infrastructure, which contains:

a. Sectoral strategy accompanied by sectoral and territorial analysis, vision and strategic objectives; and
b. Sector development plan, proposals for territorial designations, action plan and plan regulation.

A novelty of this strategy is the return of the Port of Vlora from a port for the processing of passengers and goods to a tourist port for the processing of tourist pleasure vehicles. The processing of passengers and goods will be transferred to the integrated Port of "Three ports" only 10 km north of Vlora.

There is no connection of Port of Vlora with rail infrastructure.

Following the Decision no. 1 dated 14.10.2020 converting the Port of Vlora into a touristic port, the tender procedures are finished and with the Council of Ministers Decision no 498, dated 30.07.2021 is approved the Contract of concession for the touristic port of Vlora.

All the services for the processing of cargo and passengers will be transferred to Integrated Port of Triport in Vlora.[11]

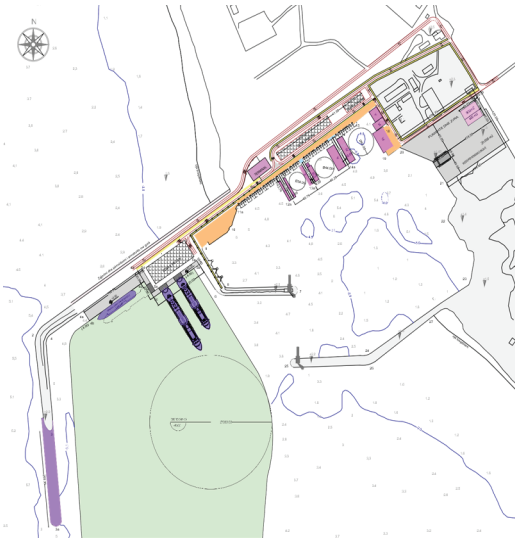
2.3.3 Governance

The Vlora Seaport exercises its economic-administrative activity as a joint company with sole state ownership.

2.4 Integrated Port of Triport Vlorë

According to the map attached to the Decision no. 1 dated 14.10.2020 The National Council of the Territory has approved the National Sectoral Plan for Maritime Transport and Port Infrastructure, it is foreseen that all the commercial activity that is currently exercised

[11] Decision of National Council for the Territory No 1, dated 14.10.2020, article 5 https://planifikimi.gov.al/index.php?eID=dumpFile&t=f&f=5546&token=696fa-665559c35af916463cb508c6bf1d9ff0152



in the Seaport of Vlora will be transferred to the fishing port - Triport, Vlora. The port will be called the Integrated Port of Vlora and will have the functions for fishing processing, passengers / passengers, goods / logistics, hydrocarbures.

For the implementation of the decision of KKT, the current Port of Vlora, will be transferred to Triport, where there is a possibility of expansion, to increase capacity and to accommodate support functions. The Port will also serve as the southwestern gate of Corridor 8, not only as a transport corridor but also for energy.

In addition to the current functions for logistics, passengers / passengers, fishing goods and oil, its expansion to Triport will be supplemented with other functions to serve:

1. as a port logistics area
2. with a markato space

The area where this structure is located (Fishery Port) is an industrial area. A significant part of the necessary port structure is currently existing, significantly reducing costs in relation to the option of building a totally new port.

After the port will be operable, Government of Albania is planning to start the physical works in order to connect this port with the rail infrastructure.

Port of Triport is privately owned by “Vlora Harbour Construction and Maintenance” SHPK (NUIS M 21806032 P).

2.5 Port of Saranda

2.5.1 Traffic data[12]

Passengers

Table 6. Passenger traffic

Port of Saranda	Passengers (embarked & disembarked)				
Year	**2016**	**2017**	**2018**	**2019**	**2020**
Passengers	251,311	442,119	482,216	516,188	5,589

Processing of cargo

Table 7. Cargo processing

Port of Saranda	Processing of Cargo (loaded & unloaded)				
Year	**2016**	**2017**	**2018**	**2019**	**2020**
Volume (000 ton)	8.39	13.62	39.30	100.63	58.72

2.5.2 Infrastructure

The port of Saranda is located in the northeastern part of the bay of Saranda. The geographical position lies at the coordinates 39 ° 53 ' 15" N and 20 ° 00' 11" E.

In the period before the 1990s, port of Saranda has served mainly for domestic transport of goods. This port has its specifics that make it distinctive and more oriented towards the region, especially the cross-border area.

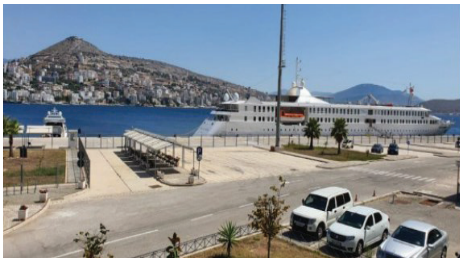
[12] http://porti-sarande.al/statistika/

During the 90s and after, the Port of Saranda has developed its activity in the city port of Limion. In this maritime infrastructure are processed bulk goods and general cargo with directions to the northern area and other ports of the country. It is worth noting that in this period this port has occupied the first place in terms of loading and unloading activity in coastal transport.[13] This port is a tourist port for the reason that of the total processed passengers; about 90% of them are tourists. The port consists of two main piers:

Passenger quay (Ro-Ro quay)

This Quay has a length of 50 ml and the depth of the basin at the beginning of the pier is 3.5 m - 4 m. In this pier are processed passenger and vehicle ferries on the regular line Saranda-Corfu-Saranda. Up to 4 ferries can also be accommodated in the vertical position. Passenger quay is the largest quay of the port of Saranda and processes almost 80% of all passengers. The RoRo quay consists of the line RoRo quay, the pleasure boats aquarium and the Border Police aquarium.[14]

Cruiser terminal



Cruise terminal is the quay for the process of cruiser ships with a length of 180 ml and a depth of -9 m. Tourist ferries with a length of 100 m to 210 m are processed at this quay. During the tourist season it happens that ferries of the "dolphin" type are processed as well, for the reason that this quay meets the depth parameters for these types of ferries. The purpose of this investment has been in direct line with the intention of the Albanian Government for the development of tourism, aiming for the port of Saranda to be the first port in Albania focused and adapted for cruise ships.

[13] http://porti-sarande.al/te-dhena-territoriale/

[14] http://porti-sarande.al/te-dhena-territoriale/

The Limion port is operated under a concession contract by "Marina Limion" ShPK (NUIS L 94602803 N).

The construction of the new quay for cruise ships together with the port infrastructure according to European security standards have made the port of Saranda even more attractive for cruise line management companies.

The cruise quay has a length of 180ml and can process cruise ships up to 200 meters long.

This investment on the other hand has made necessary the construction of the port of Limjon, which will serve for the loading and unloading of cargo ships.

There is no connection with the rail of the Saranda and Limion ports. The road infrastructure is efficient for the actual amount of passengers and cargo processed in this port.

2.6 Port of Shengjin

2.6.1 Traffic data

Processing of cargo

Table 8. Cargo processing

Port of Shengjin	Processing of Cargo (loaded & unloaded)				
Year	2016	2017	2018	2019	2020
Volume (000 ton)	228.86	248.33	200.82	227.88	233.36

2.6.2 Infrastructure

Shengjin Seaport is located in the northern part of the Republic of Albania, and is the only port in this area. The geographical position lies at the coordinates 41° 49.0 'N019° 36.0' E

The port of Shengjin dates back very early in history as a harbor known by different names

according to the city where it is located. Shengjin is a satellite town of Lezha 8 km northwest, on the Adriatic coast. Julius Caesar, in the work "Civil War" mentions the name of this port as "Nymfeum".

After the 90s, due to favorable geographical position, importance was paid to the development of this port, in order to cope with the development of the entire northern area and beyond. Thus the volume of goods processing in this port is increased, compared to the 2000s.

The port of Shengjin is a port where ships enter and exit through the canal. The length of the canal is 700 meters and the depth is 7.5 meters. The port of Shengjin consists of a quay with a length of 80 meters and a quay with a length of 70 meters. The total length of the piers is about 250 meters. The quay of the port of Shengjin is mainly used for cargo ships and the quay next to it is intended for ferries. The processing capacity of the port of Shengjin is up to 350 thousand tons per year. Because of the poor infrastructure this port is mainly used for the local companies and very little for companies from Kosovo. [15]

This port is not connected with railway infrastructure. The closest railway line (Durrës – Montenegro) is 15 km from the port. The main connection of this port is with road infrastructure.

2.7 PIA - La Petrolifera Italo Albanese

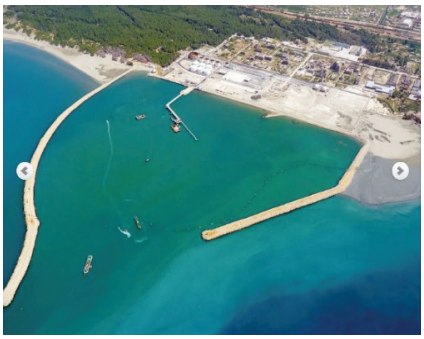
La Petrolifera Italo Albanese Sh.A. (PIA) operates a coastal terminal for LPG (Liquefied Petroleum Gases), Oil, it's by-products (Diesel, Gasoline etc.) and additional liquid and dry products in the Bay of Vlora, at circa 12 km North from the Port of Vlora.

The coastal terminal allows customers to supply both the Albanian market and the neigh-boring Countries through the trace of European Corridor VIII taking advantage of the favorable location of the bay of Vlora, located at the entrance of the Adriatic Sea and very close to the main Italian and Greek refineries. Its total storage capacity is 75,100 cbm (tanks) and 4,800 cbm (spheres).[16] PIA has 13 tanks and 2 spheres

[15] https://www.searates.com/port/shengjin_al

[16] https://www.gruppopir.com/en/documenti-pia/162-scheda-pia/file

with the range of tank capacity 3,300 - 14,500 cbm (tanks) 2,400 cbm (spheres).



The terminal can accommodate oil tankers up to 190 m and has no beam restriction. The depth of the terminal is -10 m (32,8 ft)[17]

La Petrolifera Italo-Albanese is a privately-owned entity.

2.8 Ports in the bay of Porto Romano

The Albanian Government designated an area 10 km north of Durrës in the bay of Romano Port to be the new location for the storage of oil products and LPG.

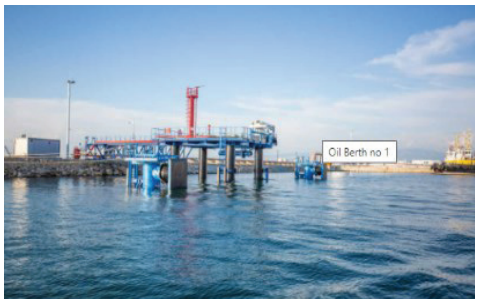
In this bay there are currently constructed and operating two oil terminals "Romano Port sh.a" and "MBM Port". In the same time with the latest updates in this bay is planned to be constructed Integrated Port of Porto Romano mentioned above.

2.8.1 Multy Buoy Mooring (MBM) Terminal

With the law no. 104/2015 dated 23.09.2015 it was approved the concession contract in the form "BOT" (construction, use and transfer) of an MBM port in Porto Romano, Durrës, concluded between the Ministry of Transport and Infrastructure and the concession company Port MBM. The object of this contract is the loading and unloading of vessels that transport hydrocarbons of sizes over 20,000 tons and with diving depth up to 8 (eight) meters.

Later with the law no. 58/2020 "On the approval of the amendments to the concession contract in the form of "BOT" (Build, Operate and transfer) of a port of MBM type in Porto-Romano, Durrës, as amended, amendments of this concession contract have been made allowing

[17] https://www.gruppopir.com/en/la-petroliera-italo-albanese



for the MBM Port in addition to hydrocarbons to process also ships transporting other goods.

This investment is only 6 km from the actual port of Durrës and close by with Romano Port terminal and the territory where is planned the development by Integrated Port of Durres - Porto Romano. This terminal increases the ability of Albanian private operators to realize imports, exports of oil products. Adding to the destinations of Albanian ports that handle hydrocarbons (such as the oil tanker near Vlora, in Romano Port and in Shengjin), the Multi Buoy Mooring will be the only one which have a capacity of over 20,000 tons of hydrocarbons, reaching the anchoring depth of these buoys at a depth of about 20 meters. This will lower the unit price for oil and its by-products.

MBM Terminal is operated by MBM – Shoqeria Koncesionare "Porti MBM" Porto Romano, (NUIS – L 51621501 S).

2.8.2 Romano Port sh.a

Romano Port Oil Terminal (RPOT) is 6.5 km north of the city of Durrës. The contract for the construction and use of this terminal was approved by law No. 9298, dated 28.10.2004 On the ratification of the Concession Agreement, in the form of "BOT" (construction, use, transfer), for the construction and use of the oil pond, gas and their by-products in the coastal area of Porto-Romano, Durrës amended by law no. 9578, dated 11.7.2006.

The terminal can process maximum ship capacities and proper operation of 9,000 Tons of LPG as well as 12,000 Tons of oil.

The assembly site of the facility is located inside the approved construction site with an area of 6,000 m^2 of land and 42,000 m^2 of sea. The length of the port is 1,100 ml with a discharge depth of 11.7 meters. RPOT is operated by Romano Port ShA (Pirro Bare).

2.9 Inland Water Way Transport

2.9.1 Transport in Shkodra lake

The Shkodra Lake is navigable in accordance with the Agreement between the Government of the Republic of Albania and the Government of the Republic of Montenegro on establishing the international Lake Passengers' Line Shkodër – Virpazar ratified with the Law No 9319 of 25.11.2004.

This agreement was followed by an active connection line for transport of passengers mainly during the summer season. Later on due to upgrade to the road connection between these two countries and amortization of the berthing infrastructure, the passenger traffic by ferry was decreased, making this ferry line economically not feasible.

Because of not being used for a long time, the berthing place in city of Shkodra needs maintenance.

2.9.2 Transport in Pogradec lake

Ohrid Lake is navigable only during touristic session in accordance with the Agreement between the Government of the Republic of Albania and the Government of the Republic of Macedonia on establishing the international Lake Passengers' Line Pogradec – Ohrid approved with the Decision of Council of Ministers No 526 of 14.11.1999.

This passenger line is active during the summer season.

3. Other

- **Impact of climate change**

GHG emissions from the industrial sector in Albania are small compared to other sectors. Therefore, no explicit measures are anticipated for their reduction. The GHG emissions baseline scenario without mitigation measures anticipates growth in the industrial sector. Emissions of CO_2 are expected to grow.

In recent years, Albania has adopted laws for environmental and air protection.

Steps have been taken to improve the implementation of the legal framework and to increase the frequency of air quality monitoring. This will help to determine in more detail the situation regarding meeting the emission targets and environmental quality standards and also in identifying investment needed to overcome the problems.

With the law no 9/2020 Republic of Albania ratified the Annex VI of MARPOL convention which provides rules for the protection of air from the emission of gases from the combustion of fuels by ships.

Albania ratified the Protocol for Pollutant Release and Transfer Registers (PRTR), Aarhus Convention, in June 2006. In October 2005, Albania joined the Convention on Long-range Transboundary Air Pollution, United Nations Economic Commission for Europe (UNECE).

Albania is in the process of preparing an Integrated system registry of pollutant release and transfer under the PRTR Protocol and is in the process of preparing for assessment of atmospheric emissions of major pollutants, based on Law No 8897 of 16 May 2002 on air protection.

Albania has been prioritising measures to align national air quality legislation with EU policies and has fully transposed the EU Directive 2008/50/EC into national law by the adoption of law no.162/2014 "On protection the ambient air quality" and DCM No. 352 dated 29.04.2015 "On air quality assessments and requirements concerning certain pollutants" that prescribes reference methods for air quality assessment. On 21 March 2007 Decision 147, governing the sulphur content in fuels, was adopted. Decision 147 limited the sulphur content of fuels to 10 ppm, aligned with the EU standards.

- **Impact of conflict in Ukraine**

Beyond the suffering and humanitarian crisis from conflict in Ukraine, the entire global economy feels the effects of slower growth and faster inflation.

A part of general impact this conflict has a major impact in waterborne transport. The higher prices for necessities like oil, food and energy will is pushing up inflation further, in turn eroding the value of incomes and weighing on demand. The price of the bunkering oil is increased

almost 100% and it put in difficulty the shipowners and it influences the costs of maritime transport.

Secondly, Ukraine was one of the biggest export of grain, corn, and iron and Albania is a direct exporter of these goods. Almost 80% of the grain and corn in Albania was imported from Ukraine. After the conflict, the number of the ships coming in Albanian ports importing these goods is almost zero causing a loss of incomes at ports.

Third, even Albania is not a direct dependent in energy from the parties in conflict the increasing price of international energy market is influencing directly in the costs of shipping industry reducing the frequency of the shipping transport of goods and the number of ships accessing in Albanian ports.

Fourth, waterborne tourism, up to now the number of tourist coming with cruise lines is increased compared with the last two years during the pandemic period and in the same level with 2019. In present Albanian administration is taking all necessary measures for tourism coming from the sea by pleasure boats and yachts.

Montenegro

Djordje OTASEVIC

Contents

1. Current State of Affairs

Montenegro covers an area of about 13,812 km^2 and borders with Albania, Serbia, Kosovo, Bosnia and Herzegovina and with Croatia in the southwest. Montenegro faces the Adriatic Sea and has a 293.5 km long coastline. With 620,739 inhabitants, Montenegro has a diverse topography consisting of high mountain massifs (Orjen, Lovćen, Rumija, Bjelasica, Komovi, Durmitor, Prokletije, etc.), valleys (Zetska, Grbaljska, Bjelopavlićka, etc.) intersected by many rivers that make canyons (Morača, Lim, Tara, Ćehotina, etc.).

This distribution of topography and the influence of climatic factors is costly for the construction and maintenance of traffic infrastructure. Over 55% of the total area of Montenegro is over 1,000 m above sea level, and about 24% of the total area of the country is on a slope of more than 30% gradient, which offers a complex and difficult framework for the construction and maintenance of traffic infrastructure.

Podgorica is the capital, the largest city, the economic and administrative center of Montenegro, and the main traffic hub of the country.

Transport is an important industry that has a major impact on the functioning of Montenegro's economy and at the same time is essential to Montenegro's economic growth and prosperity.

An insufficiently developed road network, the state of infrastructure in the railway sector, requirements for more efficient operation of airports and poor utilization of the capacity and the poor interlinkage of the Port of Bar, are the main challenges that the transport sector faces.

The weak transport connection of Montenegro with the neighboring countries, insufficient availability of experienced staff, insufficient investment in research and development activities, are additional constraints for improving the market position of companies providing transport services.

In this context the waterborne transport constitutes a huge opportunity for the Balkan country.

1.1 Roads

Within the total road network - 6,848 km - there are 312 bridges and 136 tunnels. Such a large number of road facilities is a direct consequence of an unfavorable topography. Over 66% of regional and main roads are older than 25 years. Maintaining the road network is hampered by the fact that many roads have never been brought to engineering design standards, as well as the fact that there are extremely large falls and ascents that are especially problematic in winter.

Map no.1 Network of main and regional roads

In the last 15 years, the road infrastructure was improved, the most urgent critical points were removed and repaired, and the level of traffic safety on state roads was raised.

1.2 Railways

The length of the total railways in Montenegro is 250 km, with station tracks about 330 km, of which 167.4 km or 67.34% is electrified. During the past period of 10 years, there has been a drastic decline in passenger traffic, especially freight traffic. On about 50% of the total railway network, speeds of more than 50 km per hour are not allowed.

Map no.2 Overview of the railway network in Montenegro

The Bar - Vrbnica railway line, which continues towards Belgrade, is the traffic infrastructure facility in Montenegro with the greatest international significance. The 168 km long railway has 106 tunnels, 107 bridges, 9 galleries and 371 culverts, i.e. about 37% of the railway are on engineering structures. From the point of view of maintenance,

this makes it the most demanding and expensive railway in Europe (11,800,000 EUR/year should be spent for regular maintenance, which has not been the case so far. In recent years, between 3,000,000 and 7,000,000 million euros have been spent on its maintenance). There are 12 locations on the line where traffic is run at a reduced speed due to safety reasons, so the total average speed of trains on the line has been reduced from the projected 70 km/h to 55 km/h.

1.3. European Transport Corridors in Montenegro

Montenegro's major trade routes are those leading to Serbia, Croatia and Bosnia & Herzegovina; main land trade corridors are those connecting the port of Bar with the country's capital (Podgorica) and the border with Serbia, and the coastal corridor leading to Croatia and Bosnia & Herzegovina in the North, and Albania in the South.

Core transport network in the Western Balkan region is now encompassed in the extension of three key trans-European transport corridors to the Western Balkans region: Mediterranean, Orient/East-Med and Rhine-Danube corridor. In line with ETC Regulation of 14 Dec. 2021 it is proposed for a new corridor extension, named "Western Balkan corridor.

Map no.3 Indicative Western Balkan Trans-European Transport Corridors (TEN-T) for Montenegro

Source: SEETO

Bar-Boljare motorway corridor constitutes the basic connection in the north-south direction, and it also provides the appropriate connections between Serbia, Bosnia and Herzegovina and the only one for Albania through the core corridor network system. The connection of Bar with the TEN-T Corridor X (which passes through Serbia), i.e. the Bar-Belgrade motorway, not only is the strategic orientation of Montenegro for connecting with Central Europe, but also represents a direction that has special significance for the Port of Bar and the overall economic development Montenegro.

Development of the Adriatic-Ionian corridor is also of great importance, as will connect Montenegro with Central and Western Europe, as well as enable a stronger development of seaports in several countries. This corridor should contribute to significantly greater integration of the Montenegrin territory, and to usher a connection to the regional and European road network. In the absence of the Adriatic-Ionian motorway from the WB ETC, Bar-Bojlare becomes the only such link that makes tourist destinations on the coast more accessible, including the central region for domestic tourists, and for all those from the European countries.

2. Port infrastructure and waterways

2.1 Background

Montenegro strives to encourage the development of combined and multimodal transport, providing financial and economic incentives for combined transport, mainly through support for rail and liner shipping.

The current traffic is composed by international maritime traffic: Port of Bar, port of Kotor, port of Budva, and in ports for domestic maritime traffic, marinas, and moorings on the coast.

The total length of the waterway in the coastal zone of Montenegro is 122.2 km, which is the distance between the end ports on this zone from St. Nikola (Bojana estuary) to Kotor. Of the total length, the open sea participates with 92.6 km while the length of the waterway in the Bay of Kotor is 29.6 km.

Map no. 4 Locations of the most important seaports in Montenegro

Sea waterways within Montenegro are maintained in accordance with international conventions and standards through the Administration for Maritime Safety and Port Management. This Department is financed by fees for the use of waterways paid by their users, as well as by the revenues of the Technical Inspectorate related to the issuance of the necessary certificates for vessels. In addition to the maintenance of waterways and search and rescue functions, the Administration for Maritime Safety and Port Management includes a number of other functions such as protection of the sea from pollution by ships and the development of hydrographic activity (i.e. after its takeover by the Military Hydrographic Institute).

Within the Ministry of Capital Investments, there are two port authorities in Kotor (Kotor Port authorities with branches in Herceg Novi, Zelenika, Tivat) and in Bar, (with branches in Budva, Ulcinj and Virpazar). Their purpose is inspection and supervision of maritime and inland waterways transport and safety and security at sea. They oversee the implementation of domestic legal acts and international conventions ratified by Montenegro. Currently the Harbor Master's Offices in Bar and Kotor are not able yet to meet all the requirements

of supervision and inspection at sea, primarily due to the lack of vessels and inadequate equipment.

The most important port in Montenegro is the Port of Bar, where about 95% of all port activities of the country are performed. Founded in 1906, the Port of Bar has been gaining the necessary business experience for more than a century and building partnerships with its clients, ensuring a constant presence on the market. It is located at the very entrance to the Adriatic, at 976 nautical miles (nm) to the Suez Canal and 1,190 nm to Gibraltar. The Port of Bar has significant comparative advantages over the ports of the North Adriatic, shortening transport times and creating savings in maritime transport costs for target destinations in Serbia, Hungary and the western part of BiH. Its integration with the railway system (Belgrade - Bar railway) and the road network characterizes the Port as a significant link in the intermodal transport chain.

In addition to the port of Bar, Montenegro also has the port of Kotor which is exclusively for passenger and touristic purposes. The port realizes 100% of cruise and 84% of nautical ship traffic in Montenegro. For a number of years, operator of the Port of Kotor has been Port of Kotor JSC whose majority of capital is under the ownership of the municipality of Kotor, and its main activity is passenger traffic from ships for cruise travels via cruisers ships.

The Port of Zelenika (Located at Municipality Herceg Novi part of Boka Bay) and the Port of Risan (Located in Boka Bay as part of Municipality Kotor) have a much narrower range of services that they can provide, compared to the Port of Bar. Expanding their range of services would require investments that they cannot cover from their own revenues. The justification of the investment should be checked before taking steps in that direction.

The Port of Zelenika is registered as a freight port but its infrastructure can support only minor volume services.

The port of Budva also has the status of an international port primarily for nautical vessels.

Additional to the ports, there are several marinas on the Montenegrin coast where the most important are: “Sveti Nikola” in Bar, marina in Budva, “Kaliman” in Tivat, port of Kotor, “Kordić” in Prčanj, city port in Herceg Novi, port of Meljine and mooring in Risan.

The development of water transport on Skadar Lake has been neglected for decades and left to the initiative of the people living in the region. Until ten years ago, their interests were based exclusively on fishing, so water transport was limited to the use of traditional boats – čunovi.

2.2 Port of Bar

The Port of Bar, as practically the only trading port in Montenegro through which 95% of maritime traffic takes place, has the capacities and development potentials that determine its great regional importance and role in the development of blue highways (sea highways). As a modern seaport for transshipment of all types of cargo, it offers great opportunities for further development of combined transport and for connecting the entire region.

Port of Bar JSC possesses: (a) Grain Terminal, with a 30,000 t capacity silo and a 250 m long closed transport conveyor belt running parallel and directly along the railway lines, designed for loading/unloading of grain to/from the silo; (b) a General Cargo terminal with closed storage and cold storage areas; (c) a Ro–Ro terminal designed to accept, store and dispatch Ro–Ro cargo units (complete road trucks or units of truck-trailers and semitrailers); and, (d) a Passenger Terminal with five berths for passenger ships and ferryboats, as well as terminal for liquid cargo for the reception and dispatch of oil and oil derivatives.

According to a decision of the Government of Montenegro from March 2000, the Free Zone of the Port of Bar covers the entire port area, and "Luka Bar" AD has the authorization of a free zone operator for the joint-stock company "Container Terminal and General Cargo". The total area of the territory of both companies where it is possible to operate in the free zone regime is over 130 ha.

In the port of Bar, the terminals are arranged according to the characteristic types of cargo handling. The activities of the Port of Bar include i) transshipment of cargo, ii) passenger traffic, iii) cargo storage, iv) additional cargo operations, v) pilotage, vi) mooring and unmooring of ships, vii) supply of ships, viii) maintenance of technical systems, ix) trade activities, x) hotels and tourism, and xi) food production.

The port of Bar has already been partially privatized (Port of Adria) and the Government of Montenegro has been seeking to valorize the remaining part (Port of Bar).

Currently, the Port of Bar operates significantly below its full capacity. The total current capacity of the port of Bar (Port of Bar JSC) is 5 million tons per year. The average level of utilization of the stated total capacity in the last 10 years was in the range of approximately 35% - 40%. According to the provisions of the valid spatial planning documentation, the planned capacity of the port of Bar for the future is 12 million tons / year. Major barriers for port valorization from regional markets are: (a) high travel times for accessing the port by road and rail: and, (b) non-competitive costs.

Table 1. Ship structure in Port of Bar[1]

Ship types	**Ships per year**	**Terminals**
Ro–Ro ships	80–120	Ro–Ro terminal (A1)
Conventional ships for general cargo	200–300	Terminal for general goods (A2) Terminal for single piece goods (A3) Lumber terminal (A5) Livestock terminal (A6)
Container ships	50–80	Container terminal (A4)
Combined ships	30–50	Terminal for general cargo and containers (A7)
Bulk cargo ships	45–80	Terminal for bulk cargo (A8) multi-purpose terminal (A9)
Tank ships	60–80	Terminal for liquid cargo (A10)

Port of Adria JSC, located next to Port of Bar JSC possesses a Container Terminal with an operational quay which is 330m long and depth of 12m, with a modern 40t gantry crane and open storage for 2,500TEUs and 180 refrigerated containers. It also possesses two General Cargo Piers equipped with portal cranes and closed and open storage of 7.6ha and 5.1 ha respectively, a Timber Terminal with a covered storage space of 5.86 ha, as well as a terminal for transshipment of wood and wooden products with storage space.

Annual current (theoretically) installed capacities of Port of Adria JSC are at least 150,000 TEU (containers) and 800,000 tons of general cargo. Currently, the Port of Adria annually operates with about 50,000 TEU (containers) and about 100,000 tons of general cargo. That would suggest that current capacity utilization is at 33.3% for containers and 12.5 for general cargo.

[1] Source Master plan PROSTORNI PLAN PPN ZA OBALNO PODRUČJE CRNE GORE,Detaljna razrada lokacija „Prva faza Privredne zone Bar" u opštini Bar, Podgorica – Bar, 2018

Table 2. Transshipment data[2] in port of Bar

Transshipment data "Port of Bar" JSC 2021.	
Bulk cargo	1.142.953,6 tons
Ro-Ro and general cargo	49.692,9 tons
Liquid cargo	264.598,4 tons
In total: 1,457,244.9 tons	

In the Port of Bar, an extension of the coast at the passenger terminal is planned. The project involves extending the existing coastline at the passenger terminal for 432.85 m in length and a 30 m in width. Its implementation would eliminate the existing limitations associated with low water depth along the existing operational coast (the maximum[3] water depth is currently at the berth -5.4 to -5.9 m) and it would enable the acceptance of medium and large passenger ships (including combined ships for both passengers and cargo), as well as cruise ships.

Figure 1: The Port of Bar

There is a plan to extend the operational part of the coast at the terminal for dry bulk cargo for 166 m. Through the project Second Phase of Quarry Volujica in the Port of Bar, it is planned to permanently rehabilitate the northern slope of Volujica hill in order to protect infrastructural and supra-structural objects which are located in the base of the hill, and in order to secure a new zone of 7.8 ha for transshipment and storage of dry bulk cargo.

[2] Source Port of Bar

[3] Source Port of Bar

The Port of Bar is at the junction on the main road M-24 Herceg Novi – Bar- Ulcinj and the road Bar - Podgorica - Belgrade. The results of the analysis of road connections between the Port of Bar and the hinterland indicate a significant share of hilly and mountainous sections, as well as a significant share of road sections where passing is not allowed because road access to the Port of Bar is limited through only one entrance point.

The Port of Bar is located at the beginning of the Bar – Belgrade railway. The railway network in Montenegro consists of three lines: Vrbnica - Bar (part of the Belgrade-Bar line in Montenegro); Podgorica – Nikšić, and Podgorica - Božaj (part of the railway Podgorica - Skadar on the territory of Montenegro). Railway Bar - Belgrade is of special importance to all three railway lines. Appreciating its immeasurable traffic and economic significance and the evident potentials of increasing the intensity of goods flows to the Port of Bar, there is the necessity of revitalizing the Bar – Belgrade railway as detailed above.

2.3 Port of Kotor

Since 2006 Port of Kotor JSC specializes in cruising tourism, enjoying the reputation of one of the busiest destinations in the Mediterranean. Located in Bay of Kotor, attractiveness of the site has all the required features for a developing a sustainable business trend.

For a number of years operator of the Port of Kotor has been Port of Kotor JSC whose majority of capital is on the ownership of the municipality of Kotor, and its main activity is passenger traffic from ships for cruise travels via cruisers ships.

Table 3. Overview of traffic flow in Port of Kotor for referent year (2019) and last year[4]

2021			2019		
Month	**Cruiser ships**	**Passengers**	**Month**	**Cruiser ships**	**Passengers**
January	0	0		2	53
February	0	0		5	810
March	0	0		7	1,187
April	0	0		28	44,652
May	0	0		60	82,714
June	4	487		66	81,000
July	13	1,189		65	88,942
August	17	2,396		62	81,859
September	10	1,584		71	87,954
October				66	91,525
November				22	40,483
December				10	12,568
TOTAL	**44**	**5,656**		**464**	**61,3747**

Figure 2: The Port of Kotor

[4] Source Port of Kotor

In Montenegro, based on the principles of green economy, it is necessary to secure sustainable development of maritime economy and preserve the environment, in general, and the sea as an extremely important resource. One of the highly relevant activities to achieve these strategic and operational goals is the drafting of an analysis for optimization of maritime transport vessel traffic in Boka Kotor Bay with the aim of improving maritime navigation safety and reducing the effects of maritime transport on biodiversity of the sea and other environmental parameters. The study is expected to improve and better monitor large vessels traffic capacity management in the Boka Bay, in order to avoid potential negative environmental effects, thus better contributing to the Green Agenda. Due to this, it is necessary to define the reception capacity of the Bay and work out the dynamics of calls by vessels into the ports, as well as the regime of ports in the Boka Kotor Bay. This is needed to decrease the effect of maritime transport on the environment through definition of clear measures which will alleviate negative effects.

2.4 Skadar lake and port of Virpazar

Skadar Lake covers part of the territories of two countries, Montenegro and Albania (about 2/3 belongs to Montenegro, 1/3 to Albania). It is the largest lake in the Balkans, about 44 km long and 13 km wide at the middle, with an average water depth of 5 m, and a surface area of 350 to 510 km^2 depending on the season. Skadar Lake Region is a National Park dominated by aquatic and wetland ecosystems.

Current conditions in communities next to the Skadar Lake Region are characterized by population migration, decline in economic activities, frequent floods in the coastal area, sinking and flow reduction of the Bojana River, lack of infrastructure for lake traffic and insufficient capacity of the local road network. However, in the last ten years, Skadar Lake and its coastal area have become a topic of great interest to foreign and domestic tourists, so accommodation facilities in the private sector are significantly expanding and adapting to new needs.

Currently the access to the most attractive parts of Skadar Lake is possible only by boats. In addition to “čunovi” traditional small fishing boats, there are also boats with a capacity of 12 and more passengers. Boarding and disembarking of passengers is done on makeshift docks, and in addition to the fact that it puts an ugly shadow on all the beautiful things that can be seen on the lake and its surroundings,

they are neither safe nor secure. However, the number of tourists is constantly increasing, and the starting point to all destinations on the lake is mostly a modest port in Virpazar.

Therefore, at that location is planned the construction of the first phase of the Port of Virpazar with accompanying facilities. The buildings will have ground surface with an area of approximately 150 and 100 m^2. The aim of this project is the development of multimodal transport and the establishment of inland waterways and shipping lines in the lake.

The valorization of this area is planned through the construction of adequate infrastructure in the Port of Virpazar aimed at conducting international water transport, and fulfilment of conditions for the establishment of a maritime route between the Port of Virpazar and the Port of Skadar in the Republic of Albania.

Moreover, in cooperation with the other state bodies in Montenegro and Albania, establishment of a navigation route on river Bojana is planned, as well as the identification of an adequate model for the protection of the river Bojana estuary from the depositing of sedimentation from the sea and river sides.

Figure 3: Plan for Port of Virpazar

The idea of building the Port of Virpazar dates back to 2 of July 2004 when the Agreement on International Lake Transport was signed in Podgorica between the Republic of Montenegro and the Republic of Albania. Based on that agreement, the Government of the Republic of Montenegro passed the Decision on the opening of the border crossing Virpazar for international lake passenger traffic ("Official Gazette of the Republic of Montenegro", No. 72/04). With this decision, the Directorate of Public Works was put in charge of preparing project documentation, build a border-crossing, and create the conditions for the work of the competent institutions.

In order to implement the Conclusions of the Government and the full implementation of the said Decision, the Terms of Reference for the preparation of the Main Design for the construction of the border crossing was defined, and based on the above, the Main Project was prepared. Based on the analysis of the mentioned documentation, within the planning document State Study of the location "Virpazar", zone F of the location in question was reserved for the construction.

However, the Decision of July 2004 was never fully implemented. That resulted in the adoption of a new Decision on reflecting the Agreement between the Government of Montenegro and the Council of Ministers of the Republic of Albania on the opening of the joint border-crossing Ckla (Montenegro) - Zogaj (Republic of Albania) for international road and lake passenger traffic ("Official Gazette of Montenegro - International Agreements", no. 11/2018). In this regard, the new initiative on the establishment of lake traffic and connecting Montenegro and the Republic of Albania, was supported through the Thematic project of cross-border cooperation ALMONIT-MTC. The Main Design from 2005 was the basis for the evaluation of the planned funds within the application for the mentioned cross-border cooperation project.

2.5 VTMIS in teritorial waters of Montenegro

Starting from the 1st of January 2017, the Administration for Maritime Safety and Port Management has introduced a mandatory check-in system for all vessels entering and leaving the VTS zone (Vessel Traffic System) responsibility of 12 nautical miles, or reporting to Montenegrin VTS in Dobra Voda. All vessels that are in the VTS area must send input and output reports or deviational and incident reports in cases of emergencies.

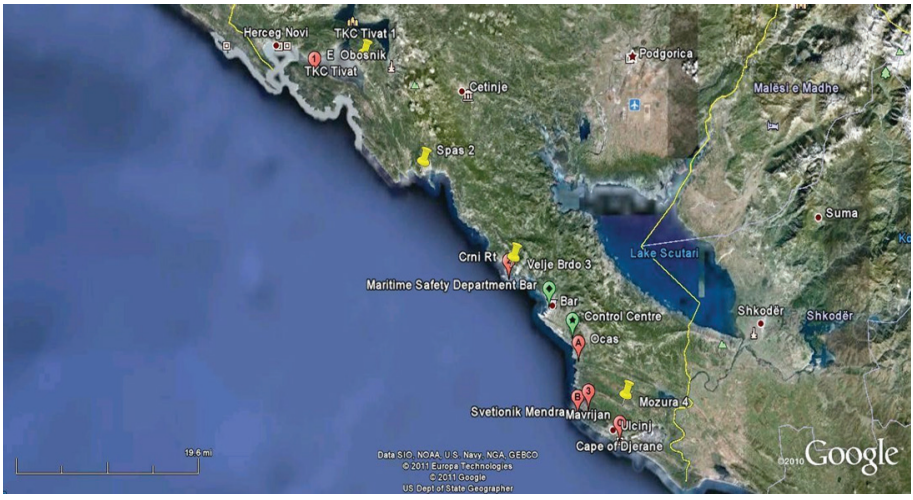
The monitoring and management of maritime navigation is implemented in order to increase the safety of maritime navigation and protection of the sea from pollution. Monitoring and management of maritime navigation (VTMIS) in force in Montenegro includes:

- Gathering data on vessels and maritime navigation;
- Providing data to all vessels;
- Providing navigational advice and support for vessels;
- Organizing navigation and management of maritime navigation;
- Control over the safety of navigation.

The system for monitoring, providing information and management of maritime navigation is done in collaboration of the Harbour Master and the port authorities with vessels that are in use or are in the internal waters, territorial waters and continental belt of Montenegro. This system is being implemented in order to increase the safety of maritime navigation, efficiency of maritime traffic and the protection of the marine area.

VTMIS equipment is located at the following locations: Dobra Voda (Bar), Obosnik (Lustica peninsula), Crni Rt (Sutomore), and Mavrijan (Ulcinj). The VTMIS equipment includes: maritime radar system, radio communication system, the coastal system of automatic identification of ships, weather stations, electronic cartography, direction finder and backup linking network.

Figure 4: VTMIS locations



Source VTS study, Final report

VTMIS system will facilitate rescue operations at sea which are coordinated by the Maritime Safety Department (MSD). This system contributes to the better work of the Coordination Centre for search and rescue at sea, because it allows precise locating of endangered vessels.

At the moment the implementation of second phase of VTMIS is ongoing. Both VTMIS phases were financed by EU as a part of IPA programme (CAP 2014 and CAP 2017).[5]

2.6 Facilities for ship generated waste

Luka Bar activities are carried out in order to develop the function of environmental protection and the incorporation of the principles of sustainable development in port activities, and in order to harmonize with the practice in European and other modern world ports.

In Port of Bar it is necessary to establish an efficient environmental protection system, whose goals should be harmonized with the main strategic commitments in the field of environmental protection in Montenegro. Activities carried out in order to develop the function of environmental protection began with the process of identifying and evaluating general aspects of the environment: air emissions, discharges into the water, waste materials, soil pollution and use raw materials and natural resources.

Further activities included, among other things, the development of the project "Environmental Protection of the Port of Bar and its waters"; (2003), "Defining the optimal technology for bulk waste disposal at the bulk cargo terminal"; (2004), "List of pollution sources in the Port of Bar"; (2004) and "Assessment of the existing situation, needs, optimal solutions and standards of collection, treatment and removal of solid and liquid cargo from ships in the Port of Bar"; (2007), etc.

A significant segment of past and future activities to improve the environmental protection system in the Port of Bar is participation in international projects, such as IONAS (Ionian and Adriatic cities and Ports Joint Corporation), WAP (Waste Management in Adriatic Ports), ECOPORT 8 (Environmental Management of trans border Corridor Ports), TEN ECOPORT (Transnational Enhancement of ECOPORT 8 network), etc.

[5] Data used from "Building up Best Cases of Connectivity in Maritime Transport, Maritime Transport Connectivity Success Factors", SAGOV project, Interreg IPA CBC programme 2020

Based on the obligations arising from the Law on Environmental Protection ("Official Gazette of Montenegro" no. 052/16 of 09. 08.2016), Port of Bar JSC is obliged to perform periodic (twice a year) measurements of air, water and soil quality by taking samples at reference points in the concession area or in the neighborhood.[6]

To deal with the sanitary and environmental protection, in close cooperation with Ports of Montenegro, the "Hemosan" Ltd. Bar. Private owned company was established on 08.04.1993, "Hemosan" has 23 employees, including engineers specialized in environmental protection and engineers with maritime qualifications. The company owns a commercial building of 900 m^2, storage of 7000 m^2 located within the company, ten available vehicles, all of the necessary equipment for working in environmental protection and processing of all types of waste, as well as two Eco Centers, one of which is located in the Port of Bar and the other one in Adriatic shipyard Bijela.

Primary activity of the Company is: i) Protection of the sea, ports, marinas from pollutants as well as acceptance of hazardous waste, ii) Acceptance, transport, storage and export of all types of hazardous and non-hazardous waste, iii) Receipt and processing of oily and waste water from the ships, and, iv) Cleaning of the tanks from oil and petroleum products and disposal of the waste derived from the same.

With the intention of harmonizing with the European Union applicable Standards, the state of Montenegro has assumed all activities from legal frameworks, economic interests, as well as the hierarchy of waste management.[7]

3. Port Connectivity and Intermodality Infrastructure

The concept of intermodality is a core component of modern transport systems. The essence is to create cohesion between different modes of transport and make a unified system which shall allow for "door-

[6] Source Master plan PROSTORNI PLAN PPN ZA OBALNO PODRUČJE CRNE GORE,- Detaljna razrada lokacija „Prva faza Privredne zone Bar" u opštini Bar, Podgorica – Bar, 2018

[7] Source https://hemosan.info/

to-door" transport. The very development of intermodal transport enables to increase the scope of transport because it unburdens specific transport braches, improves environmental protection and decreases overall costs.

In Montenegro, intermodal transport is in the initial phase of development. The main challenges it currently faces are as follows:

- Weakness of institutions, inadequate organization, lack of strategic predictions;
- Poor coordination and cooperation among stakeholders in the transport chain and lack of government initiatives for an intermodal transport organization;
- Inadequate and poorly developed infrastructure, old machinery and equipment, insufficient organization, and transport network;
- Insufficient support for a comprehensive and broad planning process in logistics transport chains;
- Undeveloped awareness of the benefits provided by the intermodal transport system;
- Tariff policy that does not stimulate the use of intermodal transport.

Support for intermodal transport terminals – mainly consisting in a place defined to be equipped for transshipment and storage of intermodal transport units-ITUs - is a prerequisite for the development of modern transport and logistics centers.

According to the International Transport Forum (ITF) guidelines, the transport policy that will be used as a basis for all infrastructure initiatives must strive, inter alia, for the following:

- Liberalization of transport at the international level, to ensure a higher degree of trade efficiency as a precondition for economic growth;
- Promoting harmonization, interoperability and intermodality on corridors, to reduce transport costs, focused also on the administrative and legal provisions governing this area;
- Encouraging railway reforms to make them competitive and to achieve investment profitability through more intensive use of railway infrastructure;
- Promoting the development of uniformity, relevant statistical databases so that investment projects can be monitored and evaluated internationally.

Montenegro strives to encourage the development of combined transport, which is reflected in the restructuring of the Montenegrin Railways (the restructuring process is still ongoing) and the Port of Bar (restructured in 2009), providing financial and economic incentives for combined transport, mainly through support for rail and liner shipping.

The Port of Bar has the capacity and development potential to gain great regional importance and could assume its role in linking Montenegro to the blue highways of the sea. As a modern seaport for transshipment of all types of cargo, it would offer great opportunities for further development of combined transport and connect the entire region. To realize these possibilities, it is necessary to plan the construction of new and reconstruction of existing terminals for combined transport at the railway stations Bar, Podgorica, Nikšić and Bijelo Polje, which will encourage further development of road-rail transport on the most important routes.

Strategic activities and planning are aimed at the reconstruction and modernization of the railway from Bar to the border with Serbia. This railway gives the port of Bar the comparative advantage of the shortest and most efficient connection for the organization of mass transport between overseas destinations and the markets of Serbia, Hungary, Romania, and others. The long-term sustainable development of the Port of Bar, in an incredibly competitive transport market, largely depends on the speed and degree of connection of the transport system of Montenegro to the Trans-European Transport Network.

The Transport Development Strategy of Montenegro 2019-2035 recognizes the importance and need for the development of intermodality in Montenegro, and defines the obligation to prepare a study on the development of intermodality. The need to develop intermodality in all Western Balkan countries was pointed out in the Smart and Sustainable Mobility Strategy for the Western Balkans from July 2021, as well as in the latest European Commission Progress Report on Montenegro for 2021, which states that significant additional efforts are needed to implement relevant regulations, in particular with regard to incentives for road users and the establishment of intermodal terminals. The OECD Competitiveness Analysis in Southeast Europe (completed in late 2020), which included Montenegro, suggests, among other things, a need for a clearly defined transport vision for Montenegro, development and implementation of integrated logistics strategies that can promote corridor access and intermodal solutions.

Given the significant efforts and resources invested in improving the condition of physical infrastructure compared to the value of GDP, it is necessary to ensure a higher degree of utilization of all available capacities of physical infrastructure (all modes of transport) and raise the quality of logistics and related services.

A comprehensive study on intermodal transport has been launched. It will analyze all advantages and disadvantages of intermodal transport in contrast to unimodal transport. In essence, the study would show the significance of the intermodal system, use of various technologies and its very principles, as well as advantages and disadvantages of specific transport branches, after which it would analyses the present economic and transport situation, and on the basis of that define directions and development perspectives, and come up with certain proposals and solutions for development in this field.

The study would include the preparation of traffic analysis (model) of regional character (not only national character) in order to assess the position of Montenegro in relation to the manifested global, EU / regional and national flows and trends (all levels of observation from highest to lowest level), which has not been done so far, and to define the overall technological and organizational needs for the implementation of intermodal chains in Montenegro. The study would consider the impact of intermodality development on economic development and competitive position of Montenegro, and define the micro-locations of intermodal terminals and logistics centers and include the preparation of conceptual solutions for them.

Application process is ongoing, so it is expected for this study to be done during this and next year.

In parallel, project for "Feasibility study for multimodality at the Port of Bar" is ongoing. The global objective of this project is to contribute to the long-term sustainable development of the logistics infrastructure and multimodal transport in Montenegro. This should be reached through the integration of all transport modes, increasing cargo mobility, improving the quality of logistics and related services, and improving the attractiveness and competitiveness of Montenegro's facilities.

The global objective would be supported by making better use of national resources, and reducing cargo carriage costs as well as the environmental impact of heavy-duty vehicles. All actions under

the project will mainstream the following cross-cutting objectives: Environment and climate change, a rights-based approach, people with disabilities, indigenous peoples and gender equality.

This project is aimed at identifying relevant opportunities for the development of a logistics center in Montenegro through the preparation of a feasibility study, defining functional requirements, technical specifications, and conceptual design of the selected option for logistic areas and sites.

One of the expected outputs of this project is the assessment of the potential of intermodal transport. The study should serve to identify key priorities for improving its efficiency and to propose an economically viable program for its development. The main goal of intermodal transport is the optimal usage (from the social point of view) of transport means of various kinds for each transport process, resulting in savings in total expenses, and better quality of service.

Traffic infrastructure should enable better interconnection of all areas and regions of Montenegro and its connection with neighbouring countries. The strategic directions of the development of the Montenegrin economy are defined by Government documents (The Agenda of Economic Reforms and the Strategy of Development and Poverty Reduction of Montenegro), in which the main goal is sustainable economic growth, decisively influenced by an enabled private sector performance.

In accordance with the obligations arising from the Stabilization and Association Agreement, i.e. Protocol IV on land transport, mutually harmonized measures necessary for the development and improvement of rail and combined transport should be adopted, as a way to ensure that most of the transit traffic through Montenegro be more environmentally friendly.

3.1 Clean Fuels

There are no data about any facility for clean fuels. There were negotiations of port of Bar in 2020 w ith American companies about transshipping and storing liquid gas and distribution over port of Bar but that did not happen. Also, in the same period there was a plan for construction of LNG terminal in Port of Bar but that was not done. Concerning it, there is only facility from “Jugopetrol” for ordinary fuels

of 128,500 m^3 (cca 110.000t). In addition, there is a plan and a feasibility study for Montenegrin part of Adriatic-Ionian pipeline with distribution station located in Bar.

Table 4. Primary Core Node Compliance Table for Montenegro

No	Port	Rail connection	Road connection	Facilities for ship-generated waste	CEMT (if applicable)	Clean fuels availability	Terminal availability	VTMIS (if applicable)	other
1	Bar	Yes	Yes	Yes	n/a	No	Yes	Yes	
2	Kotor	No	Yes	No	n/a	No	Yes	Work in progress	
3	Zelenika	No	Yes	No	n/a	No	Yes	Work in progress	
4	Budva	No	Yes	No	n/a	No	Yes	Yes	
5	Virpazar	No	Yes	No	n/a	No	No	Work in progress	

Table 5. List of IPA financing involved in Maritime & IWW in MNE;

	Project	Country action programme	Type	Status
1	Vessel traffic monitoring system (VTMIS)	CAP 2014	Supply	Implemented
2	Vessel traffic monitoring system (VTMIS II)	CAP 2017	Supply	Implementation ongoing
3	National Maritime Single Window	CAP 2017	Service/ Supply	Implementation ongoing
4	Supply of Equipment for Response to Marine Pollution Incidents	CAP 2017	Supply	Implementation ongoing

3.2 Other

Montenegro ports do not suffer relevant impact from Climate change. Concerning traffic in general, it is one of two sources of pollution but frequency of traffic and number of cars compared to size of country and number of inhabitants is irrelevant.

At the moment there is no impact of the war in Ukraine on Montenegrin ports. Only possibility would be military use of port of Bar as Montenegro is a NATO member for which, due to distance and railway connection limitations there is no large probability.

Croatia

Anastasya Raditya-Ležaić

Contents

1. State of Affairs

Two Core Trans-European Transport Network (TEN-T) corridors pass through Croatia: The Mediterranean Corridor and the Rhine-Danube Corridor; they both enable Croatia to provide the shortest route between Western Europe and Asia, as well as Eastern Europe and the Mediterranean. With excellent road infrastructure of modern highways, fairly developed railroads, 6 seaports and 7 national airports, Croatia has big potentials for intermodal transport of goods.

1.1 Inland waterway ports

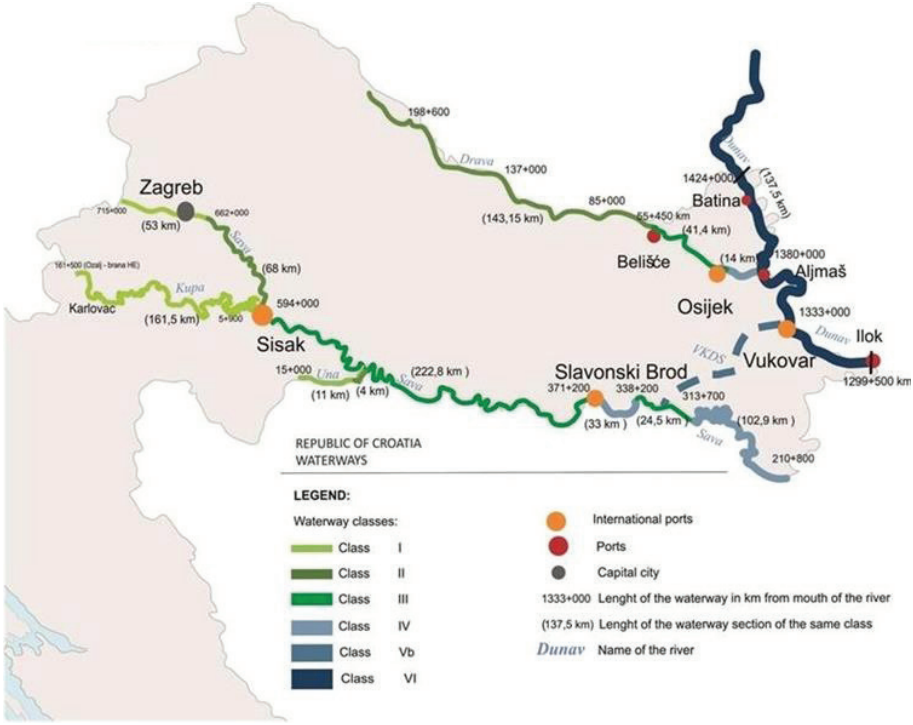
Croatia has 1,016.80 km of navigable inland waterways, out of which 534.7 km have been integrated in the European inland waterways network of international importance.[1] However, only 287.4 km comply with the requirements of international navigation standards, minimum class IV of navigability. The main navigable rivers are Danube, Sava and Drava. There are four inland waterway ports in Croatia, all situated in the Danube River and its tributaries. While they are all parts of the TEN-T Rhine-Danube Corridor, the ports in Vukovar (on Danube River) and in Slavonski Brod (on Sava River) have been classified as TEN-T Core Network ports, while Osijek (on Drava River) and Sisak (on Sava River) have been classified as ports of the TEN-T Comprehensive network.

The **Danube waterway** (E-80) along the entire length of the Republic of Croatia from Batina (1,433 river kilometres -rkm) to Ilok (1,295.5 rkm) is qualified and marked for day and night navigation and its dimensions meet the requirements of VIc international class.

The **Sava waterway** (E-80-12) from the mouth of Kupa downstream (583 rkm) to Jamena (207 rkm) meets the requirements of class III navigability and is partially qualified and marked for daily navigation,

[1] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2014) *Transport Development Strategy of the Republic of Croatia (2014-2030)*

Map 1 Inland waterways of Croatia[2]



while on the part from 583 rkm to Rugvica (653 rkm) meets the requirements of II buoyancy classes and is not suitable for commercial navigation. The Drava waterway (E-80-08) from the confluence with Danube o rkm to Osijek 22 rkm meets the requirements of class IV navigability and partially marked for day and night navigation, in the part from Osijek 22 rkm to Donji Miholjac 82 rkm meets the requirements of class III navigability and in the part from Donji Miholjac 82 rkm to 198.6 rkm meets the requirements of class II buoyancy and are marked only for day navigation.

The two most significant inland waterways Danube and Sava do not intersect inside the Croatian territory. These rivers merge later in Belgrade, Serbia. A proposed multipurpose canal of 61.4 km aiming to connect the Danube and Sava in the territory of Croatia will have important functions: shipping, irrigation, drying out and equalisation

[2] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2022) *Unutarnja plovidba (riječni promet).* Online, available at: https://mmpi.gov.hr/more-86/unutarnja-plovidba-rijecni-promet/110

of low water level. With this canal, navigation from Sava to the western Europe would be shorter by 417 km and to Eastern Europe by 85 km.

Croatian internal inland waterways are used for transport of passengers and cargo, but the passenger transport is negligible compare to the transport of cargo. Most of the cargo transport is transit, with a small share of international transport and minimum share of national transport.

1.1.1 Port of Vukovar (core)

The Port of Vukovar is the biggest inland port in Croatia with an annual transport of 500,000 tonnes of cargo and 36,000 passengers. It is situated on 1,335 km of the downstream flow of the Danube River on its right coast with class VIc of navigability and can service class 5 vessels. The port is 850 metres long and 45 metres wide, covering a surface of about 26 ha. It is navigable during the whole year regardless of the water level. It can tranship up to 2 million tonnes a year.[3]

Port of Vukovar has an excellent connection to its hinterland with direct railway link to regional railway station Vinkovci. It is a national hub for this region, and part of the Corridor X, while also is only 40 kilometres away from the Vc road Corridor. The railway line Vinkovci-Vukovar is reconstructed and electrified with EU co-financing. Four port operators currently operate transhipping for all kinds of cargoes including bulk cargo, general cargo, liquid cargo, grains and containers. Currently the port trans-ships 100,000 tonnes of different kinds of goods annually.

1.1.2 Port of Slavonski Brod (core)

The Port of Slavonski Brod is the second biggest inland port in Croatia with annual transport of 200,000 tonnes of cargo (oil, general cargo, pebble and sand). It is situated on the left coast of the Sava river on the 363 rkm, approximately 4 kilometres southeast of the city Slavonski Brod. The surface area is 90 ha with a maximum capacity of 1.5 million tonnes of cargo. It is located at the crossroads or roads and railways that connect eastern part of Europe and the Mediterranean, and represents the meeting point of all links that connect Central Europe with the southern part of Europe. This port is particularly important

[3] Source: Port Authority Vukovar (2022) *Port Vukovar.* Online, available at: http://luv.hr/?page_id=3818&lang=en

to Bosnia and Herzegovina (BiH) as it is located on the state border and closely linked through road and rail to corridor Vc, representing a direct BiH gateway to the EU.

The project "*Slavonski Brod Port Infrastructure construction and upgrade*" was approved for co-financing by Connecting Europe Facility[4] (CEF) in 2017 to construct waterside basic infrastructure (two quays), upgrade the road network and container terminal, install public utilities infrastructure and equipment and construct the port weigh house. The granted EU funds amounted to 6.63 million EUR of project total cost of 11.68 million.[5]

1.1.3 Port of Osijek (comprehensive)

The Port of Osijek is the third in terms of Croatia IWW ports of quantity of handled cargo. It is situated on the Drava River and has a very good connection to the hinterland by railway and road; and is only 8.5 kilometres away from the Osijek airport. The total surface of the port is 160 ha and because it is large, it has excellent potential to become an intermodal logistic hub.

Currently the Port of Osijek is carrying out a project aiming to develop intermodal infrastructure which consists of three phases. The first phase of the project constructed the infrastructure on the right bank of the river for a the length of about 2.2 km and would finally construct a barrier "G" which would protect the port area from harmful effects of water such as flooding and erosion.[6] Following the finishing of this first phase, the Port Authority completed its medium-term port development plan and revised its existing master plan in 2020, and continues with the preparation of the necessary documentation

[4] Connecting Europe Facility (CEF) is a key EU funding instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at European level. It supports the development of high performing, sustainable and efficiency interconnected trans-European networks in the field of transport, energy and digital services. CEF offers grants, but also innovative financial instruments such as guarantees and project bonds. More on CEF see: CINEA (2022) *Connecting Europe Facility*. Online, available at: https://ec.europa.eu/inea/en/connecting-europe-facility

[5] Source: Port Authority Slavonski Brod (2017) *EU projekti*. Online, available at: http://lucka-uprava-brod.hr/wp/eu-projekti/

[6] Source: Port Authority Osijek (2020) *Izgradnja intermodalne infrastrukture.* Online, available at: http://port-osijek.hr/projekt/3_Izgradnja_intermodalne_infrastrukture

(feasibility study and cost-benefit analysis) necessary to apply for EU funding for the final phase of the project which is constructing the intermodal infrastructure. The estimated value of the entire project including all phases is 60 million EUR.

1.1.4 Port of Sisak (comprehensive)

The Port of Sisak is the smallest freight traffic port. It is situated on the Sava river, and organised in two basins: Galdovo Basin at 593 rkm on the left bank of Sava, and Crnac Basin at 586 rkm on the right bank of Sava.[7] Crnac Basin is an oil port with a distinctly industrial character, and is connected by a pipeline into a single technological unit belonging to the Sisak oil refinery. Almost all the share of the transhipment cargo is crude oil. In 2016, the port transhipped 90,000 tonnes of crude oil transported from the Port of Slavonski Brod.

1.2 Maritime Ports

The overall length of the Croatian coastline amounts to 6,278 km including the coast of about 1,244 islands, islets, reefs and cliffs (49 islands are inhabited). There are 433 ports and small harbours open to the public in Croatia, of which 95 ports with a minimum of one-line service. Six major ports (Rijeka, Ploče, Šibenik, Split, Zadar, and Dubrovnik) are located along the mainland coast and are all classified as ports of special international economic interest. They are categorised depending on the type of traffic (passenger, freight or both). All Croatian ports of international economic interest can receive large ocean-going ships.

Croatian ports handle large amounts of the country's trade as well as transit cargo, and they play a vital role serving both the public maritime transport and coastal tourism markets. Because of the geography, the Adriatic Sea penetrates deep into Europe enabling an inexpensive maritime transport to Adriatic ports and, from there, by train, roads, or rivers, to continental parts of Croatia, and to various European countries. Some of Croatia's ports have a considerable potential to become major Adriatic gateways to both Central and South-Eastern Europe.

[7] Source: Port Authority Sisak (2022) *Luka*. Online, available at: http://www.luck-aupravasisak.hr/

About 19 million tonnes of cargo is transhipped and 12 million of passengers are transported annually in the Croatian ports. The majority of cargo traffic in Croatian ports is carried out in the Rijeka and Ploče ports, both totalling close to 90% of the total cargo traffic of all Croatian ports. Whereas the majority of passenger transport is carried out in the Split and Zadar ports, and Dubrovnik is the port with the majority of traffic of cruising vessels.

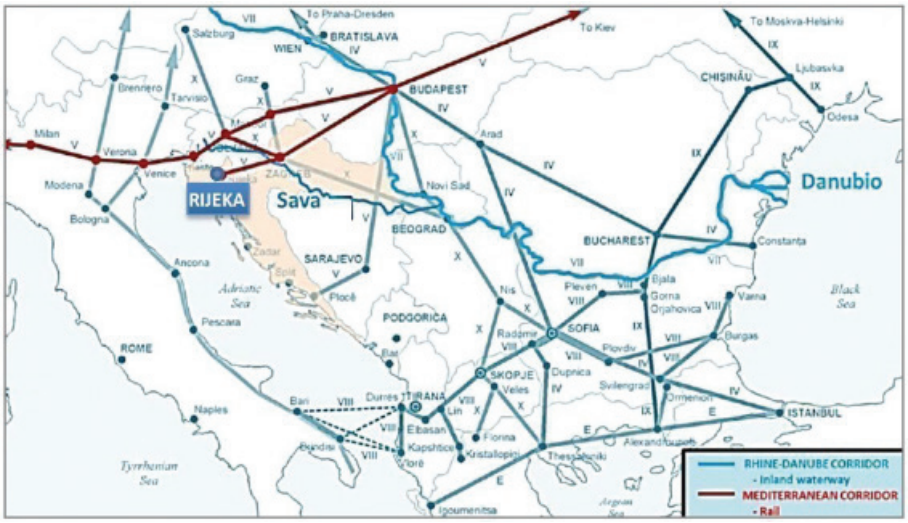
1.2.1 Port of Rijeka (core)

The port of Rijeka is the Republic of Croatia's primary cargo port, and a core port in the TEN-T Mediterranean Corridor. It handles a variety of cargo commodities including containers, dry bulk, liquid bulk, break bulk as well as passenger ferries. It is the largest port in Croatia and benefits from the deepest natural channel in the Adriatic. It is located on the coast of the protected Rijeka Bay, with a total of 58 berths, plus two additional berths in the liquid cargo terminal.

In terms of connection to road and rail, the Port of Rijeka fulfils both criteria as per the 1315/2013 TEN-T Regulation.[8] The total port area comprises 150 hectares out of which 335,000 m^2 are enclosed warehouses. The Port of Rijeka is part of the North Adriatic Port Association (NAPA) together with Port of Koper, Port of Venice and Port of Trieste.

[8] Full text of the regulation can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1315

Map no. 2. Port of Rijeka in the TEN-T corridors[9]



The Port of Rijeka is organised in five basins:

1. Rijeka Basin (general cargo, crops, phosphates and fruit)
2. Sušak Basin (containers, general cargo and timber)
3. Bakar Bay (dry bulk cargo and Ro-Ro terminal)
4. Raša Basin (general cargo, livestock and timber)
5. Omišalj Bay (oil, oil product, liquid cargo).

Traffic data

A total of 13.6 million tonnes of cargo was transported in the Port of Rijeka in 2020. The total turnover of container traffic was 344,000 TEU in 2020. It has further shown a constant overall growth. Most of the port of Rijeka's traffic is transit cargo to/from its wider hinterland in Central Europe, and is dominated in volume terms by liquid and dry bulk cargo, followed by container and general cargoes. As for the Passenger terminal, Port of Rijeka has 11 piers serving 200,000 passengers annually, traveling to nearby islands and/or other ports along the Adriatic coast.[10]

[9] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2017) *Transport Development Strategy of the Republic of Croatia (2017-2030)*

[10] Source: Port Authority Rijeka (2022) *Infrastruktura*. Online, available at: https://www.portauthority.hr/lucki-sustav/

Table 1. Terminal capacity of the Port of Rijeka[11]

Basin	Terminal	Sea depth	Max. annual capacity	Note
Rijeka Basin	General cargo	12 m	2,000,000 t	Ships up to 30,000 DWT
	Grains/crops	14 m	1,000,000 t	Ships up to 60,000 DWT; transhipment bridge 400 t/h
	Fruit and frozen	10 m	100,000 t	
	Timber	10 m	500,000 t	
Sušak Basin	Containers (Adriatic Gate)	14 m	600,000 TEU	
	Containers (ZG Deep Sea)	20 m		In development (will start operating in 2024)
Bakar Bay	Bulk Cargo	18 m	4,000,000 t	Transhipment and storage of iron, ore, coal; ships of up to 150,000 DWT
Raša Basin	Livestock and timber	8 m	600,000 t	Stables for 1,000 headages of large livestock
Omišalj Bay	Liquid cargo	30 m	34,000,000 t	Adriatic Pipeline terminal, JANAF system; tankers up to 350,000 DWT

Infrastructure: multimodal/intermodal connectivity with Mediterranean corridor

The Port of Rijeka provides the shortest connection between overseas destinations and Central Eastern Europe both with respect to land and sea routes; and covers all types of cargo.

The most important traffic routes for the Port of Rijeka are the Corridor Vb and Corridor X. On Corridor Vb, the traffic route is 540 km long connecting Rijeka-Zagreb-Budapest and covering the Hungarian, Czech and Slovakian markets as well as the south of Poland. Thanks to the newly constructed motorway, it takes only six hours to get from

[11] Source: Luka Rijeka (2022) *Terminali i servisi.* Online, available at: https://lukarijeka.hr/terminali-i-servisi/

the Port of Rijeka to Budapest, whereas a train needs 24 hours for the same route covering a distance of 592 km. The transit route for the markets of Bosnia and Herzegovina and Serbia connects to Corridor X. In addition to the road infrastructure, all basins (except for Omišalj) also have the railroad infrastructure. However, the infrastructure does not meet the expected increase in traffic volume.

In the Port of Rijeka, there is an ongoing development project for the modernization of strategic port facilities, aimed at producing direct and indirect economic effects, the most important of which are: The Rijeka Gateway Project, and the projects financed from the EU funds.[12]

In cooperation with the International Bank for Reconstruction and Development (IBRD), the Government of the Republic of Croatia has launched the Rijeka Gateway Project. The total value of the port component of the Rijeka Gateway Project amounts to a total of 187 million EUR, of which 144 million EUR is the World Bank's loan (IBRD) and 43 million EUR the domestic share from the state budget of the Republic of Croatia. Apart from the modernisation of the port area, the loan anticipates the construction of connecting roads to the Port of Rijeka and the procurement of necessary port equipment. The reconstruction and modernisation of the port area includes the modernisation of the terminal for general cargo, relocation of the terminal for timber from Delta and Porto Baroš, and development of a nautical/passenger terminal. The Rijeka Gateway programme is not intended solely for the construction and modernisation of the port but is designed to directly support the Croatian economy to become more dynamic and more competitive. This programme will also increase the attractiveness of the port city of Rijeka by balancing urban development, connection with the traffic corridor and the overall development of the port.

One the most significant object of the Rijeka Gateway Project is the realisation of a new "Zagreb Pier" Deep Sea Container Terminal to ensure new port capacities. With a straight pier of a final length of 680 m and an average width of 300 m, the planned sea depth at the pier is at least 20 m, which allows for the reception of container ships of all sizes. The construction of the first phase (the first 400 m) is in the final stage, and simultaneously, while the railway terminal interface is

[12] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2022) *Luka Rijeka*. Online, available at: https://mmpi.gov.hr/more-86/luke-106/luka-rijeka/15982

being reconstructed, and the connecting road D-403 will be built. The continuation of construction of the remaining phases is the obligation of the future concessionaire.

Governance

There are four concessionaires operating in the Port of Rijeka: Luka Rijeka d.d.,[13] Jadranska vrata d.d., Jadranski naftovod (JANAF) and Rijeka Gateway d.o.o. A concessionaire, selected through a tender, receives a concession for the management, construction and use of a terminal.

The terminals for general cargo, bulk cargo and livestock located in Rijeka, Bakar and Raša basins are operated by the concessionaire Luka Rijeka d.d., which is owned by the Republic of Croatia (25.02%) and other shareholders: Polish company OT Logistics S.A. (27.36%), Hungarian commercial OTP Banka d.d. through different pension funds –AZ and Erste plavi pension funds (23.59%), PBZ d.d. owned by Italian Intesa Sanpaolo group (8.75%), and other smaller shareholders.[14] It holds the concession until 2042.

The container terminal "Adriatic Gate" at Sušak basin is operated by concessionaire Jadranska vrata d.d. In 2011, a global port management company headquarteded in Manila, the Philippines International Container Terminal Services Inc. (ICTSI) acquired 51% share in the company and has become a strategic partner. Jadranska vrata d.d. acquired concession to operate the container terminal until 2041.

JANAF operates the oil terminal in Omišalj. It is a joint stock company owned by the Croatian Pension Insurance Institute (37.26%), the Republic of Croatia (41.25%), INA d.d. owned by the Croatian government and Hungarian MOL group (11.80%), and other shareholders with less than 10% stock each.[15]

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[13] d.d. (dioničko društvo) is a joint-stock company whose share capital is divided into shares. One of its most important features is that the shareholders guarantee the company's operations only up to the value of its own shares. While d.o.o. (društvo s ograničenom odgovornošću) or a limited liability company (ltd.) is a company in which one or more legal or natural persons invest and participate in pre-agreed share capital. Business shares cannot be expressed in securities. d.o.o. has a significantly lower level of formalities of procedures and internal organization in the functioning of the company compared to d.d..

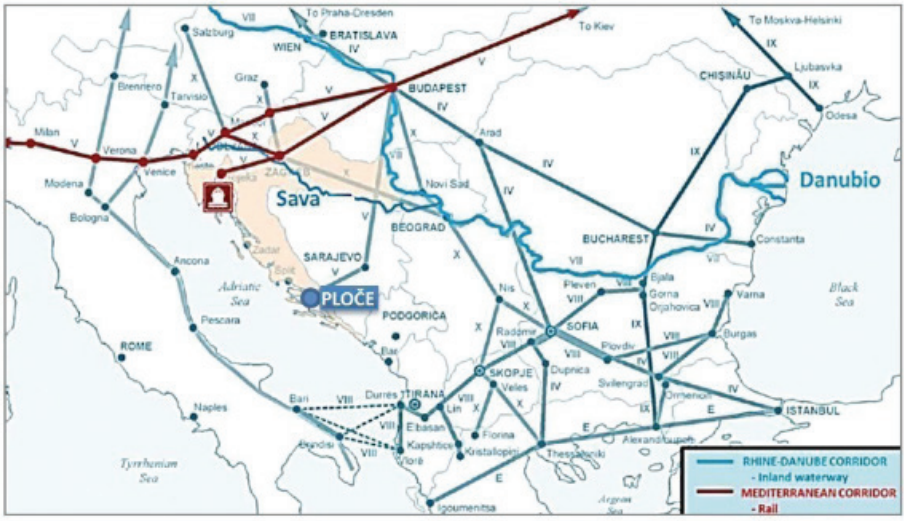
[14] Source: Luka Rijeka d.d. (2020) *Godišnje izvješće*. Online, available at: https://lukarijeka.hr/wp-content/uploads/2021/05/LKRI-fin2020-1Y-REV-Konsolidirano-HR.pdf

[15] Source: JANAF (2021) *Struktura dioničara*. Online, available at: https://janaf.hr/storage/9SGjzkh5936AUODTtjtU.pdf

In 2021, Rijeka Port Authority granted a concession of the new "Zagreb Deep Sea" container terminal to the APM Terminals (the Netherlands) /Enna Logic (Croatia) consortium for 50 years. This consortium formed a joint venture Rijeka Gateway d.o.o. The estimated value of the concession excluding VAT is 2 million EUR per year.

1.2.2 Port of Ploče (comprehensive)

Map no.3 Port of Ploče in the TEN-T corridors[16]



Port of Ploče is located at an excellent traffic inter-connection node and with a favourable geostrategic position at the junction of important industrial routes of the Adriatic, Mediterranean and Central Europe. It is the second largest port in Croatia in terms of annual cargo volumes, and by its position, it is the main Western gate of the Corridor Vc. Regarding the TEN-T compliance indicators of connection to road and rail, the Port of Ploče is compliant with both of the mentioned criteria, as per the 1315/2013 TEN-T Regulation. Although it is a Croatian port, it is of great importance for the economy of the neighbouring Bosnia and Herzegovina. As a consequence, around 90% of the Port of Ploče activity is transit serving as the main maritime gateway to Bosnia-Herzegovina.

The Port of Ploče has a total of 7 terminals. It is a universal purpose port which means that it serves for the transhipment of almost all types of

[16] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2017) *Transport Development Strategy of the Republic of Croatia (2017-2030)*

cargoes that appear in international maritime transport, except crude oil and chemicals. Today the port has complete port transhipment, storage and all accompanying port services able to provide quality transhipment of general cargoes, container cargo, Ro-Ro traffic, dry bulk cargo and liquid cargo. The port also serves passenger vessels, both for local traffic with the Peljesac peninsula and for international traffic maritime routes to Italy.

Traffic data

The annual throughput of the Port of Ploče is 4.8 million tonnes of bulk and general cargo, including 20,000 TEU containers. The maximum capacity of container traffic is estimated at 60,000 TEU annually. In 2019, throughput was 3.56 million tonnes, out of which 2.3 million tonnes was grain cargo, 762,000 tonnes were liquid cargo and 500,000 tonnes was general cargo. The highest throughput was in 2008 with 5.1 million tonnes cargo and 35,124 TEU of containers. Over the past 20 years, an average of 450 ships per year have been accepted by the Port of Ploče.

Table No.2 Terminal capacity of the Port of Ploče[17]

Terminal	Pier length	Sea depth	Max. annual capacity	Note
Container	280 m	14 m	60,000 TEU	Ships up to 30,000 DWT, Panamax ships, Ro-Ro ramp
General cargo	410 m	9.2 m		Handles food, cattle food, cotton, tobacco
Bulk cargo	510 m	14 m	200,000 t	Ships up to 77,000 DWT; reloading capacity 15,000 t/d
New Bulk cargo	365 m	18 m	4,600,000 t	In development; ships up to 180,000 DWT
Grain cargo	230 m	10 m	45,000 t	400 t/hour
Wood terminal	110 m	9.2 m		
Liquid cargo		12 m	92,000 m^3	

[17] Source: Luka Ploče (2022) *Djelatnosti i terminali.*. Online, available at: https://www.luka-ploce.hr/terminali-i-usluge/terminali/

Infrastructure: multimodal/inter-modal connectivity with Route Vc

The Port of Ploče surface area covers 75 hectares, with additional of 150 hectares for potential future development.[18] It is situated in the north-south direction of the Sarajevo-Ploče railway line, which is part of the 809-km-long railway line C (Budapest-Osijek- Sarajevo-Ploče) of the Corridor V (Venice-Trieste-Budapest-Uzgorod-Lviv) being the sea connection of this branch.

In the vicinity of the Port of Ploče there are four international passenger air traffic nodes: Mostar Airport (60 km away), Dubrovnik airport (120 km away), Split airport (140 km) and Sarajevo airport (190 km). The port is located along the Adriatic E-65 highway, a road that runs from Trieste through Rijeka and Split to the south. A modern motorway A1 Zagreb-Ploče is completely constructed, enable the users of Port of Ploče to have the fastest way to Zagreb and continue further on to destinations in Central Europe.

The container terminal was completed in 2011. The total storage area is 38,000 square meters and capacity of 60,000 TEU. The length of its coastline is 280 meters with the sea depth of 13.80 metres. The total port area is 230 hectares out of which 170 hectares are built. The port has access to road and rail networks connecting the Adriatic, the Mediterranean and Central Europe.

Governance

The port is managed and developed by the governmental Ploče Port Authority. Luka Ploče d.d. is the primary concessionaire and manages the transhipment and storage of goods as well as the container terminal, bulk cargo terminal, Luka Ploče d.d. is a joint-stock company owned by Energia Naturalis d.o.o. (38.27%), AZ pension fund (15.81%) and PBZ pension fund (8.22%) and other smaller shareholders.

1.2.3 Port of Zadar, Šibenik, Split and Dubrovnik (comprehensive)

The Port of Zadar consists of the Zadar Old city passenger port, Gaženica passenger port, Gaženica cargo port and Vela lamljana kali

[18] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2022) *Luka Ploče*. Online, available at: https://mmpi.gov.hr/more-86/luke-106/luka-ploce/15983

fishing port. Annually, the Port of Zadar has a turnover of approximately 2.7 million passengers and of 430 thousand vehicles, and of more than 300,000 tonnes of freight traffic.[19] The focus of development of the port has been the construction of the Gaženica port to alleviate the traffic affecting old city port and Zadar's historic core as well as improve security and environment parameters.

The Port of Šibenik is equipped with newly renovated Vrulje quay that is 510 metres long, reconstructed with EBRD loan of 8.2 million EUR. It now accommodates vessels of international and domestic passenger transport and cruise ship of up to 240 metres long.[20] With the constant growth of the cruise industry, the Port of Šibenik is expected to continue modernising its terminals and facilities due to the high demand of new cruise itineraries and destinations. According to the Maritime Development and Integrated Maritime Policy Strategy of the Republic of Croatia 2014-2020, Port of Šibenik is to be specialised to become a port for exclusive cruising vessels of smaller capacities (boutique vessels) and super yachts.

[19] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2022) *Luka Zadar.* Online, available at: https://mmpi.gov.hr/more-86/luke-106/luka-zadar/15984

[20] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2022) *Luka* Šibenik. Online, available at: https://mmpi.gov.hr/more-86/luke-106/luka-sibenik/15985

Map No.4 The Croatian maritime ports[21]

The Port of Split is the busiest passenger port in Croatia with an annual traffic of more than 5 million passengers and 830,000 vehicles. This traffic shows further growing trends, which is expected to lead to shortage of port facilities. In order to satisfy the increasing needs and to improve the safety of passengers and vehicles, the Port Authority Split has launched its Infrastructure Rehabilitation Project - investment amounts to 23 million EUR aiming to construct two wharves for berthing of ships in national and international traffic of passengers and vehicles, and of cruise vessels.[22]

The Port of Dubrovnik is today the world's tenth and Mediterranean's third largest port in terms of the number of passengers on a one-day visit to a destination on cruises.[23] The port is connected to the D8 Adriatic Highway (tourist road) which is one of the main Croatian

[21] Coordinating secretariat for maritime issues (2017) *Croatia*. Online, available at: http://ceec-china-maritime.org/?page_id=662

[22] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2022) *Luka Split*. Online, available at: https://mmpi.gov.hr/more-86/luke-106/luka-split/15986

[23] Source: Ministry of the Sea, Transport and Infrastructure of the Republic of Croatia (2022) *Luka Dubrovnik*. Online, available at: https://mmpi.gov.hr/more-86/luke-106/luka-dubrovnik/15987

state roads connecting the northern and southern Adriatic. Port of Dubrovnik is to be specialised to become a port for cruising vessels.

2. Maritime compliance indicators

2.1 Connection to rail and road

Croatian ports are connected to European transport road and railway corridors. Port of Rijeka belongs to the core network of TEN-T while other Croatian maritime ports belong to the comprehensive network. In addition to roads and railways, the Port of Rijeka is connected to the oil pipeline systems linking refineries in Croatia, Hungary, Austria, Bosnia and Herzegovina, Serbia, the Czech Republic and Slovakia.

The main comparative advantage of all Croatian maritime ports compared to other ports of the EU is the fact that the Adriatic reaches far inland into the continent which ensures shortest and cheapest transport connection for countries located behind Croatia to the east Mediterranean, and via the Suez Canal to Asian and East-African countries. In this sense, the multimodal TEN-T corridors spreading across the Croatian territory confirm the key role of the Croatian ports as EU access gates. The Mediterranean corridor, the Baltic-Adriatic Corridor, the Rhine-Danube Corridor and the planned Adriatic-Ionian motorway further integrate Croatia in the transport and economic system of the EU.

2.2 Availability of alternative clean fuels

The Directive 2014/94 on the deployment of alternative fuels infrastructure[24] defines that Member States (MS) shall ensure, by means of their national policy frameworks, that an appropriate number of refuelling points for LNG are to be put in place at maritime ports, so to enable LNG inland waterway vessels or seagoing ships to circulate throughout the TEN-T Core Network by 31 December 2025. It is also important to mention that the revision of the Directive 2014/94 on the deployment of alternative fuels was part of the Roadmap –key

[24] Full text of the Directive can be accessed here: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32014L0094

actions (Annex to the European Green Deal)[25]. Currently, the proposal of the Commission is being discussed in the Council under the French presidency.

But while the regulatory framework is set for the availability of clean fuels in Maritime ports, the deployment of alternative fuels in the maritime ports requires significant investments. At the moment, none of the Croatian maritime ports offers the availability of alternative clean fuels. It is however promising that the Port of Rijeka as the only core maritime port in Croatia is considering the instalment of the on shore power supply in all the terminals for up to 2030.

2.3 Availability of discriminatory way and application of transparent charges

All maritime ports in Croatia comply with the Transport infrastructure requirement on non-discrimination, meaning that all maritime ports in Croatia that serve freight traffic are open to users in a non-discriminatory way and apply transparent charges.

2.4 Facilities for ship generated waste

According to the Croatian Transport Development Strategy (2017-2020) each newly constructed port - prior to the construction of the main project or before the start of the port use and if the main project is not required - must have a maritime study on ship generated waste accepted and certified by the Port Authority pursuant to Article 5 of the Regulation on Conditions to Meet the Ports (Official gazette 110/04)[26]. When planning for future ports, it is necessary to organise solid waste collection and to provide adequate infrastructure for wastewater collection from ships.

2.5 National Transport Strategy and Action Plan

The state administration body responsible for developing the Transport Development Strategy is the Ministry of the Sea, Transport and

[25] Full annex can be accessed here: https://ec.europa.eu/info/sites/default/files/european-green-deal-communication-annex-roadmap_en.pdf

[26] Full text of the Regulation can be accessed here: https://narodne-novine.nn.hr/clanci/sluzbeni/2004_08_110_2100.html

Infrastructure (MSTI). In August 2017, MSTI published the Transport Development Strategy of the Republic of Croatia (2017-2030)[27]. The production of this strategy was co-financed by the European Regional Development Fund (ERDF). In accordance with the EC and JASPERS methodology, the development of this Strategy took place in three phases:

- The first phase was the preparation of the Transport Development Strategy of the Republic of Croatia for the period of 2014-2030, which was adopted by the Government of the Republic of Croatia on October 30th 2014 (Official gazette no. 131/14).[28] This enabled the conditional use of funds from the OP Competitiveness and Cohesion.
- The second phase is the development of the National Traffic Model which was successfully completed in June 2016.
- The third phase is the preparation of the Strategy for the period from 2017 to 2030 that included the harmonisation of the National Traffic Model and the first phase of the Strategy. As it stands, it can be considered a completed national strategic document having completed the fulfilment of all the ex-ante conditions.

In 2013, in parallel with the first Strategy (2014) preparation process, the process of drafting a Strategic Environmental Impact Study was launched. With the aim of constant interaction and harmonisation of both documents, it resulted in an environmental impact assessment in harmony with the objectives and measures of the Transport Development Strategy.

[27] Full text of the TDS for the period 2017-2030 can be accessed here: https://mmpi.gov.hr/UserDocsImages/dokumenti/INFRASTRUKTURA/Infrastruktura%2010_19/Transport%20Development%20Strategy%20of%20the%20Republic%20of%20Croatia%202017-2030%2029-10_19.pdf

[28] Full text of the TDS for the period 2014-2030 can be accessed here: https://mmpi.gov.hr/UserDocsImages/arhiva/TR-DEVLP%20STRAT-DOC%203010-14%20ANNEX%201%20FINAL%2025-12_15.pdf

3. Other

EU support

Republic of Croatia applied for the membership in the EU in March 2003. Being granted the status of a candidate country in June 2004, Croatia then became a beneficiary of EU pre-accession funds earmarked for the transport sector: primarily the Instrument for Structural Policies for Pre-Accession (ISPA)[29] and IPA programmes. The Croatian parliament ratified the accession treaty in March 2012 and Croatia became a member state of the EU on July 1st 2013 and hence after full beneficiary of EU funds.

All Croatian ports have successfully accessed financial resources from CEF and other EU funded sources. Port of Rijeka has especially been successful in implementing development projects co-financed by CEF, to a total amount of 132.8 million EUR grants. The EU co-financed projects relate to the modernization of the railway infrastructure and construction of new intermodal capacities in the Port of Rijeka, the reconstruction of general cargo piers and implementation of the Port Community System.

Table 3 Projects implemented by Port of Rijeka co-financed by CEF[30]

Project title	Implementation period	EU share (EUR) /CEF co-finance in grants	Specific goals
POR2CORE-AGT Development of multimodal platform and connection with the Adriatic Gate container terminal	October 2017 – December 2020	30,222,600.00	Upgrading railway infrastructure and improvement of the connection of Port of Rijeka with TEN-T corridors, supporting the modal shift of containers from road to rail, upgrading railway infrastructure to increase the loading/unloading capacity in freight container transport by rail

[29] It was designed to address environmental and transport infrastructure priorities identified in the Accession Partnerships with the 10 applicant countries of Central and Eastern Europe. Later it was replaced by the regional development component of IPA

[30] Source: Port Authority Rijeka (2022) *Europski projekti*. Online, available at: https://www.portauthority.hr/europski-projekti/

POR2CORE-PCS Upgrade of infrastructure – Port Community Information System	December 2017 – December 2021	1,411,000.00	Designing and constructing a unique standardised port information system that is compatible with CIMIS system
POR2CORE-ZCT Upgrade of infrastructure –Zagreb Pier container terminal	October 2016 – December 2021	26,849,056.00	Reconstruction of cargo section of Rijeka railway station, adjustment of railway lines link between the railway station Rijeka cargo and the existing railway network of the general terminal, construction of a modern and efficient intermodal terminal at Zagreb Pier
POR2CORE-Rijeka Basin	October 2017 – May 2023	28,614,466.00	Upgrading the connection of the whole Rijeka basin with the railway in the hinterland and indirectly with European corridors by removing outdated and inadequate railway infrastructure
POR2CORE-BCTB	October 2017 – December 2021	5,180,464.00	Reconstructing railway track, transport and storage areas in bulk cargo terminal Bakar Basin, upgrading the connection of Bakar basin with the railway network in the hinterland
POR2CORE-GCT	January 2017 – April 2021	3,132,042.00	Reconstructing the southern part of the pier 90 m and the northern part 74 m, increasing safety and capacity and quality of service in the transhipment of general cargo
POR2CORE-AGCT Dredging	May 2020 – December 2021	2,782,310.00	Dredging the seabed of 100 metres along the quay wall to level the depth of the sea along the entire length of the pier of 428 metres at Adriatic Gate container terminal

Climate change

Croatia waterborne transport is highly affected by climate change. In IWW transport, it could be noticed in the number of navigable days throughout the year, which is declining due to low precipitation, especially in the Sava river. In maritime transport, heavy storms have caused damages to infrastructure, which is the reason why future infrastructure projects shall have climate proofing analysis and elements of resilience of infrastructure prior to the implementation. In 2021, European Commission (EC) published a new technical guidance on climate-proofing of infrastructure projects for the period of 2021-2027.[31] Climate-proofing is a process that integrates climate change mitigation and adaptation measures into the development of infrastructure projects.

The EU Smart and Sustainable Mobility Strategy was one of the main elements of the Annex to the EU Green Deal published in December 2020. As an EU MS, Croatia has access to various funding opportunities aimed at reaching the objectives of this Strategy. The instruments to be used in this respect are CEF and the Recovery and Resilience Facility. The Croatian National Plan for Recovery and Resilience 2021-2026 adopted by EC in July 2021, recognises waterborne transport as a sector that needs further support in greening and digitalising. In order to reduce Greenhouse gasses (GHG) emission from waterborne transport, Croatia plans to invest in modernising its fleet by introducing innovations in transport technology and increasing the number of vessels using alternative fuels.

Croatia is a maritime country known for its skilled seafarers with a great tradition in shipbuilding. The Croatian shipbuilding industry intends to position itself as a manufacturer of sophisticated ships by greening the fleet of liner shipping to reduce emission from maritime transport. This will encourage the need to develop infrastructure for the supply of alternative fuels due to increasing demands.

[31] Full text of the notice can be accessed here: https://op.europa.eu/o/opportal-service/download-handler?identifier=23a24b21-16d0-11ec-b4fe-01aa75ed71a1&format=pdfa2a&language=en&productionSystem=cellar&part=

War in Ukraine

Just like it disrupts air freight, the Russia-Ukraine war is severely disrupting shipping and the supply chain. Russian forces are cutting off shipping routes, logistics firms are suspending services and prices are skyrocketing with oil prices rising to record levels. There have been initiatives to ban Russian ships in the EU ports, although no decision has been made on the EU level yet.

The war has prompted the EU and other bodes to impose a number of sanctions on Russia. The export and transhipment of containers suffer from the uncertainty caused by the war and the sanctions, whereas the extensive import of energy is yet to be affected.

It is important to mention that within the budget allocation for transport of the CEF 2021-2027, 1.69 billion EUR is devoted to ensure military mobility within the EU, providing dual-use compatibility of infrastructure to meet both civilian and military needs. In the Joint Communication on Improving Military Mobility in the EU and the Joint Communication on Action Plan on Military Mobility, transport infrastructure policy is seen as a clear opportunity to increase synergies between defence needs and the TEN-T with the overall aim of improving military mobility across EU, taking into account geographical balance and the potential benefits for civil protection.

As the EU member state, Croatia will be able to apply for funding of the projects for military mobility as well as waterborne transport projects that could be suitable for both civilian and military purposes. It is a current question whether the military mobility budget will now be increased on the EU level due to the war in Ukraine. The budget proposal of EC was originally 6 billion EUR, and was later watered down in the negotiations and finally agreed at 1.69 billion.

Serbia

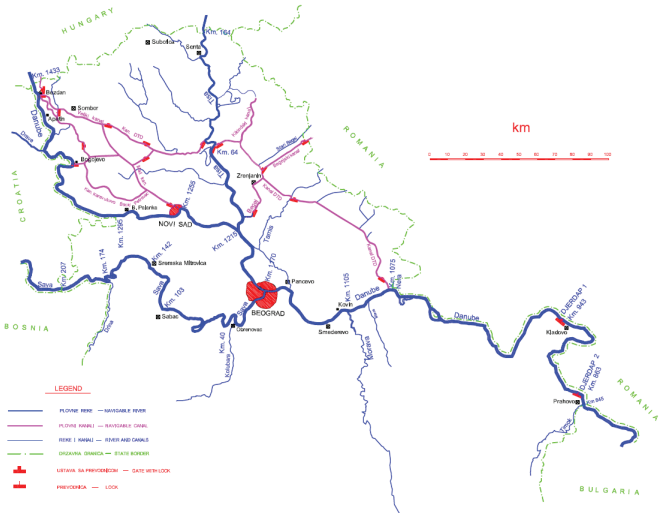
Vladislav Maraš

Contents

1. State of affairs: waterborne links

The geographical position of Serbia, as well as its existing network of rivers and canals (Figure 1), provides numerous advantages for intensive development of inland waterway (IWW) transport. However Serbia's IWW infrastructure has suffered from a lack of investment in infrastructure and in maintenance over the past decades. While other European countries – primarily the EU member states - have improved their IWW transport infrastructure with modern and advanced solutions, Serbia has not been able to keep up with these challenges. This has resulted in a reduction of the amount of cargo transported on inland waterways in Serbia. Today the revitalization of the infrastructure network is one of Serbia's priorities and, particularly from 2015 onwards many investments by the country and international financial institutions have been made to support this process.

Figure 1. Network of inland waterways in Serbia



Source: Master Plan for Inland Waterway Transports – Inland Waterways Network, 2006

Classes of IWWs in Serbia have been defined based on the CEMT-1992 classification (Table 1). CEMT-1992 classification (Table 1).**IWW COMPLIANCE ASSESSMENT**

Waterborne TEN-T network in Serbia

The indicative extension of TEN-T Comprehensive and Core network in the Western Balkans was made official through Commission Delegated Regulation (EU) 2016/758 of 4 February 2016 amending Regulation (EU) No 1315/2013 of the European Parliament and the Council for the Development of the Trans-European Transport Network[1]. According to this Indicative extension of TEN-T Comprehensive and Core network in the Western Balkans, the Core Network includes parts of the rivers Danube, Sava and Tisa in Serbia. Some basic characteristics of these rivers are given in the Table 2.

Table 2. Basic characteristics of navigable rivers in Serbia

Characteristics	Unit	Danube	Sava	Tisa
Countries	Running through	Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldova, Ukraina	Slovenia, Croatia, Montenegro, Serbia	Ukraine, Slovakia, Romania, Hungary, Serbia
	River basin	Germany, Switzerland, Poland, Austria, Slovenia, Czech Republic, Slovakia, Hungary, Croatia, Italy, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, Albania, Romania, Bulgaria, Moldova, Ukraina	Slovenia, Croatia, B&H, Montenegro, Serbia, Albania	Ukraine (8%,), Slovakia (9 %), Romania (48%), Hungary (30 %), Serbia (5 %)
	Lower	Turnu Severin (rkm 931) - Sulina (rkm 0.000)	Sremska Mitrovica (rkm 139) - Belgrade (rkm 0)	downstream from the mouth of the Maros/Mure River

[1] Transport Community (2021) Development of indicative TEN-T extensions of the Comprehensive and Core Network in Western Balkans, Report 2020 – Final version.

	Middle	Gyönü (rkm 1791) - Turnu Severin (rkm 931)	Gradiska (rkm 467) - Sremska Mitrovica (rkm 139)	Between the mouths of Maros and Somes Rivers
	Upper	Ulm (rkm 2588) - Gyönü (rkm 1791)	Sisak (rkm 594) – Gradiska (rkm 467)	Upstream from the confluence of the Somes River
Waterway length - total	km	2588 (confluence to Ulm-Germany) 2414 (international waterway – confluence to Kelheim-Germany)	944,7	966 (navigable 532)
Waterway length - Serbia	km	588	210,8	164
Total basin surface area	km²	801,463	97,713	157,220
Mean elevation	m a.s.l.	1078	545	/
Flow velocity	m/s	0.5-4.2 (Upper Danube 2.2-2.5)	0.7-2.2	0.67 (at discharge of 105 m³/s) – 4,1 (at discharge of 3.800 m³/s)

Source: Author

1.1 Danube River

Figure 2. Navigable waterways in the Danube River basin

Source: via donau, Manual on Danube Navigation, 4th Edition, 2019.

Specific characteristics distinguish the Danube River (Figure 2) from all other river systems in Europe. The Danube is not just particular by its natural features, such as the length of the waterway or the surface of the basin, but it is more important by its strategic, transport and economic position in the Old continent. Furthermore it is the only river in the world that flows through ten countries and is navigable in all those countries.

Regulation of the Government of Republic of Serbia on determination of international and interstate waterways[2] defines the Danube River as international waterway on the entire length of the flow throughout Republic of Serbia, from km 845+500 to km 1433+100. By applying CEMT-1992 classification and according to the Regulation of the Government of Republic of Serbia on categorization of international and interstate waterways[3], Danube river within Serbia falls within the following categories[4]:

- stretch from km 845+500 to km 1170 – category VII
- stretch from km 1170 to km 1433+100 – category VIc.

The EC encourages the development and a greater participation of IWW transport in the modal split as it may contribute to the significant reduction of air and noise pollution and to the optimization of land use for road transport. In this sense, the EU Strategy for the Danube Region, in 2012, set the following goals[5]:

- Increase in freight transportation on the Danube (Danube waterway network) by 20% in 2020 compared to 2010;
- Increase the physical capacity of Danube waterway by removing bottlenecks in order to enable unhindered navigation of pushed convoys with a draft of up to 2.5 m (VIb class of the waterway according to the UNECE international classification).

However, as of today these goals have not been achieved especially in the comparison of the Upper, Middle and Lower Danube within the EU Strategy for the Danube Region-Priority Area 1a: "To improve mobility and intermodality of inland waterways".

The Danube Commission and waterborne experts have defined the so-called minimum Level of Service related to fairway depth as 2.50m

[2] RS Official Gazette" No. 109/16

[3] RS Official Gazette" No. 109/16

[4] http://www.plovput.rs/international-waterways

[5] *https://danube-region.eu/download/list-of-eusdr-targets_fin/*

at Low Navigable Water Level with different maintenance measures, i.e. on 94% (343 days) of the year, calculated on the basis of the discharge observed over a period of 30 years with the exception of ice periods[6]. However, the waterway depth of 2.5 m is not constant and unchangeable. This is the minimum that guarantees that the depth of 2.5 m should not be smaller, except for 22 days a year, which do not follow one another. In our case it is a theoretical value that has been adopted to be valid for the entire international waterway of the Danube from Kelheim (km 2414) to Sulina (km 0.000).

All these reasons influenced the launch of the initiative to define indicators and parameters for measuring the reliability of the Danube waterway[7] as a part of the EU Strategy for the Danube Region under Priority Area 1A with the following objectives:

- To determine the overall reliability of the Danube waterway in terms of transport and logistics, supported and agreed by Danube shipping companies, freight forwarders, agencies, national water administrations, experts and policy makers;
- To determine the technical reliability of the Danube waterway as the minimum depth required for normal operation of the propeller with a safe reserve of 30 cm underkeel clearance;
- To determine the economic reliability of the Danube waterway by taking into account that a small depth of the waterway makes the Danube waterway transport not economically competitive with the rail and road transport, considering the growth of freight rates and the average transport distance on the Danube in the range between 600 and 700 km. Economic reliability assessments among the effect of modal shift, show a loss of amounts of transported cargoes due to low navigation levels;
- To determine policy reliability. To the effect, the Ministers of Transport of the Danube Region countries imposed a minimum guaranteed depth of the waterway of 2.5 m with various maintenance measures.

It is not easy to quantitatively describe advantages, disadvantages and relations among land modes of transport and Danube waterway due

[6] Fairway Rehabilitation and Maintenance Master Plan - Danube and its tributaries, 2014 and Capatu, A. , 2013

[7] Measurement of reliability in inland navigation along the Danube fairway, 2016

to different and complex operating conditions and environments in which they operate. For example, costs vary considerably with type of route, type of service, schedule, contract conditions, port and land transhipment systems, type of cargo, etc.

Based on various sources[8] the main aspects that will impact the development of inland waterway transport on the Danube and on its tributaries in the future, are as follows:

- Periods with low water levels can last longer and are expected to happen more frequently due to the effects of climate change. Lower discharge in the Danube will cause lower water levels, longer droughts, and periods of evaporation that can prevent and / or interrupt navigation completely;
- Limitations of draft and carrying capacity of Danube ships;
- More round trips of ships and convoys for the same amount of cargo;
- Higher transport costs per tonne and tonne-km;
- Possible modal shift towards rail and road transport due to service quality, regulatory, financial and market related barriers;
- Reduction of the volume of freight transport on an annual level in certain sectors, and on the entire Danube waterway in case of non-maintaining adequate navigation conditions along the national stretches and consequently non-enabling continuous navigation on the Danube.

With regards to the situation in Serbia, the main challenges expected to be experienced and impact the development of Danube waterway transport are:

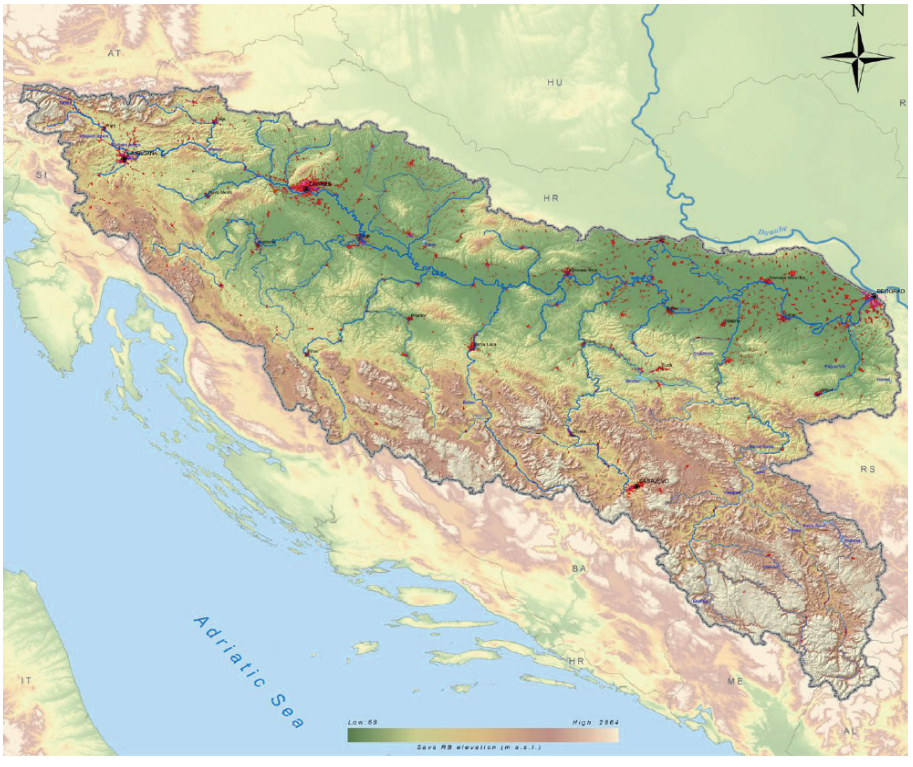
- Limitation of the draft and of the carrying capacity of the existing fleet due to non-favourable hydro-meteorological conditions, with emphasis on low water level;
- Low level of technical and technological advances of some Serbian ports, including port infrastructure due to lack of investment over the past decades;

[8] Scientific paper: Wurms, S., et al. 2010; Jonkeren, O., et al. 2008; Capatu, A., 2013; Orbst, K., 2014; European Union reports: EU Strategy for the Danube Region - Priority Area 1A, 2010, Common Danube Report, 2013 and 2014; and projects: NEWADA, 2009-2012, ECCONET, 2010-2012, NEWADA duo, 2013-2014, Fairway Rehabilitation and Maintenance Master Plan - Danube and its navigable tributaries, 2014 – 2020, and NEWS, 2012-2015.

- Underdeveloped financial capacities for acquisition of cargoes to be loaded and unloaded in Serbian ports;
- Quantity and structure of cargoes available for potential transport on the Danube mainly belongs to the bulk and liquid types, so it is non appropriate for development of container barge transport;
- Determining adequate frequency of required services, impact of seasonal nature (cereals, etc.) and direction (downstream, upstream) of cargo transportation;
- Low numbers of available staff with the appropriate education and trained for operation, maintenance and organisation of inland navigation.

1.2 Sava River

Figure 3. Overview map of the Sava River basin



Source: ISRBC, Indicator of river kilometres for the Sava River and its navigable tributaries, Zagreb, 2016.

The Sava River (Figure 3) is one of the three key rivers in the Republic of Serbia from the aspect of its contribution to the country's economy and water transport. As such it is a vital parts of inland water transport system in the Republic of Serbia.

The Regulation of the Government of Republic of Serbia on determination of international and interstate waterways[9] defines the Sava River as international waterway on the entire length of the flow through Republic of Serbia, from km 0 to km 210+800 with the following categorization[10]:

- stretch from km 0 to km 81 – category Va,
- stretch from km 81 to km 176 – category IV,
- stretch from km 176 to km 196 – category III
- stretch from km 196 to km 210+800 – category IV.

Historically, Serbian institutions have been very keen in improving the transport conditions on the Sava River. Around its trace, Sava is not only a driving force for the development of a healthy businesses sector, but also a key component for the strengthening of overall transport system in Serbia, for improvement of the level of transport service quality, and finally for maintaining river infrastructure.

Serbian institutions dealing with the maintenance of waterways work on the basis of international agreements and provisions relating to the target parameters on which navigation on the inland waterways depends. In Article 15, point 3 of the Trans-European Transport Network (TEN-T) agreement, the signatory states undertake to maintain a "good level of navigation" which is in compliance with the law on environmental protection currently in force, and to support river navigation by the River Information Systems (RIS). A good level of navigation refers to the maintenance parameters of the waterway.

Through the International Sava River Basin Commission, the countries through which the Sava flows, coordinate their efforts to achieve the best possible maintenance of the waterway. The Sava Commission has proved successful in implementing the decisions that fall within its remit.

The Sava Commission, in accordance with the Framework Agreement on the Sava River Basin (FASRB), has established the navigation

[9] RS Official Gazette" No. 109/16

[10] http://www.plovput.rs/international-waterways
Regulation of the Government of Republic of Serbia on categorization of international and interstate waterways ("RS Official Gazette" No. 109/16)

conditions (e.g. width, depth, radius of curvature) that apply to the waterway. The following activities performed by the Sava Commission can be singled out for a positive assessment:

1. pertaining to the establishment of an international navigation regime which includes:
   - adoption of a plan for marking, maintenance and the development of waterways;
   - adoption of uniform navigation rules taking into account the specific conditions on certain parts of waterways; and,
   - establishment of River Information Services (RIS).

2. pertaining to the establishment of sustainable water management, which implies cooperation in the field of water resources management in a sustainable manner, including integrated management of surface and groundwater sources, Sava Commission has had appositive impact in ensuring:
   - water in sufficient quantity and adequate quality for all types of use;
   - protection against harmful effects of water (floods, excessive groundwater, erosion and ice hazards);
   - conflicts of interest caused by different types of use and utilization are being dealt with properly; and,
   - effective control of the water regime.

The Sava River is a navigable river (where navigation is free for merchant vessels of all states), on which the navigation regime is governed by the Framework Agreement of River Sava Basin and the Protocol of Navigation Regime. The navigation route on river Sava is in AGN Agreement[11] categorized as the inland waterway of international importance within the European navigation routes network denoted E 80-12.

With regard to the safety of navigation, there may be difficulties in navigating the Sava River due to hydro-meteorological conditions which are characteristic for a climate of moderate continental type. On the waterway of the Sava River, the following difficulties stand out from the nautical point of view: i) high and low water levels, ii) rapids, iii) number of days with fog and frequency of foggy periods, iv) number of days with low temperature and ice, and the, v) number of windy days and the frequency of their occurrence.

[11] Law of Confirming European Agreement of Main Inland Waterways of International Importance – AGN ('Official Journal of RS – Interantional Agreements, No. 13/2013. The Agreement entered into force as of 10.4.2014)

The Sava river is covered by the RIS system. All ships navigating in the Serbian sector of the river are required to have radio communication devices and radar systems installed. From the point of view of monitoring transport processes, this component is reliably covered.

In accordance with the provisions of the Framework Agreement and decisions made by the International Sava River Basin Commission, the Sava River throughout its course in the Republic of Serbia should be at least in accordance with the requirements of Class IV inland waterways. Enhancement of the navigational conditions on river is planned in more strategic documents of the Republic of Serbia and of the Sava Commission.

To further develop water transport and improve its efficiency Serbian authorities are planning to improve the navigation conditions on the Sava River by improving the conditions for safe and efficient navigation affecting both transport of cargo and passengers. Defining technical and environmental conditions, as well as estimating the costs necessary to improve navigation conditions, particularly near the mouth of the river Drina, are among the most important steps.

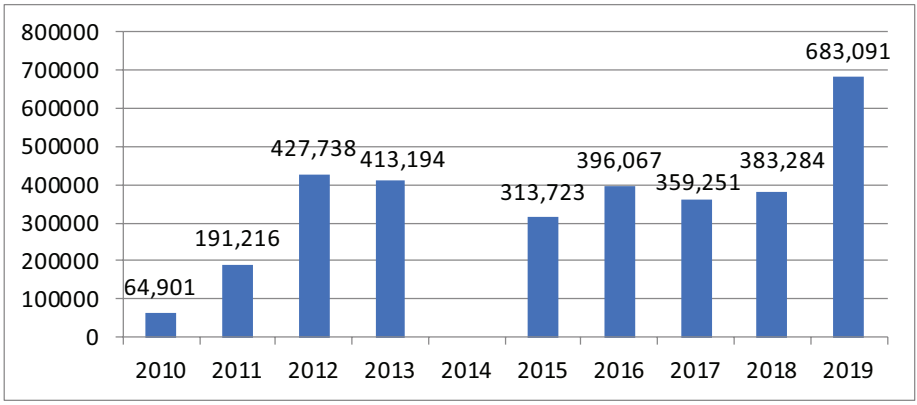
The low water level as well as the available widths of the waterway, currently lead to the introduction of restrictions related to the safety of navigation on the Sava River during certain parts of the year. The zone of the confluence of the Drina and the Sava is, in that respect, especially characteristic. The Sava River receives sediments and material from the Drina riverbed, which causes significant morphological instabilities and lead to a reduction in the available depth and width of the waterway.

Cargo transport on the Sava River, in Republic of Croatia, Bosnia and Herzegovina and Serbia, in total, in 1982, amounted to 9.5 million tons. The quantity dropped to 5.7 million tons in 1990. During the war most of the economic activities and port infrastructure were destroyed. From 2006-2008 there was a recovery of cargo transport totalling slightly more than 400,000 t per year, although there was no targeted investment in improving the existing situation[12].

By summing up the data for the ports of Leget and Šabac, as the most important Serbian ports on the Sava River, we can get aggregate transshipment information on the Sava River ports for the Republic of Serbia in the period from 2010 to 2019. Figure 4 shows the cumulative transshipment.

[12] Bosnia and Herzegovina - The road to Europe (Vol. 6): annex 5 (English) - Document of the World Bank

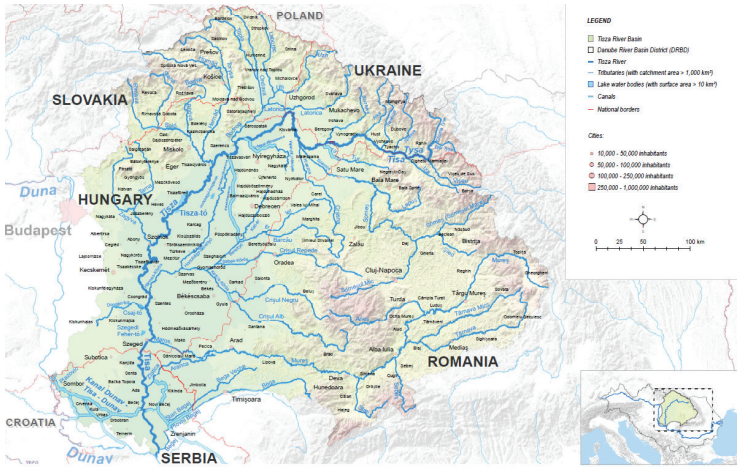
Figure 4. Cargo transshipment in Sava river ports in the Republic of Serbia in the period from 2010 to 2019[13] (in tons)



Based on Figure 2, it can be concluded that transshipment in the ports on the Sava River, which belong to the Republic of Serbia, has been constantly growing since 2010, with slight declines during 2015-2017. A particularly significant increase in transshipment has been observed in 2018 and 2019 due to increased demands for transport of construction and chemical products.

1.3 Tisa River

Figure 5. Overview map of the Tisa River basin



Source: https://www.icpdr.org/main/danube-basin/tisza-basin.

[13] Data for the port of Šabac from 2010 to 2013 was not available, while data for 2014 is not available for any port.

The flow of the Tisa River through Republic of Serbia represents an international waterway, as defined by the Regulation of the Government of Republic of Serbia on determination of international and interstate waterways[14]. The waterway of the Tisa River, on the stretch from km 0 to km 164, has a category IV[15].

Belonging to the Danube river basin, Tisa River is characterised by a small share in the transport of domestic, import-export and transit flows of goods on the inland waterways of Serbia, i.e. between 1-1.5% annually as compared to the Danube (95-97%), the Sava (2-2., 5%) and the Danube-Tisa-Danube canal network (0.5-1%). For those circumstances to change, there is need for large investments in infrastructure development.

According to the "Master plan and feasibility study Inland waterway transports for Serbia[16], the following investments for the period 2006-2025 are needed:

- For Class IV waterway requirements: EUR 9.715 million in port infrastructure and other activities, as well as additional 476 thousand EUR for the annual maintenance;
- For Class V waterway requirements: EUR 25.699 million for port infrastructure, expansion of the lock and other activities plus 808 thousand EUR for the annual maintenance.

The main economic and developmental features of the region in which the Tisa River goes through, for the period from 1990 to 2020, are as follows:

- A large decline, due to wars and sanctions in former Yugoslavia, in trade flows on the Tisa since 1990, with a trend that continues until 2020;
- High participation of the Danube countries in the total trade with Serbia, including the Potisje region, but with a decline in the share of Serbia's inland water transport in that trade due to lack of investments in maintenance of IWWs and in measures intended to enable modal shift towards IWW transport;

[14] "RS Official Gazette" No. 109/16

[15] http://www.plovput.rs/international-waterways
Regulation of the Government of Republic of Serbia on categorization of international and interstate waterways ("RS Official Gazette" No. 109/16)

[16] Zanetti, R., et al. (2005) Master plan and feasibility study – Inland waterway transports for Serbia, Vol. 1 - Main Report, pp. 6-1 - 6-5, European Agency for Reconstruction.

- The structure of freight flows on the Tisa is mainly dominated by raw non-metallic minerals (gravel), corn and liquefied gas as raw materials;
- There is a very high prevalence of one-way freight flows, which means that there are no return cargo voyages;
- In the trade with Hungary and Romania, the Tisa is little used compared to the Danube, due to limited carrying capacities of vessels and economic potentials of the hinterland. This also applies to foreign flag vessels;
- Outdated and inadequate structure of cargo vessels and the lack of developed port infrastructure, with the exception of the port of Senta, penalise the traffic flows;
- Passenger traffic is negligible; there are no permanent cruise lines, and; nautical tourism is in its infancy although a large number of boats are registered in the area of the Port authorities in Senta and Titel (500 in Senta and 300 in Titel plus those not registered, about 40% of the total number) and some excursion lines have been introduced seasonally;
- The development of a network of facilities dedicated to nautical tourism for the Tisa remains high on the agenda. The latest study from 2018 envisages marinas in Titel, Novi Bečej, Bečej, Ada, Senta, Novi Kneževac and Kanjiža.

Large ratios between depth and width of the riverbed are characteristics which make the Tisa unique in Europe. The riverbed has remained for the most part of years and during long periods, without major deformations. Despite all these aspects, it is difficult to predict the effects of climate change on the sailing conditions on the Tisa in the future.

Taking into account the quality of the Tisa waterway and the level of technical and technological advances of its port, the main difficulties in developing of water transport on the Tisa relate to:

- Limitations of the ships' carrying capacities due to dimensions of lock chamber on the lock near Novi Bečej;
- Undeveloped network of ports and harbors on the Tisa, except for the port of Senta;
- Lack of supply chains in cooperation with road and rail transport;
- The quantity and structure of cargoes available for potential transport on the Tisa, similar to the Danube, mainly related to bulk cargo (gravel, stone and cereals);

- Seasonal cargo transportation (cereals) and one-way freight flows increase the level of empty barge movements and therefore contribute to the increase of transport costs;
- Unavailable labour, educated and trained for the operation and organisation of inland waterway transport and maintenance of infrastructure; and,
- Undeveloped passenger transport and nautical tourism, even though the Tisa River is an international waterway.

Since May 2020 the Tisa River is marked with a red line on the map of the Rhine-Danube Corridor in the Fourth Work Plan of the European Coordinator. This means that works are not planned yet. An added R, indicates that the River Information System (RIS) is not developed.

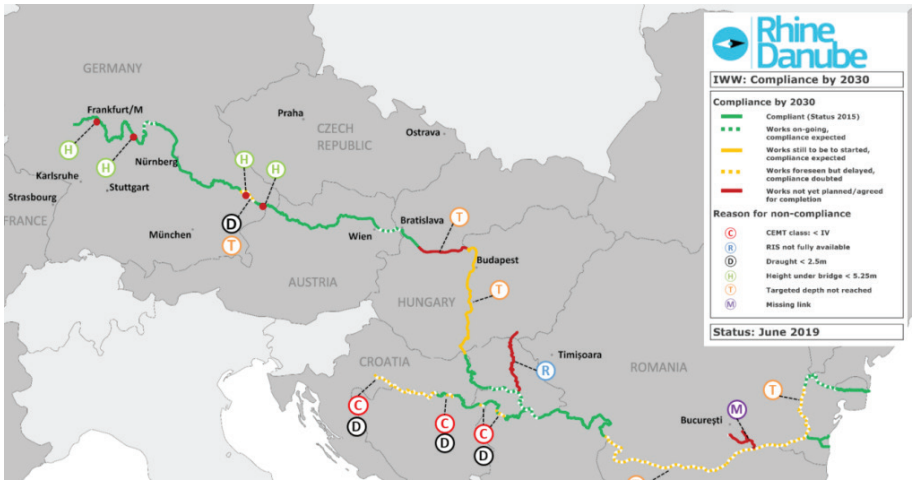
Regulation 1315/2013 provides a list of TEN-T compliance standards, commonly referred to as compliance indicators, for each transport mode. The compliance indicators for Inland waterways, inland and maritime ports are introduced in the Regulation 1315/2013 as infrastructure requirements. Report Transport Community (2021) assesses the compliance of inland waterways in Serbia as per the following indicators:

- CEMT requirements for class IV;
- Permissible Draught (min 2.5 m);
- Height under bridges (min. 5.25 m);
- RIS availability/implementation.

Expected compliance of the inland waterways network of the Rhine-Danube corridor with the standards and targets defined by Regulation (EU) 1315/2013 is presented on Figure 6. From the below presented map, we can conclude that the most of the network in the Republic of Serbia is already compliant, except for a few bottlenecks (CEMT class < IV and draught < 2.5m).

More detailed compliance assessment for inland waterways in Serbia is given in the Table 3.

Figure 6. IWW network compliance by 2030, Rhine Danube corridor



Source: Peijs, K. (2020). Rhine-Danube, Fourth Work Plan of the European Coordinator, European Commission, p. 16.

Table 3. Compliance assessment for inland waterways in Serbia - status in 2020

River	Network section	Western Balkans Regional partner code	TEN-T (Core/ Co-mprehen-sive) Network	Section length	CEMT Class (min IV)	Draught (> 2.5 m)	Bridge height (> 5.25 m)	RIS
Danube	km 1433.1-1295.0	Serbia-Croatia	Core	138.1 km	VIc	2.5 m	8.63 m - > 9.15	Y
Danube	km 1295.0-1075.0	Serbia	Core	220 km	VIc-VII	2.5-3.5 m	8.44 - > 9.15	Y
Danube	km 1075.0-845.5	Serbia-Romania	Core	229.5 km	VII	3.5 m	> 9.15	Y
Sava	km 210.8-178.0	Serbia-Bosnia and Herzego-vina	Core	32.8 km	IV	< 2.5 m	6.46 -> 7.0	Y
Sava	km 178.0-0.0	Serbia	Core	178 km	IV	2.5	6.46 ->7.0	Y
Tisa	km 164.0-0.0	Serbia	Compre-he-nsive	164 km	IV	2.5	> 7.60	N

Source: Transport Community (2021)

Based on the outcomes of the Transport Community (2021) report[17], given in the Table 3, it appears that the following compliance indicators remain unfulfilled:

- draught on the Sava on network section km 210.8 - 178.0 on the Serbia - Bosnia and Herzegovina border is less than 2.5 m,
- RIS on the Tisa river has not yet been deployed.

2. Inland ports

According to the Indicative extension of TEN-T Comprehensive and Core network in the Western Balkans, the Core inland waterway ports in Serbia are Port of Novi Sad and Port of Belgrade. Basic facts about these two ports are given in the Table 4.

Table 4. Basic characteristics and indicators about Core inland ports in Serbia[18]

Characteristics	Indicator	Belgrade	Novi Sad
River		Danube	Danube
Location	River km	1,168	1,254[19]
Bank	Left/ right	Right	Left
Type of port		Basin type	Canal type
Total port surface	ha	~ 90	24,19
Water area	ha	11	6
Depth	m	4 m at low water	4-10
Total quay length	m	940	800[20]
Vertical quay	m	610	170

[17] Transport Community (2021) Development of indicative TEN-T extensions of the Comprehensive and Core Network in Western Balkans, Report 2020 – Final version.

[18] Source of data: Transport Community (2021) Development of indicative TEN-T extensions of the Comprehensive and Core Network in Western Balkans, Report 2020 – Final version; Strategy on waterborne transport development of the Republic of Serbia, 2015-2025, The Official Gazette of the Republic of Serbia No. 3, 14th of January, 2014; https://www.aul.gov.rs/luke-i-pristanista

[19] at the entrance of the Danube-Tisza-Danube Canal (DTD Canal)

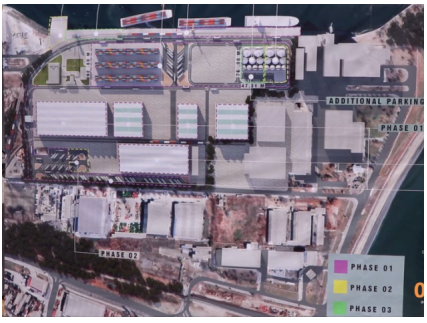
Berthing places (simultaneous)		8	5
Railway tracks length	m	12,500	6000
Connection to national railway network	yes/no	Yes	Yes
Open storage area	m^2	600,000	100,000
Closed storage area	m^2	220,000	44,000
Container storage area	m^2	12,000	/
Anchorage capacity	Number of vessels	12	/
Oil products storehouse capacity	m^3	/	270,000
maximum designed cargo handling capacity	tonnes/ year	3,000,000	2,000,000
Container storage capacity	TEU/ annualy	10,000	/
Supply of alternative clean fuels		Not available	Not available
Waste collection		Available	Not available
Shore-side power supply for vessels		Available at all berths	Available at certain berths
Bunkering		Not available	Available at the Oil terminal
Open to public	yes/no	yes	yes
Port operator(s)		Port Belgrade a.d. (owned by Worldfine, Luxembourg - www.lukabeograd.com)	DP World AD Novi Sad (www.lukanovisad.rs) NIS (www.nis.eu)

Source: Author

[20] of multipurpose trimodal terminal.

2.1 Port of Novi Sad

Figure 7. Port of Novi Sad and its development plans



The Port of Novi Sad (Figure 7) has one multipurpose trimodal terminal and one oil terminal. Port operations include cargo handling and storage of bulk cargo, general cargo, containers and liquid cargo. The handling equipment of Port of Novi Sad consists of[21]:

- six portal cranes with a capacity 5 t to 27.5 t;
- 14 forklifts with a capacity varying from 3 t to 12.5 t;
- one forklift with a capacity of 28 t;
- 5 loaders;
- two weigh bridges – one for road and and one for rail with a measuring range of 100 t;
- three telescopic funnels for bulk cargo handling with a capacity of up to 250 t/h;
- three packaging machines for 50 kg and 1,000 kg bags;
- a belt conveyor;
- pneumatic equipment;
- pumps for oil products, etc.

The main cargoes handled are grains, fertilizer components, scrap iron, ferrous metal products, etc. Table 5 gives the total amounts of transshipped cargoes in the Novi Sad port area in the period 2017-2021.

[21] Transport Community (2021) Development of indicative TEN-T extensions of the Comprehensive and Core Network in Western Balkans, Report 2020 – Final version; Strategy on waterborne transport development of the Republic of Serbia, 2015-2025, The Official Gazette of the Republic of Serbia No. 3, 14th of January, 2014. https://www.dpworld.com/en/novi-sad/services

Table 5. Total throughput in the Novi Sad port area

Port area – Novi Sad					
Year / Type of cargo	2017	2018	2019	2020	2021
Bulk cargoes	718.885,91	680.972,17	1.038.876,41	1.223.680,08	1.004.534,58
General cargos	26.487,59	12.845,00	1.288,00	34.834,47	25.772,00
Liquid cargoes	317.315,22	354.857,00	373.065,00	373.410,75	405.573,00
Total	1.062.688,72	1.048.674,17	1.413.229,41	1.631.925,30	1.435.879,58

Source: Data obtained from the Port Governance Agency – Republic of Serbia

Republic of Serbia is the owner of the land where the port lays and of most of the infrastructure. Within the port area, there are no free and available areas for further expansion. However, in the immediate vicinity, there is land that could be used for further development of the port.

At the end of 2018, the Government of Serbia initiated the process of privatization of the Port of Novi Sad. The procedure was completed in May 2019, and the consortium P&O Ports FZE managed by DP World from the United Arab Emirates became the owners of the Port of Novi Sad. P&O Ports FZE is a specialist company which manages small, multi-purpose ports including container terminals, bulk cargo and general cargo[22].

DP World Novi Sad – the new incorporated port entity - has committed to implement development projects worth 35 million EUR. Within these activities, the establishment of a container service between the Port of Constanta and the Port of Novi Sad was also planned. This was realized in March 2022, when the first 50 containers were delivered to the Port of Novi Sad, reloaded on trucks and shipped to end customers.

According to the development phases of the Port of Novi Sad, the following facilities should be built, expanded or developed within the next five years:

- 20,000 t grain silo;
- container terminal;
- multimodal rail (Huckepack) terminal;
- Ro-Ro terminal (in the later development phases)
- storage facilities (expansion);
- logistic subsystems and additional services.

[22] https://www.dpworld.com/en/novi-sad/about-us/who-we-are

In addition, the port development plans in Novi Sad include:

- a larger capacity system for handling grains, fertilizer components and fertilizers;
- extension of the operating vertical quay;
- redesigning of the existing and acquisition of new higher capacity cranes and equipment;
- modernisation of the information system; and
- development of an automatic data processing system.

These plans are aimed at increasing the throughput capacity of the port, both in terms of bulk cargo and general cargo, including containers.

2.2 Port of Belgrade

Figure 7. Port of Belgrade

Source: https://www.danube-logistics.info/danube-ports/profiles/action/port/country/Serbia/port/30/pfc/Profile/

Port of Belgrade has one multipurpose trimodal terminal. Containing one basin, the port offers handling services for bulk cargo and containers. The handling equipment of Port of Belgrade includes[23]:

- nine portal cranes with a carrying capacity from 3 t to 6 t;
- three overhead cranes with a capacity of 3t, 20 t and 50 t;
- two truck-mounted cranes with a capacity of 16 t and of 40 t;
- 30 forklifts with capacities of up to 12.5 t each;
- One container manipulator with a capacity of 27 t;
- a multi-purpose vehicle (Unimog); and,
- several trucks, semi-trailers, and other equipment.

[23] Strategy on waterborne transport development of the Republic of Serbia, 2015-2025, The Official Gazette of the Republic of Serbia No. 3, 14th of January, 2014.

The most important goods traded in the port include: salt, scrap iron, ferrous metal products, coal, paper, phosphate etc. Table 6 gives the total amounts of transshipped cargoes in the Belgrade port area in the period 2017-2021.

Table 6. Total throughput in the Belgrade port area

Port area – Belgrade					
Year / Type of cargo	2017	2018	2019	2020	2021
Bulk cargoes	116.321,86	104.325,23	126.124,49	109.720,50	161.154,79
General cargos	61.103,94	56.062,00	70.186,00	58.241,75	45.004,00
Total	177.425,80	160.387,23	196.310,49	167.962,25	206.158,79

Source: Data obtained from the Port Governance Agency – Republic of Serbia

The port of Belgrade is located near the city center. The Republic of Serbia is the owner of the port land, while the infrastructure is owned by the Port of Belgrade a.d., a private company operating the port as well. The port area is surrounded by urban environment. In addition, there are no additional spaces to expand the port capacities within the port area. These circumstances are the biggest obstacle to the future development of the port of Belgrade at the existing location[24].

Therefore, the competent authorities have initiated the process of development and construction of the new port in Belgrade. The Spatial Plan of the Republic of Serbia for the period 2010–2020 included plans for gradual re-location of the port. The Belgrade General Plan (covers the period up to 2021) indicates the needs for preparation and adoption of appropriate documentation for establishing the port area, as well as the construction and development of a new Belgrade port.

During 2020, the Ministry of Construction, Transport and Infrastructure conducted a public procurement procedure for the services of preparing technical documentation for the construction of a new port in Belgrade. Technical documentation includes Feasibility Study with Conceptual Design, Design for construction permit and Environmental Impact Assessment. The final location of the new port of Belgrade

[24] Strategy on waterborne transport development of the Republic of Serbia, 2015-2025, The Official Gazette of the Republic of Serbia No. 3, 14th of January, 2014.

will be defined through the preparation of this documentation. The preparation of this documentation is still ongoing.

2.3 Compliance indicators

TEN-T Regulation 1315/2013 introduces the compliance indicators for Core inland ports. These are the following:

- CEMT connection (Class IV waterway connection);
- Connection to rail;
- Connection to road;
- Availability of clean fuels;
- Availability of at least one freight terminal open to all operators in a non- discriminatory way and application of transparent charges.

Report Transport Community (2021) assesses the compliance of Core inland ports in Serbia as per each of these indicators. Outcomes of that assessment, as confirmed by main findings of this section, are given in the Table 7.

Table 7. Compliance assessment for Core inland ports in Serbia – status in 2020

Compliance indicators / Port name	Rail connection	Road connection	CEMT connection	Clean fuels availability	Terminal availability
Belgrade	Yes	Yes	Yes	No	Yes
Novi Sad	Yes	Yes	Yes	No	Yes

Source: Transport Community (2021)

Based on the Table 3, it is can be easily concluded that Core inland ports in Serbia, belonging to the extended TEN-T to the Western Balkans, are compliant with all requirements, i.e. requirements rail connection, road connection, CEMT connection and terminal availability, apart from clean fuels availability.

3. Other

Climate change and wars belong to events that severely impact the human life. They are so called the high-impact events. Although we can assume what consequences a 2-degree increase in temperature will have on the environment, it is difficult to predict all the effects of this process on all of humanity. If we adopt it to the case of inland waterways, although we know that rising temperatures impacts low water periods and therefore affects transport costs, it is difficult to predict how such changes will influence the competitive position and presence of inland waterway transport in total transport flows in the long run.

There is also disagreement among the authors about the possible impact of climate change on inland waterway transport. Results of the researches given in the Christodoulou et al. (2020) do not indicate a significant impact of climate change on the operation of IWW transport. Beuthe et al. (2014) findings impose that limited climate change would have a minimal impact on waterway's navigation. For sure, despite all these outcomes, Serbian IWW infrastructure development have to take into account all usual consequences of climate change that have a potential to contribute to the freight loss in IWW. This is particularly related to the impacts of events that can limit or interrupt navigation completely such as extreme weather events including floods and droughts and their effects on water levels or ice formation. Only in such a way, it will be able to respond to these events adequately and maintain or increase its modal split share.

War in Ukraine, as well as any other war, belongs to the events that are highly improbable, but could be imagined. Most often, various sectors are almost completely unprepared for such disruptive events. It was also the case with inland waterway transport on Danube at the beginning of the Ukrainian war. However, after more than three months, war in Ukraine has an impact on cargo flows and increase of freight rates, therefore on market-related aspects of IWW transport. So, it could be said that it is not significantly connected, at the moment, with existing infrastructure development projects of Serbian IWWs and ports.

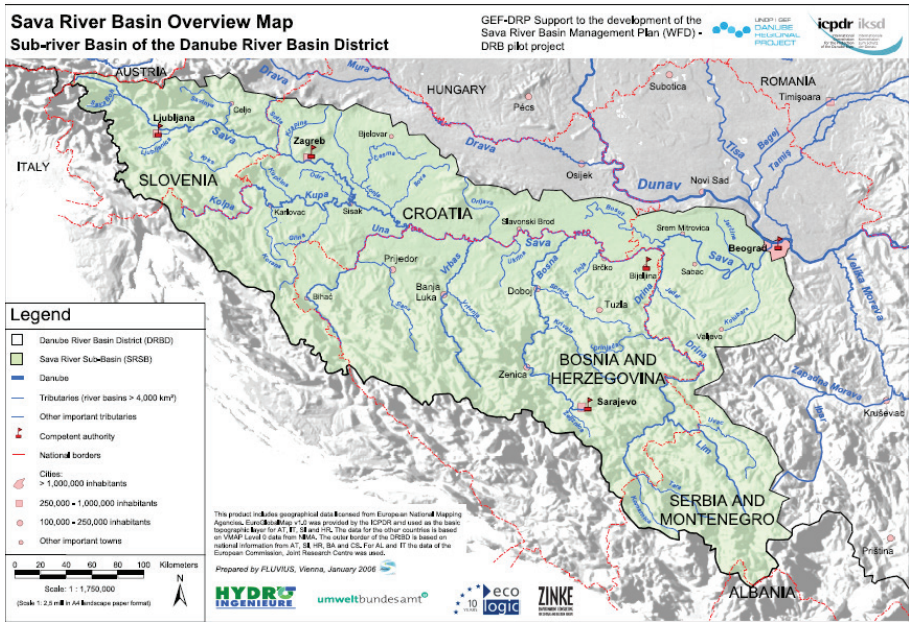
Bosnia and Herzegovina

Dario Bušić

Contents

On the north, the Sava River constitute the border of Bosnia and Herzegovina, which serves as the international waterway in the total length of 337.2 km, from the estuary of the Drina River into the Sava at 178 rkm to the estuary of the Una River into the Sava at the 515.8 rkm. According to Bosnia and Herzegovina's administrative structure, jurisdiction over the Sava River Waterway is divided between the state of Bosnia and Herzegovina and lower levels of government in the Republika Srpska (RS), the Federation of Bosnia and Herzegovina (FBiH) and the Brcko District of Bosnia and Herzegovina. BiH).

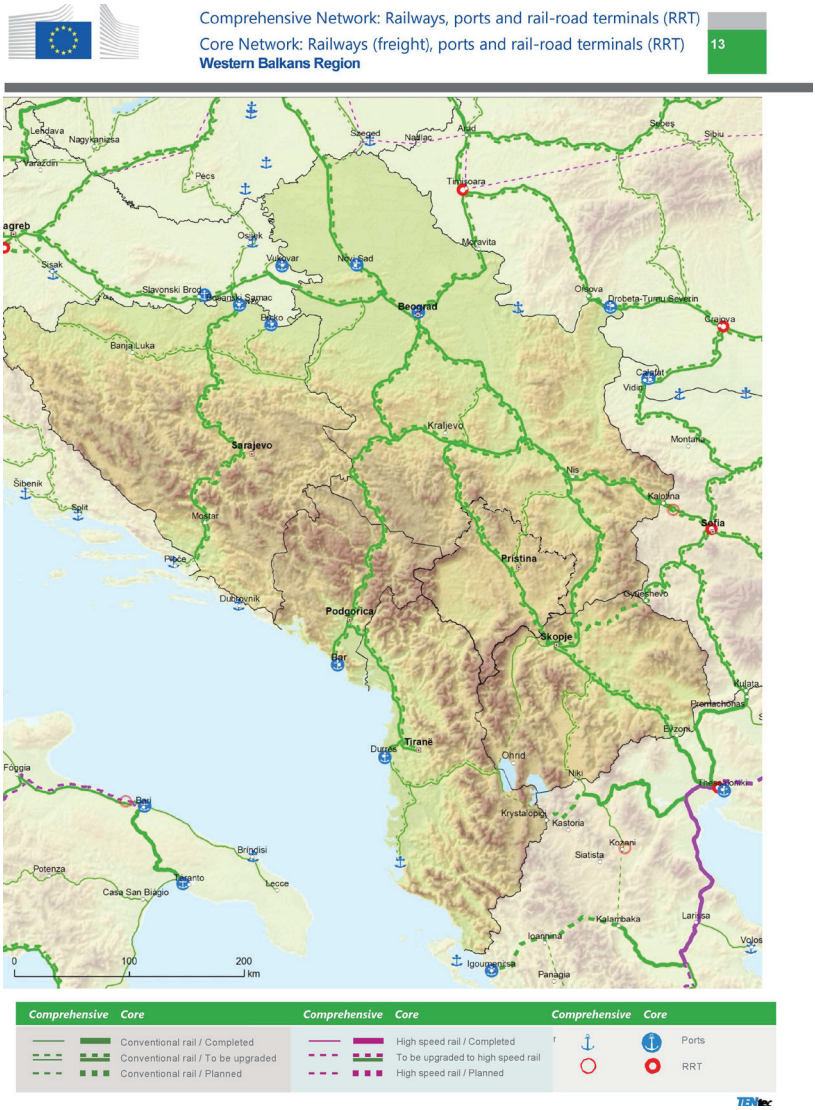
Figure 1. Sava River Basin Overview Map



Source: Witteveen+Bos in association with NEA and CRUP, KRO21-1/Pre-Feasibility Study for the Sava River – final report, Project managed by the Sava Commission, 2007

A detailed graphic presentation of the geographical area and the location of ports on the Sava River is given in Figure 2, which shows the map of *Indicative Extension to Neighbouring Countries*, as an integral part of the TEN-T network, i.e. Annex III to Regulation (EU) No 1315/2013 is amended with COMMISSION DELEGATED REGULATION (EU) 2016/758

Figure 2. Geographical location of the ports on the Sava River (TEN-T Network - Indicative Extension to Neighbouring Countries)



Source: COMMISSION DELEGATED REGULATION (EU) 2016/758 of 4 February 2016 amending Regulation (EU) No 1315/2013 of the European Parliament and of the Council as regards adapting Annex III thereto

1. Main waterborne links and nodes

Sava River is navigable from Belgrade to Sisak, at a total length of *594 km*, and through three countries: the Republic of Serbia, Bosnia and Herzegovina and the Republic of Croatia. The Sava River is the northern Bosnia and Herzegovina's border, stretching along ***337.2 km*** in length. Along the section from ***rkm 178*** to ***rkm 210.8***, the Sava River waterway represents the border between Bosnia and Herzegovina and the Republic of Serbia, while on the section from ***rkm 210.8*** to ***rkm 515.2*** the Sava River is the border between Bosnia and Herzegovina and the Republic of Croatia.

CEMT requirements for class IV

As an international waterway, the Sava River should be classified as IV navigability class. However, due to the war devastations and the long-term inadequate maintenance of the Sava waterway, the current inland waterway classification on the Sava River is as shown in Table 1.

Table 1. Inland waterway classification on the Sava River:

Section of the Sava River		Length (*km*)	Class
Downstream (*rkm*)	**Upstream (*rkm*)**		
0.0 Sava estuary	**81.0** Kamičak	81.0	Va
81.0 Kamičak	**176.0** Rača	95.0	IV
176.0 Rača	**196.0** Domuskela	20.0	III
196.0 Domuskela	**313.7** Slavonski Šamac Šamac	117.7	IV
313.7 Slavonski Šamac Šamac	**338.2** Oprisavci Rit Canal	24.5	III
338.2 Oprisavci Rit kanal	**371.2** Slavonski Brod Brod	33.0	IV
371.2 Slavonski Brod Brod	**594.0** Sisak	222.8	III

Source: Inland waterway classification on the Sava River, Sava Commission,, Decision 19/08, 14,/12 i 5/17,Consolidated text, Zagreb, 2017

In accordance with its competences, the Sava Commission published the *Detailed Parameters for Waterway Classification on the Sava River*, attached in the following Table 2.

Table 2. Detailed Parameters for Inland Waterway Classification on the Sava River

DETAILED PARAMETERS FOR INLAND WATERWAY CLASSIFICATION – "SAVA INITIATIVE"
according to (UN/ECE, GENEVA 1996.)

WATERWAY	IMPORTANCE		REGIONAL					INTERNATIONAL																
	CLASS		I	II		III		IV			Va			Vb			VIa		VIb		VIc		VII	
	CLASS MARK																							
MOTOR VESSELS AND BARGES	SKETCH	t & s p																						
	l (m)	t & s p	41	57		67 - 70		80-85 70			95-110 76,5-85			95-110 76,5-85			95-110 76,5-85		120-140 76,5-85		120-140 76,5-85		120-150 76,5-85	
	b (m)	t & s p	4,7-5,05	8,2 - 9,0 - 10,1		8,2 - 9,0 - 10,1		9,5 9,5			11,4 11,4			11,4 11,4			11,4 11,4		13-15 11,4		13-15 11-11,4		15 11-11,4	
	t (m)	t & s p	1,4	1,6 - 2,0		1,6 - 2,0		2,5 2,5 - 2,8			2,5-2,8 2,5-4,5			2,5-2,8 2,5-4,5			2,5-2,8 2,5-4,5		2,8-3,9 2,5-4,5		2,80-3,90 2,50-4,50		3,90 - 4,5 2,50-4,50	
	W (t)	t & s p	180	500 - 630		470 - 700		1 000 - 1 500			1 500-3 000 1 600-3 000			1 500-3 000 1 600-3 000			1 500-3 000 1 600-3 000		3 000-6 000 1 600-3 000		3 000-6 000 1 600-3 000		3 000-6 000 1 600-3 000	
PUSHED CONVOYS	CONVOYS							P.1			P.1			P.1.2			P.2.1		P.2.2		P.3.2	P.2.3	P.3.3	
	l (m)					118 - 132		85			95 - 110			172 - 185			95 - 110		185 - 195		195	270 - 280	285	
	b (m)					8,2 - 9,0		9,5			11,4			11,4			22,8		22,8		33	22,8	33-34,2	
	t (m)					1,6 - 2,0		2,5 - 2,8			2,5 - 4,5			2,5 - 4,5			2,5 - 4,5		2,5 - 4,5		2,5 - 4,5		2,5 - 4,5	
	W (t)					1000 - 1200		1250 - 1450			1600 - 3000			3200 - 6000			1600 - 3000		6400 - 12000		9600 - 18000		14500 - 27000	
MAIN CLASS PARAMETERS			Regulated rivers	Regulated rivers	Canalized rivers	Regulated rivers	Canalized rivers	Regulated rivers	Canalized rivers	Canals	Regulated rivers	Canalized rivers	Canals	Regulated rivers	Canalized rivers	Canals	Regulated rivers	Canalized rivers	Regulated rivers	Canalized rivers	Regulated rivers	Canalized rivers	Regulated rivers	Canalized rivers
	R_{min} (m)		250	250	250 - 450	300	300 - 550	360	360	700	360	360	750	450	450	800	450	450	600	600	750	1000	1000	1200
	T_{NPVpg} (%); T_{NPVrg} (%)		65; -	65; -	85; 90	65; -	85; 90	65; 95	85; 95	-	65; 95	85; 95	-	65; 95	85; 95	-	65; 95	95; 95	65; 95	95; 95	65; 95	95; 95	95; 95	
DIMENSION OF FAIRWAY	T (m)							2,3		2,2	2,4		2,4	2,4		2,4								
	T_v (m) + Δ		1,3	1,3	1,6	1,6	2	3,3		3,3	3,4	3,4	3,4	3,4	3,4	3,4	3,7	3,7	3,6	3,6	3,8	3,8	3,8	3,8
	B (m)		35	45		45		55		30	55		35	65		40	75		100		140	120	150	
	B_{zav} (m)	for min l_{sast} for max l_{sast}	25 35	35 45		40 45		75 75		40 40	85 90		40 45	95 100		50 55	100 120		120 150		150 180	125 125	170 200	160 160
SAFETY CLEARENS BETWEBN VESSEL AND BRIDGE/POWER LINES	H_{most} (m)		3	3		4		7			7			7			9,5	10	9,5	10	9,5	10	9,5	10
	${}_{min}B_{most}$ (m)		35	45		45		45		30	55		35	65		40	75		100		140	120	150	
	H_{dal} (m)	up to 110 kV up to 250 kV up to 400 kV	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	15 15,75 17	19 20,40 21,9	19 20,40 21,9	19 20,40 21,9	19 20,40 21,9	19 20,40 21,9	19 20,40 21,9	19 20,40 21,9	19 20,40 21,9
	H_{kabel} (m)		12	12	12	12	12	12	12	12	12	12	12	12	12	12	16,5	16,5	16,5	16,5	16,5	16,5	16,5	16,5
	B_{dal} (m); B_{kabel} (m)		B_{dal}; B_{kabel} = Širina rubova pokosa kanala ili udaljenost vanskih stopa obrambenih nasipa kod rijeka iznad VPV + 12,0m																					
DIMENSION OF LOCKS	T_{prag} (m)		1,6	2	2,25	2,5	2,5	3,0			4,0			4,5			4,5		4,5		4,75	4,75	4,75	
	${}_{min}B_{prag}$ (m)		10	10		10		10,0 - 12,5			12,5			12 - 25			26		24 - 26		34 - 37	24 - 26	34 - 37	
	${}_{min}l_{prag}$ (m)		60	60		70 - 75		90 - 190			115 - 190			190 - 210			230		230		260 - 310	310	310	

l (m) - length
b (m) - beam
t (m) - maximum draught
W (t) - tonnage
t & s - barges and motor vessels
p - pushed unit
Rmin (m) - minimal radius of curvature
TNPVpg (%) - duration of low navigation level (NPV) for navigation including maximum draught (% of navigable days with NPV or higher levels)
TNPVrg (%) - duration of low navigation level (NPV) for navigation including reduced draught (% of navigable days with NPV or higher levels)
T (m) - depth of fairway for navigation with reduced draught (95% duration)
Tv (m) - depth on a level of draught below NPV (with velocity submersion and skew)
Δ (m) - absolute reserve
B (m) - width of waterway in a stream
Bzav (m) - width of waterway in a curve
lsast (m) - length of proper vessel or pushed convoy

P.1 P.1.2 P.2.1 P.2.2 P.3.2 P.2.3 P.3.3

H_{most} (m) - vertical clearance under the bridges
${}_{min}B_{most}$ (m) - horizontal clearance under the bridges
H_{dal} (m) - vertical clearance under the power lines
H_{kabel} (m) - vertical clearance under the cables
B_{dal} (m) - horizontal clearance under the power lines
B_{kabel} (m) - horizontal clearance under the cables
T_{prag} (m) - depth on lock gate
${}_{min}B_{prag}$ (m) - minimal width of chamber of lock
${}_{min}l_{prag}$ (m) - minimal length of chamber of lock

Source: Detailed Parameters for Inland Waterway Classification on the Sava River, Sava Commission,, Decision 26/06 and 13,/09 i 5/17, Consolidated text, Zagreb, 2017

Permissible Draught (min 2.5 m)

The above table contains a detailed overview of all parameters necessary for the navigation on the Sava River. Only navigability class III requirements are not listed in Table 2. However, in other documents of the Sava Commission and the album containing the bridges, a depth of 2.0 m is used as a benchmark for this class.

Height under bridges (min. 5.25 m)

According to the available data, the height under the bridges located on the Sava River is given in the Table 3 below.

Table 3. Overview of dimensions of the bridge openings for navigation in comparison to defined classification on the Sava River fairway

No.	River	Bridge Name	Bridge Chainage (rkm)	Dimension of the Bridge Opening		Height Required by Classification	
				Height at HNL (m)	Width at HNL (m)	Height at HNL (m)	Width at HNL (m)
3.	Sava	Railway bridge Jasenovac	517.20	6.17	41.00[1]	4	45
4.	Sava	Road bridge Jasenovac	515.60	5.35	110.00	4	45
5.	Sava	Road bridge Gradiška	466.10	7.36	89.00	4	45
5a.	Sava	New road bridge Gradiška	470.20	17.86	85.00	4	45
6.	Sava	Pipeline bridge Brod	374.80	16.47	104.30	4	45
7.	Sava	Road bridge Brod	371.50	7.64	66.30	4	45
8.	Sava	Road bridge Svilaj	329.10	8.56	91,00	4	45
9.	Sava	Road-railway bridge Šamac	311.80	8.16	65.30	4	45
10.	Sava	Road bridge Županja	261.60	7.85	117.80	7	45

[1] Dimension of the bridge opening does not satisfy dimension required by the classification

No.	River	Bridge Name	Bridge Chainage (rkm)	Dimension of the Bridge Opening		Height Required by Classification	
				Height at HNL (m)	Width at HNL (m)	Height at HNL (m)	Width at HNL (m)
11.	Sava	Road bridge Gunja	228.80	7.62	47.50	7	45
12.	Sava	Railway bridge Gunja	226.80	9.58	120.00	7	45
13.	Sava	Road-railway bridge Rača	183.31	-	140.00	4	45
30.	Una	Road bridge Jasenovac	0.05	6.18	32.50*	3	45

Source: Album of bridges on the Sava River and its navigable tributaries, (description of navigation rules through the opening of the bridges), Sava Commission, Zagreb 2021

RIS availability/implementation

The RIS system is not in use in BiH. However, the BiH's side is covered by the RIS system of the Republic of Serbia and the RIS system of the Republic of Croatia, respectively. All RIS system base stations are located in the territory of the two neighbouring countries to which the BiH ports and captaincies do not have access to, which is another outstanding issue for BiH.

Given the lack of RIS system, the VTMIS system cannot be implemented in BiH.

CEMT connection (Class IV waterway connection)

The river ports in Bosnia and Herzegovina are classified according to the following navigability classes:

- The Port of Brčko at rkm 228,4: has access to the waterway class III due to problems with the section from the mouth of the Drina River downstream in the length of 20 km (from rkm 176 to rkm 196);
- The Port of Šamac at rkm 313: has access to the waterway class III due to the same restrictive issues as in the case of the Port of Brčko. The part of the Sava waterway from rkm 300 to rkm 329 is also the critical section;
- The Port of Brod at rkm 374,5: has access to the waterway class III due to the same restrictive section as the port of Brčko, and

the section from Šamac to Oprisavac in the length of 33 km (from rkm 338.2 to 371.2).

Connection to rail

The connection to rail is as follows:

- The Port of Brčko has a railway connection to the Tuzla - Brčko - Vinkovci (Croatia) railway;
- The Port of Šamac has a railway connection to the Corridor Vc Doboj – Šamac – Vrpolje railway.

Before the war, the Port of Brod had a railway connection to the Belgrade – Zagreb railway line (across the Sava River). The bridge connecting it was destroyed during the war. Currently it has only been reconstructed for the purpose of road traffic without the possibility of rebuilding the railway over the Sava River in Brod again.

Connection to road

All three ports (the Ports of Brčko, Šamac, and Brod) have connections to the road network as detailed below:

- The Port of Brčko has road connection to the road network. The only limiting factor is the bridge over the Sava River (from Brčko to Gunja), where freight traffic ban is in force due to the current bad infrastructure condition of the bridge;
- The Port of Šamac is connected to and located in the immediate vicinity of the road and near by Corridor Vc and of the Svilaj border crossing (cca 20 km distance);
- The Port of Brod has a road connection and is in the immediate vicinity of the Brod border crossing.

Availability of clean fuels

The river ports in Bosnia and Herzegovina lack the capacity to deliver clean fuels to vessels.

Availability of at least one freight terminal open to all operators in a non- discriminatory way and application of transparent charges

Both the freight terminal in the Port of Brčko and in the Port of Šamac are available all operators on a transparent and non-discriminatory basis.

Table 4. Overview of conections of the river port on Sava River fairway with rail and road

No	Port	Rail Connection	Road connection	Facilities for ship-generated waste	CEMT	Clean fuels availability	Terminal availability	VTMIS	other
1	Brčko	Yes	Yes	No[2]	III	No	Yes	No	-
2	Šamac	Yes	Yes	-	III	No	Yes	No	-
3	Bosanski Brod	No	Yes	-	III	No	Yes	No	-

Source: author

2. State of Affairs: ports

In Neum, which is situated in the South of the country, BiH has access to the Adriatic Sea. In the North, BiH is connected to the international inland waterways via the Sava River. All ports on the Sava River are situated on the right riverbank.

2.1 The Port of Brčko (core)

The Port of Brčko was first mentioned in the middle of the 17th century, when the current location of the port was used for loading coal reserves for steamships sailing along the Belgrade - Sisak water route, as the coal mines were situated in the Brčko's hinterland. Today's port was built in 1913, following the construction of the Brčko – Banovići railway, thus establishing direct connection with the Tuzla economic basin. Its expansion took place in the period 1952 – 1962.

There was no transhipment in the port during the war and five years after (1992 – 2000). With a donation from the Italian Government in 2001, the main reloading equipment – gantry cranes – were restored and put into operation, which helped to reinclude this Port in the transport system of Bosnia and Herzegovina.

[2] There is no waste collection facility in the port. There is only a container for the collection of general waste that is emptied based on contracts with companies the main activity of which is waste disposal.

Traffic data

The total transhipment in the Port of Brčko as if 2006 is shown in Table 5.

Table 5. Overview of transhipment cargo in the Port of Brčko per years

Year	Transhipped cargo (*t*)	year	Transhipped cargo (*t*)
2006.	80.626	2014.	120.270
2007.	51.798	2015.	80.103
2008.	55.546	2016.	149.186
2009.	168.340	2017.	135.727
2010.	160.278	2018.	127.362
2011.	33.511	2019.	130.402
2012.	71.273	2020.	72.782
2013.	65.506	2021.	70.128

Source: Sava Commission, Statistical Data

With the establishment of a modern container terminal, the Port of Brčko increased its competitiveness in the transport market. An overview of the scope of container operation is shown in Table 6.

Table 6. Scope of container operation in the Port of Brčko per year

year	TEU	Manipulation	Unloading
2019.	1206	1205	144
2020.	1959	1805	42
2021.	1204	1431	3

Source: Port of Brčko, Annual Report, Container operations

Infrastructure

In terms of the type of waterway, the Port of Brčko is a port with an open shore harbour and is placed on ***rkm 228.4***. In the immediate vicinity of the operational shore, there are three anchorages that are used, depending on the technological operations and the type of goods being handled. The Port is available 266 days a year for 180 cm draft, at a load of about 1,000 tons.

The Port of Brčko has a total surface area of approximately 14 hectares. Most of its usable area includes the operational shore with auxiliary and accompanying facilities, open and closed storage space,

and workshop space. There are two locations for empty containers with a total area of 6,000 m^2 within the Port, with a modern container terminal.

An operational shore of 104 m (along the sloping quay) and 76m (along the vertical quay) suitable for wharf of two large vessels has been built in. The maximum draught of a vessel is 2.5 m. A special advantage of this Port is the connection to the Brčko railway station with the single-track railway network.

Figure 3. Port of Brčko, Brčko distrikt BiH

source: https://europa.ba/?p=62448

Figure 4. Port of Brčko, Brčko distrikt BiH

source: https://tobd.ba/hr/objekti/306/luka-brcko

The Port of Brčko disposes a transhipment mechanisation with an annual capacity of about 915,000 tons, enabling the transhipment of bulk and general cargo. The most important handling equipment are two portal cranes type *Ganz* (of 5t and of 6t, respectively, l = 30 m), and auxiliary equipment that consists of forklifts and loaders that are also used in storage space. The Port is also equipped with a 45-ton loading capacity telescopic forklift for container handling.

The Port disposes a total available storage area of 61,000m^2 of open space, and 11,000m^2 of closed storage space. Closed warehouses consist of typical, classic ground space, and are partially rented to third parties.

Within the Port, there is also a facility used as the river border-crossing with a customs terminal of 17,500 m^2.

The Port of Brčko does not have alternative fuel availability or LNG refuelling points.

There is a road bridge over the Sava River in the immediate vicinity of the port which has been closed to freight traffic since 2019. It is used only by passenger cars.

There is also a railway bridge over the Sava River near the Port of Brčko[3], on the railway route from Tuzla to Vinkovci, used for freight carriage between the two countries.

Improving infrastructure in the near future

By the end of 2022, the plan is to install a new crane with a load capacity of 16/27 tons and with a crane range of 33 m. The deadline for the completion of the crane installation, according to the signed contract, is 7 September 2022.

Also, tendering procedures on the development of the main projects for the accessing infrastructure to the port of Brčko are currently conducted, with a loan financed by the EBRD. Upon completion of the procedures, the Brčko Novo - Luka Brčko railway connection will be reconstructed, together with the industrial tracks (planned amount: EUR 3,757,145.05) as well as the access road from the Bijeljina Road to

[3] Road bridge is on rkm 228+600
Railway bridge is on rkm 226+800
Port Brčko is on rkm 228+400

the Port of Brčko (planned amount: EUR 791,812.13). The conceptual design for the railway was financed by the EU.

Resolving outstanding issues of road infrastructure across the Sava River in the wider area of the Port of Brčko should take place in the near future by reconstructing the existing bridge or building a new one to enable better connectivity between BiH and Croatia. In such a way, the Port of Brčko would be significantly improved making it more competitive on the transport market.

Governance

The Port of Brčko is a public company owned by the Brčko District of BiH. It operates under the official name *Public Company "Port of Brčko" Brčko District of BiH, d.o.o*. Its international status has been recognised since 2006.

2.2 Bosanski Šamac (core)

The Port of Šamac was built from 1985 to 1990 with the aim of establishing a regional port to be used for the BiH'S heavy industry. The Port was operational from 1990 to 1992. As it suffered significant damage during the war, its operations were not reassumed until 2006.

Traffic data

Total transhipment in the Port of Šamac as of 2006 is shown in Table 7.

Table 7. Overview of transhipped cargo in the Port of Šamac per year

Year	Transhipped cargo (*t*)	Year	Transhipped cargo (*t*)
2006.	51.000	2014.	86.624
2007.	168.079	2015.	-
2008.	245.389	2016.	-
2009.	107.854	2017.	-
2010.	179.170	2018.	-
2011.	174.685	2019.	-
2012.	147.481	2020.	-
2013.	82.787	2021.	-

Source: Sava Commission, Statistical Data

The amount of transhipped goods in the Port of Šamac largely depended on the production facilities of the economic system that is part of the Port. The Port used to be owned by the Balkan Steel Company. During the period of its operation, the Port was mainly used for shipping steel pipes and delivery of cold rolled strips. The bankruptcy of the Port of Šamac was declared in 2015 and since then there has been no transhipment from vessels to the shore and vice versa.

Infrastructure

The Port of Šamac is an open shore harbour and is located at rkm 313. Anchorage and space for turning the vessel is possible downstream in the immediate vicinity of the Port. The Port is available for only 180 days for thrusters with 180cm draft and a load capacity of about 1,000 tons.

The total area of the Port of Šamac is approx. 58.8 hectares.

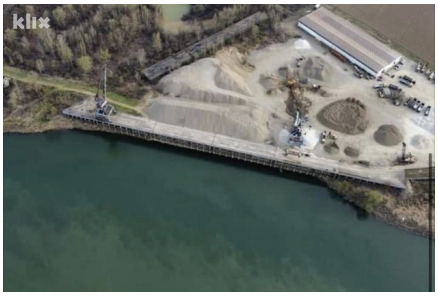
There is an operational shore with a total 311 m in length and 14.5 m in width. Special advantage of the Port is the connection with the railway network and the railway station Šamac. The total length of the rail track within the Port is 1,630 m.

The Port of Šamac disposes of a transhipment equipment with an annual capacity of about 966,650 tons, enabling transhipment of bulk and general cargo, both from the shore to ships and vice versa, and transhipment from rail to trucks, including container transhipment. There were two cranes with a capacity of 5 tons each that are no longer in operation.

The Port of Šamac has a total available storage area of 3,000m^2 of open and 3,600m^2 of closed storage space.

There is also a facility within the Port used for the river border-crossing as part of the customs terminal type A, with a total area of 1,420.40 m^2.

Figure 5. Port of Šamac



Source: https://www.klix.ba/vijesti/bih/zbog-lose-privatizacije-unisten-je-simbol-bosanskog-samca/220330068

Figure 6. Port of Šamac

Source: https://www.nezavisne.com/ekonomija/privreda/Unis-potopio-i-Luku-Samac/276585

Both road and rail Corridor Vc are in the immediate vicinity of the Port of Šamac. The proximity of the Doboj – Šamac – Vrpolje railway, as well as the new road bridge and the border-crossing on this transport corridor, represent a competitive advantage of this Port compared to other BiH ports on the Sava River.

The decision on the Port of Šamac, which is under bankruptcy procedures, is expected to be taken by the RS Government in the next period. Without such a decision, any prediction on the future of this Port is impossible.

Governance

The Port was privatised in 2006. The majority owner of the Port is the Balkan Steel Company based in Liechtenstein with the 64% ownership share. Under the privatisation contract, the owner was required to invest EUR 3.35 million over a three-year period in the rehabilitation of the cranes, the purchase of a higher-capacity additional crane, the reconstruction of the rail tracks, the covered warehouse and in auxiliary infrastructure.

As above mentioned, without Governmental decision about the Port of Šamac, any prediction on the future of this Port is impossible.

2.3 Bosanski Brod[4]

The river port in Brod was created as an exit from the Brod Oil Refinery, which was founded in 1892. The position of the refinery near the highway Zagreb – Beograd provided a good market positioning in the past. Earlier, there was a railway connection with the Belgrade – Zagreb railway connection (with railway bridge), which was not renewed in the post-war period.

Bosanski Brod is not a usual type of port. It is just a facility used for transhipment of liquid cargo from the nearby refinery. This facility is located at rkm 347.5. It is used exclusively for the handling of crude oil and petroleum products.

Figure 7. River Port of Brod Oil Refinery

Source: https://sbplus.hr/slavonski_brod/zivot/okolis/rafinerija_brod_moze_raditi_neovisno_o_janaf-u.aspx#.Ykrg9-hBw2w

Traffic data

The total transhipment at the Bosanski Brod oil terminal as of 2006 is shown in Table 8.

[4] Information on the Bosanski Brod Oil Refinery was collected on the basis of previously available information published in studies and materials, as well as some articles

Table 8. Overview of transhipped cargo in the Port by year

Year	Transhipped cargo (*t*)	Year	Transhipped cargo (*t*)
2013.	-	2017.	9.786
2014.	36.719	2018.	29.500
2015.	35.264	2019.	8.116
2016.	19.809	2020.	-

Source: Sava Commission, Statistical Data

Considering that even before the war, the scope of work was related exclusively to the transhipment of crude oil, both in the refinery and the oil plant on the Sava River from cistern tanks and railway tank-wagons, and to a lesser extent from river vessels, and that data on the distribution of modes of transport were not available, it is difficult to determine the share of each mode in the total operation volume.

Infrastructure

The Bosanski Brod petroleum transhipment facility is just an improvised barge terminal that currently requires rehabilitation to be suitable for handling liquid cargo from the nearby Refinery. Also, prior to the war, there was a pipeline from the facility to that Refinery. The technology applied in this facility is outdated.

Although the pontoon terminal was partially reconstructed between 2010 and 2015, any involvement of this facility in inland waterway transport would require a significant improvement of the existing infrastructure.

Governance

The facility for transhipment of petroleum products in Brod has the same owner as the Brod Refinery. The company operates within the OPTIMA Group, which has been owned by Russia's Zarubezhneft following the privatisation of the Refineries in Brod and Modriča in 2007.

This facility's operation depends primarily on the operation of the Oil Refinery in Brod, the facility of which 05.-IZOMAX was destroyed in an explosion on 9 October 9 2018, while the plant 04. for the production of gasoline, situated in its vicinity, is partially damaged.

2.4 The Adriatic facade

As stated above, the exit from Bosnia and Herzegovina to the Adriatic Sea is in Neum. Also, the existing development plans for the procurement of equipment for rehabilitation and expansion of infrastructure for cargo and ship handling as well as ancillary services in Gradiška will be listed below. The city of Gradiška is placed on ***rkm 466*** of river Sava.

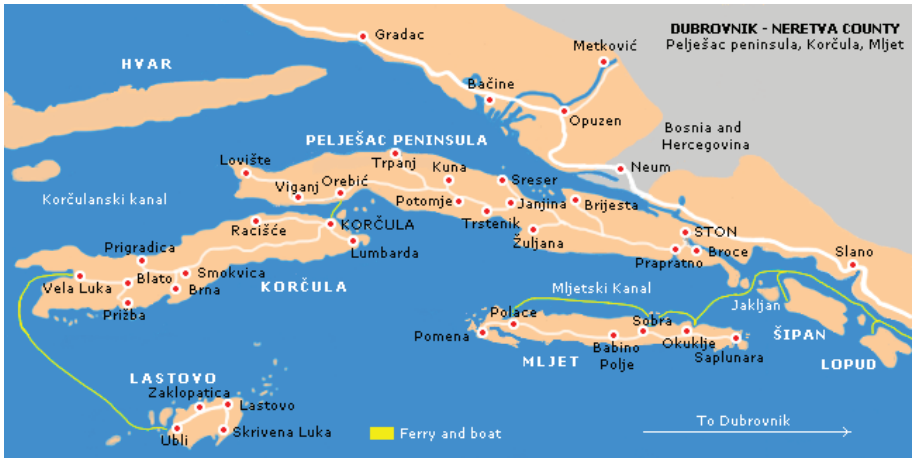
Neum, Adriatic Sea

The only BiH place on the Adriatic Sea is Neum. It is located near the Port of Ploče (18 nautical miles away) in Croatia. Since its construction, the Port of Ploče has been a natural exit of BiH to the Adriatic Sea, as the railway Šamac - Sarajevo – Ploče ends in Ploče and nowadays this point is the end of the railway corridor Vc.

With the dissolution of former Yugoslavia, Neum remains for BiH the only exit to the Adriatic Sea. BiH has a total coastline length of 24.5 km, with a total blue border length of 16 km.

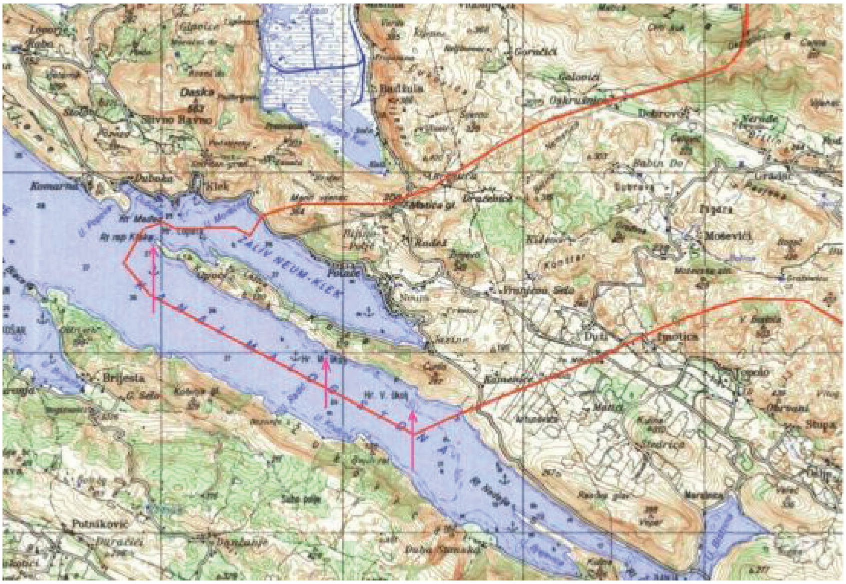
The geographical position of Neum is shown in Figures 8 and 9.

Figure 8. Map of the wider geographical area of Neum



Source: https://www.google.ba/search?q=neum+karta&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwjYst70rtfaAhXKIsAKHQSfDs0QsAQINQ&biw=1280&bih=869#imgrc=-oAbwynBamej5M

Figure 9. Map of the narrower geographical area of Neum



Source:https://hamdocamo.files.wordpress.com/2012/10/karta-bosansko-hercegovackog-primorja.jpg

The position of Neum is best visible in Figures 10 and 11.

Figure 10. Neum area, view to the West

source: https://www.google.ba/search?q=neum&tbm=isch&tbs=rimg:CSlV-VfnNe3KIjhy1Rbgrdvv zupy3JVjNDj72K4uU8iVxWhNor2AwYP_1oRvCFmxCJ0maNgC1OuV-qtl_1npSRfXVFgyoSCXLVFuCt2-_1OEVVTWCHtJMaJKhIJ6nLclWM0OPsR6yi7EFB_1KgwqEgnYri5TyJXFaBFcSHdv_1QyuWioS CU2ivYDBg_1-hEfnxFk-kl0T7KhIJG8IWbEInSZoRFsqq7OOQOLEqEgk2ALU65X6q0hGgkfiV GO6YpyoSCT-elJF9dUWDEa7fPHY_1eXAe&tbo=u&sa=X&ved=2ahUKEwjBuN3fstfaAhWC_ qQKHRrwCcUQ9C96BAgAEBg&biw=1280&bih=869&dpr=1#imgrc=G8IWbEInSZoHEM

Figure 11. Neum area, view to the South-East

source: https://www.google.ba/search?q=neum&tbm=isch&tbs=rimg:CSIV-VfnNe3KIjhy1Rbgrdvvzupy3JVjNDj72K4uU8iVxWhNor2AwYP_1oRvCFmxCJ0maNgC1OuV-qtI_1npSRfXVFgyoSCXLVFuCt2-_1OEVVTWCHtJMaJKhIJ6nLclWM0OPsR6yi7EFB_1KgwqEgnYri5TyJXFaBFcSHdv_1QyuWioSCU2ivYDBg_1-hEfnxFk-kl0T7KhIJG8IWbEInSZoRFsqq7OOQOLEqEgk2ALU65X6q0hGgkfiVGO6YpyoSCT-elJF9dUWDEa7fPHY_1eXAe&tbo=u&sa=X&ved=2ahUKEwjBuN3fstfaAhWC_qQKHRrwCcUQ9C96BAgAEBg&biw=1280&bih=869&dpr=1#imgrc=NgC1OuV-qtLNIM

Currently, there is no port or marina for tourist boats in Neum, neither in the whole length of BiH coastline. Because there is no place in Neum where vessels longer than 10 m would dock, they all remain anchored. Therefore, there is no possibility to show any volume of transport to and from Neum.

Although there is no port or marina in Neum, there are still some small-sized vessels registered there, for a total of 126. They are used exclusively for tourist purposes.

There are plans to eventually build a marina in Neum, but that is at the level of conceptual ideas for the moment.

In the event of its construction, the marina would pose a comparative advantage of this BiH place for the development of nautical tourism. The position of Neum is in the immediate vicinity of the Vc corridor, facilitating the accessibility of this place in the BiH'S tourist offer.

In BiH there is only the Port Authority of Neum, as an integral part of the Federal Ministry of Transport and Communications (Federation of BiH - entity level).

Gradiška, future plan

Within the first phase of World Bank project of the *Sava - Drina River Corridor Integrated Development Program* [5], Ministry of Transport and Communications of Republic of Srpska planned the preparation of the project documentation for the Port of Gradiška in the site of Gradiška by 2026.

The priority plan includes the development of a port and a pier, which will primarily serve for freight transport, but will also serve for passenger transport. Therefore, it is necessary to consider the construction of a quay that would fit into the profile of the Sava riverbed, with the aim of developing tourism.

In the later stage, the project will be followed with the procurement of equipment for rehabilitation and expansion of the infrastructure for cargo and ship handling, as well as ancillary services.

As part of the Project, the plan for the port is to provide transport, transhipment and storage of goods, including:

- protecting vessels from bad weather,
- transhipment from water to other modes of transport and vice versa;
- enabling the provision of services to vessels;
- supplying vessels with fuel and other necessities;
- storage of goods in transit; and,
- performing customs and other operations.

All of the above about Gradiška is currently at the conceptual level of development plans, for which it is necessary to consider possibilities for conceptual solutions, which would eventually represent a good basis for further development and realization of the planned.

3. Link compliance update

Improving the volume of navigation on the Sava River waterway primarily depends on fulfilling certain preconditions. These can be divided into two groups. The first group includes infrastructural preconditions, while the other one can be defined as administrative preconditions.

[5] Sava - Drina River Corridor Integrated Development Program, World Bank, Conceptual Outline, October,2018

The latter stem from the implementation of international agreements signed by BiH and the existing legislation within BiH, as well as from the need to adjust its legislation to the EU standards and transposition of EU IWW acquis.

3.1 Infrastructural preconditions

An increase in the volume of navigation along the Sava River may only be expected in case of complete rehabilitation of the waterway, and in the event of raising the navigability class.

Also, the fundamental precondition for the rehabilitation of the Sava River waterway is primarily to demine the right Sava Riverbank, with currently about *8 Mm2* of area that is still under mines. Assistance in addressing this issue was offered by the World Bank (WB), which approved the funds needed for this purpose through the WBIF. Grant application for the Project „*Sava and Drina River Corridors Integrated Development Program – demining of the right bank of the Sava river*" (value: 8,160,000.00 €) was approved by WBIF Board meeting on December 15./16. 2020.

Demining is the primary requirement for further implementation of the proposed "Sava and Drina Rivers Corridors Integrated Development Program" (SDIP), in which the countries of the region are included.

However, from the above project approval date, there has been an inexplicable delay in the grant approval process, due to administrative problems that need to be addressed in order to facilitate the effectiveness of funds. Therefore, the entire process has been slowed down and put on hold, although according to the first (optimistic) estimates, even before the approval of funds, the demining process should have been fully completed by the end of 2021.

Given the immediate necessity to begin demining of the right Sava Riverbank and along the total length of the Sava River waterway in the joint sector between the two countries (305 km in total), activities have been undertaken to improve waterway characteristics at specific critical sections.

The Ministry of Sea, Transport and Infrastructure of Croatia financed the project *Development of Environmental Impact Assessment Study and Design for the Action: Improvement of the Navigability Conditions of the Sava River from rkm 300 to rkm 329* (project Jaruge-Novi Grad). The

project was co-financed by the Connecting Europe Facility financial instrument (CEF).

The Study is in its final phase. The next phase will include the preparation of the conceptual design and the main project for the improvement of navigability conditions of the Sava River from rkm 300 to rkm 329.

The next step should certainly include full rehabilitation of the Sava waterway and raising the level of its navigability to class IV. Necessary funding must also be in place for these activities.

3.2 Obligations arising from international agreements

By signing the *Stabilisation and Association Agreement between the European Communities and their Member States, of the one part, and Bosnia and Herzegovina, of the other part*[6], BiH has undertaken the obligation to align its legislation, regulations and standards with that of the EU. Failure to adopt the legislation to meet the alignment directly impacts slowing down the process of approaching the commitments stemming from the transport acquis.

As a logical sequence of further activities in the process of BiH accession to the European Union, concerns the fact that BiH, as a signatory party, adhered to the *Treaty establishing the Transport Union between the European Union and Southeast European countries: the Republic of Albania, Bosna i Hercegovina, Former Yugoslav Republic of Macedonia, Montenegro, the Republic of Serbia and Kosovo*[7].

The Transport Community Treaty provides for an Action Plan according to which the parties to the Transport Community are expected to adopt IWW and maritime-related EU legislation within a specific period of time.

In addition to the above Agreements, Bosnia and Herzegovina has ratified other international agreements as well, the provisions of which must be respected, such as:

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[6] Stabilisation and Association Agreement between the European Communities and their Member States, of the one part, and Bosnia and Herzegovina, of the other part, 2008

[7] This designation is without prejudice to positions on status, and is in line with UN Security Council Resolution 1244 (1999) and the Opinion of the International Court of Justice on Kosovo's declaration of independence

- *Framework Agreement on the Sava River Basin* (multilateral), establishing the International Commission for the Sava River (so called Sava Commission);
- *Agreement between the Council of Ministers of Bosnia and Herzegovina and the Government of the Republic of Croatia on Inland Waterways Navigation, its Signalling and Maintenance;*
- *Agreement between the Council of Ministers of Bosnia and Herzegovina and the Government of the Republic of Serbia on Navigation on the Inland Waterways and their Technical Maintenance.*

BiH and its representatives actively participate in the work of the Sava Commission.

As a result of the Agreement with Croatia, the *Rulebook on the manner of marking the Sava and Una waterways* was adopted, according to which the maintenance of the marking system is the responsibility of the Ministry of Communications and Transport of BiH. According to available data, in order to enable the operation, the Ministry of Communications and Transport of BiH subcontracts this job to a contractor to perform the above tasks on behalf of the Ministry.

However, due to the lack of appropriate legislation at the state level to systematically define the activities and tasks related to international waterway, which is also the international border, the implementation of the said Rulebook is not completely possible. The said Bilateral Agreement also envisages the adoption of a *Rulebook on waterway maintenance and other acts related to maintenance*, which would significantly facilitate navigation on the Sava River waterway. However, such Rulebook has never been adopted, due to lack of agreement within BiH on the competencies over this waterway.

3.3 National legislation

In accordance with the constitutional competencies in BiH, access to the Adriatic Sea in Neum and the Sava River as an international waterway, is under the jurisdiction of the state, i.e. the BiH Ministry of Communications and Transport, which is responsible for international infrastructure and international transport.

However, there is no piece of legislation at the state level governing maritime navigation or inland waterway navigation, although the Sava River is an international waterway and natural state border.

Therefore, there is no legislative, regulatory or institutional framework in Bosnia and Herzegovina aligned with the EU acquis. In this regard, there is a possibility for technical assistance support with the aim of ensuring the necessary preconditions within IPA 2023.

Internal Waterways

Given the lack of state-level legislation regulating this area, there are three laws in Bosnia and Herzegovina, namely in the Federation of Bosnia and Herzegovina, Republika Srpska and Brčko District of Bosnia and Herzegovina, that regulate it. These are:

- Law on Inland Navigation of Republika Srpska *("Official Gazette of RS", No. 54/19)*, (Captaincy of the Port of Brčko, RS);
- Law on Inland and Maritime Navigation *("Official Gazette of FBiH", No. 73/05)* (Šamac – Ostrožac Captaincy, FBiH) and;
- Law on Inland Navigation of the Brčko District *("Official Gazette of the Brčko District", No. 28/08 and 19/10)* (Brčko District Captaincy, Brčko District BiH).

Maritime

There is no state-level legislation regulating maritime navigation, but the above Law on Inland and Maritime Navigation of the FBiH applies. Also, the Port Authority of Neum is an administrative unit within the Ministry of Transport and Communications of the Federation of BiH.

Administrative capacities

In addition to the already mentioned administrative division and the lack of a single state-level legislation that would facilitate approximation to IWW and maritime transport European standards, a special aggravating factor preventing further progress in inland waterway transport is the lack of highly qualified staff to deal with these matters in a more appropriate manner.

In terms of the administrative structure of Bosnia and Herzegovina, the low number of civil servants by institution at different levels of the government, responsible for waterborn transport can be illustrated as below:

a) The Ministry of Communications and Transport of BiH (state level): one civil servant in charge of overseeing water transport affairs, along with the superior head of the Department and the line Assistant Minister.

b) At entity level:

- In the Federation of BiH, maritime and inland navigation are within the scope of work of Federal Ministry of Transportation and Communications where the position related to water transport is currently being filled by the competent Assistant Minister. Two Port Authorities, namely the Port Authority of Neum and the Port Autority of Ostrošac are under the responsibility of this Ministry. there is one Captain and two administrative workers at the Port Autority of NEMU. In the Inland Navigation Port Authority of Ostrožac there is only one Captain.
- In the Ministry of Transport and Communications of the Republic of Srpska, one civil servant, the superior head of the Department and the line Assistant Minister are in charge of waterborn transport, and in the Captaincy of the Port of Brčko there are two staff members in charge of these affairs.
- Within the Government of the Brčko District (autonomous district level) there is a District Captaincy, under the authority of the Department for Public Affairs, with one person responsible for river navigation affairs.

3.4 Strategic transport-related documents

In the *Framework Transport Strategy of Bosnia and Herzegovina*[8] strategic plans are presented for the development of the transport system of BiH, and its administrative units (Entities and the Brčko District of BiH), by each transport mode.

According to this strategic document, the adoption of the Law on Maritime and Inland Waterways in BiHs envisaged as a key step forward and strategic goal (short-term by 2020 and med-term by 2025) in addressing concerns and aligning with EU directives and acquis in this area. However, since the adoption of the Framework Transport Strategy, there has been no progress in the adoption of the said law.

Given that the core short-term and long-term goals have not been sufficiently implemented, all activities envisaged by the Framework Strategy Action Plan for the implementation in the medium and long term have also been called into question.

[8] 2016 – 2030 Framework Transport Strategy of Bosnia and Herzegovina ("Official Gazette of BiH", No. 71/16)

Moreover, non-adoption of legislation in this area coincides with non-fulfilment of obligations assumed by BiH within the Transport Community, as its signatory. Therefore, the obligations envisaged by the Action Plan adopted under the Transport Community Agreement are currently not being fulfilled.

4. Other

Meeting the preconditions under Chapter 4 required for improvement of the IWW lead to complementarity and alignment with the Green Agenda, as well as to improvement towards more environmentally friendly and less polluting transportation, and may facilitate the transition to decarbonisation of transport.

There is also possibility of obtaining IPA III support for mature and well-prepared projects, focused on transport and cross-border cooperation. There is also a great complementarity with Corridor Vc, especially due to the connection of the Port of Brčko with Corridor Route 9a.

Climate change largely disrupts the water regime and navigation on the Sava River. Therefore, significant and urgent interventions are needed to improve the waterway in order to create the conditions for increasing the number of navigability days on the Sava, but also to enable the use of higher capacity vessels.

The current conflict in Ukraine does not significantly impact the Sava River waterway. It may be assumed that the potential effects of the conflict may be in the form of reduced shipping on the Black Sea, possible transport risks in the border areas of Romania or in the event of a possible spread of the conflict to Moldova.

North Macedonia

Ana Krstinovska

Contents

North Macedonia is a land-locked country situated in the center of the Balkan peninsula. As such, its links to the nearest maritime ports are ensured only through land transport (highways and/or railways). The country does not have any major navigable rivers or canals. Waterborne transport takes place only for passengers and to a very limited degree on the natural lakes. The country does not have any Class IV Inland Waterways (IWW) that could have been considered eligible for inclusion in the extension of the European TEN-T to the Western Balkans (both core and comprehensive network).

On the other hand, waterborne transport offers clear advantages from the point of view of environmental impact, reduced congestion, lower costs and increased efficiency of the transport operations.[1] Hence, the paper at hand departs from a long-term development perspective and aims to analyze the potential for further gradual improvements that would enable the development of waterborne transport in North Macedonia along both the European Corridor X and Corridor VIII. To that effect, it presents the current state of play in terms both of lakes and rivers, examines previous initiatives aimed to establish international transport, the experienced and potential risks and obstacles, as well as the preconditions which need to be implemented for any initiative to come closer to completion.

1. North Macedonia's national transport strategy and country priorities

The country has developed policy, legal and institutional framework to support the development of the transport sector in general. The first national transport strategy covered the period 2007-2017, while the current one adopted in 2018 defines specific priorities and plans spanning until 2030. According to the annual country report published

[1] Transport Community Permanent Secretariat (June 2021), *Action plan for waterborne transport and multimodality*, https://www.transport-community.org/wp-content/uploads/2021/06/Waterborne-and-Multimodality-Action-Plan.pdf, p.6

by the European Commission for 2021, in terms of alignment with the EU acquis and the relevant negotiation chapters the country is "moderately prepared" in chapter 14 – Transport policy and "has a good level of preparation" in chapter 21 – Trans-European Networks. The identified shortcomings refer to the lack of administrative and operational capacity, as well as political will to deliver on the key sectoral reforms.[2]

When it comes to maritime transport, North Macedonia has been a member of the International Maritime Organization since 1993 and is party to all its basic conventions, such as the ones on safety of life at sea, prevention of pollution from ships and the facilitation of international maritime traffic. In the area of inland waterway transport, the country is aligned with most of the EU acquis, except for the Regulation on the recognition of certification and transportation of goods and passengers, as there are no goods that are transported on North Macedonia's inland waterways.[3] The main legal act which regulates waterborne transport is the Law on internal waterways adopted in 2007 and subsequently amended on several occasions.[4] The competent institution is the Ministry of Transport and Communications which has a special body responsible for waterborne transport – the Captain of the Ports, located in the city of Ohrid.

North Macedonia has 2 ports with access for ships, both on the lake of Ohrid – one situated in the Ohrid city center and the other one in St. Naum. There are also 10 additional locations in the Ohrid region where ships can stop.[5] According to the National State Statistical Office, the number of registered passenger ships on the lakes in the past decade has been on the rise, from 2 in 2011 to 6 in 2020, allowing for an increase in the number of total available passenger seats on ships from 260 in 2011 to 670 in 2020.[6] The total number of

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[2] European Commission (2021), *Country Report on North Macedonia*, https://ec.europa.eu/neighbourhood-enlargement/north-macedonia-report-2021_en, p. 90

[3] Ibid. p. 91

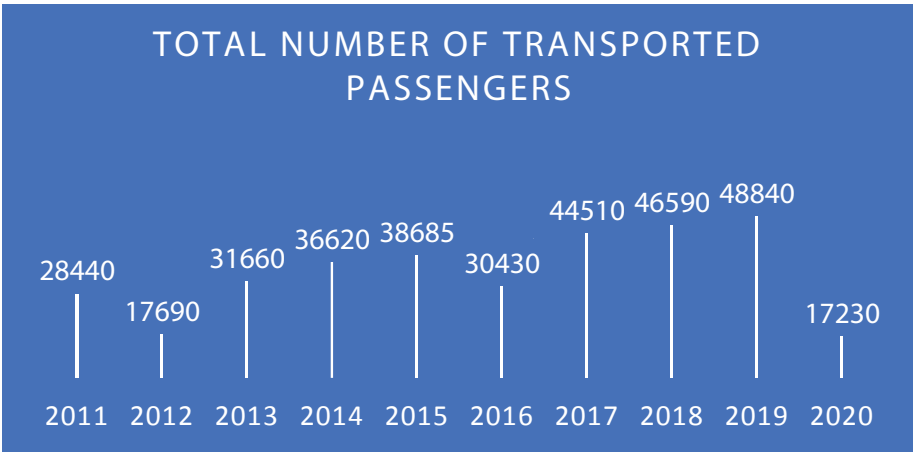
[4] Law on inland waterways – 2007 version and subsequent amendments (English translation), https://www.ecolex.org/details/legislation/law-on-inland-waterways-lex-faoc153325/

[5] Official reply to a request for information submitted to the Ministry of Transport and Communications of the Republic of North Macedonia, 10 March 2022.

[6] State Statistical Office of North Macedonia, MakStat database, http://makstat.stat.gov.mk/PXWeb/pxweb/mk/MakStat/MakStat__Transport__EzerskiTransport/550_Trans_MK_T23_mk.px/table/tableViewLayout2/?rx-

transported passengers has also been increasing until 2020 when it marked a sharp decline due to the impact of the COVID-19 pandemic on the overall number of tourists.

Figure 1: Total number of transported passengers on the lakes in North Macedonia, 2011-2020



Source: State Statistical Office, MakStat database

The National Transport Strategy 2007-2017 presented ambitious plans for the development of waterborne transport. The official document claims that the Ohrid Lake has great potential and adequate preconditions for the development of this type of transport, provided that it manages to attract a bigger number of passengers.[7] A feasibility study on sustainable waterborne transport on the lakes was considered necessary to determine the current state of affairs and to identify the improvements needed in terms of infrastructure, types of vessels and the overall capacity of the Ohrid Lake for such activities.[8] The strategy also presented a map of all the ports and marinas which should be built in order for waterborne transport to contribute to the development of the tourism and local economy in the Ohrid region.

id=46ee0f64-2992-4b45-a2d9-cb4e5f7ec5ef

[7] National Transport Strategy of the Republic of Macedonia 2007-2017, p. 9

[8] Ibid. p. 10

Figure 2: Proposal for transport lines on the Ohrid Lake. The black squares are the existing potential stops and the purple circles the stops to be built. The red line is a direct line from Ohrid to Pogradec (Albania).

Source: National Transport Strategy of the Republic of Macedonia 2007-2017

However, the National Transport Strategy 2018-2030 concludes that the objectives of the previous strategy in terms of (re)construction of the appropriate capacities have not been met, and henceforth remain valid for the forthcoming period.[9]

[9] National Transport Strategy 2018-2030, p. 23, http://www.mtc.gov.mk/media/files/2019/NTS-final%20MK.pdf

2. Lakes

North Macedonia has three tectonic natural lakes – the lakes of Ohrid, Prespa and Dojran.[10] Among them, the lake Ohrid, which is the biggest of all, is the only one with permanent and somewhat developed waterborne transport for commercial, fishing, taxi or tourism (sightseeing) purposes. During the summer season it operates several passenger lines with small ships (25-150 seats). The two ports – Ohrid and St. Naum - do not have access to fuel supply for the vessels and offer limited facilities (wharfs and piers, but no terminals or warehouses).

On one hand, this situation acts as impediment for the further development of waterborne transport on the Ohrid Lake. On the other hand, the lake is a UNESCO protected natural heritage sight, with over 140 endemic species.[11] Any development which could threaten the natural habitat could also threaten the lake's UNESCO status. This could have adverse effects on the tourism and the local economy, since the UNESCO label is one of the key attraction points for tourists. The other two lakes – Prespa and Dojran - have only seasonal traffic for personal leisure or fishing purposes with small boats.

[10] More information about each of them can be found at the following link https://www.igeografija.mk/Portal/?p=1038

[11] Ibid.

Figure 3: Map of North Macedonia showing the three tectonic lakes – Ohrid, Prespa and Dojran

Source: www.geology.com

The National Transport Strategy 2007-2017 introduces the idea to establish a permanent waterborne passenger line between the cities of Ohrid in North Macedonia and Pogradec in Albania. Such a line existed until 1948 and became a renewed topic of intensive communications between the local authorities in 1989.[12] It took nearly 25 years for the project to come to fruition and a seasonal charter line became operational in 2014.[13] In June 2014 for the first time a municipal delegation from Ohrid led by the mayor went to Pogradec using water transport and the mayor of Pogradec waited to greet them at the port. However, due to the low interest among tourists and declining number of passengers, the line existed for only 3 years and was suspended in 2017.[14] On the basis of this experience, the National

[12] Jovanovski Milcho (June 2014), *After a quarter century of negotiations, finally a ship connection between Ohrid and Pogradec*, Deutsche Welle, https://bit.ly/39vrStl

[13] Ibid.

[14] Skopje Info (August 2017), *The ship connection Ohrid-Pogradec is dwindling*, https://skopjeinfo.mk/brodskata-linija-ohrid-pogradec-zgasnuva

Transport Strategy 2018-2030 determines that the permanent line Ohrid – Pogradec is not feasible.[15]

Figure 4: Transported passengers in international waterborne transport in North Macedonia (charter line Ohrid – Pogradec), 2014-2016

Source: State Statistical Office, MakStat database

However, the local authorities on both sides of the border remain committed to find solutions and enable the operation of a water line between the two countries. In 2021, at the initiative of the municipality of Struga in North Macedonia, a project was launched in the framework of the EU Instrument for pre-accession - Cross-Border Cooperation program between North Macedonia and Albania 2014-2020 (IPA CBC) called "The Ohrid Lake – Bridging two countries in one destination".[16] The project worth EUR 2 million envisages the construction of ports in the cities of Struga and Pogradec and the purchase of two solar-powered ships to be used for sustainable transport. At the same time, the bilateral agreement between North Macedonia and Albania on the establishment of an international lake traffic line is currently being amended to further improve the conditions for service providers.[17] However, the success

[15] National Transport Strategy 2018-2030, p. 23, http://www.mtc.gov.mk/media/files/2019/NTS-final%20MK.pdf

[16] Struga Online (March 2021), Struga, Ohrid and Pogradec will be connected with a regular ship connection, https://strugaonline.mk/vesti/lokalni/struga-ohrid-i-pogradec-kje-se-povrzuvaat-so-redovna-brodska-linija/

[17] Interview with the Captain of the Ports – public body responsible for waterborne transport in North Macedonia. 12 April 2022.

and the sustainability of the endeavor will be largely contingent upon market conditions or significant public subsidies.

When it comes to the lakes of Prespa and Dojran, they both lie along international borders. The Prespa Lake is divided between North Macedonia, Albania and Greece, while Dojran is divided between North Macedonia and Greece. However, there have never been any significant initiatives to use the lakes for cross-border travel, there are no facilities and the water traffic is reduced to small fishing boats and tourist strolls during the tourist season.

3. Rivers

When it comes to rivers and canals, the only potentially navigable river in North Macedonia is the Vardar River, which source is located in the north-western municipality of Gostivar, flows through the capital city of Skopje and into the Aegean Sea in Greece to the West of Thessaloniki.

Vardar is the missing link in a much-discussed potential waterway connecting the Danube to the Aegean Sea, or the so call Danube-Morava-Vardar Canal. The first study on the Morava river section was commissioned by the Obrenovic royal family in Serbia and prepared in 1879 by Ante Aleksic.[18] Although the idea is more than one century old, it still occasionally comes to the forefront in the public discussion in all the three concerned countries – Serbia, North Macedonia and Greece.

The estimated length of the canal between Belgrade and Thessaloniki is 650 kilometers, including a 30-kilometers artificial canal linking the rivers Juzhna (Southern) Morava and Vardar through the river Pchinja. The Danube-Morava-Vardar Canal, through the Rhine-Main-Danube waterway, would link the Aegean and the North Sea. It would reduce the navigable route between the two by 1,180 kilometers (in comparison to the current route crossing through the Black Sea) and the costs by 25-30%.[19] According to the considered design options,

[18] Arsovski-Przho, Kiril (March 2018), *The Canal Danube-Morava-Vardar-Aegean is neither feasible nor viable for Macedonia*, ResPublica, https://respublica.edu.mk/blog/javen-interes/2018-03-08-09-44-47/

[19] Jovanovic, Bozidar and Miodrag Jovanovic (accessed: April 2022), *Hydropower and navigation system "Morava",* https://www.grf.bg.ac.rs/~mjovanovic/papers-sr/MoravaBMJSistem.pdf

the section going through North Macedonia is estimated at 206-275 kilometers, with 21 cascade dams and 4 ship lifts. [20]

Figure 5: Current state of play of the potential waterway Danube-Morava-Vardar and measures which need to be undertaken to transform it into a navigable canal.

Source: Radakovic, M. *The Danube-Morava-Vardar-Aegean Sea Waterway* in: "Danube Strategy – Strategic Significance for Serbia", eds. Jeftic-Sarcevic and Stojic-Karanovic, p.181.

The canal's minimum width is estimated to range between 28 and 43 meters, depending on the drought conditions, while the minimum depth is estimated at 4 meters, the bare minimum needed for cargo ships of up to 1,350 tons.[21] These parameters would qualify the canal as Class IV waterway of international importance along the Corridor X. However, despite more than a dozen studies and projects in the course

[20] Arsovski-Przho loc.cit.

[21] Jovanovski, Dobrivoje (November 2011), *Morava - Vardar (Axios) Navigation Route*, in: "Danubis – Journal for Regional Cooperation", http://danube-cooperation.com/danubius/2011/11/28/morava-vardar-axios-navigation-route/

of the past century proving the technical feasibility and economic justification, [22] the project has never been seriously considered. Furthermore, the prospects for the canal to see the light of day in this century seem ever more distant.

The benefits of building the canal could be strategic, socio-economic and environmental. For a land-locked country like North Macedonia, it would mean waterway access to two seas and to the European inland waterway network, as well as renewed potential to improve and speed-up its socio-economic development. The building, exploitation and maintenance of the navigable route as a new economic activity, as well as the impetus for the related sectors, could create economic and employment opportunities. This would be particularly significant for some of the cities planned to be built into ports, such as Kumanovo and Skopje. The increased and regulated water flow could improve the water supply for the industries and cities along the waterway, open new avenues for electricity production and lead to better flood management.[23] According to the Macedonian Chamber of Commerce, waterborne freight transport could reduce the transport time and the costs for Macedonian companies by 1/3, especially given the fact that 51% of the exports are destined to countries along the Danube.[24]

However, all these benefits seem unrealistic when contrasted with the potential obstacles. One of the main reasons why the canal was never seriously considered is the high level of investment needed, which is

[22] Some of them include: *The river Morava, its present state and possibilities of navigation* by A. Aleksić, Beograd 1879; *Project of the navigable routes Danube – Thessaloniki* by Prof. Dr. N. Stamenković, Beograd 1909; *Preliminary project of the navigable route Danube – Thessaloniki* by Projektantski Zavod Rečnog Saobraćaja, Beograd 1961; *Economic studies of the river Vardar catchment area* by Zavod za vodostopanstvo S.R.Makedonija; *Study of navigation on the rivers Velika Morava, Južna Morava and Zapadna Morava* by Projektantski zavod "Ivan Milutinović", Beograd 1964; *Study of the problems of traffic in connection with arrangement of Morava catchment area* by Institut za vodoprivredu "Jaroslav Černi" of Beograd, 1964; *The economic base of the river Morava catchment area* by Združeno opšte vodoprivredno preduzeće "Morava" of Beograd, 1971; *Supplement to the preliminary project Morava-Vardar (Axios) navigable route* by Projektantski zavod "Ivan Milutinović of Beograd, 1973; *Navigable route Morava-Vardar (Axios)* - Report by United Nations Experts, Beograd 1973.

[23] Jovanovski, loc.cit.

[24] Blazhevska, Katerina (June 2013), *Canal named Desire*, Deutsche Wele, https://www.dw.com/mk/%D0%BA%D0%B0%D0%BD%D0%B0%D0%BB%D0%BE%D1%82-%D0%BD%D0%B0%D1%80%D0%B5%D1%87%D0%B5%D0%BD-%D0%B6%D0%B5%D0%BB%D0%B1%D0%B0/a-16852803

estimated according to various studies between EUR 8-17 billion.[25] The time needed for the canal to be built and to become operational is estimated between 13 and 30 years.[26]

Another very serious problem is the fact that the Vardar River currently does not have the water flow needed to be navigable throughout the year and this situation seems to be worsening with the climate change and the prolonged drought periods in recent years. The water flow during the summer period is 5 cubic meters per second, which is largely insufficient to sustain transport.[27] Even the annual maximum of 200-300 cubic meters per second is significantly lower compared to the Danube which flows at 700-1000 cubic meters per second.[28]

Moreover, the fact that the riverbed floating through the Skopje city center is highly urbanized, with low hanging bridges and objects (artificial vessels) hindering the passage of ships, implies the need to build an additional canal circumventing the city, further increasing the cost and the complexity of the project.[29] A number of railway and highway sections would also need to be dislocated and rebuilt.[30]

The potentially high environmental and social impact has also been considered. Namely, the construction of the canal would imply the loss of fertile agricultural land. Also, at least three settlements along the route would need to be relocated and their population would need to be moved and professionally reoriented.[31] The route would need to cut through or near the ecologically protected zone Badar situated between the rivers Pchinja and Vardar, which is a natural monument since 1991 and a home to many endemic protected species. Finally, Vardar's delta into the Aegean Sea is also protected as a natural park, Ramsar area and Natura 2000 site.[32]

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[25] Conic, Igor (December 2012), *The construction of the Danube-Morava-Vardar Canal*, Gradnja, https://www.gradnja.rs/gradnja-kanala-dunav-morava-vardar/

[26] Radakovic, Milorad, *The Danube-Morava-Vardar-Aegean Sea Waterway,* in: "Danube Strategy – Strategic Significance for Serbia", eds. Jeftic-Sarcevic and Stojic-Karanovic, Belgrade 2012, p.182, http://bib.irb.hr/datoteka/547440.Danube_Strategy_Book.PDF#page=176

[27] Arsovski-Przho, loc.cit.

[28] Ibid.

[29] Ibid.

[30] Blazhevska, loc.cit.

[31] Blazhevska, Katerina (August 2017), *Vardar – the unnavigable link in the canal from Thessaloniki to Belgrade*, Deutsche Welle, https://bit.ly/39tN6YB

[32] Thermaikos Gulf Protected Areas, https://axiosdelta.gr/en/

However, in the last decade and with the launch of the China – Central and Eastern Europe cooperation platform in 2012, the canal project regained attention. The Chinese side, driven by its own commercial interests, has been lobbying all the concerned governments to reconsider the feasibility of the project. They have also put forward the idea to provide the necessary funding and implement the project according to the Chinese development assistance modalities – with a preferential loan by its Export Import Bank and a Chinese contractor. In 2013 China's Gezhouba Corporation conducted a preliminary feasibility study which determined that the canal is technically feasible and economically justified, estimating the cost at EUR 12 billion and the construction time needed at 5-7 years.[33] The recommended financing instrument, according to the Study, is a concession.[34]

However, the practice in the past decade shows that construction projects financed and implemented by Chinese entities display a gap between the initially planned amount and the actually incurred cost which is usually higher.[35] On the Macedonian side, it is also questionable whether the project is compatible with another landmark project envisaged in the area of energy – the construction of the "Vardar Valley", which consists of 12 hydro-power stations on the river Vardar and an irrigation system to be constructed over 12-15 years.[36] However, the "Vardar Valley" project has also been in the pipeline for several decades with slim prospects to find investors, given that the overall estimated amount equals EUR 1,5 billion and the economic feasibility of some components is questionable.[37]

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[33] Cerovina, Jelena (January 2018), *For China the Morava canal is feasible and viable*, Politika, https://www.politika.rs/scc/clanak/397318/Za-Kinu-moravski-kanal-je-izvodljiv-i-isplativ

[34] Kanal 5 Television (September 2013), *The Danube-Morava-Vardar Canal is a viable investment*, https://kanal5.com.mk/kanalot-dunav-morava-vardar-e-isplatliva-investicija/a184453

[35] Krstinovska, Ana (February 2022), *China's aid in the Western Balkans: Supporting Development, Undermining Good Governance*, China Observers in Central and Eastern Europe – CHOICE, Association for International Relations (AMO), Prague, https://chinaobservers.eu/chinas-aid-in-the-western-balkans-supporting-development-undermining-good-governance/

[36] ELEM - Macedonia's Electricity Plants (2017), "*Vardar Valley" Project*, https: //www.esm.com.mk/wp-content/uploads/2017/04/Vardarska-Dolina_2017_%D0%9C%D0%9A_lek.pdf

[37] Paunoski, Aleksandar et al. (accessed: April 2022), *Characteristic Indicators from the Pre-Feasibility Study for the Implementation of the "Vardar Valley" project*, https://www.scribd.com/document/487615687/Vardarska-Dolina

4. Further development prospects

Waterborne transport in North Macedonia currently exists only on the Ohrid Lake, particularly during the summer season and at a very limited capacity. There have also been reflections in the past to develop an inland waterway linking the Danube and the Aegean Sea through the rivers of Morava in Serbia and Vardar in North Macedonia. Further development of waterborne transport both on the lakes (namely Ohrid) and the rivers (Vardar and Pchinja) could arguably offer numerous benefits for the country in terms of socio-economic development. It could lead to new investments, jobs, export opportunities and reduced costs for economic operations. However, due to a number of constraints, at present it is not likely to envisage any specific activities in that direction.

First, environmental concerns rank high in the considerations regarding both the Ohrid Lake and the Danube-Morava-Vardar Canal. Any interventions or upscaling in the current infrastructure could potentially damage the biodiversity in the existing ecosystems. However, there have not been any studies to determine the specific environmental impact and whether there are any potential measures that could be taken to reconcile the local economic development and the environmental protection. Moreover, bearing in mind the negative tendencies with regard to climate change and extreme weather conditions, notably droughts, the sustainability of navigation on the Vardar River should not be taken for granted.

Second, in both cases there are concerns regarding the economic sustainability of the initiatives. In the case of the Ohrid Lake, the pilot project to establish an international passenger line between Ohrid and Pogradec demonstrated that there is insufficient interest and that the project is not commercially viable. In this respect, a more in-depth analysis is required to determine the underlying reasons and develop a comprehensive plan that would examine the potential role of such a line in the broader context of the international Corridor VIII. When it comes to the Danube-Morava-Vardar Canal, the initial investment is extremely high to the point that the potential return on investment is not certain or easily quantifiable.

Third, since water is becoming an increasingly scarce resource, competition between the water use in different economic sectors is

also a potential obstacle. With the current uncertainties and efforts of countries to ensure self-sufficiency of food and electricity production, North Macedonia will also face the decision how to maximize the use of water inter alia for irrigational and energy production purposes. Moreover, the climate change has significantly altered the validity of the historic parameters underlying the viability of a new canal. Should the drought periods and declines of the water levels continue at the current pace, the construction of the canal will no longer be even a feasible option.

Fourth, North Macedonia has already engaged in ambitious and costly plans to further develop or upgrade the transport infrastructure along both Corridor X and especially Corridor VIII. There are concrete plans and, in some cases, even prepared project documentation to finalize the highway route from the Albanian to the Bulgarian border and to also build a railway along the same line. Thus, the fiscal space for undertaking new sizeable projects with uncertain return on investment, such as the Danube-Morava-Vardar waterway has significantly shrunk.

Finally, Russia's invasion on Ukraine has brought into light the vulnerabilities of the existing trade routes and supply chains, making a case for strengthened cooperation with like-minded liberal democracies, reducing dependencies and prioritizing secure supply and trade channels. In such a context, the construction of Corridor VIII which runs through and connects only NATO allies certainly comes into prominence.

Hence, under the current scenario of opportunities and constraints, the potential for the development of international waterborne transport in North Macedonia does not seem to be easily achievable on the short to midterm. However, on the long term, it should be the object of more in depth studies that would cover two main aspects. The first is the importance of waterborne transport for the purpose of local economic development, especially tourism and cross-border economic activities on the Ohrid Lake and potentially the other two lakes. The second one is the development of specific navigable sections along the Morava-Vardar waterway which could be integrated in the future development of multimodal transport strategies for the region.

Greece

George N. Tzogopoulos

Contents

1. Port of Piraeus

By its geographical position, Greece is a crucial country in the Balkan Peninsula. Moreover it is an interconnection, trade and financial transactions hub, and a country that is emerging as a pillar of economic stability and security in the whole region and in the Mediterranean basin.

Against this backdrop, the country's ports, in particular the port of Piraeus, have the capacity of strengthening waterborne transport connections and facilitating linkages with South-Eastern Europe and higher up to the heart of EU. The 2020 report on the 'Growth Plan for the Greek Economy', for instance, stresses the need for Greek ports to upgrade their export potential and interconnectivity character. It also encourages Athens to grasp the opportunity to increase its exports with other countries[1] by the virtue of Greece having been recognized by China as a critical partner in the implementation of the Belt and Road Initiative and the port of Piraeus as a gateway to Europe. In that optic, the port of Piraeus is an absolute primary node not only in the new EU TEN-T methodology, but also in the larger Mediterranean context and in the BRI.

1.1 COSCO in Piers II and III

Piraeus is located in the region of Attica and surrounded by the sea. Its port is the largest in Greece and one of the biggest in the Mediterranean and in Europe where it is largely considered a commercial gateway to the EU.

In January 2008, the then conservative Greek government organized an international tender for the two main container terminals, II and III. The aim was to 'providing port services' through a concession agreement of

[1] Greek Government website, *Growth Plan for the Greek Economy*, available at: https://government.gov.gr/schedio-anaptixis-gia-tin-elliniki-ikonomia/, 2020 (in Greek).

piers II and II of the container terminal. At that time the port belonged to Piraeus Port Authority hence under the control of the Greek state. The concession conditions stipulated that the company would operate piers II and III for a period of 35 years, while pier I was then to stay under the management of the Piraeus Port Authority controlled by Greek authorities. The Chinese shipping giant COSCO made a better offer than Hutchinson Port Holdings (HPH) and won.[2] It offered €4.3 billion to operate the two piers bettering the 4.06 billion euro HPH bid[3].

According to tender documents, COSCO Shipping had to pay an initial amount of €50 million to the Greek state, plus each year a percentage of consolidated revenues as well as lease-related payments respective to the surface size and length of the berthing docks amounting to a nominal total amount of €4.3 billion over the 35-year concession period. The Chinese company pledged to upgrade the facilities of existing pier II and to construct the planned pier III investing approximately €230 million for the duration of the concession.[4]

The concession agreement was ratified by the Greek parliament in 2009 and consequently approved by the European Commission.[5] COSCO got possession of the Piraeus port in October of that year, coinciding with the election of the center-left PA.SO.K party and the outbreak of the financial crisis.

Since then, the results of COSCO's presence in the Piraeus port activity have been in constant increase. *Table 1* presents the number of twenty-foot equivalent units (TEUs) handled by the Chinese company from 2011 until 2021.

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[2] *Hi Kathimerini* (English edition) newspaper, 'Piraeus Port Announces COSCO Is Tender Winner', available at: http://www.ekathimerini.com/58053/article/ekathimerini/business/piraeus-port-announces-cosco-is-tender-winner, 13 June 2018.

[3] *Reuters* website, 'Piraeus Port Names COSCO Provisional Tender Winner,' available at: https://www.reuters.com/article/greece-port-cosco-idINL1245511020080612, 12 June 2008.

[4] See Law 3755/2009, *Hellenic Republic Governmental Gazette*, No. 52, 30 March 2009 (in Greek). See also: Frans-Paul van der Putten, *Chinese Investment in the Port of Piraeus, Greece: The Relevance for the EU and the Netherlands,'* available at: https://www.clingendael.nl/sites/default/files/2014%20-%20Chinese%20investment%20in%20Piraeus%20-%20Clingendael%20Report.pdf, Clingendael Report, 14 February 2014.

[5] Elias Bellos, 'The Next Day in Piraeus after the Approval of the Commission,' available at: https://www.kathimerini.gr/economy/local/777810/i-epomeni-mera-sto-limani-toy-peiraia-meta-tin-egkrisi-tis-komision/, 27 April 2014 (in Greek).

Table 1: Number of TEUs handled in piers II and III of the port of Piraeus (Piraeus Container Terminal SA data, in million TEUs)

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1,1	2,1	2,5	2,9	3	3,4	3,6	4,4	5,1	4,9	4,6

The TEUs throughput continuously increased from 2011 until 2019, before declining in 2020 and 2021, principally due to COVID-19, but also because of strikes of port workers protesting over safety issues. In 2020, the largest decrease was monitored in the month of June (-19.5 percent in comparison to 2019 June) but December 2020 witnessed an upward trend (+3.7 percent in comparison to 2019 December).[6] In 2021, the lowest number of handled TEUs was witnessed in the month of December (-25.4 percent in comparison to December 2020). On some occasions in the last months of 2021, the port failed to serve container ships waiting to dock due to workers' strike.[7] As the situation was stabilized in the first two months of 2022, a 1 percent increase was recorded in January and February 2022 compared to the same months of last year.[8]

On the whole, investments in Piraeus port are transforming the port well beyond a primary transport node serving mainly Greece, into a growing processing and distribution platform with an intercontinental vocation. In 2012, for instance, COSCO, Hewlett-Packard (HP) and Greece's railway company TRAINOSE agreed to use the port terminals managed by COSCO as a hub to distribute the electronics giant's products to central Europe, Middle East, North Africa, the Eastern Mediterranean and Eastern Europe.[9]

COSCO's operations profitability has also gradually increased. In 2014, its worldwide revenue from the terminal business rose by 13.6 percent

[6] Minas Tsamopoulos, 'Piraeus Remains Resilient During the Crisis,' available at: https://www.newmoney.gr/roh/palmos-oikonomias/nautilia/cosco-antechi-o-pireas-tin-krisi-giati-chriazonte-nees-ependisis/, 18 February 2021 (in Greek).

[7] Elias Bellos, 'Frequent Strikes Turn Vessel Itineraries away from Piraeus,' available at: https://www.kathimerini.gr/economy/561708202/oi-sychnes-apergies-kovoyn-dromologia-apo-ton-peiraia/, 8 February 2022 (in Greek).

[8] *Naftemporiki* website, 'A Positive Start for Piraeus in 2022,' available at: https://m.naftemporiki.gr/story/1843911/me-to-deksi-sto-neo-etos-o-peiraias, 19 March 2022 (in Greek).

[9] Ministry of Foreign Affairs of Greece website, 'Samaras Hails HP-COSCO-TRAINOSE Deal as Vote of Confidence for Country', available at: https://www.mfa.gr/uk/en/the-embassy/news/samaras-hails-hp-cosco-trainose-deal-as-vote-of-confidence-for-country-3.html, 15 November 2012.

due to the terminals located in Piraeus, Guangzhou and Xiamen.[10] The main comparative advantage playing in favour of Piraeus is the transit time. Btween Shanghai and Piraeus it takes approximately 22 days, 10 days less in comparison to that between Shanghai and the North European ports of Rotterdam and Hamburg.

By significantly shortening the delivery time between China and Europe, Piraeus is becoming a major access point for Chinese goods in Europe [11] offering to shipping companies and agencies better and cheaper opportunities to expand their activities. When mother vessels dock to Piraeus, smaller feeder vessels follow in order to transport commodities and products to smaller ports that cannot serve the needs of mother ships.

Additionally, to access central European markets Chinese companies intend to profit from the land-sea express route that starts in Piraeus and reaches Serbia via North Macedonia[12], to continue through Belgrade up to Budapest. The Greek part of such route will be operated by the Italian company, Ferrovie dello Stato, which bought TRAINOSE for 45 €million in 2016.[13]

1.2 The Privatization of Piraeus Port Authority

The initial success of COSCO in the Piraeus port, along with the launch of the Belt and Road initiative by President of China Xi Jinping in 2013, whetted the company's interest to increase its investments. The opportunity emerged when Greece needed to privatize the Piraeus Port Authority under its EU bailout obligations. The process for the tender started in March 2014 and concluded, in January 2016. By winning this tender COSCO Shipping would be able to expand its presence in Piraeus, manage pier I, together with piers II and III, and

[10] George N. Tzogopoulos, 'From China to Greece - on Track for the New Silk Road ' in Hartmut Marhold (ed.) *Europe under Stress: Internal and External Challenges for the EU and its Member States*, Nomos, Baden-Baden, 2016, pp.193-200.

[11] Oleg Levitin, Jakov Milatovic and Peter Sanfey, *China and South-Eastern Europe: Infrastructure, Trade and Investment Links*, available at: http://www.ebrd.com/news/2016/ebrd-papers-highlight-potential-of-southeastern-europe.html, European Bank of Reconstruction and Development paper, July 2016.

[12] Embassy of the People's Republic of China in Greece, Speech by Ambassador Zou Xiaoli at the Seminar 'The New Silk Road of China: One Belt, One Road (OBOR) and Greece,' available at: http://gr.china-embassy.org/eng/zxgx/t1351970.htm, 30 March 2016.

[13] Greek Privatization Fund website, Press Release, http://www.hradf.com/storage/files/uploads/18667b08321a9b05942c2f5f46eea234.pdf, 14 July 2016.

take control of all its activities including the ship-repair zone as well as the vehicles, cruise and passenger terminals.

In the first stage, the Chinese company paid €280.5 million to become a majority shareholder (51 percent) of the Piraeus Port Authority. The concession agreement stipulates for the payment of an additional amount of €88 million to increase the stake of the Chinese company to 67 percent after a period of five years for a total of EUR 668.5 Mio, under the condition of the realization of pre-defined mandatory investments. Hence the total value of the agreement – upfront payments plus mandatory investments - amounts to circa €1,5 billion. On top of the 368,5 million payments, it includes contractual investments amounting to €350 million as well as circa €410 million in revenue share from the concession agreement on the grounds of a 3.5 percent of the Piraeus Port Authority consolidated profits fee per year. The amount also takes into account the expected dividends and interest receivable by Greece's Privatization Fund as well as the estimated investments until the expiration of the concession, in 2052.[14]

On the primary infrastructure plan, the so-called 'Master Plan' of COSCO Shipping on the grounds of the 2016 agreement envisages a multidimensional overhaul of the port. Its approval by Greek authorities proved to be a lengthy process and the final decision was only made in October 2019.[15]

However, its practical realization has been an arduous task mainly due to concerns of the environmental nature raised by local municipalities, and organizations as well as individual citizens. The inability of COSCO to deliver in the pre-arranged timeframe generated a lively debate on whether it should acquire a further 16 percent of the Piraeus Port Authority or not. Subsequent discussions between the Chinese company and the Greek government to assess the situation and reach a midway solution were difficult and time-consuming. Following intensive deliberations the Greece's Shipping Minister Giannis Plakiotakis acknowledged that the Chinese company had concluded only a part of the mandatory investments but assessed that this was mainly due to external factors such as litigation and bureaucracy.[16]

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[14] Ibid.

[15] Elias Bellos, 'COSCO's Piraeus Plan Approved, in Part,' available at: https://www.ekathimerini.com/economy/245471/cosco-s-piraeus-plan-approved-in-part/, 13 October 2019.

[16] *Hi Kathimerini* (English edition) newspaper, 'Parliament Paves Way for COSCO to Raise its OLP Stake,' available at: https://www.ekathimerini.com/economy/1168886/parliament-paves-way-for-cosco-to-raise-its-olp-stake/, 1 October 2021.

Against this backdrop, an amicable compromise was reached that gives 5+5 years to COSCO to implement mandatory investments. The Greek Court of Audit okayed the sale of the majority stake of 67 percent in August 2021, and the Greek parliament followed suite and voted in favor in the hope to guarantee the smooth evolution of the investment as well as benefits for the Greek national economy and local societies.[17]

In March 2022, a judgement of the Council of State further found that previous approvals of the 'Master Plan' had overlooked the absence of an environmental impact report for the different facets of the investment.[18] This ruling led to '*a temporary halt of construction works*', as the Piraeus Port Authority puts it, but has not altered the commitment of the company to '*apply its big investment plan for the country, taking into consideration potential adjustments that are considered necessary according to decisions made by relevant administrative and judiciary authorities*.'[19] The conditions created after the judgement of the Council of State practically mean that new environmental studies have to be approved by the Municipality of Attica and other relevant Greek Ministries. The Piraeus Port Authority stresses the importance of climate change and participates in relevant EU-funded projects such as 'The Green and Connected Ports' one that aims at facilitating the compliance of the ports of Piraeus, Valencia, Venice, Wilhelmshaven and Bremerhaven with European environmental regulations.[20]

We estimate that notwithstanding the technical problems, there is no alternative for the Chinese company and Greek authority but to

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[17] Capital website, 'G. Plakiotakis: The Modification of the Concession Agreement with Piraeus Port Authority' Safeguards the Implementation of a Big Investment,' available at: https://www.capital.gr/politiki/3585064/g-plakiotakis-i-sumfonia-tropopoiisis-tis-sumbasis-me-ton-olp-diasfalizei-tin-ulopoiisi-mias-megalis-ependusis, https://www.capital.gr/politiki/3585064/g-plakiotakis-i-sumfonia-tropopoiisis-tis-sumbasis-me-ton-olp-diasfalizei-tin-ulopoiisi-mias-megalis-ependusis, 29 September 2021 (in Greek).

[18] *Ekathimerini* website, 'Cosco's Piraeus Masterplan Stopped for Want of Environmental Report,' available at: https://www.ekathimerini.com/economy/1179834/coscos-piraeus-masterplan-stopped-for-want-of-environmental-report/, 16 March 2021.

19 Piraeus Port Authority website, Announcement Following the Council of State Decisions, available at: https://www.olp.gr/el/plirofories-ependyton/etairikes-anakoinoseis/item/12753-2022-03-23-07-05-36, 22 March 2022 (in Greek).

[20] Piraeus Port Authority website. 'Green and Connected Ports,' available at: https://www.olp.gr/en/environmental-protection/eu-projects/active/item/7370-green-and-connected-ports, 24 January 2022.

proceed together in Piraeus as the former will be present for the decades to come.

1.3 The Way Forward: Piraeus and Beyond

Since 2009, COSCO engagement corresponds with the transformation of the port of Piraeus into a transshipment hub. According to Port Economics data, Piraeus, which had not been in the top-15 container ports in Europe in 2007, climbed to the 8th position in 2016, the 7th in 2017, the 6th in 2019 and the 4th in 2019, preceded by Rotterdam, Antwerp and Hamburg and followed by Valencia.[21] Piraeus kept the 4th position during the pandemic in 2020, and was 5th in 2021.[22] Also, Lloyd's Global Ports Top 100 ranking finds the Port of Piraeus moving up from the 44th position in 2016 to the 26th in 2020. In Lloyd's description *'the Greek port is still expanding and has become the largest in the Mediterranean Sea, growing by 70 percent since 2015.'*[23] The year after, the port of Piraeus was ranked in the 28th position overall, and 2nd in the Mediterranean after Tanger Med and ahead of Valencia.[24]

However COSCO's investments have cause some dysfunctionalities in Piraeus mainly due to their massive scale even their economic significance is hardly challenged. The involvement of the Chinese company in Piraeus consists in the lion's share of the of Greece's ports upgrade including the boost up caused by the privatization of the Thessaloniki Port Authority in 2018.

[21] See George N. Tzogopoulos, *The Miracle of China: The New Symbiosis with the World*, Springer-China Social Sciences Press, 2021.

[22] Port Economics website, 'Top 15 Container Ports in the European Union in 2021,' available at: https://www.porteconomics.eu/top-15-container-ports-in-the-european-union-in-2021/, 3 March 2022.

[23] Lloyd's List website, One Hundred Ports 2020, available at: https://lloydslist.maritimeintelligence.informa.com/one-hundred-container-ports-2020, 2021.

[24] Lloyd's List website, One Hundred Ports 201, available at: https://lloydslist.maritimeintelligence.informa.com/-/media/lloyds-list/images/top-100-ports-2021/top-100-ports-2021-digital-edition.pdf, 2022.

2. Thessaloniki Port

Since 2018, the port of Thessaloniki, the second biggest in the country, has been controlled by a Cyprus-based consortium under the title the South Europe Gateway Thessaloniki (SEGT) Ltd. The Deutsche Invest Equity Partners GmbH, the Terminal Link SAS, and the Belterra Investments Ltd were the three other consortium partners. In 2021, Belterra company, owned by Greek-Russian businessman Ivan Savvidis, acquired the majority of stakes in this consortium.[25]

The 2018 privatization did spark a rise in the throughput of TEUs. Their volume evolved from 448,766 in 2019, 460,780 in 2020 to 471,063 in 2021.[26] Rail services connecting Thessaloniki to the Bulgaria dry port located in Iliyantsi nearby Sofia are already operating, whereas North Macedonia has relied on imports of pharmaceutical material from this port during the pandemic.

The port of Thessaloniki is closely connected to that of Piraeus. According to a study conducted in the last months of 2021, 28 percent of its vessel calls were destined to or coming from Piraeus.[27]

New investments in Thessaloniki to reach an amount of circa €150 million in the next five years are expected to strengthen the capacity of the port. Future plans also include the creation of dry ports and distribution centers in North Macedonia and Serbia, following in the steps of the Ilyantsi Bulgarian example. The Thessaloniki Port Authority is expected to finance those projects in the hope not only to boost trade exchanges but also to contribute to a greener shipment of containers through freight line directly reducing the road traffic. As it is the case with the Piraeus Port Authority, the Thessaloniki Port Authority participates in green initiatives. In March 2019, it became a member of the Green

[25] *Naftemporiki* website, 'Belterra Increases Thessaloniki Port Authority Percentage to 71.85 Percent,' available at: https://m.naftemporiki.gr/story/1808817, 7 December 2021 (in Greek).

[26] Thessaloniki Port Authority website, Announcement: 2021 Economic Results, available at: https://www.thpa.gr/index.php?option=com_content&view=category&id=79&Itemid=1313&lang=el, 30 March 2022.

[27] Port Economics website, The Embeddedness of Thessaloniki Port in the Maritime Transport Networks,' available at: https://www.porteconomics.eu/the-embeddedness-of-thessaloniki-port-in-the-maritime-transport-networks/, 22 March 2022.

Award Network, and offers thus a 15 percent discount on port charges to vessels and shipping companies that exceed the statutory obligation relating to environmental terms and constraints.[28]The construction of pier 6 of the Thessaloniki port and its connection to the existing road and rail network is also on the agenda of the private company[29]. Beyond Thessaloniki, Greece is, at the writing, in the process of carrying out privatizations for the ports of Kavala and Alexandroupolis that are expected to further empower trade interconnectivity to the Balkan Peninsula. Winners of tenders will be announced in 2022.

3. The New Context

The new international environment after the beginning of the Ukraine war on 24 February 2022 arguably impacts on the ports of Piraeus and Thessaloniki. The latter, in particular, has been scrutinized in the media discourse. The EU policy of sanctions might allegedly affect its ownership. In mid-March, *AFP* quoted a Greek source from the Ministry of Finance and reported that the name of Ivan Savvidis had not been in the list of sanctioned oligarchs.[30] More importantly, the Greek-Russian billionaire is reportedly interested in acquiring a stake in the port of Alexandroupolis, a place where the US has strategically invested in recent years.[31]

Although the ongoing turmoil generates fluid conditions that render predictions hard, both the ports of Piraeus and Thessaloniki outline the

[28] Thessaloniki Port Authority website, Press Release: Port of Thessaloniki: The First Port in Greece to Become a Member of the Green Award Network, available at: https://www.thpa.gr/index.php/en/press-releases-1/2097-press-release-09-03-2019, 9 March 2019

[29] Metaforespress website, 'Ath. Liagos: Investments in the Thessaloniki Port according to Timetable,' available at: https://www.metaforespress.gr/naftilia/83303/, 25 February 2022 (in Greek).

[30] The original article of *AFP* has been translated by Greek newspaper *TA NEA* and is available at: https://www.tanea.gr/2022/03/17/inbox/galliko-praktoreio-o-polemos-stin-oukrania-fernei-se-dyskoli-thesi-ton-ivan-savvidi/, 17 March 2022 (in Greek).

[31] Gerd Hoehler, 'Russischer Oligarch Greift nach Hafen in Griechenland – USA Sind Besorgt,' available at: https://www.handelsblatt.com/politik/international/ukraine-krieg-russischer-oligarch-greift-nach-hafen-in-griechenland-usa-sind-besorgt/28168910.html, 16 March 2022 (in German).

importance of connectivity through Greece in an epoch of geopolitical competition. Being a close ally of the USA at the defense sector, does not prevent Greece from occasionally benefiting by investments of third countries. Theoretically – subject to capacity limits – the Piraeus port,[32] and partly that of Thessaloniki will even be able to host vessels unable to reach some Black Sea ports. Greece's international role in keeping EU-Asia trade flux free will thus be enhanced.

[32] Hartrodt website, 'War in Ukraine: Piraeus as Backup for Black Sea Ports,' available at: https://www.hartrodt.com/news/war-in-ukraine-piraeus-as-backup-for-black-sea-ports, 10 May 2022.

Bulgaria

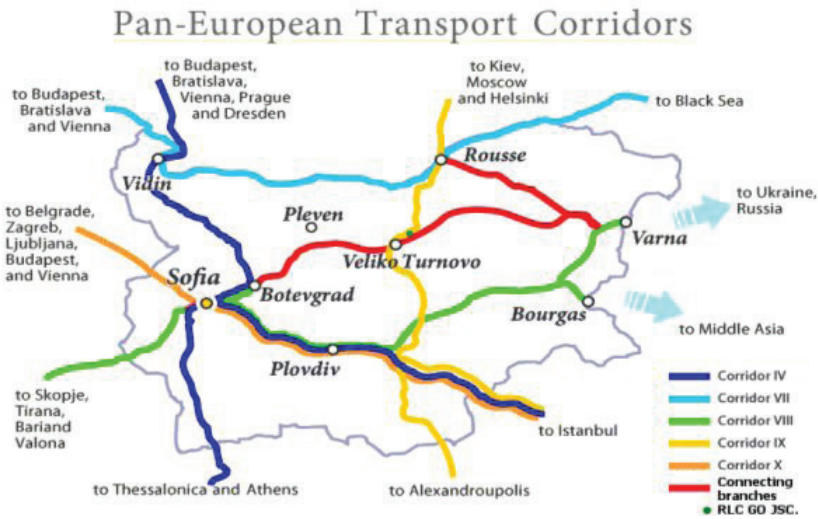
Bozhidar Yankov

Contents

Due to its geo-strategic location on Europe's map, Bulgaria could benefit from a well-developed, modern and secure waterborne transport network. On the crossroad of four trans-European transport corridors and of TRACECA[1], Bulgarian territory provides with benefits for logistics and transport chain.

The Black Sea ports of Varna and Burgas on the EU's external border; the connectivity of Port Varna with Port Ruse on the Danube with its opportunities for multimodality and flexibility of the logistics; the carrefour position of Port Vidin as an intersection point of Rhine-Danube with Orient/East-Mediterranean TEN-T corridors, provide the prerequisites for a substantial impact to the economic growth of the country, and the development of the whole neighboring areas.

Figure 1. TEN-T network on BG territory



Source: *https://geopolitica.eu/spisanie-geopolitika/127-2013/broi-5-2013?limit=7&start=21*

[1] TRACECA is an international transport programme involving the European Union and 12 member states of the Eastern European, Caucasus and Central Asian region. The programme aim is to strengthen economic relations, trade and transport in the regions of the Black Sea basin, South Caucasus and Central Asia providing connectivity of Central Europe to the Middle East and of Western Balkans to Ukraine and Russia on the east. For more information please consult http://www.traceca-org.org/en/about-traceca/

1. The normative context

1.1 Bulgaria - Romania bilateral agreement on maintenance of the fairway

Being a cross-border river from its rkm 845 (Timok river mouth on the Bulgarian- Serbian border) to rkm 374 (town of Silistra, Bulgaria) stretch with total length of 471 km, the Danube is maintained by both Bulgaria and Romania.

In 1955 was signed an Agreement between the governments of People's Republic of Bulgaria and Romanian People's Republic on maintenance and improving of the fairway in the common Bulgarian-Romanian stretch of the Danube. In general, the provisions of the Agreement set that Bulgarian state should maintain and improve the fairway from rkm 610 (town of Somovit) to rkm 374 (town of Silistra) downstream, and Romania will do the same in the stretch between rkm 610 to rkm 845 upstream. This includes the maintenance of the fairway (ensuring with respective width, drought and curve radii), marking of the fairway with floating signals (for day and night navigation), as well removing of obstacles. Both countries are maintaining the coastal signalization alongside the whole riverbank, respectively Romania on the left and Bulgaria – on the right riverbank.

A joint Commission had been constituted dedicated to the common planning, consultation and informing on works and activities for fairway maintenance, such as dredging works, marking plans, winter preparation, etc. The Commission gathers twice a year – in spring and in autumn.

1.2 National legal framework

The main national legal act concerning the waterborne transport is the "Maritime areas, inland waterways and ports of Republic of Bulgaria Act".[2]

It regulates the legal regime of the maritime areas, inland waterways and ports of Republic of Bulgaria, where the state exercises sovereignty, certain sovereign rights, jurisdiction and control in accordance with the generally recognized principles and norms of international law and international treaties to which the Republic of Bulgaria is a party.

According to the Act, inland waterway(s) in Bulgaria is considered the stretch of the Danube River from rkm 845 to rkm 374, limited between the right river bank and the border demarcation line between Bulgaria and Romania as determined with the Convention for determination of the river border between Bulgaria and Romania from 1908. Other internal rivers, lakes, dams and canals are not considered as inland waterways. The state rights, safety of the navigation conditions, control and navigational provisions are also described in detail.

Concerning the sea, the Act describes the internal sea waters, territorial sea, adjacent areas, continental shelf, exclusive economic zone, usage and protection of the sea environment, safety and security of the navigation.

Further on, the Act classifies the ports in five major categories – for public transport, piscatorial, yacht, with special purpose and naval, incl. border police. Ports aquatory is defined as exclusive state's property. The conditions, rules and principles of construction, maintenance, operating and control of the ports are comprehensively described.

1.3 Ecological aspects of inland navigation

In 1994, in Sofia, Bulgaria, the Convention on Co-operation for the Protection and Sustainable Use of the River Danube (Danube River Protection Convention - DRPC) was signed by eleven of the Danube Riparian States (Austria, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Moldova, Romania, Slovakia, Slovenia and Ukraine) and by the European Community. It came into force in October 1998 when it was ratified by the ninth signatory.

[2] https://www.lex.bg/bg/laws/ldoc/2134907392

The main objective of the DRPC is to ensure that surface waters and groundwater within the Danube River Basin are managed and used sustainably and equitably. This involves:

- the conservation, improvement and rational use of surface waters and groundwater;
- preventive measures to control hazards originating from accidents involving floods, ice or hazardous substances; and,
- measures to reduce the pollution loads entering the Black Sea from sources in the Danube River Basin.

The signatories to the DRPC have agreed to co-operate on fundamental water management issues by taking "*all appropriate legal, administrative and technical measures to at least maintain and where possible improve the current water quality and environmental conditions of the Danube river and of the waters in its catchment area, and to prevent and reduce as far as possible adverse impacts and changes occurring or likely to be caused*."[3]

The International Commission for the Protection of the Danube River (ICPDR) was established in order to implement the Convention.

One of the major achievements of ICPDR with a significant impact on the Danube navigation is a document called "Joint Statement for the Development of Inland Navigation and Environmental Protection". This document summarizes the principles and criteria for environmentally sustainable inland navigation on the Danube and on its tributaries, including the maintenance of existing waterways and the development of future waterway infrastructure. The "Joint Statement" is a guiding document.[4]

[3] https://www.icpdr.org/main/icpdr/danube-river-protection-convention

[4] https://www.icpdr.org/main/activities-projects/joint-statement-navigation-environment

2. State of affairs - Danube

2.1 Current situation of the common Bulgaria - Romania waterway

The common Bulgarian-Romanian section of the Danube stretches from rkm 845 (the mouth of Timok river on the Bulgarian-Serbian border) to rkm 374 (town of Silistra on the right river bank, town of Calarasi – on the left river bank). In this part the Lower Danube is a free flowing river, with typical hydro-morphological characteristics of plane river – wide riverbed, spilled waters, numerous islands, intensive sedimentation (consisting mainly of fine sediments), varying water levels – often in summer and autumn. These dynamic processes, in many cases, result to fairway realignment, lateral sedimentation, and appearance of bottom sills. The whole stretch meets the requirements of VII international class.

The waterway infrastructure is maintained by both countries – Bulgaria and Romania through riverbed surveys, water level monitoring and forecasting, waterway marking, dredging, provision of information to the users, Electronic Navigational Charts (ENC) updates, RIS Index, meteorological data, etc. As described above, the Bulgarian state maintains the fairway from rkm 610 (town of Somovit) to rkm 374 (town of Silistra) downstream, as well the coastal signalization on the right river bank alongside the whole common stretch.

According to the national legislation in force the Executive Agency "Exploration and Maintenance of the Danube River" is the competent Bulgarian authority for the Danube fairway maintenance in Bulgaria. The Agency's headquarters is located in Ruse city, on rkm 495 (www.appd-bg.org).

The main problems concerning the provision of good navigational status and safety of the navigation that both river administrations from Bulgaria and Romania face, are connected mainly with the water levels, bottom sills appearance and fairway parameters.[5][6][7][8]

[5] http://www.fairwaydanube.eu/wp-content/uploads/2016/06/2016-05-31_FAIRway_National_action_plans_May_2016_final.pdf

[6] http://www.fairwaydanube.eu/wp-content/uploads/2017/08/FRMMP_National_Action_Plans_May_2017.pdf

[7] http://www.fairwaydanube.eu/wp-content/uploads/2018/09/FRMMP_national_action_plans_May2018.pdf

[8] http://www.fairwaydanube.eu/wp-content/uploads/2019/07/FRMMP_nation-

The bottlenecks which affect the most the inland navigation on the Bulgarian-maintained river stretch are the Belene island area (rkm 561-568), the Vardim island area (rkm 536-548), and the Popina area (rkm 398-407). During low waters period the needed waterway depths and widths could not be provided on a regular basis. Often convoys have to be separated in order to pass up- or downstream; or should wait for the water level to increase. When possible a realignment of the fairway is investigated through hydrographic surveys, as well dredging works are performed in the bottlenecks areas as a solution to avoid fairway blockage.

During the last four years (2018-2021) a total volume of 1 120 000 m^3 were dredged in the bottlenecks occurring in the Bulgarian part of the river. The whole stretch is covered by River Information Services (RIS), providing the users with Notices to Skippers (NtS), Electronic Reporting International (ERI), Vessel Tracking and Tracing (VTT), ENC, and System for Electronic Processing of Documents in Bulgarian River Ports (Single Window) services. The Bulgarian RIS (BULRIS) provider is Bulgarian Ports Infrastructure Company (http://www.bgports.bg/bg; https://www.bulris.bg/en/Home).

2.2 Main ports

2.1.1 Port Ruse (Core)

Port Ruse is the biggest river port in Bulgaria. It was open for operation in 1976. Port Ruse consists of 4 terminals – Ruse East 1, Ruse East 2 (Ro-Ro terminal), Central Passenger Terminal and Ruse West. The bridge over the Danube, connecting Ruse (Bulgaria) with Giurgiu (Romania) is in the vicinity.

Port terminals Ruse East 1&2 are located on rkm. 489-490 in an industrial area of Ruse city. It is the only one location in Bulgaria where river-sea vessels can be transshipped at high waters on the Danube. The terminals the technical capacity to process heavy tonnage units up to 60 t. Heavier and non-standard sized cargo can be processed, as well, using one unit 100 t floating crane. Port Ruse is directly connected to the national road and railroad infrastructure.

The total port area covers 825 533 m^2; has 14 berth places (8 on Ruse East 1 with total quay front of 820 m, and 4 on Ruse East 2 with total

al_action_plans_May2019.pdf

quay front 670 m); an average depth of the firth at water level zero-between 1m - 2 m; 17 cranes with lifting capacity between 5 and 32 tons; and, a total 196 300 m^2 of storage area, out of which 15 800 m^2 are covered storage area and 190 500 m^2 are open storage area.

Figure 6 Port Ruse East-general view, Google Earth

The port is directly connected with the national rail and road network of Bulgaria. The port has an unutilized area of 825 533 m^2 within its limits which provides an opportunity for its future development. In the General plan of the port there is a territory specified for future construction of a container and grain terminal.

Port terminal Ruse East 2 is a Ro-Ro terminal for horizontal transshipment of vehicles. It has a Ro-Ro ramp suitable for simultaneous mooring of two Ro-Ro vessels, 2 parking lots with capacity of 80 trucks each; an internal parking area of 11 719 m^2; an external parking area of 11 484 m^2; phytosanitary center, bathroom and WC. It also provides connection with the national road network of Bulgaria.

The **Central Passenger Terminal** operates on one pontoon along the quay, suitable for both passenger and commercial vessels. It has 3 birth places with total length of 270 m. The passenger quay is located in the city center, near the Central Square and of most of the sightseeing places.[9][10]

Port terminals Ruse East 1&2 as well the passenger terminal are operated by state-owned “Port Complex-Ruse” JSCo.

[9] http://www.bgports.bg/bg/page/32

[10] http://www.port-ruse-bg.com/en/index

Figure 7 Port Ruse West-general view, Google Earth

The **Port terminal Ruse West** is located on rkm. 495-496. It has 12 berth places; with a total quay front of 1 518 m; maximum real firth depth of 2,50 m; circa 27 600 $m^{2\ of}$ open storage area; 9 696 m^2 of covered storage area; and a 2 000 m^3 of liquid fertilizers storage volume. The terminal is connected with the national road and railroad infrastructure. It's operated by state-owned Bulgarian Ports Infrastructure Company.[11]

For the period 2017-2019 in Port Ruse a total amount of 4 724 049 t cargo was transshipped - 1 861 717 t in 2017; 1 439 088t in 2018 and 1 423 244t in 2019.

2.1.1 Port Vidin (Core)

The main advantage of Port Vidin is its key location situated on the intersection of Rhine-Danube and Orient/East-Mediterranean TEN-T corridors. National road and railroad networks reach the port, as in the vicinity is the bridge over the Danube connecting Vidin, Bulgaria with Calarasi, Romania.

Port Vidin consists of four terminals – Vidin North, Vidin South, Vidin Centre and Ferry Complex Vidin (Ro-Ro).

[11] http://www.bgports.bg/bg

Port terminal Vidin North is in the north industrial area of Vidin town (rkm 792.8 -793.6), and includes two port terminals – port terminal Vidin North and port terminal Ferry Complex Vidin.

Figure 8 Port Vidin North-general view, Google Earth

Port terminal Vidin North is located on rkm 793 – 793.6. The total port terminal area is 120 000 m^2. Open storage area is 10 000 m^2 while the covered storage area - 3 725 m^2. There are three birth places: one for grain and two for general cargo. The total quay front is of 300 m, with firth depth of 2,4 m. The terminal is certified for transshipment of general cargo (containers, metals, machinery, equipment, over size and heavy cargo); bulk cargo (grain, inert materials, wood, coal, etc.); non-dangerous liquid cargo (vegetable and animal oils, liquid chemical products and products, etc.); as well vessel bunkering. It has two portal cranes and other loading equipment, able to handle cargo units up to 30 tons each. A grain-loading equipment is available, suitable for processing of all grains.

The Port terminal Ferry Complex Vidin is located on rkm 792.8 – 793. Specialized in transport of passengers and vehicles with Ro-Ro vessels it has a Ro-Ro ramp of 30-50 m wide suitable for one ferry, a total quay front 40 m with a firth depth of – 2,4 m.

“Bulgarian River Shipping” JSCo (private entity) operates port terminal Vidin North (http://www.brp.bg/brp.html).

Figure 9 Port terminal Vidin South - general view, Google Earth

Port terminal Vidin South is located on rkm 785 in the south industrial zone of town of Vidin, on the right riverbank. Total port terminal area is 48 000 m^2, out of which 18 000 m^2 are open storage area. Two birth places are available with total quay front of 200m and firth depth 2,4m. The terminal is designed for processing bulk and general cargo that do not require special transshipping conditions the main cargo being coal. The transshipment operations are performed with a portal crane. The terminal operator is the private company TPP Sviloza JSCo (http://tpp-sviloza.bg/index.php/bg/home-page).

Port terminal Vidin Center is located on rkm 789,9 - 791,3 on the right riverbank, in the central part of town of Vidin. The total port terminal area is 17 000 m^2. It has 4 birth places with total quay front of 1 440 m, and firth depth of – 2,4 m. Being a passenger terminal four pontoons are designated to dock the vessels and for the customs and border formalities. From the terminal's main building there is quick and easy access for the passengers to other modes of transport as rail and bus stations are in the vicinity. The operator of the terminal is the state-owned "Port Vidin" Ltd[12].

For the period 2017-2019 in Port Vidin a total amount of 693 099 t cargo was transshipped - 183 587 t in 2017; 147 479 t in 2018 and 362 033 t in 2019.

[12] https://portvidin-center.com/aqua

Table 1. Statistical data on cargo, processed in (all) Danube river ports (thousand tons)[13]:

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	5270	5947	6622	6351	4830	4524	4230	3894	3831	4529	4568	3993	3705	3547	4038	3815
Import - unloaded	3011	3265	3580	3054	2258	1974	1832	1682	1529	1688	1708	1312	1721	1547	1497	1294
Export - loaded	384	682	839	934	708	1116	835	805	1112	1410	1165	1459	892	1150	1471	1711
Cabotage	1875	2000	2203	2543	1864	1434	1563	1407	1190	1431	1695	1222	1092	850	1070	810

[13] https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=62

The transshipment capacity (of all Bulgarian ports) under existing conditions, technical means and operating technology is estimated at about 62.728 million tons of cargo in seaports and 22.472 million tons in the river ports. The estimated capacity of ports of national and regional importance in the main port areas are detailed below:[14]

Table 2. Bulgarian port capacity

Port region	Main features	Capacity	
		Cargo, tons/ year	Passengers, people/year
Burgas	Port terminals with national importance	31 216 168	278 886
	Port terminals with regional importance	2 438 059	66 000
Varna	Port terminals with national importance	27 960 681	160 359
	Port terminals with regional importance	1 113 487	0
Ruse	Port terminals with national importance	7 261 860	388 922
	Port terminals with regional importance	4 110 306	37 944
Vidin	Port terminals with national importance	2 514 000	212 200
	Port terminals with regional importance	2 858 816	56 000

3. State of affairs – maritime

The Black Sea forms the eastern border of Bulgaria. The Bulgarian Black Sea's coastal line is 354 km long – from the state border with Romania (Cape Sivriburun) on the north to the Rezovska river mouth on the Bulgarian – Turkish border on the south. Stara Planina Mountain sinks in the Black Sea at Cape Emine, conditionally dividing the coastline into southern and northern parts. The southern coast is known for its wide and long beaches, unlike the northern one which has a more rocky terrain.

[14] https://www.mtc.government.bg/sites/default/files/integrated_transport_strategy_2030_bg.pdf

There are five Black Sea islands in Bulgarian territorial waters:

- St. Anastasia (old name Bolshevik) with a surface area of 8.5 decares
- St. Ivan with a surface area of 660 decares
- St. Peter with a surface area of 4-5 decares
- St. Kirik and Yulita (old name: St. Cyril) with a surface area of 82,5 decares
- St. Toma (also known as Snake Island) with a surface area of 10 decares[15]

There are two main Bulgarian sea ports – port Varna, situated in the northern part and port Burgas, located in the southern part of the coastline.

Figure 10

Source: https://bg.maps-bulgaria.com/%D0%BF%D0%BE%D0%B4%D1%80%D0%BE%D0%B1%D0%BD%D0%B0-%D0%BA%D0%B0%D1%80%D1%82%D0%B0-%D0%BD%D0%B0-%D0%91%D1%8A%D0%BB%D0%B3%D0%B0%D1%80%D0%B8%D1%8F

[15] St. Toma island (or Snake island) is different from the Zmiinyi Island (equally called Snake island and currently occupied by Russia)

3.1 Main ports

3.1.1 Port Varna (Comprehensive)

In the late 19th century, Varna became a key economic, administrative and cultural center of the new independent Bulgarian state. In 1888, the government took the decision to build new seaports in both Varna and Burgas. The port facilities was designed in accordance with the modern European standards at the time, so that with some subsequent extension, it has served perfectly as a commercial port for more than 100 years, before discussions were opened about future development plans. The advice of the French engineer Adolf Guerard, who was among the most distinguished port planners and experts in port building, was sought after throughout the world. Beyond building of Varna port, he was involved also in port construction in Burgas, Constanta (Romania), Montevideo (Uruguay), and the expansion of Buenos Aires port.

Port Varna is a comprehensive TEN-T maritime port, located on Orient/East-Mediterranean TEN-T corridor (43°12'N, 27°55'E). Varna is the biggest Bulgarian seaport and consist of 10 terminals.

Varna East Port Terminal was officially opened on 18th of May 1906. Today it is a successfully-functioning multi-purpose port terminal (licensed for general cargo, bulk cargo, liquid bulks, edible liquids, ro-ro, containers and passengers), continually developing and improving.

The terminal is situated in the Bay of Varna at the southeast end of Varna City, some one km of the downtown area. It has 14 berths, including one berth for servicing of passengers, passenger ships, cruise ships, pleasure boats and naval ships. The max depth is 11.50m and the total quay length is 2 345 m. Various quay cranes are available:

- portal jib cranes - 22 units with capacity up to 32 t,
- mobile crane - 1 unit with capacity 84 t,
- gantry crane - 1 unit with capacity 30.5 t,
- 1 quay ship-loader for grain, and,
- 1 unloading facility for molasses.

The mobile equipment includes 59 units, of which 12 bucket loaders, 9 forklift trucks, 1 reach-stacker, 9 terminal tractors, 7 container semi-trailers, 7 self-dumping trailers, etc. The total open storage space is 73.15 decares (including the Storage Base), and the total area of warehouses

is 35.34 decares (including the Storage Base). In addition, the terminal has a road-rail unloading station for grain, linked to a warehouse.

The storage areas have access to the national railway network. The port road system connects to the national road network and the international Airport of Varna is about 10 km away from the terminal. A variety of marine technical services and operations are available as well.

The record year for cargo traffic at Varna East was 2013, when the terminal handled over 4.1 million tons of cargo, with only the grain exports accounting for 3.6 million tons. Investments have been made to improve port infrastructure and facilities and to modernize the handling technology for grain and cereals, so that Varna East can maintain its image of Bulgaria's grain hub.

Located some 5 km of Varna, East Port Terminal is the Storage Base (also known as the Dry Port) – a separate unit which is licensed for customs-bonded warehousing, operating on a total area of 85 decares. Six warehouses with total storage area of 15 decares are used for various types of general cargo and grain, while the open storage space is about 16 decares available for general cargo.

Varna West Port Terminal became operational in 1974, and 2 years later the deep-water channel linking the sea with the lake (Canal No.1) was completed successfully for navigation of deep-draft vessels to Varna West. Initially, the concept for development of port facilities was to build an industrial port intended to serve the "valley of the great chemical industry." Nowadays, the port of Varna West is the most modern facility on the north Bulgarian Black Sea coast with the most-promising future prospects. It is situated about 30km west of Varna City, on the west shore of Beloslav Lake. Adjacent to the chemical factories of Devnya, the terminal enables effective ship-to-factory direct handling of goods. The terminal has modern technologic lines for handling of containers, general cargo, soda ash, fertilizers, cement, coal, ores, phosphates, silica and liquid chemicals. All port berths and warehouses have access to the national rail and road networks.

In recent years, Varna West Port Terminal has proved itself as Bulgaria's container hub. In 2018, it handled more than 160 thousand TEU. There is a modern information (proprietary) system in place allowing for real time tracking of container's condition/location by the clients. Varna

West Port Terminal is capable of handling non-hazardous general cargo (incl. containers), bulk cargo, liquid bulks, ro-ro and containers loaded with dangerous goods of most IMO classes (as per IMDG Code). Various marine and technical services are available together with many port related activities.

Over the last years, the port terminal has been involved in grain exports as well. Substantial investments were made for this purpose, and the process continued to introduce an innovative system for loading grain into 20' containers. Also, the terminal has multi-purpose berths available for handling of various types of cargo as necessary, depending on the specific operational situation. The terminal successfully handles heavy lifts and out-of-gauge traffic, such as wind turbine components, power transformers, line pipes, specific project cargo, etc.

The terminal has total quay length of 3 430 m, with 22 berths out of which 19 are operational for cargo ships. The terminal's total territory is of 1 800 decares out of which 346 393 m^2 for open storage area, 37 806 m^2 in covered storage area, and 10 000 m^3 are reservoirs for liquid cargo.

The terminal possesses two mobile Quay cranes with capacity 144 t, 2 units with capacity 100 t, and 2 units with capacity 63 t. It has 26 units of portal jib cranes with varied capacities up to 32 t; and 2 units of Gantry cranes with capacity 35 t.

With regard to mobile equipment, it has 10 reach-stackers with capacity 45 t; 24 bucket loaders; 31 forklift trucks with capacity varying from 3.5 to 28 t; 17 terminal tractors; 24 container semi-trailers, as well as other specialized equipment such as weighbridges, belt conveyors, quay ship-loaders, etc.[16]

The table below contains information on transshipments of cargo in Port Varna (East and West) for the last few years.

[16] https://port-varna.bg/en/Nachalo/Home

[17] https://port-varna.bg/bg/About-us/Year-report

Table 3. Cargo Transshipment in port of Varna, 2011 - 2019

Processed cargo[17] (thousand tones)	2019	2018	2017	2016	2015	2014	2013	2012	2011
Total	8 452	8 551	9 997	9 542	9 575	10 090	11 000	8 942	9 142
Bulk cargo	4 982	5 371	6 302	6 145	6 110	n/a	n/a	n/a	n/a
General	817	825	925	896	625	n/a	n/a	n/a	n/a
Liquid	534	295	878	680	1 033	n/a	n/a	n/a	n/a
Containers (number)	2 119	2 060	1 892	1 821	1 807	n/a	n/a	n/a	n/a

Both Varna East and Varna West port terminals are operated by "Port Varna" SJSCo – a 100% state-owned company.[18] The rights of the state as the sole owner of the capital are exercised by the Minister of Transport and Communications.

Port terminal Petrol is certified for processing (loading and unloading) of non-hazardous liquid cargo (biodiesel) and hazardous liquid goods in Class 3 of IMO classification. It has 3 berths with total quay front of 515 m, max firth depth – 10 m. Total liquid goods storage capacity 56 000 m^3. It's operated by the state-owned Bulgarian Ports Infrastructure Company[19].

Port terminal Lesport was built in 1973 as a specialized terminal for transshipment of timber from the former Soviet republic of Komi. Subsequently, the terminal specializes as a multifunctional for general and dry bulk cargo. The terminal operated under the state leadership of the Ministry of Transport until 2006.[20] It has 3 berths, a total quay front of 450 m with firth depth of 8-9 m. The total port terminal area is 124,000 m^2. It has a covered storage area of 2 338 m^2 and an open storage area of 69 195 m^2. The quay transshipment operations are realized with five electric gantry cranes with a load capacity of 10 t and two high-speed mobile cranes. The open storage area is serviced by a specialized bridge 10 ton electric crane. Its 63-meter track gauge makes it unique within Bulgaria, allowing fast movement of vehicles under it,

[18] https://port-varna.bg/en/Nachalo/Home

[19] http://www.bgports.bg/bg

[20] http://lesport.bg/aboutus

enough room for maneuvering and a high operational efficiency. The terminal is ope
rated by the private company "Port Lesport" JSCo.[21]

Figure 11 Port Varna-general view

Source: https://bnr.bg/varna/post/101294991/udalbochavat-kanal-1-i-2-v-port-varna

Port terminal Ferryboat complex is part of Port Varna specialized in ferryboat transport for auto and rail. It has 2 berths, a quay front of 400 m with a firth depth of 11,5 m. The terminal has the possibility to operate two vessels simultaneously. It's operated by the state-owned Bulgarian Ports Infrastructure Company.[22]

3.2.1 Port Burgas (Core)

Port Burgas consists of 9 port terminals. It's a core TEN-T maritime port located on Orient/East Mediterranean corridor. Port of Burgas is established based on the Decree for Construction, signed by Prince Ferdinand I on 20 December 1894. The opening ceremony has been held on 18 May 1903 and since this moment the port has been operating in commercial shipping. Only a few years before, in 1899, the first Bulgarian port light i.e. the Light of Burgas, has been switched on.

[21] http://lesport.bg

[22] http://www.bgports.bg/bg/page/28

Port terminal Burgas East-1 has 14 berths, a total quay front of 2 020 m, a firth depth of 10 m., an open area storage of 21 510 m^2, a covered storage area of 23 300 m^2 , and a liquid cargo storage of 1 000 m^3 capacity.[23] The terminal is used for processing general cargoes of all kinds: metals, wood, paper, foodstuff are handled in Terminal East. Also, due to operational reasons, bulk cargoes such as coal, sugar, ammonium nitrate and small shipments of concentrates can be processed.[24] The terminal has 17 portal cranes, 4 gantry cranes, 3 mobile cranes and variety of mobile and additional equipment, and is connected with national road and rail networks. The terminal operator is "Port Burgas"Ltd. Which is a state-owned enterprise.

Figure 12 Port Burgas-general view

Source: https://port-burgas.bg/map

Port terminal Burgas East-2 has 14 berths, a total quay front of 2 145 m, a firth depth of 14,6 m., an open area storage of 137 853 m^2 , a covered storage area of 18 471 m^2 , and a liquid cargo storage 36 780 m^3 . Bulk, general and liquid cargo, as well as grains are processed on the terminal. It is connected with the national rail and road networks.

[23] http://www.bgports.bg/bg/page/28

[24] https://port-burgas.bg/terminal-east

Port terminal Burgas West has 6 berths, a total quay front of 1 188 m, a firth depth of 11 m., an open area storage of 142 561 m^2 , and a covered storage area of 55 866 m^2 . Bulk, general, liquid cargo, containers, as well grains are processed on the terminal. 7 000 m^2 of covered warehouse is available for foods not requiring special temperature regime. The terminal is connected with the national rail and road networks.

Both port terminals Burgas East-1 and Burgas West are operated by the private company BMF Port Burgas Ltd.

Port terminal Rosenets (with geographical coordinates 42 27.1N / 27 32.2 E) is a specialized on loading/unloading of liquid fuels to/from tankers. It has 3 berths (piers) equipped with special facilities. Pier 1 allows for mooring of vessels with maximum draught (MD) of 9,6 m and length overall (LOA) of 174-180m; the Pier 2 allows for MD of 12 m and a maximum LOA of 260m; Pier 3 allows for MD of 6,8 m and maximum LOA of 120 m. The total storage capacity for liquid fuels is 682 000 m^3 .

The terminal is operated by the private company Lukoil Neftohim Burgas JSco.[25]

[25] https://neftochim.lukoil.com/en/Services

Table 4. Statistical data on cargo, processed in (all) Black Sea ports (thousand tons) :[26]

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	24841	27513	24900	26576	21893	22946	25185	26012	28841	27235	27166	28685	30953	27868	30997	25258
Import - unloaded	14293	16250	15853	16791	11797	11847	13036	12722	12503	12299	12622	13115	14184	13046	14770	12535
Export-loaded	10548	11263	9047	9785	10096	11099	12149	13290	16338	14936	14544	15570	16769	14822	16227	12723

[26] https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=61

4. Future developments

Prepared by a consultant and adopted in 2017, the Integrated Transport Strategy for the period until 2030[27], commissioned by the Ministry of Transport and Communications, provides with the forecast on the development of Bulgaria inland and sea cargo and ports:

Table 5. Estimates for packaged goods that can be transported in containers:

Burgas	422,887	453,587	497,884	496,163	532,276	548,819	551,342	553,865
Varna	308,825	365,038	398,201	393,822	419,077	429,778	431,142	432,506
Ruse	28,638	18,018	18,731	17,403	17,236	18,197	18,484	18,772
Lom/Vidin	21,238	16,435	19,254	20,652	23,818	24,051	23,921	23,790
Total	781,588	853,078	934,069	928,040	992,407	1,020,845	1,024,889	1,028,934

Table 6. Estimates for bulk cargo (grains) turnover*:

Port	2014	2020	2027	2034	2044	2047	2050
Burgas	674,628	131,1510	1,860,288	2,232,648	2,479,003	2,483,909	2,496,992
Varna	3,279,114	4,884,630	5,184,371	5,660,605	6,285,207	6,297,646	6,330,817
Ruse	267,616	453,965	516,133	578,306	642,116	643,387	646,776
Lom/Vidin	194,291	360,338	409,684	459,034	509,685	510,693	513,383
Total	4,415,648	7,010,443	7,970,476	8,930,593	9,916,011	9,935,636	9,987,970

** includes domestic production export only*

Table 7. Estimates for copper concentrates, export (tons):

Port	2013	2014	2020	2025	2027	2034	2044	2047	2050
Burgas	764,157	526,986	584,122	582,407	0	0	0	0	0
Varna	6,071	58,554	0	0	0	0	0	0	0
Total	770,228	585,539	584,122	582,407	0	0	0	0	0

Table 8. Estimates for copper concentrates, import (tons):

Port	2013	2014	2020	2027	2034	2044	2047	2050
Burgas	966,648	672,357	777,650	954,468	1,134,137	1,213,634	1,231,624	1,249,614

[27] https://www.mtc.government.bg/sites/default/files/integrated_transport_strategy_2030_bg.pdf

Table 9. Estimates for coal, import (tons):

Port	2009	2014	2020	2027	2034	2044	2047	2050
Burgas	119,225	128,493	92,909	72,850	16,541	26,932	34,372	41,812
Varna	2,196,181	2,366,905	1,711,437	1,341,939	916,506	572,578	480,191	387,805
Ruse	64,544	69,5615	502,978	394,386	269,354	168,277	141,125	113,974
Lom/ Vidin	543,538	58,579	423,567	322,120	226,828	141,709	118,844	95,979
Total	2,923,488	3,249,592	2,730,891	2,141,295	1,429,229	909,495	774,532	639,569

Table 10. Estimates for other bulk cargo-cement, fertilizers, chemicals and inert materials (tons):

Port	2014	2020	2027	2034	2044	2047	2050
Burgas	113,618	155,718	170,190	193,511	218,979	222,210	225,441
Varna	2,222,895	3,395,770	3,711,356	4,219,920	4,775,314	4,845,774	4,916,234
Ruse	51,3127	554,577	60,6117	68,9172	779,876	791,384	802,891
Lom/Vidin	42,595	83,575	91,342	103,858	117,527	119,261	120,995
Total	2,892,235	4,189,640	4,579,004	5,206,461	5,891,697	5,978,629	6,065,561

Table 11. Estimates for metals, import

Port	2014	2020	2027	2034	2044	2047	2050
Burgas	651,698	753,756	938,551	1,106,748	1,184,325	1,201,881	1,207,732
Ruse	39,452	45,630	56,818	67,000	71,696	72,758	73,113
Total	691,150	799,386	995,368	1,173,748	1,256,021	1,274,639	1,280,845

Table 12. Estimates for metals and metal products, export

Port	2014	2020	2027	2034	2044	2047	2050
Burgas	454,425	520,054	630,849	743,268	793,002	804,256	808,007
Varna	62,978	73,087	89,479	106,299	113,750	115,436	115,998
Total	517,403	593,141	720,328	849,567	906,752	919,692	924,005

Table 13. Estimates for sulfuric acid, export

Port	2014	2020	2027	2034	2044	2047	2050
Burgas	0	527,328	587,819	680,717	802,759	814,604	818,552
Varna	911,858	527,328	587,819	680,717	802,759	814,604	818,552
Total	911,858	1,054,656	1,175,637	1,361,435	1,605,517	1,629,208	1,637,104

Table 14. Estimates for machinery, import

Port	2014	2020	2027	2034	2044	2045	2047	2050
Burgas	663,552	740,307	879,287	1,004,528	1,067,274	1,072,547	1,083,094	1,088,367
Ruse	328,386	366,372	435,151	497,133	528,185	530,795	53,6015	538,624
Total	991,938	1,106,679	1,314,438	1,501,661	1,595,495	1,603,342	1,619,108	1,626,992

Table 15. Estimates for liquid fuels (tons)

Port	2014	2020	2027	2034	2044	2047	2050
Burgas	10,621,270	12,570,921	13,469,512	13,830,915	13,830,915	13,830,915	13,830,915
Varna	381,610	451,659	483,944	496,929	496,929	496,929	496,929
Total	11,002,880	12,022,580	13,953,456	14,327,844	14,327,844	14,327,844	14,327,844

Table 16. Estimates for sea cruises (passengers)

Port	2009	2014	2020	2027	2034	2044	2047	2050
Burgas	263	6,035	9,468	19,851	25,698	27,246	27,695	27,845
Nesebar	7,957	22,683	33,098	44,126	49,324	55,960	58,339	57,132
Varna	2,504	8,701	12,696	22,425	24,296	24,844	24,067	24,264
Total	10,724	37,419	55,262	86,401	99,318	108,051	110,102	10,9241

Table 17. Estimates for river cruises (passengers)

Port	2009	2014	2020	2027	2034	2044	2047	2050
Ruse/Svishtov	9,244	8,624	11,557	13,946	16,012	17,853	18,378	18,553
Vidin/Lom	16,393	17,213	23,067	26,723	29,504	34,237	35,983	35,983
Total	25,637	25,837	34,624	40,669	45,516	52,090	54,361	54,536

Several EU-funded projects concerning the inland waterways, sea and the respective ports were planned for implementation within the horizon 2030. Most of them provide investments in infrastructure improvement, while some of them are “soft” ones such as furthering development of human resources, information systems, etc.

For the fairway maintenance on the Danube, the projections envisage the delivery of a dredging equipment, specialized vessels, investments on the fairway such as engineering measures and construction works to eliminate the bottlenecks, upgrade and modernization on the signaling system and provision of information, monitoring of the fairway, RIS, etc. The European Regional Development Fund (ERDF), the Cohesion Fund (CF), the Connecting Europe Facility (CEF) and respective national co-financing, and other public sources will finance these initiatives.

Additional EU-supported projects on further development of GIS-management system, electronic data exchange (River Port Community System), deployment of alternative fuels infrastructure, waste reception facilities, shore-side electricity power supply, multi-modal terminals deployment, etc. shall be implemented in Danube ports.

For the sea ports – Varna and Burgas - investments in infrastructure improvement are planned, such as deepening of the access channels in ports, (re-) construction of breakwaters, quay improvements, GIS-management system, electronic data exchange systems, deployment of alternative fuels infrastructure, waste reception facilities, shore-side electricity power supply, further development of multi-modality, etc.[28]

In addition, as the state considers the concession form as a main public-private partnership instrument for ports development and operation, the private (concessionaire) capitals are a factor in the current and future investments in ports modernization.

5. Other

In its Lower part the Danube is a free-flowing river, having all typical characteristics in such river stretch: i.e. wide riverbed, meandering, relatively slow current speed, intensive hydro-morphological processes. The climate change as an indisputable fact is expected to influence the Danube River Basin (DRB) as a whole.

According to ICPDR's Climate Change Adaptation Strategy, a large palette of possible impacts may be expected in the DRB region.[29]

For the next few decades, a decrease in water availability for the southern and eastern parts of the DRB is indicated, whereas in the northern and western parts no trend or even a slight increase is projected. Changes in water availability can highly differ locally or regionally. This may result in medium to severe water stress in the MDRB, and in severe water stress in the Lower Danube River Basin (LDRB). Water stress is expected to remain low in the UDRB because of generally high-water availability there. It is expected that regions

[28] https://experience.arcgis.com/experience/211c3681090d4dd6878eb5f46bc-c7a55

[29] https://www.icpdr.org/main/activities-projects/climate-change-adaptation

affected by water stress will shift northwestward, which leads to increasing water stress in the UDRB by the end of the 21st century.

Following the future increase in air temperature, water temperature will most likely increase in the DRB. Due to changes to all temperature-dependent chemical and biological processes, as well as increasing flood and drought events, the pressure on water quality in rivers and lakes will increase.

More frequent limited or impassable navigation conditions are expected due to more frequent extreme water levels and unstable conditions, especially on routes comprising free-flowing river reaches. While higher future temperatures in winter will have a positive effect because of less frost and icing, low water levels are expected to lead to reduced cargo and limited navigability. This is particularly true for the MDRB countries such as Slovakia and Hungary, especially in summer season for the hot lowlands with less future precipitations. The development of navigability in the MDRB also depends on climate change impact in the upper area. For the moment with regard to the UDRB, definitive and consistent conclusions regarding low flows and its effect on navigation cannot be made.

In the long-term an increase in air and water temperature, combined with changes in precipitation, water availability, water quality and increasing extreme events, such as floods, low flows and droughts, may lead to changes to ecosystems, life cycles, and biodiversity in the DRB. This is frequently mentioned to be one of the most relevant climate change impacts. The habitats and ecosystems in the southeastern region of the DRB and in the Hungarian Great Plain area are especially likely to become drier and more fire accidents might occur.

Every military conflict disturbs logistics not only in the impact area, but also in the neighboring territories. In this sense the conflict in Ukraine (actually a state of war, as officially such was not declared by Russia) is not an exemption. Transport infrastructure has been already destroyed (rail, road), seaports are blocked and grain could not be exported. In addition, floating mines are launched in the Black Sea, making navigation unsafe. For safety reasons and in respect of international applicable conventions, Turkey has closed the Bosporus because of naval mines[30]. The current situation affects the passenger

[30] https://www.economic.bg/bg/a/view/turcija-zatvori-bosfora-zaradi-syobshte-nie-za-voenna-mina

transport as well. It is expected that in addition to the COVID-19 crisis, which led to collapse of river and sea cruises, the tense circumstances in the Black Sea region will definitely lead to a decrease in mobility.

Normally, the affected countries are looking for alternatives. Ukraine has started to relocate cargo from seaports to trains[31] and transshipments of grain and iron ore, for example, towards the Romanian port of Constanta[32].

The EU has introduced several sanctions towards the Russian Federation[33], including closure of EU ports for Russian vessels, thus affecting transport of some goods from/to Russia. This have and will have serious impact on river and seaborne transport in not only Eastern, but also for the whole of Europe. In this optic, Varna port with its good rail connection to Ruse port on the Danube could be used as an alternative transport route for cargo from/to Ukraine and Eastern Europe.

Russia's invasion of Ukraine has increased the urgency of making Europe's transport infrastructure fit for dual civil and defense use. The European Commission has therefore brought forward the awarding of grants for projects that support military mobility. Other selected projects will help put in place the infrastructure for an anticipated increase in energy-efficient and zero-emission mobility. A total of 37 projects will receive EUR 425 million under the Connecting Europe Facility (CEF) calls for proposals launched in September 2021.

Commissioner for Transport Adina Vălean said: "*Europe's Transport infrastructure is critical for our security, this is why we are taking concrete measures to support investments that make it fit, not only for civilian use, but also for our defense. We are funding projects worth 339 million that will facilitate the movement of military troops and assets leading to more efficient deployment of our missions on the ground. In addition, we also decided to advance the 2nd Military Mobility call originally planned for later this year*."

Consequently, to ensure that transport infrastructure is adapted for dual civil/defense use the EU Commission has accelerated the

[31] https://profit.bg/svetat/ukrayna-prehvarlya-iznosa-si-ot-korabi-na-vlakove-vaz-mozhno-li-e-tova/

[32] https://www.dnevnik.bg/sviat/voinata_v_ukraina/2022/04/29/4341655_ukraina_zapochna_da_iznasia_zurno_ot_rumuniia/

[33] https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/sanctions-against-russia-explained/

evaluation of the military mobility proposals, and has selected 22 projects to receive support worth EUR 339 million. Projects include railway infrastructure upgrades to allow the circulation of larger and heavier trains, as well as works to increase port and airport capacity and strengthen road bridges. The next military mobility call has also been brought forward, and will now be launched in May 2022.

The CEF 2021 calls has also invited proposals for the first selection under the Alternative Fuels Infrastructure Facility (AFIF). In line with the European Green Deal goals and aiming to increase the EU's energy independence, the Facility will help Europe's transport network move away from reliance on fossil fuels. A total of 15 alternative fuel projects will receive support of EUR 86 million between them. The projects range from the installation of electric recharging stations along the EU's TEN-T road network to the deployment of hydrogen refueling stations for cars, lorries and buses, and the electrification of ground handling services at airports. The call remains open, with regular cut-off dates until 19 September 2023. The next cut-off date is 7 June 2022.

For the remaining of the 2021 calls, addressing notably railway, waterborne and road infrastructure on the TEN-T network and traffic management systems for all modes of transport, the selected projects will be announced in June 2022.[34]

In this respect both seaports Varna and Burgas, as well the main Danube ports could benefit of such projects.

[34] https://transport.ec.europa.eu/news/eu-transport-infrastructure-speeding-investments-dual-civildefence-use-and-energy-efficiency-2022-04-08_en

European Union and the new TEN-T in the Balkans peninsula

Anastasya Raditya-Ležaić

Contents

1. EU policies and normative framework

The EU's Trans-European Transport Network (TEN-T) policy aims at building an effective, EU-wide and multimodal transport network across the EU. It comprises railways, inland waterways, short sea shipping routes and roads linked to cities, maritime and inland ports, airports and terminals. TEN-T identifies the transport infrastructure in Member States (MS) that has high added value at the European level and that should be part of the TEN-T network. The policy is a key instrument for the development of coherent, connected and high-quality transport infrastructure across the EU.

1.1 Regulations

1.1.1 Regulation (EU) No. 1315/2013[1]

This regulation (EU) No. 1315/2013 on guidelines for the development of the TEN-T network applies since December 21st 2013 and sets out guidelines for developing TEN-T consisting of comprehensive network and the core network (the latter being established on the basis of the comprehensive network). It identifies projects of common interest[2] and specifies the requirements to be complied with in managing TEN-T infrastructure. The regulation lays down rules regarding measures to implement the TEN-T such as degree of maturity of the projects of common interests, compliance with EU and national legal procedures, and availability of financing.

This regulation introduces a network with a dual layer structure consisting of a comprehensive network and of a core network.

[1] Full text of the regulation: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013R1315

[2] As per Article 3 of the 1315/2013 Regulation, Project of common interest means any project carried out pursuant to the requirements and in compliance with the provisions of this Regulation. For further see Article 7 of the Regulation.

One practical difference is in the degree of maturity: the aim is to complete the core network by 2030 and comprehensive on by 2050. The guidelines set out a long-term strategy for the development of a complete TEN-T consisting of infrastructure for railways, maritime and air transport, roads, inland waterways and railroad terminals. It includes the technical standards, along with the requirements for interoperability of infrastructures; and defines priority links and nodes for the development of the TEN-T.

The comprehensive network represents the basic layer of the TEN-T and ensures accessibility and connectivity of all regions in the EU; whereas the core network consists of the parts of the comprehensive network that are of the highest strategic importance, linking the most strategically important urban and other nodes (ports, airports and border crossing points). Projects of common European interests should create a new transport infrastructure as well as upgrade existing ones. These projects should tackle main problems such as missing links at cross-border sections, infrastructure disparities between and within the member states, insufficient multimodal connections, inadequate interoperability of different transport-related systems and overly high levels of greenhouse gasses (GHGs) from transport. EU funding is available for these projects under the Connecting Europe Facility (CEF).[3]

1.1.2 Regulation (EU) 2021/1153[4]

This regulation (EU) 2021/1153 establishing the Connecting Europe Facility was formally adopted on July 7th 2021 to establish CEF for the period of 2021 and 2027 (so called CEF 2.0) and lay down the objectives of CEF, its budget, the forms of EU funding and the rules for providing such funding. It also repeals Regulation (EU) No. 1316/2013 and Regulation (EU) No. 283/2014.

The general objectives of CEF are to finance the building, development, modernisation and completion of the trans-European networks in the

[3] Connecting Europe Facility (CEF) is a key EU funding instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at European level. It supports the development of high performing, sustainable and efficiency interconnected trans-European networks in the field of transport, energy and digital services. CEF offers grants, but also innovative financial instruments such as guarantees and project bonds. More on CEF see: CINEA (2022) Connecting Europe Facility. Online, available at: https://ec.europa.eu/inea/en/connecting-europe-facility

[4] Full text of the regulation: https://eur-lex.europa.eu/eli/reg/2021/1153

transport, energy and digital sectors. These objectives also aim to facilitate cross-border connections and foster greater cohesion across the EU. For the period of 2021-2027, the budget amounts to 25.8 billion EUR for transport, 5.8 billion EUR for energy and 2.1 billion EUR for digital. Reflecting the importance of tackling climate change in line with EU's commitments to implement the Paris Agreement and the UN SDGs, this Regulation is intended to contribute to mainstreaming climate actions and to the achievement of an overall target of at least 30% of EU budget expenditure supporting climate objectives.

1.1.3 Regulation (EU) No. 2016/758

This amended the Regulation (EU) No. 1315/2013 on the EU guidelines for the development of the trans-European transport network. A high-level agreement between the EU and the six Western Balkan countries (Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro and Serbia –further referred as WB6) was endorsed at the WB6 Summit in Vienna on August 27th 2015 on the adaptation of the indicative extension of the comprehensive TEN-T maps, as well as on the identification of the core network connections on the comprehensive network maps in the Balkans region. The agreement concerns specifically the lines of the railway and road networks, as well as ports and airports in the peninsula. The adaptation of the indicative comprehensive network maps and, in particular, the identification of the indicative core network should allow the EU to better target its cooperation, including in terms of its financial support, with the WB6.

The extension of the TEN-T policy beyond EU borders articulates two objectives: to ensure consistency and effectiveness of an interoperable and multimodal network between MS and their immediate neighbours and partner countries; and to focus the EU engagement (including financial support) in these regions. In the broader perspective of the European Neighbourhood Policy and EU Enlargement policy, the TEN-T extension is a tool to closely integrate and respectively prepare candidate countries and potential candidates for possible EU accession.

WB6 have long been a priority region for the EU and are an important market for the EU as well as a significant transit area for the transport of European goods. WB6 have a key role to play in the global value chain that supply the EU, and the role could be further reinforced by providing for better transport connectivity with the EU and within

the region. Following the change to the TEN-T Regulation, a Treaty establishing the Transport Community (TCT) was adopted in 2017[5]. TCT requires the Wester Balkans to transpose EU transport acquis into their national legislation, allowing for the integration of WB6 into the EU transport market before their accession to the EU. This includes the areas of technical standards, interoperability, safety, security, traffic management, social policy, public procurement and the environment; thus supporting the region in its effort to close the gap to MS. TCT is developing a work plan for the development of the indicative TEN-T core and comprehensive networks while its Permanent Secretariat assists WB6 in the transposition of EU transport policy and implementation of TEN-T projects.

1.2 Proposal for further revision of the TEN-T Regulation (December 2021)

At the end of 2021, European Commission (EC) published a proposal[6] for revising the TEN-T Regulation (EU) No. 1315/2013; to reflect the priorities of the European Green Deal, the Sustainable and Smart Mobility Strategy of the EC and the Global Gateway Connectivity Strategy. A public consultation to give feedback to the published proposal had been held in the first quarter of 2022. The proposal is envisaged to be adopted by late 2022 – early 2023.

The suggested revision brings real opportunity to make TEN-T network fit for the future, aligning the development of the network to the European Green Deal objectives and the climate targets of the EU Climate Law: to cut GHGs from the transport sector by 90% compared with 1990 levels by 2050 which is key to achieving climate-neutrality by the same date. To make this significant emission cuts, a modern, fully-fledged European transport network needs to: (1) makes all transport modes more sustainable by setting firm incentives and requirements for transport infrastructure development and better integrating different modes in a multimodal transport system; (2) ensures that new infrastructure projects on the network are climate-proof and consistent with environmental objectives; and, (3) delivers the infrastructure basis for alternative fuel deployment.

[5] Full text of the treaty can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A22017A1027%2801%29

[6] Full text of the proposal can be accessed here: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2021:812:FIN

The high-quality network shall be gradually completed in three steps: 2030 for the core network, 2040 for the extended core network and 2050 for the comprehensive network. The core and extended core network together form European Transport Corridors which are the most strategic part of the network.

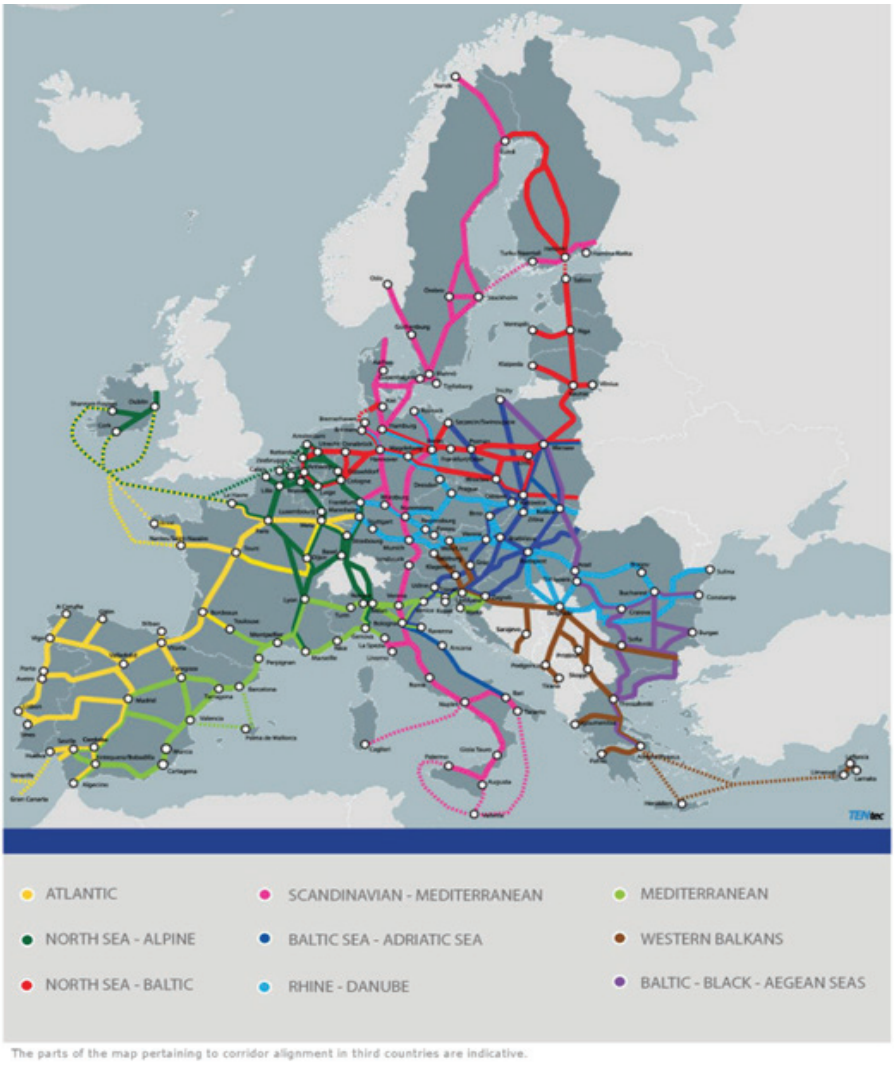
In the proposed new corridor alignment, one of the biggest changes was the proposal of the new Western Balkan Corridor. The wording of the Corridors was slightly changed, as the former Core Network Corridors will be replaced with the European transport corridors (ETC). The approach of EC was to align the Rail Freight Corridors and the Core Network corridors to use the untapped potential for streamlining, increased effectiveness and synergies.

As per the proposal, the European Transport Corridors should cover the most important long distance transport flows and consist of key European transport multimodal axis, based on parts of the trans-European network, be multimodal and open to the inclusion of all transport modes and cross at least two borders and involve at least transport modes. They still remain to be an instrument to facilitate the coordinated implementation of parts of the TEN-T Network and are intended in particular to improve the cross/border links and remove bottlenecks within the EU.

In terms of the governance, the approach of Corridor Coordinator will remain also as per the new EC proposal meaning that the European Coordinator shall support the coordinated implementation of the respective European Transport Corridors and horizontal priorities concerned (Motorways of the Sea or ERTMS). The instrument of the core network corridors including the European Coordinators has proven to be both relevant and effective. The proposal of the revision of TEN-T regulation therefore further develops and extends the corridor concept and strengthen the role of the European Coordinators. Some of the proposed competencies of the Corridor Coordinator are to support the coordinated implementation of the European Transport Corridor or horizontal priority concerned; consult with the Corridor Forum in relation to the work plan; report to MS, to the Commission and, as appropriate, to all other entities directly involved in the development of the European Transport Corridor or horizontal priority on any difficulties encountered; and in particular when the development of a corridor or horizontal priority is being impeded, with a view to helping to find appropriate solutions.

In terms of monitoring of the progress of the Corridor, the European Coordinator will draw up work plan for the respective European Transport Corridor and provide a detailed analysis on state of compliance every two years.

Map of TEN-T Corridors[7]



[7] European Commission (2022) *Trans-European Transport Network (TEN-T)*. Online, available at: https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en

2. Maps

2.1 Map of IWW and maritime ports in WB6

Map of IWW and ports in Western Balkans Region[8]

The map above presents the Maritime Ports of Durres and Bar, which are currently marked as Core Ports of the extended TEN-T Network. Port of Vlore in Albania is marked as a comprehensive Maritime port of the extended Network. It is to be expected that after the

[8] Source: Regulation (EU) No. 2016/758, Annex III

finalisation of the discussion of the WB6 and EC, all three ports will not change their status in the TEN-T Revision process. However, it is also expected that the ports will be compliant with the TEN-T indicators and standards until 2040, which has been set as a new interim deadline of the finishing of the extended core network according to EC's proposal.

2.2 Map of IWW and maritime ports in Croatia, Greece, Romania and Bulgaria

Map of IWW and sea ports in Croatia (and Italy)[9]

[9] Source: Regulation (EU) No. 1315/2013, 20 December 2013, Annex I

The map above presents the IWW and Sea Ports in Croatia and Italy according to the current TEN-T Regulation. Currently the Council is discussing EC's proposal on TEN-T Revision and each MS will have the opportunity to argue and justify potential amendments and proposals of the inclusions of new sections or changing the status of core/comprehensive IWW or sea ports. Therefore, it is too early now to predict which changes will take place in the final version of the TEN-T proposal. The final version is expected to be ready in the course of 2023.

Map of IWW and sea ports in Romania and Bulgaria[10]

[10] Source: Regulation (EU) No. 1315/2013, 20 December 2013, Annex I

The map above presents the IWW and Sea Ports in Romania and Bulgaria according to the current TEN-T Regulation. Currently the Council is discussing EC's proposal on TEN-T Revision and each MS will have the opportunity to argue and justify potential amendments and proposals of the inclusions of new sections or changing the status of core/comprehensive IWW or sea ports.

Map of IWW and sea ports in Greece (and Cyprus)[11]

The map above presents the IWW and Sea Ports in Greece and Cyprus according to the current TEN-T Regulation. Currently the Council is discussing EC's proposal on TEN-T Revision and each MS will have

[11] Source: Regulation (EU) No. 1315/2013, 20 December 2013, Annex I

the opportunity to argue and justify potential amendments and proposals of the inclusions of new sections or changing the status of core/comprehensive IWW or sea ports. Therefore, it is too early now to predict which changes will take place in the final version of the TEN-T proposal. The final version is expected to be ready in the course of 2023.

3. Maritime nodes in the new proposed TEN-T methodology

The priorities for maritime infrastructure development in the Regulation (EU) No. 1315/2013 are: (a) promotion of motorways of the sea and development of measures to improve the environmental performance of maritime transport in accordance with the applicable requirement under EU law or relevant international agreements; (b) interconnection of maritime ports with inland waterways; (c) implementation of VTMIS[12] and e-Maritime services; (d) introduction of new technologies and innovation for the promotion of alternative fuels and energy-efficient maritime transport including LNG; and (e) modernisation and expansion of the capacity of the infrastructure necessary for transport operations within the port area.

In the proposed new regulation of December 2021, waterborne transport priorities are slightly changed and adapted. MS and project promoters are required to give due consideration to climate change, natural hazards and human-made disasters by developing sustainable forms of transport with the implementation of high-level standards for green transport infrastructure. Further, given the decarbonisation goals and the need to be consistent with Paris Agreement objectives, projects of common interest should be assessed to ensure that TEN-T policy is coherent with transport, environmental and climate policy objectives of the EU. MS and project promoters need to carry out environmental assessment of plans and projects based on latest available guidance and best practice.

[12] Vessel Traffic Management Information System

In addition to the abovementioned two priorities, priorities specific to maritime infrastructure development according to the proposed regulation are:

- Upgrade of maritime access such as breakwaters, sea channels, fairways, locks, capital dredging and navigational aids;
- Construction or upgrading basic port infrastructure such as internal basins, quay walls, berths, jetties, docks, dykes, backfills and land reclamation;
- Improvement of digitalisation and automation processes, in particular in view of an increased safety, security and sustainability;
- Introduction and promotion of new technologies and innovation for zero and low carbon energy fuels and propulsion systems;
- Improvement of resilience of the logistic chains and international maritime trade, including in relation to climate adaptation;
- Noise reduction and energy efficiency measures; and
- Promotion of zero and low emission vessels serving and operating short-sea shipping links, and developing measures to improve the environmental performance of maritime transport for port call or supply chain optimisation in accordance with the applicable requirements under EU law or relevant international agreements.

3.1 Conditions to be main nodes of Core Network

The core network is a subset of the comprehensive network, overlaying it to represent the strategically most important nodes and links. The core network is multi-modal, it includes all transport modes and their connections as well as relevant traffic management systems, in order to enable modal integration and multimodal operation. A strong focus is given to interoperability within and across the modes.

The core network is identified in the following steps:[13]

3.1.1 Definition of the class: primary or secondary

There are two classes of main nodes: primary main nodes (P) and secondary main nodes (S). The primary nodes fulfil the corresponding

[13] Source: European Commission (2013) *Commission Staff Working Document –the Planning methodology for TEN-T accompanying the document Communication from the Commission –Building the Transport Core Network: Core Network Corridors and CEF*. SWD/2013/0542 final

criteria and therefore selected before shaping the network, and the secondary nodes result from shaping the network.

3.1.2 Passenger and freight, freight only, passenger only

Main nodes of the Core Network are the nodes of the highest importance in the EU, which are identified in the first step of the planning procedure: main nodes for passengers and freight, main nodes for freight only, and main nodes for passengers only.

A. The main nodes for passenger and freight traffic:
   1. (P) Capital city of each EU MS and cities with EU capital function
   2. (P) Every "Metropolitan European Growth Area" according to ESPON (9) Atlas 2006;
   3. (P) A city cluster which exceeds 1 million inhabitants (Larger Urban Zones in EUROSTAT);
   4. (P) Main city of an island or archipelago of NUTS 1 region with at least 1 million inhabitants;
   5. (P) One main border crossing point per mode between each EU MS with external border and each of its neighbouring non EU MS with the highest long-distance traffic flow. Border crossing points only serve as auxiliary points for network planning, and do not provide any other core node function.

B. The main nodes for freight traffic:
   1. (S) A sea or inland port or a road-rail terminal of an urban main node (A.1 – A.4);
   2. (P) A sea or inland port with annual transhipment volume at least 1% of the total transhipment in all EU seaport;
   3. (P) The largest seaport (in terms of transhipment volume) along each continuous coastline of insular MS and non-insular NUTS1 regions with access to the sea where no ports are classified according to criteria B.1 or B.2;
   4. (S) Inland ports with interface function to core network rail links for freight and/or maritime transport, to be connected to the corresponding modes;
   5. (S) Seaports which are core inland ports according to B.4 and inland ports which are seaports according to B.3;
   6. (S) Road-rail terminals which are located in the area of branching or crossing points of core network rail links for freight or which are located in the neighbourhood of a core sea or inland port;

7. (S) Airports with annual airfreight volume of at least 1% of the EU total.

C. The main nodes for passenger traffic:
   1. (S) Main airport of each urban main node according to A.1 – A.4;
   2. (P) Airports with annual passenger volume of at least 1% of EU total;
   3. (P) The cities relative to core network seaports according to B.2 or B.3, if their population exceeds 200,000 inhabitants in the corresponding Larger Urban Zones;
   4. (P) Core network seaports according to criteria B.2 or B.3 if they have relevant bridgehead function for passenger ferry connections within the core network.

As for the WB6, it is expected that all the current core ports in IWW will keep their status after the TEN-T revision. That also includes Sava, Danube and Tisa rivers. If the WB6 would like to propose any amendments in terms of inclusion of new ports, the requests will have to be duly substantiated with statistical data and explained in terms of their importance for the TEN-T Network.

3.2 Compliance of Port of Durres and Port of Bar

The requirements of transport infrastructure for the core network are to follow:

- MS of WB6 country shall ensure that:
  - alternative fuels infrastructure is deployed in full compliance with the requirements of the Regulation on the deployment of alternative fuels infrastructure[14];
  - maritime ports are equipped with necessary infrastructure to improve the environmental performance of ships in ports, among others reception facilities for the delivery of waste from ships in accordance with Directive (EU) 2019/883[15];

[14] This regulation is also being proposed. The proposal can be accessed here: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021PC0559. The proposal itself once adopted will repel Directive 2014/94/EU on the deployment of alternative fuels infrastructure, full text of the directive can be accessed here: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32014L0094

[15] Full text of the Directive can be accessed here: https://eur-lex.europa.eu/eli/dir/2019/883/oj

  - VTMIS and SafeSeaNet are implemented in accordance with Directive 2002/59/EC[16];
  - maritime national single windows are implemented in accordance with the Regulation (EU) 2019/1239.[17]

- By December 31st 2030 for core network[18], MS or WB6 country shall ensure that:[19]
  - Maritime ports are connected with the rail and road infrastructure and, where possible, inland waterways, except where specific geographic or significant physical constraints prevent such connection;
  - Any port that serves freight traffic should offer at least one multimodal freight terminal which is open to all operators and users in a non-discriminatory way and which applies transparent and non-discriminatory charges;
  - Sea canals, port fairways and estuaries connect two seas or provide access from the sea to maritime ports and correspond at least to inland waterways that meet the IWW transport infrastructure requirement accordingly;
  - Maritime ports connected to inland waterways and are equipped with dedicated handling capacity for inland waterway vessels.

3.2.1 Port of Bar, Montenegro

As defined by the TEN-T regulation, Port of Bar is a core Maritime Port of the Extended Core Network. The extended core network is defined only maps as per the regulation (EU) No. 2016/758 which amended the Regulation (EU) No. 1315/2013 on the EU guidelines for the development of the trans-European transport network.

[16] Directive establishing a Community vessel traffic monitoring and information system, full text of the Directive can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32002L0059

[17] Full text of the Regulation can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R1239

[18] Otherwise by December 31st 2050 for comprehensive network

[19] At the request of MS in a justified case, exemption from these requirements may be granted by EC. All requests for exemption have to be based on a socio-economic cost-benefit analysis, the assessment of specific geographic or significant physical constraints and/or potential negative impacts on environment and biodiversity.

The Port of Bar is Montenegro's main sea port, capable of handling about 5 million tonnes of cargo annually. Situated on the Adriatic Sea, its location greatly helps to shorten transit times and lower transportation costs. The port is integrated with the Belgrade – Bar railway line and with the road network, and is thus an important factor in intermodal transport. The Port of Bar is treated as a free trade zone.

The Port of Bar is compliant with the indicators for rail connection, road connection, facilities for ship-generated waste and terminal availability. Non-compliance for this port concerns clean fuel availability, while VTMIS is partially compliant as it has been partially implemented in Montenegro. Currently, the Port of Bar is also non-compliant with availability of clean fuels, and no planned projects have been reported to address the failure to comply with this indicator.

3.2.2 **Port of Durres, Albania**

As defined by the TEN-T regulation, Port of Durres is a core Maritime Port of the Extended Core Network. The Port of Durres is located approximately 38 km from Tirana. The largest Albanian port and the busiest Western Balkans seaport in cargo traffic volume (3.5 million tonnes annually). It is government-owned, with private companies managing port terminals and pilotage services.[20]

The Port of Durres is compliant in road connection, facilities for ship-generated waste and terminal availability. CEMT connection to inland waterways is not applicable for the Port of Durres.

Non-compliance for the port of Durres relates to the partial rail connection, due to the fact that currently only the eastern port terminal is linked to the national railway network, therefore its multimodal dimension at the moment is very limited. As for compliance with VTMIS, according to the available data, VTMIS has not yet been implemented in Albania. Regarding compliance with clean fuel availability, the Port of Durres is non-compliant and at the moment there are no planned projects to address this.

[20] Source: Transport Community Treaty Permanent Secretariat (2021) *Development of indicative TEN-T extensions of the Comprehensive and Core Network in Western Balkans*. Online, available at: https://www.transport-community.org/wp-content/uploads/2021/08/TEN-T-report-2020.pdf

The future developments of the Port of Durres will have to be regarded in the light of the latest plans of reallocating of the Port itself. In December 2020, the Ministry of Infrastructure and Energy announced that the Albanian Government had signed a cooperation agreement with the Government of United Arab Emirates (UAE) aimed at transforming the Durres Port into a tourist area dedicated to passengers and yachts. The 2 billion EUR forecasted investment will be implemented by the UAE-based EMAAR Group.[21] According to the master plan designed by the Albanian Government, the cargo port will be relocated to Porto Romano area. It is important that the Port of Durres keeps the compliance of the crucial TEN-T indicators of road and rail connection, non-discriminatory measure for all operators, as well as ship generated waste facilities. The relocation could also be a good opportunity to start planning at early stages the compliance with the alternative fuels availability indicator as well as on shore power supply for ships.

To keep its status as a Core Maritime Port of the Extended TEN-T network, Durres Port Authority should prove that after relocation to Porto Romano, all the TEN-T key performance indicators will remain, especially rail connection, road connection, facilities for ship generated waste, terminal availability, as well as preparations for availability of alternative fuels, VTMIS.

3.2.3 Conclusions

Both Ports of Bar and Durres are defined as the Core maritime nodes of the extended TEN-T network. It is to be expected that these two ports will also remain the important maritime nodes in the ongoing TEN-T revision as they fulfil the basic criteria for inclusion. However, both ports will have to significantly increase their efforts and take all necessary measures to start planning the green transition of their ports. The ports of Bar and Durres should strive to continue the "greening of the port", which means much more than the transport side. All industry players in the port should have their agendas, goals and plans aligned to maximise the impact of any greening initiative. The process of greening the ports, including all the respective actions

[21] Cooperation and Development Institute (2021) *Albania in the Berlin Process: Monitoring the connectivity agenda*. Online, available at: https://cdinstitute.eu/wp-content/uploads/2021/03/2021-12-03-ALBANIA-IN-THE-BERLIN-PROCESS-MONITORING-THE-CONNECTIVITY-AGENDA-EN.pdf

and plans in that respect can be regarded in the broadest possible terms including small scale investments like installation of LED lightning and lowering the energy consumption in the port, etc.

In the light of the necessary compliance with the new TEN-T regulation, the ports will also have to increase their efforts in deploying ICT systems which will enable improvement of digitalisation and automation of processes. The ports must ensure to keep the existing infrastructure operational and improving or maintain its quality in terms of safety, security, efficiency, climate and disaster resilience and environmental performance. In addition, both ports have to plan their infrastructure components in the view of ensuring zero waste operations and circular economy measures. In the long run, focus should be given to promoting zero and low emission vessels serving and operating short-sea shipping links, and developing measures to improve the environmental performance of maritime transport for port call or supply chain optimisation.

Ports of Bar and Durres will have to face a lot of challenges in terms of compliance with the new additional priorities for maritime infrastructure development. The completion of the extended Core network (including the full TEN-T compliance of Port of Bar and Port of Durres) is set for 2040 according to the new approach of the EC, as defined in the TEN-T revision proposal of gradual development of the TEN-T network. This gives the Western Balkan ports additional time to fulfil the requirements.

Having in mind that EU for abovementioned investments will be relatively limited for all WB6, significant amount of funds will have to be deployed through own resources, national budgets and loans from EIB, EBRD and other financial institutions. However, in terms of recovery of the maritime industry and its significance for international trade, the volumes of traffic are expected to raise in the coming years as these two ports serve not only their own countries, but also other neighbouring Western Balkan countries: Kosovo[22] and North Macedonia in the case of Port of Durres and Serbia in the case of Port of Bar. Along with the green deal ambitions, it is to be expected that more traffic will be shifted from road to rail and other environmentally friendlier modes, such as IWW and maritime, where the Port of Durres and Bar could profit in terms of their further growth and importance as multimodal hubs.

[22] This designation is without prejudice to positions on status and is in line with UNSCR 1244(1999) and the ICJ Opinion on the Kosovo declaration of independence.

Finally, the Republic of Albania in cooperation with the Durres Port Authority will have to complement the dossier of Porto Romano and provide all the substantiated information needed to keep the status of Durres port as a Core Maritime Port of the extended TEN-T Network).

3.3 Impact of climate change in IWW and maritime connectivity

Heavy storms, low precipitation and other natural hazards caused by climate change could affect waterborne transport and damage the infrastructure. Because of this, future transport infrastructure projects must have not only Environmental impact assessment but also Climate proofing analysis and elements of resilience of infrastructure prior to its implementation. In July 2021 EC published a new Technical guidance on climate-proofing of infrastructure projects for the period of 2021-2027.[23] Climate-proofing is a process that integrates climate change mitigation and adaptation measures into the development of infrastructure projects. The technical guidance sets out common principles and practices for the identification, classification and management of physical climate risks when planning, developing, executing and monitoring infrastructure projects and programmes.

The EU Smart and Sustainable Mobility Strategy[24] was one of the main elements of the Annex to the EU Green Deal published in December 2020. Today transport is the only economic sector in which GHG levels are higher than in 1990 and have been growing since 2013 despite mitigation efforts. Sea ports are now seen as potential new clean energy hubs for integrated electricity systems, hydrogen and other low-carbon fuels, and testbeds for waste reuse and the circular economy. Making the maritime ports cleaner and greener is done by incentivising deployment of renewable and low-carbon fuels and feeding stationed vessels with renewable power instead of fossil energy; incentivising development and use of new, cleaner and quieter vessels; optimisation of port calls; and through wider use of smart traffic management. Zero-emission ocean-going vessels shall become market ready by 2030.[25]

[23] Full text of the notice can be accessed here: https://op.europa.eu/o/opportal-service/download-handler?identifier=23a24b21-16d0-11ec-b4fe-01aa75ed71a1&format=pdfa2a&language=en&productionSystem=cellar&part=

[24] Full text of the Strategy can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789

[25] Source: European Commission (2020) *Sustainable and Smart Mobility Strategy* –

Short-sea shipping and efficient zero-emission vehicles can also contribute to greening freight transport in Europe. The Motorways of the sea has proven successful since its inception and should continue to boost more cargo to be transported via short-sea shipping. Transport by IWW and short sea shipping should increase by 25% by 2030 and 50% by 2050.

In the context of the WB6 it is important to mention that Transport Community Permanent Secretariat together with the 6 regional Partners developed the Smart and Sustainable Mobility strategy – western Balkan dimension[26]. Through monitoring of this Strategy, WB6 contribution to modal shift and future detailed impact will also be followed in the years to come.

3.4 Impact of Ukraine conflict in IWW and maritime connectivity

The Russia-Ukraine war is severely disrupting shipping and the supply chain. Shipping routes have been cut, logistics firms are suspending services and prices are skyrocketing. There have been initiatives to ban Russian ships in EU ports, but by the time this paper is written, no concrete decision in this respect has been taken on the EU level yet.

Within the existing CEF for the period of 2021-207, 1.69 billion EUR is devoted to ensure military mobility within the EU, providing dual-use compatibility of infrastructure to meet both civilian and military needs. In the Joint Communication on Improving Military Mobility in the EU[27] and the Joint Communication on Action Plan on Military Mobility[28], transport infrastructure policy is seen as a clear opportunity to increase synergies between defence needs and the TEN-T with the overall aim of improving military mobility across EU, taking into account geographical balance and the potential benefits for civil protection. In 2018, in accordance with the Action Plan, the Council considered and validated the military requirements in

putting European transport on track for the future. COM (2020) 789 final

[26] Full text of the strategy can be accessed here: https://www.transport-community.org/wp-content/uploads/2021/06/Strategy-for-Sustainable-and-Smart-Mobility-in-the-Western-Balkans.pdf

[27] Full text of the communication can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017JC0041

[28] Full text of the communication can be accessed here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=JOIN%3A2018%3A5%3AFIN

relation to transport infrastructure and, in 2019, the Commission services identified the parts of the TEN-T which are suitable for dual use, including necessary upgrades of existing infrastructure. In August 2021 the Commission adopted an Implementing Regulation that specified the infrastructure requirements applicable to certain categories of dual-use infrastructure actions.

Ardian Hackaj is Director of Research at Cooperation and Development Institute, Tirana, and coordinator of Tirana Connectivity Forum. Mr. Hackaj has authored research on the Berlin Process, EU Connectivity Agenda, Belt & Road Initiative, Western Balkans 6 institutional reforms, etc. During his career Mr. Hackaj has held management positions at the College of Europe-Bruges, International Organization for Migration, United Nations, and the EU Commission. He holds an MA from College of Europe and a BA in International Economics from Université Lumière, Lyon II. Currently he lives in Tirana.

Ana Krstinovska, PhD, is the President of ESTIMA, North Macedonia-based think tank and consultancy focusing on the EU, China and the Western Balkans. Formerly State Secretary for EU Affairs in the Government of North Macedonia and First Secretary in the Macedonian Mission to the EU in Brussels, she has extensive experience in public policy, EU integration and management of EU funds from the perspective both of policy making and civil society. Krstinovska has authored over a dozen publications on EU affairs and EU funds, including analyses and manuals on the accession process.

Dr George N. Tzogopoulos (Ph.D. Loughborough University, UK, 2009) is an expert in media, international relations and Chinese affairs. He is member of Cife core faculty and Senior Fellow, as well as director of the module 'Conflict and Co-operation in the International System' within the MA 'European Integration and Global Studies.' George is also the director of EU-China programmes at Cife and leads partnerships with several Chinese academic institutions. Additionally, he has carried out several Cife research programs under the aegis NATO Public Diplomacy Division, including the December 2021 'Building Security in Iraq' conference. He recently, edited a special Cife e-book about The EU and the Eastern Mediterranean: The Multilateral Dialogue Option which includes a prologue by Ambassador Nikolaus Meyer-Landrut.

George systematically organises different Cife discussions on current affairs, for example on US foreign policy, the Eastern Mediterranean, and China's Belt and Road Initiative (with Aydin University).George is also is Senior Fellow at the Hellenic Foundation for European and Foreign Policy (ELIAMEP), and the Begin Sadat Center for Strategic Studies (BESA) in Israel, and Lecturer in International Relations at the Democritus University of Thrace. He is the author of three books: US Foreign Policy in the European Media: Framing the Rise and Fall of Neoconservatism (IB TAURIS), The Greek Crisis in the Media: Stereotyping in the International Press (Ashgate) and The Miracle of China: The New Symbiosis with the World (Springer and China Social Sciences Press).

Bozhidar Yankov is Head of European Programs, Projects and Public Relations Dept. within Executive Agency Exploration and Maintenance of the Danube River. My dept. is responsible for the whole project management process of projects implemented by the Agency as a beneficiary/partner. Our field of work concerns the Danube River inland waterway management in the common Bulgarian-Romanian stretch of the river. My department also deals with the international affairs of the Agency, cooperation with other Danubian river administration on development and improvement of inland navigation.Personally, I have experience in regional development, project management, environment protection. I work for the Agency since ten years.

Anastasya Raditya Ležaić received a Master degree in European and International Studies from the European Institute of the Centre international de formation Européen (CIFE) in Nice, France, with a fellowship from the DG Education and Culture of the European Commission. Previously she received a Bachelor degree in International Relations from Gadjah Mada University in Yogyakarta, Indonesia, where she graduated with honors (cum laude). Since 2014 she is a PhD candidate enrolled in the Interdisciplinary Doctoral Program of the Faculty of Social Sciences, University of Ljubljana in Slovenia in the field of Diplomacy. She is employed in IRMO as Research Assistant in the Department for International Economic and Political Relations. During her employment in IRMO, she had co-written the book Green Jobs for Sustainable Development and the book Commercial Diplomacy

of the Republic of Croatia. She also worked in several EU and UN funded projects and studies such as Blue Plan – Water Management in Croatia; Strengthening competitiveness by internationalization of business – the role of commercial diplomacy; and Supporting economic recovery by cooperation between commercial diplomacy of Slovenia and Croatia in the third markets; etc. Her research interests include commercial diplomacy, environmental diplomacy, sustainable development, green jobs, and project management. She had finished the intensive training for EU Project Management and Implementation organized by PJR consulting. Anastasya is an alumni and a member of the Academy of Political Development, which is supported by the Council of Europe. She also had finished UN Academy and a member of the Croatian UN Association. In Croatia, she is as well an active member of the Indonesian Diaspora Network. She speaks English, Croatian and Indonesian fluently.

Elson Thana is an experienced maritime specialist, who is flexible, adaptable and able to manage multiple priorities at the same time. His academic experience in World Maritime University (WMU) and Lund University in Sweden, and professional experience on maritime transport policies and protection of marine environment significantly, increased its professional knowledge and social abilities of talking to, and building relationships with all kinds of people. He has a long history of working in the maritime industry. Skilled in Negotiation, International Shipping, Environmental Awareness, Ports, and Contract Management. Strong support professional with a Certificate of Participation - Summer Academy focused in Law of the Sea & Maritime Law-Uses and protection of the Sea-Legal,Economic and Natural Science from International Tribunal for the Law of the Sea (ITLOS) Hamburg, Germany etc.

Dario Bušić is the Head of Department for Water, Air and Pipeline Transport at the Ministry of Communications and Transport of Bosnia and Herzegovina. He is the contact point for EMSA, REMPEC, International Sava River Basin Commission, and Directorate for Civil Aviation of BiH. From 2005 to 2017 Dario was the Head of Department for Road and Railway Transport at same Ministry. He was responsible for drafting relevant laws and bylaws. As the Head of the Transport Group and a member of the Negotiation Team, he actively participated in the Stabilization and Association Process of BiH to the EU.

Đorđije Otašević was born in Berane, Montenegro, on 10th October 1986. He finished primary and secondary school in his hometown with the highest grades. The Faculty of Political Sciences enrolled in 2008. in which he graduated with the thesis "The influence of Hitler's ideology on his foreign policy". At the same faculty, he obtained his master's degree with the topic "Vampire or man, the power of fear". in 2016. He has been employed as an implementation and project manager in the Ministry of Capital Investments since 2018. The of his expertise are pre-accession European funds with an emphasis on maritime and railway projects and the principle of multimodality. He is a member of several working bodies, working groups and committees including, Project steering committee for project "EU reform instrument", Steering committee for Monitoring of the Implementation of the United Nations Integrated Program for the period 2017-2022 and TCT Road Technical Committee. He is the author and co-author of several works in the field of maritime affairs as well as international and regional cooperation. He is a graduate of the Diplomatic Academy "Gavro Vuković". In his spare time, he is an avid bibliophile and horologist.

CIP KATALOGIMI NË BK