




Interreg 
EUROPEAN UNION

Danube Transnational Programme
DIONYSUS

**Integrating Danube Region into Smart
& Sustainable Intermodal Transport Chains**

**D T2.1.2 Report on multimodal -
intermodal market perspectives**



Version 1.0
Status: Final
Date: 23.5.2022



Document History

Version	Date	Authorised
0.1	27.10.2021	iC
1.0	23.5.2022	VPAS

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Abbreviations

Abbreviation	Explanation
DR country	Danube Region country
GDP	Gross Domestic Product
TEN-T	Trans-European Transport Network
TEU	Twenty-foot equivalent unit
TIR	Transports Internationaux Routiers
AFDJ	Lower Danube Administration
C.N. A.P.M.	Compania Națională Administrația Porturilor Maritime S.A. Constanța – National Company Administration of Maritime Ports S.A. Constanta
CSCT	Constanta South Container Terminal
GDP	Gross Domestic Product
NC MDPA	National Company Maritime Danube Ports Administration SA Galati
PBN	Port Bazinul Nou (one of the ports in Galati)
AGTC	Agreement on Important International Combined Transport Lines and Related Installations
ÚNS	Ústredná nákladná stanica / central freight station
VTIP	Verejný terminál intermodálnej prepravy / public intermodal transport terminal
ŽSR	Železnice Slovenskej republiky / Railways of the Slovak Republic

1 Introduction

The Danube Transnational Program promotes economic, social and territorial cohesion in the Danube Region. As part of this program, a consortium of nine countries has implemented the DIONYSUS project - Integrating the Danube Region into Smart & Sustainable Multimodal & Intermodal Transport Chains for 2 years, aiming to transform Danube ports into high-performance multi and intermodal transport hubs, better connected and integrated with supply chain logistics.

During the last one and a half years we have observed complete change of logistics map of Europe. Trade war between USA and China, global chip shortage in combination with pandemic of COVID-19 followed by war conflict in Ukraine affected global market and reset the production and supply chain. Some of production was relocated from Asia to Europe. This increases pressure on reevaluation of existing transport routes for intermodal transportation and assessment of alternative routes with future potential. In European context, inland waterway transportation may play major role in the transition we can currently observe.

In order to explore and use the full potential, many has to be done. At present, the entire fleet of demarcation and measuring vessels has been renewed along the Danube in the section from Bratislava to the Black Sea, which contributes to the modernization of waterway management. This renewal is a clear message - a stronger position for the Danube in the European transport network in the coming years. Although the potential for increasing water transport on the Danube (Danube Region Strategy) exists, there are still obstacles to greater growth. According to the Danube Transnational Program (Daphne) "Container Market Report", the current transport of full containers across the Danube is almost zero. However, there is potential in the medium to long term for the transport of empty containers. In the long run, when transporting full containers, it proves to be an opportunity to create a regular service in places where there is a real demand for the transport of full containers (industry / ports) and where there is also insufficient railway capacity.

1.1 Scope of the report

According to the European Green Deal, transport is responsible for a quarter of the EU's greenhouse gas emissions, and this proportion is constantly increasing. If we want to achieve climate neutrality, we must reduce transport emissions by 90% by 2050. All modes of transport, road, rail, air and water, will have to contribute to this reduction. If we want to achieve sustainable transport, users must be paramount, and we must provide them with more affordable, accessible, healthier and cleaner alternatives to their current mobility habits. Multimodal transport needs strong support. Thanks to multimodal transport, the efficiency of the entire transport system will increase. 75% of inland freight transport currently takes place by road. It will be paramount that a substantial part of it is transferred to railways and inland waterways. "

Scope of this report is to identify current or future-potential multimodal container hubs in each DR country. Each project partner representing it's country will identify one (or more) port that is or has the potential to become multimodal container hub. Each

project partner provides overview of transhipped commodities with perspective of those that could be eventually containerized. Along with data about commodities, GDP forecast are evaluated to estimate the market perspective for containerized goods in upcoming 5 years. Important part of the report is to summarize previous, ongoing, planned and considered projects and activities in responsibility of project partners that aim to support and/or develop multimodal and intermodal flow of goods in their DR ports.

However, in connection with the analysis of the current state of intermodal transport, it should be emphasized that there are currently no comprehensive aggregated, reliable, methodically agreed data on the direction of flows and types of transported commodities (in all modes of transport), which could accurately assess the current situation.

1.2 Sources and data

As defined in project´s Application form and project´s Work plan, inputs for present deliverable are country reports elaborated by responsible project partners for each country, represented in the project consortium, namely Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Romania, Moldova, and Ukraine. Country reports covered above all:

- macroeconomic overview of the country and forecast focused on container transportation
- cargo volume statistics
- potential for container transshipment
- current and desired state of intermodal affairs of port of choice

Regarding data, it should be emphasized that accurate statistics on combined transport are limited throughout the European Union, as these statistics are official do not follow, resp. the same data structure is not monitored. At present, there are no complex aggregates data on the direction of currents and types of commodities transported (in all modes of transport), based on which could accurately assess the current state of intermodal transport vis-à-vis other modes. The classification of combined transport is also different.

It is also necessary to distinguish "services of combined transport itself" and "services of combined transport terminals". As for the performance of combined transport terminals, these can be simply characterized by two simple circuits, namely the performance of the manipulated intermodal units (reported in TEU) by the terminal at a certain time, or the capacity of intermodal units (reported in TEU) at a certain time. Subsequently, the terminals can be referred to as their performance, which is determined by the terminal's operating processes themselves, and there are several approaches to measuring terminal performance.

1.3 Relevant preceding projects

The fact that in the future there may also be an increase in the potential for transport on the Danube congestion of railway infrastructure in the Danube area, which may lead to increased interest in water transport. In order to make better and more efficient use of the potential that the Danube provides, the countries through which this river flows have agreed to cooperate with each other. In 2008, the "Danube Strategy" initiative was launched, in which one of the goals is to improve the navigability of the Danube, especially for freight shipping.

Supporting an increase of freight shipping on the Danube has two levels, physical and institutional.

Recently, the countries of the Danube region participated in the implementation of the international projects "*FAIRway Danube*" and "*Danube STREAM*", in which the emphasis is on improving mobility and multimodality, as well as the harmonization of standards for waterway and infrastructure.

In terms of institutional support, harmonisation of legislation, market researched and studies two very important projects need to be mentioned, projekt "*DAPhNE*" tackling the most urgent insufficiencies with the help of guidelines, recommendations and concrete pilot activities based on good practices leading into an overall development strategy and action plan for the Danube ports and project "*DIONYSUS*" addressing main regional challenges in infrastructure governance and planning highlighting key actions needed to support Danube transport, port infrastructure planning.

Both projects were supported by Danube Transnational Programme which aims to facilitate a balanced development of Danube Ports as eco-friendly, well accessible multimodal hubs for the transport system of the region and to turn them into buzzing economic centres functioning as catalysts for economic growth and creation of high value jobs.

2 Multimodal / Intermodal market perspectives in Austria (EHO00)

2.1 Macroeconomic overview of the country

Austria's economy recorded a historic decline in economic output of 6.7% in the pandemic year 2020. The COVID-19 crisis therefore hit the Austrian economy harder than the financial crisis of 2009 (-3.8%). According to currently available information, the decline in Germany, the most important trading partner, was far less pronounced with a minus of 4.6%. In the European Union, GDP fell by 5.9% according to preliminary calculations. Austrian GDP at current prices amounted to approximately 379.3 bn euros (-5.1%) in 2020 and GDP per inhabitant equaled 42 540 euros.

Almost all economic sectors show negative growth rates. Due to lockdowns, accommodation, and food service activities (-40.1% in real terms), arts, entertainment, and personal services (-19.7% in real terms) suffered the strongest losses, while financial and insurance services increased (+5.1% in real terms).¹

Austrian economy dropped by 12.1% in the second quarter of 2020, growth in 2019 at 1.4%

Vienna, 2020-09-28 – The Austrian gross domestic product (GDP) dropped by 12.1% in volume terms (seasonal and working day adjusted) during the second quarter of 2020 compared to the first quarter of 2020 and by 14.3% (unadjusted in real terms) compared to the second quarter of 2019. According to Statistics Austria, the measures to contain COVID-19 affected nearly all economic indicators.

In 2019, the Austrian economy grew by 1.4%, which means a slowdown in growth dynamics compared to the previous years (2017: +2.4%; 2018: +2.6%).

GDP in the second quarter of 2020: production, domestic demand and foreign trade equally affected

Private consumption declined by 12.6% in volume terms compared to the previous quarter (-16.1% compared to Q2/2019), mainly due to the lockdown of leisure services (accommodation, food service, arts, and entertainment). Consumption of housing (rents, electricity) and food/beverages grew slightly.

GDP growth in 2019 was close to EU average

The latest estimate for the Austrian economic growth of +1.4% is slightly below the preliminary ones. In the European Union, real GDP growth was 1.5% and thus similar to the increase in Austria. The growth rates for Germany (+0.6%) and Italy (+0.3%), Austria's most important trading partners in the EU, were clearly lacking behind (source: Eurostat database).

The economic growth of both the producing sector and the service sector was 1.4% in real terms. Growth in construction (+2.7% in real terms) and in energy supply (+2.5% in

¹https://www.statistik.at/web_en/statistics/Economy/national_accounts/gross_domestic_product/annual_data/index.html

real terms) was significantly above average. Manufacturing, which predominantly shaped the producing sector in the last years, showed a slowdown in growth (+0.7% in real terms). Within the service sector, the highest growth rates were observed for information and communication services (+3.7% in real terms), followed by financial and insurance services (+3.0% in real terms). On the other hand, trade services, which contribute substantially to overall gross value added, increased by only 0.6% in real terms.

On the expenditure side, gross fixed capital formation was the predominant category of domestic demand (+4.0% in real terms), thereby showing the most significant increase for transport equipment (+7.9% in real terms). Investments in construction rose by 3.6% in real terms, so did investments in research and development. The demand for machinery and equipment was also significant (+3.3% in real terms).

The increase in consumption expenditure was 1.0% in real terms and was thus similar to the growth in the previous year (2018: +1.1% in real terms), showing a stronger growth for government consumption expenditure (+1.5% in real terms) than for household consumption expenditure (+0.8% in real terms), caused by an increase of government expenditure on individual consumption (comprising mainly health and education services) by 2.2% in real terms.

Growth in exports of goods and services (+2.9% in real terms) was significantly below the previous years (2017: +4.9%; 2018: +5.4%), reflecting the slowdown in manufacturing. Imports of goods and services increased by 2.4%. However, the overall surplus in the external balance (+13.4 bn euros) was mainly based on the balance of travel (+9.3 bn euros).

Employment expressed in full-time equivalents increased by 1.5%. The number of jobs rose by 1.3%, reaching an all-time high of more than 4.8 million. Compensation of employees grew by 4.2% in 2019.²

Year	Value	Year-on-year increase / decrease (%)
2017	42 000	2,6
2018	43 610	3,8
2019	44 780	2,7
2020	42 540	-5,0

Table 1: GDP development in Austria

²https://www.statistik.at/web_en/statistics/Economy/national_accounts/gross_domestic_product/annual_data/124378.html

2.2 Macroeconomic forecast and container transport forecast

After a decline of 1.1% q-o-q of GDP in the first quarter of the year 2021, real GDP growth is projected to bounce back to 3.5% in the second quarter and 3.6% in the third. On an annual basis, after a contraction of GDP by 6.3% in 2020, real GDP growth is expected to increase to 3.8% in 2021 and 4.5% in 2022. This is slightly higher than projected in the Spring Forecast as it takes into account the good progress of the vaccination campaign and favorable impulses from world trade. It also reflects the performance of sentiment indicators in May, which returned to or surpassed pre-pandemic levels in many sectors. The improvement in the health situation has prompted a further relaxation of restrictions since mid-May. As a result, the Austrian tourism industry is setting high hopes for the summer, especially given the lost winter season. However, as some travel restrictions still apply and pose certain difficulties especially for tourists from more distant destinations, the share of domestic tourism is expected to be higher in 2021 than on average in pre-pandemic years. Pent-up demand is expected to support private consumption while external demand for goods and business services, driven by favorable world trade developments, is set to benefit Austria's export industry. Going forward, further expanding domestic and external demand as well as the implementation of the Recovery and Resilience Plan should support the economic recovery and GDP growth.

Graph 2.15: Austria- Real GDP growth and contributions

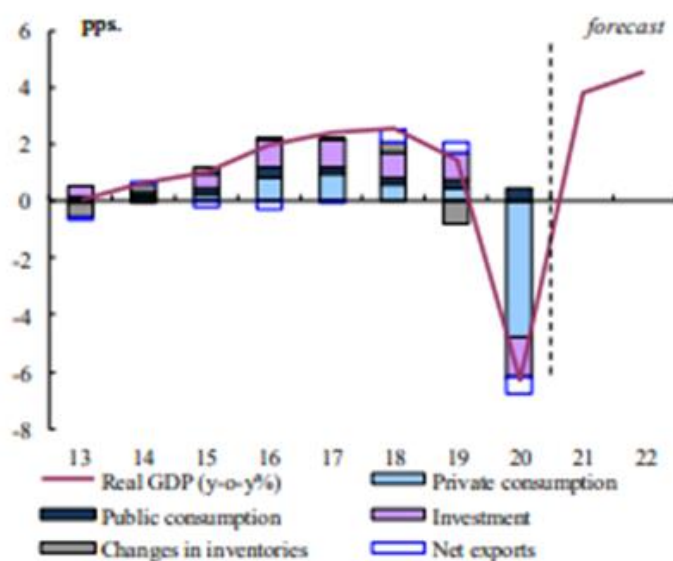


Figure 1: Austria - Real GDP growth and contributions

Rising oil prices on the back of expanding global economic activity partly explain the noticeable increase in inflation since the beginning of the year. Price pressures in the service sector that prevailed also during the lockdown phases are set to continue when

restrictions are further lifted. After reaching 1.4% in 2020, HICP inflation is expected to peak at 2.1% in 2021 before gradually decreasing to 1.9% in 2022.³

Austria: Growth rate of the real gross domestic product (GDP) from 2016 to 2026 (compared to the previous year)

The statistic shows the growth in real GDP in Austria from 2016 to 2019, with projections up until 2026. In 2019, Austria's real gross domestic product grew by around 1.42 percent compared to the previous year.

There are no data available for forecast. Forecasts can only be possible on basis of general economic developments. Container transportation in Austria and to Enns-shafen port will remain at the same level over the next few years.

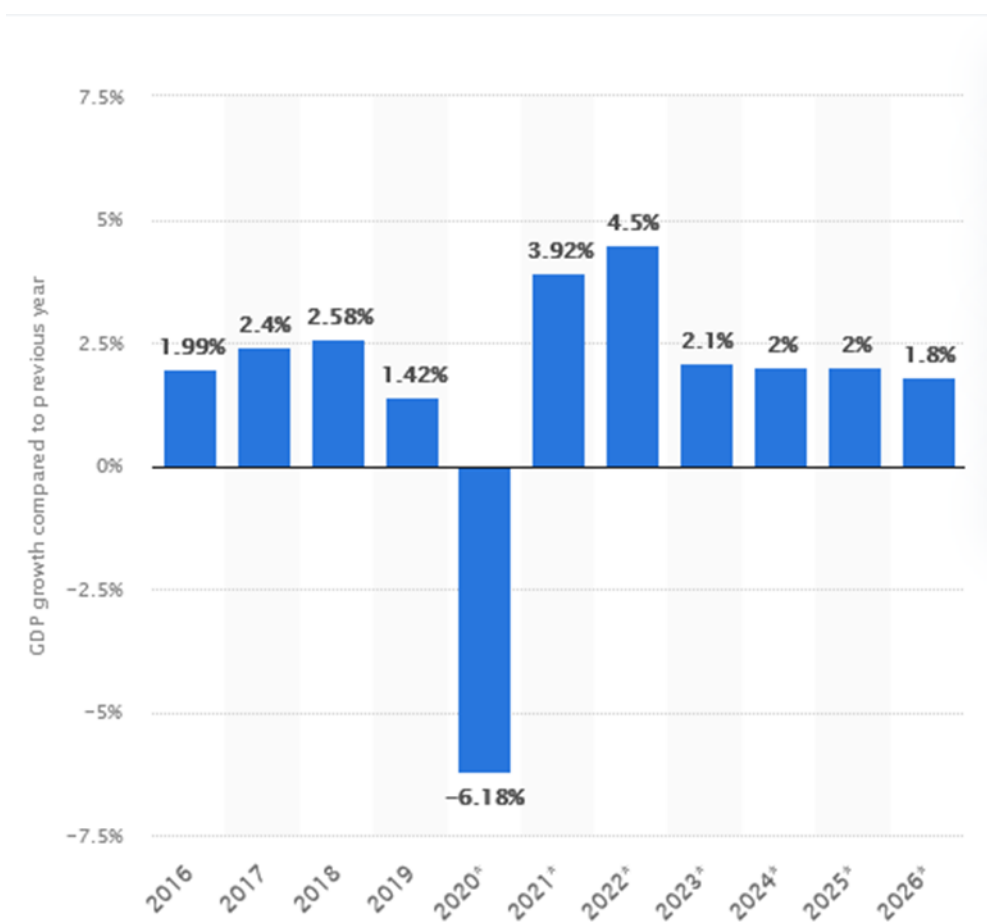


Figure 2: the growth in real GDP in Austria from 2016 to 2019, with projections up until 2026⁴

³https://ec.europa.eu/economy_finance/forecasts/2021/summer/ecfin_forecast_summer_2021_lat_en.pdf

⁴ ©Statista 2021 <https://www.statista.com/statistics/375293/gross-domestic-product-gdp-growth-rate-in-austria/>

2.3 Ennshafen Port

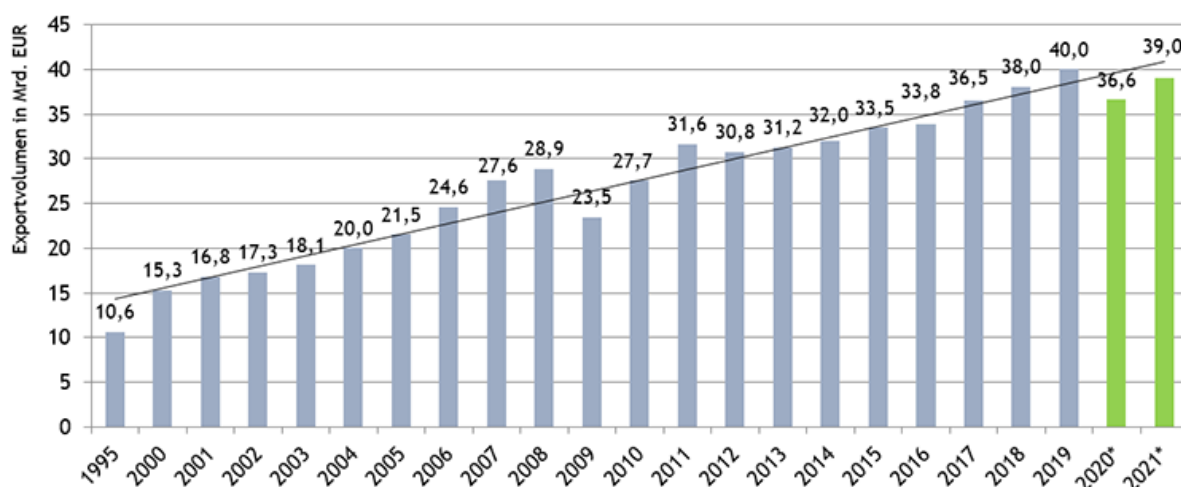
The ENNSHAFEN port is the newest public port in Austria. It links the main transport routes for international cargo, the Rhine-Main-Danube waterway from west to east and the north-south railway that extends from the North Sea to the Adriatic. Within the Trans-European Transport Network (TEN-T) of waterways, the ENNSHAFEN port is defined as one of two Austria core nodes in the Rhine-Danube Corridor. With direct access to motorways and main roads, the ENNSHAFEN port offers ideal road links to the regions of Austria and adjacent countries. Waterways, rail and road connections empower the port as a transport hub for goods and commodities in international logistics operations and for local businesses. The ENNSHAFEN port is situated in Austria´s strongest industrial region. Serving the largest continuous industrial area on the Upper Danube, the ENNSHAFEN port is a trimodal centre spanning 3.5 million square meters; by water, it connects the business parks of Enns and Ennsdorf to a powerful economic hub. Located in the heart of Europe, the port is ideally linked to the most important inland ports and seaports of Europe.

The ENNSHAFEN port is a centre of service, logistics and excellence in transshipment and warehousing. Its high-performance infrastructure, roads, quays, and railway systems provide companies with neutral access to various modes of transportation. With a quayside extending some 2,500 meters, cargo handling conditions are ideal. Services such as transshipment, heavy cargo transshipment, warehousing, packaging, and bunkering are provided by operators located in the ENNSHAFEN port.

Export location Upper Austria

The development of the Upper Austrian export economy is a success story. Products and services “Made in Upper Austria” are more popular than ever before worldwide. While Austrian exports of goods over 20 years ago at the time of EU accession (1995) were still at a volume of 10 billion euros. The domestic export industry was able to reach the 40 billion euros mark for the first time in 2019.

26.1 percent of Austrian goods exports come from Upper Austria (No.2 with 16,9 percent is Styria, No.3 with 14,7 percent is Lower Austria). The Upper Austria goods export quota with 58.5 percent is also high in an international comparison and around 20 percentage points higher than the Austrian average.



Quelle: Statistik Austria im Auftrag der Wirtschaftskammerorganisation und der Landesregierungen. *2020/2021: Prognose

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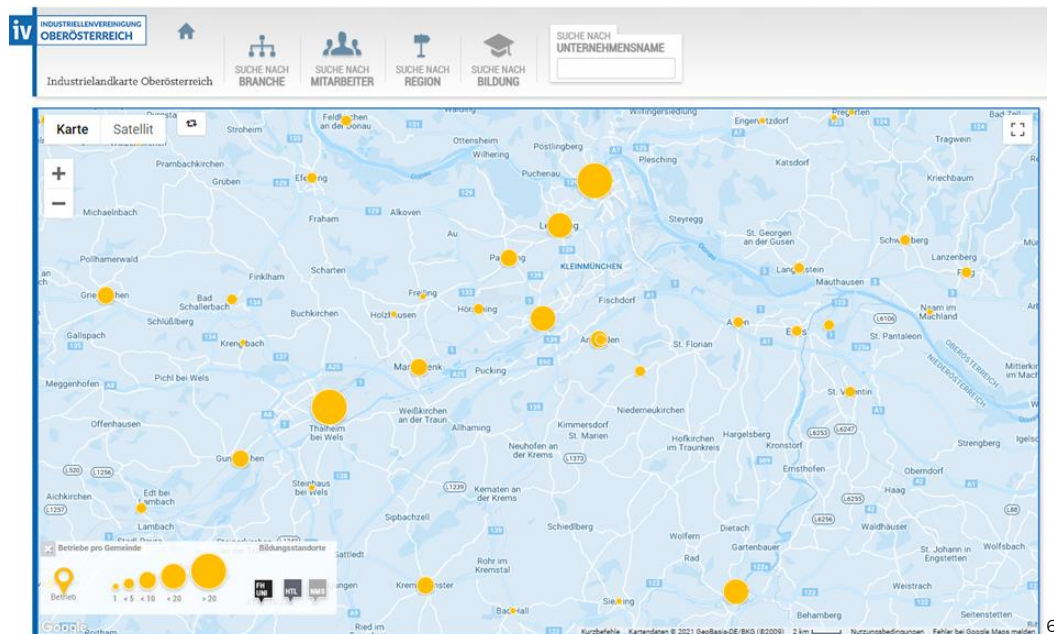
Figure 3: Positive export development since 1995, Ennshafen Port

Example of successful Upper Austrian companies

- Engel machines for making Lego bricks: working together for 40 years, 2012 saw delivery of another 1500 injection moulding machines to Lego plants in Hungary, Denmark and Mexico
- BMW motors: in 2010, the BMW plant in Steyr produced more than 1,000,000 engines per year for the first time. And with 1,036,000 engines achieved a historic production record for the location.
- Lenzing Fibres: Lenzing fibres are used by international designers in their collections. Organic fibres from Lenzing are used to make Converse footwear. H & M, Zara and Levis are also customers, as well as IKEA who use their fibres for hand towels and bed linen
- Other international companies or selected branches: Voest Alpine, Borealis, FACC, Rosenbauer, KTM, Silhouette, SKF, Steyr Automotive, etc....

In the first half of 2020, Upper Austria recorded exports with a volume of 17.2 billion euros and imports with a value of 13.2 billion euros. This puts Upper Austria in first place in terms of exports in a comparison of the federal states. There was a decline in both exports (-13.9%) and imports (-13,3%). “(Electrical) machines”, “vehicles” and “iron and steel” are of particular importance for the Upper Austrian export economy. Upper Austria’s most important export country is Germany with 6.5 billion euros, followed in second and third place by the United States and Italy.

⁵ Source: <https://www.wko.at/site/export-center-ooe/exportstandort-ooe.html>



Multimodal transportation and facilities

The analysis of multimodal facilities in various ports along the Danube demonstrated heavy disbalance in favour of the ports on the upper, and partly middle Danube. This is not just in terms of multimodal facilities, but also in terms of intermodal services connecting seaports and inland ports. The upper Danube and middle Danube ports, down to Budapest, benefit from their geographical position and relative nearness to North Sea ports and Adriatic ports, enabling them to harvest the benefits of economies of scale and use frequent rail shuttles to and from these seaports. Moreover, inland ports of the upper, and partly lower, Danube are physically closer to large industrial centres of high-tech products capable of generating containerized cargo flows of higher value goods and have excellent railway connections. Last, but not least, the high economic development of their host countries serves as a perfect generator of both inbound and outbound flows of goods suitable for containerization and therefore for intermodal supply chains. In terms of fully functional intermodal terminals in inland ports, only Enns, Vienna, Bratislava, Budapest, Belgrade and Giurgiulesti have such terminals. The one in Belgrade is heavily underused as there are no more barge shuttles from Constanta to feed it with containers. Moreover, it is not connected by railway with any of the seaports in the neighbourhood. Out of these terminals, only the one in Giurgiulesti is connected with the seaport of Constanta with a regular feeder line for containers. Intermodal (container) terminals in Enns, Vienna, Bratislava and Budapest are connected with various Adriatic and North Sea ports by regular rail shuttles.

In Austria, both analysed ports, Enns and Vienna, have functional and well-equipped intermodal (container) terminals. Although located in inland ports, both terminals function mostly as bi-modal terminals (rail and road), as only a small number of empty

⁶ Source: Industriellenvereinigung OÖ

containers are transported by IWT as spot shipments. This is mostly to the fact that they are very far away from Constanta as the entry/exit seaport for overseas trade using inland waterway transportation, and because they have very developed railway infrastructure and regular connections with Adriatic and North Sea ports.⁷

2.3.1.1 Cargo volume statistics

Following table presents the cargo handling statistics - **waterside transshipment** - of Ennshafen port from 2016 till 2020 in tonnes.

Commodity (t) / Year	Historical data				
	2016	2017	2018	2019	2020
Agricultural, forestry products & living animals	111,644	149,635	95,335	210,967	181,235
Food & Feeding stuff	194,572	207,716	149,850	196,071	235,185
Solid fuels	358	221	0	0	0
Petroleum products	3,465	3,246	2,897	3,461	4,509
Metal products	37,602	36,588	16,742	19,771	16,685
Mineral raw materials or products, building materials	150,240	151,173	131,472	211,237	404,813
Fertilizers	92,160	118,422	83,765	134,252	72,730
Chemical products	3,263	2,530	954	1,796	820
Machines, vehicles, other goods	3,985	9,139	4,202	4,723	5,889

Table 2: Commodity structure by year (Ennshafen Port)

2.3.2 Potentials for container transshipment

2.3.2.1 Current state of affairs with intermodal cargo

Container terminal Enns - CTE

CTE Container Terminal Enns is operating a trimodal container yard located on the border of Upper- & Lower-Austria directly at the river Danube. CTE is one of the most

⁷ Source: abstract of DIONYSUS WPT2.1.1Conclusions

significant transport hubs for combined transport in Upper-Austria. The site is located directly at the TEN17 rail track, connecting central Europe with the south and eastern European regions. CTE has an own motorway exit connection close to the junction of the A1. CTE therefore is the gateway for both the industry and trading companies in the region, and the Gateway for transit cargo with final destinations in Vienna, Graz, Linz and Salzburg.

CTE (Container Terminal Enns GmbH) is a private company and operates the container terminal within Ennshafen facilities based on a long-term lease agreement with the port authority Ennshafen OÖ GmbH.

Service hours: Monday to Friday: 24h Service, Saturday: from 05:00 to 13:00

In the following table only transshipment-figures “land-land” are listed because there is no traffic for loaded containers on the river Danube. Only some small amounts of empty containers are shipped via IWW between container depots of several terminals along the Danube, but these figures do not have really relevance to container business in the Danube region (for Ennshafen: normally 1-2 % of the total annual transshipment number)

Traffic (TEU)	2016	2017	2018	2019	2020
Containers - land to land	318.320	354.656	365.314	394.996	381.189

Table 3: Handling statistics Ennshafen



Figure 4: © ENNSHAFEN PORT

Container terminal Enns

Terminal infrastructure

As a multi-modal logistic hub, the Container Terminal Enns is a major hinterland terminal for the big sea ports. Spanning some 270,000 sqm and with a capacity of 500,000 TEU, it has some of the most modern transshipment infrastructure in Austria. Block train rail connections, modern gantry cranes and a full range of services ensure optimum container handling.

Terminal infrastructure characteristics	Value	Unit/Description	Notes
Multipurpose terminal	Yes	Yes/No	
Specialized intermodal terminal		Yes/No	
Total area	270.000	m ²	
Storage area	-	m ²	not defined
Handling area	-	m ²	not defined
Interim (transit) storage capacity	-	TEU	not defined
Depot (base) storage capacity	10.000	TEU	
Quay length at the terminal	620	m	
Rail length along the quay	620	m	
Capacity to handle block-trains	Yes	Yes/No	
Maximum length of complete block-train	720	m	
Number of rail sidings for loading/unloading	10	n	
Total length of rail sidings for loading/unloading	24.000	m	
Number of road lanes for truck traffic	3	n	inlets to terminal
Number of road lanes for truck loading/unloading	-	n	not defined
Parking space for trucks / semitrailers	-	n	not defined
Number of fixed ramps (Ro-Ro)	1	Harbor basin at Lower Austria	outside the container terminal area

Table 4: Terminal characteristics Enns

CTE infrastructure assets

Terminal suprastructure

The container terminal itself has only very few suprastructure installed (besides the handling equipment described in 5.1.1.3). As Ennshafen in total is organized as great public-private-partnership complex some suprastructure elements are installed outside the terminal area in close neighbourhood to the terminal (e.g., office building for partners, customs, ...).

Inside the terminal area there are situated:

- a container repair hall,
- two warehouses (used as stuffing centres) and
- a small but modern office building (help desk, counter, office space, meeting rooms, common rooms for stuff, ...).

The weighing systems for road/rail are state of the art and are just in upgrading for installation of modern digitalized systems.

Terminal handling equipment

CTE Enns operates:

- four powerful gantry cranes with a capacity of 41 tons.
- 10 rail tracks in block train length (720 meter) can be reached by electrified rail tracks. All rail tracks are covered by gantry cranes. The experienced agents arrange the daily dispatch and arrival of more than 300 railcars resp. or 3000 trains per year. The daily handling capacity comes to over 1.200 TEU's and around 400 trucks.
- more than 24 kilometres of rail tracks for dispatch and parking of block trains and single railcars. CTE has a handling capacity of appr. 500.000 TEU's per annum and will be able to supply the anticipated future increases in containerized transport.

Waterside handling equipment

The high-performance container gantry crane ensures that handling is efficient. This crane makes it possible to simultaneously service four block train rail tracks and two vessels along the 630 m wharf.

Ship to shore cranes capable of handling containers	Capacity (handlings/hour)	Lifting capacity (t)	Manufacturer	Production year
high-performance container gantry crane	25 units/hour	45	KÜNZ	2004

Table 5: Waterside handling equipment Ennshafen

Landside handling equipment

CTE Enns operates three powerful landside gantry cranes with a capacity of 41 tons each. 10 rail tracks in block train length (720 meter) can be reached by electrified rail tracks. The rail tracks are covered by the three gantry cranes.

Rail mounted gantry cranes (RMG)	Capacity (handlings/hour)	Lifting capacity (t)	Manufacturer	Production year
RMG 1	25 units/hour	45	KÜNZ	2015
RMG 2	25 units/hour	45	KÜNZ	2015
RMG 3	25 units/hour	45	KÜNZ	2019

Table 6: Landside handling equipment Ennshafen

Reach stackers (RS)	Capacity (handlings/hour)	Lifting capacity (t)	Manufacturer	Production year
RS 1		45	KALMAR	-
RS 2		45	KALMAR	-
RS 3		45	KALMAR	-
RS 4		45	KALMAR	-

Table 7: Landside handling equipment – reach stackers Ennshafen

Maritime, inland waterway and rail liner and feeder services

Seagoing liner shipping services and Barge (IWW) shuttle services are not applicable for containers.

Some characteristic figures regarding rail shuttle services for CTE Enns are as following:

- 3000 trains per year in 2019
- 6000 container repairs per year in 2019
- appr. 6000 containers in permanent storage 2019 (2020 figures are not typical / Covid)
- about 10 rail operators in the terminal
- all leading seaports are served (Antwerp, Bremerhaven, Hamburg, Koper, Trieste, Piraeus, Rotterdam, Wilhelmshaven)
- appr 20 trains per day are serviced from the terminal
- typical travel times: Hamburg 17 hours, Koper 10 hours, Piräus 48 hours

Typical train connections Terminal Enns:

Enns – Hamburg	17 trains a week in each direction
Enns – Bremerhaven	5 trains a week in each direction
Enns – Koper	2 trains a week in each direction
Enns – Piräus	2-3 trains a week in each direction

Average train connections CTE

The information in the table are average values (as of March 2021) and can change at any time.

Current Maritime schedule Terminal Enns

- Traffic accessibility German Ports

Dispatch day	Port of destination	Closing
Monday	CTB	11.00H
Monday	BRV	17.00H
Tuesday	MAS	17.00H
Wednesday	CTA/CTB	11.00H
Wednesday	BRV	17.00H
Thursday	MAS	17.00H
Friday	BRV	11.00H
Friday	MAS	17.00H
Saturday	CTA/CTB	FR 17.00H

Outbound rail connections to German seaports⁸

Arrival day	Port of entry	Closing
Monday	Bremerhaven	06.00H
Monday	Hamburg	13:30H
Tuesday	Maschen	13.30H
Wednesday	Maschen	06.00H
Wednesday	Maschen	13.30H
Friday	Hamburg	13.00H
Saturday	Bremerhaven	MO 06.00H

⁸ Source: Maritime - Rail Schedule - TRAFFIC ACCESSIBILITY - CTE - Container Terminal Enns (www.ct-enns.at) Accessed 19.03.2021

Inbound rail connections from German seaports

Description:

- **CTB: Container Terminal Burchardkai Hamburg**
 - **CTB: Bremerhaven**
 - **MAS: Mix via Maschen all quais in Hamburg and Bremerhaven**
 - **CTA: Container Terminal Altenwerder**
 - TCT, EKOM, SÜD are arranged via Maschen.
- Traffic accessibility south ports Trieste & Koper

Outbound and inbound: Trieste and Koper have a daily connection (A/C) vice versa. Please contact your local container operator for more details. Closing: 17.00H

Services to cargo and containers

Container Terminal Enns offers a full range of services to ensure optimum container handling.

Container trucking of all containers (20ft, 30ft, 40ft/HC, 45ft, Flat, etc.):

We ensure your load gets on its way, shipments from or to the harbours, trucked domestically or cross border trucking. Whatever type of load you have your cargo is in the right hands with us. Our dangerous goods officers arrange controls for DG categories 2-6, 8 and 9.

Our trucks are equipped with modern truck telemetry. Special trailers for heavy duty transports are available. Our fleet is furnished with Euro 5 EEV/Euro 6 trucks. Truck orders can be electronically transferred via our web-based IT-Systems. CTS is the market leader when it comes to containerized transport in Salzburg.

Container storage:

CTE disposes about a storage capacity of more than 10.000 TEU's. The total terminal surface area capacity for storage of containers comes to more than 170.000m². FCL Containers are stored in security areas and monitored 24 hours by our security systems. We provide electrical connections for refrigerated containers. In case of emergency a leakage pan is available for DG container units. Empty containers are handled by modern spreader forklifts. The communication to our clients is arranged by electronic data interchange (EDI).

Container maintenance & repair:

CTE is certified by GL Germanischer Lloyd. Container checks and repairs are carried out at our in-house facilities according to the internationally certified standards CSC – Container Safety Convention. We communicate via EDI CODECO with our clients.

VGM SOLAS weighing: CTE arranges your VGM weighing according to SOLAS regulations. CTE is your expert when it comes to weighing of your containers, calibrated equipment according to VGM method 1 class IV (4) is available in Enns.

Weighing is arranged according to SOLAS IMO circular MSC1/Circ. 1475 and according to national Austrian regulations that will be available in Autumn 2016.

CTE has got 3 truck gates in automated service (touch free truck gates with OCR) and even a dynamic railcar weighing system for each departing train.

Services offered	Mark with X
Storage	X
Customs clearance	X
Stuffing/stripping	X
Inspection	X
Container repair	X

Table 8: Services to cargo and containers in the Ennshafen port

2.3.2.2 Desired state of intermodal affairs with intermodal cargo

Austria has a highly developed container business due to the fact that it is a highly developed industrial country at a very high level of prosperity. Furthermore, the terminals are very well developed, at a very high level of technology. Due to the good industrial region, very high investments were done in the last five years. There is fierce competition between the terminals with regard to flow of goods as well as inbound and outbound.

There are no major investments or adjustments necessary (except for ongoing optimizations, e.g. in the context of “green logistics / CO² neutrality...)

Austria already has a highly developed industry. It is not to be expected that in the next few years there will be any significant changes to settlements that require additional terminal capacities.

Although Austria has a high level of prosperity (consumer behaviour), no significant changes for an additional consumer goods market (import of goods) are predictable here either.

Hinterland connections are developed on a very high level therefore no significant changes are actually predictable.

Since there is a high level of competition among the terminals and ports, no further details (plans) can currently be published (confidential).

Own assessment about the possibility of additional cargo that could be transported in containers

Currently there are no clear lines of development foreseeable on the market, which is why it is very difficult to make any forecasts.

In Austria there is a very high level of competitive behaviour among the 3 modes of transportation (Road/Rail/Inland Waterway) with regard to underlying high

investments and degrees of maturity. Therefore, no substantial change is currently foreseeable.

There could be affects due to CO² pricing, but this is still too early to make an assessment here.

2.3.2.2.1 Internal and external factors for initiation / increase of container transport in Ennshafen port.

The Ennshafen port is fully developed and there are no further needs. Depending on market demand there will be maybe some future developments but nothing concrete so far.

With regard to hinterland connections, we can say that maybe in medium term there could be a bottleneck with regard to railway infrastructure, therefor we are doing feasibility studies to evaluate possible options with regard to debottlenecking of railway infrastructure.

2.3.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Ennshafen Port – Container Terminal Enns			X					X	- Port is fully developed and there are no further needs identified so far

Table 9: Existing transport and potential – Ennshafen

2.4 Port of Vienna

The Port of Vienna, a neuralgic trimodal hub at the intersection of the Danube and three TEN-T corridors, has a strong focus on sustainable city-port integration while ensuring network connectivity. As the largest provider of logistics space in Vienna, the port has over 300 hectares of floor space on which over 100 companies are located. The "Business Development and Internationalization" department defines the long-term objectives and developments at the port area in the course of master planning and is largely responsible for the preparation and planning of corresponding conversion and expansion measures.

The Port of Vienna operates the Vienna Danube ports of Freudenuau, Albern and Lobau. Its core business is trimodal cargo handling. With a total of approx. 11.5 million tons of cargo handled per year, it operates one of the largest commercial cargo handling facilities on the Danube.

In addition, it is one of the largest warehousing companies in Austria with a hall and outdoor storage capacity of approx. 270,000 m².

As the largest provider of logistics space in Vienna, the port has over 300 hectares of floor space on which more than 100 companies are located.

Due to its geographical location, the Port of Vienna is one of the most important hubs along the Danube axis and plays an essential role as a hub to Southeastern Europe.

The "Business Development and Internationalization" department defines the long-term objectives and developments at the port area in the course of master planning and is largely responsible for the preparation and planning of corresponding conversion and expansion measures.

Europe has set ambitious transport, environmental and climate targets for 2030 and 2050. European inland ports, due to their role as multimodal transport hubs as well as their proximity to metropolitan areas, have a significant role to play when considering strategies and approaches for achieving climate targets in the coming years.

Globalization, changing consumer behavior and urbanization are leading to a steady increase in traffic, freight transport and emissions in European cities.

At the latest since the European Commission's Green Deal concept presented in 2019, the mobility sector has moved closer together with the energy sector.

Since 2019, the Port of Vienna has been working intensively on sustainable city-port integration while ensuring network connectivity.

Hydrogen produced on-site could be used internally to fuel handling equipment such as cranes, reach stackers, forklifts, excavators, etc. Subsequently, refueling of ships, trains, trucks for internal use as well as for customers would be possible. In the same way, externally produced hydrogen could be transported to the port via ship, used or further distributed.

The evaluation of the infrastructure requirements in the ports in the case of a further development to hydrogen hubs including potential assessment of which quantities

can be handled, further processed/stored and further distributed are the focus of the exploratory project in order to be able to take further steps.

Project-relevant infrastructure of the partner:

The area of the Port of Vienna is around 3 million square meters. The Hafen Wien Group, which belongs to the Wien Holding Group, operates three large freight ports including infrastructure here with its subsidiaries: the Port of Freudenau, the Port of Albern and the Lobau oil port.

All three cargo ports handle around 1,200 cargo ships per year. The waterways are mainly used to transport petroleum products, road salt, building materials such as cement, sand and steel products, and agricultural products such as grain and artificial fertilizers.

Total area: 300 ha

Quay length: 5,000 m

Crane capacity: 84 t

Heavy load handling up to 450 t

Covered storage areas: 70,000 m²

Raw material halls: 36,000 t

Open storage areas: 200,000 m²

Car terminal: 7,000 car parking spaces in the open-air warehouse, 2,000 car parking spaces in the car warehouse

Container terminal: 10,000 TEU (parking spaces)

Block train length tracks: 4 with 700 m each

Development of multimodal facilities – two main topics

The Port of Vienna, together with project partners from Austria (via Donau, Pro Danube Management GmbH, hydrogen initiative showcase region Austria Power & Gas) and Bavaria (Landshut University of Applied Sciences), is submitting an exploratory project entitled "H2 meets H2O" to the Austrian funding programme "Mobility of the Future" (Federal Ministry for Climate Protection). HAW Landshut is participating as a foreign research partner. If the project is approved, we will start implementation in April 2022 (12 months duration).

The aim of the project is to develop guidelines for the implementation of a hydrogen infrastructure along the Danube (roadmap) through an intensive exchange with stakeholders from the fields of infrastructure, shipping and logistics. In addition, the foundations for a subsequent international R&D project are to be developed in this exploratory project (elaboration of consortium, key contents, pilots based on the Austria-Bavaria exploratory area, etc.).

The project is intended to support the transition to climate-neutral logistics chains, especially in the area of bulk and heavy lift logistics. In addition to inland navigation, the road and rail sectors (multimodal approach) as well as industry are considered as end users of hydrogen applications.

The topic of energy and hydrogen is being proactively promoted by the Port of Vienna. After the planned exploratory project, the roadmap and further studies, implementation projects are to follow.

Hafen Wien GmbH is planning to expand the existing infrastructure in the Freudenu port area. Within the scope of the land reclamation project, an area of approx. 40,000 m² is to be filled in the area of the front side of the port basin in order to create additional space for operational use (container terminal, real estate, car terminal, etc.).

For the time being, the measures relate to the construction of the future usable area (fill), which will be limited by a vertical shoring (sheet pile wall) on the front side towards the harbor basin. The land reclamation area will be designed statically in such a way that a later container terminal operation for the hopeful customers Hupac and Helrom is possible.

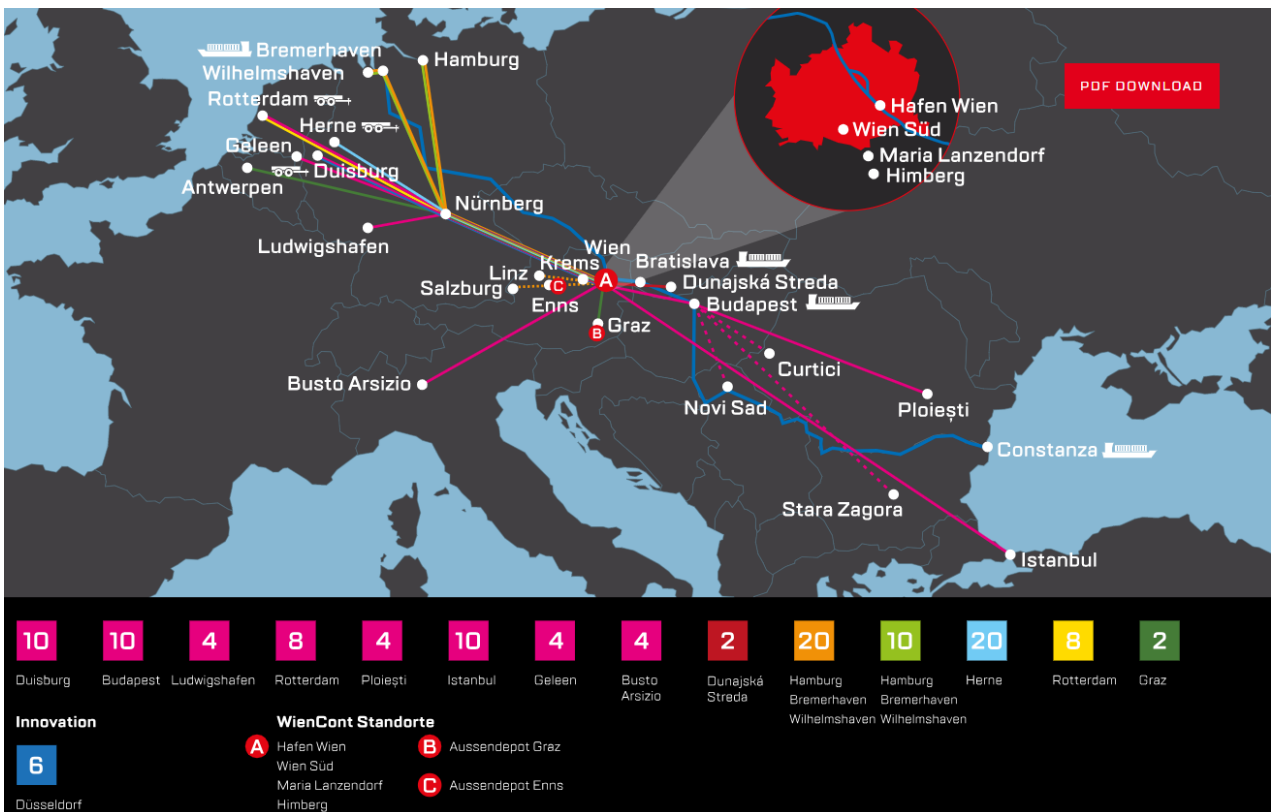
2.4.1.1 Cargo volume statistics

Commodity / Year	Historical data (tonnes)				
	2016	2017	2018	2019	2020
Mineral Oil Products				874 434	710 629
Food and Beverage				111 811	50 418
Metals and metal sheets				112 379	68 988

Table 10: Commodity structure by year (Port of Vienna)

2.4.2 Potentials for container transshipment

2.4.2.1 Current state of affairs with intermodal cargo



Container traffic history

As a multi-modal logistic hub, the Container Terminal Freudenuau is a major hinterland terminal for the big seaports. Spanning some 170,000 sqm and with a capacity of 400,000 TEU, it has some of the most modern transshipment infrastructure in Austria. Block train rail connections, modern gantry cranes and a full range of services ensure optimum container handling.

WienCont Container Terminal GmbH is operating a trimodal container yard located in Vienna directly at the river Danube. WCT is one of the most significant transport hubs for combined transport in Vienna. The site is located directly at three TEN-T rail corridors, connecting central Europe with the south and eastern European regions. WCT has motorway exit connections close to the junction of the A1, A4 and S1. WCT therefore is the gateway for both the industry and trading companies in the region, and the Gateway for transit cargo with final destinations in Vienna and south Europe.

WCT (WienCont Container Terminal GmbH) is a company of the Port of Vienna.

Service hours: Monday to Friday: 24h Service, Saturday: from 04:00 to 24:00

Container transport today

Terminal infrastructure characteristics	Value	Unit/Description	Notes
Multipurpose terminal	Yes	(Yes/No)	
Specialized intermodal terminal	-	(Yes/No)	
Total area	170.000	(m ²)	
Storage area	-	(m ²)	not defined
Handling area	-	(m ²)	not defined
Interim (transit) storage capacity	-	TEU	not defined
Depot (base) storage capacity	10.000	TEU	
Quay length at the terminal	650	(m)	
Rail length along the quay	650	(m)	
Capacity to handle block-trains	Yes	(Yes/No)	
Maximum length of complete block-train	700	(m)	
Number of rail sidings for loading/unloading	7	(n)	
Total length of rail sidings for loading/unloading	-	(m)	
Number of road lanes for truck traffic	3	(n)	inlets to terminal

Number of road lanes for truck loading/unloading	-	(n)	not defined
Parking space for trucks / semitrailers	200	(n)	not defined
Number of fixed ramps (Ro-Ro)	-		

Figure 5: WCT infrastructure assets (Port of Vienna)

Increasing train connections and container throughput at WienCont.

With the onset of the Corona crisis in March 2020, lower volumes of goods from Asian countries and the Americas were expected. The company also stepped up its involvement in continental traffic. Even before the pandemic, the company relied on the Turkey route and steadily increased continental round trips during COVID-19 - resulting in a total of more containers in Vienna than in 2019.

"WienCont handled around 428,000 container transshipments in 2020 (2019: 376,000) - an increase of around 14%. The entire range of services in the container sector is covered and we are very successful with this, as not only WienCont's revenues but also the number of partnerships increased in 2020. Long-term contracts could be concluded with well-known train operators and shipping companies," Doris Pulker-Rohrhofer, technical managing director of the Port of Vienna, is pleased to report. "In addition, as in the previous year, WienCont is focusing on a significant increase in container trading and container repair." With new services, the offer was expanded to meet customer needs and continuously developed. The purchase of FTSC in 2019 for the mobile repair and service area has sustainably expanded the spectrum and generated a considerable result in 2020."

More than 110 container trains per week commute between the Port of Vienna and European freight centers. Additional connections have also been created: Since 2020, there have been increased connections to and from Rotterdam with ten trains per week.

Traffic (TEU)	2016	2017	2018	2019	2020
Containers - land to land	440.000	403.000	350.000	375.000	427.000

2020	WCT:	Road	Rail	Water
		52,1%	47,8%	0,1%
Tons	2.053.000	1.069.613	981.334	2.053
2019	WCT:	Road	Rail	Water
		59%	41%	0%
Tons	1.810.000	1.071.520	738.480	-
2018	WCT:	Road	Rail	Water
		43,5%	56,4%	0,1%
Tons	1.660.000	722.100	936.240	1.660

On the terminal entrance is an automatic ingate situated and office buildings just as a container repair hall and a repair hall for reach stackers.

WienCont operates with three powerful gantry cranes (KÜNZ) with a capacity of 41 tons. 4 rail tracks in block train length (720meter) can be reached by electrified rail tracks and 2 rail tracks with a length of 650 m handled with shunting. While the former rail tracks are covered by gantry cranes, the later implies a handling with reach stackers. WienCont handles around 120 trains per week. The daily handling capacity into the automatic ingate comes to over 600 trucks.

Waterside handling equipment

The high-performance mobile container crane ensures that handling is efficient. This port mobile crane makes it possible to service along the 1500 m wharf.

Ship to shore cranes capable of handling containers	Capacity (handlings/hour)	Lifting capacity (t)	Manufacturer	Production year
Port mobile crane	10 units/hour	84	LIEBERHERR	2015

Landside handling equipment

WienCont operates on three powerful landside gantry cranes with a capacity of 41 tons each. 4 rail tracks in block train length (720 meter) can be reached by electrified rail tracks. The rail tracks are covered by these three gantry cranes.

Rail mounted gantry cranes (RMG)	Capacity (handlings/hour)	Lifting capacity (t)	Manufacturer	Production year
RMG 1	25 units/hour	45	KÜNZ	2008
RMG 2	25 units/hour	45	KÜNZ	2008
RMG 3	25 units/hour	45	KÜNZ	2012

Reach stackers (RS)	Capacity (handlings/ hour)	Lifting capacity (t)	Manufacturer	Production year
3 Reach Stakers (all equal)		45	KALMAR	2012/2016

2.4.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

Disadvantage

As already mentioned in the general part, the port of Vienna is geographically very limited and therefore unable to grow on land. Therefore, we are planning the following project.

Hafen Wien GmbH is planning to expand the existing infrastructure in the Freudenu port area. Within the scope of the land reclamation project, an area of approx. 40,000 m² is to be filled in the area of the front side of the port basin in order to create additional space for operational use (container terminal, real estate, car terminal, etc.).

For the time being, the measures relate to the construction of the future usable area (fill), which will be limited by a vertical shoring (sheet pile wall) on the front side towards the harbor basin. The land reclamation area will be designed statically in such a way that a later container terminal operation for the hopeful customers Hupac and Helrom is possible.

Advantage

Around 2,000 kilometers from the Black Sea and 1,500 from the North Sea, the harbor in Vienna serves as an optimal direct connection to three modes of transport: ship, rail and truck (keyword tri-modality). In addition, with its proximity to the Vienna international airport as high-performance interface for international trade and transport.

The Hafen Wien Group and its subsidiary Wiencont are situated right on the main artery for inland shipping. As a result of the opening of the Rheine-Main-Danube

waterway yielding new transport perspectives from the ARA ports of (Amsterdam, Rotterdam and Antwerp) to the Black Sea (Constantia).

The port of Vienna is a very attractive transport nodal point through its connection to the 3 TEN-T corridors:

- Rheine – Danube corridor
- Baltic – Adriatic corridor
- Balkans-/eastern-Med. corridor

2.4.2.1.2 Main reasons for success or failures of regular/significant container handling (volumes) in port of Vienna.

Due to a newly developed terminal operating management system (TOM) specially tailored to the WienCont terminal, the numbers of the loading units and the license plates of the trucks are initially registered by an OCR (optical character recognition) photogate when they enter the terminal and automatically compared with the customer data already stored. A specially developed application enables the truck and load to be notified in advance - directly by the hauler or operator. The loading units are checked at one of four Check-IN lanes, the driver can log on to the SelfCheck-IN kiosk and is automatically assigned to the respective truck stop. assigned. The Self-Check-IN can be operated directly by the drivers in nine different languages. drivers in nine different languages. The newly introduced ILU codes can also be processed. In the two exit areas in Terminal 1, Terminal 2 and Terminal 3, the outgoing outbound trucks are digitally scanned by the latest high-resolution line scan cameras and compared by OCR with the stored system data. Only with exact match of the data, the trucks can be driven out. The implementation of this ultra-modern system now also saves time in the time savings for WienCont customers in the handling process, too - thus another important step in the expansion of competitiveness at the Freudenu location.

2.4.2.1.3 Development potential

The citizens of Vienna are the leverage for the logistics hub Port of Vienna. In addition, online trade increases the manipulation of goods in the region immensely. The more orders are placed, the more international transport chains are triggered.

2.4.2.2 Desired state of intermodal affairs with intermodal cargo

Green Deal Project

MultiRELOAD involves highly ambitious logistics hubs. The project acts as a major integrator for best practices from past, current, and future projects and initiatives, through intelligent research and innovation matchmaking backed up by funding and financing for better integration of the freight transport nodes into overall logistic chains of about 450 Mio. EUR until 2025.

The MultiRELOAD multimodal node partners together cover the geographical area of the hinterland along corridors in Central & Western Europe, where two thirds of all intermodal transports originate or end. They pursue aspiring strategies for more efficient, effective and sustainable management of freight flows on the level of the city, region and corridor, which are supported by the MultiRELOAD project.

Thus, Duisport is expanding multimodal access and shift of goods transport from road to the sustainable modes rail and waterways at the level of the terminal, node and corridor. Starting with today's already excellent modal split at the node (road/rail/waterways) of 50%, 25% and 25 %, Duisport wants to further raise the share of rail and water to 40% each at "Duisburg Gateway Terminal" by 2025, lowering the share of road freight transport to 20%. Further-more, Duisport pursues an ambitious digitalization and automation strategy to increase effectiveness and efficiency of port operations based on the Physical Internet. With its far-reaching connections as a global freight operator on routes through the European hinterland from Europe to China including Eastern Europe, Duisport will use its influence and presence on the market to achieve a quick uptake of MultiRELOAD solutions.

The Port of Vienna, a neural trimodal hub at the interface of the Danube and three TEN-T Corridors, has a strong strategic focus on optimizing the use of existing assets and infrastructure (for, e.g., zero-emission last mile distribution and asset-sharing between logistics companies). Based on its actual modal split (42% road/24% rail/34% waterways), the port wants to reduce the share of trucks by 10%. As a trimodal logistics location in the tri-border area of Switzerland, France and Germany, the Port of Basel – Schweizer Rheinhäfen (SRH) follows a holistic strategy for sustainable and efficient port operations by a circular economy approach for construction of a new trimodal terminal, aiming at a more efficient connection of water, rail and road for container traffic through increase of the entire terminal capacity to up to 390,000 containers transported per year & shifts at least 50% of goods to rail.

The three MultiRELOAD nodes Duisport, Vienna and Basel are supported by a consortium of leading European research institutions (FHOO, FRAUN, DST), well-connected networks & multipliers (ALICE, EGTC Rhine-Alpine, Pro Danube, RSOE), knowledge partners (Smart Freight Centre, IDIT, RC) as well as highly innovative technology, logistics and service providers (NOSTA, CargoBeamer, prodevelop, eYard, TTS, ASE,) thus covering all required interdisciplinary competences from the transport, digital, environmental and economic fields.

In line with ALICE's vision to realize the Physical Internet by 2030 to pave the way to Zero Emissions by 2050, MultiRELOAD transforms intermodal freight nodes into interconnected data platforms to connect actors, physical and digital infrastructure, assets, resources and services creating a truly integrated transport and logistics network. This overarching vision is illustrated the following Figure.

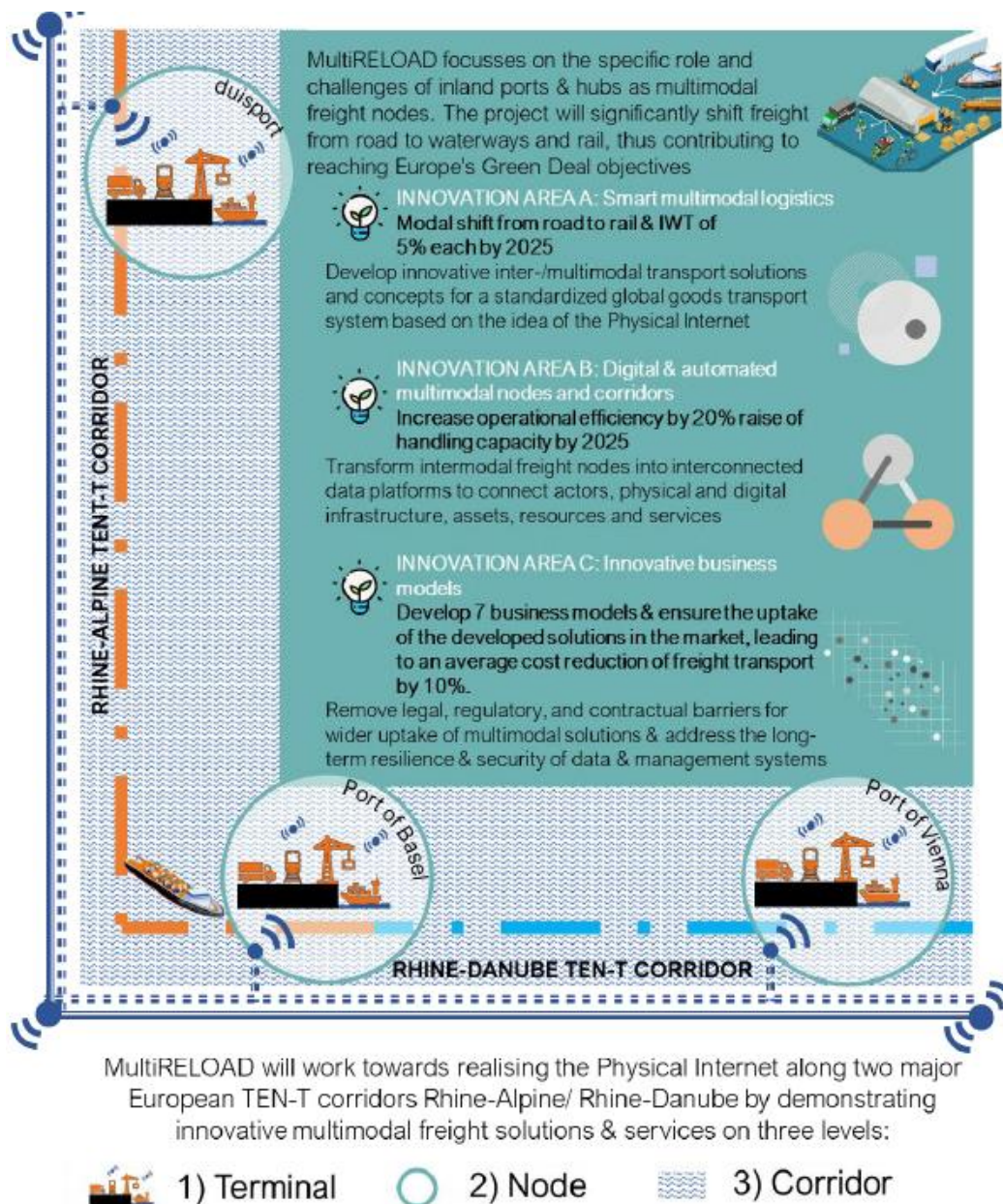


Figure 6: MultiRELOAD

2.4.2.2.1 Objectives of intermodal transport development in the port of Vienna

2.4.2.2.2 Physical needs in terms of:

- a. Space and infrastructure

Completed projects

Port of Vienna has completed 5 port infrastructure projects in the recent period, until 2016. Those projects are listed and briefly explained in continuation:

OPTIHUB, 01/2013 – 12/2016

Based on a case study at the Port of Vienna, a standardised optimization system for multi-modal hubs was developed with new simulation algorithms. It analyses, combines and optimizes significant (administrative, operational and logistic) and innovative processes as well as location-based conditions. New goods with waterway transport affinity are identified to strengthen inland waterway transports.

Studies for the expansion of the trimodal port of Freudenuau, 01/2012 – 12/2015

In recent years, the increase in container transshipments at the Port of Vienna-Freudenau has caused bottlenecks in terms of cargo handling space. Compared to 2010, container transshipments alone increased by 38% to nearly 442,000 container units (TEU) in 2011. The project consists of studies aiming to plan and design the expanded Port of Vienna Freudenuau. The studies specifically look at extending the container handling capacities of the port. The project includes all the necessary steps from preliminary planning to obtaining the building authorisations and publishing the works tenders.

Expansion of the tri-modal inland port of Vienna by land recovery, 01/2012 – 12/2025

Freight handling capacity bottleneck, work phase of the above-mentioned project. Involves extension of the port's container handling capacities through land recovery and the construction of a new quay wall in order to optimise the areas of operation.

Port mobile crane purchase and installation, 12/2014 – 12/2015

Although not exactly a project related to port infrastructure, Port of Vienna declared this project as an important one since it is related to capital equipment infrastructure. It involves a purchase of the new port crane and its installation on the quay wall.

Land recovery – Phase 2, 09/2013 – 12/2015

Expansion of the container transfer capacities in the Port of Vienna-Freudenau through land recovery and the optimisation of operative areas and thus an increasing of the storage capacity and transfer capacity form the basis for achieving the primary corporate objective.

b. On-going projects

Currently, there are two on-going projects in the Port of Vienna:

Planning and construction of the expansion of the trimodal Port of Freudenuau,

01/2015 – 12/2025

This project involves addition to container handling capacities, including handling yards and waterside infrastructure. Relevant studies and designs are being made for the purposes of two-phased expansion of the container terminal.

Expansion phase 1 will be performed in two steps. In the first step the empty container terminal will be moved from Terminal 2 to Terminal 3-new. Terminal 3- new will be operated with mobile container stackers. At the same time the water-side crane rail support and crane rail will be rebuilt at Terminal 2-new, the land-side crane rail will be partially exposed.

In the second-step two gantry cranes will be constructed on the north-western terminal ending of Terminal 2- new on an area of approximately 80 m x 50 m.

In expansion phase 2 the rail tracks of Terminal 2-new are extended to block train length (650 m). Another loading rail track will be constructed. The access lines of Terminal 2-new as well as the feeder tracks will be electrified so that no traction change is necessary in the area of the marshalling yard. The existing rail connections of Terminal 2 will be demolished up to the location of the parking house. After the completion of the rail track construction works the crane rails of Terminal 2-new can be extended to block train length. At the northern end of the terminal a second crane repair area is planned. A third gantry crane will be set up. In Terminal 3-new only the adaptation of the tracks will be carried out in this expansion phase due to the expansion of the rail track system in Terminal 2-new.

Expansion container terminal construction Phase 1, 01/2013 – 12/2017

Following activities are either recently completed or are being carried out at the moment of writing of this report:

Terminal 2-new: Container transshipment is carried out by means of 2 gantry cranes. At the downstream end of the terminal a 45 m long crane repair area exists. The electric supply of the crane bridges already exists and is provided by the transformer in the roundabout. A total of 11 rows of containers with a length of approx. 600 m exist. The maximum stacking height is 5. Instead of 3 rows of containers north of the land-side crane rail, an optional container check area including stacking facility is possible. If needed the 2 water-side rows of containers at Terminal 2-new can be used as temporary parking lanes for trailer.

Next to the crane repair area, within the terminal section, connections for reefer container are planned. The remaining space in the north-western area can also be used as container parking area with stacking facilities or as parking area for trailers. For the transshipment of hazardous goods an interim parking area in the area of Terminal 2-new has to be included. The area in front of the new repair house, which can be placed at the downstream front side of the terminal, can be used for the transshipment of hazardous goods containers due to its separate collection and drainage of the surface water and its high-quality surface structure. The remaining space in the northwestern area can be used as container parking area with stacking facilities with a capacity of 1,110 TEU or as parking space for 65 trailers.

Terminal 3-new: In Terminal 3-new the container transshipment will be carried out with container stackers. 13 rows of containers with a maximum stacking height of 6 and a total effective length of approximately 500 m can be set up. In the land reclamation area step 1 16 rows of containers with a stacking height of 6 are possible. The remaining spaces at both ends of Terminal 3-new will be also used as storage area for empty containers respectively as trailer





parking spaces. After the completion of expansion phase 1 the following division for Terminal 2-new and Terminal 3-new can be made based on the northern terminal boundary.

Location of the expanded terminal, after the land recovery, is shown in Figure 69 below.



Figure 7: Planned expansion of the container terminal (Port of Vienna)

a. Facilities

 HAFEN WIEN <small>ein Unternehmen der wienholding</small>			
HAFEN FREUDENAU	22	13	35
HAFEN ALBERN	10	10	20
HAFEN LOBAU	16	0	16
GESAMTSUMME HAFEN WIEN	48	23	71

c. Equipment,

Equipment that is required for the execution of ongoing business is procured in the course of the ongoing procurement process. Currently, we have no open items on the procurement site. The most recent acquisition in 2021 was a polymer grabber for the growing biomass handling business.

d. Operators,

PARTNER
 OPERATORS AND RAILROAD COMPANIES AT WIENCONT.

Eccorail / Hupac / IMS / Lineas / PCC / RCO / Roland / Transfracht / Turkrail / TX
LTE / Metrans / ECCO Rail / RCA / RPA / WLC / Lokomotion / HELROM / LKW-Walter

e. Hinterland connections

Port of Vienna has one planned project, based on the project list reported to the study team of the Rhine-Danube Core Network Corridor study. Following information are currently available.

Improving of the multimodal interconnections at Port of Freudenau,

unknown start and end date

The project aims at the expansion of the container transshipment capacities at the port through land reclamation and optimisation of operational areas to increase storage capacity and handling performance. The proposed Action includes activities to optimise the operational areas to increase the storage and transshipment capacities and improve the multimodal interconnections of the container transshipment area at the port by reorganising the rail track system.

This project will involve the second expansion phase of the currently on-going container terminal expansion. At Terminal 2-new, container transshipment is carried out by means of 3 gantry cranes. At both terminal fronts a crane repair area with each 45 m respectively 40 m of lengths. For the rail-side transshipment 2 loading rail tracks in block train length as well as a new loading rail track with a crane able length of 600m exist. A total of 9 rows of containers with a length of approx. 650 m are available. The maximum stacking height is 5. On both fronts of the container storage area connections for reefer containers are planned. However, the possibility exists to set up a stacker operated container check area.

The remaining space in the northwestern area can be used as container parking area with stacking facilities with a capacity of 240 TEU or as parking space for 11 trailers. After the completion of expansion phase 2 the expansion of Terminal 2-new will be completed.

In Terminal 3- new the container manipulation is carried out with stackers. The organisation of the terminal will be carried out as described in expansion phase 1. Regarding the container stacking area, no considerable difference exists when compared with expansion phase 1. After finishing expansion phase 2 and based on the northern terminal boundary the following division for Terminal 2-new and Terminal 3-new can be made.

2.4.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Vienna			X					X	<ul style="list-style-type: none"> - to expand the Freudenuau port area - to raise the share of rail and water to 40% each at “Duisburg Gateway Terminal” by 2025, - to lower the share of road freight transport to 20% - to pursue digitalization and automation strategy - to realize the Physical Internet by 2030 - to acquire / upgrade transshipment equipment (cranes, stackers...)

Table 11: Existing transport and potential – Vienna

3 Multimodal / Intermodal market perspectives in Slovakia (VPAS)

3.1 Macroeconomic overview of the country

Year	Value (bn USD)	Year-on-year increase / decrease (%)
2017	95,36	3
2018	105,566	3,8
2019	105,29	2,6
2020	105,08	-4,4

Table 12: GDP development in Slovakia⁹

3.2 Macroeconomic forecast and container transport forecast

Slovakia is ranked 23rd among 45 countries in the Europe region, and its overall score is above the regional and world averages. From 2017 through 2019, Slovakia's economic growth slowed. It contracted in 2020 but returned to growth in 2021.

Year	Year-on-year increase / decrease (%)
2021	3,0
2022	2,3
2023	3,6

Table 13: GDP development in Slovakia – forecast by ec.europa.eu¹⁰

⁹ Source: www.euroekonom.sk

¹⁰ Source: Spring 2022 Economic Forecast, ec.europa.eu

Year	Value (bn €)
2021	88
2022	89,8
2023	94,6
2024	96,3

Table 14: GDP development in Slovakia – forecast by Ministry of finance of the SR¹¹

Intermodal transport / Year	TEU	Mil. tkm
2023	895778	1734
2024	985355	1908
2025	1093744	2117
2026	1224994	2372
2027	1384243	2680
2028	1578037	3055
2029	1814742	3513
2030	2105101	4075

Figure 8: Intermodal transport forecast in Slovakia by 2030¹²

In the Slovak Republic, accurate statistical data are not monitored, which would provide us with a comprehensive picture of the state of combined transport and thus also of a reliable distribution of combined transport performance in terms of individual national and international transports and their distribution according to distances. Container performance is monitored in statistics only with third countries, e. g. outside the EU. The pan-European trend of strengthening the increase in combined transport performance, although not so sharply copied by the strengthening of combined transport in the Slovak Republic.

¹¹ Source: <https://www.mfsr.sk/en/finance/institute-financial-policy/economic-forecasts/macro-economic-forecasts/#collapse-386171653714187421>

¹² Source: The concept of the development of intermodal transport in the Slovak Republic until 2030

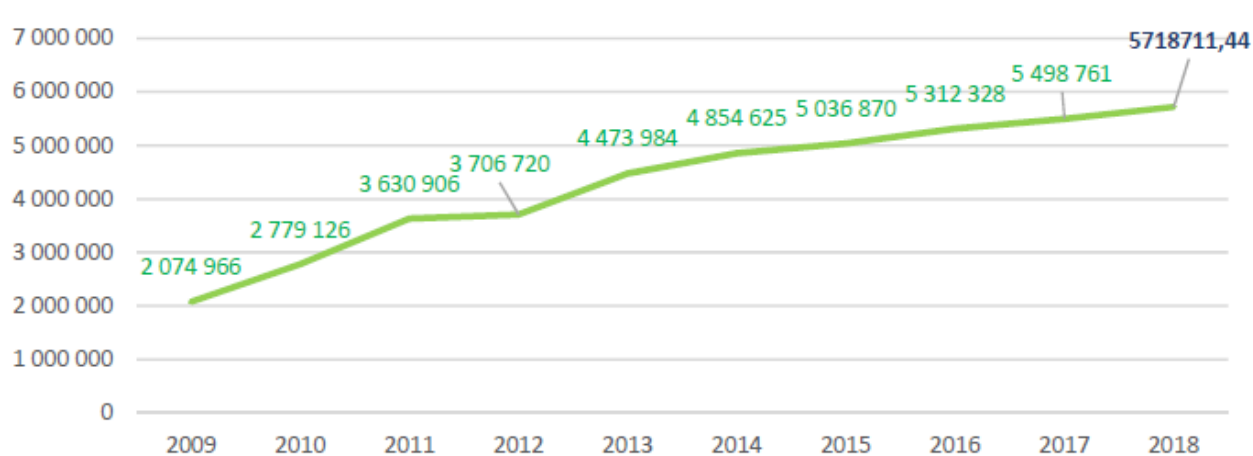


Figure 9: Combined transport performance in the Slovak Republic in gross tonnes (value for 2018 estimated)

Based on the above, it can be stated that in the current period the performance of intermodal / combined transport in the Slovak Republic is growing, but not significantly faster than in the EU countries.

Regarding inland ports on the Slovak section of Danube, only in port of Bratislava container terminal is located. It is the only trimodal terminal (water / rail / road) in Slovakia.

3.3 Port of Bratislava

Port of Bratislava, located between r. km 1,867,290 and 1862,000 currently serves as a universal, cargo and passenger port. Its potential is enhanced by its advantageous geographical location at the intersection of the Rhine-Danube and Baltic-Adriatic corridors of the TEN-T trans-European transport network, as well as good accessibility to other European capitals and important ports - Vienna and Budapest.

In the area of the port, the only trimodal (water / road / rail) container terminal is located. Terminal is located on the land owned by the port authority (VPAS) – long term lease. All the infrastructure and superstructure (incl. handling equipment) are owned by port / terminal operator – separate private entity.

Basic information about the terminal:

- The only trimodal container terminal on Slovakia
- Track: 2 tracks: 150 m and 300 m
- Handling equipment: 3 gantry cranes, 3 reach stackers
- Area: 12,000 m² = possibility of further expansion, i.e., 24,000 m²
- Storage capacity: 1,400 TEU

- Operation: MON-FRI 6:15 -21: 30, expeditions trains even on weekends
- Direct train connections – both directions: 2x Antwerp (NL), 2x Mělník (CZ), 1x Koper (SLO), 2x Bremerhaven (DE), 6x Rostock (DE), 2x Trieste (IT) per week
- Direct train connections – one way: Bratislava – Budapest (HU) 2x per week
- Estimated number of manipulated TEUs per year: 110,000 TEU (year 2019)

During the last one and a half years we have observed increased demand for terminal services from companies from within the radius of around 100 km around the port of Bratislava, from Slovakia, Czech Republic, Austria and Hungary.

3.3.1.1 Cargo volume statistics

Commodity / Year	Historical data (t)				
	2016	2017	2018	2019	2020
Mineral oils	526368	564297	351403	412667	393222
Fertilizers	121100	86176	67078	89904	69684
Agricultural production	5016	998	5286	6144	5376
Containers	57 470	70000	106000	98000	96000
Iron, iron ore	742458	1282171	959443	822959	904104
Coal	13706	90251	52692	230186	78423
Steel coils	58004	14859	71462	89817	68745
Transformer	3368	2895	3100	1733	1960
Construction and machinery	59733	25545	20677	64175	21403

Table 15: Commodity structure by year port of Bratislava

It is necessary to point out that 2020 is not a reference year in terms of the number of manipulated TEUs. Based on interviews with selected representatives of terminals in the Slovak Republic, the corona crisis caused more significant power outages in the waves, which was subsequently followed by an increase in transport flows. Based on interviews with terminal operators in the Slovak Republic, the overall decrease in manipulations can be estimated at an average of 10%. The results of the interviews can be understood as copying the response of intermodal players in the intermodal

transport market in Europe (see coronary crisis patterns below), when they expect a recovery in 2021 and a 20% to 20% increase in output from 2022. Because of the pandemic in 2020 and 2021, the Concept retains an estimate of traffic flows from 2019.

3.3.2 Potentials for container transshipment

3.3.2.1 Current state of affairs with intermodal cargo

In Slovakia, the dominant share in transport is the transport of goods in containers. There are currently no RoLa lines in operation. Combined transport in contrast to other modes of transport, t. j. water, rail, road, or. does not use its own specific means of transport. It uses only its own specific freight units, which are transported by water, rail and road. This results in a very wide involvement of carriers in this mode of transport. Their interests clearly meet in places where the cost unit changes mean of transport t. j. most often in combined transport terminals (See Combined Transport Terminals in the Slovak Republic). That is why it is necessary to perceive intermodal transport in the context of the entire transport sector in the Slovak Republic. The transport sector in the Slovak Republic has been facing several problems for a long time and thus also today. One of the basic problems is the unfavorable development of the division of transport work in favor of road transport, especially individual (non-public) transport. The situation in freight transport does not contribute to improving the overall situation either. While the importance of transport modes suitable for the transport of large volumes of goods without an excessive burden on infrastructure and the environment either decreases or stagnates or is negligible in the total transport volume, the transport performance of road freight transport is growing in the long run.

Container traffic history

In the period since 1993, intermodal transport in the Slovak Republic underwent a complex development, which was characterized by the interruption of transport growth due to the disintegration of the CMEA market, the emergence of an independent Slovak Republic and a change in market orientation. In the years 1991 - 1994, there was a decrease in combined transport to less than 40% of transport in 1991. Since 1995, there has been a gradual increase in combined transport and the share of combined transport in total rail transport has increased from 0.33% in 1994 to 1.53% in 2002.

In the past, several national measures were taken, which together with cross-border EU initiatives created certain strengthening trends in combined transport performance in the EU, so the permanent growth of combined transport performance in the Slovak Republic was partly due to national demand but also national measures, but these were not and are not sufficient to achieve the required state of intermodal (combined) transport performance, both in comparison with the surrounding countries of the Slovak Republic and also with regard to the general trends of reducing emissions generated by road freight transport.

Capacity of the container terminal is 1400 TEU including parking space for 60 semitrailers.

Intermodal transport / Year	TEU
2015	54 869
2016	57 470
2017	70 000
2018	106 000
2019	98 000
2020	96 000
2021	110 000

Table 16: Containers transhipped in port of Bratislava

Container transport today

3.3.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

Container terminal in the port of Bratislava has geographically very advantageous position since it is in the capital city of Slovakia, right next to borders with Austria and Hungary and not far from the border with Czech Republic. In the action radius of 200 km a significant number of producers, manufacturers, importers, and exporters may be found. These subjects represent industry, services, agriculture, and freight forwarding. Regions around capital cities Bratislava and Vienna are economically the strongest regions in their respective counties.

Position right next to the city center comes with one major disadvantage which is limited space. Located in industrial area surrounded by buildings and other infrastructure and superstructure, container terminal has nowhere to expand.

3.3.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

Port area (and terminal as well) is connected by a connecting track with AGTC terminal Bratislava ÚNS (Ústredná nákladná stanica / Central freight station). This bimodal (rail / road) terminal has an area of 34 500 m² and is located on track no. 132 Bratislava – Hegyeshalom (HU). Handling performance is approximately 80 000 TEU / year. Terminal is operated by private entity and information about transported commodities are not available.

Slovakia is pro-import economy, especially in the region of the capital city. Therefore, goods are imported in containers and after unloading, empty containers are moved to pro-export countries, mostly Austria and Germany unfortunately for port, mostly by road or rail. When it comes to container transshipment via inland waterway, according to terminal operator, there is occasional demand for empty containers in Romania.

3.3.2.1.3 Main reasons for success or failures of regular/significant container handling (volumes) in port of Bratislava.

Terminal in the port of Bratislava benefits from its strategical position near the borders with three EU countries in the region where two close capital cities are located. Due to unpredictability of inland navigation (just-in-time principle) the vast majority of container handling is executed between road and rail. Navigation is minimally represented. Terminal is reaching its full capacity and according to operator, there is significant potential for increase of transport flows. However, terminal is spatially limited and for expansion, broad agreement between private and public entities would have to be concluded.

3.3.2.1.4 Competitive (dis)advantages of other transport modes/routes in your port

As explained in sub-chapter above, due to unpredictability of inland navigation (just-in-time principle) the vast majority of container handling is executed between road and rail. However, from current trend we can foresee unsustainable demand for rail transportation what would draw attention to other modes of transport, in our case inland waterway.

3.3.2.1.5 Development potential

Intermodal terminal in the port is usually 70-80% busy, in some peak times it reaches its capacity. Any increase of transshipped volume would not be possible without physical extension of the terminal. Terminal is located on land leased for long time and there are buildings located in the vicinity. To expand the terminal physically, it would be necessary:

- to conclude lease agreement with owner of the land (VPAS)
- to demolish buildings located in the immediate vicinity (old warehouse / locksmith workshop)

3.3.2.2 Desired state of intermodal affairs with intermodal cargo

3.3.2.2.1 Objectives of intermodal transport development in the port Bratislava

Intermodal transportation is seen as future for inland port in Slovakia, especially in Bratislava. The Port Bratislava is a multimodal logistic terminal providing storage and transshipment activities within three basic modes of transport. To fulfill these functions,

its aquarium as well as its territory must be equipped with the relevant technical infrastructure and superstructure.

Master Plan II - Port Bratislava, strategical document proposed construction of modern intermodal terminal in Pálenisko basin.

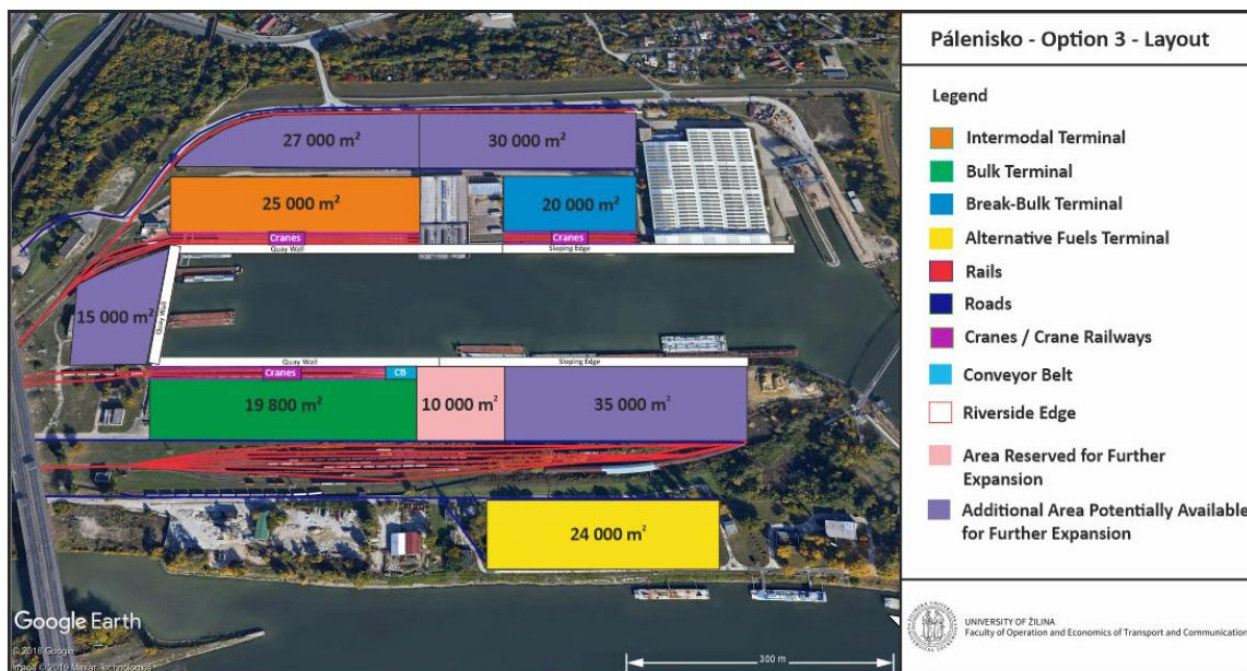


Figure 10: Proposed layout of terminals Bratislava - Pálenisko basin

In 2009 the feasibility study for VTIP (Verejný terminal intermodálnej prepravy / public intermodal transport terminal) was elaborated by ŽSR (Železnice Slovenskej republiky / Railways of the Slovak Republic). Project was supposed to be located on the land of the VPAS inn the location of the Pálenisko basin. The documentation for zoning decision was elaborated for this project.

The implementation of the project was put on hold due to unauthorized state aid, since the sources of financing should have been public resources (the EU and state budget resources).



Figure 11: Layout of intermodal terminal Bratislava - ŽSR project 1



Figure 12: Layout of intermodal terminal Bratislava - ŽSR project 2

3.3.2.2 Internal and external factors for initiation / increase of container transport in port of Bratislava.

Terminals that can be characterized as open access terminals in the Slovak Republic are only two terminals, TIP Žilina (rail / road) and SPaP Pálenisko Bratislava / port of Bratislava (rail/road/water). Terminals in the hands of private operators do not officially declare non-discriminatory and free access for other intermodal operators. This represents a certain dependence on the will, intentions, willingness of these intermodal players to provide services for other intermodal transport units and not only for most sea containers. Expanding the possibilities of providing services by terminals on an

open and non-discriminatory basis creates preconditions for the development of continental intermodal transport

3.3.2.2.3 Physical needs in terms of:

a. Space

As described in 6.3.2.1.5, terminal currently reaches its full capacity and physical extension is limited by leased land and nearby (albeit not modern) buildings.

b. Infrastructure

The capacity of adjacent road and railway infrastructure of the cargo port is to tranship 8-10 million tonnes per year. The majority of transport operations are realized by railway transport (the 2nd biggest railway siding in the Slovak Republic) and less by road transport. The current transshipment capacity is 2 million tonnes per year, and thus the transport capacity is approximately 20-25%.

c. Facilities

Container terminal is spatially limited therefore there is not enough space to construct warehouses that would be needed.

Current capacity of railway siding does not allow more than 3 trains to enter the port at once. Demand would be higher, but capacity of rails does not allow it.

d. Equipment

All train sets inside the terminal are operated by only one locomotive. This results in limited flexibility and increased time for transshipment / manipulation with trains and cargo as well.

f. Operators

Terminal is operated by one private entity that owns all the infrastructure, superstructure and transshipment facilities. Non-discriminatory access for multiple operators / market players is therefore restricted. Operator operates the terminal on land leased from the owner of the port – Port Authority. Upgrade and / or any kind of reconstruction is limited by ownership setup. Port authority cannot invest in other company's property and operator is not motivated in long-term investment on leased land.

g. Hinterland connections

Port of Bratislava where terminal is located has direct connection to highway, national railroad and inland waterway. Terminal is connected by rail with nearby ÚNS terminal (2km) and to highway bypass around the city as well. Hinterland connectivity can be therefore considered good. Hindering elements are located inside the port, such as reached maximum throughput of railroads.

h. Legal

Slovakia, together with Slovenia, Spain, Estonia and Latvia, is one of the EU countries that they do not provide any form of subsidies for combined transport. The strongest subsidy policies in the field of combined transport in Europe are Austria, Germany, France and Switzerland.

It is necessary to modify Act no. 514/2009 Coll. on transport on railways, as amended regulations, and Act no. 338/2000 Coll. on inland navigation so that the maximum support for the development of intermodal transport is equal to the amount of support normally provided in other EU countries (i.e., in the case of support for the development of new routes from the current level up to a maximum of 15%.

Other issues related to administration, legislation and / or customs were not identified.

3.3.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)					Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable		
Port of Bratislava			X					X	<ul style="list-style-type: none"> - expansion of existing intermodal terminal / construction of new modern intermodal terminal - increase of permeability of railways inside the port area 	

Table 17: Existing transport and potential – port of Bratislava

4 Multimodal / Intermodal market perspectives in Hungary (HFIP)

4.1 Macroeconomic overview of the country

A 50% of GDP is given by household consumption in Hungary. Gross fixed capital formation is 22% and government expenditure is 20%.¹³

At the end of the 2010s, the Hungarian economy showed a stable increase – a higher growth than in much of Europe.¹⁴ As a result of improved employment and productivity GDP has risen, and the trend continues. The Western-European standard of living is reachable within a reasonable time. However, the COVID-19 pandemic interrupted this favorable process. Besides the health crises, it caused serious disruptions in international trade, passenger traffic and tourism have decreased significantly, and all economic activity has been significantly slowed down. The second wave of the pandemic had more serious casualties. It still failed to extinguish completely Hungary's growth potential. Even if the momentum is clearly broken. While mitigating the consequences of the defense and the pandemic, major economic actors also shall pay attention to growth be adequately prepared to launch. In the key national economic sectors, the induced growth and dynamism can be revived with the appropriate tools.

Year	Value (billion USD) ¹⁵	Year-on-year increase / decrease (%)	Annual growth (%) ¹⁶
2017	142,96	4,32	11,28
2018	140,62	5,41	12,21
2019	163,56	4,58	1,9
2020	154,56	-4,96	-5,45

Table 18: GDP development in (Hungary)¹⁷

In 2021 Q2, the performance of the Hungarian economy (seasonally and calendar adjusted) was 2.7% higher than in Q1. GDP is 17.9% higher, than a year ago, when the first shock of the coronavirus crisis resulted in huge shutdowns in the domestic economy. Analysts had tentatively expected economic growth to be 2% quarter-on-

¹³ Hungary GDP Growth Rate | 1995-2021 Data | 2022-2023 Forecast | Calendar | Historical (tradingeconomics.com)

¹⁴ [McKinsey-Hungary-2030-Report-HU.pdf](#)

¹⁵ Hungary - gross domestic product (GDP) 1986-2026 | Statista

¹⁶ [Itt a friss GDP-adat, így nőtt a magyar gazdaság! - Portfolio.hu](#)

¹⁷ Source: statista.com and omnicalculator.com

quarter and 17.2% year-on-year. The economy expanded even more dynamically than experts expected.

Strong GDP growth was expected, as the Hungarian economy was slowed down by much fewer epidemiological restrictions in the second quarter.

In economic terms, the perfect completion of a crisis means that the economy is returning to the pre-crisis growth trend line. For this to happen in the next six months, GDP would need to grow at a similar pace as in recent quarters. It is a hyper optimistic scenario since it requires the economy to expand as it does without the accelerating effects of the resolutions. If this does happen, average GDP growth this year could be around 9%.

The second quarter data confirms the optimistic scenario saying Hungary would reach pre-crisis output levels by the second quarter. If the economy runs the expected trajectory in the second half of the year, average GDP growth in 2021 can be above 7%.

The other two (gloomier) scenarios have already been overwritten by life, with Q2 performing much better than assumed. However, it is worth noting that the government’s target of 5.5% GDP growth this year can be achieved even with these pessimistic trajectories.

4.2 Macroeconomic forecast and container transport forecast

The fourth wave of the coronavirus pandemic will not cause as much economic disaster as the previous shocks, which allows a higher GDP growth in 2021. Thanks to the rapid recovery of the Hungarian economy, GDP reached pre-crisis levels in Q2 of 2021. Despite the third wave of the coronavirus epidemic, the expansion was robust, indication that the Hungarian economy grew by 2.7% compared to the first three months of the year.

Year	Value (billion EUR) ¹⁸	Year-on-year incr./ decr. (%)	Annual growth (%) ¹⁹
2021	176.54	4.3	14.22
2022	194.14	5.9	9.97
2023	207.01	3.8	6.63
2024	219.24	3.2	5.91

Table 19: GDP development in Hungary - forecast

¹⁸ [Hungary - gross domestic product \(GDP\) 1986-2026 | Statista](#)

¹⁹ [GDP Growth Rate Calculator \(omnicalculator.com\)](#)

Although, Hungary has no sea, tons of goods arrived in containers at sea.²⁰ In the first half of 2021, stacked container traffic arriving by sea was 20% higher than a year before with its 168,145 TEU.

In the upcoming decade, number of trimodal container terminals will grow. Within 10 years, 2 or 3 trimodal container terminals will be operating along the Hungarian Danube section. Besides, container traffic will increase within the next 5-8 years. Maritime traffic will expand by 30%, intra-EU traffic by 25%, and however the OBOR/silkroad traffic will not be significantly higher, still perform an increase regarding container traffic. All these factors necessarily pull IWT as well, especially if the bottlenecks defined within the CEF Masterplan will be solved and navigation conditions on the Danube will be better.

Year	Number of 20-foot freight container	Number of 40-foot freight container
2017	1,705	3,075
2018	674	2,058
2019	1,434	1,458
2020	331	2,799

Table 20: Number of containers in freight traffic of inland ports (total volume loaded and unloaded) Hungary

4.3 Ports of MAHART Container Center (MCC)

It is a specialized intermodal terminal with a total area of 111,000 m², 80,000 m² storage area and 29,000 m² handling area. Transit storage capacity is 1,700 TEU, whilst the depot storage capacity is 5,400 TEU. The terminal has a 280-meter-long quay equipped with 280-meter-long, 5-track rail. There are 3 lanes for loading/unloading trucks in the terminal.

There is a potential for increasing multimodal transportation since the terminal does not operate on maximum capacity. The available capacity is 230,000 TEU per year, however, waterside handling was only 6,000 TEU in 2020 according to D.T.2.1.1.

²⁰ [Hungary's maritime traffic has significantly increased – MLSZKSZ](#)

4.3.1.1 Cargo volume statistics

Commodity / Year	Historical data				
	2016	2017	2018	2019	2020
Total handling	354,083	218,851	335,923	393,773	411,447
Land-to-land handling	349,350	210,650	331,200	389,650	405,500
Waterside handling	4,650	8,350	4,800	4,350	6,000

Table 21: Commodity structure by year (Port of interest)²¹

4.3.2 Potentials for container transshipment

4.3.2.1 Current state of affairs with intermodal cargo

Recently, MCC has been focusing on increasing the efficiency of terminal operations by using IT facilities (e.g., OCR technology). Besides, the space of the terminal has been expanded in the last 3 years with 13.000 square meters. The fleet of transshipping equipment has been increased from 7 to 11.

Container traffic history

In 2020 container traffic was 210,800 TEU. MCC handled 411,500 TEU. The number of trains handled was 2,264 in 2020. 62.5% of containers handled in the terminal in 2020 was loaded container and 37.5% was empty.

Transshipping trains in the following relations:

- Budapest-Bremenhaven
- Budapest-Koper
- Budapest-Trieste
- Budapest-Rijeka
- Budapest-Vienna (connections to Wels, Ludwigshafen, Duisburg, Rotterdam, Antwerp, Hamburg)
- Budapest-Köln
- Budapest-Herne
- Budapest-China via Malaszewicze (PL), Dobra (SK)

Transshipping barges in the following relations:

²¹ Source: containercenter.hu

- Budapest-Constanta (connections to Galati, Beograd)
- Budapest-Bratislava
- Budapest-Regensburg (connections to Vienna, Enns, Linz)

Container transport today

4.3.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

MCC is located in the Freeport of Budapest, on the Csepel Island, to the south from the centre of Budapest. Its closeness to the heart of the capital is a major advantage. The container terminal has a great location within the port as well. It has trimodal connections between the two pools.



Figure 13: MAHART Container Center from bird's eye²²

4.3.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

MCC declares, every type of goods can be containerized and the number of categories of goods is ever-expanding. Although, 37.5% of containers transhipped is empty.

4.3.2.1.3 Main reasons for success or failures of regular/significant container handling (volumes)

MCC's terminal successfully combined maritime, intra-EU, OBOR/silkroad and rental container traffic in the last three years. Hence, MCC has become able to create an optimized customer mix, thus the company stabilized its future. Besides, one of the

²² Source: containercenter.hu

advantages of the terminal over other competing terminals is market neutrality, cooperation with all participants.

4.3.2.1.4 Competitive (dis)advantages of other transport modes/routes in port

Major advantage of road and rail is countability. Changing water level makes IWT exposed to weather conditions. In low-water conditions, only empty containers can be transported.

4.3.2.1.5 Development potential

The commodity base is clearly growing. On the one hand, traffic in the existing area can be increased by increasing efficiency / IT methods. On the other hand, and by introducing more efficient container loading systems in the existing area, trimodal capacity can be increased (container gantry cranes, new tracks in the existing area). In addition, capacity can be increased by renovating older areas with limited use. Furthermore, it is also possible to include new areas within the port and to use areas suitable for out-of-port activities.

4.3.2.2 Desired state of intermodal affairs with intermodal cargo

As mentioned above, the most important elements of necessary development are the renovation of the existing area, development of tracks on the existing area, commissioning of trimodal gantry cranes in the existing area, track and pavement developments in a new area, IT development.

4.3.2.2.1 Objectives of intermodal transport development in the port of MCC

The main elements of the complex development of the terminal are the followings:

- modern, gantry crane
- granting terminals to become modern ports with advanced IT system

4.3.2.2.2 Internal and external factors for initiation / increase of container transport in port of MCC.

The key factors for increasing container transport in MCC are the followings:

- Reconsidering BIREG (Electronic Pre-Registration System), as currently it is not capable to meet its purpose.
- reconsidering shipping rules for containers, as currently they are rather limiting traffic on the Danube
- reasonably designed combined transport subsidy (not given to railways, but preferring freight forwarders using intermodal solutions for an introduction period of 2-3 years)
- reasonable development of terminals

- facilitate the capacity development of existing container terminals in addition to and partly in place of the construction of new terminals (due to the existence of basic infrastructure, it would be more efficient to spend public money to increase unit capacity).

4.3.2.2.3 Physical needs in terms of:

a. Space,

The existing area of the terminal shall be renovated, and new spaces shall be created and added to the MCC terminal.

b. Infrastructure,

The existing rail tracks shall be reconstructed, and additional tracks and pavements shall be constructed if the terminal area expands.

c. Facilities,

Modern IT system shall support port logistics.

d. Equipment,

Trimodal gantry cranes shall be purchased to operate.

e. Operators,

MCC is the terminal operator and new actors shall not be involved.

f. Hinterland connections

The most important physical needs besides the above-mentioned terminal conditions are as follows:

- The development of navigability of the Danube, water infrastructure
- Construction of the new Gubacsi railway bridge
- Construction of VO that is a railway ring around the metropolitan area
- During the reconstruction of line 150, creating a direct access to the Southern railway bridge by avoiding Ferencváros

4.3.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
MCC			X				X		<ul style="list-style-type: none"> - modern, gantry crane - granting terminals to become modern ports with advanced IT system

Table 22: Existing transport and potential – MCC

Due to remarkable factory investments, maritime traffic will develop. With the development of Záhony, the increase of OBOR traffic is also expected. Current road regulations and the persistence of driver shortages are helping to develop intermodal intra-EU traffic.

5 Multimodal / Intermodal market perspectives in Croatia (PAV)

5.1 Macroeconomic overview of the country

Year	Value (million €)	Year-on-year increase / decrease (%)
2017	49.913	3,4
2018	52.718	2,9
2019	55.604	3,5
2020	50.225	-8,1

Table 23: GDP development in Croatia

5.2 Macroeconomic forecast and container transport forecast

A reliable forecast related to container transport is not available. As regard GDP forecast only percent for 2021 and 2022 year can be found

Year	Value (million €)	Year-on-year increase / decrease (%)
2021	57.342	10,4
2022	60.094	4,8
2023	61.986	3,0

Table 24: GDP development in Croatia - forecast

No container transshipment hasn't been recorded in the Port of Vukovar, as well as in other Croatian inland ports. Furthermore, at national there isn't available data related on forecast for container transport. However, a significant value of container transshipment in Croatia currently is transshipped in maritime Port of Rijeka. Due to mention fact forecast for container transshipment has been made for maritime Port of Rijeka. Forecast of container transshipment is calculated according to average GDP growth for Croatia in the last 24 years. Except for average growth of transshipment, which represent realistic forecast, hypothesis is made also for pessimistic and optimistic forecast of container transshipment.

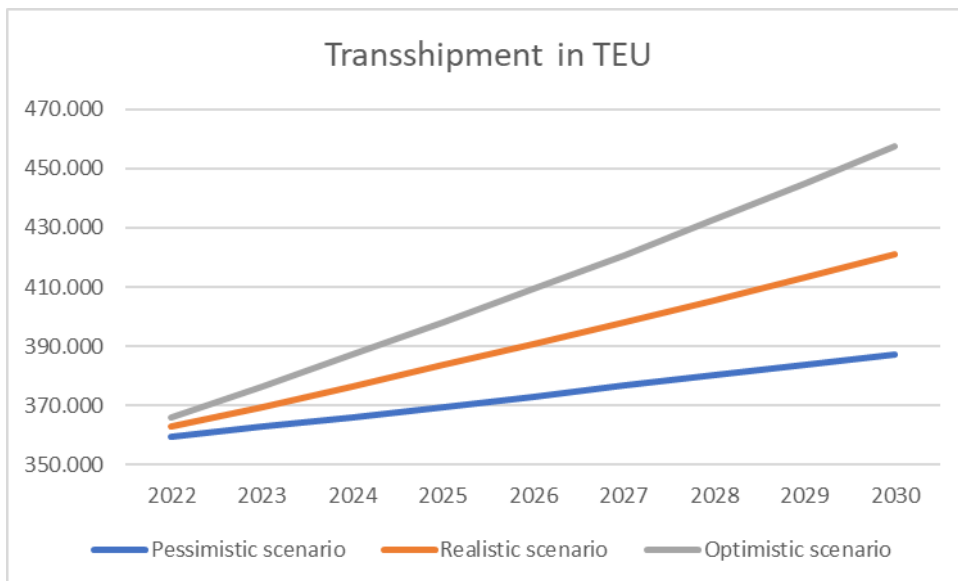


Figure 14: Port of Rijeka – pessimistic, realistic and optimistic scenario for transshipment of containers forecast for 2022 - 2030 in TEU

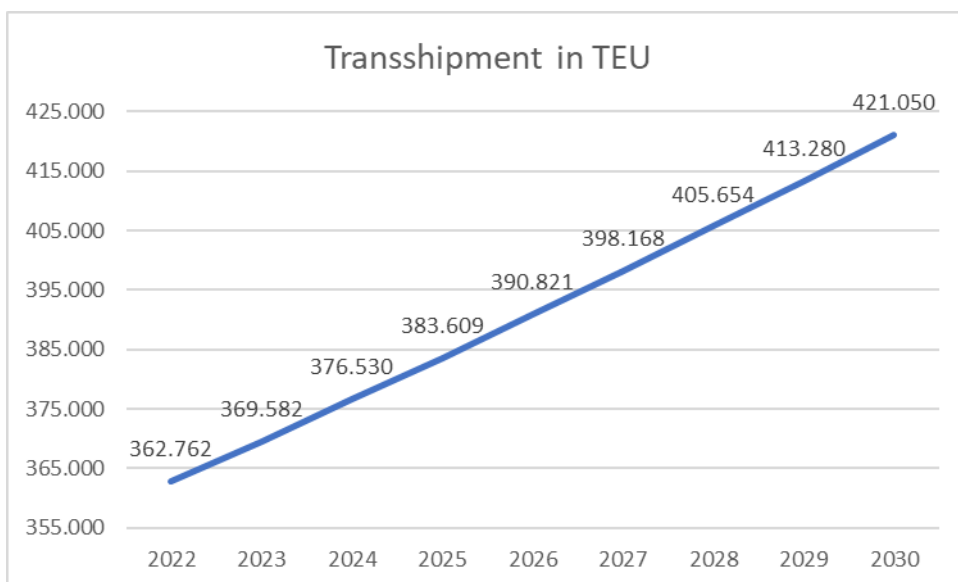


Figure 15: Port of Rijeka - realistic transshipment of containers forecast for 2022 - 2030 in TEU

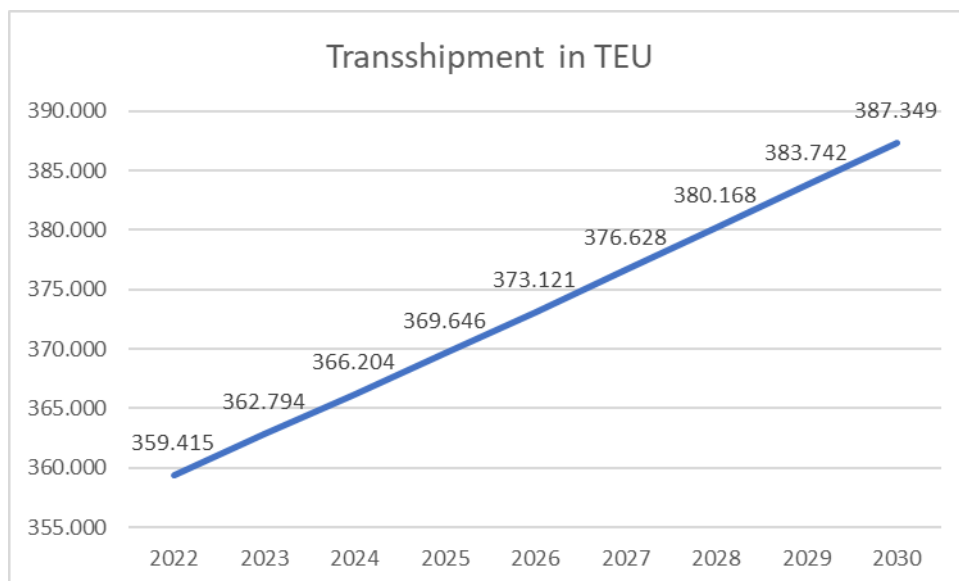


Figure 16: Port of Rijeka – pessimistic transshipment of containers forecast for 2022 – 2030 in TEU

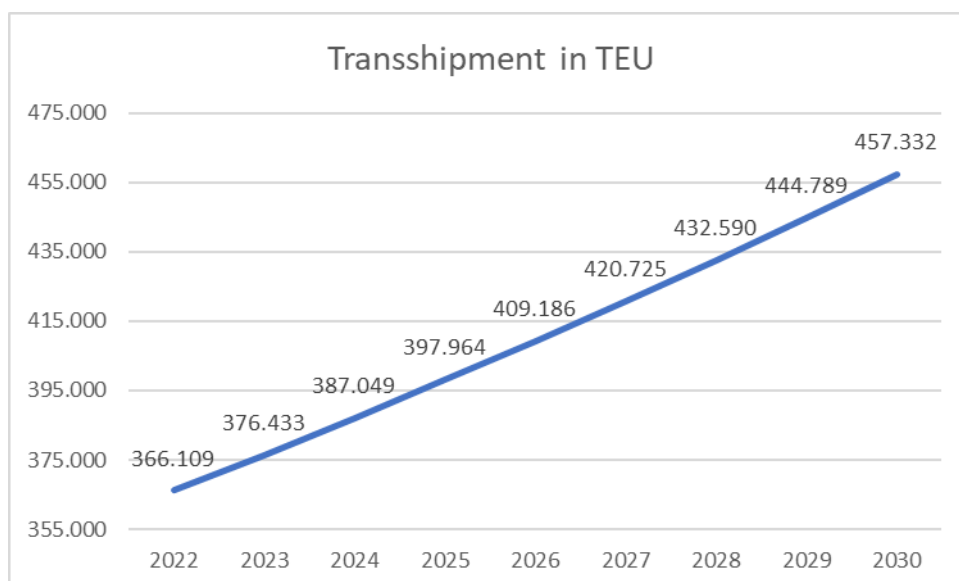


Figure 17: Port of Rijeka – optimistic transshipment of containers forecast for 2022 – 2030 in TEU

5.3 Port of Vukovar

Port of Vukovar is situated on 1335+000 rkm on the right bank of the Danube River. The port stretches towards the East and West and it is 1700 meters long and 45 meters wide. The port is very well situated on the Danube which makes it possible for the port to be accessible during the entire year regardless of the water level. This is so even during the period of the lowest water levels. Port of Vukovar is accessible by road, as well as by railway.

Port of Vukovar doesn't have Container terminal, but Multipurpose terminal located in port of Vukovar can be used as a multimodal facility. Terminal with its location on the

Danube river is accessible by IWW and connected by highway A3 over state road D55 , as well as with main international railway corridor RH1(ex pan European corridor X) by railway.

According to concession agreement port operator Luka Vukovar Ltd operate at Multipurpose cargo terminal and operator is allowed to provide port activities related to loading/unloading cargo, cargo handling, as well as cargo storage. Port operator has two gantry cranes with a load capacity of 5/6 t, a port gantry crane with a capacity of 63 t, which has the special feature that it allows handling of heavy loads, as well as general and bulk cargo, as well as 20-foot and 40-foot containers. It also has forklifts with a capacity of 2 to 20 tons (a total of 8 forklifts), two loaders, a diesel locomotive, as well as a thruster of 300 hp.

5.3.1.1 Cargo volume statistics

Commodity / Year	Historical data				
	2016	2017	2018	2019	2020
Dry bulk	233.001	263.079	324.836	286.244	357.631
Liquid bulk	11.184	9.246	17.006	0	0
General cargo	42.916	47.142	76.866	124.941	136.623

Table 25: Commodity structure by year (Port of Vukovar)

5.3.2 Potentials for container transshipment

5.3.2.1 Current state of affairs with intermodal cargo

Port Authority Vukovar within CEF-Connecting Europe Facility instrument began the preparation of project documentation for the construction of the port road and related manipulative and storage area adjacent to the area intended for the construction of the vertical quay. The preparation of project documentation is financed by the state budget with a value of 1.677.852,35 EUR. The estimated duration of the project implementation is 24 months. Port Authority Vukovar plans to prepare the project documentation and obtain necessary permits by the end of 2023 in order to be able to start the construction phase.

Container traffic history

There hasn't been any container traffic in Port of Vukovar.

Container transport today

5.3.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

Port of Vukovar is the major port in Croatia by volume of cargo, the largest river port and is a port of economic importance for the Republic of Croatia. The Port is located on the Danube, which represents a Pan European corridor VII and is a part of the Rhine-Danube Core Network Corridor. The Danube also represents natural border with Serbia. Vukovar-Srijem County, as the immediate hinterland of the Port of Vukovar, occupies a part of Slavonija and Srijem, geographic regions on the east of Croatia, and it is as such Croatia's easternmost county. Given that the County borders with two countries, the Republic of Serbia on the East and Bosnia and Herzegovina on the South, it has an important geostrategic position for Croatia. Good connection with third countries is very important for the EU in order to encourage trade with the neighbouring countries as well as to encourage economic growth. Connection of West Balkan countries with the countries within the European Union and beyond, facilitates trade and mobility among the Member states and candidate states. The specificity of Croatian waterways is the fact that these are mostly border rivers.

5.3.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

Containerize cargoes are being transhipped only through the Mediterranean maritime Port of Rijeka at the Container Terminal Adriatic Gate.

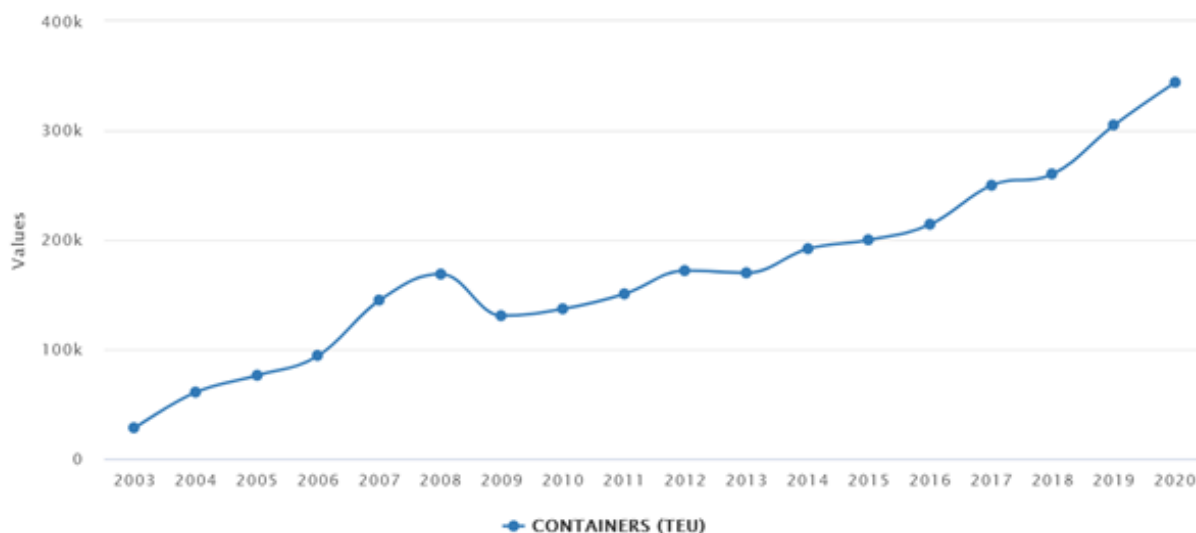


Figure 18: Container transshipment in Port of Rijeka in TEU from 2003 to 2020 year

The Container Terminal Adriatic Gate is located in the Sušak basin, and it started operating in 1977. At that time, the first container crane in the Port of Rijeka was set up in this first phase of construction. Subsequently, in 1987, the south pier in a length of 300 meters was built with a depth of 11,2 meters.

In 2013, after the implementation of the Rijeka Gateway Project at the container terminal, the second phase of terminal construction was completed, namely the extension of pier by another berth and the corresponding increase of the storage areas and the construction of the entry/exit point. At the end of the works worth 30 million EUR, sea depth increased to a minimum of 14,2 meters which enabled the servicing of container ships of up to 370 meters long, reaching the maximum capacity of 600 000 TEU. The installation of a temporary mooring buoy and the construction of the entry/exit point and the Border Inspection Point (BIP) followed. After the implementation of the expansion works under the Rijeka Gateway Project, the concessionary company Jadranska vrata d.d. installed new pier and storage equipment worth 23 million EUR, namely two high-capacity Panamax cranes, 6 container gantry cranes and 2 container rail-mounted gantry cranes.

In addition to the large investments in the implementation of the Rijeka Gateway Project, significant funds have been approved for the implementation of the European project from the Connecting Europe Facility (CEF). The project called Multimodal Platform Development at the Port of Rijeka and connection with the Adriatic Gate Container Terminal (POR2CORE-AGCT) worth 35,556,000 EUR will improve the intermodal terminal by reconstructing the existing Rijeka-Brajdica marshalling yard and extending the existing tunnel by 400 meters for the purposes of construction of the pull-out track, which will significantly increase the share of railways in the transport of containers by December 2020.

In 2018, the project Improvement of the Infrastructure of the Port of Rijeka– AGCT dredging (POR2CORE-AGCT dredging) was approved. This project worth 13,9 million EUR will also be funded from the CEF programme, in partnership with the concessionaire of the terminal, Adriatic Gate j.s.c. The funds will finance terminal adaptation in order to increase capacities and the possibility to accommodate larger vessels.

At the Container Terminal Adriatic Gate, located on Brajdica, company Adriatic Gate Container Terminal (AGCT/ICTSI) provides services primarily related to the transshipment and storage of containers, as well as additional services such as Container Freight Station – filling and emptying of containers. All the services are related to the containers and the cargo they carry. The services include: loading and unloading of containers, reception and delivering containers from/to lorries, reception and delivering containers from/to the railway, filling and emptying of containers, container washing, fumigation and assistance in customs or phyto-sanitary inspection, sealing and storage of cargo.

5.3.2.1.3 Main reasons for success or failures of regular/significant container handling (volumes) in port of Vukovar.

Port of Vukovar efficiently performs port manipulations and warehousing operations on goods for various business entities from Croatia and abroad, providing the highest quality services to partners. The Port of Vukovar is the only river port in Croatia located on the right bank of the Danube River, which with its navigability class Vc in this part enables the availability of navigation 365 days a year. The port has the technical characteristics of an E-port according to the European Agreement on Main Waterways of International Importance (AGN; OG 16/98), the status of an international port and is of economic importance for the Republic of Croatia. The total area of the port area is 26 hectares, and the length of the operational shores, which include four connections, is 450m.

There are three operational railway tracks in the port area for handling ship-shore and loading/unloading general and bulk cargo. The internal road system of the port consists of the main port roads, which provide access to the public road system for each terminal or facility.

The port is equipped with one mobile crane - Gottwald HMK 170E with a capacity of 63t, and one gantry crane - Ganz DAF350 with a capacity of 25t, providing transshipment capacity for transshipment of bulk and general cargo as well as 20-foot and 40-foot containers. It also has two smaller port cranes of 5/6t (GANZ) capacity, forklifts with a capacity of 2 to 20t, two loaders, 2 diesel locomotives, as well as a tugboat of 480HP.

Current capacities allow for an annual load of about 1,200,000 - 1,500,000 t, depending on the type of cargo. In European traffic, the port became the most important part of the bridge between inland European waterways, from the Danube through Croatian territory, to the Mediterranean, thus gaining immeasurable economic and transport importance, not only for Croatia but also for Europe.

5.3.2.1.4 Competitive (dis)advantages of other transport modes/routes in port

Port of Vukovar is connected to the cities of Županja, Vinkovci and Brčko (Bosnia and Herzegovina) via M55 road. The same road connects it to the highway E-75 connecting Zagreb and Belgrade (Republic of Serbia). It is also connected with road M2 with city of Osijek and with corridor VC (Budapest-Osijek-Sarajevo-Ploče). The port is located on Danube River that is Pan European corridor VII and it is part of the Rhine-Danube Core Network Corridor.

5.3.2.1.5 Development potential

The Port of Vukovar is very well situated on the Danube, which makes it possible for the Port to be accessible during the whole year regardless of the water level. This is so even during the period of the lowest water levels when the Port is fully operational and active. Existing bank of Danube has been set as sloped bank, equipped with harbour cranes. At the smaller part, at length of 55 m there is a vertical bank. However, bank wall

is located at the part of the bed which remains outside water at low water levels. Even though Danube is navigable around the Port of Vukovar through the whole year, ships may have difficulties docking along both the vertical and the sloped bank and have to anchor at required distance, determined by their draught and available water depth. Aforementioned circumstances limit the transshipment capacities of the Port, despite acquired modern cranes and transshipment equipment and relatively favourable arrangement of industrial rail tracks within Port area.

In addition, there is an acute shortage of space, especially regarding the manipulative space between the water side and the rails, as well as traffic areas for arrival and departure. The layout of the Port area, particularly the access to railway tracks and the quay operational area, are technologically inappropriate and not compatible. Altogether, it affects the quality of the service which can be provided in the Port and thus decreases the competitiveness of the Port.

The main development objective of the Port of Vukovar is to ensure the flow of goods, the development of the region and to increase the competitiveness of the Port while ensuring the raise of environmental standards. The development aspect of the Port of Vukovar is of state interest because it directly encourages national and regional economic development.

Port Authority Vukovar has been continuously working on development, preparation and implementation of projects that would lead to accomplishment of the Global Project goals. Implementation of the Global Project will create conditions for a better connection between the Port of Vukovar and the economic hinterland, which will highlight the comparative advantage of inland navigation over other modes of transport. So far, the project for Modernization, renewal and electrification of the Vinkovci-Vukovar railway is in implementation phase. Upgrading and electrification of the railway line from Vinkovci to Vukovar with a length of 18.71 kilometres, sections important for international traffic, will enable the increase of volume of railway traffic and the transshipment of goods in the Port of Vukovar. Furthermore, it will enable better connection of rail passenger transport in the Vukovar-Srijem County with the main traffic corridors and other counties and will have a particularly positive effect on travel comfort and safety as part of daily passenger migration. Electrification of the section will ensure economically, energy-efficient and environmentally sustainable rail transport. The capacity of the section will be increased and access to the Port of Vukovar will be improved, which will make it, being on the TEN-T corridor Rhine – Danube, well connected to the RH1 Corridor, the former X Pan-European Corridor. Modernization of the railway line from Vinkovci to Vukovar will contribute to the economic development of the local community and the recovery of the eastern part of Slavonia. The grant contract for the project for Modernization, renewal and electrification of the Vinkovci-Vukovar railway was signed on 21st May 2018 by the Ministry of the Sea, Transport and Infrastructure, Central Financing and Contracting Agency and HŽ Infrastruktura (end user). Total investment value of the project is 90.867.746,15 EUR and eligible costs are estimated in the amount of 69.233.006,01 EUR. The project is co-financed by the European Union from the Operational Program Competitiveness and Cohesion from the Cohesion Fund at 85% of the eligible costs and at 15% by the Government of the Republic of Croatia. The estimated duration of the project implementation is 24 months.

Furthermore, Port Authority Vukovar began the preparation of project documentation for the construction of the port road and related manipulative and storage area adjacent to the area intended for the construction of the vertical quay.

The Port area is of a very specific shape, with several natural obstacles that restrict Port activities. The Port of Vukovar extends to a total of 38.53 ha, of which the land part occupies 22.10 ha and the water part occupies 16.42 ha. Accordingly, it is evident that there is a lack of space to expand the Port. As shown in the Figure, the only remaining part of the Port in which it is possible to construct port structures and thus put into operation a space that is not currently operational is the area of Zone 1 and Zone 2 intended to accommodate the vertical quay and associated tracks of Zone 3 foreseen to locate port roads, storage and manipulative areas. The project for the construction of port roads, storage and manipulative areas within Zone 3 aims to provide a better and more reliable road connection between the two parts of the port and to increase the storage capacities, which are insufficient due to the structure of the goods in the Port. With the implementation of the construction project, an area of approximately 3 hectares is put into operation.



Figure 19: Planned expansion zones in Port of Vukovar

5.3.2.2 Desired state of intermodal affairs with intermodal cargo

Further development of the port requires the construction of a new multi-purpose terminal. The difference between multi-purpose terminals and general cargo terminals is very small and comes down to the layout of the terminals and the equipment used. Most multi-purpose terminals combine conventional bulk cargo with container and RoRo cargo. With the implementation of the construction project, an area of approximately 3 hectares is put into operation.

Due to fact of lack of space Pre-feasibility study for extension of port area has been done, where suitable solution for construction of new multi-purpose terminal was presented. According to Pre-Feasibility study estimated cost of investment is around 65 mil. euros. The investment consists of the purchase of land, supporting project and technical documentation required for the construction of the terminal, the costs of construction of port infrastructure and construction supervision, and the final works of equipping.

Furthermore, in accordance with Pre-feasibility study the construction of the multi-purpose terminal is identified as a long-term project with term for implementation of 18 years.

5.3.2.2.1 Objectives of intermodal transport development in the port of Vukovar

The Croatian accession to the EU has opened some new opportunities for the improvement of transport on inland waterways. Favourable geographical location of the Croatian inland waterways in the heart of Europe, and most cost-effective and safe transport compared to other types of transport, are the main strengths of this sector. However, the sector has a lot of weaknesses. There is a need for systematic work on the elimination of weaknesses and deficiencies within the sector, in terms of improvement of the organisation, fleet modernisation, education, construction of infrastructure (waterways and ports), maintenance and safety of navigation (full operation of the RIS system), as well as improved cooperation with the neighbouring countries. Croatian inland waterways are specific in that most of the waterways are rivers which follow Croatia's borders. In consequence, the riverbed regulation projects have to be coordinated with neighbouring countries.

The main priorities regarding the inland waterways sector will be focussed on:

- Establishing and maintaining conditions for safe and reliable inland navigation, especially to maintain international waterways according to the required international navigational class standard,
- Developing and modernizing international inland ports according to international standards in order to satisfy the existing and expected transport demand,
- Increase the sustainability of the system by performing a reorganization of the sector, improving the efficiency of the maintenance, reducing the

environmental impact and implementing measures to increase the safety and the interoperability of the system,

- Improve the accessibility of the ports and their connections to other transport modes to facilitate the development of multi-modal transport.

5.3.2.2.2 Internal and external factors for initiation / increase of container transport in port of Vukovar.

The increase in the share of inland waterways transport can be achieved if this sector is integrated into the intermodal transport network. It is necessary to establish an intermodal transport network, especially on the Adriatic-Danube axis, and to join maritime and inland transport.

The main requirements for establishing an intermodal network are:

- Improvement of the connections of inland ports to the road and railway network,
- Development of the Sava waterway
- Upgrading, construction and extension of railway lines
- Construction of cargo storage facilities
- Establishment of a comprehensive Information and Communication Technology system (ICT) for intermodal transport

5.3.2.2.3 Physical needs in terms of:

a. Space

The proposed location is located on the site of the current factory Borovo d.d. and occupies an area of approximately 18 hectares.

b. Infrastructure

The port is divided into a coastal zone and a coastal zone separated by a main port traffic corridor. The corridor consists of a road, rail and pedestrian-bicycle corridor. In the coastal zone, goods are transhipped and stored, while in the coastal zone, administration and workers' standard buildings, a gas station, vehicle service, a motel and a parking lot are located. The dominant transshipment routes are vessel-warehouse-vehicle, and vehicle-warehouse-vessel, which is why transshipment points are planned on the side of the main traffic corridor along with all warehouses. It is possible to carry out direct transshipment of vessel-vehicle and vehicle-vessel for which a coastal track and road are provided in the coastal zone.

The port consists of four connections for which continuous operation during the year of approximately 265 working days in one to two shifts is envisaged. Only for the transshipment of fertilizers is it expected that the majority of the total quantity is transhipped during the summer months. The total length of the coast is approximately 1,000 m and is performed as a type of sloping shore (600 m) and as a type of vertical shore (400 m) which allows a larger number of transshipment days (during low summer

water levels). The vertical shore includes berths for fertilizer and general cargo. The total area of the port is 20 ha.

c. Facilities

Foreseen warehouses type

Cargo type	Warehouse type	Capacity
Coal	Open warehouse	Area 1,3 ha
Fertilizer	Warehouse bunker with conveyors	Volume 40.000 m ³
Basic agricultural products - small quantities, construction materials, heavy loads, iron / pig iron, steel, iron and steel plates, wood and wood products, containers	closed warehouse	area 3.250 m ²
	covered storage (canopy)	area 3.250 m ²
	open warehouse (parcel load)	area 4.800 m ²
	open storage (containers)	area 3.500 m ²
Ro-ro loads	open storage (parking)	area 8,500 m ²
Liquid cargo	two tanks	volume 4,000 m ³

d. Equipment

Cargo type	Type of equipment
Coal	-1 x narrow-gauge crane 16 / 25t (unloading) - boarding with a narrow portal crane, and possibly a fertilizer loader
Fertilizer	-3 x boarder every 160 t / h (boarding) -to unload an adjacent narrow-portal crane
Basic agricultural products - small quantities, construction materials, heavy loads, iron / pig iron, steel, iron and steel plates, wood and wood products, containers	1 x wide portal crane 45t (unloading - loading)
RO-RO	RO-RO ramp for loading and unloading is planned

e. Operators

The provision of port services at the multi-purpose terminal is provided by port operators through concessions. The Port Authority is conducting a public tender for the provision of port services at the multi-terminal terminal.

f. Hinterland connections

The planned location of the multipurpose terminal has the possibility of direct connection to the existing railway and road network.

5.3.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Vukovar			X			X			<ul style="list-style-type: none"> - safe and reliable inland navigation - Developing and modernizing international inland ports - Increase the sustainability of the system - Improve the accessibility of the ports and their connections to other transport modes

Table 26: Existing transport and potential – port of Vukovar

6 Multimodal / Intermodal market perspectives in Serbia (PGA)

6.1 Macroeconomic overview of the country

According to the yearly review of the Statistical office of the Republic of Serbia, the average GDP growth for the period 2013 – 2019 is 38.31% at the country level. The highest GDP growth is shown by the Region Belgrade with 45.93%, while the lowest growth is shown by the Region Šumadija and Western Serbia with 34.03%.

Regarding the population, it is observed that the total population shows a decrease of 3.04% at the country level. The highest decrease is shown by the Region Southern and Eastern Serbia with 5.77%, while for Region Belgrade it is noticed a growth with 1.47% of the total population, due to the migration from other regions.

The overall GVA growth for the period 2013 – 2019 is 28.49 % at the country level. The highest GVA growth is shown by Construction with 149.22 %, while the negative growth is shown by Mining and Quarrying with -7.05 %.

Regarding imports, the highest growth of 175.50% is observed for commodities like coin (other than gold), gold (excluding gold ores and concentrates) and unclassified goods. These products are followed by beverages and tobaccos, as well as crude materials, inedible, except fuels both with the growth of above 120%.

For exports it is noticed a decrease of almost 22% for crude materials, excluding fuel, and the highest increase of around 100% for chemicals and related products.

Year	Value (Million RSD)	Year-on-year increase / decrease (%)
2017	4.760.686	5,13 %
2018	5.072.932	6,56 %
2019	5.417.725	6,80 %
2020	5.502.216	-0,9 %

Table 27: GDP development in Serbia

6.2 Macroeconomic forecast and container transport forecast

International Monetary Fund's projections of the growth rate of real gross domestic product given in below table were made in October 2020.

Year	Value	Year-on-year increase / decrease (%)
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2021		5,48
2022		6,03
2023		4,51
2024		4,03

Table 28: GDP development in Serbia - forecast

Container market demand in Serbia currently has a volume of 30-50.000 TEUs on the yearly basis. Out of this number, 70% is transported through North Adriatic ports (Koper, Rijeka), and the rest through the port of Bar in the South Adriatic, Aegean ports in Piraeus and Thessaloniki, and very some small number through Black Sea and North Sea ports.

With the intensive industrial development of the Republic of Serbia demand for the container transport could be multiplied in next 10 years.

Even though the factors determining port selection are numerous, efficient hinterland connections and shorter transit times for railway and road delivery are the main reasons for such volume split. Container transport via inland waterways still can't be provided through reliable and efficient liner service, due to the unstable navigable conditions on certain sections of the river Danube.

However, in previous 15 years there were several attempts to establish reliable container line on the Danube, but none of these were successful on the long run. For the same reason it is not possible to make the forecast of potential container transport on inland waterways.

6.3 Port of Bogojevo

The port of Bogojevo is located on the left bank of the Danube from km 1366,73 to km 1367,42.

The port covers surface of approximately 9ha. Port of Bogojevo is an open-type port with maximum available draft maintained at 4 meters Total quay length is 210m, out of which vertical quay is approximately 90m. Two vessels can be simultaneously accommodated and serviced. Anchorage has the capacity to accommodate 6 vessels.

There is already a built infrastructure in the port, which ensures the functioning of port activities. On the filled plateau behind the operational shore, a grain silo of 30,000 tons, a dryer, 10.000m² of covered storage space and open warehouses, a truck scale weighing system, an administrative building and gates were built. The face of the operational shore towards the open flow is represented by a vertical quay construction on piles 89 m long, while the operational shore is about 12 m wide at an approximate elevation of 86.56 m above sea level. A gantry crane is used for cargo handling, while the grain is loaded from the silo with a belt conveyor. The main types of cargo handled in port are grains, chemical fertilizers, gravels and sand.

West Bačka District is very important part of Vojvodina in terms of agricultural production. Further economic development and increase of agricultural and industrial production in this region are base for growth of transport demand.

There is available space for the expansion of the port which has been foreseen in the Strategy for the development of waterborne transportation of the Republic of Serbia.

6.3.1.1 Cargo volume statistics

According to the PGA data record, following commodities were transhipped in Port of Bogojevo in previous 5 years.

Commodity / Year	Historical data				
	2016	2017	2018	2019	2020
Cereals	279 744	210 846	247 809	290 458	292 179
Fertilizers				17 820	33 019
Sand and gravel	107 932	130 428			86 735
Oilseeds				55 163	50 739
Bulk cargo	5 713	1 027	7979	1 816	24 011
Metallurgical products					394

Table 29: Commodity structure by year (Port of Bogojevo)

6.3.2 Potentials for container transshipment

6.3.2.1 Current state of affairs with intermodal cargo

As described in previous chapter, there are no intermodal facilities in Port of Bogojevo, thus there is no record of multimodal transport in the port.

There are plans for connection of the port to the railway network and expansion of the port has been foreseen.

Container traffic history

n/a

Container transport today

n/a

6.3.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

This port is located at a distance of 4 km from the village of Bogojevo and 34 km downstream from the town of Apatin. The location of the port in Bogojevo has an extremely favourable position, both in relation to the settlement of Bogojevo and business entities in the West Bačka District (City of Sombor and the municipalities of Apatin, Odžaci and Kula), and in relation to the wider area and Mali Idoš in the North Bačka District, as well as the Municipality of Vrbas in the South Bačka District)

Short distance export/import exchange with some neighbouring countries like Croatia and Bosnia are predominantly done by road and rarely by rail and will probably remain that way because there is no economical ground for river transportation for this short distance routes.

6.3.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

The main types of cargo handled in ports of Vojvodina region are grains and chemical fertilizers. Even though grains are usually transported in large quantities in bulk, market globalisation and container transportation development created possibilities for trading with smaller quantities. With the proper equipment grain can be suitable for containerisation. Fertilisers also can be packed in different type of bags and on pallets and suitable for containerisation.

Smaller shipments originating from other industries (food/drinks production, textile industry etc.) from the hinterland of the port, which are now being transported by road to some Adriatic ports could be interested in modal shift if there is proper liner service.

6.3.2.2 Desired state of intermodal affairs with intermodal cargo

Strategy of waterborne transport development in the Republic of Serbia 2015-2025 has foreseen expansion of the ports where possible and development of multimodality of ports. In line with cargo types destinating/originating to/from the port hinterland, multipurpose terminal enabled for operations with containers will be included in port planning documents and further development of technical documentation for port expansion.

6.3.2.2.1 Objectives of intermodal transport development in the port of Bogojevo

As already mentioned, grains are usually transported in large quantities in bulk, but in line with market globalisation and container transportation development there are possibilities for trading with smaller quantities. With the proper equipment grain can be suitable for containerisation. Fertilisers also can be packed in different type of bags and on pallets and suitable for containerisation. Making conditions for the transshipment of multimodal units in port of Bogojevo could attract new, non-traditional cargo to IWT.

6.3.2.2.2 Internal and external factors for initiation / increase of container transport in port Bogojevo.

For the development of the new multipurpose terminal in the function of the container transport, technical documentation has to be finalised and financing of the infrastructure construction works have to be secured. Superstructure development will be responsibility of the future operator/concessionaire.

6.3.2.2.3 Physical needs in terms of:

a. Space

Physical needs in terms of space, infrastructure, facilities, equipment, hinterland connections Etc. will be defined through the development of corresponding studies and technical documentation.

6.3.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Bogojevo				X				X	<ul style="list-style-type: none"> - connection of the port to the railway network - expansion of the port - proper equipment for bagging and containerization of grains - new multipurpose terminal

Table 30: Existing transport and potential – Bogojevo

6.4 Port of Bačka Palanka

The port of Bačka Palanka is located on the left bank of the Danube River, km 1295 in the agrarian area of South Bačka. It is basin type port, with a water area of 5.2 ha and a minimum depth of 3.5 m at a low navigation level.

The port covers surface of approximately 74 ha. Port of Bačka Palanka –is port with maximum available draft maintained at 4 meters Total quay length is 322m, all of which is vertical quay. Three vessels can be simultaneously accommodated and serviced. Anchorage has the capacity to accommodate 12 vessels.

The port uses a portal crane, a port mobile crane, a floating crane and a port tugboat to provide port transshipment services. The port provides transshipment services for all types of bulk and general cargo: cereals, mineral fertilizers, scrap iron, gravel, wood and other cargo, in bulk, in bags, jumbo bags, reels, crates, barrels, on pallets and more.

Storage facilities consists in 8,260 m² of open spaces and 650 m² closed spaces. The types of cargo handled in the port are bulk commodities including construction materials, metallurgy products, heavy loads and general cargo.

The Agroport Center which belongs to Port of Bačka Palanka also houses storage capacities for receiving and storing 50,000 tons of mineral fertilizers and 30,000 tons for packaged goods, as well as 30,000 tons of storage capacity for mercantile goods. The centre has a line for packing mineral fertilizers with a daily packing capacity of 450 tons and a line for packing in a "big bag" with a daily capacity of 500 tons. The daily shipping capacity of packaged mineral fertilizer is 2000 tons.

6.4.1.1 Cargo volume statistics

According to the PGA data record, following commodities were transhipped in Port of Bačka Palanka in previous 5 years.

Commodity / Year	Historical data				
	2016	2017	2018	2019	2020
Cereals	228.536	210.172	120.798	178.188	292.113
General cargo	462	3.241	3.170	1.373	1.756
Bulk cargo	57.299	64.417	54.673	9.365	10.467
Sand and gravel	40.241				
Oilseeds				70.960	82.781
Fertilisers				89.065	86.199
Metallurgical products				449	

Table 31: Commodity structure by year (Port of Bačka Palanka)

6.4.2 Potentials for container transshipment

6.4.2.1 Current state of affairs with intermodal cargo

As described in previous chapter, there are no intermodal facilities in Port of Bogojevo, thus there is no record of multimodal transport in the port.

There are plans for connection of the port to the railway network and expansion of the port has been foreseen.

Container traffic in history and today

There is no container traffic history in the port of Bačka Palanka

6.4.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

The port is 30 km away from the E70 highway, direction Belgrade-Zagreb, and 45 km from the E75 highway, direction Belgrade-Budapest. The port is not connected to the national railway network but is far away about 5 km from the regional railway Bačka Palanka – Gajdobra that is connected with the Belgrade-Subotica railway and further with the Budapest.

There are two state roads near the Port of Bačka Palanka of Ib class which extend to the borders of Bosnia and Herzegovina and Romania.

Also, one road of IIa class, row number 108 is connecting Port of Bačka Palanka with Croatia: - Bačka Topola - Kula - Despotovo - Silbas - Gajdobra - Bačka Palanka - state border with Croatia (border crossing Bačka Palanka).

The existing crossing of road/railway infrastructure (bridge) with the corridor of the waterway E80 - Danube near Port of Bačka Palanka is the crossing Bačka Palanka - Ilok which is defined at km 1297.

Bačka Palanka is in the immediate vicinity of the City of Novi Sad. The Port Operator of the port in Novi Sad has already started the preparations for the construction works of upgrading the port infrastructure and port facilities. These works are including the construction of the container terminal in the Port of Novi Sad. Relatively short distance of two ports could be disadvantage and the business risk for the smaller port (Bačka Palanka)

6.4.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

Same as with port in Bogojevo and other ports in Vojvodina region, the main types of cargo handled in these ports' grains and chemical fertilizers. Even though grains are usually transported in large quantities in bulk, market globalisation and container transportation development created possibilities for trading with smaller quantities. With the proper equipment grain can be suitable for containerisation. Fertilisers also can be packed in different type of bags and on pallets and suitable for containerisation.

Smaller shipments originating from other industries (food/drinks production, textile industry, furniture industry etc.) from the hinterland of the port, which are now being

transported by road to some Adriatic ports could be interested in modal shift if there is proper liner service.

6.4.2.2 Desired state of intermodal affairs with intermodal cargo

Similarly, as in case of the port of Bogojevo, base for the development of multimodality lies in the Strategy of waterborne transport development in the Republic of Serbia 2015-2025. Also, cargo types destinating/originating to/from the port hinterland are grain and fertilizers, suitable for containerization partially. Immediate vicinity of the Novi Sad, province capital, and overlapping with the hinterland of the port of Novi Sad could generate more cargo for containerization. Therefore, multipurpose terminal enabled for operations with containers will be included in port planning documents and further development of technical documentation for port expansion.

6.4.2.2.1 Objectives of intermodal transport development in the port Bačka Palanka

As already mentioned, grains are usually transported in large quantities in bulk, but in line with market globalisation and container transportation development there are possibilities for trading with smaller quantities. With the proper equipment grain can be suitable for containerisation. Fertilisers also can be packed in different type of bags and on pallets and suitable for containerisation. Making conditions for the transshipment of multimodal units in port of Bačka Palanka could stimulate alternation for the relatively close port of Novi Sad and attract new, non-traditional cargo to IWT.

6.4.2.2.2 Internal and external factors for initiation / increase of container transport in port Bačka Palanka.

6.4.2.2.3 Physical needs

Physical needs in terms of space, infrastructure, facilities, equipment, hinterland connections Etc. will be defined through the development of corresponding studies and technical documentation.

6.4.2.3 Existing transport and potential – overview

Port	Existing container transshipment	Potentials (for new or additional container flows)	Desired state and objectives (container transshipment development)

	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Bačka Palanka				X				X	<ul style="list-style-type: none"> - connection of the port to the railway network - expansion of the port - proper equipment for bagging and containerization of grains - new multipurpose terminal

Table 32: Existing transport and potential – Bačka Palanka

6.5 Port of Prahovo

The port of Prahovo is located on the km 861, right bank of the Danube.

The port covers surface of approximately 6,7 ha. Port of Prahovo – is an open type port with maximum available draft maintained at 4 meters Total quay length is 560m, out of which vertical quay is approximately 320m. Six vessels can be simultaneously accommodated and serviced. Anchorage has the capacity to accommodate 60 vessels.

Storage facilities consists of 8000 m² of open spaces. Port of Prahovo has the following facilities and devices: conveyor belt, pneumatic equipment and 6 gantry cranes of 40 tons lifting capacity per each. Of storage facilities there are open storage area, covered storage area and customs warehouse.

6.5.1.1 Cargo volume statistics

According to the PGA data record, following commodities were transhipped in Port of Prahovo in previous 5 years

Commodity / Year	Historical data				
	2016	2017	2018	2019	2020
General cargo	164.664	149.815	274.569	209.616	199.435
Cereals	9.818	5.989	8.096	1.020	11.075
Bulk cargo	368.818	562.728	686.839	729.390	791.124
Coal	10.883	13.785	11.555	7.951	8.959
Fertilisers				34.740	4.755
Waste materials	2.771	1.701	7.355		

Sand and gravel	33.010	64.998	53.096	71.442	92.219
Oilseeds					1.999
Metallurgical products				44.190	83.710

Table 33: Commodity structure by year (Port of Prahovo)

6.5.2 Potentials for container transshipment

6.5.2.1 Current state of affairs with intermodal cargo

As described in previous chapter, there are no intermodal facilities in Port of Prahovo, thus there is no record of multimodal transport in the port. However, with the bridge crane of 40t lifting capacity, waterside operations with containers are possible but only for direct transshipment vessel -railway car/truck, or vice versa.

There are plans for reconstruction of the port and expansion of the port area.

Container traffic history

N/A

Container transport today

6.5.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

Prahovo is the only port open for international traffic on the long stretch of the river Danube, between Smederevo and border with Bulgaria. Also, it represents the closest exit to the Rhine-Danube corridor for the eastern, southern and part of the central Serbia. Especially for the cities with developed industrial and free zones, such as Niš, Pirot, Kruševac, Majdanpek and Bor.

The 971 m long industrial and railway track is connecting the port with the national railway network. Port of Prahovo has a connection with two railway sections: Crveni Krst-Zaječar-Prahovo pristanište section and Bor teretna-Prahovo pristanište section. Crveni Krst-Zaječar-Prahovo pristanište section connects port with Bulgaria, while Bor teretna-Prahovo pristanište section connects port with Belgrade and further with Hungary.

State road of class IIb No. 400 connects Port of Prahovo with the State Road 35 - Dušanovac - Border with Romania near Kusjak.

6.5.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

There are no other ports with container terminals, or rail-road terminals in the vicinity.

6.5.2.1.3 Development potential

There is potential to develop intermodal (container) transport in the port of Prahovo, not only because of above sad industrial areas in the port hinterland, but also because of the Government plans to develop new industrial zone in the immediate vicinity of the port of Prahovo. Industrial Park will cover large area next to the existing chemical production plant and is planned to maximise the benefits of closeness to the Rhine Danube corridor.

6.5.2.2 Desired state of intermodal affairs with intermodal cargo

Similarly, as in case of other two ports, base for the development of multimodality lies in the Strategy of waterborne transport development in the Republic of Serbia 2015-2025. Even though most of the current cargo is in bulk, position and hinterland links of the port are enabling attraction of other transiting goods and those originating from industrial zones. Even now, waterside container operations are possible (crane with lifting capacity 40t) but only in direct transshipment since port has lack of yard equipment and storage area. Therefore, multipurpose terminal enabled for operations with containers, or even container terminal will be included in port planning documents and further development of technical documentation for port expansion.

6.5.2.2.1 Objectives of intermodal transport development in the port of Prahovo

6.5.2.2.2 Internal and external factors for initiation / increase of container transport in port of Prahovo.

For the development of the new multipurpose terminal, or even the container terminal, technical documentation has to be finalised and financing of the infrastructure construction works have to be secured. Superstructure development will be responsibility of the future operator/concessionaire.

Certainly, Government strategic position to develop chemical park in the industrial zone in the direct hinterland of the port could be generator of goods suitable for containerization.

6.5.2.2.3 Physical needs

Physical needs in terms of space, infrastructure, facilities, equipment, hinterland connections Etc. will be defined through the development of corresponding studies and technical documentation.

6.5.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Prahovo				X				X	<ul style="list-style-type: none"> - new intermodal (container) terminal connected to industrial zone and chemical park planned in the vicinity - construction of superstructure

Table 34: Existing transport and potential – Prahovo

7 Multimodal / Intermodal market perspectives in Bulgaria (BRCCI)

7.1 Macroeconomic overview of the country

Year	Value	Year-on-year increase / decrease (%)
2017	52.5	3
2018	56.2	2.8
2019	61.6	2.7
2020	61.3	-4.4

Table 35: GDP development in GDP development in Bulgaria²³

The Gross Domestic Product for Bulgaria, shown in the table, is calculated based on current prices and converted to euro for the purposes of easier comparison with other countries.

There is a general trend for GDP increase, which was approximately 3% in the last few years (2017-2019), which was fueled by the well-developed economy and increased consumption. However, the pandemic in 2020 stifled that growth and decreased the GDP significantly, because many companies suspended their activity either temporarily or permanently. According to data from the Bulgarian National Statistical Institute, the GDP decrease in comparison to 2019 was approximately 4.4%.

Bulgaria's import and export both decreased in 2020 in comparison to 2019 (by 8.8% and 6.3% respectively).

7.2 Macroeconomic forecast and container transport forecast

For the period between 2022 and 2034, a realistic forecast for a real GDP growth was adopted, as it is forecasted in the Integrated Transport Strategy for the Period Until 2030:

- 1.5% annual growth in the 2022 – 2030 period
- 1.4% annual growth from 2031 to 2034

A 11.22% growth is expected in 2027 compared to 2018 and respectively – 22.95% growth in 2034 compared to 2018.

²³ Source: National Statistical Institute – Bulgaria and Bulgarian National Bank

Year	Value	Year-on-year increase / decrease (%)
2021	63.7	4%
2022	66.8	4.9%
2023	69.2	3.7%
2024	71.5	3.4%

Table 36: GDP development in Bulgaria - forecast²⁴

According to that forecast, published in the autumn of 2021, the real GDP growth is expected to reach 4% by the end of 2021. This is an increase from the forecast in the spring, the reason for which is the increased domestic demand in the first half of the year. The growth rates for the 2022-2024 period were also increased to 4.9%, 3.7% and 3.4% respectively.

The nominal GDP growth is expected to reach 8.1% and then slow down to 5.4% in 2024.

GDP growth will accelerate to 4.9% in 2022, driven by the investments with nearly 14% increase. Public consumption will also continue to contribute to GDP growth. As a result of the weaker growth of external demand, exports of goods will slow down compared to the previous year. The increase in services is expected to remain significant, in view of the continued intensification of tourism services.

A downward trend is also expected in the growth of imports of goods and services. The overall rate will remain higher than that of exports, as a result of which the contribution of net exports to GDP growth will remain negative.

In 2023 and 2024, economic growth will slow down to 3.7 and 3.4%, respectively. Household consumption will grow by just over 4%, supported by declining unemployment, steady income growth and credit. Exports will also have a lower contribution to GDP growth in both years due to the slowdown in external demand. In 2023, trade in services is expected to return to pre-crisis levels. The contribution of net exports to GDP growth will remain negative.

Bulgaria, with its strategic location, is used as a transport link between Europe and Asia and the country has huge potential for multimodal and intermodal transport. The intermodal terminals in the Danube region are few and are not working in the last years. The only operating dedicated intermodal terminals in Bulgaria are located in Southern Bulgaria. These are the intermodal terminals in Plovdiv and Stara Zagora.

²⁴ Source: Ministry of Finance of the Republic of Bulgaria and own calculations

The Integrated Transport Strategy for the period until 2030 underlines the main aspects for the development of the Bulgarian national transport system for the period until 2030.

The planned in the draft "National Plan for Development of Combined Transport in the Republic of Bulgaria until 2030" construction of 2 intermodal terminals in Ruse, equipped in accordance with the requirements for intermodal transport, will facilitate the overall development of transport and trade in the country.

In the Integrated Transport Strategy for the Period Until 2030. there are medium and long-term forecasts for the cargo turnover in the Bulgarian ports until 2050. The turnover by regions is aggregated by areas of planning and is presented in the following table.

TEU, forecast by planning regions	2014	2020	2027	2034	2044	2047	2050
BULGARIA	462,3	498,992	531,078	558,759	592,909	602,071	610,715
South-West Planning Region (SWPR)	173,555	193,079	211,989	229,645	253,358	260,093	266,657
South Central Planning Region (SCPR)	80,058	85,199	89,287	92,492	95,897	96,682	97,357
South-East Planning Region (SEPR)	63,016	68,475	73,204	77,244	82,106	83,395	84,608
North-East Planning Region (NWPR)	56,68	61,053	64,635	67,545	70,839	71,648	72,381
North Central Planning Region (NCPR)	45,883	47,722	48,777	49,276	49,404	49,364	49,275
North-West Planning Region (NWPR)	43,108	43,464	43,186	42,557	41,304	40,889	40,437

Table 37: Forecasts of container turnover by planning regions and time sections

The range of cargoes, which are transported in containers, is constantly increasing, since even products, such as dry bulk cargo and automobiles, are sometimes transported in containers.

For the 2025 forecast, it is generally accepted that the level of redirection from road to combined transport will be around the average for the 2030-2040 period. The results from that forecast for the goods, which will potentially be transferred from road to combined transport, when there are favorable conditions for that, are summarized in the next three tables.

Group of goods	Economic sector	Local	Import	Export	Transit
1	Food industry	0,8	348	359	94
6	Extraction and production of non-metallic and construction minerals	2,5	25	24	30
8	Chemical industry	0	148	115	385

9	Other industries	2	177	275	995
	Overall	5,3	698	773	1 494
Group of goods	Economic sector	Local	Import	Export	Transit
1	Food industry	0,8	348	359	94
6	Extraction and production of non-metallic and construction minerals	2,5	25	24	30
8	Chemical industry	0	148	115	385
9	Other industries	2	177	275	995
	Overall	5,3	698	773	1 494

Table 38: Forecast for 2025 for goods, which will potentially be transferred to combined transport, thousand tones

Group of goods	Economic sector	Local	Import	Export	Transit
1	Food industry	2	500	480	130
6	Extraction and production of non-metallic and construction minerals	4	41	38	47
8	Chemical industry	1	285	290	900
9	Other industries	4	350	500	1 700
	Overall	11	1 176	1 308	2 777

Table 39: Forecast for 2030 for goods, which will potentially be transferred to combined transport, thousand tones

Group of goods	Economic sector	Local	Import	Export	Transit
1	Food industry	5	1 050	975	265

6	Extraction and production of non-metallic and construction minerals	9	85	77	100
8	Chemical industry	1,5	575	585	1 830
9	Other industries	7,5	715	1 010	3 480
	Overall	23	2 425	2 647	5 675
Group of goods	Economic sector	Local	Import	Export	Transit
1	Food industry	5	1 050	975	265
6	Extraction and production of non-metallic and construction minerals	9	85	77	100
8	Chemical industry	1,5	575	585	1 830
9	Other industries	7,5	715	1 010	3 480
	Overall	23	2 425	2 647	5 675

Table 40: Forecast for 2040 for the goods, which will potentially be transferred to combined transport, thousand tonnes

The forecasts by types of goods were made under the assumption that transit cargo from Bulgarian ports to Bulgaria's neighboring countries will not increase.

The forecasts of packaged commodities, which can be transported in containers, are made based on the assumptions that the level of containerization, which is 48% in 2013, will become 60% in 2030 and will remain at that level until the end of the forecast period and the share of packaged commodities, which can be transported in containers, handled in seaports, is 33.5%.

The forecasts of the packaged commodities, which can be transported in containers, are shown in the table below.

	2009	2014	2020	2027	2034	2044	2047	2050
	422 887	453 587	497 884	496 163	532 276	548 819	551 342	553 865
Burgas	308 825	365 038	398 201	393 822	419 077	429 778	431 142	432 506

Varna	28 638	18 018	18 731	17 403	17 236	18 197	18 484	18 772
Ruse	21 238	16 435	19 254	20 652	23 818	24 051	23 921	23 790
Lom/ Vidin	781 588	853 078	934 069	928 040	992 407	1 020 845	1 024 889	1 028 934

Table 41: Forecasts for the packaged commodities, which can be transported in containers²⁵

7.3 Port of Ruse

Port of Ruse is a multimodal transport hub and provides a suitable connection between three modes of transport – waterway, rail and road transport.

The port is directly connected to the national rail and road network of Bulgaria.

Port terminal Ruse-East is part of a public transport port of national importance - Ruse. It is specialized in general and bulk cargo and Ro-Ro traffic handling. The terminal can also handle containers and provide mooring services, supply of electricity, water and communications to vessels, as well as ship handling. The total storage area of the terminal is 825 533 sq.m., where the open storage area is 190 500 sq.m. and covered storage area - 15 800 sq.m. Port terminal Ruse-East has connection with the national rail and road network of Bulgaria. The port also has 17 cranes with lifting capacity between 5 and 32 tons, but only 12 of these cranes are currently active.

7.3.1.1 Cargo volume statistics

The table below shows the different types of cargo handled in Port of Ruse for a 5-year period (2016-2020).

Commodity / Year	Historical data (thous t)				
	2016	2017	2018	2019	2020
Coal	214	277	249	122	136
Dry Bulk Cargo	480	645	445	341	340
Cereals and fodder	138	214	68	101	98

Table 42: Commodity structure by year (Port of Ruse)

²⁵ Source: Project “Drafting of a concept for the development of Bulgarian ports for public transport with national importance based on the expected freight throughput”, MTBS and INFRA CARE, 2014

The next table shows the general cargo handled in the Port of Ruse, by type:

Commodity / Year	Historical data (thous t)				
	2016	2017	2018	2019	2020
Coal	214	277	249	122	136
Dry Bulk Cargo	480	645	445	341	340
Cereals and fodder	138	214	68	101	98

Table 43: Types of general cargo

** The value in the brackets is the overall amount of handled machines and equipment, including those, which were handled by the ro-ro terminal*

The port of Ruse has not handled any containerized cargo for the 2018-2019 period.

7.3.2 Potentials for container transshipment

For Bulgaria and Romania, a rising coal demand is expected based on Oxford Economics forecasts. This result is similar to the findings about steel demand and iron ore transport in Eastern Europe.

The project "Construction of intermodal terminal in the North Central Planning Region in Bulgaria - Ruse" is based on the policy for the construction of the Trans-European Transport Network and aims to improve the modality in the southeastern region of the EU, by creating conditions for optimal interaction and integration the different modes of transport and improving quality of freight transport services.

The construction of the terminal is planned for implementation through PPP.

The terminal has the potential to service the exports from the regions of Ruse, Razgrad and Silistra to Turkey, Greece, western Romania, Russia, Ukraine and the countries of Central and Western Europe; if there is regular shuttle service to the terminals/ stations abroad, the terminal in Ruse could also attract export cargo for the same directions from the regions of Varna, Veliko Tarnovo, Dobrich, Lovech, Pleven, Targovishte and Shumen to be transported to Ruse by road transport. Also, the terminal has the potential to service the imports to the regions of Ruse, Razgrad and Silistra from Turkey, Greece, western Romania, Russia, Ukraine and the countries of Central and Western Europe; it is possible to attract imported commodities of the same areas for

the regions of Varna, Veliko Tarnovo, Dobrich, Lovech, Pleven, Targovishte and Shumen. The terminal has the potential to service domestic transport between the regions of Ruse, Razgrad and Silistra on the one hand, and Sofia, Plovdiv and Burgas on the other; the condition for attracting the cargo from road to rail transport is to create a regular shuttle line with reasonable frequency and competitive price for shipment.

	2020	2030	2040	2045
Tons	362928	441554	536780	597380
Domestic	38524	42226	47315	49045
Exports	199790	237566	281622	312115
Imports	124613	161762	207844	236219
TEU/full TEU	20981	27449	34488	39236
Domestic	2903	3181	3564	3691
Exports	12406	15685	18986	21416
Imports	5672	8583	11938	14129

Table 44: Container traffic (forecast) within the zone of influence of Ruse IMT²⁶

7.3.2.1 Current state of affairs with intermodal cargo

The main part of the complex - Port Terminal Ruse–East – is situated between km. 489,287 and km. 490,993 along the Danube. It is the largest Bulgarian port terminal on the Danube and the only one from the port complex in Ruse, which handles cargo. Among the offered port services are the loading and unloading of bulk cargo (dry and liquid), general and containerized cargo, mooring services; supply of electricity, water and communications to vessels; ship handling, warehousing services, as well as repairs.

Cargo handling capacity: 2 500 000 t/y.

Containerized cargo is handled in the port, but there is no specialized container terminal per se. It is expected that one will be built within the next few years, after the new concessionaire is determined, which is expected to happen before the end of 2021.

²⁶ Source: Report on the implementation of Stage 1 (Feasibility studies) of project "Construction of intermodal terminal in North Central Planning Region in Bulgaria - Ruse"

Container traffic history

The cargo turnover in the Bulgarian ports is based mainly on the import and export of cargo. While for the period until 2010 imports were higher than exports, in the period after 2012 things changed and exports in cargo surpassed imports.

The biggest trade exchange by water is with the Russian Federation, followed by Turkey, Romania and Ukraine. The amounts of handled cargo for other destinations are very small.

The main share of the cargo turnover in the Bulgarian ports belongs to liquid bulk cargo and it varies between 38% to 50%. The largest cargo turnovers were reached in 2008 and 2013, which is mainly due to the large export of grains.

The transportation of liquid cargo also has a major share in the growth of Bulgarian seaports – 32%, which is mainly processed in the ports at the sea. Despite the small decrease in 2009 -2011, there is constant growth.

Constant growth rate is also visible in the processing of containerized cargo as the cargo turnover for 2015 is 57.4%, higher than in 2007.

For the other types of cargo (general cargo), after the strong decrease in 2009 and 2010, there has been since a slight increase, but the level of the cargo turnover from 2007 has yet to be reached.

The biggest decrease can be seen in Ro-Ro cargo - over 4 times compared to 2007 and 2008. This is mainly due to the drastic reduction in Ro-Ro traffic through the river ports, especially in the region of Lom and Vidin, the reason for which is the opening of Danube Bridge 2 in Vidin and redirection of road traffic through it.

Port Ruse-East started operations in 1976. At first, the port handled only small-capacity containers (3–5-tons). Eight years later (1984) it started to also process large-capacity containers. The port specializes in providing transport services to the Eastern Industrial Zone of Ruse. It is situated at km 489–490 and can process-river-sea type of cargo vessels. The port has a hundred-ton floating crane, which allows it to handle heavy-lift and out-of-gauge cargo. Right next to the port is the city's Free Economic Zone. It is the best functioning one out of the six economic zones in the country. In addition to having components of the transport logistics, there are also a number of other manufacturing activities situated there. The Free Zone is connected to the transport terminals of Port Ruse-East.

In 2013 Port Ruse was included as part of the comprehensive transport network in the European Transport System (TEN-T). The connection to rail, also identified as a key logistics hub, proves the city's important role in Europe's passenger and cargo network.

Regular handling of trailers and containers started in 2015. The incoming and outgoing destinations were Germany (Cologne, Nuremberg), Romania (Curtici) and Serbia (Novi Sad). A new ro-ro line from Passau was also started. Ruse-East is the only river port terminal in the Bulgarian part of the Danube, which began to service intermodal transport lines regularly.

2017 was the last year, when intermodal units (containers and trailers) were transhipped through Port of Ruse (2082 TEU for the whole year, a significant decrease

compared to 2016 - 8028 TEU). Since 2018 there has been no container traffic passing through the Port of Ruse.

Container transport today

7.3.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

It is necessary to generate a new spatial model for the development of the port infrastructure in terms of valorisation of the transport and geographical position of the territory of Northeastern Bulgaria (where Port Ruse is located), which would be based on the following main characteristics:

- Using the comparative advantages of Northern Bulgaria's territory for the development of intermodal transport in the European Southeast. The perspective of realizing significant transport infrastructure projects on its territory should be subordinated to this strategic goal in the spatial development of the transport infrastructure. The realization of this goal directly corresponds to the goals and priorities defined in the strategy for the development of the EU transport system - Transport-2050.
- Using the fixed assets of the already built transport infrastructure on the territory and redefining its functions under the new socio-economic and geopolitical conditions. The localized transport infrastructure on the territory of Northeastern Bulgaria is significant in volume and has a very large technical and technological capacity. It is rational for it to be functionally included in the new transport strategy of the country and the EU.
- Using the territorial proximity of such natural transport routes like the Danube River and the Black Sea.

7.3.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

The main port in relative vicinity to Port of Ruse, which handles large volumes of containerized cargo, is Port of Constanta. Much of the container traffic transported on the Lower Danube passes through it (via the Danube–Black Sea Canal). Port of Constanta handles between 650 000 and 700 000 TEU of container traffic each year. It has the capacity to handle a cargo throughput of 1.5 million TEU/year.

7.3.2.1.3 Main reasons for success or failures of regular/significant container handling (volumes) in port of Ruse.

The reasons for the absence of container service, and respectively container traffic, via Port of Ruse are complex. They can be summarized as follows:

- Navigational issues

The liner service (and container service as well) requires keeping a strict sailing schedule. Same cannot be guaranteed in the Bulgarian-Romanian leg of the Danube due to seasonal fluctuations in the water level. The current dredging operations can be regarded as palliative measures while the focus should be shifted towards sustainable infrastructural solutions.

- Relatively weak hinterland potential

The liner container service needs a steady and balanced import and export cargo flow which, at least at this stage, cannot be provided by the hinterland economy behind Port of Ruse.

- Relatively short distance to major Black Sea container terminals (Constanta, Varna and Burgas).

Bearing in mind the limited containerized cargo potential of the hinterland it appears to be easier and more effective to deliver the containers to/from the sea port by road instead of using rail and barge shuttle service

7.3.2.1.4 Competitive (dis)advantages of other transport modes/routes in port

Advantages of the railway transport:

- The port has direct connection to the national railway network.
- The port can handle full block trains along the quay, as well as in the port area.
- There are two railway connections of Port of Ruse to the hinterland – one of them (Ruse-Gorna Oryahovitsa) is part of the core TEN-T network, while the other (Ruse-Kaspichan-Varna) is part of the comprehensive TEN-T network. Both connections are electrified, with a standard track gauge and a standard maximum axle load.

Disadvantages of the railway transport:

- the railway tracks within the region of the port are not in good operational condition and need to be modernized. Since the Ruse-Gorna Oryahovitsa rail line has been marked as a priority line by the National Railway Infrastructure Company for the 2019-2024 period, there are plans to renovate it by replacing the current rails with heavy transport rails UIC60 (60E1) and also replacing the railroad switches by implementing UIC60-type switches.
- The technical parameters of the railway network do not meet the requirements for a safe and comfortable transport.
- for safety reasons, cargo trains cannot go over 70 km/h

Advantages of the road transport:

- The port has direct connection with the republican road network
- Part of the road connections are in good condition
- The regional road network is generally well-developed and has high road density

Disadvantages of the road transport:

- Most road connections consist of second and third-class roads, which are rated by the Road Infrastructure Agency to be in average or bad condition

There is no motorway passing through the region (although one is expected to be built before 2027, connecting Ruse and Veliko Tarnovo

7.3.2.1.5 Development potential

Though the hinterland economy cannot be regarded as a sufficient containerized cargo source, the transit cargo could potentially lead to development of container service via Port of Ruse. In this case the target cargo should be from/to Western Europe and a shuttle rail service can be used for linking the Port of Ruse with Port of Varna-West or eventually BMF Port Burgas (port operator of terminals Burgas-East 2 and Burgas-West).

Another potential option for development of Port of Ruse in terms of container handling could be as a mid-range „dry port“ of Port of Varna-West or eventually of BMF Port Burgas.

That's because Port of Ruse is simultaneously close enough to and faraway enough from those sea ports and it has much more than the facilities needed for a dry port. The dry port development itself may have a positive effect on the local economy in the region of Ruse by reducing the inland part of the freight rates and by providing faster container positioning to the exporters. It is worth mentioning that a very detailed scientific research on the cargo flow, differentiated by container types and considering the seasonal volume fluctuations, should precede any investment in a dry port. On the other hand, the dry port concept could be tested without any investment in the existing Port of Ruse terminals where all necessary facilities are available.

7.3.2.2 Desired state of intermodal affairs with intermodal cargo

The recently developed project „ National plan for the development of the combined transport in the Republic of Bulgaria until 2030“ recommends „development of the network of terminals that meet the modern requirements of cargo and transport services “.

Intermodal terminal in Ruse

The construction of an Intermodal terminal in Ruse is marked as most necessary. According to Regulation (EU) 1315/2013, as part of the Rhine-Danube transport corridor in the EU, Ruse is defined as an intermodal node (railway and road connections, as well as an IWT port) in the core Trans-European network for intermodal transport.

The „Construction of an intermodal terminal in the North Central planning region of Bulgaria - Ruse“ project aims to improve intermodality in the Southeast region of the EU by creating conditions for the integration of the various types of transport and improving the quality of the delivered cargo transportation services.

According to the preliminary studies drafted in 2015 and subsequently approved, the future terminal will be built on land, owned by National Company Railway Infrastructure, where the former railway station at Ruse-East used to be. The planned length of the terminal would be 992 m., the width - 128 m. The railway infrastructure would consist of 3 railway tracks with minimum useful length of 750 m. The terminal will be serviced by a single-track railway with a useful length of 520 m., which would be designed to accept a block train of 26 wagons. The maximum capacity of the facility will be 115,200 20-foot containers (TEU) and the envisaged investment value is BGN 42.7 million.

The perspective transport functions of the Ruse transport node will be determined, first of all, by its possibilities for servicing the intermodal cargo flows along the route of the VII Pan-European transport corridor (Danube waterway) from Western and Central Europe through the Black Sea basin (Varna and Sulina) to the post-Soviet space (Russia, Ukraine, Georgia, Moldova, Azerbaijan, Armenia), Central and East Asia. Many of the infrastructural elements of the Ruse Transport and Logistics Center are significantly developed: the free economic zone, port "Ruse-East", etc.

In order to achieve certain positive regional effects for the territory of Northeast Bulgaria when developing the transport infrastructure in perspective, it is rational to separate the port infrastructure from the transport activities related to servicing the logistics of the intermodal transportation in the eastern direction of the Ruse transport node. This could be achieved through the infrastructural development of the ports in Silistra and Tutrakan. The maximum territorial distance of the Silistra transport hub from the one in Ruse is 120 km. On a European scale, this does not change the functions and parameters of the transport relations. At the same time, this approach could lead to positive regional, local and territorial structural effects. Through the infrastructure development of the Silistra transport node and the Tutrakan transport center, alternative transport routes can be created for the development of intermodal cargo transportation in the Danube-Black Sea relation towards the Varna and Burgas transport nodes.

7.3.2.2.1 Objectives of intermodal transport development in the port of Ruse

There is no publicly available information such as, for example, a General Plan for Development of Port Ruse-East, or any other document regarding the plans and intentions of the port operator in terms of the development of intermodal transport in the port.

BRCCI has also not received any feedback from Port Complex Ruse J.S.Co. (the port operator) regarding its plans for future container cargo development.

7.3.2.2.2 Internal and external factors for initiation / increase of container transport in port of Ruse.

Investments in modern container handling facilities could trigger the deviation of transit cargoes via Port of Ruse. Though such investments are not so significant and could be realized in a relatively short period of time same should be preceded by a sustainable infrastructural solution regarding the hindrances to navigation in the Bulgarian-Romanian leg of the Danube.

7.3.2.2.3 Physical needs in terms of:

a. **Space**

Port terminal Ruse-East already has a big surface area (825 533 m²) and a quay length of 1618 m. The port has big potential for future development in terms of construction of new terminals, quays and storage areas.

b. **Infrastructure**

The port has 14 ship berths (2 of them are in the ro-ro terminal) with a total length of 1490 m. There are also dedicated road and rail weighbridges. There are 6 rail sidings for loading and unloading of cargo with a total length of 2354 m. There are also 8 road lanes used for loading/unloading as well.

c. **Facilities**

Port terminal Ruse-East has both covered warehouses (15 800 m²) and an open storage area (190 500 m²). There is one conventional cargo terminal, as well as a specialized ro-ro terminal, which has two parking areas with a capacity of 160 TIR. There is also an administrative building, a Customs house, as well as a workshop for maintenance and small repairs of handling equipment.

d. **Equipment**

The port terminal in Ruse already has the necessary equipment and machinery for the transshipment of intermodal units. There is waterside handling equipment, which consists of 12 portal cranes for loading and unloading activities, with a total lifting capacity of 1440 tons. There are also two rail-mounted gantry cranes, each of them having 20 tons of lifting capacity and being able to lift 120 tons of cargo per hour. In additions to the gantry cranes, the other landside cargo handling equipment includes 5 reach stackers (with a lifting capacity from 10 to 45 tons) and 5 forklifts (each having a 5-ton lifting capacity).

e. **Operators**

Port terminal Ruse-East is managed by the state-owned port operator Port Complex Ruse J.S.Co.

f. **Hinterland connections**

In terms of railway connectivity of Port Ruse-East to the hinterland, the two most important lines are Ruse-Gorna Oryahovitsa and Ruse-Varna. Both tracks are electrified, with a standard track gauge (1435 mm) and a standard maximum axle load - 22.5 tonnes.

In terms of road connectivity, the port has several first-class, second-class, as well as third-class roads, which connect both the port and the city in general with the rest of the country via the national road network.

g. Other

This is the currently available infrastructure, facilities, equipment etc. in Port of Ruse. There is no publicly available information about the future physical needs of the port in order to develop and increase its intermodal transport. The port operator has also not presented any data in that regard.

7.3.2.3 Existing transport and potential – overview

Port Ruse has a cargo handling capacity of 2.5 mln. t/year. The port also has the ability to handle containerized cargo, estimated to be 50 thousand TEU/year (although there is currently no specialized container terminal at the port). This capacity is conditional and depends on working hours, technology used, mode of transport, weather characteristics, etc.

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Ruse			X					X	<ul style="list-style-type: none"> - construction of an Intermodal terminal - separation of the port infrastructure from the transport activities related to servicing the logistics

Table 45: Existing transport and potential – Ruse

8 Multimodal / Intermodal market perspectives in Romania (AAOPFR, MPAC)

8.1 Macroeconomic overview of the country

GDP – Gross Domestic Product

Data has been considered from the DT1.2.1 report, as follows. Data at NUTS 2 level have been collected from the National Statistics Institute. In the following the data is presented for each category of socio-economic data. The available data set is for the period 2014 – 2018, in mln. Lei, as follows:

Region – NUTS2	2014	2015	2016	2017	2018
Regiunea NORD-VEST	76764	81499	89715	104849	114694
Regiunea CENTRU	73595	78612	86291	96984	108370
Regiunea NORD-EST	67834	71578	76990	88848	98763
Regiunea SUD-EST	75735	76254	79824	87914	97757
Regiunea SUD-MUNTENIA	87397	86728	93599	100918	112179
Regiunea BUCURESTI - ILFOV	177422	196988	207390	232876	256596
Regiunea SUD-VEST OLTENIA	48785	52215	55300	63928	73300
Regiunea VEST	61699	67486	74012	80895	89327
Total	669232	711360	763120	857212	950986

Table 46: GDP evolution by region in Romania, 2014 - 2018

The following data set is for the period 2019 – 2024, in billions of Lei, as follows:

Region – NUTS2	2019	2020	2021	2022	2023	2024
Regiunea NORD-VEST	128.8	126.6	135.8	146.1	157.7	169.9
Regiunea NORD-EST	111.3	109.3	117.9	127.6	138.5	150.0
Regiunea SUD-EST	108.8	105.8	114.5	124.2	135.0	146.5
Regiunea SUD-MUNTENIA	124.2	120.3	131.5	141.8	152.9	164.4
Regiunea SUD-VEST OLTENIA	81.3	79.7	86.4	93.4	101.2	109.2
Regiunea VEST	99.1	95.8	102.7	110.2	118.4	126.7
TOTAL	1059.8	1040.8	1116.8	1204.2	1301.6	1403.8

Region – NUTS2	2019	2020	2021	2022	2023	2024
Regiunea NORD-VEST	128.8	126.6	135.8	146.1	157.7	169.9
Regiunea NORD-EST	111.3	109.3	117.9	127.6	138.5	150.0
Regiunea SUD-EST	108.8	105.8	114.5	124.2	135.0	146.5
Regiunea SUD-MUNTENIA	124.2	120.3	131.5	141.8	152.9	164.4
Regiunea SUD-VEST OLTENIA	81.3	79.7	86.4	93.4	101.2	109.2
Regiunea VEST	99.1	95.8	102.7	110.2	118.4	126.7
TOTAL	1059.8	1040.8	1116.8	1204.2	1301.6	1403.8

Table 47.2: GDP evolution by region in Romania, 2019 – 2024

The table below shows the evolution of the GDP for the period 2014 – 2018.

Year	Value, million Lei	Year-on-year increase / decrease (%)
2014	669232	100.00%
2015	711360	106.29%
2016	763120	107.28%
2017	857212	112.33%
2018	950986	110.94%

Table 48: GDP development in Romania (Lei)

It is observed that the highest growth in the analysed period is 12.33%.

Year	Value (bil. \$)	Year-on-year increase / decrease (%)
2017	211.7	7.3%
2018	241.46	4.5%
2019	249.7	4.1%
2020	248.72	-3.9%

Table 49: GDP development in Romania (USD)

8.2 Macroeconomic forecast and container transport forecast

Year	Value (billion Lei)	Year-on-year increase / decrease (%)
2020	1,055.5	-3.9
2021	1,190.3	7.0
2022	1,317.3	4.6
2023	1,440.1	5.3
2024	1,560.1	5.0
2025	1,678.6	4.5

Table 50: GDP development in Romania- forecast²⁷

The GDP forecasts shows quite a high rate of yearly increase, after the 2020 decrease due to the global pandemic conditions.

8.3 Port of Constanta

Constanța Port is the main Romanian port, being located at the intersection of the trade routes that connect the markets of the landlocked countries of Central and Eastern Europe with Transcaucasia, Central Asia and the Far East. Together with the two satellite ports, Midia Port, located 25 km north of Constanta, and Mangalia, Port located 38 km south, it forms a port complex, under the management of Compania Națională Administrația Porturilor Maritime S.A. Constanța (C.N. A.P.M.).

Port of Constanta is the largest EU port at the Black Sea. It is the only maritime Romanian port with container facilities. It has natural depths up to 19 m operational being able to accommodate the largest vessels that pass through the Bosphorus Strait. Regarding container facilities, PoC has two terminals – Constanta South Container Terminal and SOCEP, with a total capacity of 1.5 mil TEU. There currently 15 regular services connecting PoC with destinations in the Black Sea, Mediterranean Sea, Middle East and Far East.

Currently, almost half of the operational capacity is used – average of 600-700 TEU`s/year, the largest volumes - 1.4 mil TEU`s being registered in 2007. PoC was a hub for containers before the 2009 crisis. Even that part of its market was lost to Koper and

²⁷ GDP forecast is provided by the National Forecasting Commission - <https://cnp.ro/prognoze-macroeconomice/>

Hamburg once its connection will be improved PoC can regain its lost market segments.

The main competitive advantages that Constanta Port has are the following:

- It is the largest port in the Black Sea in terms of surface (approximately 4,000 hectares) and has the largest natural depths (8-19 m).
- It benefits from connections with all modes of transport: rail, road, river, providing the premises for the development of intermodal transport in the area.
- It provides facilities for the operation of all types of goods, including modern facilities for the operation of passenger ships.
- Since January 1, 2007, Constanta Port has become a Free Zone.

Total surface [ha]	North area of Constanta Port	South area of Constanta Port	Mangalia	Midia
Total surface [ha], of which:	817	3.109	189,6	823,9
Land [ha]	495	818	32,9	223,8
Water [ha]	322	2.291	156,7	600,1
No of berths	82	74	2	13
Maximum depth [m] - designed	14	19	10	10

Table 51: Brief presentation of the characteristics of the ports

8.3.1.1 Cargo volume statistics

Commodity / Year	Historical data				
	2016	2017	2018	2019	2020
Cereals	20.393.803	17.891.285	17.963.535	21.329.156	21.893.550
Oil and oil products	13.140.869	12.825.443	13.373.323	14.323.469	11.680.751
Fertilizers	2.927.072	3.094.332	3.007.574	4.024.682	4.420.218

Table 52: Commodity structure by year (Port of Constanta)

Total surface [ha]	North area of Constanța Port	South area of Constanța Port	Mangalia	Midia
Total surface [ha], of which:	817	3.109	189,6	823,9
Land [ha]	495	818	32,9	223,8
Water [ha]	322	2.291	156,7	600,1
No of berths	82	74	2	13
Maximum depth [m] - designed	14	19	10	10

Table 53: Brief presentation of the characteristics of the ports

The historical trends of traffic flows are shown in the table below, for the period 2011 – 2019 and by category of freight.

Type of goods/year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Live animals, sugar beet	22817	49245	64993	58690	61382	93299	97738	70934	96399
Different articles	6529296	6958497	6544679	6782263	6850355	6897358	6525662	6567347	6561433
Articles made of metal	1558	2833	7485	5124	429	3545	5263	8019	10900
Potatoes, other vegetables and fresh and frozen fruits	38062	20604	15171	11734	6488	5696	6913	7289	3227
Cellulose and paper waste	7639	25832	45684	63451	65189	78058	39089	28274	48801
Cereals	9534972	1,3E+07	1,5E+07	1,7E+07	2E+07	2E+07	1,8E+07	17963535	2,1E+07
Cement, lime, prefabricated materials for construction	328160	547769	349422	265413	140997	169874	165702	205712	363850
Solid mineral fuels	3151964	3504331	2890793	2157731	3207635	2226771	2830470	3770447	3834946
Equipment, machines, etc.	355904	369418	437955	365651	363638	356800	337910	535331	376115
Fertilizers (natural and chemical)	2015114	2153597	1763452	1742245	1842646	2927072	3094332	3007574	4024682
Wood and cork	941453	928522	1053601	919411	855578	557132	416751	314695	289549
Minerals, raw or processed	218748	318400	304694	316140	293295	334379	438273	448322	615906
Iron ores, scrap iron and	4731028	6888094	9676268	5501674	2750024	2594201	3924125	4521893	5189807

steel, furnace slag									
Ores and non-ferrous waste	2609918	2643509	2325828	2551646	3109993	3158060	3111182	3976068	3861530
Crude oil	5534289	5042697	5396525	6750866	6593434	7487357	7352164	7475408	8027409
Leather, textiles and clothing	64825	172811	398	0	0	0	553	3344	1608
Food and feed for animals	525758	497245	563137	416089	764390	796547	504549	167256	349544
Other chemical products	1484861	1029540	906680	1151105	525026	619988	559649	590365	537533
Chemicals derived from coal and tar	115487	131411	134144	72962	108478	102331	153372	167805	102722
Metallic products	2189071	1871458	1593497	1888533	2062785	2047544	2217403	2287151	2529108
Petroleum products	3600332	3999621	3820247	4714318	5165550	5653512	5473279	5897915	6296060
Oily seeds, oily fruits and fats	1932248	736300	1932875	2478251	1951341	2918535	3215811	3262034	2141252
Glass, glassware and ceramic products	38591	64588	48740	8066	2001	2959	17679	27056	11755
Total	4,6E+07	5,1E+07	5,5E+07	5,6E+07	5,6E+07	5,9E+07	5,8E+07	61303774	6,7E+07

Table 54: Freight traffic in Constanta Port by category of goods, in tonnes, 2011 - 2019²⁸

From the above table it is observed that in the last years, the main category of goods consists of cereals, with 32% of the total volume of goods.

Below are shown the historical trends for specific categories of goods (highest volume ones considered).

²⁸ Source: Port of Constanta, 2019

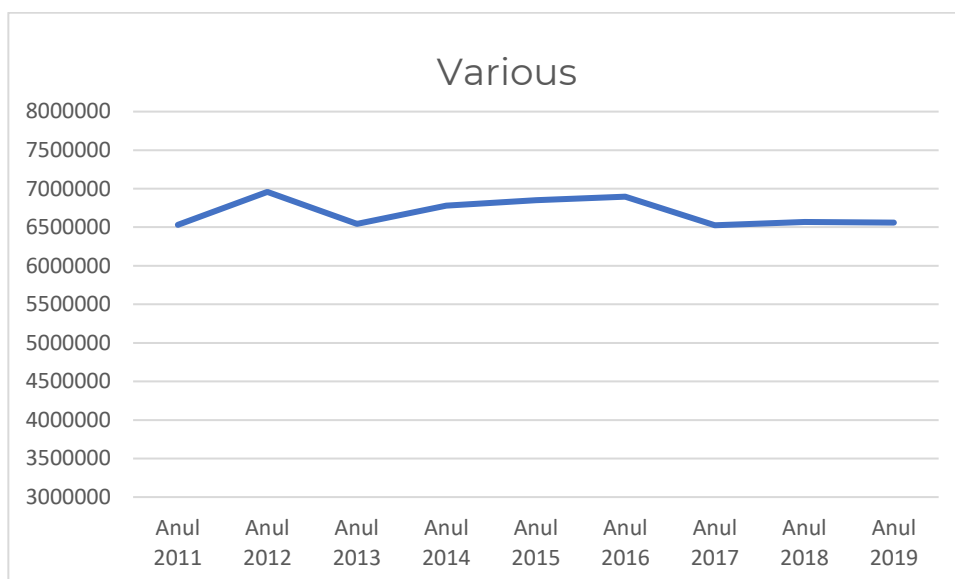


Figure 20: Historical trends miscellaneous articles, tonnes/year

It is observed that for miscellaneous articles it is a steady development, thus the total volumes remain quite constant between 6 and 7 mln tonnes per year for the analysed period.

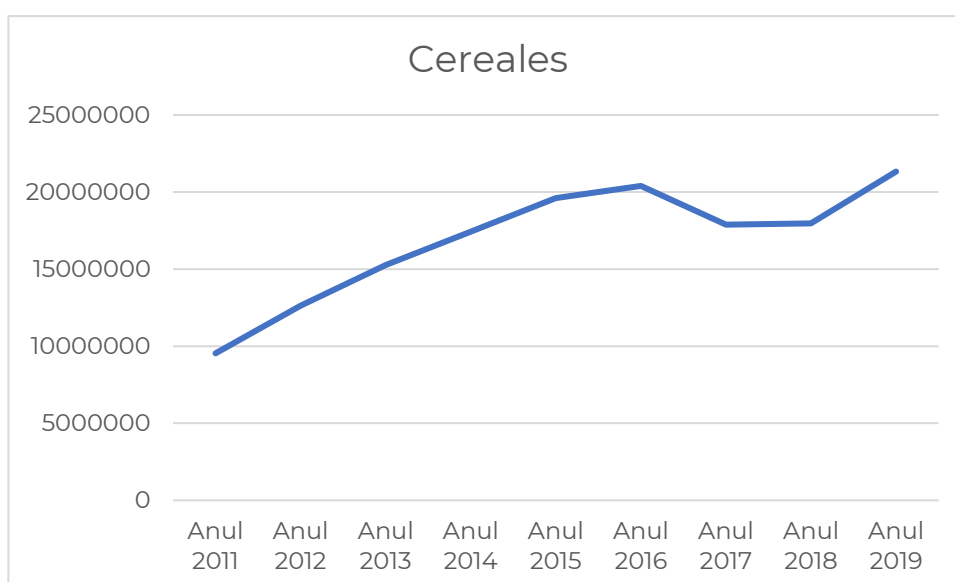


Figure 21: Historical trends cereals, tonnes/year

For cereals it can be observed a growing trend, the highest among all categories of goods, from 10 mln tonnes in 2011 to more than 20 mln tonnes in 2019. This implies also a trend of the transport modes on the hinterland of the port, as well as storage and loading capacities in the port.

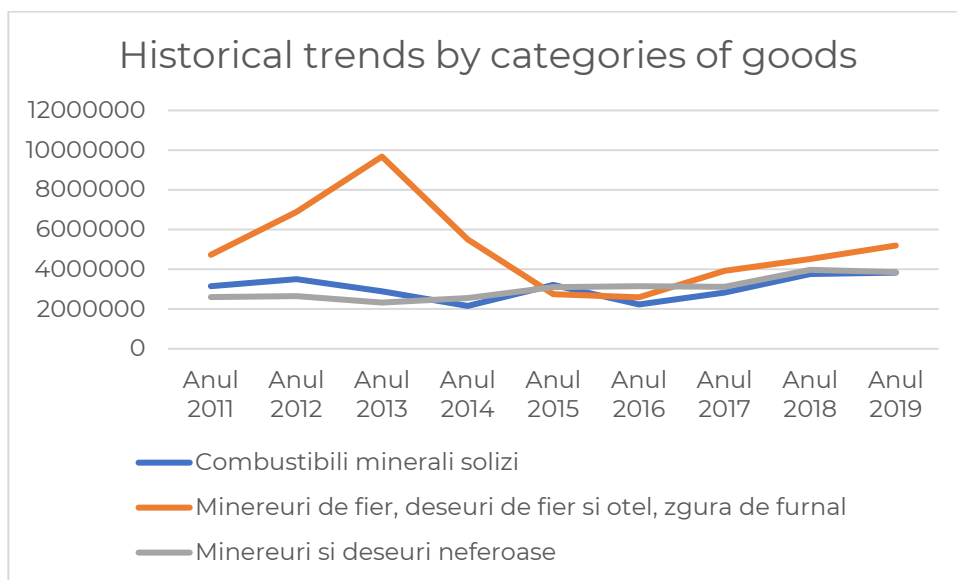


Figure 22: Historical trends solid mineral fuels, Iron ores, scrap iron and steel, furnace slag

For solid mineral fuels, iron ores, scrap iron and steel, furnace slag and ores and non-ferrous waste, the trend shows a small increase in the analysed period, with a peak for scrap iron and steel, furnace slag and ores and non-ferrous waste in 2013.

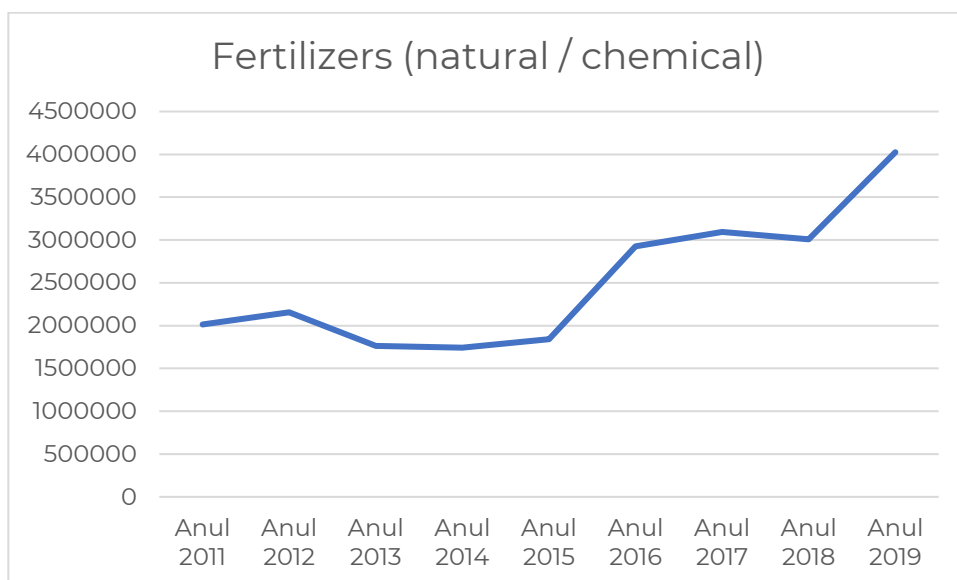


Figure 23: Historical trends fertilizers (natural and chemical), tonnes/year

Natural and chemical fertilisers shows a high trend in the analysed period, from 2 mln tonnes in 2011 to some 4 mln tonnes in 2019. This trend is in line with the one for export of cereals.

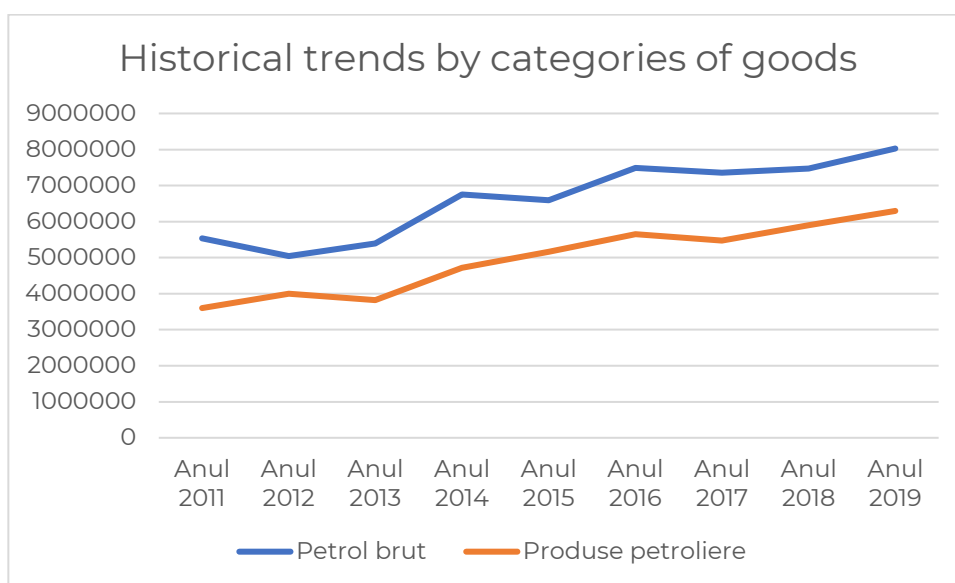


Figure 24: Historical trends crude oil and petroleum products, tonnes/year

Crude oil and petroleum products shows a constant growth in the analysed period. Crude oil shows a growth from 5.5 mln tonne sin 2011 to 8 mln tonnes in 2019, and petroleum products from some 3.6 mln tonnes to 6.2 mln tonnes in the same time period.

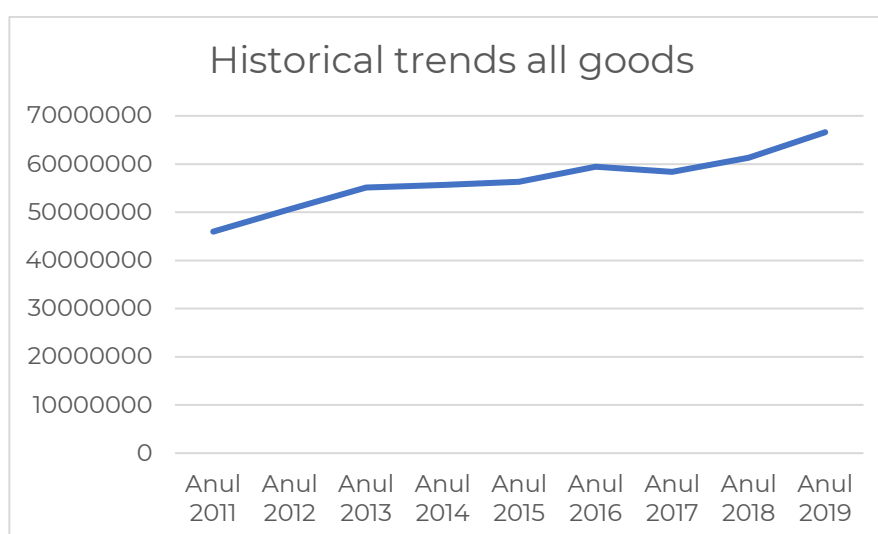


Figure 25: Historical trends all goods, tonnes/year

Regarding all goods, it is observed a growing trend from 46 mln tonnes in 2011 to almost 67 mln tonnes in 2019. This growth is mainly supported by cereals, crude oil and petroleum products and fertilisers.

8.3.2 Potentials for container transshipment

8.3.2.1 Current state of affairs with intermodal cargo

Currently the containerized flows are from Romania`s export and import. Before the economical crisis in 2008, 60% of the cargo traffic was transit from hinterland. The container traffic in Constanta Port is heavily dependent on its hinterland connections, especially rail connections.

Even there are 15 regular services for port-containers ships, there is no regular railway service available to connect with the hinterland.

River Danube can be an option but is real challenge to find the proper cargo for a slow but more predictable transit.

In the Port of Constanta there are four container terminals, which offer modern conditions and facilities for the operation of container vessels.

The direct line services launched between the port of Constanta and the ports of the Far East in recent years, have had the effect of transforming the port of Constanta into a distribution port for the Black Sea region and Central and Eastern Europe, the port of Constanta serving neighbouring ports through feeder ships.

At the end of 2003, the largest specialized container terminal in the Black Sea was inaugurated in the port of Constanta, being operated by Dubai Ports World. With a total area of over 76 ha (52 ha operational), the terminal offers an annual operating capacity of approximately 1.5 million TEU.

Due to the depths, which have a minimum of 14.5 meters, the terminal allows the operation of Post-Panamax container vessels, and the operating facilities ensure the efficient operation rate of the berthed vessels. The length of the main berth is 636 meters, and of the supply berth of 411 meters, the covered storage area is 5,000 sqm. The terminal offers railway coordination services through the 3 railway lines, each having a length of 616 meters, being able to handle 3 train sets with 30 wagons each.

The facilities, the depths offered by the Port of Constanta made it possible in 2007 to reach a record annual container traffic in the Black Sea region, totalling 1,411,387 TEU.

Container traffic history

Evolution of container traffic is shown in the table below

Year	Volume, tonnes	Number	TEU
2012	6.680.107	423.081	684.059
2013	6.543.354	399.372	661.124
2014	6.778.884	408.99	668.349
2015	6.849.564	420.793	689.066
2016	6.897.358	434.439	711.339
2017	6.524.093	413.253	696.438
2018	6.563.658	400.832	668.016
2019	6.552.433	400.945	666.036
2020	6.345.692	389.061	643.725

Table 55: Container traffic in Constanta Port, 2012 - 2020

Evolution of container traffic split into import, export and transit is shown in the table below

2016 TEU`s		
Import	Export	Transit
329.876	314.224	67.239
2017 TEU`s		
Import	Export	Transit
341.399	329.137	25.902
2018 TEU`s		
Import	Export	Transit
322.608	318.728	26.680
2019 TEU`s		
Import	Export	Transit
330.199	312.537	23.240
2020 TEU`s		
Import	Export	Transit
318.748	305.990	18.989

Table 56: Container traffic in Constanta Port, 2016 - 2020, Imp/Exp/Tran

Container transport today

The Port of Constanta is connected to the Pan European Corridor VII - Danube - that links two of the main trade poles of Europe: Rotterdam and Constanta, creating a navigable inland waterway from the North Sea to the Black Sea. The length of the navigable river is 2,414 km from the Romanian terminus Sulina to Kelheim in Germany, where it connects to the Main-Danube Canal, the Romanian sector having a length of 1,075 km. The Danube-Black Sea Canal links the Port of Constanta to the Rhine-Main-Danube Corridor, offering the most efficient and ecological transport alternative within the hinterland and at the same time a 4,000 km shortening of the sea trade routes coming from Far East and Australia through the Suez Canal.

According to European Union and United Nations standards The Danube-Black Sea Canal has a class VI rating and is an 'F' class inland canal. The 64.4 km long and 90 m wide canal has a water depth of 7 m and 17,5 m clearance under the bridges and the daily running of the waterway is in the responsibility of the National Company "Navigable Canals Administration".

1-9.2021 (TEU)						
Traffic type		Cabotage	Export	Import	Tranzit	TOTAL
Empty containers	20'	144	32.379	627	3.131	36.281
Empty containers	40'	366	16.246	52.906	4.474	73.992
Full containers	20'	136	11.108	50.381	1.262	62.887
Full containers	40'	282	169.930	141.134	2.098	313.444
TOTAL		928	229.663	245.048	10.965	486.604

Table 57 Containter transport overview, port of Constanta 1-9.2021

8.3.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

The Port of Constanta is connected to the Pan European Corridor VII - Danube - that links two of the main trade poles of Europe: Rotterdam and Constanta, creating a navigable inland waterway from the North Sea to the Black Sea. The length of the navigable river is 2,414 km from the Romanian terminus Sulina to Kelheim in Germany, where it connects to the Main-Danube Canal, the Romanian sector having a length of 1,075 km. The Danube-Black Sea Canal links the Port of Constanta to the Rhine-Main-Danube Corridor, offering the most efficient and ecological transport alternative within the hinterland and at the same time a 4,000 km shortening of the sea trade routes coming from Far East and Australia through the Suez Canal.

According to European Union and United Nations standards The Danube-Black Sea Canal has a class VI rating and is an 'F' class inland canal. The 64.4 km long and 90 m wide canal has a water depth of 7 m and 17,5 m clearance under the bridges and the daily running of the waterway is in the responsibility of the National Company "Navigable Canals Administration".

The location is advantageous especially if in future the intermodal connections will be developed to reach Caspian and Central Asia market. The only disadvantage is the Bosphorus Strait, more accurate the length restrictions of the strait.

8.3.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

The contents of the containers are not available.

8.3.2.1.3 Main reasons for success or failures of regular/significant container handling (volumes) in port of Port of Constanta.

Port of Constanta shows a high potential for significant container handling, due to the following factors:

- Excellent maritime connections due to the depths, which have a minimum of 14.5 meters, the terminal allows the operation of Post-Panamax container vessels, and the operating facilities ensure the efficient operation rate of the berthed vessels.
- Very good rail, road and inland water connections.
- High demand for freight transport both in Romania and in the neighbouring countries.

Predictability is very important and is heavily influenced by the hinterland connections on Romania`s territory (especially rail connections).

8.3.2.1.4 Competitive (dis)advantages of other transport modes/routes in port

Road – lack of a continuous network of highways toward the north-west part of Romania and border with Hungary and Serbia. Construction works are currently undergoing.

Rail – slow commercial speed 20 km/h. Practically, is one the main bad influence on attractiveness of the port.

Inland waterway/Danube – slow time of transit, but cheaper, more reliable, ecological friendly and with a better fairway maintenance more predictable than the other modes of transport.

8.3.2.1.5 Development potential

Even that the market context has changed since 2008-2009, the total traffic operated in 2007 of 1.4 mil TEU, can be regained through the development of hinterland connections for road and rail, and also volumes can be added by developing a Danube regular service.

National Transport Model forecasts shows the following figures for year 2040:

NTM 2049 – Forecast 2040 container traffic Constanta Port. Distribution in hinterland, in TEU/an							
Road		Rail		Inland water		Total	
Import	Export	Import	Export	Import	Export	Import	Export
301657	278084	138613	368459	13521	13521	453791	660064

Table 58: Container traffic forecast in Constanta Port, 2040

The forecasted container traffic for year 2049 is 1.113.885 TEU.

8.3.2.2 Desired state of intermodal affairs with intermodal cargo

8.3.2.2.1 Objectives of intermodal transport development in the port Constanta

Our connections in the port related to container transportation are improved and functioning. Unfortunately, there is a big gap between the port`s infrastructure and its hinterland connections.

In November 2003, DP World was awarded a long-term concession to operate Constanta South Container Terminal (CSCT) SRL and in 2004 began operations as a state-of-the-art facility with excellent deep-draft access located near the entrance to Constanta. This terminal is acknowledged to be the Black Sea's premier container terminal, serving both the Romanian domestic market and a wider hinterland spreading into parts of Central Europe, together with first class feeder connections to the Ukraine, Russia, Georgia & Moldova. The port's geographic location has also proved ideal as a reliable transshipment hub for the greater Black Sea region.

DP World Constanta offers importers & exporters in Central Europe speedier and more cost-effective access to the Far East market than movement via the traditional routing over North Continental ports by avoiding congested intermodal bottlenecks in Western Europe. To promote this routing, DP World is actively developing an intermodal network reaching out from the port to assist shippers in the movement of their cargo. The current capacity of the terminal is approximately 1,200,000 TEU and there is sufficient land area for phased expansion to cater for volumes in-excess of 4,500,000 TEU.

8.3.2.2 Internal and external factors for initiation / increase of container transport in port of Constanta.

As mentioned before, the development of container traffic is dependent of the development and improvement of its hinterland connections. The port has two terminals that can provide quality services. Among current initiatives it can be mentioned:

DP WORLD container terminal developments:

- DP WORLD development of intermodal transport by offering a new service in Romania. Jointly with their global partner in the agricultural business, and other business partners, has designed a new logistics solution. Empty containers loaded on barge in Constanta deep-sea terminal, traveled to The Great Braila Island where containers are being stuffed with cargo. Further on, the full containers are loaded back on barge and travel to DP World Constanta, where they will further be loaded on mainliner vessels to their final export destination.
- Launching in April 2021 the RO-RO service between Karasu in Turkey and Constanta.

8.3.2.3 Physical needs

- continuous highway connection with NW of Romania and Budapest and Belgrade
- an improved railway infrastructure with a higher commercial speed for cargo trains that can provide the arguments for regular railway services with the hinterland.

8.3.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Constanta			X					X	<ul style="list-style-type: none"> - closing the gap between the port`s infrastructure and its hinterland connections - improved railway infrastructure with a higher commercial speed for cargo trains - continuous highway connection with NW of Romania and Budapest and Belgrade

Table 59: Existing transport and potential – port of Constanta

8.1 Port of Galati

The Galati port is the largest sea-river port, respectively the second largest port in Romania, with access to the Danube maritime sector and the Black Sea through the Sulina Chanell and the Danube-Black Sea Chanell. Galati Port is located on the left bank of the Danube, from Mm 77 to Mm 80, is managed by the National Company Maritime Danube Ports Administration SA Galati; has a total of 56 operating berths.

The port operator operating in the Bazinul Nou Port, respectively Port Bazinul Nou SA (PBN), has some port equipment for the operation of ships and cargo (eg. four 30-50 tons car cranes, 23 forklifts, 2 self-loading trucks) but does not have facilities for the

operation of intermodal flows, such as special cargo handling cranes, cranes for handling operations of the type of those used for ship-to-shore operations (STS) and those used for the used for transshipment of loading units between rail and road (RMG), these following to be achieved through the implementation of the Project Galați Multimodal Platform (the "Project").

The Project aims the development of a multimodal platform with a capacity of 150,000 TEU/year in the port of Bazinul Nou (from Galati port), is being implemented with a completion deadline of 2023, the first year of operation 2024.

8.1.1.1 Cargo volume statistics

In the following the cargo volumes by category of goods are presented, for the period 2016 – 2020.

No.	Category of goods	2015	2016	2017	2018	2019	2020
1	Cereals	221,88	202,261	261,518	318,495	440,611	240,481
2	Seeds, fats, oil	136,251	101,604	198,707	179,521	228,679	88,257
3	Animal feed	3,15	7,421		5,961		6,5
4	Fruits and vegetables						
5	Live animals						
6	Sugar beet, sugar						
7	Food, beverages, tobacco	20,162		5,834	0,811		
8	Laminated products	1,152,373	427,374	907,984	889,339	1,052,630	1,143,193
9	Scrap	99,132		196,877	259,295	169,848	260,627
10	Nonferrous metals						
11	Machines, machinery, equipment	2,568	0,679	0,375	0,107	3,523	
12	Articles made of metal			10,421	1,426		
13	Timber	7,002		1,638			
14	Logs	1,602	12,319		2,053	0,801	
15	Pulp and wastepaper						
16	Natural and chemical fertilizers	23,22	52,145	0,176	4,289	11,792	20,539
17	Crude mineral products (quarry and gravel, plaster, slag, salt)	694,899	2,601,136	670,325	615,596	504,638	451,879

18	Lime, cement, building materials, manufactured	7,809	0,158	3,967	1,606		8,238
19	Iron ore	1,454,714	1,721,759	1,533,788	1,524,124	2,188,251	2,500,341
20	Non-ferrous ores		1,368,185	2,989			
21	Solid fuels (coal, coke, etc.)	465,049	571,311	541,391	552,104	515,548	545,102
22	Crude oil						
23	Petroleum products and gas		10,423	48,826	32,449	34,158	103,484
24	Tar and natural gas tars	28,736		21,138	31,312	36,025	54,964
25	Pitch						
26	Chemical products				2,338		
27	Ceramic products, glassware						
28	Textiles, textile products and fibres, leather, furs, raw rubber, etc.						
29	General merchandise (fabrics, clothing, footwear, etc.)						
30	Other products		10,281		0,25		
	Total	4,318,547	7,087,056	4,405,954	4,421,076	5,186,504	5,423,605

Table 60: Cargo volume by year Port of Galati, 2016 - 2020

8.1.2 Potentials for container transshipment

8.1.2.1 Current state of affairs with intermodal cargo

Currently, the port infrastructure and its facilities are in an inadequate technical state. The substantial upgrading of existing infrastructure will eliminate bottlenecks in two ways.

Firstly, the port infrastructure will be upgraded, contributing to: (1) the increase of the efficiency of handling modern ships with higher capacities and the increase of the safety and security conditions; and (2) facilitating rail interconnection between Russia and the European Union via Ukraine by integrating two types of gauges (1435 and 1520 mm) into the terminal's operations. This is of strategic importance and can initiate new multimodal services between Europe and Russia, Ukraine and the Republic of Moldova.

The access in the port platform is performed directly from the European road E87 (on the road) and from CFR triage through a railway line. The upgrade of the existing public road infrastructure (by building a highway passage and a roundabout) is performed in order to streamline road traffic on the E87.

The implementation of the intermodal and IT & C facilities will enhance the capacity, efficiency, safety and security of the port operations. The upgrade of the terminal will

provide a sustainable alternative to the road transport between the Central Europe and the Black Sea region, especially Turkey and Greece.

Currently, most freight transport on these routes is made by road. The efficient combination of the modes of shipping, river, rail and road will open up new possibilities for the multimodal services.

8.1.2.2 Desired state of intermodal affairs with intermodal cargo

8.1.2.2.1 Objectives of intermodal transport development in the port Galati

A multimodal terminal is under development in the Port of Galati.

For the Project it was allocated an area of 85,506 sqm from the platform existing at shore, out of which 25,000 sqm are deemed as „expansion area” that will be used for extra deposit spaces, specifically for semi-trailers that can be handled by cranes. The expansion of the quay inside the port basin will add a free space of 29,974.024 sqm according to the Technical Project to the existing of 85.429 sqm. The platform from the quay will be equipped with storage and stacking areas that are designed in order to ensure a handling capacity of 150.000 TEU/year.

Currently, the entire superstructure on the 85,506 m² land allocated to the Project is the private property of the port operator – PBN. All the superstructure elements that will be developed on the water shore and on this land and that will integrate as much as possible the existing buildings are the property of PBN. For the avoidance of any lack of clarity/possible confusions, we mention that the company name is the same as the port name where the Project will be implemented (the Bazinul Nou Port).

PBN owns as property the port superstructure located on the land of 85,506 m² leased from NC MDPA, superstructure that will be included within the Galati Multimodal Platform project, being the only operator from the area of the port of Bazinul Nou that owns superstructure that fulfils the technical requirements and needs imposed for the platforms located on the Core Corridors. PBN offers handling and storage services to all the port customers in a non-discriminatory manner. After the implementation of the Project, all the facilities resulting will be opened to the public access for the port's customers that request port services, on a non-discriminatory basis.

It will work from Monday to Friday 16 hours/day.

8.1.2.2.2 Internal and external factors for initiation / increase of container transport in port of Galati

The Port of Galati is a river-maritime port allowing the access for barges, river and seagoing vessels with a capacity of maximum 15,000 dwt.

The size of the ships that can operate in the port of Galati depends on the draught of the water at the entrance to the Sulina Canal. In accordance with the Recommendations of the Danube Commission, the minimum draught that the Lower Danube Administration (AFDJ Galati) must ensure all over the year is 7.01 m.

In this sector, under normal conditions, the navigation of ships with lengths of maximum 180 m and with wideness of maximum 40 m is allowed.

Based on these parameters, on the Sulina Channel can enter seagoing vessels with a capacity of 300-500 TEU. dedicated to the container traffic on short distance in the Black Sea and of the Mediterranean Sea area.

Considering the draught limitations, it was taken into account the optimum scenario with a ship of 300 TEU, respectively of 8,000-9,000 dwt, considering all the containers loaded at capacity (an average of 28-30 tons/TEU).

In practice, the port-container ships transport both loaded and empty containers, generating an average of approximately 15 tons/TEU that would conduct to the possibility of the transportation of a higher number of TEUU/ship. Depending on the proportion of empty and loaded TEU, the ships that will enter within the terminal can have a transportation capacity between 300 and 500 TEU, the proportion empty/loaded being determined by the container line considering the weight and the maximum accepted draught mentioned above.

From the Traffic Study, the estimated potential is as follows:

Potential	2022	2032	2037	2042
TEU's international OD relations	47871	144513	178429	216133
TEU's Moldavia RO, Republic of Moldavia, Ukraine (containers already from 2017)	18276	55172	68120	82515
TEU's Moldavia RO, Republic of Moldavia, Ukraine (non containers in 2017, 30% of the total in containers in the future)	11133	33608	41495	50263
Total TEU's	77280	233293	288044	348911

Table 61: Estimated potential for container transport, Port of Galati

8.1.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Galati			X				X		<ul style="list-style-type: none"> - finishing an intermodal terminal - assuring the minimum drought in port

Table 62: Existing transport and potential – port of Galati

8.2 Port of Giurgiu

The surface of the port territory administered by CN-APDF-SA GIURGIU is 389565 sqm. The length of the walled / vertical / natural shore quays under the administration of CN APDF SA Giurgiu is 1742 m.

The port is of river type, allowing the mooring of barges up to max. 2000 t.

Giurgiu port is developed in three locations as follows:

- Ramadan sector - with mooring functions on the Danube in length of approx. 750 ml.
- Plant Canal - where mooring fronts with a total length of 740 ml are arranged. Towards the Cioroiu island there is a berth for ballast products.
- Veriga Basin - where there is an important shipyard with a syncrolift for ships of 5000 t, reinforcement docks, production and repair halls, equipment, etc. At present, it is included in the Giurgiu Free Zone.

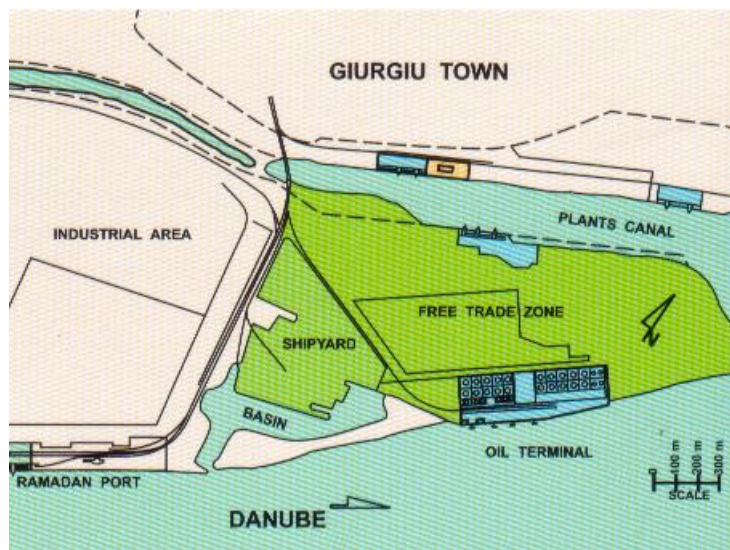


Figure 26: Layout of the port Giurgiu

GIURGIU PORT COMPLEX (Average operating capacity of 1,500,000 tons / year)

RAMADAN PORT (Operating capacity 435,000 tons / year)

4 berth – 750 ml (operating grains, fertilizer, steel products)

PASSANGR PORT

- 5 berths - 500 ml

- 2 berths - 150 ml ships waiting area

Giurgiu Free Zone

- 5 berths - 500 ml vertical quay (general cargo)

Until 2008, a container terminal operated in the Giurgiu free zone. After the railway line linking the port to the national railway network was disconnected, the terminal was closed.

CIOROIU PORT

Cioroiu Port is located on the Danube, Km 490 + 500 at Km 491 + 510, within the Giurgiu Free Zone and it is specialized for loading / unloading oil products

Operating capacity 415,000 to / year

Accessibility:

Road - the port platform is connected to the road system of Giurgiu Municipality and with exit to Bucharest, Zimnicea, Oltenița, Russe (Bulgaria).

COMMERCIAL PORT CANALUL PLANTELOR – GIURGIU (Operating capacity 1,320,000 tons / year)

Mooring front 1390 ml (14 berths), as follows:

- 170 ml (2 berths) vertical quay operating front
- 200 ml (2 berths) quay operational front perished at the grain silo
- 170 ml (2 berths) operational front walled quay products ballast
- 850 ml (8 berths) stationary ship front at natural shore

Operating capacity 500,000 to / year

Accessibility:

Road: E 20 Bucharest - Giurgiu - Russe

DN 41 Giurgiu - Oltenita

DN 5C Giurgiu - Zimnicea

8.2.1.1 Cargo volume statistics

The cargo volumes for years 2016 to 2019 are presented below.

No.	Freight category	2016	2017	2018	2019
0	Total (1+2+...+25)	807226	786461	714474	758674
1.	Cereals	217037	225891	158,871	273630
2.	Fresh fruits and vegetables				
3.	Live animals, sugar beet				
4.	Food, beverages, tobacco and animal feed				
5.	Seed (nuts) oleaginous, oils and fats	60775	45090	35295	18622
6.	Wood, firewood		3097		
7.	Fertilizers (natural and chemical)	66296	94129	90,32	148550

8.	Crude mineral products (quarry and gravel pit, plaster, sulphides, slag, chalk, salt etc.)	193951	74100	60349	5586
9.	Iron ore, scrap		1246	2063	
10.	Non-ferrous ores	3265			5242
11.	Textiles, synthetic and artificial products; other raw materials of animal or vegetable origin (leather, furs, rubber)				
12.	Pulp and wastepaper				
13.	Solid fuels (coal, coke, etc.)				
14.	Crude oil	6396			22142
15.	Oil and gas products	126644	161247	207,167	138994
16.	Tars derived from coal and natural gas				
17.	Chemical products		4888		9368
18.	Lime, cement, manufactured building materials		9269	27224	25403
19.	Glass, glassware, ceramics	6828			
20.	Metals ((ferrous and non-ferrous)	11379			
21.	Articles made of metal	114518	164421	133,003	114307
22.	Cars, transport equipment	137	835	182	172
23.	Various items (fabrics, clothing, footwear, furniture)				
24.	Other products		2248		
25.	Container				

Table 63: Cargo volume by category of goods, 2016 - 2019, Port of Giurgiu

8.2.2 Potentials for container transshipment

8.2.2.1 Current state of affairs with intermodal cargo

Currently the traffic of containers does not exist in the Port of Giurgiu.

A container terminal was available in Giurgiu, but since the railway is not in operation, the terminal has been closed.

Container traffic history

Container transport today

8.2.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

The Port of Giurgiu is the closest port to Bucharest and Ilfov, at 65 kms by 4-lanes express road. Therefore, the potential for container transport could be quite high to/from Bucharest/Ilfov and Constanta Port.

8.2.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

Currently containers from the Port of Constanta are reaching Bucharest/Ilfov by road and rail.

8.2.2.1.3 Main reasons for success or failures of regular/significant container handling (volumes) in port of Giurgiu.

The most important reason for closing the container terminal is the fact that railway is not in operation anymore.

8.2.2.1.4 Competitive (dis)advantages of other transport modes/routes in port

Road connection to Bucharest/Ilfov is quite good

8.2.2.1.5 Development potential

If proper investment in port facilities and hinterland connection by rail would be considered, the potential could be quite high for container transport from Constanta Port to Bucharest/Ilfov and other potential destinations in the region, as Slatina – aluminium factory, and Craiova – automotive Ford factory. This is proved also by the current transport of metal products, which counts 114 thousand tonnes per year.

The potential could be considered also for cereals container transport, as in the area is a high production of cereals that are exported via the Port of Constanta.

8.2.2.2 Existing transport and potential – overview

Port	Existing container transshipment			Potentials (for new or additional container flows)					Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Giurgiu			X				X		<ul style="list-style-type: none"> - investment in port facilities and hinterland connection - operational railway

Table 64: Existing transport and potential – port of Giurgiu

8.3 Port of Drobeta Turnu Severin

Port is located at km 927- 934- left bank of the Danube, Mehedinti County, in the accumulation lake - Hydropower and Navigation Complex "Iron Gates II"

GENERAL DATA

Administrator: the port infrastructure is the public property of the Romanian state

The total surface of the concessional port precinct by the Ministry of Transports and Infrastructure to CN APDF SA Giurgiu (commercial + passengers + oversized parts ramp) is 137,592.11 sqm, of which for passengers 44,084.55 sqm, commercial 72,662.42 sqm, 20,845.14 sqm for the ramp.

Operated goods: general goods, laminates, ores, fertilizers, cereals, coal, etc.

Main operators: TTS Porturi Fluviale GALATI

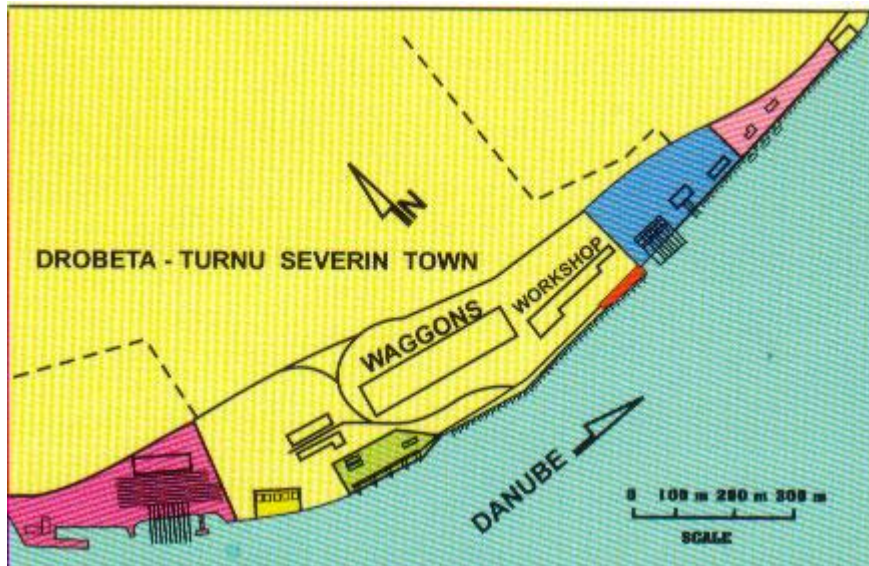


Figure 27: Layout of the port Drobeta Turnu Severin

MAIN FEATURES

- The port is of fluvial type, allowing the mooring of barges up to 3000 t.
- Access to the quay is made directly from the navigable signal.
- Length of mooring front.
- 300 ml vertical wharves related to commercial berths.
- 420 ml walled docks for waiting berths.
- 365 ml walled docks for winter berths.
- At 300 ml upstream of the commercial port there is the silo operating berth with $l = 100\text{ml}$ of which 65 ml vertical quay and 35 ml walled quay.
- Quay equipment: - 1 gantry crane 5tf x 32 m type Bocsa.
- 2 quay cranes 16 tf x 32 m type Bocsa.
- Commercial port traffic capacity: 725 thousand t / year.
- Both sectors have operating buildings, as well as facilities for electricity supply, water and sewerage (passenger port).
- In the downstream part of the commercial port there is currently an oil terminal "OMV"
- Ways of communication:

- road access to the street network of the city and further connections to DN6, DN 56, DN 56A and DN 67.

- railway access through rebrusment lines connected to the c.f. of the city and further on at lane 900 Bucharest-Caransebes-Timisoara.

8.3.1.1 Cargo volume statistics

The cargo volumes for years 2016 to 2019 are presented below.

No.	Freight category	2016	2017	2018	2019
0	Total (1+2+...+25)	278633	325011	346,497	368951
1.	Cereals	4336		3369	
2.	Fresh fruits and vegetables				
3.	Live animals, sugar beet				
4.	Food, beverages, tobacco and animal feed				
5.	Seed (nuts) oleaginous, oils and fats	1960	1024		
6.	Wood, firewood				
7.	Fertilizers (natural and chemical)	13862	10812	39,794	23240
8.	Crude mineral products (quarry and gravel pit, plaster, sulphides, slag, chalk, salt etc.)		12488		
9.	Iron ore, scrap	1532	7183	18,372	20730
10.	Non-ferrous ores				
11.	Textiles, synthetic and artificial products; other raw materials of animal or vegetable origin (leather, furs, rubber)				
12.	Pulp and wastepaper				
13.	Solid fuels (coal, coke, etc.)	16636	1910		
14.	Crude oil				27737
15.	Oil and gas products	186755	243797	251,488	243501
16.	Tars derived from coal and natural gas				

17.	Chemical products	20525	18891	7144	
18.	Lime, cement, manufactured building materials				3892
19.	Glass, glassware, ceramics				
20.	Metals ((ferrous and non-ferrous)				11564
21.	Articles made of metal	33027	28406	26330	38287
22.	Cars, transport equipment		500		
23.	Various items (fabrics, clothing, footwear, furniture)				
24.	Other products				
25.	Container				

Table 65: Cargo volume by category of goods, 2016 - 2019, Port of Drobeta Turnu Severin

8.3.2 Potentials for container transshipment

8.3.2.1 Current state of affairs with intermodal cargo

Currently the traffic of containers does not exist in the Port of Drobeta Turnu Severin.

Container traffic history

n/a

Container transport today

8.3.2.1.1 Geographical (dis)advantages (*both advantages and disadvantages*) of locating a container terminal in selected port/s

The Port of Drobeta Turnu Severin could be of interest for containers having as destination Timisoara area, as both rail and road connections are available between the port and Timisoara.

8.3.2.1.2 Containerizable cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

Currently containers from the Port of Constanta are reaching Timisoara by road and rail.

8.3.2.1.3 Competitive (dis)advantages of other transport modes/routes in port

Road and rail connections to Timisoara are quite good.

8.3.2.1.4 Development potential

If proper investment in port facilities would be considered, the potential could be quite of interest for container transport from Constanta Port to Timisoara and other potential destinations in the region.

8.3.2.1.5 Objectives of intermodal transport development in the port Drobeta Turnu Severin

In 2020, the elaboration of a feasibility study regarding the construction of a multimodal terminal in the port of Turnu Severin began. The study was financed through the European Commission CEF program. The study will be completed by the end of 2021. The necessary funds for the implementation of the project will be insured through same CEF program.

8.3.2.1.6 Internal and external factors for initiation / increase of container transport in port of Drobeta Turnu Severin

Development of the container terminal.

8.3.2.2 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Drobeta Turnu Severin			X				X		- construction of a multimodal terminal (currently in progress)

Table 66: Existing transport and potential – Drobeta Turnu Severin

9 Multimodal / Intermodal market perspectives in Ukraine

9.1 Macroeconomic overview of the country

Year	Value	Year-on-year increase / decrease (%)
2017	2,982 UAH	+25,2%
2018	3,558 UAH	+19,3%
2019	3,974 UAH	+11,7%
2020	4,194 UAH	+5,5%

Table 67: GDP development in Ukraine

* Please note that numbers indicated in both tables are nominal GDP, but not the real GDP.

9.2 Macroeconomic forecast and container transport forecast

According to the World Bank forecasts, Ukraine's economy will grow by 3.8% in 2022, and by 4.7% in 2023. The World Bank estimated that activity should continue to recover in the second half of 2021, due to a better harvest, increased consumer demand and a favorable external environment. The forecast also takes into account the possible introduction of further temporary quarantines to combat the COVID-19 pandemic.

Year	Value	Year-on-year increase / decrease (%)
2021	4,353 UAH	3,66%
2022	5,369 UAH	3,8%
2023	5,993 UAH	4,7%
2024	6,651 UAH	5%

Table 68: GDP development in Ukraine - forecast

A period of 2020-2021 was a turning point in shipping logistics. The Covid-19 pandemic has affected both shipping and logistics in general. The delivery time of goods increased, there were constant interruptions, internal logistics operations in certain

regions were stopped, and freight in many directions doubled. The first quarter of 2020 was remarked for a 4.7% reduction in the global sea freight market.

Ukraine is a country with an advantageous geographical position and with an access to the Black Sea and to the Azov Sea. In this regard, it claims to be a regional transit maritime center. But today the total share of containerized cargo in the total turnover of goods in Ukraine does not exceed 9.5%, which is considered a low indicator. For comparison: the world average indicator is no less than 55%.

Analyzing the SE “Ukrainian sea ports authority” (hereinafter – SE “USPA”) data from January to October 2021, 121,024.46 thousand tons of cargo were processed in Ukrainian seaports. The export of containerized cargo for 10 months decreased by 3.5% - to 394,957 TEU, import decreased by 2.6% - to 410,103 TEU, and transit - by 10%, to 35,337 TEU. The decrease in transshipment figures in seaports, compared to the same period last year, is due to a decrease in a number of indicators, such as: export of grain cargo, import of coking coal and containers, as well as a decrease in transit of ore.

It is expected that 2022 will be more stable for maritime transport, but it is not possible to make accurate forecasts. Sustainability is the main factor to focus on in 2022. The role of containerized cargo will remain an important component in international trade. The current sharp rise in freight rates is likely to continue throughout 2022, and perhaps longer.

Today, the main cargo traffic of all Ukrainian ports and container terminals is import-export. Unfortunately, the transit share is extremely intangible, although it has long term potential. In this regard, there is practically no significant competition in relation to import and export cargo traffic. There are small intermodal transport links that can bypass Ukrainian ports and get interconnected with other international transport links, but they are not promising, and their share is extremely insignificant. Therefore, Ukrainian container ports do not compete with anyone for the import-export flow, only among themselves.

Maritime ports	Indicators of container turnover	Including import	Including export	Transit
Odessa seaport	+2,22% -	+4,1% -	- 0,6% 251 277 TEU	+8,9% -
	552 436 TEU	274 617 TEU		25 976 TEU
Pivdennyi seaport	-9,2% -	-9,00%	-2,00%	-
	186 836 TEU	887 26 TEU	88 749 TEU	39,30%
				9361
				TEU
Chornomorsk seaport	-19,0% -	- 21,7% 46 737 TEU	- 16,5% -	-

	101 489 TEU		54 752 TEU	
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Table 4. Container traffic of Ukrainian seaports in 2021

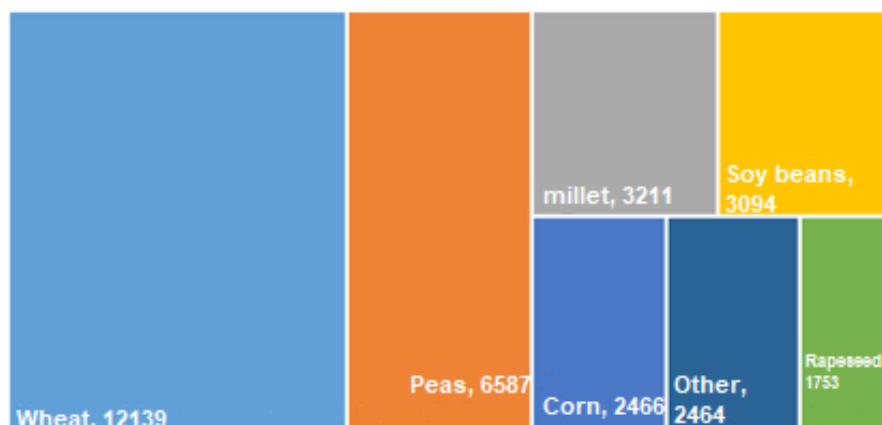


Figure 1. Commodity structure of export of grain cargo in containers in 2020

Despite the uncertainty about the development of the situation with Covid-19 and the fall in consumer demand, in 2022, a recovery and growth in agricultural trade is expected. Weather conditions in the main producing countries will remain the key factors, but it is safe to say that the main expectations today are directed to China.

Nowadays, the total capacity of all terminals in the seaports of Ukraine is 840,965 thousand tons per year.

The strategy for the development of seaports in Ukraine stipulates that by 2038, maritime container traffic in Ukraine should increase in more than 2 times, exceeding the mark of 2 million TEU. In the port of Odessa, two leading world container carriers - the French company CMA CGM and the German HHLA are engaged in the implementation of major investment projects already. They are aimed at improving the technical parameters of berths and modernization of technical equipment, which in general will increase the capacity of container terminals of companies.

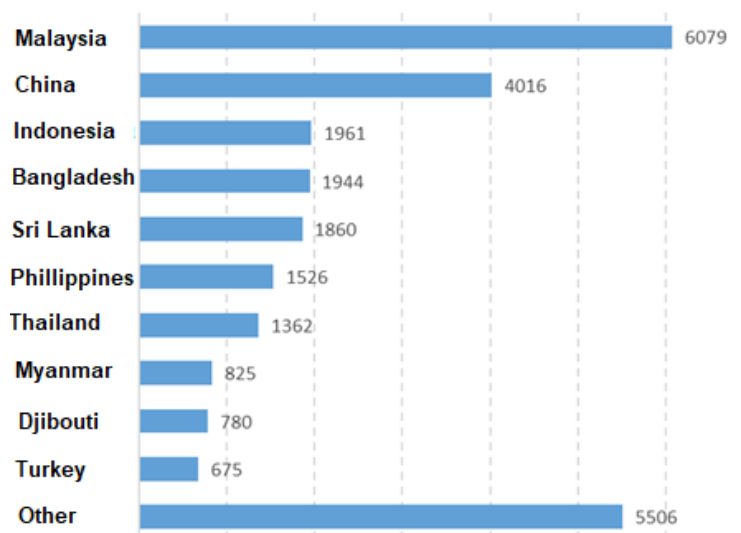


Figure 2. Geography of export of grain cargo in containers from Ukraine in 2020

9.3 Port of Izmail

The state port of Izmail is located on the left bank of the Danube River, between the 85th km and 94th km, at the junction of the borders of Ukraine, Romania and Moldova and at the intersection of Pan-European transport corridors VII and IX.

Overall territory of Izmail seaport warehouses is 81.99 hectares. The outer length of 24 berths is located at the exit of the SE “USPA” warehouse is 2627.21 m.

The area of the open-air warehouse is 201.1 thousand m², covered - 19.7 thousand m².

The capacity of the seaport allows to process up to 8.5 million tons of cargo per year and to accept vessels with draft up to 7 m, length up to 150 m and width up to 30 m.

SE "Izmail merchant seaport" has a large set of handling equipment: gantry cranes with a capacity of up to 40 tons, forklifts up to 25 tons, floating cranes up to 10 tons.

Since SE "Izmail merchant seaport" has a significant share of grain transshipment and other bulk cargo, there is the potential to transport these goods in containers.

Nowadays, there is no significant container fleet to ensure the transportation of goods exclusively within the country. This type of transportation, as an alternative to specialized grain trucks and railway wagons, is just beginning to emerge in Ukraine and has a sound future.

Today, containers have confidently taken their place in the export of agricultural cargo and products of their processing. Basically, up to 85%, these are niche grains, shipped in batches from one container (20 tons) to 1000 tons, at the freight rate the same as when shipment of a ten thousandth ship batch.

One of the tendencies to increase the container turnover of SE “Izmail merchant seaport” is the export of agricultural products, which indicator is growing steadily. The

potential in this segment is obvious: Ukraine can get a significant increase in the percentage of transshipment of such cargo in containers compared to other technologies. Automation and robotization of all operations in ports is a global trend, without which further development of cargo transshipment is impossible. Another promising direction is the creation of a surplus product in ports. If all of the above points are implemented, it may be possible to start handling containers at SE “Izmail merchant seaport”.

Loading containers directly from internal elevators is the most correct solution from the standpoint of the science of intermodal transportation, because containers were created specifically for door-to-door transportation. But nevertheless, even the newest and most modern elevators, ready to ship 30 hoppers per day, are not adapted to shipping grain into sea containers, since their loading, unlike the hopper, is carried out from the end doorway.

The assessment of the prospects for container transportation in SE “Izmail merchant seaport” is only positive. The transport of agricultural goods in containers plays an important role, especially when it comes to niche crops, as well as processed products. Moreover, a container is a universal cargo unit, which makes it possible to use it for the transportation of various types of cargo, different in the type of packaging and without it, by various modes of transport.

With the correct organization of containers logistics, this will inevitably optimize profitability, which will affect the cost of the cargo itself, which means it will make the grain more competitive. And under the conditions of the development of a private specialized container fleet, containers can become a worthy alternative to hoppers, capable of ensuring not only the transportation of grain from the elevator to the port, but also its storage, as well as loading onto the ship. At the same time, the elevator will not necessarily need to have access railway tracks on its territory.

9.3.1.1 Cargo volume statistics

Commodity / Year	Historical data				
	2016	2017	2018	2019	2020
Cereals and cereal preparations	37501,25	184083	93582	5606	11715
Metalliferous ores and metal scrap	18235,97	185250	165261	157892	142584
Coal, coke and briquettes	9724,13	26131	6058	1886	-

Table 69: Commodity structure by year (Port of Izmail)

9.3.2 Potentials for container transshipment

9.3.2.1 Current state of affairs with intermodal cargo

In 2013, reconstruction works of the container site were carried out. Site is located at the production and transshipment complex №2 (PTC - 2), berth №14. During renovation, works of modernization of storage sites and engineering infrastructure were completed. PTC-2 of the port of Izmail is located on the 91st kilometer of the Danube River. There are ore berths (coke, pellets, sinter, concentrate, coal) and a container terminal.

The total area of the container site is 7470 m², designed for handling and storage of 416 containers. The length of the berth №14 is 150 m, the design depth near the berth is 7.5 m. The rate of loading / unloading of containers is 120 units per day.

The site was used by PJSC "Ukrainian Danube Shipping Company" at a time when the shipping company was engaged in container shipping in the Mediterranean and Black Seas (until the early 2000s).

The area for storage of containers is covered with concrete slabs, fenced and equipped with two railway ramps.

The proposal of the Ministry of Transport and Communications to prepare an investment project "Construction of the first stage of berth №6 for containers and cars" was also approved. The proposal was to be implemented in the period from 2013-2015, and its value was 114,500 UAH, but the project was never completed.

Container traffic history

20 years ago, there was a berth №22 that was able to handle container cargo. There was once a project that was guided by commercial agreements between Germany and Ukraine on how to use self-propelled vessels (Captain Babkin design), operating from the Izmail, in container transportations. It was an attempt to use self-propelled vessels with flat lids capable of transporting containers attached to those lids.

After the project accomplishment, it turned out that the cargo flow was not provided although it was possible to provide such transportations to/from Izmail sea port. At those times, there were only occasional deliveries of containerized cargo. Later the project stopped its existence, because it was planned that empty ballast containers go to Germany, and from Germany they come loaded with some container cargo across Ukraine, as an import.

In 2013, the port of Izmail received a permit from the Southern Customs Administration to operate a new container site. At that time, production and transshipment complex №2 was completely ready to work with containerized cargo: an infrastructure for handling containers has been created, local port dockers have been trained.

The port planned to receive the first container ship in October 2013. It was planned that the cargo would be delivered to Izmail by the vessels of the Ukrainian Danube Shipping

Company, but as a result, due to the lack of cargo traffic, the container site was used as a warehouse.

At the moment, the container transshipment complex at berth 14 is used as a temporary bonded warehouse to ensure the idle time of empty containers.

Due to absence of container cargo in Izmail port, container terminal isn't operating at the moment.

In July 2021, the “Viking” combined transport train set off for Izmail for the first time. It carries 41 40-foot containers with cellulose.



Figure 28: “Viking” combined transport train

This step will contribute to more convenient further shipment of goods by sea and river transport using the port's facilities to the countries of Central and Southern Europe located in the Danube River basin, as well as in the opposite direction.

In the future, it is planned to increase the monthly volume of cargo turnover in the direction of the Izmail port and transport various types of cargo.

The international project "Viking" was founded in 2002 with the aim of increasing the competitiveness of railway transport in comparison with other modes of transport. It made it possible to connect the regions of the Black and Baltic Seas.

The project participants are working in the direction of increasing the freight traffic on the “Viking” trains and expanding its geography.

A SJSC “Ukrzaliznytsia” (a state-owned joint-stock company of rail transport in Ukraine) emphasized that for half of 2021, 220 624 TEU were transported across Ukraine by rail, which is 1.8% more than the volume of container traffic for the same period in 2020 and is 2.2% of the total volume of goods transported by rail.

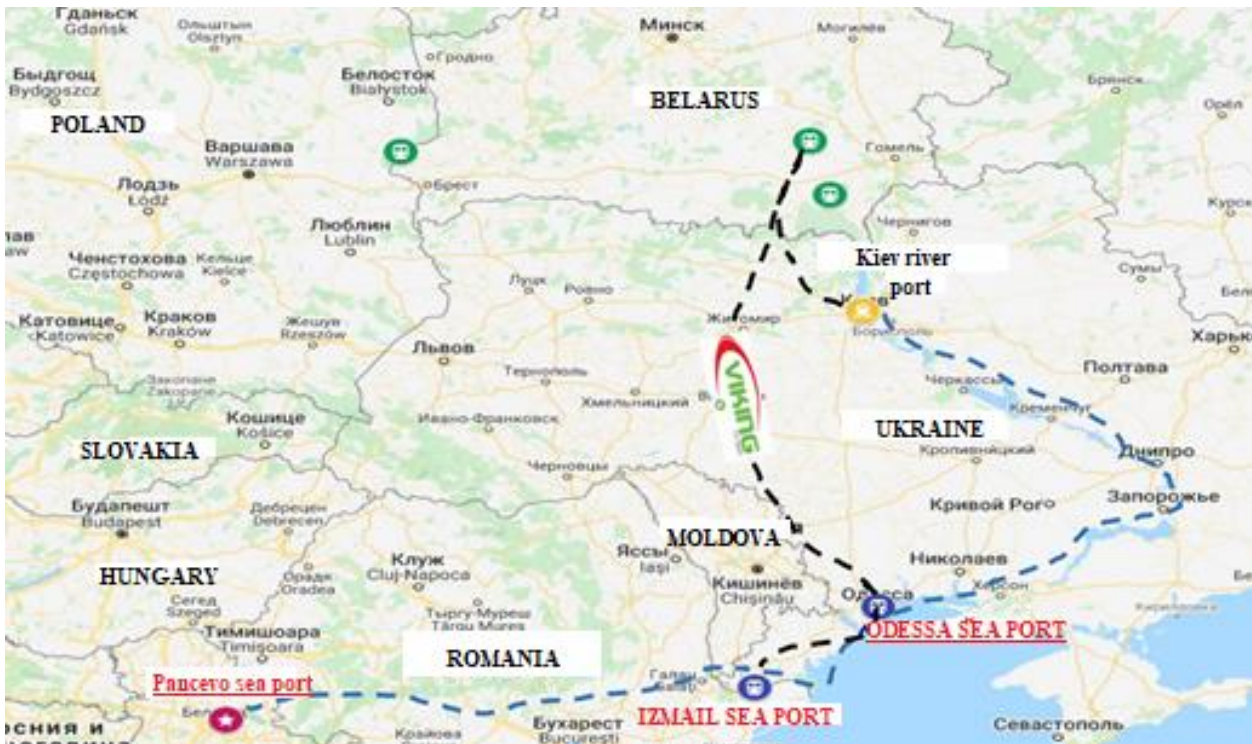


Figure 29: Visualization of the project for the delivery of goods by “Viking” combined transport train to the DR countries

Container transport today

9.3.2.1.1 Geographical (dis)advantages (both advantages and disadvantages) of locating a container terminal in selected port/s

International transport corridors pass through the Izmail transport hub: the first is the VII (Danube) European transport corridor, with a total length of 2415 km, connecting Western and Eastern Europe through the Rhine-Main-Danube canal, crossing Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Moldova, Ukraine. This corridor is actively operated by PJSC "Ukrainian Danube Shipping Company"; the second is the IX International Transport Corridor - Helsinki - St. Petersburg - Moscow - Kiev - Chisinau - Bucharest - Alexandroupolis, the third - the international highway E-57: Izmir (Turkey) - Tulcea (Romania) - Izmail - Odessa (Ukraine) - Rostov (Russia).

This port is one of the most modern and well-equipped Ukrainian ports in the DR. This port serves as a major transportation center, connecting various modes of maritime, river, rail, and road transportation. Navigation is available all year long, 24 hours a day.

Containerized cargoes that are being shipped through other ports in relative vicinity, or rail-road terminals and routes

Port of Chornomorsk occupies a leading position among Ukrainian ports in container transshipments. The port is located 236 km from the port of Izmail.

This is a universal logistics complex that provides a full range of services for the transportation of goods in containers:

- transshipments and storage of containers.
- operations for stuffing containers.
- placement of goods in warehouses with the status of a permanent customs control zone.
- technical support for customs inspection of goods.
- organization of round-the-clock release of containers from the port.
- dispatching the movement of auto container carriers on the territory of the port and at the entrances to it.
- information exchange between all the parties in the transport process logistics and regulatory authorities.

The total handling capacity of the port for handling containers is 1.15 million TEU, of which - 1 million tons of bulk cargo and 150 thousand tons of food products.

The port has a container complex with a capacity of 200 thousand TEU per year, a complex for transshipments of general cargo (bananas, citrus, rice, sugar, etc.) located on 3 berths over 300 m long, equipped with gantry cranes with a capacity of 3.2-6 tons. In the general cargo warehouse, a terminal for storage of bananas and citrus with a capacity of 5,000 tons was put into operation, which is able to maintain the optimal temperature for their long-term storage.

The warehouse space allows to store up to 26 thousand TEUs at one time, including: 18 thousand TEU loaded and 8 thousand empty TEU.

The capacity of the warehouse for storing goods in refrigerated containers is 606 containers (TEU).

Containers are loaded onto ships and unloaded from ships by gantry cranes. Transportation of containers from the port to recipients and their delivery to the port is performed by road and rail.

In May 2021, a new multimodal container route between the ports of Karasu (Turkey) and Slavkovo (Poland) through the port of Chornomorsk was opened.

As part of this route, containers will go from the Turkish port to Chornomorsk by ferry, then by rail to the multimodal terminal in Slavkovo, from where they will be sent to the countries of Scandinavia and Northern Europe. At the same time, a test batch of 25 containers has already been sent to Turkey from the ferry terminal of the port of Chornomorsk.

The development of the new route is envisaged in three stages. At the first stage, one route will be transported per week (50 TEU). The second stage will include 2 routes per

week. The third stage is the ability to follow the specified route for both containers and trucks.

9.3.2.1.2 Main reasons for success or failures of regular/significant container handling (volumes) in port of Izmail.

The main reasons for the termination of container transshipment at the port of Izmail include:

- the difficult economic situation in Ukraine (a significant decrease in the demand for consumer goods and the purchasing ability of the population), largely due to the devaluation of the Ukrainian currency (hryvnia).
- complicated procedure for registration of customs documentation.
- a significant share of empty containers in exports.
- an unimproved system of tariffs: in terms of the number of items, they exceed the tariffs of the main competitors in the Danube region.

Additionally, at the port of Reni, in Soviet times there was a record for transshipment - about 15 million tons per year. Then Moldova became independent from USSR, and the railway that connected Reni sea port with the other countries, partly passes through Moldavian territory. After Soviet Union collapse, problems arose with the passage of trucks through Moldova. Thus, the cargo, which was previously processed in Reni, went to the port of Izmail. That is, the whole system began to fall down, the economic ties that existed within the USSR collapsed, the cargo nomenclature was renewed. All these aspects have led both to a change in the direction of goods transportations within the country, and to the need to modernize the facilities to effectively handle the new cargo flow. That is, the old methods of cargo handling can be adapted in some way, but their effectiveness in the new market conditions is not necessary.

Concerning Izmail sea port, the container terminal has been operating slowly in 2000 years, but then the container traffic began to develop, and there was a need for additional capacity. Ukraine began to import many goods, which in world shipping are mainly in containers, so there was a flow of goods that had to be processed in some way. And then there were investors ready to develop this area. In the 1990s, a form of state cooperation with private investors emerged, such as a joint venture agreement. At that time, this was the only possible form of cooperation. Under such an agreement, the government provided territory and capacity, and the investor supplemented them. That's how it worked.

In addition, recently, a following situation has been observed: there are no empty containers, as well as no storage on the ship for handling loaded containers. Plus, both the containers themselves and the space must be booked at least a month in advance, which is absolutely inconvenient for e.g. the segment of the containerized grain cargo market.

This happened due to a significant decrease in imports to Ukraine, and shipping lines did not find a better solution other than to reduce the size of ships and even cut space on them for containers from the port of Izmail. Also, in most cases, the lines refuse to deliver empty containers by separate ships from other nearby ports, which is a normal practice.

9.3.2.1.3 Competitive (dis)advantages of other transport modes/routes in port

Among the main disadvantages of container transportations by rail in Odessa region are:

- Increase in the cost of transportation of 1 ton of bulk cargo by rail - from 380 UAH per ton to 1555 UAH per ton.
- Lack of wagons and delays in deliveries of wagons at the request of elevators. In case of under delivery of the declared number of wagons to the elevator from the side of SJSC “Ukrzaliznytsia”, there is a problem of fail of handling of the volume of cargo under contracts from the company.
- Increase in the number of abandoned loaded wagons on the tracks by 3 times. Downtime can be up to 4-5 days. This leads to delays in the dispatch of already distributed wagons and disruptions in the main delivery times of products to Odessa and Nikolaev ports.
- When filling out applications for freight forwarders' own wagons, the company faced the problem of queuing for 1 month in advance, because almost the entire wagon fleet was booked for large orders from multinational trading companies.

A number of factors drives such strategies, namely: more and more routing of railway shipments, the closure of ineffective stations, the replacement of common carriages with private ones. It will not be possible to count on receiving wagons, and if they are available, wagon shipments will be of high cost and unprofitable. The price of trucking will not decrease. In addition, it is unlikely that new directions of container trains will appear, and the number of directions on existing routes will also increase. With all this, wagon container transportation by rail will still operate, which can be received and loaded at non-route railway stations.

Based on the present situation with rail and road transport, the strategy of container logistics should be based on two options:

- By road - grain trucks to Odessa to the loading (stuffing) warehouse,
- By loading containers at the elevator, itself, delivered by road or rail.

9.3.2.1.4 Development potential

The development of transport infrastructure in Izmail sea port can be the main factor that will attract carriers that perform container transportation from Asia to European countries.

The development of the container transportation system is impossible without the harmonious development of all types of transport, the organization of coordinated interaction between them, the establishment of an acceptable and economically justified level of tariffs and legislative protection of shippers. Unfortunately, at the current moment, given the existence of a container terminal in the port, Izmail does not have sufficient transport support for its effective further use. Railway transport in Izmail currently already accounts a small share of container traffic and has significant potential to increase its share in this direction. A number of unresolved issues, both technical, technological and legislative, as well as the presence of inflexible tariff policy now represents the main barrier. Crisis phenomena in the domestic and global economy, on the one hand, creates an additional negative impact on the transport industry, but at the same time provides an opportunity to increase its market share by offering a better and cheaper service. However, it should be taken into account that the use of these opportunities requires sufficient investment and their rational use in the most problematic areas - technical modernization of railway transport, improvement of information technology systems, improving the level of transport services and more. It is also necessary to create accessible and understandable conditions for foreign investors. Their entry into the port economy and development plans is a key factor in the success of the industry of Izmail seaport.

9.3.2.2 Desired state of intermodal affairs with intermodal cargo

By the order of the Ministry of Infrastructure of Ukraine dated 01.12.2020 № 805 the property of the SE "Izmail merchant seaport" and the property of the Ismail branch of the State Enterprise "USPA" are included in the list of state-owned objects of transport that can be transferred to concession during 2020-2023.

Currently, a non-disclosure agreement has been concluded between the Ministry of Infrastructure of Ukraine, a potential private partner (Container Logistics LLC), SE "Izmail merchant seaport" and SE "USPA" for the exchange of information necessary for the preparation of a feasibility study for a PPP project on a private initiative. The exchange of the specified information proceeds.

The concession of the container complex in the port of Izmail will help to modernize the existing equipment of the complex, improve and optimize its operation, as well as create additional services for carriers and cargo owners.

Today in Ukraine concession is considered to be one of the solutions to invest into the development of port infrastructure facilities by private parties. This also applies to highways, possibly even railways, since the government does not have sufficient funds to develop the infrastructure, modernize it to meet modern requirements and standards. Therefore, the only way out is to attract investors, and with regards to large-scale capital investments, the investor must have a guarantee that, having invested funds at his own risk, he can earn on these facilities and infrastructure.

The possible concession of the port of Izmail is a step that can provide positive results in the long term. But in the current economic conditions, it would be unreasonable to

expect that concession will solve all the issues. The industry needs a strategic approach, where possible port concession agreements with investing companies is only one of the vectors.

Based on the D.T3.2.3-IIN-Agricultural DR Ports-Country Report, given the state of the railway infrastructure in the port of Izmail, namely, the lack of electrification and the necessary railway stock, it is difficult to estimate the possibilities of significant container transportation on the railway carriers.

Together with the overall decline in freight traffic at the port of Izmail observed in the last two years, we can also observe a drop in freight traffic by rail. On the section between Artsiz and Izmail, no more than 3-4 freight trains per day follow in each direction. Compare this with the frequency of freight trains on the main lines connecting to Odessa and the neighbouring ports of Chornomorsk and Yuzhny - where freight trains run in one direction or another every 15-20 minutes.

Thus, the railway in the Odessa region from Belgorod-Dnestrovsky to Izmail is actually now operated rather inactively. At a significant part of the stations between Artsiz and Izmail, almost no work is carried out on loading or unloading wagons - and such stations are used only as siding.

Any revitalization of the port of Izmail will immediately entail an increase in the volume of traffic by rail. But SJSC “Ukrzaliznytsia” is working on optimization of tariffs and logistics schemes in order to attract the bulk transportation of grain from the large stations of Sarata, Artsyz, Dzinilor, Kulevcha, Berezino towards the ports of Izmail, Chornomorsk and Odessa by rail.

Given the shallow depth at the berth (7 m), where the container site is located, it is difficult to talk about the possibility of handling container ships in Izmail seaport without the enhancement of the depths. But it is possible to handle barges adapted for containers.

In the spring of 2021, the Izmail seaport for the first time received a barge with metal cargo according to a new logistics scheme - from Zaporizhzhia along the Dnieper river to the Black Sea, and then along the Danube to the port of Izmail.

Izmail seaport unloaded a consignment of rolled strip in the volume of 5.3 thousand tons. A barge of this volume is a rather rare occurrence for this port. Then the metal products are loaded onto smaller barges and delivered to the ports of Serbia and Bulgaria.



Figure 30: Barge loading in Izmail seaport

9.3.2.2.1 Objectives of intermodal transport development in the port of Izmail

Izmail seaport is absolutely able to accept container traffic flow, since the port has the necessary equipment and port facilities in terms of maritime infrastructure.

Although, as it was mentioned before, it is important to renovate the railway tracks and resume railway transportation.

Based on the D.T3.2.3-IIN-Agricultural DR Ports-Country Report, electrification of the railway is a radical way to solve the railway problems in the south of the Odessa region. This will give not only a "gain" in the cost of transportation due to the transfer to electric traction. This will also make it possible to increase the speed of the trains.

It is also necessary to obtain approval from the railway administration to work with containers at a certain station, such as the registration of acceptance and dispatch, determination of the weighing method and placement of e.g., grain in containers. If the station has never worked with containers before, there are no such approvals, which means that the station is not able to handle containers.

The seagoing vessels don't have top-loading containers. For such specialized containers, it won't be necessary to make any special technical modifications at the elevators for their loading, but they will also be able to transport goods in the coming years only within the country.

Small consignments give maritime container shipments attractiveness and profitability in relation to the size of the freight rate, depending on the ship's lot - they

provide the possibility of shipment in small lots (from 20 tons), with freight rates comparable to ship lots of thousands of tons.

Freight rates for maritime container transportation are formed by linear carriers and depend on many factors, among which the distance of the sea passage does not play a primary role, as in the same tramp shipping. For this reason, the freight rates for the delivery of containerized cargo to two different ports located in the same country, or to two different terminals in the same port, can vary significantly.

9.3.2.2.2 Internal and external factors for initiation / increase of container transport in port of Izmail.

In order to start container transportation, it is necessary, first of all, to stabilize the economic situation in the country. Changes are now taking place in the field of customs control. In 2015, the Resolution of the Cabinet of Ministers of Ukraine No. 491 dated 07.07.2015 “On Amendments to Certain Resolutions of the Cabinet of Ministers of Ukraine”, which experts call a breakthrough in the field of transport, came into force. But it is necessary to continue this implementation in all ports at a high level, since the current level of cargo clearance is not competitive with the ports of the Black Sea basin, including the port of Constanta (Romania).

There are several main reasons that negatively affect container shipping, holding back their growth:

- the need to speed up and simplify port customs procedures, including introduction of modern solutions. After all, when choosing a route, potential customers carefully assess the simplicity and speed of cargo passage at all stages of delivery.
- an increase in the share of bulk cargo containerization, which now accounts for a significant part of the total cargo turnover in Izmail seaport.
- improvement of transport infrastructure.

9.3.2.2.3 Physical needs in terms of:

- Space** - development of free territories
- Infrastructure** - the construction of new and reconstruction of existing parts of road transport and railway infrastructure. Rail tracks electrification, renovation of the rolling stock.
- Facilities** - improving the efficiency of the use of existing transshipment capacity
- Operators** - the possibility of attracting private port operators for transshipments of containers at the existing state container complex in the port of Izmail (without the need for significant investments in its renovation or modernization), through a lease mechanism.

- e. **Hinterland connections** - Odessa-Izmail-Reni highway partially runs through Moldovan territory. Ukrainian border customs regulate the part of the road between Mayaki and Udobnyi, which takes a considerable time to cross. As a result, it makes multimodal transportation in the DR (Lower Danube) rather inefficient, so there is a need in a new project of the highway construction. In past, there were few proposals for construction of new highway, but they weren't implemented due to inefficient funds and negative impact on ecosystem.
- f. **Other** – establishment of a competitive framework for private investments by transferring the Izmail seaport in concession.

9.3.2.3 Existing transport and potential – overview

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Port of Izmail			X			X			<ul style="list-style-type: none"> - Renovation of road and railway infrastructure -Transferring the Izmail seaport in concession - Stabilization of freight rates for container shipping

Table 70: Existing transport and potential – port of Izmail

10 Conclusions

Port	Existing container transshipment				Potentials (for new or additional container flows)				Desired state and objectives (container transshipment development)
	From/to water	Rail and road only	All modes	None	None	Very limited	Sufficient	Considerable	
Ennshafen Port – Container Terminal Enns			X					X	- Port is fully developed and there are no further needs identified so far

Port of Vienna			X				X	<ul style="list-style-type: none"> - to expand the Freudenau port area - to raise the share of rail and water to 40% each at "Duisburg Gateway Terminal" by 2025, - to lower the share of road freight transport to 20% - to pursue digitalization and automation strategy - to realize the Physical Internet by 2030 - to acquire / upgrade transshipment equipment (cranes, stackers...)
Port of Bratislava			X				X	<ul style="list-style-type: none"> - expansion of existing intermodal terminal / construction of new modern intermodal terminal - increase of permeability of railways inside the port area
MCC			X				X	<ul style="list-style-type: none"> - modern, gantry crane - granting terminals to become modern ports with advanced IT system

Vukovar			X						<ul style="list-style-type: none"> - safe and reliable inland navigation - Developing and modernizing international inland ports - Increase the sustainability of the system - Improve the accessibility of the ports and their connections to other transport modes
Bogojevo				X				X	<ul style="list-style-type: none"> - connection of the port to the railway network - expansion of the port - proper equipment for bagging and containerization of grains - new multipurpose terminal
Bačka Palanka				X				X	<ul style="list-style-type: none"> - connection of the port to the railway network - expansion of the port - proper equipment for bagging and containerization of grains - new multipurpose terminal

Prahovo				X				X	<ul style="list-style-type: none"> - new intermodal (container) terminal connected to industrial zone and chemical park planned in the vicinity - construction of superstructure
Port of Ruse			X					X	<ul style="list-style-type: none"> - construction of an Intermodal terminal - separation of the port infrastructure from the transport activities related to servicing the logistics
Port of Constanta			X					X	<ul style="list-style-type: none"> - closing the gap between the port`s infrastructure and its hinterland connections - improved railway infrastructure with a higher commercial speed for cargo trains - continuous highway connection with NW of Romania and Budapest and Belgrade
Port of Galati			X					X	<ul style="list-style-type: none"> - finishing an intermodal terminal - assuring the minimum drought in port

Port of Giurgiu			X				X	<ul style="list-style-type: none"> - investment in port facilities and hinterland connection - operational railway
Drobeta Turnu Severin			X				X	<ul style="list-style-type: none"> - construction of a multimodal terminal (currently in progress)
Port of Izmil			X			X		<ul style="list-style-type: none"> - Renovation of road and railway infrastructure - Transferring the Izmil seaport in concession - Stabilization of freight rates for container shipping

Table 71: Existing transport and potential – Summary

11 Observations and recommendations

Given deliverable „D T2.1.2 Report on multimodal - intermodal market perspectives“ is a summary report consisting of 8 country reports focusing on history, current status and future potential of transshipment of intermodal units in inland ports on respective sections of Danube River.

According to what has been analyzed, we can divide DR countries into three categories

- Countries / ports with developed infrastructure for modal transshipment Austria, Hungary, Ukraine²⁹)
- Countries / ports with existing intermodal infrastructure where other hindering factors are present, such as Slovakia (limited space), Romania (insufficient hinterland connections)
- Countries / ports with missing intermodal infrastructure, such as Croatia, Serbia and Bulgaria

Despite the status, in all analyzed countries, new projects have been identified, either in terms of physical expansion of existing terminals or planning / studying new intermodal infrastructure.

Infrastructure however must always reflect local conditions a particularity of local market (demand / offer). Ports in capital cities such as Vienna, Budapest and Bratislava may have higher potential for import and export of intermodal units than regions where main focus is transshipment of agricultural production. Here it must be pointed out the intention of port of Bogojevo and Bačka Palanka to introduce short-distance grain transportation in containers if the proper bagging equipment is available.

This deliverable underlined the necessity of developing intermodal transport infrastructure in the DR region since all country reported:

- growth of GDP and positive estimation in upcoming years

as well as

- growth of intermodal transportation on country level including positive estimation in upcoming years.³⁰

Inland navigation is directly linked to maritime transport. Maritime transport accounts for about 90% of total international transport. Container transport accounts for about a quarter of the world's freight. The average annual growth rate of container traffic is estimated at 4.6% worldwide by 2026, but the world's seaports predict an average annual growth rate of container transshipment in 2019-2023 of around 5.5%. This also

²⁹ As od 24th February 2022 Ukraine is a victim of military aggression, therefore it is not possible to expect favourable general economic data since country´s economy and infrastructure are suffering significant damage.

as well as condition of state´s infrastructure and cargo flows will be severely

³⁰ For some countries, GDP and / or intermodal transportation forecast were not available

confirms estimated increase of the pressure on road and railway infrastructure when inland waterway freight transport may play the role of very attractive alternative.

Recommendations:

- To increase the use of freight container transport within the Danube area, it is recommended reconsider the following steps:
- Extension of the waterway network
- Elimination of bottlenecks
- Improving the maintenance and management of waterways
- Establishment of effective dam management on waterways
- Integration of water transport into modern logistics chains
- Development of ports in the form of multimodal logistics centers
- Further development / construction of trimodal "Danube" ports.

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