

# **ENERGY BARGE**

**Building a Green Energy and Logistics Belt**

**Project Code: DTP1-175-3.2**

## **Deliverable 6.2.2**

**Report on identified legal and administrative barriers and bottlenecks regarding green biomass logistics in the Danube region**

31<sup>st</sup> December 2017

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## Content

I	Tables .....	7
II	Figures.....	7
III	Abbreviations.....	8
IV	About the ENERGY BARGE project.....	9
V	About this document.....	11
1	Background.....	12
2	Executive summary .....	13
3	Legal and administrative barriers to biomass logistics.....	14
4	Status-quo of Inland Waterway Shipping in the partner countries.....	14
4.1	Austria .....	14
4.1.1	Conditions of shipping .....	14
4.1.2	Conditions of ports .....	19
4.1.3	Formalities in ports.....	20
4.1.4	Formalities at the border .....	22
4.1.5	General situation of Inland Waterway Shipping .....	22
4.1.6	Quality requirements for biomass .....	24
4.2	Bulgaria.....	25
4.2.1	Conditions of shipping .....	25
4.2.2	Conditions of ports .....	26
4.2.3	Formalities in ports.....	28
4.2.4	Formalities at the border .....	29
4.2.5	General situation of Inland Waterway Shipping .....	32
4.2.6	Quality requirements for biomass .....	32
4.3	Croatia .....	33
4.3.1	Conditions of shipping .....	33
4.3.2	Condition of ports .....	36
4.3.3	Formalities in ports.....	37
4.3.4	Formalities at the border .....	38
4.3.5	General situation of Inland Waterway Shipping .....	38
4.3.6	Quality requirements for biomass .....	39
4.4	Germany .....	39
4.4.1	Conditions of shipping .....	39

4.4.2	Conditions of ports .....	41
4.4.3	Formalities in ports .....	43
4.4.4	Formalities at the border .....	44
4.4.5	General situation of Inland Waterway Shipping .....	44
4.4.6	Quality requirements for biomass .....	45
4.5	Hungary .....	46
4.5.1	Conditions of shipping .....	46
4.5.2	Conditions of ports .....	47
4.5.3	Formalities in ports .....	49
4.5.4	Formalities at the border .....	50
4.5.5	General situation of Inland Waterway Shipping .....	51
4.5.6	Quality requirements for biomass .....	52
4.6	Romania .....	52
4.6.1	Conditions of shipping .....	52
4.6.2	Conditions of ports .....	53
4.6.3	Formalities in ports .....	53
4.6.4	Formalities at the border .....	53
4.6.5	General situation of Inland Waterway Shipping .....	54
4.6.6	Quality requirements for biomass .....	54
4.7	Slovakia .....	54
4.7.1	Conditions of shipping .....	54
4.7.2	Conditions of ports .....	55
4.7.3	Formalities in ports .....	55
4.7.4	Formalities at the border .....	56
4.7.5	General situation of Inland Waterway Shipping .....	56
4.7.6	Quality requirements for biomass .....	57
5	Barriers for green biomass logistics in the partner countries .....	57
5.1	Austria .....	58
5.2	Bulgaria .....	58
5.3	Croatia .....	59
5.4	Germany .....	60
5.5	Hungary .....	62
5.6	Romania .....	62

5.7	Slovakia .....	63
6	References .....	65

## I Tables

Table 1: Locks on the Austrian Danube stretch.....	15
Table 2: Transshipment points on the Austrian Danube.....	19
Table 3: Port infrastructure and superstructure of some of the ports in the Bulgarian section. ..	27
Table 4: List of waterways in Croatia. ....	33
Table 5: Tons of agricultural and forest goods in Germany split into modes of transport. ....	45

## II Figures

Figure 1: Pushed convoys in Danube lock .....	15
Figure 2: Availability of the waterway in Austria 2002-2016.....	16
Figure 3: Minimum continuously available fairway depths on the free-flowing stretches 2016 in days.....	17
Figure 4: Position of Republic of Croatia on the TEN-T Core network corridors – 1. ....	35
Figure 5: Position of Republic of Croatia on the TEN-T Core network corridors – 2. ....	35
Figure 6: Trend development of waterside transshipment in German, Bavarian ports and port of Straubing. ....	45
Figure 7: Share of agricultural products transhipped in Hungarian Danube ports in 2016.....	48



### III Abbreviations

AND	European Agreement for international transport of dangerous goods on inland water ways
BG	Bulgaria
BMVIT	Bundesministerium für Verkehr, Innovation und Technologie
DHR	Danube Flood Control Agency
EU	European Union
EUSDR	EU Strategy for the Danube Region
HR	Croatia
IWT	Inland Waterway Shipping
LCI	Load Compartment Inspection
NAP	National Action Plans Danube Shipping
RIS	Bulgarian River Information System
RO	Romania
SER	Serbia

## **IV About the ENERGY BARGE project**

The Danube region offers a great potential for green energy in the form of biomass. The main objective of ENERGY BARGE is to exploit this potential in a sustainable way, considering the Renewable Energy Directive 2009/28/EC, thereby increasing energy security and efficiency in the Danube countries. The project brings together key actors along the entire value chain, biomass companies and Danube ports as well as relevant public authorities and policy stakeholders. The project maps value chains and facilitate the market uptake of biomass, support better connected transport systems for green logistics and provide practical solutions and policy guidelines. The Agency for Renewable Resources (FNR) coordinates the project with its fourteen partners from Austria, Bulgaria, Croatia, Germany, Hungary, Slovakia and Romania.

## Project coordinator

Agency for Renewable Resources

Fachagentur Nachwachsende Rohstoffe e.V.	FNR	Germany
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## Project partners

BioCampus Straubing GmbH	BCG	Germany
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Deggendorf Institute of Technology	DIT	Germany
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Austrian Waterway Company	VIA	Austria
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Port of Vienna	PoVi	Austria
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Bioenergy2020+ GmbH	BE2020	Austria
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International Centre of Applied Research and Sustainable Technology	ICARST	Slovakia
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Slovak Shipping and Ports JSC	SPaP	Slovakia
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National Agricultural Research and Innovation Center	NARIC	Hungary
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MAHART-Freeport Co. Ltd.	MAHART	Hungary
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International Centre for Sustainable Development of Energy, Water and Environment Systems	SDEWES Centre	Croatia
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Public Institution Port Authority Vukovar	PoVu	Croatia
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Technology Center Sofia Ltd.	TCS	Bulgaria
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Romanian Association of Biomass and Biogas	ARBIO	Romania
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Federation of owners of forests and grasslands in Romania	Nostra Silva	Romania
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## V About this document

This report corresponds to Deliverable 6.2.2 *Report on identified legal and administrative barriers and bottlenecks regarding green biomass logistics in the Danube region* of ENERGY BARGE. It has been prepared by:

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## 1 Background

This deliverable “D 6.2.2 Report on identified legal and administrative barriers and bottlenecks regarding green biomass logistics in the Danube region” is mainly based on the activity as described in the latest approved version of the Application Form of the project ENERGY BARGE (Project Code: DTP1-175-3.2).

- *Activity 6.2 Identification of legal and administrative barriers (Lead: FNR)*

Separate country reports will be produced by each partner, identifying legal and administrative barriers and develop workable solutions that will be grouped according to the main biomass feedstock relevant for each country, based on conclusions of WP3, WP4, and WP5. Identified legal and administrative barriers and bottlenecks regarding green biomass logistics will be summarized. Good practices at local level with regard to local biomass production will be identified. Regional/national stakeholders, including the ENERGY BARGE consortium, will be integrated into the process of legal and administrative barriers, which will be reached by ENERGY BARGE workshops and B2B meetings. Moreover, stakeholders from the bioenergy sector and Danube logistics sector may benefit from this action as well as from networking and communicating with regional/national policy makers, also beyond the project’s lifetime. Regions along the Danube will be preferred, but for learning purposes other regions with similar background will be considered as well in order to support transnational collaboration.

## 2 Executive summary

This report comprises information on identified legal and administrative barriers and bottlenecks regarding green biomass logistics in the Danube region. Country reports were compiled by the project partners for Austria, Bulgaria, Croatia, Germany, Hungary, Romania and Slovakia as these countries are represented by members of the consortium. The deliverable shall contribute to better integrated policies and practical solutions to further develop the logistical aspects of transporting biomass. Its content will serve as the basis for the main outputs of Work Package 6 (“Transnational policy recommendations” and “Transnational energy security strategy”), which will be compiled in the further course of the project.

The ENERGY BARGE project targets to foster port locations as biomass and bioenergy logistics and, where possible, as production hubs where actors along the value and supply chains come together, supported by policy and administrative actors that promote this concept. To be able to be competitive in this economic field it is important that the port locations are willing to improve the conditions on site, which includes e.g. infrastructure, market orientation, digitalization, transport technologies as well as cargo options in the inland waterway sector. The situation of some ports at the Danube requires technological modernisation of the handling machinery as well as the storage capacities to be able to handle new cargo types and thus become attractive for a modal shift towards higher share of inland waterway shipping within the overall transport volumes of biomass. It is essential that coherent conditions are offered along the Danube river and thus this approach needs to be targeted on a transnational level.

An ideally continuous navigability of the Danube is a crucial aspect in terms of barriers towards the target of increasing volumes of biomass transports on the river. The available fairway depth is an important economic factor for the cargo shipping business as it determines the maximum cargo load of the inland vessels. For some parts of the Danube waterway, the required fairway depth can be guaranteed currently only for 200 to 240 days per year. A standardisation of the maintenance of fairway conditions in all ten Danube riparian countries, based on a common level of service, would constitute a major contribution to shift the transport of biomass from the road to the Danube waterway. This should comprise the harmonisation and simplification of the legislation and administrative framework for the affected logistics sector on international level as well as for the border controls at the Schengen borders along the Danube. The EU Strategy for the Danube region (EUSDR) contributes to the solution of these issues by searching for and adjusting potential measures with the relevant stakeholders from the region.

The lack of good transport connections between the ports and hinterland areas can be a problem in some Danube riparian states, e.g. in Bulgaria. To improve intermodal transport services it is important, besides the focus on the conditions of the inland waterways, to consider also the conditions of the railroad and road systems as those are essential for biomass transports to and from the surrounding areas of the ports.

### 3 Legal and administrative barriers to biomass logistics

For this deliverable legal and administrative barriers as well as non-legal barriers are taken into account. Legal and administrative barriers are those issues that are caused by regulations originating from government bodies and which delay or prevent the development of biomass logistics.

Barriers can also be non-existing legislation; wrong or ineffective types of support and incentives; lack of consultancy or information. Any actions or lack of actions that lead to a prevention of biomass logistics on inland waterways were taken into account for this report. Therefore, the project partners are encouraged to research and describe the status-quo in the following areas:

- Conditions of shipping
- Conditions of ports
- Formalities at ports
- Formalities at the borders
- Situation of Inland Waterway Transport
- Quality of biomass

In a subsequent step, this information is analysed and the greatest need for action is investigated. Furthermore, this deliverable will serve as the basis for the future work of the ENERGY BARGE project, especially for Activity 6.3 where recommendations for national and EU policy makers shall be developed.

Information is to be gained from literature studies, expertise from the respective agencies or agencies network, as well as from consultation with external experts.

## 4 Status-quo of Inland Waterway Shipping in the partner countries

### 4.1 Austria

#### 4.1.1 Conditions of shipping

The Danube flows through Austria for approximately 350 kilometres and overcomes a difference in height of over 150 meters. This energy potential is utilised by the nine Austrian Danube power plants to produce energy from hydropower. To overcome the height difference, ships have to be locked through at each of these power plants - in 2016 93,298 vessel units<sup>1</sup> in total. The continuous availability of the 18 lock chambers (9 locks) of the Austrian Danube amounted to 99.96% of all days in 2016. Reasons for lock closures were so-called lock overhauls, along with necessary large-scale repairs and year-round repairs of damage to facilities caused by vessels (viadonau, 2017a).

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<sup>1</sup> Convoys and individual vessels.

## Austrian locks

Table 1: Locks on the Austrian Danube stretch.

No.	Lock	River-km	Lock chambers Length x Width (m)   No. of chambers
1	Aschach	2,162.80	230,00 x 24.00   2
2	Ottensheim-Wilhering	2,147.04	230,00 x 24.00   2
3	Abwinden-Asten	2,119.75	230,00 x 24.00   2
4	Wallsee-Mitterkirchen	2,095.74	230,00 x 24.00   2
5	Ybbs-Persenbeug	2,060.29	230,00 x 24.00   2
6	Melk	2,038.10	230,00 x 24.00   2
7	Altenwörth	1,980.53	230,00 x 24.00   2
8	Greifenstein	1,949.37	230,00 x 24.00   2
9	Freudenau	1,921.20	275,00 x 24.00   2

On average, only 8.9% of all shipping units (commercial freight and passenger vessels) experienced waiting times at the nine locks on the Austrian section of the Danube in 2016. The

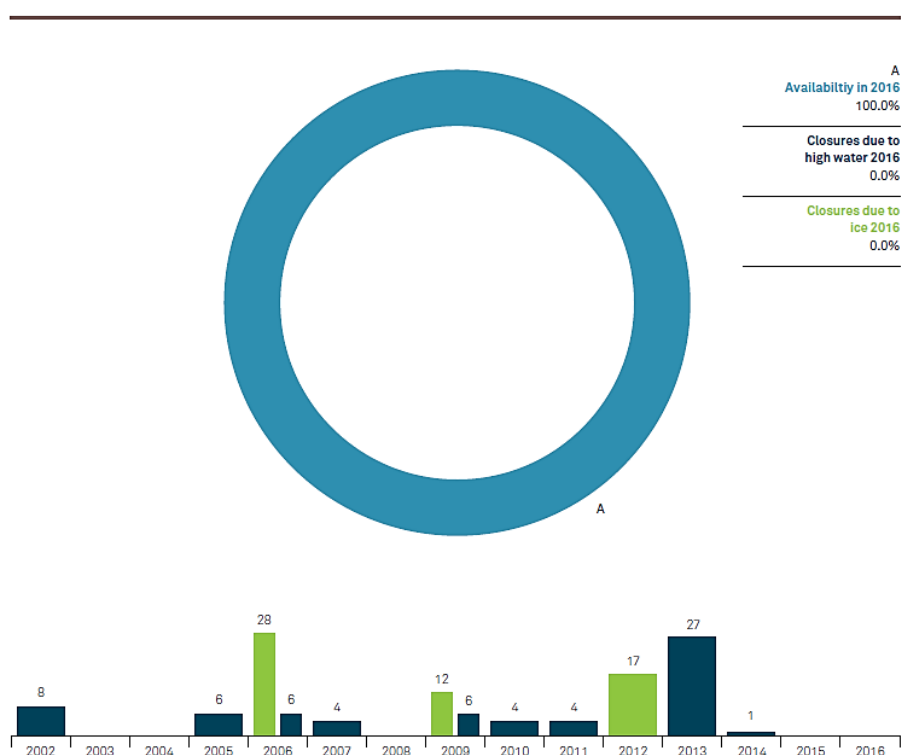


Figure 1: Pushed convoys in Danube lock

average waiting time amounted to 33 minutes per lock. For more than half of these vessels the waiting time was less than 30 minutes and only approximately 13% of all vessel units were delayed for more than an hour.

During the previous 15 years (2002 to 2016), the availability of the Austrian section of the Danube waterway accounted for 97.8%, or 357 days per year in average. Three closures due to ice were recorded in the same period. In average the Danube waterway was closed 19 days (viadonau, 2017a).

## Navigational closures due to high water and ice 2002 to 2016



**Figure 2: Availability of the waterway in Austria 2002-2016.**  
 Source: viadonau, 2017a.

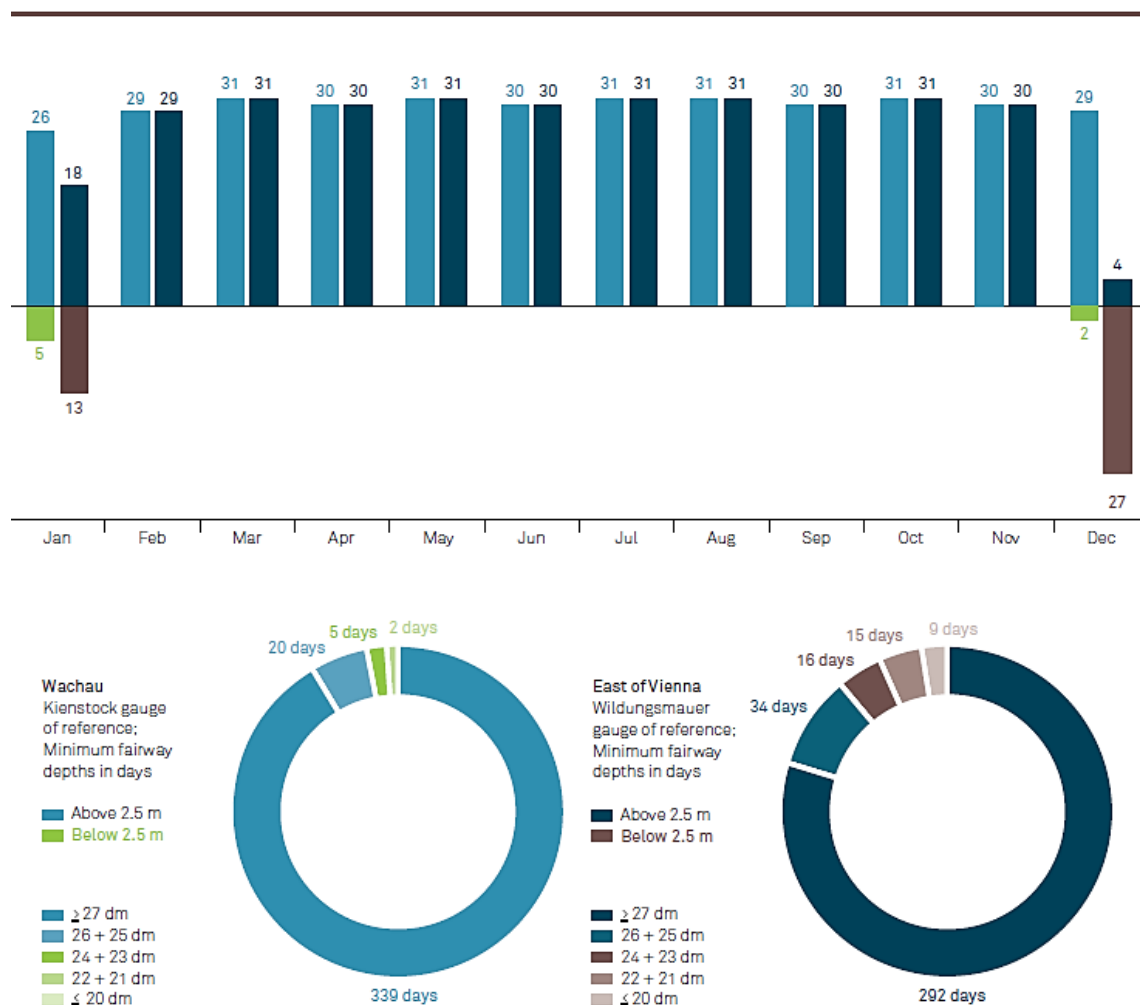
But the general availability of the Danube for navigation is of course only one aspect in terms of barriers for navigation. The available fairway depth is a crucial economic criterion for the cargo shipping business as it determines how many tons of goods may be carried on an inland cargo vessel. The more cargo loaded on board of a vessel, the higher is its draught loaded, i.e. the draught of a ship when stationary and when carrying a certain load.

viadonau has adopted a proactive approach in its efforts to ensure the provision of internationally specified fairway parameters on the Austrian section of the Danube. The objective is to ensure that the shallowest sections of the river are maintained and in good condition prior to the onset of low water periods.



In 2016, water depths of more than 2.5 metres in the deep channel of both free-flowing sections of the Austrian Danube were continuously available for ten months of the year (from February to November). Only the months of January and December recorded days with water levels below 2.5 metres due to the low water discharge. Overall, the Wachau recorded the availability of a minimum depth in the deep channel of 2.5 metres on 359 days, or more than 98% of the year (+9.6% compared to 2015).

In the free-flowing section east of Vienna a minimum navigable depth of 2.5 metres was available on 326 days or just under 89% of the year (+27.7% compared to 2015). To remove aggradation from the shallow sections of the river proactively, in total 14 maintenance dredging were carried out in 2016, resulting in the removal of approximately 285,000 cubic metres of material. Nearly 86% of this dredging activity took place in the stretch of the river to the east of Vienna (viadonau, 2017a).



**Figure 3: Minimum continuously available fairway depths on the free-flowing stretches 2016 in days.**  
Source: viadonau, 2017a.



There are four public Danube ports in Austria, which offer Danube logistics services:

- Port of Linz, located at km: 2128.19, Right bank
- Port of Enns, located at km: 2111.83, Right bank
- Port of Krems, located at km: 1998, Left bank
- Port of Vienna, located at km: 1920, Right bank



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© Port of Krems



© Port of Linz



© Port of Vienna

In addition, private ports and transshipment sites can also be taken into account for Danube logistics related business cooperation. The following table provides an overview of all transshipment points along the Austrian Danube.



**Table 2: Transshipment points on the Austrian Danube.**

Transshipment point	River-km	Type
Aschach an der Donau	2,160	Transshipment site
Linz commercial port	2,131	Port
Linz oil port	2,128	Port
Linz – voestalpine	2,127	Port
Linz – ILL	2,127	Port
Linz Felbermayr*	2,125	Port
Ennshafen	2,112	Port
Ybbs	2,058	Port
Pöchlarn	2,045	Transshipment site
Mierka Donauhafen Krems	1,998	Port
Pischelsdorf	1,972	Transshipment site
Korneuburg – MOL	1,943	Transshipment site
Korneuburg – Agrarspeicher	1,941	Transshipment site
Vienna-Freudenau	1,920	Port
Vienna-Albern	1,918	Port
Vienna-Lobau	1,917	Port
*located on the river Traun		

#### 4.1.2 Conditions of ports

##### Port of Linz

The port of Linz has a total area of round 1.4 million m<sup>2</sup>. Handling of biomass products is conducted in the “Commercial port”, while the “Oil port” focuses on oil-based products.

The storage facilities in Port of Linz offer an open storage area, covered storage area, storage facilities for dangerous cargo as well as a customs warehouse. For transshipment cranes with loading capacity of 40 tons, telehandler and stackers as well as equipped staff enable biomass handling. Currently, Port of Linz does not handle large quantities of biomass due to focus on oil based products.

## **Port of Enns**

The total area of the Port of Enns accounts for 3.5 million m<sup>2</sup>. Covered water transshipment, conveyor belt and pneumatic equipment offer suitable conditions for biomass handling. Furthermore, several logistics service providers located in the port offer handling and storage services for agricultural products such as Fuchshuber Agrarhandel or Danubia Speicherei. Storage of biomass is secured though open and covered storage areas. In 2016 more than 300,000 tons (Bundesanstalt Statistik, 2017) of biomass was transhipped on the waterside in the port of Enns.

## **Port of Krems**

Biomass products are also handled in the Port of Krems. The port area accounts for round 484,000 m<sup>2</sup> and offers open and covered storage area as well as customs warehouse. Biomass handling is facilitated through adequate equipment – conveyer belt, gantry and mobile cranes. In the 25,000 m<sup>3</sup> grain silo of Mierka Donauhafen Krems, all grain types are stored. The company Danugrain, which is 40 % owned by the port and 60 % owned by the Raiffeisen Ware Austria (RWA) operates this silo and develops competent logistics solutions for grain and feed stock (Rhenus Logistics, 2017).

## **Port of Vienna**

In 2016, approximately 110,000 tons of biomass were loaded or unloaded in the Port of Vienna. The port area is round 3 million m<sup>2</sup>. The port offers several devices for covered water transshipment as well as transshipment possibilities via conveyor belt and various cranes (Hafen Wien, 2017). Open, covered storage area (70,000 m<sup>2</sup>) (Hafen Wien, 2017a) and customs warehouse are also available. Several companies from the biomass sector are located in the port area such as Grand Molini, Raiffeisen Ware Austria, Agrarspeicher and other. The company Agrarspeicher is specialised in warehousing and handling of grain. The company is certified with GMP+ B3(2007) Trade, Collection and Storage & Transshipment. The storage capacity of Agrarspeicher for organic grain accounts for 20,000 tons (Agrarspeicher, 2017).

### **4.1.3 Formalities in ports**

In this section, a couple of exemplary formalities and procedures at Austrian ports are presented.

#### **Case 1 – Loaded vessel arrives at the port of discharge (example Port of Krems)**

1. The captain announces the arrival of the vessel in the port.
2. The captain is being informed where to berth.
3. After berthing, the captain declares his arrival and brings the transport documents (waybill, commercial invoice, packing list, customs documents (in case of non-EU cargo)) etc. to the port's office (begin of free discharging time).

4. The cargo is being customs cleared (if non-EU cargo).
5. The discharge and the on-carriage begin.
6. After the discharge, the load compartment is being cleaned.
7. The vessel leaves the port.

#### **Case 2 – Empty vessel arrives at the port of loading (Example Port of Krems)**

1. The captain announces the arrival of the vessel in the port.
2. The captain is being informed where to berth.
3. The captain declares his arrival in the port's office (begin of free loading time).
4. Before the loading, an inspector checks the load compartment for cleanliness (if necessary).
5. The loading process begins.
6. After the loading, the captain picks up the transport documents (waybill, commercial invoice, packing list, customs documents (in case of non-EU cargo)) at the port's office.
7. The vessel leaves the port.

#### **Case 3 – Port acts as a service provider (example Port of Vienna)**

1. The port master and the area manager receive the information when the ship arrives (approximate dates at least one week in advance - the exact dates 24 hours before arrival).
2. All necessary resources are provided to handle the ship.
3. The port master takes the data of the ship on arrival (Ship Number, Crew, Goods, Scale, and Quantity).
4. The collected data are entered into our ERP system for the settlement of bank charges (quay fees, demurrage paid by the shipping company).
5. In addition, statistics are compiled for Statistics Austria.
6. After the cargo handling and the release by the port masters the ship can immediately take off.
7. Various storage possibilities generate a high degree of flexibility in the break bulk area.

#### **Case 4 – Port acts as a landlord (example Port of Vienna)**

1. The port master receives the information when the ship arrives 24 hours before arrival; SMS notification available when a ship enters the port.

2. All necessary resources are provided by our terminal operators to handle the ship.
3. The port master takes the data of the ship on arrival (Ship Number, Crew, Goods, Scale, and Quantity).
4. The collected data are entered into our ERP system for the settlement of bank charges (quay fees, demurrage paid by the shipping company paid by the shipping company).
5. In addition, statistics are compiled for Statistics Austria.
6. The port masters will receive the departure papers as soon as the goods have been transhipped.
7. After the cargo handling and the release by the port masters the ship can immediately take off.

In general, no specific waiting times can be determined because waiting times may depend on availability of handling equipment, storage space, staff, etc. Usually, loading and unloading are facilitated on weekdays during the opening hours however, in exceptional cases transshipment is conducted outside the usual business hours.

#### 4.1.4 Formalities at the border

Austria is bordering with Germany and Slovakia along the Danube River – both countries are members of the European Schengen Area. Consequently, no border controls of vessel staff members or cargo are executed. Customs controls in Austria do not take place in case of cargo origin is within countries which are member of the EU customs union.

In exceptional cases border controls were introduced due to transnational crises and the assumed security threat such as in the year 2015 – when border controls were temporarily reintroduced according to the decision of the National Council and vessels had to follow the instructions of the police Vienna (DORIS, 2017).

In case cargo originates from a non-EU country controls take place in the port of unloading. In Austria, customs offices are located in ports in order to enable efficient and time-saving control procedures.

#### 4.1.5 General situation of Inland Waterway Shipping

In Austria the Federal Ministry for Transport, Innovation and Technology (bmvit) is in charge of several tasks regarding inland navigation. The Ministry acts as the Supreme Navigation Authority and is responsible for the provision of Notices to Skippers via [DoRIS Website](#) in cooperation with viadonau. viadonau is established and owned by the bmvit. viadonau carries out its task in accordance with the Federal Waterways Act (BGBl. I no. 177/2004). These include the planning, allocation and control of water construction projects. In addition, regulation, conservation and

development of water and flood protection systems occupy an important position within the service portfolio of viadonau.

By measuring, collecting and processing all hydrographic data, viadonau is able to provide the federal government with essential basic data in the field of water management. The company also assumes management responsibility of the Danube Flood Control Agency (DHK). The implementation of development tasks for inland waterway transport at national and international level also falls within the company's portfolio. The growth and development of cargo transport and intermodal transport, along with the development and implementation of new technologies and systems for inland waterways (especially River Information Services) is also at the forefront of viadonau's core activities.

The supervision of all nine locks on the Austrian Danube and the lock at Nussdorf are a sovereign responsibility for viadonau, as is the supervision of the weirs and all other bodies of water. The strategic planning, management and control of the waterway administration rests with the Federal Ministry for Transport, Innovation and Technology (DORIS, 2017).

In order to support and strengthen inland navigation in Austria, National Action Plans Danube Navigation (NAP) had been enshrined in the current federal government programme from 2007 to 2015 and was the strategic instrument for promoting Austrian inland navigation. Since 2013, a new instrument is introduced which aims at implementing a strengthened waterway and an upgraded flood protection system. The "[Aktionsprogramm Donau des bmvit bis 2022](#)" ("Action plan Danube of the Ministry for Transport, Innovation and Technology until 2022") is an integrative strategy for a balanced development of the Danube. For the first time, the objectives of both shipping and ecology as well as flood protection are applied. In a total of 23 measures, new initiatives will be bundled which will enable new developments. The wide range of proposed measures reflects the multifunctional character of the Danube and thus corresponds to the numerous requirements. The action programme focuses on the competencies of the Ministry and can be implemented in its own field of action.

#### **Objectives Shipping:**

- Customer-oriented waterway management and improved navigation of the Danube
- Increasing the competitiveness of the Danube shipping industry in logistics networks
- Increased traffic safety as well as safe lock operation

#### **Objectives Ecology:**

- Reduction of greenhouse gas emissions and increasing the environmental friendliness of the Danube navigation
- Preserve and improve the Danube habitat

#### **Objective Flood Protection:**

- Ensuring flood protection and minimizing damage in the event of a flood disaster

The catalogue of measures was developed in close cooperation with the relevant stakeholders.

In 2006 the European Union launched the [NAIADES Action Programme](#) for the promotion of inland waterway transport, with the aim of strengthening the position of inland waterways in the overall European transport system. This was superseded by NAIADES II, which is still running today. viadonau cooperates with the other Danube countries to improve mobility and multimodality along the waterway within the framework of the [EU Strategy for the Danube Region](#). Together with the Romanian Ministry of Transport viadonau acts as Priority Area 1A — to improve mobility and multimodality: inland waterways of the EU Strategy for the Danube Region coordinator with the involvement of a wide network of key players and stakeholders from the 14 countries of the Danube region (viadonau, 2017b).

Additionally, the association [ProDanube Austria](#) actively represents the overall interest in shipping in Austria and is strongly committed to providing a framework for navigational conditions. The main objectives are the development and promotion of shipping and the shaping of the framework conditions for shipping in Austria in cooperation with all the state and social institutions and organisations of the economy that are important for achieving these goals.

On international level, [ProDanube International](#), located in Vienna, acts as network of private businesses to promote better infrastructure and services which result in a more intensive use of the environmentally friendly inland waterway. The association represent the "Danube-minded business" in the political debate on transport policy, transport technology and regional development (ProDanube International, 2017).

#### 4.1.6 Quality requirements for biomass

There are several factors and conditions, which highly affect the quality of the transported biomass such as high humidity (risk of fungal infestations), unsuitable temperature conditions, possible contamination of cargo as well as the number of transshipments (risk of breakages). This is why the logistics service provider has to ensure that no quality loss occurs during transport, transshipment and storage of the cargo.

Different requirements have to be met when looking at the transport conditions of biomass. Some examples of transport requirements for biomass are constituted below (viadonau, 2016).

Wheat, which is dry for shipment is more than 12 months durable. The water content of wheat should not exceed 15% due to danger of mould, fermentation and germination. Optimal conditions for wheat transport and storage are 70% humidity and 20°C. Sufficient ventilation if case of higher water content should be ensured in order to prevent self-heating. Wheat transport as bulk is more common than transport in bags.

Stowage factor: 1.31 - 1.36 m<sup>3</sup>/t (bulk cargo)

Maize, which is dry for shipment is more than 12 months durable. The water content of maize should not exceed 15.5% in overseas transports since humidity can lead to mould and loss of

quality, especially in winter. The humidity protection should also be respected during transshipment and storage with a maximum of 75% as well as temperature with an optimum of 20°C. Higher temperatures cause mould growth and reinforce self-heating.

Stowage factor: 1.36 - 1.39 m<sup>3</sup>/t (bulk cargo)

Soybeans should be protected from moisture in order to prevent mould and activation of self-heating processes. Consequently, water content beyond 13% and humidity over 70% are critical. Soybeans require particular temperature 5-25°C and ventilation conditions also. Soybeans are generally transported as bulk cargo but occasionally also as break-bulk cargo in bags. The use of hooks is not recommended in case of bagged cargo.

## 4.2 Bulgaria

### 4.2.1 Conditions of shipping

The Bulgarian section on the River Danube is between km 845.650 and km 374.100 on the right bank of the Danube River. It is completely navigable and there are no locks constructed on it. Due to the climate conditions, there are periods of restricted sailing in the Bulgarian-and-Romanian section. This is due to low-tide in July – August, as well as ice-packs in January-February. During low-tide periods, competent authorities limit the depth of ships' draft, thus limiting the transportation of loads. Ice-pack such as to limit or prevent sailing (i.e. ice-pack of over 30%) is comparatively rare, happening once in 4-5 years.<sup>2</sup> In conditions of ice-pack, sailing of ships in the respective section is not allowed and it is recommended that they are taken to berths. According to data from "Maritime Administration" Agency – River Supervision – Russe" Directorate, in the section from Somovit to Silistra, there have not been periods of complete ban on traffic, however there are periods of limited navigation annually.<sup>3</sup> According to data from "Maritime Administration" Agency – River Supervision Directorate – Lom, on navigation in their section (West of Somovit), low-tide during various periods of the year and ice-packs in winter impedes or even prevents navigation.<sup>4</sup>

Executive Agency for Exploration and Maintenance of the Danube River, responsible for the maintenance and exploration of the navigation route through the entire Bulgarian section states that there are periods when navigation is impeded due to low-tide, narrowing of the navigation route etc., but this does not cause a complete restriction of navigation in the entire section.<sup>5</sup>

Hydro morphological changes in the Lower Danube are dynamic ones, thus each intervention such as widening and excavating the fairway with the purpose of facilitating navigation calls for a preliminary study. Sections containing islands tend to be problematic. There are more than 25 of

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<sup>2</sup> Verbal consultation – representative of "Harbour complex - Russe" Plc, 15.09.2017

<sup>3</sup> Written standpoint of River Supervision Directorate - Russe", at Maritime Administration Executive Agency (MAEA), 28.09.2017

<sup>4</sup> Written standpoint of River Supervision Directorate – Lom, MAEA, 19.09.2017

<sup>5</sup> Written standpoint of Executive Agency for Exploration and Maintenance of the Danube River, 19.09.2017



them. Their state of being in a critical condition is monitored by the Executive Agency for Exploration and Maintenance of the Danube River. Areas around the island of Belene (BG) (km 566-564) and Somovit (BG) – the island of Calnovat (RO) (km 612-610), as well as Papadia - Bechet (RO) - Oriahovo (BG) (km 678-675) have been identified as the most in need of performing certain types of dredging works (EAMDR, 2017; NEWADA, 2017)

Naval route in the section of km 845.650 to km 374.100 of the Danube River is maintained by the competent Bulgarian and Romanian authorities, according what has been stated in an agreement between the governments of the two countries (Republic of Bulgaria, 2017). A mixed Bulgarian-Romanian commission for the maintenance and improvement of the fairway in the Bulgarian-Romanian section for the Danube River prepares suggestions for improvement of the conditions for navigation (MTITC, 2005).

Navigation provision for shipping on inland waterways of Bulgaria, except for the shipping route, is carried out by the State Company of Port Infrastructure, and navigation provision for shipping in the Bulgarian section of the shipping route is carried out by Executive Agency for Exploration and Maintenance of the Danube River.

Changes in the navigation-related situation and special temporary recommendations for ensuring safety of navigation are being announced in “Notices to Skippers” issued by Maritime Administration Executive Agency, which serves as a controlling authority over the activity of all other state institutions and enterprises. These messages are published on the website of the Bulgarian River Information Services system (RIS).

By September, 2017, on the territory of the Bulgarian section of the Danube River there function 3 public transport ports of national importance with 9 port terminals and 2 ferry boat connections, as well as 16 ports and one ferryboat connection for public transport of a regional importance, handling cargoes. The territory and port infrastructure of public transport ports of national importance are public state property, except for the zones for storing cargoes, which could also be property of physical and juridical persons (Republic of Bulgaria, 2017).

Ports – state-owned – are managed by the State Enterprise of Port Infrastructure (BG Ports, 2017). The State gives port infrastructure under concession to port operators – state-owned or private commercial companies. For instance, Port Complex – Ruse Plc – a state-owned commercial company (MARAD, 2017; Port of Ruse, 2017) operates the port terminals of Ruse – East, Ruse – Ro-Ro terminal, Tutrakan and Silistra at Ruse port. Port Invest Ltd (MARAD, 2017; Portinvest, 2017) – a private company, operates Lom port terminal.

#### **4.2.2 Conditions of ports**

State-owned ports of Vidin, Lom, Somovit and Ruse are among those appropriate for transportation and handling of biomass. Except for possible poor meteorological condition which



could temporarily limit the volume of biomass handled, State enterprise of Port Infrastructure does not state restrictions to biomass as a type of load.<sup>6</sup>

**Table 3: Port infrastructure and superstructure of some of the ports in the Bulgarian section.**

Port/Port terminal	Loading places and berths	Open storage area, m <sup>2</sup>	Covered storage area, m <sup>2</sup>	Equipment
Vidin - North	1	10,000		Portal crane and other specialized lifting equipment for up to 20 tons
Vidin - South	2	9,600		
Lom	13	54,853	9,468	19 electric portal cranes of lifting capacity from 5 to 20 tons
Somovit	2	9,700	2,175	4 portal cranes with a capacity of 5 tons; a 120 tons rail weighbridge; a 80 tons auto weighbridge; supporting machinery & equipment
Ruse - West	11	27,600	8,900	10 portal cranes with lifting capacity between 5 and 20 tons
Ruse - South	14 + 2 Ro-Ro loading platforms	148,200	15,800	17 cranes of maximum lifting capacity from 5 to 32 tons

Besides the ports of national importance, some of the privately-owned ports of regional importance, such as Port Bulmarket – Ruse, ADM Silistra etc., also dispose of infrastructure appropriate for storing, handling and re-loading of biomass.

ADM Silistra	1			Specialized loading machinery of capacity of 200 t/h, 10 silo boxes of volume of 2,580 m <sup>3</sup> each, 2 auto-scales of 60 t, grain-drying facility, grain-cleaning equipment, laboratory (Port Silistra, 2017).
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Biomass quality is monitored by state-approved companies for control, inspection, testing and certification of products, which monitor and supervise the biomass- and biomass waste producing companies. Cargoes arrive at the ports with accompanying documents issued to the producer company by the control authority. At the ports, so called *technological cards* are in use, which aim to give information about set requirements for the storage and handling of different types of cargoes.

<sup>6</sup> Standpoints by or State Enterprise of Port Infrastructure and River Supervision Directorate in Ruse and Lom provided to Executive Agency for Maritime Administration (21.09.2017, 19.09.2017, 29.09.2017)

Currently, most handling operations at the ports deal with grain and oil-bearing crops, while few operations involve wooden goods. It is technologically possible to handle lumber, all kinds of loose cargoes, as well as some types of loads in bulk.<sup>7</sup>

#### 4.2.3 Formalities in ports

For use of the ports in the Bulgarian section of the Danube river, there apply the Rules for sailing on the Danube river, the mandatory rules for Bulgarian ports on the Danube river, the respective port's internal rules and the technological cards for handling various types of cargo.

Registered port operators perform the port services according to the approved technological cards (Republic of Bulgaria, 2017). A technological card contains the following elements:

- Name and code of load according to the National nomenclature of cargoes in transportation (NNCT 176), characteristics and properties, packing, requirements and restrictions in regard to the condition of the load and its packing;
- Description of the loading unit along with attached scheme for the manner of hanging (securing), respectively – hosing and positioning on belt- and other re-loading equipment;
- Description and requirements in regard to work equipment, including load-bearing equipment and inventory;
- Scheme of technological lines and description of the technological process according to the options for carrying out the work;
- Description of works to be carried out before, during and after the working process;
- Means of storing the load and requirements in regard to its safe-keeping;
- Table of the number, qualification and obligations of workers participating in the loading-and-unloading operations;
- Rules for applying of health-and safety working conditions, according to the requirements and prescriptions of the valid regulations, incl. Regulation 12/2005 for ensuring healthy and safe conditions for work when carrying out loading-and-unloading operations (SG, issue 11/2006);
- Sanitary-and hygiene requirements and requirements towards means for personal protection;
- Specific rules for fire-and-accident safety and prescriptions in regard to how to act in a case of emergency;
- Requirements for environmental preservation and prescribed actions in case of pollution to the environment (Republic of Bulgaria, 2017).

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<sup>7</sup> Written standpoints of River Supervision Directorate - Lom, MAEA (19.09.2017)

When a new cargo, which has not been handled so far, is expected at the port, the port operator designs a new Technological card according to the normative regulation for the country.<sup>8</sup>

According to the number of vessels handed in the respective port and the meteorological conditions, there may be cases when handling is put on hold; however, considering the fact that ports' capacity is under-utilized, cases of handlings put on hold are limited in number and duration.<sup>9</sup>

Vessels, except military ones visiting public ports of national importance, are subject to port fees. Fees are payable before departure and include: channel fees, vessel fees according to tonnage, linear pier fees, lighting fees, fees for accepting and handling of waste—resulting from navigation. State Enterprise of Port Infrastructure collects the fees, and expends them mainly for securing access to ports of national importance, incl. for construction and maintenance of external protective embankments, port infrastructure, and maintenance of prescribed depths in ports' basin as far the border of the operational basin (Republic of Bulgaria, 2017).

State Enterprise of Port Infrastructure also has the following obligations in regard to the ports:

- ensures the level of stated categories of ports and standards;
- coordinates management and maintenance of ports for public transportation;
- supports Minister of transport, information technologies and communication in exercising control over performance of concession agreements;
- maintains register of port operators;
- allows access to the ports;
- controls the keeping with requirements for technical safety of port equipment, requirements for safety of labour and accident-free carrying out of loading-and-unloading operations by personnel qualified for the respective type of work
- controls keeping with the conditions and order for carrying out of port activities and services, etc. (Republic of Bulgaria, 2017).

#### 4.2.4 Formalities at the border

Border control on entry and exit is carried out according to the requirements of Regulation on the organization for performing border-, passport-, customs-, health-, veterinary-medical- and phytosanitary control, as well as control on transport vehicles in the ports of the Republic of Bulgaria, serving international vessels (Approved with a Ministry Council Decree No 186/23.08.2012, amended in SG, issue 55 of 7 July, 2017).

Vessels visiting Bulgarian ports are subject to entry- and exit border controls, carried out in points of entry- and exit control within the ports. Border checks of vessels navigating between ports of EU member states applying the Schengen law are not performed, except for in regard to protecting internal order and security and for the purpose of applying the immigration legislation.

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<sup>8</sup> Verbal consultation with the representative of River Supervision Directorate - Ruse , MAEA (13.09.2017).

<sup>9</sup> Written standpoint of River Supervision Directorate - Lom, MAEA (19.09.2017)

Vessels navigating between ports within the EU-customs territory are also not subject to entry- and exit border control. This is not the case for vessels coming from ports outside the EU-customs territory or such that are having a layover or are leaving to a port outside of the EU-customs territory onto a port, situated in a free zone in the sense of the customs legislation. An exception from the rule of non-border control for vessels navigating within the EU-customs territory is made for purposes of applying the customs- and tax legislation and the protection of environment and public health legislation.<sup>10</sup>

Border control organization is carried out according to the Regulation for border points of control and admission, accepted with Ministry Council Decree No 104/2002, (amended in issue 22 and 61/2010). Border control authorities make a decision regarding the necessity of performing of a control check on a vessel on the grounds of the information received and based on the evaluation of a risk analysis. The decision is then registered at the National Centre for Electronic Documents Exchange for Maritime Transport, by every border control authority.

All institutions performing border control and all stages of the procedures – from applying to the authorities for entry control until receiving a permission to leave a port – are covered and monitored through the National Centre for Electronic Documents Exchange for Maritime Transport, which functions as “one desk” in the sense of Directive 2010/65/EU of the European Parliament and of the Council of 20.10.2010 regarding the formalities for providing information on vessels arriving to and/or leaving ports of member states and regarding the cancellation of Directive 2002/6/EC (OB, L 163 /2010). The Centre is maintained and managed by State enterprise of Port Infrastructure. Information is sent to the Centre once and is provided to the respective competent national authorities and to the member-states of EU. Information received at the Centre is entered in the National SafeSeaNet system and, upon request from a competent authority of an EU member-state, is provided by the SafeSeaNet system.

Border control procedures are in line with all applicable documents of international enactment, which Bulgaria is a party to.

#### **Example of a procedure:**

- The vessel's Captain, agent/vessel manager requests an entry- and exit border control from the border control authorities via the Centre. All necessary forms are attached, incl. maritime health declaration and a Sanitation Exemption Certificate, if applicable;
- Request is sent at least 24 hours before arriving at the port or at least at the time of leaving the previous port, if the trip takes less than 24 hours. If the port of call of the vessel is not known or if it has been changed during the journey – as soon as this information becomes available.
- Upon vessel's entry, authorities carry out a document check regarding the arrival and, through the Centre, give instructions on performing or exempting the vessel from border control;

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<sup>10</sup> REGULATION on the organization for performing border-, passport-, customs-, health-, veterinary-medical- and phyto-sanitary control, as well as control on transport vehicles in the ports of the Republic of Bulgaria, serving international vessels

- Border health control is carried out by regional health inspectorates in accordance with the Regulation under Art. 57, par. 2 of the Health Act.

For vessels with itinerary exclusively through ports of on the territory of EU member states, parties to the Schengen agreement, the “free practice” permission obtained in a port of a country which is a party to the Schengen law, is also valid for a visit to a Bulgarian port, except if circumstances which have taken place meanwhile require other handling, e.g. illness or death on board of the ship. Exceptions are also possible in case the border passport control authorities consider that there exists a threat to the international security and in regard to illegal immigration.

- General Directorate “Border Control” at Ministry of Interior carries out the border control. Crew and passengers may not leave the vessel before the border control is completed or before an exemption of such control has been granted. Authorities may allow persons related to loading-and-unloading activities to board the vessel before the check on board has been completed;
- Customs Agency, under the Minister of Finance, carries out customs control. It is not allowed for the vessel’s cargos to leave the customs area before customs control has been carried out or before an exemption from such has been granted, and before there has been granted a permission for lifting of goods.
- Customs Agency also carries out control over the road vehicles in the ports by checking whether all necessary documents according to Bulgarian legislation for carrying out international, transportation are available, collects fees and controls the total mass, axle load and dimensions of road vehicles;
- Border veterinary-and-medical control and phyto-sanitary control is done by the Bulgarian Agency for Safety of Foods, under the Minister of Agriculture and Foods. Should the authorities consider that there exists the risk of importing or spreading a disease subject to quarantine, and also in case a preliminary check of the loading compartments of the vessel is called for, the control upon entry is physically carried out before commencing the loading-and-unloading operations;
- Vessels leave the ports after the necessary documents have been submitted and after receiving permission from the border control authorities and the issuance of a certificate for departure. Border control authorities carry out checks of the documents for departure and, via the Centre, provide instructions on board for either carrying out or exempting from border control. Each authority which has requested border control on board of a vessel, upon the vessel’s departure informs the border control authorities of General Directorate Border Police of the completion of the check, via the Centre. State Enterprise Port Infrastructure issues the Certificate for departure.

Executive Agency Maritime Administration is to be informed in case of arrival of a vessel subject to a mandatory extended check, the respective necessary forms are to be provided,

also stating the date of the last extended check carried out in the area of the Paris memorandum.<sup>11</sup>

In case a vessel transports dangerous goods or such causing pollution to the environment, which vessel has departed from a port outside of the EU, a notification for dangerous or environmental hazardous cargoes is to be sent to the Maritime Rescue and Coordination Centre and RIS (Republic of Bulgaria, 2017).

There is no specific regulation for the import and export of biomass.

#### 4.2.5. General situation of Inland Waterway Shipping

Border control and handling cargoes procedures for Bulgarian ports on the Danube River do not differ considerably from those related to border control at the road borders. Competent institutions responsible for carrying out control function efficiently and in a well-synchronized manner. This is a considerable advantage in comparison to, for instance, transportation by large trucks. At almost all border-control points in the country, the border control of the trucks happens slowly, which results in queues of many kilometres. This is also the case at the only bridges over the Danube river in the Bulgarian section at Ruse and Vidin.

#### 4.2.6 Quality requirements for biomass

Quality of biomass in Bulgaria is monitored by approved companies for control, inspection, testing and certification of products, and control is carried out during production and upon loading at the producer's location. Regional inspectorates on environment and water preservation, Bulgarian Agency for Food Safety, as well as State-owned forestry offices and municipalities are the competent authorities in regard to transportation of biomass.<sup>12</sup>

When biomass is a dangerous load, transportation is carried out according to the European agreement for international transport of dangerous goods on inland water ways (ADN).<sup>13</sup> Ships crossing the inland waterways of the Republic of Bulgaria carrying dangerous goods must comply with the regulations prescribed by the Rules for transportation of dangerous cargoes on inland waterways, accepted by the Danube Commission and by the European Economics Commission.

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<sup>11</sup> REGULATION on the organization for performing border-, passport-, customs-, health-, veterinary-medical- and phyto-sanitary control, as well as control on transport vehicles in the ports of the Republic of Bulgaria, serving international vessels

<sup>12</sup>

Verbal consultation with a representative of the Regional Inspectorate for Environment and Waters - Ruse, 20.09.2017.

<sup>13</sup> Written standpoint of Rives Rupervision Directorate - Russe, MAEA (29.09.2017)

## 4.3 Croatia

### 4.3.1 Conditions of shipping

According to the European Agreement on Main Inland Waterways of International Importance (AGN) on rivers with fluctuating water levels (which are Croatian international waterways), the characteristic draught should be provided through 240 days or 66% per year. The 1.20 meter navigation depth should be secured throughout the year. The fairways on Croatian sector of waterways are designed at higher percentages of sailing days with full draught in average during the year, since the economic aspects do not endure major congestion or long periods when vessels need to be unloaded or sail with lower draught. According to strategic documents, the goal would be to achieve navigability with a full draught in 300 days a year. During the low water level periods it is usual to reduce maximum vessel capacity up to 30% of total loading capacity, which results in a vessel draught reduction of about 20%.

Commercial navigation in the Republic of Croatia takes place only on the Danube and the Drava and Sava sections on which the international navigation regime was proclaimed. Maintenance works should be conducted at project level demanding preparation of documentation and obtaining necessary permits. Waterborne deviations are expected, but should be within the limits defined by the AGN contract. In 2016, restrictions and stoppages of navigation were caused primarily by inadequate depths. Insufficient widths of the waterway were also present at low water levels, but taking into account the intensity of traffic was not a limitation (Inland Waterway Agency, 2017).

In Croatia inland waterways are defined According to the Ordinance on the classification and opening of inland waterways (Official gazette 77/11 and 66/14) as follows:

**Table 4: List of waterways in Croatia.**

River	Section	Length (km)	Class of the waterway
DANUBE	1,295+500 (Ilok) – 1,433+100 (Batina)	137.5	VI. class
SAVA	210+800 (Račinovci) – 313+700 (Sl. Šamac)	102.9	IV. class
	313+700 (Sl. Šamac) – 338+200 (Oprisavci)	24.5	III. class
	338+200 (Oprisavci) – 371+200 (Sl. Brod-grad)	33	IV. class
	371+200 (Sl. Brod-grad) – 594+000 (Sisak-Galdovo)	222.8	III. class
DRAVA	0+000 (Ušće Dunava) – 14+000 (Osijek luka Nemetin)	14	IV. class

On the Danube, typical vessels of the VI c class consist of a length of 195 to 280 meters and a width of 22.8 to 34.2 meters with a characteristic draught of 2.50 meters. Even there are some sections



with insufficient width and small radius of curvature a congestion in navigation is not common since most of the sections are quite short, and there is always a possibility of one-way navigation. Serious limitations and stoppages in navigation are only caused by low water depths which, due to the flow regime of our rivers, can last for a longer period during the summer and autumn. On the Danube from Ilok to the border with Hungary critical navigation sectors have been defined by the Joint Expert Group of the Republic of Croatia and the Republic of Serbia for the maintenance of the waterway, and a total of 17 critical sectors have been recognized. Alongside Croatian section of the river Danube in total of 137.5 km from Hungarian border to Ilok, there is only one river port on the right side of the Danube river – Port of Vukovar ( rkm 1,335 +000) and one that is positioned on the Drava river (tributary of the Danube) – Port of Osijek ( rkm 14 +000) (Inland Waterway Agency, 2017).

Croatia is intersected by Pan European transport corridors V and X and at same time it is also part of TEN-T network. Due to its geographic position, the Republic of Croatia has a key role to establish effective links between the Western Europe and the Balkans, and in terms of the connection between the Central European area and the Adriatic Sea and Mediterranean. The core network of ports comprises Vukovar (on the Danube river) and Slavonski Brod (on the Sava river), and comprehensive network ports Osijek (on the Drava river) and Sisak (on the Sava river).

Port of Vukovar is extremely well connected to main transport corridors including road and railway Pan European corridor X connecting Zagreb (HR) and Belgrade (SER) and 5c corridor connecting Budapest with the Adriatic Port of Ploče. Overall distance between Port of Vukovar and main motorway corridor, Pan European X and 5c, is not further than 50 km what gives great accessibility to the port from all other parts of the whole region. Port of Vukovar is located approximately on a half of total length of the Danube river, and considering its geographical position, port of Vukovar traditionally has been servicing the markets of the Eastern Croatia and neighboring Bosnia and Herzegovina.



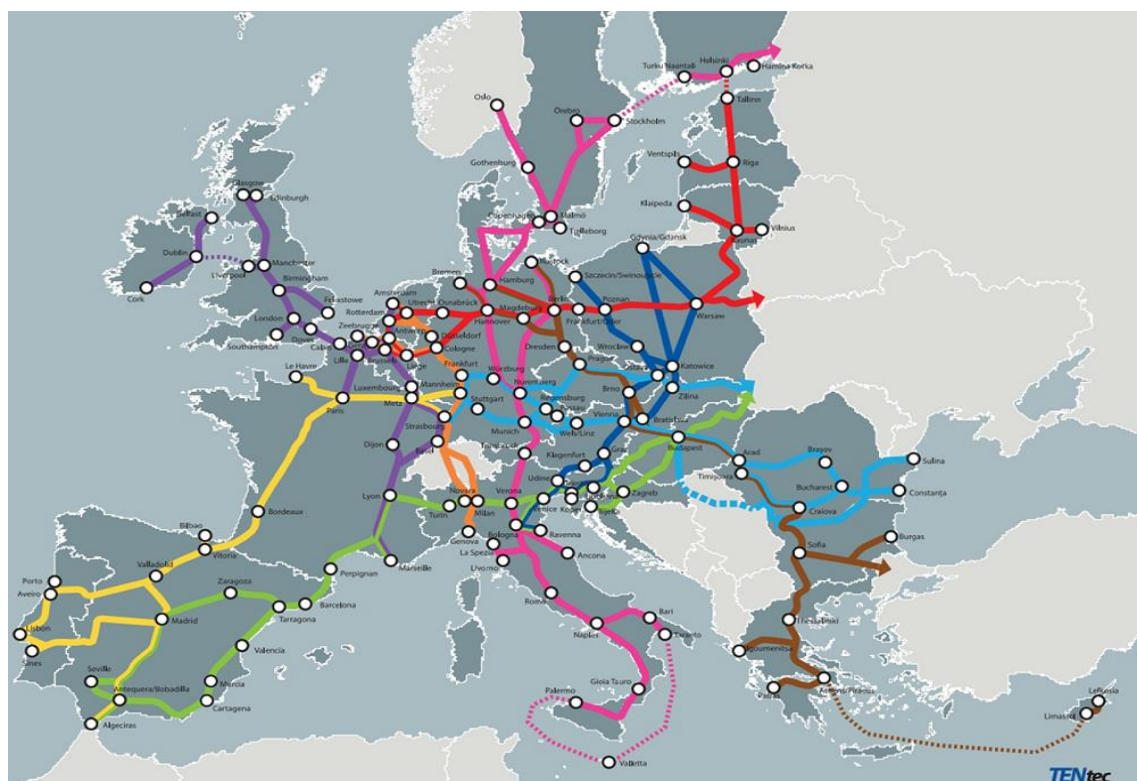


Figure 4: Position of Republic of Croatia on the TEN-T Core network corridors – 1.



Figure 5: Position of Republic of Croatia on the TEN-T Core network corridors – 2.

### 4.3.2 Condition of ports

The main Croatian inland ports are Osijek, Sisak, Slavonski Brod and Vukovar. Inland waterway resources in Croatia are relatively underused and the share of river transport in total goods transport amounts to just 0.17%. Croatian river ports require qualitative and technological modernization in order to satisfy the existing and expected transport demand. Along with modernization of the port infrastructure, the system of safety and surveillance in the port area should also be enhanced. Ports need to take advantage of its geographical position and improve existing connections with main road and rail corridors in order to achieve better integration with the economic hinterland and to create preconditions for the development of multi-modal transport attracting new cargo.

The operational port of Vukovar is a linear object on the Danube bank, its length is approximately 1.7 km and it has seven berths. Five of these berths have inclined banks, and two have vertical bank. The total surface area of the port territory is 26 ha and four port operators are doing business in. The port accommodates 13,500 m<sup>2</sup> of open storage, 2,400 m<sup>2</sup> of closed storage, 10,000 m<sup>3</sup> of storage for liquid cargo and 48,000 tons capacity of silo. All port operators are equipped with different type of transshipment equipment since they have different concession contracts for different port activities. All port operators have equipment as cranes with adapters for transshipment of bulk, in general pelletized cargo, while one port operator has special suction equipment device for loading or unloading only bulk cargo. Currently there is no biomass as a raw material handled in the port, but some of the port operators have been handling agricultural products that are used for human food or animal food production, indicating that with some modifications and adjustments they could handle biomass like any other cargo that has already been present in the port. In terms of biomass, a limiting factor could be the storage capacity for specific types of biomass, in case special storage and handling conditions are required.

To increase the overall cargo volumes in the ports, inland navigation has to become more attractive in comparison with other transport modes. According to the interviews, which were conducted with Croatian stakeholders in the frame of Work Package of the ENERGY BARGE project, biomass itself and final products made of biomass are not suitable for many transshipment operations (loading/unloading) because it raises the overall transportation costs. One of the measures to move biomass from road transport would be to find the model of reducing overall expenditures (transshipment fee, port dues, storage fee) giving the potential customers opportunity to use ports as hubs where they could store higher quantities of biomass that could later be transported with vessels to the final destination. Another positive effect in rehabilitation of inland navigation could be the installation of new capacities of biogas and biomass powered plants near ports and in close vicinity of agricultural and forests areas that could be mutually source for power plants, but also a source of raw material for the transnational market. A modal shift towards an increased use of inland navigation by the biomass sector would require common efforts, involving all concerned parties, e.g. Ministry of Sea, Traffic and Transportation, Directorate for inland navigation, Croatian Chamber of Economy, Ministry of Economy, entrepreneurship and crafts, Ministry of Environment and Energy, policy makers but also all stakeholders who carry out policies and activities.

### 4.3.3 Formalities in ports

The formalities of the port of Vukovar are defined by port regulations and ordinance in the Vukovar Port Document (2004), which determines all aspects within the port area. Except the determinations of this act, within the port area all other regulations related to safety of navigation, border crossings, customs, sanitary, veterinary, phytopathological and other applicable regulations<sup>14</sup> must be applied. The Port Authority manages the port area of the Vukovar port, monitors and controls the traffic and supervises all other processes in the port. Every arrival of a vessel has to be submitted at least 24 hours before expected time of arrival. A notification of arrival has to be submitted by the captain or his agent. Each notification of arrival must contain:

- name of the vessel, country of registration, total capacity, draught, overall length,
- number and names of the crew,
- cargo type and quantity,
- port of departure, date and time of departure,
- date and time of expected arrival.

Notification of arrival can be delivered electronically, by e-mail, radio or fax. It is captain's duty to announce exact time of arrival at least 2 hours before actual arrival. After receiving the notification of arrival, Port Authority informs Harbours Masters Office, Ministry of the Interior, Customs office, port operators and agents. It is considered that a vessel has arrived to the port when the vessel has securely arrived to the berth alongside bank or it is securely positioned inside the berthing area. After finishing transshipment operations, departure of the vessel has to be announced at least 2 hours before departure. Notification of departure can be submitted by the captain or his agent by e-mail, radio or fax or electronically. Notification of departure has to contain:

- name of the vessel
- cargo type and quantity
- expected time of departure

It is considered that a vessel has left the port area when the captain confirms departure after leaving the port area.

Formalities in ports on national level are clearly defined and determine procedures for all incoming and outgoing vessels without exceptions, and in terms of that are not considered as barriers. In terms of barriers on the transnational level, within the Danube Transnational Programme, 1<sup>st</sup> call, the project Dante will give appropriate solutions as guidelines for harmonization and simplification of all procedures and practices alongside the Danube through the implementation of the idea: Same river – same rules.

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<sup>14</sup> Energy Barge, *Deliverable 6.1.1 – Mapping the political and regulatory frame in the Danube region regarding biomass production for energetic use and logistics*, 31. May 2017, 53.

#### 4.3.4 Formalities at the border

Community goods (so-called domestic goods) that are traded by persons from the Republic of Croatia and persons from other EU countries are not subject to customs supervision and will not be subject to customs procedures and therefore no duty is charged. However, if the commerce between the legal entities within the EU is taken on goods which do not have the customs status of community goods (i.e. foreign goods), they are placed under customs supervision and are obliged to submit a declaration for release for free circulation and pay import duties (customs and taxes). Similarly, for goods from third countries, customs have to be paid in accordance with community legislation. As for the role of the customs shipper, it should be noted that under the terms of the Community Customs Code each person may appoint an agent who carries out the acts and formalities provided in the customs regulations. Therefore, for the purposes of customs formalities, the services of authorized shippers may be used.

#### 4.3.5 General situation of Inland Waterway Shipping

The inland waterway transport has some advantages in comparison to other inland modes of transport in terms of its capacity and attractive low-costs. However, it is also important to meet the users' demands with regards to the efficiency of the waterway transport by means of securing the reliability and flexibility. Referring to this, the inland waterway transport has significant shortcomings, for instance when compared to road transport. To enlarge the reliability of inland waterway transport, it is important to ensure the navigability in conformity with the requirements of the relevant companies, e.g. guaranteed dimension values of a fairway as well as securing a required quality of port services.

The inland navigation has less harmful impacts on the environment in comparison to other transport modes. The external costs, which are mostly related to environmental pollution, are becoming a determining factor in the development of transport infrastructure and the valorisation of transport. However, mechanisms have not been set up yet, by which these costs could be included into the price of transport.

The capacity of the port of Vukovar (located on the Danube river) and port of Osijek (located on Drava river – tributary of the Danube river) amounts to almost 5 million tons per year (Vukovar 2 million, Osijek 3 million). A major problem for the two ports is missing cargo. This is a result of a disordered market, non-existing intermodal links with the hinterland and as the main challenge an underdeveloped economy, due to a lack of industry especially in the surrounding areas of the ports. A potential and promising solution could be the construction of co-generation plants, which could create new employment opportunities for the local population and provide energy from environmentally friendly sources. To increase the processing depth of biomass for energetic purposes in the respective regions could also have positive effects for the regional labour markets instead of exporting raw materials. Mainly the Ministry of Economy and the Ministry of Sea, Traffic and Infrastructure, Directorate for Inland Navigation, are in charge to adopt laws to support higher transport volumes on inland waterways in the future.

#### 4.3.6 Quality requirements for biomass

From the perspective of the logistics – ports, biomass is mostly treated as any other cargo. If the biomass is transshipped as raw material there are no special prerequisites to be fulfilled except those that can affect safety in terms of preventing the working area and equipment from fire if the biomass is inflammable. Quality could be crucial and significantly affect the transshipment process if the consigner of the cargo and the cargo structure demands special treatment including special conditions during storage and cargo handling. The most important thing during the transshipment process is not to affect the cargo quality in terms of reducing quality of the product. Generally speaking, quality of the cargo cannot significantly influence on transshipment procedures and processes, since port operator's obligation is to handle all cargo, no matter of its quality, with the same care.

### 4.4 Germany

The German Danube stretch is only navigable from Kelheim and the connection to the Rhine-Main-Danube-Channel, respectively, to the Austrian border, as has been presented in Deliverable 6.1.1. Thus, only this section of the Danube is relevant when talking about improving the legal and administrative situation for biomass logistics. Moreover, the options for further transport of products and intermediates from the Danube macro region on to the Rhine-Main-Danube Channel and vice versa have to be kept in mind and are considered in the following chapters. Information on the legal and administrative barriers for biomass transport on the Danube has been collected from own internal expert knowledge at the port of Straubing (managing director, port manager), the ASP Government of Lower Bavaria, the relevant authorities, associations and stakeholders (Wasserstraßen- und Schifffahrtsverwaltung des Bundes/Federal Administration for Inland Waterways and Navigation, Bundesverband öffentlicher Binnenhäfen/Federal Association of Public Inland Ports, Bundesverband der deutschen Binnenschifffahrt/Federal Association for Inland Waterway Navigation), and the ENERGY BARGE exchange workshop in the German ports of Bamberg and Aschaffenburg (both located at the Rhine-Main-Danube-Channel).

#### 4.4.1 Conditions of shipping

In general, inland waterway navigation is a special kind of transport mode as it does not necessarily need the provision of sophisticated dedicated infrastructure compared to e.g. road, rail and air transport – rather, rivers are natural infrastructure (viadonau, 2017). Nevertheless, the reliable availability of a well-established, dredged and save waterway that is deep and wide enough for standard vessels to navigate in it is the most decisive precondition for smooth freight traffic on the river Danube as well as on the connecting channels. The depth available determines the freight volume vessels can load (so-called laden draft). In order to allow reliable and competitive transport on the Danube, a laden draft of 2.50 metres the whole year round must be guaranteed (WSV, 2013).



## *Danube*

The shipping conditions alongside the Danube with its length of more than 2,000 km differ considerably. In this section, the situation along the Bavarian navigable Danube is dealt with. This stretch is around 210 km long with six locks, of which 70 km between Straubing and Vilshofen, both in Lower Bavaria, are “free-floating”, meaning that no considerable structural actions such as locks have been introduced. Except for these 70 km, the German Danube can provide the required 2.50 m all year round now (WSV, 2013). In the section between Straubing and Vilshofen, this draft can only be offered for around 144 days. In all periods of low water, only a draft of 1.60 m is possible. Additionally, the stretch between Straubing and Vilshofen has heavy currents and limited width that restricts navigability that forces vessels coming from the North and South to choose a different coupling of pusher and barge and sometimes even requires discharging. At a part of this section, the Danube is so narrow that vessels can only drive into one direction at the same time, making waiting times necessary. This is a situation, which again restricts competitiveness and economic viability of this otherwise very environmentally friendly mode of transport.

This situation at the German Danube overall depicts a critical barrier to increased inland waterway navigation on the German Danube, which, indeed could and should be the interlinkage to the much farther developed waterway system of the Rhine area. The current infrastructural situation however inhibits this development. The types and sizes of vessels that can navigate on the upper Danube are restricted by the nautical situation. The transport of biomass feedstocks and products, being mainly bulk products, could become much more efficient and economically viable if larger quantities on bigger barges and convoys could be transported (viadonau, 2017).

Overall, especially the situation at the Straubing-Vilshofen section has been a matter of heated discussion especially between politics, Danube logistics, shippers and conservationists. The political and societal discussion about upgrading this stretch has been going on for over 50 years and is considered a legal, societal and political barrier. Hardened opposition has inhibited a solution that fits all interests. In 2014, the Bavarian head of Government, Mr. Seehofer, made a decision to settle the dispute. The measures to be taken according to this decision run under the title “sanfter Donauausbau/Variante A” (Smooth Upgrading of the Danube waterway, Variant A) (StMI, 2014). Since the administrative procedures are developing very slowly at the moment, it is not possible to make a reliable prediction as when the measures will be finalised in order to allow better shipping conditions at the Bavarian Danube.

It is however save to argue that German and Bavarian politics in this respect have been regarded as harmful for the beneficial development of the entire Danube region by almost all other Danube countries for not eliminating this very extensive bottleneck (although it clearly is not the only bottleneck existing along the river (WSV, 2013).

Despite the existing bottlenecks, it is of utmost importance to acknowledge, preserve and actively further the environmental and cultural heritage of the ecosystem along the river Danube. As it is convinced that the interests of both a healthy Danube ecosystem, the people using it, and a vital Danube logistics sector are not per se contradictory, the port of Straubing has started a stakeholder initiative that aims at finding constructive compromises. By regularly discussing with

environmentalist interest groups, actively offering environmentally sound solutions in its port area and informing the public about it, the port of Straubing has managed to work together with conservationism. This led to more goodwill on their side when it comes to official statements during planning approval procedures, e.g. regarding the benefits the port will have when it comes to the better linkage to the West in the direction of the Straubing lock.

#### *Rhine-Main-Danube Channel*

The 171 km long channel was opened in 1992 and connects the river Main with the river Danube. The Main in turn is connected to the river Rhine and thus depicts the direct linkage between the macro regions Rhine and Danube. The channel is equipped with 16 locks and barely ever suffers from low water (WSV, 2017). Draft is mostly 2.70 m and pushing units of 185 m are allowed. However, other than the Danube itself, the channel is more prone to limited shipping times due to ice. The port of Bamberg for example often has an ice cover, that however can be handled most of the cases.

Regarding the port density, both the Danube and the Channel are well equipped, as is depicted in more detail in the next chapter 3.4.2. Ports, in general, and inland ports, in particular, understand themselves primarily as intermodal – ideally trimodal – logistics hubs. The German Federal Association of Inland Ports e.g. states that only in inland ports, the advantages of all transport modes, rail, water, and road, can be used and combined to the highest economic advantage. In all Bavarian inland ports, there is not only the required infra- and superstructure available, but also companies offering logistics services for all kinds of cargo, also filling possible equipment gaps at the ports themselves (BÖB, 2017).

#### **4.4.2 Conditions of ports**

Along the Bavarian Danube, there are five public inland ports, as well as nine public ports along the Channel (StMI, 2017). Six of these ports (Aschaffenburg, Bamberg, Nürnberg, Roth, Regensburg and Passau) directly belong to the Free State of Bavaria. In general, all ports are modern and well-equipped (BÖB, 2017). The administrative and legal topics relevant for all Bavarian inland ports revolve around the following topics, as stated by the Federal Association of Inland waterways:

- Integration and integrative transport politics
- Infrastructural politics
- Public investments
- Public regulations
- Intermodal transport modes incl. road and rail transport
- Port and transport chain security and safety
- Environmental politics
- Business development and marketing

Consequently, all these aspects can pose potential legal and administrative barriers – also for the specific transport and freight goods from the agricultural and forestry good sector, namely biomass.

Many Bavarian ports have engaged in strategic business development activities in the recent years, resulting in specialisation in specific types of cargo. In the ports of Straubing, Aschaffenburg, Regensburg or Bamberg, for example, an emphasis lies on the cargo categories of agricultural and forest good as well as food and feed, which both include all kinds of biomass for both material and energetic use. Considerable shares of their annual tons handled are made up by these cargo types that are among the top three cargo goods on the Danube as a whole (viadonau, 2017). Consequently, these ports also invest in specific equipment and infrastructure for these goods where necessary or possible. A problem sometimes is posed by sufficient storage space. In most of the ports listed, special companies are settled in the port area that offer biomass logistics services in addition to what the port authorities themselves can offer.

This cooperation between the port authorities and settled logistics companies is an important business model for ports like the one in Straubing. The port authority in Straubing owns all the direct handling superstructure, e.g. the cranes and the rails. For example, in the port of Straubing, there is the company “Hafenlogistik Straubing” that offers specific handling services for biomass goods with a combination of port-owned and own equipment. It books the personnel, e.g. crane drivers, from the port authority to unload or load the vessels, but for example owns its own dedicated open and closed storage facilities (halls, silos), e.g. for wood pellets, rape seed, or grain. In general, the equipment and personnel run by the port authority only offers services to logistics providers as well as to directly producing companies such as the rape seed and soy mill run by ADM. In the case of the port of Straubing, a natural restriction currently is posed by the lack of own closed storage space that is required for almost all agricultural goods (an exception is round wood). This restriction mainly exists due to limited physical space in the port basin vicinity, which of course is a highly demanded space for buildings for higher added-value creation than a storage building has. The port of Straubing relies mainly on their customers’ availability of storage or just-in-time handling to other modes of transport.

In general, whether Bavarian Danube ports handle biomass feedstock or not clearly depends on the demand side that customers exhibit. In the ports of Straubing or Aschaffenburg for example, agricultural and forestry goods are of importance due to the surrounding agricultural landscape (outgoing) as well as by settled companies that use biomass in their downstream production (ingoing). As a reaction, these ports have actively specialised in the handling of these goods, also when attracting new companies to settle in the port – e.g. via clustering strategies or specific business support activities. In Bamberg, Deggendorf or Regensburg for example, agricultural goods are of importance due to geographical circumstances, but the authorities do not actively promote these sectors, as we for example learned during the visit in Bamberg. Nevertheless, these ports are equipped for biomass handling and have big settled companies such as the BayWa that handle their biomass freight exclusively by themselves. In general, as agricultural and forestry goods are among the top 3 good categories transported on the Danube, all Bavarian ports are at least generally equipped to handle these types of cargo.



#### 4.4.3 Formalities in ports

In inland ports, the given standard regulations as described in Deliverable 6.1.1 apply. These are mainly federal or Bavarian law. In the ports itself, each port authority or the public administrative body carrying the port authority issues special port regulations dedicated to the specific port. These port regulations stipulate the rules of procedure and conduct within the port area. These regulations apply for all kinds of transport modes active in the port, so not only waterside transport but also road and rail freight, e.g. in the case of Straubing. The port regulation covers all aspects from general behaviour and responsibilities, procedures for registration and deregistration, to handling of dangerous or hazardous goods and cleanliness regulations.

The port of Straubing shall function as an example here for depicting the general procedure for a vessel entering the port area fully loaded.

In the port regulation, the following procedure is laid out:

When a vessel enters the port, the skipper is obliged to immediately register the vessels arrival at the port manager's office. Once the handling is finalised and the vessel is ready to leave the port, it has to deregister. In case the vessel carries hazardous goods according to the federal hazard goods ordinance, all characteristics of the vessel and the good carried have to be registered. The vessel is only allowed to anchor at the berth that has been assigned to it by the port manager. In case several vessels are in the port and want to unload at the same handling slot, the handling happens in the order of registration. In case of bulk goods such as many agricultural products, the handling company is responsible for clearance of any residue material lying on the grounds and inside the handling equipment, also and especially in order to prevent pests and parasites to spread.

Additionally, all users of the port need to abide to the port fees regulation. This fees regulation is split into the port fees and demurrage charge. The demurrage charge applies for the specific cargo good and has to be paid by the handling company or the company that uses the handling services of the port authority directly. It is based on the gross specific weight of the good handled as stated in the shipping document. The classification of goods happens based on the official register of goods for transport on inland waterways. In Straubing, for example, for all goods from category I through IV, 0.40 €/t apply. For rape seed, there is a special charge of 0.36 €/t.

The port fees are charged for every vessel that comes into the port and has to be paid by the skipper or the ship owner per day spent in the port after the regulated loading/unloading time, that is depending on the tons loaded/unloaded is over (e.g. up to 125 t: after 1 day, up to 300 t: after 2 days, etc.). The port fee is 50 €/day for days 1 through 4, after day 5, it is 75 €/day.

In the view of the managing director of the port of Straubing, the generally applicable regulations that directly pertain to the ports and the times that vessels are inside the ports for loading and unloading are not strict enough. This does not only concern biomass freight, but of course can also affect the attractiveness of using IWT for biomass transport.

The lack of regulations identified mainly pertains to insurance aspects. Oftentimes, the vessels, and/or the skippers on board do not have sufficient insurance in case of accidents or port services

needed due to emergencies on the vessels. Consequently, the port authorities have to bear the costs incurred by accidents caused by the vessels (e.g. damage to the quay walls) and there is no option for the port authority to trace back the vessel owner or shipping company responsible. A harmonized standard requiring all vessels to carry sufficient insurance would be highly needed.

#### 4.4.4 Formalities at the border

Generally, based on the Belgrade Convention of the Danube Commission (Convention Regarding The Regime Of Navigation On The Danube), using the Danube for shipping reasons is free of charge, meaning that as an international waterway, there are no fees or charges for using the Danube as a route of transport and each Danube country has to assure that there are no legal or physical barriers along their national stretch and within their borders (Danube Commission, 2017). A different situation applies for using the Main-Danube Channel. Here, as well as for the Black Sea Channel in Romania, a charge is being levied (viadonau, 2017).

Generally, there are no restrictions to the movement of goods within the European Union or the Customs Union, more specifically, except for some specific regulations for certain types of goods (Zoll.de, 2017). As the Danube however links countries with different EU status regarding membership in the EU and the Schengen zone, there are border controls in place at several borders for import, export and transit (41 check points in six riparian states). These checks tend to be quite lengthy with high administrative and time efforts and the procedures differ from country to country. The Austrian inland waterway authority viadonau therefore urges a streamlining of these procedures to increase efficiency of border checks (viadonau, 2017). Currently, no customs duties apply when crossing the border between Germany and Austria. Of course, when importing goods from a non-EU country, all goods have to be cleared by customs (Zoll.de, 2017).

Generally, all vessels are obliged to carry valid documents and shipping documents (way bill) and customs documents giving specific information about the type of cargo loaded, the vessel itself and the staff.

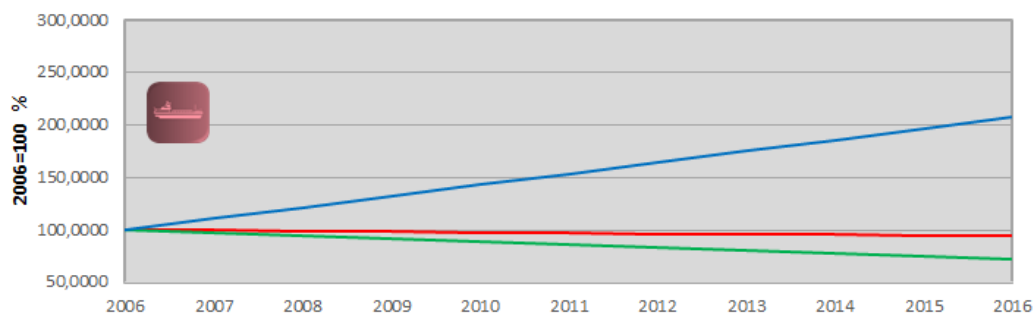
When importing agricultural goods from a non-EU country to Germany, specific regulations apply for a number of countries of origin. As these countries however are very unlikely to be countries of origin for feedstock covered under ENERGY BARGE, this is not covered here in detail.

#### 4.4.5 General situation of Inland Waterway Shipping

In general, the market situation of IWT in Germany in general and in Bavaria as the main Danube riparian region in particular has been stagnating for years, in Bavaria in particular, the transshipment in ports has been declining (see figure 6). This situation occurs while the economy is growing, trade volumes are growing, and the volumes transported in other modes of transport, especially road, are growing as well (destatis, 2017; Kraftfahrtbundesamt, 2017). The port of Straubing, in comparison, was able to decouple from this trend. The reasons for the comparatively



bad performance of German IWT has various reasons, most of which clearly are economic of nature, but some are also caused by legal and administrative barriers, that are laid out below. As pertains to the port of Straubing, the positive waterside transshipment situation is mainly caused by the cargo group of agricultural and forest goods which made up 62% of the waterside handling in 2016 (Hafen Straubing-Sand, 2017).



## Values 2006 – 2016 linear trend extrapolation



**Figure 6: Trend development of waterside transshipment in German, Bavarian ports and port of Straubing.**

(Source: own visualization, based on official statistics)

### 4.4.6 Quality requirements for biomass

Generally, agricultural and forest goods and thus biomass is a classic IWT transport good. However, when comparing the three main transport modes in Germany, road transport for this goods category is still in the lead:

**Table 5: Tons of agricultural and forest goods in Germany split into modes of transport.**

(Source: destatis, 2017; Kraftfahrtbundesamt, 2015).

Mode	1,000 t
Rail	4,092 (2015)
Road	1,157,567 (2014)
IWT	16,243 (2015)

Biomass feedstock and biobased products and intermediary goods are almost never categorised as hazardous good themselves. Inflammable biobased liquids such as bioethanol pose an exception, which could be suitable for IWT.

However, all cargo goods from the category agricultural and forestry goods, based on their natural characteristics, can be prone to physical decay, which inhibits their quality for further usage. The physical integrity of biomass products needs to be ensured throughout the entire supply chain

including storage, independent of what modes of transport are used. A main category here for example would be to ensure that the products stay dry. In the port of Straubing, for example, huge volumes of rape seed are processed for the bioenergy sector and the feedstock arrives mainly from Hungary, Slovakia and Ukraine via the Danube. In order to ensure that the seeds stay free of pests like fungi or rats and also to avoid introducing invasive species such as e.g. the Asian long horned beetle, in the countries of harvest, the cargo spaces of the vessels as well as the storage units are being gazed with pesticides. In Germany, there are strict limit values for the concentration of these pesticide gases and the ships that are treated with these gases need to be clearly marked. In the port of Straubing, for example, it has happened before that the ships coming in from Eastern Europe were neither marked nor did the levels of gas concentration stay within the limits. Consequently, the port had to be temporarily closed and the ships had to be evacuated due to high risk of suffocation for port workers unloading the vessels. The same has been noted in overseas cargo containers in ports such as Hamburg (proplanta.de, 2009). It is important that the limits are being harmonized, vessels marked, and concentration and type of pesticide noted in the freight documents of the vessel.

Also pertaining to the vegetable oil production: in case a production line is strictly GMO-free, e.g. only using GMO-free soy from the Danube Region (“Donausoja”), it is important to avoid the contamination of the logistics and production sections with genetically modified seed material to ensure that the production stays GMO-free (e.g. some types of imported soy or rape seed can be genetically modified).

Moreover, when transporting pernicious and/or edible biobased goods, it is important to ensure that residue materials, e.g. on the quays, are cleaned in order to prevent pests from happening or to avoid invasions of birds such as doves that disrupt the port procedures. Cleanliness is thus an important trait in ports working with biomass. A number of federal and EU-wide regulations are in place to steer the import of agricultural and forestry materials in order to guarantee phytosanitary protection (Zoll.de, 2017).

Overall, there are no highly inhibiting administrative barriers in place regarding the quality of biomass particularly in the IWT sector.

## 4.5 Hungary

### 4.5.1 Conditions of shipping

The opportunities for improving waterways and eliminating the most typical barriers and constraints on shipping are limited. With conventional river regulation tools, the following interventions were designed (VITUKI 2007):

- dredging of the waterway, including the removal of the marly, rocky basement,
- use of combined dredging-reduction solutions,
- use of medallion with regulatory works (spurs, T-works, parallels),
- possible reconfiguring, correcting the waterway,
- an unique flow control procedure.

## **Natural conditions; navigability**

The River Danube cannot be navigated throughout the year in Hungary as the weather conditions are decisive. At the 378-km long section in Hungary, the required 2.7 metres water depth can be guaranteed only on 200-240 days of the year. During the rest of the year, vessels are limited, typically between 2 and 2.7 metres in depth. On some sections, there is a size restriction on low water levels, whereby bi-directional traffic and overtaking of vessels over certain dimensions are not permitted. In recent years, the government has paid particular attention to improving the navigability of the Danube. This goal can be achieved not only by modifying the basin, but also by better and more efficient utilisation of the existing conditions. This allows increasing the number of navigable days to 300 per year. Difficulties on navigation are mostly on the upper Hungarian Danube section but there are quite many on the Great Plain too, according to the Green Navigation Strategy (Dunai Zöld Hajózási Stratégia, 2011).

## **Road and railway connections**

Concerning the entire supply chain, roads are well connected to ports, as two motorways run by the Danube river:

- M1 from Vienna to Budapest
- M6 from Budapest to the south, Pécs (capital City of Baranya County).

The capital area serves as a transportation hub, too, since all the other motorways start there: M3 to the east (in the direction of Nyíregyháza), M5 to Romania and Serbia, M7 to Croatia and Slovenia passing by the Lake Balaton on its south side.

Regarding the railway network of the country, important TEN-T corridors go through Hungary. Among Europe's nine rail freight corridors, RFC7 – Orient and RFC6 – Mediterranean cross the country in north-south and east-west directions.

## **Density of ports**

Currently existing bigger ports seem to be close enough to each other, but they are specified to different type of goods e.g. handling and or storing grain or metal. There is no port specified for solid biomass handling. Therefore, it could be a possible new programme to set up ports in the vicinity of forest and wood processing areas (solid biomass extractors, raw material processors) and biomass users located by the river (power plants, heat plants etc.). Renewable sources and final products / services could this way be connected by the river Danube.

### **4.5.2 Conditions of ports**

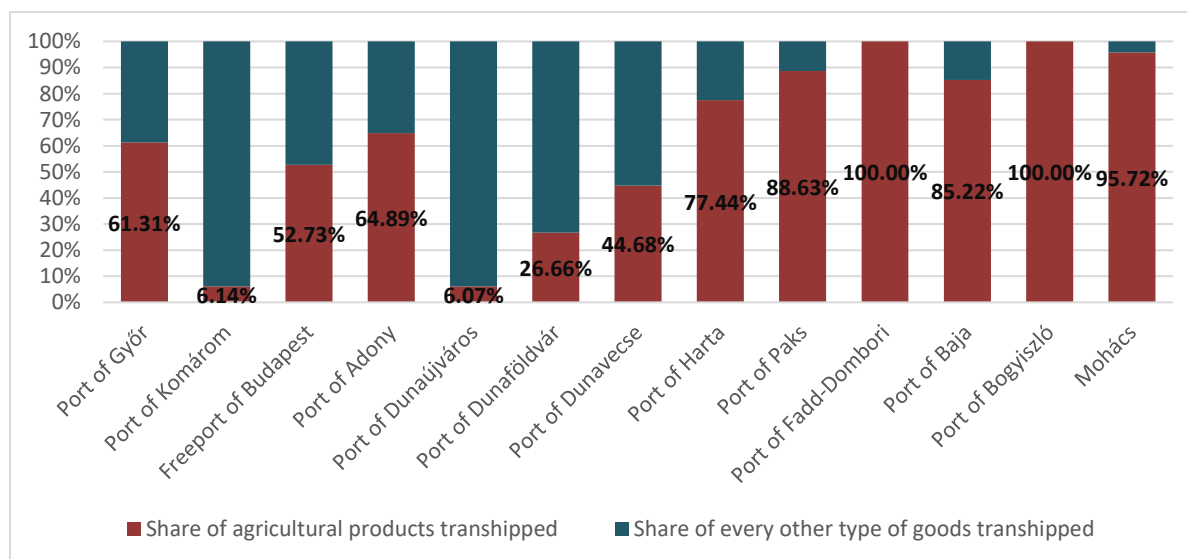
Since most of the ports in Hungary have settled and developed their equipment and facility for dealing with agricultural (mainly bulk cargo) goods including biomass, their capacities can be utilised when handling or storing biomass products as well. However, during peak harvest season, food & beverages enjoy priority against biomass for energy or chemical utilisation.

Concerning specific needs of biomass, weather conditions can decrease its quality. It must be protected from the weather, therefore only those are suitable, which have covered storage capacities.

Regarding difficulties and the fact that most of the companies do not ship biomass, there are cost-related reasons and such coming from the characteristics of biomass. Biomass should be processed as soon as possible (max. 80-100 km distance). Further, most of customers and users are not located by the river, meaning that goods perhaps need to be transshipped twice (at the first and at the final inland port).

On the other hand, short distance shipping and transshipping have additional costs causing less motivation to stakeholders and market players to enter and carry biomass on IWT. Even though, it can be stated, that only smaller ports have closer connection to biomass by transshipping, handling, storing oilseeds and agricultural by-products.

Hungarian Danube ports have hardly any biomass related experience, when it comes to direct energetic use, but mostly all of them are transshipping agricultural products which require similar facilities, equipment, machines, lifts, cranes etc. Taking a closer look at shares of agricultural products in Hungarian Danube ports, it can be noticed that two ports, namely Fadd-Dombori and Bogyszló, loading or unloading agricultural products had nothing else transshipped in 2016 according to KSH data, and in other three ports, Paks, Baja, Mohács, more than 85% of goods handled were agricultural products.



**Figure 7: Share of agricultural products transshipped in Hungarian Danube ports in 2016**

(ports not dealing with agricultural products at all are not represented in this diagram).

Source: Own editing based on OSAP statistics 1857\_2016. I-IV. 3R\_v1 by KSH (Central Statistical Office).

## Required developments

The biggest ports are specified to handle, store different types of goods and cargo, e.g. grain or metal, and have hardly any experience in the field of biomass carrying. However, there are potentials on developing them especially those which have facilities and equipment for grain handling. In general, these ports should be developed by settling adapters for machines and cranes, expanding capacities of warehouses for loading/unloading, drying, handling and storing solid biomass, bulk and break-bulk products.

The port of Komárom should be developed to be a great supporter of Rossi Biofuel by settling closed storage and drying facilities. Freeport of Budapest should contact FŐTÁV Zrt. (District Heating Co. of the Capital) about the company's new biomass based heating plant: the south plant could be settled up in (or close to) the port area.

Furthermore, biomass users such as Power Plant in Dorog, District Heating Company of Szentendre should also have their own ports and carry about having biomass delivered on the Danube.

### 4.5.3 Formalities in ports

Below documents that are needed to be presented in ports are listed. All of them are required across Europe; there are no specific documents and procedural elements, formalities that is necessary only in Hungary. The two most important among these papers are the River way bill and the Cargo Manifest. Others could be skipped as they are not relevant in certain ports.

Notice of Readiness presented by the Master

- Time sheet for lay time
- River way bill
- Mate's receipt
- Cargo Manifest
- Cargo Plan
- Draft survey report
- Load compartment inspection
- Loading/Discharging sheet
- Sealing report
- Master's receipt
- T2L custom document
- Commercial (Custom) invoice
- Phytosanitary and/or Veterinary certificate
- Weight certificate
- Quality and condition certificate
- Analysis Certificate



## Procedures in ports

- Simple procedures usually take up to one-two hours per vessel in a river port.
- Usually trading documents are prepared prior to arrival to the port.
- Draft (joint) survey before and after loading takes an hour.
- Load compartment inspection (LCI) before loading takes half an hour

### 4.5.4 Formalities at the border

Mohács is a Schengen external border point before Danube reaches the Serbian border. Control process includes the following steps (Practical manual on border controls along the Danube and its navigable tributaries 2017):

- vessel traffic on the border section is monitored via RIS and port radar system
- establishing contact via radio communication
- dispatcher allots the ship to the control spot by the approval of the Border Police
- service boat picks up the Captain
- captain receives a movement document at the reception in order to collect the signatures by the different authorities
- captain visits the offices of the Border Police, Tax and Customs Control, Water Police, Health Control and Disaster Control. Requested documents (passports, crew list, etc.) are handed in and forms filled out
- a mixed team representing all the relevant authorities accompanies the captain back to its ship
- on-board check is being conducted:
  - Border Police: passports of crew (and passengers) with mobile document readers
  - Water Police: boat masters certificate, technical ship certificate, alcohol check, AIS transponder, service book entry
  - Tax and Customs Control: Gasoil declaration, Inspection of tanks, etc.
  - Disaster Control: check list of 100 points – AND handbook, AND certificate, expert qualification, fire extinguishers, safety equipment, etc.: checklist is signed by all parties, a copy stays with the captain
- if relevant, fines are issued and will be sent by mail

Control forms are the Movement Document, the Arrival and Departure Report, Gasoil Report, Declaration of Health, ADN Checklist (completed by the control authorities during the controls aboard the vessel) and supplementary data sheet. According to the Hungarian Ministry of Interior, cargo ships use the forms of the Convention on Facilitation of International Maritime Traffic (Crew List – IMO FAL Form 5; Passenger List – IMO FAL Form 6).

At the Border Crossing Point Mohács, all relevant authorities take place in the same building by the river:

- Border Policing Division of the Mohács Police Office (in short: Border Police)



- National Tax and Customs, Border Customs Office (in short: Tax and Customs Control)
- Danube Water Police Office (in short: Water Police)
- Public Health's Service of the Government Office of Baranya County (in short: Health Control)
- Disaster Management (in case of dangerous goods transport)
- Food Chain Safety and Animal Health Directorate of the Government Office of Baranya County (in short: Phytosanitary Control)

Custom Clearance at Mohács takes approximately 4 hours. The following documents are required:

- Original commercial invoice stating the usual: price, delivery clause, country of origin, etc.
- RWB and Manifest for each barge
- Original Certificate of analysis
- Original EUR-Med Certificate
- Romanian custom documents (T1, etc.) in case of a vessel coming from Constanza
- VAT and custom duty deposit must be paid prior to vessels/barges arrival to Mohács
- Broker's fee per vessel or barge, 100% cost and surcharges within 8 days

#### 4.5.5 General situation of Inland Waterway Shipping

##### Institutions to support IWT

EU White Paper on Transport Policy in 2011 set the objective (ProDuna 2013) to reduce the share of road transport, and increase other modes of transport (e.g. rail and waterways) for more than 300 km 30% by 2030 and 50% by 2050. This will be a core challenge for Hungary, especially as the mode of transport is fundamentally determined by owners of goods and their logistics service providers.

According to the Ministry of National Development (hajozas.hu), Hungarian Government aims to improve the competitiveness of Hungarian navigation and simplify its embeddedness into the international logistic chain. Therefore, HUF 31.6 billion (approx. EUR 102 million) will be invested into the development of navigation on Danube in the framework of 12 transportation projects until 2020.

As part of the Danube shipping way a creation system until the end of May 2020, modern flagging boats, buoys and coastal shipping signals will be acquired. The development of a waterway information system is also part of the CEF call. In the Freeport of Budapest (Csepel), a unique LNG filling station will be created which will be able to provide propulsion of road and rail vehicles. The development of Baja (HUF 3.61 billion) and Győr-Gönyű (HUF 2.91 billion) in the framework of IKOP continues, a new national public port in Mohács (HUF 4.75 billion) and mobile flood dam at Csepel (HUF 1.32 billion) are being built. The expansion of the services and the increase of their standards, in line with the national industrial development policy, promote the emergence of new investors. The flow of river navigation is expected to facilitate the entry of Hungarian products into export markets.



## **IWTs role in the public procurement and public building and tenders**

Unfortunately, in Hungary, according to external experts asked, there is no such advantage for the development of IWTs in the public procurement and tenders aiming to improve navigability or granting policy preferring IWT against road or rail.

### **4.5.6 Quality requirements for biomass**

Quality standards ensure customers they will meet their needs. International practices and rulings are not aligned to each other under all circumstances which makes the Hungarian legislation even harder. However, besides standards of products, there are certificates on the market ensuring economic actors; their partners are taking care of environmental sustainability by greening entire supply chains.

## **4.6 Romania**

### **4.6.1 Conditions of shipping**

Danube river navigation conditions in the Romanian segment are generally good. Even though there might be short periods of draft restrictions under extreme drought conditions. In order to increase the traffic of river transport, there is the project of the Bucharest-Danube boundary, which would facilitate about 65 km of transport on a special channel.

There are ports that have both sea and river access as well as inland ports with only river access. Most ports have connections to transport railways. The density of ports is sufficient, most of them being specialized for bulk cargo transports, especially agricultural products. The port of Constanta is the most important seaport and has container terminals.

Galati port, one of the largest ports in Romania, is located on the left bank of the Danube, with a total area of 86.4 ha. In the port general goods, bulk solids, bulk liquids and containers are transhipped. During the winter season, the port offers stationary facilities. It has a railway connection of 12.3 km (European gauge) and is in distance of 120 km to the highway.

In 2016, Galati port registered the most intense activity in comparison to the other river ports. Other ports with a good infrastructure are Giurgiu and Drobeta Turnu-Severin.

The total transport volumes of inland waterway transport are relatively low compared to other transport modes. Agricultural products amount to 34% of the domestic inland waterway traffic, 1% are wooden products.

#### **4.6.2 Conditions of ports**

Most ports have very good capacities for transporting agricultural products and are equipped with high-capacity storage silos and barge loading capacities. For wood-bulk products there are no storage capacities available at the moment. Specialization and capacity development to handle bulk wood products could be developed in the future, but it requires very large quantities of at least 50-100,000 tons a year for ports to make those investments profitable. These quantities cannot be mobilised for wood products currently and capacities would be used only temporarily or with reduced capacity.

#### **4.6.3 Formalities in ports**

The formalities in ports are regulated by Order no. 187/2015, concerning the arrival/departure formalities in/from Romanian ports of inland waterway vessels. The arrival/departure formalities consist of filling in the required data in the "Electronic Travel Reporting" application on the Portal [www.RoRIS.ro](http://www.RoRIS.ro) and forwarding them to the RoRIS center/branch of the port of arrival/departure.

Arrival formalities need to be carried out within 12 hours of arrival, but before the start of loading/unloading, bunkering, repairs, crew exchange or material/food supply. The arrival/departure formalities in/from the port are priced according to the legal provisions. Operations in ports are mainly conducted by specialized service providers: port operators, shipping agents, port administrations, customs commissioners.

#### **4.6.4 Formalities at the border**

The formalities at the border are regulated by Order no. 3177/2014 regarding the customs formalities for the goods transported on the Danube. For general commodity goods transported on the Danube between ports in Romania and Bulgaria, proof of their status will be made only by presenting the T2L document and the shipping document (shipping manifest used by shipping companies), stamped by the customs office from the port of departure.

For commodity goods transported on the Danube between two ports in Romania, the information and the data on the goods will be obtained from the customs office at the port of destination in the RORIS system (Danube traffic management system and information on inland waterway transport).

For commodity goods transported on the Danube from another member state to Romania, proof of their status will be made by one of the documents provided under Art. 314c of Regulation (EEC) 2454/93.

#### **4.6.5 General situation of Inland Waterway Shipping**

Although the Romanian navigation sector has a long tradition and plays an important role in the national transport sector, the Romanian state does not grant sufficient incentives and supports for companies active in IWT. Small Romanian shipping companies seem to suffer more from these circumstances than the large-scale operators that have emerged from the former state fleet.

Romania is still engaged in the process of adapting national legislation to the standards of the European Union. Inconsistencies between Romanian regulations and currently valid regulations in the old EU member states are constantly causing irritations and complicating the organisation of seamless and efficient transport chains between Romania and other European countries. There are currently no public incentives to encourage the inland waterway transport sector.

#### **4.6.6 Quality requirements for biomass**

There are no specific requirements regarding the biomass qualities for transport. Restrictions are given by the specialisation of each port for certain types of products. There are general quality standards for different types of products, which are particularly aligned for transportation issues.

### **4.7 Slovakia**

#### **4.7.1 Conditions of shipping**

The water level in the Slovak part of the Danube is controlled by Gabčíkovo dam, leading to the possibility of shipping generally for the whole year. Occasionally, the shipping has to be interrupted during winter due to irregular conditions when Danube is frozen or ice blocks flow on the shipway. In such a case, the authorities announce warning of various urgencies (up to total ban of shipping). The Transport Office owns icebreakers to make a way sufficient for towboats (Teraz Slovensko, 2017).

Other reasons for limited shipping are the maintenance work in ship locks of the Gabčíkovo dam or other works on the shipway. Besides this, the Transport Office may ban the shipping due to accidents of ships, building or maintenance of bridges, low water level, high level (insufficient space under bridges), etc. Most of these events are planned in advance so that the period of limited shipment is known soon enough.

Two ports transporting cargo are located on overall 172 km of Danube length on Slovak territory (Wikipedia, 2003).

The third port located in Štúrovo acts only for passenger transport. It is located at the Slovak – Hungarian border at the same place where Danube is leaving the territory of Slovakia. Its area is somewhat over 13,000 m<sup>2</sup>, being only around 1% of total area of all ports in Slovakia (Verejne prístavy, 2013b).

#### 4.7.2 Conditions of ports

The port Bratislava consists of three port basins on the left river bank, where manipulation with cargo proceeds. The basins are used also for protection of ships under severe conditions (flood, ice).

The port has infrastructure to deal routinely with agricultural products as well as high volume goods, such as iron ore. Any vessel with capacity range up to 500 to 3,000 tons can be accepted, depending on the actual water level height. The transport can be performed using any standard vessel such as uncovered barges with covered cargo hold (unmanned or with crew) or by river cargo ships. Transshipment of agricultural products as well as biomass (wood chips, pellets) is performed by using high-capacity container deposited in a “hole” so that trucks can easily spill out the content into container. Then the container is lifted up by a crane, transported above the ship and tilted so that the content is poured in the vessel. Overall covered port area is 25,800 m<sup>2</sup> area and over 75,000 m<sup>2</sup> of the open area.

The port is connected to highway D1 and to railroad so that combination with any standard transport means is possible. Transloading to or from trucks or rail wagons is possible only from top (Slovenská plavba a prístavy, 2008 a).

The port Komarno is located on the left bank of the Danube and on both banks of river Vah. It has 6,600 m<sup>2</sup> of covered area and over 26,000 m<sup>2</sup> of open area. The conditions of transshipment are similar to those in port Bratislava (Slovenská plavba a prístavy, 2008 b).

Regarding biomass, in both ports mainly wood in various forms is transhipped, however, no mechanisms are available for dealing with bulk wood (grapple saw is not available) (Slovenská plavba a prístavy, 2008 a, b).

Concerning biomass, insufficient area is available where the stored goods are not protected against rain and generally moisture (personal communication). This may create some problems if certain types of biomass should be stored for few days or longer in the ports, especially in Komarno port.

#### 4.7.3 Formalities in ports

Official procedures consist of various formalities depending on the type of vessel and desired activities in the port. All requirements are described comprehensively in operating instructions of open harbours of Slovak Republic. These requirements include, e.g. to sign the ship after entering the port using the official form (possible also through internet webpage), to present bills of freight or consignment notes for calculation of fees, to pay all due fees within period according to the Operating Instructions of Slovak Ports and others (Verejné prístavy, 2016).

#### 4.7.4 Formalities at the border

Neither formalities nor custom inspections are required on the borders as Slovakia is a member of European Union/Customs Union and principles of free circulation of goods are fully applied.

#### 4.7.5 General situation of Inland Waterway Shipping

Regarding biomass, three transport ways have to be discussed and compared, namely road transport, railway transport and waterway transport (air transport is irrelevant concerning biomass transportation due to high both volumes and expenses).

Road transport is the most frequently used mode of transportation and it is transporting the major portion of goods. The main advantage is flexibility and speed, disadvantage consists in ecological effects, since the road transport is considered as the most negative from an ecological point of view. Another disadvantage which is growing year by year, is the saturation of roads by cars leading to a decrease of speed of road transport and damages at road surfaces caused by heavy trucks. Regarding the two Slovak ports on Danube, the connection to Bratislava is reasonable with three main highways, connecting regions of Czech Republic, north and middle of Slovakia, and Hungary/Austria. The main problem is the transport through Bratislava. The building up the highways, including by-pass highway around Bratislava (partially finished) are among the primary concerns of both local authorities and Slovakia government, but the solution can be expected not earlier than by the end of 2020. This would make the situation acceptable for the next 10-15 years (Dial'nica D4 2016).

Connection of Komarno port by road is far from being ideal, since the only highway accessible is the one on Hungarian side, over the bridge through Danube. However, the bridge is not in good technical state having been built more than 100 years ago and the parameters do not fulfil the requirements for heavy truck transport. In 2017 a construction of a new bridge has started and it is planned that it will be completed in 2020. However, certain delay may be expected (Spravy Pravda 2017).

Railroad transport may be considered as the most appropriate from both technical and environmental points of view. It needs an innovation of railways for higher speed, which has started about ten years ago and has been completed partially between Bratislava and north Slovakia. The connection with ports seems to be acceptable; both ports have rails up to trans loading areas and are also equipped with technical means for all types of products.

High-speed railroads for connection with Europe are lacking in Slovakia. The discussions are continuing concerned to connecting Bratislava with Vienna and Budapest but the project preparation is presumed to start not sooner than in 2023-2025.

In Slovakia, the institution Dopravný úrad (Transport Authority) was established from January 2014 by law 402/2013. Within the organisational scheme a division of inland shipping was established which is fully responsible for inspection and regulation of shipping on Slovak part of Danube according to legal requirements (Dopravny urad / Transport Authority 2014).

A specialised agency, namely Waterborne Transport Development Agency (WTDA) has been established by law in 2010 via an appendix to the law 338/2000 on inland waterways. The agency is responsible to control and organise the network of waterways, building of new and maintaining the existing waterways and preparation of conceptions and plans for development in cooperation with managers and beneficiaries, as well as distribution of financial sources, performing pilot projects and implementation of new technologies. Before beginning to build new waterways and/or parts of new infrastructure the agency signs the agreement with new managing body ARVD Agentúra rozvoja vodnej dopravy (2015).

#### 4.7.6 Quality requirements for biomass

No special requirements need to be considered regarding biomass transport by inland ships. Standards are defined regarding flammability, toxicity and other factors, which may influence environment or health either at regular processes or at accidents.

Maintaining the quality of biomass, certain kinds of transported materials need to be protected against moisture, especially rain. This may be difficult if the amounts of biomass would increase significantly in near future, due to limited covered area, especially in Komarno port.

## 5 Barriers for green biomass logistics in the partner countries

The analysis of the status quo has revealed that legal barriers are only a small part of the obstacles that hinder the expansion of biomass logistics on the Danube. The partners' analysis showed that adding Bulgaria and Romania to the Schengen area would facilitate the border crossing formalities. The same applies for the simplification and harmonisation of the border controls at the Schengen borders along the Danube.

The biggest barriers are non-legal, but that does not mean that these problems cannot be solved through appropriate legislation or initiatives of the respective policy makers. The greatest need for action is seen in the following points:

- Renewal and expansion of the road and train network
- Integration of ports into a functioning infrastructure
- Modernization of ports with regard to biomass trading
- Promotion of shipping as an alternative transport method

The following sections describe the fields of action in each partner country. Recommendations for national and European policy makers will be elaborated during Activity 6.3 of the ENERGY BARGE project and will be published in June 2019.



## 5.1 Austria

To shift the transport of biomass for energy production from road to the Danube waterway, a harmonisation and simplification of the logistics-related legislation and administrative framework needs to take place on international level. Two examples for policy fields which urgently require international standardisation are the maintenance of fairway conditions in all ten Danube riparian states based on a common level of service on the one hand as well as the simplification and harmonisation of border controls at the Schengen borders along the Danube on the other hand.

The EU's Strategy for the Danube Region (EUSDR) provides an opportunity to support this harmonisation. Priority Area 1a which deals with inland waterways is already working closely together with relevant stakeholders to achieve this objective. More information can be found on the following website: [www.danube-navigation.eu](http://www.danube-navigation.eu). ENERGY BARGE will closely cooperate with the PA1a coordinators to contribute to these transnational efforts.

## 5.2 Bulgaria

Public ports of national importance dispose of a well-developed access to the railroad and road systems, as well as a well-developed RIS system (River Information System).<sup>15</sup> The lack of highway roads, as well as the condition of the 1-st- and 2-nd-class roads in the Danube region poses a considerable problem, especially in North-West Bulgaria. The ports of Vidin, Lom, Somovit, Ruse and Silistra, as well as other regional private ports such as Bulmarket Port (by Ruse) have access to the railroad system.<sup>16</sup> In general, railroad system in the county is not developed well enough and there is the need of its extending with regard to the development and improvement of intermodal services.

Bulgarian ports' capacity is under-utilized. Depending on the port, its rate of utilization falls between 30% and 50%. Share of biomass in the loads handled is still very small. Reasons lie in low demand and supply, to a lesser degree - in the risks involved in transportation over the Danube river, and lastly - in the lack of appropriate infrastructure.<sup>17</sup>

There are only two bridges in the 471 km-long Bulgarian-and-Romanian section of the Danube River, and they are highly insufficient. Ferry-boat connections are just four. Every day, on the bridges, trucks line up waiting to cross over, forming queues which stretch for kilometres. To use the ferry-boat service, one often needs to wait, sometimes for up to 4 hours. These circumstances impact the economic development and commodity circulation between the two neighbouring countries and within the entire Danube region in an extremely negative way. Improving the

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<sup>15</sup> Written opinion by State Enterprise of Port Infrastructure, 21.09.2017

<sup>16</sup> <http://www.bdz.bg/bg/info/railway-map.html> (29.09.2017), <https://www.google.bg/maps/place/> (29.09.2017), [http://www.bulmarket.bg/index.php?option=com\\_content&view=article&id=75&Itemid=312&lang=bg](http://www.bulmarket.bg/index.php?option=com_content&view=article&id=75&Itemid=312&lang=bg) (29.09.2017)

<sup>17</sup> Verbal consultations with a representative of State Enterprise of Port Infrastructure (28.06.2017) and with a representative of River Supervision Directorate - Russe, MAEA (13.09.2017)



transport connections between the two countries or rather build new bridges over the Danube river in this region would considerably facilitate the transportation of raw materials and of products, and would encourage the utilization of Bulgarian and Romanian ports.

Improving Danube navigability in the Bulgarian section by means of periodical dredging works, especially in the sectors identified as problematic. As at the current time, Bulgaria receives criticism from all countries along the Danube for not performing its obligations in regard to maintaining the waterway navigability.

Further suggestions for improvement are as follows:

- Admission of Bulgaria and Romania to the Schengen area;
- Extending the country's railroad network, including the involvement of more ports with the objective of developing intermodal services;
- Improving the condition of road infrastructure in the Danube region of Bulgaria, including the road arteries connecting the country's inland region to the ports;
- Continuing the efforts for popularization of possibilities for reuse and commerce with waste biomass. (A considerable part of the small- and medium sized agriculture-related enterprises are still not well-informed. Waste biomass remains on the fields and is often burnt, regardless of prohibitions, etc.);
- Encouraging recycling of biomass to products of higher added value through the involvement of the state and municipalities;
- Development of investment programmes for encouraging the establishment of companies for biomass recycling in the suburbs of cities with port infrastructure, and adjacent to or on the territory of ports;
- Extending the existing and constructing of new open and covered storage areas on the territory of the ports (One of the problems in collecting and utilizing of biomass lies in the reluctance of agriculture producers to store biomass on their fields. Buyers need to collect biomass within 2-3 days, which requires that they dispose of considerable storage areas.);
- Improving the demand for biomass by foreign companies through information platforms including data regarding Bulgarian producers of biomass products;
- Establishing of regional/local centres for biomass logistics and commerce, which shall, on the one hand provide for the local market, and on the other – encourage international commerce with biomass (a proposal of the National Biomass Association – Bulgaria).

### 5.3 Croatia

The establishment, maintenance and improvement of conditions of the safe and reliable inland navigation are continuous missions of the Croatian government. The Development Strategy for Inland Waterway Transport in the Republic of Croatia is an addition to the implementation of the Integrated European Action Programme for Inland Navigation Transport – NAIADES. It covers six main areas: safety of navigation and environmental protection, the market, infrastructure, shipping and education, promotion and administrative capacity.

It is necessary to integrate inland waterway transport into the intermodal transport network in order to strengthen its position on the market. Besides the already mentioned introduction of the RIS, it is necessary to raise the level of inland waterway transport reliability and efficiency by ensuring a high quality of the transport infrastructure in order to integrate inland waterway transport into the intermodal transport network. The main objective for some sections of the waterways is to ensure that they are classified at least as the international class IV (waterways with minimum depth of 2.5 m for 300 days a year). Further, investments to basic port infrastructure are required and capacities for the transshipment of special types of biomass cargo, following market demand, are needed. All ports have to meet environmental protection requirements, primarily by constructing separate reception facilities for liquid waste and oils.

Furthermore Croatian river ports need a qualitative and technological modernisation in order to satisfy existing and prospective transport demands. Along with the modernisation of the basic port infrastructure, systems of safety and surveillance in the port area should be improved. The ports need to connect with the main road and rail corridors in order to achieve better integration with the economic hinterland and to create preconditions for the development of intermodal transport hubs. An increased utilisation of inland waterways and ports represent an important opportunity to accelerate the economic development especially for the eastern Croatian areas Slavonia, Baranja and Posavina.

## 5.4 Germany

In general, experts on inland waterway navigation state that the system in Germany does not suffer from over- but rather from under-regulation, resulting in a situation that renders the inland waterway system disadvantaged compared to road and rail, making it less attractive to potential customers – this is particularly true regarding the legal requirements for vessels from outside of Germany regarding insurance, behaviour in port facilities and the like and regarding public tender procedures in certain branches. Moreover, the lobby of inland navigation in Germany and especially in Bavaria is not strong enough, compared to the road and rail logistics lobby.

The BDB e.V., the German Federal Association for Inland Waterway Transport, functions as the main support and lobby institution for companies within the IWT branch. Besides the BDB, there are other lobby groups such as the Federal Association for Public Inland Ports. These are groups representing the interests of IWT to the public policy sector. Their main claims for IWT in Germany are predictability and reliability of IWT to be attractive for the shippers from business and industry – two claims that are directly linked to a well-equipped infrastructure of the inland waterways. The BDB criticizes that despite continuous construction measures, federal and regional politics do not grant enough awareness to the current state and needs of inland waterways, as compared e.g. to the road infrastructure. For example, 30% of all German locks have reached their life span of 100 years and are in an unacceptable state (BDB e.V., 2017).

At the same time, road transport volumes are increasing heavily and the capacities on the German roads and highways are reaching their limits. In addition, heavy-duty transports on the roads are increasing as machinery etc. is increasing in size. The road system clearly needs a relief of

transport volumes and frequency for which the free capacities on the inland waterways could offer an alternative – at least for certain types of goods such as heavy-duty cargo, bulk cargo such as all kinds of biomass, etc. However, a number of barriers, administrative and political ones, arise.

Firstly, the number of overweight cargo goods and special cargo transported via road and over long distances is increasing. These transports need to be authorized according to §29 of the German road traffic regulation. Although not directly related to biomass, this is an example of how administrative procedures inhibit IWT performance in Germany: on the authorization forms given out by the local authorities in charge, the box “IWT” is pre-filled in with a “no”, stating in brackets that this mode of transport is uneconomical. This is a clear sign that administrative levels are not interested in the options IWT has to balance the overburdened road system. Clearly, heavy-duty transports on IWT always require pre- and post-shipping hauls on road or rail to and from the start and final destination, but long distances could be easily covered via IWT.

In case of public tenders for infrastructure projects such as road or bridge renewals or huge projects for locks etc. close to the water, tenders explicitly using IWT should be encouraged and should benefit when using IWT to supply the construction sites via the river system. This is currently not the case but could be a sensible administrative tool to increase the usage of IWT.

Finally, the IWT branch and all its stakeholders from ports over logistics companies, shipping lines and forwarders in comparison to e.g. the road system has a comparatively weak lobby – even the German magazine “Spiegel” published an article about the lack of political support the IWT has in Germany, calling it a “political stepchild” (Spiegel.de, 2008). The stakeholders however are also reluctant to modernize and innovate their branch in the face of new challenges. Consequently, shippers as potential customers do not desire IWT as a suitable and environmentally friendly way of transport. This was also visible during the ENERGY BARGE interviews for work package 4, when biomass and bioenergy companies said they did use IWT 10 years ago, especially down the Danube, but made bad experiences even though in general, they would see IWT as highly suitable for transporting their products – IWT thus has a bad track record, that clearly needs improvement.

Overall, all restrictions limiting the freight transport on the river Danube also have limiting effects on the transport of biomass feedstock, intermediates and products. The Bavarian Danube stretch close to Straubing takes a special role here as it is and has been a nautical and logistical bottleneck for inland waterway navigation for a long time, although new regulations for the upgrading of navigation conditions have been decided upon but have not been put into reality yet (WSV, 2013).

The entire Danube region could, in theory, benefit from better and more sustainable utilisation of its natural circumstances and characteristics. These include the high scientifically proven sustainable potential for the utilisation of biomass in the sense of a bioeconomy and the natural logistics axis enabling this development as provided by the river Danube itself. The goal should not be to exploit the fertile biomass regions downstream, just harvest and use the raw materials and residue potential there and bring it to Austria and Germany. Rather, the goal should be integrate the three steps described above and use ports and port areas as biomass and bioenergy logistics, and where possible, production hubs where actors along the value and supply chains come together. In order to realize that, actors of both big sectors, the biomass and bioenergy sector, and the IWT sector, need to talk to each other, express their needs and offers. Moreover,

they need to be supported by regional and national policy and administrative actors that see potential in this development concept. Other stakeholders, such as environmentalist groups need to be included in order to avoid mistakes made in earlier projects such as the Danube extension or the biogas market decline in Germany.

In order to improve the situation of IWT in Germany, in particular, it is of utmost importance that the actors of the sector jointly innovate the offers that the sector can make to customers and also actively engages in business development in new, potentially growing markets such as the bioeconomy. Experts say that the willingness to innovate – in infrastructure, market orientation, digitalisation, fuel and other transport technologies as well as cargo options in the IWT sector is very limited. Furthermore, this willingness and the economic capability to do so need to cover the entire Danube stretch, not only for example Germany, in order to offer the same coherent service for customers along the river. Moreover, IWT needs a bigger appearance on the political agenda. The advantages this mode of transport has to offer particularly for freight are numerous and are barely fully tapped. It also can extensively contribute to the development of the Danube region, which surely should be an imperative for the EU as a whole.

The development of cooperative research and coordination and support action projects surely can contribute to this development. However, a stronger interest from shippers / customers for the services IWT offers and the readiness for IWT actors to make attractive offers to their potential clients is important. Especially in bioeconomy, logistics play a decisive role. It should be clear that IWT can contribute heavily to the development of a European, sustainable bioeconomy.

## 5.5 Hungary

Key improvements to strengthen the role of waterway shipping on the field of biomass transports comprise an improvement of the navigability of the Hungarian Danube section. The capacities of the ports need to be developed and in the neighbourhood of major wood production areas (including installation of riverside wood processing capacities), information services on waterway transport costs and special offers for biomass suppliers, and subsidised investment programmes need to be initiated in order to increase the number of larger end users in the vicinity of the Danube.

## 5.6 Romania

In Romania, the potential for mobilizing biomass from agricultural waste is high, especially pelletizing of straw. Due to high prices of the wooden raw materials on the domestic market, the export potential in this market segment is small in the short and medium term, but there is potential for increasing the imports, especially pellets, through the Constanta port and a subsequent distribution through the river ports.

The specialisation of ports for certain product types or the settlement of production facilities at the river ports, which could benefit from the availability of the agricultural resources in the

Danube basin, could increase the traffic on Romanian inland waterways and especially on the Danube.

## 5.7 Slovakia

At present, the requirements for improvement resulting in an increase of the biomass transport on the Slovak part of Danube can be defined on two levels, namely elimination of obstacles related to shipping on Danube and dealing with requirements related specifically to biomass. The main reasons hindering the development of waterway transport in Slovakia are described below, to improve the situation; the outlined barriers should be dealt with.

General problems appearing in shipping on Danube consist in low exploitation of the port capacities, obstacles at particular parts of the river or during certain weather and seasonal conditions, low and permanently decreasing interest to start business enterprise in shipping, over ageing of current fleets, and a decreasing trend in waterway transport (Verejne pristavy, 2013a).

The capacities of both Slovakian ports are extremely underexploited. The representatives of the ports estimate the real portion of exploitation to 20% for Bratislava and merely 10% for Komarno ports (personal communication). While the annual increase of revenues was around 2.25% between 2000-2009, currently a levelling off or even decrease is registered.

According to recommendation of Danube Commission, transport on Danube should be maintained for at least 300 days a year. This goal is not always reached due to irregularly appearing obstacles for shipping at certain periods or particular parts of Danube. These are as follows:

- Low water level depends on weather conditions and is almost impossible to be controlled. Due to continuing effect of global warming this obstacle may get worse year by year.
- Insufficient underbridge height at higher water level affecting larger ships more frequently. The treatment may consist in reconstruction of bridges which is long-term and economically demanding action.
- Limited shipway width at particular sections of Danube in Slovakia. To treat this obstacle, permanent maintaining the shipway is needed.

The Danube, as a shipway of international importance should provide a transport capacity according to international rating of inland shipways. At present, the requirements are impossible to meet each year for recommended number of days (Verejne pristavy, 2013 c).

Low and permanently decreasing interest to start business enterprise in shipping is registered during the last decade. The entrepreneurs usually own 1-2 cargo ships, a total number of 63 licenses were issued during the period 2001-2012 (newer data are not available). The reasons for low interest in business activities in shipping transport consist in obstacles described above, a shrinking market, high primary investment needed, and no attractive state support. During the period of 2005-2011, the number of ships decreased approximately by 20 %. The decrease may be caused by depreciation of vessels after technical lifetime. According to data of the biggest

shipping operator in Slovakia, the company SPaP, average age of cargo ships was in 2007 around 30 years, while that of towboats was by three years less (Verejne prístavy, 2013 c).

The development in cargo transport is affected significantly by current trends in storing, applying the so-called just-in-time system, aimed at a decrease of expenses for storing. Therefore transport of products should occur in expected time and in appropriate quality. The timing sensitivity of shipping transport is the least acceptable, since the transport on inland waterways takes longer compared to both rail and road (Verejne prístavy, 2013 c).

Considering bioenergy produced from biomass, presumably the situation could be improved by attracting the entrepreneurs to turn to production of biogas. The power plant consuming biomass could be built close to or directly in the port. By such a way the expenses for additional transport will be reduced to acceptable level, moreover, if the plant will be situated directly in the port, also the process of trans loading might be simplified.

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