

# COMPETITIVENESS IMPROVEMENT PLAN

## Enhancing Inland Waterway Transport

Activity: WP 2, Activity 1

Version: final

Date: 28/02/2019



This document represents the EMMA Competitiveness Improvement Plan (CIP). It contains many facets regarding the results of the EMMA Project<sup>1</sup>. Since this report is mainly about procedures regarding the EMMA project, some aspects for single readers might be missing, since the project did not claim to cover everything, but to cover everything of relevance regarding the projects requirements.

The EMMA Project is funded by the INTERREG V B Baltic Sea Region Programme. The region covered (BSR) is characterized by growing transport volumes especially between East and West. Road and rail infrastructure needs innovative and pragmatic solutions to cope with future requirements on transport facilities. Rivers, canals, lakes and also the Baltic Sea have huge capacity reserves, whereas in some parts of the BSR road and rail infrastructure is already overloaded.

Inland Waterway and River-Sea Shipping (IWT) still do not play an adequate role in the transport system compared to its possibilities. Too often, inland shipping is not even considered as transport alternative by many forwarders and stakeholders in the transport sector, even though of its benefits. The question that needs to be answered is how the modal share of IWT can be increased in the Baltic Sea Region countries.

This leads to EMMA's main objectives being:

- Improving competitiveness of IWT
- Strengthening the future development of IWT
- Identification of possible new IWT services
- Raising the awareness of the potentials of IWT
- Ensuring better standing of IWT in policy and society
- Proving feasibility of IWT in the BSR by pilot activities

This document serves mainly as a global overview enabling readers to get information what to do in general when trying to gain information about enhancing competitiveness of the own business. The CIP does not recite each and every aspect of the project nor its reports, it rather collects and concentrates upon the most vital conclusions and references and indicates where to find more detailed information.

The document reflects the general project's layout: Information is collected per participating country (Finland, Germany, Lithuania, Poland, Sweden) and for cross border transports to set a common scene. It starts with a country's information on responsibility structures and recommendations for more efficient structures. Then today's existing lobby structures are discussed as far as relevant for the EMMA project partners. Further on, pilot activities were performed and briefly reported here to demonstrate IWT potentials. Moreover, current or upcoming issues were collected and briefly described.

The discussion of each country and Baltic Sea Region follows the following track: at the beginning the current responsibility structures in administrations are named, then recommendations for improved structures taking IWT development into consideration are suggested, today's existing lobby structures

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<sup>1</sup> <http://project-emma.eu/>

are named. After that, chosen EMMA pilot activities are presented, some possibly upcoming bottlenecks are shown and conclusions are drawn. Since the single countries are independent states but Germany a federation with states, the structures are generally not comparable. For further information please refer to the appropriate EMMA report.

The sequence of countries in this report is according to alphabetical order.

Contrary to the description of parts of EMMA Activities, costs regarding e.g. the overcome of bottlenecks are not included in this report as the description reads. The research unveiled a range of cost to realise different measures from none to multi-million Euro investments for e.g. infrastructural enhancements. But these figures show just a part of the truth: anticipated costs would be given, but these figures might be completely different to real cost. Further social benefits might not be reflected probably in just presenting costs for building infrastructure. Finally, administration and lobby cost are not determinable. Since this project is also about such aspects, absolute or relative cost would distort the reality and might impeach credibility of this project.

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## 1 INTRODUCTION

Inland waterway transport (IWT) is a safe, environmentally friendly and economic feasible means of transport today. However, decision makers in charge of organising transport chains did not realise the performance of IWT to full extend. IWT is not a competitor to road and rail cargo transport, all modes of transport have own advantages and also drawbacks. The notion might be that IWT is too complicated and too risky. In addition, acquisition efforts of shipping lines for inland navigation are in many cases weak. Investments in adequate shipping lines is sometimes hindered by unsure future infrastructure developments resulting in rather aged floating equipment and infrastructure. This project and resulting documents should contribute to an efficient and reliable European inland waterway transport network of the future.

Already today, the inland waterway network within the EU used by IWT exceeds 40,000 km and connects almost all important economic areas in Central Europe. Many kinds of industrial sectors and also large cities are located along inland waterways due to historical developments (see Figure 1<sup>2</sup>). Today the challenge is to advance these developments with modern science and techniques and create a competitive but also environmentally friendly mode of transport. One general idea is to



Figure 1 Vital economic areas linked to inland waterways

enhance capacity of single transports e.g. using larger vessels in order to lower rates and reduction of emissions for single boxes transported. This principle works fine at containerized deep sea haulage (New build container vessels add capacity compared to wrecked vessels<sup>3</sup>). But oceans and deep sea

<sup>2</sup> Source: via Donau, 2013, EMMA Project 2018. Sweden: Inland navigation is allowed in lake Mälaren and lake Vänern including Göta river  
Text taken from EMMA\_4\_4\_V2.docx

<sup>3</sup> [https://dmkn.de/wp-content/uploads/2016/12/2\\_3\\_Entwicklung\\_der\\_Welthandelsflotte\\_Jahresbericht2016.pdf](https://dmkn.de/wp-content/uploads/2016/12/2_3_Entwicklung_der_Welthandelsflotte_Jahresbericht2016.pdf), p.40



ports have less obstacles which hinder vessel size. By having narrow locks and bridges, varying water levels, inadequate port and waterway infrastructure, distributed responsibilities and more barriers, a simple solution gets more complicated.

The labour market in Europe counts about 45,000 directly involved employees at the private inland navigation sector with the public employees (e.g. Administrations) on top. The private sector includes all types of employment (employed persons, self-employed, family workers). The inland navigation logistic chain consists of all kinds of administration and companies known from deep sea haulage: port authorities, handling facilities like ports, stuffing and stripping companies, tally-men, 3rd party logistics providers etc. The amount of people dependent upon IWT is therefore much higher than the a.m. number<sup>4</sup>. Increasing the IWT sector is prospect to provide additional employment and regional welfare.

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<sup>4</sup> CCNR in partnership with the EU COM, in: Annul Report 2016. Inland Navigation in Europe. Market Observation, p. 84

## 2 FINLAND<sup>5</sup>

Finland is a country with about 16,200 km coastal routes and inland waterways, of which are about 4,000 km used commercially. The most important fairway is the Lake Saimaa area with a length of about 772 km and 1,200 vessels calling per year.

### 2.1 Responsibility structures

Port areas are generally owned by local communities with the task to maintain and develop fairways. IWT issues are managed by the Finnish Transport Agency<sup>6</sup> (FTA) under the Ministry of Transport and Communications<sup>7</sup>. This agency provides most of the maintenance and development. The agency also obeys EU regulations and prepares for the Finnish Parliament to enact legislation. This counts for the whole Finnish cargo transport system. The Ministry also published a maritime strategy for 2014–2022<sup>8</sup> to provide an overall view that serves Finland's economy, business life and employment and takes account of the new environmental norms.

### 2.2 Recommendations for efficient structures

Today IWT in Finland is less developed than other modes of transport. This might partly be caused by heavy winters with harsh ice conditions. The lake Saimaa is navigable about 9 month per year. Prolonging the navigation period would support the industry better and they would be more willing to shift into the IWT. In order to maintain the discussion, IWT should be seen as an equal mode of transport as like as road transport. The administrative side, including FTA and the regional administrations/councils as well as the industry, ports and operators need to be gathered in to the same table to discuss and to agree on development steps. The development of inland waterways in Finland needs commitments from all parties involved.

### 2.3 Existing Lobby Structures

IWT is represented today by four different associations with slightly different focusses. Numbers of members range from four to 130 due to the small sector. The Finnish Port Association<sup>9</sup> represents 31 sea- and inland ports, the Finnish Port Operators Association<sup>10</sup> holds 41 members currently, the Timber Floating Association of the Finnish Lakes is a highly focused organisation consisting of four members from the timber industry and the Finnish Waterway Association<sup>11</sup> acts for its 130 members from

<sup>5</sup> EMMA\_Act3\_1\_IWT Responsibility Report FINLAND\_2017.docx  
<https://www.liikennevirasto.fi/web/en/home>

<sup>7</sup> <https://www.lvm.fi/en/home>

<sup>8</sup> [https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/77872/Julkaisu\\_ja\\_24-2014.pdf?sequence=1&isAllowed=y](https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/77872/Julkaisu_ja_24-2014.pdf?sequence=1&isAllowed=y)

<sup>9</sup> <http://www.finnishports.fi/>

<sup>10</sup> <http://www.satamaoperaattorit.fi/>

<sup>11</sup> <https://www.vesitiet.org/>

companies, cities and counties, other associations and private persons. All institutions are financed mainly by membership fees, exception is FIWA which also acquires EU funds.

## 2.4 Pilot Activities and Best Practice

This chapter highlights pilot activities and a best practice example to improve IWT in Finland. All information is concentrated upon the Saimaa Canal and the Lake Area. Aspects shown in pilot activities refer to infrastructure, vessels using the infrastructure and a discussion about the use of a River information system instead of the Vessel Traffic management system. The Best Practice is about an ongoing Transport of Cellulose in the Saimaa Canal. All information stated and figures shown in this chapter is taken from multiple EMMA documents<sup>12 13 14 15</sup>

### 2.4.1 The Saimaa Canal and the Lake Area

Vuoksi Waterways or Lake Saimaa consist of several lakes and waterways connected by either natural or artificial canals and locks. Several commercial ports are located in that area, e.g. Lappeenranta, Imatra, Savonlinna. These ports are either public or industrial ports. An efficient waterway connection is essential for the export industry (mainly raw wood and paper) located in Eastern Finland.

The Saimaa Canal was built in 1856 and rebuilt in 1968. The length of the Canal is 42.5 km and located on Finnish and Russian Territory. The Finnish Administration rented the Russian part of the canal until 2062.

The maximum size of the vessels in the Saimaa Canal are<sup>16</sup>:

- Length: 82.50 m
- Width: 12.60 m
- Draft: 4.35 m
- Height: 24.50 m

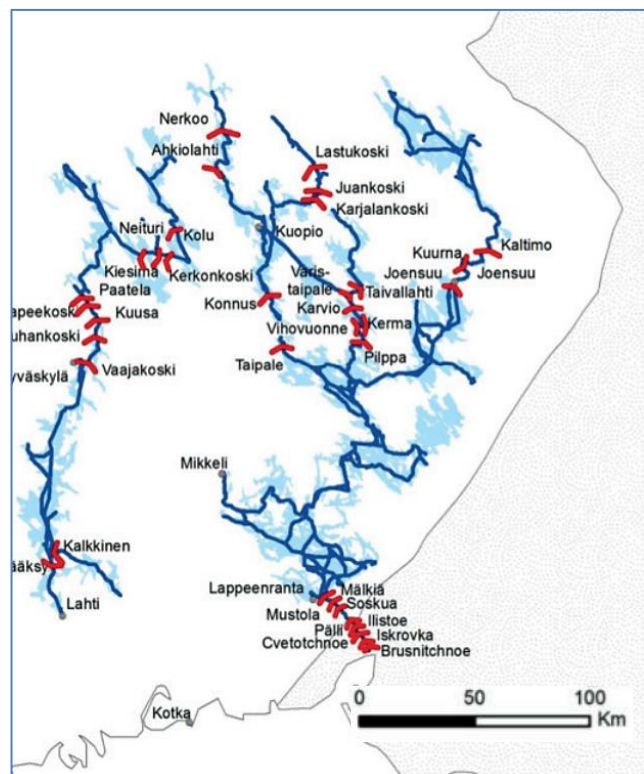


Figure 2 State-owned lock canals in Finland

<sup>12</sup> EMMA\_A2-2 Technical Improvements to Increase Traffic Finland.docx

<sup>13</sup> EMMA\_A2-5 Raw Wood Finland 7.2.2018.docx

<sup>14</sup> EMMA\_A2-7 Information Systems in Saimaa Finland 3.10.2018.docx

<sup>15</sup> EMMA\_Act4\_1\_Template\_IWT\_best\_practice\_caseCelluloseSaimaa.docx

<sup>16</sup> <https://vayla.fi/web/en/waterways/canals-and-bridges/the-saimaa-canal/navigation-in-the-saimaa-canal-and-lake-saimaa>

These dimensions resulted in an own vessel class to maximise efficiency, commercially named 'Saimax'.

The length of commercial fairways in the Saimaa Canal and Lake Saimaa is 772 km. The Saimaa Canal, aka Saimaa and the various locks are shown in Fig. 2. The Saimaa Canal connects Lake Saimaa to the Baltic Sea.

#### 2.4.2 New Barge Type for Saimaa

First idea was to develop a new barge type for the Lake Saimaa. Investigations on the traffic routes have shown, cargo is transported mostly between the lake area to the seaports in the Baltic and the North Sea. Lake Area's internal cargo traffic is negligible. Thus, the majority of used cargo vessels are seagoing coasters chartered for one or a few voyages. This structure prevents vessel owners from investing in new vessel types as vessels need to be used also in other navigation areas as well beside Saimaa.

#### 2.4.3 Extending the Locks

The locks used today in that area were renewed in 1968 when vessels in general were smaller than today. Since then markets developed and vessel sizes grew bigger, resulting in Saimaa infrastructure hardly being competitive compared with other transport activities in the Baltic Sea. Ships sailing to Saimaa must be flexible to transport cargo between Lake Saimaa ports.<sup>17</sup>

Research by the Finnish Transport Agency show, locks might be extended about 10 to 12 metres by reconstructing the gates rather easily, whereas the width of the lock chambers restrict wider vessel beams. The cost for extension locks by 10 metres would be approximately 60 million euros. This refurbishment would enable vessels of a maximum length of 93 meters to navigate on Saimaa (Vuoksi) waterways with an increased capacity gain of 200 to 500 tonnes cargo.<sup>18</sup>

#### 2.4.4 Higher Water Level in Saimaa

The Advisory Committee of Eastern Finland<sup>19</sup> proposed advantages for IWT traffic by lengthening the locks as described above and raising the water level in the Saimaa Canal and Lake Saimaa (Vuoksi) waterway by 10 cm. Just increasing the water level will result in an increased cargo capacity by 100 tonnes per vessel and as such improved feasibility of inland waterway traffic. Further, vessel capabilities to operate in icy conditions will be improved and the overall number of vessels operating at a time might be increased. Estimated cost for raising water level is five million euros, needed for structural changes in the canal, e.g. maintenance costs of canal walls.

#### 2.4.5 Providing Operational Information and adopting RIS

Finland inland waterways and seaports use today an information platform named Portnet<sup>20</sup>, a sort of single window data sharing system, Vessel Traffic Service (VTS), Automatic Identification of Ships (AIS)

<sup>17</sup> <https://yle.fi/uutiset/3-10343385>

<sup>18</sup> <https://www.liikennevirasto.fi/ajankohtaista/tapahtumat/vesivaylapaiva-6.4.2016#.W9gjVf1f3IV>

<sup>19</sup> <http://www.pohjois-karjala.fi/-/ita-suomen-neuvottelukunnan-kannanotto>

<sup>20</sup> <https://app.portnet.fi/com.atbusiness.asm.ASMLogin>

and pilotage. This information is today not available to all stakeholders requiring this information despite the open data principle adopted by Finnish Public Authorities. Contrary to Central Europe implementation of interoperable RIS, in Scandinavia no RIS services neither respective infrastructure exists.

The systems mentioned above are used in marine traffic. In some BSR countries, such as Finland, inland waterways are connected to sea rather than other inland waterways. Seagoing vessels like river-sea ships are used in addition to inland barges. A separate RIS system for inland navigation is probably not being installed, especially as river-sea shipping plays a more dominant role in these waterways and duplication of similar systems is not productive. Therefore, regulations and operational practices should take interoperability of both sea and inland waterway systems (RIS/VTS) into account.

#### 2.4.6 Elaboration of a technical concept for IWW barge prototype adjusted to Saimaa canal

The Saimaa deep fairway and also the Saimaa Canal still have potential for additional transport routes for raw wood. The goods might be used increasingly as source for bioenergy. Planning of new factories might also have a positive impact on those transports. Increased use of wood pellets in CHP plants provides opportunities for transports from Vuoksi to CHP plants at the southern coast. Calculations offer the IWT is the most cost efficient and environmentally friendly means of transport.

Vessel sizes increase and by lock extension for larger vessels of the Saimaa Canal in the Northern Baltic would allow new vessels to operate in that area. This would be an important factor for keeping inland waterway transport in Finland as commercially feasible mode of transport.

Additionally, the need for raw wood in other countries for further uses (e.g. use of biomass as renewable energy source) is expected to increase.

#### 2.4.7 Best Practice: Transport of Cellulose in the Saimaa Canal

This best practice example reports about the company StoraEnso Enocell using IWT starting at the Port of Joensuu to transport cellulose via the Saimaa Canal towards various Baltic and North Sea ports to reach markets mainly in Germany, Belgium and The Netherlands. The transport chain via the canal carries about 60,000 tons of the 460,000 tons pulp every year. Advantages using this type of transport are seen at the Saimax vessel size for all operators and stakeholder involved. Also factors like reliability, cost, environmental friendliness and the provision of clean cargo space to remain the pulps purity and whiteness are advantageous compared to other transport modes regarding the relations. Long-termed business relationships between buyer and seller, port and transport operators are seen to be success factors. Furthermore plannable transports and adequate storage areas allow a steady utilisation of each part of the production and transport chain.

## 2.5 Bottlenecks and Potentials<sup>21</sup>

Two bottlenecks are investigated for the project in Finland and are both connected with the Saimaa Canal. It connects many lakes and was always of strong interest for the Finnish forest industry. The canal is located on Finnish and Russian territory. The dimensions of the Saimaa canal defines its own vessel sizes separate from the UNECE Blue book, this type is called Saimax<sup>22</sup>. The map to the right shows the collected bottlenecks of the EMMA Project in Finland.<sup>23</sup>

By enlarging all eight locks by 12 meters in length would benefit traffic in Saimaa inland waterway by increasing the vessel fleet from 30 to 90 and thus increased efficiency and reliability of this IWT.

A political issue is raising water level in the Canal by 10 cm. This measure together with a solution to stabilise the dams is technically possible but requires a permission of The Water Court. These measures would enhance cost efficiency and reliability of this waterway.



Figure 3 : Map of Finland

Realisation of measures above would result in a new vessel size able to enter to Saimaa deep water fairway. Advantages are to carry about 20% more cargo per vessel resulting in enhanced competitiveness of IWT against other transport modes with further positive effects for development and volume growth. This would also support Finnish Traffic Agency's<sup>24</sup> goal to prolong IWT season up to 11 months per year.

## 2.6 How to increase Inland navigation in Finland<sup>25</sup>

The main cargo transport route in Finland is from north to south and is dominated by truck today. Potential for IWT is seen at forest, construction and chemical industry, with some important companies. Weather conditions hinder transports in wintertime and would create a need for additional storage capacity as well as a good financial background when sales decrease.

<sup>21</sup> EMMA A2.1 Final Report finalised.docx

<sup>22</sup> <https://www.liikennevirasto.fi/web/en/waterways/canals-and-bridges/the-saimaa-canal/navigation-in-the-saimaa-canal-and-lake-saimaa>

<sup>23</sup> Figure 3 provided by HHM

<sup>24</sup> [https://julkaisut.liikennevirasto.fi/pdf5/mkl\\_2008-6\\_saimaan\\_sisavesiliikenteen.pdf](https://julkaisut.liikennevirasto.fi/pdf5/mkl_2008-6_saimaan_sisavesiliikenteen.pdf)

<sup>25</sup> EMMA\_4\_4\_V2.docx p.8

Ideas to increase IWT are to convince companies to use this mode, e.g. shipments from Russia are said to be thousands of cubic meters of cargo. The same time, vessels and infrastructure regarding the Saimaa canal should be developed to shorten the period of a complete shutdown of the canal in winter time.

## 2.7 Recommendations and Conclusions

The planned investments should be implemented without delay to offer reliable infrastructure to IWT stakeholders.

Digitalisation should be pushed forward to ensure to keep track of VTS service developments and to align it to central European RIS accordingly.

Industry has a positive feeling for developing the Lake Saimaa and Saimaa Canal cargo traffic according to investments decided. Also the environmental understanding of industry is increasing, and thus increasing transport volumes in the inland waterways.

Enhanced co-operation between politics and administrations to support resources, financing and involvement of the industry in order to conduct the needed improvements and enable more efficient use of IWT should be aimed.

### 3 GERMANY<sup>26</sup>

This country has a large amount of navigable inland waterways and more inland ports than any other EU country. The German IWT network is used to a great extent by the industry.

#### 3.1 Responsibility structures

Waterways are in full ownership of the German Federal Government and managed by the German Federal Ministry of Transport and Digital Infrastructure<sup>27</sup> (BMVI) respectively the Wasserstraßen- und Schifffahrtsverwaltung des Bundes<sup>28</sup> (Federal Administration for Waterways and Shipping). Subordinated to the administration are the 7 inland waterway administrations responsible for maintenance, environmental, planning, enforcement and other issues. These administrations cooperate with Germany's State administrations. For legislation the federal and the state administrations are responsible but opinions of other stakeholders (the industry and environmental associations) are taken into account.

The BMVI responsible for all Germany transport issues published a Federal Transport Infrastructure Plan<sup>29</sup> containing detailed plans for the development of all transport infrastructure (incl. rail, road, IWT and other) in Germany until 2030. This plan helps to avoid from the top responsibility disputes about the importance of e.g. waterways between German States.

#### 3.2 Recommendations for efficient structures

The current system with a long history for IWT in Germany looks quite complex from the outside due to the different state and waterway administrations. However, responsibilities are clear and cooperation between these entities is most times seamless. Adaptation of the working relations is needed for new or changing aspects, one of these is the emerging discussion about emissions.

#### 3.3 Existing Lobby Structures

In Germany a wide range of lobby organizations to support IWT is present. Regional focused entities concentrate on single waterways, limited stretches of waterways, regions or even infrastructure projects. These lobby organizations have often industry as members and are driven by chambers of commerce. The regional awareness of these organizations is very good, but they often lack some attention on federal level.

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<sup>26</sup> EMMA\_Act3\_1\_IWT Responsibility Report Germany\_v2.1.docx

<sup>27</sup> <http://www.bmvi.de/EN/Home/home.html>

<sup>28</sup> <https://www.wsv.de/>

<sup>29</sup> Germany's Federal Ministry of Transport and Digital Infrastructure, The 2030 Federal Transport Infrastructure Plan, retrieved Apr. 23<sup>rd</sup> 2018 from [https://www.bmvi.de/SharedDocs/EN/Documents/G/ftip-2030.pdf?\\_\\_blob=publicationFile](https://www.bmvi.de/SharedDocs/EN/Documents/G/ftip-2030.pdf?__blob=publicationFile)



Nationwide acting organisations (e.g. BDB<sup>30</sup>, BÖB<sup>31</sup>) working on national level but have often regional structures. Especially BdB and BÖB are lobbying on regional level via regional councils towards regional policy. Those organisations are also active on European level by being member in European branch lobby organisations.

### 3.4 Best Practices

This chapter highlights two best practice examples prepared during the project in setting up transport chains for heavy goods transport respectively container transport including inland navigation. One of these examples is located at the Elbe River and the other at the Rhine River. All information stated in this chapter is taken from two EMMA documents<sup>32 33</sup>.

#### 3.4.1 Heavy goods transport

Large or heavy goods, which might not be assembled on construction sites and therefore must be transported as one piece, is a growing branch for IWT. Using road or rail transport for large machinery (e.g. gas turbines for power generation) for a long distance suffers from infrastructure, e.g. rather narrow rail and road tracks, narrow curves, bridges, overhead traffic light, sign posts, railway power supply and weight restrictions. Using IWT relies upon usable handling areas in ports for heavy and oversized cargo, means of transport and usable fairways and locks. Since machinery dimensions and weights have grown recent centuries but assembly sites did not move towards port areas, at least one road leg is still required. This is the case for a Berlin producer of gas turbines, having a road leg of 9 km from the plant to the inland port.

The transport solution is made of three components where business and administration worked together: The quay wall between a new build handling area near the factory and an existing inland port where usual IWT vessels are handled (Berlin-Westhafen) is defined as a heavy cargo quay wall. Adequate handling capacity on the quay wall was established and special cargo transport equipment was planned and constructed. This transport equipment is named 'Drive-In-RoRo-Barge'. This barge was constructed to allow handling on every known RoRo-ramp in Europe and can be moved with standardised push-barges.

The port operator also serves as the logistic provider for the transport of turbines from the factory via road/barge to the port. The minimum lead time is seven days but enough to organise the pick-up with the modular transporter, roll on the barge using the ramp, transport with a push barge to e.g. a seaport and finally unloading the turbine with a harbour crane from the barge to the ocean going vessel (export). This part is organised by the shipper.

The total investment was about 10 million Euros which is covered by a long-term contract with the shipper. Advantages are seen from all main stakeholders: the manufacturer might develop his product

<sup>30</sup> <https://www.binnenschiff.de/content/>

<sup>31</sup> <https://www.binnenhafen.de/>

<sup>32</sup> EMMA\_Act4\_1\_IWT\_best\_practice\_cases\_Elbe\_final.docx

<sup>33</sup> EMMA\_Act4\_1\_Template\_IWT\_best\_practice\_cases\_Rhine.docx

range, the port operator extended his business and the administration reduces heavy cargo traffic on roads.

### 3.4.2 Containers on the river Rhine

Starting in the 80's the use of containers was the main trend in cargo handling. This trend did not stop at seaports, the containerised transport chain also hit IWT. Just when a crisis in German coal-, iron- and steel-industry started with barges loosed its traditional goods, the change started on the river Rhine. Reaction to the demand of regular container inland services was establishing such services by vessel operators and ports offering container handling. The system evolved further by first hub and spoke networks. The expansion of hinterland terminals had to be managed to react against the increased volume. In order to reduce cost for single transports larger vessels and increased handling capacity followed. Today many logistic operators have an understanding that truck, rail and barge are parts of an intermodal system and developed business models as well as sales models to serve upcoming needs.

## 3.5 Bottlenecks and Potentials<sup>34</sup>

Due to the amount of rivers and canals used for IWT in Germany, the amount of investigated bottlenecks is rather high. Once has to consider that EMMA just investigated in the northern and eastern IWT network which is covered in following description only too. The map to the right shows the collected bottlenecks of the EMMA Project in Germany.<sup>35</sup>

19 different obstacles were investigate, basically from the river Weser to the east, involving river Elbe and Oder and the connecting waterways and also river Peene. The river Weser is connected to the river Elbe via the Mittelland Canal. The river Elbe is connected to the river



Figure 4 Map of Germany

Oder via several waterways creating a network of waterways instead of rather unconnected waterways as described in the other countries in this document. Since the river Oder is also named in the polish section (see below) the issues of this particular river can be seen as a crucial cross border issue connecting two national IWT networks.

<sup>34</sup> EMMA A2.1 Final Report finalised.docx

<sup>35</sup> Figure 4 provided by HHM

The range of bottlenecks found includes lock restrictions, length and width restrictions, clearance height and draught restrictions. Three general obstacles are also observed: from an IWT shipper's and associations' point of view, missing mooring areas for inland waterway vessels in ports, limited availability of River Information Services (RIS) in some parts and limited operating hours at a ship lift.

Further potentials for IWT are seen upon these bottlenecks are lifted. The inland shipping industry likes to have all of them removed at once, which seems from an administrative point of view not realistic due to e.g. planning procedures, staff and budget constraints.

Please find a table with selected potentials in Germany below. Common understanding is to enhance complete river stretches instead of elimination single bottlenecks.

Inland Waterway	Potential	Source
Elbe Lateral Canal	15-19 m tons (Base year data 2014)	Ergänzungsgutachten zum Ausbau des Elbe-Seitenkanals (ESK), Hanseatic Transport Consultancy (HTC), 8th June 2015. <sup>36</sup>
River Saale	LUB Consulting: 2 m tons (Base year data 2012)  PLANCO: 0.23 – 0.56 m tons (Base year data 2011)	Argumentationspapier zum Saale-Seitenkanal auf Basis der aktualisierten gesamtwirtschaftlichen Bewertung 2012, LUB Consulting GmbH <sup>37</sup> , August 2012.  Aktualisierung des Gutachtens zur Gesamtwirtschaftlichen Bewertung des Ausbaus der unteren Saale, PLANCO Consulting, 2012. <sup>38</sup>
River Elbe	0.27 m TEU linked to hinterland transport of the port of Hamburg (Base year data 2011)	Analyse des Ladungspotenzials der Binnenschifffahrt im Hinterlandverkehr des Hafens Hamburg (2011/2012), Hamburg Port Authority <sup>39</sup> and Port of Hamburg Marketing, 2011/2012.
Berlin Region, Spree-Oder- Wasserstrasse	3.3 – 4.5 m tons	Tischvorlage, Treffen mit PSts Enak Ferlemann, WEITBLICK e.V. 26.04.2016 <sup>40</sup>
Elbe-Lübeck-Canal	2 – 3 m tons	Hanseatic Transport Consultancy (HTC) <sup>41</sup> , 2013.

Table 1 List of selected German IWT potential

<sup>36</sup> [https://www.besk-niedersachsen.de/files/03\\_esk-ergaenzungsgutachten\\_2015\\_langfassung.pdf](https://www.besk-niedersachsen.de/files/03_esk-ergaenzungsgutachten_2015_langfassung.pdf)

<sup>37</sup> <https://www.lub-consulting.de/>

<sup>38</sup> <http://www.planco.de/index.php?id=108>

<sup>39</sup> <https://www.hafen-hamburg.de/de/firma/hpa-hamburg-port-authority-aoer-hamburg---7893>

<sup>40</sup> [http://www.weitblick-verkehr.de/fileadmin/user\\_upload/Downloads/Anlagen\\_nach\\_Zahlen\\_sortiert/Anlage\\_3\\_-\\_TV\\_Ferlemann\\_26.04.2016.pdf](http://www.weitblick-verkehr.de/fileadmin/user_upload/Downloads/Anlagen_nach_Zahlen_sortiert/Anlage_3_-_TV_Ferlemann_26.04.2016.pdf)

<sup>41</sup> <http://www.htc-consultancy.de/>

### 3.6 How to increase Inland navigation in Germany<sup>42</sup>

On average a single transport covers a length of more than 300 km and thus barge transport is a good alternative to rail and road. However, the truck is seen as the most flexible means of transport offering door-to-door transport.

Especially private investments are particularly hindered by lack of maintenance and rehabilitation as well as regeneration measures in river basins and infrastructure, which result in unstable navigational conditions. This uncertainty in economic viable inland navigation also causes the absence of modernisation and innovation in the fleet. Investments are undertaken by the private sector only if a return on investment is foreseen. Improvements should be aimed.

Another key aspect is information sharing and digitalisation to achieve competitive IWT services in Germany. Inland navigation needs to be competitive to be integrated into multimodal transport chains. Telematics systems have been used in air, sea and road transportation for years but the inland navigation is lagging behind other transport modes. River Information Services (RIS), Sea Traffic Management (STM), Smart Fairway and RIS Corridor Management concepts as well as corresponding infrastructure are being developed further by the CEF projects CoRISMa, RIS Comex, RPIS, MONALISA, MONALISA 2.0 and STM Validation. Especially corridor management aims to realize support for route and voyage planning as well as transport and traffic management. These initiatives are the first step towards remote traffic control systems and autonomous sailing and have to be pushed forward.

Information should also be provided for potential customers with positive news, e.g. fewer accidents on inland waterways. The general public should be aware of advantages and disadvantages for single modes of transport. Information should also cover temporal and environmental aspect.

Thus, removing infrastructure bottlenecks, a modern and green vessel fleet, enhancing infrastructure (better access to waterways, appropriate storage) and improved information system by administrations would support customers' acceptance.

### 3.7 Recommendations and Conclusions

The dualism of strong waterway administration and political will to develop inland navigation as well as the issues with the administrative tradition when realizing is a major challenge in Germany today. As an evolutionary process new types of stakeholder cooperation (as getting more common in infrastructure planning today) may help to overcome barriers that slowdown the implementation of vital projects.

The results of the analyses of German IWT responsibilities can be helpful to stakeholders located at waterways that are not set as very high priority but necessary for the European and German waterway network. It provides guidance to these stakeholders who is recipient of their important message and

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<sup>42</sup> EMMA\_4\_4\_V2.docx p.8

will support in forming strategies. Waterway transport needs a network without bottlenecks. So less important waterways have a critical function and a strong need to be in best possible conditions.

Also national branch organisations should be strengthened by regional stakeholders. Registered branch organisations (accredited to the German Bundestag) missing members from North-/North East-Germany. Those potential members are mainly organised in regional alliances (not registered to the German Bundestag). This may lead to a regional imbalance in lobby activities. Missing the majority of stakeholders from specific river basin areas or regions may result in less lobby activities for the entire inland navigation network. As some of the regional alliances are quite successful in lobbying for their regional needs, members often do not see the importance to be a member in the respective branch organisations. Consequently this risks decreasing importance of branch organisations in view point of national policy, not representing the entire industry sector anymore. However, alliances' members need to consider that a direct link to the upper policy level often is missing. Alliances do not have the power and legitimation to consult national- and European policy levels like branch organisations can do. As such regional needs might not been heard on a higher policy level, resulting in disadvantages for stakeholder's business opportunities on a long term view point.

Finally the waterway administration should:

- Set up adequate infrastructure to enhance further digitalisation and to develop ITS systems further to increase efficiency and safety as well as prepare for autonomous shipping in future.
- Support data exchange and set-up of easy to use information platforms as well as one-stop-shop platform to provide navigational, operative and administrative information on inland waterways. Availability and usage of open data is a precondition and should be sought by all stakeholders. Links between RIS, eTools and other digital applications should ensure future compatibility.

## 4 LITHUANIA<sup>43</sup>

This country has rather short navigable inland waterways and a few inland ports. Rail and road transport play a greater role for the industry than IWT.

The IWT network in Lithuania covers today about 260 km of navigable waterways. This is mainly the Kursiu Lagoon and the river Nemunas, the cities of Kaunas, Jurbarkas and Klaipeda are located in close distance to these waterways.

### 4.1 Responsibility structures

The Lithuanian Ministry of Transport and Communications<sup>44</sup> is responsible for all waterways in that country. Subordinated to the Ministry is the Waterway Administration<sup>45</sup>, which is in charge of all aspects of waterway management (maintenance, infrastructure planning, safety measures, etc.) and the cargo transport. The legislation is on state level with close interaction of adjacent responsibilities, e.g. with the Ministry of Environment<sup>46</sup>. The Lithuania Infrastructure Plan<sup>47</sup> and the Lithuanian Inland Waterway Administration reform should make Lithuania waterways reliable to use for the future.

### 4.2 Recommendations for efficient structures

Lithuania is working and besides a short period of sceptic the political responsible stakeholder wants to enhance the opportunities for waterway transport. Even if the influence in Lithuania policy is limited the inland navigation and inland ports do have support by the Inland Waterway Administration as well as legislative and executive bodies on many fields. The importance of inland waterway transport for a greening of freight transport is a vital aspect of Lithuania Government and regional authorities. Responsibilities on IWT are in clear but may have to be adapted to new aspects e.g. safety and emission policy.

### 4.3 Existing Lobby Structures

The Lithuania Inland Waterway Development Committee (LIWWDC<sup>48</sup>) acts as an opinion-forming and consulting unit in the scope of preparing strategic approaches and documentation with respect to IWT. It is a state funded enterprise working for Lithuania Inland Waterways Administration (LIWA) on behalf of the Lithuania Transport and Communication ministry (LTCM) and is lobbying among respective

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<sup>43</sup> EMMA\_Act3\_1\_IWT Responsibility Report LITHUANIA REVISED.docx

<sup>44</sup> <http://sumin.lrv.lt/en/>

<sup>45</sup> <https://sumin.lrv.lt/en/sector-activities/water-transport-2/about-the-sector-2>

<sup>46</sup> <http://www.am.lt/vi/en/vi/index.php>

<sup>47</sup> Lithuanian State Progress Council, LITHUANIA'S PROGRESS STRATEGY "LITHUANIA 2030", retrieved Apr. 23<sup>rd</sup> 2018 from [https://lrvt.lt/uploads/main/documents/files/EN\\_version/Useful\\_information/lithuania2030.pdf](https://lrvt.lt/uploads/main/documents/files/EN_version/Useful_information/lithuania2030.pdf)

<sup>48</sup> <http://vvd.lt/en/>

decision-makers. Due to the current size of the IWW sector in Lithuania the overall public awareness is rather small and competes heavily with other transport modes.

## 4.4 Pilot Activity

### 4.4.1 Demonstration for IWT potential regarding Oversized Cargo<sup>49</sup>

The need to transport oversized cargo has a tendency to grow. The transport might be done using truck or vessel transport, rail transport is not recommended due to rail gauge. If part of oversized cargo flows run using inland waterways, optimistic forecast would reach the up to 1010 units per year regarding waterways.

The inland waterway of the Nemunas River E-41 is the most promising and most convenient inland water in Lithuania also for oversized cargo, due to its length of 260 - 290 km from Kaunas Mavele inland waterway port to Klaipeda Seaport. A prototype design method was chosen for the outline of barges for oversize cargo transportation by Lithuanian inland waterways.

## 4.5 Bottlenecks and Potentials<sup>50</sup>

The bottleneck investigated is on the river Nemunas. It has a total length of 914 km, the obstacle described between Klaipeda and Kaunas, at a length of 275 km, described as length, draft and width restrictions and also weather conditions. The draft between Jurbarkas and Kaunas may fall down to 1.1 meters only. Icy conditions cause a closure from end of November until end of March.

The map to the right shows the collected bottlenecks of the EMMA Project in Lithuania.<sup>51</sup>



Figure 5 Map of Lithuania

Potentials are seen at removing these obstacles but also at refurbishment of infrastructure. Navigable parts of the river are marked by non-illuminated buoys. This causes vessels to navigate at slow speed in the night time. By illuminating these stretches speed, attractiveness and reliability of IWT could be enhanced.

<sup>49</sup> TP 2017 OVERSIZE.pdf

<sup>50</sup> EMMA A2.1 Final Report finalised.docx

<sup>51</sup> Figure 5 provided by HHM

#### 4.6 How to increase Inland navigation in Lithuania<sup>52</sup>

A good number of industry (e.g. chemical plants) are located about 30 - 50 km to the inland port of Kaunas. Additionally construction companies and parts of the energy industry is based in that area. Potential is seen at shifting oversize cargo to IWT, e.g. at refurbishment of energy plants. Also the transport of bulk loads (e.g. sand, gravel) should be strengthened to enhance this type of cargo transport. Investments should be made in IWT infrastructure for e.g. loading places and service providers (operators, barges).

#### 4.7 Recommendations and Conclusions

Lithuania Inland Waterway Administration is not comparable with those in other EMMA countries. From an outside view the responsibilities scheme is quite complex and detailed. This based on historical development and must in general mean no disadvantage. When political will and administrative efficiency comes together the chances that a reformed Lithuania Inland Waterway better enable IWT.

For this actions and initiatives from other stakeholder may be needed and can be helpful for those waterways that are not set as very high priority but necessary for the network of waterway in Europe. This can be the learning task for EMMA. A first aim might be to develop the Lithuania Inland Waterway Development Committee (LIWWDC) further to be recognized the “one and only” IWT lobby association in Lithuania. This implies to strengthen the cooperation with other associations, like Lithuania Stevedoring Companies Association, Lithuania Forwarders and Logistics Association and other stakeholders on the national and European perspective, who are interested using inland navigation in Lithuania

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<sup>52</sup> EMMA\_4\_4\_V2.docx p.9



## 5 POLAND<sup>53</sup>

Poland has an inland waterway network of 3655 km in length, of which only 214 km meets the requirements of the international waterway class. Three International Waterways connecting Western and Eastern Europe and the Baltic Sea with Mediterranean and Black Sea (E-30, E-40 and E-70) are located in Poland. Due to the poor condition of waterways and long-term negligence in the field of inland waterway transport, only approx. 0.4 % of the whole cargo is carried by waterways. The theme of the recovery and revitalization of waterways has been strongly emphasized in the plans of the new Polish Government, which in 2016 already prepared the "Assumptions for the Strategy for the Development of Inland Waterways in Poland for 2014 - 2020 with a perspective until 2030", which defines the main directions of activities on rivers of transport significance. In 2017, Poland ratified the AGN Convention and proceeded to prepare a feasibility Study to modernize the International Waterway E-30 (Oder) and the International Waterway E-40 (Vistula). Both documents are under development and will be the basis for starting modernization works ensuring at least IV class of navigability on both rivers. Further government plans include: modernization of the E-70 waterway (including the Oder-Vistula connection), construction of the Silesian Channel, as well as international cooperation and training of the new professional staff.

### 5.1 Responsibility structures

Since January 2018, the management of maritime economy has been in the hands of one Minister, who is fully responsible for both the organization and safety of inland waterway transport, as well as for maintenance and modernization of waterways. In the new structure of maritime economy management, the Ministry of Maritime Economy and Inland Navigation<sup>54</sup> is responsible for the supervision of the State Water Management "Polish Waters" ("Wody Polskie"), whose task is, among others, carrying out modernization and maintenance works on rivers, preparing draft documents related to flood risk management and preventing drought effects and issuing water-law permits, including water approvals, as well as supervision over Inland Navigation Offices, which in turn are responsible for, among others, supervision over the safety of inland navigation and issuing ship and passenger ship documents.

### 5.2 Recommendations for efficient structures

The maritime economy management reform resulted in a significant improvement in the division of competences in this area. At the moment, the full responsibility for maritime economy management rests with the Minister of Maritime Economy and Inland Navigation. A similar way of organizing maritime economy management was recommended by the Kujawsko-Pomorskie Voivodeship<sup>55</sup> already in 2016, at the beginning of the EMMA project. In consequence, this change significantly improved decision-making and set the direction in which Poland is going, i.e. comprehensive development and

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<sup>53</sup> EMMA\_Act3\_1\_KPV 24.04.docx

<sup>54</sup> <https://www.gov.pl/gospodarkamorska>

<sup>55</sup> <http://www.bydgoszcz.uw.gov.pl/en/>

modernization of Polish rivers to the requirements of a waterway of international significance and entering them into the TEN-T network. In addition, the Ministry included in its activities representatives of territorial self-governments, scientists and the business world, creating a Steering Committee for investments on inland waterways, which is an opinion-forming and advisory body. This solution in the opinion of Polish project partners is sufficient and efficient.

### 5.3 Existing Lobby Structures

In Poland, lobbying organizations in the field of inland water economy management do not operate on a large scale, as they do in Western Europe and are partly dependent on water administration. However, the “Polish Inland Ship Owner Association”<sup>56</sup> is the only association being a member of a European IWW lobby organisation to incorporate national opinions in European legislation processes. Further, the other associations concentrate much on the Odra River currently. Besides the “Association for the Development of Inland Navigation and Waterways - The Board of Inland Waterway Captains” the other organisations seem to be - from a capacity perspective - small. A good example of a lobbying organization is the Waterways Bureau, operating at the Marshal’s Office of the Kujawsko-Pomorskie Voivodeship, which operates in all areas of the broadly understood water economy management, mainly in the area of the lower Vistula from Warsaw to Gdansk.

In contrary to e.g. Germany the Polish regional policy level (e.g. voivodship) lobbies directly for its waterways too.

### 5.4 Pilot Activity

#### 5.4.1 Multimodal Inland Port in the region of Bydgoszcz-Solec Kujawski

As part of the operation, the Kuyavian-Pomeranian Voivodeship together with the City of Bydgoszcz joined the elaboration of a Location Study for a modern Multimodal Platform in the region of Bydgoszcz-Solec Kujawski (between km 766 and km 771 of the Vistula river), which will be the first facility of this type in Poland (combining 3 means of transport) and contribute to the region’s economic development, as well as to restore regular navigation on the Vistula on the section Gdańsk-Bydgoszcz-Toruń-Warsaw. Document contains analyses in fields of: geological, environmental, transport, economic, financial, legal and terrain conditions. Construction of the Bydgoszcz – Solec Kujawski Multimodal Platform is to solve a number of needs and problems occurring in the area of the project impact in the regional and national dimension. On a national scale this is primarily a steady increase in transshipments in sea ports in Gdańsk and Gdynia which allows forecasting that the capacity of the existing transport system in this area of ports will soon be exhausted. The constant increase in land transport has negative consequences at all levels of impact. It translates into an increase of congestion a decrease in security and increase in pressure on the natural environment. Multimodal Platform Bydgoszcz – Solec Kujawski will allow the use of various transport modes integrated in one place which will increase the efficiency of transshipment process. Inland waterway transport could be considered first of all in the section from Baltic

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<sup>56</sup> <http://www.armatorzy.com.pl/>

Sea Region to Bydgoszcz – Solec Kujawski. The implementation of the Multimodal Platform construction project in the future will be one of the elements contributing to the economic activation of the Vistula River which is part of International Waterways (E-40, E-70). These activities are consistent with the plans and government policy which was defined in the document “Assumptions for plans for the development of inland waterways in Poland for 2016-2020 with an outlook until 2030” adopted by the Council of Ministers on June 2016. The accepted document “Location Study for Multimodal Platform Bydgoszcz – Solec Kujawski” was received on November 23, 2018 by Kujawsko – Pomorskie Voivodship and City of Bydgoszcz.

#### 5.4.2 Container cruise Gdansk-Warsaw<sup>57</sup>

One of the joint activities of Polish partners (Kujawsko-Pomorskie Voivodeship and the City of Bydgoszcz) was a promotional and research container pilot cruise on Vistula River from Gdansk to Warsaw. A pushed convoy, consisting of a pusher and barge (20 containers in total), set off from the Port of Gdansk on 19/04/2017 and reached the target on 27/04/2017. Two demonstration of container reloading at the wharves were carried out, and for research purposes, constantly, scientists from the Kazimierz Wielki University in Bydgoszcz and employees of the Regional Water Management Board in Gdansk, who conducted comprehensive research on the shipping route, were on board. Promotional events took place in seven cities, as well as during five press conferences, attended by a total of approximately 470 guests. The cruise showed the feasibility and environmental friendliness of inland waterway transport on the Vistula, indicated the main bottlenecks and the possibilities of using inland waterway transport. The report on the entire cruise is available on the EMMA project website.

#### 5.5 Bottlenecks and Potentials<sup>58</sup>

Poland has an inland waterway network of 3,655 km of which 214 km were navigable using international standards in 2015 (6% of all waterways). The country's transport policy and related investment focus mainly on road and rail transport, while the advantages of inland water transport are still not well recognized. Lack of investments in the maintenance of water routes caused the disappearance of inland waterway in the freight services of the country. For this

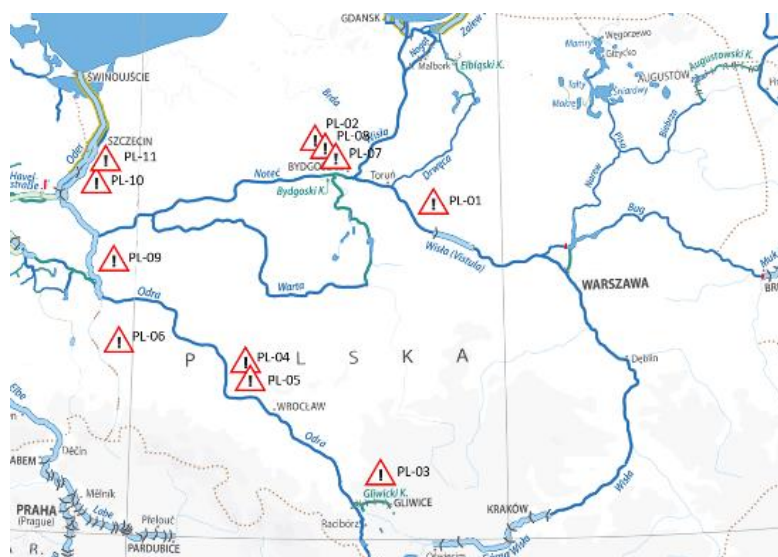


Figure 6 Map of Poland

<sup>57</sup> Container cruise Gdansk-Warsaw summary.pdf

<sup>58</sup> EMMA A2.1 Final Report finalised.docx

reason, the efficiency and advantages of inland transport have been severely limited and cannot compete with other modes of transport today.

Due to the current quality of fairways and navigable parameters 0.4% of all freight is transported on waterways. The identified eleven bottlenecks are concerned with the two largest rivers in Poland: Vistula and Oder. These two rivers are connected via the river Brda, the river Wartha and river Notec and the 24.7 km Bydgoszcz Canal. This connection is usable since end of the 18<sup>th</sup> century.

The range of bottlenecks are mainly length and width restrictions of vessels, their needed draught and clearance height. These bottlenecks apply to the natural waterways, whereas lock restriction and insufficient maintenance was named at manmade canals. The map above (Figure 6) shows the collected bottlenecks of the EMMA Project in Poland.<sup>59</sup>

Potential in Poland twofold. Inland transports might shift from road and rail to IWT by governmental measures to enhance usability, efficiency and reliability of all usable waterways. Attractiveness of inland navigation might be enhanced by investments in fleets of the private sector with close cooperation between both parties in order to overcome bottlenecks to avoid creating new ones. The other potential is seen on the international IWT. All three waterways (E-30, E-40 and E-70) could gain more attractiveness by strengthening reliability in order to shift long-distance transports towards waterways.

Please find a table with selected potentials in Poland next page.

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<sup>59</sup> Figure 6 provided by HHM

Inland Waterway	Potential	Source
Dolna Wisła	<p>Uniwersytet Gdański 7-12 mln ton (Dane roku bazowego 2017)</p> <p>Projekt InWapo (Interreg Central Europe) 7-10 mln ton (Dane roku bazowego 2014)</p>	<p>K. Wojewódzka-Król, R. Rolbiecki, Społeczno-ekonomiczne skutki zagospodarowania dolnej Wisły, Gdańsk 2017.<sup>60</sup></p> <p>Studium Techniczno-Ekonomiczno-Środowiskowe rewitalizacji i przywrócenia żeglowności Dolnej Wisły na odcinku Warszawa-Gdańsk, Gdynia 2014.<sup>61</sup></p>
Połączenie Odra-Wisła (Warta, Noteć, Kanał Bydgoski, Brda)	<p>Porozumienie MDW E70 (województwa lubuskie, wielkopolskie, kujawsko-pomorskie, pomorskie i warmińsko-mazurskie) ok. 4 mln ton (Dane roku bazowego 2011)</p>	<p>Analiza popytu na przewozy ładunków i pasażerów Drogą Wodną E70 (dla przedsięwzięcia: Rewitalizacja śródlądowej drogi wodnej relacji wschód-zachód obejmującej drogi wodne: Odra, Warta, Noteć, Kanał Bydgoski, Wisła, Nogat, Szkarpa oraz Zalew Wiślany (planowana droga wodna E-70 na terenie Polski), Sopot 2011.<sup>62</sup></p>
Oder	<p>1970-1980: transport from the Gliwice channel to Świnoujście at a level of up to 10 ml tonnes.</p> <p>In the long-term perspective, an increase in transport is estimated E-30 waterway to 25 million tons.</p>	<p>III International Maritime Congress –debate „Odra szlakiem rozwoju” Krzysztof Woś, Założenia do programu rozwoju polskich śródlądowych dróg wodnych. Warszawa 9.02.2016<sup>63</sup></p>
Oder	<p>The team under the guidance of prof. Michał Pluciński 20 million tons (Data base year 2016)</p>	<p>Resolution No. 79 of the Council of Ministers of June 14, 2016 regarding the adoption of "Assumptions for plans for the development of inland waterways in Poland for 2016-2020 with a view to 2030"<sup>64</sup></p>

Table 2 List of selected Polish IWT potential

<sup>60</sup> [https://issuu.com/energasa/docs/spo\\_\\_eczno-ekonomiczne\\_skutki\\_zagos](https://issuu.com/energasa/docs/spo__eczno-ekonomiczne_skutki_zagos)

<sup>61</sup> <https://docplayer.pl/4015174-Opracowanie-studium-techniczno-ekonomiczno-srodowiskowego-rewitalizacji-i-przywrocenia-zeglownosci-dolnej-wisly-na-odcinku-warszawa-gdansk.html>

<sup>62</sup> [http://obserwuj.lubuskie.pl/uploads/documentsearch/id44/1.4.%20MDW%20E70%20-%20Analiza%20popytu%20na%20przewozy\\_76678.pdf](http://obserwuj.lubuskie.pl/uploads/documentsearch/id44/1.4.%20MDW%20E70%20-%20Analiza%20popytu%20na%20przewozy_76678.pdf)

<sup>63</sup> [https://mgm.gov.pl/wp-content/uploads/2016/02/Zalozenia\\_do\\_Programu\\_rozwoju\\_polskich\\_srodladowych\\_drog\\_wodnych.pdf](https://mgm.gov.pl/wp-content/uploads/2016/02/Zalozenia_do_Programu_rozwoju_polskich_srodladowych_drog_wodnych.pdf)

<sup>64</sup> <https://mgm.gov.pl/wp-content/uploads/2017/11/assumptions-for-the-development-plans-of-inland-waterways-in-poland-for-2016-2020-with-2030-perspective.pdf>

## 5.6 How to increase Inland navigation in Poland<sup>65</sup>

Similar to other countries in this report, truck transport dominates the movement of cargo. Reasons why IWT in Poland is often unused are low navigation possibilities: few ports, missing handling equipment, narrow locks and more reasons. Promising waterways are the River Oder (Odra, E-30), River Vistula (E-40) between Warsaw and Gdańsk and the International Waterway E-70. Many companies with good prospects to use IWT (e.g. (petro-) chemical, paper, steel industry) for oversized and bulk cargo incl. liquid transports are located along the waterways.

In recent years, along with the reform of water management, there has been a positive return in terms of the perception of river revitalization and the development of strategic documents in this area has started. As a result, many projects related to inland navigation and economic use of the potential of Polish rivers have been initiated.

The scope of investment tasks on the Odra Waterway in the short term includes the preparation of feasibility studies, functional and utility projects, strategic environmental impact assessments, including hydrological analysis for the implementation of long-term projects. It is planned to adapt the Odra Waterway to Va class parameters and the implementation of a harmonized river information system (RIS) on all waterways of international importance. Detailed information can be found in Resolution No. 79 of the Council of Ministers of June 14, 2016 regarding the adoption of "Assumptions for plans for the development of inland waterways in Poland for 2016 - 2020 with a prospect until 2030".

One of the examples of the socio-economic benefits of launching inland waterway transport is the Vistula River, and more precisely its lower section from Warsaw to Gdańsk. Previous research in this area shows great benefits from the comprehensive development of this section, which will not only allow regular - economically justified inland transport, but also bring tangible benefits in the field of flood protection, hydropower, drainage, communication links and tourism development.

More detailed - the latest data will be provided together with the currently developed by the Gdansk Seaport Authority - "Feasibility study for comprehensive development of international waterways: E-40 for the Vistula River on the section from Gdańsk to Warsaw, E-40 from Warsaw to the Polish-Belarus border (Brześć) and E-70 on the section from Vistula to the Vistula Lagoon (Elbląg) with the completion planned for 2020.

It should be noted that the current policy of the Government of the Republic of Poland and the bottom-up activities of many environments, including local government units are conducive to activities for the development of inland transport and allow to assume that in the near future it will return to the transport map of Poland.

The most prominent international inland waterway in Poland is the E-30 within which the Odra River is located. In connection with this, the Polish government initiated the development of the Odra Waterway development program. After the modernization, the Odra River will ultimately have the fourth navigability

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<sup>65</sup> EMMA\_4\_4\_V2.docx p.9

class. The investments carried out also in the reconstruction of weirs, locks and regulatory buildings will improve the conditions for development.

## 5.7 Recommendations and Conclusions

The water management reform carried out in the last two years, which in the opinion of Polish project partners is sufficient, creates great chances for the development of inland navigation and the return of water transport in Poland. The prepared strategic documents and planned feasibility studies for individual sections of international waterways are to initiate the investment process, including the construction of, among others, water levels, canals, locks and multimodal ports, thus fulfilling the obligations inscribed in the AGN agreement.

The key issue will be finding sources of financing for planned projects, including European funds. This plan should also include measures to integrate Polish inland waterways into the Trans-European Transport Network (TEN-T<sup>66</sup>).

To develop the existent lobby network further, might be a good starting point to strengthen sectors voice and support the government in their strategic visions for the waterway network. The guidance and experience of the “Polish inland Ship Owner Association” during such development process could be helpful, to cover the whole Polish perspective in future. Thus, a dialogue between the different associations should be started to develop the network further and strengthen its voice towards European associations

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<sup>66</sup> [https://ec.europa.eu/transport/themes/infrastructure\\_en](https://ec.europa.eu/transport/themes/infrastructure_en)

## 6 SWEDEN<sup>67</sup>

Sweden implemented the EU Directive 2006/87/EC (a set of rules and regulations dictating technical and operational requirements for ships engaged in inland waterway traffic) and by that opened the market for inland navigation just a couple of years ago. As such Sweden is in the phase of an emerging IWT market which needs to be recognised very positive. Sweden's status comes along with all the needs and challenges in setting up new regulations and creating a business environment for inland navigation for the first time.

From the governmental side, several processes and initiatives appear to be supportive to an increased use of more energy efficient means of transport. Energy efficiency, and as a result, less emissions per ton-km, remains a strong argument in favour of all forms of transport on water.

### 6.1 Responsibility structures

Due to the late introduction of Inland Waterway regulations, the administration and responsibility is widespread and not really concentrated. It includes various public and private stakeholders involved in the development process of the IWW system depending on the type of measure or legislation.

Please refer to the relevant EMMA Document for an insight towards this issue.

### 6.2 Recommendations for efficient structures

Following the chapter above, efficient structures for Sweden cannot be recommended without a clear sharing of responsibilities.

Please refer to the relevant EMMA Document for an insight towards this issue.

### 6.3 Existing Lobby Structures

In Sweden lobby organizations depend on the waterway administration and their power and plans. Mainly the Maritime Forum<sup>68</sup> is working partly on inland navigation topics as separate entity.

### 6.4 Pilot Activities

The Swedish pilot actions are regarded as very important input to further shape emerging IWT markets in Sweden. The pilot activities in Sweden are two design studies regarding retro-fit barges to resist ice conditions and the use of an LNG/LBG hybrid propulsion system. The studies take special conditions like shallow weather, narrow fairways, ice and small vessels with rather high unit cost into account.

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<sup>67</sup> WP-3.1-EMMA-Sweden-IWT\_responsibilities-170327-Alf.pdf

<sup>68</sup> <https://maritimeforum.se/english/maritime-forum/>



Further a pilot sailing was executed to demonstrate IWT potentials. The container barge transport from Port of Gothenburg to the Port of Vänersborg via Göta River demonstrated in principle functionality of a new logistics concept if framework conditions and legislation will be set by the administration accordingly.

#### 6.4.1 Re-fit inland barge to resist ice<sup>69</sup>

The first case study is an investigation about the modification of an inland motor barge constructed on European standards for navigation in the Swedish Lake Mälaren during ice conditions. The lake has vessel restrictions due to the lock in Södertälje (L = 124.0 m, B = 18.0 m Draught = 6.80 m) and the lock in Hammarby (L = 110.0 m, B = 15.0 m Draught = 5.50 m) and usually an ice period of 8 - 12 weeks when navigating is not possible. The aim is to reduce the time of the standstill.

Based upon the design of the Amice barge, calculations show that from the vessel structure mainly the bow of the vessel must be reinforced, the plate thickness and the number of frames should be increased. Furthermore the recommendation is to increase the engine power and subsequent components since an increased speed helps to navigate through ice conditions.

#### 6.4.2 Re-fit an inland barge with LNG/LBG hybrid propulsion systems<sup>70</sup>

The second case study is an investigation about exchanging common diesel engines against propulsion systems with less emissions for today's and future use. The steps taken were an analysis of existing vessels, an identification of possible modifications, an evaluation of the impact in terms of total weight and cargo, fuel consumption and manoeuvrability and a comparison vessel emission before and after re-fitting.

Based upon a hypothetical chemical tanker for inland waterways, the vessels emission reduction was identified by 90% less sulphur, nitrogen, carbon oxides and solid particles if liquefied biological gas (LBG) is used as fuel. For further optimisation, a pure electric propulsion for speeds less than 8 knots is suggested. This includes further installations like mechanical disconnection of one or the other propulsion system to the propeller but enhances vessels safety in cases of main engine failure.

#### 6.4.3 Container barge pilot

On this unique pilot, a barge was first loaded with containers in Gothenburg and then pushed by a tugboat along the Göta River to the port of Vänersborg by the Lake Vänern

The container barge transport demonstrated in principle functionality of a new logistics concept if framework conditions and legislation will be set by the administration accordingly.

Experiences are used to enhance inland navigation and to work on the improvement of Swedish regulations for inland navigation.

<sup>69</sup> EMMA\_Act. 2.2. Report BK.docx HANDBOOK ON TECHNICAL BARGE CONCEPTS Ch. 3.1

<sup>70</sup> EMMA\_Act. 2.2. Report BK.docx HANDBOOK ON TECHNICAL BARGE CONCEPTS Ch. 3.2

#### 6.4.4 IWW transport of recycling volumes<sup>71</sup>

Another case study in Sweden is located around Lake Mälaren, having about 30 per cent of all Swedish population approximately 3.2 million inhabitants and one of the fastest growing regions. In order to facilitate goods transport, return-packaging such as paper, glass, newspaper, metal, plastic, aluminium cans, PET-bottles, household waste, sand, gravel and even snow cleared from streets in wintertime are taken into account using IWT. The vessels currently used are not according to IMO classes, these vessels operate in low waved waters only hence open sea is unsuitable. Another drawback is cost structure. The customer of the transport in one direction is liable to pay both directions since there is no cargo to be transported in opposite direction.

The idea to facilitate barges to a greater extent than today is using this mode of transport for the Swedish Return Packaging – as part of the “producer responsibility”. This instructs each producer to recycle manufactured goods after individual operating time, mainly plastics, paper products (including newspapers), metal products and glass products.

In 2015, FTI recycled a total of 308,000 metric tonnes of glass, paper, plastics, metal and newspaper in Mälardalen. The consumer uses recycling containers installed at various places. These containers are emptied by adapted lorries and contents are transported to regional distribution centres where different materials are sorted and compressed. Then goods are forwarded to different places in Sweden and abroad, each plant reprocesses a single material. Two of these recycling centres’ are already today near inland waters. Predicted voyage times fit into vessel’s crew working hours. By forcing a modal shift, the total amount of material generated per week in a certain region equates up to 370 TEU or 185 lorries with trailers. In order to use IWT, destinations need be accessible by water. Taking the current growth of 1.0 to 1.5% of the Swedish population into account, a growth of this business is foreseeable.

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<sup>71</sup> EMMA A2.4 Report IWW Recycling volumes EMMA Final.pdf

## 6.5 Bottlenecks and Potentials<sup>72</sup>

In the Gothenburg area industry and cargo and passenger traffic by road, rail and vessel meet. Conflicts occur at many crossing points between river traffic and passing train and roadways. Also politics is discordant regarding these issues.

The map to the right shows the collected bottlenecks of the EMMA Project in Sweden.<sup>73</sup>

River Göta and Trollhätte Canal is equipped with six locks between Göteborg and Lake Vänern. All locks have been built about 120 years ago with a predicted end of usability in 2030. Budget for the renewing of the locks is included in the national transport plan.

Potential is also seen at traffic synchronization between different modes in order to avoid mutual blockades between rail, road and IWT. The GOTRIS<sup>74</sup> Project showed the need and usability for such a system. Advantages are better usage of the river infrastructure, less waiting time for vessels at bridges (openings), lower emissions, better energy efficiency and less waiting time for public transport. The replacement of the locks between Gothenburg and Lake Vänern is inevitable to maintain IWT in Sweden. A vessel classification is seen as beneficial to turn unused waterways into navigable waterways and the elimination of compulsory pilotage reveals further potential. Administration is asked to remove legal obstacles.



Figure 7 Map of Sweden

## 6.6 How to increase Inland navigation in Sweden<sup>75</sup>

Due to the rather short period of 4 years since the implementation of EU regulations (Dec. 2014) for IWW the market for IWT still is in a kind of start-up phase.

However, with no practical experience of the capacity of IWW and the competitive aspects related to IWW, the new legislation, worked out by the Swedish Transport Agency in 2012 - 2013, took its point of departure in SOLAS shipping. This became a major problem, as it suddenly proved impossible to just bring in second hand tonnage from Europe that some possible start-up companies had planned. That was because the standard of these ships now proved too low for the new Swedish legislation. Especially when it comes to two aspects this is perfectly true, as there is more winter ice on Swedish lakes, but

<sup>72</sup> EMMA A2.1 Final Report finalised.docx

<sup>73</sup> Figure 7 provided by HHM

<sup>74</sup> <http://gotris.se/>

<sup>75</sup> EMMA\_4\_4\_V2.docx p.10

also larger surfaces of open water. To complicate things further, regulations demand the use of pilots on board all ships with a length above 70 meters.

Sweden has established inland waterway zones, but from a European perspective these zones are like isolated islands. Such initiatives should be avoided in future as they hinder market developments.

Even though Sweden implemented the directive “Technical requirements for inland waterway vessels” (2006/87/EC), most requirements other than strictly technical issues for inland navigation and ships used are still based on IMO/SOLAS convention.

Further, regulations demand the use of pilots on board all ships with a length above 70 meters (Lake Vänern and Mälaren) respectively 60 meters (Göta river), which comes at a cost that ruins all ordinary business plans.<sup>76</sup>

The governmental desire of shifting cargo from road and rail to IWT is given but Swedish industry also is unfamiliar with this new means of transport. Therefore heavy promotion and respective institutions concerning new IWT logistics and respective institutions are needed too.

## 6.7 Recommendations and Conclusions

All private and public parties involved in transport in Sweden national and regional administration, industry and transport business as well as environmental organisations should work together to get a common idea on the Swedish future of inland waterway transport. As long as there is no clear idea and vision, an enhancement of the current situation seems to be more complicated to achieve.

To build up a lobby structure focusing on IWT and representing Sweden in European and International matters too is urgently needed. This will ensure the consideration of some IWT market specifics (e.g. ice conditions, VTS systems instead of RIS) and gaining experience and knowledge from more advanced IWT markets in central Europe.

At the same time this IWT regulations should remain as streamlined as possible to the European regulations. If not there can be no exchange of tonnage and few foreign operators, bringing the necessary experience, will risk entering.

UNECE has previously been discussing extending resolution 61 with rules for river-sea shipping, where inland navigation vessels may sail outside the traditional inland waterway zones with some additional safety requirements. This extension of inland waterway transport with river-sea shipping may, from a Baltic perspective, close gaps between areas classified as zone 3 to 1 (like in Sweden) and facilitate growth of transport volumes between hubs.

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<sup>76</sup> Exemptions are obtainable, after tests and exams by the Maritime Agency. For a longer fairway, like the Göta River, the cost comes to about EUR 10.000 for each navigator the first time: [www.transportstyrelsen.se/sv/Om-transportstyrelsen/Avgifter/Sjofart/Avgifter-for-personliga-tillsstand/Lotsdispenser](http://www.transportstyrelsen.se/sv/Om-transportstyrelsen/Avgifter/Sjofart/Avgifter-for-personliga-tillsstand/Lotsdispenser).

## 7 BALTIC SEA REGION AND INTERNATIONAL

### 7.1 River-sea shipping<sup>77</sup>

River-sea shipping is a transport mode combining the advantages from inland navigation and short sea shipping. Special ships which can navigate at sea and inland waterways (river-sea ships) operate on many rivers in Europe with a connection to the open sea. In Finland this mode is referred to lake-sea-shiping due to the countries characteristics.

Benefits of this mode is a reduction of transshipment costs in sea ports related to time and cost. Furthermore, danger of damages to the cargo decreases, since the cargo is handled less. New vessels are often characterised by lower draught, and therefore are able to expand their operation area further inland making use of the inland waterways via river mouths.

Usually inland navigation and river sea shipping is regarded separately e.g. in statistics. Anyhow both modes of transport use part of the same infrastructure (inland waterways) and as such should be recognised during cost benefit analyses and infrastructure planning accordingly.

### 7.2 Existing Responsibility Structures

Responsibility structures can be found in the EU Parliament, EU Commission and the EU Council. Like with all other EU-legislation the EU law must be turned into National law and sometimes even state law.

The European Commission established expert groups in which registered European branch organisations can be heard (compare next chapter). As such representatives from BSR countries in European branch organisation are crucial to place countries specifics in legislative processes (if the country is nor represented by itself in for of a delegate). An overview is shown in the table below<sup>78</sup>.

Expert groups of the EU Commission or other similar institutions	VBW	INE	ESO	EFIP	EBU
<a href="#">E02210</a> Co-ordination Group for Biodiversity and Nature		+			
<a href="#">E03280</a> Digital Transport and Logistics Forum		+		+	+
<a href="#">E03497</a> Inland Waterway Transport - Naiades II implementation expert group	+	+	+	+	+
<a href="#">E01346</a> Working Group for Non Road Mobile Machinery (Emission from non road mobile machinery engines)		+	+		+
<a href="#">E03496</a> Expert group on technical requirements for inland waterway vessels	+				+
<a href="#">E03511</a> Social issues in inland navigation			+		+
<a href="#">E03542</a> European Ports Forum				+	
<a href="#">E02821</a> Expert Group on Land Transport Security					+
<a href="#">E00371</a> Strategic Coordination Group for the Water Framework and Floods Directives					+

Table 3 Expert Groups of the EU Commission or other similar institutions

<sup>77</sup> EMMA\_Policy Paper to strengthen IWT in BSR.pdf

<sup>78</sup> All information according to the EU Transparency Register as from Jan 2018. No information available for ERSTU, which is not registered. Table 1 provided by HHM

Apart from these bodies **river commissions** are established, working to improve collaboration of waterborne transport among states. These commissions are based on single rivers and may affect multiple states. The commissions' consists of relevant Member States, Partner Organisations and sometimes Observer Members from third states. Four commissions are active today: Central Commission for Navigation on the Rhine (CCNR), Danube Commission (DC), Sava Commission and Mosel Commission.<sup>79</sup> A special role plays CCNR which has established a very integrated legal regime, particularly regarding RIS regulations. CCNR adopted a resolution creating a European committee for drawing up common standards in the field of inland navigation (Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI, [www.cesni.eu](http://www.cesni.eu)). This Resolution promotes the development of uniform, modern, user-friendly requirements. The European Committee for drawing up standards in the field of inland navigation has the following missions in particular:

- Adopting technical standards in various fields, in particular as regards vessels, information technology and crew to which the respective regulations at the European and international level, including the European Union and the CCNR, will refer with a view to their application,
- Deliberating on the uniform interpretation and application of the said standards, on the method for applying and implementing the corresponding procedures, on procedures for exchanging information, and on the supervisory mechanisms among the Member States;
- Deliberating on derogations and equivalences of technical requirements for a specific craft and
- Deliberating on priority topics regarding safety of navigation, protection of the environment, and other areas of inland navigation.

By that the CCNR formed the CESNI Committee which directly influences European legislation and as such all member states should be present (which is not the case in respect of all BSR countries).

**The United Nations Economic Commission for Europe (UNECE)**<sup>80</sup> was set up in 1947 by ECOSOC. It is one of five regional commissions of the United Nations. One area of work is “Transport” and its subdivision “Inland Water Transport”. The corresponding UNECE Working Party on Inland Water Transport is called “SC.3”. Representatives from Member states, their waterway administration or River Commissions are appointed to represent national interests in the different working parties and committees.

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<sup>79</sup> Act.5.3\_IWT Lobby Structures in the BSR.pdf p.19

<sup>80</sup> <https://www.unece.org/>

### 7.3 Existing Lobby Structures<sup>81</sup>

On European level several IWW associations represent the sector towards EU institutions like the EU Parliament, the EU Commission and the EU Council. On European level several lobby organisations exist focusing on inland navigation, namely European Barge Union (EBU), European Federation of Inland Ports (EFIP), European River-Sea-Transport Union (ERSTU), European Skippers' Organisation (ESO), Inland Navigation Europe (INE) and the Association for inland navigation and navigable waterways in Europe (VBW).

Analyses in the project showed the lack of members from the Baltic Sea Region (besides Germany and Poland to some extent) represented by IWW associations in Brussels. This is due to the fact of missing national branch associations. However, especially the acquisition of single private organisations from one country should not come along with the privilege representing this country officially on European levels. The danger is to represent single interests of one/some financially strong members and not the entire sector of the country. Thus, it can be stated, that the national drawback is also influencing sectors representation on the European level.

However, it has to be clearly stated, that cooperation between the associations exist and increases. Besides others joint statements, policy-/recommendation papers and events are organised to bundle forces. Strengths of the individual associations are getting used by all, even though not in any kind of business yet.

The figure below shows the cooperation of legislation, administration and lobby associations for member states.<sup>82</sup>

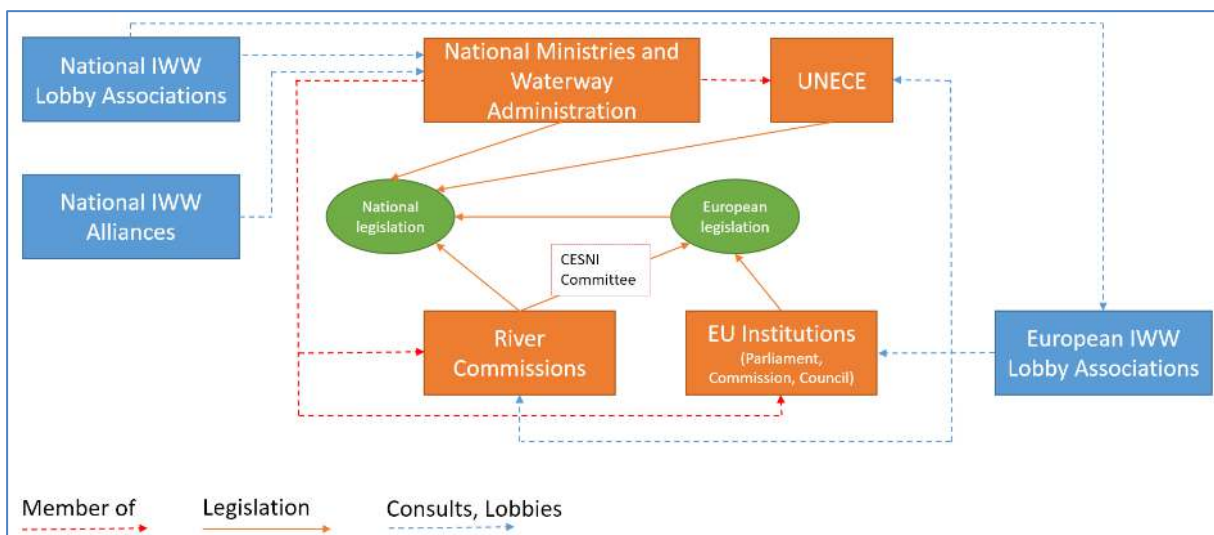


Figure 8 Cooperation of legislation, administration and lobby for MS

<sup>81</sup> Act.5.3\_IWT Lobby Structures in the BSR.pdf p.14

<sup>82</sup> Figure 8 provided by HHM

## 7.4 How to set-up a new inland waterway Service?<sup>83</sup>

Creating a new inland waterway service is basically identical than setting up other new business with an economic feasibility as the main criteria. Nonetheless, several special characteristics have to be considered. Several parties are involved (authorities, infrastructure companies, shipping companies) and shipping issues (vessel, crew, water level) must be taken into account.

In brief, an easy guideline to set-up a new IW service is described as follows, the figure below<sup>84</sup> shows the sequence single steps should be taken.

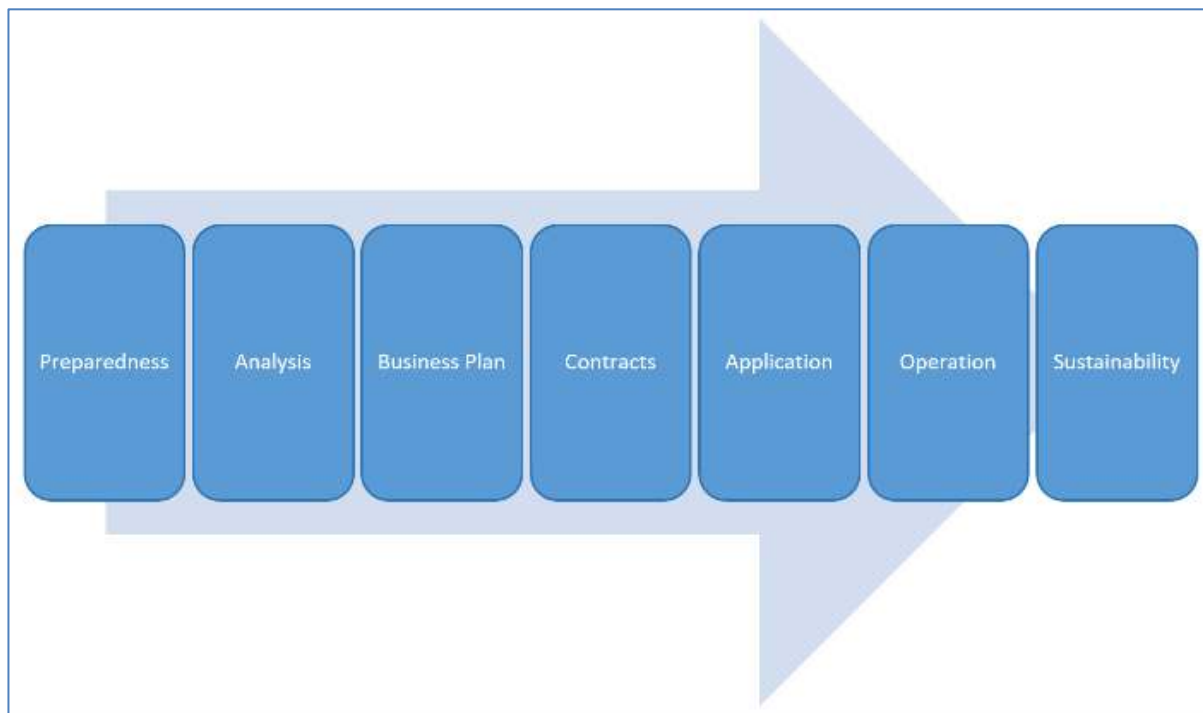


Figure 9 The seven steps to set up a new inland waterway service

The first step is preparedness towards a new service. The organiser must be aware of political developments and current legislation, promotion and lobbying must be done.

The market potential must be analysed in the second step to see if cost and potential revenues offer profitability. Mostly market analyses identify these figures along with potential clients, subcontractors and cargo.

Creating a business plan is next. This third step unveils feasibility and related risks. The IWT service characteristics are analysed in terms of market and customer requirements also at vessel and service characteristics. Also competitors and partners have to be taken into account as well as the internal and

<sup>83</sup> EMMA\_4\_4\_V2.docx p. 12

<sup>84</sup> Figure 8 provided by BÖB



external organisation of the service is planned with partners and legal considerations are part of this step. Marketing issues and risk management are also part of this plan.

The fourth step is contracting the partners involved, a close understanding of IWT concerned legislation of possibly different countries is needed.

The fifth step is the application of all needed permissions before the first transport starts operations.

When the IWT service is running quality and performance must be monitored at the sixth step in order to provide a stable service quality.

The final step in this list is to ensure sustainability of the new service in terms of a more environmentally friendly transport, e.g. LNG or hybrid propulsion. Also constant monitoring of cost, changes of customers' demands and in the market need to be surveyed and might require action.

## 7.5 European information systems for inland waterway transport

### 7.5.1 General overview and challenges in the BSR

It's a fact that in transport, digitalisation can significantly improve traffic and transport management through more accurate information on traffic and infrastructure conditions and on the location of vehicles and goods. Better access to and sharing of digital transport data for both public and private stakeholders along the supply chain can foster seamless information flows and open up a wide range of new business opportunities.

River Information Services (RIS) are information services designed to enhance safety and efficiency of inland waterway transport (IWT) by optimising traffic and transport processes. Focal aspect is a swift demand oriented electronic data transfer between water and shore through real-time exchange of information. RIS therefore aim to streamline the exchange of information between all IWT stakeholders. Since 2005, an EU framework directive provides minimum requirements for RIS implementation and agreed RIS standards to enable cross-border compatibility of national systems.

On October 20th 2005, the EU RIS Framework Directive of the European Union (2005/44/EC - OJ L 255, 30.09.2005) entered into force. The Directive is applicable to all interconnected waterways of class IV or higher across the European Union and provides binding rules for the authorities on the implementation of RIS services according to agreed regulations. The European Commission has published the RIS Guidelines, but also Commission Regulations regarding all RIS key technologies (Vessel Tracking and Tracing (VTT), Notices to Skippers (NtS), Electronic Reporting International (ERI) and Inland Electronic Chart Display and Information System (Inland ECDIS).

#### **Situation in Sweden and Finland**

In Central Europe implementation of interoperable RIS will provide information for navigation and operations. However, one must consider that e.g. in Finland no RIS services neither infrastructure exist but similar Vessel Traffic Services (VTS) systems, Automatic Ship Identification (AIS) and single window data sharing systems are in operation. These systems are used in marine traffic. In some BSR countries,

such as the Nordics, inland waterways are connected to sea rather than other inland waterways. Seagoing vessels like river-sea ships are used in addition to inland barges. A separate RIS system for inland navigation is probably not being installed, especially as river-sea shipping plays a more dominant role in these waterways and duplication of similar systems is not productive. Therefore, regulations and operational practices should take interoperability of both sea and inland waterway systems (RIS/VTS) into account.

Anyhow the developments in central European RIS systems and corridor management applications is interesting to follow and a harmonisation of VTS system might be beneficiary to offer same service to Nordic stakeholders in future by using VTS systems.

#### 7.5.2 ELIAS information system developed in EMMA<sup>85</sup>

A prototype to support vessel masters, fleet and cargo managers was created to show feasibility of the use of modern information technology. The prototype collects and aggregates a number of data sources from existing River Information Services (RIS) and displays the information using an integrated web application called ELIAS. This application only requires a small bandwidth internet connection and a standard internet browser. The advantage of this technique is, that no new specialised hardware or software is necessary.

The prototype provides a publicly accessible part and a password protected part for registered users. The section accessible to the general public allow access to information using a single window of data stored in distributed external RIS or RIS related systems. The private section comprises functions that process and display sensitive data, such as vessel positions, which are visible only to the data owners and those with proper authorisation.

Central part of ELIAS is a map based web application displaying relevant information on inland waterways. External information sources are integrated directly, e.g. available electronic navigational charts (ENCs) provided the by German Federal Waterways and Shipping Administration<sup>86</sup> (WSV) using a standard web map service<sup>87</sup>. Current and predicted water levels at numerous gauges are available via another service<sup>88</sup> operated by the WSV, accessible through a standardised REST<sup>89</sup> API<sup>90</sup>.

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<sup>85</sup> <https://elias.isl.org/index.xhtml>

<sup>86</sup> Wasserstraßen- und Schifffahrtsverwaltung des Bundes, <https://www.gdws.wsv.bund.de/>

<sup>87</sup> <https://atlas.wsv.bund.de/clients/desktop/?parameter=visible&value=iencwms>

<sup>88</sup> <https://www.pegelonline.wsv.de/>

<sup>89</sup> REST: REpresentational State Transfer

<sup>90</sup> API: Application Programming Interface

Figure 10 shows a screenshot of the prototype, figure 11 the integrated databases.<sup>91</sup>

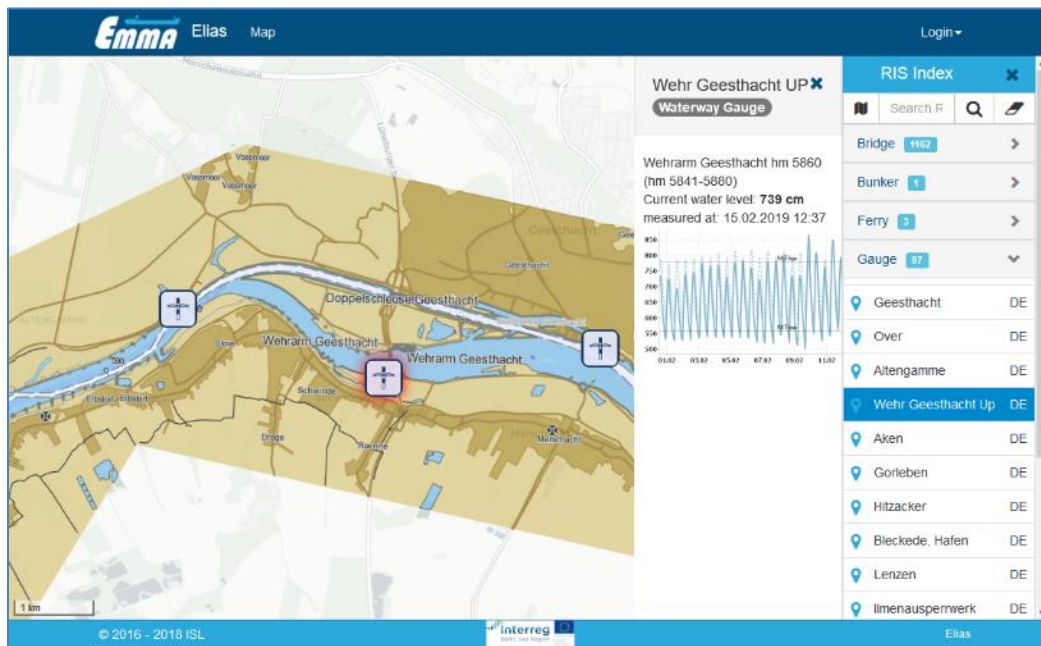


Figure 10 Screenshot of electronic navigational charts and water levels

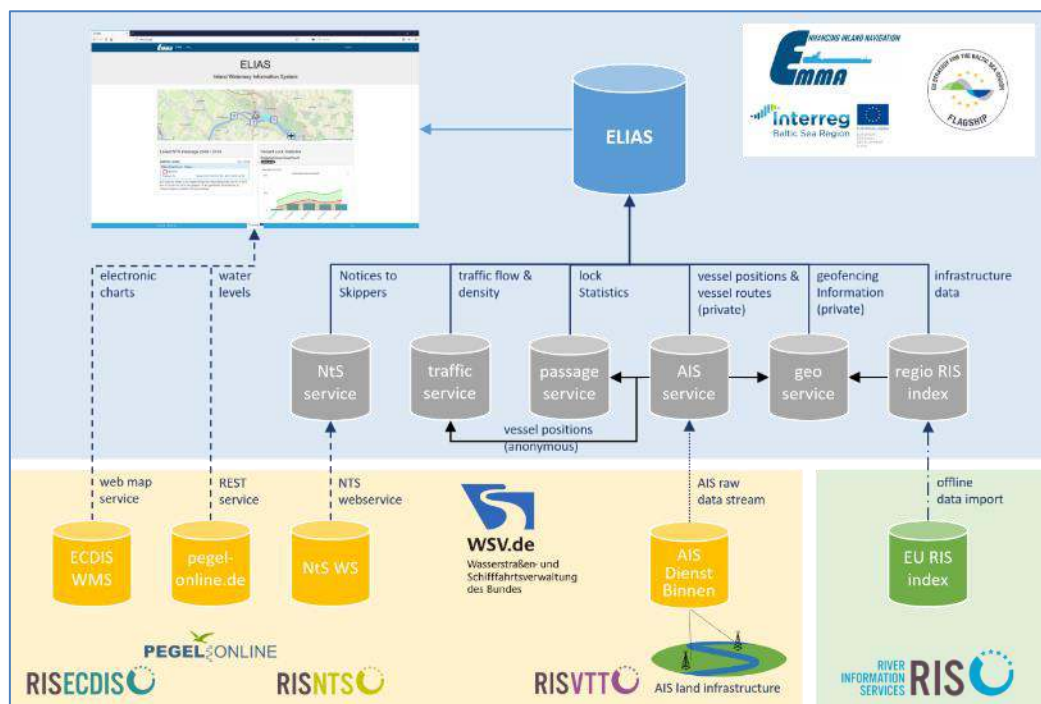


Figure 11 Overview of integrated databases

<sup>91</sup> Figures 9 and 10 provided by ISL

Following services are integrated into the application:

### Regional RIS Index

Information on waterway infrastructure is gathered from the European RIS index<sup>92</sup>, maintained by EU RIS expert groups and populated by national waterway authorities. The RIS index contains static information on objects (locks, bridges, gauges, ports, terminals). EMMA regional RIS index maintains a copy and provides access to the data allowing filtering on object types and on geographic area.

### AIS service

The application provides Germany's public available (anonymized) AIS data. Inland vessels broadcast individual AIS information, WSV collects information and feeds vessel positions into a nationwide service named "AIS Dienst Binnen". The EMMA AIS service receives the data, stores in a local repository for display and subsequent services, e.g. passage service or the traffic service.

The vessel display is anonymised in the public section and usable with all information of the fleet of registered users in the private section of the ELIAS system. The consent of the data owner is required. From the history of the vessels' positions, the AIS service may also produce recent routes of vessels.

### Traffic service

The anonymised vessel positions allow a calculation of traffic density (number of vessels per waterway section per time) and traffic flow (average speed of vessels per waterway section per time). The traffic display is colour coded: from green (low density / fast flow) to red (high density / slow flow).

### Passage statistics service

Also based on anonymous vessel positions, this service analyses vessel movements at places of interest, e.g. locks. The times entering the waiting area, advancing into the lock chamber and leaving it are recorded and an average waiting and passage time is calculated. Statistics are displayed as a continuous timeline per hour, day, week or month as well as an aggregated average as a diurnal curve per weekday.

### Notices to Skippers Service

National and local fairway authorities are obliged to inform skippers about the safety and accessibility of the individual waterway<sup>93</sup>. ELIAS collects NtS messages (e.g. status of locks and bridges) via a web service provided in Germany by the WSV and displays the messages on the map.

### Geofencing service

In the private section this service determines from latitude and longitude of a vessel position the nearest infrastructure object such as waterway section, lock, port and terminal or city area. Calculations are performed using reverse-geocoding and locations provided by the regional RIS index.

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<sup>92</sup> [http://www.ris.eu/library/expert\\_groups/ris\\_index](http://www.ris.eu/library/expert_groups/ris_index)

<sup>93</sup> [http://www.ris.eu/expert\\_groups/nts](http://www.ris.eu/expert_groups/nts)

## 8 CONCLUSIONS AND RECOMMENDATIONS<sup>94</sup>

### 8.1 Improvement of the Regulatory framework

The regulatory framework should arrange for harmonisation of competitive conditions between different transport modes even in an European scale and cater for equal parameters at all sections.

One of the biggest achievement in the EU is the common market, but it is still today partly incomplete at the shipping industry including IWT and river-sea shipping. Special care should be taken of regulations regarding barge transports, vessel classifications, and admission of ship types in certain areas and funding of infrastructure. River-sea-shipment often suffers from goods losing community status and results in additional administrative and other efforts for all stakeholders. A harmonised electronic cargo eManifest might help to avoid this burden and also assist at third country ports. Documentation requested by administrations at vessel arrival regarding cargo and crew information is seen to be outdated, unnecessary and repetitive. To comply with these different tasks in an economical way might be performed by a real European Single Window application. Unequal competition is also present at taxation at the use of waterway infrastructure compared to road and rail transport. Waterway transport is the most expensive mode these cost but could be an integrated part of all transport modes if policy instruments are used the right way. A reform of Directive 92/106/EC might help.

When comparing the single countries involved in this project, national legislation is seen to be inhomogeneous and sometimes too regulated resulting in a decrease of competitiveness of inland navigation. Inland navigation should be at no cost at a high security level, supported by modern technical achievements e.g. AIS and VTS. A good idea is the extending of UNECE resolution 61 regarding river-sea shipping which might close gaps between areas classified as zone 3 to 1 in order to facilitate growth of transport volumes between hubs. In addition, these hubs should treat vessels the same way as other transport modes when taking waiting times and handling charges into account.

### 8.2 Enhance Administrative and Branch Associations' Structures

Administrations should be aware of strengths and weaknesses, benefits and risks of inland navigation and river-sea shipping in the same way as other modes are known. Administrations should also be responsible in the same manner for IWT as for other modes since this is partly not the case today. This requirement also expands to technical knowledge and logistics concepts to improve the sector by development.

On the other hand, branch associations should assist administrations to reach mutual agreements for the profit of both. Countries with small IWT sector available might also miss working national and international lobby structures for discussion. The EU already supported in this issue by appointing the "Comité européen pour l'élaboration de standards dans le domaine de la navigation intérieure" (CESNI) to draw up common standards within EU directives on technical requirements and professional

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<sup>94</sup> EMMA\_Policy Paper to strengthen IWT in BSR.pdf

qualifications and also focuses on RIS regulations. CESNI is a very integrated legal regime referred to in EU directives on technical requirements and professional qualifications and with a new focus on RIS regulations. CESNI promotes the development of uniform, modern, user-friendly requirements and by that directly influences European legislation procedures for inland navigation and river-sea shipping. As such it should be specially considered by national IWW stakeholders from the BSR, which are clearly underrepresented in this important committee

### 8.3 Digitalisation

The subject heading has a few facets. On the one hand it refers to additional and more accurate pieces of information regarding traffic, infrastructure and locations of vehicles and goods to allow intervention if necessary. On the other hand digitalisation also refers to telematics systems used for years at other modes of transport but to a small extend in IWT. Furthermore digitalisation in administrations will help to lessen burdens in goods and corridor management administration.

By enhancing digitalisation in all these fields inland navigation will increase efficiency and profitability and will participate more in multimodal supply chains. It also might open future opportunities of semi- and fully-autonomous inland shipping and reduction of pilotage.

### 8.4 Waterway Infrastructure and its Maintenance

IWT and river-sea-transport heavily relies on the existing infrastructure. Today, administrations in the Baltic Sea Region often focus on road and rail transport without taking external costs for society into account. This results in missing links and bottlenecks thus limiting overall efficiency of this mode. Even the feature of border crossing apart from roads and railway tracks, avoiding congestion is seldom taken into account but should be considered when planning for more investments, also for TEN-T corridors.

Private investments in the transport business by setting up new relations or strengthen existing relations build upon reliable infrastructure thus predictable maintenance is essential. Investors like foreseeable return of investments but missing public maintenance results in less private engagement. Thus inland waterway infrastructure should be taken more into EU legislation with a balanced environmental protection and competitiveness of inland navigation and river-sea shipping.

### 8.5 Sustainability, Innovation and Investment

Sustainability is today more than a buzz word and transport business is part of the discussion. Thus alternative fuel technology in inland navigation and river-sea shipping is another branch of innovation. The research for hybrid engines (e.g. diesel-electric) or alternative fuels (e.g. LNG<sup>95</sup> or LBG<sup>96</sup>) plays an

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<sup>95</sup> Liquefied Natural Gas

<sup>96</sup> Liquefied Bio Gas

important role either in the replacement of propulsion systems of existing vessels to extend the individual live cycle or in the design of future vessels. In addition, hydrogen or pure electrical power units for short distances and small vessels are part of today's research.

Apart from the propulsion system the vessels hull is permanently improved and adopted according to the intended operational area. This area is also of interest to improve competitiveness of IWT, e.g. an improved ice class might extend the operational period or for light weight vessels might carry additional cargo. These concepts need innovative ship owners and funding to confirm theoretical solutions.

Two more areas of innovation, depending on ship owners' financial and technical resources should be mentioned: the first one is the as investments in new technology (e.g. RIS applications) to improve overall vessel or fleet performance or to reduce cost (e.g. fuel cost). The second area is logistics concepts which should integrate IWT to a greater extend into multimodal concepts e.g. for pallets, big bags, parcels, waste. These logistics concepts might also use smaller units in urban areas (city logistics) in order to avoid road congestion.

All these ideas need financial investments to realise, however inland navigation and river-sea shipping is not characterised by big profit margin nor ensured return on investment for private investors. This reflects on the authority side where investments are often realised when the need is present but not much earlier. This deadlock should be the spark for tailor-made European funding and financial instruments for inland navigation and river-sea shipping in order to put in research and development of new and profitable technology to gain green, smart and congestion-free transport and logistics.

## 8.6 Develop an IWT Masterplan for Europe and the Baltic Sea Region

Inland navigation and river-sea shipping heavily depends on the infrastructure of rivers, canals and adjacent waterways. Investments are rather scattered taking often single relations in single countries into account. Although about 75% of all inland waterway transport is cross-border and the weakest link in a chain determines overall performance. Thus the view should change from the fragmented support of this mode towards a transnational network perspective with seamless infrastructure and taking green and smart services as a part of the EU decarbonisation strategy into account. Such a strategy should result in common vessel standards according to anticipated cargo volumes and associated infrastructure regarding well-integrated European inland waterway network instead of promoting single corridors.

An IWT masterplan for the development of inland navigation and river-sea shipping is needed, which should include a holistic perspective of the sector. Such masterplan should provide the strategy and the instruments to pave the way for a well-functioning internal single market for inland navigation and river-sea shipping, in which a green and future-oriented fleet supports the European goals as set in the White Paper on Transport.

## 8.7 Introduction of a single BSR-wide state-of-the-art information system

The information system described in chapter 7.5.1 is a prototype designed to work either nation-wide or even BSR-wide. One of the advantages of using a single system is the seamless tracability of cargo transports that cross borders. The vessel master or fleet manager does not have to change systems when crossing the border using IWT. This procedure is similar to trucks, where drivers also use one navigation system all over the continent having appropriate map information installed.

One requirement for such a system is compatible data provided by respective authorities which is not yet the case today. The Baltic Sea Region does not have the same prerequisites as central Europe e.g. no inland waterways provide data according to the RIS Directive except the River Odra located in Poland. In Finland<sup>97</sup> no RIS services nor infrastructure exist but similar Vessel Traffic Services (VTS) systems, Automatic Ship Identification (AIS) and single window data sharing systems are in operation, which are partly also used for coastal sipping elsewhere.

The introduction might follow the path below:

1. The information system should be connected to existing Vessel Traffic Systems in countries where the system should operate.
2. Differences between maritime regulations and the RIS Directive are to be investigated regarding availability and usability of information.
3. In order to connect the new information system to existing VTS and RIS data, appropriate adaptors are to be developed.
4. Participating countries and/or regions should provide services and data repositories where existing VTS do not provide necessary information today, e.g. RIS index
5. The concept regarding a provider is to be determined. One idea is to have national instances of the information system, another idea is about a single BSR-wide instance

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<sup>97</sup> EMMA A2.7\_Information\_Systems\_in\_Saimaa\_FINAL.DOCX