REDUCING ADMINISTRATIVE BARRIERS FOR SWEDISH IWW

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EMMA – Report

Content

1 SUMMARY

The Inland Waterway regulation was formally implemented in Sweden in December 2014. With the adaption of a technical framework it was now possible to receive a type-approval in Sweden for an inland waterway vessel. Since this introduction, no shipowner have applied for such a type approval, and the reason is that there are still barriers for IWW to be properly introduced in Sweden.

There are five regulatory areas which are significant for establishing IWW in Sweden, These are summarized below:

Area	Current situation	Desired situation	Status	Note
Technical framework for IWW type approval	A technical framework for IWW was implemented in Decmber 2014	As few national special regulations as possible compared to European IWW technical regulation	Implemented, and is seen reasonable by industry	The largest IWW area in Sweden, Lake Vänern, is classified as Zone 1, which excludes most of the existing European IWW tonnage.
Manning regulation	Since no special manning regulation for IWW is implemented, the national regulation for general shipping is applicable.	Manning regulation that are more transparent and predictable than current process with application for individual cases.	EU directive 2014/112/EU concerning Organisation, resting-and working time for Inland Waterways, was implemented in the Swedish regulatory framework, even though it does not address the core question of lesser need for personnel on board an IWW-vessel.	The existing regulations for manning are deemed to be acceptable for Swedish IWW industry representatives.
Pilotage regulations	The same regulation applies to IWW vessels as for SOLAS vessels	The goal is to establish the possibility for the ship-owner	An internal project in the transport agency are doing an oversight on	EMMA-project proposes an assessment-based, functional

	in Swedish IWW waters when it comes to pilotage. Pilot exemption is possible but draws unproportional costs for acquiring this for an IWW operation.	to ensure and show that significant skills are present at the bridge, and for the authorities to verify these circumstances, enabling authorities to grant pilot exemption.	this. Currently needs from IWW perspective,is however not included in this work.	approach for this ensurance, is identified [1] The ability for the authorities to get transparent access, to be able to audit and to be able to monitor the operations is central in this proposed approach. STM services like route-check and enhanced monitoring are identified as possible supporing services for creating above mentioned transparency.
Port and fairway dues for IWW	Sweden, as opposed to other IWW countries in Europe, do not apply any exemptions on fees, manning, certificates or pilotage[1]	Evening out the unbalanced subsidy of trucks compared to IWW (looking at the internalisation of societal cost)	New fee structure for fairways and infrastructure implemented 2018 unfortunately do not take IWW into consideration The major ports in the Mälaren are currently evaluating pricing structure more adapted to	X

			regional maritime traffic. An investigation of a possible eco-bonus system is initatied by the Swedish government for stimulating modal-shift to maritime transport.	
Ice assistance for IWW	The cost for Ice-breaking is financed by fairway dues .Ice-assistance does not cover vessels with no, or insufficient Ice-class. Few IWW-vessels in Europe with sufficient ice-class exist, meaning difficulties starting up an interruption free operation in Sweden with second-hand tonnage.	A possibility for IWW-classed vessels to be entitled to ice-breaking assistance when needed.	No current initiatives for overseeing the ice-breaking regulations.	Route-check, and route-optimisation for ice-conditions is identified as possible Sea Traffic Management services which could support IWW vessels when severe ice conditions occur.

Table 1 Summary of regulatory barriers for IWW in Sweden

1.1 Assessment of regulatory impact on IWW

Area	Category	Impact estimation	Intervention experiences	Comments
Technical framework	Legislation (EU/National)	High	EU IWW framework implmented in a,	Dialogue in the project have opened for the

			for industry, acceptable way.	possibility of using PNF (assessment based technical framework) for Swedish IWW.
Manning	Legislation (EU/International)	Low	Sweden recenty implemented EU reulations for work hours on IWW.	Swedish Transport Agency currently investigation implementation of assement-based manning criterias.
Pilotage	Regulations National	High	Proposal through the project to assess possibility for PNF approach also for pilot exemptions	
Port and fairway dues	Administrative and commercial policies	HIgh	The recent re-structure of fairway and infrastructure fees, did not take into account current political will to promote IWW. As for harbour fees, these are mainly commercial agreements, and ports today categorise IWW in the same way as oversea shipping, and not as	

			alternative to land transport.	
Ice assistance for IWW	National regulation	Medium	No process of influencing the ice-assistance for IWW have been started in Sweden.	The lack of ice assistance for IWW can have high negative effect on the reliability if such a service, however there are usually few winters where ice conditions are so severe for a longer time.

Table 2: Assessment of regulatory thresholds and their impact on Swedish IWW

1.2 Analysis and recommendations

The case study shows that there are several important areas which was not addressed when Swedish government decided to implement European IWW into Swedish legislation. The fact that no single proposal to Swedish Transport Agency for type approval of an Inland Waterway Vessel in Swedish waters have been made, indicates that more than the adopting of a technical framework is needed for real business is started based on IWW. This has also been recognised by the Swedish government, resulting in the assignment to Swedish Maritime Administration and Swedish Transport Administration to produce a report of the potential of inland and coastal shipping in Sweden[1] which was delivered in December 2016.

This project has identified five main areas which are important for enabling Swedish IWW to be running on commercial grounds. From these, the main issues from a commercial standpoint (being able to run an IWW based logistic service on commercially viable terms, competing with land-based transport), it this the infrastructure and handling fees (fairways and ports) and the possibility for pilot exemption that are seen as the biggest thresholds. These issues can be addressed by a combination of change in regulation and new regulatory frameworks This indicates that the remaining hurdles for a successful IWW in Sweden lies more on the transport agencies and administrations, but also the ports, rather than on the legislative branch of the Swedish government. The issue of internalisation of societal costs for transport, is through a far bigger question than only for IWW, and the user-funded financing model for Swedish Maritime Administration also poses a difficulty for restructuring of infrastructure fees.

At the same time, there are undergoing processes which may work in advantage to IWW in Sweden. The newly introduced technical framework for domestic Shipping, the assessment based PNF framework, can be seen as a new way of implementing regulation and enforcing the very same. With a less descriptive regulation and instead a more functional based, there are larger degrees of freedom,

boht from the legislator point of view , and from the industry – in how the prescribed standards can be met. Allegedly, Sweden is the first European country that tries this approach in the transportation area, and this may very well be an area of transferability. In this analysis we propose to look at the possibility of a assessment based, functional approach also in the area of pilotage. It has also been suggested that the PNF-framework would be more suitable for Swedish IWW, than the newly implemented IWW technical framework. This since the very strict zone-regulation that relates to the technical framework, cold be solved with an assessment based approach.

Our analysis also shows that future information-based services such as SeaTraffic Management (STM) can work as a tool for creating transparency and control mechanisms, which partly can substitute strict prescriptive frameworks and regulations. From a Swedish perspective, infrastructure and technology are in place.

2 INTRODUCTION

Since the introduction of the Inland waterway (IWW) directive in Sweden the 16:th of December 2014, there have been few initiatives an even less implementations of IWW in Sweden. Even though the technical framework of the IWW directive was implemented, important parts of regulation such as manning, ice-breaking and pilotage are not yet in adjusted for IWW, which creates an uncertain business case for the maritime industry when looking at business opportunities with IWW.

At the same time as IWW is struggling to create a foot-hold in the Swedish transport system, new tools and technologies are developed in the maritime sector enabling enhanced safety, efficient shipping and better environmental footprint for shipping as a whole. One of these areas, Sea Traffic Management (STM) have the potential also to support IWW and possibly contribute in solving some of the remaining obstacles for making IWW an attractive mode of transport in a Swedish setting.

This study will also examine in what areas STM can contribute positively to implementation of IWW in Sweden, and what changes in regulatory frameworks are needed to establish such a positive change.

2.1 Approach and work process in this study

Inland waterway transport in Sweden is at this present stage almost non existing, at least with a strict IWW definition. There are two waterways in Sweden that are defined under the Swedish IWW framework. Läke Vänern with the Göta Älv river connecting it to Gothenburg and Kattegatt, and Lake Mälaren, connected to the Baltic sea through Södertälje canal but also through Stockholm. Even though approximately 2 Mton of goods are transported to the Lake Vänern area by water and 3 Mton in the Mälaren region, most of this cannot be seen as IWW, since it is transported by SOLAS-vessels with river-sea traffic. The approach taken for this case study, is therefore not to study the effects on IWW based on changes in regulation in the past, but rather to explore possibilities with new regulations or adoptions to existing, that can have positive effect in the future on IWW in Sweden. This, then, takes a more pro-active approach which can be more beneficiary in Sweden for the development of IWW.

Since the IWW community in Sweden at present is quite limited, we have the advantage to be able to gather most of the organisations and persons vital for the progress of IWW at one place. We have therefore taken a workshop based approach giving the opportunity for different stakeholders to discuss and develop ideas together, taking several aspects and perspective into consideration. In a more mature industry, studying existing literature and reference documents combined with interviews, would have been a more likely approach.

Two workshops have been conducted during Q3 and Q4 2016, gathering representatives from the different organisations involved in IWW at present in Sweden.

The following organisations have been involved in the workshops:

- Trafikverket (Swedish Transport Administration)
- Transportstyrelsen (Swedish Transport Agency)
- Sjöfartsverket (Swedish Maritime Administration)
- Sjöfartsforum (Swedish Maritime Forum)
- Avatar Logistics
- Viktoria Swedish ICT

Consultations have been made also with SMHI (Swedish Metrological and Hydrological Institute)

The first workshop focused on the current situation and identified remaining obstacles for implementing IWW in Sweden.

The second workshop focused on identifying solutions and proposals for legislative changes or adoptions and supporting (technical) developments to such changes.

During the workshops, a set of scenarios were used to stimulate discussions in how Sea Traffic Management could support the various areas of problems. These scenarios are described in appendix A.

Parallel to this process, a public assignment from the government have been conducted by Sjöfartsverket and Trafikverket - Analysis of the potential for Inland and coastal Shipping in Sweden.

A third workshop is planned outside this study, to further elaborate some of the results (see section 7.1).

3 FIVE REGULATORY AREAS OF IMPORTANCE FOR A COMPETETIVE IWW IN SWEDEN

When the Swedish parliament decided to implement the EU IWW framework, this was made by implementing the (2006/87/EG) which is the technical framework for ships in IWW-traffic. This is how far the implementation has come in Sweden. Recently the Swedish Parliament passed a bill to implement the 2014/112/EU regulation of working hours for IWW-vessels. The definition of what areas in Sweden is not a regulatory question for the parliament but is instead under the jurisdiction of Transportstyrelsen. By measuring significant wave-height over time (according to UNECE recommendation), so far the following areas have been classified as IWW areas in Sweden:

- Zone 1:Significant wave-height do not exeed 2,0 meters
  - Läke Vänern, Rivöfjorden
- Zone 2: Significant wave-height do not exeed 1,2 meters
  - Göta Älv, West of Älvsborgsbron
- Zone 3: Significant wave-height do not exeed 0,6 meters
  - Läke Mälaren, Södertälje Kanal, Stockholms hamnar

Even if this is a good start, several areas have been defined where the current framework or regulation is insufficient for creating incentives for shipping companies to start IWW-traffic. Below we have summarised current status, desired situation and identified regulatory or institutional barriers for achieving the desired state.

3.1 Technical framework adapted to IWW

3.1.1 Current situation

The EU directive (2006/87/EG), technical framework for IWW vessels, have been implemented in Swedish regulations as per December 16th, 2014. The implementations was made with few national exceptions for a Swedish context

- Fixed ladder to cargo hold
- Lifesaving and radio gear

No vessels have yet applied for IWW-certificate in Sweden.

The national exceptions does imply a threshold for a ship-owner that plans to purchase existing tonnage from any other European state, however industry representatives do not see these thresholds to be significant. The Swedish shipping industry argued prior to the implementation of the directive for a transparent adaption of European technical requirement. A study of the implications of this will be delivered in the EMMA-project during 2017.

The recently delivered report from SMA and STA to the Swedish government on IWW[1] highlighted the process Swedish Transport Agency have started in transforming parts of the legal framework towards a more functional based regulation. Primarily, this is targeting the technical framework and the oversight mechanisms for this, but also manning and certificates is being assessed for this approach. This only applies to Swedish Tonnage with Swedish flag, and traffic between Swedish ports, but this could be considered as an alternative to the IWW framework for ship owners who wants to operate inland waterway transport in Swedish waters.

Further on in this report we will address also pilotage as a possibility for this approach.

[1] Analys av utvecklingspotentialen för inlands- och kustsjöfart i Sverige, Sjöfartsverket DNR 16-00767

3.1.2 Regulatory barriers

Access to the market for Swedish domestic shipping can be accomplished by newbuilding, acquisition or charter of an existing vessel. It can be operated under Swedish or foreign flag. However, the process for changing a foreign vessel to Swedish flag is both complicated and expensive. The formal process for this could add up to 30 K EUR. This problem have recently been addressed by the Swedish Transport Agency together with other relevant Swedish authorities, proposing a simplified web-based approach for flagging a vessel to Swedish flag [1]..

Article 1

With effect from 1 January 1993, any carrier of goods or passengers by inland waterway shall be permitted to carry out the national transport of goods or persons by inland waterway for hire or reward in a Member State in which he is not established, hereinafter called 'cabotage', provided that:

- he is established in a Member State in accordance with its legislation and, where appropriate,
- he is entitled there to carry out the international transport of goods or persons by inland waterway

If he fulfils those conditions, he may temporarily carry on cabotage in the Member State concerned without having to set up a registered office or other establishment there.

The option of accessing the market with foreign flagged vessels is uncertain, since the regulations addressing cabotage states that this only is allowed if the transport is of a temporary nature according to (EEG) nr 3921/91.

What this means for IWW have not yet been tried, however there is an ongoing preparatory work on governmental level addressing the issue of a bare-boat register, which could solve this issue. [1]

3.2 Manning regulations adapted to IWW

3.2.1 Current situation

Since no other regulatory framework has been implemented concerning manning for IWW, It is the same regulations for IWW vessels as for a SOLAS vessel that are in state. Recently the EU directive 2014/112/EU concerning Organisation of working time for Inland Waterways, was implemented in the Swedish regulatory framework, even though it does not address the core question of lesser need for personnel on board an IWW-vessel.

3.2.2 Desired situation

The existing regulations for manning are deemed to be acceptable for Swedish IWW industry representatives.

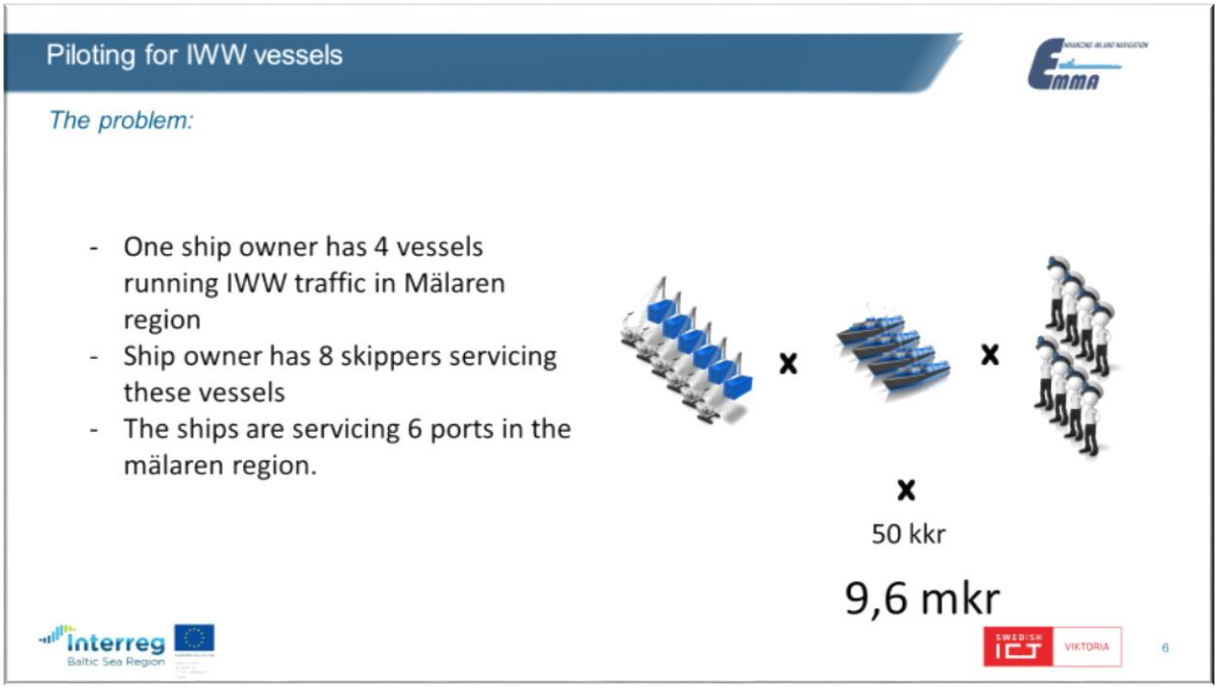
3.2.3 Regulatory barriers

See 2.2.1

3.3 Pilotage regulations adapted to IWW

3.3.1 Current situation

Pilotage is required for vessels larger than 70*14*4, 5 meters when using Swedish national waters, and IWW is not exempted from this. For an IWW-vessel, competing with land-based transport such as train or truck-transport, the cost for such pilotage would make the IWW transport not competitive with land based transport. There are however possibility to obtain pilot-exemption, on a certain approach or fairway, or existing general exemptions, but to a high cost for the ship-owner, which also would make it hard to compete with land-based transport. In the example of a IWW operator should set up an operation in the Malaren region with 4 vessels, 8 skippers and 6 ports in the operational setup, the cost only for fee to SMA and the Transport agency for getting the certificate would equal approximately 1 MEUR. In addition to that, pilot fees, cost for own crew etc.



Figur 1 Illustration cost for pilot exemption

3.3.2 Desired situation

The overall goal for society as well as for ship owner and crew is the safe running of the ship. The pilot regulation is in place to ensure that there always will be one person on the bridge with knowledge of the local waters. In an IWW context it is highly probable that the skippers of the IWW vessels will be just as qualified and with just as much local knowledge as any assigned pilot. There is also a significant difference between an inland vessel and a SOLAS vessel when it comes to manoeuvrability in both fairways and port operation. The possibility with pilot exemption is in place to facilitate this by using the skilled knowledge on board (the skipper), but on the same time mechanisms in place to ensure the safe sailing of the ship to the relevant authorities. The goal is to establish the possibility for the ship-owner to ensure and show that significant skills are present at the bridge, and for the authorities to verify these circumstances.

The approach by Swedish Transport Agency described in 2.1 of an assessment, functional approach for this ensurance, is identified [1] as a possibility also for the pilot-context of IWW. A similar approach as the International Safety Management code (ISM)[2].

The ability for the authorities to get transparent access, to be able to audit and to be able to monitor the operations is central in this proposed approach.

[2] http://www.imo.org/en/OurWork/HumanElement/SafetyManagement/Pages/ISMCode.aspx

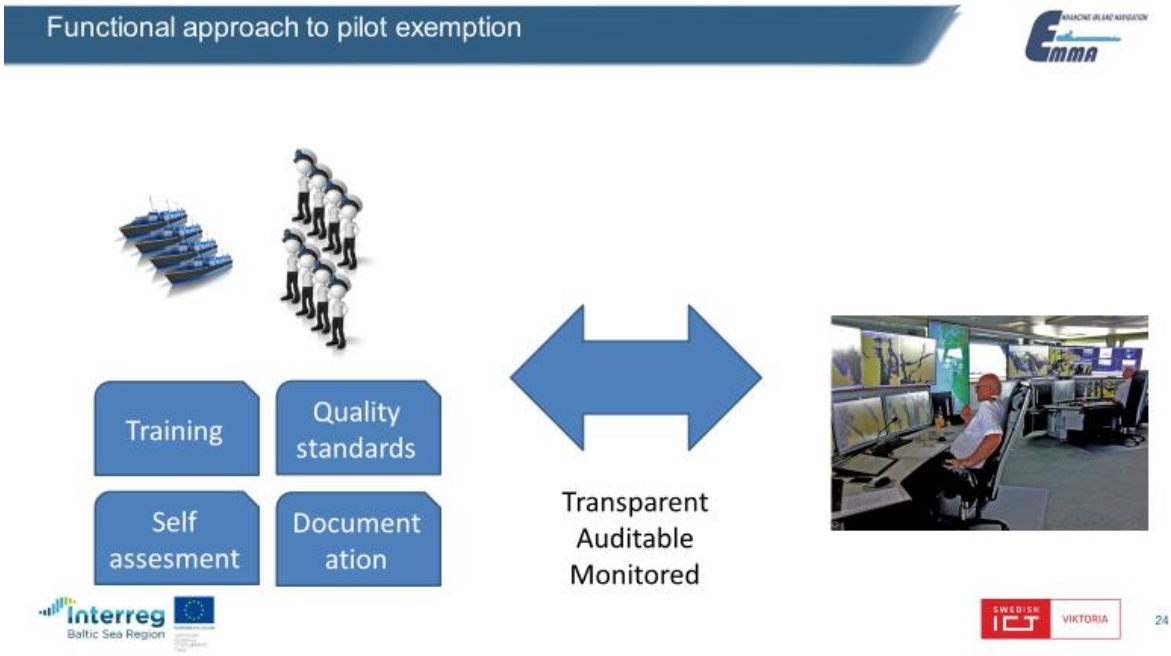


Figure 2 A functional approach to pilot exemption

3.3.3 Regulatory barriers

The absence of any exceptions or specific regulations for IWW when it comes to pilotage is both a problem and a possibility. The special context for IWW which means repeatedly training for the waters they are sailing, is not reflected in the current legislative framework for pilotage. This absence constitutes a barrier for potential IWW operators to start early, commercially unsure business operations since this constitutes a high initial cost, with uncertain profit ahead. But since this has not yet been addressed in the Swedish adoption of EU IWW, there is a possibility to for Swedish Transport Agency to expand their ambition to simplify legislative processes for domestic shipping to the area of IWW pilotage.

The possibility for the authorities also to monitor traffic which use simplified piloting framework more actively, could be facilitated by Enhanced Monitoring, a service-concept defined in Sea Traffic Management (STM), which is further described in chapter X in this document.

3.4 Port and fairway dues adapted to IWW

3.4.1 Current situation

Sweden, as opposed to other IWW countries in Europe, do not apply any exemptions on fees, manning, certificates or pilotage[1] as described earlier in this document. This is probably a highly contributing reason for why the newly adopted IWW has not yet been tried in Sweden.

The Swedish Maritime Administration (SMA) is today financed mainly by the industry through fees, whilst the Transport Agency (STA) is financed through the national budget. This means that the maintenance and monitoring of Swedish waters is dependant of the collection of fairway

dues, pilotage fees and similar mechanisms. SMA recently revised the structure and adaption of fairway dues, which moves away from discounts for certain types of shipping towards a simplified and transparent model where ship-size is the main factor in deciding the dues, complemented with discounts for environmental performance.

This new structure will be implemented in 2018.

3.4.2 Desired situation

Since IWW does not intend to compete with regular shipping, but with land based transport mainly truck and in some extent also rail, the neutrality between the transport modes when it comes to taxation, fees and administrative cost is of highest importance. However, national studies shows that for a transport made with shipping in Sweden, about 3-10 % of the cost is national taxations and dues and 30-62 % is harbour dues and port logistics costs. Even though national taxation is not the largest fraction of cost, in an industry with small margins these still constitutes a threshold for establishing new transport concepts. The proposed new structure for fairway dues will reward ships with alternate fuels and good environmental performance. In a zero-sum scenario where SMA is financed by these fees, it will mean that second hand tonnage with traditional fuel will be taxed even higher. Even though this is a progressive and correct approach for lifting the environmental performance of shipping even higher, it will make the threshold higher for the IWW operator who do not want to start up with new buildings and alternate fuels at first.

3.4.3 Regulatory barriers

The different approaches for financing infrastructure in Sweden does constitute a hurdle for implementing IWW. Even though land-based truck transport pay a higher share of the external costs (environment, usage, noise, health etc) - 70% versus 58% for shipping - the non-internalized cost for the truck transport is still twice the one for shipping. This means that the truck-transport is subsidized through other taxes in a higher degree than for shipping, where a larger part is financed through user-fees. This fundamental difference will continue to create an unbalanced competition between inland road-based transport and waterborne transports.

3.5 Ice-breaking supporting IWW shipping

3.5.1 Current situation

The cost for Ice-breaking is today covered by fairway dues, and is not specific charged to a vessel that draws the benefit from it. The right to ICE-assistances does not cover vessels with no, or insufficient Ice-class, regardless if it is a SOLAS- or IWW-vessel. A vessel without this, travels on own risk in icy waters. There are few IWW-vessels in Europe with ice-class, which means that starting up an operation in Sweden with second-hand tonnage, will mean calculating disruptions in the service if ice-conditions occur.

3.5.2 Desired situation

To equip IWW-vessels with engine power and hull-characteristics equivalent with proper ice-class, would make IWW proportionally expensive compared to land based transport. A possibility for IWW-classed vessels to be entitled to ice-free fairways in IWW-classed waters (Zone 1-3) would be a desired approach.

3.5.3 Regulatory barriers

Adjustments would be needed to current regulatory framework and adaption of this in Sweden.

4 ONGOING REGULATORY WORK RELATED TO IWW

4.1 Government assignment for assessing potentials of IWW in Sweden

In late February 2016, the Swedish Maritime Administration was commissioned by the Swedish government to analyse the future potential of transporting goods on inland- and coastal waterways in Sweden. The final report was presented to the Ministry of Enterprise and Innovation at the end of last year.

The report shows that there are future possibilities for inland waterways to grow, but there are also huge challenges to meet. Inland waterways in Sweden are connected to the two large cities Stockholm and Göteborg, where congestions to some extent actually are a growing problem. For example, building materials to and from buildings sites and container goods to and from large container ports could be transported on inlands waterways instead of, as today, on road. However, the driving forces for a modal shift are weak, especially from an economic point of view. Public fees, such as fairway- and pilot-fees, are indeed barriers, but most of all harbour fees have a crucial impact on the competiveness of inland waterways. The additional costs for transhipments make it difficult to offer competitive transport prices. Special requirements on ports handling vessels larger than 1350 GT is also an obstacle when to establish new transport concepts. The investigation also highlights the lack of coordination between the actors involved (i.e. ports, ship-owners, cargo owners, authorities etc.). The fact that the establishment of new lines assumes significantly larger investments compared to rail or road is also underlined.

Among others, the report suggests the government to set an action plan for how to make IWW-traffic to take a larger part of the transports and to appoint a national coordinator to make the actors head for the same goal. Temporary reductions in public fees, in order to reduce the economic risks are also discussed. Furthermore, the ports are suggested to introduce price models that stimulate traffic on inland waterways and the ship-owners are suggested to develop attractive and price-efficient transport concepts. Altogether, strong actions from all parts are needed, in order to realize the future potential of inland waterways in Sweden.

4.2 PNF – Functional based regulatory framework for shipping

The Swedish Transport Agency is just about to adopt a new regulatory approach for national certificates, concerning vessels registered in Sweden in service between Swedish ports. The new regulations are based on a functional way of thinking, focusing on what to fulfil rather than how to fulfil it. It might open

up for regulations to be adapted to a specific vessel´s actual need, based on for example which trade and business it is operating. Most probably, it will give the ship-owner a larger regulatory playfield, but also a larger responsibility to find sufficient solutions accepted by the authority. For example, by “higher the standard” on an IVV-vessel it might be possible to operate outside IVV-classified areas or by “lower the standard” on a SOLAS-vessel, it might be possible to reduce the costs for vessels operating within IVV-classified areas, and possibly also extend those areas to coastal waters. The new regulations are not yet tried and it is therefore difficult to say how it will affect seaborne traffic on inland waterways in Sweden.

4.3 New model for user fees for Maritime infrastructure starting Jan 1st, 2018.

Maritime Administration has decided on a new user-fee model that brings several changes compared with the current way of charging. The basic idea was to develop a sustainable model that is as simple, fair and transparent as possible and that makes it easier to predict costs at the choice of transport. Among other things, all types of vessels will be charged on the same basis and exemptions and current fee reductions will be reduced or removed.

The new fee model is based on the conditions that apply today and affecting shipping in general. Changes In brief is that charges will be levied in relation to the ship's net tonnage classified by size and the ship's cargo. A larger proportion of the charge will depend on the size of the vessel compared to the past, to reduce sensitivity to the economy. For cargo ships, charge will be based on the size of the vessel, and charged five times a month instead of twice a month. The model also includes environmental policy instruments that aim to reduce the environmental impact of shipping. Discounts will among others, be given to vessels have a low environmental impact verified in the index 'Clean Shipping Index'' rather than based on emissions of nitrogen oxides. The new fee model comes into force January 1, 2018 provided that, with respect to the relevant competition and state aid rules, and technical notification, approved by the European Commission. It is difficult within the framework of current funding to develop sufficiently strong economic incentives to stimulate the necessary investment climate in the shipping industry and a larger free use of the maritime potential. Under present conditions, this means a strong differentiation and probably higher fees for those who do not take action or affected otherwise. This in turn could lead to a reverse migration, i.e. that goods move from sea to land transport. (Translated from [1])

5 PARTS OF THE STM CONCEPT WHICH COULD SUPPORT IWW

5.1 The STM concept in short

Sea Traffic Management (STM) was developed in the MonaLisa2 project during 2012-2014 to address Safety, Efficiency and Environmental challenges for shipping as a whole. The concept is now being validated and testbeds and early implementations is being established in the Mediterranean and the Baltic sea within the STM Validation project.

“STM is a concept encompassing all actors, actions, and services assisting maritime traffic from port to port. STM is a part of the multimodal logistics chain, encompassing sea as well as shore-based

operations. The STM concept includes concepts for strategic and dynamic voyage management, flow management, port collaborative decision making, and the service based communication infrastructure concept Sea SWIM. STM is service-oriented approach to secure sharing and enhanced use of data from the maritime space in real time, in order to improve safety, environmental performance and efficiency in the maritime transport chain[3]" .

The development and validation of STM is led by Swedish Maritime Administration and supported by four other European maritime administrations (NO,FI,ES,IT), but is in no way targeted only as a European tool. The gains and true effects of STM will be when it is adopted on a wide base throughout the international shipping community. To enable this development, the concept is being anchored in international foras such as IMO, IALA, CIRM and other maritime organisations.

However, some of the basic cornerstones of STM is already disseminated and included by the shipping navigation industry. One of these enablers is the Route Exchange Service and the RTZ standard format (see 4.1.2). In this work we have assessed how services based on this can be adopted to support the implementation of IWW and address some of the remaining problems described earlier in this document.

Below we will describe some of the conceptual services of STM which we have assessed to be able to support IWW and the challenges described:

5.1.1 Strategic Voyage Planning (SVM)

In the STM concept, SVM[4] is described as "The Strategic Voyage Management (SVM) concept focuses on the initial planning phase conducted by various maritime actors when planning what they need from a voyage. The content description of the operational concept covers a planned sea voyage and the lifecycle of a voyage plan (from the initial planning to the execution of the plan)." And is further described as "The main goal of the STM Voyage Management System is to enable an improved coordination between all involved parties by collecting and distributing up-to-date information to the right part immediately when it is needed.".

The parts of the SVM concept is already implemented in EU through the necessity to inform nation authorities through the National Single Window reporting, but this is not today applicable to domestic transport or transport under the European IWW framework. Other aspects of SVM such as Unique Voyage ID and the possibility for nominated parties to subscribe for relevant and authorised information about the voyage planning is yet to be implemented.

5.1.2 Route sharing and the Route Exchange Format (RTF)

"The Route Exchange Service is the communication of parts of the route (route segments), ship-to-ship, and possibly also from ship-to-shore centres, such as VTS areas that only need to know a segment of the route. The route segment could be sent using AIS-ASM or by other means of

[3] Stmvalidation.eu/downloads: ML2-D2.3.1-STM-The-Target-Concept.pdf
[4] Stmvalidation.eu/downloads: ML2-D2.3.1-4.1-Strategic-Voyage-Management-Description.pdf

communication. The complete route used for optimization, etc. is included in the Voyage Information Service and is not considered a part of the Route Exchange Service." [5]

The purpose of the Route Exchange service is further described as a tool to create situational awareness around the vessel and to be used "in a medium-term navigation perspective to avoid incidents and close-quarter situations with the risk of collision. COLREG always applies, and in short-term and close-quarter situations, route exchange should not be used so as not to confuse anti-collision decision-making."

Since route exchange functionality now is commercially available on the market, such capability could be linked to any simplifications or incentives for future IWW legislative framework. Route Exchange is also the base for some of the services described below.

5.1.3 Shore based route checking or SVM Route Check

"The objective of the Route Cross-check is to ensure that a ship's route is accurate and executable from departure to arrival by checking it with various sources. The possibility to exchange information about routes, for example, gives coastal states better tools and possibilities for verifying that the ship's planned route is in accordance with local conditions and updated regional area information along the route. This will lead to safer routes and a reduced administrative burden on board and ashore."[5]

Route Check is also building on the capability to share the route in a standardized format, and enables costal states and other service providers to deliver Route Check services. This capability could be linked to any simplifications or incentives for future IWW legislative framework.

5.1.4 Shore based navigational assistance (SBNAS)

"The objective with SBNAS is to support ships' own navigation with shore-based navigational assistance, in, for example, confined areas and/or dense traffic conditions. This can reduce the number of accidents and be a cost-efficient alternative to deep-sea pilotage outside of areas with compulsory pilotage." [5]

"The service can be offered for areas of dense traffic or challenging navigational conditions, but outside of VTS- and pilotage areas it does not intervene with compulsory VTS or pilotage services. In some areas, for example, ships which lack regional experience use pilotage even outside of the mandatory pilotage area, a so-called deep sea pilotage. Dependent on the current needs on board, a more cost-effective solution can be to offer SBNAS as a complementary service." [5]

By combining a functional based framework for piloting with the possibility of SBNAS for Swedish IWW, a tool for relevant authorities to secure safety, more flexibility in boundaries for

[5] Stmvalidation.eu/downloads: ML2-D2.3.1-4.2-Dynamic-Voyage-Management-Description.pdf

mandatory pilotage (geographic areas, ship sizes) but still cost efficient for the IWW operator can be achieved.

5.1.5 Voyage information service (VIS)

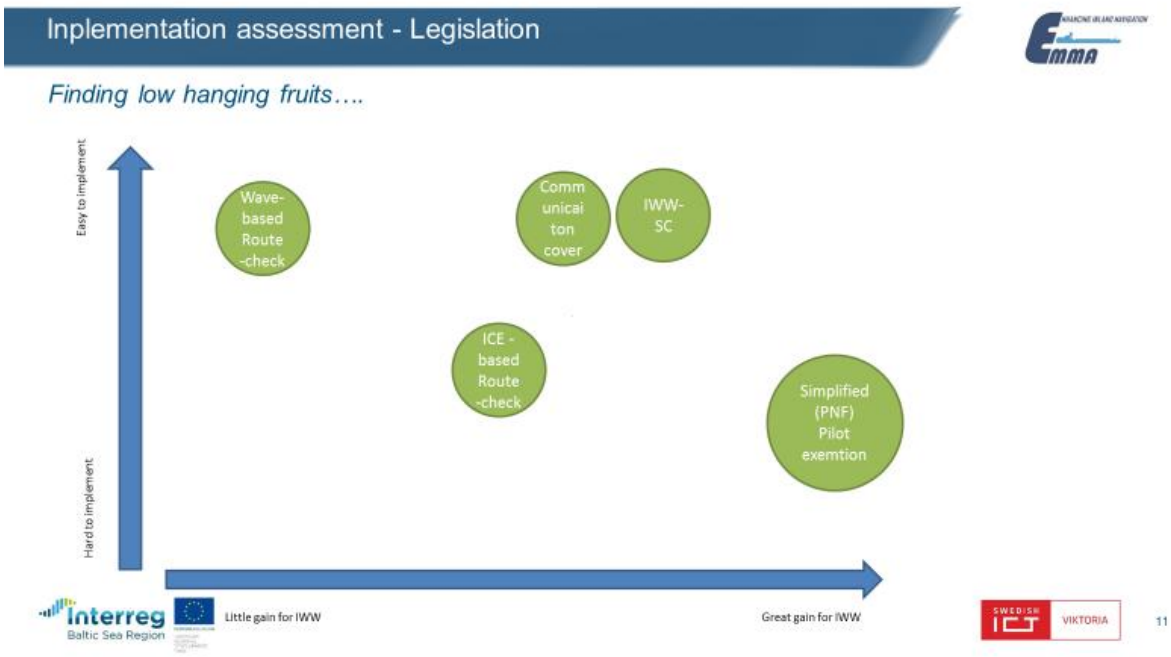
"The main purpose for VIS existence is to handle the communication around the Voyage Plan (VP). VIS implements methods for exposing new and updated VP's and to consume external VP's. VIS also supports subscription of Voyage Plans. Every message to and from VIS is sent through the SeaSWIM Connector, SSC"[6]

The VIS is also a component which would support some of the services described above, by providing additional information about the voyage other than the tactic route. VIS is an important component for example the SVM Route check service which could be a tool for the Vessel Traffic Service (VTS) or IWW shore centre to be able to monitor and guide an IWW vessel with Pilot exemption or need for Ice-cleared routes.

5.2 STM concepts impact on addressed challenges

In the second workshop of this EMMA-activity, an assessment was made in how the earlier discussed changes, including STM-based services, could support IWW in the identified challenge areas, and to which extent the implementation of such support was easy or challenging. By this assessment a priority can be made in what services should be focused upon, if STM should be used for supporting IWW.

5.2.1 Legislative challenges



[6] Stmvalidation.eu/downloads: VIS-Specification-2016-09-20_1.1.pdf

How hard would it to be, from a legislative point of view, to implement some of the changes earlier discussed in this document.

No significant legal impediments were identified to either Route-check services for supporting IWW ships with a route cleared for a Zone 2 vessel in a Zone 1 area. However, the gain for IWW for such a service was assessed as very small, since the skipper can, per the Swedish IWW Zone regulation, assess this by consulting any of the major metrological services available on the internet.

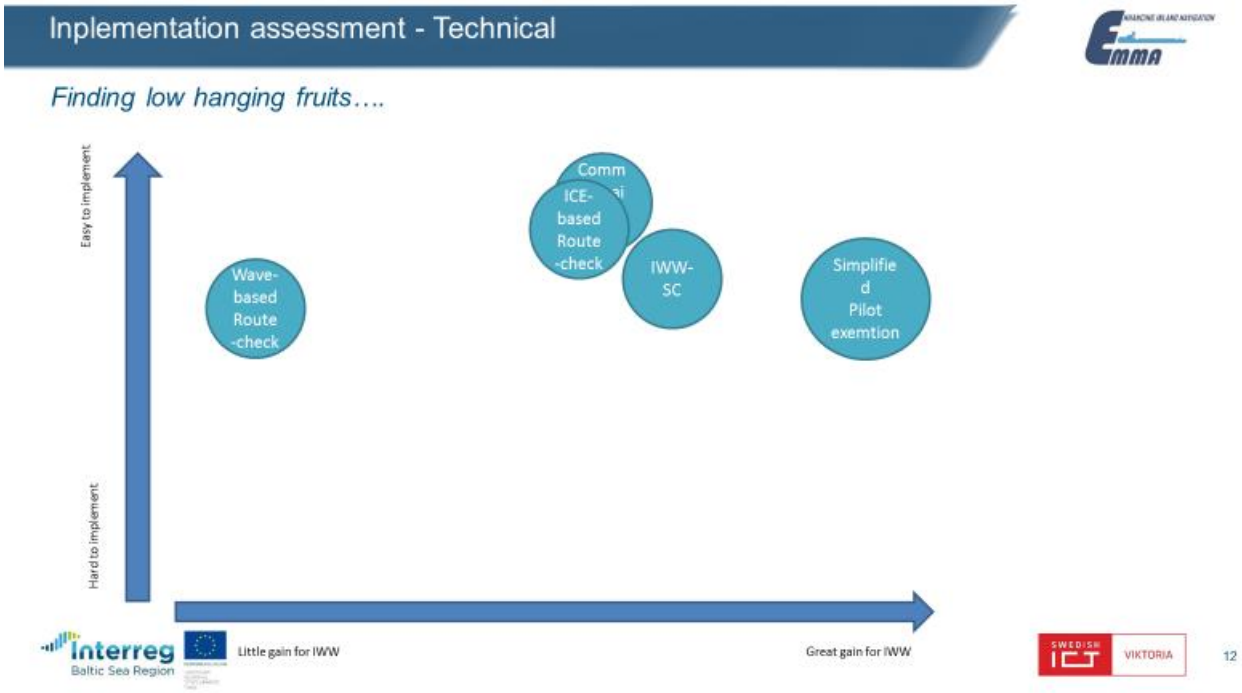
A similar support function for assessing the Ice situation for the intended route, were assessed higher in gain for IWW, but there is a substantial degree of uncertainty around how and if IWW can or should be supported by national ice-breaking resources. (See 2.5). An ice-based route-check could be commercially available from any of the hydrological institutes.

Since the coverage of AIS and necessary maritime communication in Swedish IWW waters are good (see appendix B), no legislative impediments are identified for including reporting services or monitoring services in IWW framework.

The establishment of a shore centre for Swedish IWW was assessed having a large positive impact for Swedish IWW, and now legal impediments were identified for doing this. Since there are VTS centres covering these areas already today, the organisation and regulation for such services are already in place.

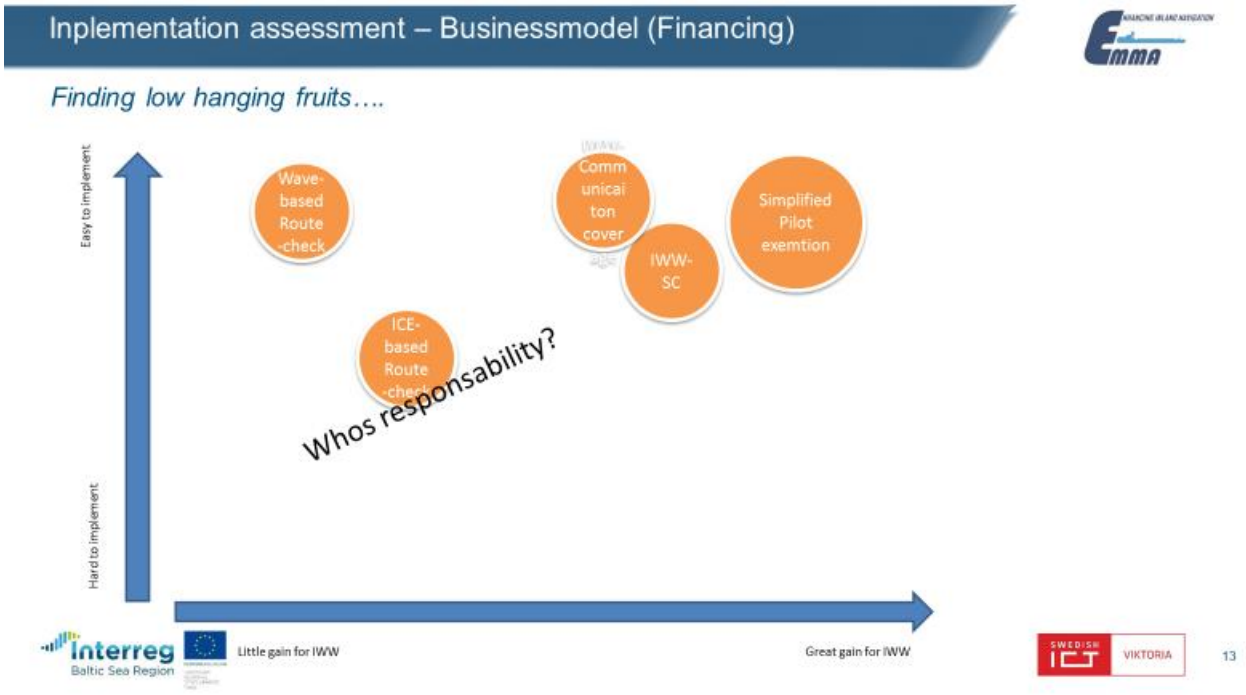
A simplified, functional approach for handling pilot exemptions for IWW was identified as the most significant action for IWW, but also assessed as a challenge from a legislative perspective. However, the similar processes on the technical side, and possibly also manning and skills (see 2.x), shows that there is willingness for flexibility in the legislative process around domestic shipping.

5.2.2 Technical challenges



The same assessment from a technical point of view shows that there are few greater technical challenges for realizing the services or changes discussed in this document. Of course, there need to be some technical implementations, both on the public side (VTS) and the industry side (Route exchange, communication capability), but this is mostly a business model question, since the technology already is there, even though not established in IWW context.

5.2.3 Business model



From a Business model perspective, there is an understanding that most of the services provided would be financed in the same way that today's services are financed – by User pays. Route checking and navigational assistance that would be complementing a functional approach to pilot exemption, would probably be financed by service fee. But since the set-up cost of such services are assumed to be low (if co-located with today's VTS-services), there are possibilities to scale up this following the demand from IWW traffic increasing. The remaining issue, is as described earlier, the situation of ICE-breaking, where SOLAS vessels do not pay for an ice-free fairway today. A service guiding IWW-vessels what routes could be taken, taking current ice situation into consideration, would that be something that should then be financed exclusively by IWW? IWW-ships would probably also traffic areas not covered by official fairways in order to access specific loading points, not necessarily an official port infrastructure. Should this be covered in ice-breaking services, or Ice-free routing? In this area, IWW role is not clear, and further work needs to be done by legislators and maritime administrations.

6 SERVICE HYPOTHESES EVALUATED IN THE STUDY

As a part of the workshops, a set of service hypothesis were developed to illustrate possible situations or scenarios where IWW could be supported by different STM services. These scenarios and the discussions around these generated both a deeper knowledge of current regulatory framework, and also constituted a base for the evaluation of how, and in what extent, the services would support further implementation of IWW. These service hypotheses are listed below and further elaborated in appendix C, and the results of these scenario discussions are embedded in chapter 3 and 4 of this document.

- Predictability through sharing of Voyage plan and route Exchange

- Port efficiency through sharing of Voyage plan
- Predictability and administrative simplifications through Voyage Information Service
- IWW pilot exemption supported by Shore based Navigational Assistance
- IWW pilot exemption supported by Route Check
- IWW supported by Route Check and Flow management
- IWW Safety enhanced by Shore Based Navigational Assistance
- IWW predictability enhancement, Port efficiency by Route Exchange
- IWW Zone/Vessel conformance through route check 3:rd party service

7 CONCLUSIONS

With the decision in the Swedish parliament in November 2013 to implement the EU directive of Inland waterways, a new mode of transport was born in Sweden. But despite these good intentions, and the adaption of the EU technical framework for inland waterways (2006/87/EG) with started in December 2014, no vessels have yet been certified under these new regulations. The work in this activity of the EMMA-project have included representatives from the major actors involved in Swedish IWW so far: Swedish Maritime Administration, Swedish Transport Administration, Swedish Transport Agency, Swedish Maritime Forum and Avatar Logistics. The conclusions in this report should be seen as a result from the EMMA-project and, and not necessarily official standpoints from the organisations which have participated, even if those will be seen as coinciding in general when placed side by side. The fact that these participants haven't been bound by their organisations official standpoints, may have contributed to some of, what in the future may be seen as enablers of Swedish IWW, but today perhaps are just god ideas and areas to pursue together or in the respective organisations. Below we will list and summarize some of the conclusions the process has showed:

The Swedish adaption to the EU technical framework for IWW includes some Swedish exceptions. National exceptions always makes it difficult to move tonnage between countries and inhibits free movement of resources, however preliminary assessment from industry representatives do not see these exceptions as a very high threshold. The EMMA activity 2.4 will in more practical terms show these affect a flag-change from a European IWW-vessel to Swedish flag.

The Swedish definition of IWW areas from the Zone classification system that reflects the area´s significant wave height, have been discussed. Since the largest IWW area in Sweden was classified as Zone 1, with risk of significant wave-height over 2.1 meters occasionally, many feared that no real IWW traffic would be possible, since few IWW vessels are built for zone 1. However, Swedish Transport Agency included in the regulation a possibility to use Zone 2 vessels in these areas if it could be verified that wave heights during the course of the voyage will not exceed Zone 2 boundaries. It is up to the captain to verify this with a trustworthy hydrological service, and to document this assessment. This assessment process gives room for Route-check services provided by commercial weather services based on STM Route-check service standards.

The Swedish parliament decided in 2016 to implement EU directive with the regulation (2016:1044) of Working time for inland waterway traffic. By this, parts of the manning issue will be harmonized in EU.

Even though Sweden, unlike other EU-countries, do not have special regulation for manning of IWW vessels, the current general principles and regulation is deemed to be satisfactory by the industry.

The largest threshold for IWW is considered to be user fees which is charged to IWW traffic in ways which is not charged to the main competitors, trains and trucks. Studies show that around 10% of the cost for an IWW voyage would be user fees for public infrastructure (fairway dues, pilotage etc) and as much as 53-62 % would be harbour fees and stevedore costs[1]. In the report from SMA to the Swedish government on IWW one strong recommendation is to further look into the possibility of reflecting the public ambition of sustainable transport modes into the fee models. This might implicate that the Maritime administration and the maintenance of the maritime infrastructure, would need part public funding complementing the user fees to avoid high taxation of Inland waterways.

The ICE situation in Sweden is one of the areas where Swedish IWW would differ from European IWW. To find IWW vessels with Ice-breaking capability, which according to current Swedish standards is almost impossible. A vessel in Lake Vänern or Mälaren would need to have some ice-breaking capabilities (engine power, hull construction) to be able to perform safely during an Ice-winter in Swedish waters. Since a vessel certified under IWW is not covered by current obligation for the ice-breaking task of SMA, an IWW vessel is risking to be stuck inoperable in ice if ice conditions are harsh. A STM based Ice-risk route check service would help minimize this risk. However, a clarification of the status and obligations regarding IWW and ice-breaking seems to be necessary. In the EMMA-project, Ice conditions for IWW will be explored from a vessel point of view.

One of the greatest challenges for establishing IWW in Sweden seems to be the pilotage issue. Continuous IWW operation in Swedish waters demands - according to current regulation - either pilot on board or a pilot exemption. Examples showed in this report indicate that costs for these alternatives cannot be commercially justified, especially in the early phases of starting up IWW. An approach elaborated in the workshops were to use a functional approach in the rule and regulations, something is currently tried by Swedish Transport Agency for the technical framework of domestic shipping. By using the same approach, the ship-owner can take a larger responsibility for upholding, documenting and allowing transparent auditability for the authorities, and training his personnel, ensuring high standards and quality. In this work we also propose the possibility to combine such an approach with shore based monitoring and navigational assistance using services defined under the Sea Traffic Management concept. Thus ensuring and validating the safe running of IWW vessels in Swedish waters.

The STM concept is found to support IWW especially by enabling a complement to on-board pilotage (see above), for supporting the IWW skipper in assessing wave height in Zone 1 waters and to provide the skipper with adequate route validation in relation to current ice condition along its route. The necessary infrastructure for such services is easily generated by using existing VTS infrastructure for STM shore centres, by conditioning route exchange for allowing simplified pilot exemption.

Necessary communication infrastructure is assessed (on an overarching level) and found to be present in the Swedish IWW areas both for AIS and for data communication capabilities (see appendix D).

8 PROPOSED FURHER ACTIONS

8.1 Workshop for further exploring possibilities with a functional based approach for pilot exemption for IWW in Sweden

The involved organisations in this activity agreed upon the necessity for further exploration of the possibilities with a functional approach to pilot exemption described earlier in this document. This activity could be a part of the round table activities in WP4, or to be carried out as separate activity, inside or outside the EMMA project. This question was also brought forward in the SMA report on IWW delivered to the Swedish government in December 2016.

8.2 Piloting Enhanced monitoring (Outside EMMA project)

The possibility with enhanced monitoring and shore based navigational assistance should be tired in a pilot including VTS and real vessels, evaluating the effects and possibilities related to IWW. This activity should be coordinated with the STM validation project and the governing body of the STM concept.

8.3 Demonstration project of Ice based route check/route optimizing service in Swedish waters

Since the Ice question is judged to be a critical issue for Swedish IWW, services and procedures supporting IWW in Ice conditions should be explored further and demonstrated in close cooperation with the industry. Supporting information services - such as ice condition route check - should be coordinated with the STM validation project and the governing body of STM.

9 LIST OF TABLES AND FIGURES

10 APPENDIX

10.1 STM scenarios evaluated

10.2 Communication coverage in Swedish IWW areas