Inland waterway transport in the Baltic Sea region

Service implementation guideline


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CONTENT

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INTRODUCTION

Inland waterway transport (IWT) is safe, environmentally friendly and economically feasible. However, for many decision makers responsible for setting up transport chains in the Baltic Sea Region (BSR), IWT is not considered as an alternative to rail and mainly road transportation. This has also to do with limited knowledge about IWT and its integration into international transport chains. They see it as too complicated and too risky. Furthermore, acquisition efforts of inland navigation shipping lines are often weak. Inland barge operators are faced with unsure future infrastructure developments, which hinder larger investments in floating equipment and a modernisation of the fleet. In consequence IWT does not mobilize its full potential to contribute to an efficient and reliable European transport network of the future.

The guideline summarizes results and experiences of various stakeholders in the Baltic Sea region: IWT best-practice cases, an overview on IWT affine in the industry and customer needs, new potential IWT services and a service set-up guideline. It demonstrates the potential IWT could play and aims at changing the way of thinking and acting by all stakeholders.

Inland Navigation: the mode of transport with great potential

Using inland navigation is a way to shift transport of goods from road to waterways in the future. The navigable inland waterway network within the EU exceeds 40 000 km and covers all important economic areas in Central Europe. Many industrial and population centres are located along inland waterways.

Small inland ships generally carry up to 500 t of bulk commodities, whereas medium and large ships carry up to 2 000 t of dry bulk and up to 3 000 t of liquid bulk. A pusher convoy with two barges can carry over 7 000 t of dry bulk. This equals approximately 175 railway wagons of 40 t each or 280 road trucks of 25 t payload each. The largest inland container ships can today load over 400 TEUs. Large shipments make sense with a deliberate policy of bundling volumes driven by digitalisation and fed by sustainability concerns (better use of capacity of assets and land, decarbonisation, less energy use…). When it comes to smaller rivers, clean modular barges with higher frequency could supplement the European waterway network. By that inland navigation and river-sea shipping could help to save external costs, reduce emissions and decongest roads and railways.

Inland navigation labour market in Europe and the gross value of the sector

Around 45 000 people are directly employed in the private inland navigation sector in Europe, without counting those working in the public sector. This includes all forms of employment (employed persons, self-employed, family workers). However, it needs to be considered that inland navigation is a part of the logistics chain and that the operation of inland navigation requires entities to be involved. This could be port authorities, handling facilities like ports, stuffing and stripping companies, tally-men, 3rd party logistics providers etc. The amount of people involved in this sector is consequently much higher and results in regional welfare by providing jobs and income (Source: CCNR in partnership with the EU COM, in: Annul Report 2016. Inland Navigation in Europe. Market Observation, p. 84). An increase in inland

navigation activities in areas with a lower inland waterway transport share (such as the Baltic Sea Region) therefore provides potential for new jobs and welfare for regions. The latter also results in better multimodal network and with that increases the attractiveness of the region.

Important economic areas connected to inland waterways.

Source: via Donau, 2013, EMMA Project 2018.
Remark for Sweden: Inland navigation is time being allowed in lake Mälaren and lake Vänern including Göta river.

BEST PRACTICES: HOW TO MAKE INLAND NAVIGATION OPERATIONALLY AND ECONOMICALLY POSSIBLE?

IWT is characterised by its reliability, energy efficiency, environmental friendliness and major capacity for increased exploitation. However, IWT still does not play an adequate role in the transport system and is often not even considered as transport alternative by many forwarders and stakeholders in the sector. However, there are good examples on how a modal shift to inland navigation was made possible and how it helped to secure business and protect the environment.

The challenges for IWT in the BSR are as diverse as the area itself. In the whole region physical bottlenecks and problems caused by locks and ship lifts are hot topics. In the Nordic countries also strong weather conditions in winter times, smaller transport volumes, a less dense IWT network, insufficient RIS applications and limited coverage of the area classified as inland waterways play an important role. In Central Europe partially low water levels, clearance height restrictions of relatively low bridges and a lack of new business locations for ports and terminals close to the waterfront are key.

Facing these challenges, it is useful to look at best practices: how were these overcome in specific locations? How do the related business models look like? In the cases presented in this chapter using inland waterway transport in supply chains has created true added value for the shippers by saving costs, implementing environmental protection measures, dissolving bottlenecks and preserving local businesses of inland shipping companies.

A transport concept for turbines from Berlin to German seaports

The trend among European plant manufacturers is easy to see: Plant and machinery elements are growing ever more powerful and accordingly even larger and/or heavier. For the Czech and German manufacturers along the Upper Elbe, inland waterway shipping therefore plays a major role in freight transport.

Whereas project and heavy-lift shipments by road often require traffic lights to be uprooted, crash barriers dismantled, or sign bridges lifted, the transport of e.g. gigantic turbines, generators or elements for wind power units often proves simpler on the river Elbe. Objects with a height of up to 6.0 m, a width of 7.5 m and unit weights of up to 300 t are transported almost every week. Plant manufacturers in the Elbe's catchment area regularly use this inland waterway for shipments to seaports like Hamburg.

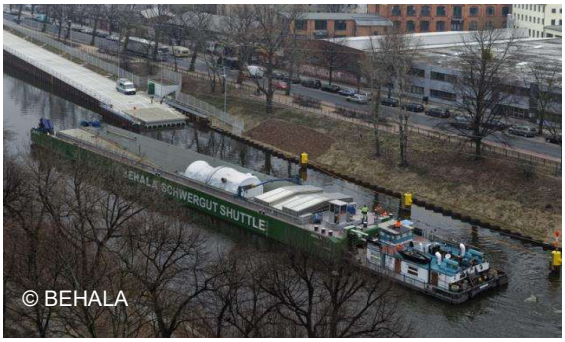
However how to reach the next inland port, when the next generation exceeds the mentioned limitations? The challenge arose for a producer of gas turbines for power generation. The innovation secured the company market leadership status. It also led to a more complicated logistic chain. As an additional challenge, the distance of 9 km between production side and inland port includes a bridge over train tracks. It only allows transport crossing with a maximum weight of about 250 tons.

The port operator developed a transport solution from the factory to the port, which enables the deliveries in accordance to the requirements of both customers and authorities. In order to bring the turbines on the water, first, a road route was defined. The route was chosen by shortest distance and low restrictions. Second, at the channel a special roro-ramp was constructed by the port authorities and a corresponding drive-in roro-barge. The barge, called URSUS, was constructed to allow handling on every known roro-ramp in Europe. The equipment can be used with standard push-boats. The investments, including also a heavy-duty modular transporter were in the range of 10 million Euros. For the return on investment, the port authority negotiated long term contracts with the shipper. Arriving at the port, a crane puts the

More information?

turbines on an ordinary inland barge that ships it to the seaport.

Why is this concept a success model? The new transport concept allows the shipper to develop his product range. This secures the maintenance of the production site in Berlin and corresponding jobs. The port operator becomes an important part in the shipper's logistic chain and ensures the utilization of the existing equipment for heavy cargo. Based on long-term contracts, this solution brought a win-win-situation for the shipper and logistic provider, high customer loyalty and reliable reinvestment opportunities.



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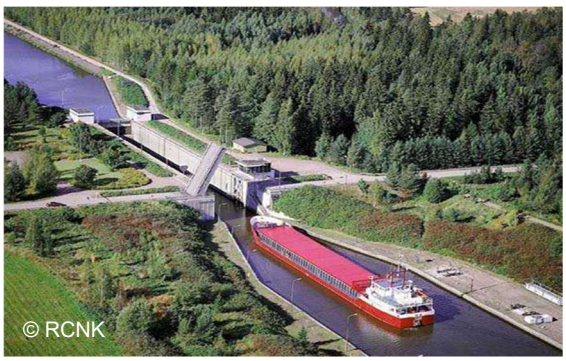
Shipping cellulose on the Saimaa canal

The Saimaa canal connects Lake Saimaa with Gulf of Finland. The vessel size is limited due to the capacity of the canal locks. IWT cargo traffic in **Lake Saimaa** are divided in three type. Vessels and pusher barge combinations carrying round wood inside Saimaa, collecting it from ports and directly from islands to forest industry mill sites situated around lake area. Another IWT traffic in Saimaa is based on Russian river boats that are importing round wood from Russian river systems to forest industry located in Saimaa area. Normal situation is that vessels go back to Russia empty.

Third and the most important type of IWT traffic in Saimaa are the multipurpose Coaster vessels with around 3500 net deadweight tonnage importing and exporting goods around the Baltic Sea. Due to the draught of 4,35 these vessels are able to carry approximately 2400-2500 tons cargo in Saimaa area. This type of bulk and break bulk volumes are based more on export volumes then import.

Currently the operating fleet, called the Saimax vessels, is about 25 ships. The operating time is about 300 days per year, due to ice on the canal in winter times and about one-month maintenance period of the locks.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However, a cellulose mill still created a business case, using inland navigation for the transport of cellulose to seaports and smaller inland ports near the customers in Europe (Germany, Belgium). The company is located about 50 km north from inland port of Joensuu. Cellulose units are of standardized size and designed especially for efficient transportation and material handling purposes. The transport from the mill to the inland port is done by rail and road. Then there is one vessel approx. every two weeks.

Operational tasks have been clearly divided so that every actor is in charge of certain tasks in the whole supply chain. Vessels are used on an on-demand basis. Special handling equipment has been set up at the port: amongst others, a hydraulic harbour crane that can handle pulp up to 600 t/h, automatic loading equipment that can easily grab pulp units from the rounding wires and pulp bale clamps that can carry six units of 12 t each from storage with one grab.

There are several reasons, why choosing IWT in this business case is a good option:

- The transport capacity of Saimax vessels is optimal for cellulose
- Close proximity to the Port of Joensuu makes short notice (<7 days) shipping orders possible

- Safety and eco-friendliness of IWT
- Cost efficient door-to-door transport solutions
- Flexible and fast supply chain

The business of shipping cellulose on the Saimaa Canal shows continuous improvement and innovations in material handling by using IWT. The solution approach is unique and it is specially designed to the industry located in Saimaa area. An ideal solution was found for customers situated in a suitable operational distance by combining this short first-mile advantage with vessels operating in seaport hinterland traffic. This results in minimizing logistical costs, the possibility of door-to-door transport to customers and reducing handling time. Cargo is transported directly from the lake area to customers located near inland waterways in Europe, passing sea ports in Finland and also in Europe.

Container transport on river Rhine

Over the last decades, container transport on the Rhine was mainly influenced by external ecological conditions and favourable political decisions. The inland navigation model of the Rhine cannot simply be transferred to other regions. However, it can serve as a prime example on how industry and politics work together in order to improve the conditions for IWT.

Container transport on the Rhine grew rapidly since the early 1980´s. This resulted from general developments in the international container industry as well as favourable waterway conditions on the Rhine itself. Today the Rhine axis is thus responsible for approximately 2/3 of European inland waterway transport.

The depths of the Rhine differ in the regions Upper-Rhine, Middle-Rhine and Lower-Rhine due to natural conditions. According to the European Agreement on Main Inland Waterways of International Importance (AGN Agreement), the largest vessels navigable on the Rhine are the large Rhine Vessel and large barge combinations the Extra-long Large Motor Vessel Type 3 (135 m long, up to 340 TEU) and the pushed-convoy (270 m long, up to 540 TEU).

In the 1990´s the size of barges increased very rapidly leading to enhanced efficiency, lower rates and a higher demand in IWT. The increase in container traffic opened new business opportunities for barge operators as well as private railway operators. In reaction to increased volumes hinterland terminals had to be expanded. The development continued. The early 2000's brought even bigger barges and container volumes. Linking rail and IWT became even more significant. New opportunities of data management and web connectivity led to the set-up of intelligent and complex logistical systems. Stakeholder recognized even more the locational advantage of the Rhine shore due to important transport connections. The recognition was also strengthened by massive public investments in strategically located terminals by the German funding scheme for not-state-owned combined transport-terminals.

Inland ports invested in container storage and handling equipment or offered the corresponding areas for industrial and logistical developments enabling shippers to build facilities close to intermodal terminals with a short last/ first mile. This gave terminals the possibility to increase their range of services like customs declaration, repairing, trucking, and packing.

Today only a few business locations are left between Bonn and the Netherlands. Development projects for terminals and logistic areas often conflict with NGOs and residential areas due to the popularity of real estate close to the waterfront. This can lead to emission restrictions for the surrounding manufacturers. Furthermore, inland ports do not necessary receive prioritized treatment in the urban planning process. Inland ports along the Rhine used the opportunities provided by the German funding programme for intermodal terminals and adapted to the general trends in container business by adding new business models for container handling.

More information?

HOW TO INCREASE INLAND NAVIGATION IN THE BSR?

Not all companies have a potential of shifting their cargo to inland waterway transport. Their location and the distance to the inland waterway network is as important as the type of cargo, the volume and the infrastructure in place. However, at the end the willingness is the decisive factor.

Working towards a shift from road and rail to inland navigation, low hanging fruits must be picked first. That is why the EMMA partners focussed on companies in the catchment area of the inland navigation network. This catchment area was defined by a maximum road or rail distance of about 50 km. Companies were headquarters, but also storage facilities. The aim was to communicate the inland navigation potential and to give impulses for the set-up of new services.

Finland

In Finland the only lake area with commercial IWT cargo traffic is lake Saimaa in eastern Finland. Other lake areas in Finland are used only for leisure and cruise tourism and only few pusher barges collect occasionally round wood from islands in other lake areas.

The mills around Lake Saimaa have the biggest potential of transport via IWW. The mills belong to forest, construction and chemical industry. Amongst the companies are UPM, Stora Enso, Versowood, Nordkalk and SP-minerals.

Generally, inland navigation is not seen as very important for the competitiveness of the companies. The dominating and only transport mode is truck.

In order to increase the share of inland navigation the volumes should be significantly larger than what they currently are. Shipments for instance from Russia should be thousands of cubic meters and this would require other users as well as storage space in a port. There would be room for much higher volumes if industrial partners saw more value in using inland waterway transportation. It is at least partly the lack of interest from the industry that is limiting increasing cargo volumes.

Another important limiting factor is Finnish climate. During the winter goods cannot be shipped through Saimaa and this decreases sales in the market area. Therefore, companies need to compensate cargo costs in winter. Thus, the time Saimaa connection cannot be used in winter should be shortened.

Also, it should be remembered that cargo is mainly transported from north to south, i.e. from the source (wood from forests) to the production sites. This means that most of the ships travel empty to the north where the cargo is loaded and then transported to south. And this affects the cost structure of transportation in a negative way. One solution to increase traffic and have more balanced volumes could be the option to use Lake Saimaa as a part of an intermodal corridor from Europe to Russia, Kazakhstan and China, where Eastern part of Finland is located in the middle. In this scenario Saimaa could be included in the Rail gate brand because many of the inland ports in Saimaa has direct railway lines to Russia, Kazakhstan and China but also direct and working connections to different ports in Europe.

The ambitions towards carbon neutrality might bring about new possibilities to IWT in Finland. New bio-based power plants are being planned and built. Wood chips used in these plants can be transported as an IWT and road combination. Cargo could be stored and handled in inland ports and in terminals in inland locations that have no direct waterway connection. This could allow connecting road transport with Europe and its markets through waterways.

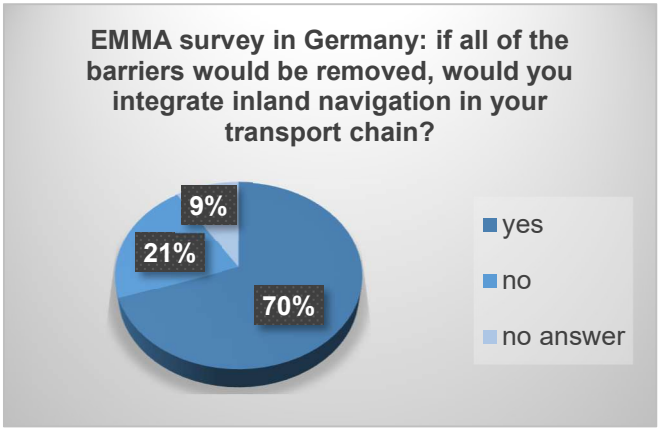
Lastly, the changes in law concerning working hours imposed by the EC is seen a big challenge in Saimaa.

Germany

In Germany customer needs and wishes play an important role. With more than 300 km of transport, the barge is always offering an alternative to road and rail, however customers often decide for trucks, as in their eyes this is the most flexible solution. Individual information for companies is one of the requirements,

claimed by transport companies. Customers have to be informed e.g. that fewer accidents happen and the ship is reliable, the media should report in a more balanced way about the advantages and disadvantages of the modes of transport in order to inform the civilian population. Information should also cover temporal and environmental aspect. Barge is most economical for logisticians but needs to be more actively supported by politics. Due to the current driver and fleet shortage, a modal shift would also be beneficial for the transport companies.

Removing infrastructure bottlenecks (locks) and extending the inland waterway vessel fleet and infrastructure (access for clients to waterways and appropriate storage for goods at transhipment points) would further reveal a high potential. Also an improved information system by administration (water levels, closing times of locks) would be appreciated to increase planning security.



30 companies are using trucks as dominating transport mode, but if all barriers would be removed, they would integrate inland navigation.

In order to increase the share of IWT in Lithuania large-scale investments in IWT infrastructure would be needed (loading places). The same applies for the service of inland navigation (operators, barges).

Lithuania

The Lithuanian IWW network that is used and could be further developed for freight transport is covers the Kursiu lagoon and the river Nemunas. This area has a length of about 260 km of IWW. The cities of Kaunas, Jurbarkas and Klaipeda are in close distance to these waterways. Around the city of Kaunas several big chemical plants are located (e.g. LIFOSA in Kedainiai and ACHEMA in Jonava). They are located about 30-50 km to the inland port of Kaunas. Also some construction companies are located in Kaunas as well as energy industry. They have the potential of shifting mainly their oversize cargo to IWT, e.g. spear parts for energy plants renovation. In Jurbarkas big construction materials plants are located (sand, gravel). Construction materials are already traditionally transported by IWW from Jurbarkas to the Port of Klaipeda. So this sector would need to be strengthened only. The reason why companies do not use IWT are caused by a lack of infrastructure and IWW transport units, missing experience and knowledge about IWT and competitive prices.

Poland

The most promising rivers are the Oder River E30, the Vistula River (E40) on the part from Warsaw to Gdańsk and the International Waterway E70. Along these waterways production and logistics companies are located as well as chemical and paper industry, tools production, heavy engineering, petrochemical manufacturers and fuel distributors. The highest potential of exploiting the IWW network is in oversize cargo, bulk, the chemical industry and the enterprises specializing in the manufacture of packaging made of synthetic materials, the petrochemical industry.

The present approach of decision makers on national level, of the Polish Ministry of Maritime Economy and Inland Navigation and the politicians in the Polish Parliament are very favourable towards revitalisation of Polish inland waterways and also enhancement of the navigation.

Today truck is the dominating transport mode. The reasons why companies do not use inland navigation are:

- No possibilities because of unregulated riverbed. Low navigation possibilities.

- Water level on Vistula river is too low
- Not enough ports/docks amount. No loading/unloading/transhipment possibilities.
- No suppliers on Inland Waterway area.
- Inland Waterways locks don't work on Bydgoszcz Canal

Only when the river conditions would be improved and IWT would be offered at a low price level, the potential of IWT could be increased. The AGN implementation will be crucial to make Polish inland waterway to minimum IV class (International Waterways E-30, E-40, E-70).

Sweden

Sweden implemented EU regulations for IWW in December 2014 and looking at this short time perspective the market for IWT is still under the startup phase. By implementing the new regulations, it is the Swedish governments desire to move cargo to the IWW in order to facility accessibility in the road and railway networks. Since IWT is a new mode of transportation the Swedish industries are unfamiliar with this new opportunity and a heavy marketing concerning new IWT logistics are needed. Looking at the geographic areas of the three appointed IWW zones, Lake Vänern, Göta Älv and Lake Mälaren, the potential for moving cargo to IWW differs between the areas looking at consuming areas, industry production sites, congestion and environmental impacts. Around Lake Vänern, with a low population density is today road and rail the dominating way of transportation. The potential for IWT is within the basic industries, such as the forest and petroleum industry, which present has own waterway access to the lake. Most of the industries transport their cargo by short sea bulk vessels while the container segment is quite poor within the Vänern area. Lake Vänern is classified as IWW zone 1 and this is a limitation since there is no existing barges of that type available on the European market, however it can be possible to operate with a zone 2 barge undertaken weather restrictions. Göta Älv, which is a zone 3 area has a future potential for container transports by IWT. New warehouses and logistics hotspots are planned along the river and a container feeder by barge to/from port of Gothenburg could become an alternative to road and rail transportation. City of Göteborg suffers of the growing congestion and a regular barge container service could relive the road and rail systems. The area with biggest potential for moving cargo to IWW is around Lake Mälaren that is rapidly growing with the highest population density in Sweden. In this area the potential is in cargo segments such as, recycling, liquid fuels, building logistics and city logistics for retailers. An advantage is that Lake Mälaren is classified as IWW zone 3 and this gives many opportunities to find suitable barges within the European cluster. The hurdle in the Mälaren region, especially in Stockholm city, is lack of empty spaces close to the lake side due to the heavy development of new housing areas. This is something that needs to be considered as a strategic political decision for the future.

When is there a potential for a shift?

The development status of inland navigation and its modal share differ amongst the BSR countries. This has to do with river and weather conditions, but also with political decisions and knowledge amongst the industry. It's a typical chicken-and-egg situation: economically feasible services will only be set up if high and stable volumes can be guaranteed by the industry. Starting a business needs high investment cost in barges, but also in transhipment points. However if no inland waterway company exist, running a reliable service, no company will shift its goods from the flexible truck to a complicated and cost intensive barge. Cooperation amongst all actors will be needed to discuss all requirements, needs and expectations regarding new and sustainable barge services. These needs to be followed by political guarantees and long term business contracts to pave the way for secure investments and launch business.

Infrastructure development is needed to ensure access to the inland navigation network. This includes innovative last mile solutions, inland ports and transhipment points but also storage facilities. The long-term assurance of a good navigation status of the rivers is key to extend the operation time of services and to provide reliable planning.

Environmental aspects play a minor role regarding the choice of transport modes. To reach the European environmental goals, policy and administration have to work together with the industry to make IWT more competitive. Then the envisaged modal shift from rail and road to the more environmentally friendly inland waterway transport will happen.

WHY INLAND NAVIGATION?

"Shippers with smaller transport volumes that do not fill a complete barge, benefit of a regular shipping service for project and bulk cargo. The combination of heavy and high volume goods leads to an optimized vessel utilization."

Sales manager Annett Hütter, Imperial Baris GmbH, branch Dresden

"For certain combined transports, there is a maximum total weight of 44 t for trucks transporting goods to the nearest rail station on inland port. This should be valid for all kinds of goods as it would lead to a significant shift potential."

Authorized representative Jes-Christian Hansen. HaBeMa Futtermittel GmbH & Co KG

"Economic Order Quantity, optimal transport frequency and knowhow in material handling are the key success factors why the Inland water way is good way of transporting. Also the cost of first and last mile is benefits for Inland water way transport (…)."

Ari Mononen, Managing Director, Scanpole/Iivari Mononen Group

"For our company Lake Saimaa inland water way transport is not seen as separate transport mode but considered as equal shipping mode to our sea port shipments. When the plant is situated at the lakeside, shipping via Lake Saimaa is the natural, most efficient and environmentally friendly mode of transport. Direct shipments from our inland plant to our customer's terminals reduce the number of handling of our cargoes preserving the cargo quality and keeping the intermediate handling and storage costs down."

Anna Näsi, Maritime Transport Manager, Yara Finland Oy

"Scheduling of vessels has been very easy, because vessel that operates in Inland water transport is easy to get. Advantage compared to sea ports is that there is always free space in inland port were unload the cargo. That means no waiting and demurrage costs for the shipper. This means excellent supply certainty for our customers. (…)"

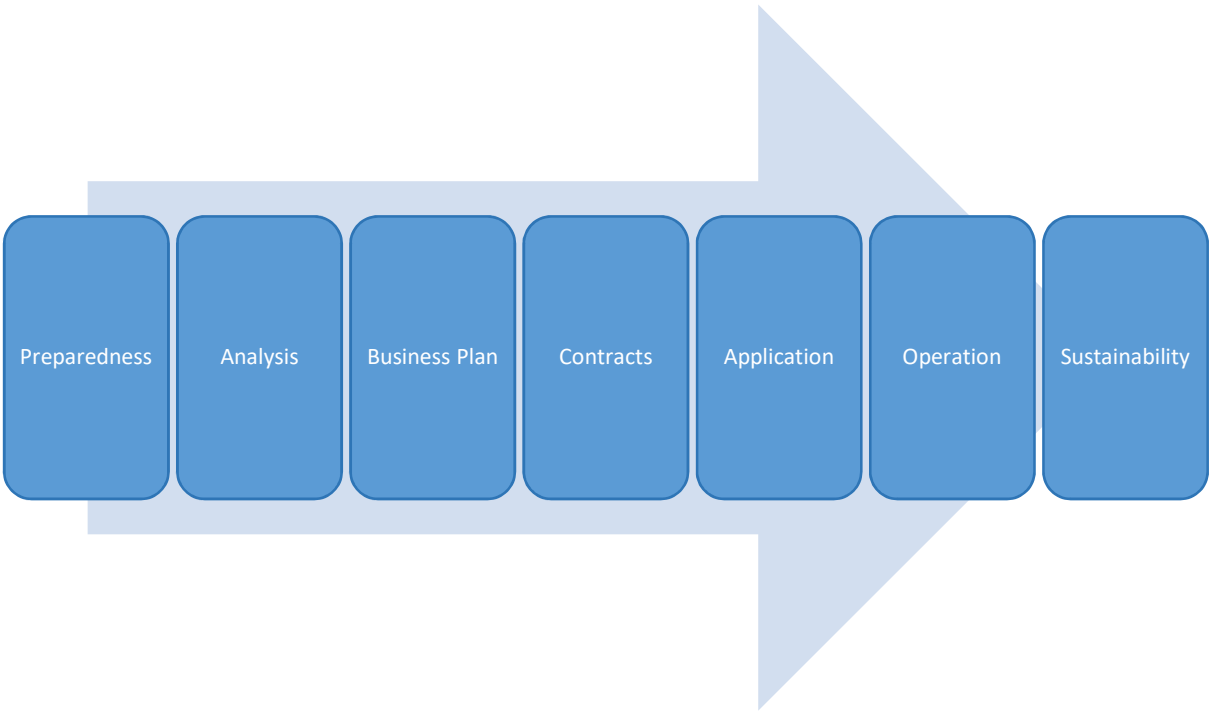
Risto Kuittinen , Logistic Manager, Embra Oy/CEMEX

HOW TO SET-UP A NEW INLAND WATERWAY SERVICE?

From analysis to business case – how interested shippers and barge operators can initiate a modal shift to inland navigation.

Generally setting-up a new inland waterway service follows the same principles as in other business cases; economic feasibility is naturally the main criteria. However, inland waterways include some special characteristics. These are e.g. several parties involved (authorities, locks traffic control, ports shipping companies) and issues related to shipping (vessel, crew, water level etc.).

This case study presents easy guidelines for setting-up a new IWW service. The first step concerns preparedness towards a new service. An analysis of the market potential of the new service constitutes the second step. The third step – creating a business plan – builds on the previous phases and it is highly important. The business plan can reveal if the business is not feasible at all or if related risks are too high. Planning precedes signing of contracts (step 4) and possible application processes (step 5) before starting business activities. Once in operation (step 6), monitoring of quality and performance are required to maintain the desired level of service. Lastly, it is important to ensure sustainability (step 7) of the new service.



1. Preparedness

A starting point for all activity needs to be preparedness to maintain and develop IWW. This requires well organised IWW lobbying, promoting, and marketing. IWW can be affected by international legislation and its development may require significant investments. Having an influence on these requires both national and European co-operation as well as influencing or lobbying strategy. The key elements to prove IWW completeness are economic and ecological benefits.

- Promotion
- Lobbying
- Supporting infrastructure and services (pilot and locks etc.) are supporting business development
- Economy and ecology

2. Analysis

Development of a new service requires understanding where potential transport flows are and the kinds of transport volumes that can be expected. Market analysis provides information of these flows, identifies potential clients, and may even contain interviews. Interviews can be seen as pre-marketing of the new service.

The market analysis usually contains preliminary profitability calculations which take costs and benefits into consideration. The results of the market analysis form a basis for marketing plans used for promoting the project (of creating a new service).

- Preparing a market study
- To find possible clients and cargoes
- Plan for marketing principles
- The result is an assessment if there is any market potential and if inland waterway is a competitive solution

3. Business plan

A business plan is the company's manual, required for launching a successful business or service. Its role is to assist in systematically outlining and planning the business and profitability of a new enterprise or expansion of existing company.

- Service characteristics – Business idea

Competitiveness, benefits compared to other means of transport, newness and / or innovativeness of the idea.

- Market and Customer requirements

The value of time has significant impact on the whole logistics chain in modern logistics. On one hand ships and vessels tend to be slower than other means of transport. On the other hand, ships can carry greater amounts of cargo. Frequency and the overall transport time can have an important impact on competitiveness of waterway transport.

- Vessel characteristics

Technical requirements of vessels depend on the needs of the customer and the features of cargo. It is common that the size of vessels (lengths, width, height, draft) is restricted in several inland waterways. Also, the loading features in vessels must be modern and thus contribute to competitiveness of inland waterway compared to other means of transport.

- Organizational set-up

Many parties:

State, Infrastructure, traffic control, possibility for public-private partnerships

Ports, shipping companies, charterer agents.

Developing inland waterway service requires not only internal development of the responsible organisation. Instead interaction with several stakeholder groups must be acknowledged. The stakeholder groups include for instance those responsible for the infrastructure, ports, shipowners, and charterer agents.

- Legal considerations

Are there any legal considerations that need to be acknowledged? Are for instance any permissions needed? How about country related regulations or environmental regulation? If yes, discussions should be started with respective authorities about actions that are needed to be granted approval.

- Market Regulation and quality control

There are rules and regulations that aim at sustaining confidence in the (financial) markets. Certain level of regulation enables order and predictability. Price regulation, subsidies and other financial incentives can be used as tools for correcting errors in the market. Quality control tries to ensure that market manipulation or insider trading does not occur. Market manipulation and insider trading lessen the trust of investors and credibility of the markets.

- Economic feasibility

In principle economic feasibility stands for the balance of income and outcome. Income should exceed or be at least on the level of outcome. Economic feasibility can be monitored at various frequencies: on a daily, weekly, monthly or a yearly basis. Monitoring should be planned carefully. For instance, there can be differences in the outcome and income flows on a monthly basis. A common method for overcoming this obstacle is known as Net Present Value (NPV) which is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting and investment planning to analyse the profitability of a projected investment or project.

- Marketing

Plan for efficient marketing starts with 5 questions: how, where, when, for whom and why?

How stands for the format of marketing – is it a still shot, a video, an audio tape, an animation or just text?

Where stands for the channel – very often this nowadays means a website.

However, efficient marketing requires multiple channels (traditional printed media, tv and radio, social media) which lead back to the website. If there are several client groups, tailored marketing might be needed. In this case, however, personal connections to different stakeholders might be the most efficient marketing channel.

When is about timing – marketing is not a one-time activity which should be conducted regularly through various channels. Therefore, active lobbying (marketing) and discussions could be started prior to the launch of the new service to create interest.

For whom is important. Marketing is only efficient if it reaches the potential clients or users of the service.

Why is the underlying reason for marketing – what are you trying to accomplish through marketing, in this case to increase the transport volumes and number of users of IWW.

- Risk management

Risk management means that potential risks are identified and prepared for. Risks can relate to business activities, personnel, property, crime, liability, interruption, dependence, contractual risks and information. Business activity risks stand for decrease of demand, intensified competition, decrease of selling prices, increase in buying prices and so on. Personnel can also create risks such as injuries, sickness and even exhaustion or hiring a person with wrong set of skills for the job, losing an important member of staff, not finding highly qualitied workers or having staff with outdated skills. Property risks include fire, leakage, breaking of machinery, spoiling of stock or decreasing of the value of stock. Crime risks relate to theft, burglary, robbery, vandalism or fraud. Liability means the legal responsibility a company may have for instance on an environmental hazard it has created. Dependence risks are described as the business activities of a company depending on a major client, supplier, subcontractor or partner. Contractual risks are associated with unclear or unfavourable terms of contract, disagreements of interpretation, delays or even contract violations. Lastly, information risks relate to important and secure information for the company. There is a risk the information may be destroyed or stolen for instance by viruses or spy programmes.

4. Contracts

The transport related contracts require understanding of contract law. In the context of IWW this can mean taking the legislation of several different countries into account.

Generally speaking, the duration of contracts should be as long as possible to enable investments in the new service.

5. Application of permissions

Permission processes that possible relate to transport must be studied carefully before operation of the new service can be launched. In some cases, launching a new transport service may require large permission processes (such as environmental impact assessments).

6. Operation

Introduction of the new service ensures that the transfer of the service occurs as planned. Once the service is in operation, it is important to monitor its performance and quality. Ongoing monitoring of operation allows reacting to possible changes or challenges. Operation also requires planned and implemented maintenance and repairs if something in a vessel is damaged.

7. How to stay sustainable?

There are several ways to approach sustainability of business. The first is the environmental side. Consider alternative fuels such as hybrid, electricity, LNG as well as better technology, e.g. new cleaner diesel engines. Another side is business. Sustainability of business requires constant monitoring of costs, changes in the market, changes in demand, and acting accordingly.

BUSINESS CASE: SWEDEN

The new IWT service is based on a barge container service on Göta älv between the port of Göteborg to receivers in the geographic area of Trollhättan-Vänersborg. By using existing IWW, the new IWT service has a potential to shift cargo from the road network into a more sustainable way of transportation looking at emissions, congestion and safety.

Looking into the container market the trend shows that new warehouses and production sites are established in the Trollhättan/Vänersborg region and the main container flows are passing the port of Göteborg in import or export direction. By locating new industries to this geographical area, it is possible to benefit from lower land prices and building cost combined with the availability of a reliably workforce. The downside of these new establishments is an increase of frequent transportation to and from the port of Göteborg on the roads along the Göta älv valley. Since Göteborg and the area around the city already are suffering from heavy congestion and high environmental impact a more sustainable logistics is needed. A possible solution to meet this need is a modern barge container service with high cargo capacity that can move about hundred trucks per day from the road system.

A new IWT service can offer a more sustainable and safe solution than today's traditional transport on road however; transport on inland waterways has a too high cost level due to the present regulations where high fees and expensive handling costs are affecting the barge alternative in a negative way. Facing the high costs and at the same time trying to operate on a mature transport market with extreme low pricing means that a new IWT concept will be associated with high financial risks. To succeed with the intended modal shift, Sweden needs rapidly to adapt the remaining IWW-regulations and standards as the rest of the EU. The main conclusion is that during the present circumstances the business risk is too big for establishing a new IWT solution for containers on Göta älv.

SWOT analysis of the new potential service

Strenghts	Weaknesses
Strong & solid owners of Avatar Logistics Good skills in inland navigation Reliable partners in barge operations, port handling & distribution Offering a sustainable solution	High fixed costs on long term High initial costs before start Low volume during start-up phase Difficult to predict start date of the IWT service Inland navigation is a new transport mode in Sweden, a lot of marketing needs to be done High cost factors in port, fairway & pilot dues
Opportunities	**Threats**
Offering a sustainable solution IWT has high transport capacity Reliable time table with a IWT solution alternative Barge will be established as the fifth transport mode reised from pilot & infrastructure fees	Strong competition from road transport Low price services Price shocking campaigns from competitors Negative or none political decisions for IWT future in Sweden Non-performance in contracted ports

New potential IWT service in Sweden	
Service origin-destination	The new container service will be operated on a regular timetable between APM Terminals in Göteborg and port of Trollhättan with a regular call northbound/southbound in Fraktservice-Marieholm.
Navigational parameters	The Göta älv river has in total six locks that needs to be passed and which limits the vessel size to a length of 89,00m, width of 13,40m and a draft of 5.7m. In addition to the locks there are eleven bridges crossing the river. Looking at the possible IWT concept the benefits with a modern standard EU barge is that only one bridge needs to be opened during the voyage between Göteborg and Trollhättan.
Kind of goods transported	Containers (light 40' container, heavy 20' container, mixed container sizes), Project cargos.
Estimated volume	20.000 TEU p.a.
Forecast (volume)	Volume growth is estimated to 5% per year.
Service schedule (how often)	• Frequency of service during start up phase 3 roundtrips per week • Option to increase frequency when volume grows • Sailing time estimated to 9 hours one way • Estimated transit time for a roundtrip incl. time in the ports is about 26 h • Sailing schedule needs to be coordinated with the port operations and the customers demand of frequency and delivery time.
Possible customer	• Varner Group AB • Vargön Alloys AB • Katoen Natie AB • Fraktservice AB • NEVS
Possible barge operator	AVATAR Logistics
Vessel characteristics	Time charter of a Dutch motor barge from Avatar Logistics partner company Vigilia Shipping Ltd in Dordrecht Netherlands. The barge is constructed to fit the limitations in Göta älv, vessels length 86m, width 11m & draft of max 3,5m. The time charter contract period is minimum three years with option for additional two years.
Competition to potential new market	Today all potential customers are using direct transport by truck to and from the APM Container Terminal in port of Göteborg. The roundtrip market price is about EUR 200 per TEU. Main competitors on road in the Göteborg-Trollhättan container trade: • Ancotrans AB • Skaraslätten Transport AB
Requirements for the service to start operation	A cost efficient barge with high environmental standard Reasonable pilot and fairway dues and positive political decisions. A new container port is under investigation in the city of Trollhättan. A container IT-system linked to the major ocean carrier's standards.

More information?

Please scan to read the full report or call Johan.

BUSINESS CASE: LITHUANIA

Resting on the investigation of the economic and environmental potential possibilities of the Lithuanian IWW, two main types of the cargo can be transported by barge. These are oversize and mass cargo, like construction materials (sand, gravel), grain, wood and fertilizers. Today only small quantities of mass and oversize cargo are transported by IWT between Klaipeda and Kaunas or Jurbarkas.

Potential new services would follow the recommendation of the EU regarding green transportation. They should meet the requirements of the potential users, being grain terminals, construction materials suppliers, and energy and chemical industry companies. Inland waterway operators should work together with chemical plant owners to create a reliable business basis, but also with respective authorities (national and regional administrations). Especially during the initial phase, administrative hurdles should be removed such as reasonable dues and tariffs but also support for new buildings to set up the needed barge fleet.

The development of the Lithuanian inland waterway network and fleet should be coordinated with the development of inland ports and/or loading places as well as suitable last mile solutions from the terminal to the factories and good storage facilities.

The main risk for the new potential service is to ensure constant cargo volumes. However this is crucial to set-up a high quality service at a relatively low price to compete with pure truck transportation. Government support and strong direct marketing are needed to reduce this risk. Another risk is the lack of experience and knowledge how to organize a whole logistics chain including inland navigation. Careful analysis and planning are needed as well as trainings for employees and education.

SWOT analysis of the new potential service

Strenghts

Possibilities used Lithuania IWW for the oversize cargo transportation as well some types of the mass cargo.

Existing depts. of the IWW is enough for the oversize and mass cargo transportation with barges capacities up to 600 – 800 tons.

Transportation oversize cargo by Lithuania IWW can decrease transportation costs, delivery time and should be more environmental friendly in comparison with other transport modes

Weaknesses

High infrastructure and superstructure preparation costs, lack of experience and tradition. During dry summers it is complicate keep guaranties depts. on the all length of the Lithuania IWW for the freight transportation

Limit of the cargo quantities which could be reoriented from roads and railway transport on IWW.

Opportunities

Increase depts. on the IWW by building patches of equipment and attract more cargo on IWW.

Mass cargo owners, located clause to the Lithuania IWW, such as agriculture and wood industry positively look on IWW opportunities in future.

Threats

Good public road and railway network in Lithuania and low density of population (in comparison with The Nederland density of population in Lithuania is about 8 times less), cannot stimulate create big volumes of the cargo and rich critical mass.

New potential IWT service in Lithuania	
Service origin-destination	Klaipeda port – locations on Nemunas river up to Kaunas, in future Neris river up to Jonava, as well used link with European IWW system via Konigsberg (Kaliningrad) region and visa-versa
Navigational parameters	• Guaranteed depths between Klaipeda and Jurbarkas: 1,5 m; • Between Jurbarkas and Kaunas: 1,2 m; • Minimum width of river between Klaipeda and Kaunas: 30 m; • Minimum turning radius on the IWW bends: 250 m.
Kind of goods transported	Oversize and overweight goods, as well bulk cargo like grain from Kaunas to Klaipeda port and fertilisers from Jonava to Klaipeda port, constructions materials (sand) from Jurbarkas to Klaipeda
Estimated volume	• Construction materials (sand, gravel) - up to 1 mil t per year; • Grain – up to 500000 tons per year; • Wood and wood production – up to 300000 tons per year; • Oversize cargo - up to 1000 units per year.
Forecast (volume)	Oversize cargo demand for the IWW today is from 500 units ap to 700 units, forecast demand for 2026 is about 1000 units of oversize cargo. Traditional cargo demant in case of good organisation and provide good services for the clients could be up to 2 million tons per year. Sales targets could be oriented on new services based on low prices, flexible and high profesional work with potential IWW clients.
Service schedule (how often)	Oversize and overweight cargo – 2 – 3 times per week, grain during August – November – daily, fertilizers during navigational period – daily, construction materials during navigational period - daily
Possible customer	• Construction companies • Agriculture companies and grain elevators (storage) owners • Wood and wood production companies • Oversize cargo (construction, energy and chemical industry)
Possible barge operator	Lithuanian IWW Administration, private operators
Vessel characteristics	• Oversize cargo: push pontoons or barges with capacity of 800-1000 tons. • Traditional cargo: self propeller push barges with capacity of 500-600 tons.
Competition to potential new market	Lithuanian Railways and mainly road transport companies (in Lithuania exist more than 100 road transport companies)
Requirements for the service to start operation	In Lithuania governmental support is needed for the improvement of the IWW, especially loading and unloading places, good logistics services organized by forwarding companies, reasonable price policy on basis governmental support. To link the Lithuanian IWW with the European IWW system it is necessary to wait for better political environment between Russia and other countries, because IWW link goes via Konigsberg (Kaliningrad) region.

More information?

Please scan to read the the full report or call Vytautas.

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