Main results of the preparatory study undertaken by EICB

Introduction

There is a high urgency for the IWT sector to develop measures to facilitate the transition towards zero-emissions. Greening the fleet can further improve air quality in urban areas along waterways, will help to reduce global warming, can be a boost for the industry, can provide export opportunities for selling greening technologies worldwide and can create new jobs in Europe. In the context of this study, greening means largely and ultimately eliminating greenhouse gases and other pollutants by 2050.

On 28 November 2018, the European Commission presented its strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050 – A Clean Planet for All[1]. It can be concluded that these recent developments ask for a European policy on the reduction of GHG emissions by IWT. The Communication identifies three priority areas for action:

- *Increasing the efficiency of the transport system by making the most of digital technologies, smart pricing and further encouraging the shift to lower-emission transport modes,*
- *Speeding up the deployment of low-emission alternative energy for transport, such as advanced biofuels, electricity, hydrogen and renewable synthetic fuels and removing obstacles to the electrification of transport*
- *Moving towards zero-emissions vehicles. While further improvements to the internal combustion engine will be needed, Europe needs to accelerate the transition towards low and zero-emissions vehicles.*

In addition, the Communication "A Europe that protects: Clean air for all" from the European Commission provides the policy framework for reduction of air pollutant emissions such as NOx and Particulate Matter[2]. The 2018 Communication calls for further interventions given infringements in many European countries of air quality limit values a. The Communication stresses the following:

"*there is an urgent need to improve air quality in Europe through the full implementation of the air quality standards agreed by the Member States and the European Parliament more than a decade ago. This requires action at all levels (national, regional, local) and the European Commission is supporting such action by means of all the tools at its disposal. Poor air quality reduces quality of life and is of great cost to the economy. There is no time to waste. Cost-effective solutions to improve air quality exist and are widely available. There is a need to act now to scale them up and implement them without delay across the EU to the benefit of the half a billion European citizens.*"

More specifically for Inland Waterway Transport (IWT), the Mannheim declaration of October 2018 emphasised the need for up-to-date, workable and harmonised environmental and safety regulations in Rhine and inland navigation. The CCNR Member States agreed on the following[3]:

"WE emphasise the need for up-to-date, workable and harmonised environmental and safety regulations in Rhine and inland navigation. To further improve the ecological sustainability of inland navigation, we task the CCNR to develop a roadmap in order to
- *reduce greenhouse gas emissions by 35% compared with 2015 by 2035,*

[1] https://ec.europa.eu/clima/policies/strategies/2050
[2] http://ec.europa.eu/environment/air/index_en.htm
[3] https://www.zkr-kongress2018.org/files/Mannheimer_Erklaerung_en.pdf

• *reduce pollutant emissions by at least 35% compared with 2015 by 2035,*
• ***largely eliminate greenhouse gases and other pollutants by 2050.***
WE point to the need for new financial instruments to achieve these environmental objectives and entrust the CCNR with the task of leading this development."

In this regard, the Mannheim declaration stresses the need for new and updated financial instruments to achieve these environmental objectives, because existing funding and financing instruments have not yet yielded the hoped-for results, namely a large scale greening of the IWT sector.

This has led to the launching of a preparatory study undertaken by the EICB, involving many stakeholders. The aim of this preparatory study was to develop the basis for the technical specifications for a 'Main Study' concerning new and updated financial instruments to achieve the environmental objectives.

Overall policy background for IWT

All modes of transport are required to make the transition towards zero-emissions. The White Paper of 2011 already announced that all modes will need to internalise external costs and that "*mandatory application of internalisation charges on all inland waterways on EU territory"* should be examined.[4] A large proportion of the external costs of IWT is caused by atmospheric emissions. The external costs of atmospheric emissions were estimated by PROMINENT[5] in 2016 at around 1.1 billion euro annually. There is therefore an incentive to reduce external costs in order to avoid high additional costs in future, which may result in IWT losing market share.

An important policy objective is to accommodate the growth in cargo flows by means of waterborne transport in order to decongest motorways and to reduce externalities like noise, air pollutant emissions, GHG emissions. IWT has still capacity on the waterway network to accommodate growth. As regards energy required for transporting goods, the IWT mode has a strong advantage compared to road haulage. For container transport, a market segment with strong growth potential for IWT, a truck has a CO_2 emission of 102 grams per tonne-km while a barge emits only 24 grams of CO_2 per tonne-km[6].

Promoting measures to support IWT is therefore an effective and efficient way to reduce transport emissions of CO_2 as roughly 75% can be gained by means of modal shifts from road to inland navigation.[7] IWT is very well established, with a dense network of waterways,ports and terminals in several EU countries. However, IWT clearly needs to cut air pollutant emissions (PM and NOx) in order to stay environmentally competitive in terms of air pollutant emissions since the road haulage sector drastically reduces NOx and PM emission by means of the strict Euro VI emission standards combined with the relatively short lifetime of a truck.

In the NAIADES II Communication from DG MOVE[8], actions were planned under the heading "Environmental quality through low emissions", which was accompanied by the Commission Staff Working Document "Greening the fleet: reducing pollutant emissions in inland waterway transport". Since the Impact Assessment study (2013)[9] on emissions reduction of the inland fleet, a major concern

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN (see page 29)
[5] http://www.prominent-iwt.eu/
[6] See table 4 page 14, report STREAM Goederenvervoer https://www.ce.nl/publicaties/download/2259
[7] See table 4 page 14, report STREAM Goederenvervoer https://www.ce.nl/publicaties/download/2259
[8] https://ec.europa.eu/transport/modes/inland/promotion/naiades2_en
[9] https://ec.europa.eu/transport/sites/transport/files/modes/inland/studies/doc/2013-06-03-contribution-to-impact-assessment-of-measures-for-reducing-emissions-of-inland-navigation.pdf

has been the availability of capital, funding (grants) and financing (loans/own capital), for greening the fleet. The study was the basis for negotiations on the revision of the NRMM directive which resulted in the Stage V regulation for air pollutant emissions for (only) new engines[10].

Gaps in the current legal framework of IWT

It was concluded in the stakeholder interviews during the pre-study that there are clear gaps which need to be closed. In brief and generally speaking, the shortcomings in current IWT policies and legislation are:

- Existing engines are not addressed;
- Greenhouse gas emissions are not addressed.

The European Commission's original proposal was presented in the Staff Working Document (SWD) "Greening the fleet: reducing pollutant emissions in inland waterway transport". It aimed for intervention measures addressing **both existing engines and new engines in IWT.** The follow-up was the implementation of NRMM Stage V regulation, which is however only applicable for new engines installed in vessels. The ambition to address greening of the existing fleet with existing engines as well is not addressed by EU legislation.

Moreover, the staff working document and NRMM regulation only address air pollutant emissions such as harmful NOx and PM emissions. However, the need to reduce greenhouse gas (GHG) emissions became stronger after the COP21 agreement, which was confirmed by the Mannheim declaration of 17 October 2018 and the EC strategic long-term vision "A Clean Planet for All".

As concluded in the Horizon 2020 project PROMINENT, a wide range of greening technologies for existing vessels is available to drastically reduce air pollutant emissions such as NOx and PM. The main bottleneck identified by PROMINENT was the lack of a business case: missing financial solutions and commercial incentives for ship-owner/operators to green their fleet.[11]

For example, a vessel engine's service life is relatively long compared with a truck engine. Almost 70% of engines installed in the fleet were produced before 2003 and, as such, unregulated and not compliant with either CCNR1 or CCNR2 emission standards. Given the long service life, the shipowner/operator requires certainty that the right choice can be made for the powertrain, in order to ensure a certain economic value of the vessel over the coming decades. It can be concluded that one of the gaps is the lack of an up-to-date European policy framework on how Inland Waterway Transport (IWT) should develop towards zero-emissions transport by 2050.

An understanding of "no regret options" is needed. In this respect there are high expectations from electric powertrains. There are different (modular) options for zero-emissions powertrains: powered by fuel cell technologies, powered by battery packs, use of renewable fuels such as bio-fuels and synthetic power-to-gas and power-to-liquid fuels (e.g. green hydrogen, bio-methanol, bio-LNG). Many of these zero-emissions technologies are however still experimental and not developed to a mature level (TRL 8 or 9). Consequently there are no solid conclusions on the required investments and the impact on total cost of ownership of such zero-emissions solutions. It is however generally expected that the investment costs and/or operational costs for powertrains within zero emissions solutions will be much higher compared to conventional diesel powertrains. Furthermore, these technologies also require an effective policy and legal framework (e.g. CESNI/ES-TRIN for vessel standards) and supporting investments for the associated bunkering/charging infrastructure on shore. As a result of uncertainty and higher costs (CAPEX and/or OPEX) for cleaner powertrains, it is expected that many

[10] Regulation (EU) 2016/1628 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R1628
[11] Deliverable 6.3 and 6.4 http://www.prominent-iwt.eu/wp6-roll-out/

existing and polluting engines will remain operational in a business as usual scenario by means of overhauling engines to extend service life.

Consequently, without legal requirements and/or financial incentives to green the fleet, it is not expected that existing engines will be replaced or upgraded to reduce emission levels. The 'business as usual' scenario will result in a loss of image and public support for IWT. This development is conflicting with policy objectives, as IWT needs to play a role in decongesting roads and making the overall multimodal transport system more sustainable and efficient.

It is therefore concluded that effective policy and financing/funding instruments need to be developed. An understanding of and greater certainty on financing and funding options and on the most cost-effective measures to support the transition towards zero-emissions are needed.

Summarising Recent Activities

In the period between the Impact Assessment study (2013) and the Mannheim declaration (2018) various studies have been performed on the financial aspects of greening (see Annex V). One of the generic conclusions of the studies is the presence of financial bottlenecks which hamper a large-scale greening of the European inland waterway transport (IWT) sector. The financial bottlenecks can be regarded as the non-availability of capital for investments in greening techniques in order to lower air pollutants and/or climate change emissions. This is mainly due to a lack of positive business cases, either with or without public funding, combined with high risk levels for the shipowner who needs to make the investment.

This conclusion is based on detailed assessments of the Total Cost of Ownership (TCO) of different greening technologies, mainly addressing air pollutant reduction.[12] For many greening techniques, and for both existing and new vessels, the TCO is uncompetitive compared with current conventional diesel powertrains. This is due to large upfront investment costs, the high risk profile of the investment, no or long payback period, additional operational costs, lack of long term contracts, etc. Moreover, shippers are in general not able or willing to pay higher freight rates for less polluting vessels. There is also a lack of understanding on the environmental performance of vessels for benchmarking purposes for shippers. In addition to technology-related factors, access to funding and capital also forms a bottleneck. Acquiring funding involves a significant administrative burden and knowledge, which is a major barrier for small companies. Banks are reluctant to provide financing, given also the fragmented market structure of the sector and questions about the financial soundness of investments in greening solutions. In addition, funding programmes (grants) are usually temporary and limited in funding rate and budget. EU facilities (e.g. CEF) to provide funding or loans are usually focussed on larger investment and funding volumes, which does not correspond to the demand from individual (small) companies in IWT. Finally, with a view to addressing greenhouse gas emissions, new technologies such as electric powertrains combined with batteries or renewable fuels (e.g. biofuels, hydrogen, etc..) will require even higher investments and may have higher operational costs.

Some of the initiatives proposed financial solutions to reduce the financial bottlenecks. PROMINENT provided different scenarios to help the entire European fleet towards EU Stage V emission levels. This would require an investment of around 1 to 2 billion euro[13] . A promising scenario included a funding and financing mechanism based on the pooling of subsidies, possibly combined with an environmental (differentiated) surcharge on fuel. Based on the revenues from the surcharge and/or additional funds

[12] Deliverable 6.3 and 6.4 http://www.prominent-iwt.eu/wp6-roll-out/

[13] Based on technologies LNG retrofit or after treatment (DPF and SCR), overall investment sum depends on market share of LNG

from governments, greening the fleet investments can be funded/financed and possibly backed by EU financial products. This concept has similarities with the Norwegian NOx fund principle.[14]

'Fonds Verduurzaming Binnenvaart', a Dutch study, conducted a feasibility study on a fund comprising public and private contributions. However this proved not to be feasible owing to a lack of resources to finance a fund and the divergent financial interests between the participants, as well as level playing field issues with neighbouring countries.
Furthermore, discounts on port dues and guarantee programs have been developed and studied for investments in environmentally friendly techniques (e.g. Green Award). However, the financial impact of these incentives is limited. Tax exemption could also be an efficient tool to support the deployment of environmentally friendly techniques.

A relatively new concept is the modular (battery electric) powertrain application for short distance container shuttles by barge. A consortium[15] is developing a concept and business offer to adapt existing vessels to electric powertrains with 'energy as a service' contracts. Energy as a service means that the investment in batteries, maintenance, charging and logistics is taken care of by service providers. Consequently, the ship owner/operator pays for the energy usage itself and not for the batteries. The owner/operator however still needs to invest in the electric platform on the vessel (electric motor, wiring, control systems, etc.) The ambition is to deploy 50 vessels with this concept, targeting container vessels active in the Benelux area.

Existing grant schemes dedicated for IWT, at various levels including EU and national, are listed in the EIBIP Funding Database[16]. More recently the following programmes and projects have been initiated concerning the financial topic:

- 'le Plan d'Aide à la Modernisation et à l'Innovation 2018-2022 (PAMI)' programme initiated by VNF[17];
- GRENDEL (Interreg project)[18];
- 'Evaluierung des Förderprogramms nachhaltige Modernisierung von Binnenschiffen' programme initiated by the German Federal Ministry of Transport and Digital Infrastructure[19].

Problem Definition

The general problem as regards greening the European IWT fleet towards zero-emissions in 2050 can be defined as follows:

"Without intervention limited progress is expected on reduction of greenhouse gases and air pollutant emissions by the Inland Waterway Transport (IWT) sector towards the emissions target for 2050 set by the CCNR, which is consistent with European and international emissions goals ".

In short and summarised, the drivers of the problem are:

- Lack of legislation for the existing fleet and existing engines as regards targets for atmospheric emissions (notably NOx, PM and CO2);
- There is no effective internalisation of external costs or 'polluter pays' mechanism in IWT;
- In general htere is no willingness to pay for green vessels by the vast majority of shippers, in particular for reduction of air pollutant emissions;

[14] https://www.nho.no/samarbeid/nox-fondet/the-nox-fund/
[15] Consortium consisting of Heineken, Engie, Eneco, CTT, Wärtsila, ING Bank, Port of Rotterdam
[16] https://eibip.eu/funding/
[17] http://www.vnf.fr/vnf/content.vnf?action=content&occ_id=29169
[18] http://www.interreg-danube.eu/approved-projects/grendel
[19] Document available on request

- The long service life of vessels and their engines and the ability for the ship owner to extend service life by overhauling the traditional engine, avoiding higher expenses for engine replacement. This results in a very low demand for new engines;
- Compared with other modes, the IWT market is small with stringent requirements. Consequently, there is low interest from engine and technology suppliers in developing and offering new engines and energy solutions specifically for IWT vessels, resulting in relatively higher greening costs for IWT. Development of bunkering infrastructure and corresponding supply chain faces the same difficulties;
- In general, higher total cost of ownership for greening technologies as well as risks and uncertainties in the business case development (e.g. a persistent low oil price);
- Uncertainty for ship owners about possible future emissions standards;
- Uncertainty about appropriate technologies and fuels for the near future in view of a development towards decarbonisation and zero-emissions in IWT;
- A fragmented supply side of the sector combined with dominance of short-term or even single trip contracts in the spot-market impose barriers to acquiring loans for investments. There is a lack of collaborative long-term approaches between shippers and IWT operators to green transport.

Purpose of the main study

a) Overall vision

The greening of the IWT sector requires a new approach regarding funding and financing. There is a financial gap in terms of total cost of ownership, CAPEX and OPEX between the business as usual scenario and any other scenario with technologies contributing towards zero-emissions. Greening the entire fleet will require research into appropriate financial support mechanisms for its achievement.
In-depth analysis will be conducted on realising suitable funding and financing for ship owners active in IWT to drastically reduce emissions. **The main study needs to pave the way for political decision making, working on the development of one or more solutions that can count on support from relevant stakeholders.**

The solution(s) needs to incorporate both the push and pull factor to stimulate the transition, i.e. investments in greening. There needs to be an incentive for the shipowners to invest in greening, since a financial instrument on its own will not be sufficient. For example, it would be beneficial to have all vessels labelled according to the emission performance in order to have a common European framework and approach for developing differentiated incentives and financial support from European, national and local levels.

The solution needs to be technology neutral, enabling the market to select the most appropriate technology to effectively reduce emissions (greenhouse gas and air pollutants).
The problem is multidimensional and a new approach regarding funding and financing alone will not be sufficient for the transition towards zero-emissions IWT. Attention needs to be paid to interrelated topics such as:

- (Additional) Legislation, norms and certification procedures for environmental performance of the fleet;
- Level playing field and market impacts;
- Stakeholder engagement and commitment for implementation of measures;
- Stimulating and favouring 'greening' in IWT by contracting shippers and brokers;
- Clear technological roadmap towards zero-emissions in 2050.

The pre-study led to the preliminary conclusion that intermediate mandatory emissions limits between 2020 and 2050 are not the preferred option to stimulate greening, because it can lead to a 'lock-in'

due to the long service life of powertrains because zero-emissions technologies are not yet available. The consequence is to put effort into introducing incentives in the business case of the ship owner/operator itself to push the deployment of technologies which contribute towards reaching zero-emissions in the year 2050.

b) Scope and focus areas of the main study

The **geographic and market** scope of the study will encompass the whole of Europe given the level playing field requirements. All markets and vessel types will be included in the study (freight and passenger vessels, small and large vessels, existing and new vessels) to ensure a level playing field. Possible funding and financing solutions for greening which are recommended by the main study should be **easy accessible** both for relatively small and large investments and with a minimal administrative burden, for IWT companies from **all segments and countries**. However, the research should focus on the main IWT markets and countries in Europe, notably the Rhine and Danube markets and countries which adopted the technical requirements for vessels ((EU) 2016/1629).

The **technological** scope is neutral. However, there is a need to elaborate on transition pathways for those technologies which can contribute to (near) zero-emissions from a Tank-to-Propeller viewpoint by 2050. Emissions from Well-to-Tank and the overall life cycle performance are important to keep in mind but are out of scope since the IWT policy makers have no influence over the emissions emitted in other parts of the energy supply chain.

Close **involvement and communication with the companies in the IWT sector** is essential for understanding business level barriers and to identify the opportunities. The focus should be on understanding all greening drivers and barriers for, taking into account different stakeholder positions. An important element is to raise support for the overall process towards zero-emissions and to address leadership and governance of the implementation after the main study.

The analysis in the main study should strongly **take into account future scenarios** as regards technical, regulatory and financial aspects, since possible solutions recommended by the main study will only be deployed in 2021 at the earliest.

a) Questions identified

Given the problem definition and the identified drivers of the problem, the main study needs to address questions. The pre-study identified a non-exhaustive list of questions based on the interviews with stakeholders. The questions are listed below.

A. What are the possible triggers and financial drivers to enable a positive investment decision by shipowners to invest in technologies contributing to zero-emissions performance?

- What revenue-generating elements of an IWT company can be identified to promote the use of technologies contributing to zero-emissions? What measures will lead to more revenues, what is the role of shippers and brokers in this respect, what are their requirements?
- What elements in expenditures can be identified in relation to the powertrain and emission and energy performance? What cost parameters can be identified and what proportion of overall operating costs do they represent (e.g. capital costs, energy costs, port dues, maintenance costs)?
- What are the current financing mechanisms in the IWT sector for powertrains and how does this relate to the financing of the ship as a whole?
- What is the current financial profile of IWT companies based on information from the balance sheet, profit and loss accounts, and what does this mean for the ability to acquire capital for investing in technologies contributing to zero-emissions?
- What other issues play a role in making investment decisions (economic outlook, age of the owner, age of engine and vessel, structure and stability of the market, type of contract, ...)?

B. What can we learn from other transport modes?

- What is the status/developments in other transport modes and industries concerning zero-emissions development and financing?
- What are best practices, financing solutions and technologies which could be applied by IWT, and which solutions cannot be applied by IWT?

C. Which greening techniques fit into zero-emissions development of IWT and what are the impacts?

- Which greening techniques can be applied in IWT to - ultimately - largely eliminate greenhouse gases and other pollutants by 2050?
- What are possible transition pathways for those technologies which can contribute to (near) zero-emissions from a Tank-to-Propeller viewpoint by 2050?
- What is the current and anticipated availability of the required energy infrastructure for the supply of alternative fuels, charging points, battery exchange points, etc?
- What is the required investment per transition pathway (CAPEX) and impact on operational expenditures (OPEX), taking into account different scenarios (e.g. energy price levels)?
- What is the business case at ship owner/operator level (Total Cost of Ownership) for the identified greening technologies, also taking into account future price and technological developments?
- Compared to business as usual, what are the CAPEX and OPEX impacts of technologies contributing to zero-emissions?
- Which technologies are suitable, differentiated as between the different fleet families, vessel types and sailing profiles and scenarios (e.g. fuel price development)? What are the corresponding transition pathways for clustered market segments?
- What is the required overall investment for the zero-emissions transition of the European fleet? Starting from 2020, how could (no-regret) investments best be made in the years leading up to 2050?

D. What is the potential of pay-per-use and leasing schemes for the IWT market?

- What are characteristics of such schemes and how does they fit with current financing mechanisms in the IWT sector?
- What are the drivers and barriers for the widespread implementation of such schemes?
- What is the potential market for 'pay-per-use' and leasing schemes?

E. What is the potential of joint procurement?

- Are their possibilities for joint procurement/financing through a cooperative or another collaborative organisation to reduce investment costs?
- What are the possible bottlenecks, for example in terms of liability? Can these bottlenecks be removed and how?
- What economies of scales can be achieved by means of joint procurement and financing, given certain techniques/technologies, number of investments, type of vessels, etc.?

F. What can be expected from national and European programmes and products providing funding and financing?

- What funding schemes are expected in the next few years from the EU level (e.g. CEF, LIFE, HORIZON Europe) and what are their characteristics (typical funding rates, budgets, duration, requirements)?
- What financing schemes and products with EU financial backing are expected (InvestEU, COSME Guarantee, Green Shipping Guarantee, EFSI-SME Window, ESI funds etc.) for projects related to greening and innovation?

- What funding and financing schemes and products would be suitable to support pay-per-use / energy-as-a-service solutions?
- Is it possible to make the programmes and products more accessible and visible for the IWT sector, dominated as it is by very small companies, in order to help them invest in greening technologies?
- Are national and regional governments prepared to provide financial support for the transition towards zero-emissions IWT?
- To what extent is it possible to combine the different EU and national and regional funds? Can they be combined with financing schemes and products; what is the scope for blending?
- Is it possible to secure a price advantage on a European level between conventional diesel fuel and cleaner fuels, for example by a hedge?
- Would it be possible to develop a specific programme, financial instrument/product or facility specifically for the IWT sector and investments in greening with relatively simple procedures, low requirements and/or relatively high funding rates?

G. What is the potential for polluter pays schemes in IWT?

- Who is the polluter in IWT? What is a proper definition?
- What are possible schemes which serve the polluter pays principle and on which basis?
- What are the legal barriers to implementing such schemes across the European Union and including other relevant European countries as Switzerland, Serbia and Ukraine?
- What are the legal barriers and options as regards the Mannheim Act to enable polluter pays schemes for atmospheric emissions?
- What can we learn from the CDNI protocol, the scrapping fund and 'old-for-new' regulation in terms of approach and the processes that have been developed for solutions incorporating sector contributions?
- What could be the revenues from a 'polluter-pays' scheme?

H. What are requirements and boundaries considering level playing field and modal share?

- What are the potential market impacts of polluter-pays schemes in relation to:
    - Costs for the shippers and their competitiveness?
    - Competition between vessel types (new vs existing, large vs small)?
    - Competition between IWT operators from different countries?
    - Competition between transport modes, notably with road haulage, with respect to undesired reverse modal shift impacts?
- What is the effect of these measures on the modal share of IWT taking into account price elasticities for different type of markets in IWT?
- What are the limitations as regards atate aid regulation as regards providing funding from public bodies?
- What could be the contribution from the IWT industry itself to cover higher costs of ownership?

I. What is the added value of a new European funding and financing scheme for IWT and how could this work?

- Taking into account:
    - the market potential for pay-per-use schemes,
    - the potential of polluter-pays-schemes providing financial resources from the private sector,
    - the potential for joint procurement (collaborations),
    - the expected funding (grants) from EU and national and regional sources,
    - market impacts and level playing field considerations,
      => what could be the added value of a fund for the transition towards zero-emission IWT?

- How could a fund with European coverage be structured and what would be its characteristics?
- How can such a fund be managed and what are the expected management costs?
- Which approaches (grants, pay-per-use, polluter-pays, etc.) can be joined together into a new scheme with European coverage? Which ones have synergetic effects?
- What could be the share between funding and financing (loans)?
- How can pre-financing be arranged for such a scheme; what could be the role of EIB or InvestEU or others?
- How would the funding be backed? What share by public bodies and what share by private sector, e.g. by means of 'polluter-pays' revenues?
- What should the governance of such a new European scheme look like?

J. What accompanying measures and follow-up steps are needed?

- *What measures targeting/supporting shippers and brokers need to be taken to promote making contracts with clean(er) vessels?*
- *What will be the outlines of the implementation plan in case the main study concludes that one or more intervention measures can be implemented?*
- *How will the measures be deployed; which stakeholders need to be involved and what role would they have?*
- *What is the expected required budget for the execution and management of the implementation phase?*