



PLATINA³

IWT policy platform

D1.5. Report on recommendations for policy measures which result into higher use of green IWT

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Executive Summary

This report presents the results of the research conducted for Task 1.5 of PLATINA3, focusing on the existing regulatory framework, policy measures, strategies and various initiatives at EU level that support inland waterway transport (IWT) development and modal shift from road to inland waterways. Specific attention is given to measures targeting decarbonization of the sector in line with the main provisions of the EU legislation. This task builds upon the analysis of the relevant regulatory framework, policy proposals, EU-funded projects and existing good practices at the European level for facilitating modal shift and promoting better use of IWT. The analysis concludes with regulatory support measures, which were not addressed fully or implemented yet, but should be taken into account to further boost modal shift and support energy transition. Based on collected good practice examples, sustainable approaches and lessons learned from other transport sectors, this deliverable comes up with the recommendations for regulatory bodies, policymakers, national administrations and other involved sectors main actors.

The recommendations take into account the findings described in the deliverable both from a regulatory point of view, taking into account and reflecting the conclusions of other deliverables of Work Package (WP) 1 (chapter 5), from the perspective of on-going national and international initiatives (chapter 4) and from the perspective of regulatory framework and market development (chapter 6). The recommendations are complemented by the list of actions to be undertaken at the regulatory and policy levels for further support and facilitation of modal shift towards green IWT. The recommendations and the list of actions target only the “market” aspect of IWT development. Other aspects such as infrastructure (physical and digital), fleet, crewing issues, competences, etc. are considered outside of the scope of this deliverable. The recommendations with regards to regulatory and policy measures focus on modal shift to “green” IWT reflecting the further direction of the regulatory framework development aiming to achieve energy transition together with the modal shift. At the current moment, a large ambition to achieve 30% modal shift by 2030, according to the Sustainable and Smart Mobility Strategy (SSMS), is rather compound, as regards the current rate of IWT (6% in 2019) in Europe. This obviously poses a big challenge on what has to be taken into further consideration to promote IWT and provide it a level-playing-field in comparison with other transport modes, especially from the policy and regulatory side.

Certain regulations are now in a process of revision or adoption (“Fit for 55”, TEN-T Regulation, Combined Transport Directive, RIS Directive), therefore it was only possible to assess the proposals presented for their revision and to evaluate possible future impact on modal shift from these regulations. A possible assessment of the efficiency of these regulations and their impact on modal shift can only be conducted during the next multiannual-financial framework. Currently, only analysis of the potential impact and corresponding conclusions have been provided with regards to these legislative proposals. However, a number of recommendations is provided in the context of the current status of the European IWT market development that can be undertaken and/or better addressed on the regulatory/policy level to provide further support to the sector and to stimulate its better integration into logistic chains. The recommendations address several aspects in relation to the IWT status quo, its potential for further development and the role it plays in reaching the objectives of the European Green Deal.

Recommendations regulatory perspective

Recommendations addressing the regulatory perspective focus on various aspects of IWT development and the main issues in relation to:

- lack of funding and financing to support IWT development, especially for large investments that cannot be carried by the sector alone;

- lack of legislative harmonization and standardization (for many different topics, including, in particular, energy transition, logistics (multimodality, RIS services) and the establishment of new markets);
- lack of alignment of national and regional transport strategies and investment policies with global EU strategies and targets, resulting in differences in support provided to IWT Europe wide;
- difference in stakeholder's interests in IWT and slow modal shift undertakings due to the aforementioned unalignment and lack of incentives provided on the regulatory level;
- low number of pilot projects testing the impact and economic viability of IWT, technological and logistic innovations, gaining knowledge of new technologies, addressing further development of the sector;
- reduced negative externalities (pollution, noise, congestion, safety, etc.) that are getting more attention nowadays in view of not only regulatory compliance, but also corporate responsibility and increased awareness;
- absence of a clear mechanism for evaluation of NAIADES action implementation or a monitoring system for the progress achieved.

The list of actions, which provides a summary of policy actions supporting the development of IWT and facilitating modal shift, is given in Table 1 (chapter 6). It is worth mentioning that a number of these actions (e.g., revision of certain legislation) are already ongoing, but because they have particular importance for the sector, they were included in this table and prioritized.

While a full list of recommendations, supplemented by Table 1 is given in the last chapter of this deliverable, some of the key recommendations addressing the regulatory perspective are listed below.

1. Regulations addressing transport emissions performance

IWT has always been positioned as a mode of transport that is “cleaner” and “greener” in comparison with other modes in terms of calculations of grams of CO₂ emissions per ton-km, keeping a positive environmental record that can contribute to the European Green Deal objectives if the modal shift is achieved. However, today, taking into account rapid implementation of innovations in road transport sector, IWT is demonstrating much slower uptake of innovations due to higher investment costs for shipowners. Considering this, one of the major targets of the sector today is to increase the number of pilot projects supported by experimental research, testing and certification processes for inland vessels. **In this regard, dedicated support for the sector in terms of funding and financing is one of the most relevant issues.** Innovations (new markets) are exploited when the necessary funds are available. **Financial security and de-risking investment of pioneers shippers and logistic service providers undertaking a modal shift, particularly in new cargo segments, is an important issue that must be addressed from a regulatory and innovation funding perspective. Pilot projects to overcome initial budgetary constraints in multimodal start-ups are needed for better exploration of new market opportunities.**

In addition, **to provide a level-playing-field for IWT when addressing it in various legislative proposals and policy measures while comparing it with different modes of transport, a number of factors other than CO₂ emissions, shall be considered.** Contribution to decongestion of overcrowded road networks in densely populated regions, capacity utilization of available space, reduction of externalities such as noise, pollution and the number of accidents and traffic casualties, etc. shall not be overlooked in the evaluation of IWT performance. There is certainly no full internalization of external costs yet, resulting in a lack of incentives for using inland waterway vessels instead of trucks to perform the main haul of the transport. Currently, CO₂ emissions performance is taken into account as an environmental performance indicator of IWT. The criteria given above should be better addressed in future investment and subsidy mechanisms and taxation policies. Regulatory measures and their evolution over time must take into account these differences in order to maintain the economic balance for operators to bear the additional investment and operating costs that they will incur over the next decades.

2. Combined Transport Directive revision

The revision of the Combined Transport Directive (CTD) is an important step from the perspective of the regulatory framework towards modal shift, which has to take into account better support for IWT. The existing CTD is focusing on the road-rail leg and not on the road-IWT leg, which creates a lack of level-playing-field conditions for IWT with regards to multimodality. **The revision has to ensure that all transport modes are treated equally, with a priority given to environmentally friendly and sustainable ones.** Digitalization is vital to improving supply chain management and logistic operations on multimodal transportation and shall also be reflected in the revised CTD. Taking into account that CTD is the only EU legislative act promoting multimodal freight transport, actions and support are needed to ensure a competitive environment for barges in large seaports in comparison with rail and road transport. The revision shall be aligned with the main targets of the EGD, SSMS and NAIADES III as regards the modal shift.

3. RIS Directive revision

The revision of River Information Services Directive (Directive 2005/44/EC) is an important instrument to promote IWT as an innovative and competitive transport mode. Cooperation on RIS development between Member States at EU level is successful, but now a new challenge of services integration in the logistic chain has to be properly addressed to better integrate IWT thanks to reinforced activities in RIS and Intelligent Transport Systems. **The RIS Directive and the Intelligent Transport Systems Directive (Directive 2010/40/EU)** are under revision. While targeting advanced applications of innovative services relating to different modes of transport and traffic management, ITS provides better visibility, informed and safer, more coordinated, and 'smarter' use of transport networks. So does RIS for IWT. However, today, separate regulations for all modalities create a high level of fragmentation in terms of the development of multimodal transport. Road, rail, and IWT establish different regulatory frameworks requiring the submission of a large number of different documents with specific cargo details. This limits the possibilities of switching to another modality, affecting, in particular, the utilization of IWT. Therefore, now is an appropriate moment for strong cooperation to continue to transfer RIS and mobility services to a new level by increasing the market share of IWT in comparison with other modes of transport.

4. Need for better alignment of national and regional transport strategies and investment policies with global EU strategies and targets

Modal split varies significantly from one country to another, reflecting the difference in national transport strategies as well as economic and geographical factors. At the same time, different approaches are taken in Member States national programs in terms of cross-border cooperation, making IWT projects implementation even more complex in terms of investments and funding. It is important that main programs and policy documents, together with their action plans, are similarly reflected on the national level to eliminate fragmentation of actions and facilitate coordinated integration across the transport corridor. Establishment of a clear mechanism for evaluation of NAIADES-actions implementation and a monitoring system of the progress achieved would be helpful for further implementation of the NAIADES program.

5. Non-EU Member States involvement

A better involvement of non-EU countries contributing to the development of an interconnected IWT network, addressing common European priorities and goals through joint participation in EU projects and funding programs as well as through reflection in their national transport strategies goals of the EGD, SSMS, and NAIADES III should be achieved.

Recommendations market perspective

The market perspective recommendations address the following:

- The development of new markets with respect to the regulatory and political developments, among others, addressing energy transition and the development of new technologies;
- The establishment of separate markets for separate cargo categories under particular conditions to be considered as a potential measure for market structurization;
- Support of experimental undertakings through the development of public policies and dedicated measures on the state level, as well as providing funding to secure experimental undertakings when developing new multimodal chains compared to traditional transport modes;
- Cooperation between IWT and other transport modes to ensure the better development of multimodal transportation at the European level;
- New standards for alternative energy types and future role of inland ports in the light of energy transition and establishment of the new markets;
- Further improvement of information flows and data exchange in IWT and further implementation of synchromodality concepts;
- Building awareness of IWT's potential through better involvement of key players in the market and targeted cooperation.

1. Separate market segments

The establishment of separate markets for separate cargo categories and under particular conditions (long distances and large volumes—IWT; short distances and low volumes—road, as a rough indication) can be considered a potential measure for market structurization. IWT is not always able to compete with other transport modes (road, rail) on an equal footing. This leads to IWT losing its positions due to its lack of predictability and flexibility. This becomes especially sensitive in the transportation of small consignments, perishables, containers, and other goods requiring just-in-time operations. **The establishment of a clearer framework condition for separate market segments, the opportunities, needs and requirements for those segments and the value certain innovations can bring to address them. Synchromodality, automation bringing more flexibility to the operations and fleet management and further integration of IWT solutions into the supply chains transport management platforms, shall help to align all the transport modes (focused on their particular segments) and to work towards future collaboration and coexistence rather than strong competition, where IWT was consequently losing its market share.**

The creation of new markets shall take this dimension further into development by gradually implementing segregation between different transport modes or otherwise ensuring their rational combination (multimodality).

Similar principles can be considered from the perspective of maritime ports to ensure a level-playing-field for all transport modes and to ensure multimodal services are present with a proportionate share.

2. Support of experimental undertakings

The creation of business cases to stimulate modal shift from road to IWT is the successful practice shown, for instance, through the activities of viadonau, the Voies navigables de France (VNF) and De Vlaamse Waterweg (creation of stakeholders' networks, assisting, advising, conducting consultations with supply chain actors to come up with win-win solutions) and reflected in this deliverable. An importance of application of a case-by-case approach targeting not only modal shift and reduction of environmental impact, but also rational and efficient utilization of existing (underutilized) capacities of other transport modes, such as IWT, is addressed. An important

cornerstone in this regard is a question of responsibility in the case of an unsuccessful undertaking of modal shift and compensation of losses, overcoming financial and economic barriers. Having no warranties or concrete vision on how, in case of an unsuccessful undertaking, a company can get certain reimbursement or a back-up, makes it acting reluctantly towards new approaches and follow a traditional approach in its logistic activities. Moreover, multimodal transport is always more expensive, making it more challenging to overcome the price difference, meaning that the creation of financial incentives for new trials can be a big help to the sector.

3. Cooperation with other transport modes

Cooperation between IWT and other transport modes shall address such aspects of IWT functioning as the possibility of a speedy switch from one mode to another in case of an inability of IWT to ensure sufficient transportation due to reasons that don't depend on the sector's performance itself. Such reasons often relate to external factors such as low water levels, long waiting times at maritime ports and at locks, accidents, congestion, or any other disruptions. In this regard, cooperation, networking, and the exchange of information on most topical issues can help to tackle relevant challenges collectively. Barge owners, truck companies, and railways shall be brought together in cooperation for synchromodal solutions.

4. Future role of inland ports

A better addressed role of inland ports on the way towards energy transition and from the perspective of new market opportunities shall also be considered. Creation of industry hubs and clusters around inland ports—integration of the urban nodes of the TEN-T network, which will exclude long pre- and end-haulage by road or rail to inland ports. In this regard, inland ports shall be seen as future hubs for synergies between transport, alternative energy, industry, and the digital sectors, which shall lead to the development of essential relationships between grid companies, local energy companies, and ports.

Development of inland port strategies as centres of “green” energies and industrial hubs for circular economy shall address the following:

- a) Reconsideration of the future role of inland ports to achieve economies of scale and offer the best transport solution for a competitive green industry position in the process of energy transition;
- b) Building up synergetic business models with different industries for the shipments, storing, supplying clean energy and refuelling infrastructure (collaboration between energy & transport);
- c) Reshaping the inland navigation agenda, including inland ports, to seize cooperation opportunities as hubs for “green” energy production, handling, storage, transportation, etc.

5. Better involvement of key market players

Better involvement of the key market players in order to increase the number of business cases for modal shift. To materialize modal shift in Europe, it is important to look at the top sector stakeholders (cargo owners, barge owners, and logistic service providers) and stimulate the capacity. The following main pathways shall be taken into account: creation of awareness of the potential of IWT (as not all cargo owners are familiar with sustainable options), monetarization of energy-efficiency and assessment of the possibilities to come up with **a new plan for modal shift at the European level** (i.e., new ideas, new products and new services to realize modal shift).

To move from policies and regulations towards real business cases, an IWT business development strategy with a strong promotion of the modal shift on the industry level as well as on the level of the individual company is needed. A Master Plan with differentiation on the national level by each MS, resulting in targeted projects and providing enough resources for promoting agencies and waterway administrations, has to be put into practice in

the upcoming years. A Master Plan shall consider existing National Transport Strategies, national support measures for the IWT development, other programs of the EU MS and certain successful experiences as well as lessons learned with regards to the modal shift. This can help to avoid duplication of measures, which were already undertaken, as well as to evaluate real potential of particular undertakings and the results achieved.

6. Implementation of synchromodality concepts

Shortcomings on the freight transport markets, e.g., the lack of reliability and punctuality of IWT services is a source of dissatisfaction among customers causing potential customers to consider IWT as less able of meeting their logistical needs in a synchromodal environment. This means that the IWT sector must prepare for a rapid and substantial evolution. It will have to think differently about its value propositions, continuously developing and improving products and services that generate customer responses, uncover missed customer segments, look, check and adopt services developed in other sectors that can be a source of inspiration of good practices.

The cooperation with actors from other modes will be key in order to apply innovations from other sectors and to develop high quality and seamless mobility solutions. This requires liaising with relevant stakeholders, most definitely including the logistics industry.

7. Increased awareness

Moreover, environmental performance and modal shift to IWT can be achieved only through joint efforts. As indicated in “Fit for 55”: “Reaching climate neutrality will require a shared sense of purpose, collective efforts and a recognition of different starting points and challenges. Many citizens, especially younger people, are ready to change their consumption and mobility patterns when empowered by relevant information in order to limit their carbon footprint and to live in a greener, healthier environment”. This is why cargo-owners, large producers, industry representatives and logistic service providers should be addressed and better informed about the real impact of logistics concerning GHG footprint across the multi-modal supply chain. In this way, from the regulatory perspective, a wide approach to reach potential users is needed to implement measures for better visibility and differentiation of “clean”, “greener” and environmentally friendly transport operations.

List of abbreviations

AFIR – Alternative fuels infrastructure regulation	ETS - Emissions Trading System
B2B – Business-to-business	EUSDR - European Union Strategy for Danube Region
CCNR – the Central Commission for the Navigation of the Rhine	FRMMP - Fairway Rehabilitation and Maintenance Master Plan
CEEAG - Guidelines on State aid for climate, environmental protection and energy	GBER - General Block Exemption Regulation
CEMT - the European Conference of Ministers of Transport	GHG - Greenhouse gas
CESNI - European Committee for drawing up standards in the field of inland navigation	IWT - Inland waterway transport
CTD – Combined Transport Directive	LNG – Liquefied natural gas
DC – Danube Commission	NOx - Nitrogen oxides
EEA - European Economic Area	NSAR - New State Aid Regime
EC - European Commission	PM - Particulate matter
ECDB - European Crew Database	PSB - Pallet Shuttle Barge
EGD – European Green Deal	
EFIP - European Federation of Inland Ports	SDG - Sustainable Development Goals
	SSMS - Sustainable and Smart Mobility Strategy
eFTI - Regulation on electronic freight transport information	TRL - Technological Readiness Level
EGD - European Green Deal	TSC - Technical Screening Criteria
EHDB - European Hull Database	RED – Renewable energies directive
ESPO - European Sea Ports Organization	RIS – River Information Services
ES-RIS - European Standard for River Information Services	UNECE - United Nations Economic Commission for Europe
ES-TRIN - European Standard laying down Technical Requirements for Inland Navigation vessels	
ES-QIN - European Standard for Qualifications in Inland Navigation	
ESR – Effort Sharing Regulation	
ETD – European Taxation Directive	

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1. Introduction

Growing attention is being given to the concept of sustainability of any commercial activity during the last decades as an approach to address social, environmental and economic development. In 2015, the United Nations (UN) published its Sustainable Development Goals (hereinafter – SDGs), as part of “The 2030 Agenda for Sustainable Development”. There are 17 SDGs that encompass a broad range of incentives, values and targets. The development of sustainable low-carbon transport is reflected by all of the SDGs. Its contribution towards improvement of the daily lives of people and businesses around the world, in measurable ways and with concrete actions is reflected in particular SDGs. Inland waterway transport (IWT) has proven itself as a safe, efficient, clean and reliable transport mode being reflected by UN SDGs agenda with separate attention given to its contribution to strengthening resilience to climate related hazards, climate change mitigation (SDG13), development of sustainable infrastructure (SDG9).

Developed in Paris in December 2015, the climate agreement¹ adopted under the UN Framework Convention on Climate Change² claimed to unite countries world-wide to prevent climate change, to slow down the increase of the global average temperature by limiting it to 2°C above pre-industrial levels by 2100 and to reduce CO₂ emissions world-wide.

In 2017, the European Council declared its commitment on behalf of the European Union (the EU) and its Member States (MS) to fully implement the Paris Agreement and to present the EU policy document as well as a strong legislative proposal for long-term EU greenhouse gas (GHG) emissions reduction in accordance with the Paris Agreement provisions, emphasizing the role of the Paris Agreement as a key element for modernization of the European industry and economy. Therefore, in 2019, the European Commission (EC) presented its European Green Deal³ (EGD) and Sustainable and Smart Mobility Strategy⁴ (SSMS), which correspondingly had to be reflected in the national strategies and action plans of the EU MS.

In May 2018, Communication “A Europe that protects: Clean air for all”⁵ from the EC provided a policy framework calling on MS for reinforcement of current measures to comply with existing air quality standards and to strengthen infringement procedures in case of non-compliance with technical requirements for vehicles. It also proposed the revision of national emission reduction targets to include new limits on air pollutant emissions, addressing, in particular, the transport sector.

In addition, in November 2018, the EC presented another Communication - A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy⁶ by 2050, calling for immediate and decisive climate actions to be undertaken in order to slow down drastic climate changes and global warming. Thus, a need for a European policy on the reduction of CO₂ emissions towards net-zero GHG emissions by 2050 for all transport modes, including IWT, was a key aim of “A Clean Planet for all”. This was one of the preconditions for formulating the next step towards adoption the EGD and SSMS.

¹ [Paris Agreement \(unfccc.int\)](https://unfccc.int)

² [UN Framework Convention on Climate Change \(unfccc.int\)](https://unfccc.int)

³ [the European Green Deal \(europa.eu\)](https://europa.eu)

⁴ [Sustainable and Smart Mobility Strategy \(europa.eu\)](https://europa.eu)

⁵ [A Europe that protects: Clean air for all \(europa.eu\)](https://europa.eu)

⁶ [A Clean Planet for all \(europa.eu\)](https://europa.eu)

1.1. Structure of the deliverable

The deliverable is divided into six chapters. The first chapter describes the overall deliverable's structure, objectives, scope and accepted methodology based on the task description, NAIADES III objectives, kick-off meeting proposals and the research conducted. It is following the introduction, which describes the main European regulations and policy measures aimed at energy transition and, in particular, paving the way towards climate – neutral transportation.

The first chapter is a starting point for the deliverable, which investigates the basis of the range of EU-wide policies, regulations, initiatives and legislative proposals reflected correspondingly in national strategies, master plans and EU-funded projects. An overview of the regulations and measures supporting energy transition and sustainable transportation and their influence on the IWT fleet, regulations and measures supporting the deployment of inland waterway and inland port infrastructure and targeting the creation of skilled workforce in the IWT sector, is provided in the correspondent annexes of this report (Annex I, II and III).

The second chapter takes a closer look at primary subsequent legislation and policy proposals, which were adopted/proposed for adoption/revision at EU level, to undertake the following steps to reach the main targets of the overarching legislation described in the first chapter. The precise focus of this chapter is “modal shift to energy-efficient IWT”.

The third chapter focuses on European initiatives and other measures encouraging and facilitating the use of IWT, ongoing projects, national strategies and secondary legislation supporting IWT and modal shift. The fourth chapter presents examples of good practices collected during the PLATINA3 4th Stage event, such as the activities of Multimodal Vlaanderen - an advisory organization promoting the modal shift in Flanders and viadonau in Austria for the Danube River and activities of the EU Strategy for the Danube Region, the Voies navigables de France. Additional input collected during a panel discussion and stakeholder consultations of the 4th Stage event of PLATINA3 is reflected in this chapter too. The chapter is complemented by desk research on successful modal shift initiatives, projects, business cases and other examples.

As all the deliverables of WP 1 tackle the issue of modal shift and directly or indirectly address regulatory and policy measures for better use of IWT, the current deliverable also collects and consolidates certain findings from WP 1. The findings reflect a need for regulatory actions and policy measures in light of specific aspects of the IWT market development. Regulatory and policy measures encouraging a modal shift to IWT in the scope of other deliverables of WP 1 – “Market” - are consolidated in the fifth chapter, supplementing the overall recommendations of the current deliverable.

The sixth chapter, based on the desk research and analysis conducted, provides recommendations on policy measures and other supporting actions for increased use of IWT. The recommendations take into account the findings described in the deliverable both from a regulatory point of view and from the perspective of on-going national and international initiatives. Recommendations provided in this chapter also take into account and reflect the conclusions of other deliverables of WP 1. The recommendations are complemented by the list of actions at the regulatory and policy levels for further support and facilitation of modal shift towards green IWT. The recommendations and the list of actions target only the “market” aspect of IWT development. Other aspects such as infrastructure (physical and digital), fleet, crewing issues, competences, etc. are considered outside of the scope of this deliverable.

1.2. Objective of the deliverable and its methodology

The objective of this deliverable is to identify and assess policy measures and IWT support schemes that serve the EGD ambitions to encourage the use of decarbonized and energy-efficient IWT. The assessment shall lead to recommendations and good practices for policy makers and IWT stakeholders.

The current deliverable presents analysis and delivered a set of recommendations following a detailed assessment of the main existing and proposed regulations, policy measures, national strategies, EU projects and initiatives.

Link of the deliverable objective with NAIADES III:

The most relevant Flagship action for Task 1.5 to which this deliverable belongs to, in particular, but as well as for Work Package (WP) 1 – “Market” in general, is Flagship 2: Updating the EU’s legal framework for intermodal transport to stimulate IWT, which has a close correlation with the objectives of PLATINA3: to support further integration of IWT into smart, synchromodal value chains to increase the efficiency, reliability and safety of the whole European transport system; to facilitate further integration of IWT into EU and national policies and initiatives by means of attracting higher freight volumes and contributing to increased modal share.

Sections 2.1.3, 2.1.4 and 2.2.1 of NAIADES III are most relevant for this task focusing on the following:

2.1.3. Boosting the uptake of more sustainable transport modes

- **Commission will present a comprehensive set of measures** – including emissions trading, infrastructure charges, energy taxes, to ensure that the ‘polluter pays’ and ‘user pays’ principles are implemented across all transport modes. This should **support the shift to more sustainable forms of transport such as inland waterways**.
- As set out in the Sustainable and Smart Mobility Strategy, **the Commission will therefore establish an EU framework for the harmonised measurement and reporting of emissions from logistics and transport, which could then be used to provide businesses and end-users with an estimate of the carbon footprint of their choices, and increase the demand for more sustainable options, including inland waterways where feasible**.

2.1.4 A well-functioning inland waterways internal market

- *Improving the functioning and efficiency of the EU inland waterways market and stimulating the offer of sustainable inland waterway transport services and operations can help boost the sector’s attractiveness in relation to other modes.*
- **The European Commission has been reviewing the legislation on market access to inland waterway transport to ensure that it is fit-for-purpose and to ensure the smooth and fair functioning of the internal market.**
- **Moreover, the inland waterway transport system must be made to work more efficiently both in itself, and within cross-border multimodal logistics chains, thanks to the optimisation of navigation conditions, a greater use of smart traffic management systems, and the multimodal exchange of data. This will not only require substantial investments in IWT and multimodal infrastructure, fleet modernisation and digitalisation, but also adaptations to the EU’s policy and legal frameworks to develop inland waterway transport, namely by tackling continued market fragmentation and improving the existing framework for intermodal transport.**

2.2.1 Towards a zero-emission fleet

- **the greening of the inland waterway fleet should also be promoted through regulatory and financial incentives to ensure and speed up the deployment of affordable zero-emissions vessels and related low-carbon fuels and infrastructure.**
- **the Commission will assess the need for further legislative measures to promote the uptake of zero-emissions vessels.**

4. Governance

- **This governance setup is complex and its simplification could lead to further harmonisation of EU policy and reduce the administrative burden at EU and Member States level, thus increasing the sector's efficiency. The European Commission will continue to work with the CCNR, the Danube Commission and the Permanent Secretariat of the Transport Community to ensure, where appropriate, the coordination between the EU policies and the policies of these international organisations and indicate the possibilities for support through CEF.**

Certain synergies between the current deliverable and D2.7 – “Report on policy recommendations on regulatory pathway towards zero emission fleet”⁷ of PLATINA3 are observed in terms of regulatory measures towards zero emission inland vessels.

Methodology of the deliverable is based on:

- desk research and analysis of existing regulatory framework, policy measures, national strategies and other initiatives and their impact on modal shift in line with the European Green Deal and NAIADES III Action Plan;
- stakeholder consultations addressing existing and potential policy measures, stimulating better use of IWT and existing missing links, measures that were not considered or addressed properly yet in the scope of relevant regulatory framework;
- analysis of modal shift initiatives, reflected in correspondent European national and international support programs, relevant projects, good practices and other measures;
- relevant finding of other deliverables of WP1 tackling modal shift, and directly or indirectly addressing regulatory and policy measures for better use of “green” IWT;
- recommendations on policy measures and other supporting actions for higher use of IWT.

Taking into account that the two main focuses of this deliverable are: “modal shift towards IWT” and “energy transition” this task is analysing the relevant European regulatory framework and measures that are directed at these two research key points.

The deliverable starts with main legal acts and policies that established a base for all the subsequent legislation towards carbon emission economic activities and, in particular, low-carbon/emissions-free transportation, such as the European Climate Law (ECL), the Paris Agreement, the EGD, SSMS and following main legal framework, which was adopted or proposed for adoption/revision to implement the main objectives of the aforementioned legal acts. The practical application of the policy measure and regulatory action according to the current state-of-play of the IWT was assessed and gaps were analyzed. Based on this assessment and on the good practice examples collected, recommendations were drafted taking into account, among others, outcomes of other deliverables of WP1.

⁷ <https://platina3.eu/download/towards-zero-emission-fleet/>

2. Regulations serving the European Green Deal and their influence on modal shift

2.1. Relevant policy background

European Green Deal – Mobility Strategy

In line with the objective of this task: to identify and assess policy measures and IWT support schemes encouraging the use of decarbonized and energy-efficient IWT, the EGD and the SSMS together with NAIADES II Action Plan should serve as a starting point for this report and formulate the basis of the research provided within this deliverable.

While the two previous Communications of the EC focused precisely on energy transition, the EGD is emphasizing with regards to the transportation sector that *“substantial part of the 75% of inland freight carried today by road should shift onto rail and inland waterways”*. To ensure successful implementation of its key targets, the EGD envisages a set of actions bringing into practice sustainable and cost-efficient environmental solutions, setting up standards, establishing binding regulations for emissions reductions and *coordinating international efforts towards building a coherent financial system that supports these solutions*.

With the adoption of the EGD (December 2019) and the SSMS (December 2020) it became possible to draw up a path for a set of the EU defining regulations in the field of transport and, in particular, in the field of IWT. Moreover, as the EGD states: *“new measures on their own will not be enough to achieve the European Green Deal’s objectives. In addition to launching new initiatives, the Commission will work with the Member States to step up the EU’s efforts to ensure that current legislation and policies relevant to the Green Deal are enforced and effectively implemented”*.

The particular role of IWT as an efficient, safe and sustainable transport mode is described in the ambitious actions of the EGD foreseen for decarbonization of the energy systems and is critical for reaching climate objectives in 2030 and 2050. To bring into reality these objectives it is essential to ensure that IWT becomes not only “greener”, but also fully integrated, interconnected and digitalised. Smart infrastructure, together with energy transition and digital transformation of the sector, shall constitute a sustainable model of inclusive economic growth.

Specific attention of the EGD is given to *“digital technologies as a critical enabler for attaining the sustainability goals of the Green Deal in many different sectors”*, and in particular as regards the IWT sector automation and connected multimodal mobility.

Among the key actions of the EGD roadmap for Sustainable and Smart Mobility, which address IWT and promote its further development, are strong incentives to increase and better manage the capacity of inland waterways. SSMS (Figure 1), adopted in December 2020, is putting a strong and clear focus on making the transportation sector more sustainable, relying on an interconnected multimodal transport system and setting an Action Plan of 10 flagship areas. It identifies main measures to reach the aim of 90% emissions reduction in the transport sector by 2050. Among other priorities, it is indicated that by 2030 zero-emission vessels will become ready for market, while by 2050 *“the multimodal Trans-European Transport Network (TEN-T) equipped for sustainable and smart transport with high-speed connectivity will be operational for the comprehensive network”*.

With regards to modal shift, SSMS is setting up the following milestone:

“Transport by inland waterways and short sea shipping will increase by 25% by 2030 and by 50% by 2050 in comparison with 2015.”

Claiming to lower the sector’s dependence on fossil fuels SSMS, is giving a priority to renewable and low-carbon energy sources. Together with this, SSMS foresees the deployment of inland ports potential for production and

transportation of Low and zero-emission energies (Flagship 1 – “Boosting the uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure”). Flagship 2 – “Creating zero-emission airports and ports” aims to turn maritime and inland ports into green multimodal transport nodes serving clean industrial clusters, waste recycling centres as integral parts of the circular economy. At the same moment, a need for sustainable and modern infrastructure for new fuels and low- and/or zero-emission vessels have to be considered for the whole IWT network, along with the total upgrade of the existing infrastructure of the TEN-T network to enable modal shift. Together with the emissions reduction, the SSMS is highly promoting digital transition and automation to achieve full modernization of the transportation sector.



Figure 1: SSMS main objectives and set of actions. Source: European Commission.

SSMS clearly emphasizes that in comparison with road and railway transport, IWT is facing greater challenges regarding energy transition due to the range of well-known issues such as the comparatively low technological readiness level (TRL) of existing innovations for inland fleet, the need for large long-term investments and therefore longer transition period to be considered. “The Union should create the enabling environment to achieve this, including through adequate carbon pricing policies and research and innovation (R&I) in particular through the partnerships that could be put in place under Horizon Europe”. This allows to conclude that to ensure a level-playing-field for IWT and to promote modal shift, differentiation on the level of policy measures and regulatory actions has to be considered. This has to be taken into account especially with regards to Fit for 55 package⁸, Taxonomy Regulation⁹ and corresponding Delegated Acts.

To help IWT overcome the aforementioned challenges, SSMS describes the strong intentions of the EC to incentivise the development of the IWT market not only by means of the implementation of binding regulations, but also by putting into practice revised lending policies for banks and other financial institutions.

⁸ [‘Fit for 55’: delivering the EU’s 2030 Climate Target on the way to climate neutrality \(europa.eu\)](https://european-council.europa.eu/media/en/press-communications/inline-photos/attachment-data/file/11424)

⁹ [REGULATION \(EU\) 2020/852 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2020/852/oj)

The particular role is given to the enhancement of the logistic performance and making freight traffic management more sustainable without empty runs and avoiding idle times and congestion. The future of sustainable and efficient performance of IWT SSMS puts at the level of development of smart solutions and utilization of digital data exchange, automated and unmanned auxiliary value-added services and deployment of artificial intelligence. In accordance with the Flagship 4 – Greening freight transport, rail & waterborne intermodal, IWT will be able to compete on an equal footing with road only with paperless freight transport, which can be implemented by implementation of e-tools initiative (eIWT)¹⁰, Regulation on electronic freight transport information (hereinafter – eFTI)¹¹, future development of RIS services and harmonization of RIS standards across the European IWT network, implementation of inland ports community systems, well-functioning of European Hull Database (hereinafter – EHDB), European Crew Database (ECDB), etc.

It is worth recalling that electronic tools require a continuous exchange of a large amount of data that is aggregated and transformed into information comprehensible by humans. Hence, efforts must focus on the further improvement of current data flows that feed electronic tools such as different European databases. This requires reconsideration of the system of public information management as regards the exchange of economically sensitive information of superior interest (e.g.: specific location of goods in a given time) and the effective implementation of current regulation such as the Data Governance Act¹² and the eFTI Regulation.

European Climate Law¹³ (ECL) became a central element of the overall EU regulatory framework targeting climate neutrality and emissions reduction. Based on the provisions of the Paris Agreement, ECL established “a binding objective of climate neutrality in the Union by 2050” and “binding Union target of a net domestic reduction in greenhouse gas emissions for 2030” serving to compel MS to fulfil their obligations according to the Paris Agreement.

The ECL doesn't reflect direct impact on modal shift and transport sustainability, yet this impact is becoming clear when reflected in subsequent legislation based on the ECL (such as Fit for 55 proposal, Taxonomy Regulation, Guidelines on State aid for climate, environmental protection and energy 2022 etc.) establishing main preconditions for future actions to support sustainable economic activities. The ECL addresses all sectors of economic activities generating GHG emissions and other air pollutant emissions, including energy, industry, transport, heating and cooling and buildings, agriculture, waste and land use, land-use change and forestry. Together with the subsequent legislation, ECL is standing for setting up a framework based on broad use of ‘polluter pays’ principles established in the Treaty on the Functioning of the European Union (TFEU)¹⁴, the ‘energy efficiency first’ principle of the Energy Union and the ‘do no harm’ principle of the EGD.

NAIADES III Action Program

In June 2021, the EC released its communication “NAIADES III: Boosting future-proof European inland waterway transport”¹⁵ for 2021-2027, designed to deliver main the objectives of the EGD and SSMS into IWT sector and to draw up the pathway to the future energy transition of the sector. Based on the ‘Strategic Inland Waterway Transport agenda for Europe’¹⁶ it focuses on four main priority areas: infrastructure, inland fleet, digitalisation and job force in the IWT sector to boost decarbonisation, energy efficiency, resilience, sustainability and modal shift.

¹⁰ [eIWT: Electronic tool for Inland Waterways Transport \(europa.eu\)](https://european-council.europa.eu/media/en/press-communications/infographic/infographic_eIWT_en.pdf)

¹¹ [REGULATION \(EU\) 2020/1056 on electronic freight transport information \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2020/1056/oj)

¹² [Regulation 2022/868 of the European Parliament and of the European Council on European Data governance](https://eur-lex.europa.eu/eli/reg/2022/868/oj)

¹³ [European Climate Law \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2023/1713/oj)

¹⁴ [Treaty on the Functioning of the European Union](https://eur-lex.europa.eu/eli/tf/2007/3203/oj)

¹⁵ [“Boosting future-proof European inland waterway transport” - NAIADES III \(europa.eu\)](https://european-council.europa.eu/media/en/press-communications/infographic/infographic_NAIADES_III_en.pdf)

¹⁶ [Towards a Strategic Research Agenda: Inland Waterways Transport and Ports in Horizon Europe \(inlandnavigation.eu\)](https://inlandnavigation.eu/en/strategic-research-agenda-inland-waterways-transport-and-ports-in-horizon-europe)

The success of the previous programs (NAIADES and NAIADES II) was delivered in various areas:

- establishment of the European Committee for drawing up standards in the field of inland navigation (CESNI)¹⁷ alongside the further development and implementation of main standards in IWT: the European Standard laying down Technical Requirements for Inland Navigation vessels (hereinafter - ES-TRIN)¹⁸, the European Standard for Qualifications in Inland Navigation (hereinafter - ES-QIN), the European Standard for River Information Services (hereinafter - ES-RIS). The work of CESNI resulted in enhanced cooperation between MS and elimination of legislative fragmentation in terms of requirements and standards in IWT;
- development of the initiatives for energy transition of the sector together with support of “green” innovations (reflected in the subsequent EU-funded projects for fleet (such as PROMINENT¹⁹, LNG Breakthrough²⁰, Novimar²¹, Watertruck²²));
- implementation of legal acts supporting energy transition (e.g., amendments to the legislation for LNG as fuel and LNG as cargo) and measures facilitating deployment of LNG across main transport corridors (e.g., EU-funded project “The LNG Masterplan for Rhine/Meuse-Main-Danube”²³);
- development and implementation of innovative solutions in the field of digitalization (establishment of Digital Inland Waterway Area²⁴, development of RIS and RIS-based solutions on the corridor level).

As given above, a scope for further actions to meet the objectives of the EGD and the SSMS identified and described a need for a coherent program to establish new priorities for IWT sector development. In this way, taking into account that during previous years modal shift wasn't fully realized and required additional support measures, first of all at the regulatory and policy level, modal shift today has to be backed up with support for energy transition solutions for IWT. Therefore, a clear need for active measures to be undertaken towards IWT has been recognized in NAIADES III.

NAIADES III reflects in its structure the main needs of the IWT sector, such as:

- dedicated investments into port and IWW infrastructure by the MS and by EU funding instruments;
- dedicated funding of the energy transition of the sector, namely through the deployment of innovations for fleet and alternative energy sources;
- synchromodal solutions, digitalization to increase the share of IWT by a full integration in the multimodal chain.

Through these flagships and the NAIADES III Action Plan, the EC is aiming for a single approach to be implemented for the IWT market, eliminating uncoordinated and fragmented actions. NAIADES III Action Plan has to serve as a single, unified program towards the IWT joint vision from the perspective of the whole sector. It is setting clear priorities, but there is no fixed schedule for dedicated measures to be delivered on time. Concrete actions to deploy the flagships to achieve emissions reduction; to contribute to a coordinated sustainable water management, climate change mitigation and adaptation solutions as well as subsidiarity principles in funding have to be foreseen in a future document.

¹⁷ <https://www.cesni.eu/en/>

¹⁸ <https://www.cesni.eu/en/standards-and-explanatory-notice/>

¹⁹ <https://www.prominent-iwt.eu/>

²⁰ <https://lngbinnenvaart.eu/>

²¹ <https://novimar.eu/>

²² <https://watertruckplus.eu/>

²³ <http://www.lngmasterplan.eu/>

²⁴ <https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&do=groupDetail.groupDetail&groupID=3505&NewSearch=1&NewSearch=1>

2.2. Regulations and measures supporting energy transition towards energy transition and modal shift and their influence on the IWT market

Environmental performance and air pollution have always been top political concerns in the EU. The EC aims for emissions reductions and improvement of air quality and has put into practice a set of legislative initiatives.

In order to achieve the aims of the EGD and SSMS, complemented by other important policy documents, and to strengthen the policy approach towards zero emissions, the EC has adopted its Fit for 55 package to reduce emissions by 55% by 2030 and achieve climate neutrality by 2050. Together with updates of the EU Emissions Trading System (ETS)²⁵ and Energy Taxation Directive²⁶ (ETD), Renewable Energy Directive (RED)²⁷ and implementation of Carbon Border Adjustment Mechanism²⁸, Fit for 55 is becoming a significant game-changer in the transportation sector.

Despite the fact that IWT has always been recognized as safe, efficient and environmentally friendly transport mode in comparison with road, today, with the recent developments and introduction of new technologies to make road transport cleaner, it becomes more difficult for IWT to compete with it on the way to energy transition.

In the past, taking into account the high level of fragmentation and comparatively small share of IWT in the scope of global transportation, the sector enjoyed certain priorities, such as, for instance, not being covered by the EU ETS.

However, in the long run, IWT may be subject to measures that are similar to those introduced for maritime transportation by “Fit for 55”. For instance, the extension of the ETS to maritime transportation; the FuelEU Maritime Initiative establishing a maximum limit on the GHG emissions of energy used on-board and the obligations to use on-shore electricity. Other legislative proposals affecting both maritime and IWT, such as the amendments to the ETD introducing a minimum tax rate on certain fuels/vessels are already currently being discussed. It is, therefore, essential to establish a clear distinction between IWT and maritime transport, in law, allowing the former to benefit from specific legal dispositions allowing for a deeper incorporation of IWT in the mix of transportation means at the disposal of economic and public operators as well as natural persons.

All the measures currently introduced by “Fit for 55” for the transportation sector are intended to increase the use of renewable energies, achieve better energy efficiency together with low emission performance, create supply facilities and ensure availability of “clean” energies to support these processes. “Fit for 55” also provides an alignment of taxation policies with the EGD objectives; measures to prevent carbon leakage by a Carbon Border Adjustment Mechanism and, in particular, describes possible funding opportunities for energy transition.

The current subchapter is taking a look at certain EU regulations and policy proposals that have an impact on IWT market development and modal shift. While focusing on the market side, this subchapter doesn't dive into other facets of IWT development, such as environmental performance, greening of the fleet, infrastructure, crewing issues etc. Additional analysis of the regulatory framework addressing the aforementioned aspects is given in the annexes to this report.

2.2.1. “Fit for 55”

The ECL established binding legislation for the EU's commitment to achieve climate neutrality by 2050 and an intermediate target of reducing GHG emissions by 2030.

²⁵ https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

²⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0096&from=EN>

²⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001&from=EN>

²⁸ https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661

In line with the main provisions of the ECL, one of the most ambitious initiatives to bring into reality objectives of the EGD and to respond to climate change is expressed by a solid set of proposals under the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions “Fit for 55”: delivering the EU's 2030 Climate Target on the way to climate neutrality²⁹. Claiming to align all the economic, industrial and social activities of the European society with the main objectives of the Paris Agreement, “Fit for 55” is the European Union’s strategy to reduce GHG emissions by 55% by 2030 compared to 1990 levels.

The package is supposed to strengthen the EU ETS, update ETD, propose new CO2 standards for vehicles, new targets for renewable energies, support clean fuels and infrastructure for clean transport, introduce measures to prevent carbon leakage. “Fit for 55” contains a set of interrelated proposals, all of which are based on the main objectives of the EGD and the SSMS to ensure energy transition by 2030 and climate neutrality by 2050. Overall, “Fit for 55” reinforces existing legislation and proposes new initiatives in relation to decarbonization, across a range of policy areas and economic sectors, including IWT. “Fit for 55” is designed to play an important role in energy transition of the transportation sector (including IWT) in order to reach climate targets and promote “green” economy, but it neither accentuates modal shift towards IWT nor promotes it as a “clean” and energy efficient transportation mode.

From the perspective of IWT, “Fit for 55” may relate to the following legislative proposals:

- AFID: Revision of the Directive on deployment of the alternative fuels’ infrastructure (analysis is reflected in Annex II)³⁰;
- ETS: EU Emissions Trading System;
- ETD: Revision of the Energy Tax Directive³¹;
- RED: Amendment to the Renewable Energy Directive³²;
- ESR: Effort Sharing Regulation.

²⁹ ['Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality \(europa.eu\)](#)

³⁰ [EUR-Lex - 52021PC0559 - EN - EUR-Lex \(europa.eu\): Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council. COM/2021/559 final](#)

³¹ [EUR-Lex - 52021PC0563 - EN - EUR-Lex \(europa.eu\): Proposal for a COUNCIL DIRECTIVE restructuring the Union framework for the taxation of energy products and electricity \(recast\). COM/2021/563 final](#)

³² [EUR-Lex - 52021PC0557 - EN - EUR-Lex \(europa.eu\): Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive \(EU\) 2018/2001 of the European Parliament and of the Council, Regulation \(EU\) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive \(EU\) 2015/652. COM/2021/557 final](#)

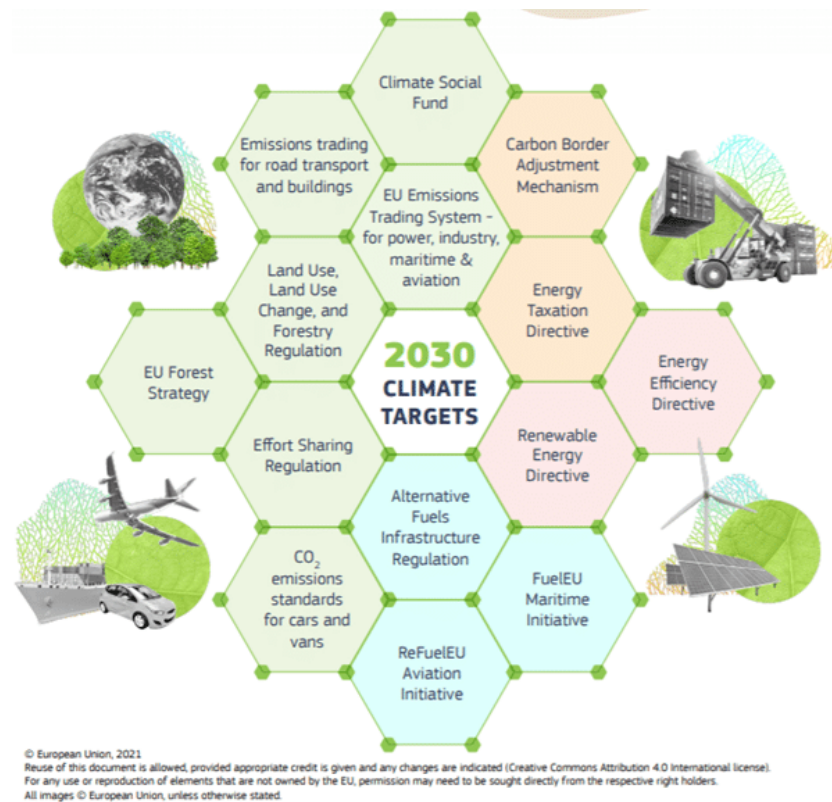


Figure 2: Fit for 55 and 2030 Climate targets. Source: European Commission

As “Fit for 55” addresses different aspects related to IWT, mostly from the perspective of fleet and infrastructure, it will certainly have a significant impact on the IWT market as a whole.

The **revision of RED II** - the main EU instrument for the promotion of renewable energies, introduces the new target of 40% by 2030 with regards to the share of renewables in an integrated energy system. This means that to achieve an increase in the use renewables by 2030 and to contribute to the new target of 40% by 2030, the IWT sector must be well prepared from the perspective of both necessary funding and technologies for alternative fuels. At the same time, taking into account the current state-of-play of the sector as well as the current level of deployment of alternative fuel infrastructure in IWT, it is difficult to estimate to what extent this target can be achieved.

From another perspective, the revision of RED II may serve as a basis to create a legal framework for future regulations to make sure that energy transition of the sector will become real and that a certain share of the energy used in IWT will be from renewable sources. One of the main focuses of the new proposal of RED II is to establish a regulatory framework for the future wide use of alternative energies and renewable energy sources and to eliminate the operational advantage of polluting conventional fossil fuels.

Rather challenging for IWT are **amendments to the ETD**. While aiming to support sustainable and low-emission fuels, the revised ETD plans to abolish tax exemptions for carbon-based fuels, coupled with the introduction of a minimum taxation on fossil fuels for IWT and on electricity used directly for charging electric vessels (Article 15 of the ETD). The rationale behind existing exemptions for IWT lies in the role that inland navigation already plays in cutting transport-related greenhouse gas emissions. Indeed, a modal shift to less carbon-intensive modes of transport, such as inland navigation, is a considerable advantage in terms of reducing greenhouse gas emissions in particular. Gasoil used as a fuel for inland navigation is indeed currently exempt from tax in several European countries: the Netherlands, France, Germany, Switzerland, Belgium, Austria, the Czech Republic, Hungary, Luxembourg, Poland and Romania.

One of the objectives of the ETD is to make all sustainable fuels tax-exempt (0% tax) for a 10-year period from 2023 on. MS will have the freedom to decide whether to implement tax exemptions for onshore power supply (OPS) or not. At the same time, all the tax exemptions for fossil fuels should be abolished. It is a rather challenging question whether tax exemptions on clean fuels will support an uptake of IWT. Before it can do so, the IWT must benefit from a “clean” infrastructure together with “clean” vessels, which is not the case today. Having said that, tax differentiation and tax exemptions can be useful tools and incentives for promoting the deployment of alternative low- and zero-emission energy sources (including electricity) as well as shore-side electricity supply for inland vessels at berths as far as they are used as “carrots” and not “sticks”. This opportunity is already used in many European countries.

However, it shall be taken into account as a main argument against abolishing tax exemptions for fuels used in IWT: IWT doesn’t currently have enough options to decarbonize existing systems, besides the innovations such as electric batteries or “green” hydrogen propulsion. Abolishment of tax exemptions on IWT will result in increased costs for inland shipping without necessarily making alternative technologies and fuels more attractive.

Taking into account overall EU aims to increase modal shift and pathways proposed by NAIADES III to support IWT in increasing its modal share, the revision of the ETD may potentially impose an obstacle to future modal shift towards IWT by putting an additional economic burden on the sector without having a certainty that the revenues from this tax would flow back to the sector. Instead, IWT requires support in its energy transition and facilitation of the smooth uptake of innovations. In any case, the timeframe for phasing out fossil fuels must be realistic and go hand in hand with the availability of sufficient alternative solutions to meet transport demand.

It is also important to mention that, while applicable only within the EU, the mechanism of how this new taxation system will be applied to non-EU shipowners is not clear. Otherwise, it is possible to assume that distortions of competition between EU and non-EU inland branches may take place in the short run.

As it was already addressed by the European Barge Union (EBU) and the European Federation of Inland Ports (EFIP)³³ to align “Fit for 55” with the objectives of the EGD and NAIADES III regarding the IWT sector in order to develop realistic pathways enabling modal shift and not hindering it. Tax exemptions for IWT must be considered until alternative fuels and corresponding infrastructure are widely available. Another option could be to use funds generated by the taxation of gasoil for future funding and financing of the energy transition of the sector.

Even though currently not applicable to IWT, it is worth mentioning two other legislative proposals aiming to enable energy transition of the maritime shipping industry, included in the “Fit for 55” package: the **revision of the ETS**³⁴ to disincentivize GHG emissions from shipping in EU waters and introduction of FuelEU Maritime³⁵ to encourage the production and uptake of sustainable alternative energies in maritime transportation.

Proposal for the revision of the ETS Directive aims to incentivize the shipping industry to reduce GHG emissions in line with the “Fit for 55” reduction targets. The mechanism of the ETS based on CO₂ pricing and revenue redistribution, is considered one of the instruments to lower emissions of the sector. It is a “cap and trade” mechanism in which CO₂ allowances are allocated and traded within a certain restricted level.

A new proposal will address GHG emissions (including CO₂) made on voyages between, from and to ports in the EU by vessels of any flag above 5,000 GT covered by monitoring, reporting and verification (MRV) regulation, transporting passengers or cargo for commercial purposes. Basically, the maritime sector, which was exempt from

³³ https://www.ebu-uenf.org/wp-content/uploads/IWT-position-on-Energy-Taxation-Directive_2022_02_18.pdf

³⁴ https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

³⁵ https://eur-lex.europa.eu/resource.html?uri=cellar:078fb779-e577-11eb-a1a5-01aa75ed71a1.0001.02/DOC_1&format=PDF

ETS before, will be subject to the same rules concerning the auctioning, trade, transfer and cancellation of allowances as other industries covered by ETS.

The idea behind the introduction of ETS to the shipping industry is to create a dedicated fund for allocating revenues from emission allowances to develop low-carbon technologies and incentivize the transition to cleaner fuels. Yet, considering the immaturity of the existing technologies, the lack of sufficient supply and availability of alternative energies, correspondent infrastructure and developed solutions for propulsion systems, as well as certain regulatory gaps, the introduction of ETS to the shipping industry (especially in the case of IWT) is rather questionable. D2.5. of PLATINA3: "Funding and financing of the energy transition of the European IWT fleet"³⁶ also touched upon the revision of ETS and reflected on its possible application to IWT when juxtaposing it to earmarking sector contributions as a possible tool to ensure funding for energy transition of the sector.

FuelEU Maritime is also a part of the proposed "Fit for 55" package, which targets the reduction of GHG emissions in the maritime shipping industry and addresses sailing to, from or within the EU. As well as the aforementioned legislative proposals, this initiative aims to promote the use of renewable and low-carbon fuels having direct links to RED and AFIR proposals. FuelEU Maritime is applied to all vessels of any flag above a gross tonnage of 5000 traveling to, from or at berth in ports in the EU with respect to the energy used during their stay within EU port areas, the entirety of the energy used on intra-EU voyages and a half of the energy used on extra-EU voyages departing from or arriving at a port of call.

As already stated above, it is currently too early to speak about the possible application of ETD, ETS and FuelEU to such a small and fragmented market as IWT, which is also rather conservative for the uptake of innovations. In the current situation and timeframe, it would not be realistic to apply the same approach to IWT. High competition for IWT with road and rail, which maritime transportation doesn't have with long-distance transportation, is another reason explaining why such an approach is currently inapplicable for IWT.

The **ESR** establishes binding GHG emission reduction targets for sectors covered by REDII, such as transport, construction, agriculture and waste. It received stricter territorial expansion targets for each MS for buildings, road and inland maritime transport, economic development and other sectors not included in the ETS. Since this regulation is supposed to be applied considering the different states-of-play and capabilities of each MS, these targets are based on their GDP per capita, adjusted for economic efficiency, it is difficult to estimate the exact impact it may have on IWT.

As mentioned above, no modal shift can be achieved without energy transition. Today, high competition in terms of modal shift between road, rail, and IWT and the comparatively slow energy transition of IWT mean that there is a strong need for support measures to speed up this transition and strengthen the competitive position of IWT in modal shift. In this regard, the "Fit for 55" package is a pro-active step towards making the sector more resilient, better prepared, and capable of undertaking this transition. To summarize key measures given in this subchapter, foreseen in the "Fit for 55" package and having an impact on IWT development, the following ones have to be put in front:

- The promotion of renewable energies by the introduction of the new target of 42,5% by 2030³⁷ with regards to the share of renewables in an integrated energy system (revision of RED II) is an important tool for creating incentives for better uptake of innovations (alternative fuels), which is currently rather low. This also relates to the current low availability of alternatives and their high prices in comparison with diesel, which is slowing the transition and further market uptake. The RED II is playing an important role in this

³⁶ <https://platina3.eu/d2.5/>

³⁷ With an additional 2.5% indicative top up that would allow to reach 45% <https://www.consilium.europa.eu/en/press/press-releases/2023/03/30/council-and-parliament-reach-provisional-deal-on-renewable-energy-directive/>

regard as it addresses this issue in terms of establishing a regulatory framework for the future wide use of alternative energies by limiting the operational advantage of polluting conventional fossil fuels. Together with this, it has to be mentioned that clarity on a regulatory level is necessary for shipowners to take further steps towards energy transition. A clear framework in terms of which propulsion system to invest in for future decades is also related to the issue of the availability of future low- and zero-emission energy sources on the corridor level and beyond. Therefore, the availability of alternative energies, their clarity in terms of future technical applications and competitive pricing are crucial for the energy transition of IWT.

- The amendments to the ETD, such as the abolishment of the tax exemptions for carbon-based fuels (also applied to IWT) and the revision of the ETS that could also affect IWT, are another set of strong instruments in terms of reducing greenhouse gas emissions and switching to alternative energies. Tax differentiation and carbon pricing can be useful tools for promoting the deployment of alternative low- and zero-emission energy sources (including electricity) and for gradually phasing out fossil fuels. To give IWT an opportunity to benefit from this, it is important to create a mechanism to ensure that funds generated from CO₂ pricing will be allocated to ensure future funding to develop low-carbon technologies and incentivize the transition to cleaner fuels. Together with the RED II revision, ETD and ETS are targeting increasing demand and strengthening the market position of alternatives available (e.g., biofuels, batteries), creating demand and therefore stimulating development, and launching pilots for more innovative ones (e.g., hydrogen, methanol). However, it is important to differentiate between the transport modes and ensure that proper support is given to IWT.

The AFIR even though not discussed in this subchapter is an important instrument of “Fit for 55” package to provide available alternative fuels infrastructure. The main idea of the revision of AFIR is to provide support for the uptake of the new fuels and to facilitate the energy transition. Aiming to create an efficient infrastructure network to achieve increased deployment and use of renewable and clean fuels, AFIR foresees a significant upgrade of inland port infrastructure as well as the creation of electric recharging points and hydrogen refueling points, including limited provisions for hydrogen and shore-side electricity supply. An important part of the AFIR is dedicated to national policy frameworks. Therefore, a smart investment plan for the allocation of the innovative fuel IWT network in order to avoid missing links or overconcentration on the separate sections shall be considered.

2.2.2. Combined Transport Directive (revision)

DIRECTIVE 92/106/EEC on the establishment of common rules for certain types of combined transport of goods between MS³⁸ (Combined Transport Directive - CTD), implemented in 1992, was a first step towards the establishment of a legal framework for intermodal transportation to facilitate cargo flow within the EU’s growing internal market, optimization of logistic processes, elimination of administrative constraints, as well as decongestion of the road transport by means of combined transport (road, rail, maritime and IWT).

The CTD established a framework for EU Member States for transport liberalization with a strong focus on the promotion of combined transport operations, consisting of road and non-road legs, from all quota systems and systems of authorization. It is currently the only existing dedicated legal instrument to promote modal shift and provide a real support measure to non-road alternatives for freight transport by defining conditions for combined transport and securing incentives to switch goods from road to rail, IWT and short-sea shipping transportation. While this directive is still in force, it is rather outdated and should nevertheless be updated to have the maximum impact on modal shift and thus reduce CO₂ emissions, air pollution emissions, accidents and congestion on highways.

³⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0106&from=EN>

In the light of the emergence of new regulatory frameworks both in EU scope and globally, such as the Paris Agreement, the EU Climate Law, the EGD, the SSMS and NAI/DES III targeting decarbonization, transition to a low-carbon economy, adoption of climate change mitigation, adaptation and resilience measures and shifting substantial part of the 75% of inland freight carried by road today to lower emission transport modes (rail, IWT and short sea shipping) to make economy and mobility more sustainable revision the EC proposed, revision of the CTD as part of SSMS³⁹ is an important step to facilitate modal shift in the context of development multimodal transportation. In the past, the EC tried to update CTD, but without success. The aim of the amendments to the CTD is to further enhance the competitiveness of combined transport compared to long-distance road freight transport and therefore encourage modal shift from road freight transport. Taking into account that the current CTD does not provide an effective framework to promote lower emission transport modes, certain substantial changes are to be implemented in the upcoming revision.

As described by the proposal for CTD revision:

“The objective of the initiative is to further increase the competitiveness of combined transport compared to long-distance road freight and therefore strengthen the shift from road freight to other modes of transport. This should reduce the share of transport externalities from freight transport. This will be done by:

- *clarifying and extending the definition of combined transport;*
- *improving the monitoring of eligibility and enforcement conditions;*
- *increasing the effectiveness of incentives; and*
- *improving the reporting and monitoring conditions of the Directive.”*

The Inception Impact Assessment (Ares(2021)5187133)⁴⁰ proposed four policy options for future revision of the CTD to stimulate and facilitate better use of non-road freight transport modes by extending it to a wider set of operations and to create favourable conditions for intermodal or multimodal transport in the EU while highly respecting the principles of sustainability and decarbonization of transportation services.

Following below are four policy options proposed by the Inception Impact Assessment:

“Option 1: no action / baseline scenario means keeping the existing Directive as it is.

Option 2: Extend the support from today’s narrowly defined combined transport operations to all intermodal or multimodal operations that save certain negative externalities compared to road only transport based on a common calculation method. Negative externalities to be saved could be either only greenhouse gas emissions (GHG), or a wider set of negative externalities such as GHG, pollution, congestion and accidents. Member States can choose from a list of economic and regulatory support measures, with at least 1 economic measure being mandatory. Establish a categorization of terminals based on infrastructure and operational efficiency, and develop regulatory requirements for terminals as regards data exchange with other participants in the transport chain. Provisions on labelling of freight transport operations.

Option 3: Option 2 plus an obligation that the support measures to be adopted by Member States have to be chosen based on regular transport system analysis and planning, thereby also enabling the assessment of the efficiency of the measures to support the attainment of the objectives of the revised Combined Transport Directive.

Option 4: Option 3 plus a certain number of mandatory harmonised support measures such as a support to transshipment costs or operational support per loading unit in intermodal transport provided to shippers/logistics operators.”

³⁹ [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017PC0648R\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017PC0648R(01)&from=EN)

⁴⁰ https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13010-Sustainable-transport-revision-of-Combined-Transport-Directive_en

The revision of CTD at the current moment is rather critical from a regulatory perspective to incentivize significant modal shift from road to IWT. Therefore, it is important to ensure that IWT is substantially addressed in the revised directive. In this way, Option 4 is deemed to be the most appropriate as it is the most reinforced one, backed up with the support measures for shippers/logistic operators, whose choice on mode of transport is usually deciding.

At the same moment, it has to be mentioned that other aspects of CTD have to be considered during the revision process to treat all types of non-road transport equally and ensure a level-playing-field for rail, IWT and short-sea shipping. The current version of CTD includes certain limitations that, during previous decades, resulted in IWT lagging significantly in competition with other transport modes and shall be revised in a future update of the document. Thus, Article 1 of the CTD defines that:

*“combined transport’ means the transport of goods between Member States where the lorry, trailer, semi-trailer, with or without tractor unit, swap body or container of 20 feet or more uses the road on the initial or final leg of the journey and, on the other leg, rail or inland waterway or maritime services **where this section exceeds 100 km as the crow flies** and make the initial or final road transport leg of the journey”.*

The distance limitation of 100 km for the non-road leg in many cases in national IWT networks played a negative role, and therefore the opportunity to use IWT was not undertaken. In many cases, especially when providing transportations by IWT from sea ports to hinterland industrial sites, such distances were considered rather short (shorter than 100 km), and while being negligible for rail and short-sea shipping, but quite vital for IWT, which was not able to benefit from CTD due to this limitation. However, today, the new proposal for CTD revision foresees the abolishment of the distance-based criteria for combined transport operations. Moreover, considering the fact that multimodal transport often results in additional costs in comparison with single modes, the new eligibility criteria will be introduced to compensate for the additional costs in return for 40% external savings. This is an important point in favor of IWT, making it more lucrative in terms of price. The Inception Impact Assessment as well as the current proposal for the revision of CTD⁴¹ already emphasized that this revision shall foresee targeted and mandatory incentives to increase the competitiveness of combined transport operations. This means that on the national level, MS will have to make at least one dedicated measure from the list of eligible operational measures, given in the annex of the revised proposal, available for all modes in a non-discriminatory manner.

To implement these measures as described in the four options of the Inception Impact Assessment, clear rules and calculating tools have to be defined by the EC, based on the “polluter pays” and “internalization of external cost” principles. Moreover, to ensure operational efficiency, multimodal transportation is targeting a cumulative effect to ensure 10% less expensive door-to-door costs through the aforementioned list of eligible operational measures and tax support listed in the annex. State aid to support transshipment costs for combined transport operations using IWT shall be addressed through dedicated funding that promotes modal shift, tax exemptions, innovative awards (e.g., the Dutch Green Award) or other incentives based on labelling system application on IWT, etc. Such state aid has to be clearly defined in the revised CTD to avoid uncertainties or vague interpretations. It is also important to take into account current discussions on the future of EU competition law into account. In the field of digitalization, initiatives such as the eFTI Regulation, the Data Governance Act, the ES-RIS and various e-tools are of particular importance. In this sense, it is important to ensure alignment of the CTD’s revision with the ongoing process of the revision of the RIS Directive⁴². In this context, digitalisation acts as a key enabler to achieve EGD’s and SSMS’s objectives, in particular with regards to sustainable multimodal logistics, which can help to reduce administrative burden and improve the processes of data exchange.

Very often, additional transshipment costs in IWT (especially in cases when the place of loading/unloading, final destination are far from an inland port) are higher than for road, makes it an unfavourable choice from the

⁴¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017PC0648&from=EN>

⁴² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005L0044&from=EN>

perspective of logistic service providers. In this regard, the revision of CTD shall foresee competitive conditions for IWT in order to make it reasonable for shippers to use it and therefore to materialize modal shift.

2.2.3. eFTI Regulation

In order to increase efficiency of freight transport and logistics, to encourage digitalization of the transportation sector to reduce administrative costs, to ensure paperless document flow and data exchange, the EC undertook targeted efforts on the way to the establishment of uniform legal framework at EU level for the electronic communication of regulatory information between the economic operators concerned and competent authorities in relation to the transportation of goods on the territory of the EU.

Regulation (EU) 2020/1056⁴³ entered into force in August 2020, will be supported by a number of Delegated Acts, some of which are currently under elaboration and from August 2025, will establish a binding obligation for the EU MS to accept electronic format of documents (eFTI data) concerning the transport of goods by road, rail, IWT and air in the EU.

As defined in eFTI Regulation: *“Electronic freight transport information (eFTI) is a set of data elements processed electronically for the purpose of exchanging regulatory information among economic operators (mainly companies involved in freight transport and logistics) and between operators and competent authorities”*.

In the past, the absence of a legal framework at EU level for electronic freight transport information was one of the main reasons for the lack of progress towards the simplification of administrative procedures, the achievement of better efficiency and swift information exchange. As specified in eFTI, *“the acceptance by competent authorities of information in electronic form with common specifications would ease not only communication between competent authorities and economic operators but, indirectly, also the development of uniform and simplified business-to-business electronic communication across the Union.”*

By implementing a new digitalized, EU-wide approach for exchanging information on cargo transportations, the EC made a significant step towards removing a range of existing administrative burdens related to a paper format of information exchange, which was always causing certain delays and resulting in additional costs to all involved parties.

For IWT it means that the sector, which suffers some weaknesses such as lack of flexibility, longer delivery times and sometimes less user-friendly data exchange services in comparison to road transport, has an opportunity to reduce these inconveniences and to become more competitive, digitalized and reliable than it currently is. Even though eFTI regulation is not specific to IWT, ensuring a level-playing-field for this transport mode will make it better integrated with other transport modes and probably more prone to uptake of new technologies.

The current on-going work of the EC, Digital Transport and Logistics Forum (DTLF), Delegated Act Expert Groups and Implementing Act Committees is streamlined with the objective of making the eFTI framework fully operable by end 2025. In the current CESNI work program for 2022-2024 particular task is dedicated to the analysis of the potential impact of the eFTI Regulation on the electronic ship reporting systems in inland navigation (ERI) part of ES-RIS. The discussions in CESNI in terms of provision of synergies between eFTI and ERI part of ES-RIS are currently ongoing. The proposed strategy of CESNI work for this task explains that the technical compatibility between eFTI and ERI datasets, especially with respect to dangerous goods, is desirable and must be examined. Therefore, as a first step, if major differences are found that can be addressed in time for ES-RIS 2025/1, this should be done.

⁴³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1056&from=EN>

There are still lots of issues to be solved with regards to the full implementation of the eFTI environment which will be elaborated in the implementing and delegated acts, such as the main functions of eFTI platforms (targeting identification, authentication, authorization, certification, etc.), as well as tasks to deal with, such as unifying under one platform and a common dataset for different transport modes being introduced through relevant MS regulatory frameworks. An important point is the large flexibility of the eFTI platforms' requirements. For instance, considering that B2B information exchange is not in the scope of the eFTI regulation, eFTI platforms can however be used for this purpose. The eFTI regulation defines the scope of the eFTI platform, yet it can vary in its functions and interface. These platforms can be dedicated to several or only one transport mode and logistic service providers can develop their own IT systems, which they can then certify as eFTI platforms.

Yet, possible synergies of existing platforms/digital services with the eFTI Regulation have to be further discussed in order to guarantee a seamless and smooth transition to the new formats of data exchange. Current projects FENIX⁴⁴ and FEDERATED⁴⁵ serve as important testing grounds to trial automated data exchanges amongst private and public operators.

2.2.4. RIS Directive (revision)

In the last two decades, significant political and economic changes have taken place in Europe. The formation and expansion of the EU (with the abolition of borders, customs control and free movement of labor, capital and services, as well as the harmonization of several national standards) led to a significant increase and strengthening of economic ties in Europe, which significantly intensified the role of transport services.

To ensure safety and efficiency of IWT, it became necessary to link the structural elements of the transport processes with common standards and data format exchange that provide certain compatibility and effective interaction, taking into account the intramodality of transportation. Meeting such requirements has only been possible with the introduction of new key technologies for inland navigation and by building up the RIS system. This was set up as one of the main priorities when adopting Directive 2005/44/EC on harmonised river information services (RIS) on inland waterways in the Community⁴⁶. In doing so, a number of progresses was made, such as the elaboration of defined technical guidelines for the planning, implementation and operational use of the services (RIS guidelines), as well as technical specifications for vessel tracking and tracing, electronic chart display and information systems for inland navigation, electronic ship reporting, and notices to skippers. These RIS guidelines and technical specifications have been adopted as Implementing Acts.

According to studies⁴⁷ as well as the EC Evaluation document⁴⁸, one of the benefits of RIS is an increase in the growth of cargo transported via inland waterways due to a better integration of inland navigation in the logistics chain. RIS-assisted corridor management allowed these services to be used not only as a safety tool but also as an integrated system that enhances the management of the entire supply chain by providing useful RIS data to logistics planners and ship actions in the context of facilitating and monitoring cargo flows in water transport.

Yet, today, 17 years after adoption of the RIS Directive, it is obvious that the evolution of IT systems and electronic data exchange services, as well as the introduction of EGD, SSMS and NAIADES III, have brought about goals to shift a substantial part of the 75% of inland freight carried today by road onto rail and inland waterways and that IWT and short-sea shipping should increase by 25% by 2030 and by 50% by 2050. In this regard, the development of

⁴⁴ <http://www.fenix-project.eu/>

⁴⁵ <http://www.federatedplatforms.eu/>

⁴⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005L0044&from=EN>

⁴⁷ https://www.researchgate.net/publication/359972482_Modeling_the_impact_of_the_River_Information_Services_Directive_on_the_performance_of_inland_navigation_in_the_ARA_Rhine_Region

⁴⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021SC0050&from=EN>

multimodal, synchromodal, resilient and smart solutions is crucial, as RIS has a contribution to give to achieve these objectives.

As also emphasized by Inland Navigation Europe (INE)⁴⁹, it should also be considered that many multimodal value chains often have a global dimension, entering or leaving the EU through, for example, seaports. Then, it will be necessary to ensure that digitalization initiatives target interoperability with global data sharing standards and legal frameworks. This perspective should be included in the impact assessment for the RIS Directive revision. Eventually, CESNI could play a role in active participating in global standardization forums such as, for example, UNCEFACT and IPCSA (Port Communities). The harmonisation of RIS with seaports should allow a common environment and enable single reporting of the same content.

Investments in both digital and (smart) physical infrastructure should be coordinated, as both are equally necessary to allow optimal results for multimodal evolution towards synchro-modal, resilient and climate-neutral transport as demonstrated in the PLANET project⁵⁰. The roll-out of 5G networks in the framework of Connecting Europe Facility (CEF) along IWT beyond dense urban areas is important for easy access to services. The revision of State Aid Guidelines for broadband networks will guarantee national authorities' may continue supporting the enablement of ultra-fast internet.

2.2.5. Revision of Commission Regulation (EU) No 651/2014

The General Block Exemption Regulation (GBER)⁵¹ is currently being amended as a part of the EC's work program for 2022. The main idea of this revision is to support the greening of the European waterborne transport. GBER is very closely linked to the New State Aid Regime (NSAR), even though those are two different mechanisms. NSAR was proposed under NAIADES III with the idea to use the rules, which are currently applied as Railway State Aid rules, and adapt them for IWT to support multimodal transport, especially based on the benefits of IWT described in comparison to the external costs of road transport. MS could apply this new regime if it can prove that its actions would help reduce the external costs in comparison with road.

The current limits of NSAR are described in the Regulation (EU) No 1407/2013 on de minimis aid⁵², which defines small amounts of State aid exempted from State aid control, as they are deemed to have no impact on competition and trade in the internal market of the European Union (EU). The maximum amount is € 200,000 for each undertaking over a 3-year period. However,⁵³ certain categories of State aid can be determined to be exempted in the future to provide larger amounts of support. Among other rules in Article 4, subsidized loans of up to € 1 million may also benefit from the de minimis regulation if certain conditions are met. The provisions of the Regulation on de minimis aid are applied since 1 January 2014 and shall apply until 31 December 2023.

As well as amendments to GBER, NSAR doesn't address the issue regarding lack of superstructure financing. This has to be taken into account, as multimodality cannot be ensured without reducing time and cost for transshipments, which requires proper infrastructure and superstructure available for IWT.

As indicated in the EC's proposal⁵⁴:

⁴⁹ https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13135-River-information-services-revision-of-EU-rules/F2670789_en

⁵⁰ <https://www.planetproject.eu/>

⁵¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02014R0651-20170710>

⁵² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1407>

⁵³ <https://eur-lex.europa.eu/EN/legal-content/summary/de-minimis-rule-exemption-of-small-amounts-of-state-aid-from-notification.html>

⁵⁴ https://ec.europa.eu/commission/presscorner/detail/en/ip_21_5027

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- *Extending the possibilities for Member States to provide support for various types of “green” projects, such as, the reduction of CO2 emissions, addressing low- or zero-emission vehicles and correspondent “clean” energies infrastructure;*
 - *Introducing new ‘green’ conditions that need to be fulfilled for large energy-intensive businesses to receive block-exempted aid in the form reduced tax rates under the ETD. In the scope of IWT it would be essential as it will prevent application of ETD on the sector, which was described as a significant concern (see 3.1.1. – Fit for 55).*
 - *Widening the existing exemptions for investment and operating aid for renewable energy to include storage projects that are directly connected to new or existing renewable energy generation facilities.*
 - *Facilitating investments in green hydrogen, by providing block exemptions for investment aid for green hydrogen projects and investments in hydrogen infrastructure.*
 - *Clarifying and streamlining the rules on risk finance aid, in line with the parallel revision of the Risk Finance Guidelines, for example by clarifying the rules on eligibility for such aid under the GBER.*
 - *Simplifying the conditions for granting research, development and innovation aid without prior notification and approval, for example by including the possibility to calculate indirect costs of R&D projects through a simplified cost approach and the introduction of new compatibility rules for support to testing and experimentation infrastructures (sometimes also referred to as “technology infrastructures”).*

Under the GBER, it is planned to introduce a new category for state aid for low- and zero-emissions vehicles/vessels, yet a separate category for state aid to support superstructure investments is still missing in the GBER amendments proposal. In order to ensure multimodality and smooth and efficient cargo-handling operations, a proper superstructure has to be created. This has to be taken into account during the new GBER negotiations.

3. European initiatives and other measures encouraging and facilitating the use of IWT

3.1. CESNI standards facilitating modal shift towards IWT

The European IWT sector, unlike the maritime sector, has always been characterized by a high level of fragmentation on the legislative level, which was regulated by a number of intergovernmental institutions and bodies, including UNECE, the EU, the River Commission combined with the application of national legislation from each of the EU as well as non-EU Member States. In 2015, as a result of work conducted in PLATINA II, the EC and the CCNR jointly created a new standardisation body for inland navigation: the European Committee for the Development of Standards in Inland Navigation (CESNI).

The task of CESNI is to ensure clear and more complete harmonization in the field of IWT by introducing EU-wide recognized technical standards relating to the inland fleet and its equipment, introduction of modern information technologies based on better use of RIS and development of uniform standards in the field of education, training and certification for crew members. The main areas of work of CESNI and its working bodies include:

a) harmonized requirements for inland navigation vessels developed and maintained by the Working Group on Technical Regulations for Inland Vessels (CESNI/PT)⁵⁵. Since 2015, CESNI Committee has regularly updated and published the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN). This standard brings together in a standardised way the requirements previously described by Directive 2006/87/EC⁵⁶ and in the Rhine vessel inspection regulations⁵⁷. It contains provisions on inland navigation vessel construction and equipment, special provisions for certain categories of vessels, such as passenger and container vessels, provisions on the model of the inland navigation vessel certificate, as well as instructions on how to apply the technical standard. This standard applies not only to the design but also to safety and emissions regulation, as well as other pollutants such as sewage. References to ES-TRIN are included in the legal frameworks of the EU and the CCNR (respectively, Directive (EU) 2016/1629 and the Rhine vessel inspection regulations). The Danube Commission also decided in 2017 to recommend the standard in its international instruments;

b) harmonised requirements for professional qualifications in IWT are developed and maintained by the Working Group on Professional Qualifications (CESNI/QP)⁵⁸, reflected in the European Standard for Qualifications in Inland Navigation (ES-QIN). The standards lay down the details of a new competence-based approach for deck crew members. Navigational safety owes much to competent, well-trained personnel with career opportunities and job mobility within Europe. The main objectives of the standard are to foster labour mobility, to make jobs in the IWT sector more attractive; to ensure safe navigation by means of sound requirements in terms of knowledge, skills and fitness, and to enable companies and crews to adapt to technical and logistic innovations. References to ES-QIN are included in the legal frameworks of the EU and the CCNR (respectively, Directive (EU) 2017/2397 and the Regulation for Rhine navigation personnel)). The Danube Commission also decided to recommend the standard in its international instruments;

c) Established in 2019, the Working Group on Information Technologies (CESNI/TI)⁵⁹ aims notably to provide common standards for technical specifications for the electronic chart display and information system (Inland ECDIS), electronic ship reporting systems in inland navigation (ERI), vessel tracking and tracing systems in IWT (VTT)

⁵⁵ <https://www.cesni.eu/en/technical-requirements/>

⁵⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006L0087&from=EN>

⁵⁷ <https://www.ccr-zkr.org/13020500-en.html>

⁵⁸ <https://www.cesni.eu/en/professional-qualifications/>

⁵⁹ <https://www.cesni.eu/en/information-technologies/>

and notices to skippers (NtS). These requirements applicable to the four technologies formed the scope of the first edition of the ES-RIS adopted in April 2021. The ES-RIS is updated every two years, and the ES RIS 2023/1 has been completed with requirements to test some features. Apart from RIS-related work, various activities in information technology are carried out, such as cybersecurity, electronic documents implementation, etc.

Through a number of specific regulations within the EU, the main technical, economic and legal issues of inland navigation are regulated, such as access to the market and profession, state aid, competition, pricing, technical regulations applicable to inland navigation vessels, and the issuance of crew certificates.

In this way, the broad work program of CESNI Working Groups (WGs) covers not only large plans for inland fleet modernization, innovations in the field of the development of new propulsion systems and engines, but also other solutions to track energy transition, to enhance synchronicity over IWT logistics by means of advanced RIS technologies, to ensure educational programs evolution at the same pace as the inland fleet, to ensure that new competences are available to operate low- and/or zero-emission vessels.

Another important task within CESNI WGs, which is going to transform the future of IWT significantly, relates to automated navigation. CESNI work program (2022-2024) plans to address this topic from mid-2023. In the Mannheim ministerial declaration⁶⁰, CCNR is called upon to “promote the further development of automation and thereby contribute to the competitiveness, safety and sustainability of inland navigation”. CCNR fulfils this request and strives to play a pioneering role in Rhine navigation through the harmonized development of automated navigation. Automation involves a far-reaching transformation in inland navigation and will affect almost every aspect of it. Automation is also a gradual progress, requiring the safe coexistence of automated and “conventional” ships taking into account current status of the IWT. In this respect, automated navigation should be consistent with the current situation of navigation on the European level and must adapt to the existing infrastructure of inland waterways whilst ensuring at least an equivalent level of safety compared to the status quo. Notwithstanding, even lower levels of automation confer on operators proven benefits in terms of security and efficiency, with a direct impact on the environment.

To speak more generally, innovation in IWT will act as a catalyst for modal shift. In this regard, the work of CESNI, tackling various aspects of improving the efficiency of IWT and aiming to prepare the sector for energy and digital transition, is contributing to the overall targets of the main EU regulations promoting IWT. Technical innovations such as digitalization and automation can certainly improve the efficiency of IWT compared to other modes.

3.2. Ministerial Declarations and other legal acts of the River Commissions, supporting and facilitating the use of IWT

In line with the EU initiatives and legal framework setting up a political focus on the development and promotion of IWT and in order to contribute to the EU’s and global “greening” policies, number of supportive intergovernmental conferences, congresses and other high-level events in the field of inland navigation took place in recent years and resulted in declarations, conclusions and other statements signed on occasions of these events with a strong support to IWT.

The EGD, together with the corresponding EU legislation promoting low- and zero-emission technologies in the field of transportation (Fit for 55, SSMS) and other strategic documents of the sector, identified the potential and ways to enhance the performance of IWT and inspired European countries to produce mutual statements supporting inland navigation development both on national and international levels.

⁶⁰ https://www.ccr-zkr.org/files/documents/dmannheim/Mannheimer_Erklaerung_en.pdf

In the past, such important intergovernmental events as the Pan-European Ministerial Conference held on 11 September 1991 in Budapest, the Pan-European Conference on inland water transport held on 5 and 6 September 2001 in Rotterdam (Netherlands)⁶¹, the pan-European Conference on inland water transport “Inland navigation: A key element of the future pan-European transport system” held on 13 and 14 September 2006 in Bucharest⁶² and the International High-Level Conference on inland water transport held on 22 February 2017 in Geneva⁶³ resulted in a number of initiatives proclaiming active development of IWT.

All these documents put forth principles of sustainability, efficiency and environmental performance of transport while at the same time addressed current issues of IWT, such as insufficient infrastructure maintenance, capacity constraints of the waterways due to existing bottlenecks, navigable conditions, a lack of skilled and competent workforce, etc. They aimed at encouraging national governments to implement national strategies and action plans, funding schemes and initiatives together with solid, binding national regulations to improve the performance of IWT, to provide better quality services, which all together will ensure modal shift in favour of IWT and better use of inland waterways.

Usually, such documents indicate the role of national policies in the context of priorities of IWT development. They aim to establish priorities for future investments, to encourage governments to act jointly, and to facilitate ways to reach local governments, executive authorities, waterway administrations and other responsible bodies of the MS.

The Ministerial Declaration of the International Ministerial Conference on Inland Water Transport - “Inland Navigation in a Global Setting”,⁶⁴ signed on April 18, 2018 in Wroclaw, emphasized the leading role IWT should possess in European transportation. This conference brought together Ministers of UNECE Member States to coordinate their actions towards: *“Building up a solid regulatory framework aimed at increasing the efficiency of inland water transport, ... Ensuring the appropriate balance among all transport modes, streamlining cargo flows and promoting the multimodality... Encouraging the realization of a modern fleet and fostering innovations... Building the inland waterway infrastructure resilient to climate changes... Promoting the attractiveness of the sector to the market and increasing its competitiveness..”*. By 2023, it is indicated to be reported at the UNECE level on the progress achieved with regards to the objectives identified by this declaration.

In the scope of the Danube region, several documents are worth mentioning:

- Communiqué “Danube Commission - Strengthening the partnership in free navigation on the Danube”⁶⁵ signed on 29th of June 2018 in Belgrade on the occasion of the 70th anniversary of the signing of the Convention regarding the Regime of Navigation on the Danube (Belgrade Convention);
- To bring together port authorities, port administrations, port operators and other port businesses to implement concrete measures to reduce greenhouse gas emissions and ensure sustainability of port development and operations, as well as to activate intensive cooperation and coordination between port actors across borders and across economic sectors at a transnational level, it was proposed to sign a "Joint Statement of the Danube Port Authorities and Ports Stakeholders" in March 2023 in the framework of the Danube Commission’s Expert Group on Ports and Port Operations;

⁶¹ <https://digitallibrary.un.org/record/450924?ln=en>

⁶² <https://digitallibrary.un.org/record/584679?ln=en>

⁶³ <https://unece.org/high-level-conference-inland-water-transport>

⁶⁴ [1804325 \(unece.org\)](https://unece.org/1804325)

⁶⁵ <https://unece.org/DAM/trans/doc/2019/sc3/ECE-TRANS-SC.3-2019-05e.pdf>

- Conclusions on effective waterway infrastructure rehabilitation and maintenance on the Danube and its navigable tributaries in 2014, 2016⁶⁶, 2018⁶⁷, 2020⁶⁸ and 2022⁶⁹ (latest Conclusions dated on the 29th of June 2022).

The documents given above are based on the idea of cooperation between riparian states towards enhancement and promotion of navigation on the Danube River. While the Communiqué has a more conventional character and addresses legal issues on freedom of navigation, non-discriminatory approach and equality of merchant shipping, the Joint Statement of the Danube ports are targeting emissions reduction. Conclusions on effective waterway infrastructure rehabilitation and maintenance on the Danube and its navigable tributaries, having regard to the “Declaration on effective waterway infrastructure maintenance on the Danube and its navigable tributaries”⁷⁰ (signed at the Danube Ministers Meeting in Luxembourg on June 7, 2012) contain proactive measures to be undertaken by riparian states for better integration of the Danube into the European IWT network, with the main focus on Danube waterway infrastructure and implementation of the “Fairway rehabilitation and maintenance Master plan of the Danube and its navigable tributaries”.

The Joint Statement of the Danube ports targets environmental impact of port operations, new solutions to support energy transition and zero-emission services, the deployment of alternative fuels infrastructure in Danube ports, and other issues related to inland ports development. The main aim of this document is to provide a platform for targeted cooperation between ports in the Danube Region and contribute to the creation of a pipeline of concrete implementation projects.

On October 17, 2018, the Mannheim Ministerial Declaration, entitled “150 Years of the Mannheim Act – Engine for Dynamic Rhine and Inland Navigation”⁷¹ was signed by inland navigation ministers of the Member States of the CCNR and set out the strategic priorities of the CCNR for the period 2018-2023. This declaration is focusing partly on elimination of the GHG by 2050 and aims to “promote the further development of digitization, automation and other modern technologies and thus contribute to the competitiveness, safety and sustainability of inland navigation.” Regarding modal shift, the ministers express their wish to “reinforce the role of inland navigation as an economically relevant means of transport” and request the CCNR: “in conjunction with the member states, to ensure faster and more efficient inland vessel cargo handling in seaports, to accelerate the integration of inland navigation into digital and multimodal logistic chains, to work towards better coordination between national development programmes and provide transparent information about them”.

In accordance with the mandate given by the Mannheim Ministerial Declaration of 17 October 2018⁷², the CCNR developed a roadmap⁷³ aimed at largely eliminating GHG emissions and air pollutants in the IWT sector by 2050, a long-term vision also shared by the EU. Specifically, the Declaration tasked the CCNR with:

- reducing GHG emissions by 35% by 2035 compared to 2015 levels,
- reducing pollutant emissions by at least 35% by 2035 compared to 2015 levels,
- largely eliminating GHG and other pollutants by 2050.

⁶⁶ <http://www.fairwaydanube.eu/wp-content/uploads/2016/07/conclusions-danube-ministerial-meeting.pdf>

⁶⁷ https://navigation.danube-region.eu/wp-content/uploads/sites/10/sites/10/2020/06/2018-12-03_Danube_Ministerial_conclusions.pdf

⁶⁸ https://transport.ec.europa.eu/news/danube-ministers-transport-conclusions-effective-waterway-rehabilitation-and-maintenance-2020-07-02_en

⁶⁹ https://navigation.danube-region.eu/wp-content/uploads/sites/10/sites/10/2022/08/Danube_Ministerial_conclusions_2022_final.pdf

⁷⁰ <http://extwprlegs1.fao.org/docs/pdf/mul-147353.pdf>

⁷¹ https://www.zkr-kongress2018.org/files/Mannheimer_Erklaerung_de.pdf

⁷² CCNR, “Mannheim Declaration”, https://www.ccr-zkr.org/files/documents/dmannheim/Mannheimer_Erklaerung_en.pdf

⁷³ CCNR, “CCNR Roadmap for reducing inland navigation emissions”, https://www.ccr-zkr.org/files/documents/Roadmap/Roadmap_en.pdf

Built upon the CCNR study on the energy transition towards a zero-emissions inland navigation sector (hereafter “CCNR study”)⁷⁴, this roadmap shall be understood as the primary CCNR instrument for mitigating climate change, fostering the energy transition, and contributing to the European IWT policy. As this energy transition represents a crucial challenge to Rhine and European inland navigation, the aim of the roadmap is to contribute to a reduction in emissions from Rhine and inland waterways navigation by:

- setting transition pathways for the fleet (new and existing vessels),
- suggesting, planning, and implementing measures directly adopted or not by the CCNR,
- monitoring the intermediate and final objectives laid down by the Mannheim Declaration.

To enable the inland waterway transport sector’s energy transition towards zero emissions, the CCNR has developed an implementation plan taking into account economic, technical, infrastructure, social, and regulatory aspects. This plan aims at suggesting, planning, and implementing measures to be adopted directly or not by the CCNR, as well as monitoring the intermediate and final objectives laid down by the Mannheim Declaration.

The CCNR hopes that this roadmap will contribute to developing a common vision of the energy transition and the associated challenges within the inland navigation sector. The proper development of clean energy infrastructure, including shoreside power supply and charging facilities, as well as alternative fuels bunkering infrastructure, is of course part of this challenge.

3.3. Other legal acts

The Bratislava Agreements⁷⁵ were adopted in 1995 by Danube shipping companies based on the need for strengthening economic relations and cooperation between the Danube countries and facilitating the procedures of interaction between the stakeholders involved in Danube merchant shipping.

The Bratislava Agreements aim at harmonization and simplification of administrative processes related to both cargo transportation issues and vessels handling in ports. They are consolidated in one document as a set of agreements and address the following issues:

- Agreement on General Terms and Conditions for International Carriage of Goods on the River Danube;
- Agreement on Carriage of High-Cube Containers in International Carriage of Goods on the River Danube;
- Agreement on the basic principles of the tariff (freight) policy and cooperation for International Carriage of Goods on the River Danube;
- Agreement on mutual towing and assistance to ships in case of accidents;
- Agreement on the mutual agency of ships in the Danube ports;
- Agreement on the mutual repair of vessels of the Danube shipping companies.

A number of initiatives were addressed to tackle the challenges of the economic crisis of 2008 and to provide better cooperation between the Danube countries in a coordinated way, with an adoption by the EC in 2010⁷⁶ European Union Strategy for the Danube Region (EUSDR) being one of the four EU macro-regional strategies. One of the important issues targeted by EUSDR Priority Area 1A “Waterways mobility” (PA1A), is focused on the promotion of

⁷⁴ CCNR, “CCNR study on energy transition towards a zero-emission inland navigation sector”, <https://www.ccr-zkr.org/12080000-en.html>.

⁷⁵ <https://unece.org/sub-regional-standards-and-agreements>

⁷⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0715&from=EN>

IWT and aims for further development of the Danube navigation, as well as potential revealed by connections to the Black Sea region, the South Caucasus and Central Asia.

The geographical scope of EUSDR/PA1A is covering Germany (Baden-Württemberg and Bavaria), Austria, the Slovak Republic, the Czech Republic, Hungary, Slovenia, Romania and Bulgaria within the EU, and Croatia, Serbia, Bosnia and Herzegovina, Montenegro, the Republic of Moldova and Ukraine (the regions along the Danube)⁷⁷, which through their National Contact Points and in cooperation with the Danube Commission and the International Commission for the Protection of the Danube River work together on enhancement of the navigational conditions on the Danube River, addressing fleet modernization issues, digitalization, infrastructure, fairway maintenance and environmental issues. Taking into account that the Danube Region is represented not only by the EU MS, but also by non-EU countries, an important role of the EUSDR is seen in the elimination of fragmentation and in the integration of mutual efforts towards better alignment of national policies in the field of IWT.

UNECE Resolutions

As indicated in the White paper, 2020⁷⁸, the UNECE has the widest geographical coverage since all European countries involved in inland navigation are its members. In the field of inland navigation, UNECE has prepared and maintains international conventions: AGN⁷⁹, the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)⁸⁰ and a number of other international conventions relevant to IWT. The most important are: the Convention relating to the Unification of Certain Rules concerning Collisions in Inland Navigation⁸¹, the Convention on the Registration of Inland Navigation Vessels⁸² and the Convention on the measurement of inland navigation vessels, which was adopted in 1966⁸³. The Pan-European rules for the carriage of goods by inland waterways are established by the Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway (CMNI)⁸⁴, prepared jointly by the UNECE, CCNR and DC.

Most important UNECE resolutions are:

- (a) Resolutions related to the status and Parameters of European network of Inland Waterways: resolution No. 30, “Classification of European Inland Waterways”⁸⁵; resolution No. 49 “Inventory of most important bottlenecks and missing links in the E Waterway Network”, revision 2⁸⁶;
- (b) Resolutions that establish the rules and signs on inland waterways: resolution No. 24, “European Code for Inland Waterways (CEVNI)”, revision 6⁸⁷; resolution No. 90, “European Code for Signs and Signals on Inland Waterways (SIGNI)”⁸⁸;
- (d) Resolution No. 31 “Recommendations on Minimum Requirements for the Issuance of Boatmaster’s certificates in Inland Navigation with a view to their Reciprocal Recognition for International Traffic”⁸⁹;

⁷⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0715&from=EN>

⁷⁸ <https://unece.org/transport/publications/white-paper-progress-accomplishment-and-future-sustainable-inland-water>

⁷⁹ <https://unece.org/fileadmin/DAM/trans/doc/2019/sc3/ECE-TRANS-120r4efr.pdf>

⁸⁰ https://unece.org/sites/default/files/2021-01/ADN_EN_FR_RU.pdf

⁸¹ https://treaties.un.org/doc/Treaties/1966/09/19660913%2002-18%20AM/Ch_XII_3p.pdf

⁸² https://treaties.un.org/doc/Treaties/1982/06/19820624%2009-51%20PM/Ch_XII_4p.pdf

⁸³ https://treaties.un.org/doc/Treaties/1975/04/19750419%2002-56%20AM/Ch_XII_5p.pdf

⁸⁴ https://www.ccr-zkr.org/files/conventions/cmni_en.pdf

⁸⁵ <https://unece.org/DAM/trans/doc/finaldocs/sc3/TRANS-SC3-131e.pdf>

⁸⁶ <https://unece.org/DAM/trans/doc/2017/sc3wp3/ECE-TRANS-SC3-159-Rev2e.pdf>

⁸⁷ https://unece.org/sites/default/files/2021-12/2109540_E_pdf_web%2BCorr1.pdf

⁸⁸ https://unece.org/DAM/trans/main/sc3/publications/SIGNI_2019_e.pdf

⁸⁹ <https://unece.org/transport/standards/transport/recommendations-minimum-requirements-issuance-boatmasters>

(e) Resolutions on RIS: resolution No. 48 “Recommendation on electronic chart display and information system for inland navigation (Inland ECDIS)”⁹⁰, resolution No. 57 “Guidelines and Recommendations for River Information Services”⁹¹, resolution No. 58 “Guidelines and Criteria for Vessel Traffic Services on Inland Waterways”⁹², resolution No. 63 “International Standard for Tracking and Tracing on Inland Waterways (VTT)” revision 2⁹³, resolution No. 79 “International Standard for Electronic Ship Reporting in Inland Navigation”⁹⁴ and resolution No. 80 “International Standard for Notices to Skippers”⁹⁵;

(f) Resolution No. 21 “Prevention of Pollution of inland Waterways by vessels”, revision 2⁹⁶;

(g) Resolutions promoting recreational navigation, the most important are resolution No. 40⁹⁷, “International Certificate for Operators of Pleasure Craft” and resolution No. 52, “European Recreational Inland Navigation Network”⁹⁸.

3.4. National Transport Strategies and national support measures for the IWT development within connected European IWT system

This subchapter provides a short overview of national strategies and other measures targeting the use and development of green energy efficient IWT on the European level.

France: Modal shift assistance plan (PARM) is setting up objectives to diversify the range of products transported, to make the success stories of inland waterway projects more visible, to simplify access to IWT for potential clients. It provides dedicated aid for feasibility studies (grants of 50% of a feasibility study budget), aid for experimentation (coverage of the additional costs of the river solution compared to road transport at a 100% rate) and subsidy for investments, which is based on “rewarding” the externalities saved by the river solution over an exclusively road solution.

PAMI (Modernisation of the fleet & Innovations)⁹⁹ is covering agreed targets for a new IWT fleet modernisation support scheme, namely: improvement of the IWT fleet’s environmental performance; better integration of IWT in the supply chain (city logistics, containers); facilitation of innovations to reach the previous two goals; encouraging business takeover by new entrepreneurs.

At the national level, hydrogen plans are also being deployed, and the number of countries with policies that directly support investment in hydrogen technologies is increasing, along with the number of sectors they target. Named examples are the French ‘plan de déploiement de l’hydrogène’¹⁰⁰, which foresees funding opportunities for the deployment of green hydrogen.

The Netherlands: The Dutch Green Deal. At the national level, the Netherlands recently adopted the “Green Deal on Maritime and Inland Shipping and Ports” in cooperation with all involved stakeholders from the private sector

⁹⁰ <https://unece.org/DAM/trans/doc/2013/sc3wp3/ECE-TRANS-SC3-156-Rev2e.pdf>

⁹¹ <https://unece.org/fileadmin/DAM/trans/doc/finaldocs/sc3/TRANS-SC3-165e.pdf>

⁹² <https://unece.org/sites/default/files/2022-03/TRANS-SC3-166e.pdf>

⁹³ <https://unece.org/sites/default/files/2021-01/ECE-TRANS-SC3-176r2e.pdf>

⁹⁴ https://unece.org/sites/default/files/2021-01/ECE-TRANS-SC3-198r1e_0.pdf

⁹⁵ <https://unece.org/sites/default/files/2021-01/ECE-TRANS-SC3-199r1a1e.pdf>

⁹⁶ <https://unece.org/sites/default/files/2021-02/ECE-TRANS-SC3-179-Rev.1e.pdf>

⁹⁷ <https://digitallibrary.un.org/record/654904>

⁹⁸ https://unece.org/fileadmin/DAM/trans/doc/2013/sc3wp3/ECE-TRANS-SC3-164-Rev1e_01.pdf

⁹⁹ <https://www.vnf.fr/vnf/accueil/beneficier-de-solutions-en-faveur-de-la-transition-energetique-du-secteur-fluvial/comment-financer-un-projet-de-verdissement-de-la-flotte-fluviale/pami/>

¹⁰⁰ https://www.ecologie.gouv.fr/sites/default/files/Plan_deploiement_hydrogene.pdf

with the goal of making the IWT sector greener and more sustainable.¹⁰¹ Specifically, by 2030, they aim to reduce carbon emissions from the Dutch inland fleet by 40% to 50% relative to 2015 and have refitted at least 150 inland vessels with a zero-emission power train. By 2035, to have a reduction of emissions of environmental pollutants from inland shipping by 35% to 50% relative to 2015, and by 2050 to have a virtually zero-emission and climate-neutral inland fleet.

Belgium: Flemish Green Deal. De Vlaamse Waterweg nv, the Flemish Department of Mobility and Public Works, the Port of Antwerp-Bruges, the North-Sea Port and the inland navigation business community are joining forces and jointly drafted a Green Deal for Inland Navigation.¹⁰² This Flemish Green Deal Inland Navigation is a public-private partnership between various stakeholders involved in inland shipping. Thanks to joint objectives and concrete commitments, the partners want to optimize the greening of inland navigation by 2030. Specifically, they aim to reduce emissions that benefit both the climate (CO₂ reduction) and air quality (reduction of other emissions). In this context, they wish to remove existing barriers and create visible change by 2030, with an outlook towards 2050. By joining forces, the involved partners want to make it a movement that makes the efforts and achievements for green inland navigation visible. In this way, it can also become a guide for short- and medium-term policy and the trajectory can be used as a frame of reference for future initiatives.

Wallonian state aid plan for alternative modes of transport for the period 2021-2025 (Plan d'aides aux modes de transport alternatifs pour la période 2021-2025)¹⁰³ is serving to promote the investment of Walloon companies in the development and use of less polluting modes of transport, to meet both economic and environmental objectives. This new Plan entered into force on January 1, 2021 (with retroactive effect) for an annual budget of €4 million for 5 years. One of the aims of this plan is to encourage industrial and logistics companies to make greater use of rail or IWT, to develop river transport of containers and to modernize the Walloon inland navigation fleet, which emits two to three times less CO₂ per ton transported than road transport.

Germany¹⁰⁴: The German 'Die Nationale Wasserstoffstrategie' – The National Hydrogen Strategy can be one of the examples on the way to energy transition, not only in the German transportation sector but also for its industrial needs. The National Hydrogen Strategy interlocks climate, energy, industrial and innovation policies. The aim is to make Germany a pioneer in green hydrogen and to achieve and secure market leadership in hydrogen technologies in the long term. With the National Hydrogen Strategy, Germany is pursuing broad use of green hydrogen in industry, transport and the energy system to maintain its competitiveness, achieve climate protection goals and open up new markets. A systemic approach to the production, transportation, distribution and use of hydrogen - including the international dimension – is a key priority.

Furthermore, via its Inland Navigation Masterplan (Masterplan Binnenschifffahrt)¹⁰⁵, Germany intends to make IWT more sustainable and attractive by 2030 through the five main areas of intervention: improving infrastructure, creating a more environmentally friendly and competitive fleet, developing digital solutions, strengthening the multimodal transport chain, and increasing the number of skilled workers in IWT.

Portugal: The Portuguese «Strategy for Increasing the Competitiveness of the Commercial Ports Network on the Mainland – Horizon 2026»¹⁰⁶ aims at providing a new vision for streamlining and modernising port operations, including infrastructures, interconnections, internal processes and maritime accessibility, as ports face a continuous increased demand. Particularly relevant are the intentions to improve the specialisation of each port, according to

¹⁰¹ <https://www.greendeals.nl/sites/default/files/2019-11/GD230%20Green%20Deal%20on%20Maritime%20and%20Inland%20shipping%20and%20Ports.pdf>

¹⁰² <https://omgeving.vlaanderen.be/nl/green-deal-binnenvaart>

¹⁰³ <https://www.wallonie.be/fr/actualites/20-millions-eu-pour-les-modes-de-transport-fluviaux-et-ferroviaires>

¹⁰⁴ Here reference is given as applied to both Rhine and Danube regions

¹⁰⁵ <https://www.bmdv.bund.de/DE/Themen/Mobilitaet/Wasser/Binnenschifffahrt/binnenschifffahrt.html>

¹⁰⁶ <https://dre.pt/dre/detalhe/resolucao-conselho-ministros/175-2017-114248655>

their specific hinterland. Worth recalling that Portuguese ports have strategic importance within the meaning of the TEN-T Atlantic Corridor connecting Portuguese ports with Spain, France, Germany, and more widely all the European network. As part of Portugal's referred strategy are 2 projects of key importance: projects of the Douro Waterway and the navigability of the Tagus to Castanheira do Ribatejo aimed at increasing inland waterways transportation in the said rivers. Finally, Portugal's port strategy – Horizon 2026 is further complemented with the National Plan for Hydrogen¹⁰⁷ and ongoing discussions with national and international stakeholders on the future of the Port Community of Sines as well as the Port of Matosinhos, of accrued relevance at a time of increased energy prices.

Sweden¹⁰⁸: The Swedish Vision to Implement a New Transport Mode in the Transport System is targeting promotion of a modal shift from road to IWT and rail for long distance transports and decreasing pollution from domestic transports with 70% by 2030 compared to 2010. Among recent initiatives undertaken by the Swedish government the following examples can be mentioned: technical upgrade of locks in Trollhättan and Södertälje; establishment of the National council for freight transports and the National coordinator for short sea shipping and inland navigation.

The Interreg Baltic Sea Region Programme Project EMMA¹⁰⁹: “Enhancing freight Mobility and logistics in the BSR by strengthening inland waterway and river sea transport and promoting new international shipping services” targeted enhancing inland navigation development in the Baltic Sea region, which was completed in 2019. Project provided pilot actions and demonstrations of feasibility and possibilities of IWT, in particular, in Sweden – Gothenburg area (Lake Värnen) to demonstrate possibilities for modal shift from road to inland waterways in Lake Värnen area.

The Danube Transnational Program project “Integrating Danube Region into Smart & Sustainable Multi-modal & Intermodal Transport Chains” – DTP DIONYSUS¹¹⁰ conducted research on political and commercial efforts to extend the use of IWT to new markets and clients, studying policy papers & strategies and some of the national strategies of Danube states, dedicated to the transport development in general with particular focus on IWT. Some of the national strategies and development plans in **the Danube region** that relate to IWT development are given below.

Austria: “Aktionsprogramm Donau 2030 des BMK” (Action Programme for the Danube 2030). In the development of the Action Programme Danube 2030 of the BMK, findings and experiences of the two predecessor programmes (Action Programme for the Danube 2015 and 2022) were embedded. In line with the targets of existing national and European strategies in the fields of transport, climate and environmental protection, the following objectives were defined for the Danube Action Programme 2030: Strengthening the competitiveness of Danube navigation in logistics chains and in the tourism and leisure industry, decarbonisation and improvement of the environmental compatibility of Danube navigation, increasing the climate resilience of the Danube waterway, protection and improvement of the Danube/March/Thaya river ecosystem and preservation of biodiversity.. The EGD is reflected in the working program of the Austrian Government; SSMS is reflected in the Mobility Masterplan 2030 for Austria, which covers the freight transport section; and NAIADES III Action Program reflected in the Action Program Danube of the Federal Ministry for Climate Action, Environment, Energy and Mobility (BMK). According to the modal shift objectives of SSMS, the Mobility Masterplan 2030 in Austria has targets on the national level to increase the modal share of IWT from 2% to 3% of the total Austrian transport performance (ton-kilometer). In combination with the share of rail transport in Austria, it will help to achieve the EU-targets for the modal shift from road.

Slovakia: Strategic plan of the transport infrastructure development in the Slovak Republic till 2020, covering among others the following specific objectives: [SV3] need for further development and use of the RIS, [SV4]

¹⁰⁷ <https://www.portugal.gov.pt/download-ficheiros/ficheiro.aspx?v=%3d%3dBQAAAB%2bLCAAAAAAABAAzNDC2MAAAFEKjvQUAAAA%3d>

¹⁰⁸ https://www.project-emma.eu/sites/default/files/P1.3_Bj%C3%B6rn_Swedish%20Transport%20Admin._Swedish%20IWT%20Vision.pdf

¹⁰⁹ https://www.project-emma.eu/sites/default/files/P1.1_Stefan_HHM_IWT%20Vision%20for%20the%20Baltic.pdf

¹¹⁰ <https://www.interreg-danube.eu/approved-projects/dionysus>

decrease of the ecological impacts of the inland water transport with focus on emission reduction (vessel retrofiting, creation of conditions for alternative fuels, emission monitoring), [SV5] creation of conditions for inland water transport education.

Hungary: “National Transport Infrastructure Development Strategy” (Ministry of National Development, August 2014) highlights the potential of the Danube navigation that shall be used to a sufficient level in order to arrive at the proper modal split. The document emphasizes the need for proper fairway conditions and well-established ports, whereas it highlights the lack of state-of-the-art inland vessels as well and sets as a goal the modernisation of the IWT fleet in parallel with the development of ports on the TEN-T corridor network.

Bulgaria: Strategy for the Development of the Transport System of the Republic of Bulgaria until 2020, a long-term strategic document that aims to outline the most important aspects for the development of the transport system.

Romania: Strategy for sustainable transport for 2017-2013 and 2020, 2030 approved by Ministry of Transport Order no. 508/2008 and the National strategy on climate change and low-carbon economic growth and national action plan for 2016-2020 on climate change, approved by Government Decision no. 739/2016. The main objective of the strategy is to mobilize and enable private and public actors to reduce greenhouse gas emissions from their economic activities in line with EU targets and to adapt to the impacts of climate change. The strategy adopts quantifiable targets in line with the EU 2030 commitments.

3.5. Non-EU Member States initiatives

Norway: The National Transport Plan 2022-2033¹¹¹ indicates the main priorities of the transportation sector in Norway, which are based on the strive for the development and broad implementation of automation, electrification and zero-emission mobility, new business models, and the development of intelligent transport systems for a smart and green transition of the transport sector.

The Norwegian IWT system can be characterised as rather isolated (with its two major waterways: Telemark and Halden Waterway, serving remote navigation on fjords and lakes) and is represented mostly by short-sea shipping and coastal navigation, which is used for the purpose of passenger transportation, tourism and recreation.

At the same moment, IWT passenger transportation in Norway is rather progressive and lots of good practice examples can be given with regards to fossil-free innovative solutions implemented. In 2018, 400-passenger electric carbon-fibre catamarans started operating on Norwegian fjords. With the adoption by the Norwegian Parliament of a new resolution establishing zero emission regulation on the world heritage fjords by 2026, a new impediment for the rapid implementation of electrically powered vessels on fjords with a world heritage designation, such as the west Norwegian Geirangerfjord or Nærøysfjord took place. Currently, one of the largest Norwegian ferry operators, Fjord 1, has been electrifying its entire fleet.

Together with the Climate Action Plan for 2021–2030¹¹², the National Transport Plan 2022-2033 describes the main instruments to be implemented to cut emissions from the transport sector: a carbon tax, biofuel quota obligations, different requirements for the use of zero- and low-emission technologies and investment support schemes.

Serbia: In the period from 2015 to 2019, the Ministry of Construction, Transport and Infrastructure (MGSI) started planning the development of water transport in a systematic way¹¹³. The Water Transport Development Strategy

¹¹¹ <https://www.regjeringen.no/contentassets/117831ad96524b9b9eaadf72d88d3704/en-gb/pdfs/stm202020210020000engpdfs.pdf>

¹¹² <https://www.regjeringen.no/en/historical-archive/solbergs-government/Ministries/kld/news/2021/heilskapeleg-plan-for-a-na-klimamalet/id2827600/>

¹¹³ <https://mgsi.gov.rs/cir/odsek/razvoj-rechne-transportne-infrastrukture>

of the Republic of Serbia for the period from 2015 to 2025, with an Action Plan, was adopted. Besides policy and regulatory framework, the strategy defines the list of the most important investments, namely:

- in Serbian ports, removing all critical sectors for navigation on the network of waterways;
- further improvement of intelligent transport systems on waterways.

Serbia continues to improve its already high level of alignment with the EU and its investments, according to the Serbia Report 2022¹¹⁴. Investments in inland waterway infrastructure need to be made in accordance with environmental standards and the cost-effectiveness principle. Serbia applies the provisions of the Directive EU 2016/1629 (technical requirements for inland navigation vessels, including CESNI ES-TRIN standard) and continues working on fulfilling the preconditions for recognition of navigation certificates in the EU in accordance with Directive 2017/2397.

It is important to note that the World Bank launched the Sava and Drina Corridor Integrated Development Program (SDIP), whose goal is to strengthen cross-border cooperation through water resources management and to improve waterway navigability and flood protection. This program, which includes Serbia, Bosnia and Herzegovina and Montenegro, through an integrated approach will finance activities aimed at flood protection, environmental management and port modernization along this corridor, in order to increase their connectivity. The project will contribute to the strengthening of cross-border cooperation and economic growth of the countries of the region.

Ukraine: During the last few years, a number of political and legislative changes took place in Ukraine, which gradually transformed national regulations in the field of IWT. With the adoption in 2021 of the Law of Ukraine "On Inland Waterway Transport"¹¹⁵ and its further entry into force in 2022, a basis was created for broad modernization of the IWT branch of the country. This law established a framework for financial support for the maintenance of inland waterways to keep them in a navigable condition; implementation of measures to ensure the safety of navigation; hydrographic support for navigation, operation, reconstruction, repair and development of RIS infrastructure; measures targeting fleet modernization in accordance with state programs; maintenance, reconstruction, repair, technical re-equipment and protection of locks.

Among the main aims of this law is the further implementation of the EU Directives in the field of IWT, such as:

- Directive EU 2016/1629 (technical requirements for inland navigation vessels, including CESNI ES-TRIN standard);
- Directive EU 2017/2397 (technical requirements for inland navigation vessels, including CESNI ES-QIN standard);
- Directive EU 2005/44 on harmonized river information services (RIS) on inland waterways;
- Directive EU 87/540 on access to the occupation of carriers of goods by waterway in national and international transport and on the mutual recognition of diplomas, certificates and other evidence of formal qualifications for this occupation.

The Strategy for the Development of IWT in Ukraine until 2031 was elaborated in pursuance of the Law of Ukraine "On Inland Water Transport" and is presented as a roadmap for planning the development of Ukrainian IWT, implementing national policy reforms and applying the principles of good governance, including institutional capacity and e-government. The Strategy of IWT Development 2031 and the Action Plan for its implementation are industry-specific documents for state planning mainly targeting the establishment of a comprehensive IWT network

¹¹⁴ https://neighbourhood-enlargement.ec.europa.eu/serbia-report-2022_en

¹¹⁵ https://mtu.gov.ua/files/nahaievskia/IWT%20Law-1182-1-d_FINAL_11.12.2020_EN.pdf

together with its infrastructure based on the policy approach, which is recognizing IWT as competitive, safe and attractive for future investments and able to meet the cargo transportation market needs in Ukraine.

Today, in the light of a full-scale Russian war of aggression against Ukraine and a blockade of the majority of Ukrainian maritime ports, IWT (the Danube River) is the only corridor available to import and export large volumes of freight to and from Ukraine. In accordance with the communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on (Brussels, 12.5.2022 COM (2022) 217 final)¹¹⁶ an action plan for EU-Ukraine Solidarity Lanes to facilitate Ukraine's agricultural export and bilateral trade with the EU was established.

¹¹⁶ <https://transport.ec.europa.eu/system/files/2022-06/COM20220217.pdf>

4. Good practices examples

4.1. Role of waterway administrations, state agencies and other IWT stakeholders in encouraging and facilitating a modal shift to IWT

On June 7, 2022, in the framework of the PLATINA3 4th Stage event, stakeholder consultations were organized during the panel discussion, among others, to collect feedback on good practices at the European level with regards to IWT development in the light of the EGD, SSMS and NAIADES III targets to be achieved by 2030 and 2050.

Considering current developments in the regulatory framework at EU level, the transition of IWT to green mobility becomes more and more urgent. It is clear that it has to be supplemented with the defined incentives and support needed. Among good practices to ensure modal shift to “green” IWT, several examples are given below.

Activities of De Vlaamse Waterweg¹¹⁷

An integrated approach of De Vlaamse Waterweg – Flemish agency & limited liability company under public law, ensuring management of the Flemish IWW network (parts of the North Sea – Mediterranean, Rhine – Alpine and North Sea - Baltic Transport Corridors), is being considered one of the successful establishments promoting IWT in Flanders. In this regard, contribution to the climate objectives of the EGD is a very important part of the key activities of De Vlaamse Waterweg. Among the main tasks of De Vlaamse Waterweg, the following are key:

- maintenance and development of IWW and inland ports infrastructure;
- improved mobility in Flanders: revealing potential of leftover capacities on Flemish IWW by including Flemish cities and industries linked to IWW in urban and industrial activities to increase the modal shift;
- water management;
- facilitation and stimulation of other functions of IWT (e.g., leisure sailing activities on IWW).

An important aspect of the activities of De Vlaamse Waterweg is the communication policy network with Flemish companies to promote modal shift and to stimulate businesses to use IWT.

Certain activities of De Vlaamse Waterweg also initiated modal shift to IWT for road decongestion and mitigation measures related to extreme weather events (increasing risk of flooding and drought in Belgium is rather high). Lots of investments were dedicated to measures tackling these challenges, such as development of IWT network to ensure sufficient capacity and the creation of resilient infrastructure to manage flooding and drought to ensure the safety of navigation.

It has to be mentioned, in particular, that De Vlaamse Waterweg activities target not only investment into infrastructure and entrepreneurs, to ensure better undertaking of multimodal transportation, but also investments into innovation and automation:

- Smart Shipping program co-financed by the EU to eliminate shortage of skippers and to implement smart solutions for vessels and data management, testing on Flemish waterways (VisuRIS);
- facilitating innovative concepts for transport. Watertruck+ concept developed by De Vlaamse Waterweg within the corresponding CEF project. The concept is covering self-propelled vessels and push-boats to be used on smaller waterways situated close to cities, urban areas and industrial sites. It can be also applied to large convoys.

¹¹⁷ <https://www.vlaamsewaterweg.be/>

To conclude, it can be stated that, as the example of De Vlaamse Waterweg shows, modern waterway administration shall be more than a state-owned enterprise providing infrastructure maintenance and operation. It has to be a party, which makes IWT accessible and reliable and ensures that there is active use of it. Incorporation of different functions in its portfolio (digitalization, automation, infrastructure management, logistics, multimodal transport development solutions) is an important element, which shall be duly reflected in the structure of a modern waterway administration. A successful combination of the aforementioned can provide a useful instrument for shaping IWT policy and achieving a positive modal shift towards IWT.

Activities of viadonau¹¹⁸

Another successful case from the perspective of waterway administration can be given through the example of activities of viadonau. Viadonau is an infrastructure management company that also conducts a broad range of modal shift activities on the Danube River in Austria. Such activities are forming a platform for business contacts in the field of Danube navigation between suppliers and users of the logistic services, providing customer support and orientation towards the IWT. viadonau also performs the role of the know-how center for the projects in the field of inland navigation and multimodality, bringing the accumulated expertise from the projects into practice and providing cost-free information on the Danube navigation through publications and online platforms such as the Danube Logistics Portal¹¹⁹.

Among the important tasks of viadonau, such as supporting companies using the Danube transportation and providing advice on logistic services and funding schemes, the role of the viadonau is in establishing B2B platforms to bring together potential consumers of IWT services and logistic service providers.

Among focus initiatives on specific cargo groups, viadonau (since 2010) continues to elaborate dedicated cases for high and heavy transport; renewable sources; recycling products; building materials; chemical and petroleum products and intermodal & rolling cargo. To create a dialogue, viadonau is inviting relevant stakeholders for a particular cargo segment, trying to establish a platform for cooperation to emerge with future partnerships. A number of dedicated workshops are being conducted by viadonau on a regular basis to ensure better involvement and to increase awareness for the promotion of the Danube transportation opportunities. These results in further deployment of dedicated transport projects, or modal shift projects.

Currently, viadonau is working on the elaboration of a modal shift strategy for high & heavy cargo, involving different stakeholders on the national level. This approach introduced the new procedure for obtaining permits for high & heavy transport to initiate the shift from road to IWT. Depending on the parameters of the heavy & high cargo, a certain permit has to be obtained to transport this cargo by road, giving the main priority to IWT to be used predominantly for transportation of this type of cargo.

Starting from January 1, 2022¹²⁰, cargo that exceed the minimum parameters (based on weight/height/width of cargo and the transportation distance) in Austria have to be carried out exclusively by IWT. Only under certain circumstances (if the price of IWT is higher than road transportation or if IWT cannot be carried out or can only be carried out with unjustifiably high efforts) a permit for road transportation can be obtained. This is a 12-month pilot project, during which the efficiency of this regulatory proposal will be monitored and evaluated.

¹¹⁸ <https://www.viadonau.org/home>

¹¹⁹ <https://www.danube-logistics.info/>

¹²⁰ www.sondertransporte.gv.at

Activities of the EUSDR¹²¹

Today, the EUSDR with its Priority Area 1A activities, is tackling the most important issues of navigation on the Danube River in line with the main targets of the EGD, SSMS, TEN-T and NAIADES III Action Plan. It is working on the embodiment of the concepts of “green”, energy and cost-efficiency, adaptability for climate change, innovative and sustainable inland navigation on the Danube River.

Adoption of the Action Plan¹²² in 2010, as an indicative framework of the EUSDR, and its further update in 2020¹²³ provided a set of objectives and actions for all priority areas, amongst which for PA1A stand the following ones:

- ACTION 1: Contribute to improve waterway and port infrastructure & management;
- ACTION 2: Foster business development;
- ACTION 3: Facilitate fleet modernization;
- ACTION 4: Support the further roll-out and enhancement of River Information Services;
- ACTION 5: Contribute to the enhanced quality of education and jobs;
- ACTION 6: Contribute to the simplification, harmonization and digitalization of administrative processes.

In line with the NAIADES III Action Plan flagships, the objectives and actions of the EUSDR Action Plan for PA1A embody global policies of the EU for IWT at the scale of the Danube region while addressing and targeting peculiar issues of the navigation on the Danube.

Another important living document in the scope of EUSDR is the Fairway Rehabilitation and Maintenance Master Plan¹²⁴ (FRMMP), elaborated based on the Ministerial conclusions on effective waterway infrastructure rehabilitation and maintenance on the Danube and its navigable tributaries, signed by Germany, Austria, Slovakia, Croatia, Bosnia, and Herzegovina, Romania, Bulgaria, Moldova, and Ukraine in Brussels in 2014. Aiming to improve fairway conditions on the Danube FRMMP serves as a basis for national action plans with a two-year revision period. National Action Plans “*identify individual actions, responsibilities, funding resources, and intermediate milestones for the implementation of measures identified by the Fairway Rehabilitation and Maintenance Master Plan*”.

An example of a national action plan can be for given the Action Plan Danube in Austria. Launched in 2006, the National Action Plan for Navigation on the Danube represented an active inland navigation policy in Austria. The government program of December 2013 called for a renewal of the instrument to be introduced for the implementation of a strengthened waterway and an upgraded flood protection system.

Activities of the Voies navigables de France (VNF)¹²⁵

The VNF in France has a similar mission as viadonau for the Danube in Austria or De Vlaamse Waterweg for the Flemish waterways. The main tasks of the VNF could be explained as: IWW network management, increasing the share of IWT in a modal split of France – modal shift, development of IWW tourism, improvement of IWT efficiency through innovations, improvement of the competitiveness of IWT in France at different levels and creation of business cases for different types of cargo transportation on inland waterways.

The regulatory framework in France implemented in the past has already brought results in terms of CO2 emissions reductions. Today’s domestic target in France is to achieve a 40% emissions reduction compared to 1990 by 2030.

¹²¹ <https://www.vnf.fr/vnf/>

¹²² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010SC1489&from=EN>

¹²³ https://ec.europa.eu/regional_policy/sources/cooperate/danube/eusdr_actionplan_swd202059_en.pdf

¹²⁴ <https://www.fairwaydanube.eu/>

¹²⁵ <https://www.vnf.fr/vnf/>

The national low-carbon development strategy, based, in particular, on carbon budgets that determine the GHG emission ceilings not to be exceeded at the national level over periods of four to five years, was adopted on 18 November 2015. The energy policy defines several targets at the national level:

- Reduce final energy consumption by 50% in 2050 compared to the 2012 baseline, with an intermediate target of 20% in 2030;
- Reduce primary energy consumption from fossil fuels by 30% in 2030 compared to the 2012 baseline.

The Territorial Climate-Air-Energy Plan is included in the French Environment Code¹²⁶ and defines strategic and operational targets for public bodies (to mitigate, combat effectively and adapt to climate change) and the program of actions to be carried out limiting greenhouse gas emissions and anticipating the impacts of climate change.

Certain initiatives on the regional level were already introduced in 2016 in cities (with a population of over 50 000 inhabitants) and applied to city logistics, targeting a decrease in energy consumption and reduction of road transportation by means of inter-communal cooperation. Today, cities have to set up concrete plans to apply certain low-emission transport modes with emission reduction targets in large cities (250 000 inhabitants). One of the initiatives is the simplification of tender procedures and encouraging the use of IWT at the same time. To make it efficient, the public purchaser has several options:

- Choose criteria for evaluating tenders that are likely favour the use of IWT;
- Provide for the presentation of a variant;
- Provide for the implementation of the right of preference;
- Combine all or some of the three aforementioned elements.

All the public procurements of transportation services in France have to include information about the environmental performance of the proposed transport mode, which can be done by means of a special tool (a calculator available on the VNF and public procurement websites). Without carrying out this GHG Emissions Assessment and presenting it as part of an offer, tendering cannot be considered legal. The public purchaser may encourage companies to use river transport for the transport of construction materials and the evacuation of waste without imposing this mode of transport in order to prevent the risk of the contract being unsuccessful. Therefore, the contract may contain specific clauses. The reasons why the public purchaser is introducing such a clause are specified in the tender documents. To make it efficient, the public purchaser has several options:

- to choose criteria for judging tenders that are likely to favour the use of river transport;
- to provide for the presentation of a variant;
- to provide for the implementation of the right of preference; to combine all or some of these three elements.

Therefore, the VNF is setting clean options, which have to be taken to ensure not only increased modal shift but energy-efficiency and environmentally friendly performance of the transport mode. This precisely gives an obligation to bidders to use sustainable transport modes (like IWT or rail).

To take advantage of inland waterway transport's benefits, the public purchaser can choose between environmental performance, the transport performance criterion, which is related to the subject matter of the works contract as it relates to its execution conditions, or the mode of transport preferred by the contract holders.

Another regulatory measure in France encouraging the use of IWT, is implemented for high & heavy cargo transportation. The Governmental Act of 4 May 2006 on exceptional transport introduced in France made it

¹²⁶ <https://www.wipo.int/wipolex/fr/text/493035>

compulsory for the shipper of high & heavy cargo to provide a comprehensive analysis of alternative transportation options. It defines exceptional transport as transport that does not comply with the general limits of the road transport code because of its dimensions or mass. As a result, the circulation on main roads is subject to conditions, namely obtaining a local governmental authorization known as "exceptional transport". These authorizations are managed and issued by the state services under the responsibility of the departmental prefect.

4.2. Examples of the EU funded projects in relation to modal shift and promotion of IWT

Among the good practices that can be taken into account for the development and better use of IWT, some innovative solutions considering the logistic dimension with a potential positive impact on modal shift are described below.

IWT, being a comparatively small and fragmented sector, is often characterized by its strictly traditional approach on the operational and technical level, as well as in terms of integration into logistic chains. Logistic performance of IWT often depends on the overall performance of the supply chain, the smooth functioning of multimodal connectivity (especially in terms of city logistics "last-mile") and IWT integration with other transport modes. A number of challenges associated with the aforementioned factors affecting flexibility, timing, speed and overall efficiency of operations indicate that the performance of IWT can be improved.

The aforementioned gives an opportunity in terms of the implementation of innovative solutions, which can change radically the way IWT services operate. Moreover, as a number of research and pilot projects have shown, logistical dimension is the one to be tackled to ensure positive improvements in a relatively short period. As also emphasized in D1.4.: "Report on economic barriers to modal shift: challenges & best practices; recommendations"¹²⁷, the fixed costs of IWT can be a significant factor in influencing modal shift from road to inland waterways. The fixed costs associated with IWT, such as the cost of owning and operating the barge and terminal fees, are typically higher than the variable costs associated with road transport, such as fuel and driver wages. This means that the way to achieve modal shift is significantly dependent on the reduction of such costs by means of the following: reduction of crew, efficiency of sailing and operating at the terminal and reduction of costs related to logistics.

Following below are given several relevant projects and concepts targeting modal shift, IWT cost reduction, supply chain optimization and logistic efficiency.

4.2.1. NOVIMAR project

Research conducted in the NOVIMAR¹²⁸ project focuses on various topics, among them targeting the efficiency increase of waterborne transport operations. The project is addressing modal shift to IWT from the perspectives of, on the one hand, improved efficiency and flexibility of cargo-handling operations (by means of a Ro-Ro cargo handling system) and, on the other hand, increased safety of navigation and crew cost reduction (by the introduction of the Vessel Train concept).

The Vessel Trains concept is focuses on crew reduction by introducing a system consisting of remotely controlled Follower Vessels led by a Lead Vessel with a reduced crew on board. To implement the Ro-Ro cargo handling system, NOVIMAR developed and introduced the Novicell cargo handling vehicle (allowing loading/unloading of two stacks of containers simultaneously) and cross-transfer platform. This concept provides faster, more cost-efficient cargo handling and can be used by IWT barges in maritime ports. This approach is tackling the issue of maritime port

¹²⁷ <https://platina3.eu/download/economic-barriers-to-modal-shift/>

¹²⁸ <https://novimar.eu/>

congestion by increasing terminal capacity and helping to reduce idle time for barges. The Novimar cargo-handling vehicle concept allows for the establishment of small Ro-Ro terminals, as cargo handling can be done by means of one small equipment unit.

The concept provides such benefits as:

- Increase of the cargo flow through terminals due to reduced cargo-handling time;
- Improved cross-docking by transferring cargo from one vessel to another;
- Reducing the size of the terminal and therefore the need of land;
- Improved cargo density onboard compared to conventional Ro-Ro vessels.

The project indicates that the introduction of a new cargo handling system can save roughly 20-30% in comparison with conventional cost of cargo handling operations. In this regard, better efficiency, cost reduction, flexibility and higher productivity of the terminal can be achieved. Yet, the start-up requires investments in cargo handling vehicles and fleet, while in addition, further research on automated navigation is needed for the unmanned aspect of the Vessel Train concept.

4.2.2. ZULU Associates

ZULU Associates introduced a number of pilot projects in the field of zero-emission propulsion and unmanned navigation (ZULU Mass, X-barge) in IWT and short-sea shipping. Through its subsidiary, Blue Line Logistics, the concept of the Pallet Shuttle Barge (PSB) (ZULU barge)¹²⁹ was developed and realized specifically for the transportation of goods on pallets, in bigbags and in roll containers. With their one-crew operation, propelled by a 300 hp engine and auto-discharging capability, these barges are fit for IWT in urban logistics, making it a cost-effective mode of transport and providing logistic optimization for a sustainable and efficient business. PSB is equivalent to 13 trucks. The result is an efficient and flexible logistics model comparable to road transport for IWT urban logistics.

PSBs were brought into operation in 2014 and were initially used for transportation of construction materials in the Antwerp - Brussels - Herentals area, while also being suitable for various kinds of goods (including roll containers, trailers and general cargoes). Being a fully self-supporting unit with its own crane that can lift pallets/general cargo from shore or from a trailer and place them on board and vice versa, PSB doesn't need any additional cargo handling equipment, which makes it self-sufficient not dependent on terminal services, reducing waiting time and eliminating congestion in ports.

4.2.3. DISTRIVAART concept

A similar concept of a larger vessel for palletized consumer goods was introduced by TU Delft in collaboration with the Flanders Institute for Logistics - DISTRIVAART (Distributed shipping) concept¹³⁰. As a part of the research, the possibilities for the development of a specialized inland ship for the transport of pallets, the storage of these pallets during sailing, the transshipment of the pallets and the ship-shore interface were investigated. Furthermore, sorting systems were looked into to automatically move pallets during transit into a suitable position for immediate unloading at the next stop. The chosen solution is based on the existing Riverhopper concept in combination with

¹²⁹ [ZULU 01 | 06105496 | Pallet Shuttle Barge | Binnenvaart.eu](https://www.zulu01.com/06105496/Pallet-Shuttle-Barge/Binnenvaart.eu)

¹³⁰ <https://www.tmleuven.be/en/project/Distrivaart>

an onboard storage and handling system. The proposed system is rather unique, which implies that standard components are not immediately applicable and tailor-made additions are required.

The concept is considered to be the simplest if applied to point-to-point transportation without additional modalities involved. To build a network with intermediate ports, more customers and different cargo, including feeder and hinterland transport, is much more complicated.

Three scenarios were evaluated in this concept:

- Transport network: Simple liner service for various ports. Cargo units are truckloads of 26 pallets with the same product and the same destination. Pallets are exchangeable.
- Distribution network: Liner service with a limited number of ports. Full truckloads; each load may consist of various contingents. Pallets are exchangeable.
- Collaborative network. Similar to the distribution network, but the network considers each pallet as unique. This also means that the destination of specific pallets may change during sailing.

The concept builds upon mechanization and automation as key success factors for efficient cargo handling in urban areas. The main problem is related to the limited availability of components to build the systems and the sorting of pallets onboard, which requires additional operations.

4.2.4. CityBarge concept

The CityBarge¹³¹ concept was developed in order to provide a sustainable solution for city logistics, focusing on downtown areas in the Netherlands. Using innovative and green IWT transport solutions, implemented by CityBarge, contribute to elimination of pollution, CO2 emissions, noise and congestion on roads in the cities. Services of CityBarge are provided in the fields of construction, waste and retail logistics to various partners, including municipalities, (commercial) waste processing companies, contractors and entrepreneurs in the downtown areas of the Netherlands. The IWT fleet is represented by innovative electric push boats, barges and modular floating mini-hubs. Citybarge is collaborating with local operators using existing hub and transshipment locations outside the city centre. CityBarge incorporates sustainability and efficiency into its concept by optimizing and combining existing logistics flows, as well as deploying a zero-emission fleet.

4.2.5. The North West Connect program

Another good practice example of modal shift and the integration of IWT into city logistics is given from the perspective of the implementation of the North West Connect program¹³² in the Netherlands. The program was launched in the provinces of North Holland and Flevoland in 2019. The aim of the program is modal shift and CO2 emissions reduction by reducing the volumes of goods transported by road. Bundling loads and establishing new regional corridors for transportation within the Netherlands and beyond is being implemented via new projects, gaining knowledge and experience, as well as bringing together shippers, logistic service providers and fleet operators. The evaluation conducted within the program targeted the regions with a potential for modal shift to IWT. Therefore, a new inland waterway connection between Zeeland, Flevoland and Rotterdam was developed.

A successful business case example can be given from the cooperation between Roos-KCB¹³³ (a cargo owner based in Dronten) and the Noord West Connect, which presents a case when a cargo owner who used road transport in

¹³¹ <https://citybarge.eu/>

¹³² <https://amsterdamlogistics.nl/succesvolle-modal-shift-interview-roos-kcb-noord-west-connect/>

¹³³ <https://rooskcb.nl/?lang=en>

his logistic activities is switching to IWT. Modal shift to IWT (transportation from Rotterdam to Flevokust Haven in Lelystad by barge + last 20 km to Dronten done by truck) was stipulated by lower cost in comparison with truck delivery. Delivering by truck was rather expensive due to congestion and long container handling time in the port of Rotterdam, while transportation by barge turned out to be more cost-efficient. This proves that, depending on the corridor setting, allocation of the transportation nodes and appropriate planning, IWT can be a cheaper transport mode than road. An important role is also played by logistic service providers involved in the “last mile” transportations, which are usually done by truck. Flexibility and reliability of other (than IWT) players in the logistic chain, especially in terms of container transportation, are important points, that should be taken into account.

As was addressed, among others, in D.1.4., the direct cost of transportation is the most influential factor affecting the decision-making process, meaning that modal shift can be directly stimulated by cost efficiency. Financial barriers can play an important role, especially for large producers/distributors/wholesalers in refraining from modal shift to IWT. At the same time, as Noord West Connect proves, the establishment of an inland corridor linked with business/logistic routes and activities fitting IWT gives the possibility of bundling of cargo and requires time to prove its efficiency while operating on a regular basis.

4.2.6. #Inland Waterway Transportation System 2.0 project

One of the reasons for the unrealized modal shift to IWT is often explained as due to the lack of modern infrastructure in ports and in proximity to large producers or large industries. Another issue is related to the real availability of such industries across the waterways, the traffic of goods transported to and from their areas of operation by IWT and the real demand for correspondent infrastructure.

The Interreg North Sea Region #Inland Waterway Transportation System 2.0 project¹³⁴ developed “GIS study industrial estates with water-dependent activities & public quay walls”¹³⁵, where evaluation of industrial concentration across the Flemish waterways, its scale (reflected in traffic), the IWT infrastructure allocation in the vicinity and demand for infrastructure renewal were assessed. This analysis was conducted in order to increase the efficiency of IWT infrastructure utilization by connecting to the larger number of industries allocated in the vicinity. Another aim was to identify perspectives and needs for infrastructure development and to establish new transport corridors and logistic routes based on existing underutilized infrastructure and industrial setting. The study was also focusing on the estimation of the need for infrastructure upgrade and modernization to satisfy the needs of IWT. Inventorying the industries and IWT infrastructure available in the proximity gave a possibility to identify unrealized potential for modal shift to IWT by better utilizing existing infrastructure, in particular public quay walls. This approach was also helping to solve an issue of infrastructure availability, as the sector is often blamed for insufficient and poorly-maintained facilities. A rational evaluation of the real needs helps to avoid stranded costs and investment in infrastructure while already having available assets.

A central role is given to optimization and better use of public quay walls. Infrastructure optimization through the shared use of private quays and where it is practically achievable to ensure the smooth-paced mutual alignment of the goods flows and logistical operations of both parties, was considered.

The evaluation gave a possibility to identify misused infrastructure facilities and to assess the rationality of connecting other industrial areas (not using IWT) to these free capacities. Major focus was given to industrial estates adjacent to waterways, which have a strategic position for the achievement of a modal shift. Even though on average industrial areas without necessary transshipment infrastructure represent a smaller share in comparison

¹³⁴ <https://northsearegion.eu/iwts20/>

¹³⁵ vlaamsewaterweg.be/sites/default/files/download/20201015_gis_study_estates_with_water-dependent_activities_final_report_base_for_heat_mapping.pdf

with their water-dependent counterparts, the total surface area (5,400ha) is such that it has potential from the perspective of modal shift.

This study demonstrates an approach to evaluating the real need for infrastructure modernization, but also more rational utilization of existing infrastructure and better connection of existing industrial zones with IWT to enable modal shift for their transshipment activities.

Another study delivered by the Interreg #IWT 2.0 project¹³⁶ focuses on modal shift to small waterways (below CEMT Class Va), which are defined as peripheral ones, located in the hinterland or partially isolated from main routes. The development of such waterways proved to be a particular challenge, as economies of scale couldn't be achieved. The study analyzed German (North-Western region), Swedish (Göta Älv and Trollhättan Canal), Dutch (small and medium waterways of the Province of Friesland) and British (North Great Britain) secondary IWT networks and their potential from the perspective of modal shift. Overall recommendations, based on SWOT analysis conducted for these waterways, emphasized the need for further support to IWT in order to develop, amongst others, navigation on secondary IWT networks.

The study put forward such solutions as: fostering innovations (digitization, automatization and artificial intelligence), infrastructure upgrade, reducing piloting and port fees for IWT, establishing protective measures limiting the number of road permits for over-sized cargo, as well as measures raising awareness among present and future decision-makers in the sector, as key ones to ensure modal shift. Establishing promotion centres for IWT information dissemination, knowledge increase and international collaboration is key to overcoming the threshold of uncertainty and insecurity in terms of IWT potential, existing opportunities and technological/logistical solutions. Creating opportunities for networks of actors by connecting not only large industries, but also SMEs linked to existing players to increase innovativeness, and generally with regards to intra-urban and rural-urban logistics.

IWTs 2.0 has proven that waterborne transport on smaller and previously neglected waterways, as well as in urban "last-mile" transport, can be a feasible and greener alternative to road transport.

4.2.7. Waste transportation by IWT

Research conducted by Bureau Voorlichting Binnenvaart (BVB)¹³⁷ focused on modal shift by evaluating the potential of residual household waste transportation by IWT in the water-bound municipalities in the Netherlands. The study identified routes that qualify for modal shift based on established criteria, such as average transportation distance, volume of cargo and water-bound transshipment location. Main bottlenecks for this type of cargo transportation were evaluated from the perspective of the "packaging method" for the waste in order to transport it by ship, obtaining environmental permits, availability of necessary equipment for waste handling in ports, infrastructure availability, staffing and loading adjustments needed (purchase or lease of (open-top) containers, or a baler).

The evaluation also pointed out the potential role IWT can play in the waste recycling industry. National regulations in the Netherlands are claiming a higher share of recycled waste to be used as a raw material. This means by 2020: 75% reuse, by 2030: 80% reuse and by 2050: 100% reuse. The initiative is driven, among other things, by higher taxes on combustible waste. This means that waste as a raw material and therefore its recycling have big perspectives in terms of transportation of larger volumes between collection points (municipalities) and recycling plants. Implemented projects of waste transportation by IWT and waste processing in inland ports were studied in

¹³⁶ <https://northsearegion.eu/iwts20/output-library/>

¹³⁷ <https://topsectorlogistiek.nl/wp-content/uploads/2022/05/117%20-%20PTL02.069.000.D02%20Eindrapportage.pdf>

D.1.1.: “Report on technology, logistic, communication innovation for IWT market development and logistic integration”¹³⁸, which shows the benefits of a combination of inland shipping and recycling.

It has to be emphasized that in terms of recycling and waste handling, the regulatory framework and overall strategic vision on waste handling in cities, reflected in legal acts and decisions to stimulate waste combustion reduction and support sustainable transportation of waste by IWT, play an important role. Provincial government support for such start-ups is needed. The use of inland shipping can be a strategic choice for this type of cargo.

The study concluded that to realize a modal shift of household residual waste transportation from road to IWT, a provincial or even national approach seems to be necessary. This could be addressed by the freight corridor program based on comparisons from the perspectives of costs and environmental and social benefits.

4.2.8. Other relevant projects and initiatives

The large number of EU projects tackling various issues addressing transport performance from environmental to logistical perspective showing a high importance of IWT to be played in the European economy as regards resilient, efficient, seamless and climate neutral transportation. Today, the European IWT is facing numerous problems and challenges. Climate change dictates the need for a greener industry with low or zero-emissions, proper waste handling (circular economy) and minimization of the overall environmental impact. Moreover, shortage of personnel with a simultaneous increase in the average age of workers in the industry, no single standard for the education and training of future crews of inland navigation vessels, although an appropriate tool is currently being developed for EU Member States. The aforementioned defines a large scope for the projects at EU level tackling various issues related to IWT performance and future development.

IW-NET ¹³⁹

IW-NET is a Horizon 2020 project that focuses on multimodal optimization processes across the EU transport system, increasing the modal share of IWT and contributing to the achievement of the EGD and SSMS GHG emissions reduction targets. The project is also addressing sustainable infrastructure management and the deployment of innovative vessels for an efficient and competitive IWT sector by eliminating existing IWW infrastructure bottlenecks, insufficient IT integration along the chain and the slow adoption of technologies in automation and energy transition (the deployment of low- and zero-emission energies).

Application scenarios in important TEN-T corridors, demonstrating and evaluating the impacts in simulations and tests covering technological, organizational, legal, economical, ecological, and safety/security issues, will be applied to cover 3 aspects of the modal shift:

“1) Digitalisation: through optimised planning of barge operations serving dense urban areas with predictive demand routing (Brussels-Antwerp-Courtrai-Lille-Valenciennes); data driven optimisation on navigability in uncertain water conditions (Danube).

2) Sustainable Infrastructure and Intelligent Traffic Management: lock forecasting reducing uncertainty in voyage planning; lock planning; management of fairway sections where encounters are prohibited; berth planning with mandatory shore power supply and other services (hinterland of Bremerhaven via Weser/Mittelland Canal).

3) Innovative vessels: new barge designs fitting corridor conditions and target markets: barges with a high degree of automation for urban distribution (East Flanders-Ghent); new barge for push boats capable with low/high water

¹³⁸ <https://platina3.eu/market-development-and-logistic-integration/>

¹³⁹ <https://www.inlandwaterwaytransport.eu/iw-net-project/>

levels optimising capacities (Danube from Austria to Romania); use of GALILEO services for advanced driver assistance like guidance, bridge height warning and automatic lock entering (Spree-Oder waterway close to Berlin)".

DTP DIONYSUS¹⁴⁰

The Danube Transnational Program Interreg-funded project focuses on the main regional challenges in infrastructure governance and planning to support Danube transport through the application of targeted approaches for port infrastructure development. The project is based on the results of the DTP DAPHNE¹⁴¹ project on port infrastructure development and Danube Ports Network cooperation.

The DIONYSUS project results are expected to feed into the elaboration of transport corridor development policies by means of gap analysis reports and recommendations. Project had already identified and assessed the shortcomings in rail & road access infrastructure of the Danube ports and consolidated the investment needs based on Market Analyses. By the end of 2022, the project delivered Regional Economic Development Plans to deliver recommendations for their adaptations in line with Danube shipping priorities. Moreover, the project is elaborating specific case studies for Container Liner Services, Agricultural Products Transport Flow in Danube ports and an Infrastructure Master Plan for the River Cruise Industry.

Essential outputs of the project consist of Port Development Plans and Operational and Business models to support quality, sustainable development, and investment decisions. All of the project's outputs will ensure alignment with specific EU Transport, TEN-T and Cohesion Policy objectives, making DIONYSUS a key instrument to contribute to EUSDR implementation.

LASTING project¹⁴²

The LASTING project is conceived to ensure the engagement of different stakeholders from IWT sector in European RD&I activities by developing a communication strategy, and implementing a long-lasting communication campaign beyond the lifetime of this project, ultimately increasing stakeholder engagement in the sector and thereby increasing the impact of European waterborne transport RD&I. This approach will address a lack of communication and collaboration between the sector's main actors and therefore ensure the development of a consolidated vision towards improving IWT performance in the future.

An essential element of the communication strategy will be the development of a so-called "plug-and-play system" for participation in European, national or regional strategic maritime and/or inland waterway transport events. This new system will be tested on a number of occasions to ensure its fitness for purpose. The main focus of public involvement and dissemination of the project communication strategy will be the use of digital tools to ensure that waterborne transport community will easily follow the concept launched in the framework of LASTING.

COMPETING¹⁴³

The COMPETING project is focused on creating the base for the introduction of competency for education and training for IWT crew at EU level. Future certificates will be recognized throughout Europe. Sustainable solutions, automation and digitalisation as well as communication on a European level will be part of the education and

¹⁴⁰ <https://www.interreg-danube.eu/approved-projects/dionysus>

¹⁴¹ <https://www.interreg-danube.eu/approved-projects/daphne>

¹⁴² <https://www.waterborne.eu/projects/coordination-projects/lasting/about-lasting>

¹⁴³ <https://www.iwt-competencies.eu/competing/>

training programmes will be achieved. The ultimate goal of the project is to increase labour mobility in the inland shipping sector. COMPETING is Erasmus+ project.

COMPETING will develop curricula and lesson materials, as well as a Quality Assurance and Quality Control (QA/QC) system, to ensure the highest level of quality concerning the implementation of future proof IWT education and training throughout the EU. The duration of COMPETING is foreseen until the 31st March 2022.

The COMPETING consortium consists of different categories of stakeholders: from IWT education and training institutes to various social partners (employers and unions) representing the industry and crew members working in the industry, competent authorities and organisations.

DIWA¹⁴⁴

Masterplan Digitalisation of Inland Waterways (DIWA) is a CEF funded project aiming at developing a digitalisation strategy for IWT in the period 2022 - 2032. The project started in 2019 and lasted until the end of 2022. The project area covers altogether five European countries that joined forces under the coordination of the Dutch Waterway Administration Rijkswaterstaat with the common goal of realizing a Digitalisation Masterplan.

The DIWA Masterplan considers the requirements put on digital transition related to cybersecurity, standardisation, rules and regulations, security and privacy. A digital information infrastructure is also addressed as an essential element of the digital transition with respect to the quality of data and information. The Masterplan focuses on procedures and processes for quality management during the implementation and operation of the digital waterway infrastructure. It will include a set of implementation scenarios covering the technical, organisational, financial and operational consequences each beneficiary will face in the digitalisation process.

The DIWA Masterplan is closely linked to RIS developments, national and EU-funded projects (such as Corridor Management projects CoRISMa and RIS COMEX). It is also expected that it will become a basis for digitalisation of IWT for fairway authorities.

FENIX¹⁴⁵

FENIX is another CEF-funded project aiming to support the development, validation and deployment of digital information systems along the EU transport Core Network.

FENIX will develop the *first European federated architecture for data sharing*, serving the European logistics community of shippers, logistics service providers, mobility infrastructure providers, cities, and authorities in order to offer interoperability between any individual existing and future platforms. The idea of FENIX comes from the recommendations of the DTLF to create federative network of platforms as enabler for Business to Administration (B2A) and B2B data exchange and sharing by transport and logistics operators.

FEDERATED¹⁴⁶

FEDeRATED is another EU-funded project for digital cooperation in logistics that aims to develop the foundations for a secure, open and neutral data sharing infrastructure through practical Living Labs. Amongst others, project aims for implementation of eFTI Regulation, in particular regarding:

- support interoperability in supply and logistics chains;

¹⁴⁴ <https://www.masterplandiwa.eu/>

¹⁴⁵ <https://fenix-network.eu/>

¹⁴⁶ <http://www.federatedplatforms.eu/>

-
- demonstration of the functioning of federative platform as proposed by DTLF;
 - initiation of the implementation of the federated network of platforms concept;
 - identification of the conditions allowing different stakeholders to use federated data sharing platforms;
 - facilitation of seamless and cross bordering multimodal freight transport, cross bordering harmonised data interoperability, and data sharing between relevant actors;
 - enabling paperless transport in all transport modes via concrete actions and large-scale collaboration;
 - support eGovernment, including a one-stop shop and only once reporting functionalities, and a corridor management information system approach;
 - fostering a future proof approach allowing current data distribution mechanisms to evolve into a data sharing environment, i.e. multiple (re-)use of data;
 - developing a reference architecture for a sustainable data sharing environment;
 - fostering seamless cargo flows along TEN-T corridors.

PLANET¹⁴⁷

The PLANET project addresses the challenges of assessing the impact of emerging global trade corridors on the TEN-T network and ensuring effective integration of the European to the Global Network by focusing on two key R&D pillars:

“- A Geo-economics approach, modelling and specifying the dynamics of new trade routes and their impacts on logistics infrastructure & operations, with specific reference to TEN-T;

- An EU-Global network enablement through disruptive concepts and technologies (IoT, Blockchain and PI, 5G, 3D printing, autonomous vehicles /automation, hyperloop) which can shape its future and address its shortcomings, aligned to the DTLF concept of a federated network of T&L platforms.”

The PLANET project goes beyond strategic transport studies and ICT for transport research by means of modelling, analysing, demonstrating and assessing their interactions and dynamics, thus providing a more realistic view of the emerging T&L environment.

ENTRANCE¹⁴⁸

The ENTRANCE project is focused on two aspects: sustainability and innovation. It offers a common and legitimate European Matchmaking Platform and complementary services that help mobilise financial resources to accelerate market access. It also promotes sustainable transport options to reduce CO2 emissions and pollutants caused by the transport and mobility sector. As described by the ENTRANCE project itself, the concept lies in the “supply-demand-finance” triangle that is envisaged for all transport and mobility modes and all relevant stakeholders.

Through the ENTRANCE Matchmaking Platform transport solutions are analysed from the perspective of emissions and the most sustainable options are provided for potential clients/shippers. Sustainable options provided via the European Matchmaking Platform are backed up with financing opportunities, knowledge on good practices for the deployment of innovative solutions and applicable legislation.

¹⁴⁷ <https://www.planetproject.eu/>

¹⁴⁸ <https://www.entrance-platform.eu/>

Knowing that choosing a sustainable transport option is often a task put on freight forwarders, brokers, logistic service providers, certain activities of the project are dedicated to training to bridge the gap between innovative solutions and the market. In addition, to de-risk the uptake of innovative solutions, ENTRANCE facilitates purchase aggregation through matchmaking activities and by setting up a neutral trustee for the orchestration of purchase aggregations.

Access to finance is supported through an online funding program database and individual and personalised innovation finance advice and support are offered. The funding advice combines public funding, private investment opportunities, and the best mix of alternative finance models for solution providers.

MAGPIE¹⁴⁹

sMArt Green Ports project - as Integrated Efficient multimodal hubs – is one of the flagship projects in relation to the implementation of clean energy infrastructure on IWW and in ports. The project has the ambition to ensure a breakthrough in the supply and use of green energy carriers in transport to, from and within ports. High priority is given to energy efficiency and the support of broad production and application of green energies in the transportation sector. Certain attention is also given to digitalization and automation to contribute to the decarbonization of port-related transport. One of the important outcomes of the MAGPIE project is going to be the Masterplan for European Green Ports, a roadmap and a handbook to accelerate the development of sustainable maritime and inland European ports. The handbook will be based on the demonstrations within the MAGPIE project and contain insights from research and other case studies. The handbook will also give guidance on how to move from planning to implementation, replication and scaling of the demonstrated solutions and results. This will apply to the different types, sizes, and geographical locations of ports across Europe.

PIONEERS¹⁵⁰

The PIONEERS is another flagship project that addresses the European ports in the light of energy transition and emission reduction targets while remaining competitive in a sector. These challenges are aligned with the European Green Deal's main objective to make Europe climate neutral by 2050.

The PIONEERS project identifies so-called “lighthouse” ports that provide demos for smaller “fellow” ports. As an example, the Port of Antwerp-Bruges, which operates the biggest port area in the world and is pioneering in the efforts towards a climate neutral port, will demonstrate the applicability and feasibility of application of sustainable solutions for other ports. On the other hand, the ports of Barcelona, Constanta and Venlo represent the ideal mix of size, location, operation models and area of influence to test these demonstrations during the project lifecycle.

The PIONEERS project identified a set of five objectives following below:

- Reduce the port's total environmental footprint by introducing Clean Energy production, storage and supply;
- Deploy sustainable port infrastructure beyond energy supply and demand;
- Introduce eco-friendly improvements relying on digitalization and new methods of operation;
- Co-define and transfer PIONEERS` demonstrations to fellow ports during the project lifecycle;

¹⁴⁹ <https://www.magpie-ports.eu/>

¹⁵⁰ <https://pioneers-ports.eu/>

- Deliver and disseminate Port Master Plan for the transition towards GHG-neutral shipping and wider multimodal mobility by 2050.

RH2INE¹⁵¹

Rhine Hydrogen Integration Network of Excellence (RH2INE), endorsed by the Dutch Ministry of Infrastructure and Water Management, is an initiative of the Province of Zuid-Holland and the Ministry of Economic Affairs, Innovation, Digitisation and Energy of North Rhine-Westphalia.

RH2INE provides a comprehensive corridor approach to one of the key priorities of CEF, i.e., “enabling and strengthening the synergies between energy, transport and telecom”. Focusing on the EU’s ambition to become the first zero emission continent, RH2INE seeks to realise market-ready hydrogen applications along one of the EU’s oldest core network corridors, powered by the first sustainable and interoperable gas and electricity networks in the world.

RH2INE is making a first step towards a zero-emission transport corridor by developing the right conditions and infrastructure for the use of hydrogen for the inland transport chain, e.g., inland shipping, freight transportation by road and rail for the last mile.

RH2INE will stimulate a targeted structural demand for hydrogen in the mobility sector, aligned with a sustainable hydrogen supply network. The transition to a zero-emission transport sector will accelerate a new sustainable economy alongside the Rhine-Alpine corridor and an improved quality of life for the people living and working there.

Watertruck+¹⁵²

The Watertruck+ aims to reactivate small inland waterways by introducing a new concept for inland waterway transport. The initiative introduces an economically feasible alternative to oversaturated road transport via a flexible model of IWT that is complementary to current waterway transport. It provides a universal standard design for various types of small inland barges. The standard design can be modified to satisfy the operational requirements of a specific goods flow (cargo flow): propulsion, hatches, lifting (pumping) systems, a small crane, etc. can be added or removed without having any major impact on the overall hull structure.

This project is the successor to the previous Interreg-funded project Watertruck, which conducted a number of studies, complemented by demonstrations on Belgian, Dutch and French IWW. Watertruck+ is focused on modal shift, targeting cargo flow redistribution through enhanced interconnectivity and interoperability between the TEN-T core network and smaller inland waterways. It creates maximum flexibility while maintaining maximum regional coverage by connecting small inland waterways with the TEN-T network.

The Watertruck+ targets the potential of inland waterways of West Flanders and Kempen and aims to achieve a solution that is complementary to the existing inland waterways activities. The aim is to equip the IWT market with business cases for a large European fleet by rolling out the Watertruck concept in various European regions.

It has to be mentioned that, as well as other EU-funded projects, Watertruck+ is considering IWT emissions reduction by: examining the fuel type; studying applications of alternative fuel types such as LNG, CNG, hydrogen, and hybrid; determining the propulsion type; decoupling loading from unloading; optimizing payload and efficiency because accommodation is no longer necessary and looking for options to grow the carrying capacity of fleets.

¹⁵¹ <https://www.rh2ine.eu/>

¹⁵² <https://watertruckplus.eu/about>

DINA¹⁵³

To address the digitalization of IWT, Digital Inland Waterway Area (DINA) expert group was established by the EC to interconnect information between IWT's stakeholders and with other transport modes. The DINA framework addresses the interdependences between solutions, actors and their digital systems identifying vertical, horizontal, operational and administrative integrations and possible ways of their implementation.

The DINA objectives are based on:

- Extension of RIS with real time data: providing additional (real-time) data, making them more interoperable and making the more useable for barge operators using new on-board e-IWT tools and apps.
- Data platform for barge operators: allowing them to control their own data and operations. This should allow barge operators to share data in a controlled way with other stakeholders such as public authorities (for reporting purposes), (inland) ports and terminals.
- Integration with booking and transport management platforms of shippers and logistic service providers: this should provide better visibility and a better integration of IWT in the full logistics chain covering multiple modalities.

RIS COMEX¹⁵⁴

The general objective of RIS-COMEX is to make services available at the corridor level to improve corridor management. Corridor management aims at supplying RIS to support fairway users and logistic parties, not just locally, but on a regional, national and international scale. It adds new services to the existing RIS. The supplied services in corridor management are all information services and thus support navigation and transport management on the network. In order to provide these services, an information system known as EuRIS¹⁵⁵ was finalised and grouped together all the necessary information for corridor management. For the logistical aspects, for example, it includes the position of the vessels and allows the calculation of estimated arrival times at destination. This information takes into account the state and development of the traffic and infrastructures with, for example, times and waiting times at the locks. As an illustration, a EuRIS experimental module was tested which allowed predictions to be made on the level of traffic in the 6 to 12 hours that follow, as well as calculating the impact on the estimated arrival times.

CEERIS¹⁵⁶ is intended to be a one-stop shop platform for administrative formalities on the Danube. It enables a boatmaster to enter, just once, all the information required by the police regulations of the countries he will pass through during his voyage, with the software then taking care of sending the various authorities the forms required by local regulations.

¹⁵³ <https://www.inlandwaterwaytransport.eu/digital-inland-waterway-area-towards-a-digital-inland-waterway-area-and-digital-multimodal-nodes/>

¹⁵⁴ <https://www.riscomex.eu/>

¹⁵⁵ <https://www.eurisportal.eu/>

¹⁵⁶ <https://ceeris.eu/>

5. Summary of regulatory and policy measures in the scope of other deliverables of WP 1 - Market

The WP1 – “Market” of PLATINA3 project focuses on various aspects of IWT market development, targeting amongst others:

- development of new markets addressing needs for further technological, logistical and marketing/communication innovations supporting modal shift and decarbonization, attracting higher cargo volumes, as well as focusing on promising market segments, new trading routes and urban areas;
- R&D actions to accommodate new cargo types on inland waterways (for standardized transport units; for vessel designs, transshipment infrastructure, etc.) and to enable the access of new types of goods and new markets to IWT;
- better integration of IWT into smart, synchromodal value chains to increase the efficiency, reliability and safety of the whole European transport system;
- assessment of existing barriers preventing parties in the logistic chain (cargo-owners, barge owners/operators) from switching to/investing in modal shift solutions and synchromodal supply chains; collecting best practices and recommendations for future actions;
- measures to encourage key stakeholders (barge-owners, barge-operators) to be more proactive in marketing and sales and facilitate this by an appropriate communication strategy.

Considering that all deliverables of WP 1 tackle an issue of modal shift and directly or indirectly addressing regulatory and policy measures for better use of IWT, the current deliverable, among other, collects the findings of all WP 1. The main focus is the need for regulatory actions and policy measures in perspective of aforementioned aspects of development of IWT market. Policy recommendations given below supplement the overall recommendations of the current deliverable and are reflected in the last chapter.

5.1. Technology, logistic and communication innovation for IWT market development and logistic integration

PLATINA3’s Task 1.1: “Increased modal shift and decarbonisation”, which assesses needs for further technological, logistical and communication innovations to support modal shift, in view of attracting higher cargo volumes and supporting decarbonisation, based on identified new and growing markets.

The scope of the report is limited to analysing the obstacles and opportunities for modal shift to IWT overall but mainly in selected new and growing freight markets. The passenger segment is out of scope. Marketing and communication as additional tools to strengthen modal shift are also explored.

The term “new and growing markets” describes, on the one hand, market segments where IWT is either not yet present or in an early stage of development and could be considered in the coming years as a suitable transport solution. On the other, it refers to existing markets with strong potential for further growth. New and growing markets can determine future products transported by inland vessels, but they often imply new types of logistics, vessels, and operations.

The 3rd PLATINA3 Stage Event (10-11 February 2022) featured discussions on new and growing markets which might trigger modal shift towards IWT.¹⁵⁷ The following options were discussed: urban logistics, waste / biomass transport, circular economy / new materials, new energies, including hydrogen and other alternative fuels, new trade routes, connections to TEN-T corridors, core and comprehensive networks, container transport.

These new and growing markets are needed to respond to a decrease or saturation of existing markets (e.g., transportation of coal, ore, oil products). On the demand side, several commodity segments have reached saturation, the energy transition changes product composition, and world trade is experiencing structural slowdown. On the supply side, more difficult navigation conditions are expected to intensify due to climate change, while low water events stress the need to diversify operations towards urban logistics where water levels fluctuations are much less severe.

Main results of the analysis and recommendations in the scope of new markets development

IWT offers clear opportunities for modal shift in urban settings where navigable waterways are available and shows the viability of IWT despite competitive pressure from road transport. Inland navigation can move such goods in different forms (pallets, barrels, containers, bulk, etc.) and is able to scale easily while benefitting from alternative and renewable energy solutions. Demographic growth, in combination with saturated and sensitive road infrastructure, vibrations, accidents, noise emissions and other negative externalities provoked by road transport in cities, are all important factors which raise IWT's attractiveness. Therefore, the current focus on urban mobility could be a crucial opportunity for IWT to seize.

New transport flows resulting from circular economy activities are certainly an opportunity for IWT, particularly in an urban setting. IWT could serve as an ideal transport solution to spearhead the development of circular economies while enabling more efficient waste management, valorisation, and storage in urban environments.

It is expected that new transport opportunities for inland navigation will also emerge in the wake of the energy transition (e.g., biofuels, hydrogen carriers, project cargo, such as wind turbine blades and components and other infrastructure and hardware needed for the energy transition). In particular, IWT can be used to distribute alternative fuels and energy sources such as biofuels, other hydrogen carriers and e-fuels, albeit requiring possible adaptations depending on the fuel distributed. Should larger volumes of such fuels be imported overseas from other continents via seagoing vessels, IWT will appear as a logical follow-up to transport them to the hinterland from major European seaports (e.g., Rotterdam, Antwerp, Amsterdam, Constanta, Hamburg, Le Havre, Marseille).

For instance, there is growing interest at European level for hydrogen as a clean energy source. Its applications are manifold (industry, transport sector, power generation) and demand has been steadily growing since 1975. While it is today overwhelmingly produced from fossil fuels, hydrogen can be produced from renewables (i.e., electrolysis using green energy from wind, water or solar), meaning there is significant potential for emissions reduction from a life cycle point of view. As hydrogen can be transported via maritime vessels, inland vessels, and pipelines, it is a promising cargo for IWT, especially if combined with new, innovative tanker designs, LOHC technology, and integrated into regional and global value chains through ports.

Finally, due to its high carrying capacity and size, IWT offers a significant comparative advantage for heavy cargo transport, especially on the Rhine and Danube. Road options cannot match these features in such a price-competitive way in most cases. In fact, some exceptionally high and heavy cargo can only be transported via waterborne options, either inland or maritime, as in the case of large machinery equipment and factory parts. Container transport on European inland waterways takes place mainly in Rhine riparian countries (as well as

¹⁵⁷ Presentations made by: Daan Schalk "New market opportunities and strategies"; Geer van Overloop "River Drones: innovation as a driving force for modal shift"; Heinrich Kerstgens "Decarbonisation of logistics and modal shift towards inland waterway transport"; Norbert Kriedel "New market opportunities in inland navigation transport"; and Thierry Vanelander "How to increase IWT market share?".

Belgium and Luxembourg), with over 99% of IWT container transport in Europe. Experiments are currently underway to make it a significant market segment on the Danube as well, mainly to replace the predicted decline of bulk cargo transport and building upon the already established reverse empty container flows on this waterway, which currently operates far below its potential capacity.

This report shows, firstly, that new markets exist, some with higher potential than others. Secondly, it is not a given that inland navigation will penetrate such new markets. In most cases, adaptations will be necessary in terms of logistics, vessel technology, design and/or size. Commercial, logistical and technological challenges will arise and be affected, inter alia, by the degree of intermodal competition.

Increasing usage of all communication and marketing possibilities will enable IWT operators to influence and inform other economic actors on the importance and advantages of IWT, namely reliability, economic efficiency, efficient use of available infrastructure capacity and sustainability. In other words, electronic communications and marketing inform and demonstrate to the wider economic operators the benefits of using IWT as a permanent business option.

Despite these promising avenues for growth, several obstacles remain to be overcome to enhance modal shift to inland navigation. These include tackling congestion at seaports and seaport-hinterland transport inefficiencies, adapting to low/high water events to ensure IWT's long term reliability, developing additional financing opportunities, including for supporting innovative pilot projects. Improving communication about such funding opportunities as well as about the pertinent regulatory framework, and more generally, building awareness of IWT's potential as a promising modal choice for any European shipper is a key stimulus for modal shift.

Furthermore, it is expected that modal shift to IWT will not thrive if the sector does not realise its energy transition. Indeed, rapid developments on the side of other modes put pressure on the speed of the energy transition in IWT. Without strong and rapid interventions to support the energy transition of the IWT sector, inland navigation's environmental advantage might be quickly eroded, deteriorating the rationale for a modal shift from road to IWT.

From regulatory and policy perspective this deliverable is concluding on following:

- the development of new markets is strongly dependent on the regulatory and political spheres, among others, with regards to energy transition and the development of new technologies.
- sectoral willingness to undergo modal shift is insufficient on its own to achieve large-scale modal shift. Targeted policies, regulations, and legislation to channel the necessary investment and stimulate innovation are needed. Building awareness of IWT's potential as a promising modal choice for any European shipper can be seen as one of the key incentives for modal shift.
- reduced negative externalities (pollution, noise, congestion, safety, etc.) are getting more attention nowadays in view of regulatory compliance as well as corporate responsibility. However, there is certainly no full internalization of external costs yet, resulting in a lack of incentives for using inland waterway vessels instead of trucks to perform the main haul of the transport.
- further improvement of information flows and data exchange in IWT may require new thinking on the accessibility of public information by private economic operators, under strict conditions, the exchange of economically sensitive information of superior interest and the implementation of current regulations such as the Data Governance Act¹⁵⁸ or the eFTI Regulation to enhance the logistic performance of IWT.

¹⁵⁸ Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act).

- continued funding of pilot projects testing the impact and economic viability of transport, technological and logistic innovations, to gain knowledge of new technologies, identify and address economic, financial, technical and regulatory obstacles to their deployment.

5.2. Gap analysis on R&D to promote market uptake conditions

Deliverable D1.2 of PLATINA3 is entitled 'Gap analysis on R&D actions to promote optimal market uptake conditions'¹⁵⁹ and focuses on the potential market update of standardised transport units, vessel designs, transshipment infrastructure, and other technical assets. This will eventually enable the access of new types of goods and new markets to IWT.

The report provides an overview of new and innovative ideas around IWT in general, and standardised transport units, vessel designs, and transshipment infrastructure more specifically. This inventory is used to analyse the market gaps which must be overcome in order to put such innovations in place and then, eventually, the needs for a market update, potential tools, and incentives are discussed in more detail.

The inventory has shown that there are a couple of trends observable when looking into innovation and development such as i) automation due to increased digitalisation, Information and Communication Technology (ICT) knowledge, and the Internet of Things (IoT), ii) alternative fuels to assist in de-carbonisation, iii) electrically driven vehicles especially for shorter distances, iv) alternative transport modes such as magnetic levitation or guided tube concepts, and v) new materials which might assist in reducing construction and maintenance costs, durability, reliability, and speed of constructions. Furthermore, six clusters influencing IWT (EU policy, new markets, external drivers, enabler, barriers, and innovation) have been identified all of which bring together specific topics which either have an influence on IWT or a bi-lateral relation.

Based on this inventory, an analysis of gaps has been performed which resulted in some key gaps/barriers for implementing the upcoming innovations and trends like i) a missing roadmap to modal shift and inter-/multimodal transport, ii) difference in regional boundary conditions (e.g. droughts in the Rhine, missing containers and infrastructure in the Danube, etc.), iii) difference in interests of stakeholders due to 'river focus' (e.g. Rhine or Danube), EU focus (EU perspective), country focus (national focus), etc., iv) primary focus on costs of transport, v) insufficient financial support, especially for large investments which cannot be carried by the sector alone, vi) lack of legislation and standardisation (for many different topics), vii) lack of workforce skills which have not been adjusted yet to any of the new developments and upcoming trends; and viii) shortage of time to implement all changes if the ambitious EU goals for the sector should be reached according to the envisaged timeline.

In the last part of the report, the focus is on potential measures to trigger market update and to make a modal shift happen. This part is based on the inventory performed and gaps identified and suggests to:

- raise awareness of advantages of inland waterway transport by information campaigns;
- provide tools to calculate the advantage of a shift (business case);
- provide a scale for 'measuring' advantages of inland waterway transport (costs per tkm, CO2 and GHG emissions, etc.);
- provide maps and comparative calculators for transport which allow to either book IWT directly or combine it with different transport modes;
- trigger an agreement on universal loading unit(s) for intermodal transport and to be used across different transport modes and the 'last mile';

¹⁵⁹ <https://platina3.eu/gap-analyses-on-rd-to-promote-market-uptake-conditions/>

- stimulate modal shift by legislative and financial incentives, both national and EU-wide. For the shift to intermodal transport various measures were discussed dealing with loading units, transshipment infrastructure, digitalisation, legislation and standardisation, and re-skilling of workforce.

Any major shift, whether it is towards the use of alternative fuels or batteries, or towards different transport mode concepts will require awareness raising and providing easily accessible tools which provide more information and reasons for the shift. Some potential tools have therefore been listed, ranging from mapping tools, over cost and business calculation tools, to waterway information (RIS) tools and smart mobility tools. Eventually, financial, legislative, and policy incentives have been briefly discussed to foster the necessary mind shift in order to reach the objectives of the Green Deal and Single Market.

5.3. Best practices, recommendations on further integration of IWT in synchromodal logistics chains

Deliverable D1.3.: “Report on best practices, recommendations on further integration of IWT in synchromodal logistics chains”¹⁶⁰ focuses on synchromodality as a logistics concept that strives to increase the share of rail and inland waterway transport in the overall transportation modal split. Addressing the insufficiency and partial absence of common processes, a common language and common standards for interoperability as key obstacles to achieving the integration of transport chains, D1.3. is analysing main enablers of synchromodal transport. It states that, despite its importance, synchromodality is at an early stage, both from a research and practice perspective. The existing contributions are sparse and treat only one or a few aspects of the matter.

The concept of synchromodality is presented in D1.3. from a supply chain perspective. When supply chain impacts are considered, there is a high possibility of significantly increasing the share of multimodal transportation without increasing total logistics costs or reducing service levels. For these purposes, synchromodality can contribute to significantly reducing the environmental impact of freight, allowing for cost savings since the best and most efficient transport mode is selected.

Moreover, any supporting technology to be applied should be highly reliable, accessible, affordable and as generic as possible. Interactions between stakeholders must be easily established at a cost affordable to all. Supply chains need to be more efficient by providing state-of-the-art visibility and collaboration capabilities. Above and beyond the proper design of infrastructures and services, the operational control of the execution of transport processes should be optimised through, for example, improved synchronisation.

D1.3. is targeting synchromodality, considering the further greening of the IWT sector together with climate-resilient vessels and digitalised vessels, as a tool to further support modal shift.

From a regulatory and policy perspective, D1.3. emphasizes the following:

- Harmonized transport regulations are indispensable for a functioning synchromodal network. Liability for the transport, especially for any delay, loss or damage, which might not always be clear when the mode is switched spontaneously is an important aspect to address. Concluding unambiguous service level agreements topped up with proper insurance agreements is therefore highly recommended. Boundary conditions for data sharing are also vital with regard to the necessary collaboration between the stakeholders. Basically, legal security must be ensured for all involved parties.
- It is important to raise awareness about the advantages of synchromodal transport and to generate a mental shift among customers. If customers insist on booking specific modes on specific transport routes, the

¹⁶⁰ <https://platina3.eu/download/integration-of-iwt-in-synchromodal-logistics-chains/>

logistics service provider lacks the freedom necessary to optimize his transport flows in a synchromodal way. The mental shift also includes that all players must be aware that not the preparation of the transport itself is the primary feature of the service performance, but rather the capability to respond to certain incidents and choose the right alternative in this case.

- Shippers (manufacturers, retailers), carriers and other providers of logistics services should take the broader sustainability goals into the economic equation. This requires ways to base decision-making in the system not only on financial and market criteria but also on safety, security and environmental/ecological aspects. In particular, transnational governance and regulation is needed to achieve such a cultural shift, and to encourage collaboration, coordination and horizontal partnerships.
- Adaptation of the regulatory framework in the context of artificial intelligence in transport processes, supporting innovations while at the same time ensuring respect for fundamental values and rights. The measures already taken include general strategies on artificial intelligence and rules that support the technologies enabling the application of artificial intelligence in transport. In addition, the EU provides financial support, in particular for research. This is addressed through the work and development of CESNI/TI, CEF Building Blocks to ensure interoperability between IT systems and facilitate the delivery of digital public services across borders.
- Need for reviewing and defining new data governance structures for synchromodal solutions, defining business models (cost-efficient and green), and defining regulatory roadmaps and policy recommendations.

All in all, promoting synchromodality at the logistics service provider level shall be a facilitator for inland waterway transport, whereas a shift towards a more environmentally-friendly transport mode is urgently needed in order to decarbonise the European logistics sector, the synchromodal concept being no doubt a promising solution for the future of freight transport.

5.4. Economic barriers to modal shift: challenges & best practices; recommendations

The objective of the work carried out under D1.4 was to identify facilitators and barriers -- economic and financial -- preventing the potential for freight modal shift to inland waterways transport. To this end, it investigated from a micro-perspective approach key factors underpinning modal choice and modal shift with the aim of identifying support actions and measures which could assist the IWT sector in its quest for achieving a higher share of modal shift at EU level. The micro approach is a more supply chain specific or individual tailor-made approach which identifies the potential for modal shift on company level taking into account the decision-making process of the shippers.

In this deliverable, economic barriers to modal shift refer to factors that prevent or discourage transport companies and shippers from choosing alternative modes of transport that are more environmentally sustainable or cost-effective. These barriers can include high initial costs, limited infrastructure, lack of government support, and market distortions, among others. Economic barriers are often broader in scope and affect multiple actors in the economy, such as businesses, consumers, and governments. On the other hand, financial barriers, also considered within the context of this deliverable, refer to factors that limit or impede economic activities due to financial reasons, such as insufficient access to credit or capital, high interest rates, and lack of financial resources.

Public policies and support measures by policy makers at national and regional level can be developed to encourage and facilitate the shift towards IWT, address key barriers and create more favourable framework conditions for IWT. It is important to note that the specific policies and support measures implemented will vary depending on the specific context and needs of each country or region.

Possible recommendations for support and modal shift promotion measures:

By understanding the different phases of modal shift, stakeholders can develop strategies that take into account the unique challenges and opportunities of their specific context, and work towards a more sustainable and efficient freight transportation system.

Public policies and support measures can be developed along the three phases of modal shift to inland waterways to encourage and facilitate the shift towards IWWs, as follows:

In the inertia phase¹⁶¹:

- Education and awareness campaigns: Policy makers work with industry stakeholders to develop educational and awareness campaigns to promote the benefits of inland waterway transportation and increase awareness of the infrastructure and equipment needed to use this mode of transport.
- Research and development: Investment in research and development helps to identify opportunities to improve the efficiency, reliability, and safety of inland waterway transportation.

In the modal shift phase¹⁶²:

- Financial incentives: Governments offer financial incentives, such as tax credits or subsidies, to companies that shift their transportation operations to inland waterways.
- Infrastructure investment: Governments invest in infrastructure improvements and upgrades, such as the construction of new ports and waterways, to support the increased use of inland waterway transportation.
- Regulatory support: Governments provide regulatory support, such as streamlined permit processes and exemptions from certain regulations, to make it easier for companies to use inland waterways and ports and to build terminals and quays.
- Industry collaboration: Industry stakeholders work together to develop more efficient logistics and supply chain management processes that integrate inland waterway transport into existing operations, one-stop-shop solutions for shippers.

In the maturity phase¹⁶³:

- Continued investment in infrastructure and technology: Continued investment in infrastructure and technology helps to further improve the efficiency and reliability of inland waterway transport.
- Encourage competition and collaboration: Encouraging competition in the market helps to ensure that companies have access to the best possible services at the lowest possible cost. In addition, collaboration can support the development of synchro modal solutions to make best use of available network capacities and efficiencies.
- Research and development: Ongoing investment in research and development helps to identify new opportunities to improve the sustainability and efficiency of inland waterway transport.

¹⁶¹ The inertia phase refers to a period of time when there is resistance to changing from one mode of transportation to another, despite the potential benefits of doing so. This resistance may be due to a variety of factors, including lack of information or awareness about alternative modes, a preference for established routines, or perceived risks or uncertainties associated with switching to a new mode.

¹⁶² During the modal shift phase, businesses and individuals may begin to use more sustainable modes of transportation. This may be driven by a variety of factors, including incentives or subsidies for using more sustainable modes, changes in pricing or regulations that make these modes more competitive, or improvements in the infrastructure and technology that support these modes.

¹⁶³ During the maturity phase, the use of more sustainable modes of transportation becomes more widespread and established, and the necessary infrastructure and operational changes are fully developed and optimized, thus implying limited incentives to shift cargo. At this point, the market potential is reached with a new equilibrium in modal shares.

Competition to inland waterway transport from other modes of transport, such as road or rail, is a major issue in the modal shift context. Both road and rail offer some advantages over inland waterway transport, such as faster and more flexible transportation options for smaller volumes of goods, and in some cases, a wider range of origin and destination locations. In addition, they may have more developed and efficient infrastructure and logistics networks, which can offer cost savings for certain types of shipments.

To compete with these other modes of transport, inland waterway transport operators and stakeholders may need to focus on improving the reliability and speed of their services, reducing the costs and time associated with transshipment and other pre- and post-transport activities, and addressing other barriers to the wider adoption of inland waterway transport, such as regulatory and administrative burdens, and limited market size and competition.

Additionally, there may be opportunities to explore new business models and partnerships with other transport modes, such as multimodal transport solutions and synchro modality (see PLATINA Deliverable 1.3), which can help to address some of these challenges and promote greater use of inland waterway transport. It involves the use of different transport modes to move goods from origin to destination. Inland waterway transport can be integrated with other modes, such as road, rail, and sea transport, to create a more efficient and sustainable logistics chain. This requires close cooperation between the different transport operators, as well as investment in the necessary infrastructure and equipment, such as intermodal terminals and intermodal load units (containers) which can be exchanged between road, rail, IWT and sea transports.

Another example is granting road haulage permits selectively which may be an effective way for authorities to promote the use of inland waterways for freight transport. By giving preference to companies that are willing to make greater use of waterways, authorities create an incentive for companies to shift away from road transport and towards more sustainable modes of transport. We suggest the following courses of action for authorities to grant permits selectively:

- Offering incentives: Authorities offer incentives, such as tax breaks or subsidies, to companies that use waterways for transport which can help to offset the costs of shifting to waterway transport and encourage companies to consider this option.
- Imposing higher fees or restrictions: Authorities impose higher fees or restrictions on companies that rely solely on road transport. As an example, authorities impose higher tolls or congestion charges on trucks, or restrict the use of certain roads or routes to reduce congestion and emissions. This would create a disincentive for companies to rely solely on road transport and encourage them to explore alternative modes, such as inland waterways.
- Prioritizing permits: Authorities prioritize permits for companies that make greater use of waterways for transport. For example, authorities give priority to companies that use waterways for a certain percentage of their freight transport, or to companies that have invested in infrastructure or equipment to support waterway transport.

Another potential business model is the use of digital platforms to optimize the use of inland waterway transport. These platforms provide real-time information on vessel availability, cargo volumes, and transport routes, allowing shippers to make informed decisions about which mode to use and when. They also facilitate collaboration between different transport operators, enabling more efficient use of resources and reducing costs.

Partnerships between public and private stakeholders can also play an important role in promoting inland waterway transport. Public authorities invest in infrastructure, provide financial incentives, and support the development of new business models, while private operators bring their expertise and experience to the table. By working

together, these stakeholders help overcome some of the barriers to modal shift and promote the use of more sustainable transport modes, including inland waterway transport.

Some potential recommendations that policy makers could consider to eliminate financial and economic barriers to modal shift from road to inland waterway transport:

1. Establish funding mechanisms to support the development and maintenance of port, terminal and inland waterway infrastructure, which helps to reduce infrastructure costs for shippers. But they need to be structural and not campaign based.
2. Implement regulatory measures that promote fair competition between different transport modes and encourage the use of environmentally sustainable modes like inland waterway transport.
3. Promote the development of innovative business models and partnerships that enhance the competitiveness of inland waterway transport, such as multimodal / synchro modal transport solutions.
4. Provide financial incentives or subsidies to shippers that make use of inland waterway transport, such as reduced port fees or fairway dues. As an example the recently launched initiative in the Netherlands whereby the Dutch Government contributes 20,- Euro for each container taken from the road and moved to IWT.
5. Reduce administrative burdens associated with customs and border police formalities, particularly in cross-border sections between Schengen and non-Schengen states, to facilitate more seamless and efficient transport operations.

These are just a few potential recommendations that could help to eliminate financial and economic barriers to modal shift from road to inland waterway transport. The most effective measures will depend on the specific context and needs of each country or region.

Also, setting up a promotion centre for modal shift to inland waterways would be a useful strategy to encourage and facilitate greater use of waterborne transportation for freight movement. This is especially relevant for countries where IWT is relatively unknown and small in size.

Such a centre could provide a focal point for stakeholders such as shippers, logistics providers, and barge operators to come together to share information, discuss best practices, barriers to modal shift, understand their composing factors and to help devise facilitators in a collaborative way.

The promotion centre could also play a role in raising awareness of the benefits of waterborne transportation, including its cost-effectiveness, sustainability, and capacity to handle larger volumes and heavier cargo than road transport. This could be realised through targeted marketing and outreach efforts, such as webinars, seminars, or other events that bring together stakeholders to discuss the advantages of modal shift. Additionally, the promotion centre could help to facilitate greater coordination and collaboration among stakeholders to overcome some of the challenges associated with modal shift, such as infrastructure limitations, regulatory barriers, or information gaps.

6. Recommendations on policy measures and other supporting actions for higher use of IWT

According to its objective, D1.5 shall provide recommendations and good practices for regulatory bodies, policymakers and key stakeholders in the sector on what has to be foreseen to increase a modal shift. The recommendations take into account all the findings described in the deliverable, both from a regulatory point of view and from the perspective of on-going national and international initiatives. The recommendations provided in this chapter also take into account and reflect the conclusions of other deliverables from WP 1 of PLATINA3.

The recommendations are based on the analysis conducted for the main existing regulations and policy measures at the European level with regards to the role they play in a modal shift. First of all, it has to be emphasized that during the last 30 years, the European IWT policy framework has undergone drastic changes. Issues related to energy transition, fleet modernization, innovations, developed solutions for smart infrastructure, improved digital services, and new market opportunities were addressed through EU legislation, and new framework conditions for EU funding was elaborated. At the current moment, a large ambition to achieve 30% modal shift by 2030, according to the Sustainable and Smart Mobility Strategy (SSMS), is rather compound, as regards the current rate of IWT (6% in 2019¹⁶⁴) in Europe. This obviously poses a big challenge on what has to be taken into further consideration to promote IWT and provide it with a level-playing-field in comparison with other transport modes, especially from the policy and regulatory side.

Certain regulations are now in a process of revision or adoption ("Fit for 55", TEN-T Regulation, Combined Transport Directive, RIS Directive), thus it was only possible to assess the proposals presented for their revision and to evaluate possible future impact on modal shift from these regulations. A possible assessment of the efficiency of these regulations and their impact on modal shift can only be conducted during the next multiannual-financial framework. Currently, only analysis of the potential impact and corresponding conclusions have been provided with regards to these legislative proposals. However, a number of recommendations is provided in the context of the current status of the European IWT market development that can be undertaken and/or better addressed on the regulatory/policy level to provide further support to the sector and to stimulate its better integration into logistic chains. The recommendations address several aspects in relation to the IWT status quo, its potential for further development and the role it plays in reaching the objectives of the EGD.

6.1. The regulatory perspective

1. Funding and financing for IWT

One of the most important issues of the sector, addressed in the context of this deliverable as well as in the other tasks of PLATINA3, is the modal shift to "green" IWT, which reflects the further direction of the regulatory framework. A central question that becomes more and more crucial is funding and financing for the sector to be able to reach the climate objectives of the EGD. Energy transition of the inland fleet, the creation of alternative energy infrastructure, and the upgrade of IWW and port infrastructure, together with the digitalization of the sector, are important issues that will not be solved by the sector itself. Research conducted in various projects and studies, as well as the outcomes of D2.5, show the necessity of ensuring proper support for the sector in terms of

¹⁶⁴ [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Modal_split_of_inland_freight_transport,_2019_\(%25_share_in_tonne-kilometres\).png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Modal_split_of_inland_freight_transport,_2019_(%25_share_in_tonne-kilometres).png)

funding and financing. This also relates to the low uptake of the existing opportunities in terms of available EU funding and the low number of pilot projects with respect to fleet modernization.

Especially, this concerns small shipping companies, individual shipowners operating on the spot market and possessing a small market share. Unlike large shipping companies, which include fleet modernization strategies into their investment plans, for smaller operators greening investments are linked with potential risks of stranded investment or low rate of return on investment (ROI). Another category is represented by the barge owners who will leave the market in the coming 5 years due to the ageing factor. It is unlikely that they will invest in greening of their fleet as they cannot offset the investment in the last years of operation which raises another question whether shipowners leaving the market before 2030 should be an aid and/or regulatory target.

In this regard, also considering relevant novel legislation introduced for European IWT, national funding, and private financing, it can be emphasized that IWT shall be better supported considering the challenges the sector is facing today. One of the major tasks is to increase the number of pilot projects supported by experimental research, testing, and certification processes. In this highly innovative field, it is difficult to rely on the limited possibilities of the sector; therefore, major focus and support shall be applied to this area.

In addition, it has to be mentioned that, in comparison with road transport, investments in low- or zero-emission vessels are rather long-term commitments (40–60 years of ship engines life-cycle), meaning that, to undertake such investments, clarity on a regulatory level is necessary for shipowners to take further steps towards energy transition. A clear framework in terms of which propulsion system to invest in for future decades is also related to the issue of the availability of future low- and zero-emission energy sources on the corridor level and beyond.

2. CTD revision

The revision of the Combined Transport Directive is an important step from the perspective of the regulatory framework towards modal shift, which has to take into account better support for IWT. The existing CTD is focusing on the road-rail leg and not on the road-IWT leg, which creates a lack of level-playing-field conditions for IWT with regards to multimodality. Revision has to ensure that all transport modes are treated equally, with a priority given to environmentally friendly and sustainable ones. Digitalization is vital to improving supply chain management and logistic operations on multimodal transportations and shall also be reflected in the revised CTD. Taking into account that CTD is the only EU legislative act promoting multimodal freight transport, actions and support are needed to ensure a competitive environment for barges in large seaports in comparison with rail and road transport. The revision shall be aligned with the main targets of the EGD, SSMS and NAI/DES III as regards the modal shift.

3. RIS Directive revision

The revision of the RIS Directive is an important instrument to promote IWT as an innovative and competitive transport mode. Cooperation on RIS development between MS at EU level is rather successful, but now a new challenge of service integration in the logistic chains has to be properly addressed to better integrate IWT thanks to reinforced activities in RIS and Intelligent Transport Systems. The RIS Directive and the ITS Directive¹⁶⁵ are under revision, meaning that now is an appropriate moment for strong cooperation to transfer RIS and mobility services to a new level and increase the market share of IWT in comparison with other modes of transport.

Moreover, separate regulations for all modalities create a high level of fragmentation in terms of the development of multimodal transport. Road, rail, and IWT establish different regulatory frameworks requiring the submission of a large number of different documents with specific cargo details. This limits the possibilities of switching to another modality, affecting, in particular, the utilization of IWT. Regulations regarding transport, addressing multimodality,

¹⁶⁵ https://eur-lex.europa.eu/resource.html?uri=cellar:26277bcb-5db8-11ec-9c6c-01aa75ed71a1.0001.02/DOC_1&format=PDF

have to be established at the European level to provide uniform requirements regarding transport documents, to eliminate administrative barriers, and to enhance the performance of multimodal transportation. This is especially important in terms of the development of synchromodal transport solutions as well as the adaptation of administrative services to real transport needs by making transport documents consistent for all modes.

4. Regulations addressing transport emissions performance

IWT has always been positioned as a mode of transport that is "cleaner" and "greener" in comparison with other modes in terms of calculations of grams of CO₂ emissions per ton-km, keeping a positive environmental record that can contribute to the EGD objectives if the modal shift is achieved. Today, taking into account the rapid implementation of innovations in the segment of road transport, IWT is demonstrating much slower uptake of innovations due to higher investment costs for ship-owners, which therefore, in the future, may lead to some loss of its competitiveness from the perspective of environmental performance and sustainability in comparison with other transport modes.

At the same time, it has to be mentioned that transportation is not addressed equally from the point of view of different aspects of sustainability. Moreover, internalization of external costs (CO₂ pricing) has never been achieved, meaning that a level-playing-field between transport modes has never been established.

An important policy objective in relation to IWT should also be seen through its contribution to the decongestion of overloaded road networks in densely populated regions (annual congestion costs reach 1% of EU GDP¹⁶⁶), capacity utilization of the available space, reduction of externalities like noise and general pollution, number of accidents and traffic casualties (a high degree of safety, in particular with regards to the transportation of dangerous goods), relieving strain on the railways, and the establishment of a more sustainable transport system as a whole. Indeed, the main IWT network can handle more traffic without modification. It is not saturated, while the highways are. These factors are currently not fully addressed in existing regulations, but they are also important from the perspectives of efficiency, safety, contribution to the SDGs, the economy, health, and well-being of European citizens and thus have to be properly reflected in a common calculation method on negative externalities. IWT is already considered a clean mode of transportation, and as has been emphasized and investigated above, facilitating the shift from road to IWT transport will have an immediate positive effect on GHG emissions, even without IWT switching to alternative fuels.

Moreover, the STEERER project¹⁶⁷ has reported an emission volume of 4.53 Mt CO₂e per year for IWT sector emissions for 2017. The overall scope of CO₂ emissions in the EU produced by transport was 826 Mt in 2017 according to Eurostat. This means that IWT has a share of 0.5% of the CO₂ emissions from transport in the EU¹⁶⁸.

To provide a level-playing-field for different modes of transportation, the aforementioned factors have to be considered for the elaboration of evaluation criteria based on the other aspects of sustainability in transportation and not only CO₂ emissions. These criteria shall be addressed in future investment and subsidy mechanisms and taxation policies. This can be addressed, amongst others, by banning truck access to certain densely populated areas, urban areas connected by IWT, and areas that can be reached by barges (electric ones) for food supply and other public goods. This shall be done by regulations coming from regional governments, city councils, and local administrations. Not only CO₂, but other factors, like noise, congestion, accidents, etc., that target reducing truck traffic in general have to be addressed, not only the cost of CO₂.

¹⁶⁶ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC69961/congestion%20report%20final.pdf>

¹⁶⁷ [D2.2 Scenarios with quantified targets for 2025, 2030 and 2050 - "Common stakeholder target scenarios, \(waterborne.eu\)](#)

¹⁶⁸ [NAIADES DINA EG 12Dec2022_Paper greening IWT.pdf](#)

Moreover, the greening of transportation services should take into account energy and technology limitations specific to each mode and type of operation. Regulatory measures and their evolution over time must take into account these differences in order to maintain the economic balance for operators, which is necessary so that they can bear the additional investment and operating costs that they will incur over the next few decades.

From a policy perspective, it has to be emphasized that the energy transition of the transport sector must be market-oriented and implemented in the most cost-effective manner: both in relation to the budgets of companies and MS.

5. Revision of the Taxonomy Delegated Act

The revision of the Taxonomy Delegated Act in terms of the establishment of realistic and feasible Technical Screening Criteria for IWT vessels and infrastructure shall be considered in order to not exclude the sector from future financing. This topic is better addressed in D2.6.: "Report on implementation of European IWT emission label / energy index / GLEC for vessels"¹⁶⁹ and D4.4.: "Report on barriers towards implementation of waterway and port infrastructure investments and proposed solutions" of PLATINA3.

6. Need for better alignment of national and regional transport strategies and investment policies with global EU strategies and targets

Modal split varies significantly from one country to another, reflecting the difference in national transport strategies as well as economic and geographical factors. At the same time, different approaches are taken in MS national programs in terms of cross-border cooperation, making IWT project implementation even more complex in terms of investments and funding. Another question is: How shall NAIADES be reflected in national transport strategies? And which initiatives must be foreseen to increase modal shift by 2030 or 2050?"

The main precondition for the efficient development of IWT is related to **political will and support given to the sector**. This situation is varying from one MS to another, depending on the number of determining factors and preconditions for IWT development (e.g., existence of large state players in the IWT market: industries allocated across the waterway network of a state, large shipping companies operating on the particular section and ensuring stable cargo flow in inland ports, availability of new market opportunities, national environmental targets, etc.). The aforementioned fragmentation creates discrepancies in terms of the approach used for IWT on the national level and is not always equally addressed to ensure corridor alignment. Same issue relates to legislative harmonization and standardization in the field of European IWT (addressing various topics, including, in particular, energy transition, professional qualifications, logistic performance (multimodality, RIS services), administrative requirements, etc.).

Therefore, it is important that main programs and policy documents, together with their action plans, are similarly reflected on the national level to eliminate fragmentation of actions and facilitate coordinated integration across the transport corridor. Establishment of a clear mechanism for evaluation of NAIADES-actions implementation and a monitoring system of the progress achieved would be helpful for further implementation of the NAIADES program.

¹⁶⁹ <https://platina3.eu/towards-implementation-of-a-label-system-for-eu-inland-vessels/>

7. Non-EU MS involvement

A better involvement of non-EU countries contributing to the development of an interconnected IWT network, addressing common European priorities and goals through joint participation in EU projects and funding programs as well as through reflection in their national transport strategies goals of the EGD, SSMS, and NAIADES III should be achieved.

8. Summary

The trend of switching the main cargo flows of the European transport market to IWT is a strategic task that requires, in addition to the regulatory framework transformation, significant steps to be taken towards modernization of the fleet, a thorough assessment of navigation conditions, the development of ports, as well as the entire logistics of the European inland navigation. The summary of the policy actions supporting the development of IWT and facilitating modal shift is given in the table following below. It is worth mentioning that a number of these actions (e.g., revision of certain legislation) are already ongoing, but having particular importance for the sector, they were included in this table and prioritized.

Market		Priority
1. Support and facilitation of the introduction of new cargo to the IWT market		
	a. Revision of the regulatory framework to ensure future transportation of alternative fuels as cargo by IWT (see D2.7. recommendations)	I
	b. Amendments to ADN to foresee hydrogen transportation (in tank) as cargo	I
	c. Harmonization of safety regulations on storage of alternative fuels in port areas	II
2. Development of inland port strategies as centres of “green” energies and industrial hubs for circular economy		
	a. Reconsideration of the future role of inland ports to achieve economies of scale and offer the best transport solution for a competitive green industry position in the process of energy transition	II
	b. Building up synergetic business models with different industries for the shipments, storing, supplying clean energy and refuelling infrastructure (collaboration between energy & transport).	II
	c. Reshaping the inland navigation agenda, including inland ports, to seize cooperation opportunities as hubs for “green” energy production, handling, storage, transportation, etc.	I
3. Enhancement of logistic services for IWT		
	a. Implementation of interconnected RIS services with the complete IWT digital ecosystem (results of RISCOTEX EU IWT wide)	II
	b. Revision of the General Block Exemption Regulation	I
	c. Revision of the Combined Transport Directive	I
	d. Revision of the RIS Directive	I
	e. eFTI implementation	II
	f. Deployment of a well-functioning European RIS system according to the RIS Directive and harmonization in accordance with the ES-RIS standard	I

	g. 5G coverage on IWT	II
4. Support actions for IWT passenger transportation		
	a. Elaboration and implementation of urban mobility plans for IWT	II
	b. Support of the development of IWT passenger infrastructure via TEN-T regulation	I
5. Implementation of solutions for decongestion of maritime ports		
	a. Revision of the Consortia Block Exemption Regulation to conduct an investigation on the impact of CBER on port congestion in container cargo handling in large maritime ports	I
	b. Elaboration and implementation of structural (creation of dedicated terminals) and non-structural (enhanced communication and digitalization) measures targeting congestion reduction in maritime ports and elimination of idle times for barges (measures addressed in the scope of D1.4. to be taken into account).	II
Awareness		
	1. Set up a database for innovations in the field of energy transition of the sector	I
	2. Support implementation of labelling system EU-wide together with all involved stakeholders for better awareness of the emission performance of the vessel	II
	3. Create awareness about the greening and modernization of IWT among the broader public: large producers, cargo owners, logistic service providers and tourism agencies (offering cruise trips on inland waterways), thus supporting them in decisions leading towards the use of low- and/or zero-emission vessels and creating additional incentives for carriers using low- and/or zero-emission vessels.	I
	4. Help to access EU funding and facilitation of participation in EU-funded programs	I
5. Communication		
	a. Better communication with the broader public as regards sharing the results of IWT projects linked with relevant EU policies and other IWT support initiatives	II
	b. Ensure sufficient use of EU-funded project results	III
	c. Establishment of partnerships involving national authorities and private sector representatives for future cooperation on modal shift initiatives	I
	6. Create synergies between already existing solutions and ensure information circulation at national and EU levels for better awareness of innovations	I
Governance & Evaluation		
	1. Establishment of a clear mechanism for evaluation of NAIADES action implementation and a monitoring system for the progress achieved	I

Table 1: The list of actions at the regulatory and policy levels for further support and facilitation of modal shift towards green IWT

6.2. The market perspective

1. New markets

Taking into account that, in line with the EGD objectives and all the greening regulations emerging on its basis, parts of traditional IWT cargo, such as crude oil and oil products, coal, and coking coal, can gradually disappear from the IWT market in the next few decades. This could potentially impact the modal shift. New markets have to be introduced to IWT, and from this perspective, support actions on the legal ground have to be foreseen. New market opportunities and better integration of urban logistics in cities have to be studied further in order to adapt the regulatory framework for new cargoes substituting for certain existing ones. An added value shall be created from other services and goods transportation, research on which is provided in D1.1. of PLATINA3. As reflected in the conclusions of the aforementioned deliverable, financial support from public authorities for the experimental use of IWT in urban areas (for instance, by supporting possible additional costs linked to the use of IWT compared to road transport) shall be considered together with future assessments of the potential public-supported projects, recent pilots that have emerged in the last few years, and the possibility to maintain a viable business case even without public support.

Lots of parameters have to be met in order to make modal shift happen and increase the share of IWT in the modal split, which is currently still rather low. In certain cases, it is hard to gain a cost advantage when shifting cargo from road to IWT, as not all the industries with large logistic hubs are connected to inland waterways. Certain industries, like construction, waste management, and food supply, can benefit from IWT by transporting large cargo volumes. Deliveries with more fragmented logistics (retail) can be tackled by means of standardized loading units, which, among others, require a proper regulatory framework. Cooperation between retailers, wholesalers, key logistic players and the IWT sector is crucial in this regard. As was emphasized during the Final Stage Event of the PLATINA3 project (Panel discussion – Market)¹⁷⁰ an important role in modal shift is given to state authorities and local governments. In their logistic activities, as well as in terms of garbage and other residual waste handling, priority must be given to IWT and not to other transport modes. Making a first step towards shifting cargo to IWT and establishing good practices for transportation needs on a governmental level will make the private sector more confident in future undertakings towards the sector. Governments, state enterprises shall be frontrunners in undertaking such initiatives and including IWT in their logistics.

With regards to new markets and urban logistics development, cities will definitely play a role as transportation hubs and large industrial nodes, meaning that regulatory and support schemes shall be considered on a national level based on successful examples presented by VNF in France and viadonau in Austria, as well as other initiatives, e.g., InTerLUD¹⁷¹ - a French national program to assist local communities in developing coordinated and sustainable urban logistics.

2. Separate market segments

The establishment of separate markets for separate cargo categories and under particular conditions (long distances and large volumes—IWT; short distances and low volumes—road, as a rough indication) can be considered a potential measure for market structurization. IWT is not always able to compete with other transport modes (road, rail) on an equal footing. This leads to IWT losing its positions due to its lack of predictability and flexibility. This becomes especially sensitive in the transportation of small consignments, perishables, containers, and other goods requiring just-in-time operations. Therefore, the traditional market for IWT is usually strictly defined. Yet, even when defined, fierce competition for existing market share was always present from the side of

¹⁷⁰ https://platina3.eu/event/final_stage_event/

¹⁷¹ <https://www.cerema.fr/en/actualites/sustainable-urban-logistics-charters-co-constructed-local>

rail and road (transportation of palletized goods, high & heavy cargo, and dangerous cargo). The establishment of a clearer framework condition for separate market segments, the opportunities, needs and requirements for those segments and the value certain innovations can bring to address them. Synchronomodality in case of disruptions of logistic chains, automation bringing more flexibility to the operations and fleet management and further integration of IWT solutions into the supply chains transport management platforms, shall help to align all the transport modes (focused on their particular segments) and to work towards future collaboration and coexistence rather than strong competition, where IWT was consequently losing its market share. The creation of new markets shall take this dimension further into development by gradually implementing segregation between different transport modes or otherwise ensuring their rational combination (multimodality). This can be established only at the macroeconomic level (EU) through regulatory measures aligning and regulating market shares. The CTD revision is one of the steps to be undertaken for the creation of adequate framework conditions to stimulate the development of multimodal transport.

Otherwise, this can be regulated by granting permits or establishing quotas for certain types of goods transported by certain modes of transport. In this regard, a good example can be the modal shift strategy for high & heavy cargo being implemented by viadonau or a proposed framework in the scope of D1.4. based on incentives, restrictions, and prioritizing permits. To influence competition law at the European level and to ensure efficient supply chain development and sustainability in transportation, this approach can be considered one of the measures to facilitate modal shift and ensure a level-playing-field for IWT. A modal shift is most likely not to be fully realized by the market itself. As key findings of D1.4. showed, market players, in their vast majority, tend to stick with traditional, proven solutions. Cost efficiency is a defining factor, while sustainability is not always taken into consideration. This means that changes at the micro level (the logistics company level) shall be triggered at the macro level (the EU regulatory framework) through market structuring. Such measures shall stimulate market players and supply chain actors to react appropriately, to undertake shared responsibility, and to find an equilibrium between cost, efficiency, and sustainability in transportation.

Similar principles can be considered from the perspective of maritime ports to ensure a level-playing-field for all transport modes and to ensure multimodal services are present with a proportionate share.

3. Support of experimental undertakings

The creation of business cases to stimulate a modal shift from road to IWT is the successful practice shown, for instance, through the activities of viadonau and De Vlaamse Waterveg (creation of stakeholder networks, assistance, advice, and consultations with supply chain actors to come up with win-win solutions). A case-by-case approach targeting not only modal shift and reduction of environmental impact but also rational and efficient utilization of existing (underutilized) capacities of other transport modes, such as IWT.

However, CO₂ reduction does not always have a higher priority than costs incurred by shippers or logistics service providers. Overall, a successful modal shift from road to IWT involves changes to the business model of a company, its organizational structure, its traditional operations and rendered services, and its marketing and sales strategies.

An important cornerstone in this regard is a question of responsibility in the case of an unsuccessful undertaking of a modal shift and compensation of losses, overcoming financial and economic barriers. Having no warranties or concrete vision on how, in case of an unsuccessful undertaking, a company can get certain reimbursement or a back-up, makes it keep off new approaches and follow a traditional approach in its logistical activities. Moreover, multimodal transport is always more expensive, making it more challenging to overcome the price difference, meaning that the creation of financial incentives for new trials can be a big help to the sector. Innovations (the establishment of new markets) are exploited when the necessary funds are available. Financial security and de-

risking investment of pioneers for shippers and logistic service providers undertaking a modal shift, particularly in new cargo segments, is an important issue that must be addressed from a regulatory and innovation funding perspective. Pilot projects to overcome initial budgetary constraints in multimodal start-ups are needed for better exploration of new market opportunities (e.g., foreseen in revised CTD start-up support options).

Considering the aforementioned, it can be concluded that the development of public policies and support measures on the state level, as well as providing funding to secure experimental undertakings when developing new multimodal chains compared to traditional transport modes, is crucial.

Moreover, as discussed during the Final Stage Event, promotion centers must go beyond national borders, reaching further down the corridor. This means that a European-wide approach is needed to ensure a modal shift in the scope of the European IWT network and not only at the level of particular countries. Promotion shall go along with end-to-end solutions, including CO₂ pricing (internalization of external cost) as an additional stimulus. National specificity shall be targeted as well from the perspective of different river basins (e.g., the Danube represents a rather different situation than the Rhine as the most international waterway in the world, including EU and non-EU MS, different historical and political preconditions, market structure, etc.).

4. Cooperation with other transport modes

Cooperation between IWT and other transport modes to ensure the better development of multimodal transportation at the European level. This shall also address such aspects of IWT functioning as the possibility of a speedy switch from one mode to another in case of an inability of IWT to ensure sufficient transportation due to reasons that don't depend on the sector's performance itself. Such reasons often relate to external factors such as low water levels, long waiting times at maritime ports and at locks, accidents, congestion, or any other disruptions. Synchronomodality: the possibility to react proactively in order to ensure high performance of the logistic chain. In this case, opposition from other transport modes should be avoided, but rather should be turned into successful collaboration through coexistence and support at the regulatory level.

In this regard, cooperation, networking, and the exchange of information on most topical issues can help to tackle relevant challenges collectively. Barge owners, truck companies, and railways shall be brought together in cooperation for synchronomodal solutions. Mutual elaboration of new approaches to establish new logistic chains in order to bring up win-win undertakings can be considered through corridor partnerships bringing together shippers, barge operators, logistic service providers, inland ports, and terminals. The exchange of information and the possibility to learn from good practices implemented at the international/corridor level can play an important role in modal shift and supply chain cooperation. It may also have a positive impact on decision-making processes when all the actors are at one table tackling common issues (e.g., infrastructure and maintenance backlogs, pricing policies, taxes, etc.).

5. New standards for alternative energy types

As defined by AFIR, maritime transport and inland navigation need new standards to facilitate and consolidate the entry of alternative fuels into the market.

Without a clear legislative framework for the introduction of new fuels to the market, all the other regulations will be based on assumptions and not on clearly defined and described standards. Taking into account TRLs and levels of maturity of the technologies proposed in the CCNR study on energy transition towards a zero-emission inland

navigation sector¹⁷² and ensuring the CCNR Roadmap, as well as discussed in other PLATINA3 deliverables, several main energy types can be addressed for future investigation of new regulations and standards. This will also help to avoid high levels of fragmentation between different EU Member States and facilitate the alignment of existing regulations.

6. Future role of inland ports

A better addressed role of inland ports on the way towards energy transition and from the perspective of new market opportunities shall also be considered. Creation of industry hubs and clusters around inland ports—integration of the urban nodes of the TEN-T network, which will exclude long pre- and end-haulage by road or rail to inland ports. In this regard, inland ports shall be seen as future hubs for synergies between transport, alternative energy, industry, and the digital sectors, which shall lead to the development of essential relationships between grid companies, local energy companies, and ports.

Inland ports can mainly play an important role in:

- Onshore power supply, fast (re)charging points for batteries and swapping locations for energy containers;
- Green energy supply, e.g., hydrogen hubs examples on the projects in the ports of Duisburg and Basel, or possible production in the wider port area. Inland ports can also develop some storage capacities or bunkering facilities for methanol or biofuels.

From inland ports' perspective, electrification seems to be a key activity. Port authorities are focusing on OPS for all types of vessels. At the same time, terminal operators are investigating and investing in electrical equipment such as electric cranes, stackers, and carriers. One aspect of the relationship with the energy supplier. In the case of ports, eventually gaining the capabilities to produce their own electricity, e.g., through solar panels, biomass plants, or wind power, and to store energy on site, e.g., using batteries, this issue takes on a new dimension. All these options raise a number of technical and administrative issues that need further development.

Two circumstances are in favor of the ports:

- Liberalization of the EU electricity market, which was completed a few years ago;
- The introduction of dynamic electricity prices in the coming period may benefit both consumers and the electricity system, insofar as they are not exacerbated by shocks created by geopolitical tensions, as is currently the case following the Russian war of aggression against Ukraine.

On the other hand, hydrogen has a clear perspective as a raw material and energy vector. A strategy is in place both at EU level and in many other countries. Ports are recognized as places of storage and distribution (or, in a broader sense, production), and IWT is recognized as a cheap and efficient way of delivery. Priority is given to the development of renewable hydrogen that can be produced with hydraulic, wind, and solar energy.

7. Better involvement of key market players

A better involvement of key players in the market needs to be achieved in order to increase the number of business cases for modal shift. To materialize modal shift in Europe, it is important to look at the stakeholders (cargo owners, barge owners, and logistic service providers) and stimulate the capacity. Activities of De Vlaamse Waterweg and viadonau, which create a platform for communication between the IWT sector and industry, can serve as a starting point for the establishment of such cooperations. In this sense, continued engagement with Pan-European trade

¹⁷² <https://www.ccr-zkr.org/12080000-en.html>

associations is also important. As it was indicated during the 4th Stage Event of Platina3 by BVB, three main pathways shall be taken into account: awareness of the potential of IWT (as not all cargo owners are familiar with sustainable options), monetizing energy efficiency, and possibilities to come up with a new plan for the EU modal shift (new ideas, new products, and new services to realize the modal shift). From the perspective of various stakeholders, policies and regulations have to be transformed into business cases. An IWT business development strategy is needed to use an approach of "Business case by Business case" with a strong promotion of the modal shift on the industry level as well as on the level of the individual company (examples are provided in the scope of D1.4).

A Master Plan at EU level with differentiation on the national level by each MS, resulting in targeted projects and providing enough resources for promoting agencies and waterway administrations, has to be put into practice in the upcoming years.

8. Permanent discussion platform

IWT is often considered a complex market segment (in comparison with road transport, for example) due to the large number of intermediary actors involved and the lack of direct interaction between cargo owners, the transport sector, and end users. One of the options could be the creation of a unified single European forum for economic dialogue and collaboration in the field of IWT.

At the current moment, there is a lack of a permanent discussion platform as well as a source that can bring together also "non-traditional" IWT stakeholders to tackle various issues of the IWT on a global level, with regards to different issues and, first of all, addressing economic development issues from the perspective of the IWT. Very often, cargo-owners are not involved enough in this IWT economic dialog and/or are not made aware enough of the existing initiatives, and therefore, a lack of cooperation is resulting in a lack of integration across the supply chains.

9. Implementing concepts of synchronomodality

Implementing effective synchronomodality built upon synergy and systemic coordination between stakeholders along the transport chains provides an alternative to uni-, multi- and inter-modality, and at the same time provides an opportunity by synchronizing intermodal services between modes and with shippers, contributing to the set-up of a European core freight network of smart hubs and corridors, supporting the emerging needs of the transport industries to serve smart, resilient and highly responsive supply chains.

Shortcomings on the freight transport markets, e.g., the lack of reliability and punctuality of inland waterway transport services is a source of dissatisfaction among customers causing potential customers to consider IWT as less able of meeting their logistical needs in a synchronomodal environment.

Therefore, the IWT sector must prepare for a rapid and substantial evolution. It will have to think differently about its value propositions, continuously developing and improving products and services that generate customer responses, uncover missed customer segments, look, check and adopt services developed in other sectors that can be a source of inspiration of good practices.

This will require all stakeholders to question long established principles and practices and to develop more sustainable and promising market opportunities by thinking faster, by thinking differently, by thinking partnerships and open collaboration. The cooperation with actors from other modes will be key in order to apply innovations from other sectors and to develop high quality and seamless mobility solutions. This requires liaising with relevant stakeholders, most definitely including the logistics industry.

In order to promote the concepts of synchromodality as well as of physical internet, several aspects need to be considered, such as:

- create awareness – by presenting the concept of synchromodality in university lectures, through dedicated activities as well as by means of workshops and events;
- initiate RD&I projects accompanied by pilot actions and demonstrations;
- technologies and logistic approaches behind synchromodality need to spread more widely to other segments of freight transport;
- engage in international cooperation – on the one hand, these are necessary as synchromodal networks will most likely best perform on a multinational scale meaning that a trans-European solution is needed.

On the other hand, other countries (like the Netherlands) are already one step further and have the first operating pilots resembling synchromodal networks. It is therefore convenient to learn from the best/first and build on their knowledge. Cooperation with those companies included in synchromodal pilots will most probably lead to further developments.

The synchromodality concept will also need to be developed in tune with and include the steps that the waterborne transport is undergoing in this period in order to reach the zero-emission goal. The new ‘green’ ships, including their increased digitalization, must be accounted for when developing the new processes, business models, etc. in the port operations and the hinterland logistics chain as part of the synchromodal approach. This also means the inclusion of electricity and sustainable alternative fuel supplies, as they will bring a paradigm shift in some areas for the IWT transport, moving away from the fossil fuel-based model that is now still largely taken ‘for granted’ in the transport sector. All these developments also need to include a resiliency aspect given the increased effects of climate change which will manifest for a long period of time for now on.

10. Passenger transportation

COVID-19 significantly affected the transportation sector, in particular IWT. While a range of initiatives were launched to support a modal shift towards IWT with regards to freight traffic, passenger transportation on IWT is kept more aside. At the same time, the COVID-19 pandemic affected passenger transport from the perspective of both the day-trip passenger sector and the river cruise sector, which suffered the most and demonstrated a reduction of passengers by 90-95% in comparison with pre-pandemic times.

At the same time, the lack of an EU-wide strategy to promote IWT urban passenger transportation or coastal transportation as well as the lack of sustainable IWT urban logistic and urban mobility business cases can be better addressed in future programs, taking into account the need for increased resilience of networks and services with regards to climate adaptation and safety provision. This can contribute essentially to an increase in the modal share of IWT, a reduction in road congestion, the creation of safer and more reliable public transport modes, and a more sustainable transport system as a whole.

It has to be emphasized that, from the perspective of energy transition, passenger IWT can demonstrate better uptake of the innovations, as ferries and day-trip vessels are expected to better adapt for the use of electric batteries. In general, vessels operating in certain densely populated areas with a limited energy demand (compared to freight transportation) and a fixed route can benefit from long charging times and low energy costs for electricity from the grid used.

11. Increased awareness

Environmental performance and a modal shift toward IWT can be achieved only through joint efforts. As indicated in "Fit for 55," "reaching climate neutrality will require a shared sense of purpose, collective efforts, and a recognition of different starting points and challenges. Many citizens, especially younger people, are ready to change their consumption and mobility patterns when empowered by relevant information in order to limit their carbon footprint and to live in a greener, healthier environment". Despite the fact that the cost of transportation is playing a vital role, many users have recognized the threat of climate change and expressed a willingness to go "green" in their economic activities. A number of large companies nowadays express their aim for sustainability (Amazon¹⁷³, IKEA¹⁷⁴). That's why cargo owners, manufacturers, industry representatives, and logistic service providers should be addressed and better informed about the real impact of logistics concerning GHG footprint across the multimodal supply chain. In this way, from the regulatory perspective, a wide approach is needed to reach potential users: to implement measures for better visibility and differentiation of "clean", "greener," and environmentally friendly transport operations. In this way, further actions on the implementation of a labelling system for vessels at the European level can be considered (D2.6) or the establishment of harmonized methods of calculating emissions, such as those proposed by the GLEC framework, will create awareness among the broader public about the emission performance of the chosen transport mode.

12. The establishment of an "EU IWT promotion centre"

As proven by studies and, moreover, by the successful activities of viadonau, the Voies navigables de France (VNF), De Vlaamse Waterweg and other European organizations with similar functions, a lack of clear, accessible, and viable information on IWT benefits is often a barrier to the modal shift towards IWT. While being more familiar with road transport, a number of stakeholders (logistics service providers, shippers) lack knowledge of the opportunities offered by IWT, especially in countries where the modal share of IWT is quite low. Backed up with the existing experience and knowledge gained in countries where well-functioning organizations exist (independent or acting as waterway administrations, such as the aforementioned), these successful practices have to go over the national borders covering the European interconnected IWT network. In this regard, the establishment of EU IWT promotion centers for IWT information dissemination, knowledge increase, and international collaboration is key to overcoming the threshold of uncertainty and insecurity in terms of IWT potential, existing opportunities, and technological/logistical solutions. This has to be considered as one of the future measures, along with the aforementioned ones addressing increased awareness and permanent discussion platforms. Creating opportunities for networks of actors by connecting not only large industries, but also SMEs linked to existing players to increase innovativeness, and generally with regards to intra-urban and rural-urban logistics, shall be targeted via the promotion center.

¹⁷³ <https://www.aboutamazon.com/planet>

¹⁷⁴ <https://gbl-sc9u2-prd-cdn.azureedge.net/-/media/aboutikea/newsroom/publications/documents/ikea-sustainability-report-fy21.pdf?rev=6d09c40ec452441091b10d9212718192&hash=1A1FDACCB00D35EE9D64428D85CA6C4E>

Annex I: Regulations and measures supporting energy transition and sustainable transportation and their influence on the IWT fleet

When assessing perspectives of modal shift towards IWT, especially in the context of energy transition, the aspect of the inland fleet becomes one of the most crucial for the sector to be addressed with regards to low- and zero-emission transition. The inland fleet got dedicated attention in EGD, SSMS, and NAIADES III, which was reflected in all the subsequent legislation and legislative proposals in the field of IWT.

The regulatory framework, which addresses the inland fleet to a certain extent, is rather challenging in terms of rigid conditions for the sector to make it "cleaner" and more sustainable to achieve the ambitious targets of the EGD.

In certain cases, as analyzed below, the creation of incentives for "greening" the fleet requires clearer definitions of sustainability and realistic approaches in terms of the sector's capabilities to go "green" in the next few decades. Yet, the level of support given by various initiatives as well as the creation of the framework paving the way towards energy transition and the introduction of innovations in IWT should definitely not be underestimated.

This part starts with two important legislative pieces in the area of IWT vessel technical requirements (EU Directive 2016/1629) and requirements related to pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery (Regulation (EU) 2016/1628), which aren't targeting modal shift yet but create a legal framework for the inland fleet from both a technological and environmental perspective. It has to be mentioned that a number of initiatives, providing dedicated support to inland fleet are described in the subsequent part.

EU Directive 2016/1629 and Regulation (EU) 2016/1628

The EU Directive 2016/1629¹⁷⁵, dated 14 September 2016, laying down technical requirements for inland waterway vessels, amending Directive 2009/100/EC and repealing Directive 2006/87/EC was published on 16 September 2016 and entered into force on 7 October 2016, in addition to zone R (special provisions laid down by the Revised Convention for Rhine Navigation).

This Directive laying down technical requirements for inland waterway vessels, ensures that all vessels under the scope of the Directive possess certificates attesting their compliance with identical technical requirements for the whole network of EU IWT. The purpose of the Directive is to ensure safety of navigation in European IWT and a level playing field. In accordance with paragraph 2 article 2, Directive does not apply to ferries, naval vessels, seagoing ships, including seagoing tugs and pushers, which operate or are based on tidal waters or operate temporarily on inland waterways.

The Directive consists of four chapters addressing: scope, definitions and waterway zones; navigation certificates; vessel identification, inspections and altered technical requirements and final provisions. Directive contains following seven Annexes:

- 1) List of Union inland waterways divided geographically into Zones 1, 2, and 3;
- 2) Minimum technical requirements applicable to craft on inland waterways of Zones 1, 2, 3 and 4;
- 3) Subjects for possible additional technical requirements applicable to craft on inland waterways of zones 1, 2 and non-linked 3;

¹⁷⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L1629&from=ES>

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- 4) Subjects for possible reductions of the technical requirements applicable to craft on inland waterways of Zones 3 and 4;
 - 5) Detailed procedural provisions;
 - 6) Classification societies;
 - 7) Correlation table (between Directive 2016/1629 and Directive 2006/87/EC).

The technical requirements of Directive 2016/1629 are based on technical standards updated regularly by CESNI. This directive is reflected in the technical standard ES-TRIN, which is legally binding under EU law. The EC is empowered to adopt delegated acts to modify the list of waterways in Annex I of the Directive, to rule on the use of the European Hull Database (EHDB) and to adapt the annexes of the Directive containing references to the ES-TRIN standards and detailed procedural rules. The EC can adopt implementing acts to ensure recognition of classification societies and to allow derogations from the technical requirements.

Adoption of this new directive, supplemented with the elaboration of the ES-TRIN standard, contributed a lot to the harmonization and unification of the regulatory framework for the European IWT fleet. Considering the high level of fragmentation existing in the European IWT, this was an important step towards future standardization and the introduction of single requirements for the inland fleet.

Regulation (EU) 2016/1628¹⁷⁶ (NRMM) of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC is targeting internal combustion engines requirements by the introduction of new emission limits (Stage V limits).

NRMM Regulation consists of fourteen chapters addressing: subject matter, scope and definitions; general obligations; substantive requirements; EU type-approval procedures; conduct of EU type-approval procedures; amendments and validity of EU type-approvals; statement of conformity and markings; exemptions; production reporting and verification; safeguard clauses; international regulations and provision of technical information; designation and notification of technical services; delegated acts and implementing acts; final provisions. Regulation also contains following 6 Annexes:

- 1) Definition of engine sub-categories referred to in Article 4;
- 2) Exhaust emission limits referred to in Article 18(2);
- 3) Timetable for the application of this Regulation in respect of EU type-approvals and placing on the market;
- 4) Non-road steady-state test cycles;
- 5) Emission durability periods referred to in Article 25(1);
- 6) Special purpose engine emission limit values referred to in Article 34(5).

The introduction of the requirements described in the NRMM regulation, among others, establishes certain preconditions for future funding for engines that comply with the emissions limits. For the relatively small and fragmented European IWT market, where vessel/engine design implies specific technological solutions for the inland navigation sector's needs, this can be rather challenging. Yet, the number of Stage V engines (and corresponding power range) is increasing¹⁷⁷, notably with technological solutions not developed for the inland waterway transport sector alone (NRE and EURO VI engines), which means that there is a possibility to come up with economically viable solutions for “clean” engines.

¹⁷⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R1628>

¹⁷⁷ Listes.cesni.eu

Guidelines on State aid for climate, environmental protection and energy 2022

In January 2022, in order to enhance the competitive environment of the internal European market, while supporting the main objectives of the EGD, the EC adopted revised Guidelines on State aid for climate, environmental protection and energy (CEEAG)¹⁷⁸: “to support a cost-effective and just transition to climate neutrality, and to facilitate the phasing out of fossil fuels, while at the same time ensuring a level-playing field in the internal market”. The guidelines provide a mechanism for assessment of the compatibility of environmental protection, including climate protection and energy efficiency measures, and aim to facilitate economic activities in line with the main regulations for environmental protection. IWT are also reflected in this comprehensive policy document and fall into different categories of measures targeted by these guidelines.

According to Article 16, following categories of environmental protection and energy were introduced:

- (a) aid for the reduction and removal of greenhouse gas emissions, including through support for renewable energy and energy efficiency;
- (b) aid for the improvement of the energy and environmental performance of buildings;
- (c) **aid for the acquisition and leasing of clean vehicles (used for air, road, rail, inland waterway and maritime transport) and clean mobile service equipment and for the retrofitting of vehicles and mobile service equipment;**
- (d) aid for the deployment of recharging or refuelling infrastructure for clean vehicles;
- (e) aid for resource efficiency and for supporting the transition towards a circular economy;
- (f) aid for the prevention or the reduction of pollution other than from greenhouse gases;
- (g) aid for the remediation of environmental damage, the rehabilitation of natural habitats and ecosystems, the protection or restoration of biodiversity and the implementation of nature-based solutions for climate change adaptation and mitigation;
- (h) aid in the form of reductions in taxes or parafiscal levies;
- (i) aid for the security of electricity supply;
- (j) **aid for energy infrastructure;**
- (k) aid for district heating and cooling;
- (l) aid in the form of reductions from electricity levies for energy-intensive users;
- (m) aid for the closure of power plants using coal, peat or oil shale and of mining operations relating to coal, peat or oil shale extraction;
- (n) aid for studies or consultancy services on matters relating to climate, environmental protection and energy.

The CEEAG introduces the definition of so-called “**clean vehicles**”, which means for IWT:

- (i) an inland vessel for passenger or freight transport that has zero direct (tailpipe/exhaust) CO₂ emissions;
- (ii) an inland vessel for passenger transport that has a hybrid or dual fuel engine deriving at least 50 % of its energy from zero direct (tailpipe) CO₂ emission fuels or plug-in power for its normal operation;
- (iii) an inland vessel for freight transport that has direct (tailpipe) emissions of CO₂ per tonne kilometre (gCO₂/tkm), calculated (or estimated in case of new vessels) using the International Maritime Organization Energy Efficiency Operational Indicator (EEOI), that are 50 % lower than the average reference value for emissions of CO₂

¹⁷⁸ [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022XC0218\(03\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022XC0218(03)&from=EN)

determined for heavy-duty vehicles (vehicle subgroup 5-LH) in accordance with Article 11 of Regulation (EU) 2019/1242.

In this regard, the revised guidelines broadened the investment categories to better address such domains as clean mobility, environmental and climate protection, support of innovations contributing to the EGD targets (such as support of the technologies related to clean fuels production and decarbonization processes), and introduced state aid amounts covering up to 100% of the funding gap in cases when aid awards are based on competitive bidding. One of the aims of the CEEAG is also the medium- and long-term reduction of energy costs in order to reduce the EU's dependence on fossil fuel imports and the gradual elimination of subsidies for fossil fuels.

An important criterion for assessing whether a vessel qualifies as a clean vehicle is not only based on the emissions level of the vessel but also takes into account evolution in the sector as a whole, which, from the perspective of IWT, makes a big difference in comparison with the Technical Screening Criteria (TSC) of Taxonomy Regulation.

Although reference to the TSC under which activity qualifies as substantially contributing to climate change mitigation, as set out in the relevant Delegated Act under Regulation (EU) 2020/852 (Taxonomy Regulation) has to be considered only from the perspective of revised and realistic TSC for IWT.

Taking into consideration that both CEEAG (from the perspective of state aid) and Taxonomy Regulation (from the perspective of private investment) are important pillars in the future implementation of the EGD, and moreover, paying attention to the fact that TSC of the Taxonomy Regulation play a role in the assessment for state aid for vessels in line with CEEAG, the urgent need for the revision of TSC for IWT becomes clear.

Regarding the fact that CEEAG isn't supporting fossil fuels, a transitional period is given in this policy document for LNG, which means that projects involving LNG can be supported with state aid but only if it can be proven that such investments are compatible with the 2030 and 2050 climate targets. For example, for LNG infrastructure, investments will be required to make it "fit for hydrogen" and renewable gases.

From the perspective of facilitating the uptake of the new funding mechanism represented by the CEEAG by MS, especially with regards to the complexity of the new mechanism for calculation of CO₂ emissions and preparation of investment proposals in compliance with the requirements for vehicles to be considered 'clean', it is important to elaborate guidelines to simplify the process of such application preparation or FAQ guide to stimulate better uptake of the subsidies established by CEEAG.

Taxonomy Regulation

With the adoption of the ECL and all the subsequent legislation, re-orientation towards a circular and low-carbon economy, and a high level of environmental protection, the EC made significant efforts to create a legal framework to direct investments towards sustainable projects and activities. While CEEAG introduced funding mechanisms for state aid for sustainable activities, the Taxonomy regulation, which entered into force on 12 July 2020, supplemented by its Delegated Acts, created a framework for private investments towards sustainable economic activities.

While significantly considering existing environmental challenges, such as global warming, deterioration of water sources, pollution, loss of biodiversity, and destruction of natural habitats for various species, Taxonomy Regulation emphasizes the importance of directing financing towards environmentally sustainable economic activities and projects. It is setting out main conditions to prove that an economic activity is meeting requirements and can be qualified as environmentally sustainable to attract investments. Taxonomy Regulation is conceived to serve as guidance for investors to address future funding of activities contributing to environmental objectives, which subsequently can lead to the elimination of funding for not-sustainable ones (the ones that are out of the scope of Taxonomy Regulation and its Delegated Acts). The incentives of this regulation have the aim of stimulating

companies to measure the environmental costs of their businesses and, therefore, to induce them to transform their businesses into more sustainable ones.

Considering the existing experience of market players trying to attract investment to certain environmentally friendly and sustainable activities and the difficulties they faced in the past trying to prove that such activities were contributing to climate objectives, the Taxonomy Regulation focused on the provision of a holistic, uniform, and harmonized approach for sustainable financing across the European Economic Area (EEA). It was meant to simplify conditions for investments through the establishment of single criteria to qualify activity as sustainable by using the same methodology in all the EU MS. Proposed criteria shall facilitate the process of evaluation in order to attract sustainable investment to such activities and therefore remove barriers to the functioning of the EU internal market. To attribute an economic activity to being environmentally sustainable, Taxonomy Regulation defines six environmental objectives:

- climate change mitigation: *“An economic activity that pursues the environmental objective of climate change mitigation should contribute substantially to the stabilisation of greenhouse gas emissions by avoiding or reducing them or by enhancing greenhouse gas removals. The economic activity should be consistent with the long-term temperature goal of the Paris Agreement.”;*

- climate change adaptation: *“An economic activity that pursues the environmental objective of climate change adaptation should contribute substantially to reducing or preventing the adverse impact of the current or expected future climate, or the risks of such adverse impact, whether on that activity itself or on people, nature or assets.”;*

- transition to a circular economy: *“An economic activity can contribute substantially to the environmental objective of transitioning to a circular economy in several ways. It can, for example, increase the durability, reparability, upgradability and reusability of products, or can reduce the use of resources through the design and choice of materials, facilitating repurposing, disassembly and deconstruction in the buildings and construction sector, in particular to reduce the use of building materials and promote the reuse of building materials. It can also contribute substantially to the environmental objective of transitioning to a circular economy by developing ‘product-as-a-service’ business models and circular value chains, with the aim of keeping products, components and materials at their highest utility and value for as long as possible. Any reduction in the content of hazardous substances in materials and products throughout the life cycle, including by replacing them with safer alternatives, should, as a minimum, be in accordance with Union law”;*

- sustainable use and protection of water and marine resources, described in accordance with the relevant EU legislation;

- pollution prevention and control, described in accordance with the relevant EU legislation;

- protection and restoration of biodiversity and ecosystems: *“An economic activity can contribute substantially to the environmental objective of the protection and restoration of biodiversity and ecosystems, in several ways, including by protecting, conserving or restoring biodiversity and ecosystems, and thereby enhancing ecosystem services”.*

The Taxonomy Regulation further explains that for each environmental objectives uniform criteria are to be elaborated and described through Delegated Acts. Therefore, Commission Delegated Regulation (EU) 2021/2139¹⁷⁹, adopted in June 2021, established the technical screening criteria for determining the conditions under which an economic activity qualifies as substantially contributing to climate change mitigation or adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental

¹⁷⁹ [COMMISSION DELEGATED REGULATION \(EU\) 2021/2139 \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2021/2139/oj)

objectives. This Delegated Act covers the first two environmental objectives out of six. The criteria for the rest of the objectives are supposed to be described in the following delegated act to be adopted in 2023.

An important element of the uniform criteria is to avoid significant harm to any of the environmental objectives set out in Taxonomy Regulation and to avoid investments in cases where the economic activities correspond to certain environmental objectives while causing harm to the environment to an extent that outweighs their contribution to that objective (for instance, retrofitting old engines, which can contribute to the 3rd environmental objective while not being aligned with the 1st and 2nd ones). Based on the life-cycle approach of the final product or service, the environmental impact of economic activity shall be evaluated.

Taxonomy Regulation specifies that criteria for environmentally sustainable economic activities should be adapted regularly to reflect changes in science and technologies, as well as relevant legislation, through mutual dedicated work of experts and different stakeholders.

In accordance with article 3 of Taxonomy Regulation, an economic activity is considered sustainable if contributes substantially to one or more of the environmental objectives, does not significantly harm any of the environmental objectives, complies with technical screening criteria established by the EC and is carried out in compliance with the minimum safeguards.

Yet, Taxonomy Regulation recognizes a need for a transitional period for sectors where there are no widely available technologically and economically feasible low-carbon alternatives: *“In addition to the use of climate-neutral energy and more investments in already low-carbon economic activities and sectors, the transition requires substantial reductions in greenhouse gas emissions in other economic activities and sectors for which there are no technologically and economically feasible low-carbon alternatives. Those transitional economic activities should qualify as contributing substantially to climate change mitigation if their greenhouse gas emissions are substantially lower than the sector or industry average, they do not hamper the development and deployment of low-carbon alternatives and they do not lead to a lock-in of assets incompatible with the objective of climate neutrality, considering the economic lifetime of those assets. The technical screening criteria for such transitional economic activities should ensure that those transitional activities have a credible path towards climate-neutrality, and should be adjusted accordingly at regular intervals.”*

At the same time, for the IWT sector, in particular, the Taxonomy Regulation currently represents criteria for the manufacturing of vessels, IWT infrastructure, and waste management that are very difficult to apply, even if considering the transition pathway towards zero emissions. From the perspective of TSC, activities related to the transportation of fossil fuels and fossil fuel bunkering" and the ones that produce zero tailpipe direct emissions fleet during navigation, operations, and berthing are automatically attributed to the non-sustainable category. Such an approach excludes options of energy transition such as the use of renewable and low carbon fuels, which provide a significant decrease in GHG emissions and potentially can be generated from waste (contributing to circular economy principles), biomass, or from renewable sources (water and air using renewable energies).

In other words, Taxonomy Regulation is excluding activities related to the transportation of fossil fuels and fossil fuel bunkering, as well as supporting only zero tailpipe direct emissions fleet.

Other criteria expressed in Taxonomy Regulation are formulated in the following way: *“Vessels derive 100% of the energy used onboard from fuels or other energy carriers which achieve at least 80% greenhouse gas emission savings compared to their fossil fuel equivalent on a Well-To-Wake basis”*.

From perspective of IWT infrastructure, which is reflected in Annex on Climate adaptation (article 6.16.) the definition of the sustainable activity: *“Construction, modernisation and operation of waterways, harbour and rivers works, pleasure ports, locks, dams and dykes and other, including the provision of architectural services, engineering services, drafting services, building inspection services and surveying and mapping services and the like as well as*

the performance of physical, chemical and other analytical testing of all types of materials and products and excludes project management activities related to civil engineering works.”

Green taxonomy shall become an enabling tool for sustainable finance on the way to energy transition. In the field of IWT today, it is more of an additional challenge than an opportunity to achieve modal shift and environmental sustainability. It is possible to conclude that Taxonomy Regulation and its TSC currently require alignment with the other policy objectives of EGD, SSMS and NAIADES III criteria for clean mobility and to set up a realistic timeframe. In addition, a level-playing-field should be established between rail and waterway infrastructure with regard to the scope of eligible activities. PLATINA3 dedicated additional research for this issue in related D2.6 and D4.4.

Annex II: Regulations and measures supporting deployment of IWT infrastructure

This part provides an overview of the existing legal framework, which provides support for the implementation of IWT infrastructure. It serves as a continuation of the previous part, which conducted an analysis of CEEAG and Taxonomy Regulation tackling not only public and private investments for inland fleet but also IWT infrastructure. Here the most relevant legislation pieces, providing support for dedicated IWT infrastructure, are reflected on a pan-European level with the legal instruments in the field of IWT (adopted by the MS of the UNECE) and at EU level.

European Agreement on main inland waterways of international importance (AGN)

The Agreement¹⁸⁰ was adopted by the Inland Transportation Committee of the Economic Commission for Europe (UNECE) at its fifty-eighth session held in Geneva from 15 to 19 January 1996. In accordance with its article 5 (1), the Agreement is open at the Office of the United Nations in Geneva for signature by States that are members of the United Nations Economic Commission for Europe or have been admitted to the Commission in a consultative capacity in conformity with paragraphs 8 and 11 of the Terms of Reference of the Commission, from 1 October 1996 to 30 September 1997.

The AGN's main aim is to provide a coordinated plan for the development and construction of a network of inland waterways and inland ports of international importance by governments (UNECE MS), based on agreed infrastructure and operational parameters. Implementation of this plan is solely under the decision of the MS and based on the inclusion of the waterways and ports in national development strategies, master plans, as well as other relevant development programs. The Agreement emphasizes the importance of inland water transport, which, in comparison with other modes, presents economic and environmental advantages and may, therefore, contribute to the reduction of congestion, increased safety, and elimination of negative environmental impacts in the pan-European transport system.

The AGN connects 37 countries, including links beyond the ECE region: coastal routes in the Mediterranean, Black and Caspian Seas. From 1998 to 2016, the total length of the E waterway network grew from 27,711 km to 29,238 km, including important waterways, which belong to Rhine and Danube basins. As indicated in the White Paper, UNECE¹⁸¹: "The share of E waterways that comply with the AGN standards increased from 79 to 83% from 1998 to 2016. 73% are the larger canals and rivers of classes IV to VII, and coastal routes. These waterways accommodate vessels of at least 80 m in length and 9.5 m in width, with a loading capacity of around 1,500 metric tons. Only 10% of the AGN network comprises smaller waterways and only smaller vessels. Most of the network is interconnected. The 6.8% represents the missing links of the E waterway network." An important monitoring tool of the AGN is so-called "Blue book" – the Inventory of Main Standards and Parameters of the E Waterway Network and the online database¹⁸².

¹⁸⁰ <https://unece.org/fileadmin/DAM/trans/doc/2019/sc3/ECE-TRANS-120r4efr.pdf>

¹⁸¹ <https://unece.org/transport/publications/white-paper-progress-accomplishment-and-future-sustainable-inland-water>

¹⁸² <https://apps.unece.org/AGN/1Default.aspx>



Figure 3: Map of the IWW of AGN network. Source: UNECE

The Blue Book database provides the navigable characteristics of E waterways classified according to Table 1 of the second revised edition of the Inventory of Essential Characteristics and Parameters of the E Waterway Network, or Blue Book, published by UNECE in 2017. The data represent both existing and target values for selected sections of E waterways to be achieved as a result of the planned upgrading of existing waterways or the construction of a new waterway. The Blue Book reflects current inland navigation infrastructure parameters as compared to the minimum standards and parameters prescribed in the AGN Agreement. Equally, the Blue Book identifies bottlenecks and missing links in the existing E waterway network.

It has to be mentioned that AGN doesn't have a binding nature; therefore, it has the character of recommendations and serves more as a compendium on the existing European IWW and ports of international importance. Yet, it is addressing the need to develop IWT infrastructure and, in many cases, serves as the basis for national strategies and development plans.

AFIR (revision)

The main idea of the revision of **Alternative Fuels Infrastructure Regulation (AFIR)**¹⁸³ is to provide support for the uptake of the new fuels and to facilitate energy transition. Aiming to create an efficient infrastructure network to achieve increased deployment and use of renewable and clean fuels, AFIR foresees a significant upgrade of inland port infrastructure as well as the creation of electric recharging points and hydrogen refueling points, including limited provisions for hydrogen and shore-side electricity supply. In addition, certain quality aspects of the infrastructure are also addressed to improve interoperability and user information.

Clear targets are set up in Article 10 "Targets for shore-side electricity supply in inland waterway ports", which states that *MS shall ensure that:*

¹⁸³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021PC0559&from=en>

(a) at least one installation providing shore-side electricity supply to inland waterway vessels is deployed at all TEN-T core inland waterway ports by 1 January 2025;

(b) at least one installation providing shore-side electricity supply to inland waterway vessels is deployed at all TEN-T comprehensive inland waterway ports by 1 January 2030.

In this way, it is important to mention that LNG is no longer required to be deployed in inland ports, but that doesn't mean that it is prohibited.

An important part of the AFIR is dedicated to national policy frameworks. Article 13, "National policy frameworks," describes requirements for national policy frameworks with regards to alternative fuel infrastructure in the transport sector and the deployment of the relevant infrastructure, in particular for IWT: *"a deployment plan for alternative fuels in inland waterway transport, in particular for both hydrogen and electricity"*.

This means that MS will have to plan the development of alternative fuel infrastructure in their national policy frameworks (NPFs) and present these plans to the EC by 2024. In its turn, the EC will provide a review of the success of the whole regulation (AFIR) by 2026 and consider next steps following NPFs. This will have a major impact on the deployment of such innovative fuels as hydrogen or methanol and provide a clearer vision on how to deploy the infrastructure in ports and on inland waterways.

As indicated in the AFIR: *"in order to promote alternative fuels and develop the relevant infrastructure, the national policy frameworks should consist of detailed strategies to promote alternative fuels, to develop clear strategies for the decarbonization of IWT along the TEN-T network. Long term decarbonization strategies should also be developed for TEN-T ports, in particular with a focus on the deployment of infrastructure for low and zero emission. Mandatory deployment targets should ensure that the sector finds sufficient shore-side electricity supply in TEN-T core and comprehensive maritime ports to comply with those requirements. The application of these targets to all TEN-T maritime ports should ensure the level playing field between ports"*.

The AFIR also sets up reporting requirements with regards to objectives and progress achieved as per the construction of the infrastructure indicated in national policy frameworks. This shall lead to clear reporting on the number of constructed refueling and recharging points for alternative fuels and regarding the infrastructure for OPS in inland ports of the TEN-T core and comprehensive networks.

At the same time, it has to be mentioned that certain aspects of the AFIR require further consideration and must be addressed in order to avoid stranded investment costs.

It is important to emphasize, though, that the deployment of OPS in ports doesn't only rely on port development but also on the availability and extent of energy grids. If there is no possibility to allow energy grids to reach the quayside, the deployment of OPS will not be possible. There need to be measures in place to ensure that this capacity will be available. Otherwise, achievement of OPS goals by 2025 will be rather questionable.

A smart investment plan for the allocation of the innovative fuel IWT network in order to avoid missing links or overconcentration on the separate sections shall be considered. Cross-border cooperation is extremely important in this regard. The EC shall take a leading role in the facilitation of this cross-border cooperation, especially in river basins and on the corridor level. Planning for alternative fuel infrastructure should go beyond the national borders of separate MS. The river commissions, which have the necessary tools and expertise, will play an important role too in corridor infrastructure alignment.

It is important to emphasize that AFIR doesn't claim a drastic transition from fossil fuels to alternative clean energy types. On the contrary, it foresees "a gradual shift" towards decarbonized fuels, with special attention given to blending options and OPS instead of the drastic exclusion of infrastructure serving vessels and supplying fossil fuels.

AFIR doesn't indicate priority to any particular energy type; it gives more freedom to the market to identify the real need of the IWT sector while ensuring the deployment of necessary infrastructure along the IWT corridors.

TEN-T regulation (revision)

The seamless functioning of the IWT network across Europe significantly relies on the creation of a common, fully integrated, interoperable, reliable, modern infrastructure network. This laid down the main provisions for the development of the TEN-T network concept for railway, waterborne, road, and air transport. The ultimate objective of the TEN-T regulation is the creation of a multimodal transportation network by closing existing gaps in its sections and eliminating bottlenecks, missing links, and capacity constraints. This objective is complemented by enforced cooperation within the EU and all over Europe as well (the establishment of indicative maps of neighbouring countries) and by common requirements for infrastructure development and maintenance projects. A consolidated approach introduced in TEN-T regulation for project planning is coordinating international efforts and facilitating investment and funding for the creation of various infrastructure objects.

For TEN-T project implementation, the EU provides its support through dedicated funding instruments, such as the Connecting Europe Facility, the European Structural and Investment Fund, InvestEU, or European Investment Bank financing. For non-EU projects, the TEN-T regulation established certain financial bases in the fields of pre-accession, enlargement, foreign policy cooperation, and development aid.

Adopted in 2013, the TEN-T regulation¹⁸⁴ sets up an aim to complete an infrastructure "core" network linking together different countries, markets, and transport corridors. Putting transportation efficiency and sustainability front, the TEN-T network promotes a modal shift from road towards environmentally clean, less polluting, cost-efficient, and economically viable transport modes. In this way, a particular role in this policy document is given to IWT: *"Besides rail, well performing inland waterways are vital for the shift of long-distance freight transport to sustainable modes"*. Now with a new proposal, a new network structure is divided not only into a core (to be completed by 2030) and comprehensive network (to be completed by 2050), but also an intermediary "extended core network" (to be completed by 2040) to ensure better planning and financing horizons and to eliminate large gaps (20 years between the completion of the core and comprehensive network) to ensure better visibility for projects' implementation. The creation of a new concept for the new nine European Transport Corridors, which as a result of the merger cover the former nine core network corridors (CNC) and 11 rail freight corridors (RFC), will allow to exploit synergies, remove overlaps in planning, and create seamless processes of project implementation. Lots of studies (investment analysis, market research) can be conducted for both of the corridors, not separately like before.

A legislative proposal for the new TEN-T Regulation¹⁸⁵ was adopted in December 2021 in order to provide adaptation of the new TEN-T Regulation to new EU legislation (EGD, SSMS, NAIADES III) and new decarbonization requirements. Taking into account significant political and regulatory changes together with wide developments on decarbonization, digitalization, standardization, and technological progress, a need for a new framework for better supporting transportation, climate-resilient and smart infrastructure, became obvious.

With the adoption of the EGD and SSMS and with regards to emissions reduction, climate neutrality, and modal shift targets, a corresponding revision of the TEN-T regulation took place in order to better adapt the transport infrastructure network to these targets. Therefore, the main reasons for the TEN-T revision are:

¹⁸⁴ Regulation (EU) N° 1315 of the European Parliament and of the Council of 11 December 2013 on Union Guidelines for the development of the trans-European transport network

¹⁸⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52021PC0812&from=EN>

- contribution to the objectives of the EGD for transport infrastructure decarbonization with a strong focus on zero-emissions, innovation and digitalization aspects;
- mid-term review of the current TEN-T regulation;
- revision of the governance of the TEN-T and improvement of the instrument to promote the development of the TEN-T as, for example, the evaluation carried out in 2021 revealed discrepancies between national investment policies and EU policies.

Among the new challenges addressed in the revised regulation are the need for smart infrastructure, OPS, infrastructure for alternative fuels, and low- and/or zero-emission vessels, as well as the need for 5G network coverage for well-functioning information exchange services and RIS across the whole IWT network.

New milestones by 2030, 2040 and 2050 were introduced to ensure that the TEN-T network is completed on time and in line with existing TEN-T standards and new standards proposed in the revision, with a main focus on green technologies and enhanced digitalization.

In the scope of the proposed TEN-T revision, the main aim for IWT is to ensure multimodality and alternative fuel infrastructure as the main priorities. In this regard, a close link with all requirements for IWW and inland ports established in AFIR will be reflected in a new TEN-T. Among the new requirements for inland ports to be reflected in the revised TEN-T are zero waste and circular economy operations, which should be stressed as the most particular ones.

As described by the additions to article 20:

- Alternative fuels infrastructure as defined in AFIR;
- Infrastructure for zero waste and circular economy operations;
- Expansion of storage equipment and alternative fuels equipment.

Article 21:

- MS shall ensure all requirements for inland ports (by 2050);
- Connection with road/rail/at least one multimodal freight terminal;
- Inclusion of alternative fuels infrastructure and facilities to improve environmental performance of vessels in ports, including reception facilities, degassing facilities, noise reductions measures, measures to reduce air and water pollution.

Article 22 describes timelines for the core network:

- 2030 for rail or road connections and at least one multimodal freight terminal;
- 2040 for environmental performance facilities.

With regards to the fairway infrastructure and inland ports, the number of implementing acts per river basin will set out the requirements related to specifications for infrastructure; specifications for inland ports; sufficient mooring places; deployment of alternative energy infrastructure; digital requirements; climate and disaster resilience; parameters for free-flowing rivers; promotion of new technologies. This will address problems in particular river basins and help to move from a rigid system to one that takes into account the specificity of a particular part of the IWT network.

One of the important points of the revised regulation is that MS will have two years to perform a study to identify available multimodal freight capacities and determine new infrastructure to be developed. These studies will have to identify missing multimodal freight terminals and the future allocation of these new terminals and connections.

Studies must be based on an examination of current and future traffic flows of freight (including road) and assess the need for additional transshipment capacity in existing terminals.

As indicated in articles 35, 36, 37, 38:

Multimodal freight terminals: *“structure equipped for transshipment between at least two transport modes or between two different rail systems, and for temporary storage of freight, such as terminals in inland or maritime ports, along inland waterways, in airports as well as rail road terminals, including multimodal logistics platforms”.*

Multimodal terminals will require at least one recharging station (AFIR) by December 31, 2030; digital tools to ensure by December 31, 2030: efficient terminal operations such as photogates, terminal operation systems, driver digital check-in/check-out, cameras or other sensors on transshipment equipment, as well as rail side camera systems; and the provision of information flows within a terminal and between the transport modes along the logistic chain and the terminal.

In terms of rail connection (exemptions can be allowed): by 2030, handling all types of intermodal loading units; by 2040, accommodating 740 m long trains without manipulation; by 2050, handling any 740 m long train without manipulation. Yet, a 740-meter train without manipulation causes the following main concerns and requires clarification:

- clear definition of “no manipulation” has to be developed;
- lots of ports are located within cities, which might make it problematic to accommodate 740 m long trains due to spatial limitations. It means that the EC will have to implement exemptions for the ports, which cannot accommodate such trains.

It has to be mentioned that in its policy paper¹⁸⁶, EFIP is positively considering the inclusion of climate resilience in the proposed new TEN-T regulation, however, specifying that the document does not define connections between railways and ports. This makes difficult to achieve the goal of redistributing traffic between modes of transport. The revised TEN-T Regulation also does not take into account important issue of passenger traffic between inland ports.

In spite of the binding status of the TEN-T regulation, planning and construction of infrastructure projects are subject to the responsibilities of MS, which are based on national infrastructure development plans and programs. In this respect, it has to be a crucial element—to search for possible synergies in legislation and state service procedures, for better cooperation between countries, and for coordination of efforts towards efficient implementation of the transport projects.

¹⁸⁶https://www.inlandports.eu/media/Position%20of%20the%20European%20Federation%20of%20Inland%20Ports%20on%20TEN-T%20Consultation_5.pdf

Annex III: Regulations and measures targeting creation of skilled workforce in the IWT sector

As indicated in NAIADES III, under Flagship 7 - Smart and flexible EU crewing rules: “The current and future workforce needs to be equipped with the right skills to deal with the green and digital transitions, cyber-security, synchro-modality and the automation of vessels and infrastructure. Policies for lifelong learning need to be developed so that new technology can be introduced in a smooth and safe manner. Digitalisation and automation in the sector could also create new opportunities for women. To produce innovative outputs or exchange best practices, participation in transnational exchange programmes and the development of sectoral cooperation on skills should be encouraged.”

In the coming years, education and practical training of crews on the IWT will become one of the most urgent issues in the sector. Analysis conducted by Seafar NV¹⁸⁷ and reflected during the 5th Stage event of PLATINA3 showed that to reach the target of the SSMS - EU Green Deal to increase the share of IWT by 25% by 2030, 6000 new jobs will be needed by 2030, while at the current rate of inflow and natural attrition, only 2400 roles will be filled by 2030. Among others, there has to be mention of the lack of an integrated system of education and practical training for crew members of inland navigation vessels. Certain difficulties in this field are related to the fact that a certain percentage of crew members do not receive uniform training. At best, a two-stage education is obtained, consisting of practical and theoretical training in a regular educational institution. In addition, many workers do not receive any formally recognized professional education at all.

Considering the long-lasting situation with the lack of IWT crew, taking into account adopted targets for energy transition, bringing into operation vessels using alternative energy types, as well as taking into account developments towards digitalization and automation in IWT, it becomes clear that a skilled workforce is one of the important drivers of the modal shift.

It has to be mentioned that current European legal framework is based on such important pillars as Directive (EU) 2017/2397¹⁸⁸, Regulations for Personnel Navigating on the Rhine (RPN)¹⁸⁹, Recommendations on Minimum Requirements for the Issuance of Boatmaster’s certificates in Inland Navigation with a view to their Reciprocal Recognition for International Traffic – Resolution No. 31¹⁹⁰. An important document, based on the provisions of the Directive (EU) 2017/2397 is CESNI standard ES-QIN, described in chapter 3 of this report.

Directive (EU) 2017/2397

Directive (EU) 2017/2397 of the European Parliament and of the Council of 12 December 2017 on the recognition of professional qualifications in inland navigation and repealing Council Directives 91/672/EEC and 96/50/EC, has been published on December 27, 2017 and entered into force on January 16, 2018. The Directive lays down conditions and procedures for the certification of the qualifications of the crew involved in the operation of an inland fleet on European inland waterways, as well as for the recognition of such qualifications in the Member States. The Directive introduced for the first time a competency-based qualification system for the training of ship crew on European inland waterways. It establishes professional qualifications and competencies in inland navigation on the basis of qualifications and also provides for executive decisions of the Commission referring to

¹⁸⁷ <https://seafar.eu/>

¹⁸⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017L2397&from=EN>

¹⁸⁹ https://www.ccr-zkr.org/files/documents/reglementSTF/stf1_072016_en.pdf

¹⁹⁰ <https://unece.org/sites/default/files/2022-02/ECE-TRANS-SC3-184e.pdf>

the ES-QIN standard, complementing the Directive with qualification and certification standards at the managerial and operational levels aimed to consequently improve safety of navigation and overall attractiveness of the work of the crew on European IWT, as well as stimulating labour mobility.

As indicated in the chapter 5 of the Directive: "To facilitate mobility, to ensure the safety of navigation and to ensure the protection of human life and the environment, it is essential for crew members, and especially for persons in charge of emergency situations on board passenger vessels and for persons involved in the bunkering of liquefied natural gas-fuelled vessels, to hold certificates proving their qualifications. For efficient enforcement, they should carry such certificates while exercising their occupation."

The Directive consists of 5 chapters addressing: subject matter, scope and definitions; Union certificates of qualification; certification of professional qualifications; administrative provisions and final provisions. Directive contains following 4 Annexes:

- 1) Minimum requirements for age, administrative compliance, competence and navigation time;
- 2) Essential competence requirements;
- 3) Essential requirements regarding medical fitness;
- 4) Applicable requirements.

The Directive does not apply to persons navigating sports or leisure crafts, involved in the operation of ferries not moving independently; involved in the operation of craft used by armed forces, forces maintaining public order, civil defence services, waterway administrations, fire services and other emergency services. The Directive also does not apply to persons navigating in Member States with no inland waterways linked to the navigable network of another Member State and who are exclusively: navigating limited journeys of local interest, where the distance from the departure point is at no time more than ten kilometres; or navigating seasonally.

The Directive created a uniform requirement for obtaining and recognising professional qualifications as well as for service record books and logbooks. In comparison with high fragmentation, which existed at EU level considering a vast number of national regulations, with the adoption of the Directive it became possible to make all the EU certificates of qualification, service record books and logbooks valid on all of the European waterways. This allows to simplify significantly not only the processes and requirements in the field of education, but also to simplify administrative processes in terms of inspections and mutual recognition.

Due to harmonisation provided by ES-QIN standard, together with implementation of the Directive (EU) 2017/2397, training and examinations for obtaining certificates of competency become more aligned, ensuring in accordance with Article 5 of the Directive high level of safety, facilitating mobility and protection of human life and the environment.

In light of aforementioned considerations related to the lack of qualified personnel, Directive is making an important contribution to creation of the framework for a quality job in the sector, which is giving a possibility to obtain EU-recognized qualification certificate and to navigate on the European IWT.

It has to be mentioned that the speed of implementation of the Directive in different countries is different, which creates certain problems for the sector and educational institutions and slows down overall process of alignment at national and EU levels.

Resolution No. 31 UNECE

UNECE Resolution No. 31 "Recommendations on the minimum requirements for the issuance of certificates for the right to operate inland navigation vessels for the purpose of their mutual recognition for international traffic",

adopted by SC.3 in November 1992 and revised in November 2009, laid down the basis for the mutual recognition of boatmasters' certificates in the scope of UNECE Member States.

The Resolution recommends Governments of the UNECE Member States to take steps as may be necessary to comply with the minimum requirements, contained in the annex of this resolution with regard to the training and licensing of boatmasters in their countries for vessels engaged in international transport on inland waterways; as well as recognize certificates issued under the provisions of this resolution or take them duly into account when issuing other certificates required for given waterways.

Recommendations on minimum requirements for the issuance of botmasters' certificates in inland navigation with a view to their reciprocal recognition for international traffic, as well as identified in the scope of the Directive 2017/2397, apply to boatmasters of vessels designed for carrying cargo or passengers on inland waterways, and shall include boatmasters of self-propelled ships, tugs, pushers, towed convoys, pushed convoys and side-by-side formations.

Resolution contains special provisions concerning professional experience, special provisions concerning the examination of professional knowledge, information contained in the botmasters' certificates, provisions related to mutual recognition of botmasters' certificates and professional knowledge required to obtain a botmasters' certificate.



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