

## 【欧州】 【海事】

# Maritime Transport - Introduction of alternative fuel vessels: Financing the decarbonisation of maritime transport: The legal framework for the decarbonisation maritime transport and financing options for the transition to low and zero emission vessels and fuels

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### 【概要 : Summary】

Under the European Green Deal, the EU committed to reach climate neutrality by 2050 and a 90% reduction of GHG emissions from transport.

Regarding the decarbonisation of maritime transport, there are mainly two legislative proposals relevant for reducing GHG emissions, including the Emissions Trading System (EU-ETS) for maritime transport (Directive (EU) 2023/959), and the FuelEU Maritime initiative Regulation (Regulation (EU) 2023/1805), which intends to shift the fuel mix in the maritime transport sector towards the use of sustainable, renewable, and low-carbon fuels. The proposal also mandates the use of onshore power supply (OPS) in EU ports for ships at berth, among others, to accelerate the sector's decarbonisation. The legislation applies to commercial vessels of 5,000 gross tonnes and above and includes a mandatory and gradual increase in the supply of low-carbon fuels to those ships and a switch to low to zero emission propulsion solutions.

However, the main question is how to finance the necessary transition to a decarbonised, sustainable maritime transport as it requires significant investments into the ships' retrofitting for using alternative, renewable fuels, onshore power supply as well as into newbuilds with cleaner vessel designs.

This report provides an overview of the EU's measures to support the decarbonisation of maritime transport and gives also a non-exhaustive overview of possible financing options for sustainable solutions.

While there exist several financing instruments to support the shipowners to invest into the decarbonisation of maritime transport, currently, there still exist uncertainties regarding the right technical choices and shipping companies could invest into solutions that could become obsolete in a few years.

The EU Taxonomy Regulation and the technical screening criteria are seen as important tools to define and certify sustainable green measures and to stimulate and facilitate sustainable investment in maritime transport.

【記事 : Article】

## 1. Background: EU-ETS extension to maritime transport and the FuelEU Maritime Regulation (EU) 2023/1805

Shipping is one of the least carbon intensive ways to transport goods. However, it still emits about 2.9% of the global anthropogenic CO<sub>2</sub> emissions (COWI and CE Delft 2021, Delegated Regulation (EU) 2021/2139).

Therefore, to achieve the EU's European Green Deal target of becoming climate neutral by 2050 and to reduce the transport sector's GHG emissions by 90% by 2050, also maritime transport needs to achieve GHG emissions reductions accordingly. To reduce the CO<sub>2</sub> emissions from maritime transport, alongside with the on-going work at International Maritime Organisation (IMO) level, the European Commission proposed CO<sub>2</sub> emissions reduction measures for the maritime sector. The main measures include the incorporation of the maritime sector into the European Emission Trading System (EU-ETS) and to introduce the FuelEU Maritime initiative to boost the demand for sustainable alternative fuels in the maritime transport sector.

The EU-ETS extension to maritime transport (Directive (EU) 2023/959) and FuelEU Maritime (Regulation (EU) 2023/1805) will, together, improve the economic feasibility of more energy-efficient ships and low-GHG fuels and technologies (European Commission 2023a).

Both, the EU-ETS for maritime transport (Directive (EU) 2023/959) and FuelEU Maritime (Regulation (EU) 2023/1805) will be applicable to ships above 5,000GT calling at EU ports, covering CO<sub>2</sub> emissions and energy used, respectively, in EU ports, intra-EU and half of emissions/energy used in international voyages (European Commission 2023a).

According to the European Commission, while the EU-ETS will put a price and cap on fossil-based CO<sub>2</sub> emissions, FuelEU Maritime Regulation will

promote the uptake of renewable and low-carbon fuels (European Commission 2023a).

According to Article 3gb of Directive (EU) 2023/959 on the phase-in of requirements for maritime transport, shipping companies shall start to surrender allowances for 40% of verified emissions reported for 2024, for 70% of verified emissions reported for 2025 and 100% of verified emissions reported for 2026 and any year thereafter (Directive (EU) 2023/959, Council of the EU 2023c, see also Antolini 2023a).

The main objective of the FuelEU Maritime Regulation is to gradually introduce renewable and low-carbon fuels in maritime transport to thereby reduce the GHG emissions from the maritime sector. From January 2030 onwards, container ships and passenger ships at EU ports will also have to connect to onshore power supply (OPS), unless they can demonstrate use of another zero-emission technology (Regulation (EU) 2023/1804, see also Antolini, 2023c).

Regarding the FuelEU targets in Regulation (EU) 2023/1805, over the next decades until 2050, the GHG intensity of energy onboard of ships above 5,000 tonnes, will be reduced by 2% from 2025; 6% from 2030; 14.5% from 2035; 31% from 2040; 62% from 2045; and 80% from 2050. (Regulation (EU) 2023/1805).

The Regulation will also contain amended provisions on revenues generated from the penalties ( "FuelEU penalties" ) regarding their allocation to projects to support the decarbonisation of the maritime sector (Council of the EU 2023a, 2023b, see also Antolini 2023b). The new Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure requires TEN-T maritime ports to install electricity supply to serve the demand of at least 90% of containerships and passenger ships, above 5,000GT, calling at that port, by 1 January 2030 (Regulation (EU) 2023/1804). In addition, OPS (Onshore Power Supply) must be provided at every TEN-T inland waterway port (Regulation

(EU) 2023/1804, European Commission 2023a). In addition, favouring a technological neutral approach, the law accommodates all renewable and low-carbon fuels in maritime transport, such as liquid biofuels, e-liquids, decarbonised gas (including bio-LNG and e-gas), decarbonised hydrogen and decarbonised hydrogen-derived fuels (including methanol, and ammonia), as well as electricity (Regulation (EU) 2023/1804).

The maritime sector needs to develop the use of alternative fuels, but many alternative fuels are still in early development, and there is much uncertainty and divided opinion on the subject (COWI and CE Delft 2021). The FuelEU Maritime initiative is addressing these concerns and examines the market barriers that hamper use of alternative fuels and uncertainty around the market readiness of the alternative fuels.

Regarding the decarbonisation of shipping, the European shipping industry seems committed to taking a leading role, but the sector faces challenges due to a lack of market-ready low-carbon technologies and -fuels (COWI and CE Delft (2021). Finally, the Alternative Fuel Infrastructure Regulation (AFIR), together with the EU-ETS and FuelEU applicable to maritime transport, is expected to mitigate the risk and provide certainty for investments in innovative low-GHG emission technologies (Regulation (EU) 2023/1804, European Commission 2023a).

## 2. The EU Taxonomy Regulation and Delegated Acts

Since the achievement of the European Green Deal objectives will require significant investments also in the maritime transport sector, the European Commission has presented an actual list of environmentally sustainable activities by defining technical screening criteria for each environmental objective to facilitate sustainable investment (European Commission n.d.a). An EU taxonomy sets conditions that an economic activity must meet to qualify as

environmentally sustainable (European Commission 2023b). The EU Taxonomy Regulation (Regulation (EU) 2020/852) offers a classification system that defines criteria for economic activities that are aligned with a net zero trajectory by 2050 and the broader environmental goals other than climate facilitates sustainable investment to support the shift of capital flows towards sustainable investments that (European Commission n.d.a). It allows financial and non-financial companies to share a common definition of economic activities that contribute to the EU's climate and environmental objectives, when determining their investment choices (European Commission 2023b). It plays an important role by creating security for investors, protecting private investors from greenwashing, and helping companies to become more climate friendly as their investment in low or zero emission solutions is certified (Regulation (EU) 2020/852, (European Commission 2023b). Thereby, the EU taxonomy is expected to help direct investments to the economic activities most needed for the transition, in line with the European Green Deal objectives (European Commission n.d.a).

The Regulation empowered the Commission with establishing technical screening criteria through Delegated Acts. (European Commission 2023b).

The technical screening criteria in Delegated Regulation (EU) 2021/2139, determining the conditions under which a specific economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation, covers economic activities from nine economic sectors (Commission Delegated Regulation (EU) 2023/2485). According to Commission Delegated Regulation (EU) 2021/2139, technical screening criteria for the transport sector should focus on reducing the main emission sources, while considering the need to shift the transport of people and goods to lower emission

modes and for the creation of an infrastructure that enables clean mobility (Commission Delegated Regulation (EU) 2021/2139). According to the Commission Delegated Regulation (EU) 2021/2139, maritime shipping has a potential to reduce its GHG emissions and contributes to the transition towards a low-carbon economy (Commission Delegated Regulation (EU) 2021/2139). European Commission's Communication "Sustainable and Smart Mobility Strategy-putting European transport on track for the future" (COM(2020) 789 final) also includes the expectation that zero emission vessels become ready for market by 2030 (COM(2020) 789 final). To ensure equal treatment of shipping in comparison with other modes of transport, technical screening criteria for maritime transport should be established and should be applicable until the end of 2025 (Commission Delegated Regulation (EU) 2021/2139).

To further facilitate environmentally sustainable investments, the Commission Delegated Regulation (EU) 2023/2485 of 27 June 2023 amending Delegated Regulation (EU) 2021/2139 to lay down additional technical screening criteria for those economic activities that may contribute substantially to climate change mitigation or climate change adaptation (Commission Delegated, Regulation (EU) 2023/2485). Since the maritime sector is characterised by a variety of ship types, sizes, range of operations, trade patterns, value-chains and business models, and its international nature, a one-size-fits-all approach is not feasible (COWI and CE Delft 2021). Accordingly, the Commission Delegated Regulation (EU) 2023/2485 updated the technical screening criteria for key waterborne activities in Delegated Regulation (EU) 2021/2139 to take account of the diversity of the shipping sector (Commission Delegated, Regulation (EU) 2023/2485).

The technical screening criteria should be technology neutral in line with the Taxonomy Regulation. Also, the shipping stakeholders advocate for technological neutrality, highlighting that at this point of the development of green technologies in the maritime sector, it is important not to choose the technological pathways, as no single solution exists that can replace fossil fuels. Based on the Commission Delegated Regulation (EU) 2023/2485, the technical screening criteria of Delegated Regulation (EU) 2021/2139 are amended by adding that as of 1 January 2026, vessels that are able to run on zero direct (tailpipe) CO<sub>2</sub> emission fuels or on fuels from renewable sources have an attained EEDI value equivalent to reducing the EEDI reference line by at least 20 percentage points below the EEDI requirements applicable on 1 April 2022 (in Delegated Regulation (EU) 2021/2139). Vessels that can plug-in at berth and gas-fuelled ships, demonstrating the use of state-of-the-art measures and technologies to mitigate methane slippage emissions, are added to the technical screening criteria (Delegated Regulation (EU) 2023/2485). Furthermore, the technical screening criteria applicable after 2025 for inland waterway vessels reflect a gradual reduction of emissions towards 2050, based on the assessment of the GHG intensity of the energy used by inland waterway transport vessels, on a well-to-wake emissions basis (Delegated Regulation (EU) 2023/2485).

### 3. General characteristics of shipping finance and green investment

The preconditions for financing in the capital-intensive maritime sector are characterised by risks related to the long lifespan of vessels, performance and engineering aspects of the projects, a changing regulatory landscape, and uncertainties regarding future prevailing technologies (COWI and CE Delft (2021)). As zero

emissions technologies and alternative fuels are still in development, transitional technologies and fuels like LNG could be incentivised in the short term to ensure the overall greening of the shipping sector. However, its role in the decarbonisation is controversial as it is a fossil fuel (COWI and CE Delft 2021). In addition, the existence of a methane slip can further question the climate benefits of LNG and its role as a transitional fuel. Other fuels like ammonia or hydrogen are considered as mid- and long-term solutions, while electrification could lead to a decarbonisation of short-sea shipping (COWI and CE Delft 2021). On the other hand, the decarbonisation of deep-sea shipping will be challenging (COWI and CE Delft 2021).

Historically, debt financing from banks has provided most of the finance and it remains the primary source of financing (COWI and CE Delft 2021). However, since the financial crisis of 2008 there has been a 36% decrease in shipping lending from the top 40 international banks that finance shipping, leaving the sector to obtain capital from alternative sources of finance (COWI and CE Delft 2021). While conventional debt-based bank finance is decreasing, alternative financing is covering the gap, as capital markets are seeking new opportunities and other financing solutions. Accordingly, alternative sources of finance such as private equity, leasing, and capital markets is growing (COWI and CE Delft 2021). However, unlocking additional sources of finance is needed to cover the cost of retrofits and highly energy efficient/zero emission vessels, especially if technologies are not yet fully cost-effective. As banks tend to favour large companies, alternative financing is important for small and medium sized shipping companies (SMEs) to procure the required capital. However, alternative financing could also have a higher price than conventional bank debts (COWI and CE Delft 2021). Moreover, some banks are moving away

from the shipping sector due to the risk profile of shipping companies. Notably, the Basel III and Basel IV regulations enforced by the Basel Committee on Banking Supervision impose stricter liquidity requirements for bank lending and makes it challenging for the shipping sector due to its high capital intensity and low liquidity to lend to the shipping sector (COWI and CE Delft 2021). Despite overall high demand for green investment opportunities in financial markets, currently green finance in the European maritime sector is still limited, due to uncertainty about technology pathways, and capital-intensive investment needs, among others. The priority is to minimise technological uncertainty of climate transition in the sector and to avoid companies investing in assets that in few years could become stranded assets (COWI and CE Delft 2021). Banks that remain active in shipping are likely to lend to shipping companies that display strong corporate cultures and those that align their business with Basel III and Basel IV regulation as well as other measures such as the Poseidon Principles (COWI and CE Delft 2021).

The Poseidon Principles launched in 2019 meanwhile include 34 signatories of leading banks operating in the shipping finance worldwide. The banks have come together to commit to the Poseidon Principles in a commitment to improving the role of maritime finance while addressing global environmental issues (Poseidon Principles n.d.). There are four Poseidon Principles including 1) Assessment of climate alignment, 2) Accountability, 3) Enforcement, 4) Transparency (Poseidon Principles n.d.). The association of the Poseidon Principles starts from the assumption that the reduction of ship pollution is achieved by obligating the lenders to only finance ships that allow them to follow a ship pollution reduction plan (Caretto 2023). Therefore, the objective of this group of financial institutions under the Poseidon Principles is to integrate climate

considerations into lending decisions in ship finance, consistent with the climate-related goals of the IMO (COWI and CE Delft 2021).

The Poseidon Principles aim to support financial institutions in integrating climate considerations into their lending decisions in line with the global climate goals. They favour lending to only “green” ships with low pollution, thereby also promoting international shipping’s decarbonization (Caretta 2023, Poseidon Principles n.d.). This debt finance from the current signatories of the Poseidon Principles amount to more than \$200 billion and large shipping companies are expected to increase low-carbon investments in the future (Garcia/Swift 2023, Poseidon Principles n.d.). Regarding the situation of SMEs, it is equally crucial to consider how to facilitate their access to financing (COWI and CE Delft 2021). While various financing choices are available to SMEs, not all options are feasible, as the cost of debt can be high. For green finance, there is thus a need to incorporate the financial requirements of SMEs in the maritime sector. (COWI and CE Delft 2021). According to COWI and CE Delft (2021), one possible financing solution is leasing, which has been growing in the shipping sector in recent years. Since leasing circumvents the need for substantial upfront capital investments, it could be a solution for SMEs. European banks and financial institutions are offering leasing solutions to shipping companies (COWI and CE Delft 2021).

As there are very few (or none) low-carbon solutions readily available for the shipping industry, activities that incentivise the transition must be supported. Transitional bonds were created by the French multinational insurance firm AXA to bridge the gap between already green projects and industries that require more time to implement transition (COWI and CE Delft 2021). The transition bonds issued by AXA are financing three areas including

electric transportation, marine transport, and industrial resource efficiency (COWI and CE Delft 2021). In the shipping sector, the bonds will mainly focus on helping shipping companies to switch from heavy marine diesel oil to LNG propulsion. Green bonds are financial products, which are used to finance green assets. The use of regular bonds has been increasing in the shipping sector but issuance of green bond in the shipping sector is still rare (COWI and CE Delft 2021). In 2019, maritime shipping accounted for less than 1% of climate-aligned financing (COWI and CE Delft 2021).

However, Green bonds could potentially tap into this growing market and support financing the green transition. So far, one of the main challenges of increasing green bonds issuance in the shipping sector is the lack of commonly agreed definitions on what constitutes green (COWI and CE Delft 2021). However, this could change with the use of the EU Taxonomy Regulation (Regulation (EU) 2020/852) and the technical screening criteria under Commission Delegated, Regulation (EU) 2023/2485.

Since 2018, there were only a few cases of issuance of Green Bonds within the maritime shipping sector. The issued Green Bonds are predominantly financing LNG fuelled ships and bunkering as well as support various abatement technologies such as ballast water treatment equipment, SOx scrubbers and VOC reduction plant (COWI and CE Delft 2021). Since advanced zero-emission vessels and GHG-emission free fuels are still in development, and due to the long lifespan of vessels, there is need to focus on greening of the existing fleet through retrofits. Current examples of green retrofitting support schemes include EIB’s Green Shipping Guarantee Program, which set out to accelerate the implementation of investments in greener technologies by European shipping companies, and to finance shipbuilding projects that promote



sustainable transport and environmental protection (EIB 2016).

However, since investments related to LNG and open loop scrubbers are controversial from a climate and environmental standpoint, the lack of definitions of climate and sustainable actions highlight the importance of the EU Taxonomy as a means of providing certainty (COWI and CE Delft 2021).

The framework offered by the EU Taxonomy for the maritime sector is highlighted by shipping finance stakeholders as a good basis for establishing definitions (COWI and CE Delft 2021). These approaches enable a comparison between the risk profiles of different technologies (COWI and CE Delft 2021).

In addition to the green bonds, there are other instruments that could be incentivised such as green or sustainability-linked loans, functioning as regular loans linked to environmental criteria. However, conventional bank finance remains the primary source of finance in the shipping sector, especially in the European market, according to COWI and CE Delft (2021).

#### 4. The EU's steps to help financing decarbonisation in maritime transport

Regarding marine infrastructure investments, in June 2023, the European Commission announced to have selected 107 transport infrastructure projects to receive over €6 billion in EU grants from the Connecting Europe Facility (CEF)'s strategic investment in transport infrastructure. Over 80% of the funding will support projects to build a more efficient, greener, and smarter network of inland waterways and maritime routes along the trans-European transport (TEN-T) network, among others (DG Mobility 2023). The funding will support projects for developing onshore power supply to reduce GHG emissions from vessels at maritime ports in Ireland, Greece,

Spain, Latvia, Lithuania, the Netherlands, and Poland (DG Mobility 2023, CINEA 2023).

To help make inland waterway transport future-proof, infrastructure along the Seine-Scheldt cross-border waterways between France and Belgium will be modernised, as well as inland ports on the Danube and the Rhine basins, such as Vienna and Andernach (DG Mobility 2023).

Furthermore, the revenues from the payment of penalties under the FuelEU Maritime Regulation (EU) 2023/1805 will promote the distribution and use of renewable and low-carbon fuels in the maritime sector and help maritime operators to meet their climate and environmental goals (Regulation (EU) 2023/1805). According to Recital 62 of the FuelEU Maritime Regulation (EU) 2023/1805, the revenues generated by the payment of FuelEU penalties should be used to promote the distribution and use of renewable and low-carbon fuels in the maritime transport sector and help maritime transport operators to meet their climate and environmental goals (Regulation (EU) 2023/1805). Furthermore, according to Article 23, paragraph 11 of Regulation (EU) 2023/1805, Member States have to ensure that the revenue generated from the FuelEU penalties, or its equivalent financial value, is used to support the rapid deployment and the use of renewable and low-carbon fuels in the maritime sector, by stimulating the production of greater quantities of renewable and low-carbon fuels for the maritime sector, facilitating the construction of appropriate bunkering facilities or OPS infrastructure in ports, and supporting the development, testing and deployment of the most innovative technologies in the fleet to achieve significant emission reductions. (Regulation (EU) 2023/1805). By 30 June 2030, and every five years thereafter, Member States shall make public a report on the use of revenues generated from the Fuel EU penalties, including information on the beneficiaries and the level of expenditure concerning the objectives

(Regulation (EU) 2023/1805). According to Article 30, paragraph 2 of Regulation (EU) 2023/1805, by 31 December 2027, and every five years thereafter at the latest, the Commission shall report on the evolution of the zero-emission technologies in maritime transport and their market, as well as of renewable and low-carbon fuels and of OPS (Regulation (EU) 2023/1805).

The EU's Innovation Fund was established by Article 10a(8) of Directive 2003/87/EC to support across all Member States innovation in low-carbon technologies and processes. The revenues of the EU-ETS payments for the GHG emissions is reinvested into the Innovation Fund. The unspent funds from the NER300 programme, the Innovation Fund's predecessor, were also transferred to the Innovation Fund (European Commission n.d.c). The Innovation Fund's total funding depends on the carbon price, and with a budget of an estimated €40 billion between 2020 and 2030, the funding instrument supports innovative projects and technologies in net-zero mobility, among others (European Commission n.d.c). The project topics focus on breakthrough technologies for renewable energies, energy storage, carbon capture, utilisation (CCU) and storage (CCS), as well as on sustainable maritime transport, among others (European Commission n.d.c). In 2023, the revision of the EU-ETS also strengthened the Innovation Fund by increasing the overall size of the Innovation Fund from 450 million ETS allowances to approximately 530 million ETS allowances and including new sectors, like the maritime transport sector as of 1 January 2024 (Directive (EU) 2023/959). Projects in the maritime sector were already being supported by the Innovation Fund in advance of the inclusion of maritime sector's GHG emissions in the EU-ETS from 2024. Examples are the funding for a 2022-Small Scale project of a Next Generation tanker vessel powered by e-methanol and wind assisted propulsion for

maritime, a 2021 small scale project of using sugar for producing a sustainable marine fuel blend component for heavy fuel oil (SOL: Sugar the godfather of fuels), and the 2021 small scale project of reducing fuel consumption in maritime transport through wind energy (SUSTAIN-SEA) (European Commission n.d.b).

By 2030, 20 million allowances from the EU-ETS should be deployed to support the decarbonisation of the maritime sector (Commission Delegated Regulation (EU) 2023/2537).

## 5. Conclusion

The transition towards sustainability and zero emission transport will require a massive increase in funding also in maritime transport to finance retrofitting of ships and low to zero emission newbuilds, depending on the availability of technical solutions. Currently, there still exists a great technological uncertainty in the sector, which needs to be minimised, to avoid companies investing in assets that could become obsolete in few years. At EU level, there are several ways of financing tools for the maritime sector, including the Innovation Fund, the CEF, or EIB operations. Furthermore, the revenues of EU-ETS and FuelEU Maritime related penalties will be added to the EU's contribution in funding of decarbonisation projects in the maritime transport sector.

The EU Taxonomy Regulation introduced a common classification system for sustainable activities, thereby facilitating and supporting the shift of capital flows towards sustainable investments, based on technical screening criteria.

The technical screening criteria will create security for investors and protect private investors from greenwashing, while helping companies to become more climate friendly as their investment in low or zero emission solutions is certified.

In maritime transport, the technical screening criteria include the vessels' ability to run on



zero direct (tailpipe) CO<sub>2</sub> emission fuels or on fuels from renewable sources. Another technical screening criteria is whether vessels can use onshore power supply (OPS) at berth.

Therefore, the EU Taxonomy Regulation is an important tool to define green measures in maritime transport as a basis for their funding. The European shipping companies, financial institutions, and other stakeholders welcome the inclusion of the maritime sector in the EU Taxonomy as an opportunity to stimulate and expand the development of green financing.

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