

FuelEU Maritime – Avoiding Unintended Consequences

**Efficacy and implications of potential measures,
including new EU fuel standards, to help
decarbonise international shipping**

May 2021

A preliminary study commissioned by the
European Community Shipowners' Associations (ECSA)
and the International Chamber of Shipping (ICS)



Prepared by

Dr Edmund Hughes

Green Marine Associates Ltd.

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The European Community Shipowners' Associations (ECSA) was founded in 1965 as "Comité des Associations d'Armateurs des Communautés Européennes (CAACE)". ECSA is a trade association representing the national shipowners' associations of the EU and Norway. European shipowners control 40% of the global commercial fleet, contribute 147 billion EUR to the EU's GDP and provide 2.1 million Europeans with careers both onboard and ashore.

ECSA promotes the interests of European shipping so that the industry can best serve European and international trade in a free, competitive, business environment to the benefit of shippers and consumers.



The International Chamber of Shipping (ICS) is the global trade association representing national shipowners' associations from Asia, the Americas and Europe and more than 80% of the world merchant fleet. Established in 1921, ICS is concerned with all aspects of maritime affairs particularly maritime safety, environmental protection, maritime law and employment affairs. ICS enjoys consultative status with the UN International Maritime Organization (IMO).

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This preliminary report has been commissioned by ECSA and ICS, in order to inform discussion on this critically important topic with policy makers and other stakeholders. The arguments it contains, and the conclusions it reaches, do not necessarily reflect, in every respect, the current views of ECSA, ICS or their member national shipowners' associations, or their existing policies and positions on greenhouse gas emission reduction. These will continue to evolve as the European Commission and the other EU institutions further develop proposals for incorporating international shipping into EU regulatory instruments.

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Introduction

FuelEU Maritime is an important initiative by the EC to support efforts to decarbonise international shipping. It is expected to involve proposals for European Union (EU) legislation during 2021, including regulations on the carbon content of marine fuel, which could have significant implications for both EU and non-EU ship operators and the global bunker supply industry.

FuelEU Maritime could provide an opportunity for the EU and its major bunkering ports to take a lead in the provision of alternative fuels. However, much will depend on the detail of what is proposed. For example, requiring ships to comply with a European fuel standard without guaranteeing the availability of safe and adequate quantities of low and zero-carbon fuels would be a matter of significant concern. The expected initial focus on the promotion of biofuels requires very careful consideration, as will the possibility that ships unable to use or obtain compliant fuels might instead be required to purchase carbon credits.

The European and global shipping industries, as represented by ECSA and ICS, are committed to the complete decarbonisation of international shipping as soon as possible.

Working with the industry's global regulator, the UN International Maritime Organization (IMO), and its Member States – as well as the institutions of the European Union – the shipping industry fully accepts the urgency and ambition that is needed to respond to the climate emergency.

The biggest challenge for commercial shipping is that zero-carbon fuels, and the propulsion systems required to use them, do not yet exist in a form and scale that can be applied to large ocean-going ships.

This is why a broad coalition of governments, with the full support of the industry, has made a detailed proposal for the establishment of a US\$5 billion IMO Maritime Research Fund (IMRF) to be financed by mandatory R&D contributions by ship operators.¹ The purpose is to accelerate R&D of those zero-carbon technologies which will be vital to ensure that a large number of ships will start to use zero-carbon fuels by 2030, so that a rapid transition across the entire global fleet can then take place.² With EU Member States' support at IMO, it is hoped that the IMRF will be up and running by 2023.

However, the rapid decarbonisation of international shipping will require a suite of different and complementary measures. As well as technical and operational CO₂ reduction measures for both the existing and future fleets, and the application to shipping of market-based measures (MBMs) – whose development, at the global level, the industry fully supports to incentivise the transition to zero-carbon fuels³ – additional measures will certainly be needed to address the supply/demand conundrum for alternative fuels.

In this context, the FuelEU Maritime initiative is considered by the EC to be an important concrete step towards its efforts to help bring the maritime sector in line with the European Union (EU) ambition to achieve an emissions reduction of at least 55% by 2030 (compared to 1990) and carbon neutrality for its entire economy by 2050.

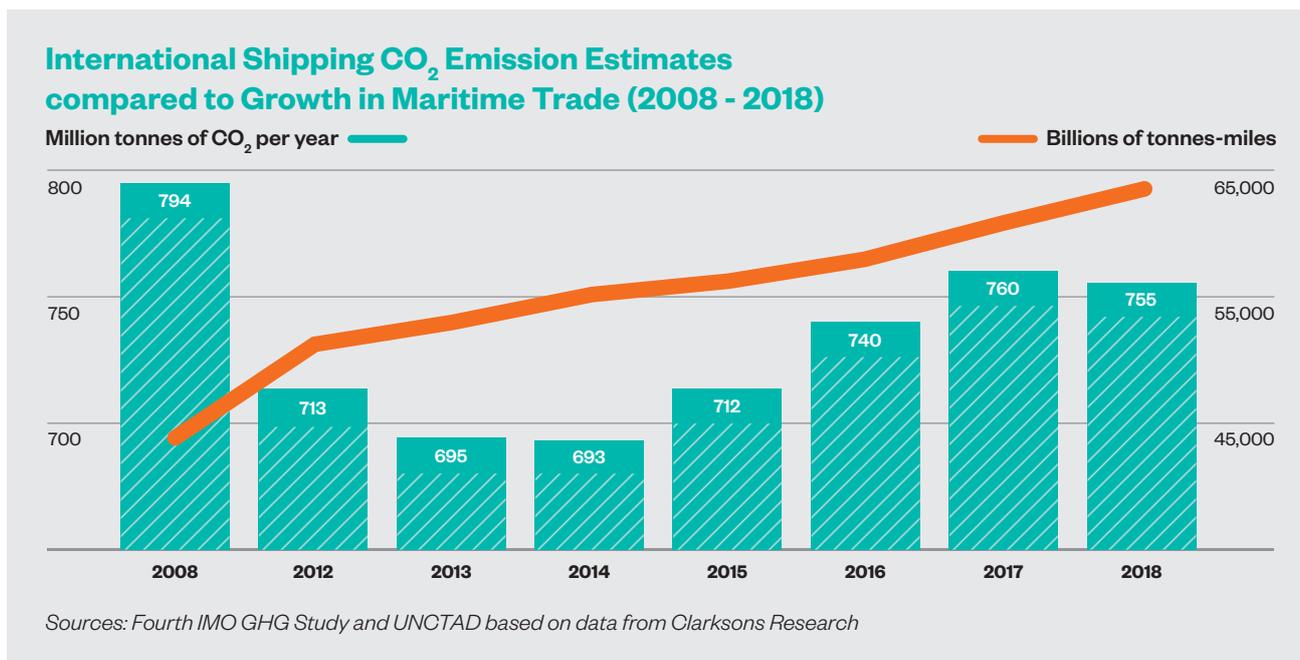
Based on the EC's own data, the GHG emissions from shipping that might be affected by FuelEU Maritime will only represent a relatively small proportion (15%) of the global sector's total emissions which have already decreased significantly compared to 2008, despite a major increase in maritime trade during the same period. The EU therefore needs to weigh up the pros and cons of what might be achieved by a

1 IMO MEPC 76/7/7 (Denmark et al.) see <https://www.ics-shipping.org/wp-content/uploads/2021/03/MEPC-76-7-7-Proposed-draft-amendments-to-MARPOL-Annex-VIEstablishment-of-the-International-Maritime-R...-Denmark-Georgia-Greece...pdf>

2 Even if only 5% of the world fleet comprises zero-carbon ships by 2030, this still equates to several thousand ships for which the technologies required to achieve this do not yet exist in a form that can be safely or practically applied to most ship types.

3 IMO MEPC 76/7/39 (ICS et al.) see <https://www.ics-shipping.org/wp-content/uploads/2021/05/MEPC-76-7-39-Consideration-of-market-based-measures-ICS-BIMCO-CLIA-INTERCA...pdf>

European approach to regulating maritime fuel standards against the negative impact this might have on making further progress on decarbonisation efforts at the IMO which will embrace the entire global fleet.



The success of existing global efforts is demonstrated by the latest IMO Study on the sector’s GHG emissions, published in August 2020.⁴

CO₂ emissions from shipping in 2018 (prior to any contraction in trade caused by COVID-19) were 7% lower than in 2008. International shipping emissions remain below 2008 levels – the baseline year agreed for the IMO GHG reduction targets set for 2030 and 2050. This is despite a 40% increase in maritime trade during the same ten year period and represents a carbon efficiency improvement, as an average across the global fleet, of about 30% since 2008 – a significant achievement. This suggests that changes to the level of shipping’s GHG emissions have decoupled from the expansion of maritime trade and the positive benefits this brings to sustainable economic development.

The following Study is intended to identify some of those issues which the EC, EU Member States and the European Parliament will all need to consider carefully, in consultation with other stakeholders and the EU’s international trading partners, when the EC publishes a full regulatory proposal on the FuelEU Maritime initiative and the EU legislative process begins during 2021.

It is very much hoped that this ECSA/ICS Study will help the EU institutions to avoid any unintended consequences which might inadvertently hinder, rather than assist, global efforts to decarbonise international shipping.

4 IMO (2021) Fourth IMO GHG Study 2020: Executive Summary. 23 March 2021.

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Overview for policy makers

What is the FuelEU Maritime initiative?

The FuelEU Maritime initiative aims to increase the use of sustainable alternative fuels in shipping by addressing, in particular, market barriers that may hamper their use and the current lack of clarity about which options are market ready.

The ultimate purpose of this EC initiative is to assist shipping's transition to zero-carbon fuels and energy, such as hydrogen, ammonia and battery power produced from renewable sources.⁵

The EC proposal on FuelEU Maritime could nevertheless have serious consequences for international shipping and the decisions that ship operators take as part of their greenhouse gas (GHG) emission reduction strategies, both in the short and longer term. The proposal could also have significant implications for the global bunker supply industry.

There is currently much uncertainty, moreover, even within EU States and the European Parliament, about what exactly the EC may put forward as a regulatory proposal for consultation during 2021. In 2020, the EC published an Inception Impact Assessment of its FuelEU Maritime initiative, but this is short on specific details.⁶

FuelEU Maritime therefore raises a number of important issues that will require careful consideration by the EU institutions:

1. Application of EU fuel standards outside the EU

It is currently understood that the EC intends to achieve its objectives by implementing mandatory EU standards with respect to the carbon content of marine fuels used by ships, including those used by non-EU flagged ships trading with EU ports. Potentially these EU standards could apply even if the fuels are purchased and loaded in non-EU States and consumed during a voyage commencing many thousands of kilometres away from EU ports.

2. Emphasis on use of biofuels

A significant aspect of FuelEU Maritime is the initial emphasis that is likely to be given to the mandatory use of biofuels in ships' bunkers, including marine fuels purchased outside of the EU. There are therefore a number of issues concerning the cost, availability and specification of biofuels, as well as important questions about enforcement, which the EU will need to take into careful account if promotion of the use of biofuels is to form a central part of the FuelEU Maritime initiative.

3. Focusing compliance on ship operators will make enforcement challenging

A further important issue is that the EC is understood to favour placing the principal legal responsibility for compliance with new fuel standards, including those for biofuels, on ship operators trading to EU ports, rather than on marine fuel suppliers. This may lead to a number of enforcement challenges, and one of the main conclusions of the following Study is that the EU should ensure that the principal obligation for compliance with any new standards will rest with fuel suppliers.

⁵ <https://www.ics-shipping.org/wp-content/uploads/2020/11/Catalysing-the-fourth-propulsion-revolution.pdf>

⁶ <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-CO₂-emissions-from-shipping-encouraging-the-use-of-low-carbon-fuels>

4. Practicality of another carbon trading scheme (on top of ETS)

Another concern is that the EC may be contemplating the inclusion of an extremely complex addition to its proposal, whereby ship operators unable to use or gain access to alternative fuels that meet the required EU standards might instead be required purchase credits from other ship operators. This would be in addition to the proposals to extend the EU emissions trading system to international shipping.

5. Reaction of non-EU States

Depending on the details, any EU regulation of marine fuel standards may also create serious concerns among non-EU States about what they may perceive to be an extra-territorial approach, leading to a two-tier market, which is potentially inconsistent with the obligations already accepted by EU States as members of the UN IMO.

Unless these important issues are appropriately considered by the EU institutions, there is a risk that FuelEU Maritime could be ineffective, or even counterproductive, in supporting the global shipping sector to decarbonise completely, consistent with the ambitious CO₂ emission reduction targets which have already been agreed for international shipping at the UN IMO.

IMO Initial Strategy on Reduction of GHG Emissions from Ships - Levels of Ambition

.....the Initial Strategy identifies levels of ambition for the international shipping sector noting that technological innovation and the global introduction of alternative fuels and/or energy sources for international shipping will be integral to achieve the overall ambition.....

.1 carbon intensity of the ship to decline through implementation of further phases of the energy efficiency design index (EEDI) for new ships

to review with the aim to strengthen the energy efficiency design requirements for ships with the percentage improvement for each phase to be determined for each ship type, as appropriate;

.2 carbon intensity of international shipping to decline (for all ships)

to reduce CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008; and

.3 GHG emissions from international shipping to peak and decline

to peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008 whilst pursuing efforts towards phasing them out as called for in the Vision as a point on a pathway of CO₂ emissions reduction consistent with the Paris Agreement temperature goals.

Source: IMO, resolution MEPC.304(72), April 2018

Potential advantages and disadvantages of FuelEU Maritime

The additional analysis in this Study explores the key policy drivers for the FuelEU Maritime initiative and the policy options being considered by the EU institutions.

In doing so, this Study highlights significant corresponding matters including: the relationship with ongoing international efforts to reduce GHG emissions from ships; legal implications and possible conflicts; the challenges associated with implementation and enforcement; and the potential risk of imposing disproportionate administrative burdens on shipping companies.

The potential advantages and disadvantages of the FuelEU Maritime initiative are summarised as follows, but these will of course depend on the detailed regulatory proposal made by the EC.

Potential advantages of the proposed FuelEU Maritime initiative

- Contributes to addressing the barriers identified in the IMO GHG Strategy, given that the global introduction of alternative fuels will be integral to achieving the agreed levels of ambition;
- Stimulates demand for low and zero-carbon marine fuels which is currently negligible, so addressing the supply-demand conundrum of which one comes first;
- Builds economies of scale in the supply of low and zero-carbon marine fuels, potentially bringing down their cost so as to reduce the price spread relative to current fuels and providing greater scope for other incentives to be applied;
- Provides shipowners and operators with an encouragement to use low and zero-carbon marine fuels and so meet the increasing demands of customers looking to reduce the carbon footprint of their supply chains; and
- Supports development and global consideration of fuel standards for low and zero-carbon marine fuels.

Potential disadvantages of the proposed FuelEU Maritime initiative

- Risk of being in conflict with the goal-based approach to reducing the carbon intensity of shipping, reflected in the amendments to MARPOL Annex VI approved by IMO in November 2020;
- Risk of adopting fuel standards at variance to those agreed globally by IMO and ISO, with respect both to carbon factors and safety standards;
- Significant challenges of enforcing EU maritime standards among fuel suppliers outside EU jurisdiction which could jeopardise the achievement of the intended emission reductions;
- Risk of substantially disrupting the international fuel market by certifying which fuel suppliers could and which ones could not refuel ships calling at EU ports. This could effectively undermine a level playing field and could lead to a two-tier market;
- Risk of market distortion if smaller companies, and those providing non-scheduled services, are less able to have access to fuels that comply with EU standards;
- Risk of overly prescriptive emphasis on use of biofuels;
- Risk that mandating use of certain fuels, with increased costs, diverts resources from more effective CO₂ reduction measures for ships;

- Risk of undermining IMO negotiations to implement the Initial Strategy on Reduction of GHG Emissions from Ships, so setting back global efforts to adopt measures for absolute emissions reduction; and
- Risk of increased political tension with third countries that could potentially lead to trade disputes if this is deemed to be interference with fuel standards adopted and enforced by non-EU States.

Key issues which the EU needs to consider

This ECSA/ICS Study suggests that, when taking forward the FuelEU Maritime initiative, the EU institutions should give careful consideration to the following issues:

Compatibility with global regulations for decarbonising international shipping

It needs to be emphasised that the EU is not operating in a regulatory vacuum.

International shipping is a global industry requiring a global regulatory framework to operate efficiently and, as identified in the IMO Convention, to remove discriminatory barriers to global trade⁷, about 80% of which is carried by sea.

A comprehensive global regulatory framework which addresses the urgent need to decarbonise international shipping is already very successfully provided by Annex VI of the IMO MARPOL Convention to which 25 EU States are signatories.

Although the EC may regard the FuelEU Maritime initiative as complementary to these global efforts, it will be important to ensure that the details are not in conflict with the Initial IMO Strategy on Reduction of GHG Emissions from Ships, which EU States signed up to in 2018.⁸

The EC claims, in its Inception Impact Assessment, that FuelEU Maritime will be in line with the global strategy adopted by IMO because the latter includes candidate measures to support the development and uptake of low and zero-carbon alternative fuels. However, these IMO candidate measures, which are for global application, have to be agreed by a consensus among all IMO Member States. They are not intended to be imposed on visiting ships by individual countries until they have been adopted as global IMO regulations which can be enforced by Port State Control authorities in those IMO States which have acceded to them.

As with the EC proposal to extend the EU emissions trading system (EU ETS) to international shipping, and regardless of the EC's good intentions with respect to FuelEU Maritime, there is a risk that non-EU States may object to what they may see as an extra-territorial attempt to apply EU standards outside of the global framework provided by IMO.

Consistency with IMO's goal-based approach to CO₂ reduction

Depending on how the FuelEU Maritime initiative is implemented and enforced, any attempt to regulate the carbon content of marine fuel provided outside of the EU could be perceived by non-EU States as being contrary to the approach to which all IMO States have only just agreed, as contained within the package of technical and operational measures for the existing fleet which were approved in November 2020 as amendments to Annex VI of the MARPOL Convention by the IMO Marine Environment Protection Committee.⁹

⁷ Convention of the International Maritime Organization, Art.(1)(b), 1948.

⁸ IMO resolution MEPC.302(72), adopted 13 April 2018

⁹ MEPC 76/3

This comprehensive package of new IMO regulations, to which both EU States and non-EU States have agreed, and which should enter into force globally by the end of 2022, requires internationally trading ships to achieve mandatory improvements in their carbon intensity indicators (CIIIs). These will be used by the world's flag State Administrations to issue a mandatory A to E rating for each ship. However, IMO Member States have deliberately decided to adopt a goal-based approach, giving the ship operator flexibility with respect to the way in which the improvement of the carbon intensity indicators and the reduction of CO₂ emissions is achieved.

Under the IMO regime, agreed to by EU States, if the ship operator wishes to use less carbon efficient fuels it is free to do so, as there may be more effective and appropriate means of dedicating scarce resources to achieve the required improvement in carbon intensity, such as the application of new technologies to enhance energy efficiency. Although account may need to be taken of the 'well to wake' emissions of the fuel being used by ships – an issue already under discussion at IMO (see below) – it is the actual CO₂ emissions reductions achieved by ships which matter, rather than the means by which they are achieved.

An overly prescriptive approach by the EU towards the fuels that ships are required to use may therefore run the risk of discouraging other actions to reduce CO₂ emissions from international shipping, and also be inconsistent with the IMO's GHG Strategy and its emphasis on taking a goal-based approach to the challenge of CO₂ reduction.

As it is foreseen that many different low and zero-carbon based fuels could eventually be used by ships to comply with future GHG reduction regulations, any performance requirements on the carbon intensity of the energy used must be fully transparent and implementable, recognising that operational decisions affecting fuel consumption and the use of particular fuels may be taken by other entities such as a vessel's charterer and not necessarily by the shipowner.

A mandatory requirement for a ship to use fuels of a certain carbon content may also be in conflict with the approach agreed by IMO, especially if the ship has no means of controlling the carbon content of the fuel which it purchases from fuel suppliers, including those fuel suppliers located in non-EU States.

Responsibility for compliance with fuel standards

Concerns among non-EU States might be especially acute if it is the ship (including non-EU ships), rather than the fuel supplier, which is held legally responsible for compliance with any EU standards for the carbon content of marine fuel that is purchased outside the EU and used on voyages which might take place many thousands of kilometres beyond EU territorial waters.

It is understood that the EC may argue that placing the obligation for compliance with EU fuel standards on the ship, as opposed to the fuel supplier, may be necessary so as to stimulate an international market for alternative fuels.

But the real reason why the EC may wish to place this obligation on the ship could be to ensure that marine fuel suppliers in the EU are not placed at a commercial disadvantage to fuel suppliers located outside of the EU, an approach which might be perceived as protectionist of the EU marine fuel supply industry. Indeed, such an approach serves to support the contention that European fuel standards for international shipping may be inappropriate and difficult to enforce.

One reason why the EC may be considering making the ship responsible for compliance is that introducing standards applicable only to EU marine fuel suppliers could lead to higher prices for marine fuel supplied in the EU, resulting in ships not wishing to purchase fuel in the EU and leading to loss of market share among EU bunker suppliers. However, this may also imply that the EC has little confidence that compliance with European requirements by fuel suppliers could be guaranteed, meaning that its policy objectives might not be achieved unless suppliers are somehow obliged by shipping companies to provide them with the compliant fuels required. Such an approach could be perceived as the EU seeking to control standards pertaining to the global provision of bunker fuels to internationally trading ships by proxy.

Most importantly, if ships, including non-EU ships, are unable to readily source compliant fuel, this may lead to serious disruption to supply chains and global maritime trade, with ships having to divert to those ports where compliant fuels are available, potentially leading to unfair competition and significant market distortion.

As discussed below, it is understood that the initial focus of the FuelEU Maritime initiative may be to require ships, trading with EU ports, to increase the use of fuel containing a specified proportion of biofuels. There are critical safety issues associated with the use of biofuels, including compliance with the requirement in the IMO Safety of Life at Sea Convention (SOLAS) for marine fuels to have a flashpoint above 60 degrees Celsius.

This is another reason why any new maritime fuel standards should be addressed to fuel suppliers rather than to ships. The use of biofuels by ships should only be a mandatory requirement if it is clearly the legal responsibility of fuel suppliers to make sure that when biofuels are mixed with fossil fuels that the blends are safe and fit for purpose.

It is therefore strongly suggested that if the EU decides to develop maritime fuel standards, it should give careful consideration to enforcement issues and ensure that the principal obligation for compliance should rest with fuel suppliers.

Enforcement challenges of an EU fuel standard mandating use of biofuels

The potential fuel standard for ships to be imposed through the FuelEU Maritime initiative is expected to be based on the EC translating its forecasts for the uptake of liquid biofuels and other alternative fuels in shipping into ambitious 'carbon intensity in fuel' targets for 2030 and 2050 respectively, with five-year intermediate targets which could begin to be implemented by 2025 if not before.

Such EC targets for the uptake of biofuels seem to be technology neutral. Moreover, it would not be practical to compel all ships visiting EU ports to use LNG despite its lower carbon factor compared to conventional fuel oil, and 'genuine' zero-carbon fuels and the technologies required to apply these to international shipping are not expected to be widely available for at least another decade.

It is therefore understood that the initial focus of the EC proposals may be to stipulate the minimum proportion of a ship's fuels that should comprise biofuels as part of the blend. However, the availability of compliant fuels would probably be limited, at least initially, to those biofuels which the EU already certifies. Due to the need to assure and certify that these fuels will meet EU requirements, enforcement outside of the EU might prove a major challenge. The danger is that this could potentially create a distorted two-tier market, comprising those ships which – due to the ports they visit – can readily obtain compliant fuels and those which cannot, through no fault of their own.

However, the use of biofuels to achieve CO₂ reduction objectives is a complex topic. Apart from legitimate debate about the effect of increasing the use of biofuels on global food production and indirect land use change, the CO₂ reduction achieved through the use of biofuels depends on consensus about the carbon life cycle analysis used to calculate the carbon factor of the biofuel. The actual GHG emissions from a given biofuel will depend vitally on the type of feedstock used and the fuel production process. Although the EU has set up sustainability criteria for biofuels under the Renewable Energy Directive (RED II), it is unclear how these criteria will be enforced on non-EU fuel suppliers.

The EU may have already arrived at its own conclusions with respect to the CO₂ reduction benefits of using biofuels in other parts of the EU economy, including for other transport modes. However, for international shipping, the introduction of an EU standard would require a certification of EU and non-EU fuel suppliers by the EU authorities. This would be very challenging to enforce outside the EU's jurisdiction, and could greatly disrupt the international bunker fuel market. It would imply that the EU would be determining which non-EU fuel suppliers could or could not refuel any ships calling at EU ports.

Consistency with global discussions on life cycle analysis

It is IMO which has responsibility for determining the carbon factor of marine fuels. IMO States are currently in the process of negotiating guidelines, for global application, on how 'well to wake' life cycle analysis should be taken into account. Unfortunately, the finalisation of these guidelines by the IMO Marine Environment Protection Committee has unavoidably been delayed due to the COVID-19 pandemic and the suspension of IMO meetings throughout much of 2020.

In the continuing absence of these IMO guidelines, it seems that the EU may introduce its own life cycle guidelines for fuels purchased beyond its jurisdiction. Attempting to regulate fuel suppliers outside the EU could lead to significant enforcement challenges. When formulating any regulatory proposals, it will therefore be important for the EC to align any EU measures with these IMO guidelines on life cycle analysis, once these have been finalised and adopted by IMO Member States during 2021.

Safety issues

Biofuels can certainly be mixed with fossil fuels enabling ships to further reduce their emissions, but only provided that these blends are safe and fit for purpose. Biofuel blends present no particular safety risks, but only provided that they comply with specific International Organization for Standardization (ISO) requirements.

In 2018, the IMO Maritime Safety Committee (MSC) invited ISO to develop standards for methyl/ethyl alcohol as a fuel for ships, with a flashpoint below 60°C as required by the IMO SOLAS Convention. In November 2020, the IMO MSC approved interim guidelines for the safety of ships using methyl/ethyl alcohol as fuel, aiming to provide an international standard for ships using such fuels.¹⁰ The IMO guidelines include provisions for the arrangement, installation, control and monitoring of machinery, equipment and systems using methyl/ethyl alcohol as fuel to minimise the risk to the ship, its crew and the environment, having regard to the nature of the fuels involved.

The use of biofuels should only be considered for mandatory enforcement by the EU if it is the legal responsibility of fuel suppliers to make sure that when mixed with fossil fuels that the biofuel blends are safe and fit for purpose pursuant to compliance with IMO regulations.

¹⁰ MSC.1/Circ.1621

Cost and supply issues

Increasing the content of marine fuel blends which comprise biofuels is also likely to make these fuels more expensive in comparison to conventional liquid fuel oils. For example, marine biofuels sold in Antwerp currently cost about double the cost of conventional liquid fuel oils. The EU institutions will therefore need to consider carefully whether incentivising or effectively mandating the use of biofuels in blends could have the effect of reducing investments by shipping companies in other energy efficiency improvements for the existing fleet or in other low and zero-carbon fuels.

If the use of biofuels blends is encouraged, the EU institutions will need to take careful account of the available supply of such fuels, especially if these requirements are applied to fuels supplied outside of the EU, as well as to likely variations in availability and price in different regions and between different ports. Ensuring that the EU's sustainability criteria are fulfilled outside the EU's jurisdiction would lead to significant enforcement challenges and could substantially disrupt the international bunker fuel market. These challenges could essentially jeopardise the achievement of the intended carbon savings.

Mandatory requirements on the use of biofuels by ships trading to EU ports could have particular implications for the majority of ships which operate non-scheduled services where the destination of the ship is often unknown until shortly before the next port of call.

In the longer term, with increasing demand from other sectors for biofuels, especially from international aviation, the EU institutions will need to consider carefully whether a sufficient supply of biofuels will be available to meet the additional demand that will be created by any mandatory requirement for ships to use biofuel blends, and the economic implications resulting from the increased demand.

However, without specific requirements for compliance even being placed on those fuel suppliers located within the EU, ships may remain unable to obtain the required fuels at sufficient locations across the EU, let alone at ports in non-EU States.

Furthermore, without a wide range of other alternative fuels being made available to the market suitable for application to shipping, this could lead to ships focusing unduly on the use of biofuels only, thereby reducing innovation and adoption of those alternative low and zero-carbon fuels that will ultimately be necessary for the sector to decarbonise completely.

Achievement of long term decarbonisation objectives

The FuelEU Maritime initiative is understood to be intended to encourage the take-up of low and zero-carbon fuels by incrementally mandating their use. However, as with market-based measures intended to incentivise the deployment of alternative fuels, it may be difficult to mandate the use of new fuels which may require completely new types of propulsion systems, as well as fuel storage and delivery systems, for which the necessary technologies required to apply these to international shipping do not yet exist. This is why a broad coalition of States, including three EU States (Denmark, Greece and Malta) has proposed to IMO the establishment of an IMO Maritime Research Fund (IMRF) and an International Maritime Research and Development Board (IMRB) to accelerate R&D of zero-carbon technologies and their deployment, so that the early uptake of zero-carbon fuels can become plausible realities.

A global approach must be the cornerstone of the EU's policies. Success hinges primarily on the introduction of zero or low-emission, safe and widely available alternative fuels, which do not yet exist for widespread marine application.

Rather than effectively mandating prescriptive targets for the take-up of new fuels before the pathway to decarbonisation of international shipping has been identified, the EU institutions might therefore consider making the FuelEU Maritime initiative compatible with the approach developed at IMO whereby the efficiency standards that must be met by new ships are progressively made stricter as and when new technologies become available.

Phase 3 of the IMO Energy Efficiency Design Index (EEDI), which is mandatory under MARPOL Annex VI, will actually require new large containerships delivered after 2022 to be at least 50% more energy efficient than those constructed before 2013, the regulation having been changed in 2020 from the original requirement for a 30% energy efficiency improvement to be met by 2025. Other ship types constructed by shipyards in the future must comply with similarly stringent efficiency standards, based on the agreed EEDI, which are expected to be made increasingly stringent in the future by IMO. This will be done either by increasing the EEDI that must be achieved by new ships, or by moving forward the date of compliance as the necessary technology is developed by ship builders and engine manufacturers to make attainment of these stricter standards feasible.

Discussions have already commenced at IMO on EEDI Phase 4 and, although this will not itself mandate the use of LNG (as an interim transition fuel) it is anticipated that many new ships will only comply with the more stringent EEDI by being fitted with dual-fuel systems that will accommodate the use of LNG.

As soon as it is clear that zero-carbon fuels will become widely available, ideally around 2030 (which, if supported by EU States, will be greatly assisted by the establishment of the IMO Maritime Research Fund), it is similarly anticipated that the EEDI will be further progressively tightened. The EEDI will then become so stringent that it can only be achieved by new ships which are built with propulsion systems that can use these new fuels, but without being overly prescriptive about which zero-carbon fuels should be used.

It should be noted that one of the main outputs of the proposed International Maritime Research and Development Board (IMRB) being considered by IMO is to help to identify the pathways to decarbonisation and the low and zero-carbon fuels that are likely to be used by international shipping to deliver the GHG reduction targets agreed by IMO.

Use of operational metrics

Due to the lack of detail contained in the EC Inception Impact Assessment, there is much uncertainty about the extent to which the FuelEU Maritime initiative may also involve the use of operational Carbon Intensity Indicators (CIIs), and compliance by ships with targets for improved carbon intensity, in combination with any new mandatory marine fuel standards that ships might be required to meet.

As mentioned above, it will be important for any EC proposals to be consistent with the amendments to MARPOL Annex VI with respect to the CIIs that must be attained by the existing fleet, which were approved by the IMO Member States (including EU States) in November 2020.

Also as mentioned above, it is suggested that care should be taken by the EU institutions to avoid an overly prescriptive approach whereby any requirements to comply with standards regarding the carbon content of fuel and/or CIIs for operational performance could potentially be in conflict with each other, leading to the diversion of resources away from those measures which will be the most effective in achieving CO₂ emission reductions.

Suggested options for ‘pooled compliance’ and ‘efficiency credits trading system’

Although the EC Inception Impact Assessment provides no mention of this possibility, it is understood that the EC may be contemplating the inclusion of a potentially extremely complex addition to its proposal. This may involve allowing options for ‘pooled compliance’ and rewards for ‘over-achievers’, whereby ship operators unable to use or gain access to alternative fuels that meet the required EU standards could purchase credits from other ship operators. It has even been suggested that the owner of a fleet of ships which chooses to invest in and operate ships using zero-carbon fuels could be given ‘carbon credits’ for the carbon not emitted below the specified standard. That ‘carbon credit’ could then be used against deficits from other ships in the owner’s fleet and/or traded with other shipowners.

It is also understood that such a system would operate outside, and as an addition to, the proposed application of the EU ETS to international shipping. In view of the overwhelmingly negative reaction that already surrounds the EU ETS amongst non-EU States, such an approach would likely be similarly controversial amongst the EU’s trading partners if applied to voyages and fuels purchased outside the EU.

Interaction with other EU initiatives

One of the challenges of provided constructive input on EC proposals for reducing CO₂ emissions from shipping is the large number of initiatives which the EC is currently contemplating simultaneously, which may have serious implications for both EU and non-EU ship operators. These include the EU ETS, the Carbon Border Adjustment Mechanism (CBAM), the Alternative Fuels Infrastructure Directive (AFID) and the Renewable Energy Directive (RED II).

Subject to the details of the FuelEU Maritime initiative which are still being finalised, all these other EU initiatives may have additional implications and further ramifications for ships trading to the EU, in terms of both the scope of approaches that can be used to comply with EU requirements and the economics of shipping cargoes, including the cost of EU exports and imports.

Possible reaction of non-EU States

It is assumed that the proportion of the world fleet affected by the FuelEU Maritime initiative will be the same as that covered by the scope of the EU MRV Regulation. Whilst its impacts could therefore affect as much as 38% of the world fleet, it would only directly affect about 15% of global CO₂ emissions from shipping. The benefits of applying EU regulations therefore have to be weighed against the negative reaction that these are likely to generate among non-EU States.

These issues are explored in more detail elsewhere this Study, and are similar to those raised by the EC’s proposal to extend the application of the EU ETS to shipping that are identified in the ICS/ECSA study prepared on this matter in July 2020.¹¹

When comparing the pros and cons of a regional approach, it must be remembered that shipping is a highly heterogeneous global industry with unique characteristics in terms of the global environment it works in, the role it plays in supporting global trade and development, the business models employed within it, and the way in which it is regulated globally.

¹¹ ICS/ECSA (2020) Implications of application of the EU Emissions Trading System (ETS) to international shipping, and potential benefits of alternative Market-Based Measures (MBMs), July 2020. <https://www.ics-shipping.org/wp-content/uploads/2020/07/ics-ecsa-study-on-eu-ets.pdf>

Key estimates relevant to applying FuelEU Maritime to international shipping

- Total global shipping emissions covered: 15%
- Number of ships affected: 12,400 to 15,000
- Proportion of fleet covered registered in non-EU/EEA flag states: 67%
- Number of companies affected: 2,000 to 2,500
- Proportion of affected companies located in third countries: 50%
- Third country maritime flag States potentially affected: > 100

Source: ECSA/ICS based on application being limited to ships of 5,000 GT and above. Minimum estimates derived from EC 2019 Annual Report on CO₂ Emissions from Maritime Transport, 19 May 2020, based on implementation of EU MRV Regulation. Maximum estimates assume different ships would make EU/EEA port calls year on year. Third country estimates exclude the United Kingdom. https://ec.europa.eu/clima/sites/clima/files/transport/shipping/docs/swd_2020_82_en.pdf

Other considerations

Until Technology Readiness Levels (TRLs) are significantly increased, it is apparent that low and zero-carbon fuels will not be available in a form and scale that can be readily applied for immediate and widespread use by all ship types (although if the IMO Maritime Research Fund is established, zero-carbon ships should start to appear on the market by 2030).

It is therefore essential that the right incentives and requirements for fuel suppliers are introduced now, in order to make low and zero-carbon fuels and energy for shipping available in the market, once the necessary TRLs have been achieved.

However, the current situation leads to significant uncertainty as to what approach ships and their owners should be considering when making future investment plans. This is particularly acute for owners whose ships may not be on scheduled services where planning is extremely difficult and where certainty of fuel supply is critical. This leads to the conclusion that a poorly designed EU policy instrument could potentially result in many ships involved in non-scheduled services being excluded from EU ports.

Until the FuelEU Maritime proposal is finalised, it is difficult to identify and draw firm conclusions about any contradictions between the potential measures of the EC's initiative and the achievement of its environmental objectives. However, this Study demonstrates that any failure to consider adequately and appropriately the implications of new EU requirements on the wider shipping market, and the importance of global enforcement, risks undermining the level playing field that is an imperative for international shipping to operate efficiently.

Importantly, this Study also highlights the uncertainty currently prevailing within the shipping industry as multiple policy initiatives to address climate change are being considered simultaneously by the EU which, either directly or indirectly, will have considerable implications for internationally trading maritime transport.

Which ships will be impacted and how those ships might be able to comply effectively and appropriately with these new EU regulations, and the extent to which these may or may not be in conflict with regulations adopted by IMO and non-EU States, are questions needing urgent clarification.

Additional Analysis

1 Context

- 1.1 Transporting more than 80% of the world's traded goods, maritime transport is essential to the world economy and, as the most energy efficient mode of mass cargo transport, to its sustainable development. Like all other modes of mass cargo transport that use hydrocarbon fuels for energy, the sector produces emissions to air as by-products.
- 1.2 International maritime transport is responsible for around 2% of global anthropogenic CO₂ emissions. The reference year for emissions identified in the Initial IMO Strategy on Reduction of GHG Emissions from Ships is 2008.¹² According to the Fourth IMO GHG Study 2020¹³, using the vessel based allocation approach, the carbon intensity of international shipping between 2008 and 2018, depending on which energy efficiency metric is used, has reduced by between 22% and 32%. Using the same vessel based allocation approach, the estimated emissions (in CO₂e) from international shipping in 2008 and 2018 are 940MT and 937MT respectively. The conclusion is clear that international shipping has significantly increased its transport work without increasing emissions.
- 1.3 However, while the impacts of the COVID-19 pandemic may have suppressed demand leading to a reduction in emissions in 2020, they are unlikely to affect the expected maritime trade growth projections for the coming decades. Indeed, UNCTAD identifies that maritime trade will recover in 2021 and projects that it will expand by 4.8%.¹⁴
- 1.4 The Communication on the European Green Deal published in December 2019¹⁵ emphasised the need to accelerate the transition to a low-emission and climate-neutral economy, including the shift to “sustainable and smart mobility”.
- 1.5 In September 2020, EC President Ursula von der Leyen proposed to raise the level of EU ambition and reduce GHG emissions by 55% by 2030 compared to 1990. In October 2020, in its position on the proposed European Climate Law, the European Parliament voted to raise the 2030 target to a 60% reduction. A revision of the Energy Taxation Directive along with a proposal to extend European emissions trading to the maritime sector are amongst the proposed measures that are planned for publication in 2021 that address the call for the price of transport to reflect the impact it has on the environment.
- 1.6 The purpose of this Study is to consider the implications of another measure, the forthcoming FuelEU Maritime (FEM) initiative, first proposed by the EC in Spring 2020¹⁶, for ships trading internationally. The FEM is considered by the EC as a first concrete step to bring the maritime sector in line with the European ambition of climate-neutrality by 2050. The initiative is expected to focus on ramping-up the production, deployment and uptake of sustainable alternative marine fuels, in efforts to drive decarbonisation and sustainability within the industry. It will also contribute to addressing the European Green Deal's ambition of regulating access of the most polluting ships to EU ports and obliging docked ships to drastically reduce their emissions, including through using shore-side electricity.¹⁷ It is identified as part of a package to bring the sector in line with the EU's ambition of climate-neutrality by 2050.¹⁸

¹² IMO (2018) Initial IMO Strategy on Reduction of GHG emissions from ships resolution, paragraph 3.2.3, MEPC.302(72), adopted 13 April 2018.

¹³ IMO (2021) Fourth IMO GHG Study 2020: Executive Summary. 23 March 2021.

¹⁴ UNCTAD (2020) Review of Maritime Transport 2020. 12 November 2020. https://unctad.org/system/files/official-document/rmt2020_en.pdf

¹⁵ EC (2019) Communication on The European Green Deal, 11 December 2019. https://ec.europa.eu/info/publications/communication-european-green-deal_en

¹⁶ EC (2020) CO₂ emissions from shipping – encouraging the use of low-carbon fuel, 27 March 2020. <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime->

¹⁷ EC (2020) CO₂ emissions from shipping – encouraging the use of low-carbon fuels, FuelEU Maritime Initiative, Public Consultation, 02 July 2020 - 10 September 2020.

<https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime-public-consultation> (accessed 5 March 2021)

¹⁸ *ibid.*

- 1.7 In the EU, maritime shipping accounted for 13% of the GHG emissions from the transport sector in 2015.¹⁹ Ship traffic to or from ports in the European Economic Area accounts for some 11% of all EU CO₂ emissions from transport and 3-4% of total EU CO₂ emissions.²⁰
- 1.8 During 2020, the EC²¹ undertook a formal consultation of the FuelEU Maritime initiative (FEM). The FEM aims to increase the use of sustainable alternative fuels in European shipping and ports by addressing, in particular:
- .1 market barriers that hamper their use; and
 - .2 uncertainty about which technical options are market-ready.
- 1.9 The “Inception Impact Assessment” (IIA)²² for the FEM issued by the EC, identifies that a shift to sustainable alternative fuels in maritime transport is critical to achieve a number of positive environmental effects including:
- .1 reduction of GHG emissions;
 - .2 reduction of local air pollution, especially in SOX, NOX and particulate matter; and
 - .3 reduction of noise emissions as a result to greater use of alternatives instead of diesel generators for ships at berth.
- 1.10 It is expected that ships calling at EU ports will be required to source and operate on less carbon intensive fuels as the FEM would require ships to use fuels with lower carbon intensity, potentially introduce an efficiency credits-trading system and impose zero emissions at berth for some ships. The EC identifies that the scope of these options will be carefully assessed also against the criteria of carbon leakage, especially with regards to the geographical application.
- 1.11 In addition, it is explained in the IIA for the FEM that the possible impact on administrative burden will depend on the policy option retained. However, to minimise additional burden it is expected to use to the maximum possible extent existing regulatory frameworks for reporting, monitoring and verification of ship emissions as well as for enforcement.
- 1.12 The IIA notes that the proposal is in line with the global strategy for reduction of GHG emissions from ships by IMO, which includes measures to support the development and uptake of low and zero-carbon alternative fuels. However, again without details it is arguable that this claim cannot be currently substantiated.
- 1.13 The FEM initiative, is separate from the proposed inclusion of maritime transport into the carbon cap and trade system, the EU Emissions Trading System (EU ETS), and comes at a time of intensive EU policy development on emissions from ships, which reflects the focus on an energy transition required for European commitments to reduce GHG emissions. Indeed, in addition to coherence with the EU ETS the IIA identifies that it will be essential to ensure coherence with other existing instruments such as the sustainability requirements, definitions and methodologies set out for renewable fuels in the recast Renewable Energy Directive, revision of the Energy Taxation Directive and revision of the Alternative Fuels Infrastructure Directive.
- 1.14 In March 2021 it became known that the EC is considering the introduction of an ‘operational carbon intensity

19 European Parliament (2020) Decarbonising maritime transport: The EU perspective, European Parliament Research Service, October 2020. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659296/EPRS_BRI\(2020\)659296_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659296/EPRS_BRI(2020)659296_EN.pdf) (accessed 5 March 2021)

20 EC (2020) CO₂ emissions from shipping – encouraging the use of low-carbon fuels, FuelEU Maritime Initiative <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime-> (accessed 5 March 2021)

21 The FuelEU Maritime initiative is led by the EC’s Directorate-General for Mobility and Transport (DG-MOVE). The push to include shipping in the carbon market is led by the Directorate General for Climate Action (DG-CLIMA) and is expected in June 2021.

22 EC (2020) Inception Impact Assessment, CO₂ emissions from shipping – encouraging the use of low-carbon fuels, FuelEU Maritime initiative, Ares(2020)1798478. <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime->

standard' under the EU ETS revision.²³ In part, this reflects a decision made on 7 July 2020 by the Environment Committee (ENVI) of the European Parliament to adopt an amendment to the EU MRV regulation to include a requirement for shipping companies to reduce their annual CO₂ emissions per transport work by at least 40% by 2030.²⁴ The standard will be additional to the requirement introduced under the EU ETS proposal, that is, ships would have to comply first with the efficiency standard and then would pay for their emissions under the EU ETS as reported in the EU MRV. Subsequently, it has been indicated that an additional operational efficiency target will not be incorporated into the EU ETS.²⁵ This example of policy development indicates the uncertainty prevailing until the final details of both the EU ETS and FEM initiative are known.

- 1.15 In its submission responding to the roadmap on the FEM including the IIA, the European Community Shipowners' Association (ECSA) stressed that any measures introduced under that initiative should be aligned with measures/standards developed by the IMO.²⁶ Furthermore ECSA identifies that fuel costs represent a significant share of total ship operating costs, with expensive investments required by all stakeholders for ships to run on alternative energy. To avoid risks of non-compliance, thereby providing strong financial advantages, any future measures must be fully enforceable without creating complex and difficult to comply with (administrative) burdens for shipowners.
- 1.16 One of the measures under consideration as part of the FEM is the introduction of a fuel standard as a requirement to achieve the goals to be set. A key consideration is whether such a standard should apply to the fuel supply industry in lieu of regulating ships to meet the fuel standard targets set by the EU. Design of the measure, and how the measure is implemented, including other aspects such as enforcement, has significant implications for achieving the policy objectives.
- 1.17 As it is foreseen that many different alternative fuels could be used to comply with future measures, any performance requirements on the carbon-intensity of energy used must be fully transparent and implementable, recognising that operational decisions affecting fuel consumption and the cost of particular fuels can be taken by vessel charterers and not necessarily the shipowner.²⁷ In part, this was considered necessary to ensure that European shipping remains competitive. However, it is concerning to note that DG-MOVE appears to prefer a fuel standard under the FEM without taking into account the work being undertaken by IMO, and that should DG-CLIMA's opposing view prevails, then two separate standards will be forthcoming, that is, one fuel standard under the FEM and one operational efficiency standard in addition to the requirement under the EU ETS. Such an approach risks the development of two non-complementary requirements so increasing significantly the administrative burden and compliance costs for the maritime transport industry.
- 1.18 For this Study, consideration is given to the potential effectiveness of the FEM as part of the EU's goal of helping to reduce and eliminate CO₂ emissions from international shipping as soon as possible, as well as examining other political and/or trade implications for its relations with non-EU States referred to as "third countries" by the EU.
- 1.19 The EC published in December 2020 its forecast with regard to the future fuel mix of the sector. Renewable and low carbon fuels (RLF) are projected at 5.5% to 13.5% of the fuel mix of shipping by 2030, while they would represent 86-88% of the energy use by 2050. Liquid biofuels would represent 39 to 40% of the fuel mix by 2050, while e-liquids would contribute up to 20%. Low carbon gases (bio-LNG and e-gas) are projected to represent 20% to 22% of the fuel mix and hydrogen another 7-8%.²⁸ The anticipated potential fuel standard for ships imposed through FEM is expected to be based on translating the forecast for the uptake of liquid biofuels in shipping into an ambitious carbon intensity target for 2030 and 2050 with five-year intermediate targets.

²³ Pers. Comm., 04 March 2021.

²⁴ EP(2021) Legislative Train Schedule: A European Green Deal, Proposal for a regulation amending regulation (EU) 2015/757 in order to take appropriate account of the global data collection system for ship fuel oil consumption data <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-eu-system-to-monitor-report-and-verify-co2-emissions-from-ships> (accessed 12 March 2021)

²⁵ Pers. Comm., 31 March 2021.

²⁶ ECSA (2020) CO₂ emissions from shipping – encouraging the use of low-carbon fuels, Response to the Roadmap Consultation, 23 April 2020. <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime-/F513560>

²⁷ Ibid, Implementation and enforcement, p.4

²⁸ EC (2020) Sustainable and Smart Mobility Strategy – putting European transport on track for the future. Staff Working Document, SWD(2020) 331 final, page 254, 9 December 2020. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020SC0331&from=EN>

- 1.20 The FEM proposal is expected to regulate fuel reported under the EU MRV system, that is, place obligations on fuel bunkered outside the EU as well. Such an approach indicates that the EC would be seeking to encourage the uptake of low/zero-carbon fuels in shipping at international level. However, due to the need to assure and certify that those fuels meet the EU requirements the availability of compliant fuels would probably be limited, at least initially, to biofuels that the EU already certifies.
- 1.21 Whether the EU is able to make sure that fuels bunkered outside the EU deliver the intended emissions reductions is of significance. Attempting to address the enforcement issue, the EC could consider the extension of certification schemes for fuel suppliers outside the EU. This would result in the EU having the power to decide where ships are allowed to bunker fuel before calling at EU ports. In addition to issues with enforcement, it is likely to create a two-tier market for ships (those that can comply and those that cannot) and disrupt the international bunkering market. Such an approach may meet significant resistance from third countries.
- 1.22 Other issues needing consideration include the disruption of the business model of those shipping segments that do not operate on the basis of fixed schedules and that may be required to call on EU ports without sufficient notice to bunker and change over to compliant fuels. Furthermore, requiring ships to comply with a fuel standard without guaranteeing the availability of safe and adequate quantities of low/zero carbon fuels is a matter of significant concern.
- 1.23 As identified above, the FEM proposed is part of a suite of EU policy initiatives to support EU action to address climate change. This Study discusses those other initiatives including Carbon Border Adjustment Mechanism (CBAM), Phase 4 of the EU-ETS, Alternative Fuels Infrastructure Directive (AFID), revised Renewable Energy Directive (RED II) and in particular how issues such as carbon leakage are to be addressed. However, without details of the FEM, which measures are to be employed and how they are to be enacted, it is difficult to draw precise conclusions and the implications for international maritime transport, in particular.
- 1.24 It is apparent that low and zero-carbon fuels are not currently available for shipping. To address the supply/demand conundrum for alternative fuels, this Study highlights the possibility of using revenues raised from the EU ETS to support shipping in its transition to those alternative fuels. Furthermore, it is essential that the right incentives and requirements for fuel suppliers are introduced in order to make low and zero-carbon fuels and energy for shipping available in the market. It is argued that sub-targets on fuel suppliers to make available low and zero carbon fuels and energy available for shipping should be introduced. Additionally, a higher multiplier than the current 1.2 under the Renewable Energy Directive for fuels consumed in maritime transport should be considered.
- 1.25 There is significant effort ongoing at the International Maritime Organization as part of the work under the Initial IMO Strategy on Reduction of GHG Emissions from Ships and its follow-up action programme agreed in 2018. This effort, including the provision of incentives for emissions reduction by ships and the importance of achieving an international consensus on the measures, are also highlighted in this Study.

2 Current status of European Parliament's consideration of emissions from maritime transport

Proposed amendments to EU MRV regulation

- 2.1 On 16 September 2020, the European Parliament (EP) adopted amendments to the EU MRV regulation (on monitoring, reporting and verification of CO₂ emissions by ships) requiring shipping companies to reduce on a linear basis their annual average CO₂ emissions relative to transport work, for all their ships, by at least 40% by 2030, with penalties for non-compliance. In order to obtain data on transport work, the reporting of 'cargo carried' per voyage would remain mandatory. In addition, the amendments introduce environmental performance labelling of ships, and call for inclusion of methane and other greenhouse gases besides CO₂, and better supply of shore-side electricity in ports.
- 2.2 The EC will have to review the regulation in light of future IMO measures, such as inclusion of shipping under the EU ETS Directive from 2022. The EP has called for an 'Ocean Fund' for the 2022-2030 period, financed by revenues from auctioning EU ETS allowances, which would be used to make ships more energy efficient, to support investment in innovative technologies and infrastructure for decarbonising maritime transport, and to protect marine ecosystems impacted by climate change. The EC would be required to assess any new global market-based emission reduction measures adopted by the IMO with respect to their ambition and environmental integrity. The file was referred back to the EP's Environment committee (ENVI) with a mandate to start trilogue negotiations.²⁹

European Parliament's Delli Report, April 2021

- 2.3 The Delli report on more efficient and cleaner maritime transport was adopted by the EP's Plenary on 27 April 2021³⁰. The final adopted text refers to the fact that no zero-carbon fuels currently exist at large scale and recalls the importance of transitional fuels.
- 2.4 The Delli report highlights several important policy goals that the EP wishes to see the EC address. These include:
- .1 applying the polluter-pays principle³¹ to maritime transport and promoting and further incentivising, including through tax exemptions, the use of alternatives to heavy fuels that are considerably reducing the impact on climate and the environment;
 - .2 the need to prevent carbon leakage and preserve the competitiveness of the European maritime transport sector;
 - .3 that, in the context of the revision of EU Regulation 2015/757 (EU MRV)³², that the EP called on shipping companies to achieve a 40% reduction in emissions by 2030 as an average across all ships under their responsibility, compared to the average performance per category of ships of the same size and type, and as such the EC should address under the FuelEU Maritime (FEM) initiative not only the carbon intensity of fuels but also the technical and operational measures which would improve the efficiency of ships and their operations;
 - .4 the FEM initiative should also include a life-cycle approach incorporating all greenhouse gas emissions and, in this regard, alternative fuels that do not meet the RED II³³ -70% GHG savings threshold on a life cycle basis should not be allowed for regulatory compliance;

29 European Parliament (2021) Legislative Train Schedule: A European Green Deal, Proposal for a regulation amending regulation (EU) 2015/757 in order to take appropriate account of the global data collection system for ship fuel oil consumption data <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-eu-system-to-monitor-report-and-verify-co2-emissions-from-ships> (accessed 12 March 2021)

30 https://www.europarl.europa.eu/doceo/document/TA-9-2021-0131_EN.html

31 The Delli report notes that the "polluter pays" principle should apply to and make responsible the party responsible for the commercial operation of the ship. This is the commercial entity that pays for the fuel that the ship consumes, such as the shipowner, the manager, the time charterer or the bareboat charterer

32 Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC

33 Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (RED II) <https://ec.europa.eu/jrc/en/jec/renewable-energy-recast-2030-red-ii>

- .5 that there is a need to make use and invest in all readily deployable options in reducing maritime emissions, in parallel to finding and financing long-term zero-emission alternatives, and in doing so recognising the importance of transitional technologies, such as LNG and LNG infrastructure, as alternatives for heavy fuel oil for a gradual transition towards zero-emission alternatives in the maritime sector;
- .6 there is a need to encourage cooperation between all stakeholders and exchange of best practices between ports, the shipping sector as well as fuel and energy suppliers in order to develop an overall policy framework for the decarbonisation of ports and coastal areas and, in this regard, urges the port authorities to put in place sustainable management methods and to certify them using methodologies that incorporate a Life Cycle Assessment of the port services, such as that offered by the Environmental Product Declaration;
- .7 support, through legislation, the objective of zero pollution (greenhouse gas emissions and air pollutants) at berth, regulate EU port access for the most polluting ships based on the Port State Control directive framework, and to incentivise and support the use of on shore power supply using clean electricity or any other energy saving technologies that have considerable effect on diminishing greenhouse gas emissions and air pollutants;
- .8 proposes a revision of Directive 2014/94/EU (AFID) as soon as possible in order to include incentives for both EU Member States and ports to scale-up the deployment of the necessary infrastructure and, in this regard, that the Commission should propose a revision of Directive 2003/96/EC on restructuring the Community framework for the taxation of energy products and electricity;
- .9 that the EC should promote a modal shift towards short-sea shipping in the Green Deal, on the same basis as rail and inland waterways, as a sustainable alternative to goods and passenger transport by road and air highlighting the importance of launching an EU fleet renewal and retrofit strategy to promote a green and digital transition and foster the competitiveness of the European maritime technology sector, and that there is a need for an infrastructure network that can support this intermodal capacity, which means fulfilling the investment commitments for the TEN-T network under the Connecting Europe Facility;
- .10 that a sustainable European maritime sector and a future proof infrastructure, including the trans-European transport network (TEN-T) and its future extension, are crucial to achieving a climate-neutral economy; stresses that the percentage increase in waterborne freight transport as envisaged in the European Green Deal needs a concrete EU investment plan and concrete measures at EU level;
- .11 that alternative propulsion systems, including wind and solar, should be integrated into the upcoming FEM initiative and that current initiatives and projects concerning sail freight transport should be assessed to ensure that propulsion systems for transport are eligible for European funding;
- .12 that the EC should provide support under its European funding programmes, in particular the Horizon Europe and Invest EU programmes, for research into and deployment of clean technologies and fuels, noting the potential of electricity from additional renewable sources including green hydrogen, ammonia and wind propulsion, and recognising the financial implications of the transition to clean alternative fuels, both for the shipping industry, the land based-fuel supply chain and the ports;
- .13 that the EC ensures the transparency and availability of information on the environmental impact and energy performance of ships and to assess the establishment of a European label scheme, in line with actions taken at IMO level, which should aim to effectively reduce emissions and assist the sector by providing improved access to funding, loans and guarantees based on its emission performance, improving emissions monitoring, create benefits by incentivising port authorities to differentiate port infrastructure charges as well as raising the sector's attractiveness; and to further promote, develop and implement the 'green ship' scheme that takes into account emission reduction, waste treatment and environmental impact;
- .14 that by the end of 2021, at the latest, the EC to propose a revision of the Port State Control Directive, to allow for more effective and comprehensive control of ships and simplified procedures, including incentives for compliance with environmental, social, public health and labour law standards, safety on board of ships calling at EU ports for both seafarers and dock workers, as well as the possibilities for effective proportionate and dissuasive sanctions, taking into account environmental, public health, tax and social law; and
- .15 that the EC should use its weight in the IMO, to achieve concrete measures in order to lay an ambitious and realistic path towards zero-emission shipping that is consistent with the temperature goal of the Paris Agreement.

- 2.5 Whilst the Delli report is a non-legislative resolution of EP, it is further evidence that the EU and its institutions are moving ahead with a policy agenda that intends to both support and require ships trading internationally to reduce emissions and, when at berth in the EU, eliminate emissions.
- 2.6 One of the key questions underlying this policy agenda is flexibility in how ships may comply with the requirements being considered, not least as there is no guarantee that the required fuels and/or infrastructure would be available if the obligation is placed on the ship rather than the fuel supplier. An example of where flexibility in compliance has been introduced in international shipping is the continued use of heavy fuel oil by ships especially those employing emission abatement technology. This is discussed briefly below as it demonstrates the complexity of policy decisions required to ensure that ships, especially ships undertaking non-scheduled services, can continue to trade.

Heavy Fuel Oil and Exhaust Gas Cleaning Systems use by maritime transport

- 2.7 The continued use of Heavy Fuel Oil (HFO) and Exhaust Gas Cleaning Systems (EGCS) by maritime transport operating to and within EU waters is also referred to in the EP Delli report³⁴ and provides insight into the EP's position and action they wish the EC to consider.
- 2.8 In acknowledging the impact of the use of heavy fuel oil, they stress the need to address effectively emissions of fuels used by ships and phase out gradually the use of heavy fuel oil in ships, not only as a fuel itself but also as a blending substance for marine fuels. To that effect there is the need for technological neutrality as long as it is consistent with the EU environmental targets noting that maritime transport is affected by the lack of adequate, harmonised EU end-of-waste criteria.
- 2.9 The new sulphur content limit in fuels of 0.5% introduced by the IMO on 1 January 2020 is welcomed but this is caveated with a concern that it should not lead to a shift in pollution from air to water. The EC, and the EU Member States, in line with Directive (EU) 2019/883 on port reception facilities for the delivery of waste from ships, are urged to work at IMO level for a comprehensive consideration of the environmental impacts on discharges into the sea of waste water from open loop scrubbers and other cargo residues and to ensure that they are properly collected and processed in port reception facilities.
- 2.10 Indeed EU Member States are strongly encouraged to set up discharge bans for wastewater from open loop scrubbers and certain cargo residues in their territorial waters in accordance with Directive 2000/60/EC establishing a framework for Community action in the field of water policy.
- 2.11 Finally, in noting that the purpose of open-loop scrubbers is to address air pollution, and that investments in them have been made, it is pointed out that the use of open-loop scrubbers has an impact on the environment and that the IMO is studying their long-term impact. However, the EP(TRAN) calls on the EC, on the basis of an impact assessment, to implement a gradual phase-out of the use of open-loop scrubbers in order to comply with emission limits, in line with the IMO framework and the MARPOL Convention.

³⁴ European Parliament Delli report on more efficient and cleaner maritime transport, 27 April 2021.

3 FuelEU Maritime initiative

Background

- 3.1 In 2018, ship traffic to or from ports of the European Economic Area was responsible for more than 138 million tonnes of CO₂ emissions (EU Monitoring, Reporting and Verification (MRV) data). This represents around 11% of all EU transport CO₂ emissions and 3% to 4% of total EU CO₂ emissions. CO₂ emissions from international shipping in the EU are currently around 32% above 1990 levels (UNFCCC data). Emissions occurring when the ships were at berth (anchored in port) amounted to around 6% of the total CO₂ emissions as reported under the MRV. In addition, significant emissions of sulphur oxides (SOX), nitrogen oxides (NOX), and particulate matter significantly contributed to air pollution in coastal areas and port cities, where ship engines are still being used to produce the necessary power during the port visit.³⁵
- 3.2 According to 2018 EU MRV data, the vast majority of the 44 million tonnes of fuel consumed and reported under the scheme concerned conventional fuels such as heavy fuel oil, gas oil, diesel oil, etc. Despite the existing framework for supporting the deployment of alternative fuels and energy sources e.g., LNG and onshore power, other fuels were only a small fraction of the fuels consumed by the monitored fleet. For instance, the use of Liquefied Natural Gas (LNG) was only 3% of the total amount of fuel consumed (mostly by LNG and gas carriers) and other alternatives, in particular renewable fuels, were negligible.
- 3.3 The Inception Impact Assessment (IIA) for the FuelEU Maritime (FEM) initiative identifies several market issues the initiative is seeking to address.³⁶ The IIA identifies that the increase in emissions is driven by the growth in transport activity not compensated by a corresponding increase in energy efficiency, owing to slow implementation of emission reduction measures and almost complete reliance on hydrocarbon fuels. While further improvements in energy efficiency are necessary, the FEM initiative focuses on accelerating the market uptake of sustainable alternative maritime fuels.
- 3.4 The IIA also identifies several barriers, including market and regulatory failures, hinder the uptake of sustainable alternative fuels in maritime transport including:
- .1 Lack of predictability and high risk of investment choices;
 - .2 Technological aspects and price factors;
 - .3 Interdependency issue; and
 - .4 Carbon leakage potential and split incentives.³⁷

Lack of predictability and high risk of investment choices

- 3.5 The long life cycle of ships of 25 to 30 years results in long lead times and a high risk of stranded assets. Accordingly, in the absence of clear-cut technological choices (see next point below) and of a defined regulatory path setting clear provisions for the decarbonisation of the future fuel mix, it is difficult for operators to build a business case and make long-term investment decisions. A wait-and-see approach is likely to prevail and defer deployment of new technologies, for example, fuel cells, and hence sustainable alternative fuels. While some alternative fuel options, for example, bio-diesel, bio-methanol, are already mature enough for use in the shipping sector the demand for these fuels has not proven to be sufficient to drive their production in sufficient and stable quantities.

Technological aspects and price factors

- 3.6 The number of sustainable alternative fuels and technologies currently available in the maritime sector is limited. This is due to the need to secure sufficient energy density (amount of energy stored in a given space per unit volume), especially for long, transoceanic voyages with no opportunity to refuel along the way. Lower energy density also implies sacrificing revenue-generating cargo space to provide for larger and/or more fuel storage tanks.

35 EC (2020) Inception Impact Assessment: FuelEU Maritime Initiative, Ares(2020)1798478. 27 March 2020. <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime>

36 Ibid.

37 Ibid.

- 3.7 Presently, liquid biofuels and electrically synthesised hydrocarbons have the highest energy density followed by natural gas and bio-gas, as well as other synthetic fuels, for example, electricity-based e-gas. These fuels are compatible with the existing assets and infrastructure (liquid or gaseous) and can therefore be deployed immediately in existing oil or LNG-fuelled ships. However, the GHG reduction potential depends on whether they can be produced and used sustainably.
- 3.8 Whilst LNG substantially contributes to air pollution reduction, any contribution towards GHG reduction is potentially limited, particularly taking into account methane slip and potential upstream methane emissions. On shorter distances and in ports, lower energy density is sufficient, already opening additional decarbonisation and zero-pollution pathways (e.g. hydrogen and electrification).
- 3.9 A positive sign is that new ships are increasingly being constructed using engines with a multi-fuel capability, which can be adapted as new sustainable alternative fuels emerge. However, the fragmentation of the sector and the high level of customisation of ships represent a barrier to reach critical mass for the deployment of new technologies, unless a large number of operators decides to take action. The lack of sufficient production levels contributes to the higher cost of sustainable alternative fuels compared to conventional fossil fuels, which remains a barrier to their uptake. Market-based-instruments, such as carbon levies or emission trading systems (ETS), may help bridge the gap, but the price difference is likely to remain high until the production of sustainable fuels and technologies achieves sufficient economies of scale.

Interdependency issue

- 3.10 The EU has set up a regulatory framework for the deployment of alternative fuels infrastructure for transport, including provisions for equipment of ports on the Trans-European Transport Network (TEN-T) through the Directive on the deployment of alternative fuels infrastructure (Directive 2014/94/EU). Yet its scope is limited to the supply of LNG and on-shore power supply (non-mandatory) and does not contain provisions related to their use in operations.
- 3.11 The very low demand from ship operators to bunker alternative fuels or connect to the electric grid while at berth makes it less attractive for ports to invest in alternative fuels infrastructure. For instance, data compiled by the European Alternative Fuels Observatory (EAFO) show that the deployment of onshore power-supply (OPS) has been slower than initially expected – OPS was only available in 19 TEN-T Core and 11 TEN-T Comprehensive Ports (over a total number of 83 Core and 236 Comprehensive Ports).
- 3.12 Regulating alternative fuels infrastructure and the supply may not be sufficient to break the “chicken-and-egg” issue. Therefore, the FEM will assess options to address also the demand side. An additional interdependency stems from the national implementation of the recast Renewable Energy Directive (Directive (EU) 2018/2001), supporting the use of sustainable alternative fuels through the obligation set out therein, is being implemented by the EU Member States (the deadline for transposition into national legislation is 30 June 2021). Accordingly, the impact of the EU Directive on the use of sustainable alternative fuels in maritime remains uncertain given that EU Member States are left with a considerable degree of flexibility when implementing this policy.

Carbon leakage potential and split incentives

- 3.13 The shipping sector is highly prone to carbon leakage since it would be possible for many ships active in both deep sea and short sea trades to bunker fuel outside the EU.³⁸ In addition, many shipowners do not directly operate their ships, but charter them to other parties, which presents a ‘split-incentive’ with respect to investment in technology to control emissions or enhance the energy efficiency of the ship. Both these factors represent significant additional obstacles to the uptake of more costly fuels and technologies as a key underlying principle of the market is the imperative to maintain a “level playing field” so as to avoid market distortion. As such the prevailing obstacles contribute to the lack of sufficient incentives for the decarbonisation of maritime transport operations.

38 “Carbon leakage” as a consequence of EU implementation of instruments designed to reduce emissions from international trading ships is discussed in detail in the ICS/ECSA report Implications of application of the EU Emissions Trading System (ETS) to international shipping, and potential benefits of alternative Market-Based Measures (MBMs), July 2020. <https://www.ics-shipping.org/wp-content/uploads/2020/07/ics-ecsa-study-on-eu-ets.pdf>

Policy drivers for the Fuel EU Maritime initiative

- 3.14 This Study has identified three related policy drivers for the development of the Fuel EU Maritime initiative (FEM). These are:
- .1 the EU Green Deal setting the goal of carbon neutrality for the EU by 2050 and that transport linked to the EU should be included in the EU Member States' National Determined Contribution (NDC) under the Paris Agreement;
 - .2 limits to what the EU ETS can achieve through pricing carbon emissions from ships and that the option of offsetting those emissions as part of such an approach could delay fuel switching and investment in the necessary infrastructure; and
 - .3 need to stimulate growth in the development and deployment of renewable/low-/zero-carbon fuels for maritime transport as investment in infrastructure is recognised as a significant barrier to shipping decarbonisation³⁹.
- 3.15 Measures being considered under the FEM are seeking therefore to address the following interconnected issues that lead to significant uncertainty:
- .1 lack of predictability of the regulatory framework and high risk of investment choices (high risk of stranded assets);
 - .2 low maturity of new renewable and low-carbon fuels and technologies with high risk for first movers;
 - .3 higher costs of renewable and low-carbon fuels (RLF) compared to fossil fuels (also due to insufficient economies of scale);
 - .4 high interdependency with supply and distribution ("chicken-and-egg" conundrum); and
 - .5 possibility of bunkering outside EU or the replacement of demand for RLFs from other sectors (risk of carbon leakage).
- 3.16 Specifically, the current barriers to decarbonise the shipping sector include the following:
- .1 a low uptake of renewable and low-carbon fuels and power by ships calling at ports; and
 - .2 a low uptake of zero-pollution fuels and power by ships at berth.
- 3.17 Of the above, the FEM initiative is in particular seeking to address how to stimulate growth in the development and deployment of renewable/low-/zero-carbon fuels for maritime transport. There are two possible approaches to stimulate such growth as follows:
- .1 as with road transport require that a prescribed percentage of the fuel used should be from a pre-defined list of fuels that are renewable/low-/zero-carbon with approved fuel suppliers identified; and
 - .2 establish a fuel standard for the entire life cycle for fuels that is considered acceptable. Such a standard could be given in terms of "GHG emissions per GJ of lower heating value", the same unit as used in the EU ETS, that is, t CO₂ equivalents/TJ.

Policy options under consideration for the Fuel EU Maritime initiative

- 3.18 The IIA⁴⁰ for the FEM identifies that, subject to further analysis and scoping, the policy options could include:
- .1 baseline: No specific action addressing the demand for sustainable fuels for maritime transport;
 - .2 support measures aiming at boosting market uptake of sustainable alternative fuels (e.g. facilitating access to funding, differentiation of port fees, etc.);
 - .3 prescriptive requirements on blending/definition of the share of sustainable alternative fuels and/or shoreside electricity to be used by ships in operation and at berth; and

39 Global Maritime Forum (2020) The scale of investment needed to decarbonize international shipping, Getting to Zero Coalition, January 2020. https://www.globalmaritimeforum.org/content/2020/01/Getting-to-Zero-Coalition_Insight-brief_Scale-of-investment.pdf

40 EC (2020) Inception Impact Assessment: FuelEU Maritime Initiative, Ares(2020)1798478. 27 March 2020. <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime->

.4 goal-based performance requirements on the carbon intensity of energy used in marine operations and at berth, no prescribing the type of fuels to be used.

3.19 It is noted that as regards the scope, the initiative is intended to be flag-neutral. However, the exact application, in terms of geographical scope, ship types and operation concerned (including, where possible, inland navigation), timing and phasing-in as well as the stringency of the requirements will be the subject of an impact assessment. Until that impact assessment process is complete, and then the final scope ascertained, uncertainty will prevail for the shipping sector leading to potential delays in future investment decisions.

3.20 Faber (2021)⁴¹ has presented some possible approaches for implementation of the FEM as follows (although option 2, in particular, is likely to be seen as very controversial and unnecessarily complicated, and the EC will hopefully not pursue such an approach):

- .1 use a minimum share of renewable and low carbon fuels (RLF); Onshore Power Supply (OPS) requirement for most polluting ships.
- .2 maximum limit on GHG content of fuel over the life cycle; OPS requirement for most polluting ships.
- .3 as option 2, with additionally options for pooled compliance and rewards for over-achievers:
 - .1 voluntary pooling; and
 - .2 baseline-and-credit system.

3.21 The possible impact of those approaches on fuel choice for ships is identified by Faber as follows:

	Fuel choice	Examples of fuel
Minimum share of renewable and low carbon fuels (RLF)	Cheapest drop-in RLF	HVO ⁴² , liquefied biogas
Maximum GHG content of fuel	Most costeffective drop-in RLF	HVO, liquefied biogas
Pooled compliance	Most cost-effective RLF	HVO, liquefied biogas, bio-methanol Possibly shifting to e-hydrogen, e-ammonia and e-methane in the coming decade

3.22 Possible impacts resulting from the identified approaches on administrative requirements for shipping companies, fuel suppliers and the regulator are identified by Faber as follows:

	Shipping companies	Fuel suppliers	Regulator
Minimum share RLF	Amount of fuel used in GJ	Certify that fuels are compliant	
Maximum GHG content fuels	Amount of fuel used in GJ	Certify life-cycle assessment (LCA) of GHG emissions of fuels	
Pooled compliance	Amount of fuel used in GJ - AND - Register Apply for credits - OR - Negotiate contract for pool Report for pool	Certify LCA of GHG emissions of fuels	Credit registry Credit issuance - OR - Check compliance of pool

41 Faber, J. (2021) Assessment of impacts from accelerating the uptake of sustainable alternative fuels in maritime transport. CE Delft/ECORYS. Unpublished.

42 Hydrotreated Vegetable Oil (HVO) fuel is one of the cleanest fuels on the market. It's a second-generation, synthetic, advanced renewable diesel alternative that eliminates up to 90% of net CO₂ and significantly reduces nitrogen oxide (NOx), particulate matter (PM) and carbon monoxide (CO) emissions. As a paraffinic, renewable fuel, HVO can be used as a drop-in alternative to fossil diesel, meeting EN 15940 standards and Fuel Quality Directive 2009/30/EC Annex II.

* HVO is produced from waste streams, plant and animal matter. Plants are grown and oils are taken away and used for their main purpose, recollected and then converted into HVO. When HVO is burnt, any CO₂ that is released is then sequestered back into a plant on the next regrowth cycle. This closed loop ensures there is no net CO₂ increase.

Application of a mandatory fuel standard

- 3.23 Application of a fuel standard could address the issue that carbon pricing leads to incremental price differentials being obtained between carbon and non-carbon fuels that are insufficient to provide an incentive for uptake of the required fuels. Furthermore, Faber argues, use of a fuel standard opens up the possibility of enabling a 'pooled compliance' scheme to be applied.
- 3.24 Faber suggests that use of a 'pooled compliance' scheme could reward the owner of a fleet of ships who chooses to invest in and operate ships using zero-carbon fuels, and then be given a 'carbon credit' for the carbon not emitted below the standard. That 'carbon credit' could then be used against deficits from other ships in the owner's fleet and/or traded to other shipowners. However, such an approach is likely to prove controversial within the industry and among non-EU States.
- 3.25 Placing the obligation on the ship, as opposed to the fuel supplier, for compliance with the standard of fuel required to be used by the ship, is considered necessary to ensure that marine fuel suppliers in the EU are not placed at a commercial disadvantage to suppliers located outside the EU. However, this approach suggests that compliance could not be guaranteed and potentially policy objectives not met were ships not able to obtain compliant fuel as suppliers were not obliged to supply it.
- 3.26 Indeed ECSA argues⁴³ that a fuel standard should be geared towards fuel suppliers and not ships, which are merely the fuel users. ECSA is quite concerned that should the FEM put forward a fuel standard as a requirement for ships, such a measure would seriously disrupt the bunkering market and would be challenging to enforce. More importantly, it would fail to incentivise energy efficiency improvements for ships, be they technical (wind propulsion assistance, heat recovery system, hull and propeller optimisation etc.) or operational (route optimisation, slow steaming etc.).
- 3.27 If the scope of application were the same as that for the EU MRV it is considered as having the advantage that it would build on an extant regulatory framework that has been implemented fully. However, the pooling scheme suggested by Faber, identified above, opens up the possibility of ships operating on voyages outside the scope of the EU MRV utilizing the credits. Such an approach adds significant complexity especially to reporting and enforcement and would require the EU MRV regulations to be amended as those ships would also need to report their emissions.
- 3.28 An additional benefit of utilising a fuel standard is that it can readily incorporate the life cycle emissions for the fuel, that is, 'well-to-wake' as opposed to 'tank-to-wake' consideration presently used for controlling emissions from ships under international instruments. As such marine fuels produced and placed on the market outside the EU can be produced to meet the standard. However, this does raise a significant question and potential limitation of accepting such fuels. How could their provenance be assured to the satisfaction of the EU? Arguably a Bunker Delivery Note (BDN), that is already a requirement under regulation 18.5 of MARPOL Annex VI, could be provided with a certificate for the fuel supplied being appended. The EU does recognise biofuels supplied from approved suppliers but these suppliers are subject to scrutiny and verification by the EC.
- 3.29 A further issue requiring consideration for the fuel standard is compatibility with the EU ETS. Currently the EU ETS recognises fuels emitting zero-carbon on combustion as just that, zero-carbon, irrespective of the upstream emissions that may have resulted from production and supply of the fuel. The FEM initiative is expected to use a fuel standard that accounts for both upstream and downstream emissions. Such a difference may be reconciled with the final design of the instrument but it needs careful consideration to avoid unintended consequences and market distortion.

43 ECSA (2021) EU shipowners call for fund coupled with targets for fuel suppliers to decarbonise shipping. 15 February 2021 <https://www.ecsa.eu/news/eu-shipowners-call-fund-coupled-targets-fuel-suppliers-decarbonise-shipping>

Relationship with ongoing work at IMO

3.30 IMO's MEPC 75 approved amendments to MARPOL Annex VI introducing mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping are expected to be adopted by MEPC 76 in June 2021 and so would apply from 1 January 2023 onwards. As reported by Safety4Sea⁴⁴, a report published in January 2021 by Wood Mackenzie,⁴⁵ and referenced by Mowat⁴⁶, identifies that IMO's 2030 carbon intensity reduction target can be achieved with the adoption of the technical and operational energy efficiency measures. The article quotes Wood Mackenzie as follows:

“Adoption of the EEDI and EEXI amendments would result in IMO achieving its target of reducing carbon intensity by at least 40% by 2030. This would cause a further decline in international marine bunker oil demand of around 370,000 barrels per day (b/d) by 2030 compared to our current outlook.”

3.31 If the reduction in fuel consumption were to be fully met by Engine Power Limitation, an overall fleet speed reduction of over 6% would be required. In addition, LNG is expected to grow steadily through this decade, displacing nearly 0.7 million b/d of oil bunkers by 2030. However, LNG contributes 9% of the total shipping emissions, highlighting its limited role in meeting future greenhouse gas targets. Still, growth in marine LNG will accelerate through the 2030s but slows post 2040 as zero-carbon fuels become more prevalent. Wood Mackenzie further opines as follows:

“A major shift towards low and zero-carbon fuels by 2050 is absolutely required to reach IMO's target to halve overall greenhouse gas emissions from international shipping by 2050, and to meet the 2050 carbon intensity target, IMO needs to extend the EEDI regulations beyond Phase three with ambitious new targets. Achieving this 2050 target though would result in a further decline in international marine bunker oil demand of around 0.9 million b/d by 2050 compared to our current outlook.”

3.32 Wood Mackenzie's base case assumes that improvements in fuel efficiency continue at an annualised rate of around 2.8% between 2030 and 2050 for new build ships, so that the EEDI index falls from 0.7 in Phase 3 to 0.4 by 2050. The report notes that low-carbon alternatives such as biofuels could play an important role in decarbonising shipping, but supply availability is a key constraint. In fact, synthetic e-fuels could become more widespread by the end of the 2040s, supported by the increasing availability of green hydrogen capacity.

3.33 ABS has concluded that “Energy regulations and ongoing industry studies on emission reduction options are progressively stimulating innovation and targeting technology readiness”.⁴⁷

3.34 The Fourth IMO GHG Study, published in August 2020, demonstrates that total shipping GHG emissions globally were 7% lower in 2018 than in 2008, the baseline year set by IMO's Initial Strategy, despite a 40% increase in maritime transport (tonnes of cargo moved one kilometre) and an improvement of about 30% in carbon intensity during the same period.⁴⁸

3.35 The views expressed by Wood Mackenzie and ABS, and the findings of the Fourth IMO GHG Study, do not support the prevailing view by some that emissions from maritime transport are increasing. Indeed, the mandatory package of additional technical and operational regulations that are expected to enter into force globally in 2023 are expected to reduce the carbon intensity of the existing global fleet by at least 40% by 2030, compared to 2008. This demonstrates that IMO is on track to achieve the ambitious target for 2030 which IMO Member States, including EU Member States, have previously agreed, as a milestone on the pathway to full decarbonisation.

44 Safety4Sea (2021) EEDI, EEXI amendments able to achieve IMO 2030 carbon intensity target, 1 March 2021. https://safety4sea.com/eedi-eexi-amendments-able-to-achieve-imo-2030-carbon-intensity-target/?utm_source=noonreport&utm_medium=email&utm_campaign=major (accessed 01 March 2021)

45 Wood Mackenzie (2021) IMO 2050: Charting a course towards decarbonisation, 29 January 2021.

46 Mowat, I. (2021) Could alternative marine fuels decarbonise shipping? Tough emissions targets could steer shipping towards biofuels and e-fuels – but there are issues to navigate, 26 February 2021. Wood Mackenzie. <https://www.woodmac.com/news/opinion/could-alternative-marine-fuels-decarbonise-shipping/>

47 American Bureau of Shipping (2021) Regulatory Debrief - Energy Efficiency Existing Ship Index (EEXI), December 2020 (accessed 12 January 2021).

48 ICS (2020) ICS comments on the Inception Impact Assessment for the proposed Amendment of the EU Emissions Trading System (Directive 2003/87/EC). 26 November 2020. <https://www.ics-shipping.org/wp-content/uploads/2020/11/Inception-Impact-Assessment-for-the-proposed-Amendment-of-the-EU-Emissions-Trading-System-Directive-2003-87-EC.pdf>

- 3.36 Furthermore, a draft review clause is provided in the international regulations stating that by 1 January 2026, the IMO shall assess both the mandatory technical and operational requirements to determine their effectiveness and whether there is a need for further amendments to be made to enhance the provisions.
- 3.37 Achievement of IMO's 2030 target is also supported by the progressive tightening of the technical efficiency standards for new build ships, with the mandatory Energy Efficiency Design Index (EEDI), meaning that several categories of new ships delivered in 2022 must be at least 30% more carbon efficient than ships delivered before 2013, while large new containerships must be at least 50% more efficient.
- 3.38 The IMO Initial Strategy on reduction of GHG emissions from ships, that EU States signed up to in 2018, sets out a clear pathway to reduce the maritime transport sector's total GHG emissions by at least 50% by 2050 with full decarbonisation to follow as soon as possible thereafter. With ongoing work at IMO progressing in accordance with the Initial Strategy and the agreed follow-up action plan⁴⁹, this raises the question as to the extent regional action taken by the EU will help or hinder the developments being undertaken by IMO. Furthermore, the IMO Initial Strategy is subject to review by 2023 that could see both the levels of ambition and other aspects including timelines for adoption of measures be revised. Further details about existing and ongoing work by the IMO on energy efficiency of ships and reducing GHG emissions from international shipping is set out in annex 1 to this report.
- 3.39 The political and legal ramifications of regional action being taken on emissions from ships when those ships are operating outside EU jurisdiction is discussed at length in the ICS/ECSA report published in July 2020.⁵⁰ The report notes that inclusion of ships trading internationally into the EU ETS, or even a decision by the EU to do so, could set a concerning precedent that may see negotiations at IMO delayed, or even derailed, if other governments perceive that the EU has concluded that IMO is unable or unlikely to deliver a coordinated global response to climate change for the shipping industry.
- 3.40 Some non-EU governments may reasonably ask why they should continue to work on an internationally negotiated instrument if EU Member States are actively pursuing their own measure? The consequences of this could be that other nations/regions decide to develop their own requirements independently of IMO, or deliberations are moved back under the UNFCCC which is ill-equipped to deliver progress for this international transport sector, which is why this mandate – with the full support of EU States – was given to IMO.
- 3.41 Undermining the progress being made by IMO to reduce global shipping emissions also presents a significant risk for the efficiency of the shipping sector, as a proliferation of regional and national schemes to address GHG emissions from international shipping would in effect create a patchwork quilt of regulations globally, introducing barriers to smooth operation of ships on international voyages and so to international trade. Preventing such an occurrence – and the recognition that shipping is a global industry requiring global rules – is precisely one of the reasons for the establishment by the international community of IMO and is reflected in the IMO Convention.
- 3.42 At this critical time, as the global economy recovers from the COVID pandemic, IMO Member States – including EU States – will presumably wish to continue to ensure that the regulatory framework for international shipping remains cohesive and acceptable to all 174 Member States of IMO. Indeed, it is notable that three EU States (Denmark, Greece and Malta) with significant shipping interests have chosen, with seven other IMO Member States, and all the major industry representative bodies including ICS, to co-sponsor a submission to MEPC 76 in June 2021 proposing the establishment of an IMO Maritime Research Fund and an International Maritime Research and Development Board.
- 3.43 When comparing the pros and cons of a regional approach, it is worth reiterating that shipping is a highly heterogeneous global industry with unique characteristics in terms of the environment it works in, the role it plays in supporting global trade and development, the business models employed within it, and the way it is regulated globally. These characteristics need to be understood fully and reflected when designing regional instruments to ensure issues such as potential jurisdictional conflict, administrative burden, and implementation including enforcement are appropriately and effectively addressed.

49 IMO (2018) Programme of follow-up actions of the Initial IMO Strategy on reduction of GHG emissions from ships up to 2023. MEPC 73/19/Add.1, annex 9.

50 ICS/ECSA (2020) Implications of application of the EU Emissions Trading System (ETS) to international shipping, and potential benefits of alternative Market-Based Measures (MBMs), July 2020. <https://www.ics-shipping.org/wp-content/uploads/2020/07/ics-ecsa-study-on-eu-ets.pdf>

4 Effectiveness of other EU regulations

- 4.1 The proposed FuelEU Maritime initiative (FEM) raises several questions as to whether the approach being considered will achieve the stated aims set out in the IIA as outlined above in Section 3. If it is to encourage ships to use cleaner fuels, how will the prospective measures contribute to this goal? Will ships be required to comply even though the supply side is not ready? If this is the case, then it raises the question why not address the supply side first? How will the approach drive innovation and investment in technology? In spite of all good intentions from shipowners to undertake the necessary energy transition, what is the use if fuel suppliers within the EU are not ready to supply the compliant fuel options?
- 4.2 The Alternative Fuels Infrastructure Directive (AFID) (see paragraphs 4.19 to 4.22) is recognised as complementing the FEM, in that together they aim to promote the uptake of new fuels and to stimulate the building of the necessary infrastructure including Onshore Power Supply (OPS) systems. However, without specific requirements on fuel suppliers located within the EU, ships may remain unable to obtain the fuels at sufficient locations across the EU. Furthermore, without a wide range of fuels being made available on the market it may lead to ships focusing on the use of biofuels only, thereby reducing innovation and adoption of alternative low and zero-carbon fuels.
- 4.3 There may be also a reluctance in EU Member States, especially those with large bunkering ports, to adopt requirements on fuel suppliers in their ports that are not applicable to their competitors globally. In many respects this relates to the question of how to achieve the policy goals but simultaneously control carbon leakage for an industry sector whose primary asset is both mobile and has the range to permit that asset to take on fuel outside the jurisdiction of the EU.
- 4.4 There is no doubt that the shipping sector is undertaking an energy transition that is being pushed as much by the market's decarbonisation goals as it is by regulation. The FEM therefore presents a clear opportunity for the EU and its major bunkering ports to take a lead in the provision of high quality and safe low or zero-carbon fuels. A summary of recent European Union institutional consideration of emissions from ships is set out in annex 2 to this Study.
- 4.5 Other instruments are being considered by the EU that may support, both directly and indirectly, the energy transition in shipping include the Carbon Border Adjustment Mechanism (CBAM)⁵¹ under the EU's Green Deal. The CBAM would ensure that the price of imports reflects more accurately their carbon content so reducing carbon leakage. Which sectors the CBAM will apply to has not been confirmed yet. However, the addition of a carbon price on goods imported to the EU may have an impact on the maritime transport sector. A brief overview is provided below of the considerations being given to the CBAM and highlights other significant amendments to strengthen EU instruments including Phase 4 of the EU ETS (2021 to 2030), the Alternative Fuels Infrastructure Directive (AFID) and the revised Renewable Energy Directive (RED II).

Carbon Border Adjustment Mechanism (CBAM)

- 4.6 The Inception Impact Assessment for the CBAM (IIA-CBAM)⁵² identifies that in addition to carefully assessing the legal and technical feasibility, and also in relation to the EU's trade acquis (the rules of the World Trade Organisation and the EU's trade agreements) and other international commitments, the complementarity of the measure with internal carbon pricing, in particular the EU ETS, will also have to be assessed, as well as how it relates to the current measures to avoid the risk of carbon leakage. The IIA notes that the measure should be commensurate with the internal EU carbon price and that various options could include a carbon tax on selected products – both on imported and domestic products – a new carbon customs duty or tax on imports, or the extension of the EU ETS to imports.
- 4.7 Consideration is to be given to the methodological approach to evaluating the carbon content and carbon pricing of imported products. Under the EU ETS, a system of harmonised EU wide benchmarks has been developed for industrial processes. To the extent that a sector is covered by the EU ETS, a border measure could be based on similar methodological considerations as for ETS, that is, benchmark values, unless the exporter certifies a lower carbon content and/or a higher carbon cost at origin. The EC will also look at alternative approaches, for example, defining carbon content of products, taking into account their interaction with existing and future climate policies.

51 EC (2020) EU Green Deal (carbon border adjustment mechanism). Ares (2020)1350037, 4 March 2020 (accessed 9 March 2021) <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12228-Carbon-Border-Adjustment-Mechanism>

52 *ibid.*

- 4.8 An important part of the CBAM work will also relate to the selection of sectors subject to this measure. A scoping in terms of sectors concerned will have to be defined to ensure that the measure applies where the risk of carbon leakage is the highest. The assessment will take as starting point the study currently underway that the EC has launched to identify the risk of carbon leakage in the third and fourth trading phases of the EU ETS.⁵³

Phase 4 of the EU ETS (2021 to 2030)⁵⁴

- 4.9 To achieve the EU's overall greenhouse gas emissions reduction target for 2030, the sectors covered by the EU Emissions Trading System (EU ETS) must reduce their emissions by 43% compared to 2005 levels. The revised EU ETS Directive, which will apply for the period 2021 to 2030, seeks to enable this through a mix of interlinked measures.
- 4.10 To increase the pace of emissions cuts, the overall number of emission allowances is meant to decline at an annual rate of 2.2% from 2021 onwards, compared to 1.74% currently. The Market Stability Reserve (MSR)⁵⁵ – the mechanism established by the EU to reduce the surplus of emission allowances in the carbon market and to improve the EU ETS's resilience to future shocks – is to be substantially reinforced. Between 2019 and 2023, the amount of allowances put in the reserve will double to 24% of the allowances in circulation. The regular feeding rate of 12% will be restored as of 2024. As a long-term measure to improve the functioning of the EU ETS, and unless otherwise decided in the first review of the MSR in 2021, from 2023 onwards the number of allowances held in the reserve will be limited to the auction volume of the previous year. Holdings above that amount will lose their validity.

Carbon leakage under the EU-ETS

- 4.11 The revised EU ETS Directive – as it applies to land based industries is expected by the EC to provide predictable, robust and fair rules to address the risk of carbon leakage. In terms of environmental impacts, the risk of carbon leakage has been considered since it implies a potential increase in global emissions. Nevertheless, this is a risk that has been considered at every step and safeguard measures against it have been included, making significant carbon leakage unlikely. As such, the potential for a negative impact at a global level is considered by the EC to be minimal.⁵⁶ With respect to the extension of the EU ETS to international shipping, however, additional considerations need to be taken into account to prevent carbon leakage, as highlighted in the separate ECSA/ICS Study on the implications of applying the ETS to shipping published in July 2020.⁵⁷
- 4.12 Currently the EU addresses carbon leakage as a consequence of the application of the EU ETS to sectors susceptible to carbon leakage by a 'free allocation' of allowances. The main purpose of free allocation is to avoid the risk of carbon leakage while remaining compatible with the decarbonisation objective of the EU ETS. Benchmarks⁵⁸ are therefore used to reward best performers and to avoid that free allocation leads to windfall profits. For industrial sectors, free allocation based on the use of benchmarks reflecting the emission levels of the best installations per sector resulted in a significant reduction of allowances allocated for free.⁵⁹

53 Trinomics (2021) Assessment of potential carbon leakage in the 3rd and 4th phase of EU Emissions Trading System <http://trinomics.eu/project/7038-3rd-and-4th-phase-assessment-cl/> (accessed on 10 March 2021)

54 EC (2021) Revision for phase 4 (2021-2030) https://ec.europa.eu/clima/policies/ets/revision_en

55 EC (2021) Market Stability Reserve https://ec.europa.eu/clima/policies/ets/reform_en

56 EC (2015) Impact Assessment: Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low carbon investments. Brussels, 15 May 2015, SWD(2015) 135 final, p.41. https://ec.europa.eu/clima/sites/clima/files/ets/revision/docs/impact_assessment_en.pdf

57 ICS/ECSA (2020) Implications of application of the EU-ETS to international shipping, and potential benefits of alternative Market-Based Measures (MBMs), July 2020 <https://www.ics-shipping.org/wp-content/uploads/2020/07/ics-ecsa-study-on-eu-ets.pdf>

58 The term "benchmark" is defined by the EC as "a reference value for the greenhouse gas (GHG) emissions, in tonnes CO₂, relative to a production activity". Product benchmarks are determined by the GHG emissions performance of the 10% most efficient installations producing that product. Once set the benchmark ensures all installations within a sector receive the same allocation of allowances per unit of activity. <https://redshawadvisors.com/learn-carbon/glossary/benchmarking/>

59 European Court of Auditors (2020) The EU's Emissions Trading System: free allocation of allowances needed better targeting. https://www.euractiv.com/wp-content/uploads/sites/2/2020/09/ECA_special-report_ETS.pdf (accessed 10 March 2021)

- 4.13 The European Court of Auditors' has asked "Did decisions on free Emissions Trading System allowances provide a reasonable basis to encourage the reduction of greenhouse gas emissions?"⁶⁰ They found that the approach to allocate free allowances on the basis of benchmarks provided significant incentives for improvement of energy efficiency, but there is scope to improve the application of these benchmarks, and the EC has not quantified the impact of allocation of free allowances on changes in energy efficiency.
- 4.14 The system of free allocation will be prolonged for another decade and has been revised to focus on sectors at the highest risk of relocating their production outside of the EU. These sectors will receive 100% of their allocation for free. For less exposed sectors, free allocation is foreseen to be phased out after 2026 from a maximum of 30% to 0% at the end of phase 4 (2030).
- 4.15 A considerable number of free allowances will be set aside for new and growing installations. This number consists of allowances that were not allocated from the total amount available for free allocation by the end of phase 3 (2020) and 200 million allowances from the MSR. Overall, more than six billion allowances are expected to be allocated to industry for free over the period 2021-2030.

Potential impact on maritime transport

- 4.16 If, as proposed, maritime transport is to be included into the EU ETS., the shipping sector, like the aviation sector and EU industry, can probably expect some free allocation of carbon credits⁶¹ (EU Allowances, or EUAs) to use for annual compliance. (However, this may be presented as a 'phase-in period' rather than as an allocation of free allowances). There are three important factors affecting free allocation⁶²:
- .1 the amount of free allocation that an industrial installation can expect to receive is based on its efficiency relative to its competitors. The top 10% efficient plant get free allocations (before other adjustments) that equal or even exceed their emissions. The rest get less than they need and must buy any shortfall. However, the aviation sector currently uses a blanket free allocation per tonne kilometre so it is also possible that shipping may be treated in the same way.
 - .2 the foundation of the EU ETS is an overall emissions cap that declines over time. The rate of decline to hit the current 2030 target of a 40% reduction from 2005 emissions levels means that, from 2021, the cap will be decreased by 2.2% per year. Because the Green Deal envisages a stricter cap reduction of 50-55% by 2030 (the EC and EU Parliament position is a 55% reduction), the cap can be expected to drop by up to 5% per year, depending on when the higher reduction rate kicks in.
 - .3 auction vs. free allocation. All free allocation is subject to there being sufficient EUAs available to distribute to affected emitters after the auction quantity has been deducted from the cap (the EU will auction around 57% of the cap in Phase IV from 2021 to 2030). The aviation sector and most industrial installations currently receive (and will receive in Phase IV) far less free allocation than they have emissions. Therefore, it is reasonable to expect that the shipping sector will receive considerably less free allocation than it needs to comply.
- 4.17 Older, less efficient ships will face the largest shortfalls and thus the highest costs associated with compliance with the EU ETS. Depending on how the free allocation/phase-in rules are decided, the most efficient ships and LNG powered vessels could end up with surplus EUAs that they can sell for a profit (or to assist with financing a conversion). Further, if free allocation is made on the same basis that it is made to fixed installations, the EUAs given out for free could be used in several innovative ways to boost shipowners' finances.⁶³
- 4.18 Another concern with inclusion of ships in the EU ETS is the potential for significant administrative burden on ships and uncertainty as the EC seeks to adjust the mechanism to balance policy objectives and reduce the risk of carbon leakage. For example, the Roadmap⁶⁴ reads as follows:

60 Ibid.

61 Redshaw Advisors Ltd. (2021) Carbon Credit. <https://redshawadvisors.com/learn-carbon/glossary/carbon-credit/> (accessed 10 March 2021)

62 Hitterski (2020) The inclusion of shipping emissions in the EU ETS, Redshaw Advisors Ltd., 26 September 2020. <https://redshawadvisors.com/the-inclusion-of-shipping-emissions-in-the-eu-ets/> (accessed 10 March 2021)

63 Ibid.

64 EC (2018) Roadmap: Revising the rules for free allocation in the EU Emissions Trading System, Ares(2018)1523713, 20 March 2018. <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1649-Revising-the-rules-for-free-allocation-in-the-EU-Emissions-Trading-System>

“In phase 3 of the EU-ETS (2013 to 2020) it was determined that more than 150 sectors, representing more than 95% of the total European industrial emissions were at risk of carbon leakage. The number of allowances given for free will significantly decrease in the future, it is expected that 6.3 billion allowances will be given for free during the 10 years period from 2021 to 2030, compared with the around 750 million free allowances received by more than 10,000 installations during 2017. During phase 3, around 1,000 changes were made per year regarding the number of free allowances received by specific installations; the new rules on free allocation adjustments due to production level changes are expected to trigger more modifications.”

Alternative Fuels Infrastructure Directive (AFID)

- 4.19 On 8 March 2021, the EC published a report⁶⁵ to the European Parliament and the Council on the application of Directive 2014/94/EU on the deployment of alternative fuels infrastructure (AFID). The report notes that the “impact of the Directive on the uptake of alternative fuels and onshore power supply for shipping and inland waterways is difficult to assess”. From available data they conclude that investments in alternative fuels infrastructure for LNG bunkering and onshore power supply (OPS) in ports have been limited in most EU Member States. However, especially in these areas, AFID is likely to have an important impact closer to the target dates for their deployment in 2025 or 2030.
- 4.20 The EC report notes that the European Green Deal highlights the great need for decarbonisation in the shipping sector. The scenarios underpinning the 2030 Climate Target Plan reaching at least 55% economy wide greenhouse gas emissions reductions project a high share of alternative fuels such as renewable and low carbon liquid fuels. Other alternative fuels to be used particularly post 2030 will be hydrogen or hydrogen carriers, such as ammonia, as well as bio-LNG, electricity, methanol and e-fuels that with the exception of e-fuels that require distinct infrastructure.
- 4.21 The EC report identifies that the FEM initiative to be adopted in 2021 will further analyse decarbonisation and pollution reduction pathways for the maritime sector, and that it is clear that considerable and long-term effort is needed to ensure adequate infrastructure provision for such fuel supply. Importantly the report notes that “current planning of EU Member States in this area is well behind what will be required to meet the short and medium-term GHG and pollutant emission reduction requirements related to the implementation of the European Green Deal”. Furthermore, “substantial additional investments are needed for providing the required recharging and refuelling infrastructure especially for zero emission vessels and infrastructure in ports” and that those “resources are not currently earmarked in the EU Member States’ planning as reported in the National Implementation Reports and additional financing may be needed to deliver on the climate objective”.
- 4.22 From a technical perspective, the EC report notes that standards for recharging heavy-duty vehicles and refuelling liquid hydrogen are required. In addition, it is suggested that maritime transport and inland navigation will also benefit from further common technical specifications to facilitate and consolidate the entry on the market of alternative fuels, especially in relation to fuel supply for electricity and hydrogen.

Renewable Energy Directive (RED II)

- 4.23 In November 2016, the EC published its ‘Clean Energy for all Europeans’ initiative. As part of this package, the EC adopted a legislative proposal for a recast of the Renewable Energy Directive. The revised renewable energy directive (RED II) 2018/2001/EU entered into force in December 2018.⁶⁶
- 4.24 In RED II, the overall EU target for Renewable Energy Sources consumption by 2030 has been raised to 32%. The EC’s original proposal did not include a transport sub-target, but this has been introduced by co-legislators in the final agreement, in that, EU Member States must require fuel suppliers to supply a minimum of 14% of the energy consumed in road and rail transport by 2030 as renewable energy.
- 4.25 The RED II defines a series of sustainability and GHG emission criteria that bioliquids used in transport must comply with to be counted towards the overall 14% target and to be eligible for financial support by public authorities. Some of these criteria are the same as in the original RED, while others are new or reformulated. In particular, the RED II introduces sustainability for forestry feedstocks as well as GHG criteria for solid and gaseous biomass fuels.

65 EC (2021) Report from the Commission to the European Parliament and the Council on the application of Directive 2014/94/EU on the deployment of alternative fuels infrastructure. 8 March 2021, COM/2021/103 final.
<https://ec.europa.eu/transparency/regdoc/rep/1/2021/EN/COM-2021-103-F1-EN-MAIN-PART-1.PDF>

66 EC (2021) Renewable Energy – Recast to 2030 (RED II). <https://ec.europa.eu/jrc/en/jec/renewable-energy-recast-2030-red-ii>

- 4.26 While biofuels are important in helping the EU meet its greenhouse gas reductions targets, biofuel production typically takes place on cropland that was previously used for other agriculture such as growing food or feed. Since this agricultural production is still necessary, it may lead to the extension of agriculture land into non-cropland, possibly including areas with high carbon stock such as forests, wetlands and peatlands. This process is known as indirect land use change (ILUC). As this may cause the release of CO₂ stored in trees and soil, indirect land use change risks negating the greenhouse gas savings that result from increased biofuels. To address the issue of ILUC in the Clean Energy for All Europeans package, RED II introduces a new approach.
- 4.27 It sets limits on high ILUC-risk biofuels, bioliquids and biomass fuels with a significant expansion in land with high carbon stock. These limits will affect the amount of these fuels that EU States can count towards their national targets when calculating the overall national share of renewables and the share of renewables in transport. EU States will still be able to use (and import) fuels covered by these limits, but they will not be able to include these volumes when calculating the extent to which they have fulfilled their renewable targets. These limits consist of a freeze at 2019 levels for the period 2021-2023, which will gradually decrease from the end of 2023 to zero by 2030.
- 4.28 The directive also introduces an exemption from these limits for biofuels, bioliquids and biomass fuels certified as low ILUC-risk. For the implementation of this approach, as required by the directive, the EC has adopted the Delegated Regulation (EU) 2019/807 that sets out specific criteria both for:
- .1 determining the high ILUC-risk feedstock for which a significant expansion of the production area into land with high carbon stock is observed; and
 - .2 certifying low ILUC-risk biofuels, bioliquids and biomass fuels.
- 4.29 The EC has also adopted an accompanying report⁶⁷ on the status of production expansion of relevant food and feed crops worldwide, based on the best available scientific data. This report provides information that EU Member States can use in conjunction with the criteria set out in the delegated act in order to identify high ILUC-risk fuels and certify low ILUC-risk fuels.

Advanced biofuels

- 4.30 Within the 14% transport sub-target, there is a dedicated target for advanced biofuels produced from listed feedstocks. The contribution of advanced biofuels and biogas produced from the listed feedstocks as a share of final consumption of energy in the transport sector shall be at least 0.2% in 2022, at least 1% in 2025 and at least 3.5% in 2030. Fuels used in the aviation and maritime sectors can opt in to contribute to the 14% transport target but are not subject to an obligation.⁶⁸ The contribution of non-food renewable fuels supplied to these sectors will count 1.2 times their energy content.
- 4.31 EU States may exempt fuel suppliers supplying fuel in the form of electricity or renewable liquid and gaseous transport fuels of non-biological origin from the requirement to comply with the minimum share of advanced biofuels and biogas produced from the listed feedstocks with respect to those fuels. Feedstocks for the production of biogas for transport and advanced biofuels, the contribution of which towards the minimum shares may be considered to be twice their energy content. For the calculation of the numerator, the share of biofuels and biogas produced from the listed feedstock shall, except for in Cyprus and Malta, be limited to 1.7% of the energy content of transport fuels supplied for consumption or use on the market. EU States may, where justified, modify that limit, taking into account the availability of feedstock.
- 4.32 The share of biofuels and bioliquids, as well as of biomass fuels consumed in transport, where produced from food and feed crops, shall be no more 1% higher than the share of such fuels in the final consumption of energy in the road and rail transport sectors in 2020 in that EU State, with a maximum of 7% of final consumption of energy in the road and rail transport sectors in that EU State.

67 EC (2019) Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the status of production expansion of relevant food and feed crops worldwide, 13 March 2019, COM/2019/142 final. <https://ec.europa.eu/energy/sites/ener/files/documents/report.pdf>

68 EC (2021) Renewable Energy – Recast to 2030 (RED II). <https://ec.europa.eu/jrc/en/jec/renewable-energy-recast-2030-red-ii>

- 4.33 Fuels produced from feedstocks with “high indirect land-use change-risk” will be limited by a more restrictive cap at the 2019 consumption level. The share of high indirect land-use change-risk biofuels, bioliquids or biomass fuels produced from food and feed crops for which a significant expansion of the production area into land with high-carbon stock is observed shall not exceed the level of consumption of such fuels in that EU State in 2019, unless they are certified to be low indirect land-use change-risk biofuels, bioliquids or biomass fuels. From 31 December 2023 until 31 December 2030 at the latest, that limit shall gradually decrease to 0%.
- 4.34 Renewable electricity will count four times its energy content towards the 14% renewable energy in transport target when used in road vehicles, and 1.5 times when used in rail transport. The EC will also develop a framework to guarantee that the renewable electricity used in transport is in addition to the baseline of renewable electricity generation in each EU State.
- 4.35 This section has explored the effectiveness (or otherwise) of regulating a ships’ fuel used on board a ship. In doing so, in addition to the as yet unknown scope and impact of the FuelEU Maritime initiative, it is evident that several related policy initiatives and legal instruments to address climate change may either directly or indirectly impact internationally trading maritime transport.
- 4.36 It is apparent that low and zero-carbon fuels are not currently available for shipping. It is essential that the right incentives and requirements for fuel suppliers are introduced in order to make low and zero-carbon fuels and energy for shipping available in the market. It is argued that sub-targets on fuel suppliers to make available low and zero-carbon fuels and energy available for shipping should be introduced with a higher multiplier than the current 1.2 under RED for renewable fuels consumed in maritime transport considered. However, the current situation leads to significant uncertainty as to what approach ships and their owners should be considering when making future investment plans. This is particularly acute for owners whose ships may not be on scheduled services where planning is extremely difficult and where certainty of fuel supply is critical. This leads to the conclusion that a poorly designed EU policy instrument could lead ships involved in non-scheduled services being excluded from EU ports.

5 Legal matters

Provision of incentives for emissions reduction by ships

- 5.1 Incentivising the development, deployment and use of alternative low-/zero-carbon fuels is identified in several of the policy developments both at IMO and EU level. Importantly, many of these developments explicitly identify that the challenge of reducing GHG emissions from ships requires collaboration between stakeholders in the shipping value chain and in particular, the ship and port sectors.
- 5.2 Due to the nature of international regulatory framework developed under IMO having a primary focus on the ‘ship’, and the fact that ports fall under national, as opposed to, international jurisdiction, many of these initiatives have to be led by the individual nation state and/or port sector in a country.
- 5.3 However, in international law, provisions under the United Nations Convention on the Law of the Sea (UNCLOS) provide powers to the port/coastal State to enforce emissions requirements on ships trading internationally. This was discussed in detail in the report prepared for ICS/ECOSA on implications of application of the EU ETS to international shipping published in July 2020.⁶⁹ Relevant parts of that report are replicated in annex 3 of this Study.
- 5.4 In summary, for emissions to the air that are polluting⁷⁰ from internationally trading ships Article 212(1) of UNCLOS provides scope for individual States to establish their rules, Article 212(2) provides for ‘other measures’, that is measures to prevent, reduce and control such pollution presumably in addition to established international rules, and Article 212(3) affirms with the use of the term ‘especially’ that such rules do not necessarily have to be developed through a competent international organization or diplomatic conference. The implication for the instruments being developed by the EU is discussed below.

International

- 5.5 Internationally the need for incentives have been identified and are reflected in several IMO instruments that have been prepared or are under development as well initiatives established by the shipping/ports sectors. These include:
- .1 mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping;
 - .2 IMO resolution MEPC.323(74) on Invitation to Member States to encourage voluntary cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships; and
 - .3 Environmental Ship Index.
- 5.6 Draft amendments to MARPOL Annex VI providing mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping are due to be considered for adoption by MEPC 76 in June 2021. Draft regulation 22B of MARPOL Annex VI on Operational carbon intensity includes the following draft provision:
- “10 Administrations, port authorities and other stakeholders as appropriate, are encouraged to provide incentives to ships rated as A or B.”
- 5.7 Resolution MEPC.323(74) identifies that cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships could include regulatory, technical, operational and economic actions, such as the provision of: Onshore Power Supply (preferably from renewable sources); safe and efficient bunkering of alternative low-carbon and zero-carbon fuels; incentives promoting sustainable low-carbon and zero-carbon shipping; and support for the optimization of port calls including facilitation of just-in-time arrival of ships.
- 5.8 Whilst several non-mandatory indices have emerged to monitor and measure the environmental performance of ships, the Environmental Ship Index (ESI) is the standard tool used by the World's ports to reward and incentivise shipowners meeting and exceeding IMO emissions standards.⁷¹

69 ICS/ECOSA (2020) Implications of application of the EU-ETS to international shipping, and potential benefits of alternative Market-Based Measures (MBMs), July 2020 <https://www.ics-shipping.org/wp-content/uploads/2020/07/ics-ecosa-study-on-eu-ets.pdf>

70 Several jurisdictions consider GHG emissions to be pollutants, for example, in 2007 US Supreme Court declared that carbon dioxide and other greenhouse gases were air pollutants under the Clean Air Act and in the UK, for example, <https://naei.beis.gov.uk/overview/ghg-overview> However, no legal definition appears to be prevalent in the EU or indeed under international climate change instruments including UNFCCC, its Kyoto Protocol or the Paris Agreement.

71 World Ports Sustainability Program (2021) Environmental Ship Index. <https://sustainableworldports.org/environmental-ship-index-esi/> (accessed 15 March 2021)

- 5.9 Established back in 2011 and first introduced by the International Association of Ports and Harbors (IAPH) in 2013, the Environmental Ship Index (ESI) is a voluntary tool which currently includes a formula-based evaluation of vessels' nitrogen oxide (NOX) and sulphur oxide (SOX) emissions. The calculation also rewards ships equipped to use available onshore power and which demonstrate fuel efficiency improvements over time, reducing carbon dioxide (CO₂) and particulate matter (PM) emissions.
- 5.10 The ESI ship register now accounts for over 7,000 oceangoing ships, with over 50 incentive providers having signed up since its foundation eight years ago. The ESI contains over half of the world's container vessels, with tankers (gas, chemical and oil) accounting for 28% of the total ships registered.
- 5.11 Through ESI, ports and other interested parties can promote ships to use cleaner engines and fuels and with preferential treatment offered either through discounts on port dues, bonuses or other benefits commensurate with the level of cleanliness. Score ranges from 0 for a ship meeting environmental performance regulations in force to 100 for a ship which emits no SOX and no NOX and reports or monitors data to establish its energy efficiency.
- 5.12 The members of the Environmental Ship Index Working Group have now decided to expand the scope of emissions included in the index due to the significant changes in international legislation. In particular, work will focus on incentivising the reduction in carbon dioxide emissions given the IMO target to cut the shipping sector's overall GHG emissions output by at least 50% by 2050.

EU's relationship to UNCLOS and IMO

- 5.13 The EU is an independent contracting party to UNCLOS. This is important as it obligates the EU to always adhere to the principles of UNCLOS when adopting EU legislation.⁷² This is unlike IMO instruments which the EU is not party to, rather it is for individual EU Member States to contract to IMO instruments.⁷³ However, the EC has competency for enacting IMO instruments into EU law and also for proposing the strengthening of the global requirements to align with EU policy. For example, the EU in the EU Sulphur Directive has strengthened the provisions compared to those found in MARPOL Annex VI⁷⁴, such as requiring ships at berth for over two hours to use fuel oil with a sulphur content not exceeding 0.10%. Also, and of direct relevance to the current EU developments to address GHG emissions from ships, is the EU MRV regulation which goes beyond the provisions of MARPOL Annex VI in that actual cargo carried by the ship has to be reported as opposed to the requirement under the IMO DCS to report a proxy for cargo carried.
- 5.14 ECSA⁷⁵ has proposed that the EU take a two-pronged approach if any measures are to be introduced:
- .1 establish a fund under an MBM and using the revenues to finance R&D projects and to bridge the price gap between new and conventional fuels; and
 - .2 incentivise and require fuel suppliers to include a certain percentage of low and zero-carbon fuels in their offering by introducing sub-targets and a higher multiplier for low and zero-carbon fuels under RED.
- 5.15 ECSA notes that the EC should address fuel suppliers by introducing sub-targets to make low and zero-carbon fuels available for shipping and by increasing the multiplier for renewable fuels used in the maritime sector under the Renewable Energy Directive (RED). A fuel standard as a requirement for ships instead of fuel suppliers under the FEM proposal would risk failing to deliver emissions reductions and would be challenging to enforce. If a market-based measure (MBM) is introduced, a fund could invest the revenues to support the uptake of these fuels.

72 The European Court of Justice has reaffirmed that EU legislation must adhere to – and be enforced by the EU Member States in accordance with – UNCLOS in three different cases:

The Intertanko case (Case C-308/06, Intertanko, Intercargo, Greek Shipping Co-operation Committee, Lloyd's Register, International Salvage Union v Secretary of State for Transport, ECLI:EU:C:2008:312),

The Manzi case (Case C-537/11, Manzi and Compagnia Naviera Orchestra, ECLI:EU:C:2014:19), and

The Bosphorus Queen case (Case C-15/17, Bosphorus Queen Shipping Ltd Corp v Rajavartiolaits, ECLI:EU:C:2018:557).

73 A noted exception is the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974 and the Protocol of 2002 to the Convention which includes "Article 19 Regional economic integration organizations", that requires that the Regional Economic Integration Organization shall make a declaration to the IMO Secretary-General specifying the matters governed by this Protocol in respect of which competence has been transferred to that Organization by its Member States which are signatories or Parties to this Protocol and any other relevant restrictions as to the scope of that competence.

74 Twenty-five EU Member States are Contracting Parties to MARPOL Annex VI. Source: Status of Conventions, IMO, 2 March 2021; <https://wwwcdn.imo.org/localresources/en/About/Conventions/StatusOfConventions/Status%20-%202021.pdf> (retrieved 17 March 2021).

75 ECSA (2021) EU shipowners call for fund coupled with targets for fuel suppliers to decarbonise shipping. 15 February 2021 <https://www.ecsa.eu/news/eu-shipowners-call-fund-coupled-targets-fuel-suppliers-decarbonise-shipping>

Enforcement of current and future requirements introduced by the EU

- 5.16 Enforcement of mandatory requirements, be they international, EU or even national requirements, is a critically important part of the regulation of shipping, particularly for ships trading internationally. This is because shipping is a business and a failure to comply with those mandatory requirements is likely to provide a ship operator with a competitive advantage over other operators. Should such a situation prevail then it would introduce distortion into the market.
- 5.17 Furthermore it would undermine the international regulatory regime to the extent that it could lead to the whole basis of international shipping regulation being called into question and its credibility undermined. This is why international shipping Conventions include articles⁷⁶ that make reference to the principle of non-discrimination, also known as, “no more favourable treatment”. This provides for an IMO Member State that is a contracting Party to an international instrument to take action against ships entering their jurisdiction irrespective of whether that ship is flagged with an IMO Member State that is a contracting Party or not.

EU MRV

- 5.18 The EU MRV regulation requires a ship of 5,000 gross tonnage and above to monitor and report emissions and other data annually to the EC (scope of application is discussed in more detail below). Compliance with this requirement is demonstrated by the issuing of a verified Document of Compliance to the ship. The EU MRV regulation provides for enforcement action to be taken against a ship found not to be in compliance and that “the case of ships that have failed to comply with the monitoring and reporting requirements for two or more consecutive reporting periods and where other enforcement measures have failed to ensure compliance, the competent authority of the EU Member State of the port of entry may issue an expulsion order”.
- 5.19 As announced by the EC, by the end of 2021 at the latest, it should propose a revision of the Port State Control Directive, to allow for more effective and comprehensive control of ships and simplified procedures, including incentives for compliance with environmental, social, public health and labour law standards, safety on board of ships calling at EU ports for both seafarers and dock workers, as well as the possibilities for effective proportionate and dissuasive sanctions, taking into account environmental, public health, tax and social law.
- 5.20 The application of requirements under both EU ETS⁷⁷ and FEM may well mirror the scope provided for in the EU MRV regulation, that is, all intra-EU voyages, all incoming voyages from the last non-EU port to the first EU port of call and all outgoing voyages from an EU port to the next non-EU port of call, including ballast voyages.
- 5.21 It is evident that the appeal of such an approach is that it would potentially take into account the majority of emissions resulting from maritime transport operating to and from the EU, although non-EU States have questioned this extra-territorial approach and it remains to be seen what scope the EC will propose for EU ETS when it makes a regulatory proposal.
- 5.22 CO₂ emissions in EU ports, including emissions arising from ships at berth or moving within a port, are also covered under EU MRV, and the FEM goal to deploy onshore power systems would support reduction of these emissions.
- 5.23 Like all regulation for ships trading internationally, the EU MRV requirements are applied in a non-discriminatory manner to all ships regardless of their flag. However, as EU MRV focuses on maritime transport, it does not establish monitoring, reporting and verification requirements for ship movements and activities not serving the purpose of transporting cargo, such as dredging, ice-breaking, pipe laying or offshore installation activities.

Fuels bunkered outside the EU

- 5.24 FEM is expected to regulate fuel reported under the EU MRV system, that is, fuel bunkered outside the EU as well. Currently the EC does recognise and certify some biofuels produced outside the EU but used to power transport within the EU. The verification and certification of those biofuels has evolved and proven to be challenging to assure compliance with EU environmental standards. The inability to extend EU certification to other low-/zero-carbon fuels that comply with any forthcoming EU fuel standard requirement has two significant implications as follows:

⁷⁶ Examples include SOLAS Protocol 1988 Art.1(3) and MARPOL Art.5(4)

⁷⁷ The scope of application for the EU-ETS is considered critical and will be at least cover intra-EU voyages. Should application be aligned with the EU-MRV, or a phased approach to widen scope over time be adopted, then it is likely to be subject to significant objection both from industry and possibly non-EU States, for example, see Knowler, G. (2020) Shipping lobby questions legality of Europe's emissions trading system. https://www.joc.com/maritime-news/shipping-lobby-questions-legality-europe%E2%80%99s-emissions-trading-system_20200910.html (accessed 12 March 2021)

- .1 compliance with an EU fuel standard requirement for use of alternative low-/zero-carbon fuels by ships calling at EU ports may lead to those ships being limited to bunkering biofuels certified by the EU only; and
 - .2 limiting the ability to comply to those fuels certified by the EU only may not only limit scope for compliance by ships but would result in limited demand for other non-EU certified fuels so disincentivising production and supply of other fuels not certified by the EU.
- 5.25 The question is whether the EU is able to make sure that biofuels bunkered outside the EU deliver the intended emissions reductions and are produced sustainably, that is both the energy and feedstocks meet criteria that mean they are not more damaging than the emissions being reduced through the use of the fuel itself. Attempting to address the enforcement issue, the EC is planning to introduce certification schemes for fuel suppliers outside the EU. This would result in the EU having the power to decide where ships are allowed to bunker fuel before calling at EU ports so potentially seriously disrupting the international bunkering market. Furthermore, it has the potential to create a two-tier market with some ships able to enter the EU and others not due to an inability to procure compliant fuel.
- 5.26 Whatever the decision about scope of application of the measures to ships trading internationally, it is imperative to ensure that a level playing field is maintained. Provisions need to be designed so that compliance can be readily established by those enforcing the requirements. A key consideration is the need to minimise the administrative burden for the ship and its crew, the ship's flag State and port State control officers.
- 5.27 The spectre of increased administrative burden is particularly of concern to ship operators that control/manage only a few ships, especially where those ships undertake non-scheduled voyages to and from the EU and, as such, may only sail on a few occasions to and from the EU. Efforts to mitigate such a burden through the implementation of compliance measures that align reporting and certification for several mandatory requirements should always be a goal of those preparing and adopting new instruments.

Concluding remarks

An Overview for policy makers, which identifies those key issues which it will be especially important for the EU institutions to consider when taking forward the FuelEU Maritime initiative, is included in this first section of the report of this Study commissioned by ECSA and ICS.

There has been a significant reduction in the carbon intensity of the international shipping since 2008. While further improvements in energy efficiency are necessary the IMO has already approved amendments that will see the introduction of technical and operational energy efficiency measures for the existing fleet that will enable international shipping to achieve, as a minimum, the 40% reduction in carbon intensity by 2030 identified in the Initial IMO GHG Strategy.

The FuelEU Maritime initiative will be proposed by the EC as a mechanism to accelerate the uptake of alternative maritime fuels. Several barriers, including market and regulatory failures, hinder the uptake of alternative fuels in maritime transport including:

- .1 lack of predictability and high risk of investment choices;
- .2 technological aspects and price factors;
- .3 interdependency issue; and
- .4 carbon leakage potential and split incentives.

The EC Staff Working Document published in December 2020 accompanying the Sustainable and Smart Mobility Strategy⁷⁸ forecasts that renewable and low carbon fuels will be as high as 5.5% to 13.5% of the fuel mix of shipping by 2030. However, it is recognised that shipping has greater decarbonisation challenges compared to other sectors, due to current lack of market ready zero-emission technologies. Indeed, low and zero-carbon fuels are not currently available for shipping in the market.

Stronger incentives and new requirements for the fuel suppliers are essential to implement the EU's objectives. It is evident that the current multiplier of 1.2 for renewable fuels consumed in maritime transport has fallen short of incentivising their uptake in shipping. Sub-targets on fuel suppliers to make available low and zero carbon fuels and energy available for shipping and a higher multiplier for renewable fuels used in the maritime sector are needed.

Revenues generated by an EU carbon pricing mechanism for shipping could be used to bridge the price gap between conventional and low and zero-carbon fuels that are currently not available for shipping. This approach would not only support the transition to alternative fuels but enhance demand, beyond just a carbon price penalty, that is currently not prevailing.

The fuel supply conundrum for shipping is exemplified by the deployment of LNG as a fuel for maritime transport. Breakthrough in uptake has occurred only relatively recently, and has been limited to those shipowners who have identified energy partners willing to share the economic risk using gas as a fuel for their ships. Furthermore, the ships using LNG as a fuel tend to be those that ply scheduled routes or at least their owners can plan their itinerary to ensure fuel supplies will be available. Such a situation is not available for the many owners and thousands of ships that undertake non-scheduled voyages but are a key part of maritime transport's service to global commerce.

This identifies the critical need for policy makers to consider whether the appropriate approach is to target demand or supply of low and zero-carbon fuels for shipping. Whilst it may be conceived as necessary to do both, the current proposals from the EU appear to focus only on the demand side. Such an approach has significant risks: how will ships comply if there is no compliant fuel available, which could well lead to distortion in the shipping market with a two-tier market prevailing, that is, ships that can trade into the EU and ships that cannot.

Fuel availability was a significant issue that came under scrutiny when the IMO 2020 sulphur in fuel regime, i.e. a global sulphur in fuel limit of 0.50% for ships operating outside IMO designated emission control areas, was being considered. Confidence in the ability to procure fuel by ships trading globally was a pre-requisite before all IMO Member States could agree to the new rule.

78 EC (2020) Sustainable and Smart Mobility Strategy – putting European transport on track for the future. Staff Working Document, SWD(2020) 331 final, page 254, 9 December 2020. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020SC0331&from=EN>

The EU may consider that its FuelEU Maritime initiative can seek to address this concern through permitting qualifying fuels to be placed on the market outside of the EU. However, this raises additional questions about enforcement, especially how does the EU assure that the fuels sold outside its jurisdiction meet its environmental standards. Furthermore, non-EU States may consider this as an attempt by the EU to try and control the marine fuel supply market for ships beyond its jurisdiction.

The FuelEU Maritime initiative, when finalised, will need to address uncertainty, concerns and risks associated with the supply of alternative fuels from both a supply and demand perspective. In many respects this Study indicates that it should be the responsibility of the fuel suppliers to make sure that any low-carbon fuel blends are safe, fit for purpose and available in sufficient quantities in EU ports. Placing the obligation on the ship is likely to lead greater risks for both ships and fuel suppliers and ultimately a failure to achieve the policy objectives the initiative is seeking to achieve.

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ANNEX 1

Existing and ongoing work by the International Maritime Organization on energy efficiency of ships and reducing GHG emissions from ships

IMO action on reduction of GHG emissions from ships

In 2003, the IMO Assembly adopted resolution A.963(23) that urges the IMO's Marine Environment Protection Committee (MEPC) to identify and develop the mechanism or mechanisms needed to achieve the limitation or reduction of GHG emissions from international shipping.⁷⁹ The resolution identifies that the MEPC should give priority to the evaluation of technical, operational and market-based solutions.

Technical and operational energy efficiency measures

In 2011, measures that entered into force on 1 January 2013 to improve the energy efficiency of international shipping were adopted by Parties as a new chapter 4 to MARPOL Annex VI, the first global agreement for an entire sector to mitigate CO₂ emissions. Phase 0 of EEDI began on 1 January 2013 and required new ships to achieve a baseline figure for energy efficiency. This requirement was subsequently strengthened by 10% on 1 January 2015 and by 20% on 1 January 2020. The Regulations for energy efficiency of ships apply to ships engaged in international voyage of 400 gross tonnage and above, and make mandatory the:

- .1 Energy Efficiency Design Index (EEDI) for new ships; and
- .2 Ship Energy Efficiency Management Plan (SEEMP) for new and existing ships.

The EEDI is a performance-based mechanism that leaves the choice of technologies to use to the shipowner. So long as the required energy-efficiency level is attained, ship designers and builders are free to use the most cost-efficient solutions for the ship to comply with the regulations. EEDI requirements are increasingly strict over time.

The 75th session of IMO's Marine Environment Protection Committee (MEPC 75) in November 2020, adopted amendments to MARPOL Annex VI to significantly strengthen the EEDI phase 3 requirements. The amendments bring forward the entry into effect date of phase 3 to 2022, from 2025, for several ship types, including containerships, gas carriers, general cargo ships and LNG carriers and at the same time, raised the EEDI reduction rate for some ship types. This means that new ships built from 1 January 2022 must be significantly more energy efficient than the baseline. For example, for a containership of 200,000 deadweight tonnage and above, the required EEDI reduction rate is now set at 50% from 2022, instead of 30% from 2025. In addition to the upcoming EEDI Phase 3, a possible Phase 4 of EEDI could be introduced later in this decade, further tightening requirements for new ships.

Each ship of 400 gross tonnage and above engaged in an international voyage is required also to keep on board a ship-specific SEEMP which establishes a mechanism for operators to improve the energy efficiency of the ship. This should be achieved by monitoring the energy efficiency performance of a ship's transportation work and at regular intervals considering new technologies and practices to improve energy efficiency.

Following the entry into force on 1 March 2018 of amendments to MARPOL Annex VI, it is mandatory for ships to collect and report ship fuel oil consumption data. Since 1 January 2019, ships of 5,000 gross tonnage and above (representing approximately 85% of the total CO₂ emissions from international shipping) are required to collect consumption data for each type of fuel oil they use, as well as additional specified data including deadweight as proxy for "transport work". The data primarily collected by the flag States is subsequently transferred to the IMO Ship Fuel Oil Consumption Database. The first report analysing and summarizing the data collected in 2019 will be presented to the MEPC in 2021. This mechanism is expected to provide robust data on international shipping's fuel consumption and GHG emissions so as to inform the MEPC's decision making. Furthermore the IMO DCS could provide the basis for an MBM applied globally.

⁷⁹ IMO (2004) IMO policies and practices related to the limitation or reduction of GHG emissions from international shipping Assembly resolution A.963(23), p.1(d).

Initial IMO Strategy on Reduction of GHG emissions from ships and follow-up actions up to 2023

Having already taken action to introduce mandatory technical and operational measures, and following the adoption of the Paris Agreement in December 2015, MEPC 72 in April 2018, adopted resolution MEPC.304(72) on the Initial IMO Strategy on reduction of GHG emissions from ships (the Initial Strategy).⁸⁰ This important agreement represents the framework for further action of the Committee, setting out the future vision for international shipping. At the time of adoption 23 EU Member States were present.⁸¹ On its adoption the EC⁸² expressed support with Commissioner Bulc stating: “This was a significant achievement for the EU and its member states, which played an instrumental role in brokering and securing the agreement with international partners” and that four MEPs also supported the EU delegation.⁸³ As such the EU⁸⁴ could be said to have fully supported the Initial Strategy and the identification of an MBM as a candidate mid-term measure.⁸⁵

The levels of ambition identified in the Initial Strategy are considered highly ambitious, including for the carbon intensity of the fleet to decline by 70% by 2050 with an interim goal to reduce CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030.

The Initial Strategy also envisages for the first time a reduction in total GHG emissions from international shipping which, it says, should peak as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008, while, at the same time, pursuing efforts towards phasing them out entirely. IMO Member States agreed to keep this Strategy under review, including adoption of a Revised Strategy in 2023. Such an ambition is considered, noting the forecast growth in trade, particularly between developing countries, to need individual ships to reduce their emissions by as much as 85% by 2050.

In October 2018, MEPC 73 approved a Programme of follow-up actions of the Initial IMO Strategy on reduction of GHG emissions from ships up to 2023. This document constitutes a planning tool on the work for IMO in meeting the timelines identified in the Initial Strategy, with eight parallel streams of activity and their expected timeframes up to 2023.

The Initial Strategy also identifies that “possible mid-term measures could be measures finalized and agreed by the Committee between 2023 and 2030”⁸⁶ and further notes that “Certain mid and long-term measures will require work to commence prior to 2023”.⁸⁷ This timeline and consideration of measures was further considered and MEPC 73 in October 2018 approved the Programme of follow-up actions of the Initial IMO Strategy on reduction of GHG emissions from ships up to 2023.⁸⁸ For mid-/long term measures the programme of follow-up actions identifies that at MEPC 74 (May 2019) and MEPC 75 (April 2020) there should be “Consideration of proposals including identification of barriers and action to address”.

Noting the urgency of the matter the MEPC has since June 2017 approved the holding of intersessional meetings of its working group on the reduction of GHG emissions from ships (ISWG-GHG). This working group initially developed the Initial Strategy and programme of follow-up action and has subsequently provided an opportunity for additional deliberation and consideration of the issues identified by IMO members.

At ISWG-GHG 4, held in October 2018 in the week before MEPC 73, France (ISWG-GHG 4/2/11) proposed to include preparatory work on mid and long-term measures in the programme of follow-up actions, in particular what Market-based Measures (MBMs) can bring, as this kind of measure could help create the appropriate economic context and enabling environment to encourage the transition to low-/zero-carbon fuels and technologies that are considered essential to meet the 2050 level of ambition, making some basic suggestions for such a measure and requesting the introduction of a dedicated work stream on this subject in the programme of follow-up actions.

80 Saudi Arabia and the United States reserved their position on adoption of the Initial Strategy.

81 The UK was a Member of the European Union when MEPC 72 took place. EU Member States not present at MEPC 72 were Bulgaria, Hungary, Lithuania and Slovakia.

82 EC (2018) Commissioners Bulc and Arias Cañete welcome the IMO agreement on CO₂ reductions in the maritime sector, 13 April 2018 https://ec.europa.eu/clima/news/commissioners-bulc-and-arias-ca%C3%B1ete-welcome-imo-agreement-co2-reductions-maritime-sector_en

83 Bulc, V. (2018) Shipping is delivering on climate change, The EU Parliament magazine, 12 July 2018. <https://www.theparliamentmagazine.eu/articles/opinion/shipping-delivering-climate-change>

84 The EC is an observer at IMO meetings and coordinates the EU's position and interventions by EU Member States.

85 Resolution MEPC.304(72), paragraph 4.8.3 reads as follows: “new/innovative emission reduction mechanism(s), possibly including Market-based Measures (MBMs), to incentivize GHG emission reduction”.

86 Ibid., paragraph 4.1.2 and 4.1.3.

87 Ibid., paragraph 4.2.

88 IMO, MEPC 73/19, paragraph 7.9.1 and annex 9.

- 2.13 The negotiations on the development of an MBM for international shipping had been ongoing at IMO until MEPC 65 in May 2013 suspended discussions on MBMs and related issues to a future session.⁸⁹
- 2.14 The adoption of the Paris Agreement in December 2015, and the principle of ‘common but differentiated responsibilities and respective capabilities, in the light of different national circumstances’ (CBDR-RC), arguably unblocked negotiations at IMO that lead to the adoption of the Initial Strategy. The Initial Strategy whilst being cognizant of CBDR-RC also recognises as a guiding principle “the requirement for all ships to give full and complete effect, regardless of flag, to implementing mandatory measures to ensure the effective implementation of this strategy”.⁹⁰ The Initial Strategy also identifies MBMs as one of those measures.⁹¹
- 2.15 In April 2021, ICS and other shipping industry organisations submitted a paper to MEPC 76 calling for IMO to resume work on the development of a global MBM for shipping as soon as possible. This will be considered by MEPC 76 in June 2021.⁹²

Measures to reduce the carbon intensity of existing ships

The Initial Strategy identifies several candidate short term measures to reduce GHG emissions from ships including the development of technical and operational measures for both new and existing ships, including consideration of indicators that can be utilized to indicate and enhance the energy efficiency performance of shipping.⁹³

EEXI

MEPC 75 held in November 2020 approved amendments to MARPOL Annex VI, introducing an Energy Efficiency Existing Ship Index (EEXI) as a technical energy efficiency measure for existing ships. Subject to adoption at MEPC 76 in June 2021, the requirements are likely to enter into force in late 2022 or early 2023.

The EEXI will be applicable to all ships of 400 GT and above falling under MARPOL Annex VI. Guidelines on calculations, surveys and verification of the EEXI are under preparation and are to be finalized at MEPC 76.

However, as the EEXI is the extension for existing ships of the newbuilding related EEDI, most procedures will be the same as for the EEDI, with some adaptations regarding limited access to design data.⁹⁴

The aim of the Energy Efficiency Existing Ship Index (EEXI) is to measure ships’ energy efficiency. However, different measurements apply for different kinds of ships.

Attained EEXI

The attained EEXI will be ship-specific, that is, it will be calculated for each individual ship and verified by the ship’s Administration or any organization authorized by it, for example, recognised organisations. The calculation will be included in each ship’s EEXI technical file along with any supporting technical data and information used in the calculation process. For all ships that have been verified for EEDI and issued an International Energy Efficiency Certificate (IEEC), the attained EEDI will be equal to the attained EEXI, provided that the attained EEDI meets the regulatory limit established by the newly introduced required EEXI regulation 21A of MARPOL Annex VI.

⁸⁹ IMO, MEPC 65/22, paragraph 5.1.

⁹⁰ IMO, MEPC.304(72), p.3.2.2.

⁹¹ The application of MBMs to international shipping is considered in the ICS/ECSA report Implications of application of the EU Emissions Trading System (ETS) to international shipping, and potential benefits of alternative Market-Based Measures (MBMs), July 2020. <https://www.ics-shipping.org/wp-content/uploads/2020/07/ics-ecsa-study-on-eu-ets.pdf>

⁹² IMO MEPC 76/7/39

⁹³ IMO, MEPC.304(72), p.4.7.2

⁹⁴ Safety4Sea (2021) Everything you need to know about the EEXI, <https://safety4sea.com/cm-everything-you-need-to-know-about-the-eexi/> (accessed 02 March 2021)

When a ship's Attained EEDI does not meet the EEXI threshold, technical modification options may be considered for compliance (e.g. engine power limitation, retrofit of energy saving technologies, alternative fuels). For such cases, the Attained EEXI calculation shall be calculated and verified based on the guidelines to be adopted by the IMO. The EEXI calculation guidelines have been developed but so far remain in draft form. The calculation methodology is aligned with that used for EEDI. However, the determination of specific technical inputs such as the ship's reference speed (V_{ref}) require further consideration. The supporting data and information that would normally be available during the EEDI verification process, may be difficult to obtain for EEXI. For such cases, an alternative calculation method was introduced based on statistical speed data of existing ships from the IHS Fairplay database also accounting for the correlation with the ship's engine power.

The draft guidelines consider that the alternative calculation method for the ship speed (V_{ref}) should by no means overestimate the ship's energy efficiency using the ship's actual EEDI reference speed (V_{ref}) once this has been determined. Correction factors that account for specific structural elements and powering needs, such as those used in the EEDI calculation for chemical tankers, ice-strengthened ships, shuttle tankers, ro-ro cargo, and ro-ro passenger ships, are pending agreement. The auxiliary power component (PAE) is expected to follow the estimation process by the current EEDI calculation guidelines. However, when engine power limitation is installed, clarifications may be necessary on if and how the Shaft Power Limitation (SHaPoLi) or Engine Power Limitation (EPL) installation will affect the calculation.

Regulation 21A of MARPOL Annex VI will provide the requirement and guidelines for calculating the required EEXI and verifying that a vessel's attained EEXI is lower than the required EEXI. The Required EEXI would be the regulatory limit for EEXI and its calculation will be in line with the EEDI reference line values using reduction factors specific to EEXI, as shown in Table 1 below.

The EEDI reference line values shall be calculated in accordance with regulations 21.3 and 21.4 of MARPOL Annex VI. For ro-ro cargo ships and ro-ro passenger ships, the reference line value to be used from phase 2 and thereafter under regulation 21.3 of this MARPOL Annex VI shall be referred.

A review shall be completed by 1 January 2026 by the Organization to assess the effectiveness of this regulation taking into account any Guidelines developed by the Organization. If, based on the review, the Parties decide to adopt amendments to this regulation, such amendments shall be adopted and enter into force in accordance with the procedures contained in article 16 of the present Convention.

EEXI Survey and Certification

For the verification of a vessel's attained EEXI, an application for a survey would be submitted to the verifier together with an EEXI Technical File containing the necessary information for the verification and supporting background documents.

The verification scope is generally expected to align with the one applied for EEDI. However, specific requirements will be introduced on the method to obtain the ship speed (V_{ref}), for situations where SHaPoLi/EPL is installed and for ships having undergone a major conversion.

Upon final verification, each ship's attained EEXI and required EEXI values will be indicated on the ship's IEEC issued by the ship's Administration. For cases where the attained EEDI of the ship satisfies the required EEXI, a confirmation of compliance with EEXI regulations and subsequent update of the IEEC would be sufficient.

Table 1 Reduction factors (in percentage) for the EEXI relative to the EEDI reference line

Ship Type	Size	Reduction Factor
Bulk Carrier	200,000 DWT and above	15
	20,000 and above but less than 200,000 DWT	20
	10,000 and above but less than 20,000 DWT	0-20*
Gas Carrier	15,000 DWT and above	30
	10,000 and above but less than 15,000 DWT	20
	2,000 and above but less than 10,000 DWT	0-20*
Tanker	200,000 DWT and above	15
	20,000 and above but less than 200,000 DWT	20
	4,000 and above but less than 20,000 DWT	0-20*
Containership	200,000 DWT and above	50
	120,000 and above but less than 200,000 DWT	45
	80,000 and above but less than 120,000 DWT	35
	40,000 and above but less than 80,000 DWT	30
	15,000 and above but less than 40,000 DWT	20
	10,000 and above but less than 15,000 DWT	0-20*
General Cargo Ship	15,000 DWT and above	30
	3,000 and above but less than 15,000 DWT	0-30*
Refrigerated Cargo Carrier	5,000 DWT and above	15
	3,000 and above but less than 5,000 DWT	0-15*
Combination Carrier	20,000 DWT and above	20
	4,000 and above but less than 20,000 DWT	0-20*
LNG Carrier	10,000 and above	30
Ro-ro Vehicle Carrier	10,000 and above	15
Ro-ro Cargo Ship	2,000 and above	5
	1,000 and above but less than 2,000 DWT	0-5*
Ro-ro Passenger Ship	1,000 DWT and above	5
	250 and above but less than 1,000 DWT	0-5*
Cruise Passenger Ship with Non-conventional Propulsion	85,000 GT and above	30
	25,000 GT and above but less than 85,000 GT	0-30*

* Reduction factor to be linearly interpolated between the two values dependent upon ship size. The lower value of the reduction factor is to be applied to the smaller ship size.

Annual attained operational Carbon Intensity Indicator and rating for ships

MEPC 75 approved amendments to MARPOL Annex VI requiring a ship to calculate annually an attained operational Carbon Intensity Indicator (CII), for example, Annual Efficiency Ratio (AER) given in terms of grams of CO₂ per dwt-mile. Furthermore, each ship of 5,000 gross tonnage and above is given a carbon intensity rating of A to E every year.

Administrations, port authorities and other stakeholders as appropriate, are encouraged to provide incentives to ships rated as A or B. The rating thresholds will be strengthened towards 2030.

Further amendments include a strengthening of the SEEMP (Enhanced SEEMP) to include mandatory content, such as an implementation plan on how to achieve the CII targets, and making it subject to verification and approval by the ship's Administration or organisation duly authorised by it. The implementation of the SEEMP will also be subject to verification and audits by the company taking into account guidelines to be developed by IMO. The requirements identify that on or before 1 January 2023, in case of a ship of 5,000 gross tonnage and above, the SEEMP shall include:

- .1 a description of the methodology that will be used to calculate the ship's attained annual operational CII required by regulation 22B of this Annex and the processes that will be used to report this value to the ship's Administration;
- .2 required annual operational CII for the next three years, as specified in regulation 22B of this Annex;

- .3 an implementation plan documenting how the required annual operational CII will be achieved during the next three years; and
- .4 a procedure for self-evaluation and improvement.

For ships that achieve a D rating for three consecutive years or an E rating, a corrective action plan needs to be developed as part of the SEEMP and approved by the ship's Administration. Technical specifications regarding baselines, methods of calculations and ship-specific requirements will be established through guidelines to be finalized and approved at MEPC 76.

These new requirements for existing ships will be reviewed by the end of 2025, with particular focus on the enforcement of the carbon intensity rating requirements and potential for increasing the level of ambition. A new mandatory carbon intensity code will also be developed to ensure certain requirements are made mandatory that otherwise may be described in non-mandatory guidelines only.

ANNEX 2

Summary of recent European Union institutional consideration of emissions from ships⁹⁵

In 2016, the European Parliament (EP) called for common technical specifications for LNG refuelling points for seagoing ships. EP also sought to ensure adequate research and development financing for improved technologies for these ships, with the aim of swiftly shifting to a lower-carbon fleet. It called on the EC and the Member States to create incentives for the development of LNG powered ships, or retrofitting those using conventional fuels to LNG.

In a 2018 own-initiative report, EP called on the EC to revise and properly implement the Alternative Fuels Infrastructure Directive. It also asked EU States to review their energy taxation to facilitate the uptake of carbon-free alternative fuels and electricity used for shoreside supply for ships.

On 28 November 2019, the EP declared a climate and environmental emergency. In a parallel resolution on the UN Climate Change Conference in Madrid (COP 25), underlining the slow and insufficient IMO action, the EP called for further EU measures to reduce maritime GHG emissions. It urged the EC to propose the inclusion of the maritime sector in the EU ETS and the introduction of a ship efficiency standard and a ship label. In its resolution of 15 January 2020 on the European Green Deal, the EP endorsed the EC's intentions concerning initiatives on maritime emissions, ending fuel tax exemptions and regulating pollution in ports. It defended a high level of ambition for GHG reductions, while reminding that EU measures should not undermine the international competitiveness of EU-flagged ships.

Agreeing that EU and international measures should go hand in hand to avoid creating double regulations, EP also affirmed that any action, or lack of action, at global level should not hinder the EU's ability to take more ambitious action within the EU. The EP also called for a move away from the use of HFO and for investments in new decarbonising technologies and the development of zero-emission and green ships while advocating the reduction of shipping speed.

In December 2019, the EC published the European Green Deal, its flagship programme to make Europe the first climate-neutral continent by 2050, boost its industrial competitiveness and ensure a just transition for the regions and workers affected. The programme seeks to reduce GHG emissions from transport by 90 % across all transport modes.

With respect to shipping, the EC proposes to include maritime CO₂ emissions in the EU carbon market (EU Emissions Trading Scheme (ETS)) and examine the existing tax exemptions for (aviation and) maritime fuels. In parallel, it wants to ramp up the production and deployment of sustainable alternative fuels to accelerate, among other things, the deployment of zero and low-emission vessels. It also intends to regulate access for the most polluting ships to EU ports and oblige docked ships to use shore-side electricity.

On 16 September 2020, when adopting its position on the EC's proposal to align the EU MRV Regulation with the IMO DCS, the European Parliament⁹⁶ identified that shipping companies should reduce their annual average CO₂ emissions per transport unit for all their ships by at least 40 % by 2030 (as in the IMO initial strategy), or face penalties (see appendix below). In addition, the EP also voted to include CO₂ emissions from the maritime sector in the EU ETS from 2022. This approach has yet to be endorsed by the Council. The amendments proposed are set out in appendix below.

In terms of shipping, the EC has already announced a forthcoming initiative to support maritime fuels – “FuelEU Maritime”. In parallel, it intends to review legislation that could impact the take-up of LNG and onshore electricity supply to ships in ports (Alternative Fuels Infrastructure Directive, Energy Taxation Directive and the guidelines on the trans-European transport network ‘TEN-T Regulation’).

⁹⁵ European Parliament (2020) Decarbonising maritime transport: The EU perspective, European Parliament Research Service, October 2020. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659296/EPRS_BRI\(2020\)659296_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659296/EPRS_BRI(2020)659296_EN.pdf) (accessed 5 March 2021)

⁹⁶ European Parliament (2020) Global data collection system for ship fuel oil consumption data. Amendments adopted by the European Parliament on 16 September 2020 on the proposal for a regulation of the European Parliament and of the Council amending Regulation (EU) 2015/757 in order to take appropriate account of the global data collection system for ship fuel oil consumption data (COM(2019)0038 – C8-0043/2019 – 2019/0017(COD))

Appendix

The texts⁹⁷ adopted⁹⁸ by the European Parliament read as follows:

Amendment 48

Proposal for a regulation

Article 1 – paragraph 5a (new)

Regulation (EU) 2015/757

Chapter II a (new) – Article 12 a (new)

(5a) The following chapter is inserted:

“CHAPTER II a

EMISSIONS REDUCTION

Article 12a

Reduction of emissions

1. Companies shall linearly reduce the annual CO₂ emissions per transport work by at least 40% by 2030 as an average across all ships under their responsibility, compared to the average performance per category of ships of the same size and type as reported under this Regulation.
2. Where, in a given year, a company fails to comply with the annual reduction referred to in paragraph 1, the Commission shall impose a financial penalty, which shall be effective, proportionate, dissuasive and compatible with a market-based trading emission system, such as the EU ETS. Payment of the excess emissions penalty shall not release the company from its obligation under paragraph 1 for the period until 2030. In the case of companies that have failed to comply with the emission limits laid down under this Article, the provisions of Article 20(3) and 20(4) shall apply.
3. The Commission shall adopt delegated acts by... [6 months after the entry into force of this Regulation] in accordance with Article 23 to supplement this Regulation by defining the ship categories referred to in paragraph 1, by determining the baseline and the annual linear reduction factor to be applied for each ship category by using the data from the THETIS-MRV, including the mandatory parameter ‘cargo carried’, and the IMO DCS, while fully recognising the emission reductions already undertaken by the ‘decarbonising first movers’ companies, so as to achieve the target referred to in paragraph 1, by specifying the rules and means for calculating and collecting the excess emissions penalty referred to in paragraph 2, and by specifying any other rule necessary for the compliance and verification of compliance with this Article.
4. Within 12 months of the adoption by IMO of measures to implement the Initial Strategy on reduction of GHG emissions from ships adopted on 13 April 2018 and before those measures take effect, the Commission shall submit a report to the European Parliament and to the Council in which it shall examine the ambition and overall environmental integrity of the measures decided upon by IMO, including their general ambition in relation to targets under the Paris Agreement, to the Union economy-wide GHG emissions reduction target for 2030 and to the climate-neutrality objective as defined in Regulation (EU) .../... [European Climate Law].
5. Where appropriate, the Commission may accompany the report referred to in paragraph 4 with a legislative proposal to the European Parliament and to the Council to amend this Regulation in a manner that is consistent with the aim of preserving the environmental integrity and effectiveness of Union climate action, in particular the Union economy-wide GHG emissions reduction target for 2030 and the climate-neutrality objective as defined in Regulation (EU) .../... [European Climate Law].”

Amendment 49

Proposal for a regulation

Article 1 – paragraph 5b (new)

Regulation (EU) 2015/757

Article 12b (new)

(5b) The following article is inserted:

“Article 12b

Emissions from ships at berth

Companies shall ensure that, by 2030, no ships under their responsibility emit GHG emissions when at berth.”

⁹⁷ Ibid.

⁹⁸ The matter was referred back for interinstitutional negotiations to the committee responsible.

ANNEX 3

Provisions under the United Nations Convention on the Law of the Sea (UNCLOS) providing powers to the port/coastal State to enforce emission requirements on ships trading internationally

- 1 Article 218(1) of UNCLOS on Enforcement by port States reads as follows:
 - “1. When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State may undertake investigations and, where the evidence so warrants, institute proceedings in respect of any discharge from that vessel outside the internal waters, territorial sea or exclusive economic zone of that State in violation of applicable international rules and standards established through the competent international organization or general diplomatic conference.”
- 2 Article 218(1) provides powers for an EU port State to investigate and institute proceedings but would appear to be applicable only to ‘international rules and standards established through the competent international organization or general diplomatic conference’. As such this raises the question as to whether regional rules adopted by the EU were enforceable by port States under UNCLOS? Indeed Fanø argues⁹⁹ that port States can assert jurisdiction over violations when they occur outside their territory, for example on the high seas, in accordance with article 218(1) of UNCLOS, however, this is in the context of a theoretical fossil fuel ban enacted by IMO.
- 3 Article 220(1) of UNCLOS on Enforcement by coastal States that reads as follows:
 - “1. When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State may, subject to section 7, institute proceedings in respect of any violation of its laws and regulations adopted in accordance with this Convention or applicable international rules and standards for the prevention, reduction and control of pollution from vessels when the violation has occurred within the territorial sea or the exclusive economic zone of that State.”
- 4 Article 220(1) of UNCLOS provides power to EU coastal States to ‘institute proceedings in respect of any violation of its laws and regulations adopted in accordance with this Convention’. This provision arguably provides greater scope for EU Member States to enforce EU rules against ships trading internationally.
- 5 Such rules could be developed under Article 212 Pollution from or through the atmosphere that reads as follows:
 - “1. States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, applicable to the air space under their sovereignty and to vessels flying their flag or vessels or aircraft of their registry, taking into account internationally agreed rules, standards and recommended practices and procedures and the safety of air navigation.
 2. States shall take other measures as may be necessary to prevent, reduce and control such pollution.
 3. States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control such pollution.”
- 6 So for emissions to the air that are polluting¹⁰⁰ from internationally trading ships Article 212(1) provides scope for individual States to establish their rules, Article 212(2) provides for ‘other measures’, that is measures to prevent, reduce and control such pollution presumably in addition to international rules, and Article 212(3) affirms with the use of the term ‘especially’ that such rules do not necessarily have to be developed through a competent international organization or diplomatic conference.

⁹⁹ Fanø, J. J. Enforcing international maritime legislation on air pollution through UNCLOS, Hart Publishing, ISBN: 9781509927784, November 2019, p.322.

¹⁰⁰ Several jurisdictions consider GHG emissions to be pollutants, for example, in 2007 US Supreme Court declared that carbon dioxide and other greenhouse gases were air pollutants under the Clean Air Act and in the UK, for example, <https://naei.beis.gov.uk/overview/ghg-overview> However, no legal definition appears to be prevalent in the EU or indeed under international climate change instruments including UNFCCC, its Kyoto Protocol or the Paris Agreement.

