King & Spalding

Client Alert

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For more information, contact:

Frederick Lazell
+44 20 7551 2143
flazell@kslaw.com

Dan Feldman
+971 2 596 7027
dfeldman@kslaw.com

Matt Hardwick
+44 20 3929 5368
mhardwick@kslaw.com

Dan Giemajner
+44 20 3929 5367
dgiemajner@kslaw.com

Zoë Bromage
+65 6303 6088
zbromage@kslaw.com

Anne-Eva Antonenko
+33 1 73 00 39 58
aantonenko@kslaw.com

King & Spalding

London
8 Bishopsgate
London EC2N 4BQ
T. +44 20 7551 7500

Abu Dhabi
Level 15, Al Sila Tower
Abu Dhabi Global Market Square
PO Box 130522
Abu Dhabi
T. +971 2 596 7000

Singapore
1 Raffles Quay
#31-01 North Tower
Singapore 048583
T. +65 6303 6000

Paris
48 bis rue de Monceau
Paris 75008
T. +33 1 7300 3900

IMO's Net-Zero Framework and the Global Carbon Price on Shipping

A Major Milestone in Decarbonizing the Maritime Sector and a New Source of Demand for Green and Low-Carbon Hydrogen Derivatives and Biofuels

On April 11, 2025, the International Maritime Organization's ("**IMO**") 83rd session of the Marine Environment Protection Committee ("**MEPC 83**") agreed draft rules mandating global greenhouse gas ("**GHG**") emissions reductions for ships (of 5,000 gross tonnage or greater) and imposing penalties for non-compliance.[i] These draft rules, known as the IMO's Net-Zero Framework, will be voted on again in October 2025, and (unless there is a major change in course before then) should impose GHG emissions reduction obligations from 2028.[ii]

The IMO's Net-Zero Framework aims to provide significant incentives for shipowners and the fuel producers and bunkering companies supplying them to substitute renewable and low-carbon fuels in place of unabated fossil-derived fuels. It supports the IMO's 2023 Strategy on the Reduction of GHG Emissions from Ships, which seeks to achieve net-zero maritime GHG emissions by or around 2050 and accelerate the deployment of zero and near-zero GHG emissions technologies, fuels and/or energy sources ("**ZNZs**").

Under the Net-Zero Framework, shipowners must report GHG emissions associated with the full lifecycle (production to end-use) of shipping fuels (i.e., the so-called, "well-to-wake" or "**WtW**" emissions). This includes both onboard fuel combustion emissions (so-called "tank-to-wake" or "**TtW**" emissions) and upstream emissions from fuel production, factoring in sustainability requirements associated with such production (so-called "well-to-tank" or "**WtT**" emissions). For the first time, shipowners, fuel producers and bunkering companies will need to consider the regulatory issues and administrative requirements associated with calculating the

full lifecycle GHG emissions intensity of fuels and the accompanying methodologies and certification standards that will facilitate this.

The IMO's rules present regulatory challenges that industry stakeholders will need to navigate, but they also create opportunities in the fuel value chain. The rules seem likely to boost the business case for renewable and low-carbon fuel production, where in recent years demand has been perceived as insufficient for the development of scaled-up supply chains. It remains to be seen which future low-carbon fuels shipowners will prefer, and therefore how and where capital should be invested in the fuel supply chain. There also remain several important regulatory gaps that will need clarification to fully operationalize the Net-Zero Framework, including details on support schemes for ZNZs (this will be important for the business cases of the lowest emissions, most expensive-to-produce fuels, such as e-methanol). The industry also needs further details of the lifecycle GHG emissions calculation methodologies and the accompanying certification standards, amongst other things and that work will continue through 2025 and 2026.

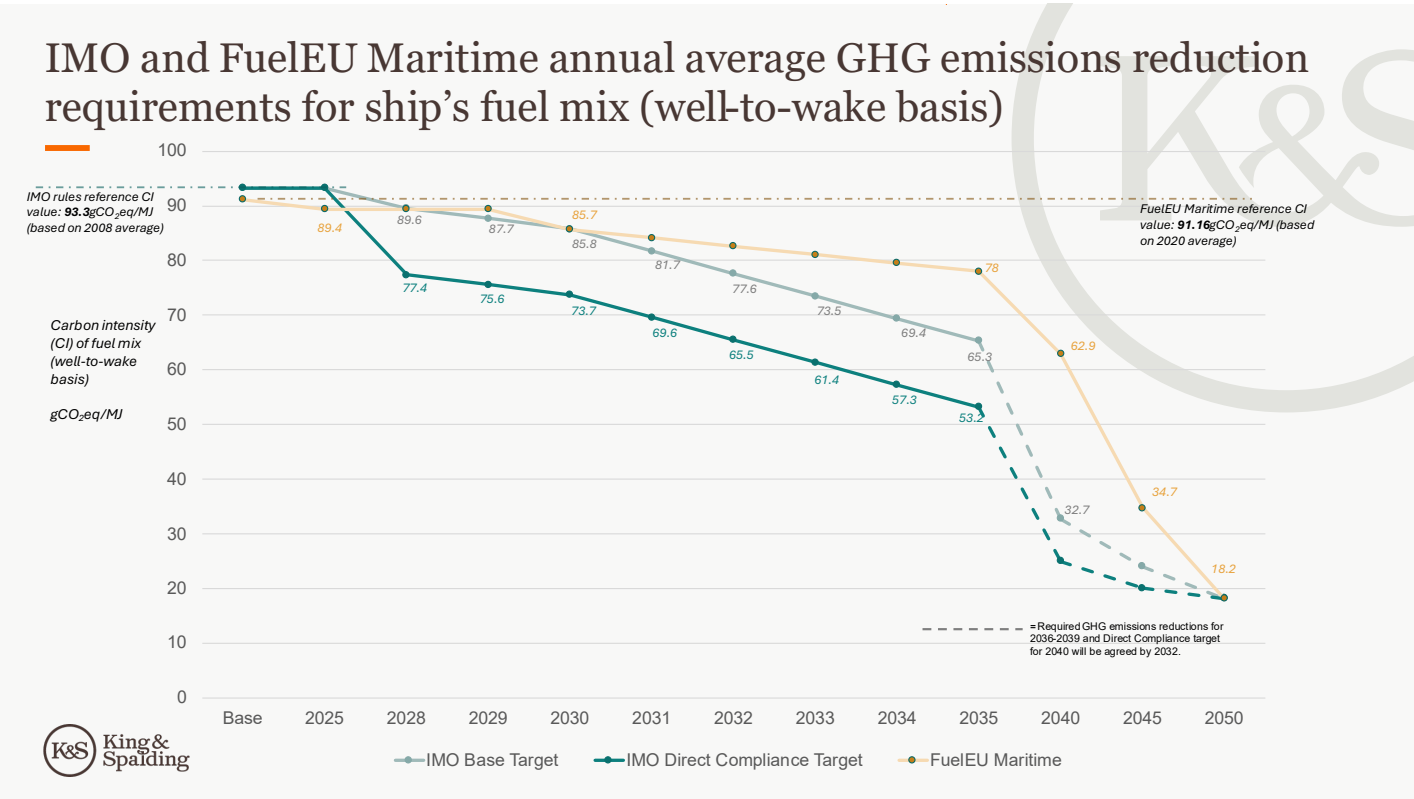
Nonetheless, the agreement at MEPC 83 on the Net-Zero Framework represents a major milestone for the decarbonization of the maritime sector: the first ever global carbon price for international shipping.

KEY FEATURES OF THE IMO RULES

1. Core Principles

- The Net-Zero Framework introduces mandatory GHG emissions reduction targets, which begin in 2028 and require increasingly significant emissions reductions each year thereafter. These are even more ambitious, requiring greater emissions reductions, than under the EU's FuelEU Maritime rules, which also aim to decarbonize shipping in the EU and internationally. *See* Figure 1 below for an illustration of these targets.
- There are two GHG emissions reduction targets: the "Base Target" and the "Direct Compliance Target", representing a less-ambitious and a more-ambitious GHG emission reduction quota, respectively. In simple terms, the fuel mix of a ship complying only with the Base Target would have a higher average annual GHG emissions intensity ("**GFI**") than that of a ship that also complies with the Direct Compliance Target.
- In calculating compliance with the GFI targets, shipowners will need to report on the well-to-wake emissions associated with the production and sourcing of fuels, as well as the combustion of those fuels. This will necessitate a new system of certification for the carbon intensity and sustainability credentials of fuels. Fuel producers aspiring to supply low-carbon fuels for IMO compliance, as well as bunkering companies and shipowners, will need to be able to navigate this new certification system.
- Contrary to earlier proposals, the agreed IMO Net-Zero Framework does not include a fixed global carbon tax or levy on all ships based on their actual emissions—i.e., there is no mechanism equivalent to the EU's carbon price, the Emission Trading System ("**ETS**"), for the shipping sector (*see* **Interaction with EU Maritime Decarbonization Regulations** below). Ships that comply with the Direct Compliance Target—and, by extension, the Base Target—will not incur any carbon price for their residual GHG emissions.

Figure 1: Annual average GHG emissions reduction requirements for a ship's fuel mix, using the 2008 reference value of 93.3gCO_2eq/MJ (well-to-wake basis) as a baseline.

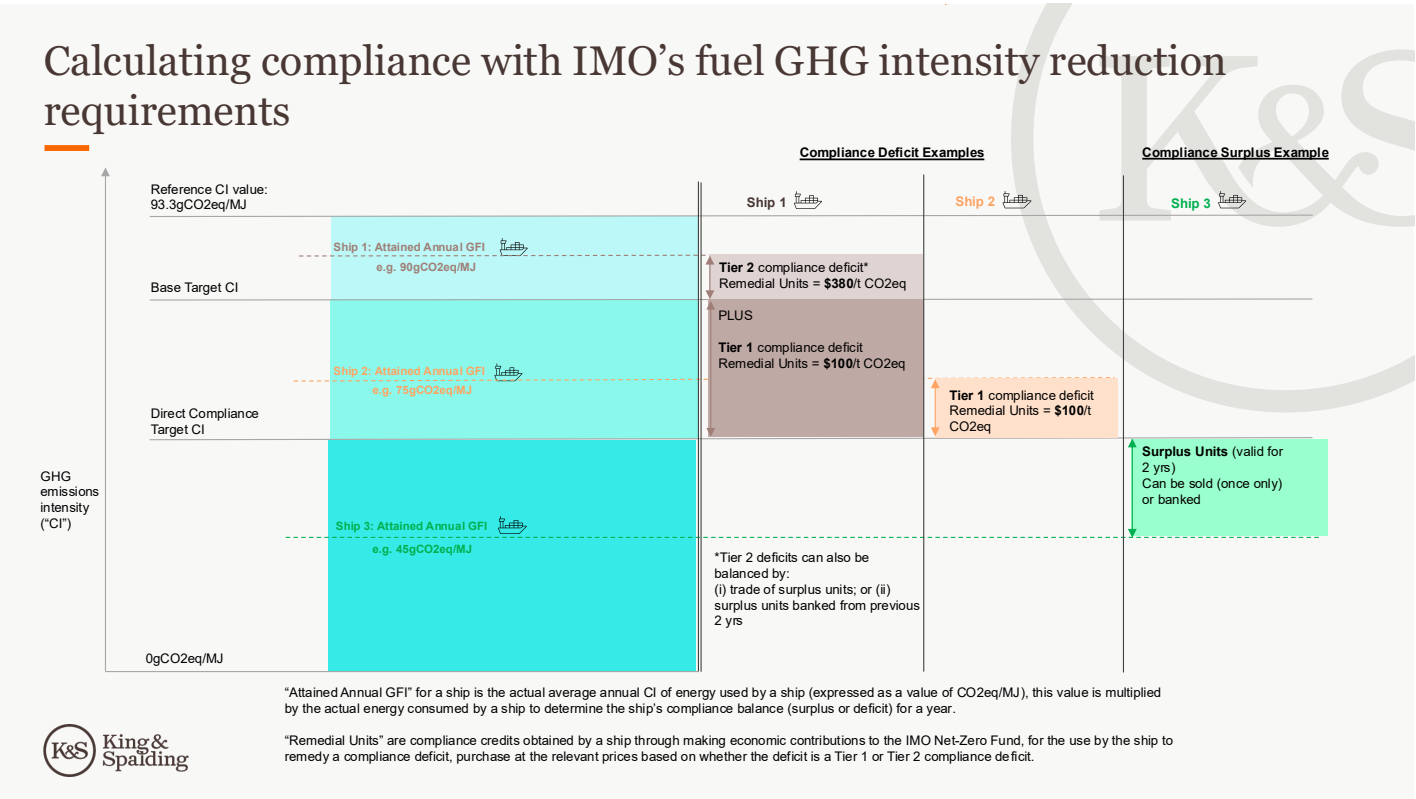


2. Compliance Mechanisms

- Ships failing to comply with the GHG emissions reduction target must offset their emissions by paying penalties. Specifically, the IMO rules require shipowners to purchase "Remedial Units" ("**RUs**") from the IMO Net-Zero Fund. The cost of these RUs (i.e., the pricing of the IMO penalties) varies based on the level of a ship's non-compliance.
- The rules set the price for RUs initially (for the period 2028-2030) at $380 per tonne of CO_2 equivalent ("**/tCO_2eq**") for failure to meet the Base Target (less ambitious emissions reduction targets—a "Tier 2 compliance deficit") and $100/t$CO_2$eq for failure to meet the Direct Compliance Target (the more ambitious emissions reduction targets—a "Tier 1 compliance deficit").
- The Net-Zero Framework permits pooling and banking mechanisms for compliance. This is done through using "Surplus Units" ("**SUs**"), which a ship can generate if it over-complies, achieving GHG emissions reductions beyond those required by the Direct Compliance Target. However, ships can only use of SUs to offset the need to purchase the more expensive ($380/t$CO_2$eq) RUs for "Tier 2 compliance deficits" (i.e., failure to meet the Base Target). Ships that fail to meet the Direct Compliance Target must purchase RUs (at $100/t$CO_2$eq) to remedy their "Tier 1 compliance deficit" (i.e., the difference between their actual achieved GFI and the Direct Compliance Target).

- Since stakeholders will, presumably, calculate the price for transferring these SUs to other ships by reference to the avoided penalty cost of $380/tCO$_2$eq for RUs to remedy a ship's "Tier 2 compliance deficit", this could be an attractive future potential revenue stream for shipowners that can over-comply, generating SUs and agreeing to sell them to other shipowners.
- The IMO rules prescribe that SUs can only be transferred once and the IMO GFI Registry (to be established) is the only permitted ledger to record generation of SUs and their transfer between ships. As a result, it seems unlikely that a trading market for SUs will emerge within the architecture of the IMO itself (other than, probably, individual bilateral trades between ships, often referred to as pooling). Of course, it cannot be excluded that separate futures markets, or other financial instruments, may emerge for SUs outside of the remit of the IMO GFI Registry itself.
- *See* illustration in **Figure 2** below for an overview of the different compliance options for some hypothetical scenarios.

Figure 2: Overview of compliance options for ships



3. Role of the IMO Net-Zero Fund

- The IMO will establish a "Net-Zero Fund", which will use the proceeds from RUs to incentivize the use of ZNZs, amongst other things.
- Shipowners using ZNZs may be eligible for incentives in addition to the ability to generate SUs (as described above). To qualify as ZNZs, fuels must meet specific GHG emissions intensity thresholds: 19.0g CO$_2$eq/MJ until the end of 2034, and a threshold set at not greater than 14.0g CO$_2$eq/MJ from 2035 onwards. Compliance with

these thresholds will be determined using the IMO's Life Cycle Assessment ("**LCA**") Methodology, which will be updated periodically along with further guidance from the IMO.[iii]

- The LCA Methodology must also be used by fuel producers, shipowners and bunkering companies to determine the GHG emissions intensity of fuels for purposes of demonstrating compliance with the Base Target and the Direct Compliance Target, as described above.
- Although the LCA Methodology was adopted by the IMO in 2024, it is subject to ongoing revision and there are several gaps and ambiguities that still need to be clarified. In addition, certification schemes will need to be established and approved by the IMO to certify fuels using this methodology.

4. Further Guidance Needed for Implementation

- The success of the Net-Zero Framework will depend on detailed guidance to be issued by the IMO, much of which is not expected to be adopted until MEPC 84 in Spring 2026. This includes the relevant IMO working groups considering revisions to the LCA Methodology.
- The IMO will also need to approve guidelines for recognition of sustainable fuels certification schemes (following which, these schemes themselves will need to be developed) and adopt more detailed procedures in relation to recognizing such schemes. It will also need to establish the IMO GFI Registry, which will serve as the central mandatory tracing system to monitor compliance for all ships globally.
- Fuel producers will also be eager to see further guidance on the parameters for issuing rewards for ZNZs as well as other uses of the proceeds from the IMO Net-Zero Fund.

5. Formal Adoption

- Agreement was reached on the IMO Net-Zero Framework at MEPC 83, but the rules have not yet been formally adopted. This is expected in October 2025 during an extraordinary session of MEPC (MEPC/ES.2). Adoption will require approval by a two-thirds majority of parties to Annex VI of the MARPOL Convention that are present and voting at the extraordinary session. Annex VI currently has 108 parties, covering ninety-seven percent (97%) of the world's merchant shipping fleet by tonnage, according to the IMO.
- In addition, following approval, the Net-Zero Framework will need to undergo an "acceptance" procedure. It will be deemed to be tacitly accepted and therefore enter into force 16 months later (expected in 2027), unless one-third or more of the parties to the MARPOL Convention, or parties representing not less than 50% of the gross tonnage of the world's merchant fleet, object to the measures within that timeframe.
- Additionally, any individual party can lodge an objection, meaning that the Net-Zero Framework would not apply to that objecting party (although this would not prevent the Net-Zero Framework coming into effect for all other, non-objecting parties). However, it remains to be seen whether any parties will choose to "opt-out" of the Net-Zero Framework.

6. Enforcement

- Responsibility for enforcement of the obligations placed on shipowners under the Net-Zero Framework rests with the administrative bodies identified by each state that is party to the MARPOL Convention. States are therefore responsible for ensuring compliance by ships under their flag.
- Port authorities (who have, when ships of any flag are within their jurisdiction, rights to inspect and require ships to demonstrate compliance with the MARPOL Convention) may also play a role in enforcing the requirements of the Net-Zero Framework. Port authorities may require demonstration of compliance with the requirements of the

Net-Zero Framework and are entitled to conduct inspections of ships to verify compliance. In practice, this may mean that a ship will need to comply with those requirements of port authorities through which the ship passes, regardless of the flag the ship flies (i.e., compliance with the Net-Zero Framework could be a condition for ships to dock in international ports).

- In a world currently characterized by policy differences on environmental matters and increasing trade conflicts, this is an area of potential geopolitical friction.
- Importantly, many of the world's major shipping hubs, including China, Singapore and Netherlands supported the Net Zero Framework during MEPC 83.

INTERACTION WITH EU MARITIME DECARBONIZATION REGULATIONS

- The European Union ("**EU**") applies two key regulations aimed at decarbonizing the maritime sector within the EU as well as for voyages that either begin or end in an EU port (in respect of which, 50% of the emissions are within scope of the decarbonization rules). These are FuelEU Maritime[iv] and the expanded EU ETS which now covers maritime transport.[v]
- FuelEU Maritime is similar to the IMO's Net-Zero Framework in that it sets mandatory GHG emissions reduction quotas for ships, which become increasingly ambitious over time. There is therefore duplication between FuelEU Maritime and the IMO's Net-Zero Framework, because a non-compliant ship, in theory, would (based on the current texts of each) be penalized under both regimes. FuelEU Maritime acknowledges this potential overlap and requires the European Commission to review the regulation with a view to aligning it with the IMO's international rules "where appropriate".[vi] Further clarity will therefore be needed from the Commission on how it will resolve this issue.
- This will not necessarily be straightforward, because the assessment of compliance with the relevant GHG emissions reduction targets will involve slightly different methodologies under FuelEU Maritime and the Net-Zero Framework. In addition, each regulation is likely to use slightly different standards for attributing emissions intensity for fuels, both for monitoring and reporting purposes as well as in relation to the approved certification standards for fuels eligible for low emissions claims (e.g., biofuels, renewable fuels of non-biological origin (RFNBOs) and low-carbon fuels). The EU has already implemented some of these regulations and is in the process of finalising the remaining parts of the regulatory landscape (e.g., the delegated act for low-carbon fuels).
- These EU-specific requirements will not necessarily be harmonized internationally (and it may not be desirable to do so, given the regulatory challenges and ambiguities with some aspects of the EU rules on renewable and low-carbon fuels). None of the various detailed standards and guidelines have yet been finalized under the IMO Net-Zero Framework.
- In contrast with the EU ETS for the maritime sector, the IMO rules do not impose a flat carbon price on all emissions from ships. A ship that meets both its Direct Compliance Target and Base Target will not have to pay any carbon price under the IMO rules; whereas a ship that meets its obligations under FuelEU Maritime but still has some residual emissions, still needs to pay a carbon price for the residual emissions. As a result, it seems likely that the EU ETS will continue to apply in parallel to the IMO Net-Zero Framework, even if there is harmonisation of the approach to penalties under FuelEU Maritime.

CONCLUDING REMARKS

The Net-Zero Framework could represent significant opportunities for maritime industry stakeholders across the value chain. We are already seeing port authorities of major shipping hubs, shipowners and fuel producers, amongst others, taking steps to position themselves in this regard. However, as with any regulated market, understanding the

details of the certification requirements, LCA Methodology and other ancillary procedures (once these emerge) required to fully operationalize the IMO's Net-Zero Framework will be crucial.

The King & Spalding Global Energy Team would be delighted to discuss any aspect of this note with you.

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[i] The draft rules, if adopted, would apply to all ships of 5,000 gross tonnage and above, other than for purely domestic voyages within the waters of the flag state of a ship. [https://www.imo.org/en/MediaCentre/PressBriefings/pages/IMO-approves-netzero-regulations.aspx]

[ii] The Net-Zero Framework would constitute a new Chapter 5 in Annex VI of the International Convention for the Prevention of Pollution from Ships ("**MARPOL Convention**").

[iii] 2024 Guidelines on life cycle GHG intensity of marine fuels, adopted as part of Resolution MEPC.391(81).

[iv] Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC. [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1805]

[v] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC. [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02003L0087-20230605]

[vi] FuelEU Maritime, Recital 69.