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FORUM**



**Mærsk Mc-Kinney Møller Center**  
for Zero Carbon Shipping

# Defining additionality in the voluntary book and claim market in deep-sea shipping

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## Introduction

A book and claim chain of custody system allows the environmental attributes of a low-emission fuel to be [separated from the physical flow of that fuel](#) in a transportation supply chain. This has created a voluntary market, where transactions of the environmental attributes from emissions reduction interventions happen beyond what is required by regulation.<sup>1</sup> Book and claim systems are one of the mechanisms within the voluntary market that enable the buying and selling of environmental attributes.

Regulatory frameworks have an impact on stakeholders partaking in the voluntary book and claim market. An increasing number of companies across the value chain are willing to take ambitious action on decarbonisation and pay a premium for low-emission transportation services. As policies to accelerate shipping decarbonisation emerge, progressively implemented by the International Maritime Organisation (IMO) and local and regional regulators, questions arise as to how policy-driven and voluntary actions interact.

One such question is whether voluntary actions are “additional” to compliance-driven actions. Considering that companies pass down the cost of compliance within their value chain, only those actions that go beyond compliance, i.e., “voluntary actions”, qualify for being sold on the voluntary book and claim market.

There is no singular, prevailing definition of additionality. In the context of transportation, additionality is defined by the [Smart Freight Centre](#) as “a criterion for assessing whether a solution or a low-emissions transportation service are required by regulation”. This has made it widely understood that for a solution or a low-emissions transportation service (e.g., a fuel switch to low-carbon fuel) to be sold on the voluntary book and claim market, it must be additional to what is prescribed by regulation. Because alternative fuel use required by regulations would occur without any voluntary market, the voluntary market should therefore only be used to incentivise the use of alternative fuels that would not occur in its absence. It should, in other words, go beyond regulatory obligations.

Recent years have been marked by the emergence of book and claim systems in deep-sea shipping, with the development of various system enablers across the ecosystem (frameworks, registries, etc.). In order to achieve an interoperable, trustworthy, and robust book and claim ecosystem, it is more effective for market actors to approach the concept of additionality in a harmonised way across systems, rather than each system taking a different approach.

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*1 In this paper, an emission reduction intervention means a fuel switch from conventional fuel to alternative fuel, i.e., refers to a reduction versus a theoretical fossil fuel baseline. Alternative fuels are biological fuels, renewable fuels of non-biological origin or other fuels that has been certified under a recognised Sustainability Certification Scheme (SCS).*

## Objective and ambition

Adopting a common interpretation on additionality is crucial to ensuring a level playing field between actors and the integrity of the book and claim market. **This position paper proposes an interpretation of additionality with respect to the various regulations in shipping.**

The ambition is to establish a shared reference for shipping additionality between all actors in the ecosystem, enabling methodologies, registries, issuers, buyers, and verifiers to point to a shared approach to and application of additionality. However, as part of the expected evolution of this nascent market, some stakeholders may have different criteria for additionality.<sup>2</sup> This paper is the result of independent work that intends to provide credible balanced guidance on additionality.

## Scope

This position paper is exclusive to deep-sea shipping and focuses solely on shipping-specific regulations.

Furthermore, it looks solely at regulatory additionality and at the monetisation of emissions reductions achieved through fuel switches from conventional fuel to low-carbon alternatives on the voluntary market. It therefore excludes any emissions reductions achieved through energy efficiency measures.<sup>3</sup> Additionality is hereby assessed by whether the use of low-carbon fuel was required by regulation.

The authors provide considerations as to the implication the respective positions on additionality may have for registries but do not go into detail about how the positions should be implemented at the registry level.

This paper will be revised and updated over time as the regulatory landscape evolves (i.e., revision of existing regulations, adoption of new regulations and interactions between regulations). Specifically, the IMO expects to adopt its mid-term measures – composed of a goal-based marine fuel standard and a greenhouse gas (GHG) emissions pricing mechanism – in 2025 to enter into force in 2027. The EU Emissions Trading System (ETS) will be fully in force in 2027 when the phase-in period ends. Finally, the IMO also expects to review its Carbon Intensity Indicator in 2025.

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<sup>2</sup> The additionality statement in the Zero Emission Buyers Alliance's (ZEMBA) second request for proposal (RfP) process is an example of another approach to additionality.

<sup>3</sup> While the optimisation of fuel consumption through the deployment of energy efficiency measures is to be encouraged, there is no standard methodology that can to a satisfactory degree of reliability quantify the associated emissions savings. It is indeed much trickier than quantifying the emission reduction from a fuel switch.

## High-level principles for additionality in the voluntary book and claim market in deep-sea shipping

To ensure the additionality of voluntary booked and claimed environmental attributes, the approaches taken by companies and registries should strive for:

1. **Environmental credibility**: Companies and registries should seek, through their commercial practices and registry design and operation, to ensure to the highest extent possible that booked and claimed environmental attributes generate GHG reductions additional to those prescribed by regulations.
2. **Transparent sharing of information**: Companies and registries should seek to enable the sharing of information between buyers and sellers about policy measures relevant to the emission reduction intervention in question and about the extent of the policy measures' coverage of the intervention. Information regarding the extent to which the effectiveness or outcome of the intervention is impacted by policy measures should also be shared between the buyer and seller. Registries should provide sufficient information to buyers in advance of a purchase to mitigate any information asymmetry.
3. **Clear and fair commercial practices**: Companies should seek to create a level playing field for all parties by ensuring that the value of additional environmental attributes is fairly reflected in the terms and pricing. This will help build confidence and promote a robust voluntary market.
4. **Pragmatism and feasibility**: Companies and registries should seek to document and verify additionality through accurate methods that ensure data integrity and do not place undue administrative burdens on any party. Providing and accessing this data should be made easy for all parties.
5. **Consistency**: Companies and registries should seek to align their treatment of additionality within the maritime industry, and ideally across the full logistics value chain.

## Guidance on additionality for application in the voluntary book and claim market in deep-sea shipping

The EU ETS, FuelEU Maritime, and the IMO's Carbon Intensity Indicator (CII) are three pieces of legislation that all target the emissions of fleets and shipping companies. FuelEU Maritime and EU ETS are both part of the EU's 'Fit for 55' package and are meant to complement each other by addressing the two main approaches to reducing GHG emissions from shipping. FuelEU promotes the use of low-to-zero-carbon fuels by setting progressively stricter GHG intensity reduction targets for ships, whereas the ETS is a 'cap and trade' scheme that puts a price on CO<sub>2</sub> to drive energy efficiency improvement and reduce emissions by [pricing the use of fossil fuels](#). CII is an environmental rating system for ships measuring their energy efficiency.

The paper provides a succinct introduction to these legislations, the position on additionality, and justifications for the position taken.

### (i) EU Emissions Trading System regulation

#### Introduction to the regulation

The EU ETS is set out in [Directive 2003/87/EC](#), as amended. With the latest revision of the ETS Directive in 2023, it was extended to also include maritime transport [as of 2024](#). The regulation applies to all cargo and passenger ships at or above 5,000 gross tonnage (GT), and from 2027 will also apply to offshore ships of the same size.

The EU ETS is a 'cap and trade' system. This means that a cap is set to limit the total amount of greenhouse gases that may be emitted. The cap is then reduced annually in line with the EU's climate target. The cap is expressed in EU Allowances (EUAs), where one allowance gives the right to emit one tonne of CO<sub>2</sub> tank-to-wake. From 2026, the ETS will also cover methane and nitrous oxide, CH<sub>4</sub>, and N<sub>2</sub>O, respectively, in a CO<sub>2</sub>-equivalent manner on a well-to-wake basis.

Each year, companies subject to the ETS Directive must surrender enough allowances to cover their annual emissions. This puts a price on the GHGs emitted by the companies. Companies face fines if they do not surrender the required allowances. If a shipping company fails to comply for more than two years, it may even [face expulsion from EU ports](#).

The EU ETS covers 100% of emissions that occur between two EU ports, and 50% of emissions from voyages starting or ending outside of the EU (as well as at berth). Furthermore, to ensure a smooth transition, shipping companies only have to surrender allowances for a portion of their emissions during an initial phase-in period: in 2025 for 40% of their emissions reported in 2024; in 2026 for 70% of their emissions reported in 2025; and from 2027 onwards for 100% of their reported emissions.<sup>4</sup>

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<sup>4</sup> The [EU ETS handbook](#) sets out calculation rules which can help a company determine the amount of EUAs corresponding to their emissions, which also enables companies to deduce avoided EUAs based on their amount of emissions reduced.

The ETS relies on the EU MRV (Monitoring, Reporting, and Verification) Maritime Regulation (Regulation 2015/757) – a system under which ships must monitor, report, and verify their CO<sub>2</sub> emissions on an annual basis. Ships must thus report their fuel consumption. This data is then aggregated at the company level, which forms the basis for knowing the amount of emissions for which the company must surrender ETS allowances. It is important to note that, in the context of book and claim systems, the ship must report the entirety of its emissions and fuel consumption to EU MRV on voyages that fall within the scope of EU regulations. The ETS is mandatory for all vessels in scope, and it is not possible to avoid it; all fuel consumption under the scope of ETS forms the basis for calculating the required allowances. Accredited third-party verification is compulsory, ensuring accurate reporting of fuel consumption and mandatory surrendering of corresponding allowances. Fuel consumption is therefore systematically reported and allowances are surrendered.

### → Joint position on additionality for the EU ETS

The ETS Directive does not require companies to use a specific fuel or technology or to meet a certain target but are merely required to surrender allowances corresponding to their total emissions, thus paying for the pollution that they cause.

A ship may reduce its emissions and, consequently, the need to purchase allowances by using low-carbon fuel. However, this is not required by the ETS. If a company does not surrender enough allowances, it will face a heavy penalty based on its emissions. This penalty can be avoided by either reducing emissions of the company fleet, including through the use of EU Renewable Energy Directive-compliant fuels, or by surrendering the necessary allowances.

An emissions quota system pushes for emissions reductions where they are the cheapest; i.e., at a certain allowance price, companies should rationally look for emission reduction options below that price. If they find such options, it would make more financial sense to avoid emissions through that solution than to buy allowances to compensate for those emissions.

We recommend the following approach(es) with respect to the EU ETS regulation:

#### **The use of low-emission fuel by a carrier on a voyage subject to EU ETS is considered additional.**

(a.) Full transparency should be provided to the buyer with respect to the quantity of EUAs avoided (i.e., not purchased by the seller) through the use of low-emission fuel. In other words, it should be made clear how many EUAs would have been purchased if conventional fuel had been used instead of a low-emission alternative.

(b.) If a buyer has a higher additionality threshold, it may also request the seller to cancel EUAs equivalent to the quantity of EUAs avoided from the use of low-emission fuel.

The seller should accurately and fully document and share such information related to the coverage of ETS and avoided EUAs for the given voyage with the buyer.

## (ii) FuelEU Maritime (FuelEU) regulation

### Introduction to the regulation

Taking effect in 2025, the [FuelEU Maritime](#) regulation is part of the EU's 'Fit for 55' package, which aims to stimulate the demand for, and consistent uptake of, alternative fuels to reduce GHG emissions by 55% by 2030 and to achieve climate neutrality by 2050. FuelEU mandates a progressive reduction in the yearly GHG intensity of the energy used by ships, starting with a 2% reduction in 2025 and scaling up every five years to reach an 80% reduction by 2050. The regulation applies to all ships and voyages subject to the EU MRV maritime regulation. Geographically, this corresponds to 100% of energy of intra-European Economic Area (EEA) voyages and 50% of energy of extra-EEA voyages. Emissions by vessels while berthed at EU ports are also regulated under this framework.

The entity responsible for compliance under FuelEU is the same entity responsible for compliance under the International Safety Management Code, i.e., the 'ISM Company' or the document of compliance (DOC) holder. While FuelEU requires a reduction of GHG intensity, it is technology neutral. The regulation suggests multiple compliance pathways:

- i. **Low- or zero-carbon fuels:** Use lower GHG-intensity fuels, such as biofuels and e-fuels. Specifically, the use of renewable fuels of non-biological origin (RFNBO), also known as e-fuels, qualify for a multiplier incentive through 2033 that effectively halves their GHG intensity.
- ii. **Wind-assisted propulsion (WAP):** Special consideration is given to ships equipped with WAP, which are eligible for a Wind Reward Factor that reduces the intensity of energy onboard.
- iii. **Onshore power supply (OPS):** From 2030, container and passenger vessels must use shore-based electrical power or an equivalent zero-emission technology during port stays. OPS energy counts as zero-emissions energy and can be used to comply with the intensity targets.
- iv. **Using flexibility measures:** These are designed to assist those that either underachieve or overachieve on the emission reduction targets.
  - » ***Borrowing:*** Allows companies to use a portion of anticipated surpluses from future years to comply with current-year targets. A 10% borrowing penalty is applied to the compliance balance and added to the following period.
  - » ***Banking:*** Enables companies with surplus reductions to save them for future compliance needs (with no expiration).
  - » ***Pooling:*** Vessels that overachieve on the intensity targets can share excess compliance ('surplus') with other vessels (including from different companies) within a pool.
- v. **Paying a penalty:** Vessels unable to adopt the above strategies may resort to paying a penalty to get their DOC. This option is intentionally designed as a costly disincentive and typically exceeds the expense of other compliance methods.

The [compliance timeline](#) is broadly divided into two phases: a 'reporting period' and a 'verification period'. Throughout the reporting period, the shipping company records data for each vessel for the given reporting year. The verification period takes place over the first half of the year following the reporting period:

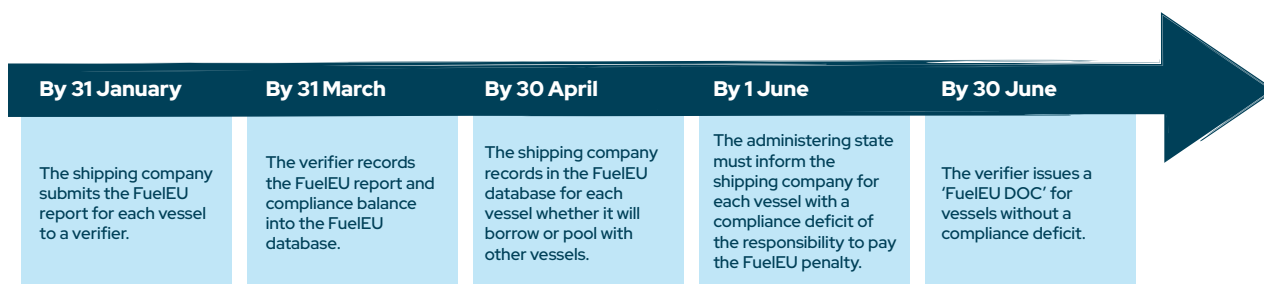


Figure 1: Verification period

## Joint position on additionality for FuelEU Maritime

As FuelEU enters into force, it will trigger the usage of higher volumes of low-emission fuels by shipping companies to reach compliance. These compliance volumes will be used first for direct compliance for a given year (either for vessels' own compliance or pooled with other vessels), and surplus may be banked for future compliance with the regulation. This paper does not consider those volumes additional since they will have been used for compliance. However, a company may choose to place a portion of their low-emission fuel (that has not been used for compliance, banked for the following year, pooled with other vessels, or used to cancel borrowed deficit from previous years), on the voluntary market through book and claim chain of custody systems. This paper considers such volumes to be additional. Ensuring their additionality in practice, however, can be challenging. If it is assumed that voluntary markets will require emissions reductions to be additional to compliance, this should create a situation in which companies have to compare the value of banked or pooled low- and near-zero emission fuels, interventions, and/or emissions reductions to their values on the voluntary market.

A challenge when ensuring the additionality of low-emission fuel placed in book and claim systems is the potential for time lags between FuelEU reporting and transaction dynamics in the voluntary market. The FuelEU DOC is issued up to six months after the end of the reporting period, which results in a time lag of six to 18 months between bunkering and reconciliation. Companies may not want to wait this long before placing the extra volumes of fuel on the voluntary market. Older interventions also tend to be perceived as lower value by buyers. If environmental attributes are bought before the FuelEU DOC is issued, the additionality of these purchased environmental attributes cannot be fully verified. However, measures can be implemented to earmark the fuel that has been placed in the voluntary market and taken out of the compliance market.



This timing challenge also has implications for book and claim systems (frameworks, methodologies, and registries) that may have vintage booking restrictions<sup>5</sup> that are shorter than the FuelEU timeline. Book and claim systems should thus take this time gap into consideration as there may be up to 18 months until FuelEU reconciliation. By adjusting their vintage restrictions, systems could enable fuel volumes to also be booked after FuelEU reconciliation, allowing the buyer to get stronger evidence that the fuel was not used for compliance.

Often, the company booking low-emission fuel volumes on book and claim voluntary markets (the ship operator), is not the same as the company responsible for FuelEU compliance (the shipowner). The FuelEU DOC is held by the ISM company (often the shipowner), which is subject to verification by a third-party verifier. In turn, the commercial operator of the vessel does not necessarily hold a FuelEU DOC but still needs to check and prove that the low-emission fuel it is placing on the voluntary market has not been or will not be used for FuelEU compliance. The verifier ascertaining this, which may be different from the one used by the shipowner for FuelEU compliance, will need evidence that the fuel has been earmarked for the voluntary market and therefore has not or will not be used in the compliance market.

We recommend the following approaches with respect to the FuelEU Maritime regulation:

**The use of low-emission fuel towards compliance with FuelEU Maritime is not additional, including fuel that is pooled, banked for future compliance with the regulation, or used to cancel borrowed deficit from previous years.**

**Low-emission fuel that is not used towards compliance with FuelEU is considered additional and may be sold in the voluntary market.**

(a.) Throughout the reporting period in a given year (i.e. before the end of the FuelEU verification period for that given year), low-emission fuel may be booked and claimed in the voluntary market on the condition that the shipping company booking the fuel provides documentation proving that it has not and will not be used by the FuelEU DOC holder (ISM company) towards compliance. Such documentation should be audited by an external verifier.

(b.) Another equally acceptable option is to wait until the end of the FuelEU verification period. In this case, the issuance of all relevant verified documentation will prove that the low-emission fuel was not used by the FuelEU DOC holder in its compliance balance or banked with the intent to use for future compliance. This provides the buyer with transparency and ensures that the volumes sold on the voluntary market are additional. It should be noted that in this scenario, such fuel volumes can only be booked in the voluntary market six to 18 months after the intervention (depending on when the intervention took place within the reporting year).

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<sup>5</sup> *Vintage restrictions aim to set reasonable durations between when a fuel switch intervention happens and when it is claimed and reported by a buyer on the voluntary book and claim market.*

In practice, the following guardrails should be implemented to uphold integrity:

- » Provide documentation proving the specific fuel volume has not been and will not be used towards FuelEU compliance (pooling and banking):
  - » *Throughout the reporting period:* A binding declaration by the ISM company stating that the specific volume of low-emission fuel will not be used towards compliance with FuelEU. This can be in the form of an agreed-upon document like a contract or a clause in the charter party agreement.
  - » *After completion of the verification period:* Relevant documentation proving that the specific fuel volume was not used for compliance with FuelEU (not pooled or banked).
- » Documentation proving the fuel is additional should be audited by an external verifier.

### (iii) Carbon Intensity Indicator (CII) regulation

#### Introduction to the regulation

The Carbon Intensity Indicator<sup>6</sup> is a short-term measure from the IMO that rates a vessel's operational efficiency on an annual basis. It aims to incentivise the implementation of new technical and operational efficiency measures. Vessels of 5,000 GT and above that trade internationally are given a rating based on their attained performance from A (superior) to E (inferior). The threshold for reaching a better rating gets more stringent year-on-year towards 2030.

The CII rating is calculated using data submitted to the IMO's Data Collection System (DCS). The CII is measured using an annual efficiency ratio expressed in grams of CO<sub>2</sub> emitted per cargo-carrying capacity and nautical mile. In addition, correction factors may be applied to cater for special design and operational circumstances. The CII is expressed in tank-to-wake emissions, with the exception of biofuels, which can be expressed in well-to-wake on the condition of meeting sustainability criteria and being certified by an internationally approved certification scheme.<sup>7</sup>

The attained annual operational CII and the environmental rating (A to E) are recorded in the vessel's Ship Energy Efficiency Management Plan (SEEMP). The CII regulation states that vessels must be rated C or higher. If a vessel receives a D rating for three consecutive years, or an E rating for one year, a plan of corrective action (PCA) must be developed.

It should be noted, however, that the CII regulation doesn't include any strong enforcement mechanism (e.g., penalties or restrictive measures).

#### → Joint position on additionality for the CII

The CII legislation will be revised in 2025, and the IMO has received numerous submissions regarding this revision that testify to the fragmented industry opinions about its focus, scope, and application.

<sup>6</sup> MARPOL Annex VI Regulation 28

<sup>7</sup> MEPC.1/Circ.905 Interim guidance on the use of biofuels under regulations 26, 27 and 28 of MARPOL Annex VI

The scope and technicalities of the regulation also present certain aspects to consider when it comes to additionality. As mentioned, there are no enforcement mechanisms or penalties for poor ratings under the regulation. Reaching a better rating does not constitute a compliance obligation. The only requirement is to report data to the DCS and develop a PCA in case of a low rating. This lack of enforcement, combined with criticism of the metrics used to determine the rating, prevents CII from being widely used commercially.

Furthermore, CII is primarily meant to measure and increase vessels' operational efficiency. CII reporting requirements do not require nor directly incentivise fuel switching, as operational efficiency measures are often easier and less costly to implement. Using low-emission fuel positively contributes to a vessel's CII rating, but it is difficult to separate the contribution of efficiency measures from fuel use.

Because the CII regulation is due to be revised in the coming year, and its current form does not include an enforcement mechanism, taking a position on CII additionality now would be premature.

**In its current form, the CII regulation imposes no concerns or restrictions concerning additionality. This position paper does not, therefore, take a position regarding the additionality of fuel used in the context of CII.**

We defer the revision of this position to after the CII has been revised at the IMO if there is better clarity on the scope and implications of the regulation.

## Conclusion

The maritime regulatory landscape to tackle shipping emissions and fuel use is rapidly evolving, with further developments anticipated in the coming years. These regulations ultimately seek to decarbonise the industry by accelerating the uptake of low-carbon fuels and phasing out fossil fuels. Such emerging policies, which are progressively being implemented by the IMO and local and regional regulators such as the European Union, can be complemented by voluntary actions from companies willing to pay a premium for low-emission transportation solutions.

While companies are subject to tighter regulation, they may still seek to reduce their emissions beyond what is required by monetising low-emission transportation solutions on the voluntary market, such as through book and claim systems.

In the absence of unified international standards, defining and applying additionality principles to FuelEU Maritime, EU ETS, and the CII is key to conserving the credibility of these voluntary systems. The proposed approaches to additionality presented here are designed to be pragmatic and adaptable, with updates anticipated as the regulatory environment continues to evolve.

## About the Global Maritime Forum

The Global Maritime Forum is an international not-for-profit organisation committed to shaping the future of global seaborne trade. It works by bringing together visionary leaders and experts who, through collaboration and collective action, strive to increase sustainable long-term economic development and human well-being.

Established in 2017, the Global Maritime Forum is funded through a combination of grants and partner contributions. It operates independently of any outside influence and does not support individual technologies or companies. Most of its roughly 45-person staff is based in the organisation's headquarters in Copenhagen, Denmark.

Learn more about the Global Maritime Forum at [www.globalmaritimeforum.org](http://www.globalmaritimeforum.org).

## About the Mærsk McKinney-Møller Centre for Zero Carbon Shipping

The Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping (MMMCZCS) is an independent, not-for-profit research and development center established in 2020 with funding from the A.P. Moller Foundation. Our purpose is to guide and accelerate decarbonization of the global maritime industry.

This complex challenge requires unprecedented collaboration across sectors, industries, and geographies. Working with our partners, governments, authorities, public sector bodies, scientists, and organizations across the global maritime industry we aim to inform, de-risk decision-making, and spark real climate action.

We are technology agnostic and have no vested interest in specific decarbonization solutions. We explore free of commercial considerations and independent of partner strategies. As a result, we deliver independent analyses of how the transition is progressing and clear, data-driven recommendations for accelerating maritime decarbonization. On top we are maturing solutions to the most pressing problems across the maritime value chain, from fuels to onboard solutions, regulations, and financing.

Strategic Partners to the Center include: Alfa Laval, American Bureau of Shipping, A.P. Moller - Maersk, bp, Cargill, CF Industries, Equinor, DP World, Hapag-Lloyd, MAN Energy Solutions, Mitsubishi Heavy Industries, Mitsui, NORDEN, NYK Line, Rio Tinto, Royal Caribbean Group, Seaspan Corporation, Siemens Energy, Stolt Tankers, Sumitomo Corporation, Swire Group, TOPSOE, TotalEnergies and V.

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