



coZEV

ROADMAP to 2040

How Cargo Owners can Work Together to Accelerate the Transition to Zero Emission Shipping through Cargo Owners for Zero Emission Vessels

Maritime shipping is a global industry essential to trade and economic development around the world. Like all industries, the maritime sector must quickly get on a pathway to dramatically reduce and, in the coming decades, eliminate its greenhouse gas emissions in order for society to reach global Paris Agreement climate goals.

Shipping is often characterized as a hard-to-abate sector because of the cost and complexity of transitioning to scalable zero-emission (ZE) fuels and technologies.¹ In order to enable a ZE transition to unfold at the pace consistent with the Paris Agreement (Figure 1), actors across the maritime value chain must come together, supported by policy, to quickly align incentives and share the cost and risk of this massive clean energy transition in shipping.

Through Cargo Owners for Zero Emission Vessels (coZEV) climate-leading cargo owner companies are coming together to do their part. coZEV is a platform for high impact initiatives that accelerate the transition to ZE maritime shipping.

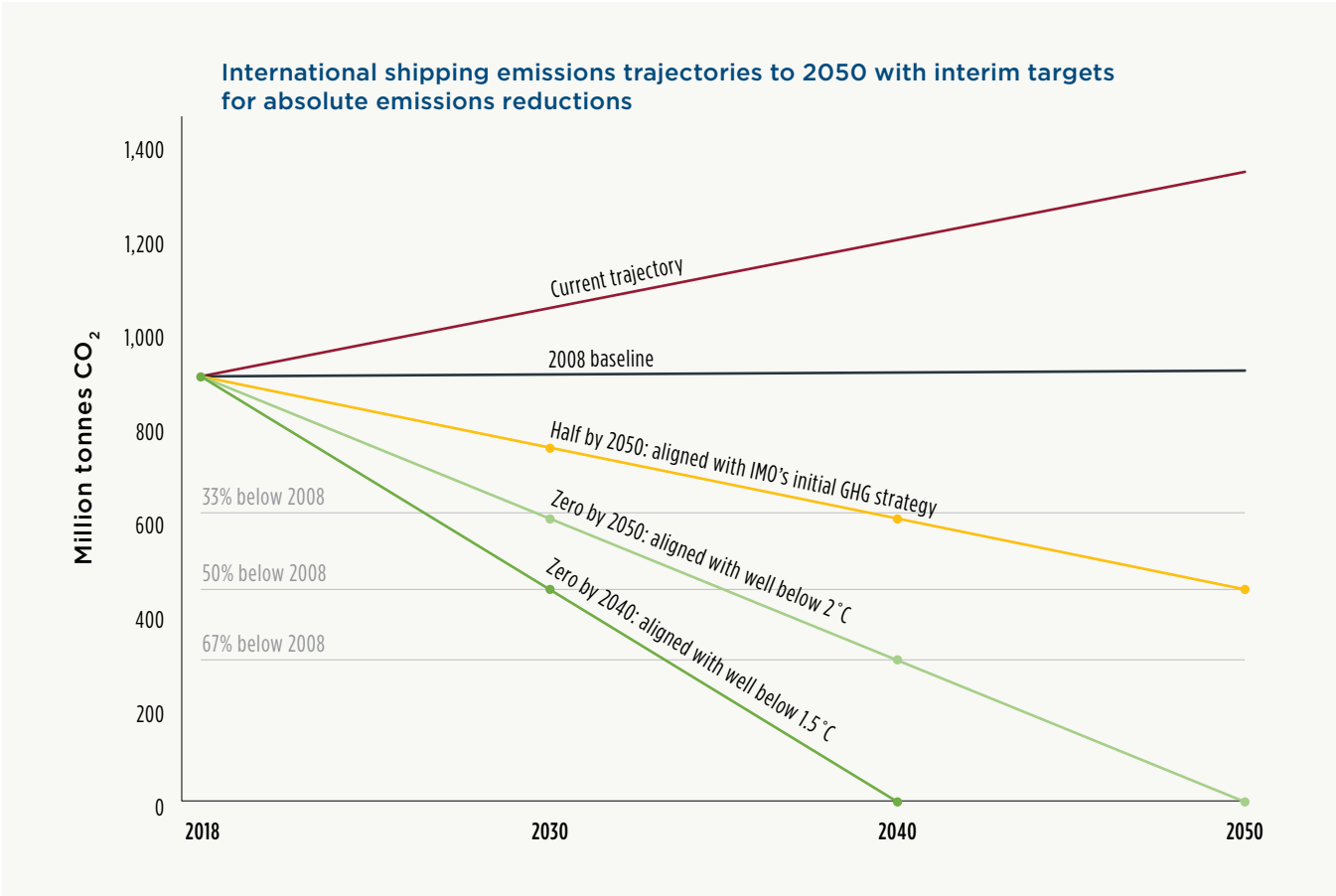


FIGURE 1: International shipping emissions pathways consistent with the Paris Agreement temperature goals require emissions from the sector to fall by one-third or one-half by 2030 and to be zero by 2040 or 2050, depending on alignment with 1.5° or 2° trajectory. Source: *The International Council on Clean Transportation*.

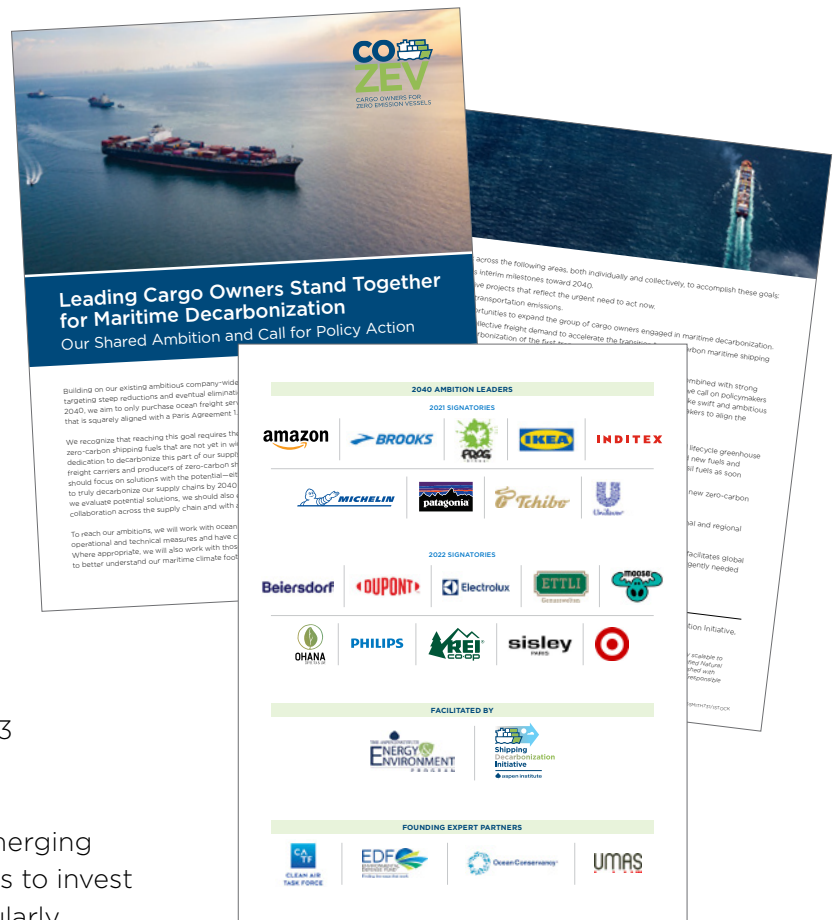
¹ A Strategy for the Transition to Zero-Emission Shipping (Getting to Zero Coalition/UMAS) defines zero-emission fuels as ‘fuels that have the potential to achieve near-zero GHG emissions on a lifecycle basis, while also scaling production in line with the pace of the transition.’

coZEV 2040 Ambition Statement

In October 2021, an initial group of nine climate-leading companies released the coZEV 2040 Ambition Statement in which they announced their ambition to only use zero-carbon² ocean shipping services by 2040 and called on policymakers for support to catalyze a scalable and economically viable industry transformation. In September 2022, coZEV announced ten additional signatories to the 2040 Ambition Statement, more than doubling the number of companies in less than a year and further sending a clear signal of urgency and growing momentum for change among maritime freight buyers. The number of companies engaged in maritime decarbonization efforts is anticipated to grow in the coming years as corporations strive to rapidly reduce Scope 3 emissions across their supply chains.

The 2040 Ambition Statement signals an emerging business case for maritime value chain actors to invest in scalable ZE fuels and technologies, particularly those capable of achieving full maritime industry decarbonization on a Paris-aligned trajectory. In response to this growing demand signal, in 2022, several major carriers announced increasingly ambitious climate commitments of their own, along with new orders for dual-fuel ships that are capable of using ZE fuels. Producers of lower emission alternative fuels also announced their intention to significantly ramp up production capability over the coming years.

These are important building blocks for progress, but a number of key elements must still fall into place. Among them are (1) concrete ZE fuel offtake and utilization by carriers, underpinned by cargo owner demand for ZE solutions and (2) policy support that will bolster ZE fuel competitiveness, production, and utilization at a vast global scale.



2 By zero-carbon fuels, the coZEV 2040 Ambition Statement clarifies that “we mean fuels that have zero greenhouse gas emissions on a lifecycle basis, are sufficiently scalable to decarbonize the entire shipping industry, and for which safety and land use concerns have been addressed. Liquefied Natural Gas does not meet these criteria. Leading analysts have determined that our goals are most likely to be accomplished with hydrogen-based fuels. Global fuel standards that address environmental and social impacts and promote ethical/responsible sourcing of zero-carbon fuels are needed to support informed decision making.” Note that while the coZEV 2040 Ambition Statement used the term “zero carbon” based on the above definition, we will be using the term “zero emission” throughout this document for consistency.

Next steps toward the 2040 ambition



Cargo owners that rely on maritime shipping have a clear stake in the transition to ZE shipping: their businesses depend on reliable and affordable maritime transport while many of them are also striving to meet society's corporate responsibility expectations and achieve their own ambitious corporate climate goals. This is certainly true of 2040 Ambition Statement signatories, but also applies to a broader group of cargo owners working to reduce their supply chain emissions. Active engagement in the maritime sector's transition to ZE fuels and technologies is a natural step to ensure climate-leading cargo owner interests are accounted for as the ZE transition unfolds in the coming years. While many aspects of the ZE maritime transition are out of most cargo owners' direct control³, there are several areas of engagement that can result in significant positive impact for both the climate and business in the long run.

In order to facilitate that engagement, coZEV plans to launch a new series of action areas in 2023 that aim to pull the main levers available to climate-leading cargo owner companies to drive change in the sector. These two action areas are:

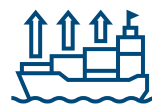
Catalyzing the first commercial offerings of ZE shipping through:

- Formation of a new maritime freight buyers alliance that will bring ZE demand to market
- Supporting green shipping corridors through a cargo owner advisory board



Fostering the economic viability and scaling of ZE shipping solutions through:

- Formation of a new policy coalition of climate-leading cargo owners organized around Paris-aligned policy goals

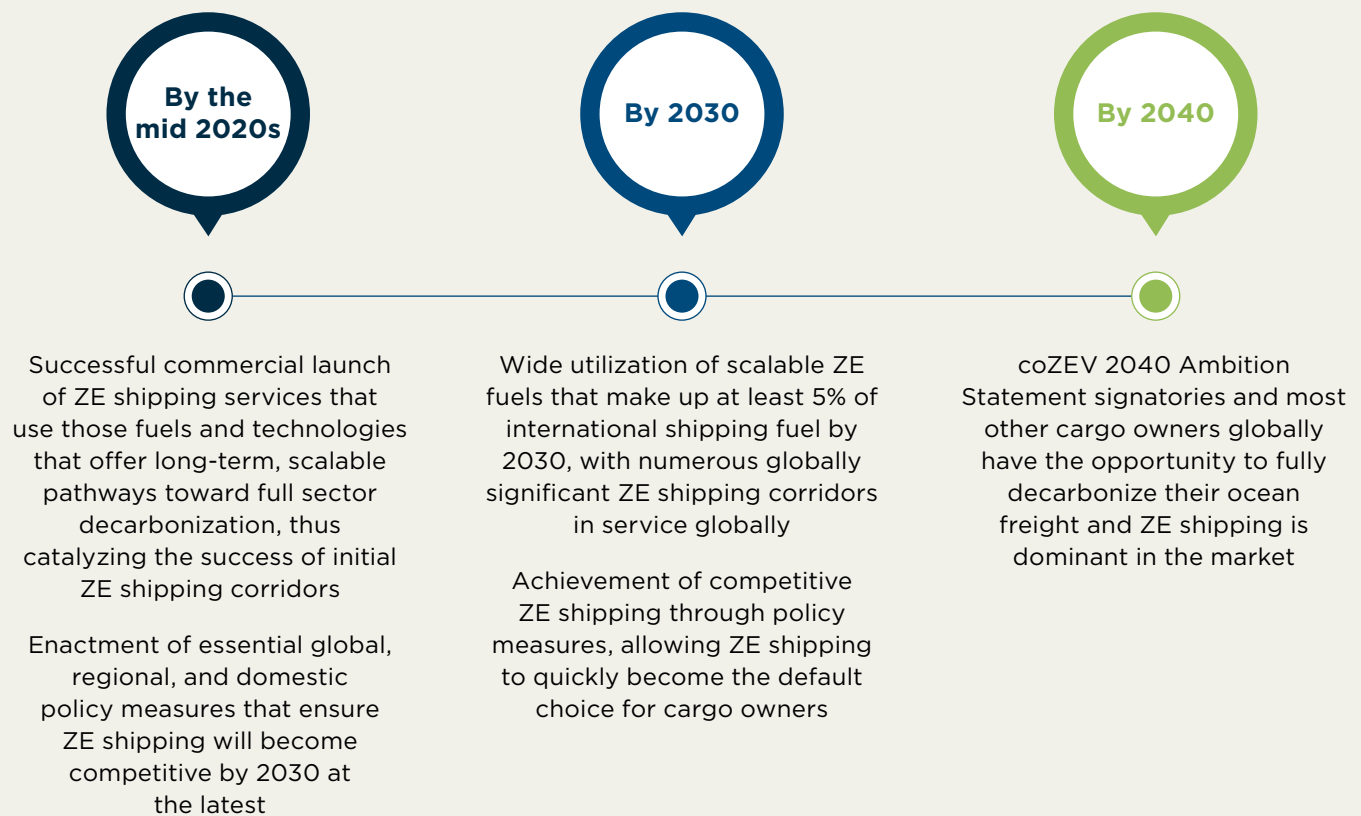


³ While cargo owner demand is a crucial part of demonstrating the business case for the transition to zero emission fuels and technologies, cargo owner action alone cannot facilitate this transition. Other key aspects that will impact the speed and scale of the transition to zero emission shipping include investment in port infrastructure upgrades (e.g., shore power capabilities, ZE fuel bunkering facilities), retrofits and orders of new build ships capable of running on ZE fuels, maritime lending requirements and alignment of portfolios with Paris Agreement goals, and the production and scaling of new ZE fuels, etc.

In order to succeed in these areas, coZEV will also:

- **Develop new mechanisms to publicly recognize companies for their leadership in supporting ZE shipping.**
- **Continue to grow the number of cargo owners involved with coZEV to further demonstrate the business case for investing in ZE shipping, support economies of scale, and maximize cargo owner impact in the policy arena.**

If concerted cargo owner engagement is coupled with bold action from across the maritime value chain, including strong support from policymakers, coZEV envisions achievement of the following milestones



The new coZEV action areas outlined in this Roadmap will enable cargo owners to support achievement of these milestones directly, recognizing that their ambition and action must be met by strong investment and policy action across the full maritime sector.

CATALYZING THE FIRST COMMERCIAL OFFERINGS OF ZERO EMISSION SHIPPING



Zero Emission Maritime Buyers Alliance

In the coZEV 2040 Ambition Statement, climate-leading cargo owners set an ambition to only use ZE shipping by 2040. As demonstrated by the s-curve modeling in [Figure 2](#), commercial adoption of new ZE fuels must begin by the mid-2020s in order for full sector decarbonization by 2050 to be feasible and for cargo owners to have access to sufficient capacity of economically competitive ZE shipping by 2040.

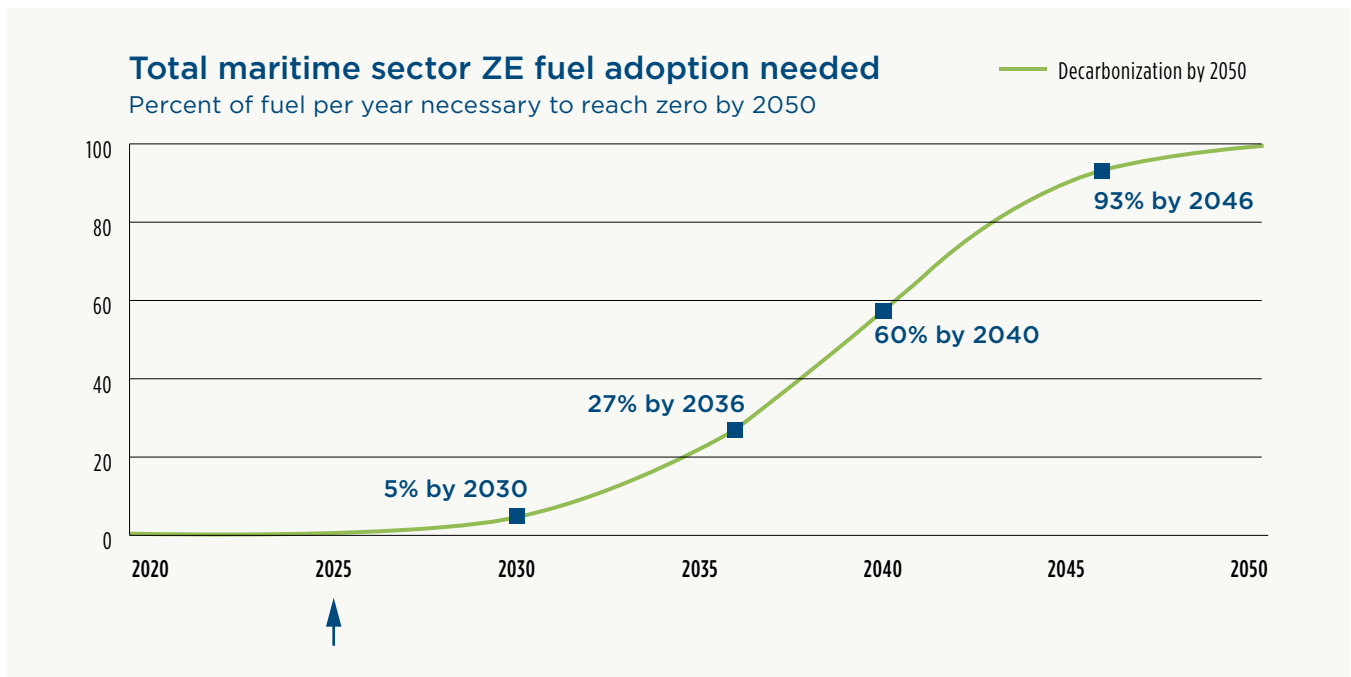


FIGURE 2: To enable full maritime sector decarbonization by 2050 at the latest, S-curve based analysis shows that zero emission fuels need to make up five percent of the international shipping fuel mix by 2030 for all segments of shipping, including, for example tankers, bulk, container, etc. This graphic shows that commercial adoption of ZE fuels must begin in the mid-20s, as well as the necessary fuel adoption rate in various years on the way to complete decarbonization by 2050. Source: COP26 Climate Champions, UMAS, Global Maritime Forum.

Among the challenges to transitioning the maritime sector to ZE shipping, actors across the value chain are concerned about the risk involved in investing in new fuels and technologies. Specifically they are unsure of:

- Whether end customers (cargo owners) will support new ZE service offerings.
- When their competitors will make similar investments.
- In which direction future regulation will push the market.

Cargo owners can help build confidence among maritime stakeholders by addressing the need for sufficient committed demand to kickstart the transition and help anchor the business case for a new ZE shipping value chain. That being said, cargo owners cannot be expected to bear the cost of this

transition alone, and need a purpose built mechanism to enable sharing of risk and cost across the value chain. This mechanism should not only combine enough committed ZE demand from cargo owners to build supplier confidence in investment, it should also foster competition among suppliers to encourage economic viability, and give confidence to policy makers to support a budding ZE market.

To meet this need, coZEV is establishing a new, first-of-its-kind buyers group within the maritime sector, the Zero Emission Maritime Buyers Alliance (ZEMBA). The aim of ZEMBA is to accelerate commercial deployment of zero-emission shipping, enable economies of scale, and maximize cargo owners' collaborative emissions reduction potential beyond what any one freight buyer could accomplish alone. ZEMBA will accomplish these goals by stimulating investment in ZE solutions.

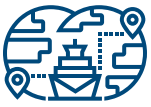
In 2023, next steps envisioned for ZEMBA include:

- Welcoming an inaugural group of freight buyers to join ZEMBA as co-founders and members.
- Announcing the members' total demand for ZE ocean shipping with an associated goal for avoided greenhouse gas emissions.
- Facilitating a competition law compliant process to attract ZE cargo services for ZEMBA member companies by the mid-2020s.

ZEMBA will consider its mission accomplished when ZE shipping has become competitive with high-emission, traditional fossil-based shipping. Until that time, a coordinated effort among cargo owners through ZEMBA is necessary to maximize avoided emissions, solidify the business case for service providers, encourage competition, support economies of scale, and give confidence to policy makers, lenders, and others to do their part in bringing down the cost of ZE shipping and creating a robust marketplace for long-term, scalable ZE solutions.

Cargo owners interested in leading an accelerated transition to zero-emission shipping are invited to learn more and join ZEMBA.





Green Corridor Advisory Board

A growing movement is emerging for the establishment of “green” or ZE shipping corridors.⁴ The ambition of these cross-value chain collaborations is to jumpstart the ZE energy transition in shipping by concentrating policy, investment, and infrastructure development in specific geographical locations where key actors are ready and willing to act. These engagements typically involve ports, vessel owners and operators, cargo owners, fuel producers, and policymakers, among others key actors across the shipping value chain. Through green shipping corridors, stakeholders can align private investment through chains of offtake agreements on a manageable scale and demonstrate the technical and commercial viability of ZE shipping.

Climate-leading cargo owners can accelerate the ZE transition by providing support to green shipping corridor efforts that maintain Paris-aligned ambition. Cargo owner input during the development of these efforts is also essential to ensure they will meet the needs of their businesses. However, with a growing number of green shipping corridor projects around the world, cargo owner capacity to engage in each individual corridor effort separately may become constrained.

Therefore, in 2023, coZEV will develop a green corridor advisory board to allow green corridor collaborations around the world to efficiently connect with and gather input from cargo owners in the course of development and implementation of plans and projects. Through the advisory board, cargo owners will be able to stay updated about progress and provide input to the creation and implementation of these green corridor efforts.

While trans-oceanic green corridor routes are of particular importance to cargo owners that ship goods globally, the advisory board will also be interested in regional or local green corridor initiatives. These localized routes can pilot ZE fuels and technologies, which can then be scaled for use on longer routes.



FIGURE 3: Major routes of the global merchant fleet, color-coded by vessel types: container, dry bulk, tanker, gas bulk, and vehicles. Source: www.shipmap.org, Website – Duncan Clark & Robin Houston from Kiln, Data – Julia Schaumeier & Tristan Smith from UCL Energy Institute.

⁴ Green corridors are defined as specific trade routes between major port hubs where zero-emission solutions have been demonstrated and are supported, according to the Getting to Zero Coalition’s recent report, *The Next Wave*.

FOSTERING THE ECONOMIC VIABILITY AND SCALING OF ZE SHIPPING SOLUTIONS THROUGH POLICY ACTION AT THE GLOBAL, REGIONAL, AND DOMESTIC LEVELS

Climate-leading cargo owners can show their demand for ZE shipping services by making strategic investments in ZE shipping projects through ZEMBA and taking part in cross-supply chain collaboration through green shipping corridors, as described above. However, these actions alone are not enough to fully decarbonize the shipping sector. Cargo owner ambitions must be matched by bold policymaker action.

Robust policy support and regulatory action at the global, regional, and domestic levels is needed in order to foster a ZE transition that:

- Is economically feasible at scale for cargo owners and other value chain actors.
- Builds confidence to stimulate necessary investment in zero emission fuels, vessels, and supporting infrastructure.
- Is globally equitable.

Unfortunately, current policy measures are not yet sufficiently ambitious to support Paris Agreement 1.5°C-aligned decarbonization of the shipping industry.



coZEV Policy Goals and Formation of New Cargo Owner Policy Coalition

Climate-leading cargo owners have a vested interest in ensuring that the transition to ZE shipping is smooth, fast, and economically viable. Policymakers and regulatory bodies must act now to establish clear targets and policies that build confidence and provide unequivocal, implementable, and equitable pathways to fully decarbonize shipping in line with the Paris Agreement 1.5°C trajectory. Therefore, starting in 2023, coZEV policy-related efforts will focus on two important, initial goals:

- 1. Enacting global and domestic policies by 2025 that directly and indirectly incentivize ZE shipping to become commercially viable by 2030 or before, including policies that close the cost and supply gap between scalable ZE fuels and high-emission fuels.**
- 2. Ensuring adequate investment in infrastructure needed for widespread adoption of ZE shipping.**

To accomplish these goals, the following elements will also need policymaker attention:

- Enabling successful green shipping corridors.
- Promoting workforce development and retraining for work with ZE fuels and technologies.
- Improving maritime emissions transparency.
- Continuously increasing and improving energy efficiency requirements.
- Establishing standards for lifecycle assessment, fuel certifications, and safety, among others.
- Bolstering the supply of renewable energy necessary as a feedstock for sustainable ZE shipping to rapidly come to scale.

In 2023, coZEV will form a new cargo owner policy coalition with the aim to inform decision makers about strategies and policy measures needed to achieve these goals. Primary decision-making venues of focus will include the International Maritime Organization, United States, and the European Union.

ADDITIONAL AREAS OF FOCUS

In addition to the main action areas detailed above, coZEV will initiate new efforts in 2023 to recognize climate-leading cargo owners who take catalytic actions. coZEV will also continue efforts to grow the number of cargo owners participating in all action areas outlined in the 'Roadmap to 2040'.

In 2023 and beyond, this will include:

- Piloting a ZE shipping “deal tracker” to recognize cargo owner companies for investment and associated emissions avoided as they support shipping services that offer significantly lower emissions than traditional bunker fuels, and eventually ZE shipping service offerings when those become available in the marketplace.

This deal tracker will publicly acknowledge climate-leading companies for their concrete investments in maritime emissions reduction. The publicity will encourage interest in making such investments among new companies. If the pilot is successful, the “deal tracker” would become a longer term coZEV action area, until ZE shipping becomes the new normal and tracking of such activity is no longer needed.

- Continuing to grow the number of cargo owners involved with coZEV action areas to demonstrate the growing business case for investing in zero emission shipping. After two successful rounds of adding signatories to the coZEV 2040 Ambition Statement in 2021 and 2022, growing the number of signatories to the statement will continue to be a focus for coZEV. By the end of 2023, coZEV aims to again double the number of signatories to the 2040 Ambition Statement.

Increasing the geographic and sectoral diversity of cargo owner companies involved with coZEV will be a priority, whether those companies engage as signatories to the coZEV 2040 Ambition Statement or through the other action areas described in this Roadmap.

Conclusion and Next Steps

The launch of coZEV in October 2021 and the growing size and influence of the initiative in 2022 has demonstrated that “the customer is always right”, even when it comes to decarbonization of hard-to-abate sectors such as maritime shipping. Through coZEV, climate-leading cargo owners have begun to show to the rest of the maritime value chain and the world that decarbonizing the sector is not only imperative for achievement of the Paris Agreement goals, but that it also makes business sense.

In 2023, coZEV is excited to grow the menu of action areas for cargo owners to get engaged, and the number of companies that collaborate to drive change. Through the actions outlined in this Roadmap, coZEV will help cargo owners ensure that the maritime sector is on track to enable them to meet their climate ambitions in a way that works for both businesses and the planet, on which we all rely for our livelihoods and indeed our very lives.

About Aspen Institute



Aspen Institute is a global nonprofit organization committed to realizing a free, just, and equitable society. Founded in 1949, the Institute drives change through dialogue, leadership, and action to help solve the most important challenges facing the United States and the world. Headquartered in Washington, DC, the Institute has a campus in Aspen, Colorado, and an international network of partners. For more information, visit www.aspeninstitute.org.

The Aspen Institute Energy and Environment Program's Shipping Decarbonization Initiative (SDI) is partnering with leading organizations and companies from around the world, tapping into a vast network to drive the transition to zero emission maritime shipping and decarbonize one of the most important sectors of the global economy. Aspen SDI is convening multinational cargo owners to accelerate shipping decarbonization, elevating the need for shipping decarbonization within the U.S. policy context, and advancing the establishment of zero emission transoceanic maritime transport corridors.

About coZEV



Cargo Owner for Zero Emission Vessels (coZEV) is a platform for climate-leading, multinational companies to come together for high impact initiatives that accelerate the transition to zero emission maritime shipping. It is facilitated by the Aspen Institute with support from a range of non profit experts and partners. For more information, visit www.coZEV.org.

Thanks to the following partners for their input toward the shaping of these action areas:

Alexander Hüser, Blue Crab Strategies, Clean Air Task Force, Climate Change High-Level Champions, C40 Cities, Environmental Defense Fund, ESP Advisors, Global Maritime Forum, Jean-Yves Rotte-Geoffroy, Lloyd's and the Lloyd's Register Maritime Decarbonisation Hub, Ocean Conservancy, Opportunity Green, Pillsbury Winthrop Shaw Pittman, Smart Freight Centre, Stephenson Harwood, University Maritime Advisory Services (UMAS), and UN Foundation, with generous support from the ClimateWorks Foundation.

With sincere gratitude to our cargo owner partners, without whose dedication, hard work, creativity, and spirit of collaboration none of this work would be possible.

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