

RioTinto

Marine Decarbonisation





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Introduction

Laure Baratgin
Head of Commercial Operations
Rio Tinto



The pressure is on for the shipping industry to decarbonise. It currently contributes around 3% of the world's carbon footprint, and would be the *world's sixth-biggest greenhouse gas emitter*, if it was a country.

The industry needs to fast-track decarbonisation today for a net zero tomorrow.

However, as a hard-to-abate sector, decarbonising the shipping industry will be expensive, especially in the absence of globally harmonised regulations and supportive policy measures, making this task a monumental one.

True progress calls for shared responsibility, collective action, and close cooperation. *Every stakeholder in the value chain needs to play their part.*

As the largest dry bulk shipper in the world, Rio Tinto is uniquely positioned to reduce overall maritime emissions and to partner with industry stakeholders in accelerating this journey.

While shipping currently accounts for just over 1% of our Scope 1 and 3 emissions, we know the actions we take can inspire and drive change in the industry.

We have set our sights higher than IMO's Initial Greenhouse Gas target, which looks to reduce the industry's carbon intensity by at least 40% by 2030, compared to 2008. We are now well on our way to achieving this by 2025 – five years ahead of IMO's timeline.

Our goal is to also achieve net zero emissions from the shipping of our products by 2050. Accomplishing this positions us as the best operator for companies looking for partners that are good for both people and the planet.

You will find in this document a snapshot of how we plan to get there: our strategic initiatives and the actions we are taking to chart the course of our decarbonisation journey, with safety¹ remaining top of mind. A key part is working with industry partners to explore different end-state fuel options.

In our journey, we have found there is no silver bullet to shipping decarbonisation – at least for now. But what is clear is that unity and collaboration in the industry is the key to unlocking shipping's transition towards net zero. *All hands need to be on deck to galvanise change.*

Achieving net zero is the grand challenge of our time. Let us all come together – industry players, governments, and customers – to work towards this goal. At the end of the day, achieving net zero future for shipping is not just about complying to IMO's targets or safeguarding our industry competitiveness. It is about protecting the environment for future generations.

¹ To learn more about our strategy to uplift safety and welfare outcomes, visit <https://www.riotinto.com/Operations/marine>

Our Shipping Operations



As the largest dry bulk shipper in the world, Rio Tinto's Marine team plays an integral role in our business. Our fleet connects our products with the global economy, moving a range of commodities – including iron ore, bauxite and minerals – across multiple continents.

Our scale puts us in a unique position to lead and influence the industry's climate commitments. Recognising this, we have placed the transition to low carbon at the heart of our business strategy.

Our shipping operations

17

owned vessels

230

chartered vessels

2,700

voyages each year

>300 million

tonnes of products
carried each year

Our carbon impact (2022)

7.8 Mt CO₂

emissions from bulk maritime
shipping of our products

0.5 Mt CO₂

Scope 1 emissions from
17 owned vessels

5.1 Mt CO₂

Scope 3 emissions from
230 chartered vessels

2.2 Mt CO₂

Scope 3 emissions from
customer-managed freight

First Movers Coalition



We joined the [First Movers Coalition](#) (FMC) in September 2022. A global initiative led by the World Economic Forum, the FMC is a coalition of companies using their purchasing power to create and commercialise innovative zero-carbon technologies across eight sectors, including shipping.

Through our membership, we committed to the ambitious targets that have been set for the shipping sector: at least 5% of our owned vessels and 10% of time charters will be powered by zero-emission fuels by 2030, on the way to 100% by 2040 for both.

We support the development of new technologies that help power our way to a net zero future. This includes having vessels capable of running on net zero-emissions fuel in our shipping portfolio by 2030². To learn more about FMC and what Rio Tinto will be doing in its commitment to the FMC pledge, click [here](#).

² This is subject to the availability of technology, supply, safety standards, and the establishment of reasonable thresholds for price premiums. Targets are only applied to vessels operationally within RT control, i.e., owned vessels only for Carrier and time charters only for Cargo Owner.

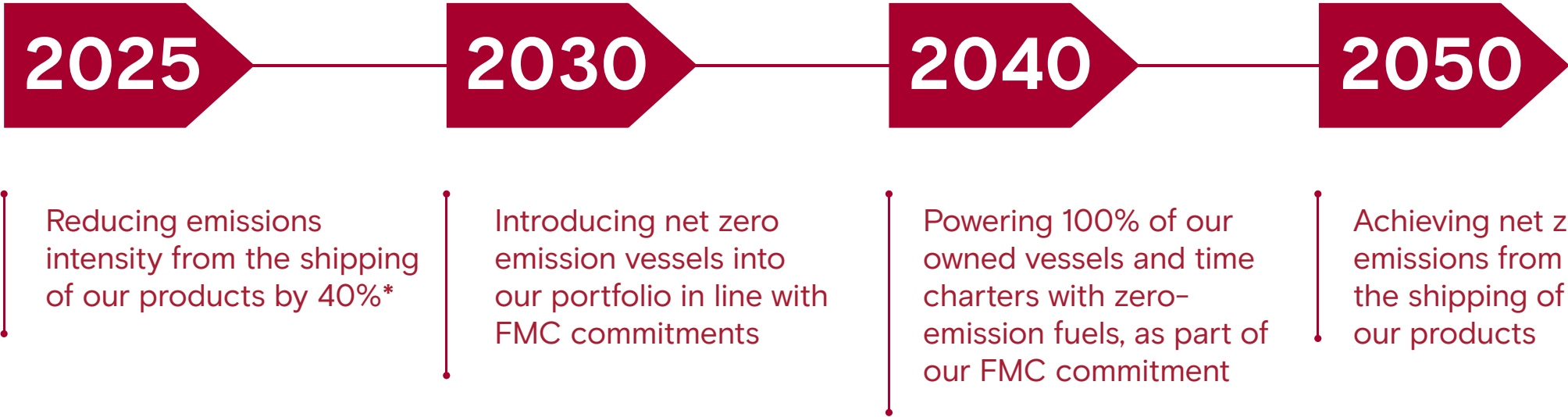


An aerial photograph of a coastal industrial facility, likely a port or refinery. The facility includes a large pier with a red crane, several green storage tanks, and a breakwater extending into the ocean. The surrounding area is lush green, and the ocean is a deep blue. The text "Our commitment: Shipping decarbonisation" is overlaid in the top right corner.

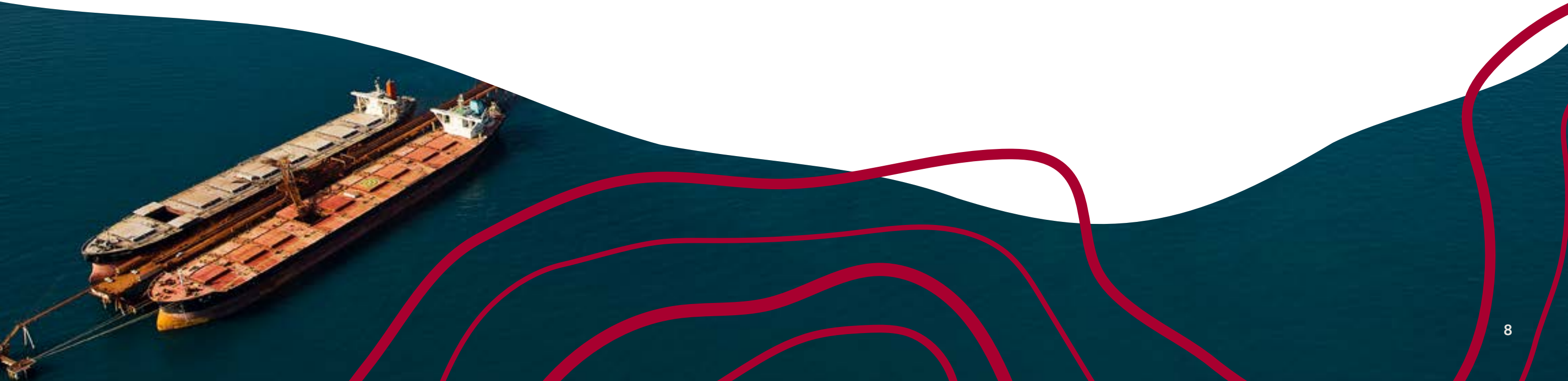
Our commitment: Shipping decarbonisation

We recognise the urgency to accelerate shipping decarbonisation.

As part of our commitment to a net zero future, we have mapped out key sustainability milestones and targets over the next few decades.



*relative to IMO's 2008 baseline



Our pathways to net zero



Three strategic pillars towards net zero

There is no silver bullet to decarbonising shipping – the way ahead requires multiple pathways. Our decarbonisation journey focuses on *three key pillars*, with *partnerships and regulation as key enablers*:



Fuel Efficiency

Improving fuel efficiency through optimising our vessel operations and advancing technical solutions



Transitional Fuels

Delivering short-to-medium term carbon emission reductions through LNG and biofuels



End-State Fuels

Partnering with industry and value chain to support regulation and development of end-state fuel solutions



Fuel Efficiency

We can reduce emissions faster by ensuring our ships use less fuel in the first place. Every drop of fuel saved reduces both fuel costs and emissions. To date, through various fuel efficiency measures, we have achieved over *30% intensity reduction in the use of conventional fuels* from an IMO 2008 baseline across our owned and chartered fleet.

Our approach to fuel efficiency is two-pronged:

Operational measures

We have implemented operational efficiency measures such as the use of *data and digital tools to optimise speed, on-board energy management, and routing according to the weather.*

We are also deploying *larger and more efficient vessels* in our trades and ensuring *integrated scheduling optimisation*. Together, these operational measures will help us exceed IMO's 2030 targets of a 40% intensity reduction by 2025.

Technical solutions



Between 2022 and 2024, we will be *modifying our owned vessels* to reduce emissions by at least another 10% on our owned fleet. These enhancements include applying *high-performance paints* to reduce friction, *modifying propellers* to improve propeller efficiency, and *installing swirl ducts* to streamline water flow. We will also continue to work with our shipowners to improve the technical efficiency of our chartered vessels and test innovative new solutions.

We have also crowdsourced new ways of improving our vessels' efficiency through the *Pioneer Portal Marine Challenge*, launched in 2022. Submissions included hull-lubricating bubble technology, a shaft generator which produces auxiliary power from propeller shaft rotation, a wind-harnessing rotor, and fixed sails that could supplement fuel use and change the look of cargo shipping in the future.



Transitional Fuels

The transition from conventional to environmentally friendlier marine fuels is complex. In the meantime, we are focused on *transitional fuels like liquefied natural gas (LNG) and biofuels*. These are lower in carbon emissions than traditional marine fuels and, crucially, are available today. While unlikely to drive the long-term net zero transition, these fuels can *deliver tangible near- to mid-term carbon reductions*.

Dual-fuel vessels

The uptake of LNG is accelerating across the industry. A cleaner-burning fuel, LNG can be used to replace very low sulphur fuel oil, delivering a *15-20% lifecycle carbon reduction* with high pressure engines onboard. This also enables the virtual *elimination of sulphur oxide and up to 80% of nitrous oxide emissions*.

LNG plays a key role in achieving our target of reducing shipping emission intensity by 40% by 2050. From January 2023, we have started the process of *introducing nine Newcastlemax LNG dual-fuel vessels* to our chartered portfolio. These vessels can operate on both conventional marine fuel and LNG, providing flexibility to our portfolio as not all ports have LNG supply available or at a cost competitive rate today. These dual-fuel vessels also have the option of switching to bio-methane or e-methane, if and when these become available and cost-efficient.

Biofuel trial

In March 2022, we launched one of the *industry's longest biofuel trials with bp*. As part of this trial, we used a B30 biofuel blend of vegetable oils (excluding palm oil or palm oil residues), waste oils, and animal fats on our owned vessel RTM Tasman for a year, as she travelled through Transatlantic and Atlantic-Pacific routes.

The B30 biofuel blend can reduce the lifecycle of carbon emissions by 26% and a long duration trial allowed us to properly assess the potential role of biofuels in our future. We are now exploring additional deployment opportunities, but recognise that the availability of biofuel may be challenged, in part due to competition from other sectors.



End-State Fuels

To achieve our 2030 and 2050 goals, our core focus is on end-state fuels. Cross value-chain partnerships between the industry and the public sector will be critical in establishing regulatory support and alignment, and in the scalable development and safe use³ of these net zero fuels.

Scaling green methanol production



Green methanol is advanced as a maritime fuel, with methanol engines already on the water since 2015. It has handling properties that can be supported by existing bunkering infrastructure, and remains the most credible end-state fuel for the foreseeable future.

However, green methanol faces supply constraints, and requires direct involvement to scale up from its infancy stage to become a viable, sustainable option. Currently, of the total 98 million tonnes of methanol produced globally, *only 0.2 million tonnes is classified as 'green'*⁴. We are exploring industry partnerships, such as with the FMC, to look into improving the accessibility and economic viability of green methanol through aggregated demand.

We also joined global trade association *Methanol Institute (MI)* in 2022, where we work alongside the Institute's members – methanol producers, distributors, and technology providers – to explore the feasibility of cost-competitive fuel sourcing and the potential deployment of methanol dual-fuel vessels.

³To learn more about our strategy to uplift safety and welfare outcomes, visit <https://www.riotinto.com/Operations/marine>

⁴https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Jan/IRENA_Innovation_Renewable_Methanol_2021.pdf

End-State Fuels



Developing ammonia's potential



In comparison, green ammonia is a highly toxic and corrosive gas requiring high pressure or low temperature storage. Currently, there is also a gap in engine design, and clear regulations and guidance for its safe application. Despite these challenges, green ammonia remains a potential end-state fuel. It is likely to have a lower production cost, as nitrogen feedstocks are more readily available and cheaper to obtain than sustainable or renewable feedstock required for green methanol.

To address these challenges, we joined an *industry group led by Japanese general trading corporation ITOCHU* in 2021 to further study the opportunities and challenges of green ammonia as a zero-carbon marine fuel. In January 2022, we also signed a *Joint Development Agreement with ITOCHU, K-Line, NS United and Nihon Shipyard* to develop and design an ammonia dual-fuel bulk carrier and collaborate on the development of the ammonia supply chain.

The Iron Ore Green Corridor



In April 2022, we joined forces with BHP, shipowners, and the Global Maritime Forum to plan the development of the *Australia-East Asia Iron Ore Green Corridor*, one of the largest shipping routes, investigating the demand and supply of green ammonia along the route. Green shipping corridors such as this have the potential to facilitate broader collaboration across the value chain, specifically with governments and regulators, some of which are signatories of the *Clydebank Declaration*, committing to support the establishment of green shipping corridors.

Through the consortium, we will also assess the conditions required to mobilise demand, and feasibly scale net zero carbon emission shipping on the corridor. While the study largely focuses on the deployment of ammonia, we expect to apply some of the learnings towards the deployment of other net zero fuels, such as green methanol.

Industry Players

- Set emissions reduction targets and commitments to a net zero ambition
- Identify and implement efficiency solutions
- Back up pledges with comprehensive sustainability reporting including strategies, GHG emissions reporting, and progress through actions

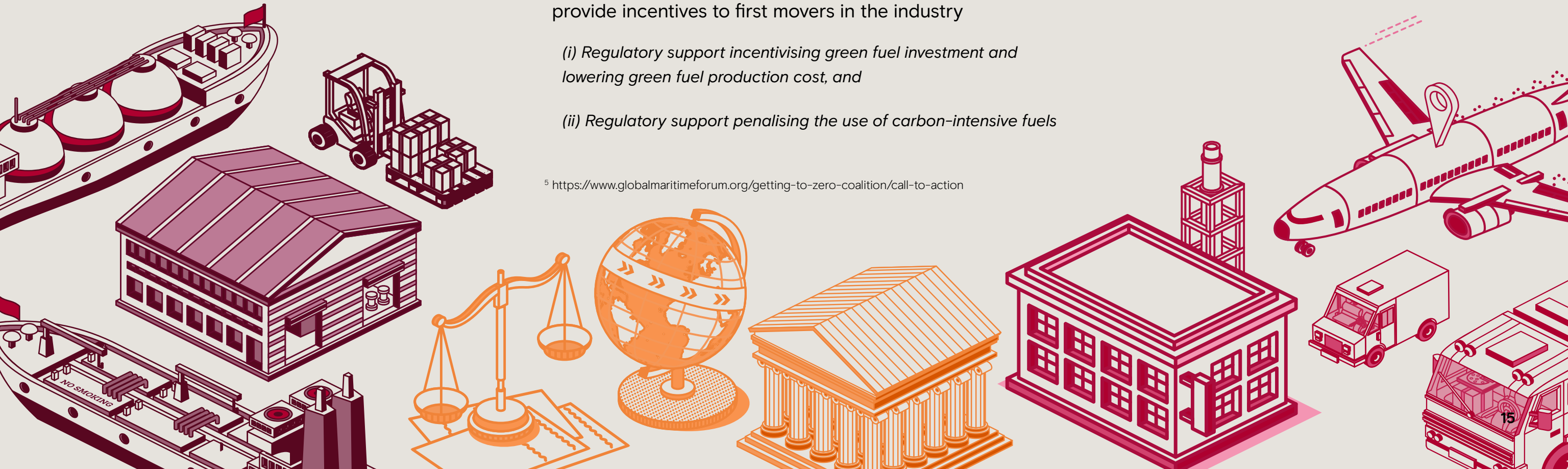
International and Government Regulatory Bodies

- Commit to decarbonising shipping by 2050 and deliver policy measures that will make zero emission shipping the default choice by 2030⁵
- Enforce reporting requirements of climate-related impacts subject to third party auditing aligned to global standards to increase comparability
- Implement taxes or carbon levies on marine fuels, and provide incentives to first movers in the industry
 - (i) Regulatory support incentivising green fuel investment and lowering green fuel production cost, and*
 - (ii) Regulatory support penalising the use of carbon-intensive fuels*

⁵ <https://www.globalmaritimeforum.org/getting-to-zero-coalition/call-to-action>

Customers and Partners

- Commit to working with suppliers who have green, sustainable practices throughout the supply chain
- Actively embark on strategic collaboration such as through value chain partnerships, public-private partnerships, and green corridors
- Purchase products that are shipped sustainably



Our journey so far: Key highlights

2008

Through our three strategic pillars, we are taking ambitious steps in our decarbonisation journey to achieve net zero by 2050.

Established as the *baseline year by the IMO* for its decarbonisation strategy.

As of 2021, we have achieved an estimated *30% intensity reduction* on our owned and chartered fleet against this baseline.

2018

Established the *GHG emissions target baseline*.

2021

Established our *dedicated Marine Climate team*.

Announced our ambition to *introduce net zero-emission vessels* into our fleet by 2030.

Advanced our goal to *reach 40% reduction in shipping emissions* intensity by 2025, five years ahead of IMO's target.

Signed on nine *LNG dual-fuel vessels* to join our chartered fleet, starting from 2023.

2022

Launched one the *industry's longest biofuel trials with bp*, on the RTM Tasman.

Became a strategic partner of the *Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping*.

Joined forces with BHP, shipowners, and the Global Maritime Forum to assess the *Australia-East Asia Iron Ore Green Corridor*.

Signed a *Joint Development Agreement with ITOCHU, K-Line, NS United and Nihon Shipyard* to develop an ammonia dual-fuel bulk carrier.

Joined the *First Movers Coalition* to help commercialise net zero carbon technologies.

**Our collective priority towards a
green shipping future**





We need to act fast

While we are committed to moving quickly to a net zero future, we cannot do it alone.

The sheer scale of this endeavor means not one business or industry player can spearhead marine decarbonisation efforts on its own. All of us – from shippers, ports, financiers, fuel producers, end-product receivers, ship owners to engine manufacturers – have a role to play in achieving our shared ambition.

Industry players need to have time-based goals that we share publicly and hold ourselves accountable to. We need to translate our strategies into action, monitoring and measuring their impact. We need to collaborate on green technology, innovation, and infrastructure, while ensuring safety remains top of mind.

We need greater government support, through *harmonised regulations and policy measures*. While regional measures like the EU Emissions Trading System and Australia's Safeguard Mechanism exist, establishing clear, *global market-based measures* that support a just and equitable transition in the deployment of greener fuels and technologies is vital. We also need to provide incentives for *first movers* and invest to develop and produce economically viable zero-emissions fuels.

Progress is being made. According to the Global Maritime Forum, pilot projects spanning ship technologies to end-state fuels have been increasing across the value chain – from 60 to 106 in 2021, and to 203 in 2022.

Governments have also shown support towards maritime decarbonisation, with countries signing the *Clydebank Declaration* during COP26 to support green shipping corridors, and over 20 green corridor consortia announced at COP27. People and communities are also placed at the centre of climate action, such as the action plan from the *Just Transition Maritime Task Force* focused on the upskilling of seafarers to ensure a safe and inclusive transition.

But more needs to be done, faster.

The Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping found that among 94 of the largest shipowners, *only 35% are aiming to be net zero by at least 2050* or have committed to IMO targets.

This is concerning. It is not enough to meet our net zero targets, and that of the industry's. Join us in uniting the industry through greater collaboration. *United as an industry, we can tackle the greatest challenge of our time and unlock shipping's transition towards a net zero future.*





**Discover our approach to
climate change [here](#).**

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