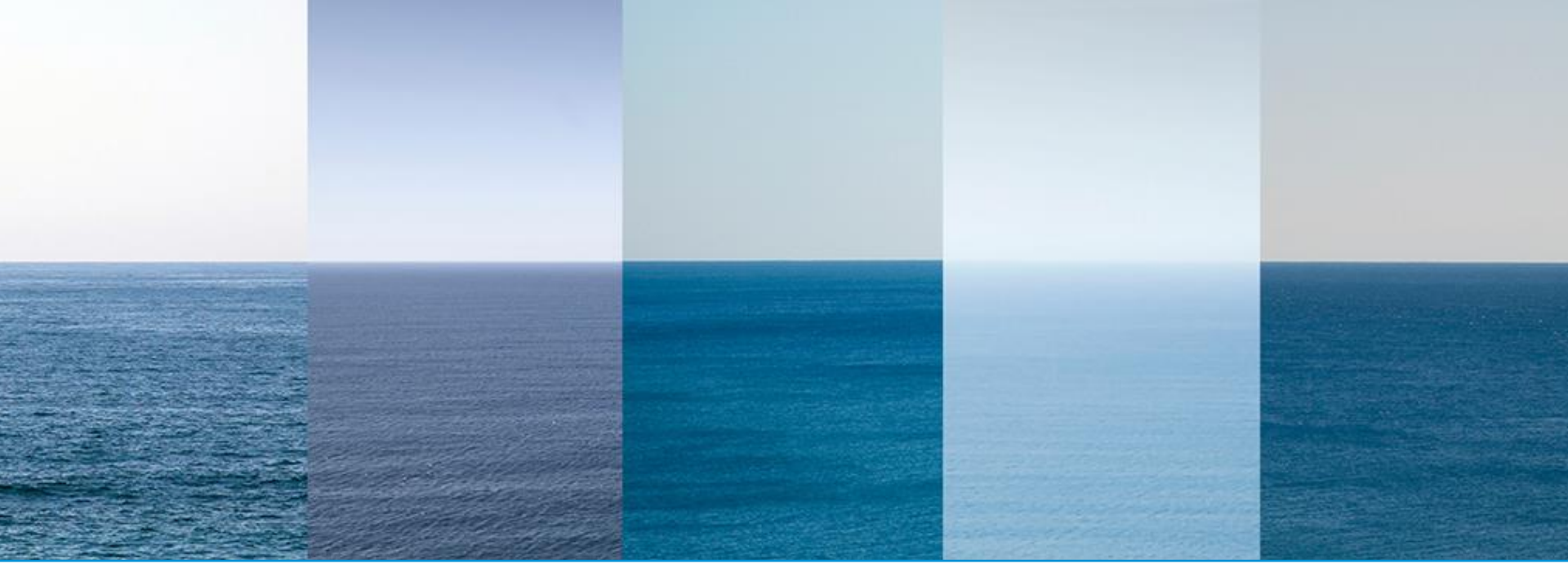

Turning the Tide on Emissions: Innovation in Marine Decarbonisation

Presenter: John Butler CEng FIMarEST

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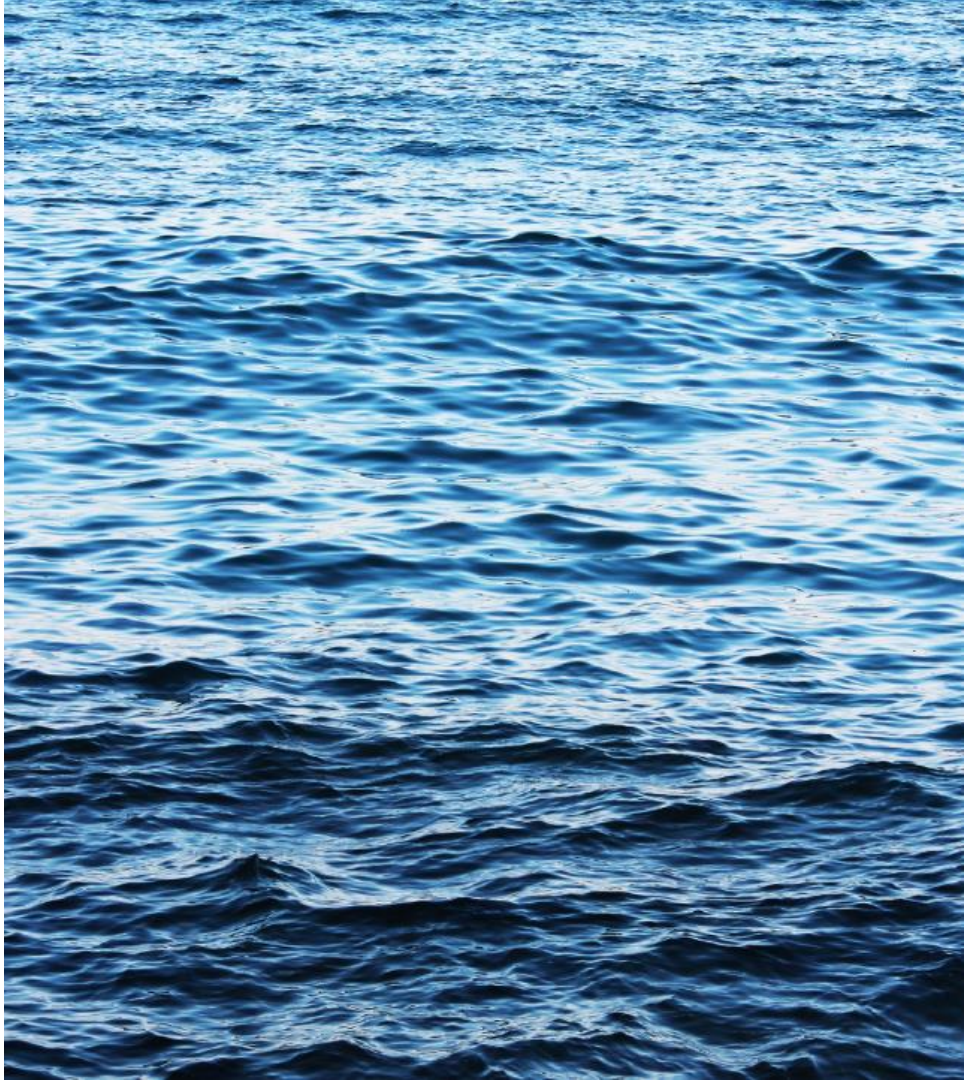
Globally active, locally present.

Contents



Overview

HyWindShips Workshop

- Held during London International Shipping Week at the IMO
- Showcased innovators and disruptors leading maritime decarbonisation.
- The event demonstrated that zero-emission ocean-going shipping is not only possible but already underway.

SHIPZERO30

$H_2 + = 0$

ZESTAs.

What is a HyWindship?

Combining technologies to cross the oceans

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Wind + H2 = 0

Maximum efficiency

throughout the supply chain

and onboard:

→ Battery storage

→ Power management system

→ Renewable generation

What is the concept of HyWindShips?

HyWindShips combine hydrogen fuel cells, wind propulsion, electric powertrains, and advanced efficiency technologies.

They achieve Absolute Zero Emissions (Tank-to-Wake) and enable trans-oceanic zero-emission commercial shipping today.

Suiso Frontier

Neoliner Origin

Brands Hatch

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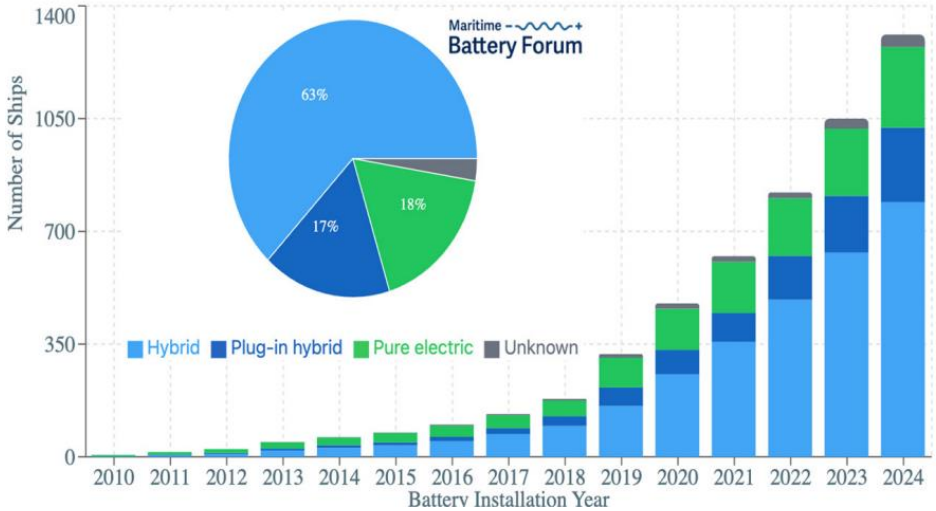
Core Technologies



1. Hydrogen fuel cells for clean propulsion.

2. Wind propulsion systems reducing fuel consumption and emissions.

3. Electric powertrains for high efficiency.

4. Integrated energy management to minimise losses.

Together, these provide scalable, proven solutions for zero-emission shipping

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Case Studies

Neoliner Origin

Suiso Frontier

1. **Union Maritime – Deploying BAR and Norsepower wind-assist technologies across 34 vessels.**
2. **Neoliner Origin – 136m Ro-Ro vessel achieving up to 83% GHG reduction.**
3. **Suiso Frontier – World's first liquid hydrogen carrier.**
4. **Hydra – World's first liquid hydrogen-powered ferry with 98% uptime.**

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Wind-assisted propulsion enables larger fuel savings

1. Mature technology that is doubling every year
2. 110 sails installed and 60 in order books
3. Fuel reduction of up to 30% measured for retrofits
4. Opportunity to futureproof vessels to saving costs now and in the furture

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Hydrogen Supply Chain

Gen2 Energy leads maritime hydrogen production, with a 30 tonnes/day LH_2 plant supported by a €61.6 million grant.

Collaborations with Chart Industries, LH2 Shipping, and Tata Steel are establishing a hydrogen corridor between Norway and the Netherlands.

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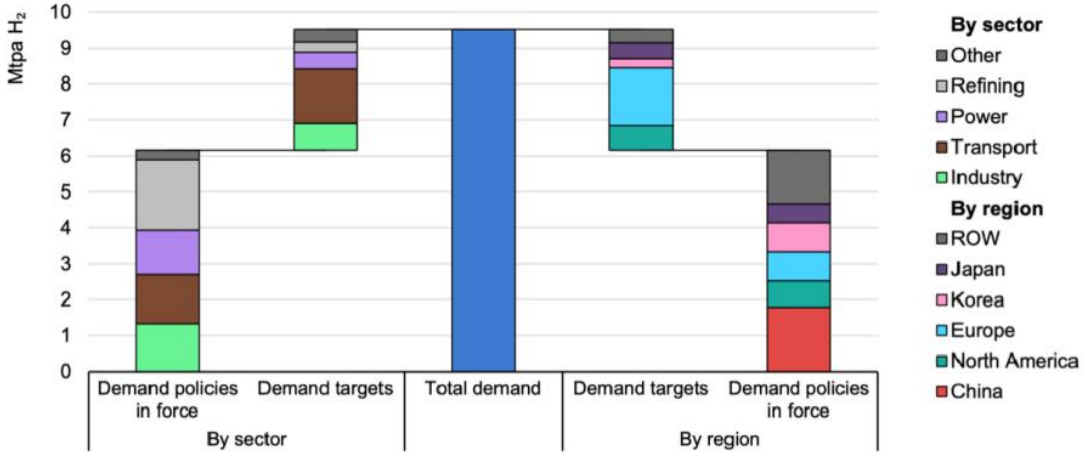
Global Hydrogen Market Trends



Comparison of potential annual demand for "low-emissions" hydrogen by 2030 created through forcing policies and targets[7]. Includes non-electrolytic

Electrolyser capacity more than doubled between 2024 and 2025

26 GW of capacity is under construction or at FID, targeting 3.8 million tonnes of green hydrogen by 2030.

Policies driving growth include China's National Energy Law, the EU Hydrogen Bank, and UK Hydrogen Allocation Rounds.

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Retrofitting and Fleet Transition

1. About 45% of the global fleet risks failing future emissions standards.
2. Retrofitting offers cost-effective compliance and performance upgrades, with payback times of 2–5 years depending on policy support.
3. Wind-assisted retrofits, hybrid propulsion, and efficiency upgrades extend vessel life and improve OPEX savings.

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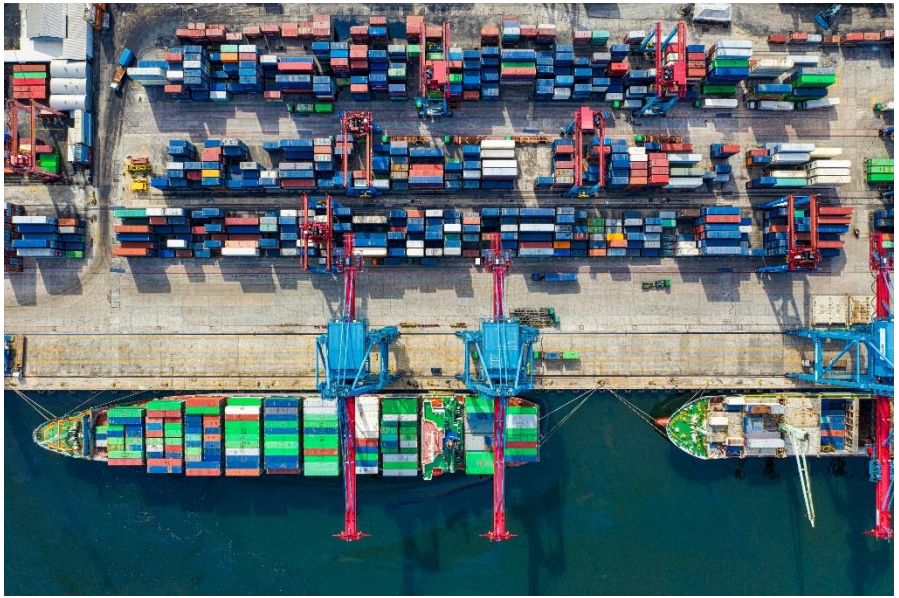
Financing the Transition



Blue Bonds, blended finance mechanisms, and the IMO Net Zero Framework, (eventually) will provide capital for zero-emission technologies.

Innovations such as the Ocean Asset Class and South Korea's $1B blue bond demonstrate financial confidence in sustainable shipping.

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Conclusion

HyWindShips prove that Absolute Zero shipping is possible today.

By combining wind, hydrogen, and electrification, the maritime sector can achieve a sustainable and profitable future.

The transformation has begun—collaboration, innovation, and policy will scale it globally.

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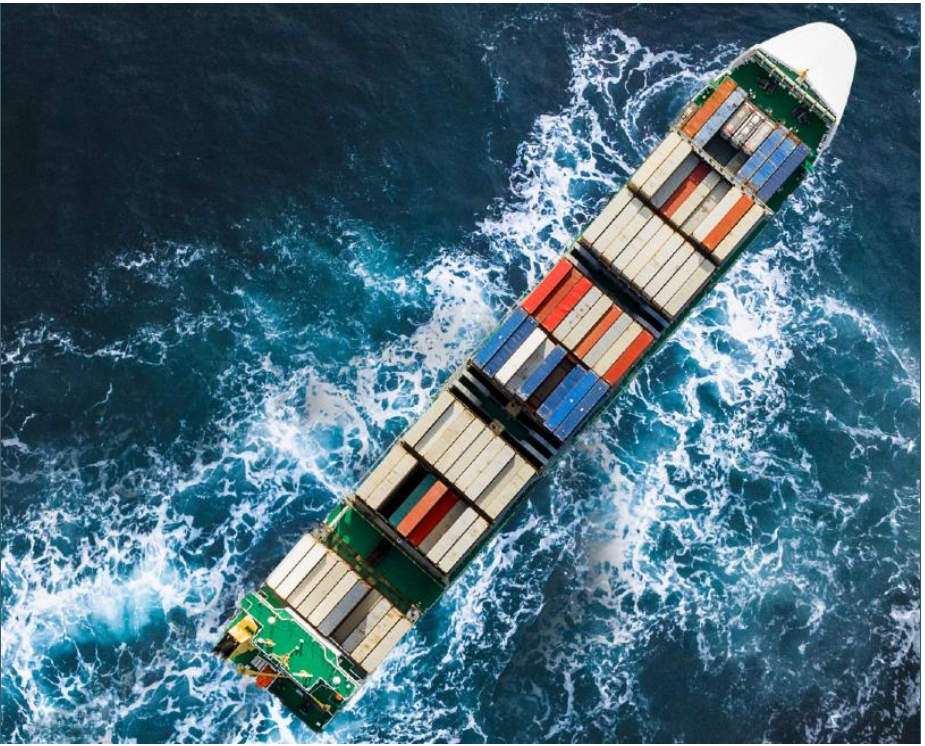

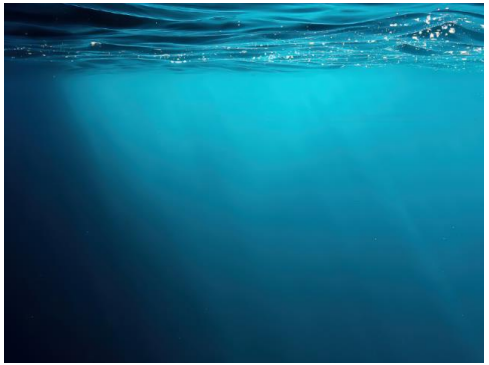

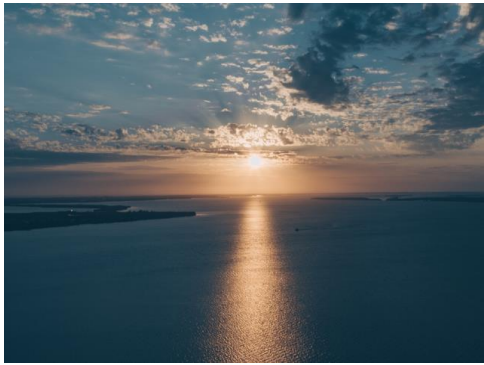


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blue sea thinking