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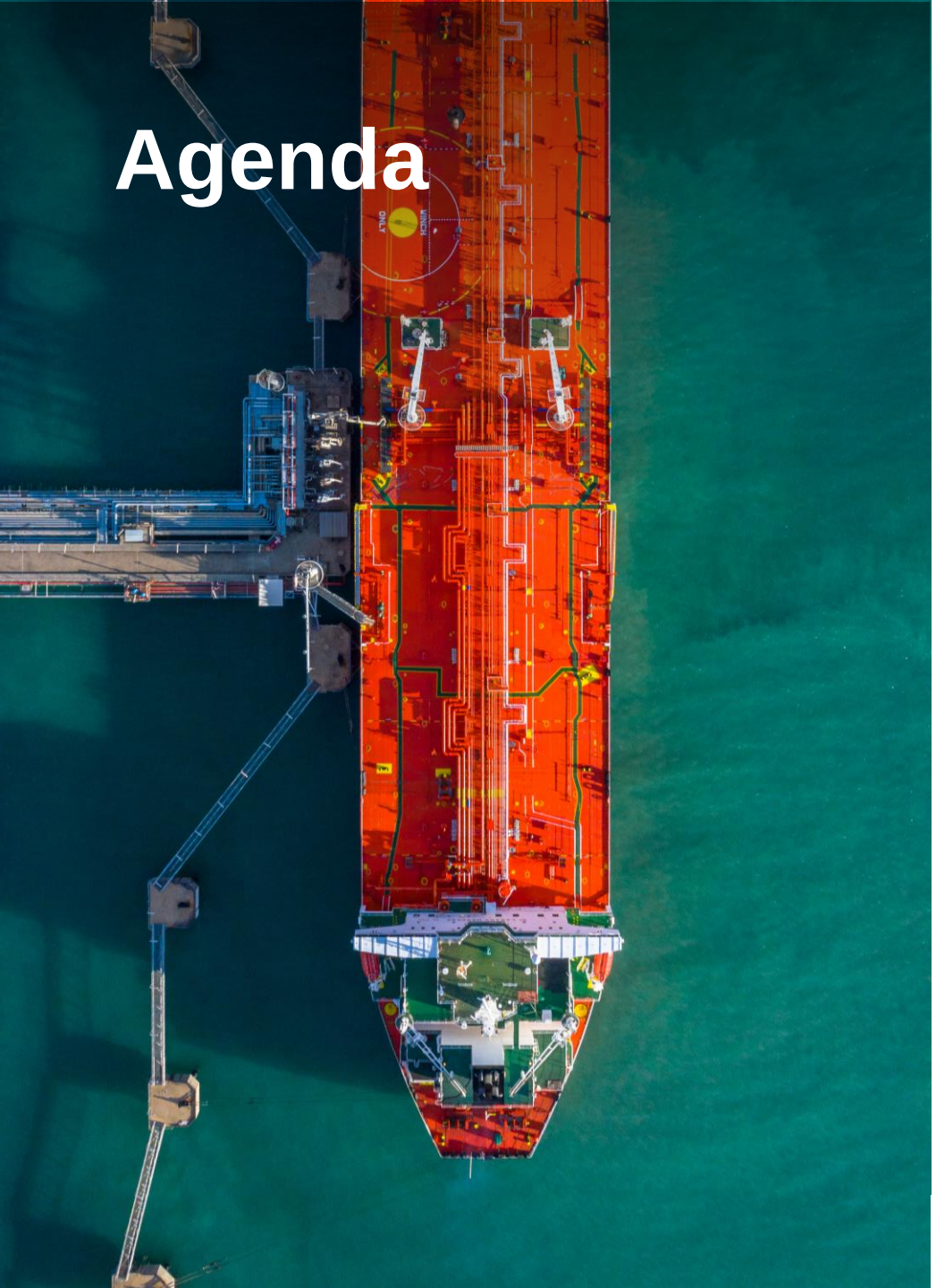
Developing markets for green marine fuels

Lessons from World Bank country work

Rico Salgmann, Transport Specialist

Webinar, H4D Partnership, 03 December 2024



Agenda

1. Shipping and green hydrogen as key drivers for global decarbonization
2. A strategic role of ports in developing a green hydrogen economy
3. Policy + common-user infrastructure facilitating hydrogen value chains

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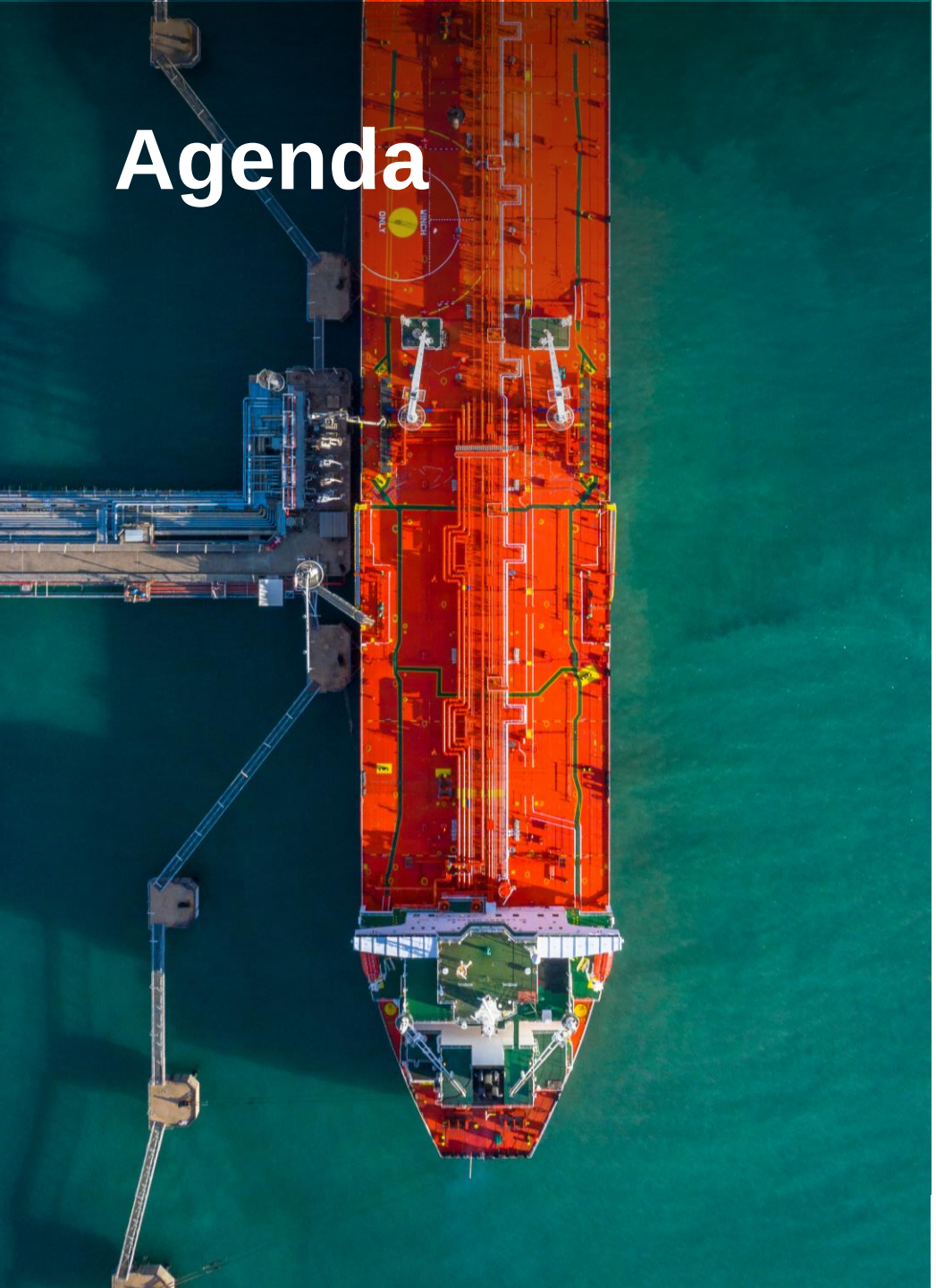

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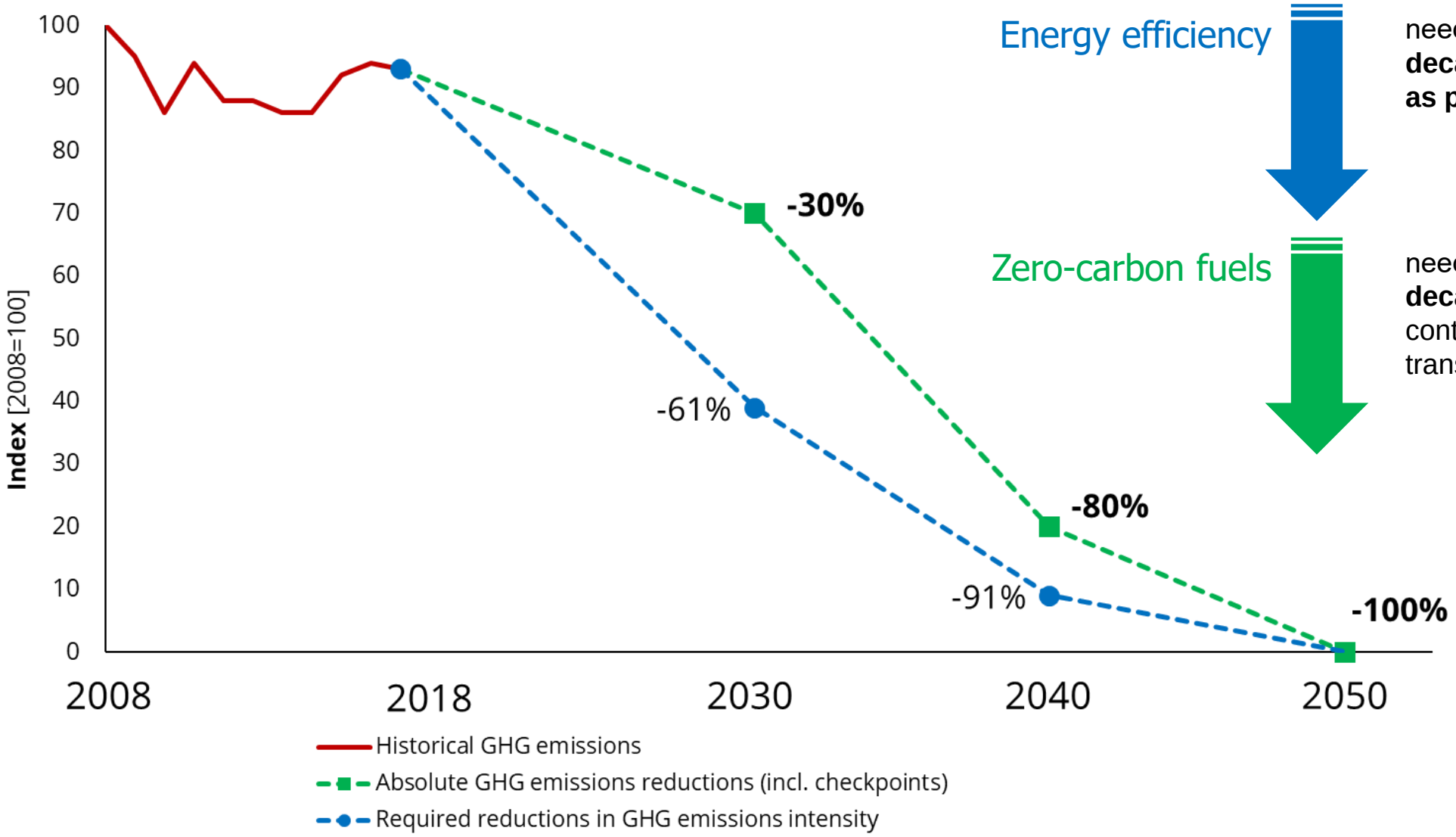
International shipping has committed to fully decarbonize by 2050



Energy efficiency

needed to drive shipping's **decarbonization as much as possible**

Zero-carbon fuels

needed for shipping's **full decarbonization** due to continuous growth of transport demand

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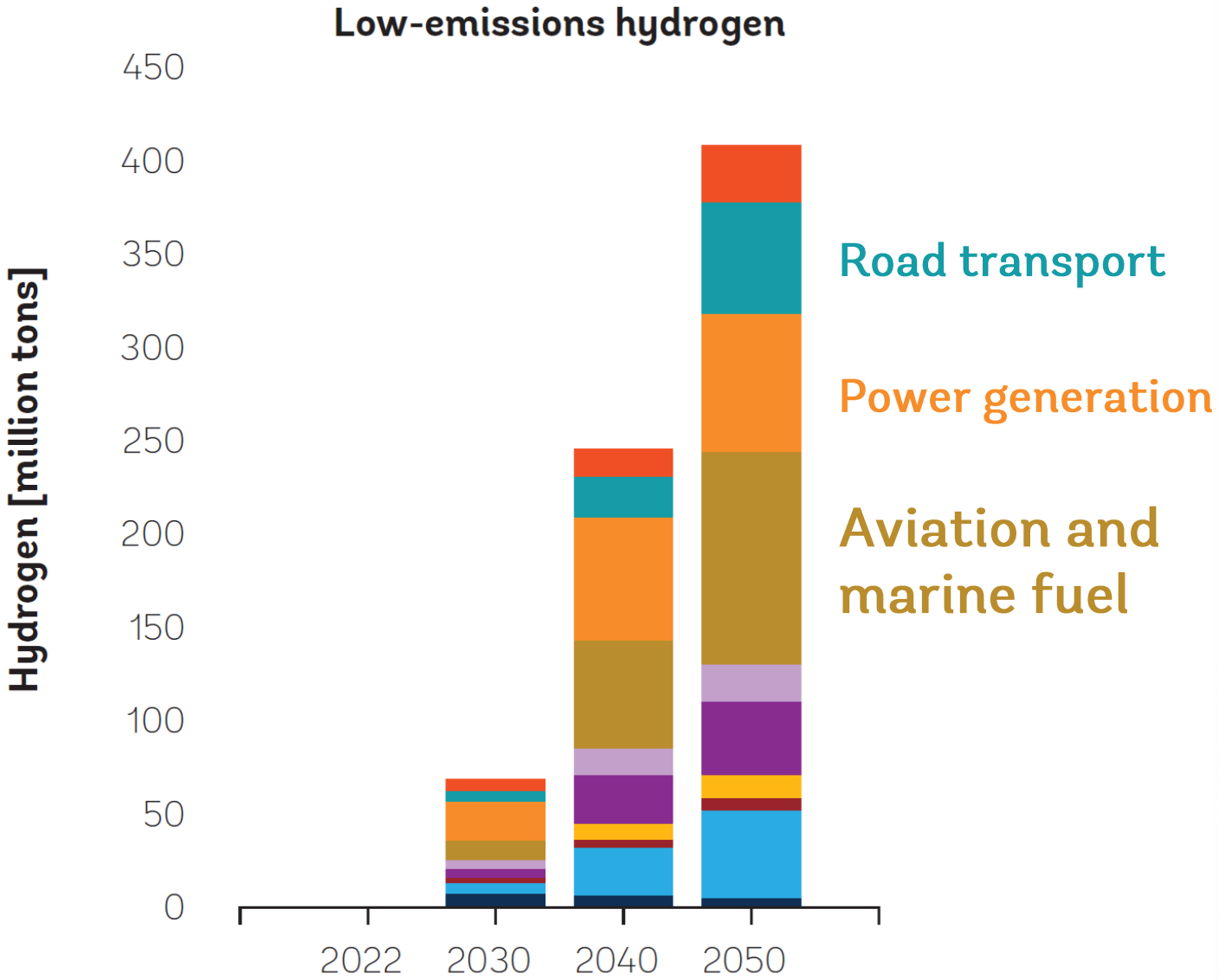
Hydrogen-based fuels expected to decarbonize shipping at large-scale

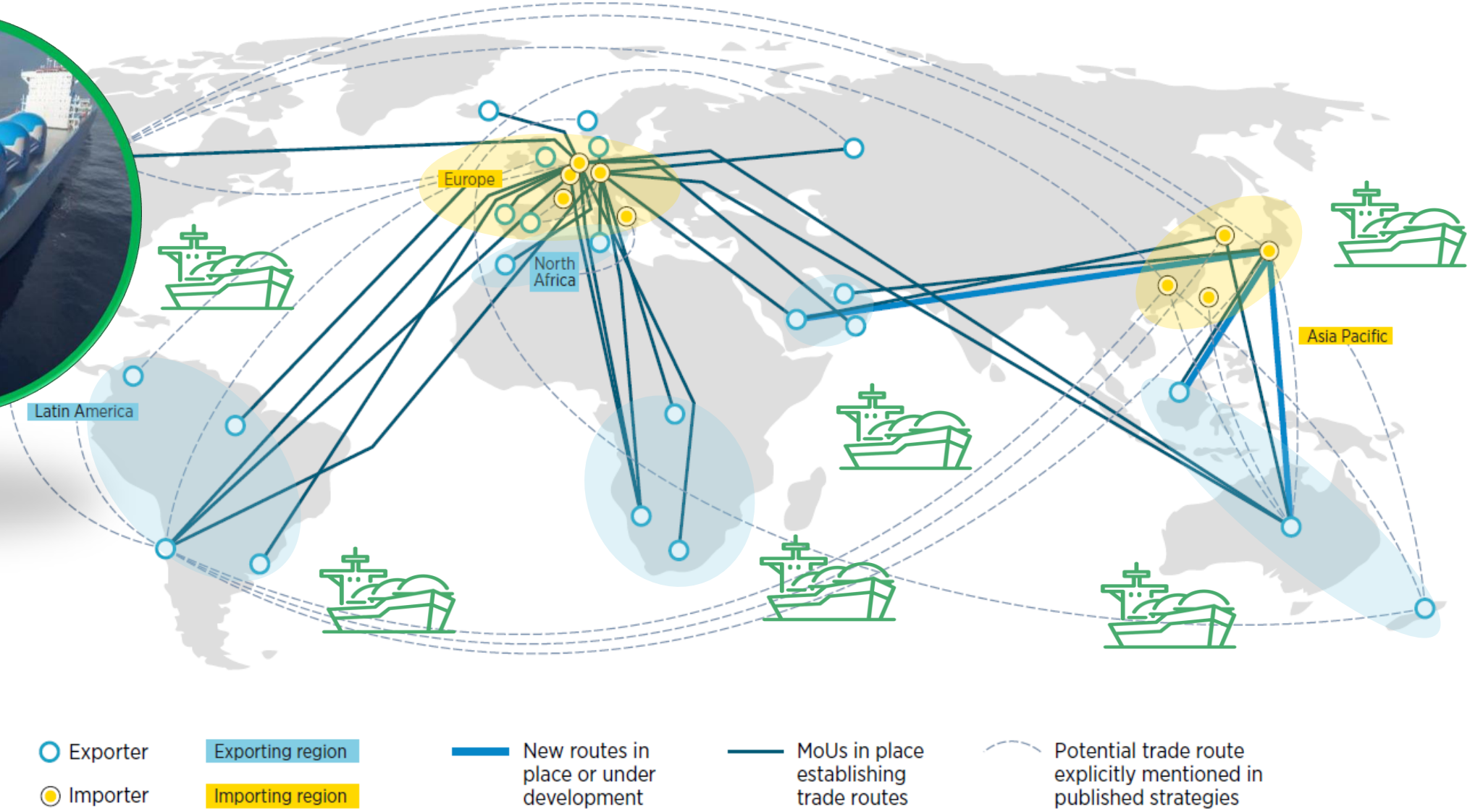
Green Ammonia and Green Methanol are currently the most-promising marine fuels for shipping's decarbonization

International shipping as a key consumer of green hydrogen-based fuels



Source: Global hydrogen demand in the NZE Scenario, 2022-2050
IEA 2023 "Global Hydrogen Review 2023.

Ships & Ports as key distributors of green hydrogen-based fuels



Source: Based on IRENA (2022), The Geopolitics of the Energy Transformation: The Hydrogen Factor

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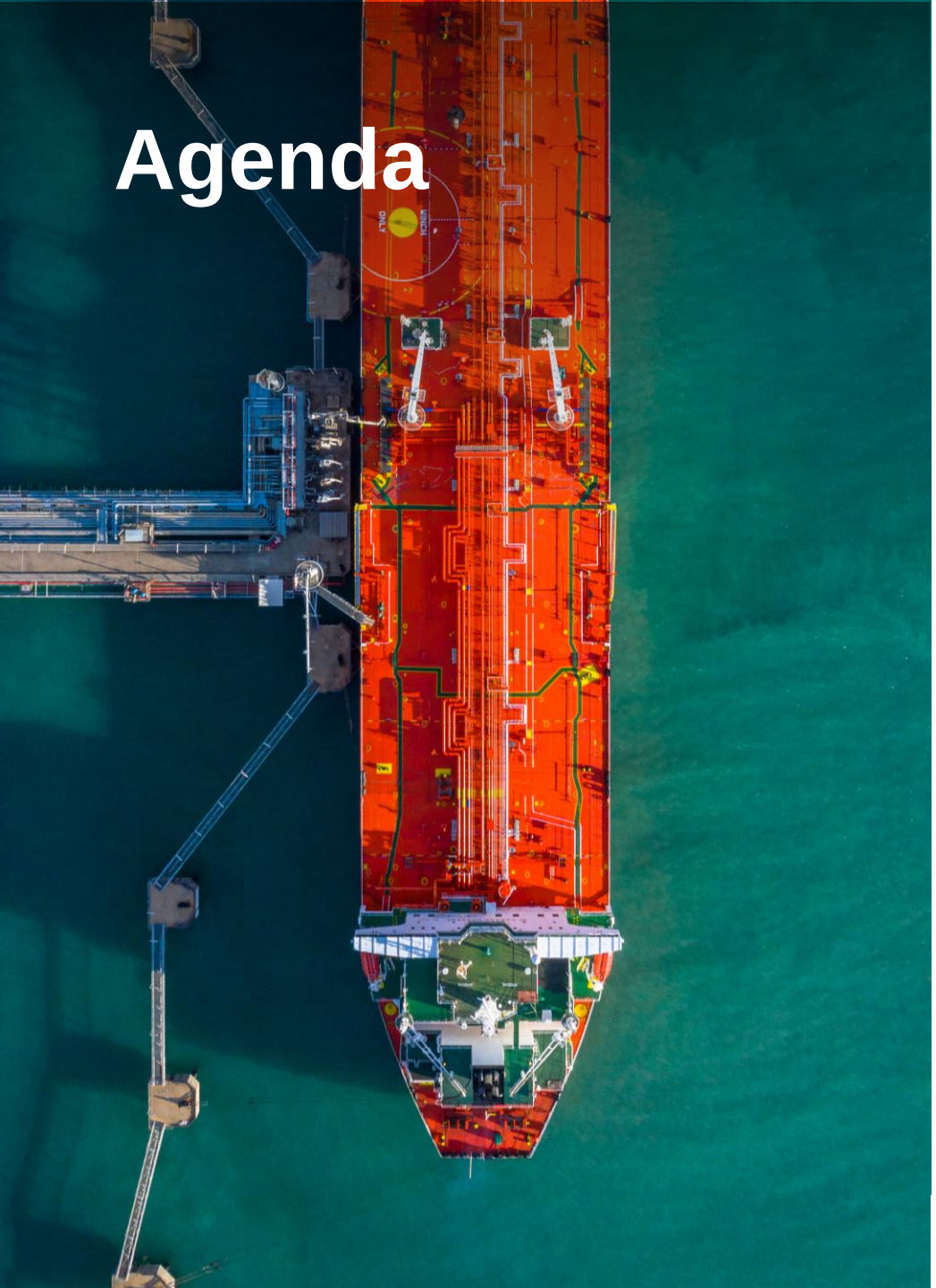

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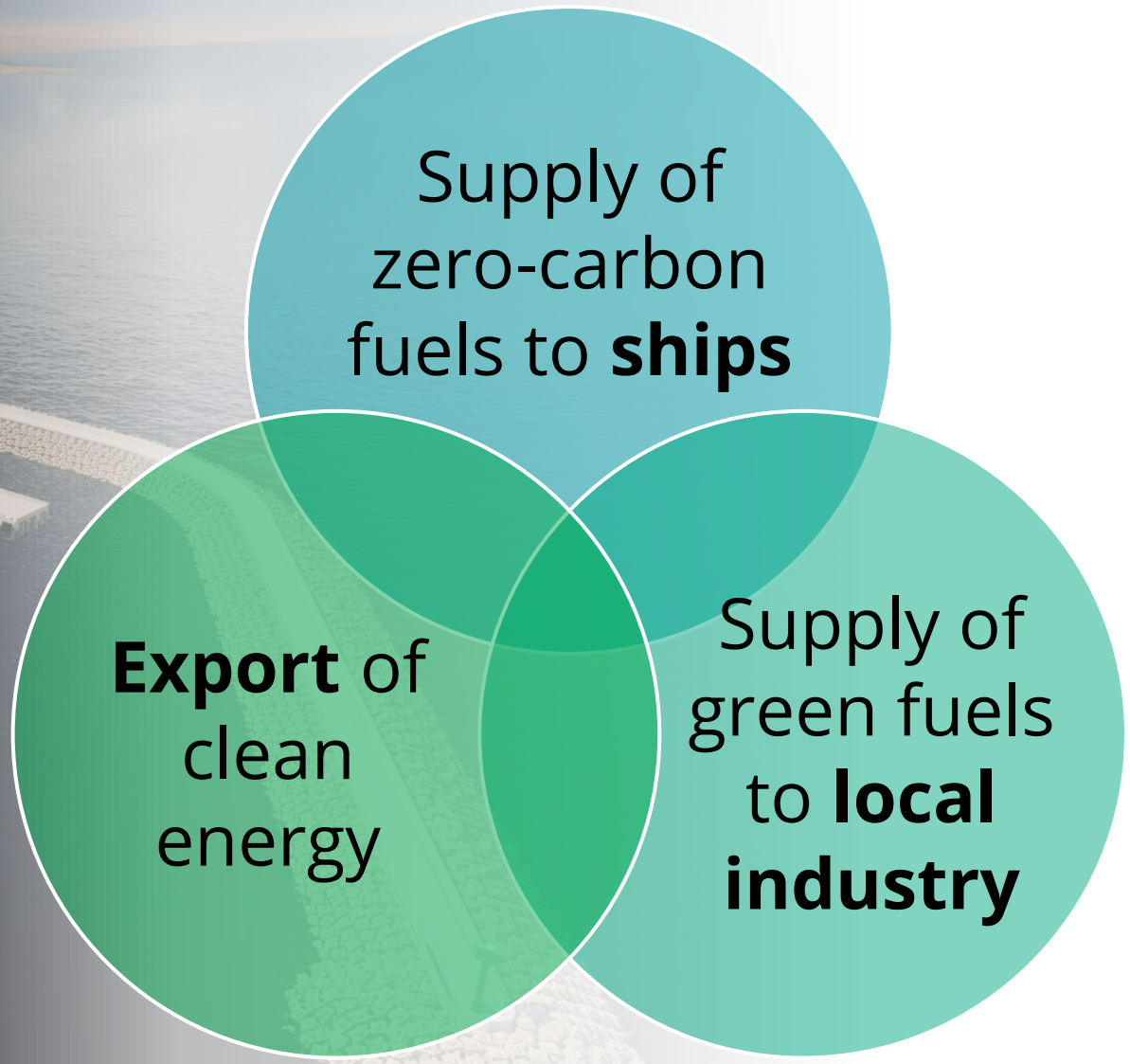
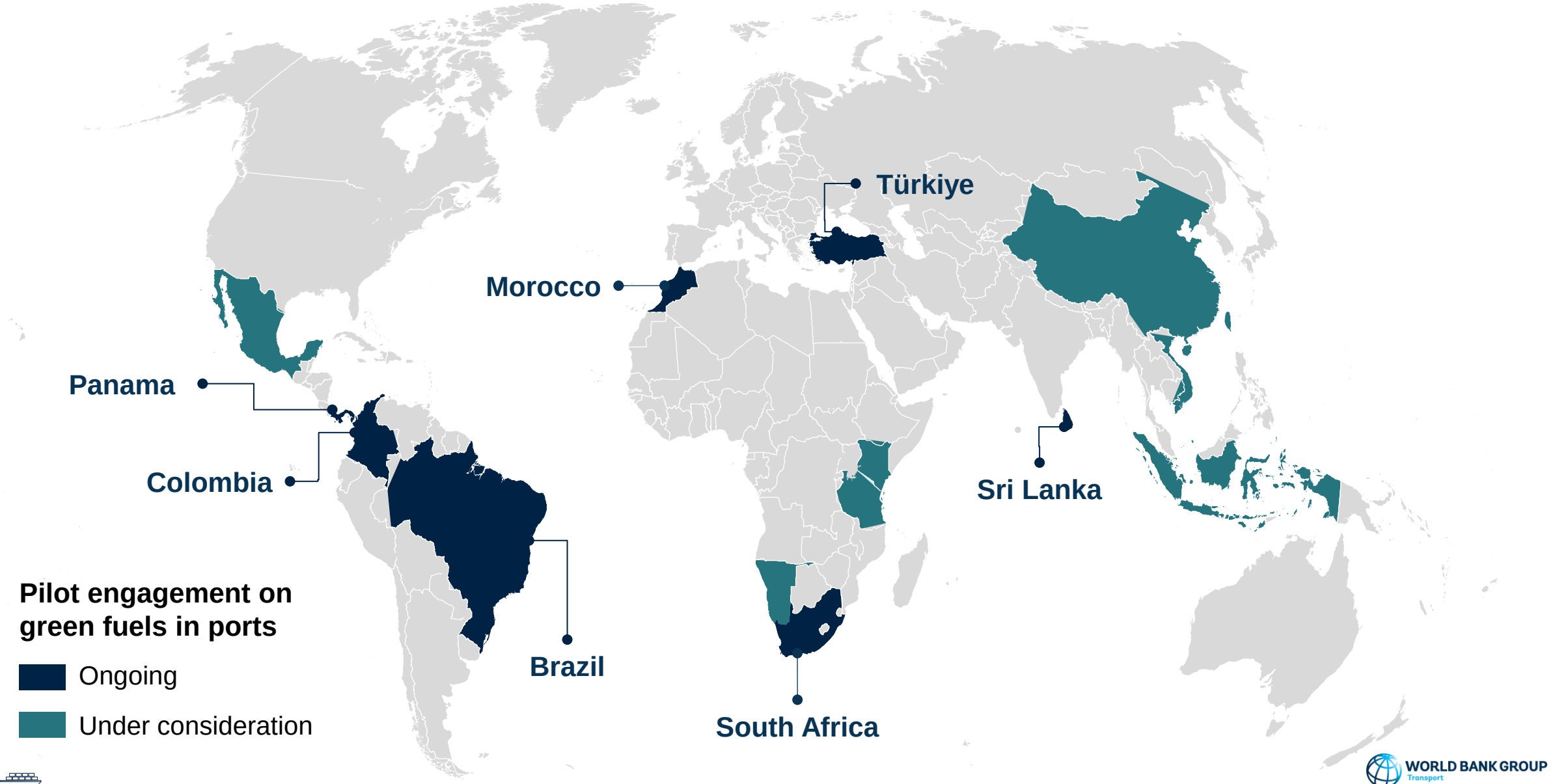
Different roles for ports – different infrastructure needs.



The World Bank has been engaging more and more in developing countries



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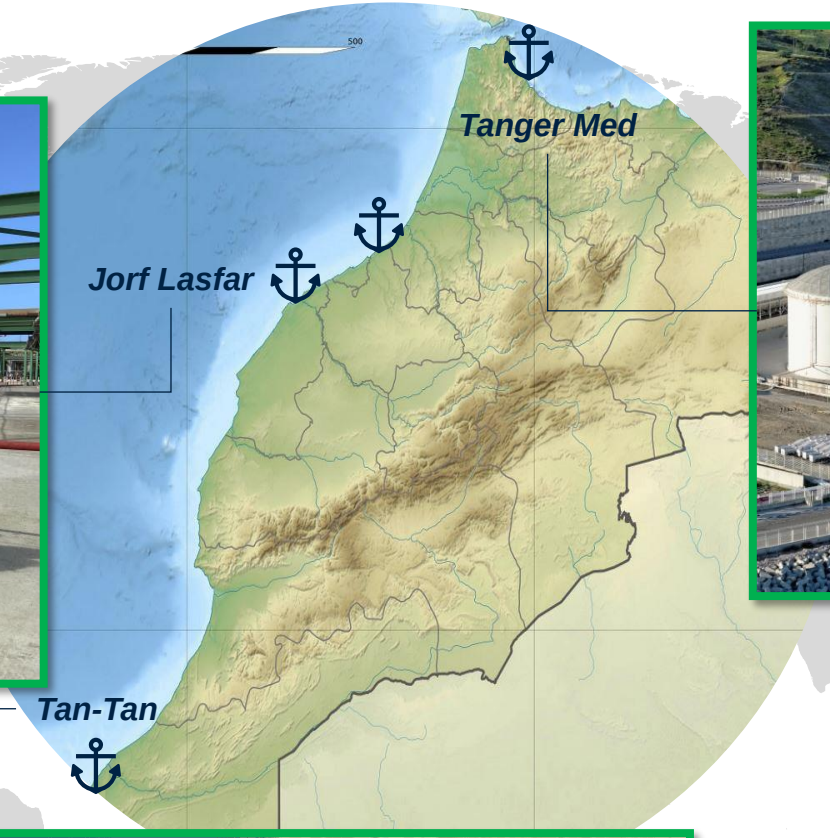
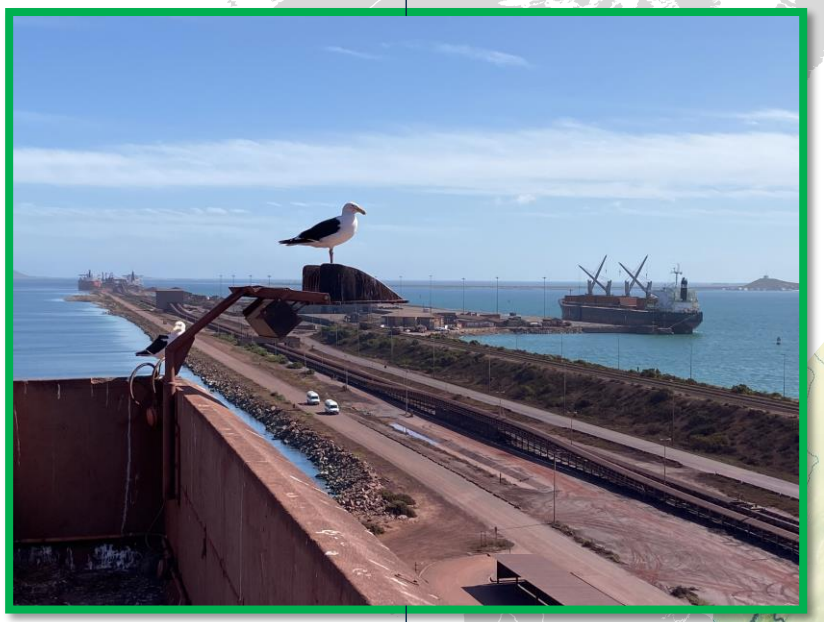
Morocco: linking hydrogen production with consumption and distribution



South Africa: combining green shipping fuels and green iron and steel



Saldanha Bay

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Colombia: converting coal-exporting ports into green energy hubs

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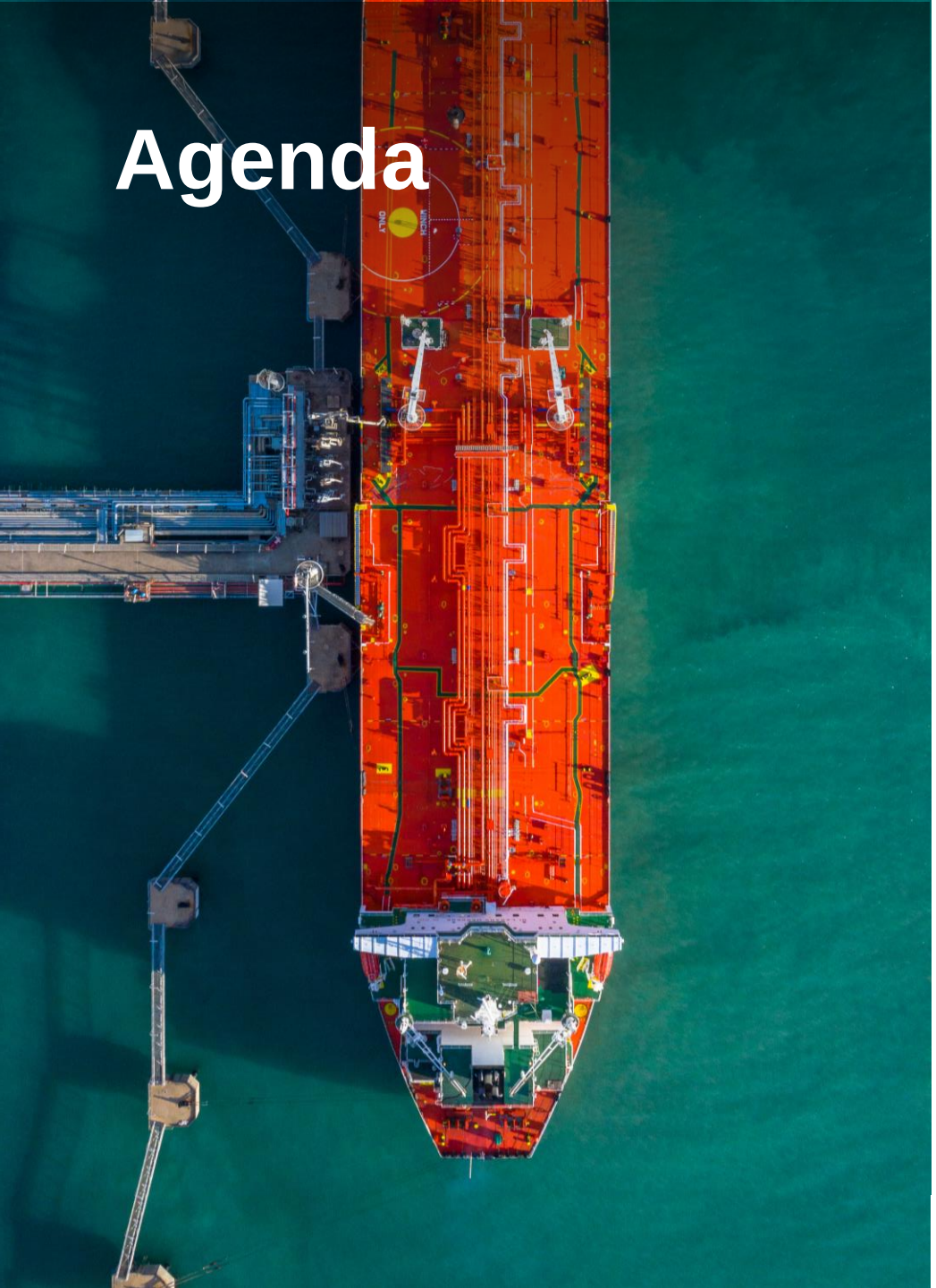

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Challenges

Too expensive!
(x-fold of conventional fuel)

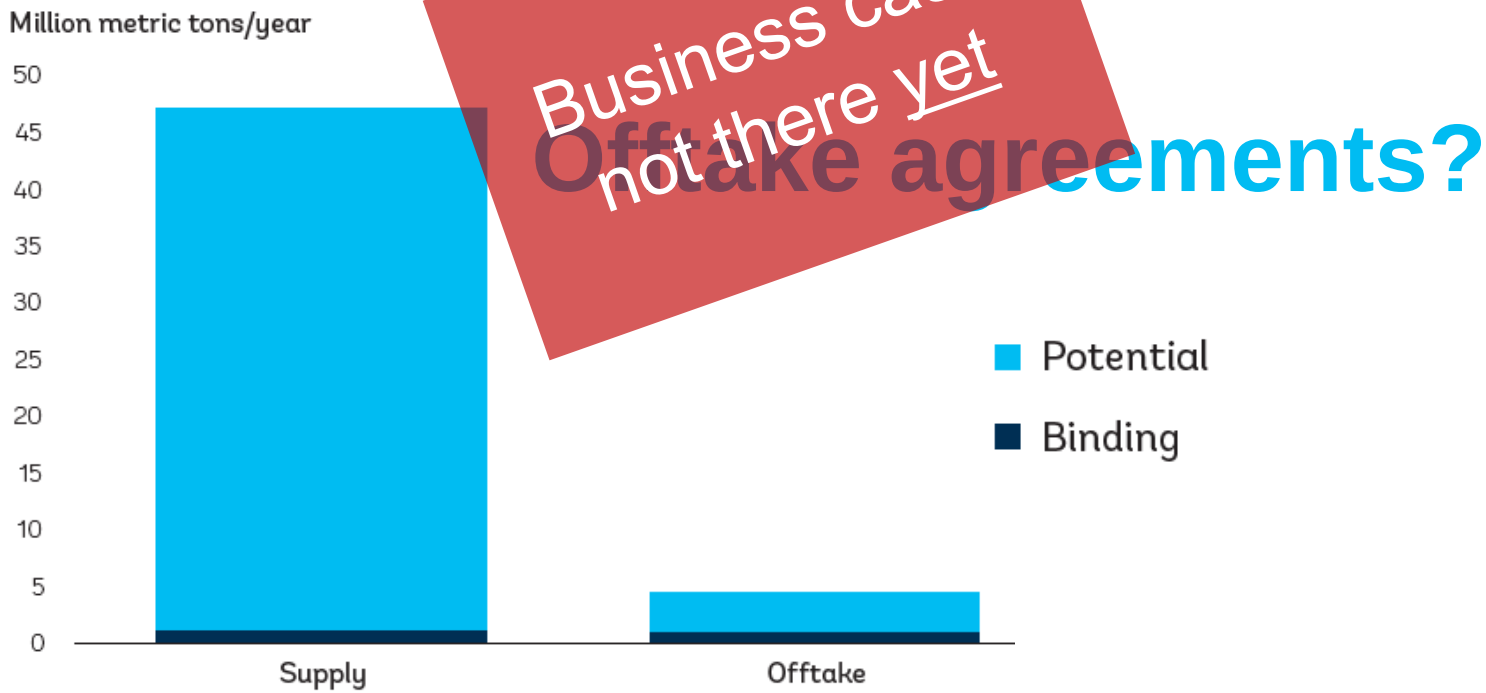
There is no demand (signal)!

There is no supply!

Who wants to pay a "green" premium?

Business case not there yet

Offtake agreements?



Source: Hydrogen supply and offtake by 2030, based on Liebreich (13 Dec 2023). Clean Hydrogen's Missing Trillions

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Challenges

Cost of capital in many high-potential countries is high and influences final cost

Table 5.27. Sensitivity analysis for the bunker scenario (Scenario D) and VLSFO equivalent price

NPV = 0			Subsidies to capital expenditure					Historic benchmark	
WACC	Scenario	Unit	0%	10%	20%	30%	40%	5-year average	3-year max
12%	D (VLSFO-eq)	$ per ton	2,860	2,610	2,350	2,100	1,830	510	670
10%	D (VLSFO-eq)	$ per ton	2,440	2,210	2,010	1,790	1,590	510	670
8%	D (VLSFO-eq)	$ per ton	2,030	1,850	1,700	1,520	1,340	510	670
6%	D (VLSFO-eq)	$ per ton	1,680	1,540	1,410	1,270	1,140	510	670
4%	D (VLSFO-eq)	$ per ton	1,360	1,250	1,160	1,050	940	510	670

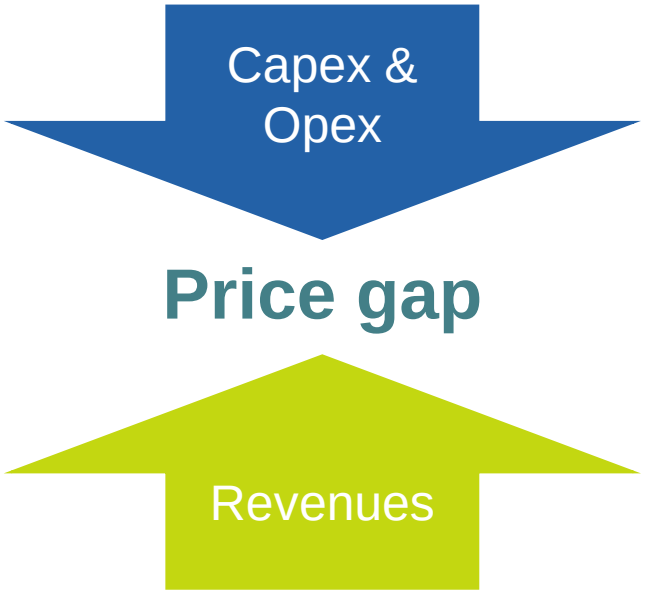
Source: *Salgmann, Rico; Weidenhammer, Maximilian; Englert, Dominik. 2024. "Creating a Green Marine Fuel Market in South Africa." World Bank. Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO.*

How to address the price gap between fossil and green marine fuels?

- Economies of scale and learning curves
- Administrative fast-tracking
- Concessional finance
- Fiscal incentives
- **Common-user infrastructure**

Supply-side enablers

Lower production costs of green fuels



Demand-side enablers

Increase the willingness to pay for green fuels?

- **GHG fuel standard**
- **GHG emissions pricing**
- Contracts for difference

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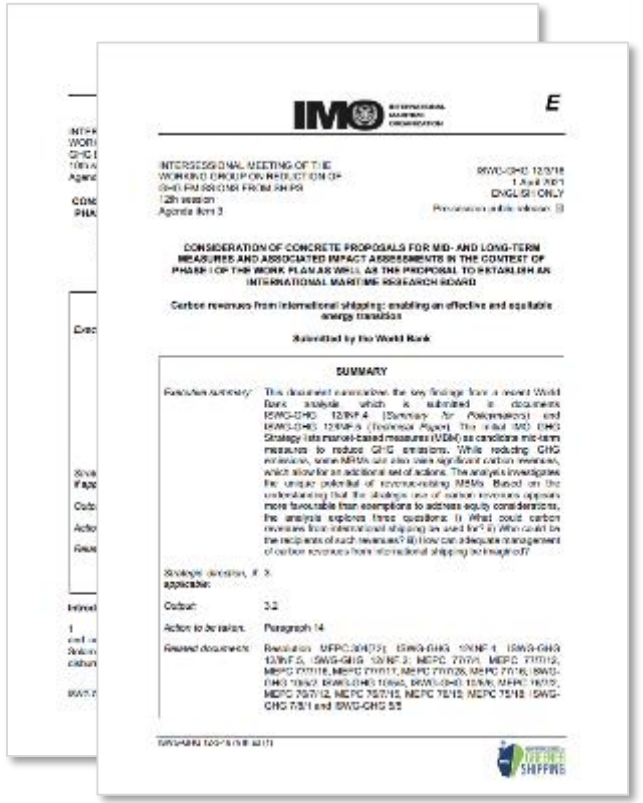
“Bankable” policy at the IMO is critical



IMO

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INTERSESSIONAL MEETING OF THE WORKING GROUP ON REDUCTION OF GHG EMISSIONS FROM SHIPS
12th session
Agenda item 3

ISWG-GHG 12/3/18
1 April 2021
ENGLISH ONLY
Pre-session public release: ☒

CONSIDERATION OF CONCRETE PROPOSALS FOR MID- AND LONG-TERM MEASURES AND ASSOCIATED IMPACT ASSESSMENTS IN THE CONTEXT OF PHASE I OF THE WORK PLAN AS WELL AS THE PROPOSAL TO ESTABLISH AN INTERNATIONAL MARITIME RESEARCH BOARD

Carbon revenues from international shipping: enabling an effective and equitable energy transition

Submitted by the World Bank

SUMMARY

Executive summary: This document summarizes the key findings from a recent World Bank analysis which is submitted in documents ISWG-GHG 12/INF.4 (Summary for Policymakers) and ISWG-GHG 12/INF.5 (Technical Report). The initial IMO GHG Strategy lists market-based measures (MBM) as candidate mid-term measures to reduce GHG emissions. While reducing GHG emissions, some MBMs can also raise significant carbon revenues, which allow for an additional set of actions. The analysis investigates the unique potential of revenue-raising MBMs. Based on the understanding that the strategic use of carbon revenues appears more favourable than exemptions to address equity considerations, the analysis explores three questions: i) What could carbon revenues from international shipping be used for? ii) Who could be the recipients of such revenues? iii) How can adequate management of carbon revenues from international shipping be imagined?

Strategic direction, if applicable: 3

Output: 3.2

Action to be taken: Paragraph 14

Related documents: Resolution MEPC.304(72); ISWG-GHG 12/INF.4; ISWG-GHG 12/INF.5; ISWG-GHG 12/INF.3; MEPC 77/7/1, MEPC 77/7/12, MEPC 77/7/18, MEPC 77/7/17, MEPC 77/7/28, MEPC 77/16; ISWG-GHG 12/3/2; ISWG-GHG 12/3/3; ISWG-GHG 12/3/6; MEPC 75/7/15, MEPC 75/7/12, MEPC 75/7/15, MEPC 75/18; ISWG-GHG 7/3/1 and ISWG-GHG 5/5

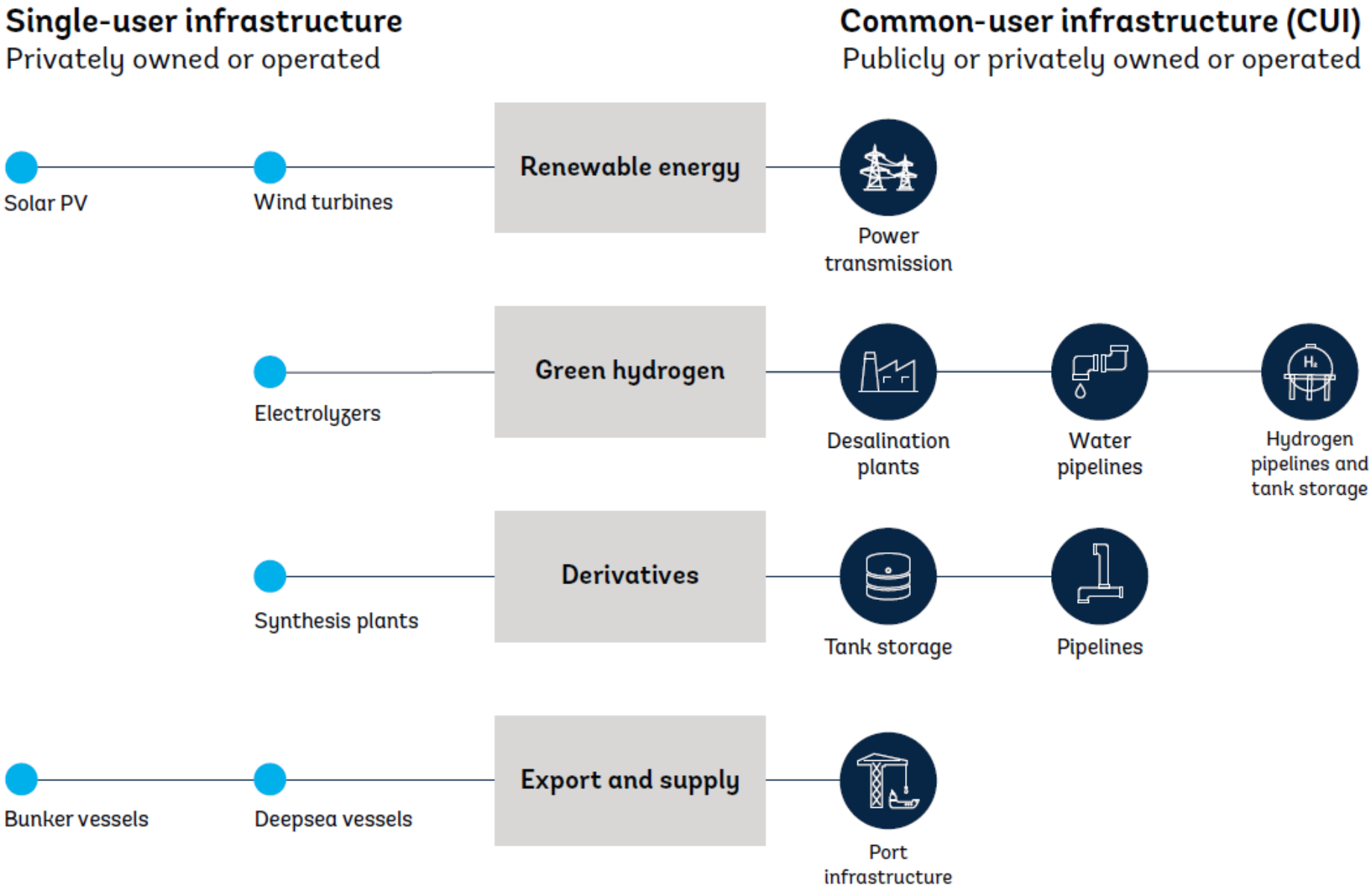
Technical measure

GHG fuel standard

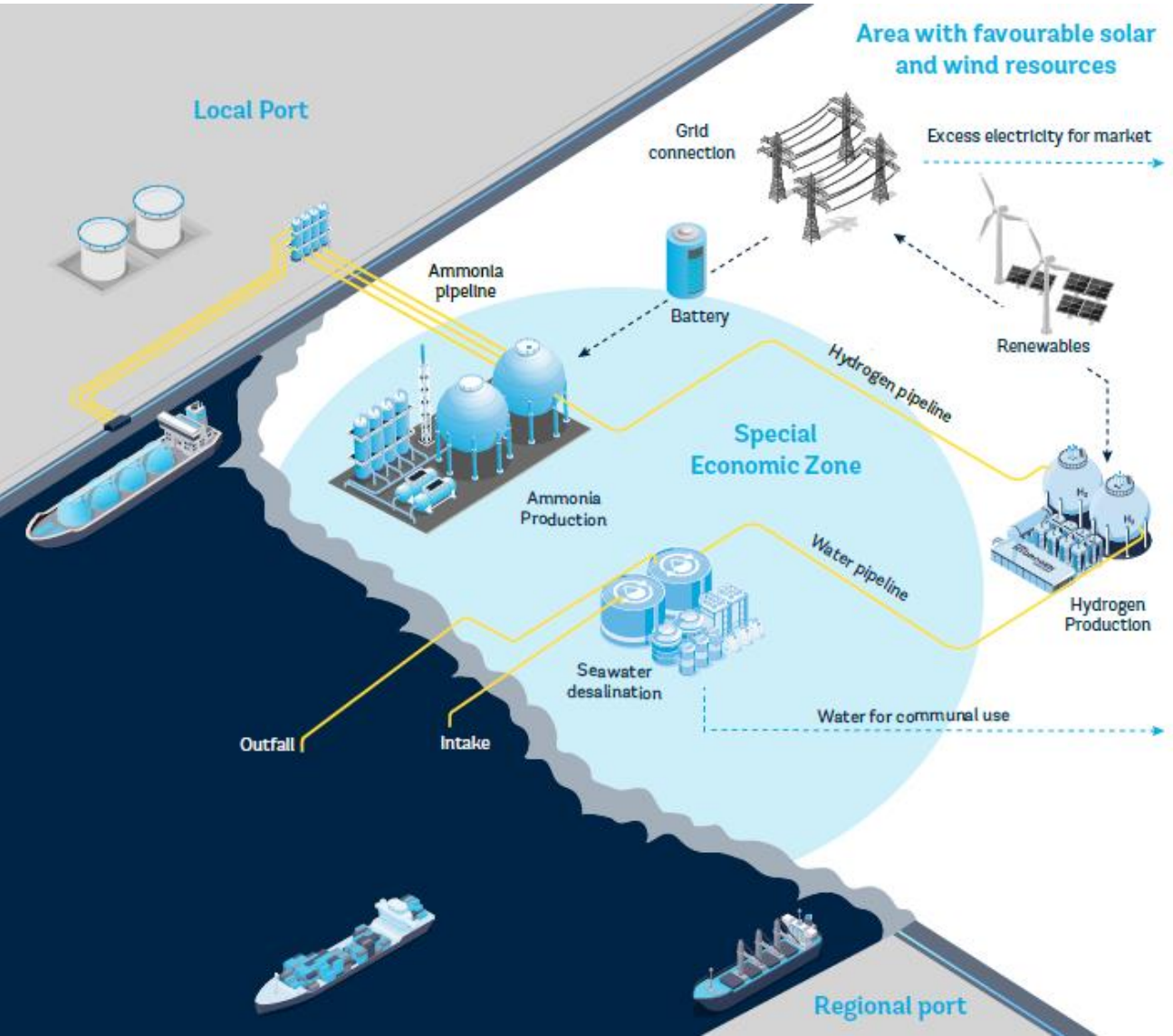
Economic measure

GHG emissions pricing

Developing common-user infrastructure to minimize and share costs



How to create infrastructure for green shipping fuels with co-benefits?



- New fuels offer co-benefits centered around ports
- Marine fuel production offer co-benefits, e.g.
  - Additional, clean, cheap renewable electricity
  - Water supply for communal use
  - Aggregation of several demand centers
  - New business opportunities in the port
  - Quality job creation
  - Local value creation, specifically for bunker supply chain

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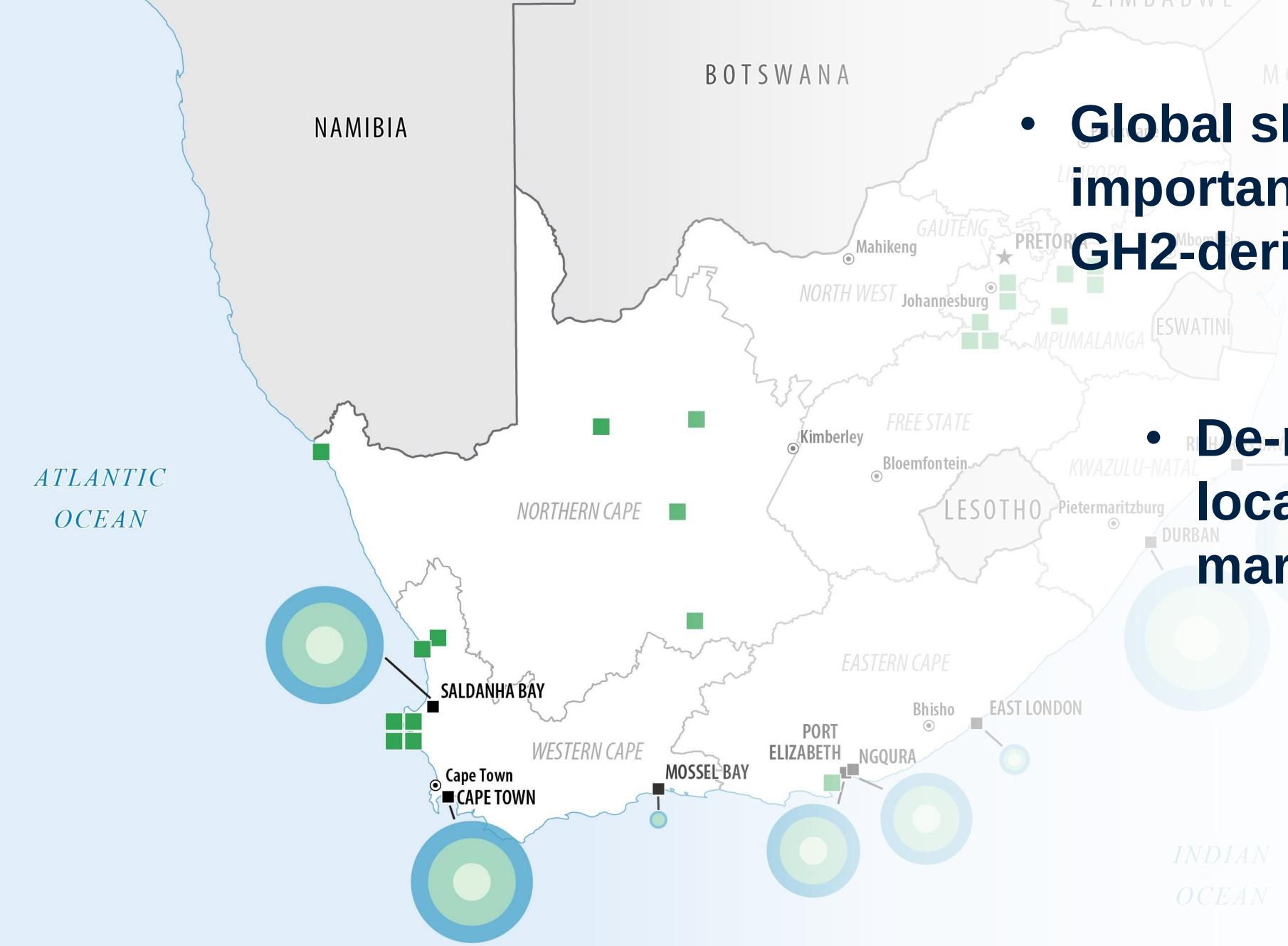

- **Global shipping as an important demand source for GH2-derivatives**
- **De-risking alongside local, and export markets**
- **Different economics for marine fuels**

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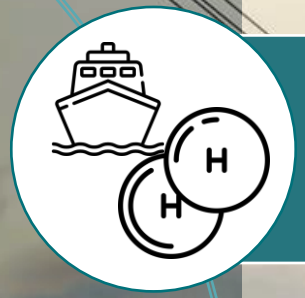
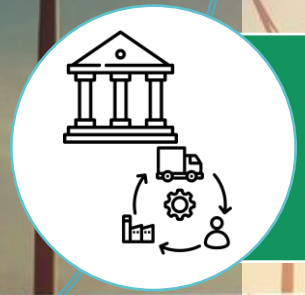
Key takeaways



For global decarbonization, maritime transport and green hydrogen are **mutually dependent** on each other.

Ports will play a **leading role** in developing a country's green hydrogen economy.



Governments should support "**bankable" policy** and explore **common-user infrastructure** requirements**.**

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Mobility and Transport Connectivity Series

Creating a Green Marine Fuel Market in South Africa

WORLD BANK GROUP PROBLUE PPIAF Enabling Infrastructure Investment

Thank you.

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