



Going to Zero, Maersk's Plans for Net Zero Emissions Operations by 2050

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MAERSK

A.P. Moller – Maersk at a glance

Present in
130+
Countries

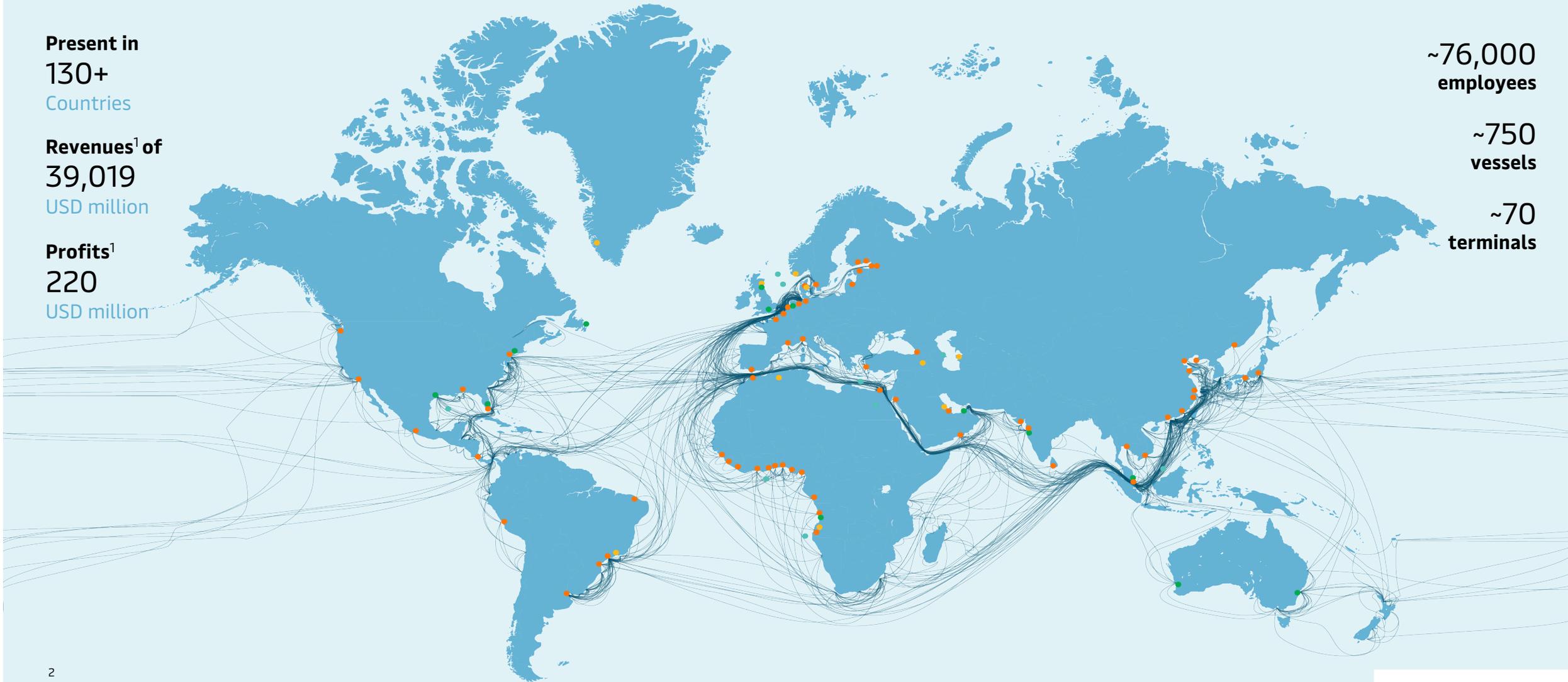
Revenues¹ of
39,019
USD million

Profits¹
220
USD million

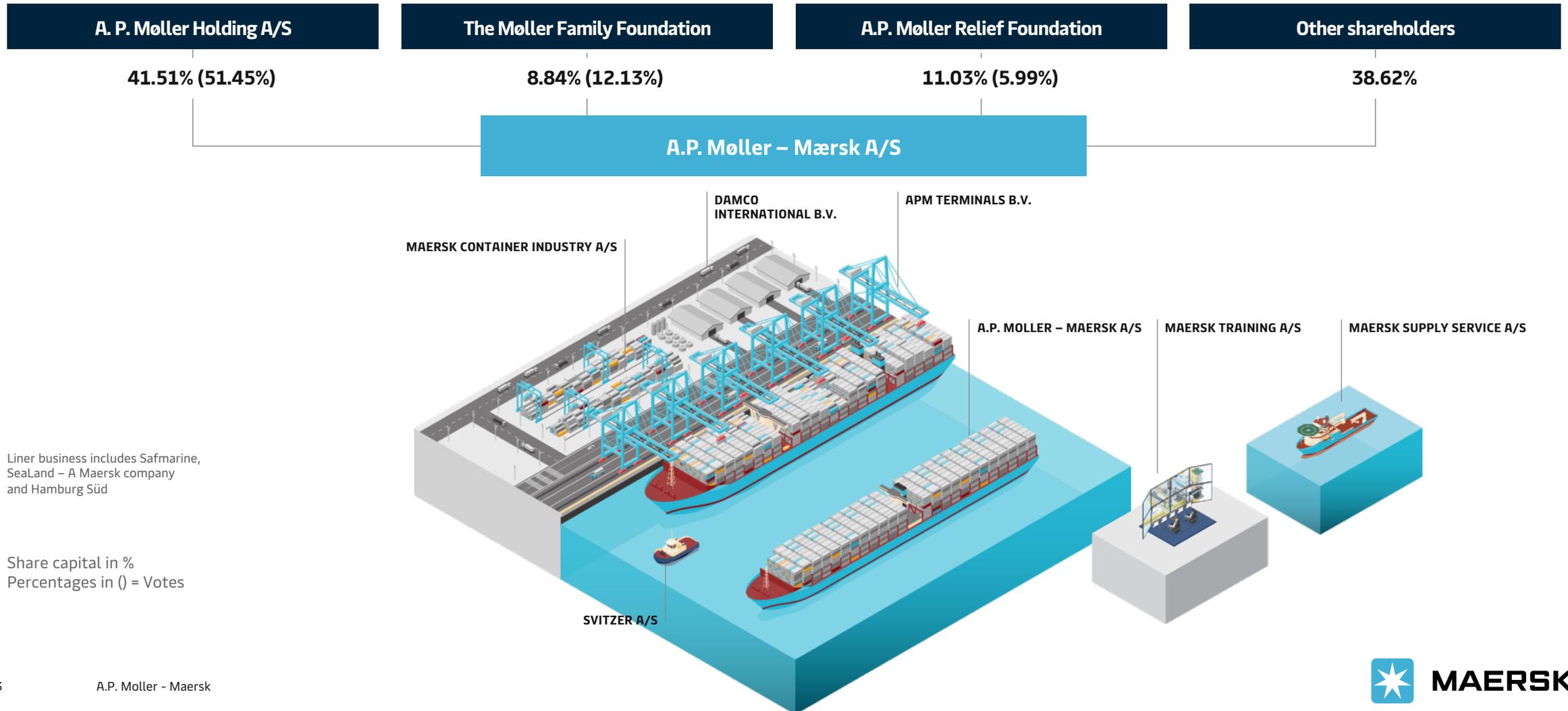
~76,000
employees

~750
vessels

~70
terminals



Ownership structure

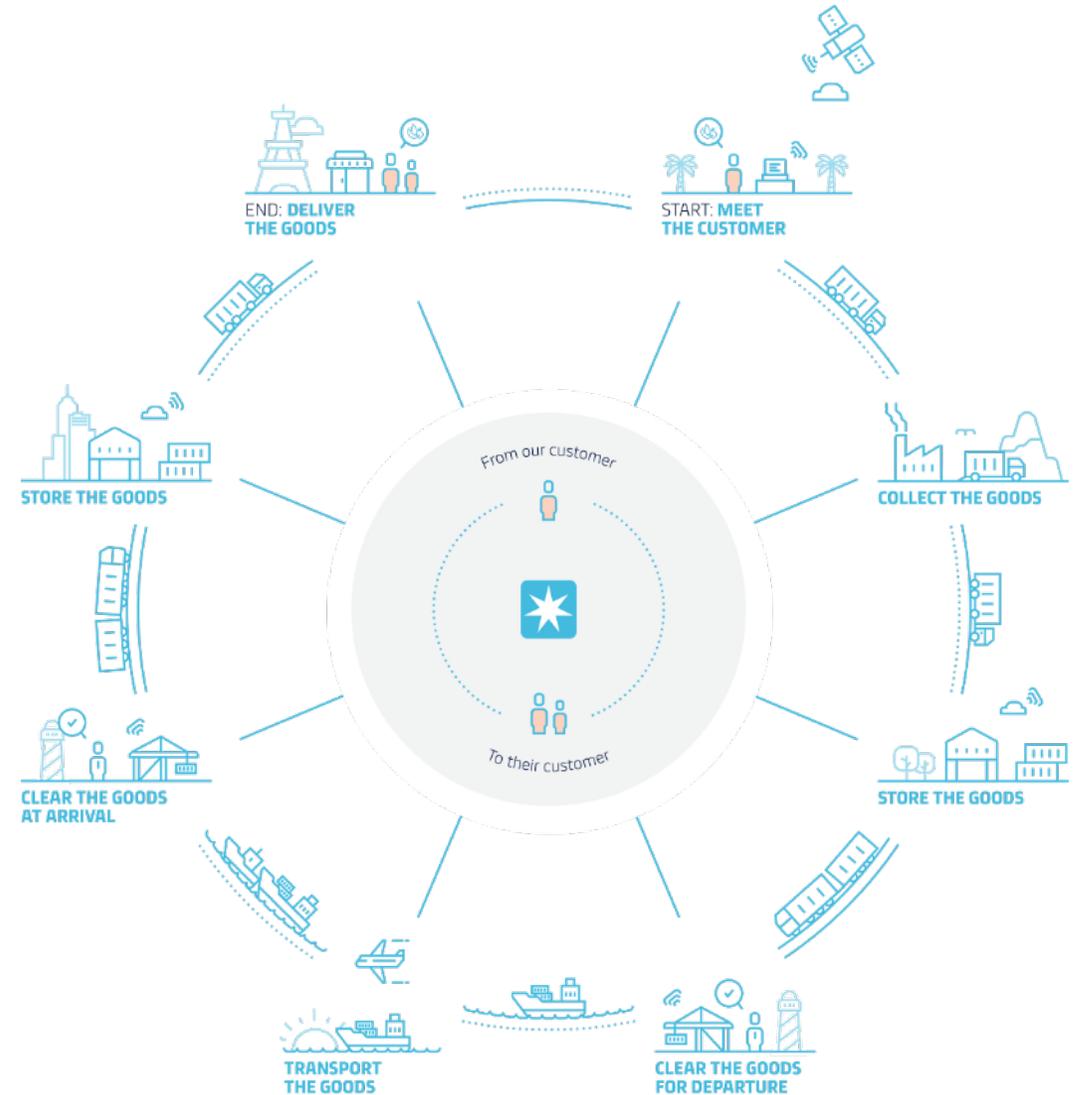


OUR BUSINESS

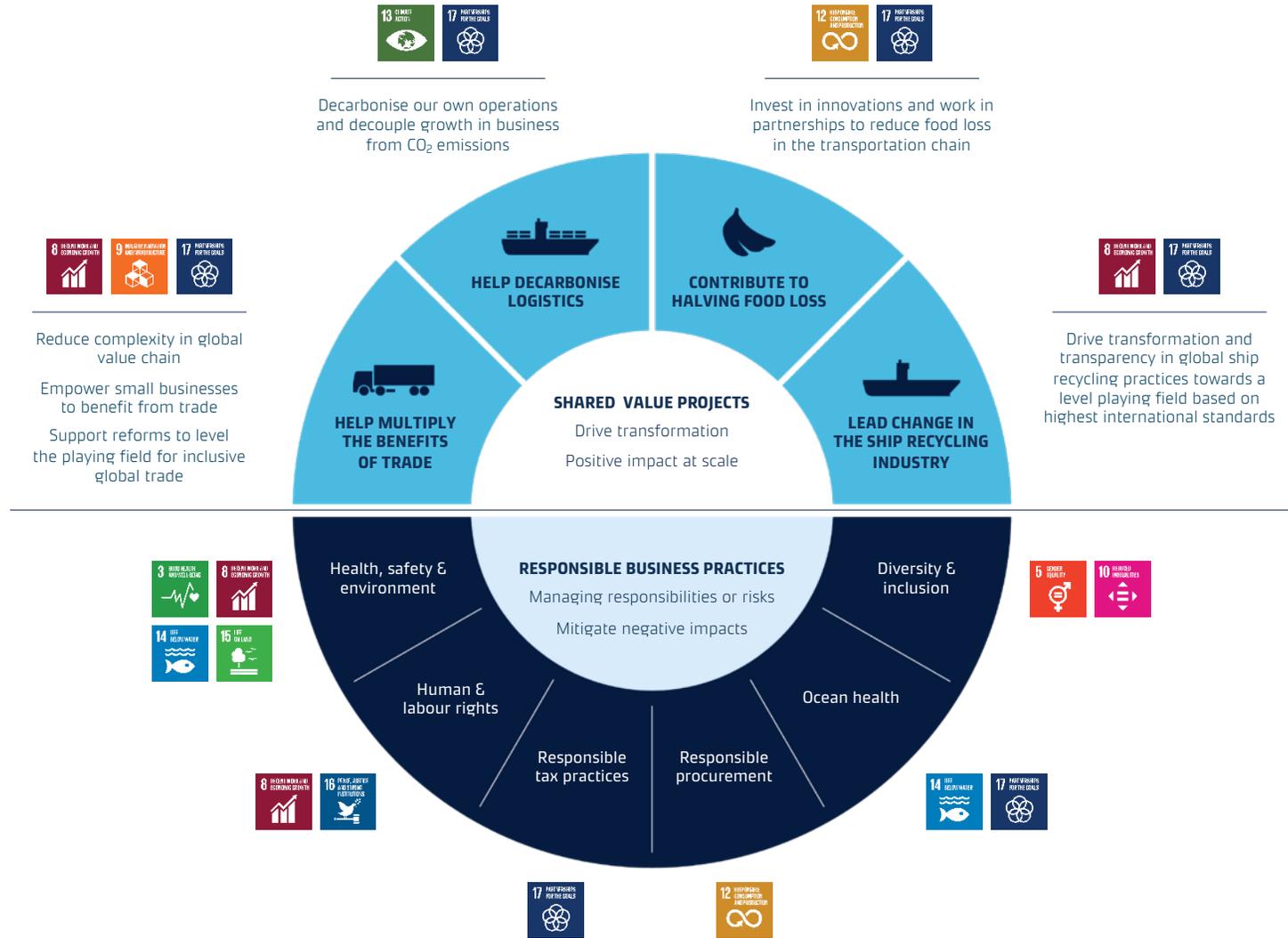
Connecting and simplifying global supply chains

A.P. Moller - Maersk enables its customers to trade and grow by transporting goods anywhere.

Maersk works to provide customers with a simple end-to-end offering of products and services, seamless customer engagement and a superior end-to-end delivery network, taking the complexity out of global supply chains.



Sustainability strategy



Working toward carbon-neutral shipping - A pledge and a call to action

Shipping is responsible for
2 – 3%
of global emissions

“ We have begun a journey towards having net-zero CO₂ emissions from our own operations by 2050. This is an important ambition and one we can only deliver on in collaboration with many other stakeholders. ”

Søren Skou, CEO of A.P. Møller - Mærsk A/S

New targets

ZERO

Net emissions from our own operations by **2050**

60%

Relative reduction by 2030 (compared to 2008)

2018 performance

41%

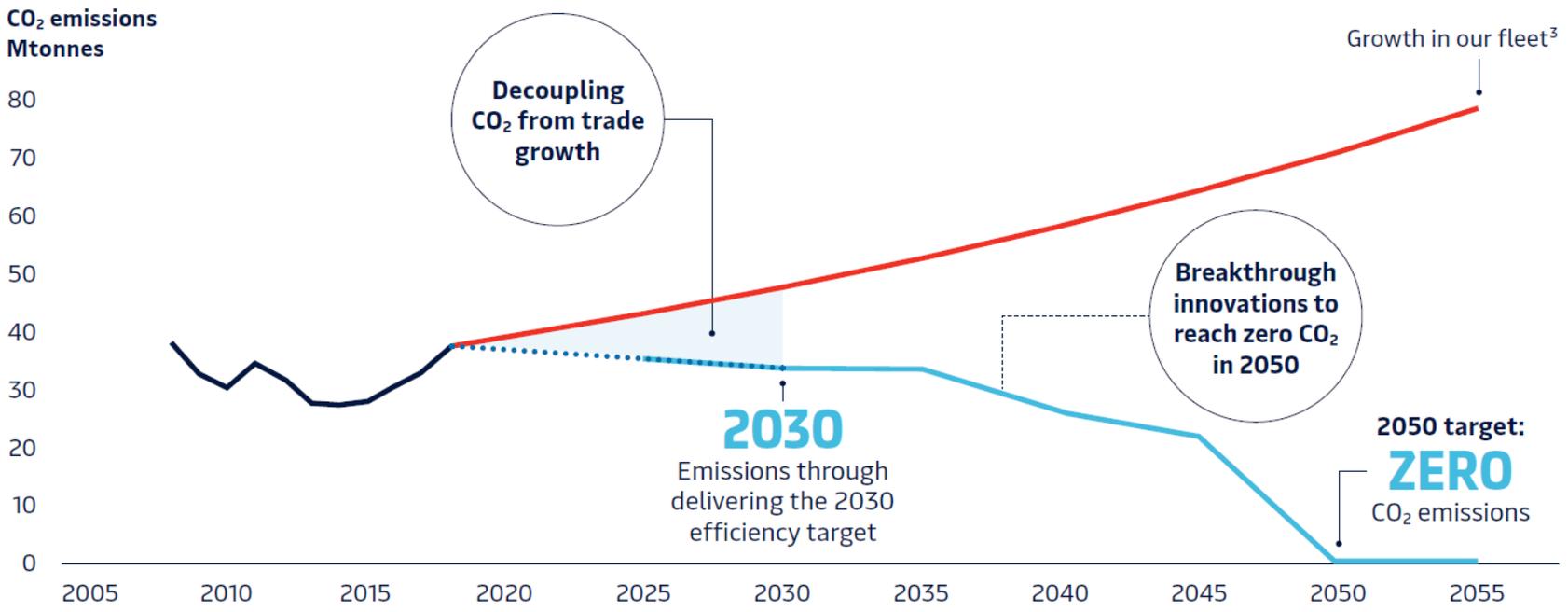
Relative reduction YTD (compared to 2008)

How could a Carbon Neutral 2050 Scenario be developed?

In a decade a total technology transition of the fleet commences...

2050 SCENARIO

— Historic emissions — Number of vessels ... Projected emissions 2030 efficiency target — Pathway to zero CO₂



WE NEED TO START THINKING NOW!

- Vessels built after 2025 will be part of the 2050 fleet, and assumed to be prepared for later retrofit to Carbon Neutral fuels
- First dedicated Carbon Neutral vessel must be introduced by 2030 followed by a slow ramp-up allowing maturation of technology and supply chain
- From 2045 Carbon Neutral ready vessels are being retrofitted to Carbon Neutral
- From 2050 Carbon Neutral fleet

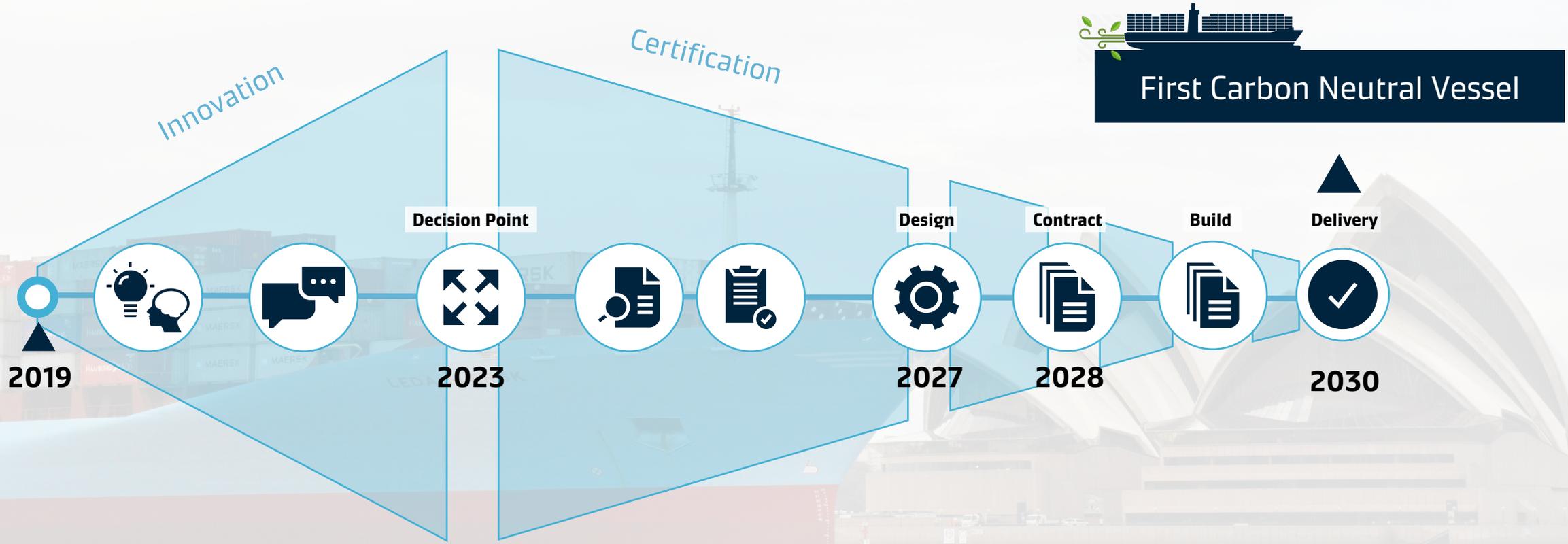
1 Global Warming of 1.5°C, Intergovernmental Panel on Climate Change, 2018.
 2 Our target is net-zero CO₂ emissions, because using e.g. biofuels will emit CO₂ when burned on a vessel. However, if the feedstock used to produce the biofuel absorbs CO₂ equal to the emissions produced when burned (and the production process of the fuel is also CO₂-neutral) then specific biofuels can be CO₂ neutral.
 3 The 2050 scenario is based on a simulation, which builds on our expectations for the development of our business activities until 2050 and the reductions coming from exchanging old vessels with zero carbon vessels. It does not however, include post 2030 reductions coming from further reductions on the remaining part of the old fleet.

NB: Please see A.P. Møller-Mærsk annual report for details



Designing our first carbon-neutral vessel

Our approach to low carbon innovation



DECARBONISED MARITIME TRANSPORT: EXAMPLES OF FUEL PATHWAYS

NB: NOT COMPREHENSIVE LIST

Energy Carrier
Characteristics

Energy Carriers



Vessel Characteristics

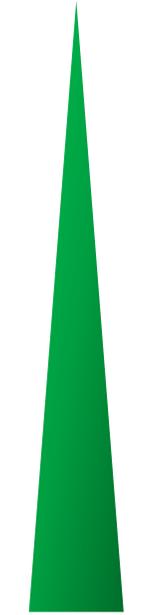
Cost of vessel retrofit

Drop-In/ Blend-in fuels		 Bio Fuel Oil	 E-Gas Oil	 Minimal changes to engine/systems	
Low flash point fuels		 Methanol (e-fuel)	 Methanol (bio)	 Ethanol + Lignin	 Liquid-Gas Engine, Low-flash system, structural tanks, and possible pilot fuel
Non-cryogenic gas		 Ammonia	 DME	 Gas Engine, Liquid Gas Tanks (non-cryogenic), FGSS	
Cryogenic gas		 Bio-LNG	 Hydrogen	 Gas Engine, Liquid Gas Tanks (cryogenic), FGSS	

Battery / Hybrid Propulsion		Battery Pack 		 Electric Propulsion, Battery Packs
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Nuclear & Unknown	X	Thorium 	Unknown X	 Nuclear Reactor and other unknown
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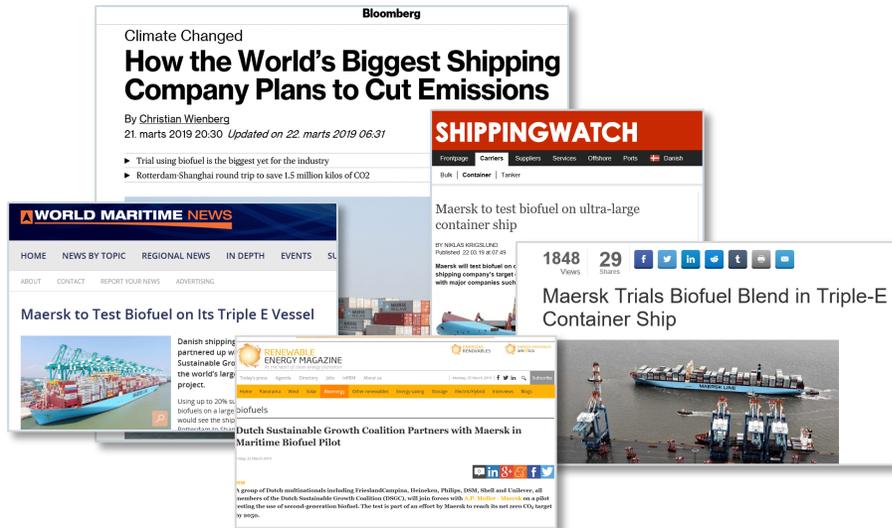
Fuel Cell	X	 Ammonia	 Hydrogen	 MeOH (e-fuel)	 Fuel cell, electric propulsion
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Moon Shots for stand-alone deep sea transport



Live innovation project: World's largest biofuel pilot



✓ Maersk collaborates with the DSGC:



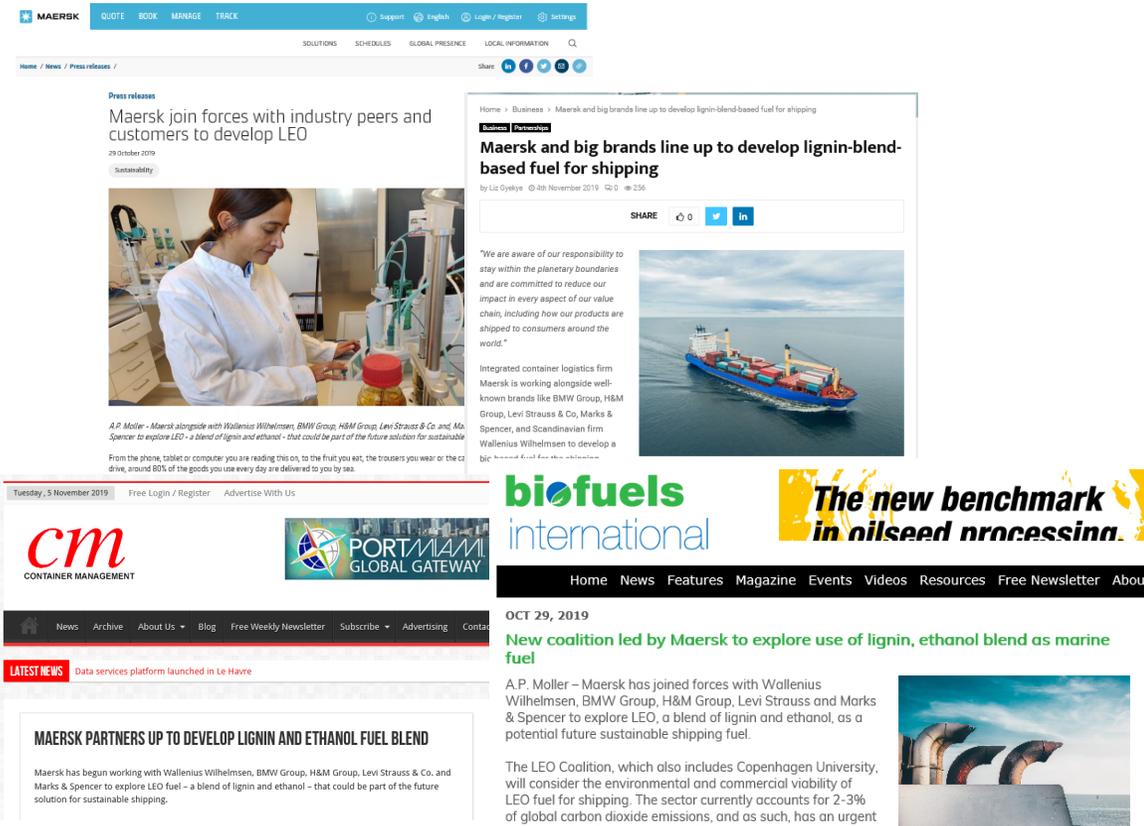
✓ Key statistics:

- ✓ 1.5M kg of CO2 saved on the journey
- ✓ Up to 20% bio-blends tested
- ✓ Full roundtrip on biofuel blends alone (25.000 nautical miles)

- ✓ Test the technical, sustainable and commercial viability of using readily available biofuels in global shipping
- ✓ Now commercial offering for select customers (2019)



New Initiative: Lignin/ Ethanol Blend



- R&D industry project
- Collaboration between Maersk, Wallenius Wilhelmsen, BMW Group, H&M Group, Levi Strauss & Co. and, Marks & Spencer:



- To test the technical, sustainable and commercial viability of using lignin-infused ethanol biofuels in global shipping

Future Fuels: Joint Study with Lloyd's Register



Press releases
Alcohol, Biomethane and Ammonia are the best-positioned fuels to reach zero net emissions
24 October 2019
Sustainability



Maersk Promotes Alcohol, Biomethane and Ammonia as Fuel



Zero Net Emissions: Alcohol, Biomethane & Ammonia a Good Start



Market projections have shown that the best-positioned fuels for research and development into net-zero marine fuels are alcohol, biomethane and ammonia.

According to a new study conducted by Danish shipping major A.P. Møller - Maersk and UK's classification society Lloyd's Register, the greatest opportunities for decarbonizing shipping lie in



Maersk ammonia, alcohol, biomethane best fuels to reach net-zero emissions

As the APMM researchers...

As Maersk and Lloyd's Register view the best opportunities for decarbonizing shipping lie in finding new sustainable energy sources - and the best positioned fuels for research and development into net-zero emissions for shipping are alcohol, biomethane and ammonia.

Maersk and energy efficiency has been and will be an important part of CO2 emissions reduction and that its own efficiency measures have produced Maersk some 40% ahead of the industry average in carbon cost.



Alcohol, biomethane and ammonia the best options for decarbonization, study says

The best opportunities for decarbonization of shipping lie in finding new sustainable energy sources, says a new study by Danish shipping giant A.P. Møller - Maersk and Lloyd's Register which identifies alcohol, biomethane, and ammonia as the best positioned fuels for research and development into net-zero fuels.

- Working hypothesis: MeOH/ EtOH, CH₄, and NH₃ are scalable and can propel deep sea vessels
- Søren Toft, COO at A.P. Møller-Mærsk:
 - *"It is too early to rule anything out completely, but we are confident that these three are the right places to start. (...) These three fuel pathways have relatively similar cost projections but different challenges and opportunities."*
- 80% of internal APMM research into long-term solutions (zero emissions) will be centered around CH₄, NH₃, and MeOH/ EtOH
- 20% of internal APMM research into long-term solutions (zero emissions) will be centered on other fuels and technologies
- Short-term solutions also need to be identified!

Thank you

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Questions?