

Green Ship Technology: What could fuel shipping by 2030 and 2050 and what might the ship look like?

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A.P. Moller – Maersk at a glance

Present in
130+
Countries

Revenues¹ of
38,890
USD million

Profits¹
509
USD million

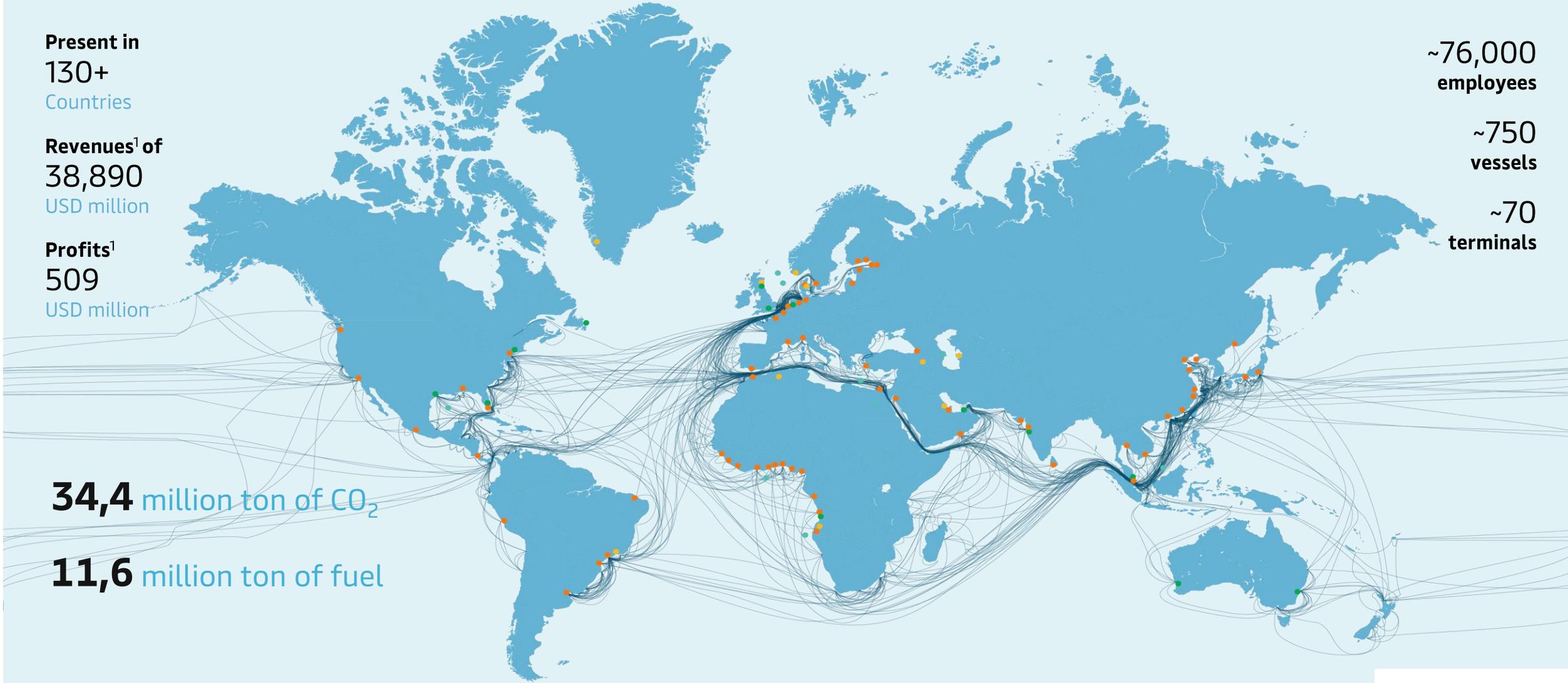
~76,000
employees

~750
vessels

~70
terminals

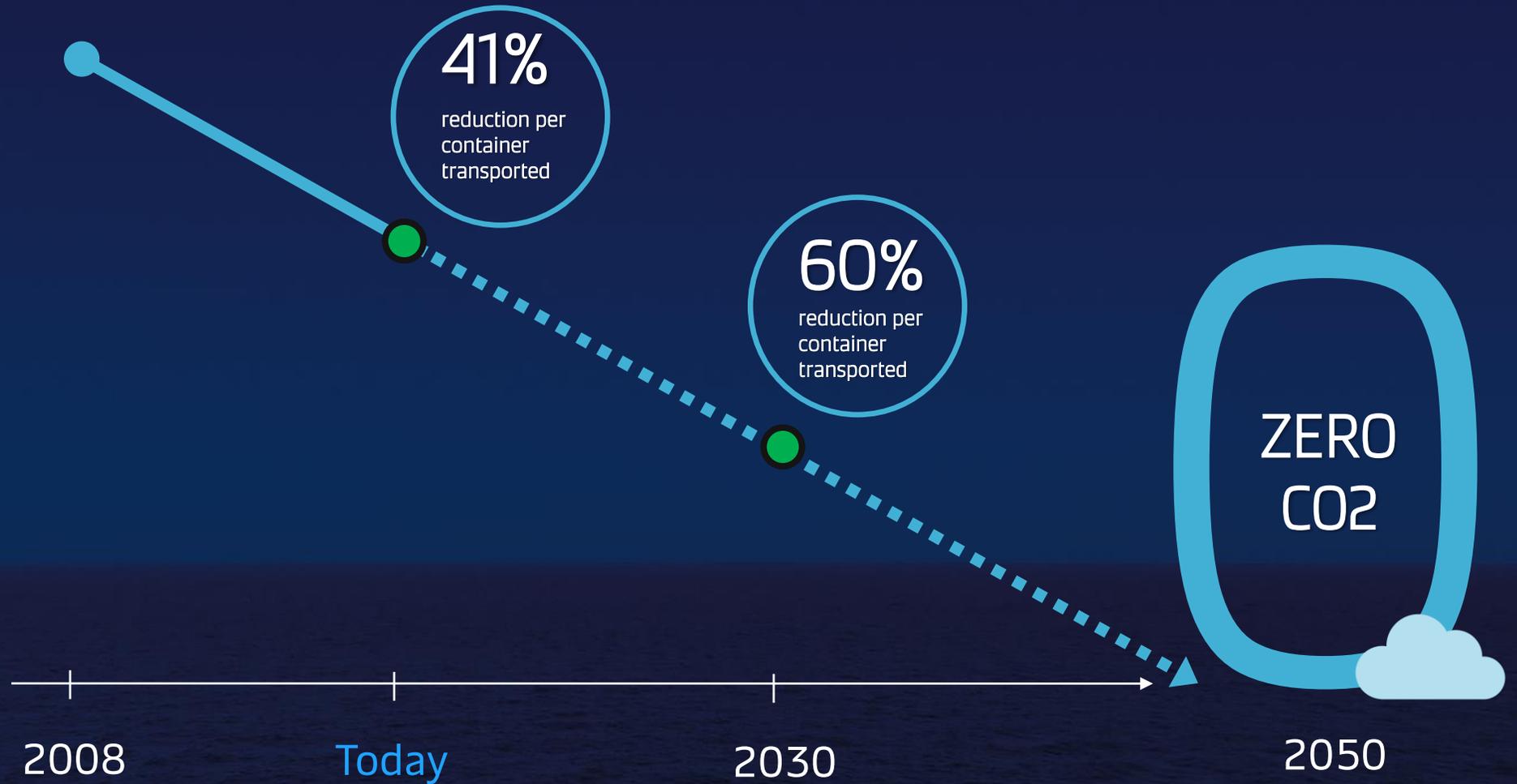
34,4 million ton of CO₂

11,6 million ton of fuel



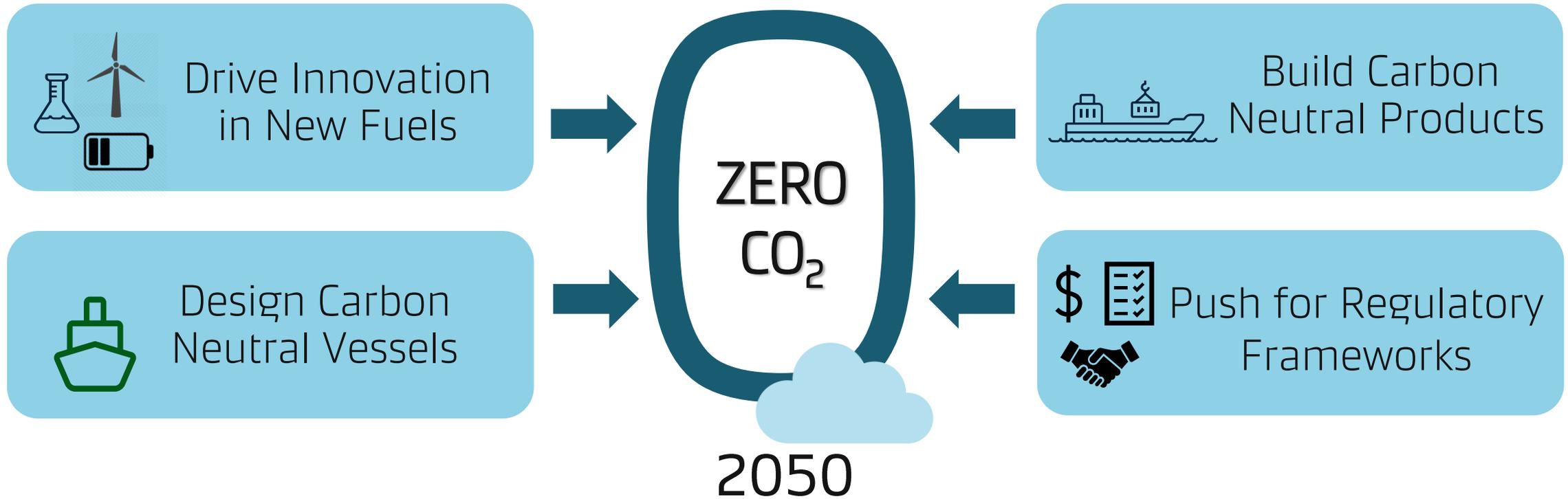
1. FY 2019

Maersk has committed to NET-ZERO CO2 EMISSIONS by 2050...

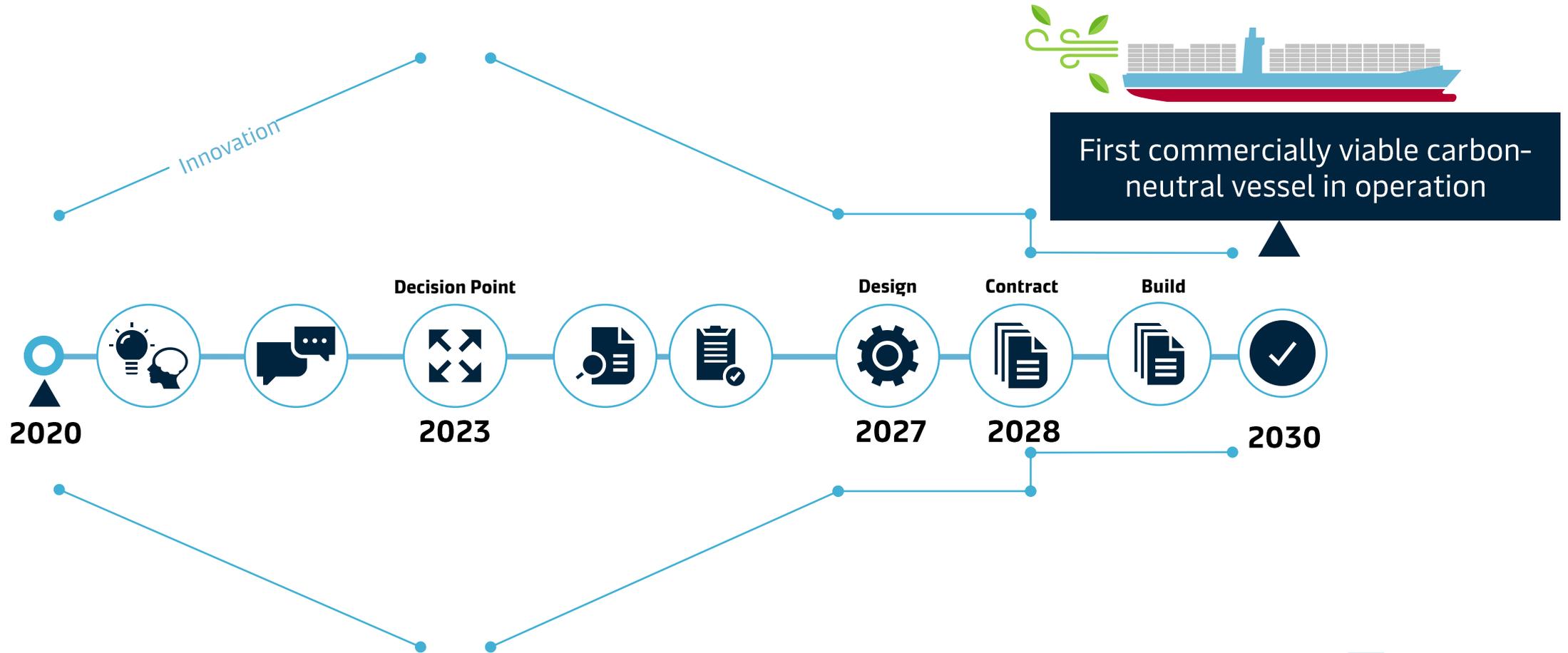


... and broad-based action is urgently needed to reach this goal

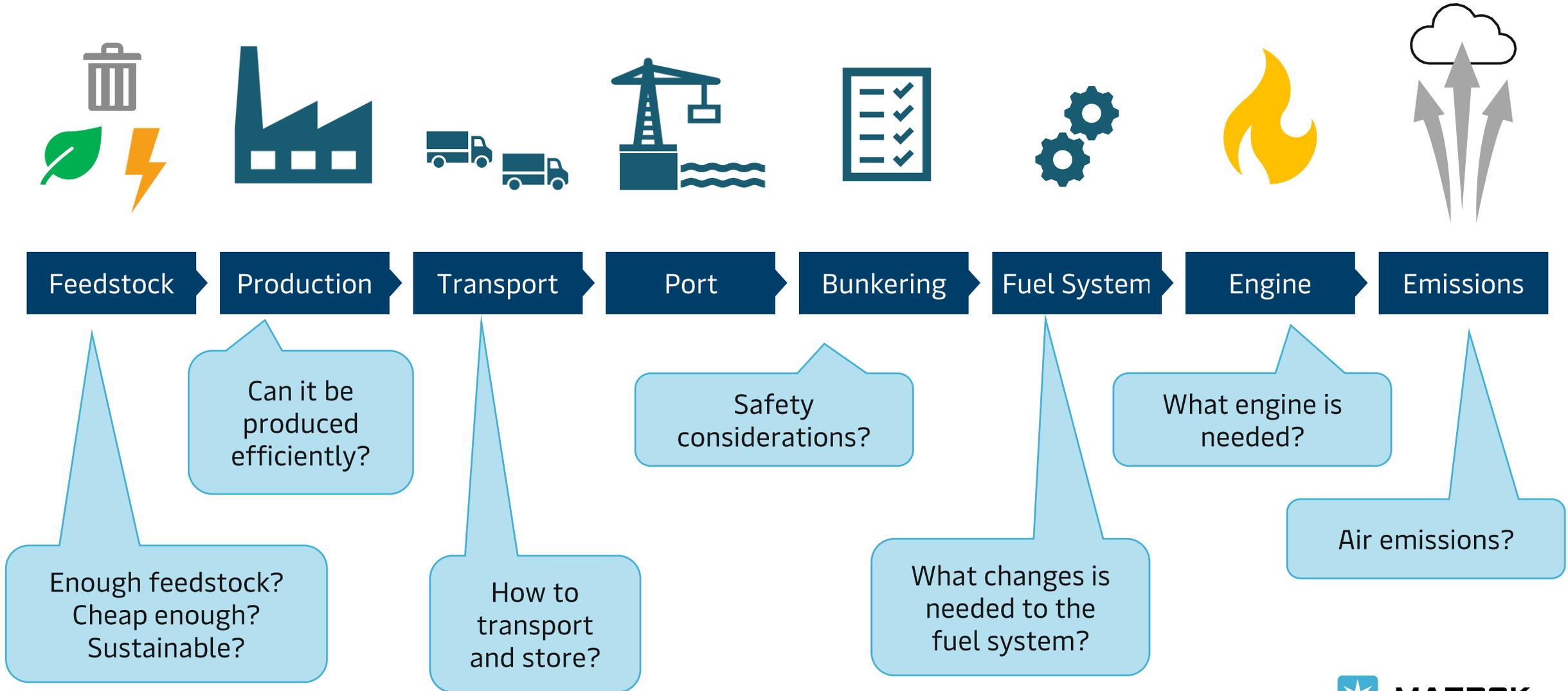
Maersk initiatives



Our plan is to have our first carbon neutral container vessel by 2030



Finding the fuels of the future will be cumbersome!



Getting to zero CO2 requires new fuel(s) for shipping

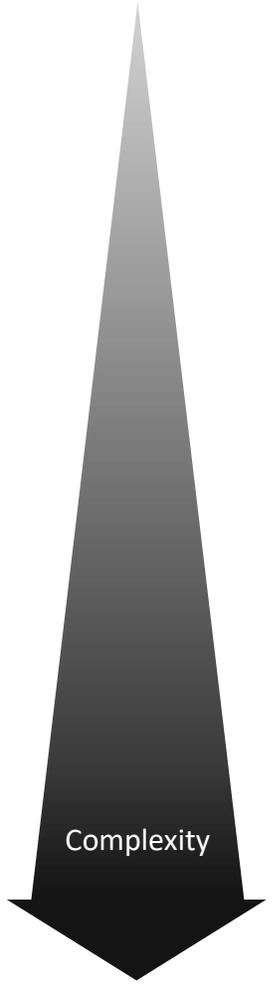


Energy Carrier Characteristics

Energy Carriers

Vessel Characteristics

Energy Carrier Characteristics	Energy Carriers	Vessel Characteristics
Drop-In/ Blend-in fuels 	Bio Fuel Oil (BIO) E-Gas Oil (POWER)	Minimal changes to engine/systems
Low flash point fuels 	Methanol (e-fuel) (POWER) Methanol (bio) (BIO) Ethanol + Lignin (BIO)	Liquid-Gas Engine, Low-flash system, structural tanks, and possible pilot fuel
Non-cryogenic gas 	Ammonia (POWER) DME (POWER)	Gas Engine, Liquid Gas Tanks (non-cryogenic), FGSS
Cryogenic gas 	Bio-LNG (BIO) Hydrogen (POWER)	Gas Engine, Liquid Gas Tanks (cryogenic), FGSS
Battery / Hybrid Propulsion 	Battery Pack	Electric Propulsion, Battery Packs
Nuclear & Unknown X	Thorium (BIO) Unknown	Nuclear Reactor and other unknown
Fuel Cell X	Ammonia (POWER) Hydrogen (POWER) MeOH (e-fuel) (POWER)	Fuel cell, electric propulsion



Concluding remarks

- Shipping needs to decarbonise – like everyone else!
- No solutions will be easy or simple – so we better get started now, so that we can learn before we scale.
- We cannot expect business as usual – the future fuels will differ significant from what we have today, so we need to adapt.
- We believe that **alcohols**, **bio-methane** and **ammonia** holds the highest potential. We expect more than one winner.
- The shipping “ecosystem” must work together to develop the fuels, ships and infrastructure of the future.

Thank you.