Maersk's decarbonization journey

Status, key learnings and challenges...

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Maersk Energy Transition

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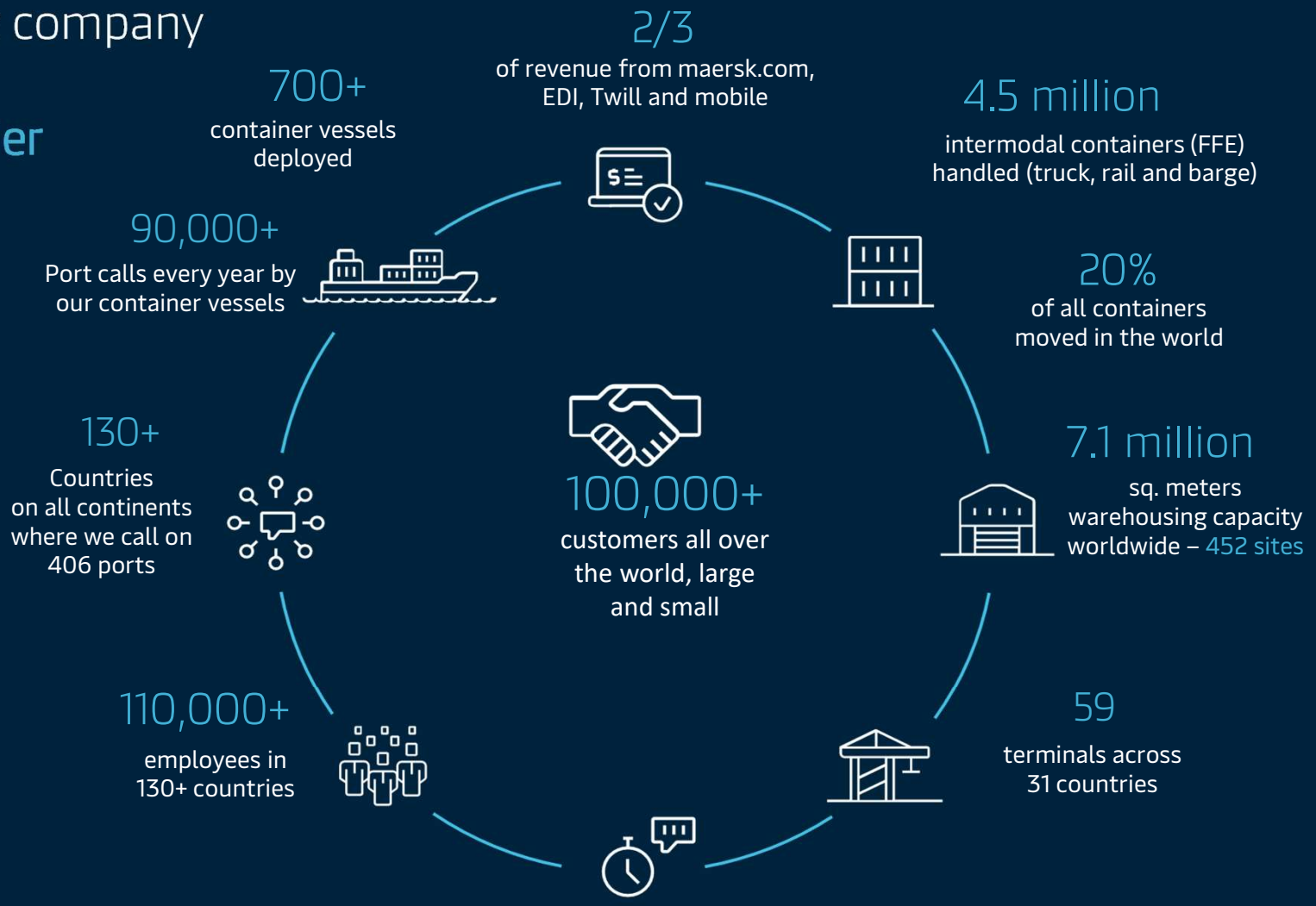
From shipping company to end-to-end logistics provider



2/3
of revenue from maersk.com, EDI, Twill and mobile

4.5 million
intermodal containers (FFE) handled (truck, rail and barge)

20%
of all containers moved in the world

7.1 million
sq. meters warehousing capacity worldwide – 452 sites

59
terminals across 31 countries

Every 6 minutes
one port call somewhere in the world

110,000+
employees in 130+ countries

130+
Countries on all continents where we call on 406 ports

90,000+
Port calls every year by our container vessels

700+
container vessels deployed

100,000+
customers all over the world, large and small

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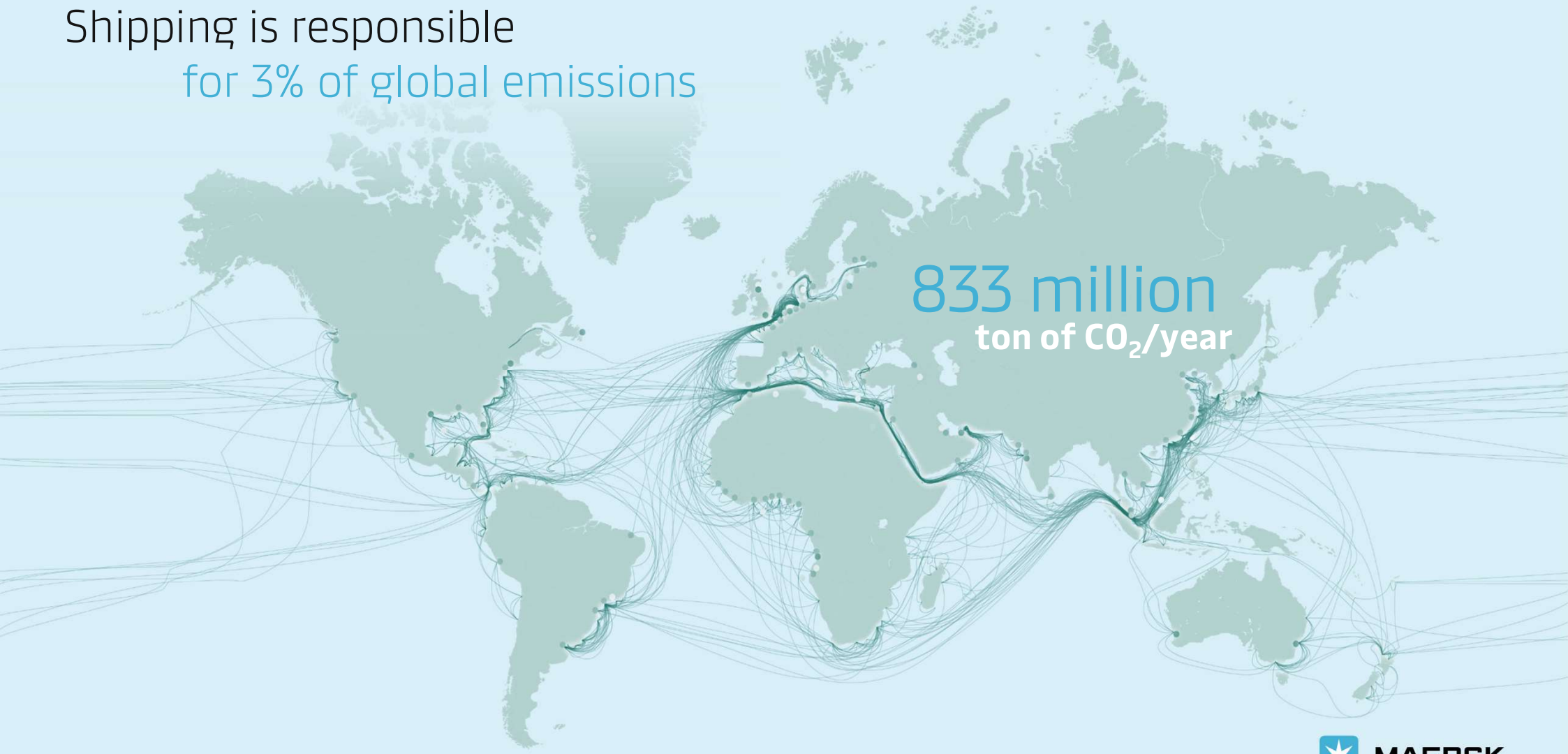
Shipping is responsible

for 3% of global emissions



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** According to the International Maritime Organisation (IMO)*

Maersk's GHG Emissions Footprint For 2022

SCOPE 1:
OWN OPERATIONS

Direct emissions coming from our financially controlled operations.

95% of our scope 1 emissions come from our ocean operations (fuel use). (2021: 94%)

34,150 (1,000 tonnes CO_2e) (2021: 36,596)

0.5%

SCOPE 2:
PURCHASED ELECTRICITY
(location-based)

Emissions from the generation of purchased electricity.

65% of our scope 2 emissions come from our terminals. (2021: 65%)

356 (tonnes CO_2e) (2021: 351)

SCOPE 3:
VALUE CHAIN

Emissions created in the value chain as a result of Maersk's business activities, including emissions from cargo transported under vessel sharing agreements and sourcing of marine fuels to third-party customers.

43,451 (1,000 tonnes CO_2e) (2021: 39,436)
The main activities driving our value chain emissions are:

- Upstream transportation and distribution: 24,547 (1,000 tonnes CO_2e) (2021: 16,275)
- Use of sold product (incl. sale of marine fuels and reefer containers to 3rd parties): 7,419 (1,000 tonnes CO_2e) (2021: 10,285)
- Fuel and energy related activities: 5,989 (1,000 tonnes CO_2e) (2021: 6,468)
- Purchased goods and services: 3,821 (1,000 tonnes CO_2e) (2021: 3,158)

Maersk decarbonisation targets
on the way to 2040

2030

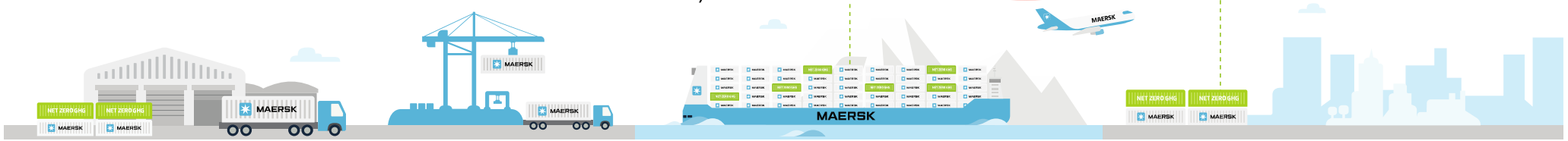
- Ocean: ~50% reduction in emission intensity from 2020 baseline
- Min. 25% of Ocean cargo transported with green fuels
- Air: Min. 30% of cargo transported with Sustainable Aviation Fuels
- Logistics facilities: Min 90% green operations*
- Landside: Min 20% of moves of customer's cargo on low/zero emissions technology
- Terminals: ~70% emissions reduction from 2020 baseline (Scope 1 & 2 from own terminals)

2040

- Industry-leading green customer offerings across the supply chain
- Aligned with a Science Based Target 1.5-degree pathway

0

- Net zero across our business and 100% green solutions to customers



(*) Operated on renewable electricity and/or green fuels

[Read more: Sustainability | Committed to Sustainable Logistics | Maersk]

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Decarbonising inland logistics

Decarbonising
Inland Logistics & Air Freight

2030 Targets

Landside Transportation

Min. **20%** of customer cargo moves on low/zero emissions technology

Logistics Facilities

Min. **90%** of logistics facilities on green operations*

Air Freight

Min. **30%** of Maersk air freight cargo on SAF-based transport

Key Levers

Efficiency improvements

- Modal shifts
- Digitally enabled optimized network and routing
- Investment in new, state-of-the-art aircraft

Electrification

- Equipment: 100% indoor, outdoor where possible
- Renewable energy sources, e.g. purchase agreements or on-site installation

Energy transition

- Battery electric trucks
- Potential use of biofuels
- Use of Sustainable Aviation Fuel (SAF)

Actions

- 2021: Ordered 16 Volvo VNR Electric Class 8 e-trucks
- 2022: Ordered 100 Volvo e-trucks and 300 Einride e-trucks

- Current investment in 12 warehouses with BREEAM, LEED or Green 5-star certified

- Running SAF pilot to determine customer demand
- Potential launch 2023

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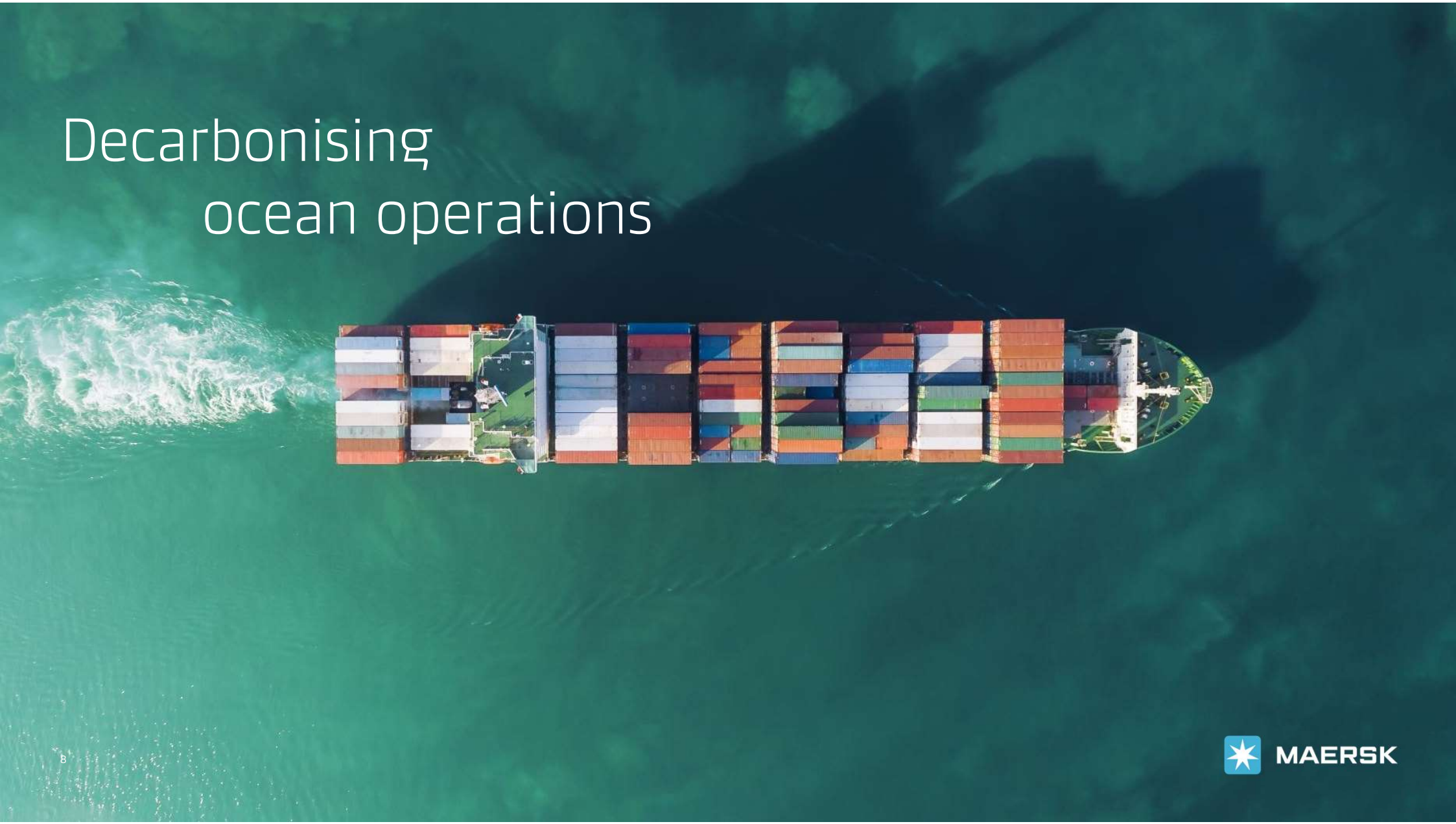
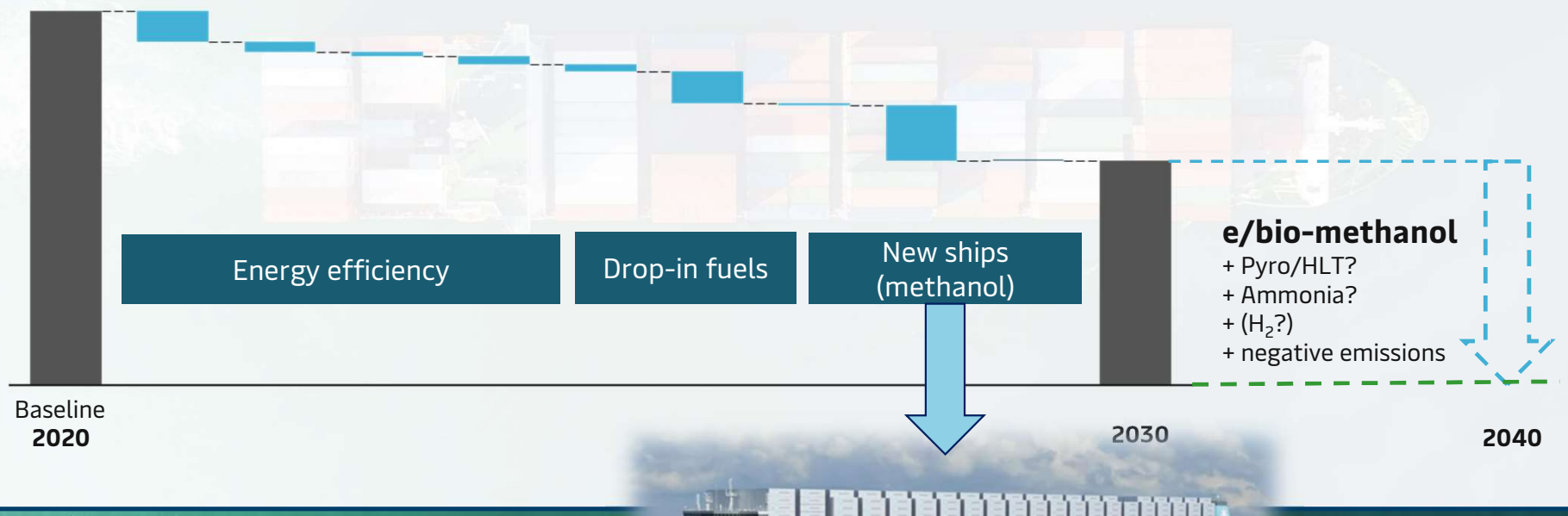
Decarbonising ocean operations



How do we intend to reach our longterm reduction targets (ocean only)?



25 dual fuel methanol ships ordered to date

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First methanol container ship delivered in September 2023

Laura Maersk being christened by Ursula von der Leyen, Sep. 2023 in Copenhagen. To be operated in the Baltics.

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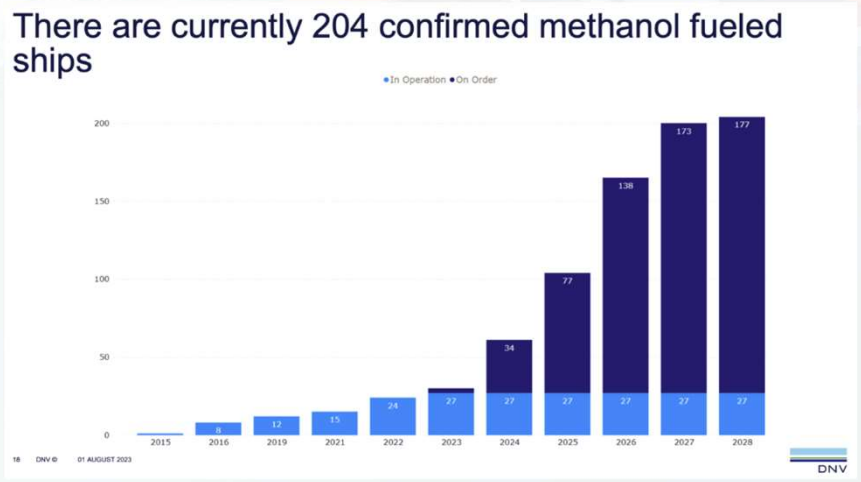
In total 25 methanol ships ordered by Maersk to be delivered 2024-2026. World-wide orders are at 200+ methanol fueled ships

- ❑ Dual fuel engines
- ❑ All ships to replace existing capacity
- ❑ All newbuildings to be able to run on green fuels
- ❑ Looking at introducing green chartered vessels



The first in a series of 12 methanol containerships launched in the water Oct 2023. 16.200 TEU.

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Maersk's top priority fuels (ocean only)

- (Pyrolysis/HTL oils)
- Bio/e-methanol
- (e-ammonia)

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Bio/e-methanol: Why do we see it as one of our main future fuels – and what are the challenges?

1) Why?

- Best overall feasibility profile due to: engine maturity, low toxicity, easy handling, multiple production pathways, easy storage, high energy denisty, simple fuel, regulation in place, suitable for fuel cells – and reasonable production costs!

2) Challenges?

- *Carbon dependency* – hence we have looked into it and found:
  - Pot. volumes of biogenic CO2 world wide: 1.38 bio. tons/year → i.e.sufficient – however availability of affordable ren. electricity in same locations (sweet spots) may pose a challenge.
  - DAC: tecnologies being matured → price expected to drop to appr. 200 USD/ton in 2030
  - DOC: technologies being matured → price expectations at up to a factor 10 less than DAC
  - At CO2 capture cost at 45 USD/ton CO2 – e-ammonia production costs equals e-methanol*
  - Need fast scale up of ren. Electricity/green H2 production
- *Market price developments* uncertain – and depends on
  - Other sectors relying on methanol to decarbonise
  - Speed of production capacity buildup

* assumed handling/logistic costs of methanol at 75 USD/ton and ammonia at 100 USD/ton

Bio/e-methanol: Why do we see it as one of our main future fuels – and what are the challenges?

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<u>All-e-fuels:</u> Maersk would need 7 × DK power consumption as renewable power

<u>All-Bio:</u> 200 × Maersk would use all sustainable feedstock!

- ❑ DAC: technologies being matured → price expected to drop to appr. 200 USD/ton in 2050
- ❑ DOC: technologies being matured → price expectations at up to a factor 10 less than DAC
- ❑ At CO2 capture cost at 45 USD/ton CO2 – e-ammonia production costs equals e-methanol*
- ❑ Need fast scale up of ren. Electricity/green H2 production

- ❑ *<u>Market price developments</u>* uncertain – and depends on
  - ❑ Other sectors relying on methanol to decarbonise
  - ❑ Speed of production capacity buildup

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E-ammonia: Why do we see it as a potential future fuel – and what are the challenges?

1) Why?

- Cheap e-fuel. No carbon-dependency. Energy density sufficient. Production tech well-known. Engine being developed. Regulatory work ongoing.

2) Challenges?

- *Safety issues* – we are investigating this through numerious external projects
  - Technical ship design
  - Safety management systems
  - Potential spills
  - LCA
  - May be issues with operational limitations at selected ports (not allowing SIMOPS, or some ports will not allow us to bunker ammonia if the port is close to a city, etc.)
  - Needs fast scale up of ren. electricity/green H2 production
- *Market price uncertain*
  - Not yet clear how many sectors will utiilze ammonia in decarbonisation efforts

Pyrolysis/HTL oils: Why do we see these as potential future fuels– and what are the challenges?

1) Why?

- Seems to be a potentially cheaper replacement of biodiesel. Fairly mature production technologies. High energy density. No need for new engines/fuel systems. Scalable (feedstock agnostic), pot. use as pilot fuel for methanol ships (and pot. ammonia ships), less competition, *negative emission*. *Blendable with heavy fuel oil* → enabling us to utilized it to decarbonise existing fleet (i.e. Help us comply with ship-individual regulations).

2) Challenges?

- Poor quality of raw pyro/HTL oil → i.e. what combi of pyro/HTL process and upgrading provides the cheapest pyro-oil just about good enough to blend into HFO at x%?
- How can we scale pyro/HTL oils fast enough?

HFO

Difficult oil quality

...is nothing new to Maersk

We are used to utilize poor quality oil!

- HFO: High viscosity, sulfur, impurities, aromatics, acidity, ...

Few hard requirements for new drop-in fuels:

- Flash point: Above 60˚C
- Miscibility: Prefered fully miscible in HFO
- Stability: At least 9 months storage
- Pour point: Below 30°C

A general challenge & an imperative for success:
securing adequate supplies of cost competitive green fuel

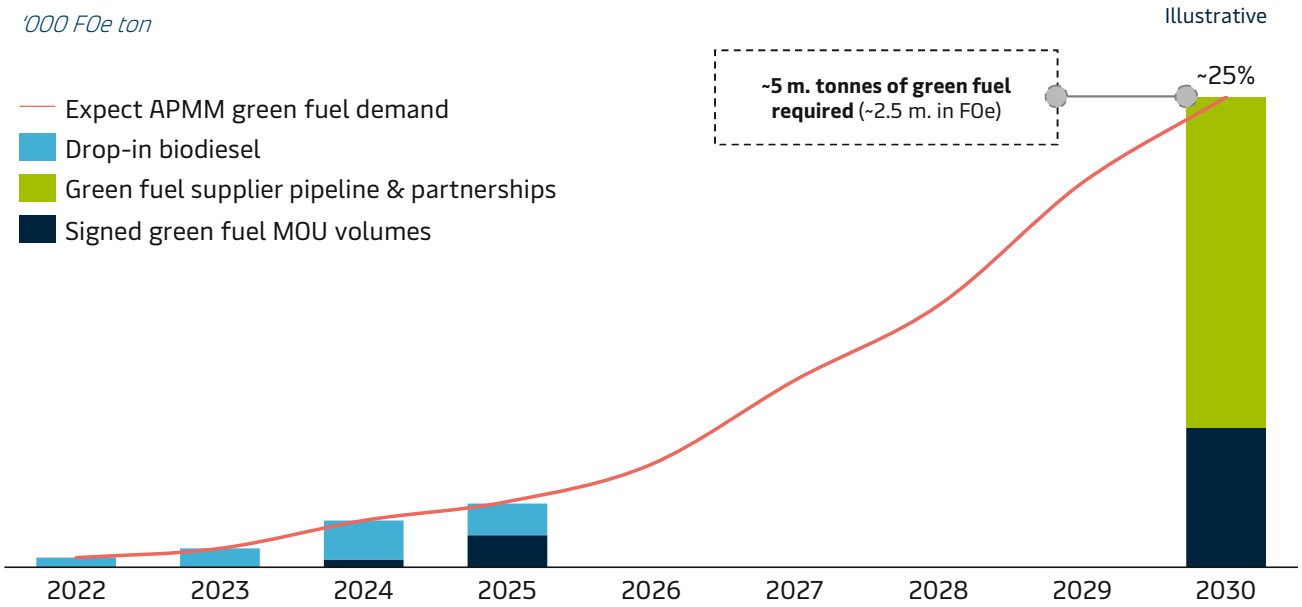
Sourcing levers

Drop-in biodiesel
ECO Delivery fuel today; gap-closer going forward

Signed green fuel MOUs[1]
MOUs for +1.5m tons of methanol signed and strong pipeline

Signed partnerships with sovereign governments

Expected green fuel requirement and sourcing lever



(1) MOUs signed – still require final validation and contracting

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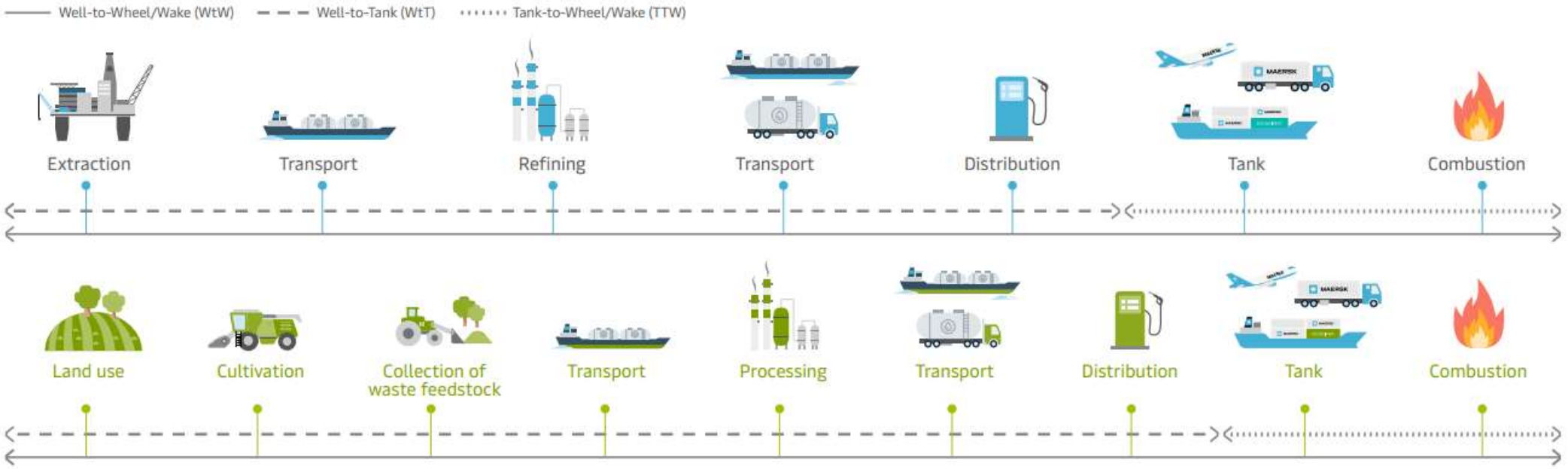
Maersk evaluates all new fuels on a 'well-to-wake' life cycle basis



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How much can we rely on
our customers to support the
decarbonisation of the transport sector?
?
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Where are customers today?

Level 1: Explorers

- Acknowledge that sustainability in logistics is important
- Are defining their sustainability logistics priorities
- Are seeking information/guidance from suppliers on sustainability
- May be willing to invest in sustainable logistics options over time, but need guidance

35% of our top 200 customers

Level 2: Risk managers

- Have basic minimum sustainability requirements
- Have integrated sustainability parameters into logistics decisions
- Engage with industry forums (e.g., Clean Cargo)
- Are considering investing in sustainable logistics options

45% of our top 200 customers

Level 3: Implementers

- Have ambitious sustainability strategy integrated with logistics
- Have sustainability parameters integrated into logistics decisions
- Contribute financially to industry sustainability investment
- Are willing to invest in sustainable logistics options

15% of our top 200 customers

Level 4: Leaders

- Are visible first-movers interested in sustainable transformation
- Have high interest in long-term partnerships and co-innovation
- Engage in long term partnerships and investment
- Exhibit high willingness to invest in long-term sustainable logistics transformation

5% of our top 200 customers

Customers are at differing levels of maturity. We can help them wherever they are.

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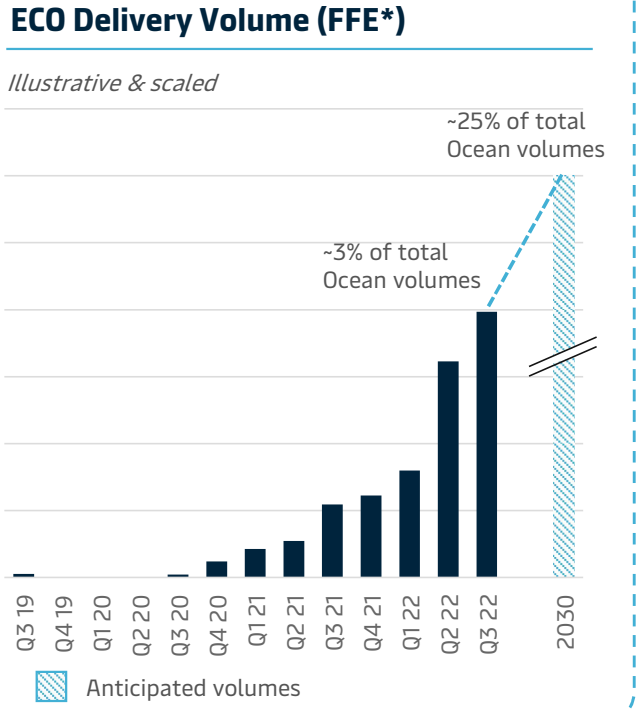
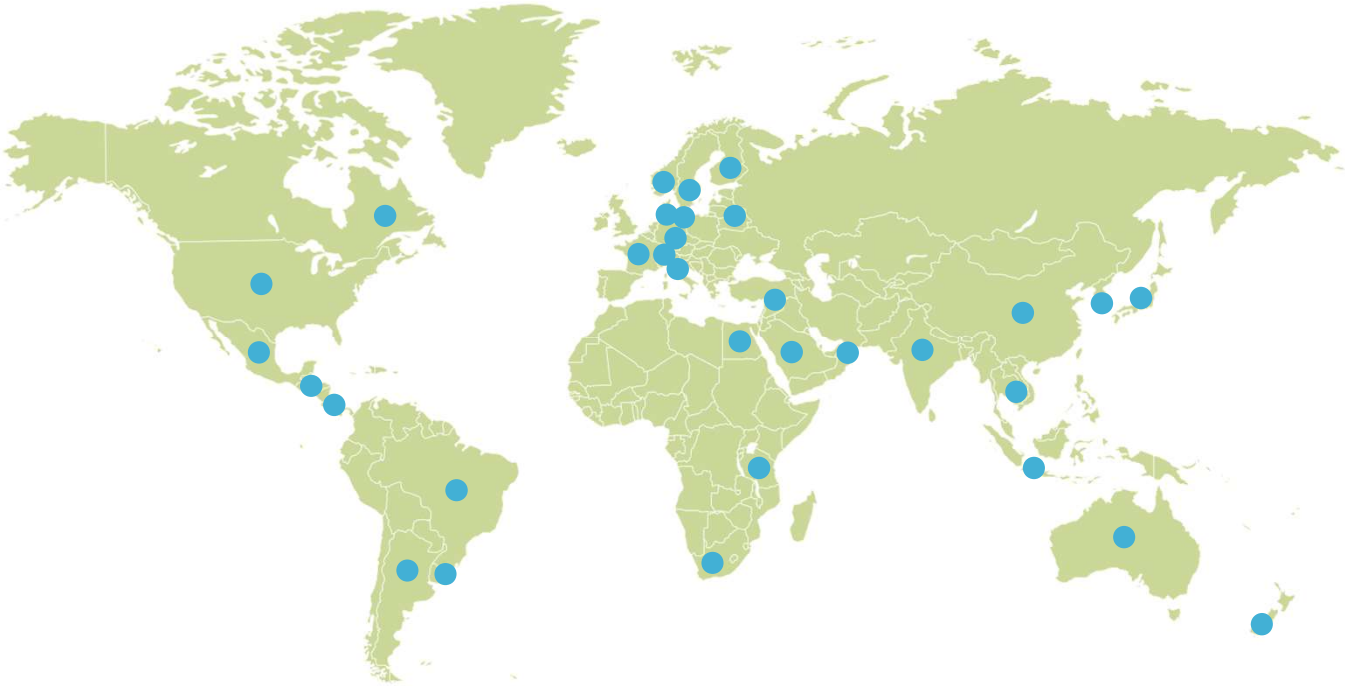
Ocean ECO Delivery:
strong and expanding demand



*Forty Foot Equivalent Units



Countries with Ocean ECO Delivery customers

→ On the horizon: End-to-End challenge

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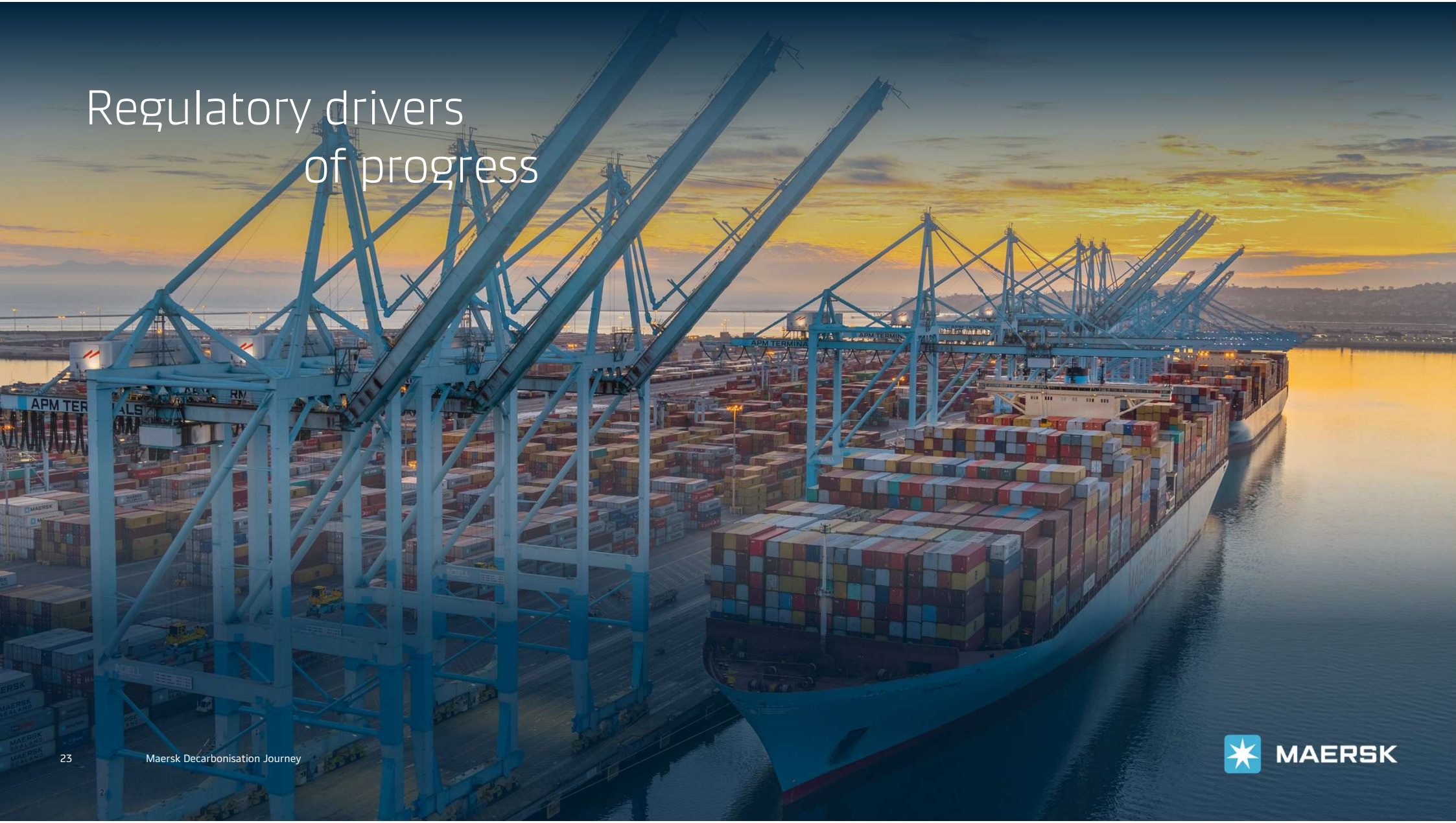
Regulatory drivers of progress



A level regulatory playing field
is key to achieving full decarbonisation

Five critical policy levers for a level regulatory playing field to achieve full decarbonisation

A market based GHG price/carbon tax of at least USD 150/ton is required

A well-to-wake approach is required (lifecycle perspective to decarbonisation)

Must look beyond CO_2 and include all GHG, notably methane and nitrous oxide

Higher IMO ambitions for 2030 and 2050 and rigorous implementation required

US and EU measures will only address part of the problem – need global rules

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Thanks

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