Ren luft konference 17. marts 2021

Grøn omstilling i praksis

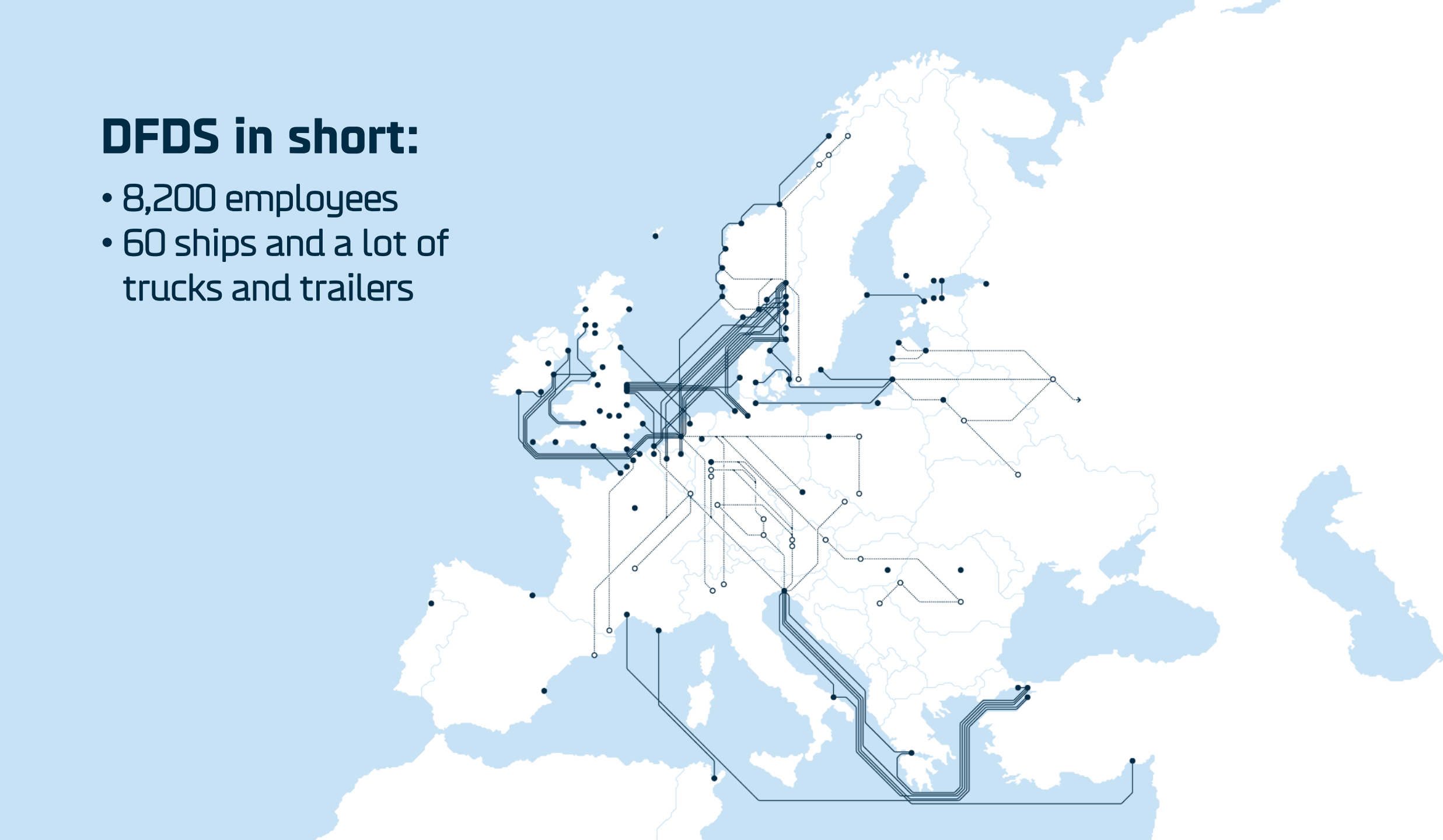
Hvad har vi lært, hvad arbejder vi med og et bud på storskala grøn omstilling af hele erhvervet.

Af Jakob.Steffensen@dfds.com

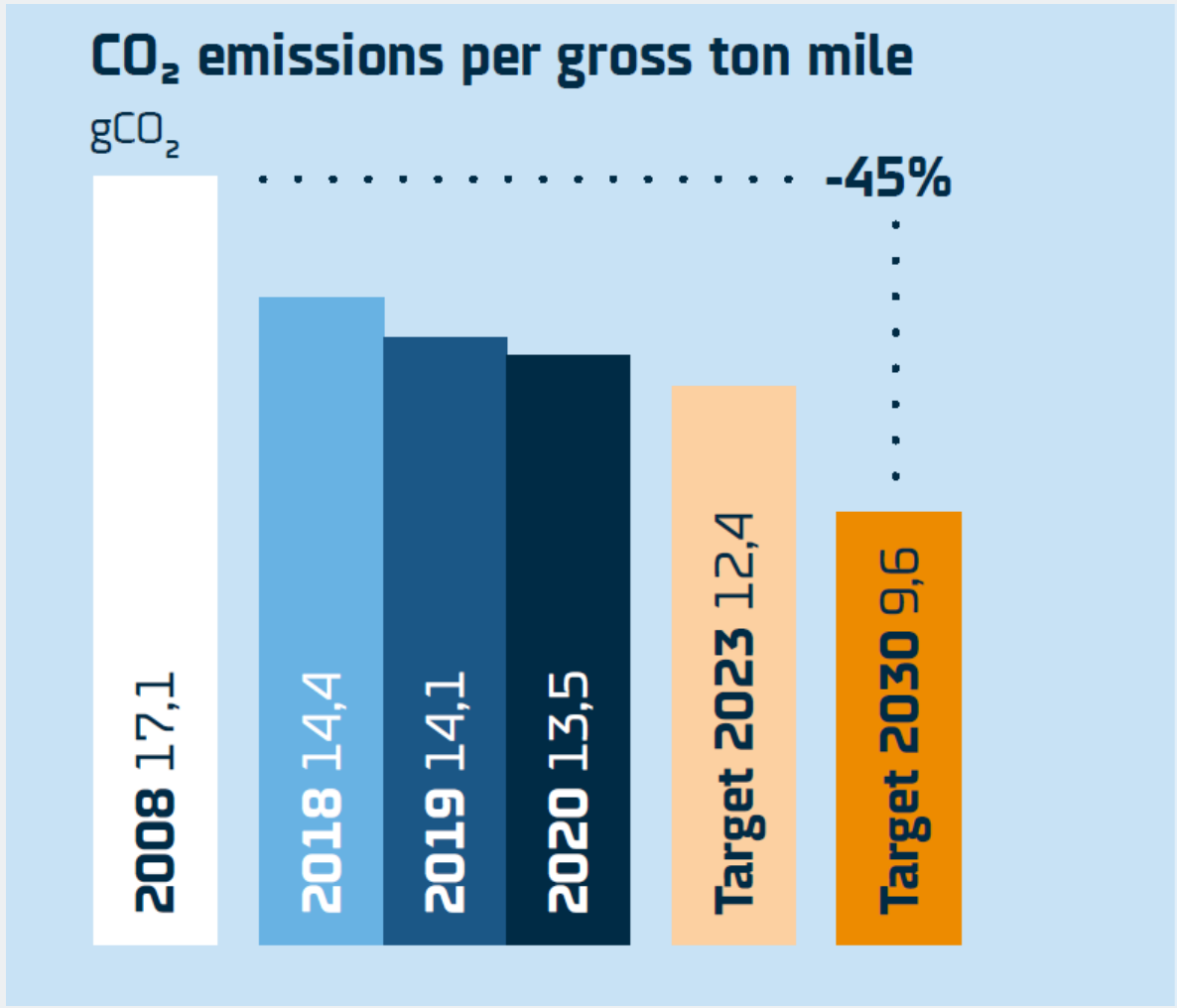
DFDS

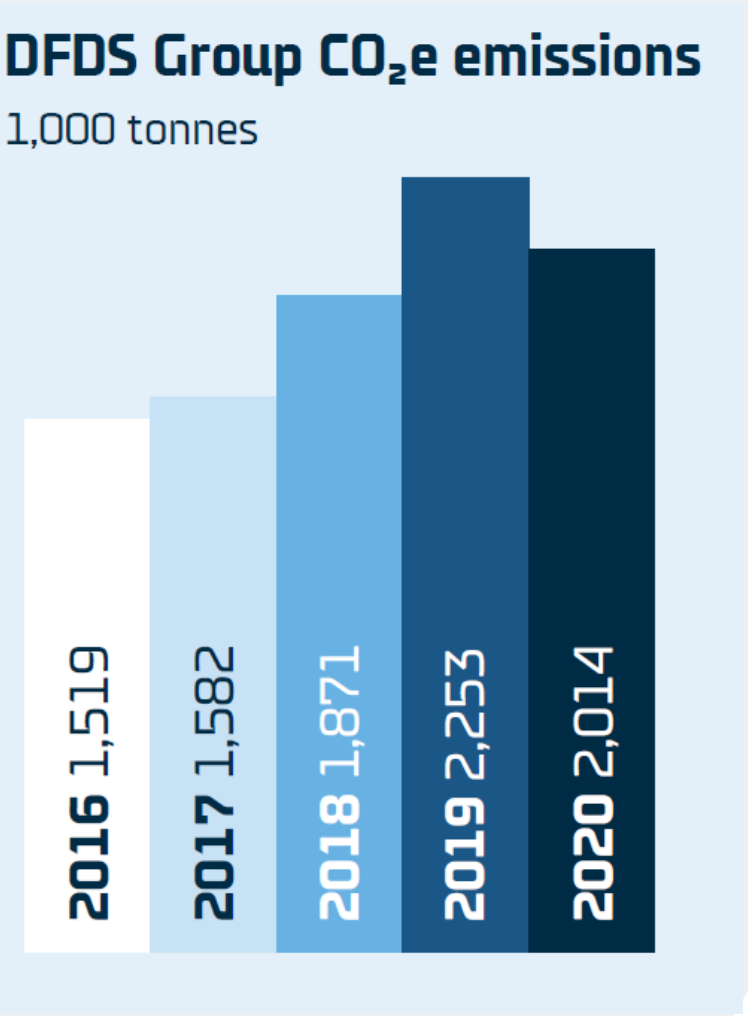
DFDS in short:

- 8,200 employees
- 60 ships and a lot of trucks and trailers

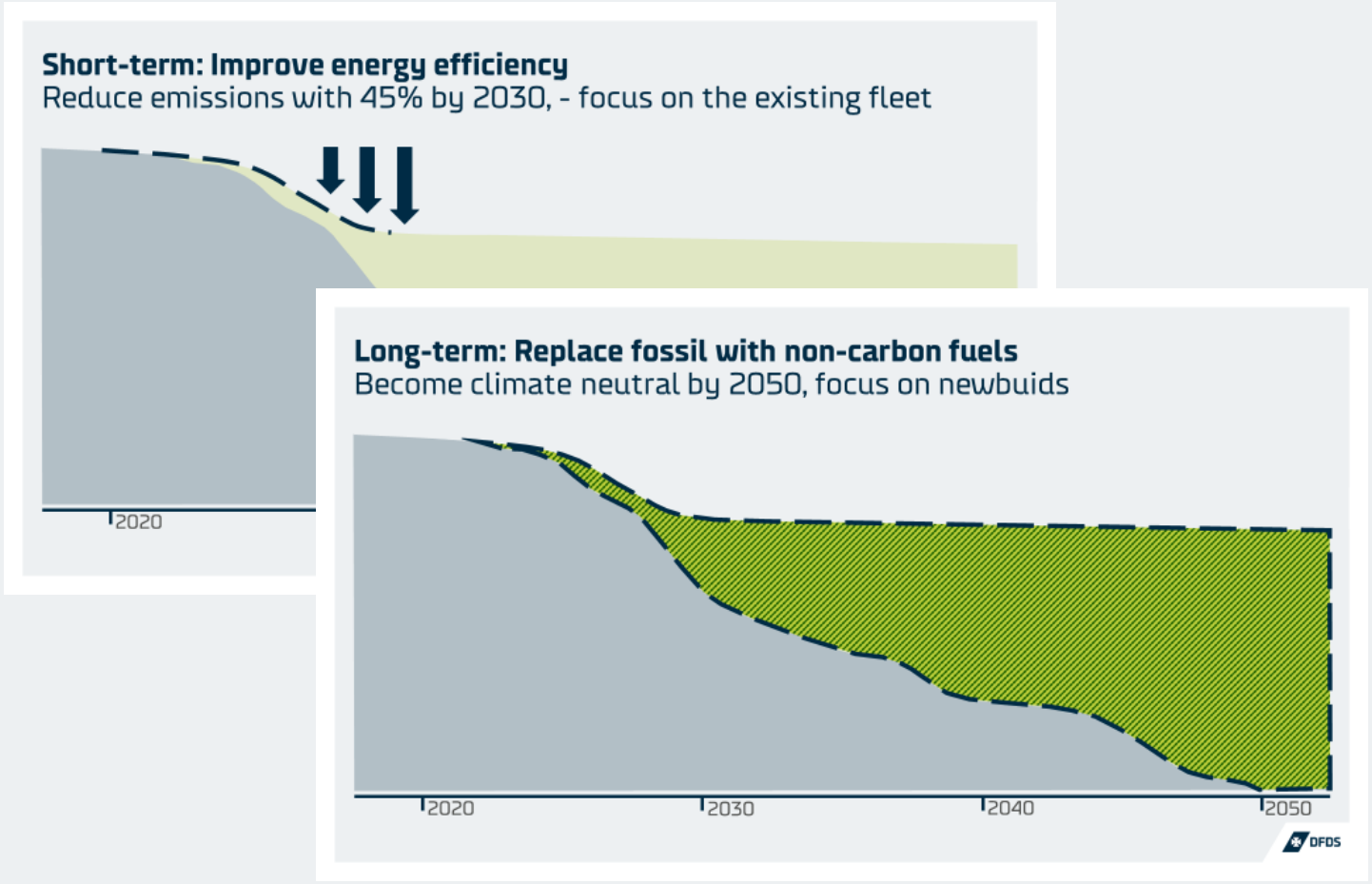


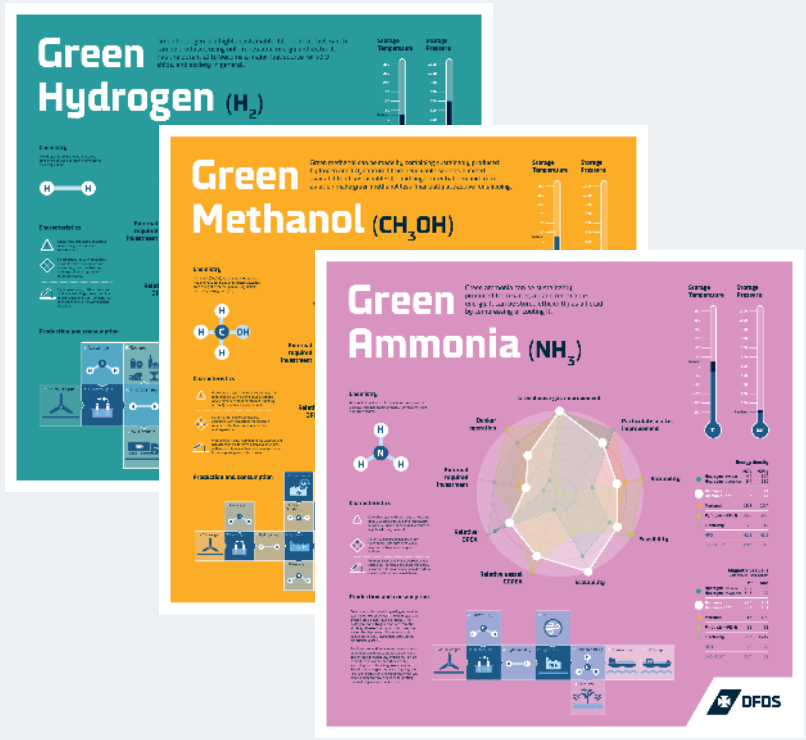
96% of the DFDS emissions come from our ships
Air pollution is more than CO2, but CO2 is an important KPI for change





The DFDS Climate Action Plan is quite straight forward: Improve efficiency of the existing fleet, then implement zero emission tonnage





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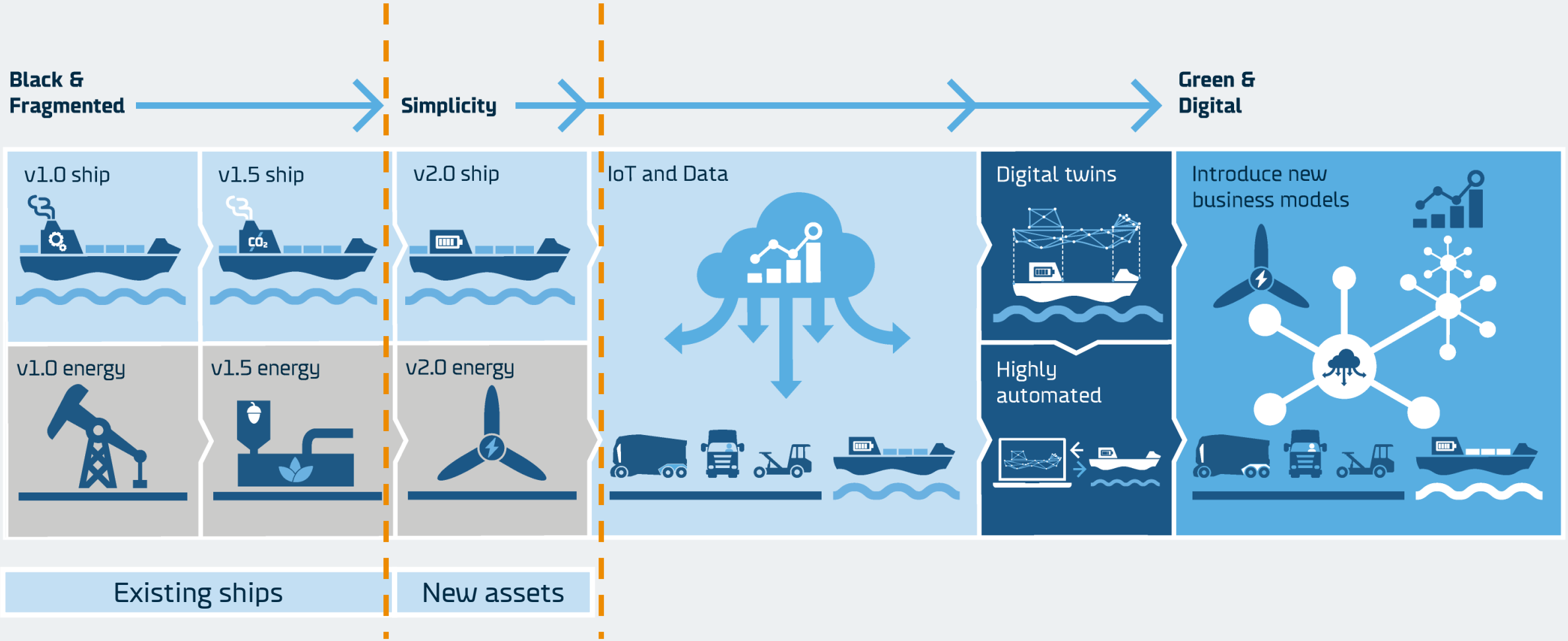
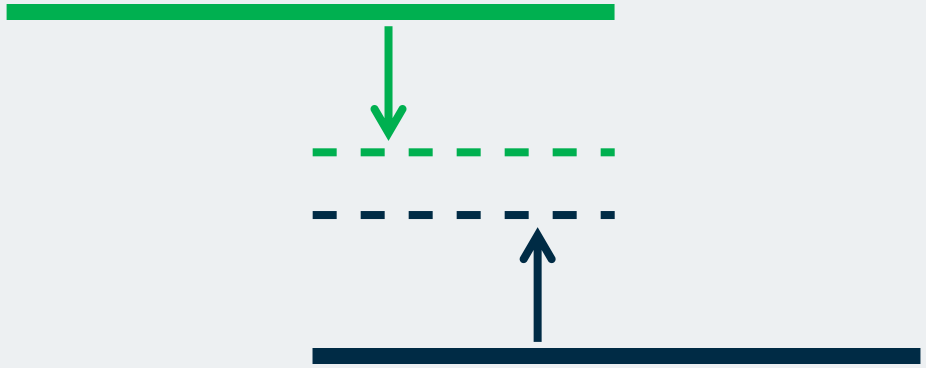
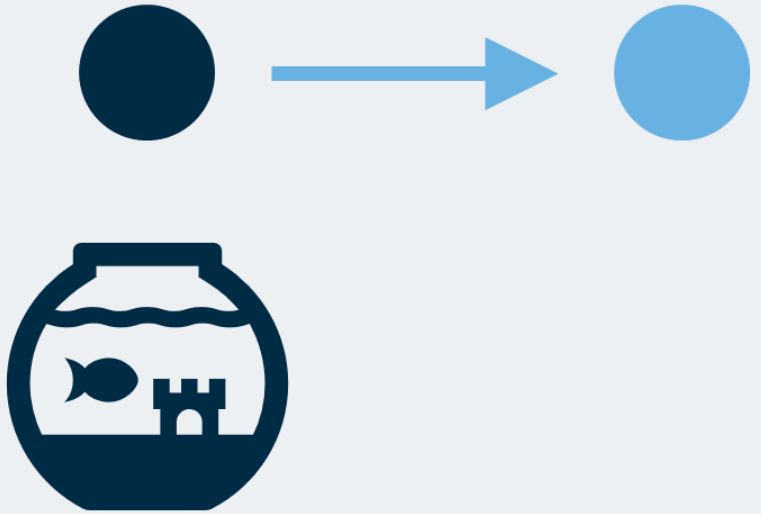
Zero Emission shipping and logistics roadmap
Digitalization and scale are the key components to bring down cost

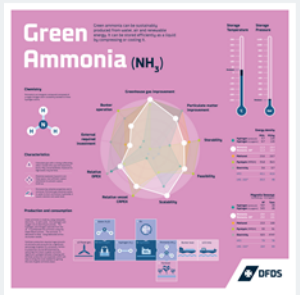


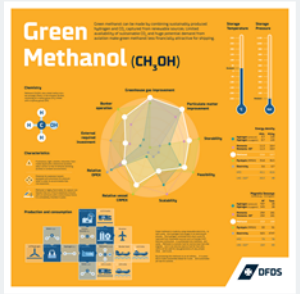
The biggest obstacle is the price gap between green and black
We need to learn fast in order to reach our targets





DFDS need to be engaged in order to ensure zero emission fuel availability within our network





Power-to-Ammonia (Esbjerg) 1GW

Green hydrogen → green ammonia → green fertilizers

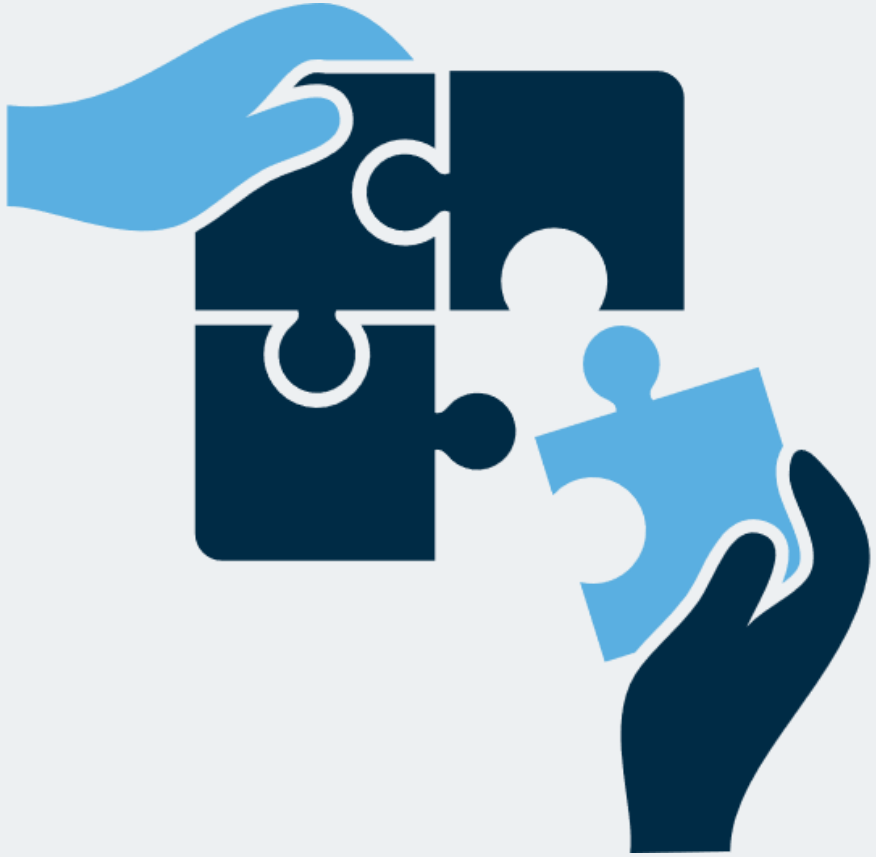
Green Fuels for Denmark (Copenhagen) 1.3GW

Green hydrogen → green Methanol → eJet fuel

The first large scale zero emission ferry for international voyages Copenhagen Oslo, 1800 passengers, 24MW and 44 tons H2 storage

This nice picture is by curtesy of Knud E Hansen

A potential path to general large scale decarbonization of shipping: Removing existing inefficiencies to enable green to compete with black



Leverage the new opportunities that zero-emission tonnage brings and innovate on Business and Operation Model to improve efficiency

The recipe

- Removal of today's inherent inefficiencies
- Extreme servitization of physical assets
- Cross sector and value stream integration to reduce risk for all stakeholders
- Access, not ownership, of assets
- Finance zero emission tonnage as green bonds

The required ingredients

- Zero Emission propulsion technologies
- Zero Emission storage and bunkering technologies
- Zero Emission fuel availability
- High level of digitalization
- High level of Standardization
- High quality twinning of physical assets

- Digitize all communication to, and control of, physical assets
- Direct digital access to all customers and stakeholders
- The right partners
- Access to attractive financing
- Scale


Characteristics
Relative OPEX
Relative vessel CAPEX
Production and consumption
1: ≥2 Power gen.
2: Water p/s
3: Electrolysis
4: Hydrogen (H2)
5: Sectors
6: Bunker boat
7: ≥2.0 trucks
8: ≥2.0 ship
Storability
Feasibility
Scalability
Energy density
Hydrogen (gaseous)
Hydrogen (cryogenic)
Ammonia
Ammonia -33°
Methanol
Pyrolysis (MSW)
Electricity
HFO
LNG -162°
Magnolia Seaways
Gothenburg - Immingham
Green ammonia can be sustainably produced from water, air and renewable energy. It can be stored efficiently as a liquid by compressing or cooling it.
Green Ammonia (NH_3)
Chemistry
Characteristics
External required investment
Greenhouse gas improvement
Bunker operation
Storage Temperature
Storage Pressure
Production and
Green methanol can be made by combining sustainably produced hydrogen and CO_2 captured from renewable sources. Limited availability of sustainable CO_2 and huge potential demand from aviation make green methanol less financially attractive for shipping.
Green Methanol (CH_3OH)
Particulate matter improvement
Storability
Transport to port
Container ship
20 foot container
Biofuel Storage
Bunker boat
≥1.5 ship
From nut farms in Africa, discarded nutshells are fed into a non-pressurized pyrolysis reactor. The organic material is heated to about 500° C without access to oxygen. The vapours are condensed into ISO 8217 compliant biofuel, and the solids are converted into bio-char, which is a great soil enhancer. Trucks pick up the biofuel from the local farms, and deliver the oil to a nearby port. From where it is shipped to Europe. The tank containers are emptied into storage tanks, from where it can be loaded to the bunker boat.
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