



# Leading the decarbonisation of marine

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## We lead the decarbonisation journey of marine

Fuel transition has started. The uptake of sustainable fuels is strengthening our market position already today

As technology leaders in decarbonisation, we are evolving from being an equipment supplier to a strategic partner for our customers

Our services business drives growth, stability and profitability. Decarbonisation of the existing fleet is creating new opportunities

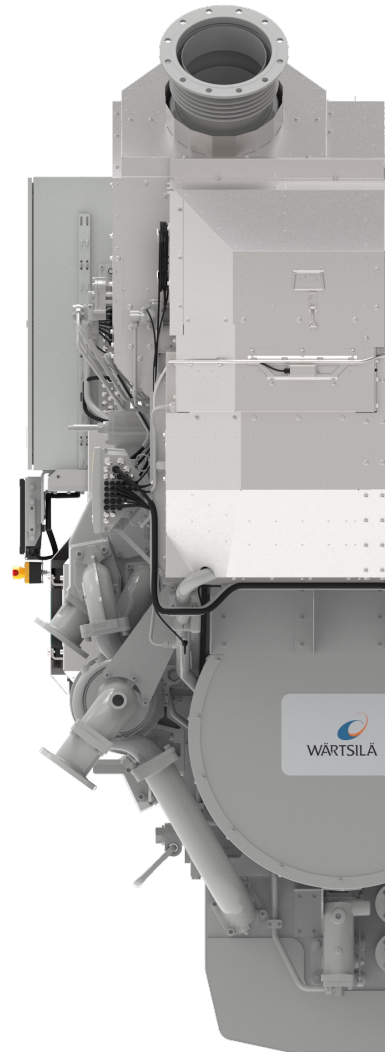


# CMD 2021: “Well-positioned to lead the decarbonisation transformation”

## Targets from CMD in 2021 → Status as of 2023

	Targets from CMD in 2021	Status as of 2023
<b>Transform</b> We enable our customers' decarbonisation	Play a central role in decarbonisation	<ul style="list-style-type: none"> <li>✓ 100+ methanol engines contracted</li> <li>✓ Ammonia engine launch in Q4 2023</li> <li>✓ #1 in hybrids</li> </ul>
	Maintain leading position in 4-stroke medium speed main engines	<ul style="list-style-type: none"> <li>✓ #1 market position</li> </ul>
	Grow market share in auxiliary engines	<ul style="list-style-type: none"> <li>✓ +10pp market share<sup>1)</sup></li> </ul>
	Tap into fuel conversions, efficiency upgrades and hybridisation	<ul style="list-style-type: none"> <li>✓ +46% retrofit net sales<sup>2)</sup></li> </ul>
<b>Perform</b> We grow in services and decarbonisation	Increase sales for transactional services	<ul style="list-style-type: none"> <li>✓ +27% transactional service net sales<sup>2)</sup></li> </ul>
	Expand agreement penetration	<ul style="list-style-type: none"> <li>✓ +55% net sales to agreement installations<sup>2)</sup></li> </ul>
	Expand performance-based agreements	<ul style="list-style-type: none"> <li>✓ +42% installations under GAP<sup>3)</sup> agreement<sup>1)</sup></li> </ul>

Even stronger market leadership in sustainable fuels



1) Q3/2023 vs. Q3/2021; 2) LTM Q3/2023 vs. 2021; 3) Guaranteed Asset Performance



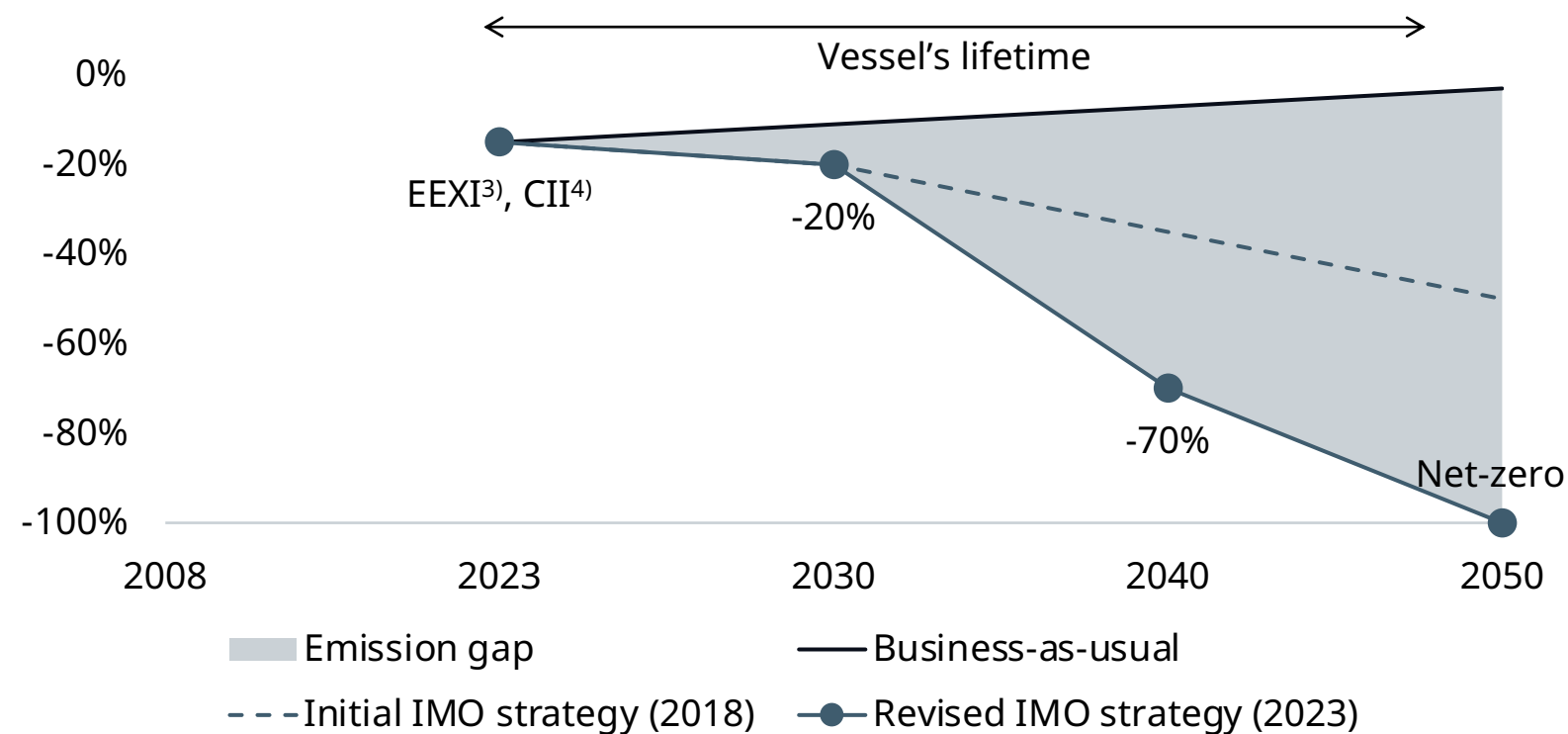
# **Transform – We enable our customers' decarbonisation**



# Accelerated decarbonisation targets are shaping the shipping industry and reinforcing our strategy

## Ambitions and checkpoints in the revised IMO GHG strategy<sup>2)</sup>

GHG emission reduction % vs 2008



1) Source: Clarksons; total newbuilding and equipment upgrades investment for fleet renewal in 2023-2050; 2) Source: DNV Energy Transition Outlook 2023; well-to-wake GHG emission reduction compared to 2008; 3) Energy Efficiency eXisting ship Index; 4) Carbon Intensity Indicator

In 2023, IMO strengthened its GHG reduction targets, and now strives for **net-zero "by or around 2050"**

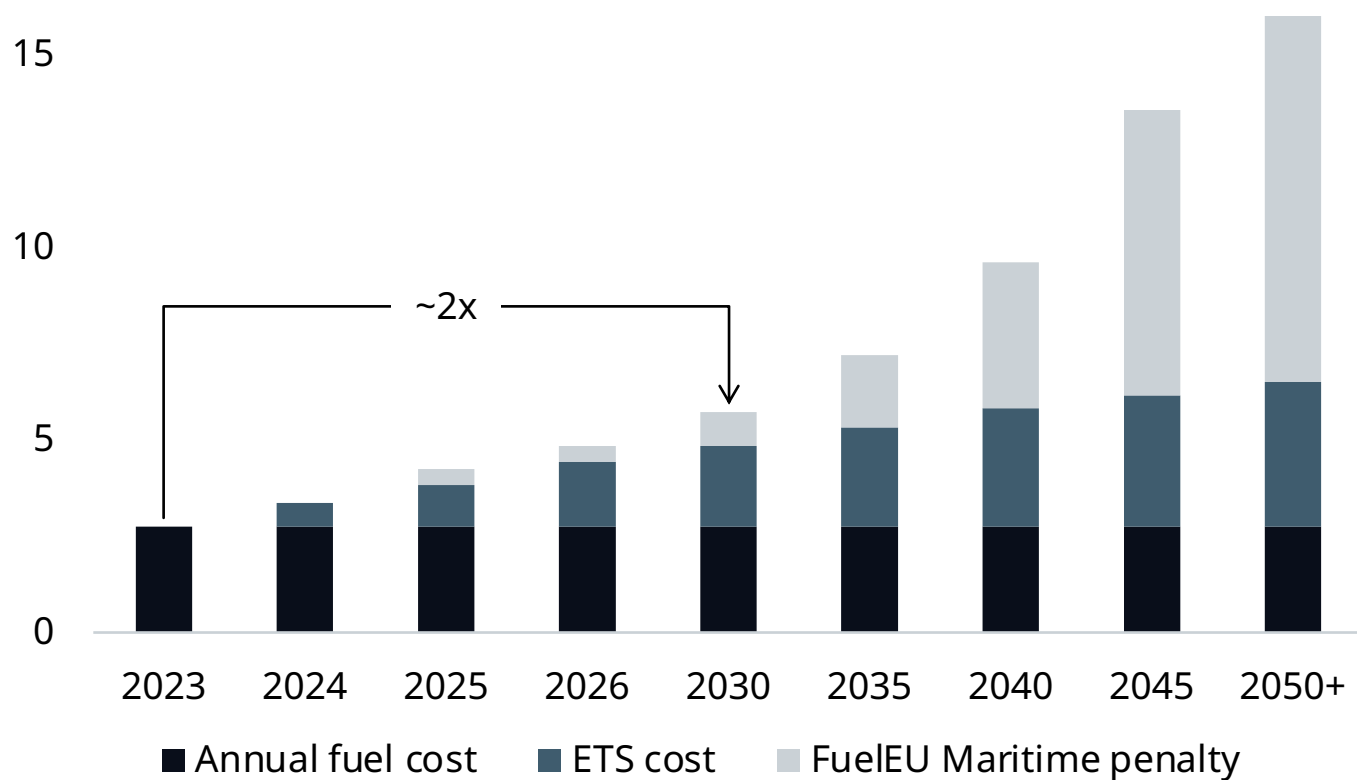
The total estimated investment in 2023-2050 is **USD ~5.0 trillion<sup>1)</sup>**

**We can enable customers to reach intermediate and 2050 targets with our existing portfolio**

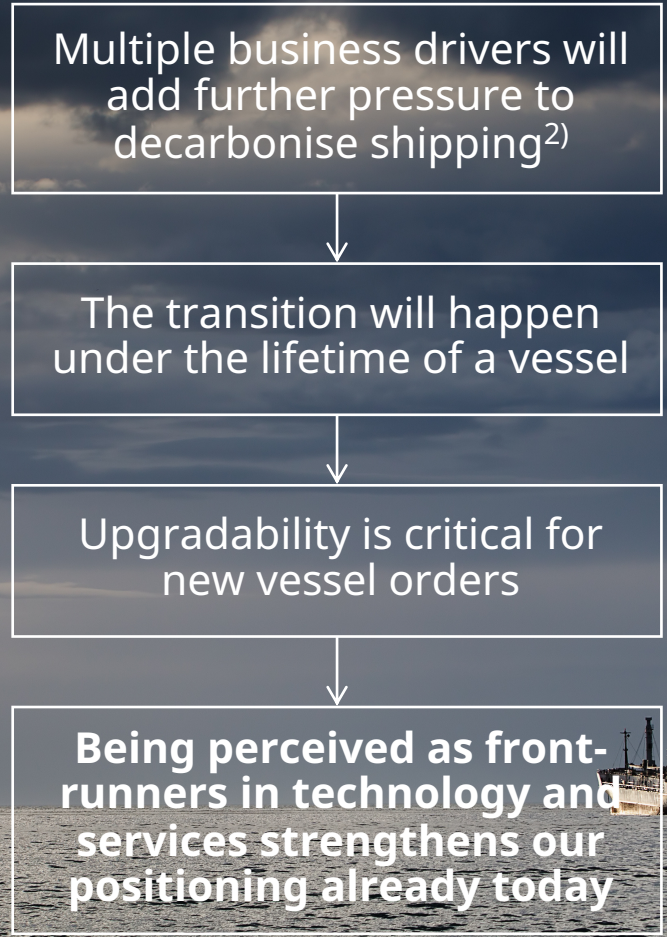


# Up to 2030, fuel cost will double due to emission fees

Fuel-related costs for Handymax bulker operating in EU waters, EURm<sup>1)</sup>



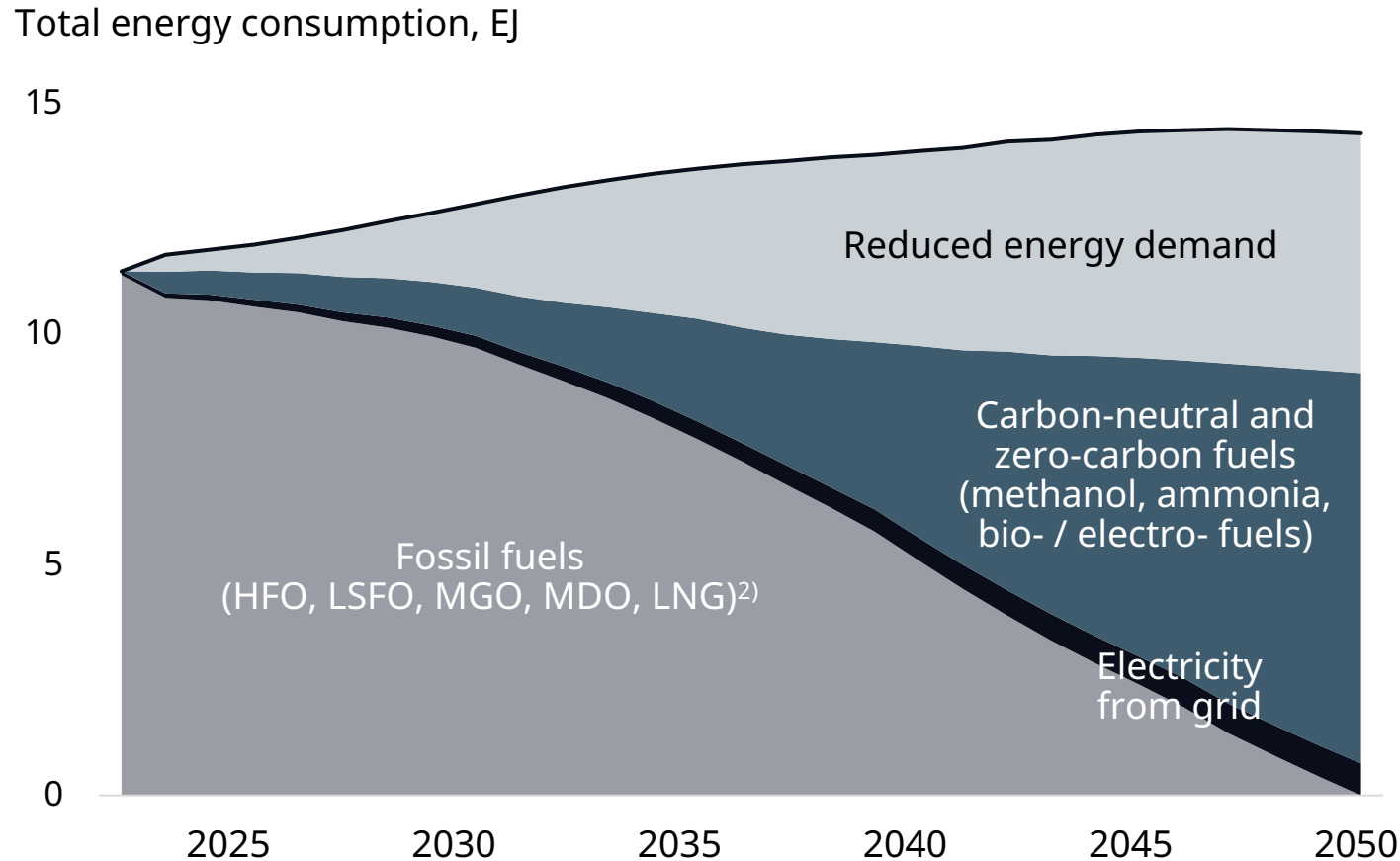
1) Assuming 5 000 tons/year VLSFO (Very Low Sulphur Fuel Oil) consumption subject to EU Fit-for-55, VLSFO at EUR 550/ton; EU allowances from EUR 100/ton today to EUR 230/ton in 2050 (source: Transport & Environment NGO); 2) E.g., local regulations and emission fees (EU Fit-for-55), green financing (Poseidon Principles), climate-linked chartering (Sea Cargo Charter), companies' ESG targets





# A progressive switch to sustainable fuels is already under way

## Sustainable fuel uptake scenario for net-zero in 2050<sup>1)</sup>

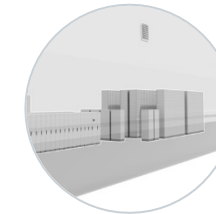
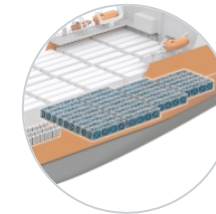
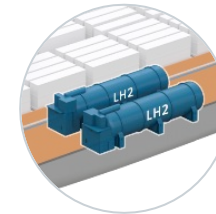
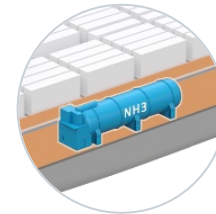
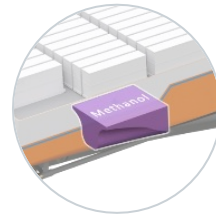
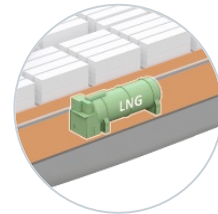
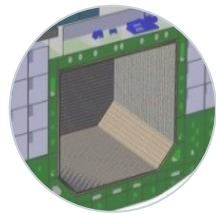


- ✓ **Fuel transition is under way:** 49% of tonnage on orderbook is set to use alternative fuels; long-term fuel mix is dependent on supply of different fuels
- ✓ **LNG is still #1 alternative fuel:** 25% of tonnage ordered in LTM is LNG fuelled
- ✓ **Methanol is gaining share:** 58% of containerships tonnage ordered in LTM are set to run on methanol
- ✓ **Ammonia will pick up in the longer run**
- ✓ **Hybrids, batteries, ESTs<sup>3)</sup> are growing:**
  - 37% of the tonnage on orderbook is fitted with at least 1 EST<sup>3)</sup>
  - 129 hybrid / full-electric 2 000+ GT vessels were ordered in LTM (compared to 99 in 2022 and 55 in 2019)

1) Source: DNV Maritime Forecast 2050; 2) HFO – Heavy Fuel Oil; LSFO – Low Sulphur Fuel Oil; MGO – Marine Gas Oil; MDO – Marine Diesel Oil; 3) Energy Saving Technology



# Cost of emissions will close the price gap between fossil and sustainable fuels; fuel selection impacts the vessel structure



Fuel type	Low Sulphur Fuel Oil @ 20°C	Liquefied Natural Gas @ -162°C	Methanol @ 20°C	Ammonia @ -33°C	Liquid Hydrogen @ -253°C	Compressed Hydrogen @ 350bar	Marine Battery Rack
Fuel price factor (per GJ) <sup>1)</sup>	1x	1.1x – 4.6x <sup>2)</sup>	2.6x – 5.5x <sup>3)</sup>	2.4x – 4.3x <sup>4)</sup>	3.6x – 4.6x <sup>4)</sup>	2.1x – 3.1x <sup>4)</sup>	2.0x – 5.3x <sup>8)</sup>
Fuel price factor in 2035, incl. carbon tax <sup>1) 5)</sup>	1x	0.8x – 1.4 <sup>2)</sup>	0.8x – 1.6x <sup>3)</sup>	0.7x – 1.2x <sup>4)</sup>	1.2x – 1.5x <sup>4)</sup>	0.6x – 1.0x <sup>4)</sup>	0.8x – 2.0x <sup>8)</sup>
Gross tank size factor <sup>6)</sup>	1x	1.7x – 2.4x <sup>7)</sup>	1.7x	3.9x	7.3x	19.5x	~40x (~20x potential)

1) Fuel production cost estimate for 2025 and 2035; source: Maersk Mc-Kinney Møller Center for Zero Carbon Shipping – NavigaTE 2023; 2) Price range spans between fossil & electro- methane; 3) Price range spans between bio- & electro- methanol; 4) Price range spans between blue- & electro- ammonia/hydrogen; 5) Assuming 100% consumption subject to EU Fit-for-55, EU allowances at EUR 159/ton (source: Transport & Environment NGO); 6) Gross tank estimations based on Wärtsilä experience; 7) 1.7x membrane tanks, 2.4x type C tanks; 8) Shore energy price EUR 10-27/kWh

# We have the industry's most comprehensive offering for decarbonisation

	2023	2024	2025
<b>Engines</b>	Diesel	▶	
	FAME/HVO <sup>1)</sup>	▶	
	LNG	▶	
	Bio-methane	▶	
	Synthetic methane	▶	
	LPG	▶	
	Methanol	▶	
	Ammonia	▶	
	Hydrogen blends	▶	
	Hydrogen 100%		▶
<b>Electric</b>	Hybrid	▶	
	Full electric	▶ Short sea / inland waterways	
<b>Carbon capture system</b>		▶	
<b>Fuel cells</b>		▶ Through partnering	
<b>Energy saving technology</b>	▶		

## Engines

- ✓ Market leaders in 4-stroke medium-speed main engines
- ✓ Industry's fastest and broadest future fuel roadmap
- ✓ 6 methanol engine types available today<sup>2)</sup>, ammonia engine in Q4 2023, full hydrogen technology in 2025

## Electrification

- ✓ Market leaders in hybrids with 26% market share<sup>3)</sup>
- ✓ New Hybrid-Electric concept launched in Q3 2023
- ✓ World's largest hybrid ferry powered by Wärtsilä

## Carbon capture

- ✓ Pioneer with the world's first full scale carbon capture plant in 2024 and full commercial release in 2025
- ✓ EUR ~10bn opportunity in next 10 years<sup>4)</sup>

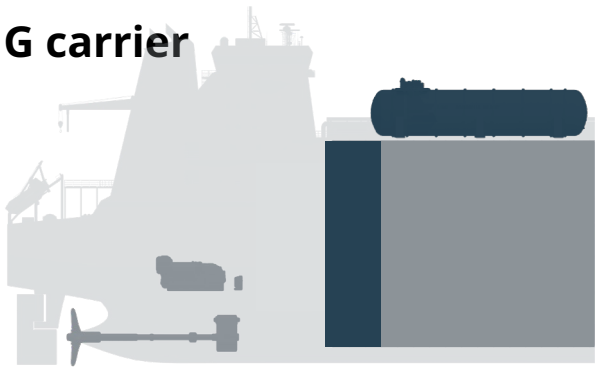
1) Biodiesels: FAME – Fatty Acid Methyl Esters, HVO – Hydrogenated Vegetable Oil; 2) Newbuild and retrofits; 3) Battery MWh on 2000+ GT hybrid vessels; 4) Newbuild and retrofits, mainly merchant 2-stroke, dependent on speed of regulation, CO2 tax incentives, development of carbon capture and storage infrastructure, price spread development between fossil and green fuels



# Hybrid-Electric will challenge 2-stroke as prime-mover for LNG carriers, enabling higher efficiency and increased cargo capacity

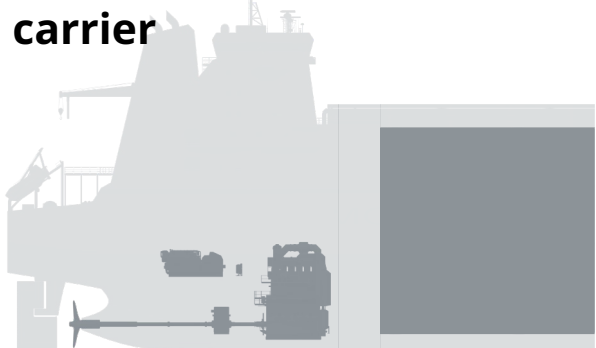
**Wärtsilä Hybrid-Electric LNG carrier**

**185k cbm capacity**  
 3x 4-stroke spark-gas gensets  
 2x 4-stroke dual fuel gensets  
 2 MWh batteries  
 ■ Extra cargo capacity



**Conventional 2-stroke LNG carrier**

**174k cbm capacity**  
 2x 2-stroke main engines  
 4x 4-stroke aux engines

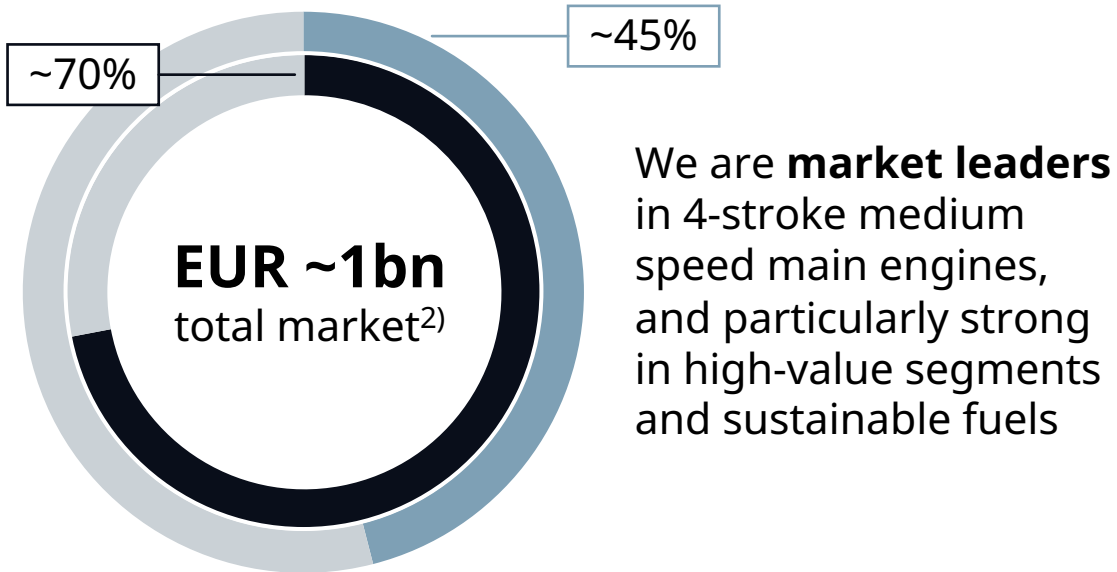


- ✓ **Launched at Gastech in 2023**  
with Shell and Hudong-Zhonghua Shipbuilding
- ✓ **6% extra cargo capacity**  
with same ship dimensions
- ✓ **>10% lower fuel consumption and emissions**  
with optimal efficiency across all speeds
- ✓ **20% lower maintenance costs**  
with fewer engine running hours
- ✓ **Superior redundancy, uptime, flexibility**  
as it can operate with fewer engines
- ✓ **Future proof**  
as it can integrate alternative power sources

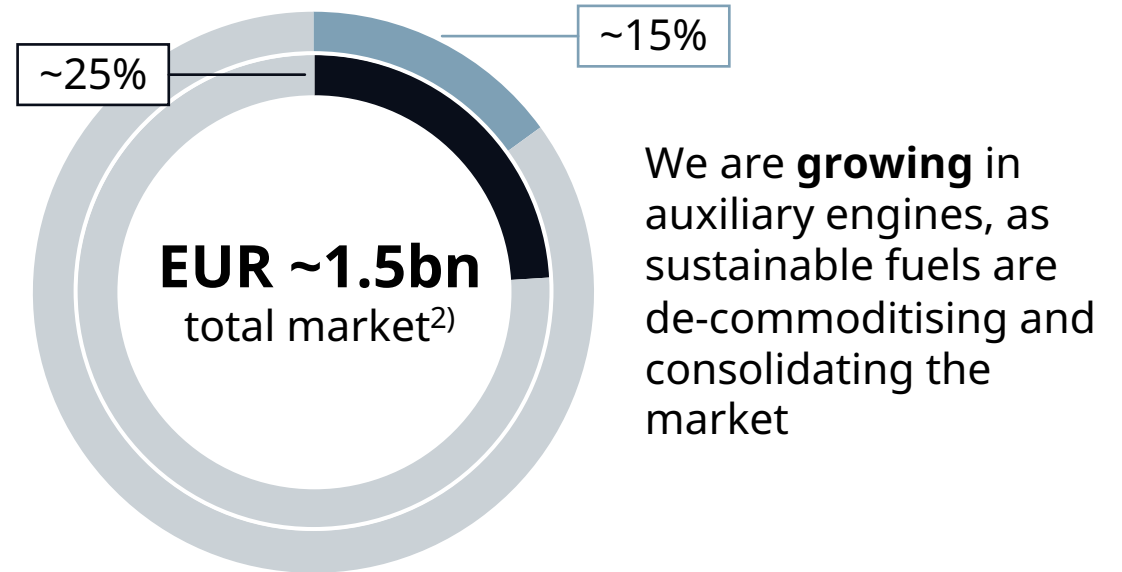
Values refer to a comparison with a conventional 174k cbm LNGC (2x 2-stroke low pressure DF main engines, 4x 34DF 4-stroke aux engines), calculated on full year cycle real operating profile with average speed of 15 knots in laden and 13.5 knots in ballast; cargo increase confirmed by Hudong-Zhonghua Shipbuilding in their general arrangements and outline specifications

# We maintain a leading position in 4-stroke medium speed main engines and are increasing our share in auxiliary engines

4-stroke medium speed main engines market share<sup>1)</sup>



Auxiliary engines market share<sup>1)</sup>



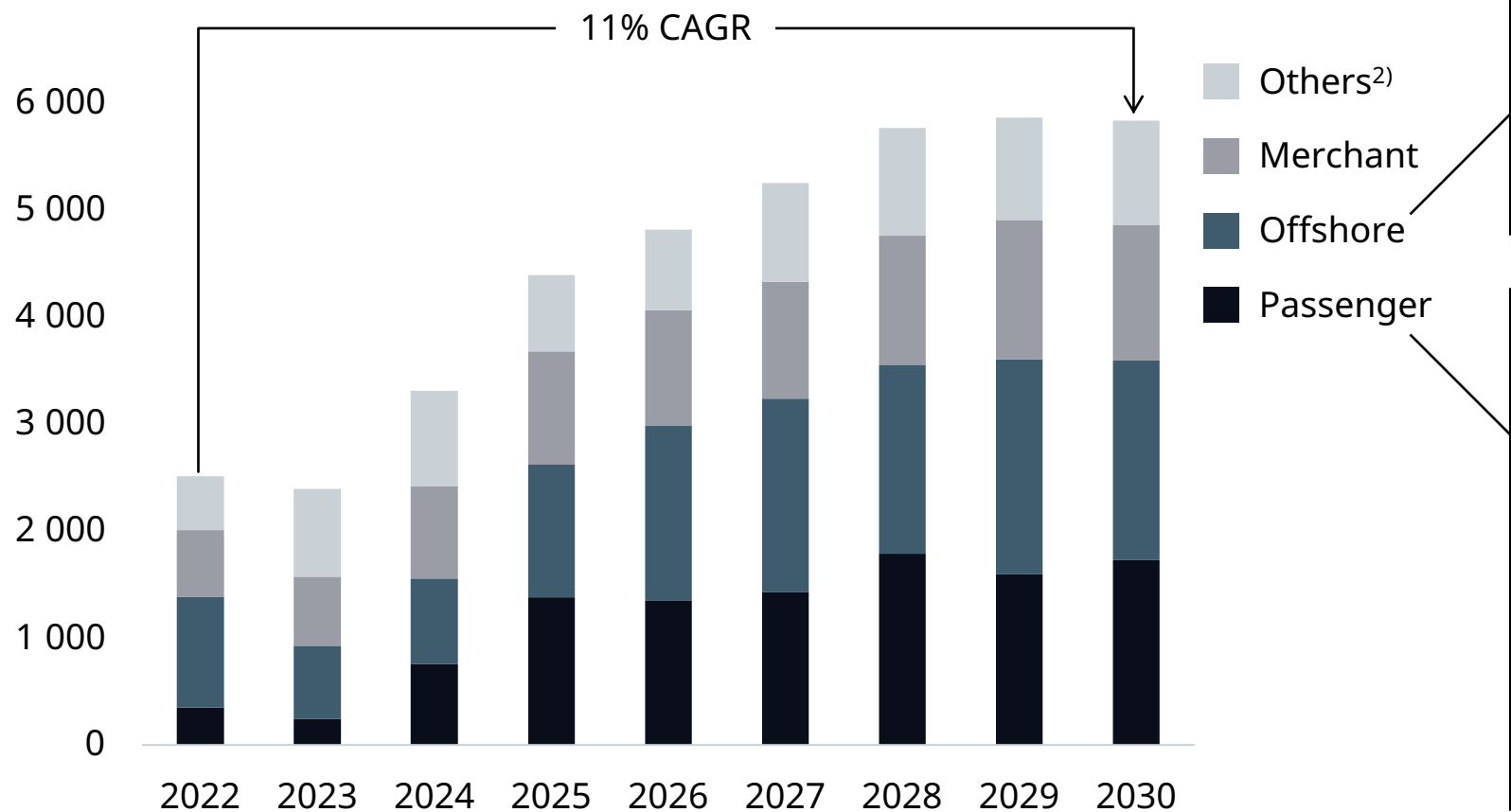
● Outer circle: Wärtsilä total market share    ● Inner circle: Wärtsilä market share on alternative fuel engines

1) Wärtsilä estimates, MW; 2) Average 2023-2027, based on Clarksons September 2023 forecasts and internal models

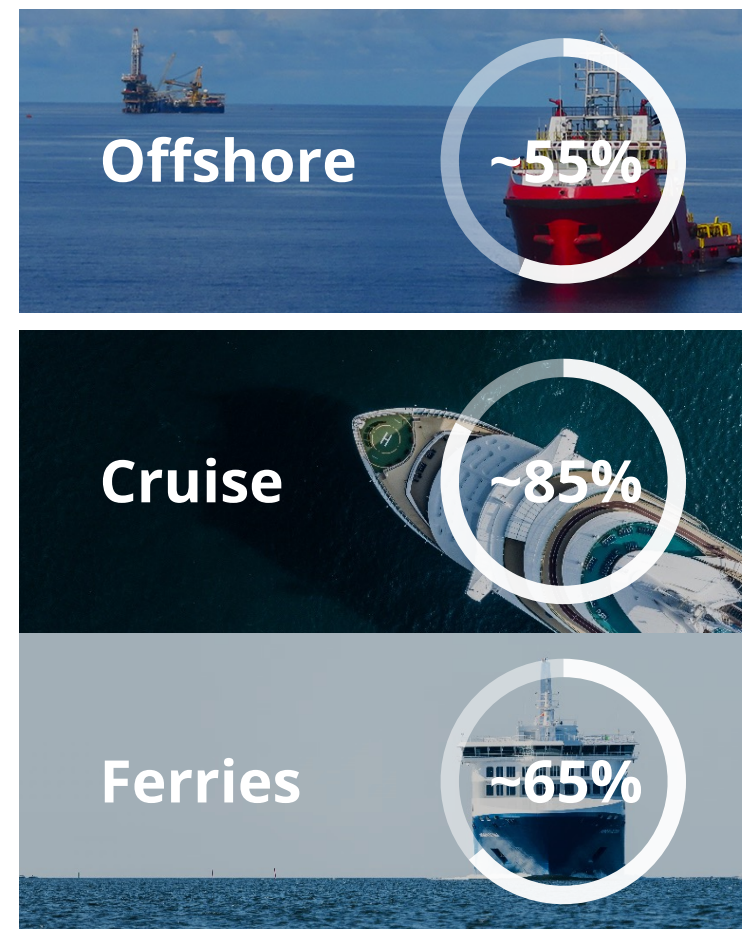


# Recovery in our key target segments will grow our addressable market for equipment sales

Newbuild ordering of 4-stroke medium speed main engine-powered ships, MW<sup>1)</sup>



Wärtsilä market share, MW<sup>3)</sup>






1) Source: Clarksons September 2023 forecasts; 2) Fishing, dredgers, support units, yachts, navy, tugs, etc.; 3) Market share on 4-stroke medium speed main engines, Wärtsilä estimates, MW



**Perform –  
We grow in services and decarbonisation**



# Services is more than 60% of Marine Power sales. We have 3 distinct revenue streams covering customer maintenance

	Transactional	Agreements	Retrofit Projects
% services sales <sup>1)</sup>	 <p>~60%</p>	 <p>~30%</p>	 <p>~10%</p>
Growth drivers	Installed base growth	Increasing ship complexity Increasing cost of emissions Increasing cost of fuel	New regulations Increasing cost of emissions Increasing cost of fuel
Focus areas	Customer service Service offering Long-tail customers	New outcome-based models Service level differentiation Digital tools and services	New retrofit solutions Consultative sales through Decarbonisation Services

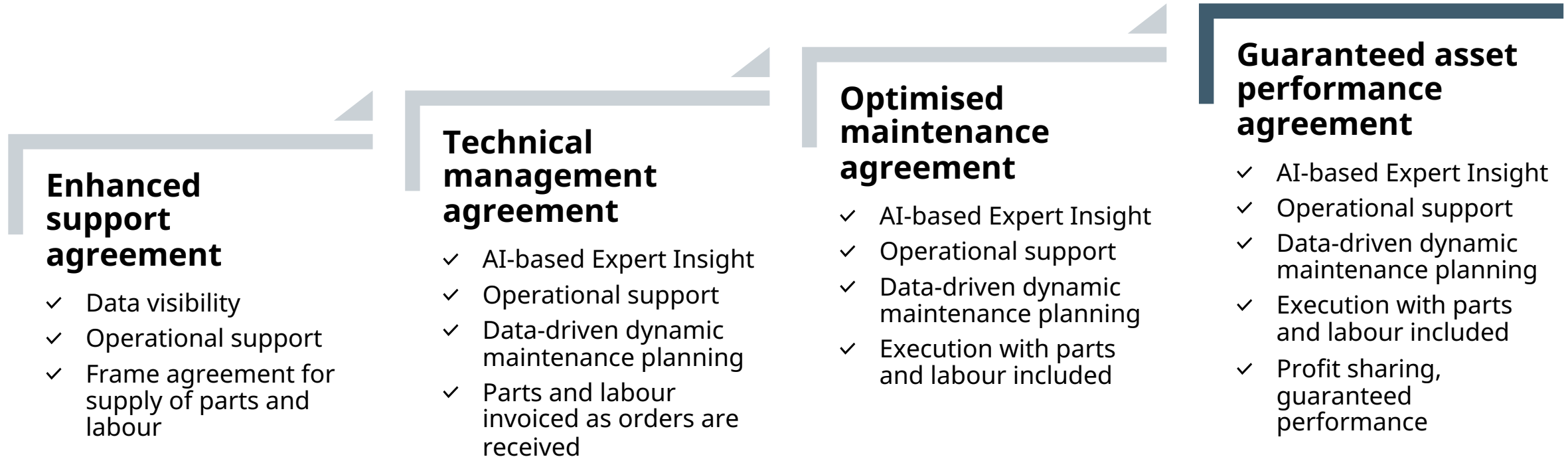


1) LTM Q3/2023; split between Transactional and Agreements based on services net sales to vessels not covered / covered by agreement

# We increase sales and profits by moving up our service value ladder

From 1x<sup>1)</sup>

Up to 2-3x<sup>1)</sup>



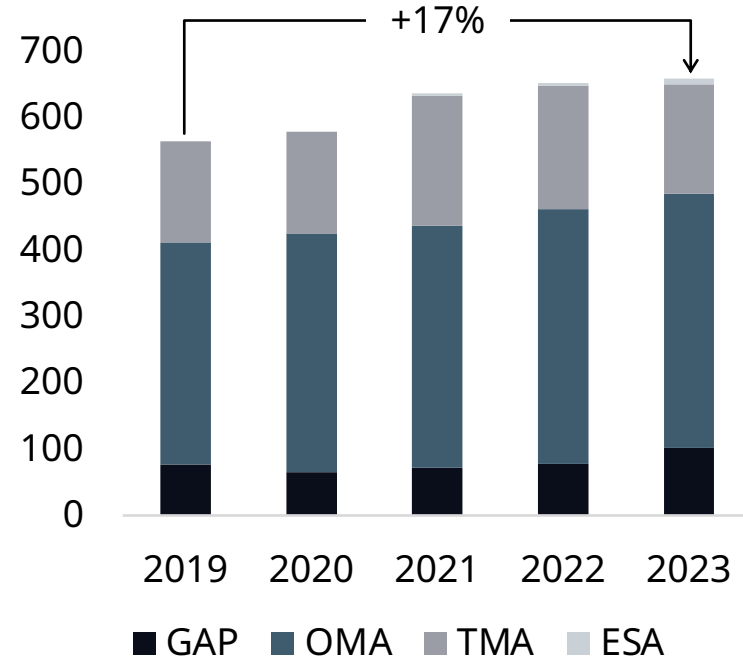
1) Sales EUR/kW relative to transactional



# We expand the installed base under agreement while climbing the service value ladder

## Key facts

Number of vessels under agreement<sup>1)</sup>



### Key metrics

- ~90%** renewal rate<sup>2)</sup>
- 26%** growth in sales to agreement vessels vs pre-Covid
- 29%** of our engine installed base is under agreement<sup>3)</sup>

### Customer benefits

- ~90%** issues resolved remotely
- 29%** average reduction of unscheduled maintenance
- EUR >60m** fuel savings on a cruise fleet over a 6-year contract period

By combining AI and data analytics with product know-how, we can increase customer value and improve our own service operations

1) GAP = Guaranteed asset performance agreement, OMA = Optimised maintenance agreement, TMA = Technical management agreement, ESA = Enhanced support agreement; 2) 4-stroke renewal rate; 3) Excluding QuantiParts

# Tightening regulations and increasing fuel and emission cost boost demand for retrofits; we are well positioned to grow this business



**48%**

of the fleet is not CII compliant in 2023<sup>1)</sup>

**72%**

of the existing fleet will not be CII compliant in 2027 if no action is taken<sup>1)</sup>

## We enable fleet decarbonisation with the most comprehensive retrofit portfolio in the industry

**4-stroke and 2-stroke<sup>2)</sup> engine retrofits:** fuel conversions, engine power limitation, engine efficiency upgrades, methane slip reduction packages

### Other retrofits:

carbon capture systems, hybrids, shaft generators, energy saving technologies

## Success stories in 2023

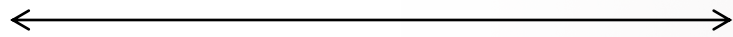
- ✓ First 4-stroke methanol conversion contracted
- ✓ First 2-stroke LNG fuel conversion contracted
- ✓ First 2-stroke derating delivered, with >10% fuel saving achieved
- ✓ Multiple hybrid retrofits
- ✓ Increasing demand for Decarbonisation Services

1) CII (Carbon Intensity Indicator) applies to all cargo, RoPax, cruise ships above 5 000 GT (with some exceptions); source: Wärtsilä CII tool, correction factors excluded, ships with D or E rating considered as non-compliant; 2) 2-stroke applicable to WinGD or Sulzer 2-stroke engines

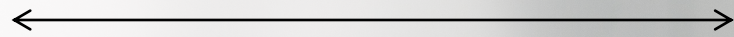


# Performance will be driven by continuous improvement and higher sales volumes; we will mitigate inflation with price and cost management

<p><b>Equipment sales</b></p> <ul style="list-style-type: none"> <li>✓ Favorable vessel contracting mix</li> <li>✓ Uptake of sustainable fuels</li> <li>✓ Higher focus on fuel flexibility, efficiency, upgradability</li> </ul>	<p><b>Structural changes and continuous improvement</b></p> <ul style="list-style-type: none"> <li>✓ Structural cost optimisation</li> <li>✓ Flow efficiency</li> </ul>
<p><b>Services sales</b></p> <ul style="list-style-type: none"> <li>✓ Growing installed base</li> <li>✓ Increasing agreement coverage</li> <li>✓ Climbing of the service value ladder</li> <li>✓ Decarbonisation-driven retrofits</li> </ul>	<p><b>Price management</b></p> <ul style="list-style-type: none"> <li>✓ Value-based pricing</li> <li>✓ Price realisation for sustainable fuel engines</li> <li>✓ Agreement price indexation</li> </ul>



**Growth**



**Profitability**

## Recent examples:

- ✓ **Manufacturing footprint optimisation:**  
ramp-down of manufacturing in Trieste, exit of Santander and Zhenjiang factories
- ✓ **Voyage Services turnaround:**  
new setup and operating model, fixed costs reduction, stricter sales and pricing policy
- ✓ **Billable vs non-billable Field Service resources:**  
20% better non-billable vs billable resource ratio in Field Service since 2020



## We lead the decarbonisation journey of marine

Fuel transition has started. The uptake of sustainable fuels is strengthening our market position already today

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