WÄRTSILÄ

SHAPING THE DECARBONISATION OF MARINE AND ENERGY

PRE-SILENT CALL
ARJEN BERENDS, CFO
JUNE 2022
STH – towards a more sustainable future

- Smart Technology Hub is the next step in shaping the decarbonisation of Marine and Energy
  - Innovation for new products and solutions
  - Future fuels development
  - ROPAX Aurora Botnia as our floating test lab
  - Region of Vaasa as a key location for many industrial companies and talent
  - Proximity to the harbour with great possibilities in green shipping and smart port development
STH will deliver our first ammonia and hydrogen 4 stroke medium speed engines

The first W32 methanol engines will be delivered in early 2023

Several milestones on low/zero carbon technologies and products are planned for the upcoming years

**STH**

**Will**

**Deliver**

**Our**

**First**

**Ammonia**

**And**

**Hydrogen**

**4**

**Stroke Medium Speed Engines**

Newly launched engines are a stepping stone in our strategic path to shape decarbonisation of the maritime industry

**W46TS-DF**

- Best-in-class fuel efficiency and emissions performance
- First order booked for Royal Caribbeans’ Utopia of the Seas

**W32 Methanol**

- Multifuel engine based on Wärtsilä’s proven 32 engine technology
- Fuel tanks and fuel handling system
- First order booked for Van Oords’ offshore wind construction vessel

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**Several milestones on low/zero carbon technologies and products are planned for the upcoming years**

- **2015:** First engine conversion ZA40S
- **2023:** Delivery of first W32 methanol engines. Sales release of additional new build engines and engine conversion packages

**Ammonia**

- **2022:** Combustion and performance testing, optimization with different engine concepts and different engines platforms
- **2023:** Ammonia concept ready

**Hydrogen**

- **2022-2023:** Combustion testing on different % blends and up to 100% hydrogen
- **2025:** Hydrogen concept ready
Wärtsilä is well-positioned for the decarbonisation transformation

Leader in

- **Carbon neutral & zero carbon fuels**
  - Available today: biofuels, methanol, up to 25% hydrogen blends
  - 2023: ammonia concept
  - 2025: 100% hydrogen concept

- **Energy efficient fuels**

- **#1 in marine hybrid power systems**

- **Power system optimisation**
  - Energy storage
  - Grid balancing power

Pioneer in

- **Marine electric drivetrain**

- **Carbon capture**

- **Marine optimisation and autonomous solutions**

- **Partnering for complementary technologies**
  - Fuel cells
  - Air lubrication
  - Flettner rotors
Adoption of new fuels is the key to decarbonising the maritime industry

High energy prices accelerate decarbonisation

Move from a single-fuel industry to a multi-fuel one

Distribution of fuel types for Decarbonisation 2050 (1.5°C scenario), EJ

2050 is a single vessel’s lifespan away - customers need to invest in fuel flexibility to avoid risk of stranded assets:

- Vessel life is 25-30 years
- Critical decision criteria: i) Multifuel capabilities for blending with green fuels ii) Conversion capabilities for future fuels

Source: DNV Maritime Forecast 2050 model, Wärtsilä internal estimates
Our power system modelling demonstrates the optimal path towards 100% renewable energy systems.

1. Add renewables
2. Add balancing with engines and storage
3. Phase out inflexible plants
4. Convert to sustainable fuels
5. Phase out fossil fuels
Significant value creation potential in Services

MOVING UP THE SERVICE VALUE LADDER

1X 1) Optimised Maintenance

1X 1) Transactional Maintenance
- Spare parts
- Field services

2-5X 1) Agreements & Performance-based Agreements

1) Customer spending ratio EUR/kW

Retrofits & Upgrades
700+ vessels globally supported with lifecycle agreements: 90% of cases are solved remotely

STH is the home of one of our advanced remote control centers

Wärtsilä signed an agreement renewal with Maran Gas

- Wärtsilä supports Maran Gas with an optimised maintenance agreement for a fleet of 21 LNG carrier vessels powered by Wärtsilä’s 50DF engines
- The maintenance agreement has been recently renewed for 5 years
- The scope of the agreement includes:
  - Scheduled parts and maintenance work for the engines and turbochargers
  - Workshop services
  - Remote operational support
  - Dynamic maintenance planning
  - Wärtsilä’s Expert Insight digital predictive maintenance solution
Our digital solutions will help our customers accelerate their journey to maritime decarbonisation.
Vessel contracting expected to decline in 2022

Source: Clarksons Research, March 2022

Support from continued container ordering boom

Accelerating fleet renewal and steady demand growth

Continuing accelerated fleet renewal supported by the fleet age profile and potential increased consensus over fuelling and technology choices
Decarbonisation of Marine and Energy is accelerating

Share of carbon neutral and zero carbon fuels in maritime

<table>
<thead>
<tr>
<th>(%)</th>
<th>100</th>
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<tbody>
<tr>
<td>Decarbonisation 2050 (1.5°C scenario)</td>
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<td>≈ 0</td>
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<td>IMO baseline</td>
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Owners will decide on technology partners now:
- Vessel life is 25-30 years
- Critical decision criteria:
  i) Multifuel capabilities for blending with green fuels
  ii) Conversion capabilities for future fuels

Share of renewables in global electricity generation

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<th>(%)</th>
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<th>25</th>
<th>50</th>
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<tbody>
<tr>
<td>Renewables</td>
<td>28%</td>
<td>61%</td>
<td>84%</td>
<td>88%</td>
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<td>Other</td>
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Total electricity generation (TWh) from 2020 to 2050, IEA World Energy Outlook 2021 (Net Zero Emissions Scenario)

Source: DNV Maritime Forecast 2050 model, Wärtsilä Internal estimates 1) Total electricity generation (TWh) from 2020 to 2050, IEA World Energy Outlook 2021 (Net Zero Emissions Scenario)
<table>
<thead>
<tr>
<th>ENGINES</th>
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<td>Diesel</td>
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<td>FAME/HVO</td>
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<td>LNG</td>
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<td>Bio-methane</td>
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<td>Synthetic methane</td>
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<td>LPG</td>
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<td>Hydrogen blends</td>
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<td>Hydrogen 100%</td>
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<td>Ammonia</td>
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<td>Methanol</td>
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<td>Full electric</td>
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**ELECTRIC**

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<th>FUEL CELLS</th>
<th>2021</th>
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<tbody>
<tr>
<td>SOFC, PEMFC</td>
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**ENERGY SAVING DEVICES**

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<tbody>
<tr>
<td>Propulsion energy saving devices</td>
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<td>Air lubrication and flettner rotors</td>
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<td>Other</td>
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**CARBON CAPTURE**

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**DIGITAL SERVICES**

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<th>2021</th>
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<tr>
<td>Fleet operation solutions</td>
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<td>Expert insight</td>
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<td>GEMS</td>
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1) FAME, HVO: biodiesel
2) SOFC: solid oxide fuel cell, PEMFC: proton exchange membrane fuel cell

Technology evaluation ongoing

Broad solution offering to support our customers in decarbonisation

OWN TECHNOLOGY  THROUGH PARTNERING  BOTH IN HOUSE DEVELOPMENT AND PARTNERING