HANDELSBANKEN SUSTAINABILITY TRENDS WEBINAR

25 NOVEMBER 2020

KARI HIETANEN,
EXECUTIVE VICE PRESIDENT, CORPORATE RELATIONS AND LEGAL AFFAIRS
ENABLING SUSTAINABLE SOCIETIES WITH SMART TECHNOLOGY
SUSTAINABILITY
for our stakeholders and the environment

SUSTAINABILITY STRATEGY AND TARGETS
Strong focus on reducing environmental impact and on ensuring personnel safety and well-being

HIGH ETHICAL STANDARDS
Values and code of conduct program

DEFINED PROCESSES
Certified QEHS management systems

TRANSPARENCY
Sustainability reporting according to GRI standards

RECOGNISED SUSTAINABILITY WORK
i.a. DJSI and FTSE4good indices

Kari Hietanen
25 November 2020
FOCUS ON DECARBONIZATION IN BOTH SHIPPING AND ENERGY SECTORS

SHIPPING
GHG reduction strategy:
• 40% lower GHG/vessel by 2030
• 50% lower GHG in shipping (total) by 2050

ENERGY
• EU: Climate neutral by 2050
• China: Carbon neutral by 2060
• USA*: carbon free electricity production by 2035, net zero emissions by 2050
• Country Climate Pledges

LEADING THE WAY TOWARDS A SMART MARINE ECOSYSTEM
A Smart Marine Ecosystem is about the maritime industry working together to address critical challenges and to generate solutions towards a sustainable future.

TOWARDS A 100% RENEWABLE ENERGY FUTURE
The energy landscape is in a transition towards more flexible and sustainable energy systems. We envision a 100% renewable energy future.

* Biden’s climate plan

Kari Hietanen
25 November 2020
REGULATION DRIVING MARINE EMISSION REDUCTION

- **2016**
  - NOx Tier III in NECA (North America)
  - Amended IMO MEPC.227(64)

- **2017**
  - IMO Ballast Water Management Convention

- **2018**
  - Inert Gas System mandatory for newbuild tankers above 8,000 DWT as of 1 January 2018

- **2019**
  - Global 0.5% SOx limit reviewed

- **2020**
  - Global cap 0.5% SOx
  - North sea and Baltic sea become NECA

- **2025**
  - NOx Tier III proposed for North Europe

- **2050**
  - Carbon emissions halved

Requirements for sewage discharges in the Baltic Sea
TOWARDS A 100% RENEWABLE ENERGY FUTURE

MITIGATING CLIMATE CHANGE
TARGETS FOR RENEWABLES AND DECARBONISATION
RAPIDLY DECREASING PRICE OF RENEWABLES
INCREASING ELECTRICITY DEMAND
EMERGING NEW TECHNOLOGIES
THE ENERGY TRANSITION IS A GLOBAL TREND…

Installed capacity by region (GW)

North America¹

<table>
<thead>
<tr>
<th>Year</th>
<th>Solar &amp; Wind</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>12%</td>
<td>55%</td>
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<tr>
<td>2030</td>
<td>26%</td>
<td>43%</td>
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<tr>
<td>2040</td>
<td>43%</td>
<td>67%</td>
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<tr>
<td>2050</td>
<td>50%</td>
<td>67%</td>
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Europe

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<th>Year</th>
<th>Solar &amp; Wind</th>
<th>Others</th>
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<tbody>
<tr>
<td>2020</td>
<td>31%</td>
<td>54%</td>
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<tr>
<td>2030</td>
<td>54%</td>
<td>54%</td>
</tr>
<tr>
<td>2040</td>
<td>62%</td>
<td>57%</td>
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<tr>
<td>2050</td>
<td>67%</td>
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APAC

<table>
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<tr>
<th>Year</th>
<th>Solar &amp; Wind</th>
<th>Others</th>
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<tbody>
<tr>
<td>2020</td>
<td>22%</td>
<td>58%</td>
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<tr>
<td>2030</td>
<td>40%</td>
<td>58%</td>
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<tr>
<td>2040</td>
<td>54%</td>
<td>54%</td>
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<tr>
<td>2050</td>
<td>58%</td>
<td>58%</td>
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META

<table>
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<tr>
<th>Year</th>
<th>Solar &amp; Wind</th>
<th>Others</th>
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<tbody>
<tr>
<td>2020</td>
<td>7%</td>
<td>26%</td>
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<tr>
<td>2030</td>
<td>26%</td>
<td>49%</td>
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<tr>
<td>2040</td>
<td>49%</td>
<td>57%</td>
</tr>
<tr>
<td>2050</td>
<td>57%</td>
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</table>

Note 1: Contains only USA and Canada, as Mexico has been included in Latin America. For more information on the regions see the appendix.

Source: BloombergNEF New Energy Outlook 2020
Most competitive source of new bulk generation in 2014

Source: BloombergNEF New Energy Outlook 2020

Note: Reflective of the cheapest benchmark project for each technology and market

Most competitive source of new bulk generation in 1H 2020

Note: Reflective of the cheapest benchmark project for each technology and market
OUR SOLUTIONS SUPPORT THE ENERGY TRANSITION

FLEXIBLE POWER PLANTS
Flexible power plants utilising modular and future-proof technology to provide the best means of support to the power system.

ENERGY STORAGE AND OPTIMISATION
Energy storage solutions that build a resilient and intelligent power system. Industry-leading software can optimise any of the customer’s assets and power systems.

LIFECYCLE SERVICES
Lifecycle services encompass performance and maintenance management as well as operational expertise, leading to safe, reliable, and environmentally sustainable operations.
THE BENEFITS OF FLEXIBILITY IN PRACTICE

Tucson Electric Power, Arizona
- 200 MW flexible gas plant and 10 MW/2.5 MWh energy storage system
- Environmental considerations: improved efficiency, emission reduction and low cooling water requirements
- Provides flexibility and enables expansion of renewable energy

AGL Energy Limited, Australia
- 211 MW power plant
- Enables the retirement of coal and the expansion of renewable energy
- Flexibility improves the reliability and security of energy supply

Kraftwerke Mainz-Wiesbaden AG, Germany
- Flexible 100 MW combined heat and power plant
- Emission reduction thanks to 90% overall efficiency
- Flexibility enables the optimisation of renewable energy
FLEXIBILITY NEEDED TO FULLY UTILISE RENEWABLE ENERGY AND ENABLE THE PATH TOWARDS CARBON NEUTRALITY

CASE GERMANY 5TH JULY 2020

- Enough renewable generation to cover load
- Excess power pushes down market price
- Baseload coal and nuclear power is exported with high price tag
- Emission reductions limited

WÄRTSILÄ PLEXOS MODELLING ACTIVITIES

OVER 80 COUNTRY AND SYSTEM STUDIES MADE BY WÄRTSILÄ ALL OVER THE WORLD

= PLEXOS study made by Wärtsilä
NOTE: 1. Heat generation assets not shown  2. Price of heat is 33 €/MWh and derived from heat generation with gas boiler and is same in all scenarios, i.e. heat price is not changing
DRIVING SUSTAINABLE SHIPPING

... ADOPTED IN A SMART MARINE ECOSYSTEM

ENERGY SOURCE AND FUEL FLEXIBILITY
ENERGY EFFICIENT TECHNOLOGIES
DATA BASED OPTIMISATION

Kari Hietanen
25 November 2020
CONTRIBUTING TO THE MARITIME SUSTAINABILITY AGENDA

MARINE POWER

Creates a commercially viable path towards decarbonisation by providing fuel efficient power systems that can be to run on low-carbon and/or zero-carbon fuels.

VOYAGE

Provides products and solutions to connect vessels to ports, remove inefficiencies during the voyage, and enhance the safety of operations through autonomy features.

MARINE SYSTEMS

Develops technologies, products, and solutions related to the gas value chain, exhaust treatment and shaft line services, with the aim of enhancing safety and energy efficiency, while lowering emissions.
DUAL FUEL IS A PROVEN TECHNOLOGY – WÄRTSILÄ 4-STROKE DUAL FUEL ENGINE REFERENCES

> 2 600 DF engines
> 45 000 000 running hours

MERCHANT
- LNG Carrier
- Container Vessel
- Chemical/Product Tanker
- LPG Carrier
- Bulk Carrier
- Crude Oil Tanker
- Shuttle Tanker
- RoRo Vessel
- Chemical Tanker
- Product Tanker
- Car Carrier
- Asphalt Carrier
- General Cargo Vessel

CRUISE & FERRY
- Passenger & Cargo Vessel
- Cruise Vessel
- Ferry
- High Speed Passenger Vessel

OFFSHORE
- Offshore Supply Vessel

SPECIAL, OIL&GAS, OTHER
- Inland Tanker
- Dredgers
- Tugs
- Icebreaker
- Inland Container
- Cable layer and repair vessel
- Fishing Vessel
- FPSO
- FSRU
- FLNG Plant newbuild
- FSO
- Fixed Production Platform
- Others (SPAR, navy etc.)

POWER PLANT
- Industry
- Utility
- IPP
- Oil and gas
- Municipal

409 vessels / 1475 engines
46 vessels / 184 engines
36 vessels / 124 engines
58 vessels / 166 engines
172 plants / 728 engines

© Wärtsilä

25 November 2020
Kari Hietanen

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POWER PLANT
- Industry
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- IPP
- Oil and gas
- Municipal
HYBRID SOLUTIONS SUPPORT THE ACHIEVEMENT OF A CLEANER, SAFER, MORE EFFICIENT, AND PROFITABLE FUTURE

NORTH SEA GIANT
North Sea Shipping AS

VICTORIA OF WIGHT
Wightlink Isle of Wight Ferries

VILJA
Luleå Hamn AB

RETROFIT

NEW BUILD

NEW BUILD

-25%
TOTAL EMISSION REDUCTION

-17%
FUEL CONSUMPTION

-50%
MAINTENANCE COST

Figures are approximate and based on current operation and usage
WÄRTSILÄ FLEET OPERATIONS SOLUTION ENABLES EFFICIENT SHIP OPERATIONS AND MAINTENANCE OF ASSET CONDITION

Reducing carbon intensity with innovative operational measures

• **Voyage Performance**
  • Save up to 10% of fuel (and emissions) by **automatic efficient planning and execution** of routes
  • **Just-in-time arrival** unlocks further efficiency by reducing speeding and waiting of vessels before port entry
  • Monitoring of efficient use of **auxiliary engines** and **boilers** saves additional fuel
  • **Post voyage analytics** feeds back and eliminates inefficient behaviour

• **Vessel Performance**
  • Track **hull and propeller condition** to act on any potential efficiency losses
  • Monitor **engine performance** continuously
THE ROLE OF GAS IS CRUCIAL AS A BRIDGING FUEL

EU ENERGY AND CLIMATE TARGETS

TODAY

2030

2050

TARGETS:
• 32% renewable energy
• GHG reduced 40% (55%)

TARGETS:
• Climate neutrality

Transitioning phase

Energy

Flexible generation with natural gas

Flexible generation with bio fuels and power-to-x

Marine

Combustion engine with LNG

Combustion engine with bio fuels and power-to-x

Kari Hietanen

25 November 2020
## Engine Technology Ready for Future – Towards Sustainable Fuels

<table>
<thead>
<tr>
<th>Technology ready</th>
<th>Industrialisation needed</th>
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<tbody>
<tr>
<td><strong>Fossil liquids</strong></td>
<td><strong>Green methanol</strong></td>
</tr>
<tr>
<td>• High energy content</td>
<td>• Carbon neutral</td>
</tr>
<tr>
<td>• Widespread availability</td>
<td>• Can be blended with liquids</td>
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<table>
<thead>
<tr>
<th><strong>Fossil gas</strong></th>
<th><strong>Under development</strong></th>
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<tbody>
<tr>
<td>• Cleanest fossil fuel</td>
<td><strong>Green Ammonia</strong></td>
</tr>
<tr>
<td>• GHG reduction 5-20% depending on engine type (well-to-power)</td>
<td>• No CO2 emissions</td>
</tr>
<tr>
<td>• Widespread availability</td>
<td>• Can be blended with liquids or gases</td>
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<table>
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<tr>
<th><strong>Bio and synthetic liquids</strong></th>
<th><strong>Bio and synthetic gas</strong></th>
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<tbody>
<tr>
<td>• GHG reduction 70-100% depending on source (well-to-power)</td>
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</tr>
<tr>
<td>• Clear transition pathway as same infra can be used for all fuel types</td>
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<th><strong>Industrialisation needed</strong></th>
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<tr>
<td>• No CO2 emissions</td>
<td><strong>Industrialisation needed</strong></td>
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<td>• Can be blended with gases</td>
<td></td>
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CONCLUSIONS

Environmental awareness and changing energy needs are driving the maritime and energy sector transformation.

Flexibility, future fuels and new technologies are key to the achievement of climate targets.

Sustainability is central to our strategy and growth ambitions - with our broad offering of solutions we are well placed to support customers in improving their environmental performance.
THANK YOU