



NAUTISKA FÖRENINGEN 2021

ABB in Marine & Port

Electric. Digital. Connected

Jörgen Karlsson



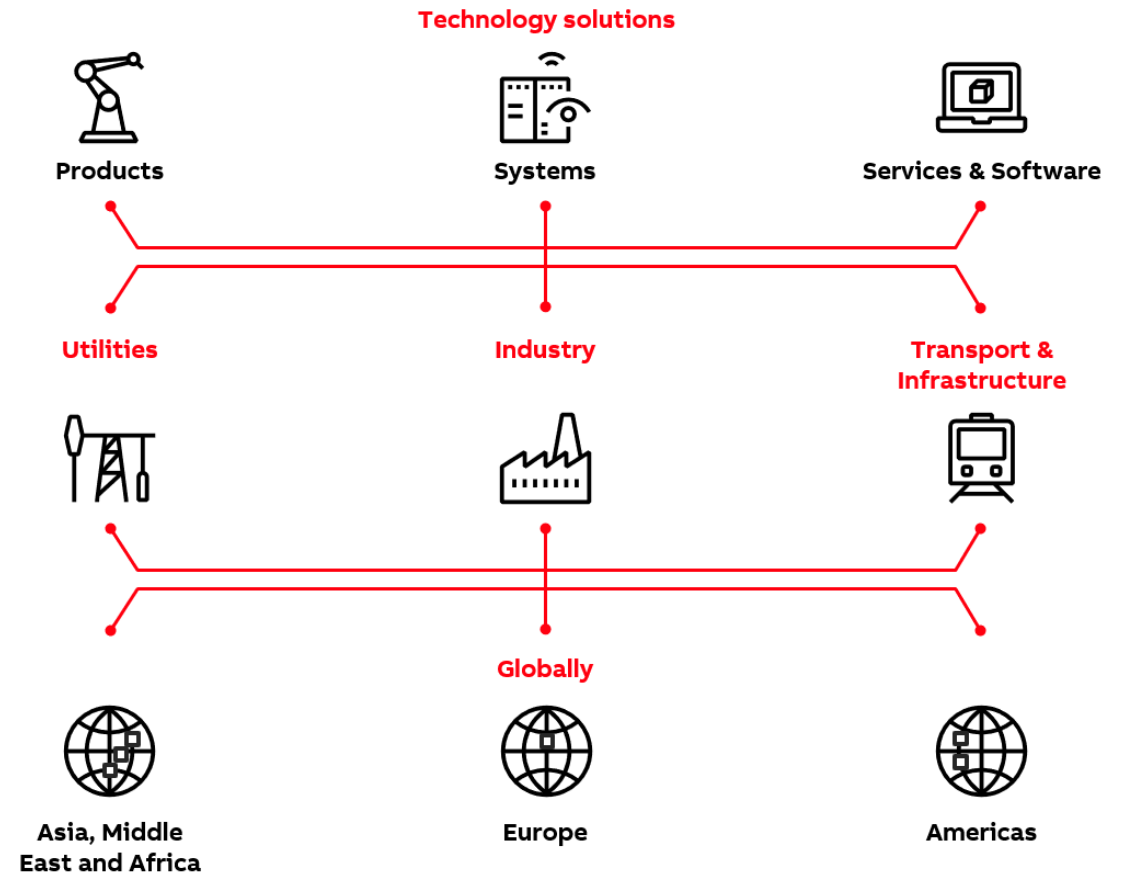
This is what we do

ABB is a technology leader that is driving the digital transformation of industries. With a history of innovation spanning more than 130 years, ABB has four customer focused, globally leading Businesses: Electrification, Industrial Automation, Motion, and Robotics & Discrete Automation, supported by the ABB Ability™ digital platform. ABB's Power Grids business will be divested to Hitachi in 2020. ABB operates in more than 100 countries with about 144,000 employee

What Offering

For whom Customers

Where Geographies



Smart Ports

High efficiency and sustainable port

Shore-to-ship power

Electric cranes

Renewables integration

Distribution substations, grid reliability, power quality

Power transformers, HV equipment, T&D Substations

Terminal automation, eBop

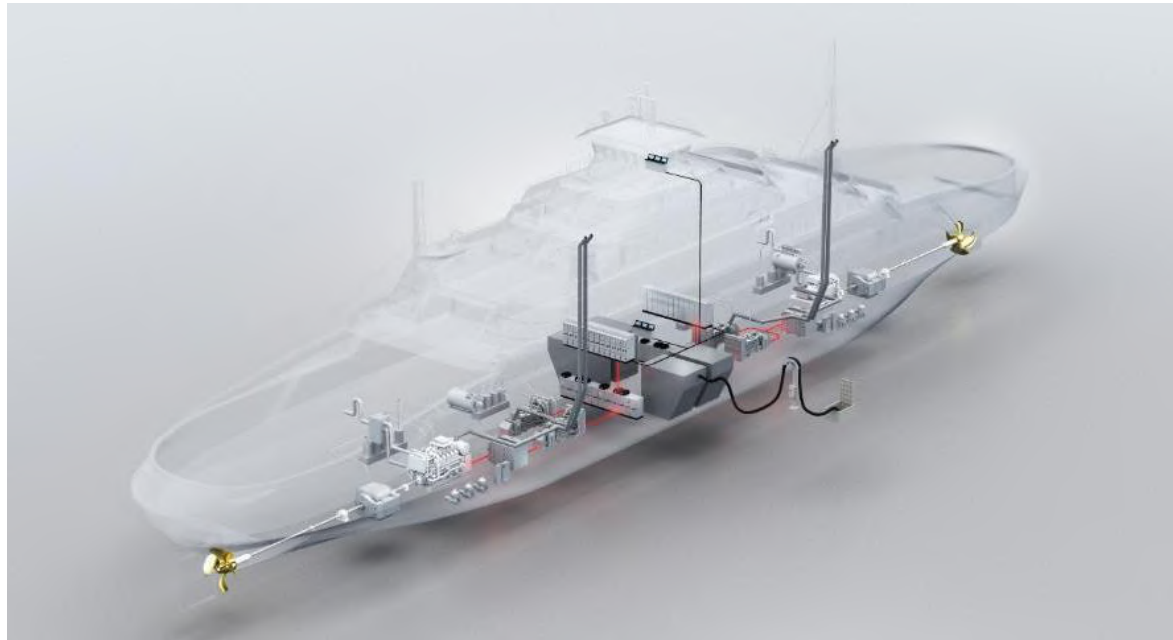
Electric vehicles

Smart grids and cities

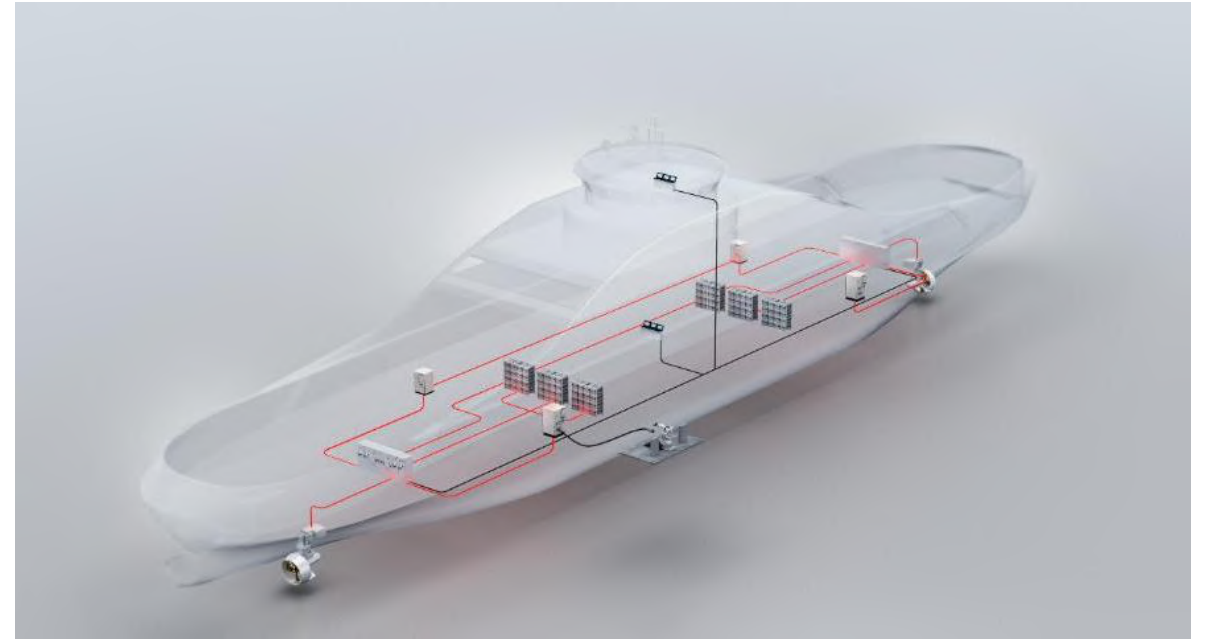
Electric. Digital. Connected.

Simplicity

Mechanical power train



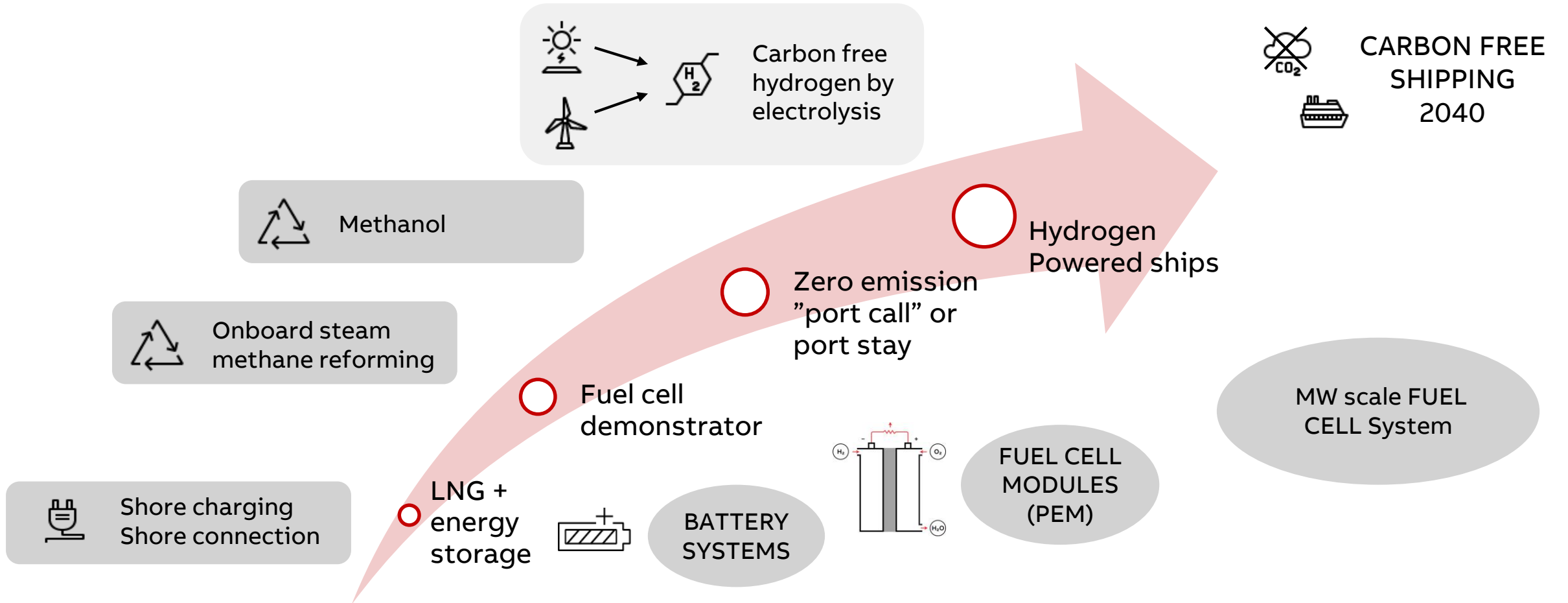
Electric power train



Electric is more efficient, simpler, flexible, more digital and better integrated

Pathway to carbon free shipping

Transition in **FUEL** and **TECHNOLOGY**



Current and future compliant fuels

Today fossil fuels



HFO
MGO
LNG



- LSHFO or Scrubber
- SCR
- DPF

Biofuels



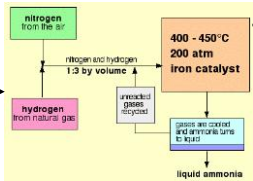
Bio Diesel
Bio Methanol
Bio Methane

e-fuels



Hydrogen

Haber Process



Ammonia
CO2 Capture

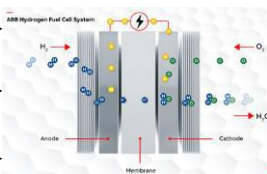


Synfuels

Diesel
Methane
Methanol

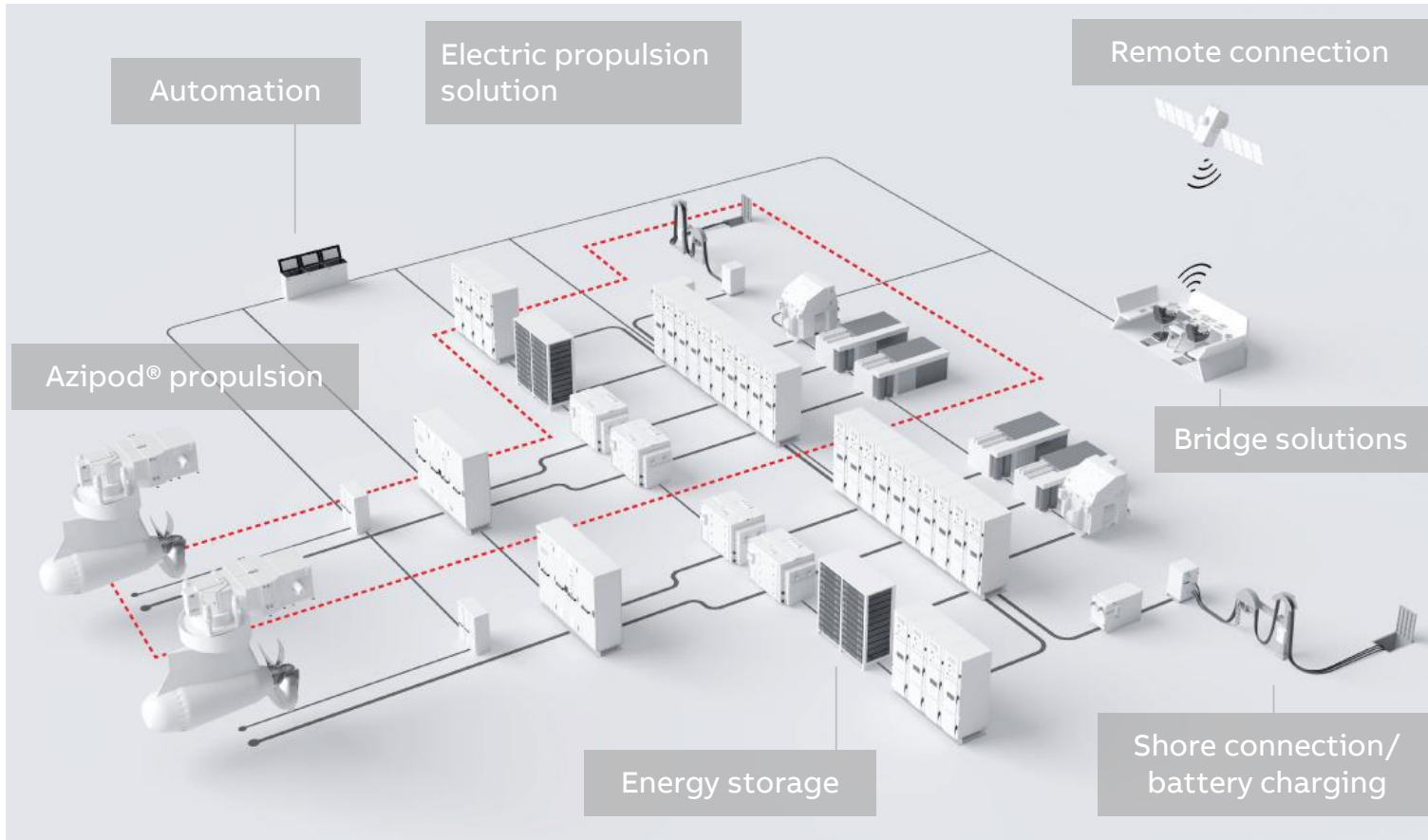
SOFC
HTFC
LTFC

Fuel Cell



Vessels: Integrated solutions from bridge to propeller

Electric propulsion is a proven solution for passenger, arctic and other specialized vessels



Customer value

- **Fuel saving and emission reduction** compared to mechanical propulsion
- Hybrid or all-electric solution enable **zero emission** vessel operation
- Improved **safety and reliability**
- **Future proof solution from fuel perspective**

Industry benchmarks

Fuel Cells are replacing conventional power sources in many sectors

Transportation

>10000 FC cars in operation



Hydrogen Fuel cell trains are in operation

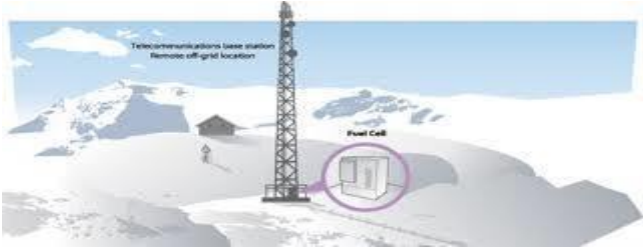
~ 20 000 Fuel Cell forklift in operation



< 3000 FC buses in operation. Ravidly growing segment



Stationary



Power Grid back up



200 000 household powered by FC in Japan

Telecommunication back up power



59 MW FC park in Korea



Maritime Fuel Cell Projects

Hydrogen fuel cell vessels, not just a vision anymore



MARANDA , 165 kW FC,
Operation 2019



RCL, 100kW
FC demo



Golden Gate Zero 360kW FC,
Operation 2019



Norled, 600kW FC
Operation 2021



Fiskerstrand Ferry, Pilot E,



CFT Flagship, 400kW FC,
Operation 2021



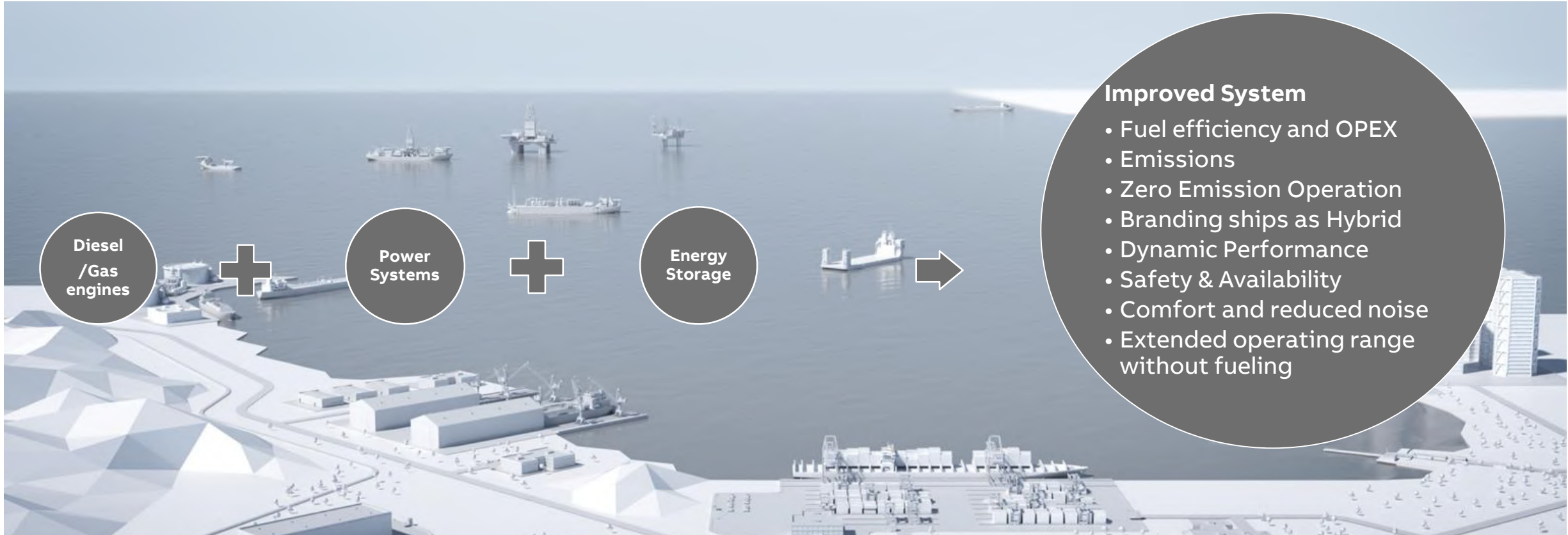
Hyseas III, 700kW FC, Operation
2021



Havila Kystruten, Pilot E

Battery Hybrid Solutions

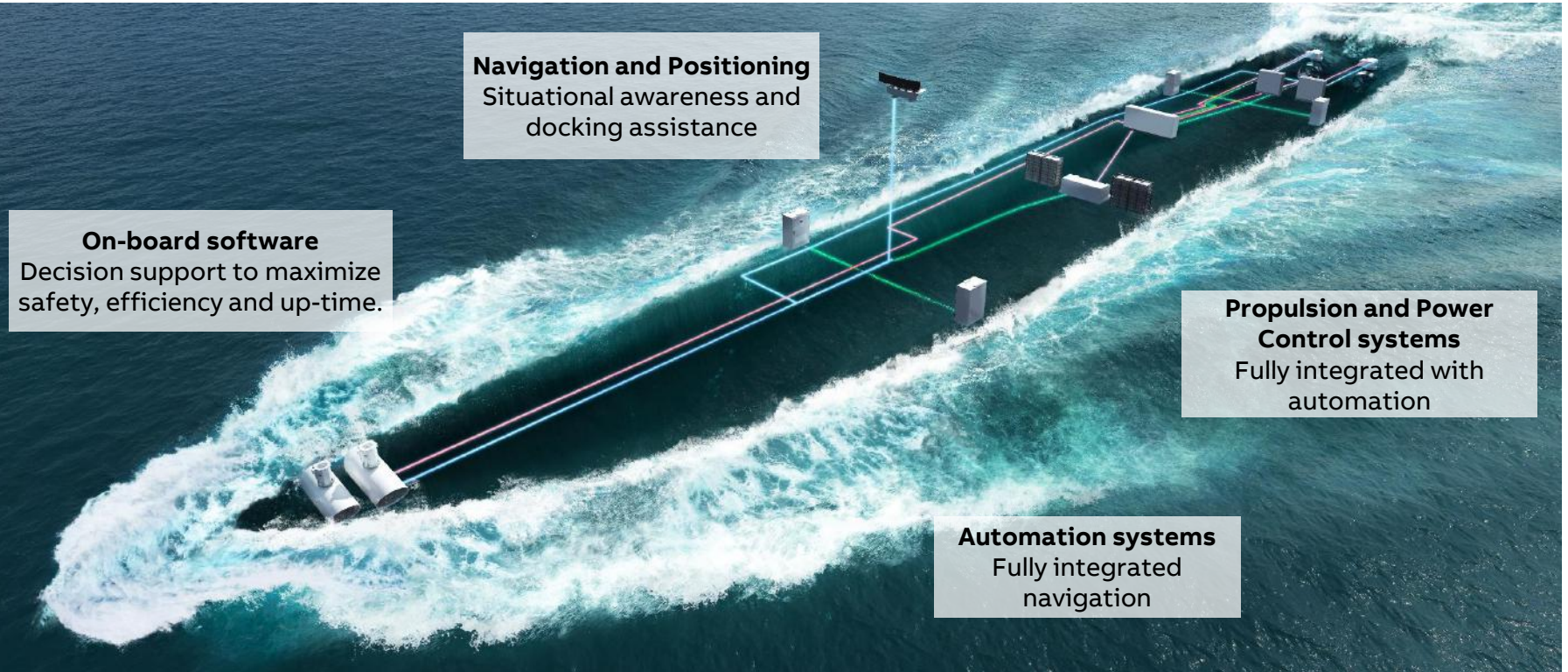
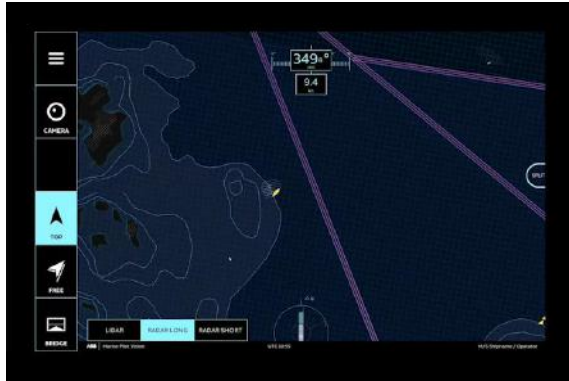
Why?



Currently 370 ships with batteries in operation or in constructions *

Electric. Digital. Connected.

System integration creates simplicity and efficiency



System integration from bridge to propeller enable simpler and more efficient operations

Connected ships - Collaborative Operations



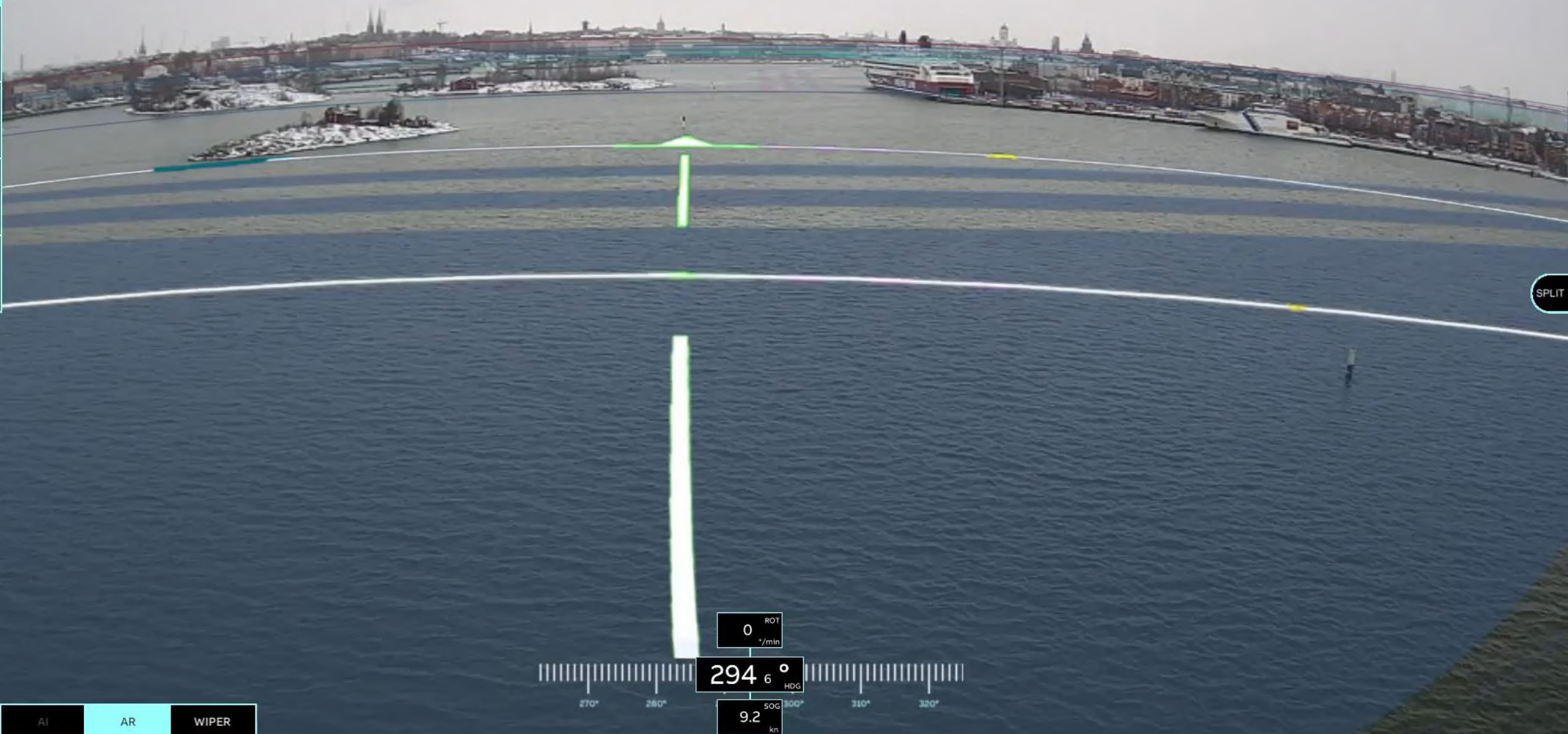
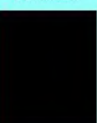
Centers are able to diagnose more than 90% of the service cases remotely, solving over 60%-70% without any on-site intervention.





07-03-2019 08:11:07

RGB



AI AR WIPER



ABB Ability™ Marine Pilot Vision Installations

Suomenlinna 2

- 36m Double Ender, Helsinki
- Pilot Vision 11/2017
- R&D Platform
- Product Modules: Full Scope
- Remote Operation 11/2018



Tallink Silja Serenade

- 220m Ro-Pax, Helsinki-Stockholm
- Pilot Vision 02/2019
- Product Modules: Lookout



Eckerö Finlandia

- 185m Ro-Pax, Helsinki-Tallinn
- Pilot Vision 12/2020
- Product Modules: Lookout, Mooring Assistance



Harbour Tug

- 34m Tug, Singapore
- Pilot Vision 01/2021
- Pilot Control 01/2021
- Pilot Onshore 01/2021
- Remote Operation and Autonomous Collision Avoidance



Onboard DC Grid & Energy Storage

Tycho Brahe & Aurora Energy Storage



Co-financed by the European Union
Trans-European Transport Network (TEN-T)



Vessel information

- Vessel name: Tycho Brahe & Aurora
- Vessel Type: Car Ferry
- Design: -
- Yard: Landskrona
- Year of delivery: 2017-2018
- Class/Notation: Lloyds Register/DMA/STA
- Owner: ForSea

ABB's Solution and scope of integration

- Generators: 4x2480kW (remain as back-up)
- Energy Storage: 4x1040kWh (~5400 car batteries)
- Propulsion: 4 x 1,5MW Azimuth thruster / Drives
- Automation: PEMS with integrated VMS
- Advisory: Remote Diagnostic, Energy Story Control System
- Shipyard package: Under ABB Scope

Other Information

- Retrofit of existing system and install energy storage to enable full battery based operation with Diesel backup
- Ferries operating between Helsingor (DK) - Helsingborg (SWE)
- Shore side infrastructure for Battery charging, with automatic shore connection.
- Energy Storage onboard including transformers, rectifiers, DC/DC converters for battery connections, Power management upgrade and Energy Storage control

This project has received funding from the Innovation and Networks Executive Agency (INEA), Connecting Europe Facility, under grant agreement No. INEA/CEF/TRAN/M2014/1040935."



Emission free – Two fully electric sightseeing ferries

Maid of the Mist



Vessel information

Vessel name: TBI
Vessel type: Sightseeing ferry
Design: Propulsion Data Services Inc.
Yard: Schoellkopf Power Station site
Owner: Maid of the Mist Corp
Delivery: 2019

Solution and scope:

Main Propulsion: 2 x 200kW motor with HES880 drive
Tunnel Thruster: 2 x 50kW motor with HES880 drive
Energy Storage: 2 x 158,2 kWh Battery package (2C)
Automation: PEMS and VMS
Shore to Ship Connection
RDS - Remote Diagnostics System

Other information

Fully electric Sightseeing ferry operating on the Niagara Falls
Length: 90.5 ft (27.58 m)
Width: 33.233 ft (10.16 m)
Hull Depth: 10 ft (3.05 m)
Seats: 530
Operation: 20 min cruise and 10min charging, 22 trips a day

Emission free – Iceland first electric ferry



Vessel information

Vessel type:	Passenger ferry
Design:	Polarkonsult, and StoGda Ship Design & Engineering.
Yard:	Crist SA
Owner:	Road and Coastal Administration's
Delivery:	2019/2020

Solution and scope:

Electrical:	OnBoard DC, drives, generators, transformers etc
Energy Storage:	3000 kWh Battery package
Automation:	PEMS and Energy Storage Control System
Shore to Ship Connection	
RDS - Remote Diagnostics System	
Octopus	

Other information

Electric ferry	operating route Landeyjahöfn on the mainland and the Westman Island,
Length:	70 m
Seats:	550 passenger, 75 cars (330 lane meters)
Operation:	13 km in about 45 minutes, 30 min charging, 3600 annual trips Able to enter the destination harbor in challenging weather

Några exempel på LinkedIn



Jorgen Karlsson

Head of Marine Sweden at ABB

1mo •

Denna vätgasdrivna färja med bränslecellssystem på hela 23 MW!! skall trafikera sträckan Köpenhamn – Frederikshavn – Oslo.
Med kapacitet på 380 personbilar, alternativt 120 lastbilar, samt 1 800 passagerare blir det världens största färja som drivs med grön vätgas.

"Ett #Partnerskap med jordens främsta experter inom design, testning, byggande, finansiering, samt att hålla innovativa farkoster i operativ drift"

#ABB #Marine #fossilfritt #electric #digital #connected #fuelcells #samverkan



Sveriges grannar bygger enorm vätedriven färja

nyteknik.se • 2 min read



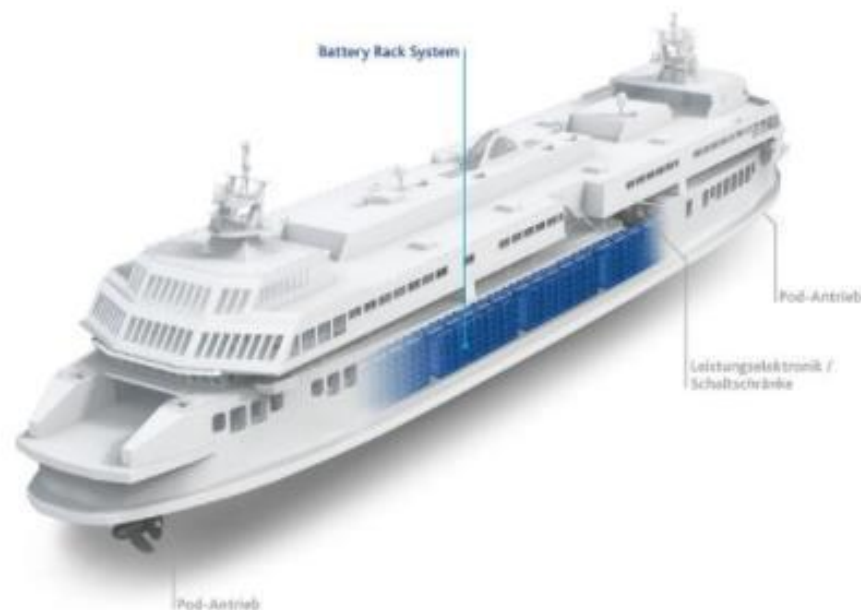
Jorgen Karlsson

Head of Marine Sweden at ABB

2mo •

Batterifärjor blir vanligare numera. Dessa två skall trafikera Dover and Calais 2023 bidra med #zeroemission

#ABB #marine har ansvaret för batterier, el och framdrivning ombord. #sjöfart
#fossilfritt



XALT to supply batteries for English Channel ferries - electrive.com

Några exempel på LinkedIn

 **Jorgen Karlsson**
Head of Marine Sweden at ABB
1w • 🌐

Båtbyggaren Oceanco tar ett viktigt steg mot [#zeroemissions](#) för Yacht segmentet.
Citat från Oceanco "THE FUTURE IS ZERO. THE FUTURE IS NOW".
[#ABB](#) [#Marine](#) är stolta att vara en partner på denna gröna resa

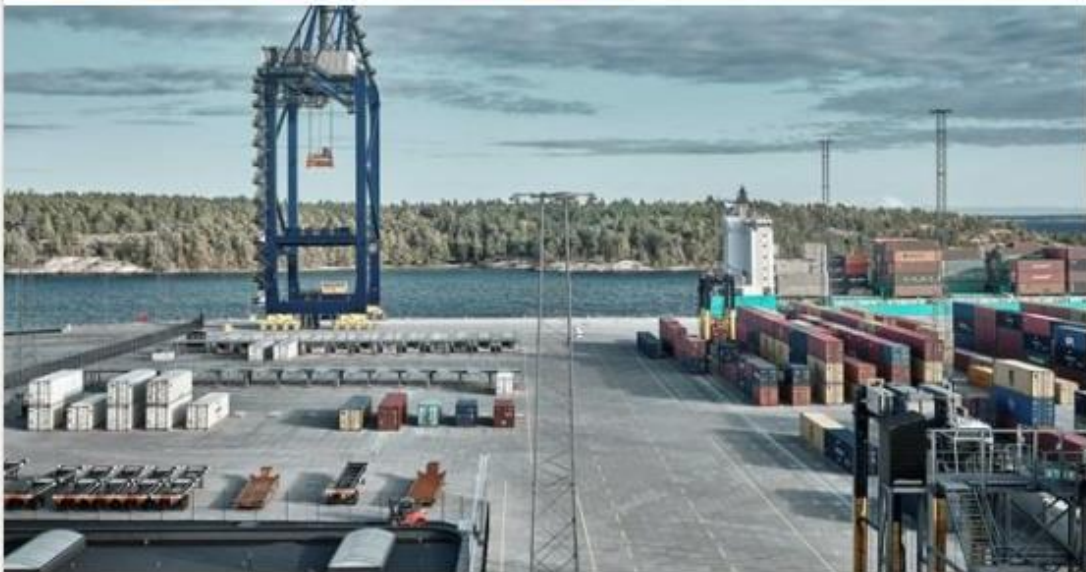
Läs mer här
<https://lnkd.in/ek-DTZF>
[#fossilfritt](#) [#sjöfart](#) [#electric](#) [#digital](#) [#connected](#) [#samverkan](#) [#hållbart](#)



ABB:s roderpropellrar installeras i "hållbar" lyxyacht
nyteknik.se • 2 min read

 **Jorgen Karlsson**
Head of Marine Sweden at ABB
1mo • 🌐

För att uppnå en fossilfria transporter behöver transporthubbar, så som hamnar, kunna understödja logistikkedjor, genom att exempelvis kunna erbjuda förnybar el. Är vi rätt rustade?
Se dagens debattinlägg om rollen som hamnen kan ta i den gröna omställningen. Håller du med? Engagera dig gärna i debatten.
[#abb](#) [#fossilfritt](#) [#electric](#) [#digital](#) [#connected](#)



Debatt: Framtidens hamn behöver även fungera som "energihubb"
altinget.se • 3 min read

We believe the future is Electric, Digital, and Connected.

Thank you!

Jorgen.x.karlsson@se.abb.com

Head of Marine Sweden

ABB Marine & Port

Jörgen Karlsson





ABB

Zero emission operation - solutions

Short distance shipping driving local environmental goals

Charging technology

Electric charging solution

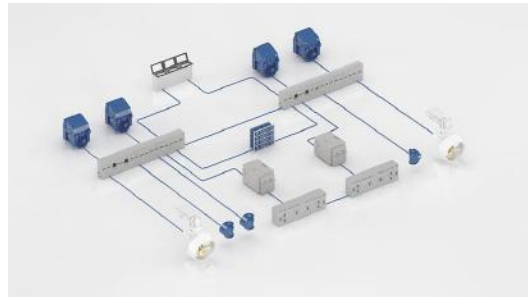
- Solutions
 - Robot charging
 - Semi Auto charging
 - Crane assisted charging
 - Manual operated charging



Onboard DC Grid™

Electric power solution

- Modular system
 - Increase flexibility
 - Increase efficiency
 - Future energy sources



Batteries

Clean, flexible and safe

- Energy storage functions
 - Spinning reserve
 - Peak shaving
 - Back-up reserve



Fuel Cells

Clean and flexible

- Energy production function
 - Modular System
 - Increase range
 - Combined with batteries

