“Industry perspective in the green transition of the maritime sector”

Andrea Borzacchiello - LPE Wave 2 the Future

20th June 2024

FINCANTIERI

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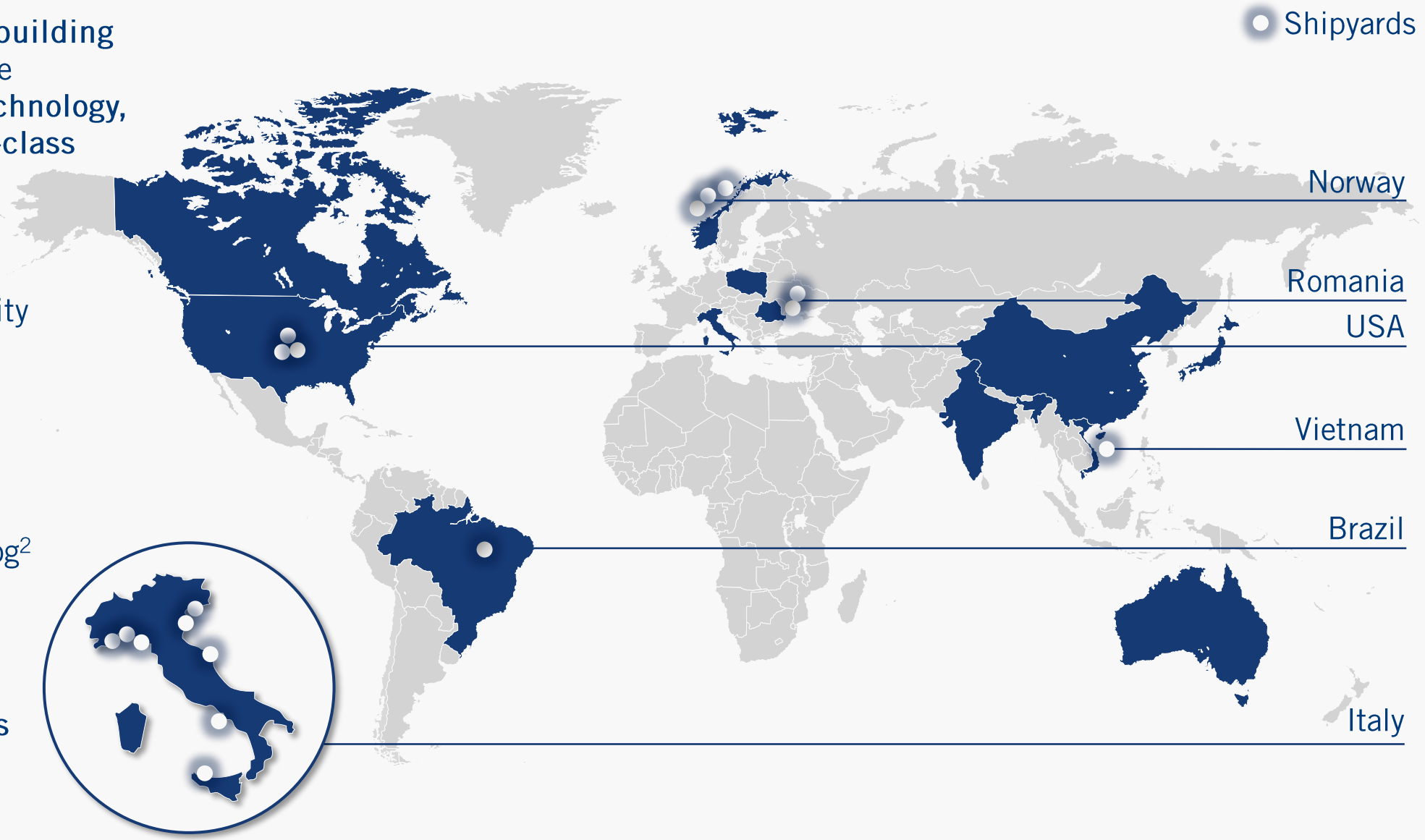
Fincantieri in brief

Company profile 2024

FINCANTIERI

A leading global Group with widespread international presence

- **Leading player in Shipbuilding** with a strong competitive positioning thanks to **technology, innovation and best-in-class execution**
- Growth led by organic diversification, global production capacity and wide client base



7.7 bn revenues[1]

34.8 bn total backlog[2]

18 shipyards in 4 continents

+21,000 employees 52% in Italy

1. FY23 revenues
2. Value as of December 31, 2023. Sum of backlog and soft backlog; soft backlog represents the value of existing contract options and letters of intent as well as contracts in advanced negotiation, none of which yet reflected in backlog

FINCANTIERI

Europe's largest shipbuilder with a vision to provide a comprehensive service proposition for the life-cycle of green and digital ships

Shipbuilding

Cruise	Defence	Offshore	Infrastructure
>40% global market share Diversified client base and complete segment coverage >120 deliveries since 1990	Sole supplier to the Italian Navy Main partner for the US Navy Partner of choice of leading navies worldwide >140 deliveries since 1990	Prime mover in Offshore Wind SOVs >30% market share for orderbook for CSOVs and SOVs[1] Historical leadership in O&G OSVs[2]	Infrastructure capabilities in sectors adjacent to shipbuilding

DIGITAL ENABLING TECHNOLOGIES

Digital integration to turn into a Digital Design Authority with Artificial Intelligence and Data Analytics competences

MARINE SYSTEMS AND COMPONENTS

Leader in the green transition toward Net Zero emissions thanks to a consolidated know-how and a continuous R&D

26 units delivered, 23 units ordered, 85 ships in backlog and 27 ships in soft backlog

1. CSOV: Construction Service Operations Vessel; SOV: Service Operation Vessel
2. OSV: Offshore Service Vessel

Roadmap to Net Zero

Company industrial plan 10.2023

A roadmap for cruise ships to target Net-zero

Valid for a large cruise vessel – 140k GRT

Tank to wake approach

Uncertainty due to regulation evolution from TtW towards WtW

	2022	2025	2030	2035	2040	2050
Milestone	**High efficiency MGO vessel**	**High efficiency LNG vessel**	**Minimal emissions in port with shore connection and Hybrid configuration**	**Net zero with new fuels, ICE-based generation**		
CO2 local emissions vs 2008[1]	**-32%**	**-55%**	**-61%**	**Net-Zero**		

Enabling technologies & innovations topics

- Bio-diesel / HVO as drop-in solution
- Bio Methanol or E-Methanol in dual fuel engine
- Dual Fuel LNG engine
- Dual fuel LNG engine with low methane slip
- E-LNG/bio-LNG
- Hybrid power generation (e.g. Fuel Cell + ICE) *Hydrogen to reduce emissions*
- Full hydrogen as alternative fuel *Only for specific applications*
- Batteries / Fuel Cells
- Nuclear power gen.

1. emissions reduction based on "selected standard profile": 63% in navigation, 37% in harbour and vs baseline of FC reference

LNG & Methanol for emission reduction

Le Commandant Charcot (Ponant)

First hybrid polar expedition cruise vessel with LNG dual fuel engines and 4.6 MWh BESS. The vessel features ice-breaking technologies and LNG storage onboard

STATUS: delivered July 2021

Sun Princess

1st Sphere class LNG cruise ship and it represents the largest ship ever built in Italy

STATUS: delivered February 2024

Prima Plus Class (Norwegian Cruise Line)

First large cruise vessels ready to use green methanol for main combustion engines as an alternative to conventional fossil fuels

STATUS: signed in Q1 2023

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Hydrogen as an innovation vector

ZEUS (Zero Emission Ultimate Ship)

First RINA Classed ship capable to be propelled by hydrogen, with a nominal power of 120 kW guarantee by PEM fuel cells + BESS

STATUS: launched in 2022

Viking Neptune

First real onboard implementation of PEM fuel cells, with nominal power of 100 kW, with hydrogen produced and stored aboard a cruise vessel

STATUS: delivered in November 2022

IPCEI Hy2Tech Project

Funded by the European Union NextGenerationEU

Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA

Validation of Fuel Cell technologies (PEM, SOFC) & liquid hydrogen storage system on board two cruise ships with a nominal power of several MW.

STATUS: started in 2023, will end in 2029

Enabling technologies & innovations topics

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- E-LNG/bio-LNG
- **Hybrid power generation (e.g. Fuel Cell + ICE)** *Hydrogen to reduce emissions*
- **Full hydrogen as alternative fuel** *Only for specific applications*
- **Batteries / Fuel Cells**
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H2 challenges in Maritime

H_2 compatible engines need to be scaled up to the desired MW scale while simultaneously addressing durability, compatibility with maritime conditions.

Sustainability

Vessels have to be designed and built taking into account limited availability of spaces, volume, payloads and safety issues, in particular in case of passenger ships. These issues lead to the necessity of development of proper and safe solutions for the on-board storage of H_2.

Safety

Refueling facilities and high-volume fuel bunkering systems will be required, particularly for larger vessels, posing a significant challenge**.**

Infrastructure

Regulations, codes and standards (RCS) related to H_2 issues are still immature.

Regulations

Wave 2 the Future Project

Funded by
the European Union
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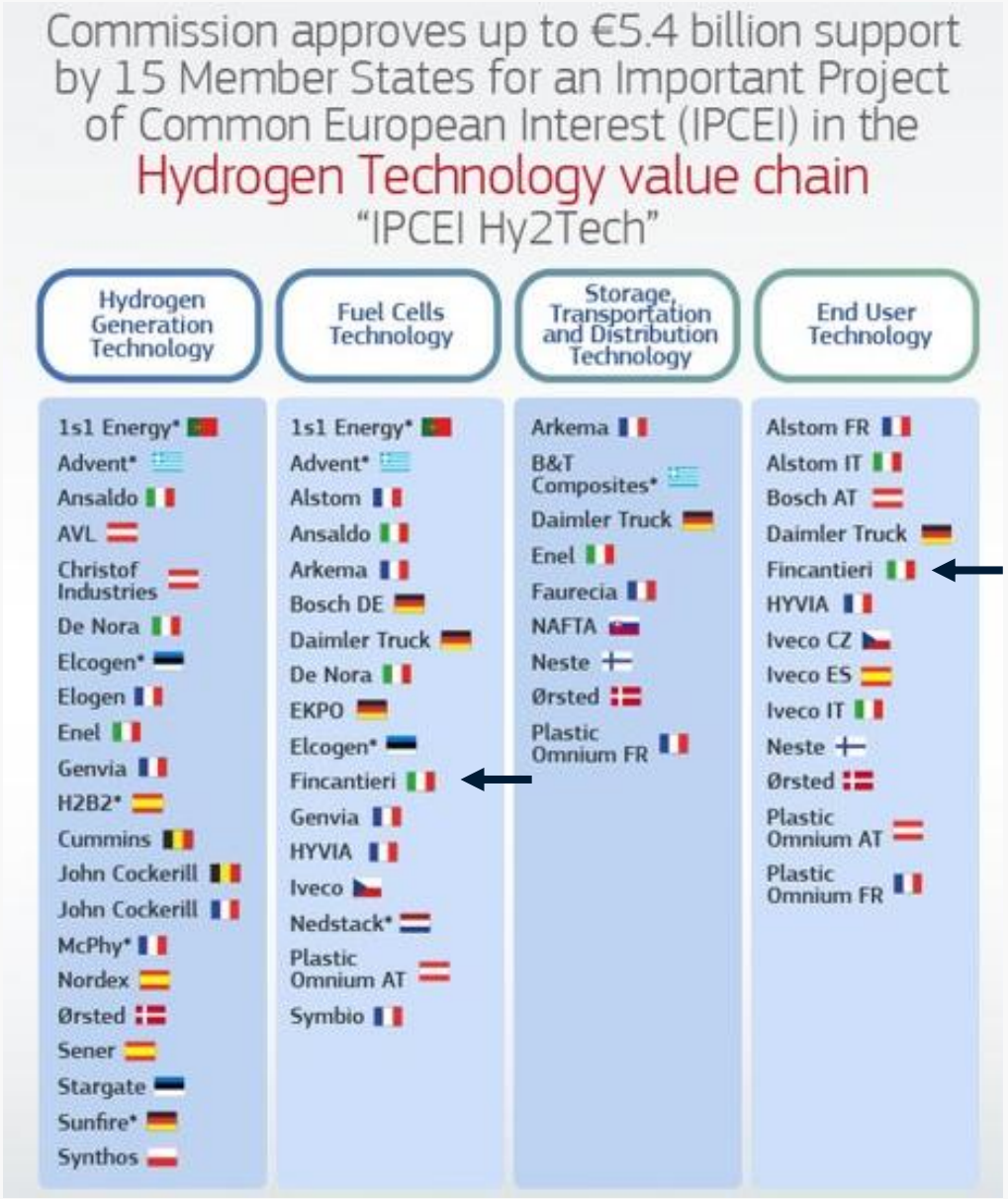

Funded by the European Union
NextGenerationEU

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Fuel Cells Technology

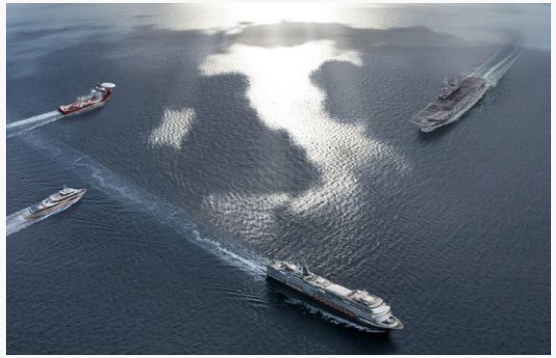
End User Technology

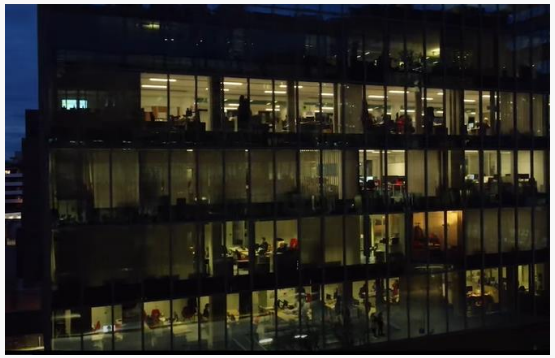
WP1
Development of Hybrid Green Power Generation System (HGPGS)

Isotta Fraschini Motori a FINCANTIERI company

WP2
Development of a Green Combined Cycle Gas Turbine fuelled by H2 (G-CCGT)

WP3
Integration of Hydrogen-based technologies onboard Green Cruise vessels





THANK YOU

Andrea Borzacchiello
LPE Wave 2 the Future
Mob. +39 3421224493
Andrea.borzacchiello@fincantieri.it
www.fincantieri.com

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