

FreeCO₂ast

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Havyard and the road to zero emission
FreeCO2ast Project
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Havyard Group ASA

Havyard Group ASA is a knowledge-based marine and maritime technological company, which deliver innovative and sustainable technology offshore and onshore to customers within seafood, energy and transport







"Change our industry"

Business segments

Shipbuilding technology

Ship Design & Solutions

Power & Control



The road towards zero-emission





The road towards zero-emission











THE FUTURE OF SHIPPING









Pilot-E awarded the project 104 MNOK in 2018.

"The FreeCO₂ast project shall develop a high-capacity hydrogen powertrain approved for zero-emission operation with higher speed and over longer distances."

FreeCO₂ast



FreeCO2ast targets

- Develop and approve **Pilot system** for Havila Kystruten
- Expand toolbox for simulation driven ship design including hydrogen and total system energy.
- Develop deep knowledge in fuel cell, tank and control system applications. "X in the loop" philosophy.
- Explore hydrogen solutions for other vessel segments with Virtual lab.
- Market analysis for maritime zero emission solutions









Approval in principal case

- 3,2 MW Fuelcell
- 3,5 t LH2 Tank

Simulation-Driven Design





FreeCO2ast realization roadmap









Market Analysis

Research questions

- Passenger desire to use zero emission transport?
- Passenger will to pay extra for zero-emission transport 3 years from now?
- Potential passenger fear of being close to hydrogen installations?
- Regulations development?



Challenges:

- Timeline require retrofit solution
- Need technology verification
- Extensive commissioning and tuning
- Ongoing tender demands very short yard stay













- Onshore Commissioning
- Testing towards simulated
- environment and other components
- (Virtual lab, X-in the loop)

















- Support and tuning during sailing enabled by data exchange from ship to shore
- The ships existing hybrid solution (LNG/battery) takes away risk of downtime





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