A paradigm shift for Maritime

Johan Burgren
Business Manager Marine
PowerCell in the World

Sales in > 80 countries
90% sales to Germany and China
Sales offices in Strategic Markets
Zero Emission For Maritime

BRUSSELS (Reuters) - The European Union agreed on Tuesday to reduce emissions of carbon dioxide (CO2) from new trucks and buses by 30 percent by a 2030 deadline as part of its commitment to cut its output of greenhouse gases. 15% by 2025!! All compared with 2019 levels.

50% GHG reduction by 2050 compared to 2008 on your total tonnage
Evaluation ongoing for 40 % by 2030 and 70% by 2050!
Our solutions

Consultancy  FC Systems  Integration
Fuel Cell stack development lab
FC system development
DCDC development capability
Marine build and test facility in Gothenburg harbor
Development partners
Automotive drives economy of scale for Maritime
Nikola has decided.
Automotive drives economy of scale for Maritime
Multi Mega Watt feasibility studies
H2 powered Heavy Fork Lift

- 54 kW Fuel Cell
- 60 kWh Lion battery
- 9 kg hydrogen
- DCDC
- 1000 hour test so far...
Aranda research vessel

- 165 kW (2 x 82.5 kW AC) fuel cell powertrain based on S3 stack
- Powering Arctic research vessel Aranda's electrical equipment and dynamic positioning during measurements - free from vibration, noise and air pollution
- 18-month marine field testing including extreme cold and saline conditions
- Container installation on deck

Project consortium:
- VTT Technical Research Centre of Finland Ltd
- Powercell Sweden AB
- ABB Oy
- OMB Saleri SPA
- PersEE
- The Finnish Environment Institute (SYKE)
- Swiss Hydrogen SA
RoPax Ferry concept development

Assumptions

Simplified operation profile (average)

Energy profile study
Fuel Cell / Battery Balancing
H2 Storage Concept
Electrofuels
Challenges for maritime implementation

• Bridging the cost gaps – Norway is in the forefront of implementing state funded demonstration projects- 12 projects running with hydrogen.
• Bridging the technology matureness versus commercial expectations.
• Making clean hydrogen available at a low cost in large quantities.
• The real z-emission alternatives are there – legislation is not!
Benefits LOHC:

- It is non-hazardous!
- It can be treated with existing oil distribution infrastructure!
- It is safe to bunker and store on board. (On board the vessel it will give an absolute minimum of molecular hydrogen at any given point in time)
- Slightly less energy dense than Liquid Hydrogen (still comparable to LNG!) => 5x the fuel tank size of diesel

Infrastructure missing (but of course missing for any other future fuel as well)

Towards Zero Emissions