



FLAGSHIPS

Clean waterborne transport in Europe

Two hydrogen flagships deployed in this project illustrate the business viability and promote social acceptability of zero-emission shipping based on hydrogen and fuel cells

VESSEL 1: LYON

A push-boat operating as a utility vessel on one of the most demanding rivers, the Rhône.

FEATURES

Total Budget: 6.8 MEUR
Duration: 4 years, 2019-2023



A total of 1 MW installed on-board fuel cell power



Hydrogen production with electrolysis powered by renewable electricity



VESSEL 2: STAVANGER

A passenger and car ferry operating as part of the local public transport network.



Hydrogen vessels



Passenger & car ferry

- Stavanger area Norway
- 600 kW FC power









Pusher

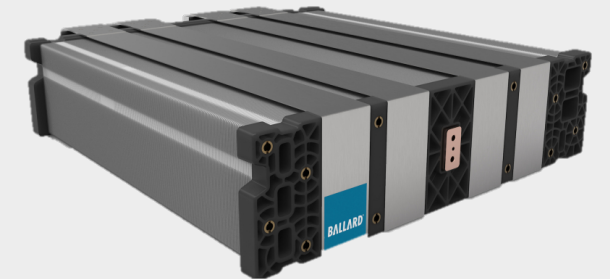
- Lyon, France
- 400 kW FC power

Ballard Fuel cell module

- Rated power: 200 kW
- Size WxDxH: 90x120x200 cm
- Weight: 200kg
- Lifetime: 34 000 hours
- Nominal design efficiency: 50%
- Type approval by DNV-GL
- Smart customer interface: Easy integration

FC gen[®] – LCS Durable heavy duty fuel cell stack

-  Power density designed for Heavy Duty requirements
-  Freeze start capability
-  Extended durability
-  Low product total cost of ownership
-  Packaging flexibility for easier integration
-  Refurbishing process re-uses plates & recycles catalyst



Project objectives

- Raise the global readiness level of hydrogen-powered zero-emission waterborne transport
 - Develop and deploy H₂+FC vessels in two commercial applications
 - Reach runtime of at least 18 months in day-to-day operation
 - Drive the uptake of H₂ fueling infrastructure for hydrogen vessels
 - Develop and strengthen supply chains for the marine FC & H₂ technology
 - Clarify approval practices for hydrogen ships

Timeline

Specification

Design

Build

Test & approval

2019-2020

2021-2022

Operation in commercial service

Project consortium

Overarching

- VTT
- Ballard
- Pers-EE
- NCE Maritime Cleantech

Team Stavanger

- Norled
- LMG Marin Norway

Joining soon...

- Westcon P&A

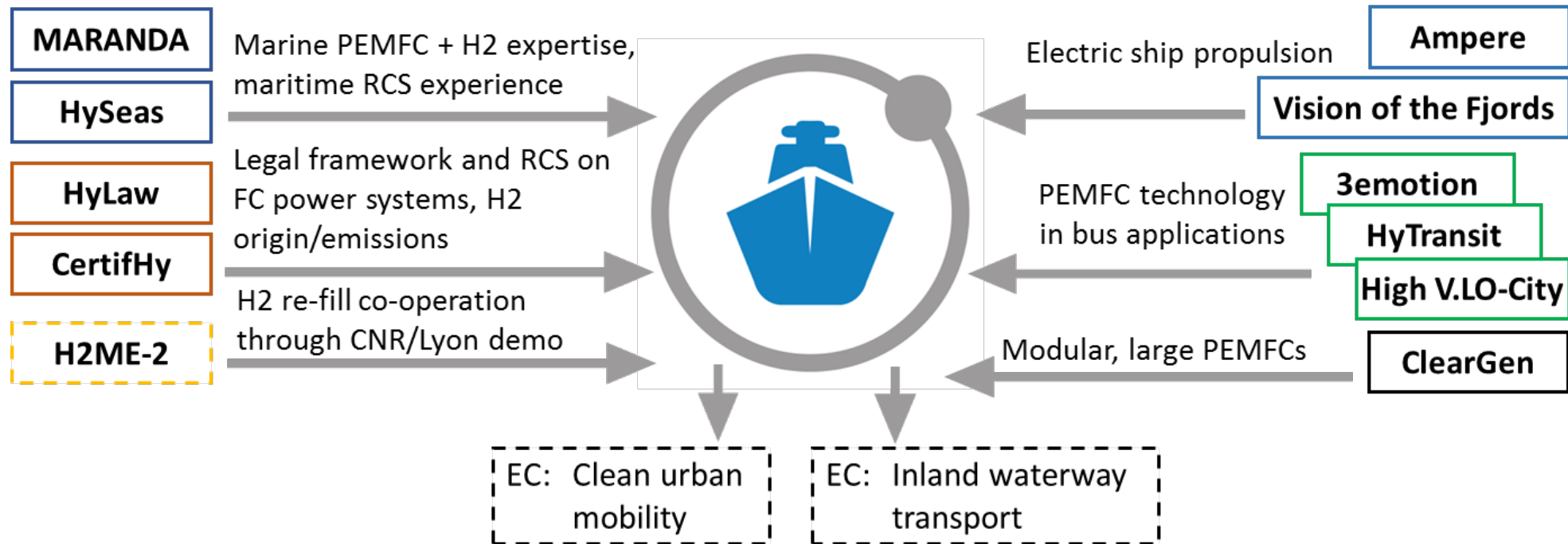
Team Lyon

- CFT
- ABB
- LMG Marin France



Building on long-running experience

- Past experience from electric and fuel cell transport applications is leveraged for pan-European commercial benefit



Contact points

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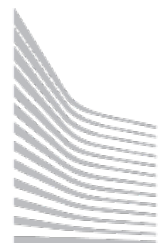


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www.flagships.eu

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European
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