



FLAGSHIPS

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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: PARIS

A self-propelled urban distribution barge to operate in the city of Paris.

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.

ON HOLD



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING



Project consortium

OVERARCHING

Persee
smarter energies

VTT

BALLARD®

maritime
cleantech

TEAM STAVANGER

ON HOLD

NORLEDA

SEAM

LMG
MARIN

CFT COMPAGNIE FLUVIALE DE TRANSPORT

SOGESTRAN GROUP

ABB

LMG
MARIN

TEAM PARIS

CARGO VESSEL

PARIS
FRANCE

FERRY
STAVANGER
NORWAY



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

Project requirements

- Two ships to be developed
- Operating period of 18 months
- 50% Green hydrogen during the FLAGSHIPS operating period.

PARIS DEMO

Zulu Case

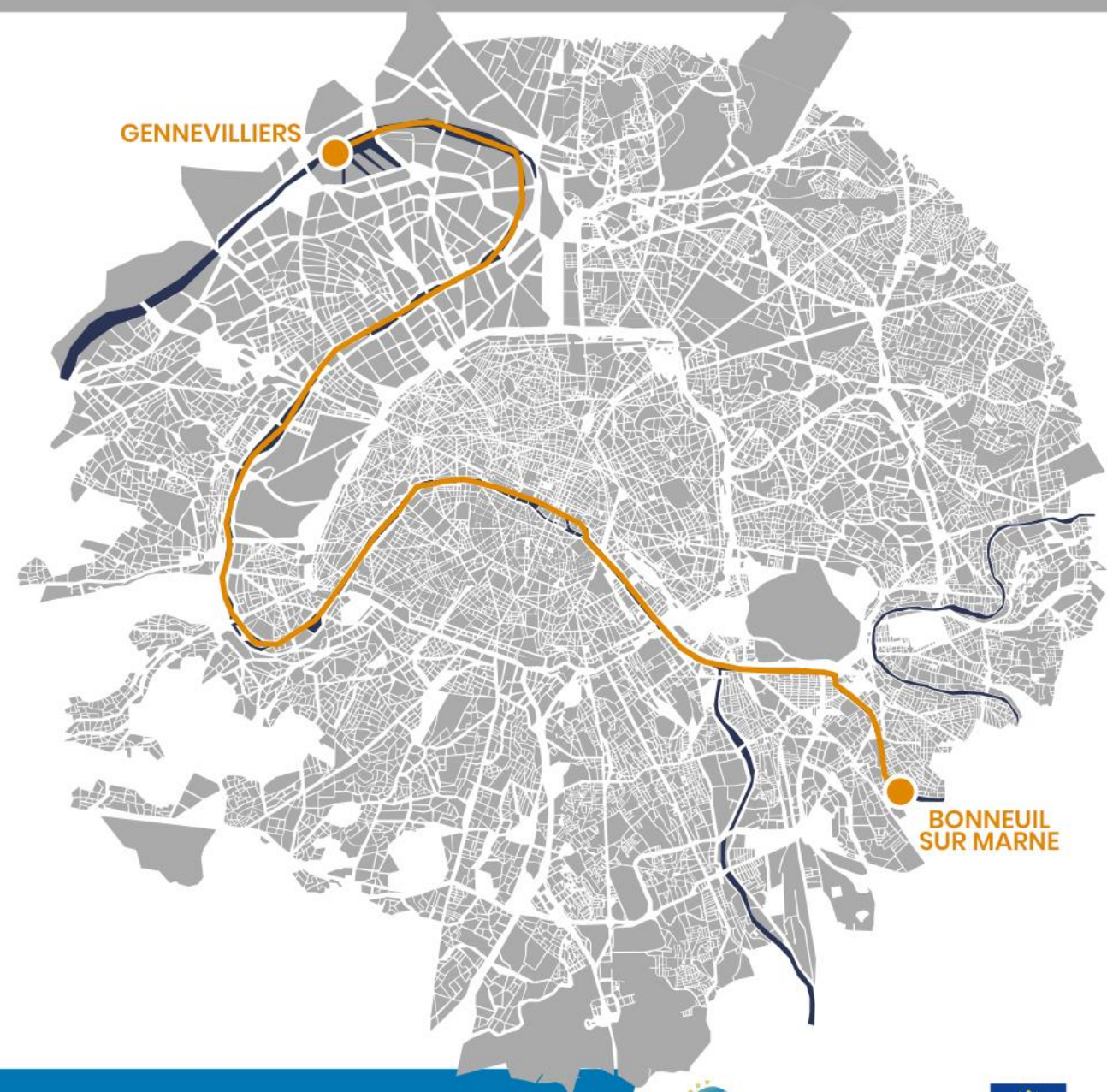


Meet Zulu!

World's first hydrogen cargo vessel

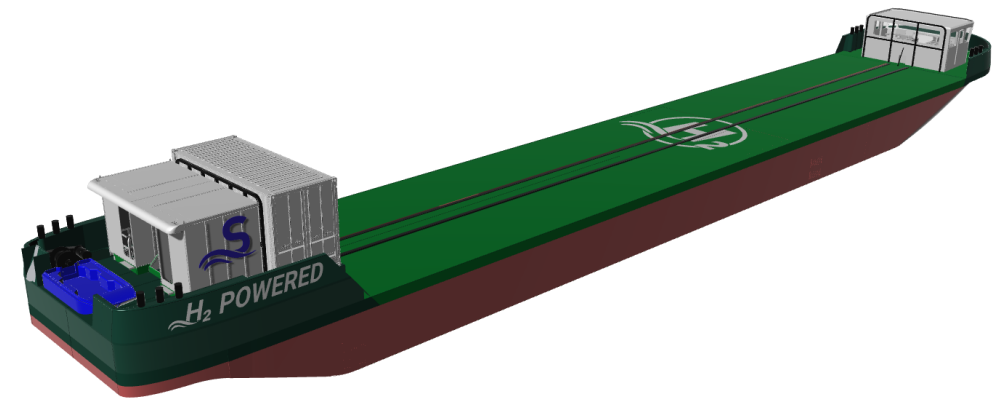


Soon plying the River Seine in Paris



A urban distribution ship

- Operating in Paris.
- Take cargo in Gennevilliers harbour or Bonneuil sur Marne and deliver on the Seine quayside in Paris.
- Potential clients are: construction material company, express mail service, e-commerce, large distribution...



World's first

- Zero-emission barge vessel
- Fitted with 400 kW PEM Fuel Cells
- Running on green compressed H₂
- Currently under construction:



Ballard FCwave

- Marine-tailored FC module
- Rated power: 200 kW - scalable
- Type approval by DNV-GL
- Easy integration
- Easy serviceability

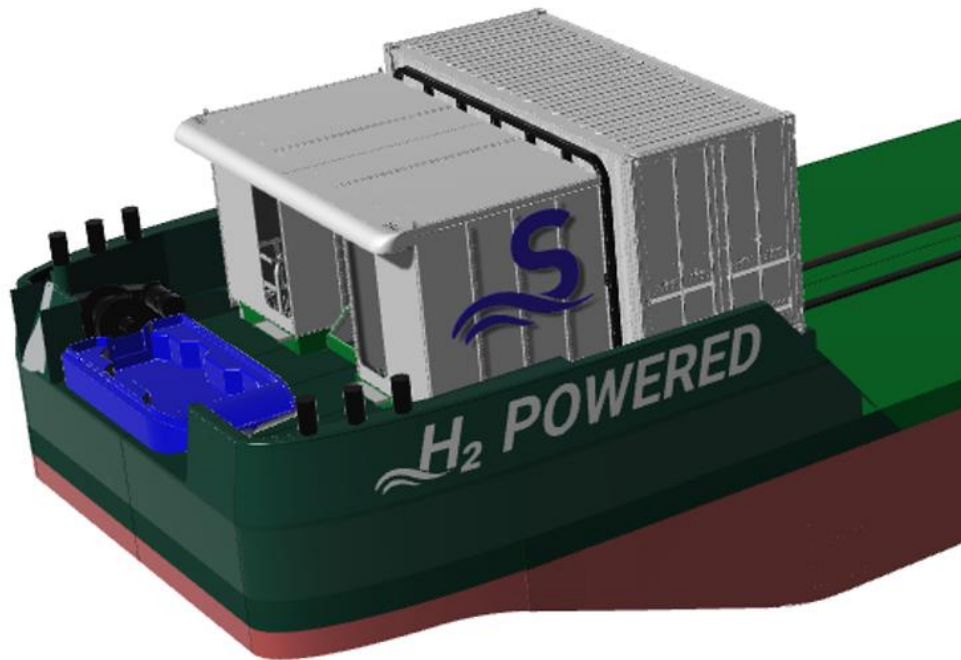


FC gen® – LCS fuel cell stack

-  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



Storage system



- 300 bars system
- Swappable
- 300kg

Navigation approval process

- Derogation process ongoing with french administration
- Derogation using the legal frame of the « arrêté zone restreinte » which set a process to submit an innovation project.

Décrets, arrêtés, circulaires

TEXTES GÉNÉRAUX

MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE

Arrêté du 20 août 2019 relatif à la délivrance
de titres de navigation sur une zone de navigation restreinte

NOR : TRET1921902A

Delivery ?

- Shipbuilding is facing some trouble linked to the electronic component shortage.
- First operation is now schedule by May 2022



Acknowledgements

The FLAGHSIPS project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 826215. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation program and from Hydrogen Europe.



European
Commission

Horizon 2020
European Union funding
for Research & Innovation

