

FLAGSHIPS

CLEAN WATERBORNE TRANSPORT IN EUROPE



FLAGSHIPS

Project ID	826215
PRR 2024	Pillar 3 – H ₂ end uses: transport
Call topic	FCH-01-2-2018: Demonstration of fuel cell applications for midsize passenger ships or inland freight
Project total costs	EUR 6 766 811.83
FCH JU max. contribution	EUR 4 999 978.75
Project start - end	1.1.2019–31.3.2025
Coordinator	Teknologian tutkimuskeskus VTT Oy, Finland
Beneficiaries	ABB Oy, Ballard Power Systems Europe AS, Compagnie Fluviale De Transport, Future Proof Shipping BV, Kongsberg Maritime AS, LMG Marin AS, LMG Marin France, Maritime CleanTech, Norled AS, Persee, SEAM AS, Sogestion, Sogestran

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PROJECT AND GENERAL OBJECTIVES

Two commercially operated hydrogen fuel cell vessels will be demonstrated, one in France (Paris) and one in the Netherlands (Rotterdam). The Paris demonstration vessel is a self-propelled barge operating as a goods transport vessel in the city centre; the Rotterdam demonstration vessel is a container vessel transporting goods between Rotterdam and Duisburg. The Paris demonstration vessel has been built and is en route to France, where hydrogen fuel cell systems will be installed. Work started on the Rotterdam demonstration vessel at the end of 2021, and the vessel was launched in February 2024.

NON-QUANTITATIVE OBJECTIVES

- The project aims to develop and demonstrate bunkering technologies based on swapping gaseous hydrogen fuel containers.
- Procedures for hydrogen bunkering by swapping hydrogen storage containers are being developed and will be demonstrated in 2024.

PROGRESS AND MAIN ACHIEVEMENTS

- The FCwave fuel cell module has been approved by the DNV.
- The *Zulu* (Paris demonstration vessel) was designed and built. The vessel is at the yard in Le Havre. ABB and Ballard Power Systems

Europe systems are already there and installation work has started. The vessel has been granted a recommendation from the Central Commission for the Navigation of the Rhine.

- The *H₂ Barge II* demonstration vessel was launched and started operating in March 2024.

FUTURE STEPS AND PLANS

- The *Zulu 06* vessel will be launched in summer 2024.
- The commercial operation of both vessels will be demonstrated for 18 months.



PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?	SOA result achieved to date (by others)	Year for reported SOA result
Project's own objectives	Complete FC and H ₂ system cost	€/kW	4 000		N/A	N/A
	FC systems demonstrated on board vessel in commercial operation	months	2 × 18		9	2023
	Develop necessary safety measures for H ₂ and FC vessels to enable the approval of their class	-	Class approval gained	✓	Yes	2023
	PEMFC system availability	%	95		N/A	N/A
MAWP addendum (2018–2020)	PEMFC system lifetime	hours	25 000		N/A	N/A