

FLAGSHIPS

CLEAN WATERBORNE TRANSPORT IN EUROPE



FLAGSHIPS

Project ID:	826215
PRD 2023:	Panel 3 – H2 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
Clean H₂ JU max. contribution:	EUR 4 999 978.75
Project period:	1.1.2019–31.3.2025
Coordinator:	Teknologian tutkimuskeskus VTT Oy, Finland
Beneficiaries:	VTT, ABB Oy, Ballard Power Systems Europe AS, Compagnie Fluviale de Transport, Future Proof Shipping BV, LMG Marin AS, LMG Marin France, Maritime CleanTech, Norled AS, Persee, Seam AS Sogestion, Sogestran

<https://flagships.eu/>

PROJECT AND OBJECTIVES

Two commercially operated hydrogen fuel cell vessels will be demonstrated, one in France (Paris) and one in the Netherlands (Rotterdam). The Paris demonstrator (*Zulu*) is a self-propelled barge operating as a goods transport vessel in the city centre; the Rotterdam demonstrator (*FPS WAAL*) is a container vessel transporting goods between Rotterdam and Duisburg. The Paris demonstrator vessel has been built, and H₂ fuel cell systems and storage will be installed. The Rotterdam demonstrator entered the project at the end of 2021, and the design work for that vessel has begun.


PROGRESS AND MAIN ACHIEVEMENTS

- The FCwave fuel cell module has gained the necessary approval from DNV.
- The *Zulu* vessel design was completed, and the vessel has been built. It is at the yard in Le Havre. ABB and Ballard Power Systems Europe systems are in place and installation work has started.

FUTURE STEPS AND PLANS

- The process of gaining approval for the *Zulu* vessel is ongoing, involving Bureau Veritas, CCNR and local authorities.
- The project will demonstrate the *Zulu* vessel in commercial operation. Operations were expected to begin in Autumn 2023.
- The project will finalise the design and retrofitting of the *FPS WAAL* vessel. Work started at the beginning of 2022 after an amendment was accepted. It is expected to be finalised in 2023–2024.

QUANTITATIVE TARGETS AND STATUS

Target source	Parameter	Unit	Target	Target achieved?
MAWP (2014–2020)	PEMFC system lifetime	hours	25 000	
Project's own objectives	Fuel cell systems demonstrated in on-board vessel in commercial operation	months	2 × 18	
	Develop necessary safety measures of H ₂ and FC vessels to enable their class approval	–	Class approval gained	
	PEMFC system availability	%	95	
	Cost of a complete FC and H ₂ system	€/kW	4 000	