

# DELHYVEHR



## DELIVERY OF LIQUID HYDROGEN FOR VARIOUS ENVIRONMENT AT HIGH RATE

DelHYVEHR

Project ID	101137743
PRR 2024	Pillar 2 – H <sub>2</sub> storage and distribution
Call topic	HORIZON-JTI-CLEANH2-2023-02-05: Demonstration of LH <sub>2</sub> HRS for heavy duty applications
Project total cost	EUR 5 064 971.25
Clean H <sub>2</sub> JU max. contribution	EUR 3 711 901.13
Project period	1.1.2024–31.12.2026
Coordinator	ENGIE, France
Beneficiaries	Absolut System SAS, ArianeGroup SAS, Asociatia Energy Policy Group, Benkei, Cesame-Exadébit SA, DEKRA Services SA, Elengy SA, European Research Institute for Gas and Energy Innovation, Fives Cryomec AG, Trelleborg Clermont-Ferrand SAS, Trelleborg Sealing Solutions UK Limited, University of Ulster

<https://cordis.europa.eu/project/id/101137743>

### PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	LH <sub>2</sub> flowmeter calibration uncertainty on the mass flow rate	wt%	0.8	
	Flow rate at which liquid hydrogen is delivered	kg/h	5 000	✓
	Cryogenic pump design's hydraulic efficiency	%	45	

### PROJECT AND GENERAL OBJECTIVES

The European research project Delhyvehr, coordinated by ENGIE, will develop a liquid hydrogen (LH<sub>2</sub>) high-rate bunkering station with a refuelling flow rate of > 5 TPH and zero boil-off losses, dedicated to maritime, aviation and railway applications. The project is expected to complete its demonstration by 2026. Along with market maturity, the cost of distribution is expected to be halved by 2030.

Delhyvehr will drive the maturation of each main system constituting the large-scale refuelling station, with a specific focus on pumping (Fives Cryomec AG), metering (Cesame-Exadébit SA), loading (Trelleborg) and boil-off gas management systems (Absolut System SAS) of the full demonstration apparatus (ArianeGroup SAS). Throughout the project, H<sub>2</sub> safety management activities (University of Ulster) will support the maturation plan and de-risk design and operation. Technology, economic and environmental (policy and governance) studies will allow the assessment and replication of the performance of the demonstration.

### NON-QUANTITATIVE OBJECTIVES

- Facilitate the industrialisation of high-rate refuelling station for aviation, maritime and

railway applications.

- Reduce helium consumption, which may be a showstopper in LH<sub>2</sub> development, by using gaseous nitrogen for sanitation.
- Provide harmonised guidelines and recommendations for the deployment of bunkering stations.
- Decarbonise heavy-duty vehicle transport and dedicated infrastructure to deliver a hydrogen-related carbon footprint aligned with the second edition of the renewable energy directive (less than 3.38kgCO<sub>2</sub>/kgH<sub>2</sub>).

### FUTURE STEPS AND PLANS

The project will first define the high-level requirements of each application based on a functional design analysis with the support of end users from the advisory board.

Through modelling, design, manufacturing and functional testing, the project will increase the technological maturity of each key component of the refuelling line in a dedicated track.

Those developments will feed into the integrated design and associated protocols specification to form components that can be assembled into a demonstration unit built at ArianeGroup SAS's unique European facility in Vernon, France.