RHEADHY

REFUELLING HEAVY DUTY WITH VERY HIGH FLOW HYDROGEN

Project ID	101101443
PRR 2024	Pillar 2 – H_2 storage and distribution
Call topic	HORIZON-JTI-CLEANH2-2022-02-10: Implementing new/optimised refuelling protocols and components for high flow HRS
Project total cost	EUR 4 734 730.00
Clean H_2 JU max. contribution	EUR 3 999 381.50
Project period	1.2.2023–31.1.2027
Coordinator	ENGIE, France
Beneficiaries	Alfa Laval Vicarb SAS, Benkei, Emerson Process Management Flow BV, ENGIE Energie Services, Faurecia Systèmes d'Echappement SAS, Hydrogen Refueling Solutions, Lauda DR. R. Wobser GmbH & Co. KG, Tescom Europe GmbH & Co. KG, Zentrum für BrennstoffzellenTechnik GmbH

https://rheadhy.eu/

PROJECT AND GENERAL OBJECTIVES

Rheadhy's main goal is to develop components and refuelling stations able to fully implement and test new – very-high-flow – refuelling protocols for heavy-duty vehicles and bring them to the market.

NON-QUANTITATIVE OBJECTIVES

- **Design and assemble a very-high-flow hydrogen refuelling line.** The main goal is to provide components and refuelling lines designed for the required performance and operating conditions (very high flow rate, pressure, temperature, dynamic behaviour), with optimal trade-off between constraints and performance and constraint repartitioning among components.
- **Develop new components needed for high-flow refuelling.** The main goals are to develop new very-high-flow components and make them ready to commercialise (cooling technology, flow meters, valves, heat exchangers), to develop an advanced bidirectional communication interface, and to test, optimise and adapt components already in the prototype phase of their development (breakaway, hose, nozzle and receptable assembly).
- **Develop and demonstrate a new protocol for refilling storage systems.** The main goal is to demonstrate new standardised refuelling protocols for heavy-duty vehicles developed in ISO TC 197 WG24 or by other standardisation bodies.
- **Ensure the fast and efficient refilling of storage systems with H_2 at a low cost.**
- **Standardise and certify components of hydrogen refuelling stations to ensure the fast deployment of the components.** The main goals are to contribute to the development of standards through participation in the development of ISO TC 197 and CEN 268 WG5 and to obtain certifications for all the components in accordance with the relevant standards (ISO TC 197, CEN 268 WG5, OIML R139).

PROGRESS AND MAIN ACHIEVEMENTS

- All partners (product manufacturers) have completed the design of the concept for their product (including mechanical design, electrical design, communication, first 3D model, first draft of piping and instrumentation diagram or layout, etc.) and are now starting the detailed design phase.
- More than 250 simulations have already been done in order to aid the design of the different components.

FUTURE STEPS AND PLANS

The components for the Rheadhy project (cooling unit, by Lauda; heat exchanger, by Alfa Laval; flow sensor, by Emerson Micro Motion; control valve and safety valves, by Emerson Tescom; transport storage testing system, by Forvia) will be developed.

Then, the high-flow distribution line will be integrated into two hydrogen refuelling stations (the Hydrogen Refueling Solutions site and the ZBT site).

Afterward, tests will be performed on these two stations in order to validate the key performance indicators of the project.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Time to refill a 100 kg HD truck storage test system	minutes	10	
	Time to refuel a heat exchanger and cooling system for hydrogen dispensed below – 30 °C	minutes	10	
	Pressure regulator and shut-off valve compatible with very high flow rate and high pressure (1 000 bar)	g/s	170 (mean flow rate); 300 (peak flow rate)	
	Peak flow for prototype's breakaway, nozzle and hose	g/s	300	
	Refuelling events demonstrated for the fully integrated chain	number	300	
	Refuelling simulations performed	operations	1 000	
	Flow rate determined by measuring device compatible with very high flow rate, targeting > 100 kg total mass per refuelling	g/s	170 (mean flow rate); 300 (peak flow rate)	

Clean Hydrogen Partnership
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