RHEADHY

REFUELLING HEAVY DUTY WITH VERY HIGH FLOW HYDROGEN

Project ID	101101443
PRR 2025	Pillar 2 – H_2 storage and distribution
Call topic	HORIZON-JTI-CLEANH$_2$-2022-02-10
Project total cost	EUR 4 734 730.00
Clean H_2 JU max. contribution	EUR 3 999 381.50
Project period	01-02-2023 - 31-01-2027
Coordinator Beneficiary	ENGIE, FR
Beneficiaries	EMERSON PROCESS MANAGEMENT FLOW B.V, LAUDA DR. R. WOBSER GMBH and CO KG, TESCOM EUROPE GMBH CO KG, HYDROGEN-REFUELING-SOLUTIONS, ENGIE ENERGIE SERVICES, BENKEI, FAURECIA SYSTEMES D ECHAPPEMENT SAS, ALFA LAVAL VICARB SAS, ZENTRUM FUR BRENNSTOFFZELLEN-TECHNIK GMBH

https://rheadhy.eu/

PROJECT AND GENERAL OBJECTIVES

RHeaDHy's main goal is to develop components and hydrogen refuelling stations to enable the implementation, testing and market introduction of new very-high-flow refuelling protocols for heavy-duty vehicles.

NON-QUANTITATIVE OBJECTIVES

- Design and assemble a very-high-flow hydrogen refuelling line. The main goal is to provide components and refuelling lines for the required performance and operating conditions (very-high-flow rate, pressure, temperature, dynamic behaviour) with optimal trade-off between performance and constraint repartition among components.
- Develop new components needed for high-flow refuelling. The main goals are (i) to develop new very-high-flow components, such as cooling technology, flow meters, valves, heat exchanger, and make them ready-to-commercialise; (ii) to develop an advanced bidirectional communication interface; (iii) to test, optimise and adapt components already in the prototype phase of their development, such as breakaway, hose, nozzle and receptable assembly.
- Develop and demonstrate a new protocol for refilling storage systems (WP4 and WP5). The main goal is the demonstration of new standardised refuelling protocols for heavy-duty vehicle developed in ISO TC 197 WG24 or other standardisation bodies.
- Ensure the fast and efficient refill of storage systems with H_2 at low cost. The main goal is to demonstrate the protocols, by using components, under the conditions mentioned above.
- Standardise and certify components for hydrogen refuelling stations to ensure a fast deployment (WP6). The main goal is to contribute to standard development through participation in ISO TC 197 and CEN 268 WG5, and obtain certifications for all the components according to relevant standards (ISO TC 197, CEN 268 WG5, OIML R139).

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

- All partners (product manufacturers) have manufactured their new products and the majority have planned the delivery to hydrogen refuelling stations.
- More than 350 simulations were done in order to aid the design of the different components. ENGIE Crigen worked mostly on pressure drop of the complete line, on the high-pressure storage configuration, and on the cooling system design.
- All external communication tools are in place (website and LinkedIn page) and are seen by the community. The profiles of the individuals of the community are in line with the project objectives.
- All management tools are in place (Dashboard, Benkeitori (for sharing of files), meeting planification and rules etc.).

FUTURE STEPS AND PLANS

The components for RHeaDHy are being produced; cooling unit- LAUDA, heat exchanger - ALFA LAVAL, flow sensor - EMERSON MicroMotion, control valve and safety valves - EMERSON TESCOM, truck storage test system - FORVIA. They will be delivered to HRS for the assembly of the hydrogen high-flow distribution lines. In parallel, the testing sites (HRS and ZBT) are being prepared. Groundworks are well advanced, and the last pending decisions are being made to host the two hydrogen refuelling stations. Afterward, the two high-flow distribution lines will be tested on these two stations in order to validate the project's key performance indicators.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Time for refill for a 100 kg HD truck storage test system.	min	10	
	Time for refuelling - heat exchanger and cooling system hydrogen dispensed below -30C.	min	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)	
	Peak flow for prototype breakaway, nozzle, hose.	g/s	300	
	Number of refuelling events demonstrated for the fully integrated chain.	Number	300	
	Number of refuelling simulations performed.	Number	1 000	
	Flow measuring device compatible with very high flow rate, targeting >100 kg total mass per refuelling.	g/s	170 (mean flow rate) 300 (peak flow)	

Clean Hydrogen Partnership
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