HYGHER

HYDROGEN HIGH PRESSURE SUPPLY CHAIN FOR INNOVATIVE AND COST EFFICIENT DISTRIBUTION

Project ID	101137867
PRR 2024	Pillar 2 – H_2 storage and distribution
Call topic	HORIZON-JTI-CLEANH2–2023-02-04: Demonstration of high pressure (500–700 bar) supply chain
Project total cost	EUR 6 769 096.25
Clean H_2 JU max. contribution	EUR 4 991 009.88
Project period	1.1.2024–31.12.2026
Coordinator	Europäisches Institut für Energieforschung EDF KIT EWIV, Germany
Beneficiaries	EIFHYTEC, Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung EV, Hype, Hype Assets, RE.CO.MA SRL, Steinbeis Innovation gGmbH, Univerza v Ljubljani

https://cordis.europa.eu/project/id/101137867/fr

PROJECT AND GENERAL OBJECTIVES

Hygher is an EU project funded by the Clean Hydrogen Partnership and coordinated by the European Institute for Energy Research (in Germany). It aims to demonstrate the maturity of an innovative high-pressure hydrogen distribution value chain. This will include the installation of an innovative filling centre able to compress hydrogen at high pressure, and the operation of two new high-pressure trailers to supply the fleet of taxis operated by HYPE in Île-de-France. With a total budget of over EUR 6.7 million, the seven consortium partners are working on improving and integrating all components along the new value chain. Through specific efforts on innovative compression, circularity and safety, the project will allow sustainable and cost-efficient hydrogen distribution, removing one of the main barriers to the wider deployment of hydrogen mobility. The project started in 2024 and has an expected duration of 3 years.

NON-QUANTITATIVE OBJECTIVES

The main objective of Hygher is to demonstrate the feasibility of an innovative, cost-efficient and reliable high-pressure value chain, by combining various innovative technologies ready for large-scale demonstration.

The main progress expected beyond the state of the art (SOA) and the results of Hygher is as follows:

- build an innovative filling centre equipped with a metal hydride compressor, a mechanical booster and cascade storage, enabling the efficient distribution of > 2 t/day at 500 bar;
- build two innovative trailers, with a capacity of 1.25 t of hydrogen each at an operating pressure of 500 bar, equipped with innovative control, monitoring and communication devices to ensure efficiency and interoperability;
- adapt a standard hydrogen refuelling station by integrating 500-bar trailers into smart storage cascade management and thereby significantly improve efficiency and demonstrate a capacity increase;
- install and operate the overall value chain in Île-de-France, close to trans-European transport network corridors, and thus reinforce the EU H_2 infrastructure network and prepare for its replication and massification;
- demonstrate the new value chain under real commercial conditions, by operating the equipment with HYPE's fleet of fuel cell electric vehicles (taxis) and other 350-bar and 700-bar fuel cell electric vehicles;
- validate the safety of the overall concept at 500 bar and prepare for a 700-bar upgrade by screening the framework of regulations, codes and standards, and performing safety analyses of parts of the system, from single components to the overarching value chain.

FUTURE STEPS AND PLANS

The main first steps of the project to be conducted in 2024 are:

- the preparation of the initial project safety plan, including a review of the regulations, codes and standards, and the planning of safety studies for individual systems and for the demonstration;
- the setting of specifications at the value chain level and determination of the optimised design of subsystems;
- the preparation of the construction phase of all subsystems (ordering components and planning construction in workshops);
- the definition of scenarios and collection of existing data for a techno-economic assessment study, life-cycle analysis and scale-up analysis;
- the preparation of the promotional toolbox, launch of the communication campaign, determination of the initial exploitation and intellectual property strategy, the delivery of a webinar for experts and stakeholders to introduce them to the project and the validation of techno-economic specifications.

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	Trailers filled at high pressure (500–700 bar)	number	2		N/A	N/A
	Filling centres at high pressure (500–700 bar)	t/day	2.15		N/A	N/A
	HRS quantities delivered	kg/day	2 500 in 2 HRSs		N/A	N/A
SRIA (2021–2027)	Tube trailer CAPEX	€/kg	450		650	2 000
	Operating pressure of tube trailer	bar	500		300	2 000
	Tube trailer payload	kg	1 250		850	2 000

Clean Hydrogen Partnership
Co-funded by the European Union