

HYGHER

HYDROGEN HIGH PRESSURE SUPPLY CHAIN FOR INNOVATIVE AND COST EFFICIENT DISTRIBUTION



Project ID	101137867
PRR 2025	Pillar 2 – H ₂ storage and distribution
Call topic	HORIZON-JTI-CLEANH ₂ -2023-02-04
Project total cost	EUR 6 769 096.25
Clean H ₂ JU max. contribution	EUR 4 991 009.88
Project period	01-01-2024 - 31-12-2026
Coordinator Beneficiary	EIFER EUROPAISCHES INSTITUT FÜR ENERGIEFORSCHUNG EDF KIT EWIV, DE
Beneficiaries	RE.CO.MA. S.R.L., HYPE ASSETS, EIFHYTEC, HYPE, STEINBEIS INNOVATION GMBH, UNIVERZA LJUBLJANA, FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG EV

<https://hygher.eu/>

PROJECT AND GENERAL OBJECTIVES

HYGHER aims to demonstrate the maturity of an innovative high-pressure hydrogen distribution value chain. This will include the installation of an innovative filling center 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 the Paris region. With a total budget of over 6.7 M € 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, HYGHER will allow sustainable and cost-efficient hydrogen distribution, removing one of the main barriers for the larger 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 are:

- Build an innovative filling centre equipped with a metal hydride compressor, a mechanical booster, and cascade storage, enabling efficient distribution of over 2 t/day at 500 bar.
- Build two innovative trailers, each with a capacity of 1.25 t of hydrogen, operating at 500 bar and equipped with advanced control, monitoring, and communication systems to ensure efficiency and interoperability.
- Adapt a standard HRS by integrating 500bar trailers into smart storage cascade management, significantly improving efficiency and demonstrating increased capacity.
- Install and operate the entire value chain in the Paris region, close to trans-European transport network corridors, thereby strengthening the EU hydrogen infrastructure and preparing for replication and mass deployment.
- Demonstrate the new value chain under real commercial conditions by operating the equipment with HYPE's fleet of FCEV taxis and other 350bar and 700bar FCEVs.

- Validate the safety of the overall concept at 500 bar and prepare for a 700bar upgrade by reviewing regulations, codes, and standards, and performing safety analyses on system components and the overarching value chain.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

During the project's first year the consortium concentrated its efforts on the following activities:

- Definition of the overall high-pressure value-chain's specifications, setting the technical scope for seamless integration of all components to be developed along the hydrogen distribution value chain.
- Design of the subsystems of the HYGHER value chain, including an innovative metal hydride compressor, two high-pressure trailers, the filling center and a remote HRS to be adapted for high pressure supply.
- Analysis of the existing regulatory framework as a basis for technical developments within the project, and of proposed regulatory adjustments to accelerate the large-scale deployment of high-pressure hydrogen distribution.
- Development of a robust safety plan, establishing a joint safety approach for all development. In addition, preliminary safety studies considering all the components in the project's scope have been carried out. This will serve as the basis for the detailed and full hazard and operability studies that are scheduled for 2025.
- Preparatory work to set common assumption, scope and models for the different analyses to be conducted within the project, such as circularity, life cycle analysis and techno-economic analysis.

FUTURE STEPS AND PLANS

Main first steps of the project to be conducted in 2025 are:

- Optimisation of the design of sub-systems.
- Preparation of the construction phase for all sub-systems (ordering of components and planning the construction in the workshops).
- Data collection for the techno economic assessment study, life cycle analysis and scale-up analysis.
- Preparation of a promotional project video.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Number of trailers filled @ high pressure (500-700 bar)	Number/ day	2	
	Filling centers @hp pressure (500-700 bar)	t/day	2.15	
	HRS quantities delivered	kg/day	2 500	