

COSMHYC DEMO

COMBINED SOLUTION OF METAL HYDRIDE AND MECHANICAL COMPRESSORS: DEMONSTRATION IN THE HYSOPARC GREEN H₂ MOBILITY PROJECT

COSMHYC DEMO
INNOVATIVE H₂ COMPRESSION

Project ID	101007173
PRR 2025	Pillar 2 - H ₂ Storage and Distribution
Call topic	FCH-01-8-2020
Project total cost	EUR 3 773 858.75
Clean H ₂ JU max. contribution	EUR 2 999 637.13
Project period	01-01-2021 - 30-09-2025
Coordinator Beneficiary	EIFER EUROPAISCHES INSTITUT FÜR ENERGIEFORSCHUNG EDF KIT EWIV, DE
Beneficiaries	COMMUNAUTE DE COMMUNES TOURAINE VALLEE DE L'INDRE, EIFHYTEC, MAHYTEC SARL, Cavendish Hydrogen A/S, STEINBEIS INNOVATION GMBH, DE

<https://cosmhydc.eu>

PROJECT AND GENERAL OBJECTIVES

To meet the demands of a growing hydrogen economy, new technologies in the hydrogen-refuelling infrastructure, including those for hydrogen compression, are necessary. In COSMHYC DEMO, the innovative COSMHYC compression solution, which combines a metal hydride and mechanical compressor, has been shown to be ready for commercial deployment. At the test site in France, a public hydrogen-refuelling station (HRS) has been installed for a variety of vehicles (e.g. vehicle fleets and garbage trucks). The hybrid compressor will be used to supply hydrogen at both 350 bar and 700 bar.

NON-QUANTITATIVE OBJECTIVES

- COSMHYC DEMO will accelerate the deployment of hydrogen mobility by integration of the new compressor in a local ecosystem in which there have been previous hydrogen mobility activities and demonstration projects.
- COSMHYC DEMO will aim to increase public acceptance of hydrogen mobility.
- COSMHYC DEMO aims to include a smart gas hub for switching between on-site hydrogen supply storage, a hydrogen refuelling station and a filling centre for trailers. Therefore, a new gas panel will be designed which allows for smart switching between the filling centre, the hydrogen supply storage and the hydrogen refuelling station.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

The main achievement is the installation of the new hydrogen refuelling station on the demonstration site and the start of refuelling operation, mainly with the garbage truck of the HECTOR Interreg NWE project. Other main progress and achievements:

- The new membrane mechanical compressor as well as the innovative metal hydride compressor

were designed, manufactured and installed on the new HRS site.

- The compositions of the metal hydrides for all compression stages, were selected, without rare earth materials. These hydrides were produced in high quantities (approx. 1 000 kg per compression stage), and the compressive reactors have been manufactured and certified, including a brand-new heat exchanger, specifically developed within the project's scope.
- Also, the filling center gas panel is completed including safety studies. Indeed, the refuelling demonstration site of CCTVI will also be equipped with green hydrogen production, funded within the scope of the "Hy Touraine" initiative. The COSMHYC DEMO metal hydride compressor and filling center gas panel will also be used to compress hydrogen produced at HYSOPARC.
- The permitting process related to the installation of the metal hydride compressor on the demonstration site has been successfully completed.

FUTURE STEPS AND PLANS

- The testing phase can now continue at the HRS demonstration site in Sorigny (France), with all elements operational, including the newly commissioned metal hydride compressor.
- Certification of the metal hydride compressor is well advanced but still requires documentation.
- Data collection for the demonstration is ongoing, and the collected data will be integrated into a techno-economic analysis to demonstrate the expected economic performance of the entire system.
- The official inauguration event for the HRS and all related components will be organised in spring 2025 to bring together local stakeholders and the general public, including EU officials, at the demonstration site.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Refuelling protocol	-	SAE J2601 (light duty vehicles) SAE J2601-2 (heavy duty vehicles)	✓
	Noise	dBA	60	⚙️