COSMHYC DEMO

COMBINED SOLUTION OF METAL HYDRIDE AND MECHANICAL COMPRESSORS: DEMONSTRATION IN THE HYSOPARC GREEN H_2 MOBILITY PROJECT

Project ID	101007173
PRR 2026	Pillar 2 - H_2 Storage and Distribution
Call Topic	FCH-01-8-2020
Project Total Costs	3 773 858.75
Clean H_2 JU Max. Contribution	2 999 637.13
Project Period	01-01-2021 - 30-09-2025
Coordinator Beneficiary	EIFER EUROPAISCHES INSTITUT FÜR ENERGIEFORSCHUNG EDF KIT EWIV, DE
Beneficiaries	Cavendish Hydrogen A/S, COMMUNAUTÉ DE COMMUNES TOURAINE VALÉE DE L'INDRE, MAHYTEC SARL, STEINBEIS INNOVATION GGMBH, EIFHYTEC

https://cosmhyc.eu/

PROJECT AND GENERAL OBJECTIVES

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

NON-QUANTITATIVE OBJECTIVES

- Integrating the new compressor into a local ecosystem with existing hydrogen mobility activities and demonstration projects will accelerate the deployment of hydrogen mobility. The project has also helped increase public acceptance of hydrogen mobility.
- The project also aimed to include a smart gas hub to enable switching between storage, the hydrogen refuelling station (HRS), and the filling centre. A new gas panel has been designed to enable smart switching among the trailer filling centre, on-site hydrogen storage, and the HRS.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

The main achievement is the installation of the new hydrogen refuelling station (HRS) at the demonstration site and the start of refuelling operations, mainly with the garbage truck from the HECTOR Interreg NWE project. Other main progress and achievements include:

- The new membrane mechanical compressor (MC) as well as the innovative metal hydride compressor (MHC) were designed, manufactured, and installed at the new HRS site.
- The metal hydride compositions for all compression stages were selected without the use of rare earth materials. These hydrides were produced in large quantities (approximately 1 000 kg per compression stage), and the compression reactors were manufactured and certified, including a newly developed heat exchanger specifically designed for the project.
- The filling centre gas panel was completed, including associated safety studies. The refuelling demonstration site at CCTVI will also be equipped with green hydrogen production, funded under the "Hy Touraine" initiative. The COSMHYC DEMO metal hydride compressor and filling centre gas panel will also be used to compress hydrogen produced at HYSOPARC.
- The commissioning of the MHC was completed, enabling the extension of the test phase to include both the MHC and the integrated COSMHYC hydride compression solution under real-life operating conditions.
- The official inauguration event of the HRS and all related components was held in May 2025, gathering local stakeholders, the general public, and EU officials at the demonstration site.
- The testing phase at the HRS demonstration site in Sorigny (France), including all elements such as the newly commissioned metal hydride compressor, was completed in September 2025, allowing for the collection of extensive operational data before the MHC was safely decommissioned.
- The data collected throughout the testing activities were subjected to comprehensive analysis to evaluate the performance of both the MHC and the integrated COSMHYC compression system.
- Technical, economic, and environmental aspects were assessed through techno-economic analysis (TEA), life cycle assessment

Clean Hydrogen Partnership
Co-funded by the European Union

- (LCA), and detailed evaluation of technical performance data.
- The main results were presented to an expert audience during a final webinar held after the official end of the project

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	

Clean Hydrogen Partnership
Co-funded by the European Union