COSMHYC DEMO

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

Project ID	101007173
PRR 2024	Pillar 2 – H_2 storage and distribution
Call topic	FCH-01-8-2020: Scale-up and demonstration of innovative hydrogen compressor technology for full-scale hydrogen refuelling station
Project total cost	EUR 3 773 858.75
Clean H_2 JU max. contribution	EUR 2 999 637.13
Project period	1.1.2021–31.12.2024
Coordinator	Europäisches Institut für Energieforschung EDF KIT EWIV, Germany
Beneficiaries	Communauté de Communes Touraine Vallée de l'Indre, EIFHYTEC, MAHYTEC SARL, Nel Hydrogen AS, Steinbeis Innovation gGmbH

https://cosmhyc.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) will be installed for a variety of vehicles (e.g. fleet vehicles and garbage trucks). The hybrid compressor will be used to supply hydrogen at both 350 bar and 700 bar.

NON-QUANTITATIVE OBJECTIVES

- The project aims to increase public acceptance of hydrogen mobility. Integrating the new compressor in a community in which there have been previous hydrogen mobility activities and demonstration projects is likely to increase overall acceptance.
- It also aims to include a smart gas hub for switching between storage, the HRS and the filling centre. A new gas panel has been designed and will allow for smart switching between the filling centre for trailers, on-site hydrogen supply storage and the HRS.

PROGRESS AND MAIN ACHIEVEMENTS

The main achievement is the installation of the new HRS on the demonstration site and the start of refuelling operations, mainly involving the garbage truck of Interreg North-West Europe's Hector project.

Other major areas of progress and achievements are as follows:

- A new membrane mechanical compressor was designed and manufactured. In addition, the design of an innovative metal hydride compressor was set and its assembly and certification process is in the advanced stages.
- The compositions of the metal hydrides for all stages of compression were selected, without rare earth materials. These hydrides are currently produced in high quantities (approximately 1 000 kg per compression stage). Furthermore, compressive reactors have been manufactured, including a brand new heat exchanger specifically developed as part of the project.
- Significant progress has been made in the permit-issuing process related to the installation of the metal hydride compressor on the demonstration site.
- The filling centre gas panel was completed, involving safety studies. The Communauté de Communes Touraine Vallée de l'Indre refuelling demonstration site will also be capable of green hydrogen production, funded as part of 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.

FUTURE STEPS AND PLANS

- The refuelling operations are starting at the newly built HRS at the demonstration site in Sorigny, France.
- The integration of a metal hydride compressor is planned for mid 2024.
- Long-term tests of the demonstration unit will be conducted with the on-site vehicle fleet.
- Final exchanges about safety studies and authorisation are taking place.
- An opening event for the launch of the HRS and compressor will be organised to gather 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	Nominal pressure of the on-site storage tank	bar	950	
	Storage capacity	kg	125	
	Refuelling protocol	–	SAE J2601 (light-duty vehicles) SAE J2601–2 (heavy-duty vehicles)	⚙
	Noise	dBA	60	
	Daily capacity	kg/day	200	
	Dispensing pressure	bar	200/350/700	✓

Clean Hydrogen Partnership
Co-funded by the European Union