

PROJECT

## COSMHYC

### **COmbined hybrid Solution of Metal HYdride and mechanical Compressors for decentralised energy storage and refueling stations**

**Funding:** European (Horizon 2020)

**Duration:** Jan 2017 - Sep 2020

**Status:** Complete

**Total project cost:** €2,496,830

**EU contribution:** €2,496,830



**Call for proposal:** H2020-JTI-FCH-2016-1

[CORDIS RCN : 207497](#)

#### **Objectives:**

The COSMHYC project aims to answer the needs identified by the MAWP of the FCH2 JU of increasing the energy efficiency of hydrogen production while reducing operating and capital costs, in order to make hydrogen a competitive fuel for transport applications. COSMHYC will develop and test an innovative compression solution from 1 to 1000 based on a hybrid concept, combining a metal hydride compressor and a mechanical diaphragm compressor, for hydrogen refuelling stations and decentralized energy storage. The aim is to reduce the overall compression costs, by reducing investments down to less than 2000 €/((kg\*day), reducing energy consumption by optimizing the interactions between both compression technologies.

Maintenance will be reduced to <50% compared to mechanical compressors and life time will be improved, by decreasing the degradation down to <1% per year, thanks to the use of technologies with no moving parts and the implementation of appropriate remote control devices and corrective algorithms.

In addition, the system will be significantly less noisy than a mechanical compressor (less than 60 dB at 5 meters). LBST will perform an analysis of the market requirements and define the main critical parameters, which will be used as an input for the research and development activities. MAHYTEC and EIFER will develop and test the metal hydride tanks and the metal hydride compressor, while H2 Logic will develop the mechanical compressor, with the support of EIFER regarding the thermal integration.

#### **Methodology:**

The partners will jointly install, connect and test the hybrid compressor in a test facility of H2 Logic in Denmark during 9 months. At each stage of the developments and tests, the results will be used to perform a technical economic assessment of the solution compared to competitors with LBST. In parallel, Steinbeis will accompany the partners in organizing and managing the communication around the project, disseminating the results and preparing their exploitation.

#### **Parent Programmes:**

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

#### **Lead Organisation:**

**Eifer Europaisches Institut Fur Energieforschung Edf Kit Ewiv**

**Address:**

EMMY NOETHER STRASSE 11  
76131 KARLSRUHE  
Germany

**Organisation Website:**

<http://www.eifer.org>

**EU Contribution:** €851,908

**Partner Organisations:****Steinbeis Advanced Risk Technologies Gmbh****Address:**

Willi Bleicher Str 19  
70174 Stuttgart  
Germany

**Organisation Website:**

<http://www.stw.de>

**EU Contribution:** €0

**Mahytec Sarl****Address:**

Avenue De Verdun 210  
39100 Dole  
France

**EU Contribution:** €753,125

**Ludwig-Boelkow-Systemtechnik Gmbh****Address:**

Daimlerstr. 15  
85521 Ottobrunn  
Germany

**Organisation Website:**

<http://www.lbst.de>

**EU Contribution:** €88,375

**Steinbeis 2I Gmbh****Address:**

Kienestrasse  
70174 Stuttgart  
Germany

**EU Contribution:** €288,125

**Nel Hydrogen As****Address:**

INDUSTRIPARKEN 34 B LIND  
7400 HERNING  
Denmark

**Organisation Website:**

<http://www.h2logic.com>

**EU Contribution:** €515,298

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## Technologies:

Fuel cells and hydrogen fuel  
Hydrogen refuelling station using ionic compressor

**Development phase:** Research/Invention

Fuel cells and hydrogen fuel  
Hydrogen production using an electrolyser system

**Development phase:** Research/Invention

**STRIA Roadmaps:** Transport electrification, Low-emission alternative energy for transport

**Transport mode:** Road transport

**Transport sectors:** Passenger transport, Freight transport

**Transport policies:** Environmental/Emissions aspects

**Geo-spatial type:** Other