

PROJECT

## H2REF

# Development of a Cost Effective and Reliable Hydrogen Fuel Cell Vehicle Refuelling System

**Funding:** European (Horizon 2020)

**Duration:** Sep 2015 - Dec 2019

**Status:** Complete

**Total project cost:** €7,127,941

**EU contribution:** €5,968,554



**Call for proposal:** H2020-JTI-FCH-2014-1

[CORDIS RCN : 198235](#)

### Objectives:

H2Ref addresses the compression and buffering function for the refuelling of 70 MPa passenger vehicles and encompasses all the necessary activities for advancing a novel hydraulics-based compression and buffering system that is very cost effective and reliable from TRL 3 (experimentally proven concept) to TRL 6 (technology demonstrated in relevant environment), thereby providing highly improved performance and reliability in accordance with the following targets that have been defined considering the intrinsic characteristics of this new solution:

- Throughput: 70 MPa dispensing capacity of 6 to 15 vehicles per hour (i.e. 30 to 75 kg/hr) - depending on the inventory level in source storage of the compressed hydrogen - with a 75 kW power supply;
- Robustness and Reliability: 10 years of operation without significant preventive maintenance requirement, demonstrated through intensive lab test simulating 20 refuellings per day during 10 years, i.e. 72,000 refuellings;
- CAPEX: Manufacturing cost of €300k for the compression and buffering module (CBM) assuming serial production (50 systems/yr). This level of cost for the CBM allows to target a cost of €450k for the complete HRS (including pre-cooling and dispensing), assuming application of the optimized approaches for pre-cooling and dispensing control being developed in the HyTransfer project, far below the current HRS cost of approximately €900k;
- Energy efficiency: average consumption for compression below 1.5 kWh/kg of dispensed hydrogen, i.e. 50% below the energy consumption of current systems, in fuelling stations supplied by trailers, which is and will likely remain the most common form of supply.

The knowledge gained will allow subsequent development to focus on optimization of components, of design for manufacturing and maintenance, further demonstration, and the development of a product range for different refuelling station sizes, thus taking this innovation to the market.

### 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:

**Centre Technique Des Industries Mecaniques**

**Address:**

AVENUE FELIX LOUAT 52  
60304 SENLIS CEDEX  
France

**Organisation Website:**

<http://www.cetim.fr>

**EU Contribution:** €1,831,640

**Partner Organisations:****H2Nova****Address:**

210 Ter Boulevard Pereire  
75017 Paris  
France

**EU Contribution:** €309,268

**The Ccs Global Group Limited****Address:**

CHURCH ROAD 11  
GREAT BOOKHAM  
KT23 3PB  
United Kingdom

**Organisation Website:**

<http://www.ccsglobalgroup.com>

**EU Contribution:** €155,500

**Haskel France****Address:**

34 RUE DES CHATEAUX  
59290 WASQUEHAL  
France

**EU Contribution:** €0

**Hexagon Raufoss As****Address:**

ENGGATA 40  
2830 RAUFOSS  
Norway

**Organisation Website:**

<http://www.rafs.no>

**EU Contribution:** €1,288,934

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

Daimlerstr. 15  
85521 Ottobrunn  
Germany

**Organisation Website:**

<http://www.lbst.de>

**EU Contribution:** €58,663

**Haskel Europe Ltd**

**Address:**

NORTH HYLTON ROAD  
SUNDERLAND  
SR5 3JD  
United Kingdom

**EU Contribution:** €2,324,550

**Technologies:**

Fuel cells and hydrogen fuel  
Hydrogen refuelling station using ionic compressor

**Development phase:** Validation

Fuel cells and hydrogen fuel  
Hydrogen production using an electrolyser system

**Development phase:** Validation

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

**Transport mode:** Road transport

**Transport sectors:** Passenger transport, Freight transport  
Societal/Economic issues, Environmental/Emissions aspects,

**Transport policies:** Decarbonisation

**Geo-spatial type:** Other