SWARM | HYFIVE | H2ME | H2ME 2

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Programme Review Days 2016
Brussels, 21-22 November

SYNERGIES BETWEEN THE PROJECTS

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

H2MOVE / NEXTMOVE

HyTEC

SWARM

Pre-commercial demonstration projects

HyFIVE

Transition to commercial deployment

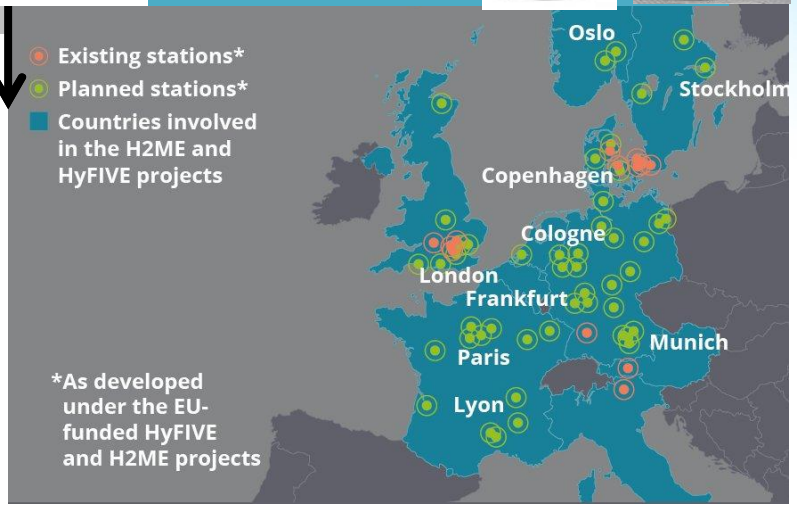
H2ME

H2ME 2

Reykjavik

Nov. 2016

- Small fleets operated by ‘soft users’ and supported by 1 HRS per location
- Larger fleets operated by ‘enthusiast users’ and supported by HRS in cluster
- Large fleets operated by commercial users supported by early network of HRS



PROJECT OVERVIEW

SWARM

- Call topic SP1-JTI-FCH.2011.1.1 (Transportation & Refuelling Infrastructure)
- 01/10/2012 to 31/12/2017
- Total budget of 15.6 M €, with a FCH JU contribution of 6.8 M €
- For a consortium of 18 partners

elementenergy

PLANET GbR

riversimple

H2O e-mobile

ULB

Coventry University Enterprises Limited

TÜV SÜD

MICRO:CAB life without oil™

AIR LIQUIDE

UNIVERSITY OF BIRMINGHAM

JADE HOCHSCHULE Wilhelmshaven Oldenburg Elsfleth

NEXT ENERGY Wallonie

SPW Service public de Wallonie

Universität Bremen

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

EWE-Forschungszentrum für Energietechnologie e.V.

Université de Liège

PROJECT SUMMARY

ElanoFC by H^2O E-mobile

- The project SWARM will establish a demonstration fleet of small passenger vehicles that builds on and expands existing hydrogen refuelling infrastructure

Rasa by Riversimple

- Initially 3 regions will be employing these vehicles: the British Midlands, the Brussels area and Wallonia, and the Weser-Ems region in NorthWest Germany

H2EV by Microcab

- University and research institutes contribute to continued improvement and optimisation of the vehicles

Air Liquide HRS in Zaventem

SWARM ("Demonstration of Small 4-Wheel fuel cell passenger vehicle Applications in Regional and Municipal transport")

PROJECT OVERVIEW

- **Hydrogen for Innovative Vehicles**
- **Topic 1.1** Large-scale demonstration of road vehicles and refuelling infrastructure VI
- April 2014 – September 2017
- **Budget: € 38,418,137 with FCH JU contribution: € 17,970,566**

Objectives:

- Deploy **185 vehicles and 6 refuelling stations in 3 European regions**
- Tackle all of the final technical and social issues which could prevent the commercial roll-out of hydrogen vehicles and refuelling infrastructure across Europe.

PROJECT OVERVIEW

hyFIVE
HYDROGEN FOR INNOVATIVE VEHICLES

GREATER LONDON AUTHORITY

AIR PRODUCTS

BMW

DAIMLER

Danish Hydrogen Fuel

elementenergy

HONDA
The Power of Dreams

HYUNDAI
NEW THINKING. NEW POSSIBILITIES.

iij

ITM POWER
Energy Storage | Clean Fuel

THE LINDE GROUP
Linde

OMV

THE DANISH PARTNERSHIP FOR HYDROGEN AND FUEL CELLS

thinkstep

TOYOTA

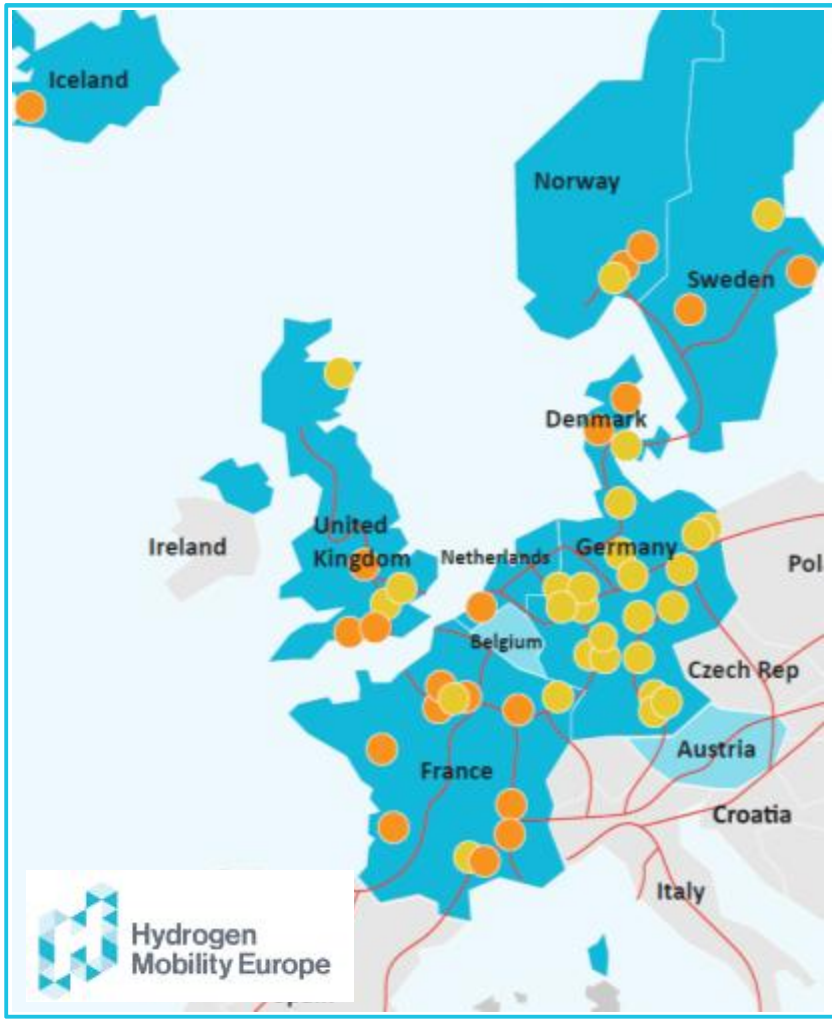
PROJECT OVERVIEW

Hydrogen Mobility Europe

- Call topic SP1-JTI-FCH-01.7-2014 (Transportation & Refuelling Infrastructure)
- 01/06/2015 (H2ME) to 30/06/2022 (H2ME 2)
- Total budget of 170 M €, with a FCH JU contribution of 67 M €
- For a consortium of 40+ partners

PROJECT SUMMARY

Hydrogen Mobility Europe



New hydrogen refuelling stations:

20 - 700bar HRS in Germany

12 - 350/700bar HRS in France

10 - 700bar HRS in Scandinavia

6 - 700bar HRS in the UK

1 - 700bar HRS in NL

Fuel cell vehicles:

350 OEM* FCEVs

150 OEM fuel cell RE-EV cars

900 fuel cell RE-EV vans

As of Nov. 2016 (> 12 months operation):
- 100 vehicles (Daimler and Symbio FCell)
- 2 HRS commissioned

Hydrogen rollout areas:

Scandinavia, Germany, France, UK, The Netherlands

Observer coalitions:

Belgium and Luxembourg

Industry observer partners:

Audi, BMW, Honda, Intelligent Energy, Nissan, Renault, Renault Trucks, OMV

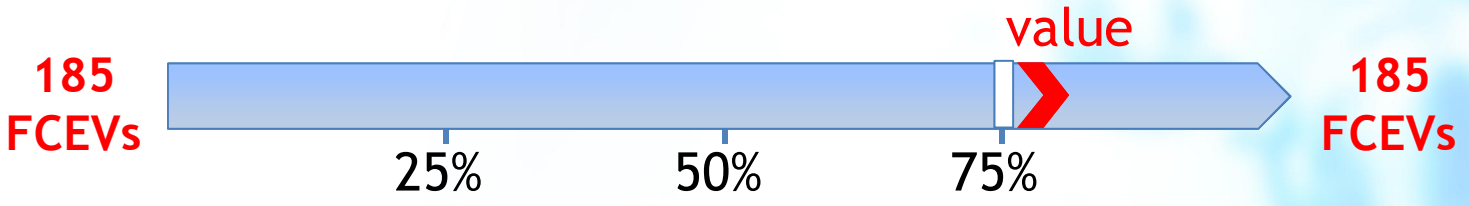
- Proposed HRS locations under H2ME-1
- Proposed HRS locations under H2ME-2

HRS: Hydrogen Refuelling Station
FCEV: Fuel Cell Electric Vehicle
OEM: Original Equipment Manufacturers
RE-EV : Range-Extended Electric Vehicle

PROJECT PROGRESS/ACTIONS

Achievement to-date

% stage of implement.



Aspect addressed	Parameter (KPI)	Unit	SoA 2016	FCH JU Targets		
				Call topic	2017	2020
Light Duty Vehicles (mainly cars) stations	~ 500	185	134	1.1 2014		

Future steps:

- *Finalise deployment of the last 51 vehicles by end of 2016*
- *Raise awareness of the operation of these vehicles*
- *Finalise refuelling network remaining issues and ensure stations operate as a network*

PROJECT PROGRESS/ACTIONS

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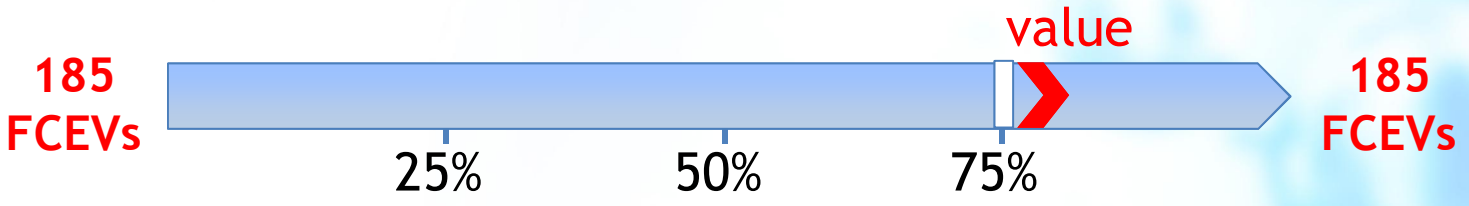
HYDROGEN FOR INNOVATIVE VEHICLES

Achievement to-date

% stage of implement.



Aspect addressed	Parameter (KPI)	SoA 2016
Vehicle Operation lifetime	>2,000 hrs	Expected to be at 80% by end of the project
Minimum vehicle operation	12 months or 10,000 km	Expected to be at 100% by end of the project
Vehicle availability	95%	So far 98% and expected to be 200% by end of the project





PROJECT PROGRESS/ACTIONS

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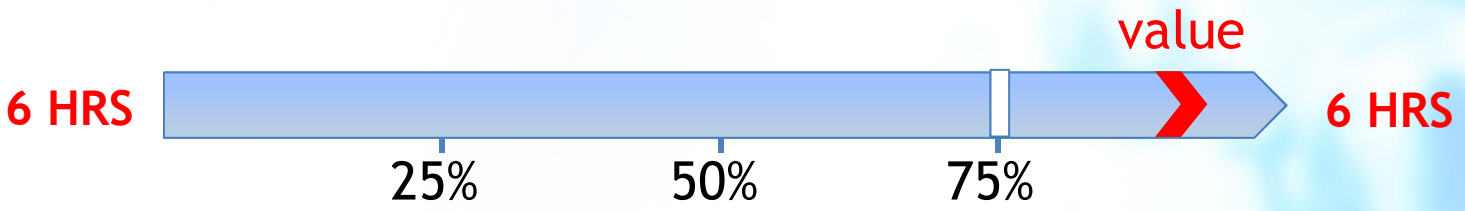
HYDROGEN FOR INNOVATIVE VEHICLES

Achievement to-date

% stage of implement.



Aspect addressed	Parameter (KPI)	To date	Status
Refuelling stations	98% availability Min 50kg/day SAE J2601 & J2719 SAE TIR J2799	5	SAE J2601 & J2719 SAE TIR J2799 Under 3 min/refuelling Capacity of 80kg/day

SYNERGIES WITH OTHER PROJECTS AND PROGRAMMES

Interactions with projects funded under EU programmes	
HYTEC	• Utilising HYTEC deployed stations/ share experience and data.
H2ME/H2ME2	• Utilising network of stations and sharing experience and relevant learning, data, research on refuelling locations, etc • Definition of a common set of core messages on hydrogen mobility and coordination of outreach efforts
Interactions with national and international-level projects and initiatives	
H2Mobility (UK/Germany/France)	• Network of stations; interoperability; vehicle maintenance; government lobbying.

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HYDROGEN FOR INNOVATIVE VEHICLES

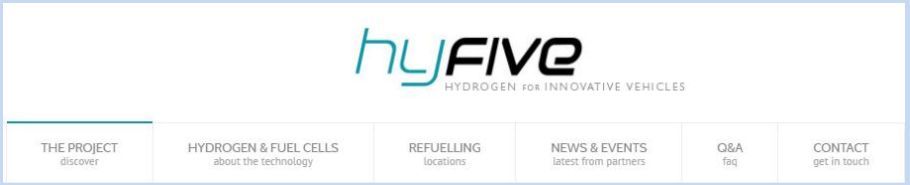
DISSEMINATION ACTIVITIES

Public deliverables

- D6.2 Produce Periodic Press releases
- D6.3 Networking events
- D6.5 Public Ride and Drive
- D6.6 Final project conference

Conferences/Workshops

- 6 organised by the project
- 18 in which the project has participated (but not organised)



www.hyfive.eu

Publications: over 15 high profile international publications

- Article about the successful development of hydrogen technology in Europe and HyFIVE's contribution

https://horizon-magazine.eu/article/crossing-europe-hydrogen-highway_en.html

RISKS AND MITIGATION

Delays in design and construction; HRS siting permitting issue

- The London refuelling stations are highly modular in nature and make use of standardised equipment.
- Delays lead to more suitable locations and valuable learning.
- Sufficient initial cover offered by existing stations.

Difficulty to place all vehicles with end users

- Transitional period with 1st sales to commercial customers and analysis of ‘niche markets‘ where FCEVs bring additional value in progress
- The OEMs are collaborating with their local dealers and distributors to help in end user selection. These deployments are supported by the cluster coordinators and we expect to reach our target.

EXPLOITATION PLAN/EXPECTED IMPACT

Exploitation

HyFIVE is a key aspect of the FCH JU's efforts to commercialise hydrogen technology across the transport and hydrogen production sectors and contributed significantly to increasing confidence in the sector.

Impact

The HyFIVE vehicles represent a major step towards the affordable fuel cell vehicle which the sector requires and the large fleet of vehicles allows HRS operators to make investments for a network of HRS.

Each of HyFIVE's partners has invested considerable resources in the project's activities in order to exploit the project's learning for their hydrogen transport activities and ultimately to secure a stake in the emerging hydrogen and FCEV markets.

hyFIVE
HYDROGEN FOR INNOVATIVE VEHICLES

HORIZONTAL ACTIVITIES

- **Refuelling infrastructure:**

Partners are collaborating in the development of training materials for three groups:

- First responders – require information on how to deal with incidents at the HRS.
- Vehicle users – require easy to use information on the fuelling procedures and specific health and safety issues around the use of unmanned HRS.
- Technicians – involved in installing and maintaining the HRS.

- **Vehicles:**

In each of the clusters where the OEMs deploy vehicles, they will establish / adapt after-sales support infrastructure. This infrastructure will not only support the vehicles deployed in this project, but will also act as the start of the full commercial supporting service which is required for the full commercial roll-out stage.

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HYDROGEN FOR INNOVATIVE VEHICLES

Thank You!

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