INTERNATIONAL PARTNERSHIP FOR
HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update April 2019: European Commission

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1. New Policy Initiatives on Hydrogen and Fuel Cell

- At the end of November 2018, the European Commission adopted the strategy for long-term EU greenhouse emissions reduction in accordance with the Paris Agreement. The strategy presents 8 different pathways for the EU that achieve greenhouse gas emissions reductions between minus 80% by 2050 (compared to 1990) up to net zero greenhouse emissions by 2050 – all of them in line with the Paris Agreement. This is not a legislative proposal, but a strategic vision, supported by a detailed analysis, on how the EU can deliver on the Paris Agreement while enhancing the socio-economic benefits of emission reductions and transforming its economy for the 21st century. It sets the scene for future policy choices of the EU. Hydrogen features strongly in this strategy as one of key enabling technologies.
- Discussions on the key files of the "Clean Energy Package for all Europeans" (Clean Energy for All Europeans) have progressed well: the recast Renewable Energy Directive (RED II), the Energy Efficiency Directive, and the Governance Regulation entered into force in December. Also, an agreement was reached on the redesign of the EU's electricity market. Beyond promoting decarbonisation, the package supports market-based integration of energy storage, including hydrogen technologies. Some examples include:
  - Hydrogen is better reflected in RED II: it is specifically mentioned in the context of Guarantees of Origin.
  - In particular, for transport the renewable objectives include an increased role for green hydrogen and derived e-fuels.
  - The definition of energy storage enables sectorial integration by referring not only to Power-to-Power, but also to Power-to-Gas and Power-to-Heat solutions.
  - In terms of security of supply, the proposal on Risk Preparedness in the electricity sector requires Member States to develop measures avoiding electricity crisis situations. Such measures include different kinds of storage.
  - The new Electricity Directive and Regulation also puts more focus on flexibility mechanisms and energy storage, including hydrogen.
- An informal meeting of EU Energy Ministers took place in Bucharest on 2 April 2019, to discuss future energy systems. In the course of the meeting, the Romanian Presidency opened for signature by Member States a declaration on "Sustainable and Smart Gas Infrastructure" aiming at exploring opportunities for using the existing gas infrastructure to transport and store increasing shares of near-zero carbon hydrogen and renewable gases. The declaration was signed by 20 countries.
- There has been an inter-institutional agreement on the next EU Framework Programme for Research and Innovation, Horizon Europe. A partnership in the area of hydrogen and fuel cells named 'Clean Hydrogen' is included in the list of potential initiatives proposed by the European Commission.

- The Strategic Forum on Important Projects of Common European Interest (IPCEI-Forum) identified **"Hydrogen technologies and systems"** as a Strategic Value-chain. IPCEI is a new instrument to access public funding that is compatible with EU state aid rules.

2. Hydrogen and Fuel Cell R&D Update

- **17 grants** were signed under **Call 2018**, while two successful projects are still in the phase of grant agreement preparation and are expected to be signed in due course. The 17 grants concern demonstration and research activities covering the energy, transport and cross-cutting pillars including an overarching project. For more information on H2020 FCH 2 JU projects please refer to the FCH 2 JU website.
- The 2019 Call for Proposals of the FCH JU was successfully launched in January 2019 with a budget of €80.8M. The FCH 2 JU info day was held on the FCH JU premises 29th January. The deadline for applications is 23 of April.

3. Demonstration and Deployments Update

- Ca.**1520**[1] FCEVs (including range extenders, i.e. Symbio) deployed in Europe, out of which **650**[2] through the FCH 2 JU (mainly via H2ME, H2ME2 and ZEFER).
- Ca. **73** FC buses in operation, of which **55**[3] through FCH JU and **295** (via FCH 2 JU mainly through JIVE and JIVE 2) in planning/development stage.
- Ca. **173**[4] HRS **in operation**, out of which **47** deployed via FCH 2 JU (mainly via H2ME, H2ME2). From those, **116** HRS are publically available or by prior arrangements for refuelling of passenger cars and other light duty vehicles.
- **3900** µCHPs contracted via FCH 2 JU, out of which ca. **1565** deployed (mainly via PACE and EneField).

4. Events and Solicitations

Publications

Hydrogen Roadmap Europe: A Sustainable Pathway for the European Energy Transition

The report makes the case that hydrogen is required to address a series of socio-economic and environmental challenges. The report lays out a roadmap for the ramp-up of market deployment across applications, setting specific milestones between now and 2050. It also calls for a coordinated approach from policy-makers, industry and investors to achieve the 2-degree scenario.

Events & Initiatives

FCH 2 JU Programme Review Days 19-20 November 2019 in Brussels; and
Stakeholder Forum 21 November 2019 in Brussels.

Upscaling Hydrogen Gensets in European Cities

To raise the interest of city authorities to initiate the process of "Upscaling hydrogen gensets in European Cities" the EVERYWH2ERE project organised a Workshop on 15 January 2019 in

[1] Latest status 31/7/2018, including non-commercial vehicles
[2] Including non-commercial vehicles and 16 discontinued cars
[3] Including 5 discontinued buses
[4] Latest update March 2019

Brussels. The workshop explained how hydrogen gensets could be a viable alternative to diesel generators and discussed the most suitable regulatory frameworks for deploying temporary hydrogen gensets in city areas. EU and local policy makers as well as industry representatives attended. They were invited to join the EVERYWH2ERE Cities Interest Group.

The H2PORTS kick-off meeting

The first internal technical meeting of the European project "H2PORTS - Implementing Fuel Cells and Hydrogen Technologies in Ports" was held in Valencia in February 2019. This project is coordinated by Fundación Valenciaport in close collaboration with the Port Authority of Valencia, and is funded by FCH 2 JU.

PEMFC development workshop

The INSPIRE project team organized a technical information-sharing and networking event focusing on PEMFC components and their integration into fuel cell stacks. The aim was to link together and strengthen synergies between H2020 FCH JU projects, with respect to new component developments, best practices and successes.

Hydrogen safety - liquid hydrogen workshop

The workshop was a joint initiative from HYSAFE and the two projects PRESLHY and SH2IFT, focusing on hydrogen safety, with special emphasis on liquid hydrogen in terms of handling and use. Results and plans of the two projects were presented, and additional invited expert speakers and key stakeholders will join.

Metering in Hydrogen Refuelling Stations (HRS)

The FCH 2 JU commissioned a study to solve some of the issues related to metering in hydrogen refilling stations (HRS). This study was carried out by a consortium led by Air Liquide and the objective was to develop a testing protocol for an accelerated certification for hydrogen dispensers and also to implement this protocol on several HRS in Europe. The final objective is to ensure that this can be adopted in as many countries in Europe as possible. Two meetings in March 2019 took place with the aim to review and disseminate the results of the study and get adhesion of the different national metrological institutes in Europe.

CertifHy final conference

The CertifHy project 2 has finalized design of the first EU-wide Guarantees of Origin (GO) for Green and Low Carbon Hydrogen. During the CertifHy Stakeholder Forum and Final Conference, the key project results and the updated implementation roadmap were presented and discussed.

Hannover Messe - 2019 edition

The FCH 2 JU attended the world's leading industrial show organised between 1-5 April in Hannover, Germany. The FCH 2 JU in collaboration with NOW hosted a booth at the Hannover Messe and presented the following topics: Hydrogen for Sectoral Integration and European Stack for Transport Applications, and participated in the press conference.

Tools for Innovation Monitoring

The Joint Research Centre (JRC) of the European Commission developed, with the support of the FCH 2 JU, a tailored-made version of TIM (Tools for Innovation Monitoring) to monitor, gather and analyse different aspects of fuel cells and hydrogen innovation and technological development.

This customised version of TIM provides the FCH 2 JU with data and functions relevant to its programme. Three technology areas have been mapped so far: solid oxide fuel cell, alkaline

fuel cell and polymer electrolyte membrane (PEM) fuel cells. A separate data set includes information exclusively on the FCH JU activities.

Procurements

- The FCH 2 JU is planning conduct a study on Opportunities arising from the inclusion of Hydrogen Energy Technologies in the National Energy & Climate Plans that have been submitted by the member states.
- FCH 2 JU awarded a contract to the successful consortium which is in the process of setting up of the 'European fuel cells and hydrogen market and policy observatory' to act as a reference point for information about fuel cells and hydrogen technologies and applications in Europe. The kick off meeting was held at FCH JU premises and a first version of the observatory platform is expected to become live in Q3 2020.

5. Investments: Government and Collaborative Hydrogen and Fuel Cell Funding

- The total budget of the FCH 2 JU for the period 2014-2020 is €665M, or, on average €95M/year, covering a broad range of R&I activities.

  Beyond FCH 2 JU, other EU instruments such as TEN-T/CEF or H2020 (Energy Challenge, SME instrument etc.) do provide some ancillary financing on competitive basis (where FCH have to compete with other technologies). As a result, we estimate the EU level funding for FCH technologies is at ~€120M/year on average.

- The Connecting Europe Facility (CEF) has recently awarded 40€ M for the deployment of 600 fuel cell city buses in Europe.

- In October, The European Commission has proposed to invest through the Connecting Europe Facility (CEF) ~€700M in 49 projects aiming to develop a more sustainable transport infrastructure in Europe. Funding includes all transport modes, from airports and ports to rail and roads, including both battery-electric and fuel cell vehicles.

6. Regulations, Codes & Standards and Safety Update

- Supported by the Joint Research Centre (JRC) of the European Commission and the Programme Office, the FCH 2 JU Regulations, Codes & Standards Strategy Coordination (RCS SC) Group developed an internal document to provide guidance to the FCH 2 JU Annual Work Plan (AWP) 2020 process for Pre-Normative Research (PNR) and RCS related activities. The document provides insights about the strategic themes and specific challenges considered as priorities. In addition, the RCS SC Group assessed the preliminary list of topics proposed for the next Call for Proposals providing support on the RCS/PNR -related themes, and plan an internal workshop on RCS and Safety-related issues for June 2019. The workship will involve FCH 2 JU projects currently demonstrating FCH applications.

- The European Hydrogen Safety Panel (EHSP) activities were kicked-off and the annual experts selection was finalised according to the activities foreseen and expertise needed. For 2019, the EHSP is composed of 16 experts from industry and research, and structured in 4 task forces. The experts were allocated to the tasks as identified in the EHSP Annual Workplan.

Summary Country Update April 2019: European Commission

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
Fuel Cell light duty Vehicles[5]	No target	- Ca. 1520 FCEVs deployed in Europe (EU28+ CH + NO) of which 650 through FCH 2 JU -Additional ~1390 cars planned/contracted through FCH 2 JU to date	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
FC Bus	No target	-Ca. 73 deployed (including 2 discontinued) of which 55 through FCH 2 JU (of which 5 discontinued) -305 more buses contracted through FCH 2 JU	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
Fuel Cell Trucks[6]	No target	-15 garbage trucks contracted through FCH 2 JU (REVIVE) -12+ more expected from 2018 Call for Proposals (Call 2018)	Addressed through FCH 2 JU Demo projects. As of today marginal activity, however upcoming projects will demonstrate a fleet within the next years	Subsidy per vehicle in demo projects

[5] Includes Fuel Cell Electric Vehicles with Range Extenders

[6] As above

Forklifts	No target	-Ca. 328 deployed in Europe (of which 268 via FCH JU)	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
Aviation & Maritime	No target	- 3 fuel cell vessels planned - 1 pilot aircraft tested - 1 pilot aircraft planned	Addressed through FCH 2 JU Demo projects. As of today marginal activity.	Subsidy per vehicle in demo projects
H_2 Refueling Stations	**Target Number**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
70 MPa On-Site Production	No target	-173 HRSs deployed for road transport (buses + cars, MHVs) of which 47[7] via FCH 2 JU out of which: • 9 x 350 delivered H2 • 6 x 350 onsite prod. • 3 x 700 delivered H2 • 10 x 700 onsite prod. • 6 x 350/700 delivered H2 • 5 x 350/700 onsite prod. • 5 (others) trucked-in • 1 (others) onsite - 50 additional HRSs contracted via FCH JU	Addressed through FCH 2 JU Demo projects	Fixed amount of subsidy per HRS installation
70 MPa Delivered	No target		Addressed through FCH 2 JU Demo projects	Fixed amount of subsidy per HRS installation
35 MPa On-Site Production	No target		Addressed through FCH 2 JU Demo projects	Fixed amount of subsidy per HRS installation
35 MPa Delivered	No target		Addressed through FCH 2 JU Demo projects	Fixed amount of subsidy per HRS installation

[7] Excluding 2 decommissioned stations, in total 49

Stationary	Target Number[8]	Current Status	Partnerships, Strategic Approach	Policy Support
Small[9]	No target	Ca. 2350 planned via FCH JU of which 1565 deployed	Medium-scale deployment through FCH 2 JU demo project	Fixed amount of subsidy per unit
Medium[10]	No target	70 planned of which 34 deployed	Small-scale demo projects via FCH 2 JU	Funding dependent on power level
Large[11]	No target	4 planned of which one deployed (in China)	Small-scale demo projects via FCH 2 JU	Funding dependent on power level
District Grid[12]	No target			
Regional Grid[13]	No target			
Telecom backup	No target	10 deployed via FCH JU	Small-scale demo projects via FCH 2 JU	Funding dependent on power level

[8] Targets can be units installed and/or total installed capacity in the size range indicated
[9] <5 kW (e.g., Residential Use)
[10] 5kW – 400 kW (e.g., Distributed Residential Use)
[11] 0.3MW – 10 MW (e.g., Industrial Use)
[12] 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)
[13] 30MW plus (e.g., Grid Storage and Systems Management)

H_2 Production	Target[14]	Current Status	Partnerships, Strategic Approach	Policy Support
Fossil Fuels[15]	No target	Out of scope of the FCH 2 JU		
Water Electrolysis[16] (PEM, Alkaline, SOEC)	No target	-34 deployed within FCH JU (incl. 24 at HRSs, 4 at Telecom, 2 for grid autonomy and 4 for grid services) -9 more planned, excl. HRSs (2 for H_2 storage, 1 for refinery, 4 P2G applications, 2 for other industrial purposes)		
By-product H_2	No target			
Energy Storage from Renewables	**Target[17]**	**Current Status**	**Partnership, Strategic Approach**	**Policy Support**
Power to Power[18] Capacity	No target			

[14] Target can be by quantity (Nm^3, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target
[15] Hydrogen produced by reforming processes
[16] Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)
[17] Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity
[18] Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity

Power to Gas[19] Capacity	No target			

[19] Operator has the opportunity to provide the stored energy in the form of hydrogen back to the energy system through multiple channels (e.g., merchant product, enriched natural gas, synthetic methane for transportation, heating, electricity)