



IPHE Country Update October 2019: European Commission

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1. New Policy Initiatives on Hydrogen and Fuel Cell

- End of November 2018 the European Commission adopted [the strategy for long-term EU greenhouse emissions reduction](#). It 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.
- All the key files of the “Clean Energy Package for all Europeans” ([Clean Energy for All Europeans](#)) are now in place: the recast Renewable Energy Directive (RED II), the Energy Efficiency Directive and the Governance Regulation entered into force in December 2018. The directive and the regulation on the redesign of the EU’s electricity market, together with the regulation on risk preparedness in the electricity sector and the regulation establishing an EU Agency for the cooperation of Energy Regulators entered into force in June 2019.

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 regulation 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 put more focus on flexibility mechanisms and energy storage, including hydrogen.
- 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 impact assessment study is in progress.
- “*Hydrogen technologies and systems*” has been identified by the Strategic Forum on Important Projects of Common European Interest (IPCEI-Forum) as a Strategic Value-chain.

IPCEI is a new instrument to access public funding that is compatible with EU state aid rules.



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2. Hydrogen and Fuel Cell R&D Update

The 2019 Call for Proposals of the FCH JU was successfully launched and closed on 23 April 2019 with a budget of €80.8M. A total of 44 proposals were submitted in response to this Call, according to the following breakdown:

- Transport – total 11 proposals
- Energy – total 23 proposals
- Overarching – total 6 proposals
- Cross-cutting – total 4 proposals

The FCH JU Coordinators Day for new projects was at the FCH JU premises on 19 September, and introduced the successful project consortia to the grant agreement preparation phase.

3. Demonstration, Deployments, and Workforce Developments Update

- Ca. **1730**¹ FCEVs (including range extenders, i.e. Symbio) deployed in Europe, out of which **720**² through the FCH 2 JU (mainly via [H2ME](#), [H2ME2](#) and [ZEFER](#)).
- Ca. **78** FC buses in operation, of which **59**³ through FCH JU and more than **300** (via FCH 2 JU mainly through [JIVE](#) and [JIVE 2](#)) in planning/development stage.
- Ca. **185 HRS in operation**, out of which **60** deployed via FCH 2 JU (mainly via [H2ME](#), [H2ME2](#)). From those, **136** HRS are publically available or by prior arrangements for refuelling of passenger cars and other light duty vehicles.
- **3900** μ CHPs contracted via FCH 2 JU, out of which ca. **1920** deployed (mainly via [PACE](#) and [EneField](#)).

4. Events and Solicitations

Publications

[Use of fuel cells and hydrogen in the railway environment](#)

On Friday 17 May 2019, there was a workshop on the use of fuel cells and hydrogen in the railway environment. It launched the findings of a joint study between the FCH JU and [Shift 2 Rail](#) JU exploring the use of fuel cells in the railway sector.

[JRC Technical Report - Global deployment of large capacity stationary fuel cells](#)

A technical report published by the Joint Research Council (European Commission) with support from FCH JU, to investigate the global deployment of large capacity stationary fuel cells. The study attempts to identify some key factors influencing deployment and to relate them to the trends observed in specific countries/regions.

Events & Initiatives

- **European Research and Innovation (R&I) Days**, September 2019
The FCH JU was present at the exhibition area of the first EU R&I days in Brussels. It demonstrated EU funded fuel cell trucks, passenger cars, μ CHPs and other products. In addition, FCH JU presented its programme achievements to policy makers, relevant stakeholders and the public.

¹ Latest status 31/7/2018, including non-commercial vehicles

² Including non-commercial vehicles and 16 discontinued cars

³ Including 5 discontinued buses



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- **FCH JU participation in Sustainable Energy Week, June 2019**
The session covered the development of hydrogen valleys, discussed the elements needed to develop and implement an integrated approach for the ramp up of hydrogen in different European regions (“Hydrogen Valleys”) and looked, among others, at policy, finance and investments, business models, local (regional) contexts and technology.
- **12th SET Plan Conference in Bucharest, June 2019**
The 12th SET Plan Conference was held in Bucharest, under the auspices of the Romanian Presidency of the Council of the EU. The role of Hydrogen in the clean energy transition was discussed throughout various sessions with the participation of FCH JU.
- **The 32nd International Electric Vehicle Symposium (EVS 32), May 2019**
EVS32 dedicated an entire part of the exhibition and conference program to hydrogen, the low-carbon energy that can support the transformation of the transport sector towards zero-emissions mobility (zero noise, zero air pollution).
The FCH JU was present at the event and hosting together with Aphyac and Hydrogen Europe a series of Hydrogen Lectures.

Upcoming events:

- The FCH JU is preparing for the ‘**Annual Programme Review Days**’ which will take place on 19-20 November 2019, proceeding the **FCH 2 JU Stakeholder Forum** on the 21 November.

Procurements

The FCH JU is planning to conduct a study on [Project Development Assistance for European Regions](#).

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 EUR 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 FCH JU beneficiary [Elcogen](#) (funded by FCH JU with €2.1M), signed a €12M loan facility with ‘The European Investment Bank. The loan is the first in the Baltic countries to get support under the InnovFin – EU-finance for innovators programme, which is financed from the EU’s Horizon 2020 research and innovation programme. Specifically, the financing falls under InnovFin’s Energy Demonstration Projects (EDP) facility.

6. Regulations, Codes & Standards and Safety Update

The European Hydrogen Safety Panel (EHSP) undertook in 2018 an in-depth analysis of safety data and events contained in the updated [European Hydrogen Safety Reference](#)



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[Database \(HIAD 2.0\)](#). In close collaboration with JRC, the EHSP members have reviewed more than 250 events and released the lessons learned originating from this assessment in an in-depth report. The new version database focuses on facilitating the sharing of lessons learnt and other relevant information related to hydrogen technology; the database is publicly available, and the events are anonymized. It aims to contribute to improve the safety awareness, fostering the users to benefit from the experiences of others as well as to share information from their own experiences.

The EHSP also recently published a **Safety Planning Guidance document** targeted towards fuel cells and hydrogen projects and programmes in Europe. This first-of-its-kind guidance document aims to assist in identifying minimum safety requirements, hazards and associated risks when generating a quality safety plan. The document serves as an assisting guide for the inherently safer conduct of all work related to the development and operation of hydrogen and fuel cell systems and infrastructure in Europe. The document is available on the [EHSP webpage](#).

The EHSP activities offer support at project level to ensure that all projects address and incorporate the state-of-the-art in hydrogen safety appropriately. A package of work is coordinated to avoid any accident by integrating safety learnings, expertise and planning into FCH 2 JU funded projects.

The [lessons learnt from the Hydrogen Safety Reference Database](#) and the [EHSP Safety Planning Guidelines](#) were presented at the **International Conference on Hydrogen Safety (ICHS 2019)**.



Summary Country Update October 2019: European Commission

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
Fuel Cell light duty Vehicles ⁴	No target	- Ca. 1730 FCEVs deployed in Europe (EU28+ CH + NO) of which 720 through FCH JU -Additional ~1320 cars planned/contracted through FCH JU to date	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
FC Bus	No target	-Ca. 78 deployed of which 59 through FCH JU (of which 5 discontinued) -301 more buses contracted through FCH JU	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
Fuel Cell Trucks ⁵	No target	-15 garbage trucks contracted through FCH JU (REVIVE) -12+ more expected from (H2Haul)	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
Forklifts	No target	-Ca. 325 deployed in Europe (of which 263 via FCH JU)	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects

⁴ Includes Fuel Cell Electric Vehicles with Range Extenders

⁵ As above



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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
H₂ Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
70 MPa On-Site Production	No target	-185 HRSs deployed for road transport (buses + cars, MHVs) of which 60 ⁶ via FCH JU out of which: <ul style="list-style-type: none"> • 10 x 350 delivered H2 • 7 x 350 onsite prod. • 3 x 700 delivered H2 • 14 x 700 onsite prod. • 8 x 350/700 delivered H2 • 10 x 350/700 onsite prod. • 5 (others) trucked-in • 3 (others) onsite - 38 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
Stationary	Target Number⁷	Current Status	Partnerships, Strategic Approach	Policy Support

⁶ Excluding 2 decommissioned stations, in total 62

⁷ Targets can be units installed and/or total installed capacity in the size range indicated



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Small ⁸	No target	Ca. 3900 planned via FCH JU of which 1920 deployed	Medium-scale deployment through FCH 2 JU demo project	Fixed amount of subsidy per unit
Medium ⁹	No target	70 planned of which 34 deployed	Small-scale demo projects via FCH 2 JU	Funding dependent on power level
Large ¹⁰	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 ¹¹	No target			
Regional Grid ¹²	No target			
Telecom backup	No target	10 deployed via FCH JU	Small-scale demo projects via FCH 2 JU	Funding dependent on power level
H₂ Production	Target¹³	Current Status	Partnerships, Strategic Approach	Policy Support
Fossil Fuels ¹⁴	No target	Out of scope of the FCH 2 JU		
Water Electrolysis ¹⁵	No target	-34 deployed within FCH JU (incl. 24 at HRSs, 4 at Telecom,		

⁸ <5 kW (e.g., Residential Use)

⁹ 5kW – 400 kW (e.g., Distributed Residential Use)

¹⁰ 0.3MW – 10 MW (e.g., Industrial Use)

¹¹ 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)

¹² 30MW plus (e.g., Grid Storage and Systems Management)

¹³ Target can be by quantity (Nm³, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target

¹⁴ Hydrogen produced by reforming processes

¹⁵ Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)



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(PEM, Alkaline, SOEC)		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	Target¹⁶	Current Status	Partnership, Strategic Approach	Policy Support
Power to Power ¹⁷ Capacity	No target			
Power to Gas ¹⁸ Capacity	No target	34 FCH JU (Research & Demonstration) projects contribute directly or indirectly in the PtG concept with 128€ funding.		

¹⁶ Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity

¹⁷ Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity

¹⁸ 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)