



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update December 2020: European Commission

Name	Patrice Millet
Contact Information	patrice.millet@ec.europa.eu Tel: +32 229-85140
Covered Period	June – December 2020

1. New Initiatives, Programs, and Policies on Hydrogen and Fuel Cells

The Commission adopted on 8 July 2020 a number of high-profile policy initiatives to put Europe in a leading position to achieve real deployment and application of clean hydrogen and fuel cell technologies over the next decade. These initiatives are:

- The Industrial **Clean Hydrogen Alliance** proposed in the EU new Industrial Strategy, as well as potential Important Projects of Common European Interest (IPCEI) on hydrogen;
- The Communication “[Powering a climate-neutral economy: An EU Strategy for Energy System Integration](#)” in which hydrogen plays an important role, and;
- [A hydrogen strategy for a climate-neutral Europe](#). This strategy covers all dimensions of hydrogen, in particular energy, climate, the associated investment challenges and the international dimension. It also includes a specific section on promoting research and innovation in hydrogen technologies.

On 9 September 2020 the European Commission released the 2030 Climate Target Plan, presenting a renewed climate ambition with an EU-wide, economy-wide greenhouse gas emissions reduction target by 2030 compared to 1990 of at least 55% including emissions and removals. All transport sectors - road, rail, aviation and waterborne transport - will have to contribute to the 55% reduction effort. A smart combination of vehicle/vessels/aircraft efficiency improvements, fuel mix changes, greater use of sustainable transport modes and multi-modal solutions, digitalisation for smart traffic and mobility management, road pricing and other incentives can reduce greenhouse gas emissions and at the same time significantly address noise pollution and improve air quality

2. Hydrogen and Fuel Cell R&D Update

The 2020 Call for Proposals of the FCH JU was successfully launched and closed on 29 April 2020 with a budget of €93Mil. A total of 71 proposals were submitted in response to this call, according to the following breakdown:

- Transport – total 23 proposals
- Energy – total 22 proposals
- Overarching – total 13 proposals
- Cross-cutting – total 13 proposals

The FCH JU coordinators day for new projects was held in FCH JU premises on the 10th of September and introduced the successful project consortia to the grant agreement preparation phase.



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

The number of proposals that will be funded depends on the available budget and the formal approval of grant agreements by the FCH 2 Joint Undertaking. It is expected that most grant agreements will be signed by December 2020.

3. Demonstration, Deployments, and Workforce Developments Update

- To date, **1907¹** FCEVs have been contracted through FCH JU, out of which **959** are currently deployed and **674** planned or in development phase (mainly via [H2ME](#), [H2ME2](#) projects and [ZEFER](#) project).
- **114** FC buses have been deployed until today through FCH JU and **244** are planned or in development phase. A total of 300 buses have been deployed or planned to be deployed through the [JIVE](#) and [JIVE 2](#) projects (including all buses currently under development).
- **139** HRS are deployed in Europe, out of which **68** deployed via FCH JU (mainly via [H2ME](#) and [H2ME2](#) projects). A chart displaying key data on the number and type of hydrogen refuelling stations deployed in Europe, including location and capacity can be found [here](#) or [here](#).
- **4003** μ CHPs contracted via FCH JU, out of which **2372** already deployed (mainly via [PACE](#) and [EneField](#) projects – around 95% of total FCH JU μ CHPs).

Publications

[PROGRAMME REVIEW REPORT 2019](#)

The [2019 Programme Review Report](#) presents the findings of a review into activities supported by the FCH 2 JU under the EU's Seventh Framework Programme and Horizon 2020 by the European Commission's Joint Research Centre (JRC). It pays particular attention to the added value, effectiveness and techno-economic efficiency of FCH 2 JU projects, assigned to six review panels under two main pillars

- Transport and Energy:
 - TRANSPORT: a) trials and deployment of fuel cell applications and b) the next generation of products;
 - ENERGY: a) trials and deployment of fuel cell applications, b) next generation of products and c) hydrogen for sectoral integration
- Support for market uptake (cross-cutting activities such as standards and consumer awareness)

This report covers all 81 projects that were ongoing for any time between April and October 2018 and assesses the strengths and accomplishments of each panel and areas that would benefit from further attention.

[2020 SUCCESS STORIES](#)

The [2020 edition of the FCH JU Success Stories](#) highlights the impact of FCH JU projects and how the FCH JU is making fuel cells and hydrogen an everyday reality in Europe. From hydrogen-powered cars and heavy-duty trucks to maritime applications, from tackling the

¹ Latest status 17/11/2020, including non-commercial vehicles



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

barriers limiting the potential of electrolyzers to greening the steel industry, our projects are helping to make an impact on the clean energy transition.

[OPPORTUNITIES FOR HYDROGEN ENERGY TECHNOLOGIES CONSIDERING THE NATIONAL ENERGY & CLIMATE PLANS](#)

The [study](#) analyses the role of hydrogen in the National Energy and Climate Plans (NECPs) and identifies and highlights opportunities for hydrogen technologies to contribute to effective and efficient achievement of the 2030 climate and energy targets of the EU and its Member States. It focuses on the potential and opportunities of renewable hydrogen, produced by electrolyzers using renewable electricity and of low-carbon hydrogen, produced by steam methane reforming combined with CCS. The opportunities for and impacts of hydrogen deployment are assessed and summarised in individual fiches per Member State. Moreover, it analyses to what extent policy measures and industrial initiatives are already being taken to facilitate large-scale implementation of hydrogen in the current and the next decades.

[HYDROGEN-POWERED AVIATION](#)

A [new independent study](#), commissioned by Clean Sky 2 and Fuel Cells & Hydrogen 2 Joint Undertakings on hydrogen's potential for use in aviation. The study found that hydrogen – as a primary energy source for propulsion, either for fuel cells, direct burn in thermal (gas turbine) engines or as a building block for synthetic liquid fuels – could feasibly power aircraft with entry into service by 2035 for short-range aircraft. Costing less than €18 [\$20] extra per person on a short-range flight, and reducing climate impact by 50 to 90%, hydrogen could play a central role in the future mix of aircraft and propulsion technologies.

[Events & Initiatives](#)

[EUROPEAN HYDROGEN WEEK](#)

The [European Hydrogen week](#) took place from **23 to 27 November 2020** and comprised of three different events:

1. *The FCH JU Programme Review Days (PRD), 23-24 November 2020*

The two-days event kick-started the whole week and, following the tradition of the past 10 years, provided an excellent visibility platform for more than 100 projects currently on-going under FCH JU. Projects presented their progress, obtained feedback and exchanged ideas on technological developments in the sectors. The event closed with the FCH JU Awards 2020, naming the winners of FCH JU's cutting-edge projects in the categories Best Outreach, Best Success Story, Best Innovation.

2. *PrioritHy: How hydrogen can bring recovery, growth and jobs for Europe, 25 November 2020*

This event focused on best-practice regional approaches to build up a hydrogen economy and to ensure the overall transition to a climate neutral Europe. The event was jointly organised by the National Organisation Hydrogen and Fuel Cell Technology (NOW) and Fuel Cells and Hydrogen Joint Undertaking (FCH JU), and with the support of the European Commission and the German Federal Ministry of Transport and Digital Infrastructure.



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

3. *The European Hydrogen Forum, 26-27 November 2020*

A high-level conference featuring keynote speeches by a number of Commissioners, including the European Commission's Executive Vice-President for the European Green Deal Frans Timmermans, many panel discussions, battlefield talks and virtual cocktails for participants under the theme Kick-starting the EU hydrogen industry to achieve the EU climate goals. In addition, market opportunities of hydrogen technologies in its entire value chain were explored in six roundtables headed by CEOs of world-leading companies. The event was jointly organised by the European Commission (DG GROW) and the Fuel Cells and Hydrogen Joint Undertaking.

[Launching of the FCH Observatory](#)

On **15 September 2020**, the [Fuel Cells and Hydrogen Observatory](#) (FCHO) online launch event took place with around 1000 participants from European and national institutions, industry and associations from around the world. The FCHO provides data and up to date information about the entire hydrogen sector. It focuses on technology and market statistics, socio-economic indicators, policy and regulation, as well as financial support.

[Webinar: Moving Electrolysers into the Gigawatt Scale](#)

On **6 October 2020** FCH JU organised a webinar together with the Institute for Sustainable Process Technology (ISPT) on the challenge of moving the electrolysers technology to a GW scale in the next decade. The speakers looked at how the [EU Hydrogen Strategy](#) published in July 2020 and the [German Hydrogen Strategy](#) can promote the massive scale up in electrolyser capacity in Europe, while collaborating at a global scale with main partners such as Australia and US to provide the necessary clean hydrogen by 2030 and decarbonise our economies. The second part of the webinar shared preliminary results of the [Hydrohub Innovation Program](#) which has been working on a baseline (2020 level) design of a GW electrolyser plant for green hydrogen and corresponding cost analysis and explored which challenges still lie ahead to bring green hydrogen to the front of the merit order.

[Launch of the Hydrogen Territories Platform](#)

The new [Hydrogen Territories Platform](#) (HTP) (<http://h2territory.eu/>) was launched on **23 September 2020**. The HTP will help to identify local replication opportunities for the development, deployment, and exploitation of hydrogen and fuel cell technologies for integrated local energy systems. It was developed within the BIG HIT project, aiming to support replication of the local energy systems model. The HTP will provide information and modelling tools to support the wider development and replication of this model to other islands and isolated territories.

[Clean hydrogen mobility for regions](#)

This [workshop](#) held on **21 October 2020** was dedicated to regions and cities interested in clean hydrogen mobility solutions to tackle climate change and air pollution. The FCH JU provided information to support technology adoption & financing; regions and manufacturers presented their plans and projects and brought evidence of the suitability of hydrogen solutions for public transport fleets. Finally, there was a discussion on why and how to invest in this zero-emissions technology, best practices, and next steps of deployment.



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

Procurements

The FCH 2 JU published a Call for Tenders on 17/09/2020 on the [Operation and Maintenance of the European HRS Availability System \(E-HRS-AS\)](#). Deadline to express interest was beginning of November 2020.

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

The [European Clean Hydrogen Alliance](#) (ECH2A) will build up a clear pipeline of viable investment projects, provide a broad forum to coordinate investment by all stakeholders and engage civil society, and facilitate cooperation in a range of large investment projects, including IPCEI projects. It will be supported by the Strategic Investment Facility under InvestEU and the ETS Innovation Fund.

The EU's recovery plan [Next Generation EU](#), will provide for funding opportunities, especially via InvestEU, the new Recovery and Resilience Facility, the increase in Cohesion funding via REACT-EU, and the Just Transition Mechanism.

The Commission has launched [calls for proposals](#) for both a [100 MW electrolyser](#) and [Green Airports and Ports](#), as part of the European Green Deal call under Horizon 2020.

6. Regulations, Codes & Standards, and Safety Update

The activities of the [Regulations, Codes & Standards Strategy Coordination \(RCS SC\) Group](#) of the FCH 2 JU focused on the coordination of identified RCS needs and gaps towards appropriate standardisation platforms (such as Technical Committees and the Sector Fora) and regulatory bodies.

The [European Hydrogen Safety Panel \(EHSP\)](#) activities during this period are ongoing in the four task forces. At the project and programme level, the EHSP has started to assess several key safety-related aspects in all FCHJU funded projects and has organised a workshop on safety of electrolysis with 15 FCHJU projects involving electrolysis technology. The outcome of the workshop will be a public summary report alongside the presentations, provided publication is finally granted.

Moreover, the EHSP continues its work on increasing the number of the safety data and events contained in the European Hydrogen Safety Reference Database ([HIAD 2.0](#)), currently above 500 events, and a new public report is being prepared with the summary of the findings, lessons learnt and recommendations stemmed from the assessment performed.

On public outreach, a revamped website is being prepared which will include a set of "Frequently Asked Questions (FAQs)" about hydrogen safety.



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

Summary Country Update November 2020: European Commission

Transportation	Target Number	Current Status ²	Partnerships, Strategic Approach	Policy Support
Fuel Cell light duty Vehicles ³	No target	1907 FCEVs have been contracted through FCH JU, out of which 959 are currently deployed and 674 planned or in development phase.	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
FC Bus	No target	- 114 buses deployed in Europe through FCH JU (of which 13 discontinued) - 244 more buses planned or developed through FCH JU	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
Fuel Cell Trucks ⁴	No target	-15 garbage trucks contracted through FCH JU (REVIVE) -16 trucks contracted through FCH JU (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	- 335 deployed in Europe	Addressed through FCH 2 JU Demo projects	Subsidy per vehicle in demo projects
Aviation & Maritime	No target	- 4 fuel cell vessels planned - 1 pilot aircraft planned	Addressed through FCH 2 JU Demo projects. As of today marginal activity.	Subsidy per vehicle in demo projects

² Data covering both FCH JU and FCH 2 JU (for simplicity referred to just as FCH JU)

³ Includes Fuel Cell Electric Vehicles with Range Extenders

⁴ As above



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

H ₂ Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
70 MPa On-Site Production	No target	-139 HRSs deployed for road transport (buses, cars, trucks MHVs) of which 73 have been deployed via FCH JU out of which: <ul style="list-style-type: none"> • 10 x 350 delivered H2 • 7 x 350 onsite production • 2 x 350 unspecified • 4 x 700 delivered H2 • 2 x 700 onsite production • 28 x 350/700 delivered H2 • 11 x 350/700 onsite prod. • 3 (others) trucked-in • 1 (others) onsite production • 5 have been decommissioned - 36 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 Number⁵	Current Status	Partnerships, Strategic Approach	Policy Support

⁵ Targets can be units installed and/or total installed capacity in the size range indicated



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

Small ⁶	No target	Ca 3927 planned via FCH JU of which 2335 deployed	Medium-scale deployment through FCH 2 JU demo project	Fixed amount of subsidy per unit
Medium ⁷	No target	72 planned of which 35 deployed	Small-scale demo projects via FCH 2 JU	Funding dependent on power level
Large ⁸	No target	3 planned of which one deployed (in China)	Small-scale demo projects via FCH 2 JU	Funding dependent on power level
District Grid ⁹	No target			
Regional Grid ¹⁰	No target			
Telecom backup	No target	10 deployed via FCH JU, of which 9 medium and 1 small	Small-scale demo projects via FCH 2 JU	Funding dependent on power level
H₂ Production	Target¹¹	Current Status	Partnerships, Strategic Approach	Policy Support
Fossil Fuels ¹²	No target	Out of scope of the FCH 2 JU		
Water Electrolysis ¹³	No target	- 35 deployed within FCH JU (incl. 25 at HRSs, 4 at Telecom,		

⁶ <5 kW (e.g., Residential Use), excl. telecom backup

⁷ 5kW – 400 kW (e.g., Distributed Residential Use), excl. telecom backup

⁸ 0.3MW – 10 MW (e.g., Industrial Use)

⁹ 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)

¹⁰ 30MW plus (e.g., Grid Storage and Systems Management)

¹¹ Target can be by quantity (Nm³, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target

¹² Hydrogen produced by reforming processes

¹³ Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

(PEM, Alkaline, SOEC)		2 for grid autonomy and 5 for grid services) - 11 more planned, excl. HRSs (2 for H ₂ storage, 2 for refinery, 4 P2G applications, 4 for other industrial purposes)		
By-product H ₂	No target			
Energy Storage from Renewables	Target¹⁴	Current Status	Partnership, Strategic Approach	Policy Support
Power to Power ¹⁵ Capacity	No target			
Power to Gas ¹⁶ Capacity	No target	38 FCH JU (Research & Demonstration) projects contribute directly or indirectly in the PtG concept with 135€ funding.		

¹⁴ Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity

¹⁵ Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity

¹⁶ 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)