



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update June 2020: European Commission

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1. New Policy Initiatives on Hydrogen and Fuel Cell

Hydrogen plays a central role in achieving the main objective of the European Green Deal and is one of the key sectors contributing to the European Economic Recovery Plan. In this context, important initiatives and activities are taking place in the EU such as:

- The proposed **Clean Hydrogen Partnership under Horizon Europe**. 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 still in progress.
- The **New Industrial Strategy for Europe** (adopted on 10 March) with the proposal to launch a European **Clean Hydrogen Alliance** + the following launch of potential **Important Projects of Common European Interest (IPCEI) on hydrogen**. IPCEI is a new instrument to access public funding that is compatible with EU state aid rules.
- The ongoing work on communication on **Energy Systems Integration**. Hydrogen is prominent in Energy System Integration – the coordinated planning and operation of the energy system “as a whole,” across multiple energy carriers, infrastructures, and consumption sectors – and will play a pivotal role in the pathway to an effective, affordable and deep decarbonisation of the European economy.
- The preparation of communication on a European **Hydrogen Strategy**. This strategy encompasses all dimensions of hydrogen’s potential and policies, in particular R&I, energy, climate, industry and environmental policies and will also address the investment challenge
- The latter three initiatives will be part on a comprehensive policy package to be adopted beginning of July 2020.
- Finally, the adoption on 27 May of the **Communication on "[Europe's moment: Repair and Prepare for the Next Generation](#)"**, which highlights in particular the important role of **hydrogen in the EU economic recovery plan**. The Commission will focus on unlocking investment in clean technologies and value chains. The €750bn economic recovery package is focused around the European Green Deal, and highlights “the rolling out renewable energy projects, especially wind, solar and kick-starting a clean hydrogen economy in Europe”. The new Strategic Investment Facility will invest in technologies that are key for the clean energy transition, such as renewable and energy storage technologies, **clean hydrogen**, batteries, carbon capture and storage and sustainable energy infrastructure.

2. Hydrogen and Fuel Cell R&D Update

- As a result of the Call for Proposals 2019, the FCH 2 JU signed **17 grants for the total FCH 2 JU contribution of EUR 69.1 million**. The 17 grants support research and



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innovation projects covering activities within the energy and transport pillars along with the cross cutting activity area and the overarching area. In the 17 projects, 195 entities from 23 EU Member States or Associated Countries are participating. Entities from four third countries are participating in seven projects. For more information on H2020 FCH 2 JU projects please refer to the [FCH JU website](#).

- The [2020 Call for Proposals](#) of the FCH 2 JU was successfully launched in January 2020 with a budget of EUR 93 million. The [FCH 2 JU info day](#) was held in FCH 2 JU premises on the 27 January 2020. Deadline for submission was 29 April 2020. A total of 71 proposals were submitted in response to this call. The evaluation of the proposals is planned to be closed by end of June 2020. Applicants will be informed of the outcome of the evaluations by the end of July 2020.

3. Demonstration and Deployments Update

- Ca. **2458**¹ FCEVs (including range extenders, i.e. Symbio) deployed in Europe, out of which **839**² through the FCH 2 JU (mainly via [H2ME](#), [H2ME2](#) projects and [ZEFER](#) project).
- Ca. **81** 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](#) projects) in planning/development stage.
- Ca. **195 HRS in operation**, out of which **63** deployed via FCH 2 JU (mainly via [H2ME](#) and [H2ME2](#) projects). From those, **127** HRS are publically available or by prior arrangements for refuelling of passenger cars and other light duty vehicles⁴.
- **4003** μ CHPs contracted via FCH 2 JU, out of which ca. **2054** deployed (mainly via [PACE](#) and [EneField](#) projects).

4. Events and Solicitations

Publications

[Life Cycle Assessment of Hydrogen and Fuel Cell Technologies](#)

The report provides an overview of the progress achieved so far and a comprehensive analysis on Life Cycle Assessment (LCA) for various hydrogen technologies and processes. The review considers 73 FCH 2 JU funded projects. The LCAs have been assessed regarding the adherence to guideline recommendations, methodology and overall quality of the work. Based on the outcome of this analysis, a harmonisation effort in the approach to LCA for the FCH JU funded projects is proposed. In particular, a Life Cycle Inventory (LCI) database useful for the projects is required together with the identification of a reference case to be used as benchmark for future LCAs.

[Keyword Analysis and Project Classification of FCH 2 JU Projects](#)

This report assesses keywords to determine relationships between funding and the different activities of the Joint Undertaking, for example, to visualise trends in the funding for particular technologies or applications. As a pre-cursor to a wider historical analysis of the impact of the FCH 2 JU, a structured classification of projects according to keywords is performed, leading to the creation of a hierarchical database.

¹ Latest status 22/01/2020, including non-commercial vehicles

² Including non-commercial vehicles and 16 discontinued cars

³ Including 13 discontinued buses

⁴ Excluding MHVs, trucks and buses



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The potential role of H₂ production in a sustainable future power system

In this report, the operation of a future highly decarbonised (95% CO₂ emissions reduction vs 1990) power system, as defined with JRC-EU-TIMES (a partial equilibrium energy system model) in 2050, is analysed with METIS, the mathematical model providing analysis of the European energy system for electricity, gas and heat.

Current Status of Chemical Energy Storage Technologies

The aim of this report is to give an overview of the contribution of EU funding, specifically through Horizon 2020 (H2020), to the research, development and deployment of chemical energy storage technologies (CEST). In the context of this report, CEST is defined as energy storage through the conversion of electricity to hydrogen or other chemicals and synthetic fuels. The report maps research activities on CESTs at the European level. In addition, projects funded at national and international level, occurring within the same timeframe, have been considered.

Global Energy and Climate Outlook 2019: Electrification for the low-carbon transition

This edition of the Global Energy and Climate Outlook (GECO) analyses the role of electrification in global transition pathways to a low Greenhouse Gas (GHG) emissions economy. The role of electricity is examined by large sector (industry, transport, buildings, power generation), with a particular regional focus on the EU and China and a sectoral focus on road transport electrification. Hydrogen fuel cells are accounted in the report.

Events & Initiatives

EU Energy day at COP25

The EU energy day took place on **10 December 2019** under the topic: "Transforming the energy system for a climate neutral economy: the EU example. Within the event, the session "Accelerating innovation for the European Green Deal" presented a number of key technologies and innovations funded by different EU R&I support instruments and included inputs from the FCH 2 JU funded project [H2FUTURE](#).

The European Green Deal

The European Commission presented the European Green Deal on **11 December 2019**, outlining the main policy initiatives for reaching net-zero global warming emissions by 2050. "Climate-neutral" Europe: this is the overarching objective of the European Green Deal. To this purpose, a plan for "smart sector integration", bringing together the electricity, gas and heating sectors closer together "in one system", is foreseen in 2020. Hydrogen is mentioned as a key instrument for meeting the Green Deal objectives.

Hydrogen for Important Projects of Common European Interest (IPCEI)

A conference/info-session on Hydrogen for Important Projects of Common European Interest (IPCEI) took place in Brussels on **15 January 2020**. The conference aimed to: (i) inform participants about the concept of Important Projects of Common European Interest; (ii) present a number of major large-scale Hydrogen projects as examples; and (iii) facilitate extensive matchmaking between participants in order to find the required industrial partners for the implementation of existing and new projects.

Covenant of Mayors Investment Forum and Official launch of the EU City Facility

The Covenant of Mayors Investment Forum – Energy Efficiency Finance Market Place is the biggest event of its kind in Europe, showcasing successful projects on financing climate adaptation, energy efficiency, clean mobility and innovative energy planning, as well as initiatives working across Europe to facilitate the market for climate and sustainable energy finance. The event was organised on **18-19 February 2020** by the European Commission's



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Directorates-General for Energy and Climate Action and the Executive Agency for Small and Medium-sized Enterprises (EASME) in collaboration with the Covenant of Mayors. The FCH JU joined the event with a session on Hydrogen mobility solutions for buses, garbage trucks and taxi fleet.

[FCHgo Award: "World of the future: the best FCH application"](#)

The international FCHgo Award challenges pupils to imagine innovative applications of FCH technology that will transform our daily-lives in the future. The theme of the contest is 'World of the future: the best FCH application'. The competition was launched on **26 February 2020** by FCHgo project, a project funded by the FCH 2 JU. The goal of FCHgo project is to strengthen public acceptance and awareness of fuel cell hydrogen technologies (FCH-Ts) by educating pupils of all education levels, from primary to secondary school. The project was launched in January 2019 and will be carried out until the end of 2020.

[Hydrogen fuel cell trucks. Paving the road to a carbon-neutral Europe](#)

The Hydrogen Fuel Cell Trucks Event was held on **5 March 2020** and brought together leading experts from the truck industry, EU decision makers, end-users and infrastructure providers to discuss how to accelerate the mass-market deployment of hydrogen fuel cell trucks and their infrastructure.

[Launch of the Hydrogen Valley Platform](#)

The [Hydrogen Valley Platform](#), launched on **21 April 2020**, is a Global Information Sharing Platform, developed by the FCH 2 JU to support the Mission Innovation IC8 Member States. Its objective is to promote the emergence and implementation of hydrogen flagship projects ("hydrogen valleys") and raise awareness among policy makers, thus advancing the clean energy transition. The platform will offer up to date information regarding existing hydrogen valley projects, while providing various support tools for project development, implementation, and facilitating interaction.

[A 2x40 GW Initiative - Green Hydrogen for a European Green Deal](#)

The European industry association Hydrogen Europe announced on **27 April 2020** the 2x40 GW Initiative. The objective is to promote a massive increase of electrolyser production within the EU in order to support green hydrogen production. The initiative proposes install 40 GW electrolyser capacity in the countries of the European Union as well as 40 GW electrolyser capacity in neighbouring countries, especially in North Africa and Ukraine up to the year 2030.

[HYTUNNEL-CS Stakeholders' workshop](#)

The consortium of the FCH 2 JU project [HYTUNNEL-CS](#) organised an online Stakeholders' Workshop on **4-5 May 2020**. Tunnel authorities, managers and designers, as well as tunnel operations and safety officers participated along with developers of hydrogen-powered vehicles and hydrogen delivery transport developers and manufacturers.

[THYGA online workshop](#)

The consortium of the FCH 2 JU project [THYGA](#) organised an online workshop on **6 May 2020**. The workshop presented first research results and discussed the specific consequences of hydrogen blending for the gas appliances sector, with the participation of researchers, manufacturers and associations.

[FCH JU'S Project Development Assistance \(PDA\) initiative](#)

Following a highly competitive public call for applications, launched by the FCH JU early 2020, 11 European regions were selected (out of 35) to benefit from direct assistance for



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developing high quality, integrated hydrogen projects. The piece of news was released on **18 May 2020** and a first meeting with these regions is planned to take place in the beginning of June. The wide geographic spread and the diverse portfolio of the end-use applications in the regions selected can create a great blueprint for the other regions. These will be included in the PDA Observers' Network and will be able to benefit from the shared knowledge and expertise.

Procurements

- The FCH 2 JU is supporting the development 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 call for tenders was published on 9 August 2018 and the first release of the observatory is expected to become live in Q3 2020.
- The FCH 2 JU published a call for tenders on 26 March 2019 to carry out a study on [Opportunities arising from the inclusion of Hydrogen Energy Technologies in the National Energy & Climate Plans](#). The final report is expected to be released in Q2 2020.
- The FCH 2 JU published a call for tenders to undertake a [Study on use of fuel cell hydrogen in aviation](#), a joint study between the FCH 2 JU and Clean Sky 2 JU on the potential of fuel cell and hydrogen technologies in the field of aircraft propulsion. The final report is expected to be released in Q2 2020.
- The FCH 2 JU published a call for tenders on 13 November 2020 to support a [Study on European Business cases for FCH trucks and technology development roadmap](#). The kick off meeting was held and a final report is expected to be released in Q4 2020.
- The FCH 2 JU is supporting the [Project Development Assistance \(PDA\) for European Regions study](#) to provide support for at least ten regions or cities to develop detailed work plans for the implementation of hydrogen projects, including at least two projects from EU13 member states. The call for tenders was published on 14 May 2019. On April 2020, 11 European regions were selected to benefit from direct assistance. The Kick-Off meeting is expected to take place beginning of June 2020.
- The FCH 2 JU published a call for tenders on 14 April 2020 to carry out a [Study on Accelerating the Deployment of Guarantees of Origin Schemes for Hydrogen and for the Design of a Voluntary Scheme for Compliance with REDII Targets](#). Deadline to express interest is the end of June 2020.

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

- All information on investments will be provided in the Hydrogen Policy package to be released beginning of July.

6. Regulations, Codes & Standards and Safety Update

- The activities of the [Regulations, Codes & Standards Strategy Coordination \(RCS SC\) Group](#) of the FCH 2 JU were focused on updating the annual work plan of the group as well as 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 for 2020 were kicked-off and activities are ongoing in the four task forces. As a result, a safety-related checklist was developed for the FCH 2 JU programme office as a tool to improve the hydrogen safety management at a programme level. Besides, the EHSP is updating the assessment of the safety data and events contained in the European Hydrogen Safety Reference Database



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([HIAD 2.0](#)) performed in 2019.



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Summary Country Update May 2020: European Commission

| Transportation | Target Number | Current Status | Partnerships, Strategic Approach | Policy Support |
|--|---------------|--|---|--------------------------------------|
| Fuel Cell light duty Vehicles ⁵ | No target | - Ca. 2458 FCEVs deployed in Europe (EU28+ CH + NO + IS) of which 839 through FCH JU -Additional ~1046 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. 81 deployed of which 59 through FCH JU (of which 13 discontinued) - 306 more buses contracted through FCH 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 JU (REVIVE) -15 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 |

⁵ Includes Fuel Cell Electric Vehicles with Range Extenders

⁶ As above



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| Forklifts | No target | -Ca. 335 deployed in Europe (of which 273 via FCH JU) | 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 |
| H ₂ Refueling Stations | Target Number | Current Status | Partnerships, Strategic Approach | Policy Support |
| 70 MPa On-Site Production | No target | -195 HRSs deployed for road transport (buses, cars, trucks MHVs) of which 68 ⁷ 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 • 4 x 700 onsite prod. • 27 x 350/700 delivered H2 • 13 x 350/700 onsite prod. • 3 (others) trucked-in • 1 (others) onsite - 41 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 4 decommissioned stations, in total 64



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| Stationary | Target Number ⁸ | Current Status | Partnerships, Strategic Approach | Policy Support |
|-----------------------------|----------------------------|---|---|----------------------------------|
| Small ⁹ | No target | Ca 3927 planned via FCH JU of which 2018 deployed | Medium-scale deployment through FCH 2 JU demo project | Fixed amount of subsidy per unit |
| Medium ¹⁰ | No target | 72 planned of which 37 deployed | Small-scale demo projects via FCH 2 JU | Funding dependent on power level |
| Large ¹¹ | 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 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)



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| 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 | - 35 deployed within FCH JU (incl. 25 at HRSs, 4 at Telecom, 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 | Target ¹⁷ | Current Status | Partnership, Strategic Approach | Policy Support |
| Power to Power ¹⁸ Capacity | No target | | | |

¹⁴ Target can be by quantity (Nm³, 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



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|--|-----------|---|--|--|
| Power to Gas ¹⁹ Capacity | No target | 38 FCH JU (Research & Demonstration) projects contribute directly or indirectly in the PtG concept with 135€ funding. | | |
|--|-----------|---|--|--|

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)