



## INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

### IPHE Country Update Nov 2016: European Commission

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#### 1. New Policy Initiatives on Hydrogen and Fuel Cells

- **New Renewable Energy Directive** for the period post-2020 is currently under elaboration, and will be presented in December 2016. This directive will be crucial for defining how the EU binding target of 27% for renewables by 2030 will be achieved, including what will drive the uptake of Renewable Energy Sources (RES) in the transport sector. It is also expected to propose a more coordinated approach to support schemes, to drive the uptake of RES in the heating and cooling sector, and in self-generation & consumption. This directive is very relevant for market uptake of renewable H2 and Power-to-X.
- **New Electricity Market Design Directive** should create the conditions for integrating high shares of variable RES and the decentralisation of electricity production by enabling liquid and well-functioning short-term markets. For this policy instrument, the focus is on cross-border integration, capacity mechanisms, better inclusion of various flexibility options and empowering consumers. Electricity storage is expected to be addressed thoroughly, hence the importance of this Directive for H2 and FC.
- The new **European Strategy** for Low-Emission Mobility ([https://ec.europa.eu/transport/sites/transport/files/themes/strategies/news/doc/2016-07-20-decarbonisation/com%282016%29501\\_en.pdf](https://ec.europa.eu/transport/sites/transport/files/themes/strategies/news/doc/2016-07-20-decarbonisation/com%282016%29501_en.pdf)) was presented July 2016. It contains the following themes of work: 1) Efficiency in the transport system, 2) Low-emission alternative energy sources and measures in support of Alternative Fuel Infrastructure including HRS, and 3) Low- and zero-emission vehicles. As a follow-up to this strategy, the EC is now preparing: 1) post-2020 carbon dioxide standards for cars and vans (proposal expected in 2017); 2) post-2020 strategy for lorries, buses and coaches, including certification and monitoring of GHG emissions and fuel consumption (proposal expected in 2017); and, 3) the revision of Directive 2009/33/EC on Clean and Energy-efficient Road Transport Vehicles – Clean Vehicles Directive that should mobilise public procurement of innovative technologies (also expected in 2017).
- Work continues on the 10 focus areas that have been identified under the **Integrated Strategic Energy Technology Plan** (SET-Plan <https://ec.europa.eu/energy/en/topics/technology-and-innovation/strategic-energy-technology-plan>). These focus areas correspond to EU's energy research priorities. For each of them, an Issue Paper has been elaborated and either has been or will be followed by Declarations of Intent by Member States to clarify the level of ambition by 2030 (more info available here: <https://setis.ec.europa.eu/towards-an-integrated-SET-Plan>). Hydrogen and fuel cells are explicitly mentioned under Action 8, "Strengthening market up-take of renewable fuels in transport". However, they are also inherent to Action 4. Resilience and security of the energy system, Action 6. Energy efficiency for Industry, and Action 9. CCS/U.
- The European Commission (EC) has formally joined Mission Innovation. Whereas the key areas for action are under elaboration, expectation is that there will be opportunities for FCH technologies.



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- Directorate General for Energy (DG ENER) of the EC has published a proposed definition and principles for energy storage (<https://ec.europa.eu/energy/sites/ener/files/documents/Proposed%20definition%20and%20principles%20for%20energy%20storage.pdf>) to support the development of a more cost-effective energy system that includes storage solutions. This paper makes an explicit reference to hydrogen, next to battery solutions.
- A dedicated Working Group within the frame of the Strategic Forum for Energy Management (SFEM) of the European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC: <http://www.cenelec.eu/aboutus/Mission/Pages/default.aspx>) continues to address research, PNR and standardization needs for Power-to-Hydrogen, including injection in the natural gas grid. A workshop on "Power-to-Hydrogen: key challenges and next steps" aiming at following up on the SFEM's 2015 report was organised by JRC on the 3-4 May in Brussels. The presentations of the workshop can be downloaded from: <https://ec.europa.eu/jrc/en/node/60042>. The 5th plenary SFEM Working Group HYDROGEN is on October 11th 2016 and shall determine the short and long-term priorities to guide future work.

## 2. Hydrogen and Fuel Cell R&D Update

- A study on "Early Business Cases for Power-to-Hydrogen in Europe" is on-going and shall be finalised by early 2017. The focus is on short-term (2017-2025) economic opportunities under the existing (or realistically anticipated) market conditions.
- Another study on "Business models and financing arrangements for stationary fuel cells" is also underway. It focuses on defining concrete market entry strategies that can enable the stakeholders to unlock the market opportunity for stationary fuel cells in Europe.
- Under the JRC-FCH 2 JU Rolling Plan 2016 there are a number of activities on harmonisation, the most advanced of which is on PEMFC cell testing. Aside from the active involvement of EU participants in the FCH 2 JU projects on harmonisation, the document has also been sent to organisations/companies in IPHE Member States (US, JP, KR). The Rolling Plan for 2017 is currently under elaboration.
- The CertifyHy project that aims at establishment of the first EU-wide Guarantees of Origin (GO) for Premium Hydrogen (that covers both green and low carbon hydrogen), including a definition of green and low carbon hydrogen and a detailed proposal for a GO system, finished in the fall of 2016. It delivered a roadmap for the implementation of the scheme in support of the roll-out of a market for low-carbon hydrogen in the EU. For more information, refer to <http://www.certifyhy.eu/>

## 3. Demonstration and Deployments Update

- It is expected that the FCH 2 JU's Call 2016 will result in substantial activity in terms of deploying fuel cell buses (100+) across Europe. A relevant proposal has been positively evaluated and is now subject to the signature of a grant agreement (expected later this year). This effort aims at consolidating Europe's leadership in this area and builds on stringent European air quality legislation.

## 4. Events and Solicitations

- The 2016 FCH 2 JU's Stakeholder Forum, which is the most significant event of the year for the European Fuel Cell and Hydrogen community, will take place on the 23rd of November in Brussels, in the European quarter. It will be preceded by the Programme Review Days (21-22 November), which will present some 100 of the FCH 2 JU's projects



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(<http://www.fch.europa.eu/event/programme-review-days-stakeholder-forum> ). All IPHE delegates are most welcome to join both events.

- The International Zero Emission Bus Conference and the 10th Edition of the Fuel Cell Bus Workshop will take place on November 30th & December 1st, 2016 in London (<http://chic-project.eu/newsevents/events/zero-emission-bus-conference-10th-edition-international-fcb-workshop-london>).
- The Hydrogen Safety Priority Workshop took place in Petten (NL) the 26-27 September. This workshop belongs to a series organised approximately every two years by the International Association HySafe, the US DoE and the European Commission's Joint Research Centre (including contribution from FCH2 JU). In this last edition, international experts from research and industry have summarised R&D advancements of the last 5 years, presented the near term research ongoing activities and the gaps still to be filled. The next step will be the prioritisation of the identified gaps and the publication of an update report building on the two previous reports (SAND2016-2644 and JRC-2014-EUR26344). The output will assist the preparation of the scientific programme of the next International Conference on Hydrogen Safety (11-13 September 2017), and will be submitted to the FCH 2 JU as a contribution to planning future calls.
- The 4th International Workshop on Hydrogen Infrastructure and Transportation took place in Egmond aan Zee (NL) on May, 24th and 26th 2016. This workshop was organised by the European Commission's Joint Research Centre and supported by US DOE, NOW from Germany and NEDO from Japan, with the aim at guiding and supporting industry to accelerate and facilitate the roll-out and commercialization of hydrogen refuelling stations around the globe. Discussion topics included re-fuelling, H2 quality and metering, as well as utilization experiences of Hydrogen Refuelling Stations (HRSs).

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

- Preparation of the FCH 2 JU's 2017 Call for proposals is currently under elaboration, with a tentative budget of €125M. The Call will be launched in January 2017 and it is expected to include topics that would benefit from broader international cooperation (outside Europe). IPHE country organizations and firms are encouraged to review the Call and partner with EU entities on proposals where appropriate.



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### Summary Country Update November 2017: EC

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
Fuel Cell Vehicles <sup>1</sup>	No target	Some 1800 (through FCH JU)	<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo projects</li> </ul>	<ul style="list-style-type: none"> <li>Subsidy per vehicle in demo projects</li> </ul>
FC Bus	No target	67 (through FCH JU)	<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo projects</li> </ul>	<ul style="list-style-type: none"> <li>Subsidy per vehicle in demo projects</li> </ul>
Fuel Cell Trucks <sup>2</sup>	No target		<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo projects. As of today marginal activity in this area</li> </ul>	<ul style="list-style-type: none"> <li>Subsidy per vehicle in demo projects</li> </ul>
Forklift	No target		<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo projects</li> </ul>	<ul style="list-style-type: none"> <li>Subsidy per vehicle in demo projects</li> </ul>
H <sub>2</sub> Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
70 MPa On-Site Production	No target	FCH JU support in total 62 HRs	<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo projects</li> </ul>	<ul style="list-style-type: none"> <li>Fixed amount of subsidy per HRS installation</li> </ul>
70 MPa Delivered	No target		<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo projects</li> </ul>	<ul style="list-style-type: none"> <li>Fixed amount of subsidy per HRS installation</li> </ul>
35 MPa On-Site Production	No target		<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo projects</li> </ul>	<ul style="list-style-type: none"> <li>Fixed amount of subsidy per HRS installation</li> </ul>
35 MPa	No target		<ul style="list-style-type: none"> <li>Addressed through FCH 2 JU Demo</li> </ul>	<ul style="list-style-type: none"> <li>Fixed amount of subsidy per HRS</li> </ul>

<sup>1</sup> Includes Fuel Cell Electric Vehicles with Range Extenders

<sup>2</sup> As above



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Delivered			projects	installation
Stationary	Target Number <sup>3</sup>	Current Status	Partnerships, Strategic Approach	Policy Support
Small <sup>4</sup>	No target		• Medium-scale deployment through FCH 2 JU demo project	• Fixed amount of subsidy per unit
Medium <sup>5</sup>	No target		• Small-scale demo projects via FCH 2 JU	• Funding dependent on power level
Large <sup>6</sup>	No target		• Small-scale demo projects via FCH 2 JU	• Funding dependent on power level
District Grid <sup>7</sup>	No target			
Regional Grid <sup>8</sup>	No target			
Telecom backup	No target			
H <sub>2</sub> Production	Target <sup>9</sup>	Current Status	Partnerships, Strategic Approach	Policy Support
Fossil Fuels <sup>10</sup>	No target			
Alkaline	No target			

<sup>3</sup> Targets can be units installed and/or total installed capacity in the size range indicated

<sup>4</sup> 0.3 kW – 4.9 kW (e.g., Residential Use)

<sup>5</sup> 5kW – 299kW (e.g., Distributed Residential Use)

<sup>6</sup> 0.3MW – 0.9MW (e.g., Industrial Use)

<sup>7</sup> 1MW – 29MW (e.g., Grid Stability, Ancillary Services)

<sup>8</sup> 30MW plus (e.g., Grid Storage and Systems Management)

<sup>9</sup> Target can be by quantity (Nm<sup>3</sup>, kg, t), by percentage of total production, efficiency capabilities \*\*\*

<sup>10</sup> Hydrogen produced by reforming processes



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Electrolysis				
PEM Electrolysis	No target			
By-product H <sub>2</sub>	No target			
<b>Energy Storage from Renewables</b>	<b>Target<sup>11</sup></b>	<b>Current Status</b>	<b>Partnership, Strategic Approach</b>	<b>Policy Support</b>
Power to Power <sup>12</sup> Capacity	No target			
Power to Gas <sup>13</sup> Capacity	No target			

<sup>11</sup> Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation and MWh of stored energy equivalence \*\*\*

<sup>12</sup> Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity \*\*\*

<sup>13</sup> Operator has the opportunity to provide the stored energy in the form of hydrogen to back to the energy system through multiple channels (e.g., merchant product, transportation, heating, electricity) \*\*\*