WORKING IN PARTNERSHIP WITH THE REGIONS TO DEVELOP THE HYDROGEN ECONOMY

The origin of Hydrogen Regions

Support for research and Innovation under the first FCH Joint Undertaking (2008-2013) was essential for the development of fuel cells and hydrogen-based applications. As these technologies matured, the FCH 2 JU (2014-2020) started to support the demonstration of energy and transport applications at large scale (fleets of buses, domestic heat and power systems, garbage trucks, etc). In parallel, hydrogen production technologies, and particularly the production of hydrogen through the electrolysis of water using renewable electricity, advanced significantly, with production capacities increasing in the last 10 years from several hundred kW to multi-MW scale plants.

The JU decided, in 2017, to support regions across Europe in assessing the business cases for fuel cell and hydrogen applications and in mapping their local capabilities so that they can be exploited in the future and launched the FCH-Regions Initiative in 2017. The initiative attracted 89 European regions and cities from 22 European countries which were actively working to shape their green energy transitions with hydrogen and fuel cells.

As part of the initiative, the study on Fuel cells and hydrogen for green energy in European cities and regions[1], published in 2018, identified project implementation intentions of more than € 1.8 billion over a 5-year period. Since then, the JU has been working closely with regions to realise this potential, while continuing to support R&I to improve the performance and reduce the cost of clean hydrogen technologies across the whole value chain.

Building on the momentum the FCH-Regions Initiative created, in May 2019, the European Hydrogen Valleys Partnership[2] (EHV-S3P) under the Smart Specialisation Platform was created. The EHV-S3P aims at facilitating exchanges of knowledge and practices between regions, strengthening the European hydrogen value chain and promoting the concept of hydrogen valleys.

Project development assistance

Following the FCH-Regions Initiative, the JU launched in 2019, a pilot project development assistance (PDA) facility[3] to help develop detailed project planning in regions and cities with a lower maturity level, with a special focus on central and eastern Europe. The PDA initiative supported 11 selected regions to develop detailed work plans for the implementation of hydrogen projects. It concluded in June 2021.

The final report covering the results of this initiative was presented in a webinar on 19 October 2021, with the participation of some of the regions involved and representatives from the European Commission and the European Investment

[1] www.clean-hydrogen.europa.eu/system/files/2018-12/181123_FCHJU_Regions_Cities_Final_Report_FINAL.pdf

[2] European Hydrogen Valleys Partnership

[3] https://www.clean-hydrogen.europa.eu/get-involved/regions-hub/clean-hydrogen-ju-pda-regions_en

Bank. The report contains summaries of the project plans and work undertaken in each of the selected regions, the activities delivered as part of the observer network, and the next steps after the end of the PDA support period. The pilot PDA for hydrogen in regions sets the path for further such initiatives, targeting regions that are not yet involved in the development of hydrogen projects and could make use of the encompassing advantages of hydrogen as a green energy carrier to ensure local, sustainable, and integrated energy solutions.

Building on the success of the pilot PDA initiative, the Project Development Assistance (PDA) for Regions II was launched in 2022[4] , with a clear focus on EU Cohesion Countries, European islands and Outermost Regions. In January 2023, 14 regions from a total of nine different countries were selected to receive support in the framework of this initiative. The projects proposed by the regions cover a wide range of hydrogen applications, from hydrogen buses in the cities to ferries that connect island communities as well as industrial applications such as glass manufacturing. The selected regions have received targeted support from dedicated teams of hydrogen consultants, thus allowing to further develop their project plans and advancing the deployment of fuel cell and hydrogen technology in areas that have seen limited hydrogen deployments to-date.

REPowerEU with Hydrogen Valleys

Hydrogen Valleys are hydrogen ecosystems that cover a specific geography ranging from local or regional focus (e.g. industrial cluster, ports, airports, etc.) to specific national or international regions (e.g. cross border hydrogen corridors)[190]. Hydrogen Valleys showcase the versatility of hydrogen by supplying several sectors in their geography such as mobility, industry and energy end uses. They are ecosystems or clusters where various final applications share a common hydrogen supply infrastructure. Across their geographic scope, Hydrogen Valleys cover multiple steps in the hydrogen value chain, ranging from hydrogen production (and often even dedicated renewables production) to the subsequent storage of hydrogen and distribution to off-takers via various modes of transport.

Since 2015, when the JU launched a call to support a first Hydrogen Valley (referred to then as a Hydrogen Territory), the hydrogen valley concept gained traction among the hydrogen community. Projects such as BIG HIT (2015 Call), HEAVENN (2019 Call) and Green Hysland (2020 Call) have become pioneers and flagships of this concept.

Building on the above activities and following the European Strategy for Hydrogen adopted in July 2020, the European Commission announced in May 2022, in its communication "REPowerEU Plan", an additional investment of €200 million available for the Clean Hydrogen Partnership through the Horizon Europe Programme. The funds aim at helping to double the number of Hydrogen Valleys in Europe and thus accelerating the implementation of the hydrogen economy across the EU. REPowerEU is the EU's plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition. Renewable hydrogen will be key to replace natural gas, coal and oil in hard-

[4] https://www.clean-hydrogen.europa.eu/media/news/15-european-regions-will-receive-project-development-assistance-2023-01-15_en

[190] https://h2v.eu/media/7/download

to-decarbonise industries and transport. Among others, REPowerEU sets a target of 10 million tonnes of domestic renewable hydrogen production and 10 million tonnes of renewable hydrogen imports by 2030. Following the Calls 2022 and 2023, the Clean Hydrogen Partnership signed grants with 13 new Hydrogen Valley projects across Europe.

Altogether, the Clean Hydrogen JU has supported to date 16 hydrogen valleys projects across 15 European countries, out of which 15 projects are still ongoing. Together they represent an investment of more than €1 billion, with a total funding from the JU of close to €200 million.

Synergies with Members States and Regions

With the above in mind, and in view of setting up a more structured cooperation mechanism between the JU and Managing Authorities of Member States and Regions, the JU awarded a contract to identify and design a structured approach to generate and implement synergies on research and innovation activities between the Clean Hydrogen JU and managing authorities of Member States and Regions.

In 2023, after an exercise to understand the state of the art on the Hydrogen R&I policies of the Member States and third countries associated with Horizon Europe[5], a Call for Expression of Interest was launched to select 10 regional or national Managing Authorities (MA) to foster a structured cooperation with the JU tailored to the needs of each MA. A meeting with the selected MAs took place in 2023. Following this, the work to develop the Memoranda of Cooperation (MoC) started. The signing of the Memoranda is planned for Q2 2024.

Mission Innovation - Clean Hydrogen

In parallel to the above, the global 'Clean Hydrogen Mission' led by European Union, Australia, Chile, the UK and the US aims to make clean hydrogen cost competitive to the end user by reducing end-to-end costs to USD $2 per kilogram by 2030. To achieve this goal, the Mission will increase research and development in hydrogen technologies to deliver at least 100 large-scale clean Hydrogen Valleys, and at least three per Mission Innovation Member. To support this, the JU released in 2021, the Hydrogen Valley Platform[6] (H2VP) under the umbrella of Mission Innovation's 'Renewable and clean hydrogen' innovation challenge. It targets primarily project promoters, but it is also raising awareness among policymakers and aims to inspire others looking to develop similar projects.

When the platform was launched, in January, 2021, it included 34 Hydrogen Valleys. A new tender was launched (December 2021) to give continuity to the Hydrogen Valley Platform and contribute to the European Commission's role under the renewed Mission Innovation 2.0. As a result, the H2.0 Valley Platform was launched. Currently, the platform includes more than 90 Hydrogen Valleys at different stages of development out of which around 60 are in Europe. These comprise a total investment volume of more than €152 billion covering 34 countries worldwide. Whilst the above represents an increase in the number of hydrogen valleys projects in recent years, those that have made it to Final Investment Decision (FID) is still limited. Evidence gathered from the H2V platform (and through the latest JU Calls for Proposals on Hydrogen Valleys)

[5] https://www.clean-hydrogen.europa.eu/media/publications/generate-synergies-member-states-and-regions-assessment-hydrogen-policies-and-funding-strategies_en

[6] https://h2v.eu/

highlighted that many of these hydrogen valleys would benefit from receiving dedicated support to help mature their projects towards FID.

To address the above, the Annual Work Programme 2024 of the Clean Hydrogen JU foresees the launch of a call for tenders for a “Hydrogen Valleys Facility” aiming at accelerating the number of hydrogen valleys in Europe by continuing to provide technical, financial and legal support through dedicated Project Development Assistance (PDA) to project promoters (both public and private entities) in the preparation of their hydrogen valleys projects.