

## Meeting Minutes

# Mission Innovation IC#8 “Hydrogen Valleys” workshop

Port of Antwerp 26-27 March 2019



Photo credit to Bernard Frois

The members and stakeholders of Mission Innovation Hydrogen Challenge (IC#8) gathered in Antwerp on 26<sup>th</sup> and 27<sup>th</sup> March to discuss the concept of « Hydrogen Valleys » as a blueprint for scaling-up the sustainable hydrogen market.

The timing for this debate was perfect as significant interest is materialising globally around the potential of hydrogen to become one of the principal building blocks of a low-carbon economy.

The second objective of the workshop was to finalise the work plan of IC#8 based on the results of the country survey launched in December 2018.

The workshop gathered more than 80 participants representing governments, industry and research community from 18 countries and jurisdictions including Australia, Austria, Belgium, Chile, China, European Union, France, Germany, India, Italy, Japan, Netherlands, Spain, United Arab Emirates, United Kingdom and the USA.

### Part I – “Hydrogen Valleys”

A “Hydrogen Valley” is a geographical area – a city, a region, an island or an industrial cluster - where several hydrogen applications are combined together into an integrated hydrogen ecosystem that consumes a significant amount of hydrogen, improving the economics behind the project. It should ideally cover the entire hydrogen value chain: production, storage, distribution and final use. As such, “Hydrogen Valleys” offer a pathway for scaling up the hydrogen sector.

“Hydrogen Valleys” are also extremely relevant for showcasing to decision makers and to the public the unique value hydrogen offers in the broader energy system context. This is important, as although many demonstration projects have successfully shown the

Commission européenne/Europese Commissie, 1049 Bruxelles/Brussel, BELGIQUE/BELGIË - Tel. +32 22991111  
Contact point: Katarzyna Drabicka - CDMA 03/074- Tel. direct line +32 229-63999

Katarzyna.drabicka@ec.europa.eu

maturity and benefits of individual hydrogen technologies, typically either in isolation or in a limited size, the potential of hydrogen as a systemic solution has not yet been showcased at scale, but is absolutely necessary to build confidence and trigger political change. While the first projects start to emerge or are in the planning phase, they are still highly dispersed and typically not very well known. The IC#8 Antwerp workshop aimed at bringing these initiatives together to assess their level of advancement, increase their visibility and define actions that could accelerate delivery and facilitate replication.

Fourteen case studies were presented from major jurisdictions investing in hydrogen – twelve from Mission Innovation members (Australia, Austria, Chile, China, EU, France, Germany, Italy, Japan, Netherlands, UK and US) with an additional input from the Port of Antwerp and Hydrogen Council. The projects were very diverse in terms of underlying drivers and scope, fully visualising the versatility and flexibility of hydrogen technologies. The most frequently quoted drivers that triggered the development of projects included environmental concerns (GHG/pollution reduction), availability of cheap and abundant renewables as a basis for future hydrogen exports, avoidance of renewables' curtailment as well as the drive to strengthen the industrial fabric in the region/country and improve the energy security. The locations where projects are deployed were equally diverse and ranged from industrial clusters, cities, regions, through ports, mining sites, islands up to knowledge driven communities.

The participants discussed the emerging lessons learnt and critical factors for successful delivery of these complex projects. The conclusion was that there is no "one size fits all" when it comes to "Hydrogen Valleys" and replication is not straightforward. Different countries have different circumstances when it comes to their economic, geopolitical and environmental situation and the available infrastructure base. The transition to a hydrogen economy requires therefore different answers depending on location. The conclusions also pointed towards the absolute importance of leveraging partnerships to establish committed consortia and share risks efficiently among various stakeholders, both public and private. The need to properly address the social dimension, i.e. to communicate the technology benefits, to engage and familiarise the local population and to ensure labour force acceptance, was also highlighted in many instances. "Hydrogen Valleys" are also uniquely placed to promote and strengthen the links between industry and research community, facilitate technology transfer, but also training, skills and human resources development.

Overall, the workshop confirmed that although projects are very specific to local circumstances, there is considerable benefit in and readiness to exchange experiences. Therefore, the participants agreed to share best practises and learnings to validate and de-risk the technology and to facilitate the emergence of new integrated hydrogen projects. Potential areas for cooperation that were identified in the course of the workshop include business and replication models, regulatory obstacles, permitting and certification, standards, technology assessments/evaluation (environmental, societal impacts etc.), mapping of the major existing and planned R&D activities in areas most relevant for "Hydrogen Valleys", identification of common R&D challenges etc.

Building on the workshop, the Hydrogen Challenge will now work on establishing of a dedicated information-sharing platform to leverage, consolidate and disseminate the existing knowledge and support building global alliances around "Hydrogen Valleys". The platform will initially be financed by the European Union through [the Fuel Cells and Hydrogen Joint Undertaking](#). The plan is to have it launched in the second half of 2019.

## **Part II – finalisation of the work-plan (IC#8 member-only session)**

In a closed session at the end of Day 2 the IC#8 members discussed the finalisation of the Challenge's work-plan. Australia outlined the results of the member survey, followed by presentations by IC#8 members on their respective international R&D priorities and views on potential collaborations in the context of the Challenge.

Considering the limited duration of Mission Innovation and also resource constraints, Hydrogen Challenge members had decided to identify a limited number of well-defined focus areas where global R&I effort is likely to generate most added-value and to identify actions that will have maximum impact in the short term. Based on the results of the members' survey that was launched in December 2018 three priority areas have been identified:

- 1) Demonstrate technology at scale and share learning (“Hydrogen Valleys”; Demonstrate that hydrogen technologies work at Scale, Best practice exchange and replication)
- 2) Heavy Duty (Road/Off-road) Transport Applications
- 3) Hydrogen Admixture into Natural Gas Networks

### Top 3 Focus Areas based on survey responses

Workshop Issue	Australia	Canada	China	EU	France	Germany	India	Italy	Japan	Netherlands	Saudi Arabia	UK	USA	Ranking
Turbines (hydrogen; ammonia)														
Admixture into natural gas networks														3
Maritime applications														
Road transport applications (heavy duty)														2
Chemical feedstocks														
Industrial processes														
Increasing the TRL of liquid hydrogen														
Scaling up of technologies for liquefied hydrogen storage and transport														
Suitable carriers for global hydrogen market and associated dehydrogenation														
Increase operating pressures for subsea pipe lines														
Increased pressure for bulk transportation														
R&D to support harmonisation of regulations for moving hydrogen around internationally														
New materials for low temperature bulk transport (below -253 degrees C)														
Demonstrate that H2 technologies work at scale														1
Hydrogen Valleys (Precincts)														1
Best practice exchange and replication														1
Technologies for safety and social acceptance														
Low pressure storage														
Technologies for safe use of 100% hydrogen														
Quality and purity limitations for hydrogen use														

High
Med
Low
n/a

It was decided that these three priority areas will form the backbone of IC#8's work-plan and will constitute the operational work streams. The Demonstration at Scale and Information Sharing will be addressed by the “Hydrogen Valleys” and the associated information-sharing platform led by the EU. Germany volunteered to (Co-)Lead the – work stream on Hydrogen Admixture in the Natural Gas Grid. Follow-up is necessary to identify the leader(s) of the Heavy Duty Road/Off-Road Transport Applications work stream and countries are invited to express their interest to Australia, EU and Germany.

Australia also noted enabling global markets is a key objective of the Hydrogen Challenge and that it will continue to explore work around hydrogen carriers with the engagement of interested members.

In the next phase, under the leadership of the respective co-leads, the work streams will define their priorities by involving the specialist community as needed (researchers, academia, industry etc.). Pragmatic implementation solutions such as workshops, webinars and twinning of projects will be prioritised, keeping in mind the complexity behind joint or coordinated calls. Overall, the prerogative of IC#8 is not to impose international collaboration, but to create the right conditions for such collaborations to materialise between the members according to their specific needs and priorities.

## Visit of the Energy Observer



*Photo credit to Antoine Drancey, Energy Observer*

The workshop coincided with the stopover of the [Energy Observer](#) in the Port of Antwerp. Energy Observer is the first vessel in the world powered by hydrogen produced on-board from seawater and renewable electricity, without greenhouse gas emissions. The catamaran uses solar panels, wind turbines and a hydrogen fuel cell system for power provision. It relies on sun or wind during the day and taps into its hydrogen reservoirs at night. Energy Observer is sailing the globe for 6 years, visiting in total 50 countries and stopping in more than 100 ports to demonstrate that a future entirely based on renewables is possible and safe.

The participants of the workshop had an opportunity to tour the Energy Observer and to exchange with Victorien ERUSSARD, the captain of the vessel, and his crew.