Europe’s “Hydrogen Valleys” set blueprint for sustainable hydrogen market

Hydrogen is expected to become one of the building blocks of a low-carbon economy. Its use has recently gained momentum with multiple initiatives launched across the globe. Last fall, 28 European countries signed a “Hydrogen Initiative” calling for intensification of sustainable hydrogen research and innovation. Over 80 representatives from government, industry, and the research community met in Antwerp last March for a two-day workshop on “Hydrogen Valleys,” held by the Innovation Challenge 8: Renewable and Clean Hydrogen (IC8), a program of Europe’s Mission Innovation initiative. At the workshop, the concept of “Hydrogen Valleys” was discussed as a blueprint for scaling up the sustainable hydrogen market.

A “Hydrogen Valley” is a geographical area—a city, a region, an island, or an industrial cluster—where several hydrogen applications are combined 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 and making this technology a viable solution.

At the same time, “Hydrogen Valleys” are extremely important for showcasing, to decision makers and to the public, the unique value hydrogen offers in the broader energy system context through its sectorial integration capability. Although many demonstration projects have successfully shown the maturity and benefits of individual hydrogen technologies, typically either in isolation or in a limited size, the potential of hydrogen as an integrated systemic solution has not yet been proven at scale.

However, replication is not straightforward when it comes to “Hydrogen Valleys” as there is no “one size fits all” solution. Different countries have different circumstances, especially in terms of their economic, geopolitical, and environmental situations as well as the available infrastructure base. The transition to a hydrogen economy requires different answers depending on location. This is why the participants of the Hydrogen Innovation Challenge decided to share their experiences in order to de-risk and facilitate the emergence of new integrated hydrogen projects in support of their countries’ policy priorities.

At the Antwerp workshop, a number of case studies were presented, as were multiple project types from industry-driven clusters, to ports, communities and regions with abundant renewable energy or those under pressure to tackle air pollution issues, to mining sites or knowledge-driven communities. The workshop confirmed that although projects are very specific to local circumstances, there is room and readiness to exchange experiences, best practices, and lessons learned. Specific areas for cooperation include business models, regulatory obstacles, permits and certification, standards, technology assessments, and mapping of major existing and planned R&D projects in areas most relevant for “Hydrogen Valleys.”

As a follow-up, the IC8 members plan to next work on establishing an information-sharing platform. This platform will leverage, consolidate, and disseminate existing knowledge and support building of global alliances around “Hydrogen Valleys.” The EU will initially host and finance this platform through its Fuel Cells and Hydrogen Joint Undertaking program.