Hydrogen Europe

# Hydrogen Europe Position Paper

## REPowering the EU with Hydrogen Valleys (roadmap)

September 2023

# Hydrogen Europe's position paper to the European Commission's REPowering the EU with Hydrogen Valleys (roadmap)

**Key recommendations:**

- **Continuous efforts are needed to raise the awareness of Hydrogen Valleys across the EU, as well as "exporting" the concept globally**.
- **Guidance should be provided on the optimal locations** across the EU for the development of Hydrogen Valley projects, with efforts to interconnect them with other major hydrogen projects (e.g., PCI, PMI, TEN-E, TEN-T, EHB, IPCEIs) within the planification processes for the development of future infrastructure.
- **Simplification and finalization of the ongoing legislative process and increase of support for transposition of energy and climate laws in Member States**, through capacity building and support programmes for national and regional administrations, in order to avoid improper transposition and tightening of applicable rules within the national regulatory frameworks.
- **Simplification of processes and increase of flexibility for applicants in different funding sources**. To ensure that projects can receive the support required to leverage the necessary private investment to enable the deployment of Hydrogen Valleys across Europe, and the establishment of technical assistance on access of other sources of funding to allow for a combination of different funding mechanisms.
- Hydrogen Valley in combination with existing EU supported projects and the future Net Zero Academies provide the perfect environment to the development of hydrogen curricula for the needed workforce, therefore **targeted funding for skills development and stronger links between projects should be established**.

The European Commission is preparing a Roadmap on Hydrogen Valleys to outline the strategic framework to reach the REPowerEU's objective of doubling the number of Hydrogen Valleys in the European Union by 2025.

Hydrogen Europe is the trade association representing the entire hydrogen value-chain with more than 500 members, and one of the private parties of the Clean Hydrogen Partnership, the public-private partnership investing into research and development of innovative hydrogen technologies. The association welcomes the opportunity to continue to support the development of Hydrogen Valleys, as expressed in its commitment in the "Joint Declaration on Hydrogen Valleys - Moving the hydrogen economy from niche to scale", [1] signed together with the European Commission, Hydrogen Europe Research, and the S3 Hydrogen Valleys Partnership.

[1] https://www.clean-hydrogen.europa.eu/media/news/hydrogen-valleys-european-commission-signs-joint-declaration-european-stakeholders-boost-eu-hydrogen-2023-03-06_en

## DEFINITION OF H2 VALLEYS

Hydrogen Valleys are a European concept defined by the Clean Hydrogen Partnership as "geographic areas - a city, a region, an island or an industrial cluster - where several hydrogen applications, new and/or existing, are combined into an integrated hydrogen ecosystem that consumes a significant amount of hydrogen. Ideally, these projects should cover the entire value chain: production, storage, distribution, and multiple end-uses".[2] In the EU, existing Hydrogen Valleys differ based on the amount of clean hydrogen produced, the number of end-uses, or areas around which they are developed (i.e., cities, regions, islands, ports, industrial clusters, other). Many of them also have a cross-border component. However, what these projects have in common is the ability to demonstrate business cases for various uses of hydrogen as well as to contribute to the wider acceptance of hydrogen technologies.

In other words, Hydrogen Valleys are "mini-hydrogen ecosystems" with a strong potential to speed up the development of the hydrogen sector in the EU.

**Action points**

- Given the relevance of Hydrogen Valleys in building the hydrogen economy, **continuous efforts are required to raise the awareness of Hydrogen Valleys across the EU, as well as "exporting" the concept globally.**
- The Clean Hydrogen Partnership could play a strong role in promoting Hydrogen Valleys by bringing together those valleys which have received funding from this programme, **gathering their experience in the implementation of the projects, and sharing the learnings** with interested stakeholders.
- In doing so, **strengthening the cooperation with the S3 Hydrogen Valleys Partnership**,[3] which gathers European regions which already are Hydrogen Valleys or aspire to become one, **is also needed**.
- **Continues updates of the Mission Innovation Hydrogen Valley Platform**[4] are crucial to understanding the state of play of the deployment of these projects in the EU and globally. Having a better overview of the size and maturity of these projects, will inform the support needed from EU, national and regional level to speed up and scale up their implementation.

## DEPLOYMENT OF HYDROGEN VALLEYS

With Hydrogen Valleys blossoming across the EU, a more strategic approach to their deployment is needed. Ideally, Hydrogen Valleys should be deployed in areas where there is access to resources for producing hydrogen (i.e., renewable energy, waste, water, land) and close to large, multiple consumers to ensure demand for the hydrogen produced. They should be on or close to existing, repurposed, or planned hydrogen infrastructure (i.e., along the TEN-T, TEN-E and EHB). Hydrogen valleys can also have an important role in the development of import infrastructure, which will be needed to meet the REPowerEU import target of 10 Mt of green hydrogen.

A successful ramp-up of the hydrogen economy also needs to consider the development of the manufacturing value-chain to provide the necessary equipment to enable the hydrogen economy.

[2] https://www.clean-hydrogen.europa.eu/get-involved/mission-innovation-hydrogen-valleys-platform_en
[3] https://s3platform.jrc.ec.europa.eu/hydrogen-valleys
[4] https://h2v.eu/

Consequently, the importance of critical raw materials should be considered especially in the context of the Net Zero Industry Act and the Critical Raw Materials Act, which both emphasize the requirement of sustainable sourcing and supply, as well as of high recycling rates, therefore material thrifting and material efficiency should be also included in Hydrogen Valleys.

In light of this, Hydrogen Europe has developed a map showing, among others, the renewable energy potential in Europe, current and planned European Hydrogen Backbone (EHB) and network of hydrogen refuelling stations, as well as expected demand (for example location of refineries in Europe) with the aim of supporting policymakers and projects promoters in their plans for developing Hydrogen Valleys (Annex 1).

**Action points**

- To maximize the impact of Hydrogen Valleys to bring hydrogen technologies from "niche to scale", the **Clean Hydrogen Partnership partners** - the European Commission, industry, and research, in close cooperation with the European regions – **should provide guidance on the optimal locations across the EU for the development of such projects, considering local conditions, specificities and needs.**
- Furthermore, to facilitate the scale up and deployment of Hydrogen Valleys in the EU, **efforts need to be made to interconnect them with each other as well as other major hydrogen projects / funding instruments.** Therefore, synergies with PCI, PMI, TEN-E, TEN-T, EHB but also IPCEIs and other relevant projects should be established.
- To realise this, the **planification processes for the development of infrastructure across sectors would benefit from increased transparency and coordination** at local, national, and European levels in order to facilitate the connection between projects.
- **The existing EU initiatives to tackle the challenges associated with critical raw materials for the hydrogen ramp up should be better linked to the Hydrogen Valley initiatives**. Especially, the possibilities of funding embedded into these initiatives that could be made accessible to Hydrogen Valley projects to incentivise material efficiency.

Finally, considering the climate objectives in the 'Fit for 55' package, REPowerEU and Green Deal Industrial Plan, Hydrogen Valleys will trigger actions that immensely leverage every single euro invested by public authorities. This refers not only to a more sustainable energy system (given hydrogen can used for long-term storage of energy and feedstock) but also to increase our resilience. If placed in strategically valuable locations, Hydrogen Valleys can foster and connect local ecosystems and enable the off take of hydrogen technologies that would otherwise not be possible due to lack of demand or supply, or infrastructure. This will ultimately contribute to the interconnection between regions and the establishment of a European Hydrogen Backbone.

## REGULATORY FRAMEWORK

Hydrogen Valleys are bound by the European and national regulatory framework. Files including the Renewable Energy Directive, Alternative Fuels Infrastructure Regulation, Hydrogen and Decarbonised Gas Market package, revision of EU Emissions Trading Scheme all impact the design, capital intensity and feasibility of these projects. While the Net Zero Industrial Act will provide the needed support for the manufacturing of electrolyzes and fuel cells. Overall, having a clear and predictable regulatory framework will ensure a cost-effective and timely deployment of Hydrogen Valleys across the EU. As such, in the

continued development of the European regulatory framework, clarity and simplicity should be key priorities.

That said, the transposition of the adopted EU Directives and complementing Delegated Acts by Member States could lead to added complexity for the implementation of Hydrogen Valleys. This will be especially relevant at the local level, where public authorities will need to apply complex rules to new technological applications. Supporting national and regional administrations in effective transposition and interpretation of EU legislation will be of utmost priority to remove barriers for project development. As noted by the European Clean Hydrogen Alliance, project developers are expected to face challenging and long permitting procedures, due to various factors, including the lack of appropriate legal framework, little or no experience and/or technical capacity for hydrogen projects in public administration as well as lack of established procedures.[5] However, the experience with hydrogen permitting to a certain extend already exists. It has been carried out in the oil and gas and the chemicals sectors, where currently most of the consumption of hydrogen takes place. Exchange of experience and best-practices will be the most effective solution to develop the necessary capacity to facilitate the permitting process for hydrogen projects, whilst guaranteeing safety and sustainability.

A key aspect of this transposition will be the needed clarity regarding the implementation of the Delegated Acts under RED, which set the conditions under which hydrogen can be considered 'renewable', as they are key to the scaling up of hydrogen production and ensuring that the increased hydrogen demand is supported by the creation of new renewable electricity generation capacities. Furthermore, importance of the upcoming rules for low-carbon hydrogen will also impact the availability of hydrogen within regions.

In this context, it is also important to emphasise that another barrier faced by project developers concerns certification. The lack of a consistent approach to certification in relation to the different production pathways of hydrogen needs to be tackled, as transparent and consistent certification of hydrogen and its derivatives will be one of the bases for investment decisions.

**Action Points**

- **Simplification and finalization of the ongoing legislative process for all the files in the 'Fit for 55' and Hydrogen and Decarbonised Gas Market packages in a timely manner**, while keeping the ambition outlined in the REPowerEU Plan.
- On permitting, the European Commission has already put forward several initiatives as part of the Green Deal Industrial Plan and the Net Zero Industry Act with the aim of speeding up the process, including **setting up "one-stop shops" in Member States.** Implementation of the proposed activities will also have a positive impact on the roll-out of Hydrogen Valleys.
- To increase support for the transposition of energy and climate laws in Member States, the **European Commission should establish capacity building and support programmes for national and regional administrations**. These should take the form of bottom-up requests for training and knowledge sharing programs, modelled on an already existing Technical Support Instrument (TSI), providing tailor-made technical expertise to EU Member States to design and implement reforms.[6]

[5] https://single-market-economy.ec.europa.eu/industry/strategy/industrial-alliances/european-clean-hydrogen-alliance_en

[6] Technical Support Instrument (TSI)

- In the transposition of EU rules and regulations affecting the sector, **tightening of applicable rules within the national regulatory framework ought to be avoided,** as this can represent a significant barrier towards the establishment of a common European hydrogen market, therefore a holistic approach should be emphasised considering the impact of the different requirements for the successful establishment of Hydrogen Valley projects.
- **The European Commission together with Member States should facilitate the development of national and regional platforms, as well as an EU level informal network** (modelled on Madrid and Florence regulatory forums) aimed at exchanging best practices on permitting for hydrogen projects. Learnings from the more advanced Hydrogen Valleys should feed into the work of this platform.
- Considering the **necessary support for de-risking** of Hydrogen Valley projects to attract the necessary private finance, regulators need to **incentivize the use of industrial hydrogen** to reducing the cost gap.
- To accelerate permitting it is necessary to close the gap in permitting and authorization procedures for developing and implementing projects. Therefore, **more agile processes are needed, as well-designed policies and permitting procedures will enable faster deployment of projects**.
- To facilitate the deployment of projects, the development of **internationally harmonized certification, codes and standards related to hydrogen,** its production, distribution, and use, must be a priority.

**FUNDING AND FINANCING OF HYDROGEN VALLEYS**

The research and innovation joint public and private funding programmes for hydrogen technologies were instrumental in moving the hydrogen technologies from labs to real life applications. The Fuel Cells and Hydrogen Joint Undertaking 2 has supported the development of the first Hydrogen Valleys in the EU with €35 million investment, while the current Clean Hydrogen Partnership has already allocated around €100 million to 9 valleys across the EU, with more planned in the next couple of years as part of the regular programme and combined with an extra €200 million from REPowerEU.

While the support from the Clean Hydrogen Partnership is instrumental for getting these projects off the ground, accessing **other EU, national and regional public funding as well as leveraging private investment is key for the success and continuity of Hydrogen Valleys.** As the support available through the partnership is limited in scope with co-funding rates of 20-30% for projects that can require more than €100 million of investment, project promoters need to closely monitor the labyrinthine funding landscape to cover the remaining 70-80% of the project costs.

Therefore, to achieve the deployment necessary of Hydrogen Valley projects while also increasing their scale to develop the European hydrogen economy, several actions are necessary to bring transparency and simplicity to funding. A first low-cost action field is to increase the awareness of accessible funding to project developers, be it from other European, national or regional sources through the development of technical assistance. This must be followed by the simplification of project applications to facilitate the blending of different funding streams, as well as private financing. All of this will increase the viability and ambition of Hydrogen Valley projects, therefore making them more attractive to private investors. These actions are especially pertinent considering the global importance of Hydrogen Valley projects and the support made available to them in other jurisdictions, such as the $8 billion provided under the US

Bipartisan Infrastructure Law for the establishment of six to ten such projects (making available from $800 million to $1.3 billion per project, depending on the number of projects).

**Action points**

- It is important to **simplify processes and provide flexibility for applicants to ensure that the projects can be designed according to the local needs and can access different sources of funding**.
- **Establishment of technical assistance on access of other sources of funding to allow for a combination of different funding mechanisms** (funding and financing blending) to ensure that project developers for Hydrogen Valleys can develop more ambitious projects and receive support for different aspects of the value-chain requiring targeted support which depend on local conditions.
- The Clean Hydrogen Partnership is offering targeted support for Hydrogen Valleys at EU level. However, several Member States are also allocating funding from the Recovery and Resilience Facility for the development of similar projects, for example Spain and Italy. The **European Commission, in close cooperation with Member States should align on the main conditions linked to funding of Hydrogen Valleys to ensure a quick roll-out of such projects while** minimizing the administrative burden.
- **More phased approach to the support of Hydrogen Valleys is also needed**. In other words, EU funding support (via Clean Hydrogen Partnership) should target different phases of project development – from project conception (feasibility studies, business case preparation and consortia building) to investments into the scale up of production, roll-out of infrastructure and end-uses.
- These activities could be addressed in the future **Hydrogen Valleys Accelerator** (established as part of the EU Hydrogen Funding Compass[7] which is the online guide for stakeholders to identify public funding sources for hydrogen projects). **Mapping of relevant funding for these projects and hydrogen technologies** in general, as well as providing guidance on blending different public and private funding streams **should ensure a better understanding of the funding environment for Hydrogen Valleys**. An awareness raising campaign regarding this tool is also needed to increase the quality of the data included, and to lead to an increased use.
- **Transfer of experience from more mature Hydrogen Valleys towards those regions, clusters, or hubs with which to set up these projects, can be ensured with designated events and workshops** taking place in Brussels and in Member States, and organized in close cooperation with the Clean Hydrogen and S3 H2 Valleys Partnership.

**CAPACITY BUILDING & SKILLS**

Hydrogen Valleys are complex ecosystems involving new (and hybridisation/intertwining of) technologies, requiring a qualified workforce in several areas: safety, engineering, project development, to name a few. They offer insights into understanding the immediate and future skills and occupational needs of the entire sector while also providing a perfect setting for the implementation of the developed training programmes. Therefore, stronger cooperation between Hydrogen Valleys and ongoing EU funded programs, such as GreenSKills4H2 (an ERASMUS + Blueprint project mapping skills trends and needs and is developing a training programme for VET) as well as the future European Hydrogen Academy

[7] https://single-market-economy.ec.europa.eu/industry/strategy/hydrogen_en

and the Net-Zero Industry Academies is needed to speed up the upskilling of workers involved in these projects, but also to adjust the developed programs based on their experience.

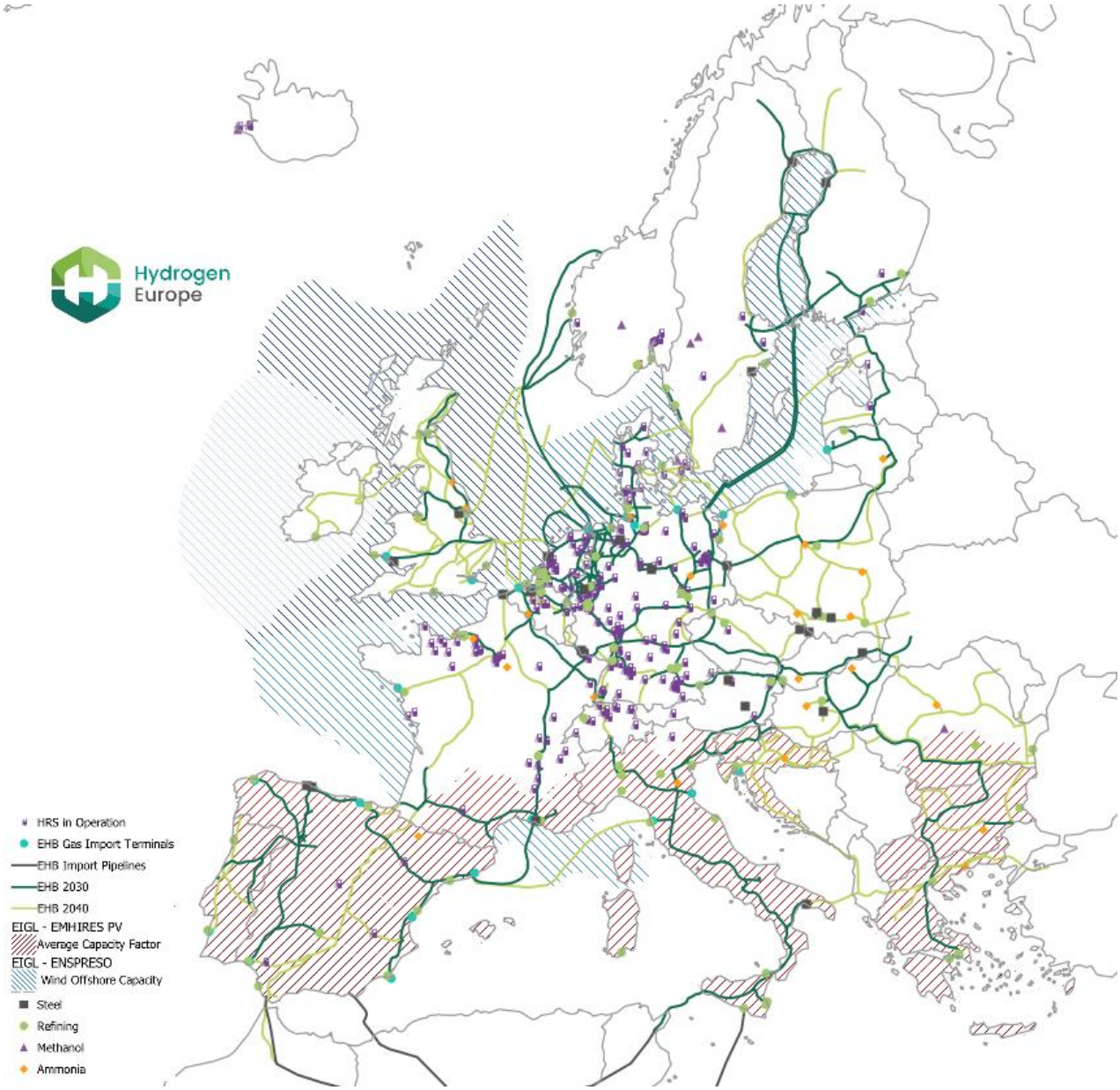
It is also **vital that "no one is left behind"**. Given the role of regional administration in the development and implementation of Hydrogen Valleys, continuous dissemination of learnings and good practices needs to continue to ensure the development of these projects in less developed regions. Moreover, regional authorities need to be supported in their investments in human capital to develop the capacity, expertise, and resources so that Hydrogen Valleys can be developed. This includes ensuring sufficient personnel to enable proper communication of applicable rules, support for developers in their project applications and the proper processing of their applications. To achieve this, adequate training of civil servants to enable them to carry out the functions above, will be key. This could be done via the existing platforms such as the S3 H2 Valleys Partnership or via the Project Development Assistance provided by the Clean Hydrogen Partnership for less advanced regions.

Finally, while hydrogen technologies are not new, there is still lack of information, or even misinformation about them present in the public. Lack of public acceptance of hydrogen technologies can greatly impede their development and deployment, more so as they represent bottom-up, localised ecosystems. Therefore, awareness and education campaigns for better understanding of hydrogen technologies and their benefits for local sustainability, social inclusion, competitiveness and energy resilience are needed on regional, national and EU level.

**Action points**

- Hydrogen Valleys provide a perfect environment to test hydrogen curricula – general as well as specialized technical knowledge. Therefore, **targeted funding for skills could be allocated from the Clean Hydrogen Partnership.**
- Several EU supported projects, such as GreenSkills4H2, are already developing training programs for VET students. **Stronger links between** these and similar **projects should be established**, by among others, organizing "training the trainer" programs with the Hydrogen Valleys consortia to ensure the dissemination of the developed hydrogen curricula.
- Representatives of the Hydrogen Valleys projects should also engage with the **future European Hydrogen Academy**, aimed at developing and deploying training programs on hydrogen across Europe.
- Tackling the issue of lack of skilled personnel will be key to develop hydrogen projects such as Hydrogen Valleys**,** therefore **the development of a sufficient skilled workforce within the relevant local and national should be a priority** to enable adequate support for project developers, as well as sufficient capacity to process applications.
- Considering the existing expertise in the Oil and Gas and Chemical sectors, **public and private stakeholders' collaboration is key for a successful development of Hydrogen Valleys**. Public institutional support as part of the engagement with stakeholders is crucial to foster cooperation and exchange of knowledge between local actors, such as industry, public authorities, research centres and other stakeholders.
- To increase public acceptance of these projects, the **Clean Hydrogen Partnership should develop an awareness program on the benefits of Hydrogen Valleys for the local population**, addressing the issues of safety, climate benefits and job creation and social inclusion.

**Annex I:**




**Disclaimer:** European Hydrogen Backbone maps contain visionary data and the maps do not represent concrete planned projects. The EHB map contains a snapshot and are up to change, the latest version can be found on the EHB website https://ehb.eu/

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