Evidence of Achievements of the Clean Hydrogen Partnership

1. Clean Hydrogen Partnership is aligned with the current strategic vision of the EU, including Horizon Europe

The Clean Hydrogen Partnership **has played a pivotal role in establishing clean hydrogen and related technologies as a strategic priority for the European Union,** supporting the transition towards climate neutrality while strengthening Europe's energy security, industrial competitiveness, and technological leadership. It has consequently led to the launch of a European Hydrogen Strategy in 2020 and related policy initiatives.

Through **sustained investment in research and innovation (R&I) since 2008**, the Clean Hydrogen Partnership has helped **transform hydrogen technologies from early-stage research into commercially viable solutions**, creating a continuous innovation pipeline from fundamental research to demonstration and market deployment.

Therefore, **Clean Hydrogen Partnership has evolved with, fed into and shaped EU priorities and policies, such as the Hydrogen Strategy, REPowerEU, the Net-Zero Industry Act, the Clean Industrial Deal and the Competitiveness Compass.**

All these were confirmed in 2020 by the independent experts' evaluation identifying **the JU as the best option to deliver the highest scientific and economic impact**, achieved by significantly increasing collaboration, bolstering EU industry (especially SMEs), therefore **contributing most to maintaining EU's leading position.**

The same experts have also concluded that **the Clean Hydrogen Partnership has been instrumental in eliminating the fragmentation that previously existed in EU support for fuel cell and hydrogen technologies that was dispersed between several support programmes.** In particular, the Partnership and its predecessors have provided a common ground for interaction between beneficiaries of national, regional and European projects, effectively contributing to overcoming the fragmentation of the sector and reinforcing.

Alignment with and contribution of the Clean Hydrogen Partnership (Clean Hydrogen Joint Undertaking - JU) activities to EU strategic agenda, challenges and policies

Due to its multiple potential uses, hydrogen is expected to play a key role in a future climate-neutral economy, enabling emission-free transport, heating, and industrial processes, as well as inter-seasonal energy storage. Therefore, the Clean Hydrogen Partnership directly supports the implementation of the **European Green Deal**, the resulting **European Climate Law**, and its **Fit for 55** legislative package by accelerating the development of clean hydrogen technologies needed to achieve the EU's climate-neutrality target by 2050 and the intermediate 2030 emissions-reduction targets.

As the EU's hydrogen objectives materialised in the 2020 **Hydrogen Strategy**, a document largely shaped by the Clean Hydrogen Partnership's results and feedback to policy, the JU became a key enabler, helping to

reduce costs, improve performance, and scale up hydrogen production, infrastructure, and end-use applications, particularly in hard-to-abate sectors where electrification alone is insufficient.

The JU also contributes to the implementation of the **Net-Zero Industry Act**, the **Critical Raw Materials Act**, and the Strategic Technologies for Europe Platform (**STEP**) by supporting innovation, manufacturing capacity, sustainability, and industrial resilience across the hydrogen value chain, and by focusing on developing a skilled workforce.

More recently, the JU's activities have become increasingly aligned with the objectives of the **Competitiveness Compass** and the **Clean Industrial Deal**, which recognise hydrogen as a strategic technology for decarbonising hard-to-abate sectors while strengthening Europe's industrial competitiveness. Through its public-private partnership model, the JU helps bridge the gap between research and market deployment, supporting European technology leadership. The results of the JU's programme have enabled investment initiatives such as the EU Hydrogen Bank and Hydrogen IPCEIs.

To ensure that its research and innovation investments remain relevant, impactful and capable of supporting both Europe's decarbonisation and competitiveness objectives, **the JU guides the implementation of its programme under the current Multiannual Financial Framework (MFF) by a Strategy Map as part of its Strategic Research and Innovation Agenda (SRIA)**. The Strategy Map translates the JU's broad objectives into more specific goals, making it easier to identify the actions needed throughout its lifetime. It shows how the JU's resources and activities contribute to concrete results and specific objectives, ultimately contributing to the European Union's broader policy objectives, particularly those related to climate action, clean energy, and sustainable growth.

The SRIA is revised as necessary, to account for changes in EU policy priorities. An example is the SRIA amendment that was adopted in June 2024. Equally important, the Clean Hydrogen JU is also a key instrument to implement the changing landscape of EU policy priorities. For example, following the publication in May 2022 of REPowerEU, the European Commission's strategic plan to rapidly phase out the EU's dependence on Russian fossil fuels and accelerate the green transition, the JU received an additional EUR 200 million for doubling the number of Hydrogen Valleys in the EU by 2025. The valleys have therefore been recognised as one of the main instruments for building a European wide hydrogen economy and supporting Europe's ambition to strengthen energy security while reducing dependence on fossil fuels.

The multi-annual budget of the Clean Hydrogen Partnership is implemented via Annual Work Programmes and Call for proposals, drafted with the SRIA objectives in mind and including specific targets and KPIs aligned with EU policies, Horizon Europe priorities, and the JU's general and specific objectives.

This role of the JU is further balanced by the JU's governance model, which ensures strong alignment with EU priorities while benefiting from the expertise of industry and research stakeholders. The European Commission holds 50% of the voting rights in the Governing Board, and no member can take decisions unilaterally, ensuring full oversight and strategic control by the Commission. At the same time, the industry and research groupings provide direct input from the sectors responsible for developing and deploying hydrogen technologies. This balanced public-private governance structure allows the JU to remain closely connected to technological, market and industrial developments while safeguarding alignment with EU policy objectives. To ensure responsiveness to a rapidly evolving policy and market environment, the Programme Office provides monthly briefings to the Governing Board, convenes an additional formal annual meeting beyond statutory requirements, and systematically incorporates emerging developments into decision-making processes and meeting preparations. This enables the JU to adapt its activities swiftly while maintaining transparency, accountability and strategic coherence.

In addition, the impact of the achievements of the JU have been confirmed and appreciated by the different independent evaluations as summarised below:

The activities of the JU were rated by the **Independents Experts Report** for the impact assessment for Institutionalised European Partnerships under Horizon Europe (2020) as "the best option to deliver the highest

scientific and economic impact, achieved by significantly increasing collaboration, bolstering EU industry (especially SMEs), therefore contributing most to maintaining EU's leading position".

It was also concluded that a partnership such as the Clean Hydrogen JU would be the most efficient support for the building of hydrogen ecosystems, by providing support to regional and local authorities, more adequately select projects, challenge the industries that might remain conservative and provide coordination capacities to bring together all stakeholders along the whole value chain. Furthermore, the impact assessment indicates that the result of the R&I activities of the JU would likely lead to new potential applications and to allow the EU to maintain the role it currently plays as a leading global hub for hydrogen research and innovation. This would have a direct impact on EU's leading research institutions and innovative SMEs which will be primarily affected by these impacts in the short and long term.

More recently, the 2024 **Clean Hydrogen Partnership Interim Evaluation Report** highlighted that the Clean Hydrogen JU and its predecessors have been effective with regards to multiple objectives. In particular, the activities of both Partnerships were highly relevant to the challenges faced by Europe such as climate change, climate neutrality, energy security and energy transition. The Report concluded that **Clean Hydrogen JU's objectives are relevant to the EU Hydrogen Strategy and to the European Green Deal, as it provides support across the whole value chain in an integrated and coherent manner, including Renewable Hydrogen Production, Hydrogen storage and distribution and Hydrogen end uses**.

The Report has also emphasised that a critical achievement of the JU was eliminating the fragmentation that previously existed in EU support for FCH technologies that had been dispersed between several support programmes. The FCH JUs provided a common ground for interaction between beneficiaries of national, regional and European projects, effectively contributing to overcoming the fragmentation of the sector and reinforcing synergies between stakeholders. The Report also concluded that the Clean Hydrogen JU and its predecessors have been pivotal in securing and consolidating Europe's role as a global leader in Hydrogen.

Furthermore in 2024, the Commission presented the **Competitiveness Compass,** a new roadmap to restore Europe's dynamism and boost our economic growth. The Compass builds on the analysis of "The future of European competitiveness" Report ("the Draghi Report") which provides a strategic framework to drive the Commission' work during its current mandate. The report emphasizes hydrogen as a key technology for decarbonizing hard-to-abate sectors and highlights Public-private partnerships and Joint Undertakings as effective tools for coordinating large-scale investments and innovation across Member States, industries, and the EU. The report suggests using these partnerships to drive forward strategic decarbonization projects like hydrogen, leveraging shared resources to overcome infrastructure challenges. Finally, the report strongly advocates for research and innovation to lower the costs and improve the efficiency of hydrogen technologies. It emphasizes the need for further R&D investments and breakthrough innovations.

2. Clean Hydrogen partnership fully supports the uptake and deployment of new technologies by EU industry

The Clean Hydrogen Partnership **has increasingly focused its research and innovation support through a feedback-loop approach, and recently more on higher technology readiness levels (TRLs) with a strong emphasis on demonstration and deployment.**

The funding profile of the JU shows a **clear evolution in support from early-stage research through to higher technology readiness levels (high TRLs), with particularly strong progression towards TRL 6-8,** with Horizon Europe making a particularly strong contribution across strategic parts of the hydrogen value chain. This trend shows how the **JU model is creating a stronger innovation-to-market pathway** and enabling the new hydrogen technology solutions to be **exploited and scaled-up by the industry into competitive European business and industrial growth.**

Central to this effort were flagship initiatives such as **Hydrogen Valleys, that help accelerate the large-scale deployment of clean hydrogen technologies within an integrated regional ecosystems** which has also helped to mobilise public and private actors and investments across the value chain.

By supporting innovation across the hydrogen value chain, the **Clean Hydrogen Partnership strengthens Europe's industrial competitiveness**, enabling companies to develop, scale up and deploy key technologies. Its support for **SMEs, start-ups and large-scale demonstrations** also contributes to resilient supply chains, industrial leadership and the market uptake of European hydrogen solutions.

The JU contributes to more resilient and competitive value chains by **supporting SMEs and startups, strengthening manufacturing capabilities, and reducing dependencies on non-European suppliers for strategic components, materials and technologies.** Since its inception it has supported over 440 SME (around 25% of all beneficiaries), with grants amounting to EUR 517 million, while 84 of those SMEs had already managed to raise EUR 5.18 billion in public and private funding, therefore indirectly leveraging 12x the amount committed by the JU.

Bridging Innovation and Market Deployment through Public-Private R&I

Over the lifetime of the Clean Hydrogen JU and its predecessors, about 27% of all grants were Innovation Actions. These projects accounted to 56% of the budget of all signed calls, demonstrating a commitment to supporting the uptake and deployment of new technologies by EU industry. While Innovation Actions (IA), which are associated with higher-TRL activities, are fewer in number than Research and Innovation Actions (RIA), they attract disproportionately large budgets. The data also show that **IA funding increased from EUR 56 million in 2021 to EUR 199 million in 2022, and remained above EUR 100 million in 2024 and 2025, indicating sustained investment over the years**.

This difference between the number of IA grants and the percentage of the overall budget means that IA projects are substantially larger than RIA projects on average, with 15 IA projects accounting for EUR 199 million, corresponding to approximately EUR 13.3 million per project, whereas 36 RIA projects accounted for EUR 145 million, or approximately EUR 4 million per project. This demonstrates a deliberate concentration of resources in larger, deployment-oriented projects.

The number of IA grants also increased over time. **The number of signed IA projects rose from 4 in 2019 to 9 in 2021, peaking at 15 in 2022, before stabilising at 10 annually in 2024 and 2025, indicating a sustained pipeline of innovation deployment activities.**

This consistent growth of higher-TRL technologies that are closer to market uptake is done within the JU's projects, from basic research, development and testing of components to the development of prototypes, and back to supporting additional research to develop more advanced prototypes, with several iterations of feedback between research and demonstrators taking place over the years –**"Feedback loop"**. This journey is helping the European industry arrive at **more performant and cost-effective technologies**.

Examples of impact:

The conclusion of the JIVE projects marks a major milestone in Europe's hydrogen mobility journey. Building on more than 15 years of JU-supported research and demonstration projects, ***fuel cell buses have evolved from small pilot fleets to over 300 buses operating across 16 European cities****. During this period,* ***vehicle costs fell from around EUR 1.5 million to EUR 600,000 per bus, bringing the technology significantly closer to commercial viability.*** *This achievement reflects the combined impact of feedback loops in R&I, pioneering deployment projects, advances in fuel cell technology, and strong industrial investment, while helping to raise awareness of hydrogen mobility across Europe.*

Examples of impact:

The Clean Hydrogen Joint Undertaking has been instrumental in advancing renewable hydrogen production through electrolysis. Over the past 15 years, it has invested EUR 258 million in 66 research and innovation projects, helping to improve electrolyser performance and reduce the cost of hydrogen production. This support has contributed to ***a major scale-up of the technology: low-temperature electrolyser capacity increased from 150 kW to 30 MW, while JU support per installed MW fell from EUR 20 million to EUR 0.5 million.*** *These achievements reflect growing technology maturity, economies of scale, and declining costs.*

Research and Innovation as an essential foundation of the Hydrogen Economy

In every call for proposals, the JU identifies projects expected to have a significant impact in accelerating the transition to a hydrogen economy, contributing to European Green Deal objectives, and that have been identified at the EU, national, or regional levels as having concrete synergies with other programmes and instruments. These **flagship projects** are identified with the specific objective of demonstrating the viability of clean hydrogen solutions at scale in real operational environments across different generations of hydrogen applications. It is expected that after completion of such projects, the hydrogen application(s) is/are fully demonstrated (including their business model) and, if successful, can further enter the market deployment stage and be replicated at scale (or on a commercial basis).

The flagship projects include, but are not limited to, **Hydrogen Valleys**. Hydrogen Valleys, a concept established by the JU, encompass production, storage, distribution, and end-use applications at regional or cross-border levels, fostering territorial innovation ecosystems, promoting regional cohesion, and the systemic integration of hydrogen into local energy systems. They help develop innovative business models to reach Final Investment Decisions in complex deployment-level projects that mobilise public and private actors across the value chain. They are high-TRL demonstration projects that have become central to the European Commission's hydrogen policy, leading to a top-up of the JU's budget under the RePowerEU plan, and therefore also illustrating the role of hydrogen as means to reduce Europe's energy dependency from abroad. Today, the JU manages a portfolio of 27 Hydrogen Valleys involving over 600 partners, over 135 of which are SMEs, across 23 countries, and leverages more than 5 times the amount put in by the JU in direct project investments.

These achievements require more than support for individual projects. It also requires the mobilisation of public and private investment, industrial collaboration across the value chain, coordination of system-level planning activities, and the development and dissemination of knowledge, skills and best practices across the hydrogen ecosystem. These elements help create the conditions needed for innovation to translate into industrial leadership, while ensuring that stakeholders across the value chain can work towards shared objectives. By bringing together these different dimensions, the JU helps accelerate the transition from innovation to industrial deployment and strengthens the overall competitiveness of the European hydrogen sector.

Contribution to Europe's competitiveness though private-public driven R&I support

Strengthening Europe's competitiveness is one of the JU's specific objectives. Technological leadership is a key part of this competitiveness. The JU supports the development and deployment of key technologies across the hydrogen value chain, including electrolysers, fuel cells, hydrogen storage and distribution technologies, heavy-duty transport applications, hydrogen refuelling infrastructure, and industrial end uses.

By supporting both low-TRL research and higher-TRL demonstrations, the programme helps European actors maintain and expand their leadership in strategic technology areas where global competition is increasing. The JU's integrated approach across the hydrogen value chain also supports industrial leadership, as competitiveness in the hydrogen sector depends not only on individual technologies, but also on Europe's capacity to develop, integrate and scale complete value chains in a coordinated way.

Furthermore, all topics included in the JU Call for proposals are expected to contribute to EU competitiveness and EU industrial leadership. They do so by supporting the development of a European value chain for hydrogen and fuel cell systems, components, cells and stacks, as well as hydrogen-related infrastructure.

Proposals submitted under the JU calls are expected to demonstrate their contribution to the resilience of the European supply chain. They should also show how they support the development of new technologies and intellectual property rights, cooperation with European research organisations, recycling and circularity, and reduced dependency on critical raw materials and PFAS. Other expected contributions include the development of new industrial ecosystems, positive spillover effects, job creation, training, and other actions that strengthen know-how in Europe.

For Innovation Actions in particular, proposals are expected to demonstrate how the activities to be funded will contribute to EU competitiveness and industrial leadership. This may include information on the origin of equipment, components and infrastructure purchased or built during the project. These aspects are assessed during evaluation and monitored during project implementation.

The JU programme also contributes to market formation and ecosystem development. Through Hydrogen Valleys, large-scale demonstrations, strategic studies, knowledge management, safety and standardisation activities, and cooperation with other European Partnerships and EU instruments, the JU helps bring research and innovation results closer to market deployment. This is particularly important in a context where successful deployment depends on infrastructure availability, regulatory readiness, skills, investment conditions and coordinated public-private action.

Transforming R&I into Growth through Startups and SMEs

The JU contributes to more resilient and competitive European value chains by **supporting SMEs and start-ups, strengthening manufacturing capabilities, and helping reduce dependencies on non-European suppliers for strategic components, materials and technologies**. This is particularly important in a context of increasing global competition and a growing policy focus on resilient industrial value chains.

SMEs Startups play a pivotal role in boosting EU competitiveness by driving innovation, creating high-quality jobs, and accelerating the adoption of new technologies. As agile market players, they are often at the forefront of breakthroughs. Supporting start-up ecosystems is essential to fostering a dynamic internal market and scaling up European solutions globally. Since 2008, the JU programme has supported more than 440 SMEs,

representing around 25% of all beneficiaries. JU grants awarded to SMEs amount to EUR 517 million. In addition, 84 SMEs supported by the programme have raised EUR 5.18 billion in public and private funding. This represents a leverage effect of around 12 times the JU funding committed to these SMEs.

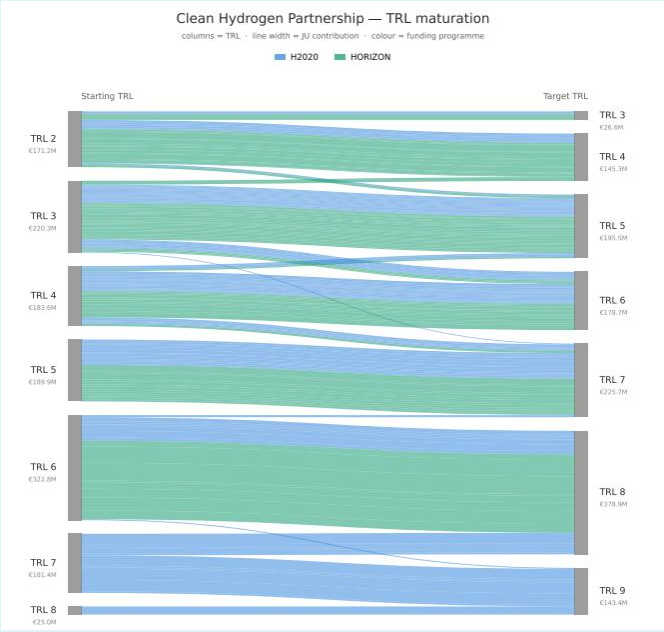
Several SMEs supported by the JU have developed into major players in the clean hydrogen sector, including ITM Power and Sunfire. Others, such as H2Site, emerged as spin-offs from JU-funded research and innovation projects and have continued to grow, including as direct beneficiaries of JU projects.

The sustained allocation of funding to SMEs is an important indicator of the programme's deployment-oriented approach. SMEs are often closer to market uptake and commercialisation than large research organisations. The consistent yearly support provided to SMEs shows that the JU is not only funding upstream research, but also supporting actors with strong potential to bring technologies to market and contribute to real-world implementation.

Supporting technology maturation across different Technology Readiness Levels

The TRL maturation profile indicates that JU funding supports projects from early-stage research through to higher technology readiness levels, with particularly strong progression toward TRL 6-8 where deployment, industrial validation and market uptake become more tangible. Together, these patterns suggest that the JU is not only nurturing innovation at its source, but also enabling startups and SMEs to bridge the gap between R&I and commercial growth, strengthening European competitiveness, industrial resilience and the scale-up of clean hydrogen solutions.

The graphic shows how Clean Hydrogen Partnership projects help technologies progress from their starting TRL to higher target TRLs. It highlights support across the innovation chain, with a strong focus on moving technologies from development and demonstration towards deployment and market uptake.



The Clean Hydrogen JU has increasingly helped transform research and innovation into growth across successive EU funding programmes, from FP7 to Horizon 2020 and now Horizon Europe. The funding profile shows a clear evolution in support. Horizon Europe makes a particularly strong contribution across strategic parts of the hydrogen value chain, including production, transport, Hydrogen Valleys and supply chains, compared with earlier programmes.

This progression reflects a shift from supporting early innovation capacity under FP7, to broader scale-up and demonstration under Horizon 2020, and towards more market-oriented deployment and industrial development under Horizon Europe.

The TRL maturation data confirm this trend. They show continued support from lower and mid-range TRLs through to higher TRLs, in particular TRL 6 to 8, where technologies move closer to validation, deployment and commercial uptake.

Together, these trends show how the JU is strengthening the pathway from innovation to market. The programme not only helps start-ups and SMEs develop new hydrogen solutions, but also supports their growth into competitive European businesses and contributes to wider industrial development.

In response to the EU Startup and Scaleup Strategy and its focus on strengthening European competitiveness, the JU is also preparing a tender to set up and run a European Clean Hydrogen Startup Hub. The Hub will aim to accelerate the translation of research results into investable start-ups, support the scaling of clean hydrogen companies by connecting innovation with investment and corporate partners, and help build and consolidate European Hydrogen Innovation Corridors.

3. Private co-funding in Clean Hydrogen Partnerships is substantial and creates significant impact

Since the establishment of the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) in 2008, **a total of 433 research and innovation (R&I) projects have been funded across the hydrogen value chain**. These projects represent **total investments of EUR 4.4 billion**, including **EUR 2 billion in funding from the European Union**. The remaining **EUR 2.4 billion comes from private and public sector co-financing including public co-funding schemes, primarily national and regional programmes**.

Out of the EUR 2.4 billion co-funding leveraged by the Clean Hydrogen Partnership, **EUR 1.2 billion has been provided by the private sector**[1]. This includes contributions from private-sector members of the Clean Hydrogen Partnership as well as from other companies and organisations active in the hydrogen sector that participate in Partnership-funded projects without being members of the Partnership.

The above represents a **leverage factor**[2] **of 1.22** (in grants) **across all Framework Programmes**, from FP7 until and including the 2025 Call for Proposals under Horizon Europe. This means that for every euro contributed by the European Union to the Clean Hydrogen Partnership, an additional EUR 1.22 has been mobilised through co-funding by project beneficiaries, in particular from the private sector.

Looking only at the portfolio of flagship projects supported by the Clean Hydrogen Partnership, and in particular to t**he portfolio of Hydrogen Valleys, the leverage factor is even much higher.** Total cost of Hydrogen Valleys projects amount to EUR 1.6 billion with a total JU funding of EUR 328 million. This represents a leverage factor of close to 4 (including both private co-financing as well as the co-funding provided by national and regional support schemes in synergies with the JU funds).

In addition to this grant-related leverage, the private members have already contributed with investments through **in-kind in additional activities of EUR 1.4 billion (out of more than EUR 2.5 billion planned total investments) only in Horizon Europe programme between 2022 and 2025.** These are additional investments related to the Clean Hydrogen JU programme objectives and as such offer significant support and achievement of these objectives overall and can also be directly related to a 'total leverage' effect of 3.

How does the Clean Hydrogen Partnership compare with the rest of Horizon Europe?

The Interim Evaluation of the Horizon Europe Framework Programme for Research and Innovation 2021–2024 also points to the **strong leverage effect of Joint Undertakings**. As of 6 January 2025, the evaluation reported a leverage factor of 0.35 for Cluster 5 — Climate, Energy and Mobility. By comparison, Joint Undertakings as a whole showed a higher leverage factor of 0.8.

The Clean Hydrogen JU recorded the highest leverage factor among all Joint Undertakings, at 1.75. This shows the programme's strong capacity to mobilise additional public and private investment and to amplify the impact of EU funding in support of clean hydrogen research, innovation and deployment.

[1] This excludes Calls 2024 and 2025

[2] In line with the definition that the EU Financial Regulation, art. 2(40) ("Definitions) calls 'leverage effect'. This measure is monitored as the short term indicator of Key Impact Pathway 9 ('Co-investment – Amount of public & private investment mobilised with the initial investment from the Programme')

Members contribution and leverage effect : How the Clean Hydrogen Partnership mobilises additional investment

The contributions of the Clean Hydrogen JU members are defined in the Single Basic Act. They consist of a cash contribution from the Union and a combination of cash and in-kind contributions from the private members. In-kind contributions refer to investments made by private members towards the objectives of the projects or of the programme, after deduction of EU co-funding.

Since 2021, building on the work of the previous Joint Undertaking, the Clean Hydrogen JU has received contributions from its members in line with the planned targets. The targets for in-kind contributions were already reached in 2025.

The Clean Hydrogen JU also shows a high level of leverage. Private co-funding comes not only from members of the JU, but also from other participants in the hydrogen sector that are not members.

For the period 2021–2027, the Clean Hydrogen JU receives a total contribution of more than EUR 2 billion from its members. This includes a Union cash contribution of EUR 1 billion. Of this amount, EUR 30.2 million supports the administrative expenditure of the JU, while the remainder supports operational activities.

Private members are expected to provide at least an equivalent contribution. This consists of EUR 30.2 million in cash contributions to administrative expenditure and at least EUR 969.8 million in in-kind contributions to operational activities. This brings the total budget of the Clean Hydrogen JU to more than EUR 2 billion. Of this amount, EUR 60.4 million, or around 3%, supports administrative expenditure.

In 2022, as part of the REPowerEU Plan, the European Commission announced an additional EUR 200 million in Union funding for the Clean Hydrogen JU. This additional contribution supports the acceleration of Hydrogen Valleys in the EU.

The administrative expenditure of the JU is financed on the basis of a matching principle. Cash contributions from members other than the Union are matched by an equivalent contribution from the Union. As a result, annual administrative expenditure is shared equally between the Union and the private members. The annual administrative budget is adopted by the Governing Board, and the corresponding contributions are collected through cash contributions from the Union and from private members.

The Joint Undertaking monitors cumulative contributions to ensure that the EUR 30.2 million contribution target from private members, matched by an equivalent Union contribution, is reached by 31 December 2031.

In-kind contributions from private members support the operational objectives of the programme. They include two types of contributions: in-kind contributions to operational activities and in-kind contributions to additional activities.

In-kind contributions to operational activities are the part of project costs covered by private members or their constituent entities. They correspond to the difference between the total eligible costs incurred by these entities in implementing projects and the EU funding received for those projects.

In-kind contributions to additional activities are investments that are related to the objectives of the Clean Hydrogen JU programme but are not directly funded by the JU or explicitly linked to a specific funded project.

These activities can make an important contribution to the overall objectives of the programme and can also support leverage, including for smaller companies.

Examples of such activities include communication and awareness-raising, large-scale case studies, pre-commercial trials and field tests, proofs of concept, and improvements to existing production lines to support upscaling.

The plan for in-kind contributions to additional activities is adopted by the Governing Board as part of the annual work programme. The Governing Board also approves the annual report on these contributions. The reported activities are verified against the agreed plans and their relevance to the JU objectives by an independent third party contracted by the private members of the JU.

Overall, progress towards the contribution objectives set out in the Single Basic Act for the period 2021–2027 is well advanced. The specific objective related to in-kind contributions from private members has already been achieved. Further information on the yearly evolution of in-kind contributions is available in the Annual Activity Reports of the Clean Hydrogen JU.

4. Clean Hydrogen Partnership is creating cross-fertilisation and knowledge dissemination with other institutionalised partnerships and other publicly funded R&I initiatives

The Clean Hydrogen Partnership **maximises the impact of EU funding by building synergies across EU programmes, European Partnerships, funding instruments, national and regional initiatives, and international cooperation frameworks**. Given the cross-sectoral nature of hydrogen, synergies are an integral part of the JU's work and are essential to support the transition from research and innovation to market deployment.

The Clean Hydrogen JU promotes and actively pursues synergies with **complementary instruments at European, national and regional levels**, including, but not limited to, the **Innovation Fund, the Connecting Europe Facility (Energy and Transport), the European Regional Development Fund (ERDF), and the Recovery and Resilience Facility (RRF)**. For example, it has aligned its calls with the CEF programme to fund hydrogen vehicles in a synergetic manner while supporting the deployment of the related hydrogen infrastructure under CEF Transport. Similarly, it leverages substantial national and regional funding within its flagship projects, such as Hydrogen Valleys, including through the recently established STEP Seal.

Within Horizon Europe, the Clean Hydrogen Partnership cooperates with other **European Partnerships, such as Clean Aviation, Europe's Rail, 2Zero, ZEWT and EURAMET**, at both the programming and implementation levels. For example, it has signed a MoU with the Clean Aviation JU to align the strategic roadmaps of the two sectors and implement funding accordingly to support the development of a zero-emission hydrogen-powered aircraft by 2035. Similarly, it has published a coordinated call with the Zero Emission Waterborne Partnership (ZEWT) to support the decarbonisation of the shipping industry through fuel cell and hydrogen solutions

Thanks to the efforts of the Clean Hydrogen Partnership, **Hydrogen Valleys have become a global concept**, and the JU continuously supports the **Commission's Mission Innovation** commitment worldwide through a dedicated platform and the sharing of EU experience, promoting a global approach to decarbonising our economies with hydrogen solutions.

In addition, the JU is working **bilaterally with Japan u**nder the MoU signed by the Commission with METI to advance clean hydrogen technologies together.

Within Horizon Europe, the Clean Hydrogen Partnership cooperates with other European Partnerships, such as Clean Aviation, Europe's Rail, 2Zero, ZEWT and EURAMET, at both the programming and implementation levels. These collaborations align research agendas and support the integration of hydrogen solutions across industrial and transport sectors. The JU's activities also contribute to the EU's industrial policy priorities under the Net-Zero Industry Act (NZIA) and the Strategic Technologies for Europe Platform (STEP) by fostering a competitive European hydrogen manufacturing base, strengthening technological sovereignty, and developing a skilled workforce.

Examples of impact:

Concrete synergies with other partnerships include the Zero Emission Waterborne Transport, which will fund one additional grant (approximately EUR 8 million budget) under a RIA topic included in the JU work programme 2026 for the development of fuel cells for the maritime/waterborne sectors, but also, within the SG, EU Rail JU and EURAMET, with programming-level synergies in various topics.

With the Clean Aviation Joint Undertaking (CAJU), an MoU was signed so that the Clean Hydrogen JU includes the development of core technologies (e.g., fuel cells, liquid hydrogen tanks, distribution systems) in its programme, following specifications set in conjunction with the Clean Aviation JU. The integration of these technologies into ground and later on flying demonstrators is within the scope of CAJU.

Connecting EU programmes and funding instruments

Beyond Horizon Europe, the Clean Hydrogen Partnership forms part of the broader EU research and funding ecosystem. It promotes and actively pursues synergies with complementary instruments at European, National and Regional Levels, including, but not only, the Innovation Fund, the Connecting Europe Facility (Energy and Transport), the European Regional Development Fund (ERDF), and the Recovery and Resilience Facility (RRF). Such coordination enables multi-source financing for large demonstration projects and accelerates the transition from R&I to market deployment. The Clean Hydrogen JU also supports the implementation of the Strategic Energy Technology (SET) Plan and contributes to the European Clean Hydrogen Alliance, supporting the objective of feeding research outcomes into industrial investment pipelines.

In addition, since the Call 2025, the JU has been awarding STEP Seals to hydrogen valley proposals that meet all evaluation criteria, to facilitate the co-funding of proposals supported by the JU, as well as those evaluated above the threshold but not funded by the JU (due to limited budget). This way, the JU wants to stimulate funding of hydrogen projects by national and regional authorities.

The Clean Hydrogen JU's reach extends beyond the European Union. It engages with international partners and organisations, including NEDO (Japan), Mission Innovation, the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), and the IEA Hydrogen Technology Collaboration Programme. These collaborations facilitate the exchange of best practices, joint standardisation efforts, and reciprocal access to testing and demonstration infrastructures.

A structured approach to synergies

Considering such a broad synergies matrix, it was necessary to structure the JU's work on synergies and prioritise the most important and most effective synergies. Therefore, and following a recommendation from the Internal Audit Service (IAS), a dedicated **Synergies Strategy** has been developed and endorsed by the Governing Board, complemented by an associated annual action plan. The JU's synergies strategy foresees establishing a synergy coordination framework ("who, what, how"), which facilitates the implementation and monitoring of synergies.

Building on existing Horizon Europe indicators and recent methodological updates, **a refined KPI framework is incorporated into the synergies strategy**, strengthening the monitoring of synergy activities and impacts. The framework retains alignment with Horizon Europe's common KPIs while introducing targeted, synergy-specific dimensions and qualitative indicators. It also establishes a clearer link between inputs, processes, and outcomes within the JU's broader monitoring logic.

Together, these indicators enable the JU to monitor both the breadth (number and coverage) and the depth (quality and outcomes) of its synergy activities, thereby strengthening the link between operational collaboration, knowledge management, and systemic outcomes. They will also allow the JU to assess the maturity of its synergy ecosystem – from *ad hoc* cooperation to institutionalised coordination supported by data-driven governance.

Governance and stakeholder input

At the governance level, the **Governing Board (GB)** provides strategic and operational oversight and advises on thematic priorities, including those developed in synergy with other European Partnerships. The GB considers input from the JU's two advisory bodies, the States Representatives Group (SRG) and the Stakeholders' Group (SG), when providing strategic guidance on synergies.

The **States Representatives Group (SRG)** brings together representatives from all Member States and associated countries. It serves as an observatory and information-exchange body that provides national-level intelligence, identifies national and regional opportunities for co-funding or complementarity, and informs the JU about national hydrogen-related policies and initiatives. It provides advisory input on JU calls and the design of the Annual Work Programmes (AWPs).

The **Stakeholders' Group (SG**) represents industrial, research and regional stakeholders at EU level. Many members of the SG represent sectors that are potential candidates for hydrogen uptake, and they provide valuable feedback on specific issues arising in their respective sectors, as well as on opportunities for cooperation. It serves as a channel for intelligence and foresight to support future collaboration. Some of the key partnerships within Horizon Europe that are part of the hydrogen ecosystem are represented in the SG.

In addition, 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, 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. As a result, 10 Memoranda of Cooperation were signed to foster synergies in Knowledge Management, Capacity Building and Programme Management, Funding and Financing.

Knowledge management and evidence-based policy support

Knowledge management is an integral part of JU's work, enabling it to monitor the projects' work at the programme level against the technology KPIs in the SRIA, strengthen the knowledge capacity of hydrogen value chain actors through data and knowledge collection, and gather intelligence to be shared as feedback to policy, supporting evidence-based implementation of EU policies. The JU has developed the Clean Hydrogen **Knowledge Hub** and has a Knowledge Management Activities Framework to gradually turn the JU into the Knowledge Hub for Hydrogen in Europe and the Programme Office into a knowledge-intensive organisation.

The Clean Hydrogen JU contributes to the activities of several services within the European Commission and, therefore, to the continuous updating and development of various policies related to R&I, energy, transport, climate and industry. The goal is to provide fact-based information on the state of the art of fuel cell and hydrogen technologies, with a focus on competitiveness and growth. In addition, the JU has supported the Clean Hydrogen Alliance, managed by DG GROW, in the further development of the IPCEIs website as part of the Clean Hydrogen Observatory activities. Similarly, in support of the Clean Hydrogen Mission under Mission Innovation (DG RTD), the JU develops and updates the **H2 Valleys Platform**. Finally, it supports the Ports Initiative of the Clean Energy Ministerial (DG ENER) through fact-based studies.

The **European Hydrogen Observatory**, which tracks the evolution of the Hydrogen Economy in Europe beyond the JU projects' portfolio, includes information on hydrogen technologies, deployment, policies, funding, and research-related topics, such as publications, patents, and training.

An **Annual Programme Review** is also conducted annually in collaboration with the Joint Research Centre (JRC), the European Commission's science and knowledge service, highlighting the JU's achievements in the previous year and proposing future actions based on the results. The JRC will primarily support the formulation and implementation of the Clean Hydrogen JU strategy and activities in the areas of standardisation, technology monitoring, including harmonising of testing protocols, and assessment and sustainability, including Life Cycle Approach (LCA) methodology.

The JRC co-authors the Programme Review Report with the Clean Hydrogen JU. The scope of the JRC assessment is to review the annual progress of the Clean Hydrogen JU Programme towards its multi-annual research targets, as reflected by the SRIA technology KPIs, while also identifying gaps in the Programme and providing recommendations on how to better meet its multi-annual programme objectives and targets. It also includes observations on the major accomplishments of the projects and difficulties encountered.

5. Clean hydrogen partnership offers an open and accessible model

The Clean Hydrogen Partnership **combines close collaboration across the European hydrogen ecosystem with an open and competitive funding model.** It supports the integration of hydrogen solutions across economic sectors while **attracting a broad and diverse range of participants**, including industry, research organisations, SMEs, start-ups, regional actors and public authorities.

The JU programme remains **accessible to newcomers and non-members**, ensuring that funding is awarded to the best projects and supports innovation across the European research, industrial and regional landscape through open and competitive calls for proposals. Under Horizon Europe, more than 70% of beneficiaries receiving JU funding each year are newcomers to the programme. This share rises to more than 85% in Hydrogen Valleys, which bring together new local and regional actors from across Europe. This demonstrates the JU's ability to broaden participation and involve actors beyond the established hydrogen R&I community.

The openness of the JU is also reflected in the **diverse profile of funded beneficiaries**. Under Horizon Europe, 57% of beneficiaries receiving Clean Hydrogen JU funding are not members of Hydrogen Europe or Hydrogen Europe Research, the two private members of the JU. Under Horizon 2020, this figure was 45%. This shows an increase in participation by non-members under the current programme.

Hydrogen is a cross-sectoral area, and synergies have been part of the backbone of the JU from the beginning, as explained above. Within Horizon Europe, the Clean Hydrogen JU cooperates with other European Partnerships on both programming and implementation levels. These collaborations align research agendas and support the integration of hydrogen solutions across the industrial and transport sectors through joint R&I roadmaps. The Clean Hydrogen Partnership has common R&I Roadmaps with **other partnerships such as Processes4Planet, Clean Steel, 2ZERO, Zero Emission Waterborne Transport, Clean Aviation JU, EURAMET, European Innovation Council and European Energy Research Alliance.**

The Clean Hydrogen JU Annual Programmes are primarily implemented through **open**, **competitive** annual Calls for Proposals. All Calls for Proposals of the Clean Hydrogen JU are implemented, including evaluation and award procedures, are managed according to the General Annexes to the Horizon Europe Work Programme.

Openness is also a factor that the JU constantly monitors and reports on annually in the Annual Activity Report. In addition to the cooperation and synergies mentioned above, specific activities are included to preserve the openness of the Clean Hydrogen JU activities in line with the SBA and the Clean Hydrogen JU strategic document, SRIA. As per the rules stated in the Horizon Europe Regulation[3], any legal entity, regardless of its place of establishment and including legal entities from non-associated third countries or international organisations, may participate in actions under the Programme, provided that the conditions laid down in the Horizon Europe Regulation have been met, together with any conditions laid down in the work programme or call for proposals. All calls for proposals, including evaluation and award procedures, were managed in accordance with, and the proposals complied with, the General Annexes to the Horizon Europe Main Work Programme, which apply mutatis mutandis to the calls. In line with the SBA and the Horizon Europe Regulation, only one additional condition was included for some specific topics: at least one beneficiary in the consortium must be a member of one of the Clean Hydrogen JU private Members, i.e., Hydrogen Europe (HE) or Hydrogen Europe Research (HER). This requirement targeted activities in which the industrial and research partners of the Clean Hydrogen JU were seen to play a key role, such as large-scale demonstrations, ensuring

[3] Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013 (Text with EEA relevance). OJ L 170, 12.5.2021, p. 1–68

a balance between partner commitment and openness. Note that this condition did not change the open nature of the call.

As a consequence of these measures, under the Horizon Europe programme, the Clean Hydrogen JU's funding benefits for 57% to entities that are not members of Hydrogen Europe and Hydrogen Europe Research, the two private members of the Clean Hydrogen JU. Under the H2020 programme, this figure was 45%.

Furthermore, the JU continued to apply a number of measures to attract newcomers to the Clean Hydrogen JU activities, as follows:

- Concerning the call for proposals, in addition to the general Info Days organised in Brussels, that are widely advertised, easy to access and register, as well as the possibility to follow online or watch the recording afterwards, several dedicated (national) Info Days take place in different countries, including those with a history of limited participation in EU R&I programmes.
- JU regularly updates the Hydrogen Valleys S3 Partnership[4], on the funding opportunities in the JU Call for Proposal, with a view to expanding the European regions interested in benefiting from the JU support for Hydrogen Valleys.

In addition, the Impact assessment for institutionalised European partnerships under Horizon Europe[5] states:

- EU growth of hydrogen economy: "[…] In terms of openness, thanks to the "support" structure of this option (e.g. the JU team) and the network informing the community about the programme, calls under this option (a.n a JU) are likely to be equally shared between larger groups and SMEs – which are key for the conception, development and deployment of clean hydrogen applications"

Also, the same report notes in terms of Transparency and Openness:

- An institutional partnership would ensure that the outputs of RD&I programmes are transparent and available to stakeholders inside and outside the hydrogen community. The framework governing participation would allow any organisation meeting defined criteria to participate, with a proportion of funded activity subject to open calls. This framework could provide support and guidance, help networking and build up consortia when addressing complex projects throughout the whole value chain.

The available data for calls 2022 to 2025 clearly support the view that the **JU is open to all beneficiaries**: 86% of beneficiaries are non-members and the funding distribution suggests that a substantial share of resources is allocated to organisations beyond the established membership base. Between 2022 and 2025, organisations that were not members of either Hydrogen Europe or Hydrogen Europe Research received EUR 519 million, representing approximately 56% of the total EUR 913 million allocated over the period, while members of HE and HER received EUR 394 million (approx. 43%). This indicates that JU funding is not concentrated among existing members and that participation extends well beyond a closed group of incumbent actors.

Furthermore, the fact that the majority of funding consistently reaches non-members across all years analysed suggests that JUs are able to attract and support a broad range of participants rather than operating as an exclusive ecosystem.

[4] Inforegio - Hydrogen Valleys S3 Partnership

[5] European Commission: Directorate-General for Research and Innovation, Technopolis, Think, Trinomics, Cambridge Econometrics, Nomisma, CEPS, AECOM, IDATE and Steer, [Directorate-General for Research and Innovation, Technopolis, Think, Trinomics, Cambridge Econometrics, Nomisma, CEPS, AECOM, IDATE, Steer], Impact assessment for institutionalised European partnerships under Horizon Europe, Publications Office of the European Union, 2020, https://data.europa.eu/doi/10.2777/295096

ANNEX

A historical overview of JU evolution and impact on EU policies including Horizon Europe programmes

- The early EU Framework Programmes (FP) supported research and development in fuel cells and hydrogen technologies with increasing funding levels over time. Nevertheless, these efforts were fragmented and uncoordinated across the different programmes and across Europe/Member States. Recognising this issue, the European Commission facilitated the creation of a **European Hydrogen and Fuel Cell Technology platform** (2004-2007), bringing together all interested stakeholders.

- In May 2008, the Council adopted a Regulation setting up a Joint Undertaking for Fuel Cells and Hydrogen (**FCH JU**). The programme entered its second phase (2014-2020), with **FCH2 JU** in Horizon 2020. Building on this, the Clean Hydrogen JU (successor of FCH2JU) was established in November 2021.

- **Since 2008**, the Joint Undertaking (JU) has supported research and innovation (R&I) in the development of hydrogen technologies, leading to improved components and, ultimately, the first prototype products across the entire value chain. This approach has relied on a **continuous feedback loop, whereby research activities have been informed by the results, lessons learned, and challenges encountered in earlier demonstration projects**. As a result, this approach has contributed significantly to the development **of commercially available, robust hydrogen technologies and products**, helping to accelerate their market readiness and deployment.

- In 2016, the JU launched its **Regions Initiative**, engaging European regions and cities interested in deploying fuel cell and hydrogen-based solutions to support their decarbonisation objectives. The initiative attracted 89 regions and cities from 22 European countries that were actively exploring the role of hydrogen and fuel cells in their green energy transitions. Through the initiative, participants received support in assessing business cases for fuel cell and hydrogen applications and in mapping local capabilities and assets. This work laid the foundations for what are now known as Hydrogen Valleys. The Regions Initiative also contributed to the establishment of the European Hydrogen Valleys Partnership (EHV-S3P) in May 2019, under the European Commission's Smart Specialisation Platform.

- In September 2019, the JU published the result of its study **Value Chain and Manufacturing Competitiveness Analysis for Hydrogen and Fuel Cells Technologies**. The study concludes that Europe had world class component and product providers across the supply chain. The study also pointed out that whilst the hydrogen sector offers Europe a chance to benefit economically and environmentally from an emerging industry and strengthen its position in clean technologies generally, it must be appropriately supported.

- Building on these achievements, the European Commission officially recognised **hydrogen as a strategic value chain**, creating the conditions necessary for the launch of the first Important Project of Common European Interest (IPCEI) on hydrogen. In parallel, the European Clean Hydrogen Alliance was established in 2020 to bring together industry, public authorities, and other stakeholders to support the scale-up and deployment of hydrogen technologies across Europe.

- In 2020 the JU published a report assessing the role of **hydrogen in the National Energy and Climate Plans** (NECPs). The report identified and highlighted opportunities for hydrogen technologies to contribute to effective and efficient achievement of the 2030 climate and energy targets.

- In 2020, the European Commission published the first ever **European Hydrogen Strategy**, which set out the European Union's roadmap for developing a competitive hydrogen economy to support the transition to climate neutrality by 2050. The strategy clearly recognised the need for a strong public-private research

and innovation partnership to accelerate the development, scale-up, and deployment of clean hydrogen technologies across the value chain.

- In 2022, the European Commission published **REPowerEU**, its plan to phase out the EU's dependence on Russian fossil fuels and accelerate the clean energy transition in response to the energy crisis triggered by Russia's invasion of Ukraine. The plan is built around three pillars: energy savings, diversification of energy supplies, and the rapid deployment of renewable energy. REPowerEU identifies renewable hydrogen as a key component of Europe's energy transition, setting targets for the domestic production of 10 million tonnes and the import of 10 million tonnes of renewable hydrogen by 2030. The plan also recognises Hydrogen Valleys as an effective mechanism for developing an integrated European hydrogen ecosystem from the bottom up. To accelerate their deployment, the European Commission allocated an additional EUR 200 million to the Clean Hydrogen Partnership, with the objective of doubling the number of Hydrogen Valleys across Europe.

- In 2022, the JU incorporated dedicated annual support for the preparation and **deployment of Hydrogen Valleys** into its annual work programme. To date, it has supported 27 Hydrogen Valley projects spanning 25 countries across Europe, contributing to the creation of integrated regional hydrogen ecosystems and accelerating the scale-up of the European hydrogen economy.

- As of 2025, the JU is supporting the **Hydrogen Valleys Facility**, which aims to provide targeted support to Hydrogen Valleys in reaching their Final Investment Decision (FID). The Facility is intended to accelerate project development and contribute to the European Commission's ambition of having 50 Hydrogen Valleys operational or under construction across the EU by 2030.

Conclusion

The achievements outlined in this document would not have been possible without **the governance model embedded in the Partnership since its first edition in 2008**. From the outset, the Partnership has brought together private members from industry and research with the European Commission, representing the European Union, in a closely integrated structure. This collaboration has enabled all parties to jointly define the Partnership's priorities, activities, and strategic direction, ensuring that investments in research and innovation are aligned with both technological needs, policy priorities and market realities.