Hydrogen Europe Research

MEDIA BACKGROUNDER

This media backgrounded is provided in the context of the policy dialogue on the future of hydrogen in Ireland and the EU which takes place Tuesday 16 June in Dublin with representatives from government, research, industry and energy infrastructure to discuss how hydrogen and fuel cell technologies can contribute to Ireland's and Europe's competitiveness, energy security and the clean energy transition.

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1. Policy and Strategic Context

Europe is seeking to strengthen its competitiveness, energy security and industrial resilience while advancing the clean energy transition. Renewable and low-carbon hydrogen are increasingly recognised as strategic technologies that can help decarbonise industry, transport and energy systems while creating new economic opportunities.

The Dublin policy dialogue takes place ahead of Ireland's Presidency of the Council of the European Union, which begins on 1 July 2026. Ireland has identified competitiveness, energy security, the clean energy transition, and research and innovation among its key priorities.

The event also takes place in the context of negotiations on the European Union's next long-term budget (Multiannual Financial Framework 2028–2034), which will shape future investment in research, innovation and strategic clean technologies. Participants will discuss how the EU can strengthen its hydrogen ecosystem and ensure that research excellence translates into industrial leadership and market deployment with sufficient funding for the next decade.

2. European cooperation on hydrogen: Research & Innovation driving hydrogen deployment

Research and innovation have played a central role in Europe's leadership in hydrogen technologies over the past two decades. Through successive EU research programmes and public-private partnerships, European universities, research centres and industry have contributed to major advances in renewable hydrogen production, fuel cells, storage technologies and industrial applications.

Since the launch of the first Fuel Cells and Hydrogen Joint Undertaking in 2008, the EU has supported the development of hydrogen technologies through collaborative initiatives bringing together industry, research organisations and public authorities. Together, the Fuel Cells and Hydrogen Joint Undertaking, its successor FCH 2, and the current Clean Hydrogen Partnership

have mobilised more than €3 billion in public and private investment, supporting hundreds of projects across the hydrogen value chain.

Today, hydrogen forms an important part of the EU's strategy to strengthen competitiveness, accelerate decarbonisation and enhance energy security. One of the key challenges is accelerating the transition from research and demonstration projects to large-scale commercial deployment, ensuring that technological leadership translates into industrial leadership.

Hydrogen Valleys have emerged as an important mechanism for bridging this gap. To date, the Clean Hydrogen Partnership has supported 27 Hydrogen Valleys across 23 European countries, representing more than €1.6 billion in total project investment, including €328 million in EU funding. The European Commission's objective is to reach 50 Hydrogen Valleys under construction or in operation by 2030.

According to European Commission estimates, achieving the EU's long-term hydrogen ambitions could require investments of between €180 billion and €470 billion in renewable hydrogen production and associated infrastructure by 2050. Continued investment in research, innovation and deployment will therefore be essential to strengthen Europe's competitiveness, build resilient supply chains and support the development of strategic clean technologies.

3. Ireland's National Hydrogen Strategy

Ireland's National Hydrogen Strategy, published in July 2023, identifies renewable hydrogen as an important component of the country's pathway to climate neutrality by 2050 and its legally binding target of reducing greenhouse gas emissions by 51% by 2030. Hydrogen is expected to play a key role in decarbonising sectors that are difficult to electrify, while supporting sustainable transport, energy security and industrial competitiveness.

Ireland currently relies heavily on imported fossil fuels, which accounted for 77% of energy demand in 2021. Supported by some of Europe's strongest offshore wind resources, the country aims to develop 2 GW of offshore wind capacity dedicated to renewable hydrogen production by 2030. The strategy highlights opportunities to strengthen energy independence, support regional economic development and position Ireland as a future producer and exporter of renewable hydrogen and clean energy to Europe. Achieving these ambitions will require continued investment in infrastructure, skills, innovation and market development.

4. Hydrogen Valleys in Ireland: Turning strategy into reality

Several flagship projects are already helping translate Ireland’s hydrogen ambitions into reality.

Ireland is currently participating in several large-scale hydrogen initiatives supported through European and national programmes and positioning itself as an emerging player in Europe's hydrogen economy.

- **KESTREL** (Cork) is a strategic energy storage project being developed by ESB, Bord Gáis Energy and dCarbonX. Located in the former Kinsale Head gas fields offshore in Cork, the initiative aims to repurpose depleted gas reservoirs for the long-term storage of renewable gases, including green hydrogen. By combining Ireland's significant offshore wind potential with large-scale storage infrastructure, KESTREL seeks to strengthen

energy security, support future hydrogen deployment and facilitate the integration of renewable energy into European energy markets.

- **SH2AMROCK Hydrogen Valley**, launched in 2024 with support from the Clean Hydrogen Partnership, is one of Europe's flagship Hydrogen Valley projects. Bringing together more than 20 partners from Ireland and across Europe, the initiative is developing an integrated hydrogen ecosystem in the Galway region covering production, distribution, refuelling infrastructure and end-use applications.

- **KILLYBEGS Green Hydrogen Valley initiative:** Killybegs Green Hydrogen Valley (Donegal) aims to explore the production and use of renewable hydrogen in Ireland's northwest, building on the region's strong renewable energy potential and maritime economy. The initiative focuses on supporting the decarbonisation of sectors such as fisheries, transport and local industry while contributing to regional economic development and the transition to a low-carbon energy system.

- **HYBERNIA**, selected in 2024 under the Clean Hydrogen Partnership Hydrogen Valleys programme, is developing a cross-border hydrogen ecosystem involving partners from Ireland and Northern Ireland. The project aims to demonstrate hydrogen applications across industry, transport and energy infrastructure while strengthening cooperation across the island of Ireland.

- **HYreland**, is a German-Irish research project led by ESB and Fraunhofer ISE, analysed Ireland's potential to become a producer and exporter of renewable hydrogen and hydrogen-derived fuels. The study identified several favourable locations for hydrogen development, including Cork, Waterford, Dublin, Wicklow and the Shannon region, and concluded that Ireland's exceptional wind resources, industrial infrastructure and proximity to European markets could position the country as an important contributor to Europe's future hydrogen economy.

Hydrogen Valleys are integrated regional ecosystems that bring together hydrogen production, storage, distribution and end-use applications within a defined geographic area. They are increasingly recognised as an important mechanism for demonstrating hydrogen technologies under real-world conditions and accelerating market development.

5. About Hydrogen Europe Research

Hydrogen Europe Research (HER) is a leading European association promoting research and innovation in hydrogen and fuel cell technologies. HER represents more than 170 universities, research centres and industrial research organisations across 30 countries and works to strengthen Europe's scientific and technological leadership in hydrogen.

Projects & Activities

- **Young Scientist Award**

The Young Scientist Award, organised annually by Hydrogen Europe Research, celebrates outstanding young researchers (35 years old or younger) from our member organisations who have made remarkable personal contributions to hydrogen-related projects. This competition highlights the achievements of students, PhD candidates, postdoctoral fellows, and early-career researchers, while encouraging their involvement in Clean Hydrogen Partnership initiatives. Each year, the award recognises excellence across four key pillars, reflecting the priorities of the Clean Hydrogen Partnership. One young scientist is honoured within each

pillar, and an additional researcher is named the “Best Researcher of the Year”. The 2026 competition will officially open for applications in June.

- **European PhD Hydrogen Conference**

The European PhD Hydrogen Conference (EPHyC) is the only event of its kind dedicated exclusively to PhD researchers in Europe working at the forefront of hydrogen innovation. EPHyC promotes a unique environment for high-level technical exchange and cross-border collaboration among early-career scientists, but what makes it truly unique is its "for PhDs, by PhDs" approach: while Hydrogen Europe Research provides the overarching leadership and organisational framework, the conference is driven by a dedicated team of PhD students who shape the program and technical content. The 2026 edition took place in Trondheim, Norway. From 1-3 June 2026. Known as a global center for energy research, Trondheim provided an exceptional setting for the next generation of researchers to share their work and expand their professional networks.

- **Women in Hydrogen Campaign**

To celebrate the role of women in hydrogen research, Hydrogen Europea Research has launched a dedicated space to promote gender diversity and inspire future generations of female professionals. Each month, we are sharing the stories of remarkable women from our membership advancing the hydrogen sector. These features will explore their journeys, celebrate their achievements, and spark conversations about building a more inclusive and equitable future for the industry. In 2026, we joined forces with Women in Green Hydrogen, turning this initiative into a shared campaign. This collaboration broadens the scope of the campaign and helps us showcase an even wider range of profiles and career paths across the hydrogen value chain. By bringing our communities together, we strengthen visibility, encourage exchange, and better reflect the diversity of roles and expertise shaping the future of hydrogen.

6. Op-ed by Professor Luigi Crema, President of Hydrogen Europe Research

Europe’s Hydrogen Future Will Be Decided by Research — Not Only by Markets

Europe is moving decisively towards a hydrogen economy. New infrastructure is being planned, industrial projects are emerging, and governments are introducing policies to support deployment. Yet a fundamental question remains: will Europe simply build a hydrogen market, or will it also lead the technologies and industrial ecosystems behind it?

This distinction matters.

Unlike previous energy eras, where strategic advantage often depended on access to natural resources, Europe’s hydrogen future will largely depend on technological capability: developing competitive electrolysers, advanced materials, efficient storage solutions, resilient infrastructure and integrated industrial value chains.

Hydrogen is therefore not only an energy challenge. It is a test of Europe’s ability to transform research excellence into industrial leadership.

Europe starts from a position of strength. Over the past two decades, collaborative programmes such as the Fuel Cells and Hydrogen Joint Undertakings and the Clean Hydrogen Partnership have helped create one of the world’s most advanced hydrogen innovation ecosystems. Universities,

research centres, industry and public authorities have worked together to accelerate innovation across the entire value chain.
However, Europe now faces a scale-up challenge.

Many hydrogen technologies have reached high levels of maturity but still struggle to move from demonstration to large-scale deployment. Costs remain high, infrastructure development is uneven, permitting procedures are complex and investment certainty is often insufficient. At the same time, global competition is accelerating rapidly.

The United States has mobilised major incentives through the Inflation Reduction Act. China is expanding manufacturing capacity at unprecedented speed. Japan and South Korea continue to invest strategically across the entire hydrogen value chain.

Europe risks creating a large hydrogen market while increasingly depending on technologies developed and manufactured elsewhere.

This is why research and innovation remain strategically essential. Competitiveness does not emerge automatically once a market exists. It is built through long-term investment in research, industrial coordination, skills and technology leadership.

Ireland offers an interesting perspective within this broader European landscape. The country possesses significant renewable energy resources, particularly offshore wind, and is progressively strengthening its participation in European hydrogen research and innovation networks.

Ireland faces challenges in relation to a convergence of research on the role of hydrogen in a net zero economy in order to overcome the investment uncertainty which is required to bridge the infrastructure gaps between pilot projects and a commercially viable and enduring market.

The creation of hydrogen valleys is crucial to developing real-world ecosystems that demonstrate hydrogen's role in a net-zero economy, from production and infrastructure to industrial applications and mobility. By showcasing tangible projects and benefits on the ground, hydrogen valleys can help build public support and strengthen understanding of hydrogen's contribution to the energy transition.
The broader European challenge is therefore not only technological but also organisational. Research efforts, industrial strategies and national policies remain too fragmented. Europe needs stronger alignment between research, industrial deployment and market development.

As Europe redefines its industrial strategy around competitiveness, resilience and strategic autonomy, hydrogen research and innovation are no longer peripheral topics. They sit at the heart of Europe’s future industrial model.

Europe does not lack talent, scientific excellence or industrial capability. The real challenge is whether it can coordinate these strengths quickly and coherently enough to remain a global leader in the hydrogen economy it is helping to create.

Professor Luigi Crema, President of Hydrogen Europe Research

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