

Hydrogen valleys: building a European clean energy system



The Clean Hydrogen Partnership is funding hydrogen valleys. Covering the entire value chain, they aim to establish regional 'green' ecosystems covering hydrogen production, storage, distribution, and final use. They are the stepping stones to a hydrogen economy that contributes to Europe's green hydrogen economy and energy security.

Creating integrated systems

For hydrogen to be a cost-effective clean energy solution, an integrated system of production and use is needed. BIG HIT, on the Orkney Islands, Scotland, developed a model for how this can be done for heat, power and mobility. HEAVENN is connecting four hydrogen project clusters in the northern Netherlands. The hydrogen ecosystem being developed by GREEN HYSLAND on Mallorca, Spain, will help decarbonise the tourism, transport, industry and energy sectors.

BIG HIT, which ended in April 2022, has shown the value of using hydrogen for energy production and storage on islands. The project created the [Hydrogen Territories Platform](#) to share information and methodologies that projects like HEAVENN and GREEN HYSLAND are using to develop their own integrated systems.

Strength in numbers

Building on the work of the Fuel Cell and Hydrogen JU (the predecessor of the Clean Hydrogen Partnership), and working with regions across Europe, the partnership has, since 2014, pursued the initial concept of hydrogen territories, which have evolved into hydrogen valleys. Originated in Europe, the hydrogen valley concept is now being mirrored elsewhere across the globe. Its flagship projects BIG HIT, HEAVENN and GREEN HYSLAND were the first successful projects in this direction.

There are now more than 60 hydrogen valleys at various stages of development in Europe. One of the main goals of the Clean Hydrogen Mission – co-led by the European Commission – is to facilitate the delivery of 100 large-scale integrated hydrogen valleys worldwide by 2030.

To further support these efforts, the European Commission has allocated EUR 200 million to help double the number of hydrogen valleys in Europe.

FROM IDEA TO IMPLEMENTATION: BARRIERS TO HYDROGEN VALLEYS

Successful and viable business cases are necessary for setting up hydrogen valleys. This is subject to attracting public-private financing and securing off-take commitments. Other barriers include successful governance models, regulatory provisions, political support, a qualified workforce and public acceptance.

TAKING THE LONG VIEW

The outcomes of BIG HIT, HEAVENN and GREEN HYSLAND, together with best practices on the Mission Innovation Hydrogen Valley Platform, supported by the JU under Clean Hydrogen Mission, are helping to showcase hydrogen valley flagship projects across Europe, and worldwide. Intended as a platform for project developers, it encourages cooperation and helps to replicate similar concepts elsewhere.

The goal? To demonstrate that integrated hydrogen ecosystems make techno-economic sense. **Key results?** The Clean Hydrogen Partnership has selected nine valleys following its 2022 call for proposals and grants have been signed for most of them. They include two cross-border hydrogen ecosystems: the North Adriatic hydrogen valley and a transnational Baltic Sea valley, each producing at least 5 000 tonnes of hydrogen/year. Seven smaller hydrogen valleys, producing at least 500 tonnes/year each, are based in countries with no or few hydrogen projects: Bulgaria, Greece, Ireland, Italy, Luxembourg, and Turkey. Four additional valleys have been selected under the 2023 call for proposals.



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https://www.clean-hydrogen.europa.eu/index_en

<https://h2v.eu/hydrogen-valleys>

<https://www.bighit.eu/>

<https://heavenn.org/heaven-projects/>

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Clean Hydrogen Partnership



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KEY ACHIEVEMENTS

26 regions across Europe supported by the Clean Hydrogen Partnership under the **Project Development Assistance I and II** initiative.

EUR 143 million JU funding awarded to 12 new European hydrogen valleys across Europe (with hydrogen production ranging 500 to 5 000 tonnes per year each)

Project level

Models for project governance and delivery developed and implemented

A new-build green hydrogen-powered vessel, the Antonie, is being developed by HEAVENN partners to transport salt between Rotterdam and Delfzijl, replacing 120 trucks per trip.

HEAVENN partner, the Municipality of Hoogeveen, has started building a **hydrogen pipeline network** to heat newly built homes in Nijstad-Oost and connect existing homes in Erflanden .

Main elements of the GREENHYSLAND hydrogen valley have been deployed, including a 2.5 MW electrolyser fed with photovoltaic power, two tube-trailers for hydrogen distribution and 5 hydrogen buses

A replicability tool developed by BIG HIT is being continued in HEAVENN and GREEN HYSLAND to encourage the initiation of Hydrogen Valleys elsewhere

IMPACTS

Additional **EUR 200 million** allocated to the Clean Hydrogen Partnership through the Horizon Europe Programme as part of the RePowerEU plan to accelerate deployment of hydrogen valleys in Europe

More than **60 European regional authorities** in 14 EU countries are involved in the European Hydrogen Valleys Partnership, created in June 2019 to share information, promote investment and develop regional hydrogen policy plans

60 hydrogen valleys are under development in Europe, according to the Mission Innovation Hydrogen Valley Platform