Making an impact on the clean energy transition

MARKET UPTAKE

COMMUNITIES ENJOY CARBON-FREE LIVING IN HYDROGEN VALLEYS

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An integrated solution

The benefits of hydrogen as an energy source are greater when it is used for a range of applications, serving several industries and sectors in a territory, while complementing existing renewable energy sources. 'Green' hydrogen can be produced by electrolysis with excess electricity from renewable sources that cannot be absorbed by the grid. The hydrogen can be stored and used to produce electricity via fuel cells when renewable energy supply dips below demand.
On the Scottish Orkney islands, the BIG HIT demonstration project built an integrated hydrogen-based energy system that serves the whole community. Although the HEAVENN and GREEN HYSLAND projects only started recently, their ambition is to create hydrogen hubs in the northern Netherlands and on the Spanish island of Mallorca, respectively, by cooperating with several international partners.

Creating hubs of hydrogen production, distribution and use can help regions become energy self-sufficient and reduce carbon and greenhouse gas emissions. Three FCH JU-funded demonstration projects are showing how these 'hydrogen valleys' can be replicated and contribute to economic growth.

Building replicable models

In BIG HIT, energy curtailment from wind and tidal turbines on the Orkney islands of Eday and Shapinsay is used to produce up to 50 tonnes per year of 'green' hydrogen through electrolysis. This heats a local school and is transported by sea to the largest town of Kirkwall, where it powers a 75-kW fuel cell providing heat and power for harbour buildings, a marina and three ferries, and supplies a hydrogen refuelling station for 5 delivery vans.
GREEN HYSLAND, launched on Mallorca in February 2021, will be the first southern European hydrogen flagship project. It aims to generate, distribute and use at least 360 tonnes of hydrogen per year, produced from solar energy. The project will create skilled jobs and economic growth in the energy sector, helping the island recover from the COVID-19 pandemic.

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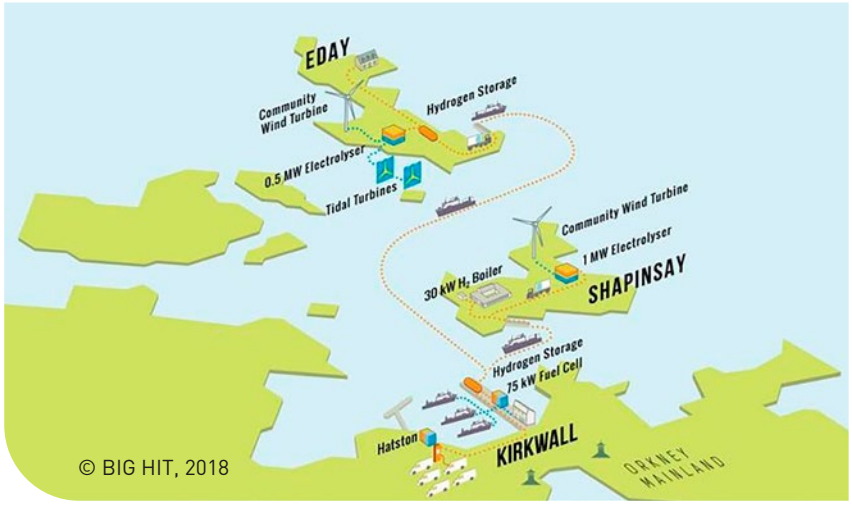
A TRIPLE BURDEN

Lack of regulations, access to funding and presenting a viable business case are the three main hurdles hydrogen valley projects face in their preparatory stages.

STRONGER TOGETHER

Whereas most hydrogen projects are individual initiatives, valleys combine several clusters, ensuring greater efficiencies, more off-take commitments and ultimately more support for the technology. HEAVENN spans six locations focused on four hydrogen-based areas of application: industry, homes, storage and infrastructure, and green mobility.

The goal? To support deployment of integrated fuel cell and hydrogen technologies across Europe, leading to decarbonisation, innovation, skills development and job creation. Interregional cooperation between public and private partners encourages information sharing and strengthens the business case for hydrogen and fuel cell (HFC) technologies. **Key results?** Hydrogen valleys develop local supply chains and expand the market for renewables. Their greatest benefits are energy self-sufficient communities and substitution of fossil fuels, resulting in cleaner air. The replicability of BIG HIT has led to the creation of the Hydrogen Territories Platform which includes a modelling tool enabling public entities and decision-makers to assess their business models for implementing HFC technologies.



KEY ACHIEVEMENTS

65 %
of the hydrogen valley projects are located in the EU

7
valleys are large-scale projects, with investments over EUR 500 million

2
valleys will each produce more than 500 H_2 tonnes/day

77 %
of hydrogen valley projects in Europe plan to expand their current scope

80 %
of Europe's hydrogen valleys are based on a power-to-mobility business model

EUR 10 MILLION
grant from the FCH JU for GREEN HYSLAND is the second-largest grant to a 'green' hydrogen project

IMPACT

FULLY-INTEGRATED
and functioning hydrogen valleys serve as a blueprint for replication

'Green' hydrogen
is used across the entire value chain, from production and supply to end-users

VALLEYS MAXIMISE
integration and use of renewable energy sources

BIG HIT
is a pioneering hydrogen fuel cell energy system resulting from international cooperation

GREENHOUSE GAS
emissions reduced by 330 tonnes per annum CO_2 equivalent by BIG HIT

FIND OUT MORE

www.fch.europa.eu/page/fch-ju-projects
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FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

A partnership dedicated to clean energy and transport in Europe

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