FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

Mission Innovation H_2 Valley Platform

Mission Innovation
Hydrogen Valley
Platform
www.h2v.eu

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Strong public-private partnership with a focused objective

A combined private-public of more than 2 billion Euro has been invested since 2008 to bring products to market readiness

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

Hydrogen Europe
Industry grouping
>185 members
50% SME

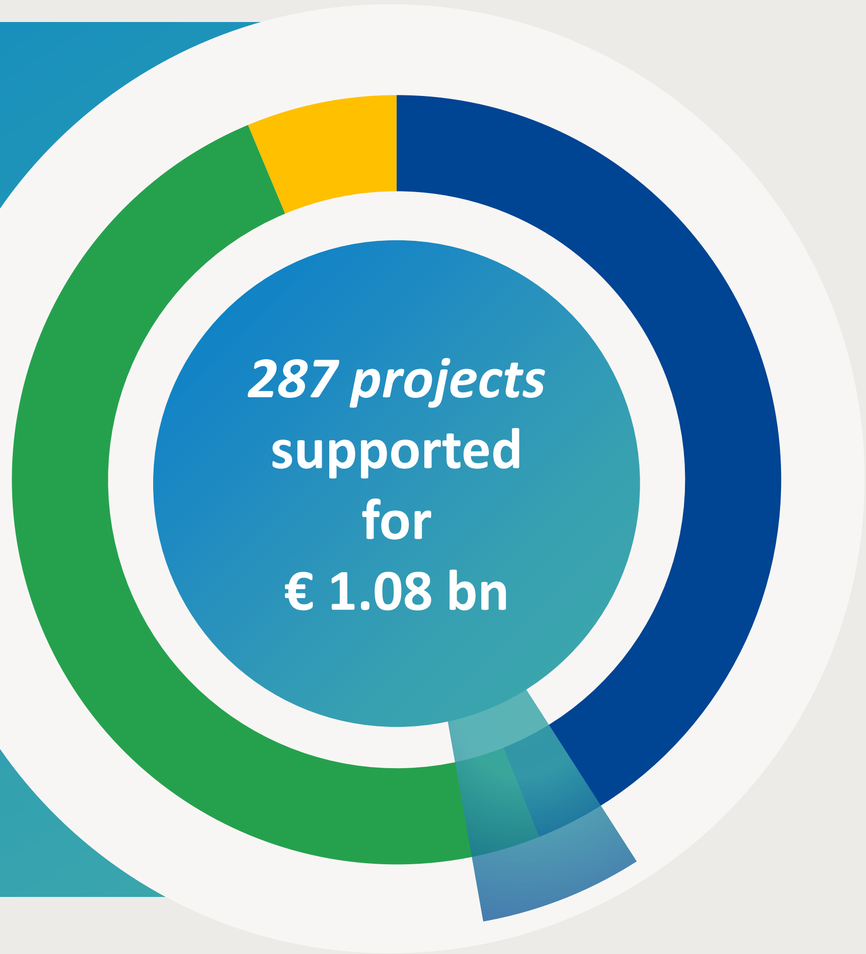
European Commission

Hydrogen Europe Research
Research grouping
83 members

Energy
H_2 production and distribution
H_2 storage
F/C for CHP

Transport
Road vehicles
Non-road vehicles
Refueling infra
Maritime, rail and aviation applications

Cross-cutting
standards, safety, education, consumer awareness, GoO…



45 %
€ 481 mn
153 projects

41.4 %
€ 443 mn
77 projects

6.3 %
€ 67 mn
48 projects

7.3 %
€ 79 mn
7 projects

Similar leverage of other sources of funding: € 1.08 bn

The Hydrogen Valley Platform

Offers a variety of insights into projects globally and also provides a way to connect

Global map of leading Hydrogen Valley projects

Project profiles, best practices, development toolbox

www.h2v.eu

Matchmaking section to connect with project developers

Aggregated data analyses based on primary data

The Hydrogen Valley Platform is a global information sharing platform for project developers, policy makers and industry alike

The Hydrogen Valley Platform…

>…is developed by the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) at the initiative of the Mission Innovation (MI) IC8 Member States

>…provides comprehensive information on large-scale hydrogen projects, in the following called **Hydrogen Valleys**

>…presents the results of a comprehensive survey in which the **Hydrogen Valleys participate**

Data is collected globally from large- scale Hydrogen Valleys

Our Mission is to…

>…advance the **clean energy transition**

>…promote the emergence and the implementation of **Hydrogen Valleys to build regional hydrogen economies**

>…foster **peer-to-peer exchange** among the Hydrogen Valleys

>…**raise awareness** among policy makers

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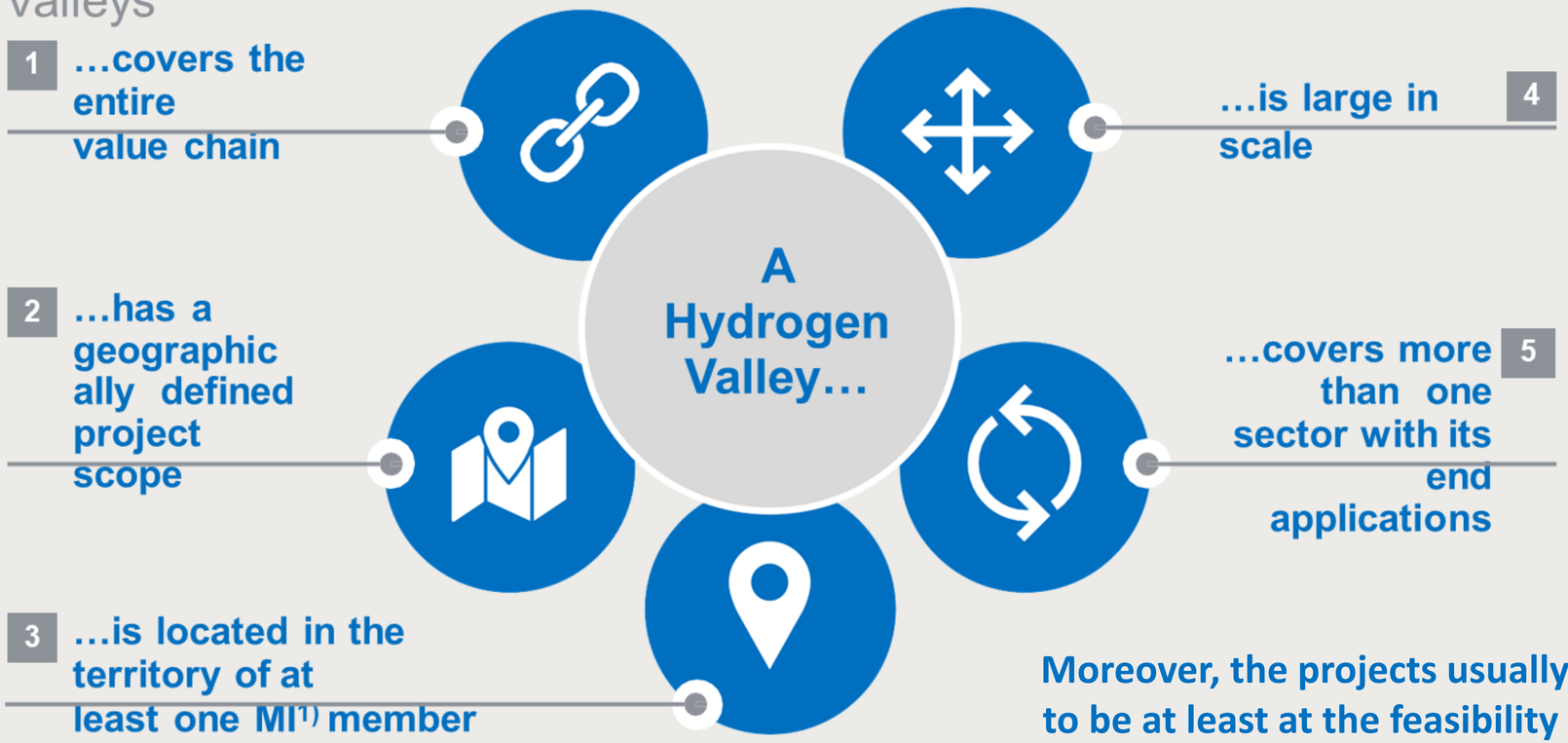
What is a Hydrogen Valley ?

The selection of the Hydrogen Valleys is based around five key criteria

Selection criteria of Hydrogen Valleys



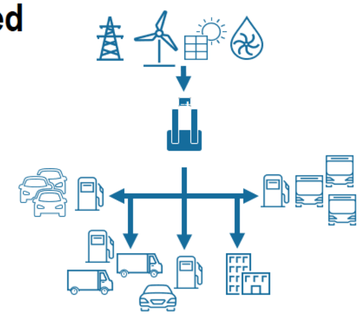
Moreover, the projects usually have to be at least at the feasibility stage

Different projects, common themes

Three basic archetypes of Hydrogen Valleys

Archetype 1:

Local, small-scale & mobility-focused

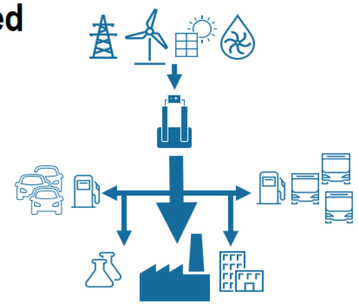


> Local (green) hydrogen production projects serving mobility applications
> Key focus is on aggregating consumption volumes and sharing refuelling infra (e.g. HRS)
> Legacy of mobility/electrolyzer demo projects
> Mostly led by public-private initiatives

Examples: Hyways For Future (Germany), Zero Emission Valley Auvergne-Rhône-Alpes (France), Hydrogen Valley South Tyrol (Italy)

Archetype 2:

Local, medium-scale & industry-focused

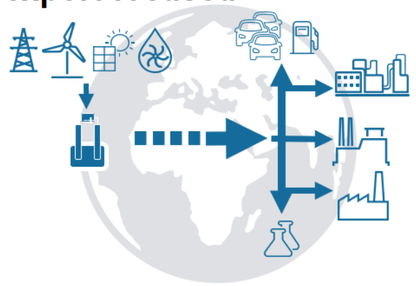


> Local (green or blue) hydrogen production projects centered around 1-2 large off-takers as "anchor-load", smaller mobility off-takers as add-on
> Making use of existing infra around industrial plants, often replacing grey H2 supply
> Mostly led by private sector

Examples: Basque H_2 Corridor (Spain), Advanced Clean Energy Storage (USA), HyNet North West England (UK)

Archetype 3:

Larger-scale, international and export-focused



> Large-scale projects with low-cost (green or blue) production, ultimately aiming for long-distance hydrogen transport to large off-takers abroad
> Focus on connecting supply and demand internationally
> Mostly led by private sector

Examples: Eyre Peninsula Gateway (Australia), Blue Danube (IPCEI), Green Crane (IPCEI)

https://www.h2v.eu/analysis/reports

Hydrogen Valleys have become a global phenomenon

Integrated projects are emerging all around the world

A fast-growing landscape of globally leading projects …

Netherlands
> HEAVENN
> Hydrogen Delta
> H2 proposition Zuid-Holland/Rotterdam
> Port of Amsterdam region

EU IPCEI
> Blue Danube > Green Crane
> Black Horse > New Green Flamingo
> Green Octopus

Germany
> H2Rivers/ H2Rhein-Neckar > Norddeutsches Reallabor
> HyBayern > eFarm > Hyways4 future

China
> Pearl River Delta (Foshan)
> Beijing-Zhangjiakou
> Rugao

Japan
> FH2R Fukushima

United Kingdom
> HyNet North West England
> BIG HIT Orkney Island

France
> Zero emission valley Auvergne-Rhône-Alpes
> Normandy Hydrogen Deployment Plan
> Hydrogen Territory Bourgogne Franche Comté
> CEOG, French Guiana

Chile
> Hydrogen Facility Initiative

USA
> ACES, Utah
> Port of LA, Shore to Store Project, California

Spain
> Green Hysland Mallorca
> Basque Hydrogen Corridor

Denmark
> HyBalance

Thailand
> Phi Suea House

Italy
> South Tyrolean hydrogen valley

Austria
> WIVA P&G

Australia
> Neoen Crystal Brook Energy Park
> Eyre Peninsula Gateway

Oman
> Green Hydrogen and Chemicals Oman

Countries with hydrogen valleys on the initial platform

Additional countries with major hydrogen valley activity where outreach is ongoing

… featured on the new platform

> 34 valleys from 19 countries

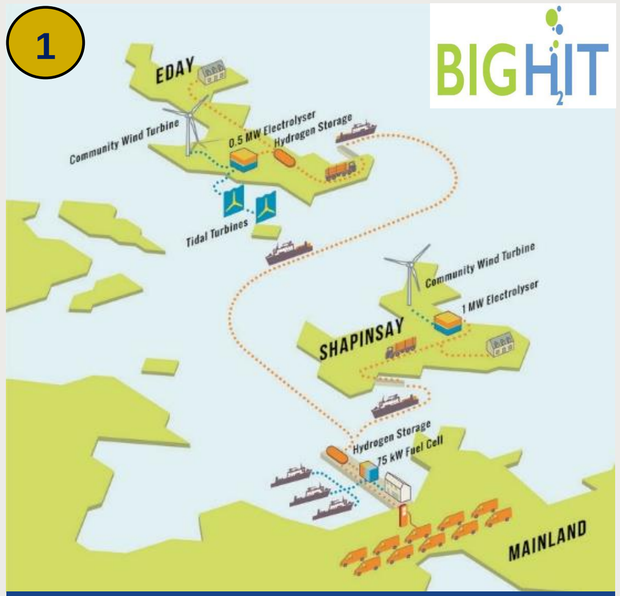
> 3,500 data points

10 in-depth best-practice profiles

Examples of Hydrogen valleys in Europe funded by FCH JU

Integration: Production of renewable H2, storage, distribution and end use (transport, stationary & industry)

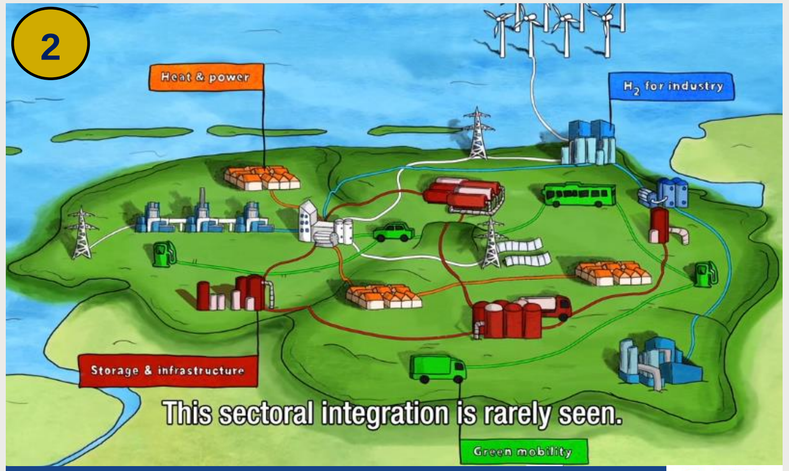
1



Orkney's Island (Scotland):

- H2 production by wind on Islands
- Storage and transportation by truck
- Use: heat (school), power (ferries) & mobility (municipality cars)

2



North Netherlands (Groningen):

- 31 partners (public + private)
- Electrolysis for green H2 production,
- H2 Mobility: buses, passenger cars and trucks
- H2 Refueling stations
- E-Kerosene for aviation
- H2 for an inland water transport barge
- Domestic Heat applications
- Underground H2 storage (Hystock)

3

Hydrogen Island (Spain)

- H2 production from solar
- H2 injection in gas-grid
- Use: heat (hotel, municipality buildings), power (port of Palma), mobility (buses)

Future Possible (cross boarder) H2 valleys: Ports, Airports, Industrial hubs, Logistical hubs, A H2 city (or area)

Hydrogen Valleys still need support

Release of the Final Report of Phase 1, key insights

Key remaining barriers for Hydrogen Valleys

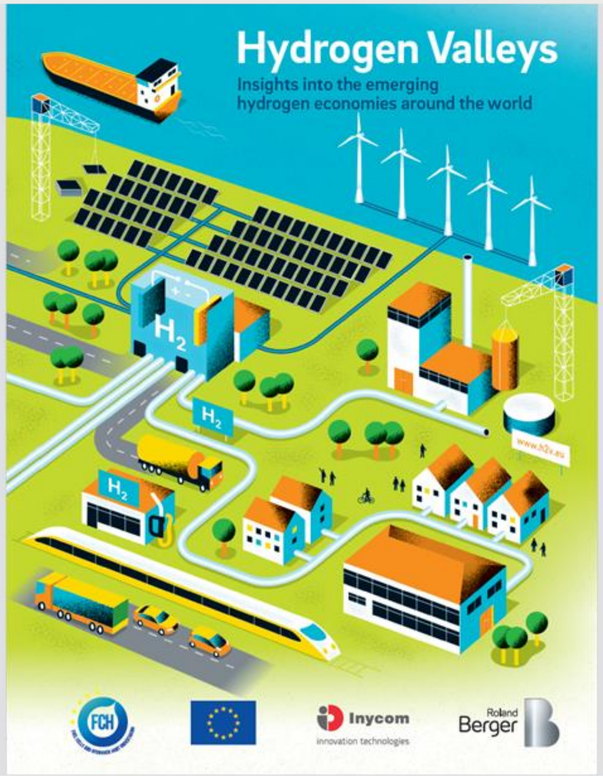
> Obtaining public funding support to close the remaining funding gaps

> Finding green hydrogen off-takers and signing long-term contracts to make projects bankable

> Ensuring technology readiness of all fuel cells and hydrogen applications required

> Ensuring adequate legal regulatory support (carbon pricing, standardization, fast permitting, etc.

More information available in the report



https://www.fch.europa.eu/publications/hydrogen-valleys-insights-emerging-hydrogen-economies-around-world

Alongside M.I. 2.0 the initiative will continue

The platform will be updated and further improved

>Alongside
Mission Innovation 2.0

>**Further development and enhancement** of the Mission Innovation Hydrogen Valley Platform

>Funded by the new **Clean Hydrogen JU**

Multi-Annual Research and Innovation priorities in the next Clean Hydrogen JU

Contribute to EU Green Deal and H2 Strategy, along H2 Alliance and IPCEI to decrease H2 production and distribution costs, while continuing to build an EU supply/value chain and strengthen EU competitiveness

Research and Innovation activities

Renewable H2 Production

1. Electrolysis
2. Other routes of renewable hydrogen production

H2 Storage & Distribution

1. Large scale storage
2. Hydrogen in natural gas grid
3. Liquid hydrogen carriers
4. Improving existing hydrogen transport means
5. Compression, purifications and metering solutions
6. Hydrogen refuelling stations

H2 End uses

Transport applications

1. Building blocks
2. Heavy duty vehicles
3. Waterborne applications
4. Rail applications
5. Aeronautic applications

Clean heat and power

1. Stationary fuel cells
2. Turbines, boilers and burners

Cross-cutting issues

Hydrogen Valleys

Supply chain

Strategic Research Challenges

Other activities

- Synergies
- JRC
- RCS SC
- EHSP
- S&CP
- KM
- International Cooperation
- COMMS

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