Mission Innovation Hydrogen Valley Platform

Support to Mission Innovation – Innovation Challenge 8
Platform for Exchanges between Worldwide Initiatives on H2 Valleys

European Hydrogen Week

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European Commission

Hydrogen Valleys

Key Takeaways from the MI "Global Hydrogen Valley Platform" and Latest Insights on Project Development

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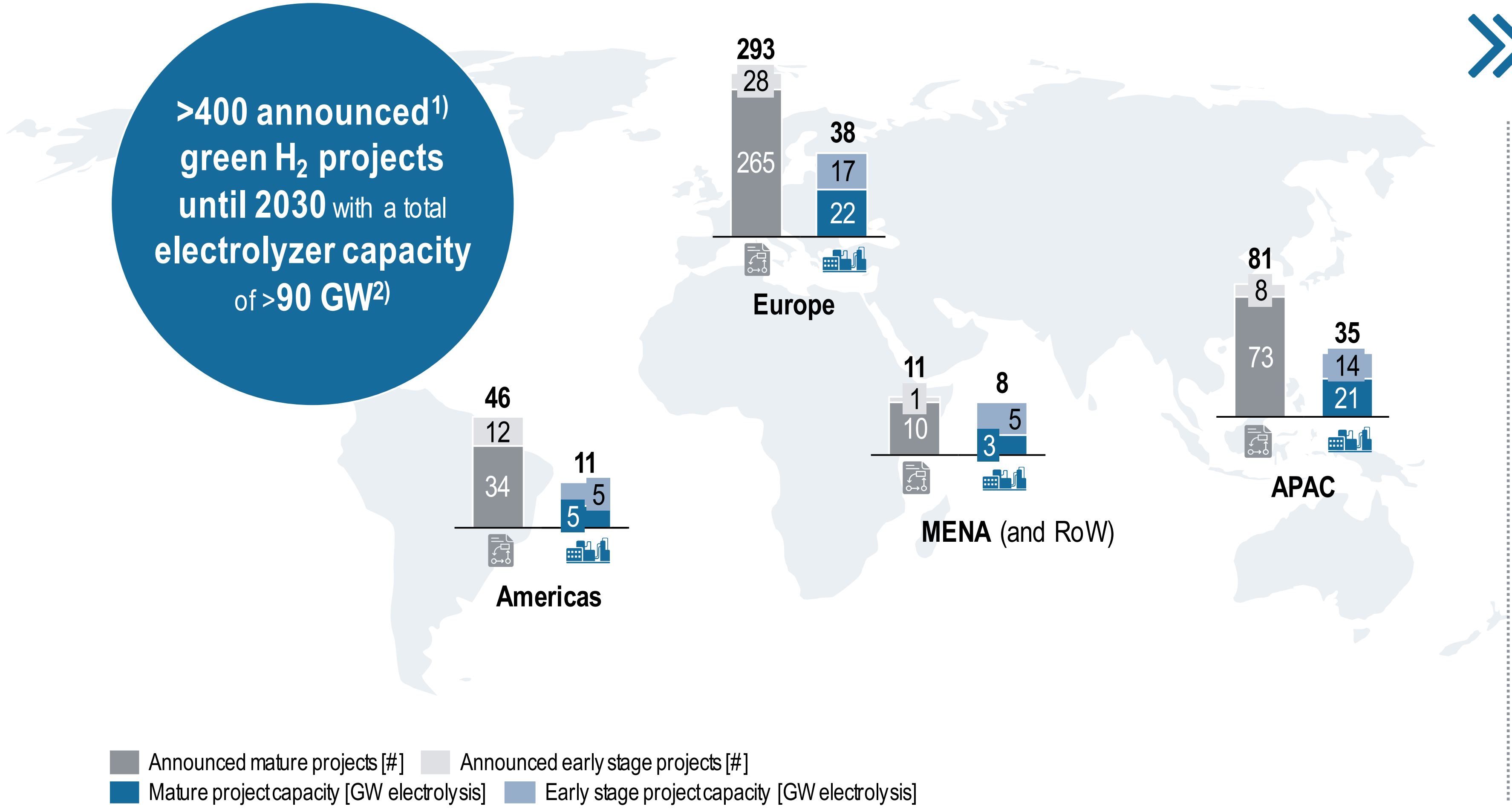
Are we arriving at the "age of projects" or "real assets" in the emerging New Hydrogen Economy? Indeed, a lot is happening



Clear trends and highlights

> **"More":** announced green H2 projects tripled over the past 12 months

> **"Bigger":** scale matters, more GW-scale projects out of ultra-low LCoH countries

> **"Actual FIDs?"** Still largely pending, in the absence of critical (regulatory) enablers

> **"Better together":** Strong integration along the hydrogen value chain – need for partnerships, de-risking

1) As of October 2021, incl. early-stage projects; 2) Announced Green H_2 project at early stage, e.g at concept design or press announcement stage;
3) Green H_2 projects that are at the feasibility study, design stage, FID, under construction, commissioned or operational
Source: IEA, Roland Berger H2 Project Database, FCH JU, Iny com

Originally a European concept, "Hydrogen Valleys" have become a global phenomenon – www.H2v.eu takes a closer look

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A fast-growing landscape of Hydrogen Valleys…

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

EU IPCEI
- > Blue Danube
- > Black Horse
- > Green Crane (West)
- > Green Octopus

Germany
- > H2Rivers/ H2Rhein-Neckar
- > HyBayern
- > Norddeutsches Reallabor
- > eFarm
- > Hyways4Future

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

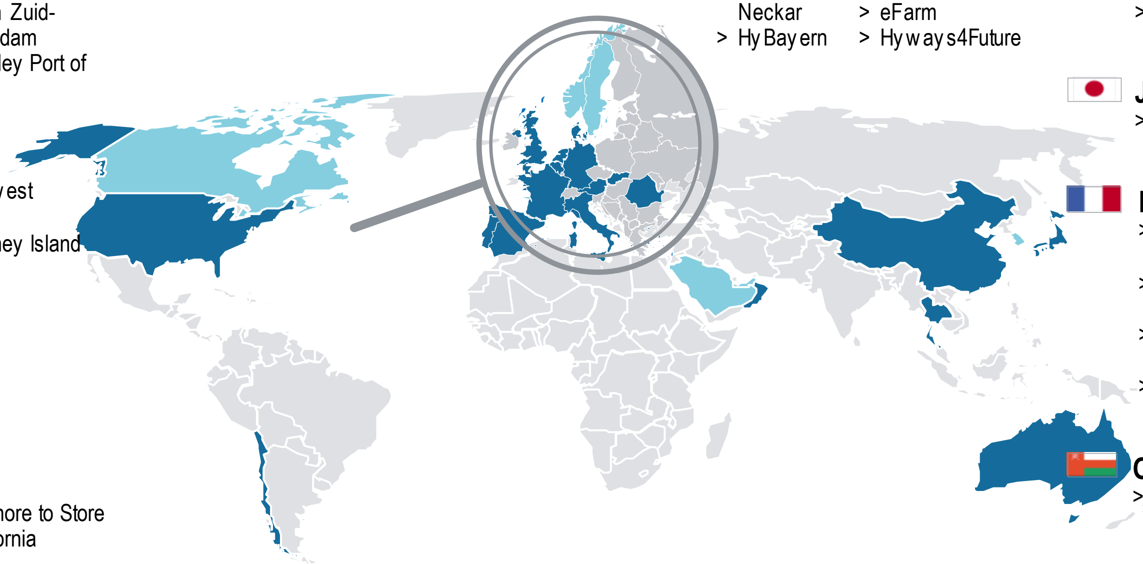
United Kingdom
- > HyNet Northwest England
- > BIG HIT Orkney Island

Japan
- > FH2R Fukushima

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



Oman
- > Green Hydrogen and Chemicals Oman

Spain
- > Green Hysland Mallorca
- > Basque Hydrogen Corridor (BH2C)

Denmark
- > HyBalance

Thailand
- > Phi Suea House

Italy
- > South Tyrolean hydrogen valley

Austria
- > WIVA P&G

Australia
- > Neoen Crystal Brook Energy Park
- > Eyre Peninsula Gateway

Countries with hydrogen valleys on the platform

Additional countries with major hydrogen valley activity where outreach is ongoing

… featured on a the platform www.H2v.eu

> 35 valleys from 19 countries

> 3,500 data points

10 in-depth best-practice profiles

Source: FCH JU, Inycom, Roland Berger

The platform gives comprehensive insights into the global state of development of Hydrogen Valleys

Key features of the platform

Hydrogen Valley **Profiles**

Global **Map** of Hydrogen Valleys

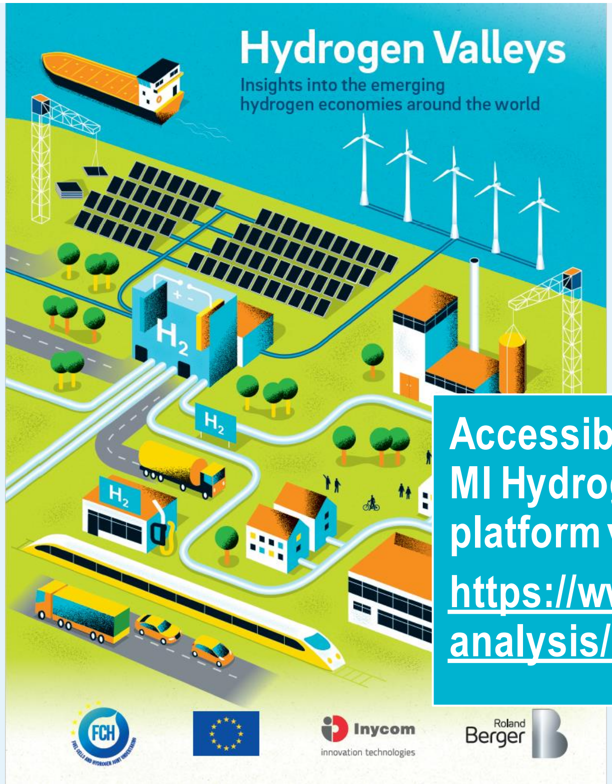
Aggregate, Dynamic Data **Analysis** (technologies, barriers, success factors, etc.)

Best Practices for Project Development

Toolbox for Early-Stage Project Development

Match-making function

Detailed analysis and recommendations available in a report



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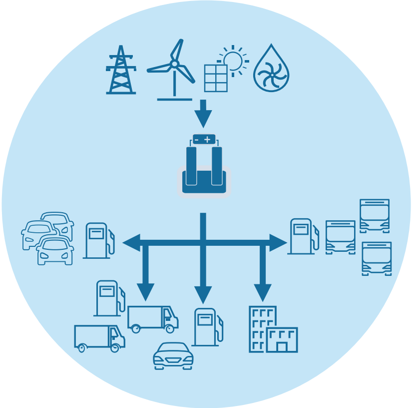
Accessible on the MI Hydrogen Valley platform via: https://www.h2v.eu/analysis/reports

Source: FCH JU, Inycom, Roland Berger

As integrated projects, the Valleys are as diverse as the sources and uses of hydrogen: We see three common archetypes

Archetype 1:

Local, small-scale & mobility-focused

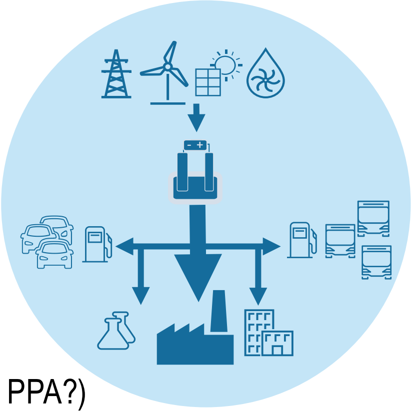


- **Local** (green) H_2 production
- **Serving mobility applications:** fleets of buses, trucks with (semi-)captive HRS
- Mostly **led by public-private initiatives,** often with long-term experience in H2
- Mostly located in Europe

Key challenges: Multitude of stakeholders involved (high complexity against comparatively low H2 volumes)

Archetype 2:

Local, medium-scale & industry-focused



- **Local** (green) H_2 production (grid, PPA?)
- Centered **around 1-2 large industrial off-takers** (e.g., refineries, fertilizer production) as "anchor-load", mobility off-taker as potential add-on
- Mostly **led by private sector**

Key challenges: Regulatory requirements (e.g., additionality), seamless integration with industrial processes, expansion limits

Archetype 3:

Larger-scale, international & export-focused

- **Large-scale projects** with low-cost (green) H_2 derivative production from dedicated RES
- **Aiming to connect supply and demand globally,** often phased implementation with initial phase for local / on-site offtake (industry, mobility)
- Mostly **led by private or large sovereign investors**

Key challenges: Regulatory enablers for long-term offtake commitments, technology at scale, transport solutions

Closed, regional ecosystems of H2 **production** ("scale"), **transport/storage** ("shared infrastructure") and **offtake** ("pooling demand") – increasingly underpinned by **long-term commercial arrangements**

Source: FCH JU, Inycom, Roland Berger

So what's next for Hydrogen Valleys? A packed agenda to sustain and expand the momentum

Short-term agenda for Hydrogen Valleys:

Priorities, needs and key steps ahead

- **More FIDs** for Archetype 2 and 3 projects
- Implementation of **regulatory enablers** in the lead markets
- Focus on **early commercial off-take routes**
- **Connecting multiple valleys** (e.g., H2 pipelines, HRS corridors)
- Expansion to **new "follower" markets**
- **Continued dialogue** among policy makers and project developers

Source: FCH JU, Iny.com, Roland Berger

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