

# Promoting Hydrogen Deployment in Regions and Valleys

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EUROPEAN HYDROGEN VALLEYS

27/10/2022



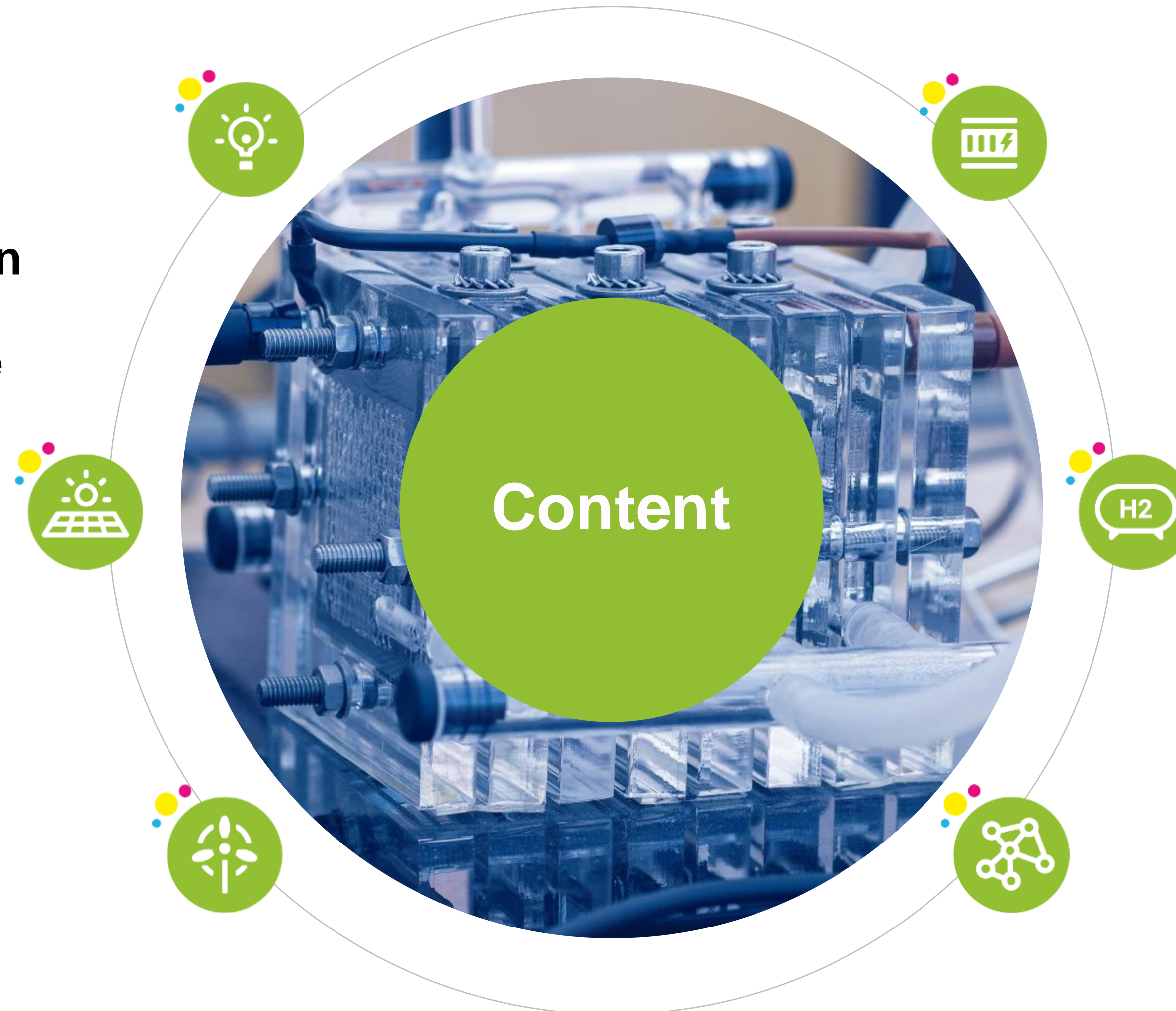


**1. H2V: Clean Hydrogen (JU) in action and its alignment with Climate Policies**

2. PDA – Project Development Assistance (I & II)

3. Mission Innovation 2.0 - H2Valley Platform

4. Main take-aways





# Hydrogen Valleys (H2V) - from RES to H2 off-take

Boost a new market by enabling Sector coupling, in a regional set up, to de-risk project deployment across the value chain

## European Green Deal (11/12/2019)

Clean Planet for All: net-0 GHG 2050

- European Industrial Strategy (10/03/2020)
- Recovery Plan for Europe (28/05/2020)
- Hydrogen Strategy (08/07/2020)  
Ely: 6GW-2024; 40GW-2030
- Energy Integration Strategy (08/07/2020)
- Clean Hydrogen Alliance (08/07/2020)
- Fit for 55 (14/07/2021)
- Gas Decarbonisation Package (15/12/2022)
- REPowerEU plan (18/05/2022)

NECPs' targets  
**Fit-4-55**

REPowerEU plan

55% CO<sub>2</sub> reduction  
45% Renewables  
36% final and 39% primary  
Energy Eff 2030

10Mt domestic RES H2 + 10Mt imported RES H2 by 2030  
Double H2V (~50) → EUR 200 mn (extra until 2025)  
H2 accelerator → build 17.5 GW electrolyzers by 2025

**5 H2Valley projects** -  
2016; 2019;  
2020; 2022 (2x)

**FCH Regions Initiative**  
(2016-2018) –  
92 MoUs; 1  
study; Mobility  
business case  
tool; Tech  
dossiers; etc.

**PDA I (2020)** – 11 direct  
support (up to total  
CAPEX of EUR 750 mn);  
24 Observer regions

**PDA II (2022)** – 15  
regions; Observer  
network

**MI2.0 H2V Platform**

**H2 Territories Platform**  
(HTP)

**Regions' Hub**

**European H2V  
Partnership (S3)**

## Synergies

- Technical Assistance to Member States & Regions (accelerate deployment; mobilise investment/co-funding)
- Seal of Excellence (H2V topics in 2022)
- Top-up by Member States
- Complementary funding from other R&I&D-relevant EU, national or regional programmes (e.g. CEF, ERDF, RRF, JTF)

## REPowerEU plan for H2Valleys

- 3 years of full support, targeting 50 H2V in EU by 2025 (EUR 200 mn)
- Gas Decarbonisation Package – sets clear and stable legal framework for H2V until 2030 (regulatory waiver) and beyond (unbundling)
- Mapping of H2V potential, its Stakeholders and creating a coherent pipeline to meet EU goals

Support and feedback to EU and MS Policies regarding a resilient and sustainable energy transition

Targeted action to achieve highest impact of taxpayers money



# The JU's region initiative was key to boost H<sub>2</sub> awareness in EU

The ~100 regions initiative led to the PDA, H2 Valley partnership and funding of H2Valley topics [https://www.clean-hydrogen.europa.eu/get-involved/fch-regions-hub-0\\_en](https://www.clean-hydrogen.europa.eu/get-involved/fch-regions-hub-0_en)

## (1) Project Development Assistance (PDA)



**Q2 2022 another PDA launched; focus on Cohesion countries, outermost regions and islands**

## (2) EU H<sub>2</sub> Valleys Partnership



<http://s3platform.jrc.ec.europa.eu/hydrogen-valleys>

## (3) Creation of H<sub>2</sub> valleys

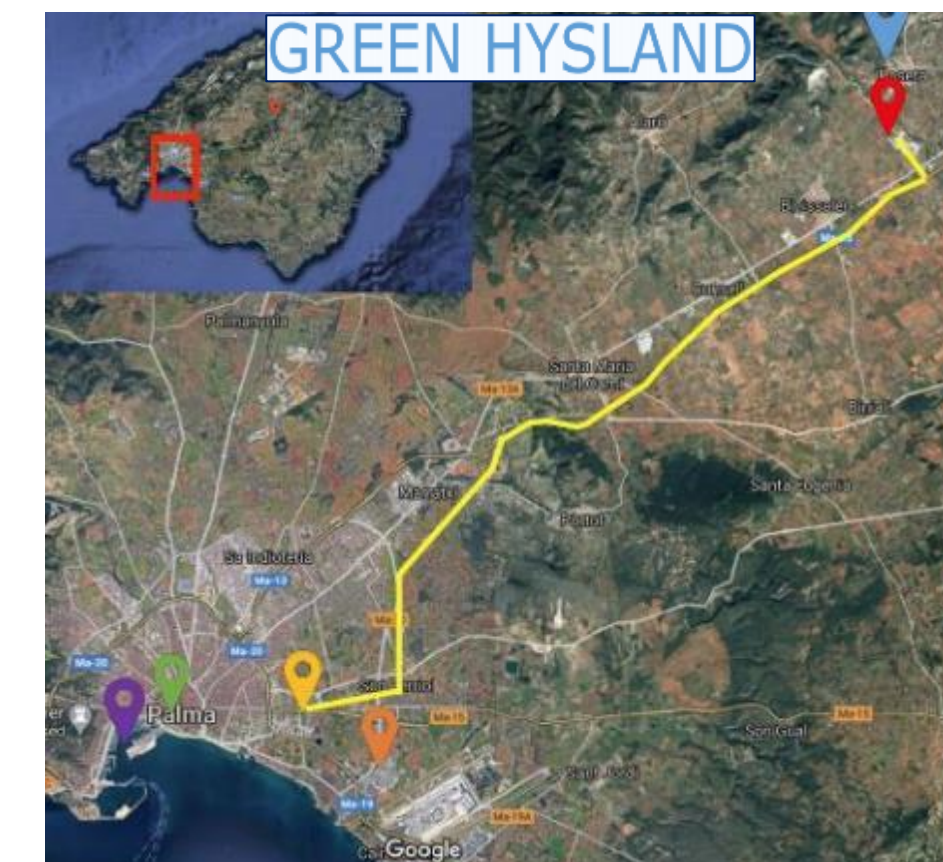
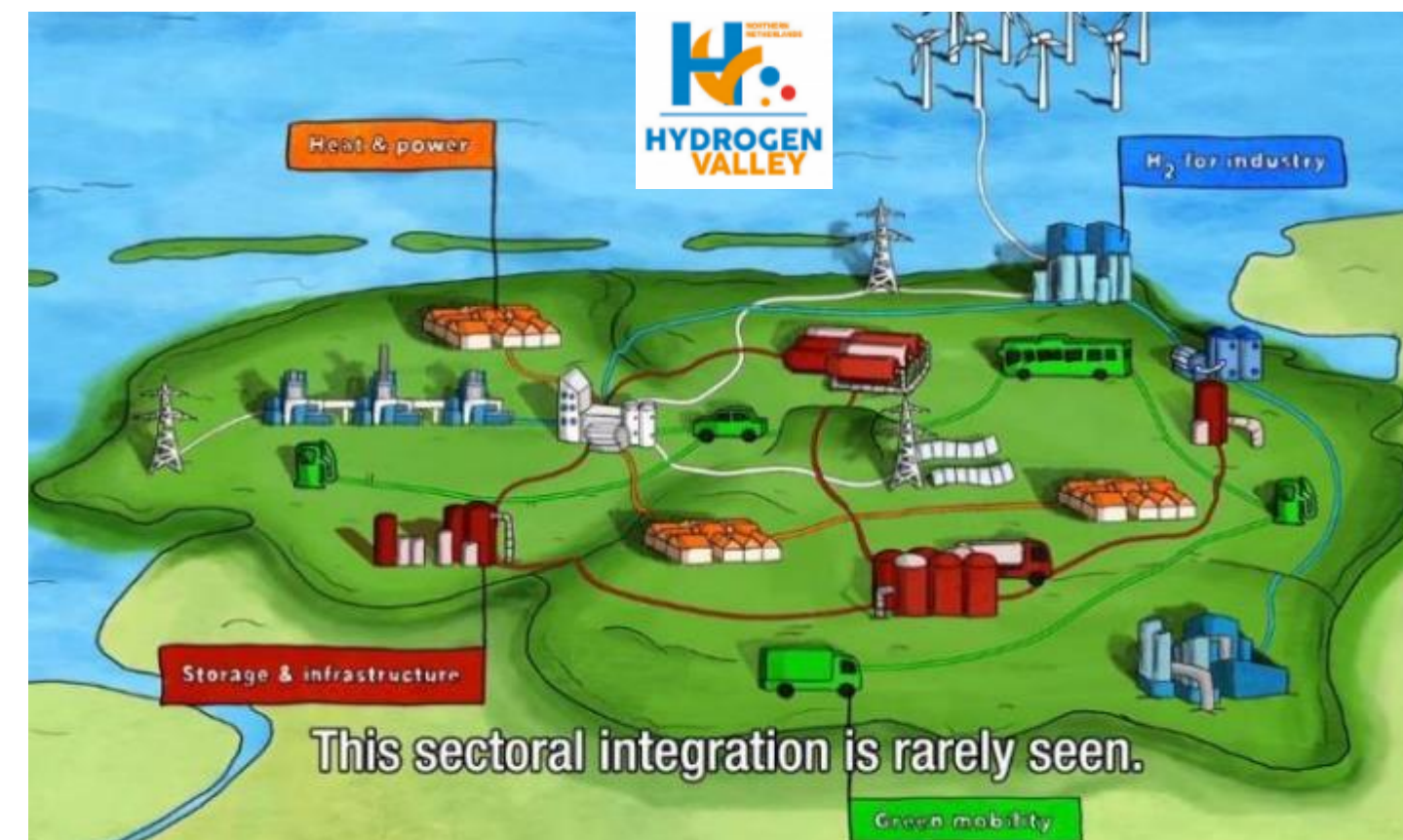




# Definition of a Hydrogen Valley

Used in the call topics and the Mission Innovation platform

*A Hydrogen Valley is a defined geographical area where hydrogen serves more than one end sector or application in mobility, industry and energy. They typically comprise a multi-million euro investment and cover all necessary steps in the hydrogen value chain, from production (and often even dedicated renewable electricity production) to subsequent storage and its transport & distribution to various off-takers.*





# Procurements relevant to H2Valleys and Regions

PROJECT DEVELOPMENT ASSISTANCE FOR  
REGIONS (I)

PROJECT DEVELOPMENT ASSISTANCE FOR  
REGIONS II

MISSION INNOVATION HYDROGEN VALLEYS  
PLATFORM (I & II)

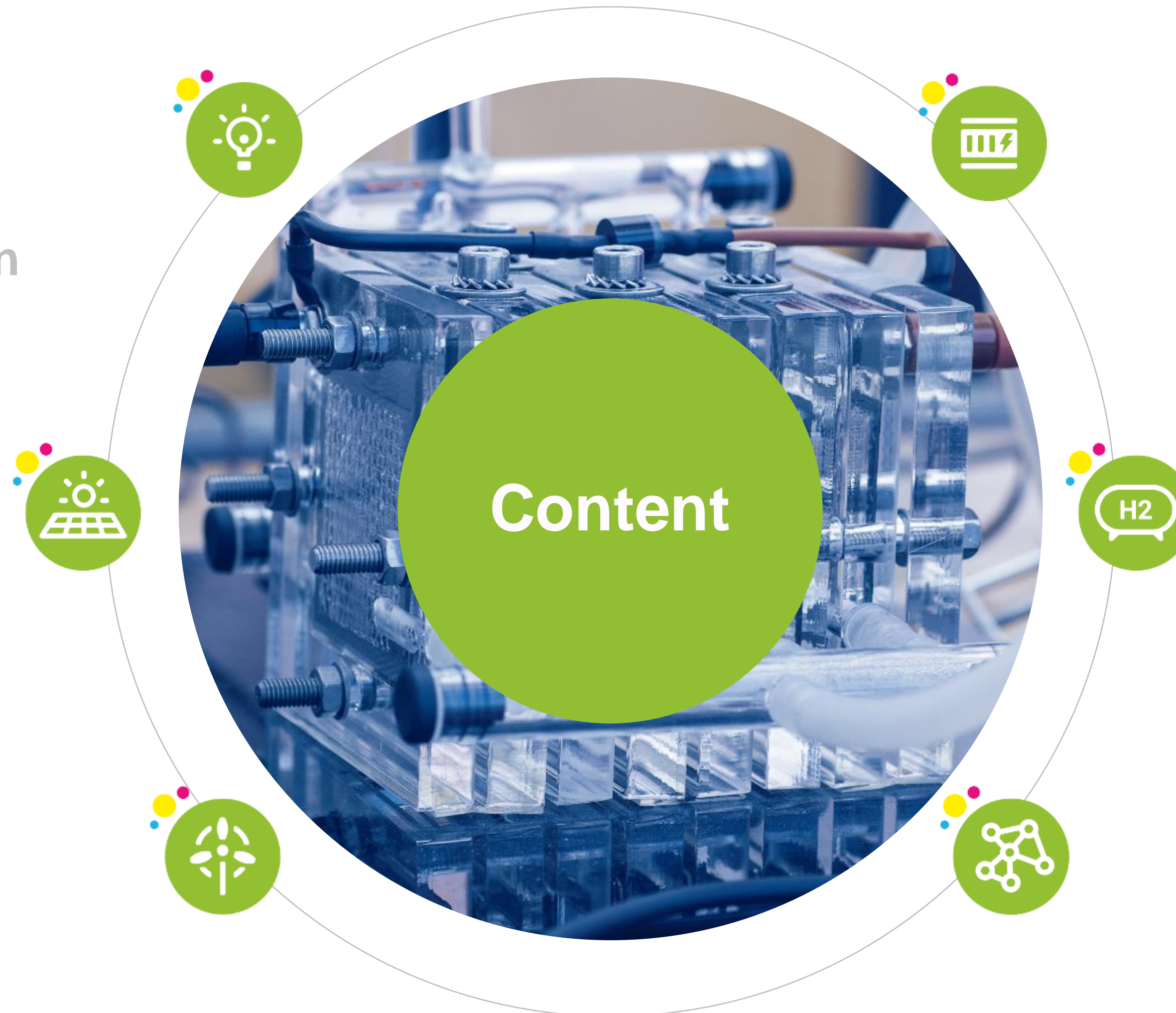


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Clean Hydrogen Partnership

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European Commission > Clean Hydrogen Partnership > Get involved > FCH Regions' Hub

### FCH Regions Hub

Navigation FCH Regions Hub | FCH Regions' Hub | Background Info | Latest News and Publications | More >

### Supporting European Regions and Cities Hub

The FCH-Regions' Hub supports regional and local authorities and other public bodies across the European Union to develop and turn their concepts for regional hydrogen and fuel cell (FCH) projects into detailed work plans. Raising awareness and providing project development assistance to regional FCH projects will further accelerate the deployment of hydrogen in Europe, contributing to carbon neutrality and zero pollution.

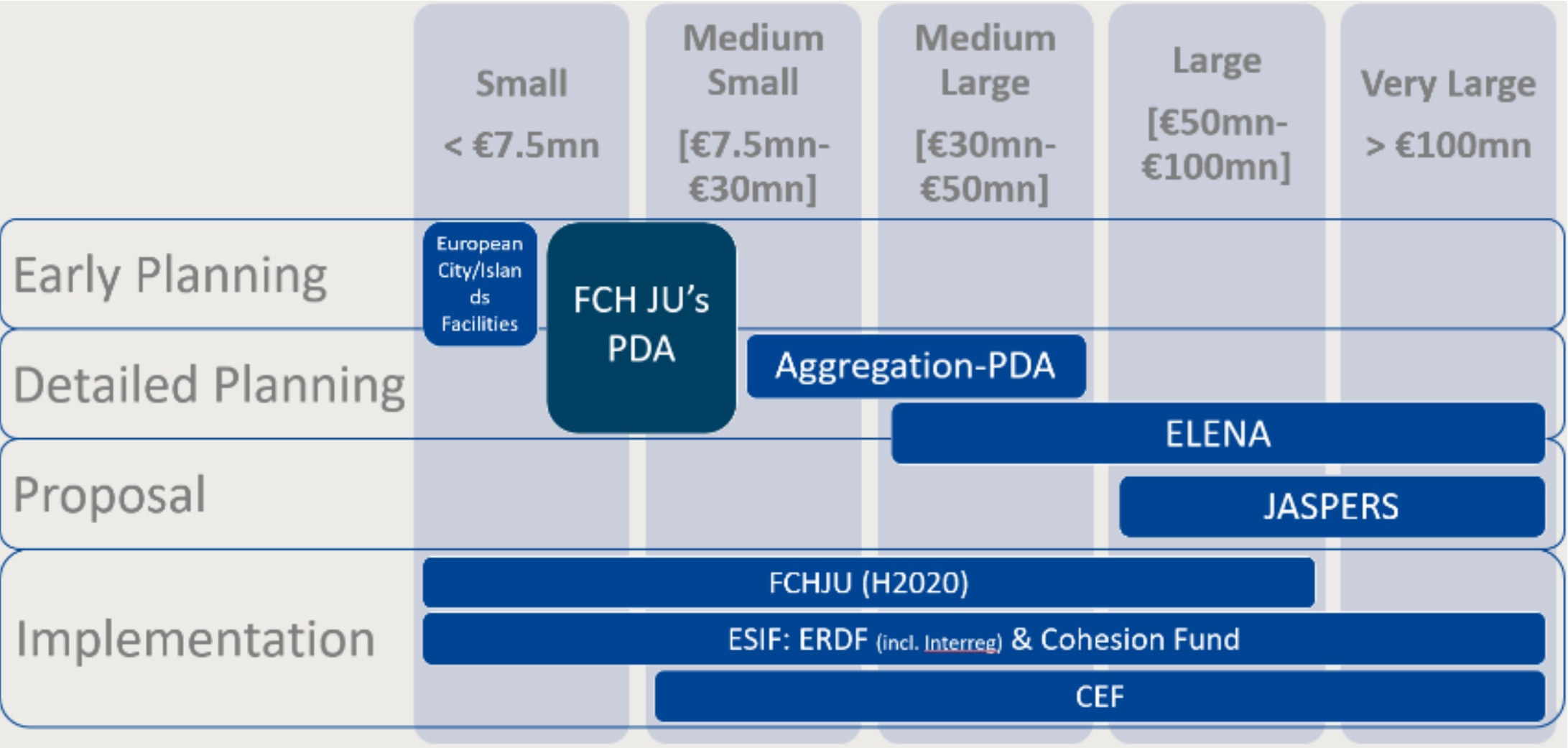
### How the FCH-Regions' Hub Works

The FCH-Regions' Hub concentrates the relevant information we gather within the funded projects, studies and initiatives. It further links you to specific external sources and complementary initiatives capable of assisting you in the endeavour of deploying your Regional FCH plans.

- Latest News and Publications
- PDA for Regions

### Hubs for regions

- Opportunities for other PDA support
- Initiatives to support networking among regions
- Tools to support the development of business models
- Reference Studies and Reports
- Demo Projects to access specific expertise on the deployment of different FCH
- H2 Islands



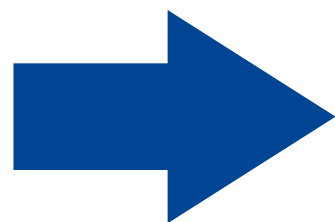
Type	Title
Initiative (S3P)	European Hydrogen Valley Partnership
Initiative	Clean Energy for EU Islands
Platform	Mission Innovation Hydrogen Valley Platform
Initiative	Covenant of Mayors. The world's largest movement for climate and energy actions
Association	CPMR - Conference of Peripheral and Maritime Regions

Type	Title	Source	Link	Last update
Technology introduction & preliminary business cases' dossiers	FCH Technology introduction & preliminary business cases' dossiers	FCH Regions Initiative (FCH JU: 2+26 PDF files)	All: - Technology Introduction Dossiers - Preliminary Business Cases Per applications:	
Business cases/models	Business models	Funding and Finance (FCH JU website)	<a href="https://www.fch.europa.eu/page/advice-complex-business-models">https://www.fch.europa.eu/page/advice-complex-business-models</a>	
Business cases/models	Teaser for Coupling wind farms (or any RES) and Electrolysers	Funding and Finance (FCH JU website)	<a href="https://www.h2v.eu/https://www.fch.europa.eu/page/advice-complex-business-models#PtH2">https://www.h2v.eu/https://www.fch.europa.eu/page/advice-complex-business-models#PtH2</a>	
Modelling tools	Mobility business case tool	FCH Regions Initiative (FCH JU Excel sheet)	<a href="#">Excel file</a>	27/03/2018
Funding tools	FCH Funding and Financing navigation tool	FCH Regions Initiative (FCH JU; Roland Berger; Excel sheet)	<a href="#">Excel file</a>	08/02/2018



## Project Development (11)

Concept



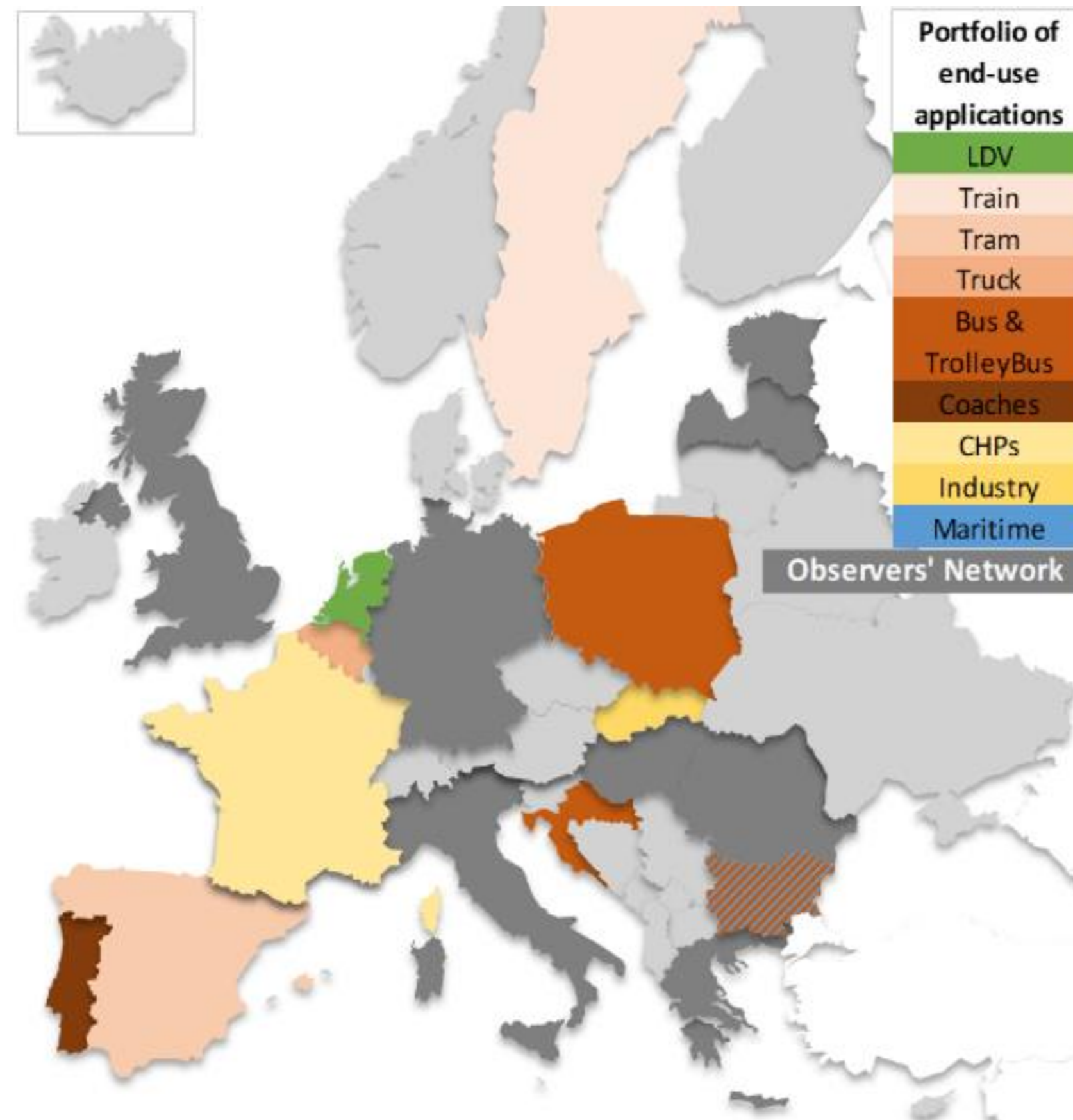
Plan

- Detailed project budgets
- Detailed project plans
- Financing and funding plans
- Strategies and best practices for procuring H2 tech

June-2020 – June-2021

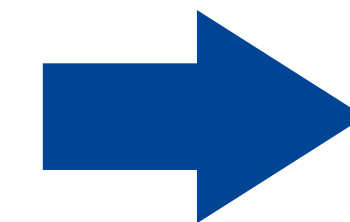


PROJECT DEVELOPMENT  
ASSISTANCE FOR REGIONS



## Observers' Network (+24)

Survey to  
define  
scope



Wide  
offer of  
webinars

### ■ Webinars

- 1<sup>st</sup> tech - FCH buses and trucks (15/10/2020)
- 1<sup>st</sup> peer review (17/11/2020)
- Funding & Financing (16/12/2020)
- 2<sup>nd</sup> tech - HRS and H2 distribution (11/02/2021)
- 3<sup>rd</sup> tech – H2 production (26/05/2021)

### ■ Database of suppliers

### ■ Request for Information (template)

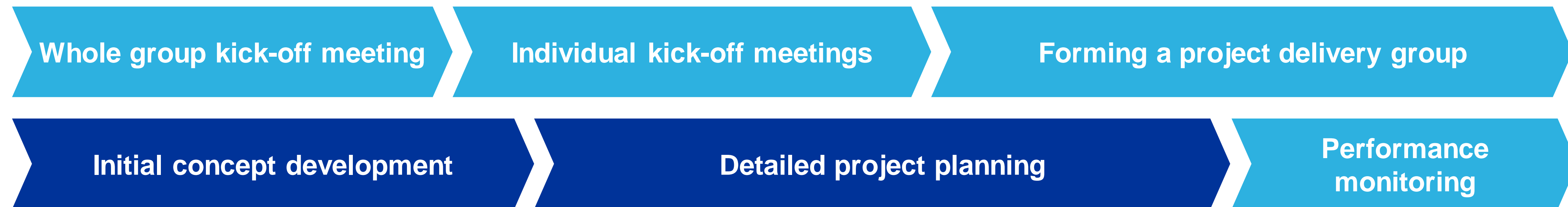
### ■ Policy ([white paper](#)) support for H2

### ■ [FCH Regions' Hub](#)



# How was PDA I delivered?

A standardised process but providing a tailored approach to each individual project



## What was offered in PDA I?

- Dedicated time with **hydrogen project consultants**
- Development of achievable **project implementation plans**
- **Connecting regions to industry** and technology suppliers
- Coordinating **project delivery groups**
- **Budgeting and business case analysis**
- Assessing and managing **project risks**
- **Engagement with regulators** to remove policy barriers

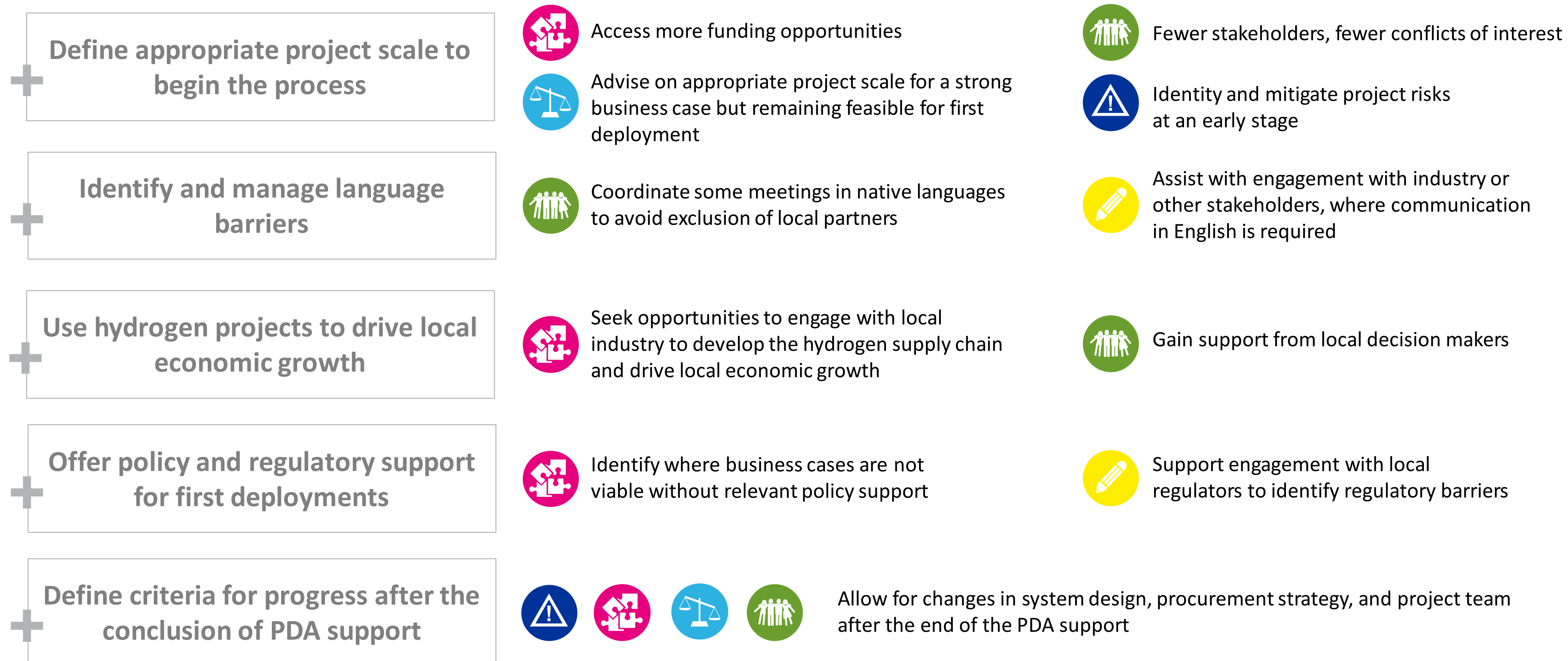
## What couldn't be offered in PDA I?

- Offer funding towards projects
- Writing of funding applications



# What has been learned from PDA I?

Key learnings to be carried into PDA II, especially focussing on EU13 countries





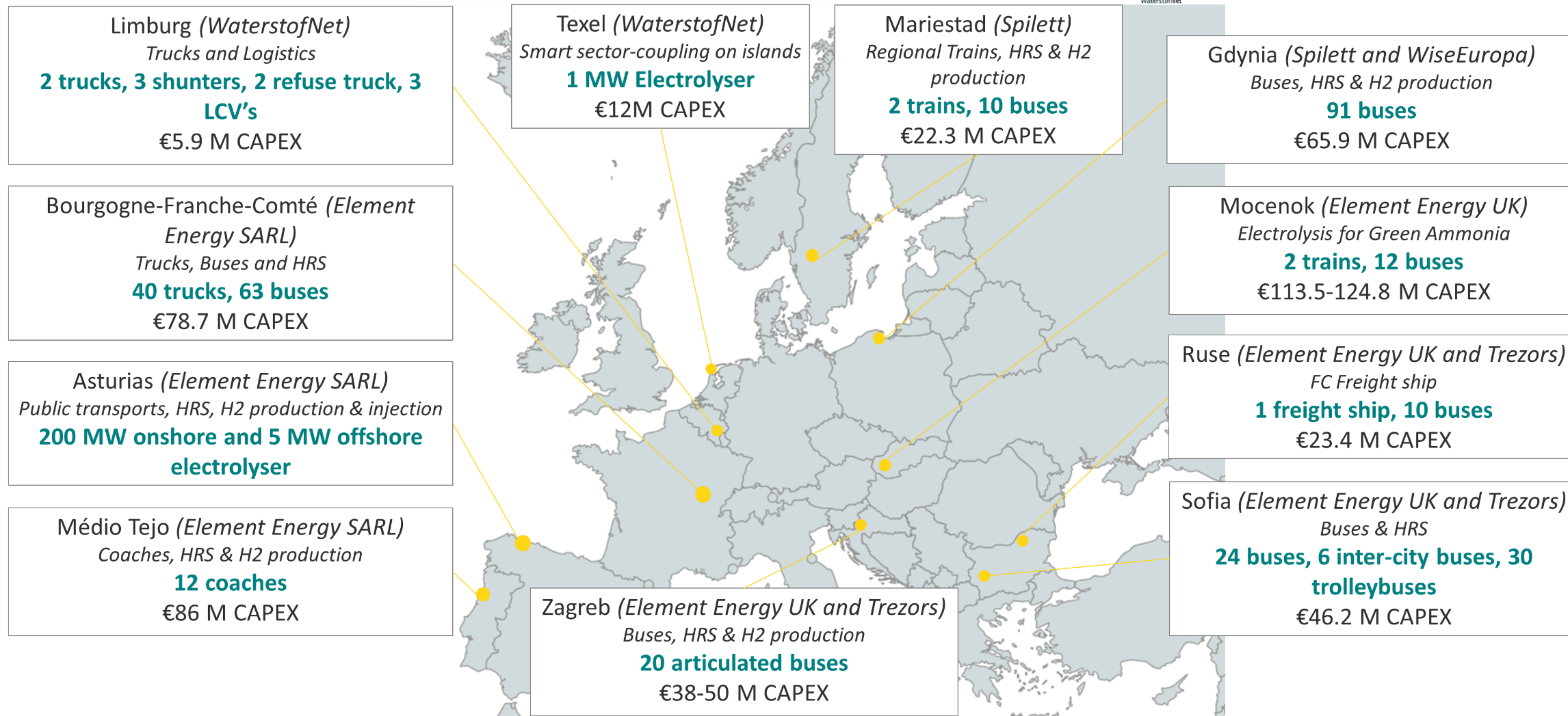
# PDA for Regions (I)

The supported regions and their projects.  
NEXT STEP: Projects' implementation

Led by:

Supported by:

12





# PDA for Regions II

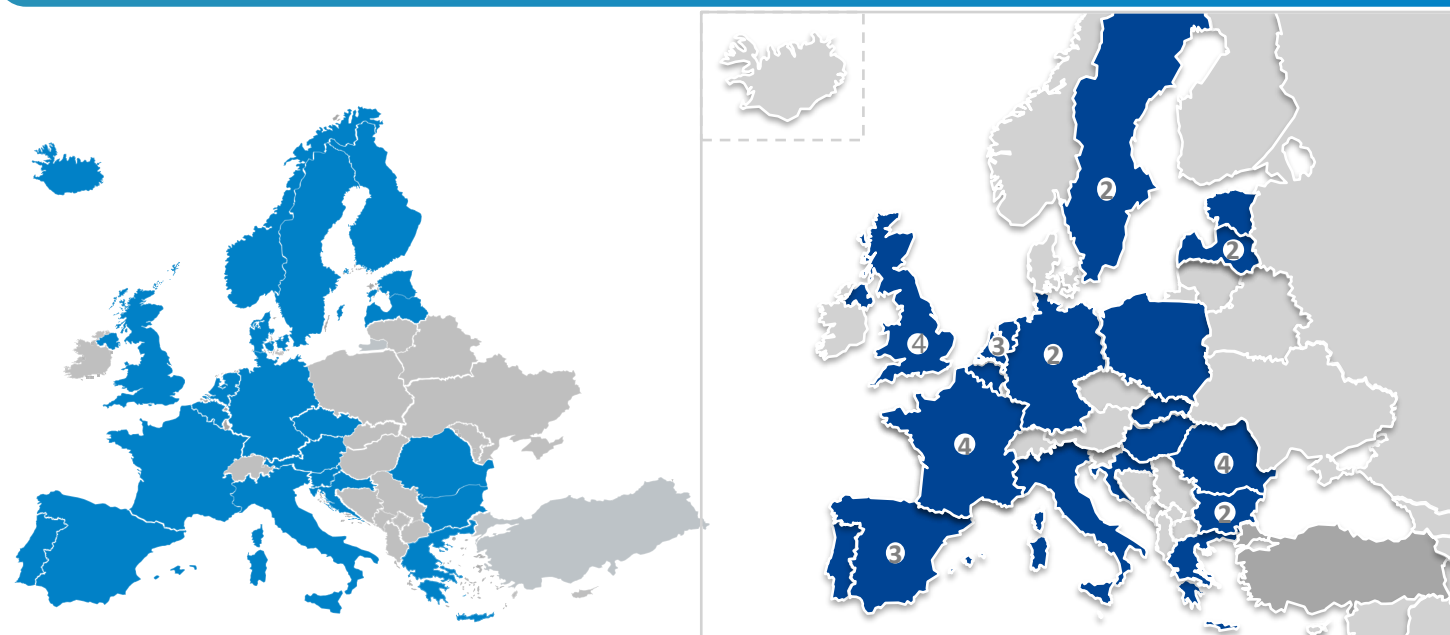
Focus on Cohesion Countries, Outermost Regions and Islands

## Planned Schedule:

- Call for EoI **21/10/2022** (deadline)
- Awarding: **Dec-2022**
- Implementation: **2023**

13

Supporting regions and cities in assessing various FCH applications ( $\frac{1}{4}$  of EU population and GDP)



## Build on the FCH Regions Initiative (2018) and its follow-up activities:

- H2Valley (2019)
- H2Island (2020), and
- PDA for Regions (2019-2021)

Support detailed project planning

Explore other geographies

Raise awareness for Funding and Financing community

## Tasks

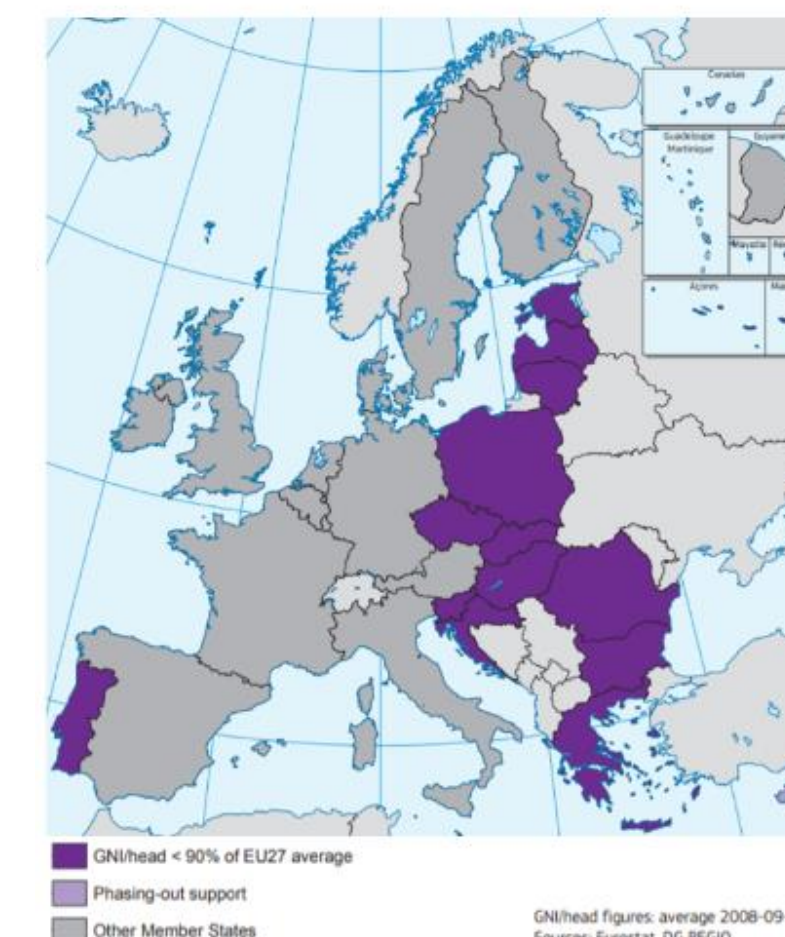
- Select at least 15 projects
- Provide PDA support to bring projects to a high level of preparedness
- Create Observers' Network(s) of inter-island, inter-regional and cross-city networks to generate specific blue prints
- Raise awareness of relevant Regional and National ESIF Managing Authorities and Promotional Bank

## Outermost Regions



**6+12 month / EUR 1 million**

## Cohesion Fund eligibility (15 MS)



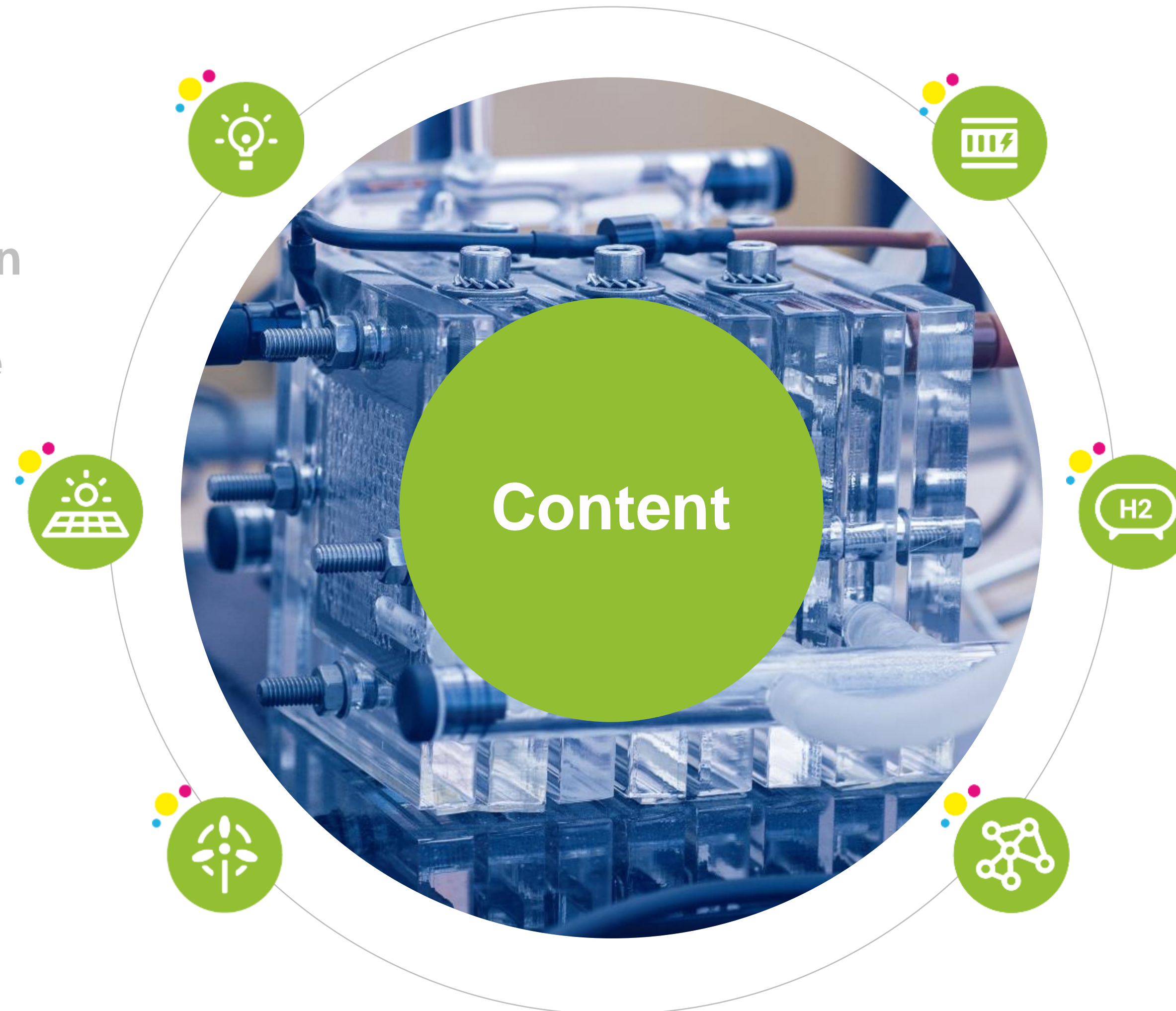


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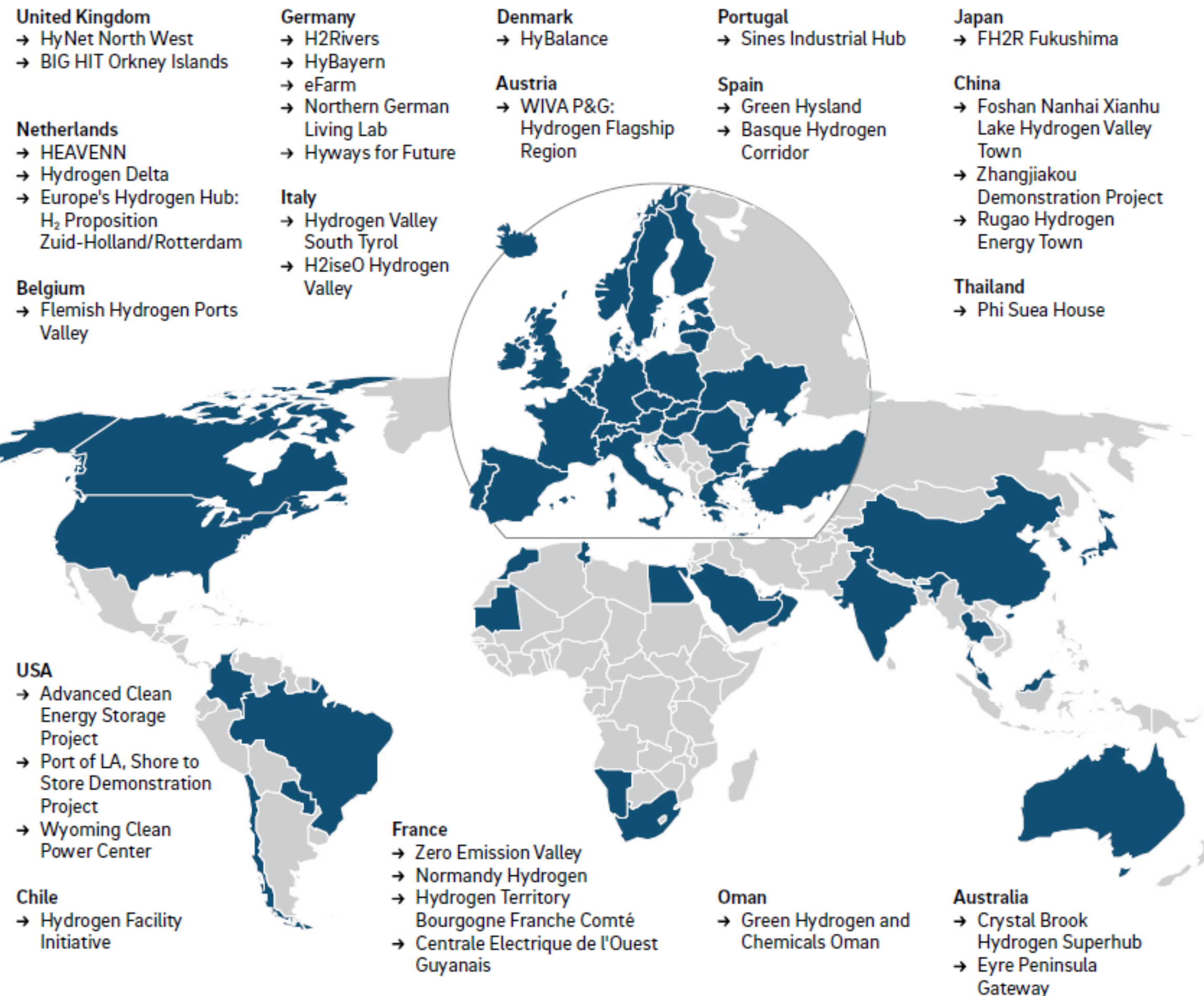




# Hydrogen Valleys have become a global theme

Integrated projects are emerging all around the world and sharing lessons learned to accelerate the energy transition

## E: Global Hydrogen Valley activities and example projects from the Mission Innovation Hydrogen Valley Platform

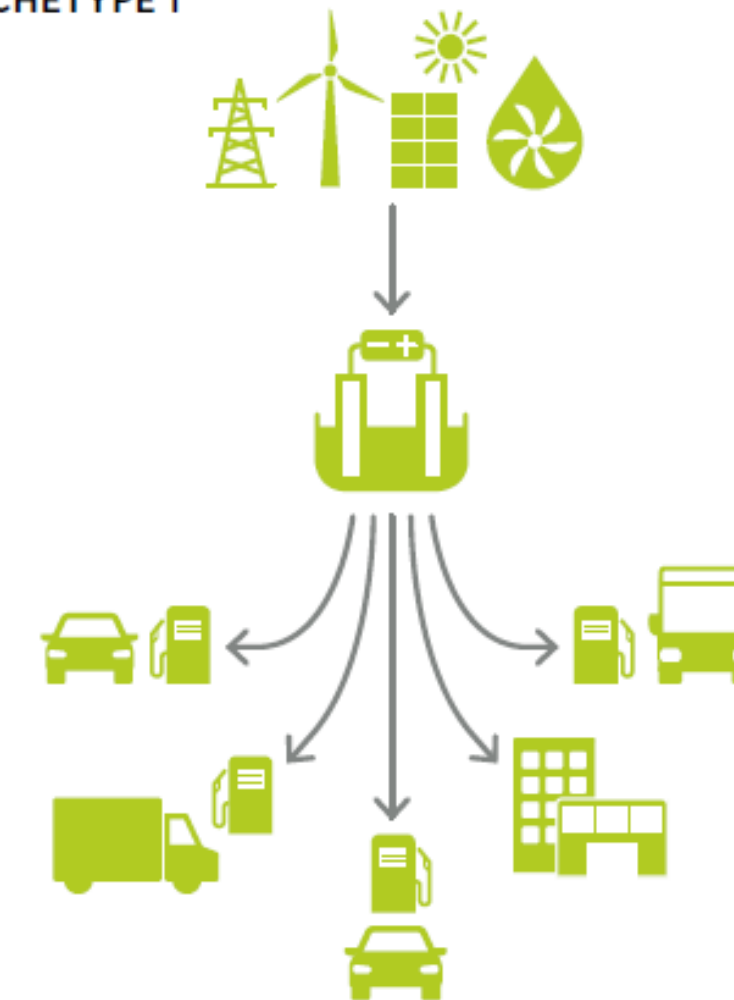


■ Countries with ongoing Hydrogen Valley activities

Source: Clean Hydrogen JU, Roland Berger

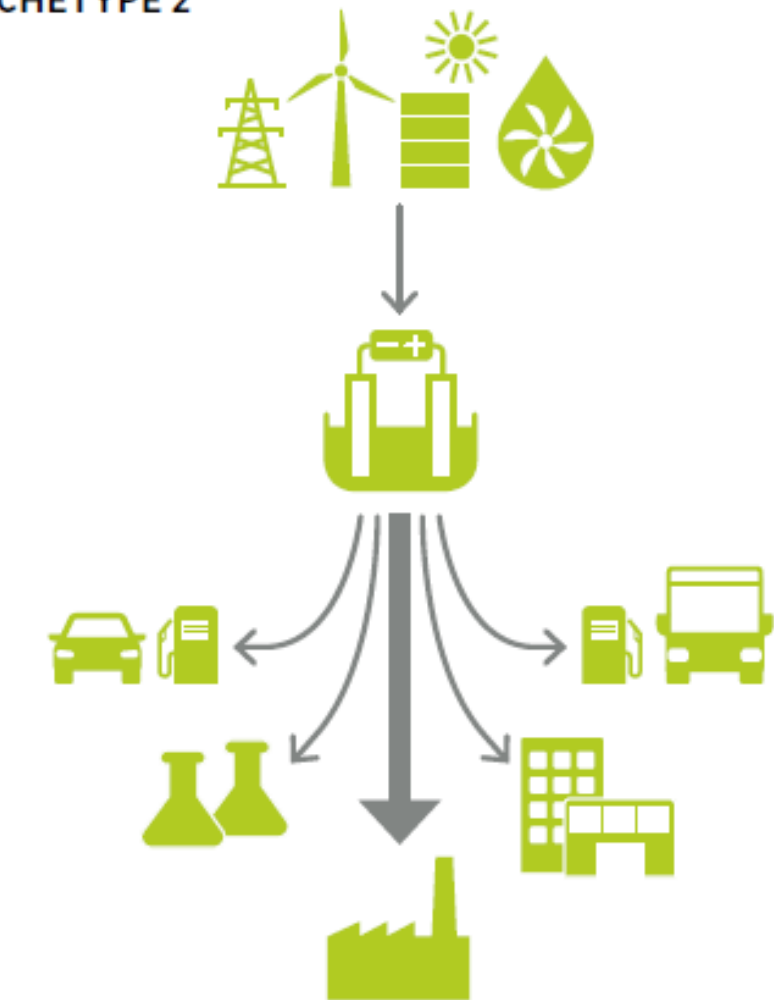
[www.h2v.eu](http://www.h2v.eu)

### ARCHETYPE 1



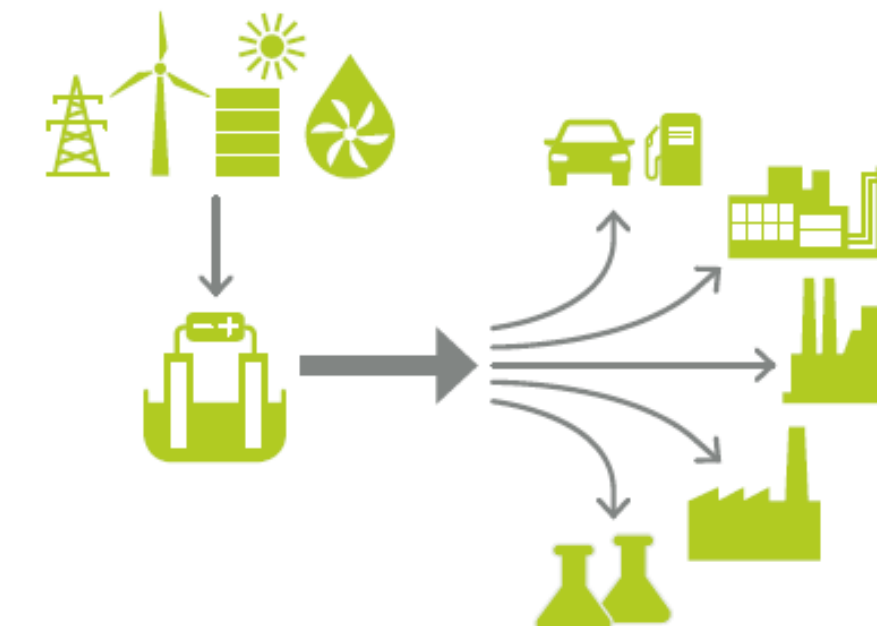
→ Smaller-scale local mobility-centred Hydrogen Valleys (typically 1–10+ MW of local electrolyser capacity)

### ARCHETYPE 2



→ Medium-scale Hydrogen Valleys focusing on industrial decarbonisation (typically 10–300+ MW of local electrolyser capacity)

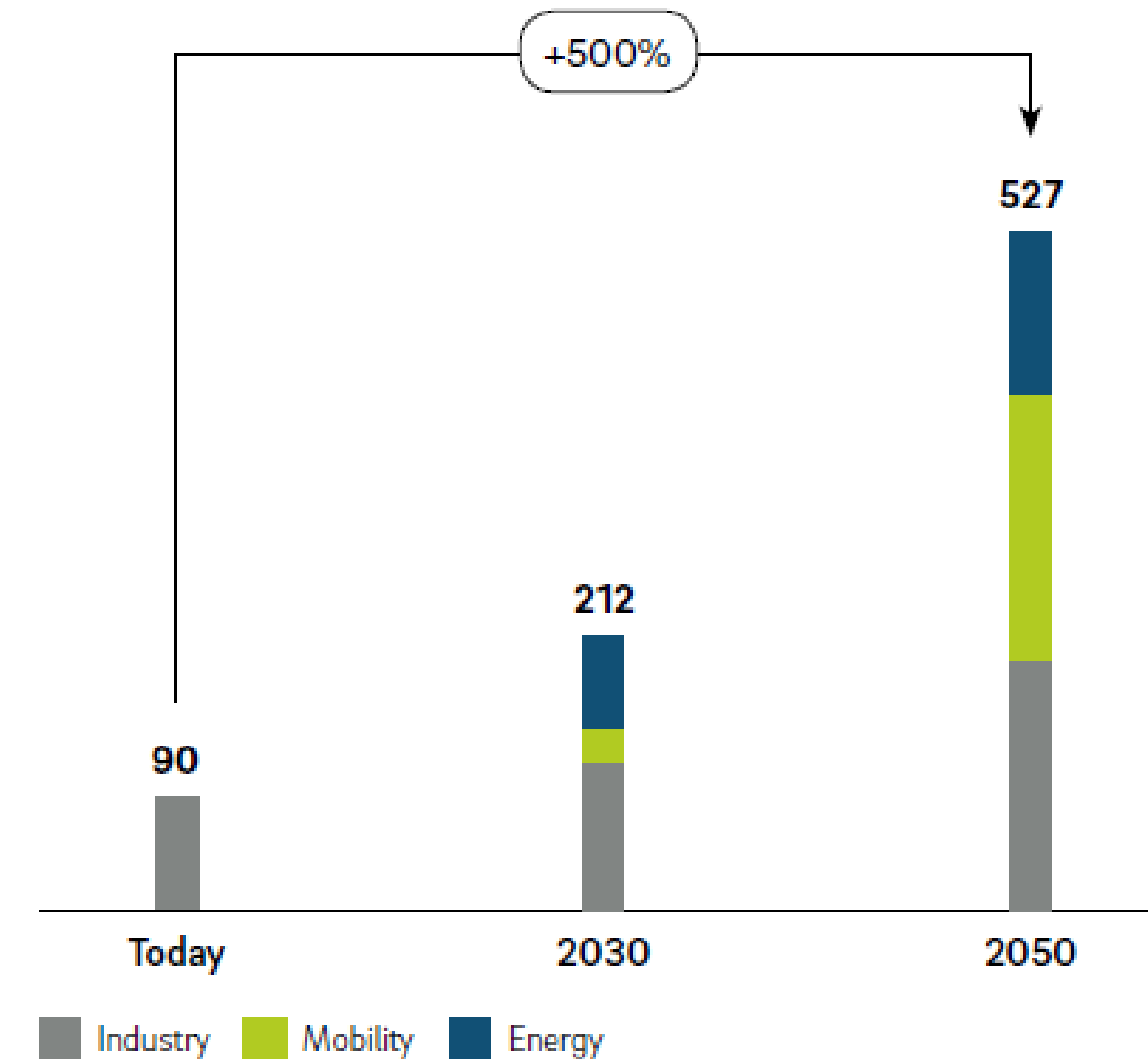
### ARCHETYPE 3



→ Large-scale and ultimately export-oriented Hydrogen Valleys (typically 250–1,000+ MW of local electrolyser capacity)



## A: Hydrogen consumption in the IEA's Net Zero Emission Scenario [Mt]

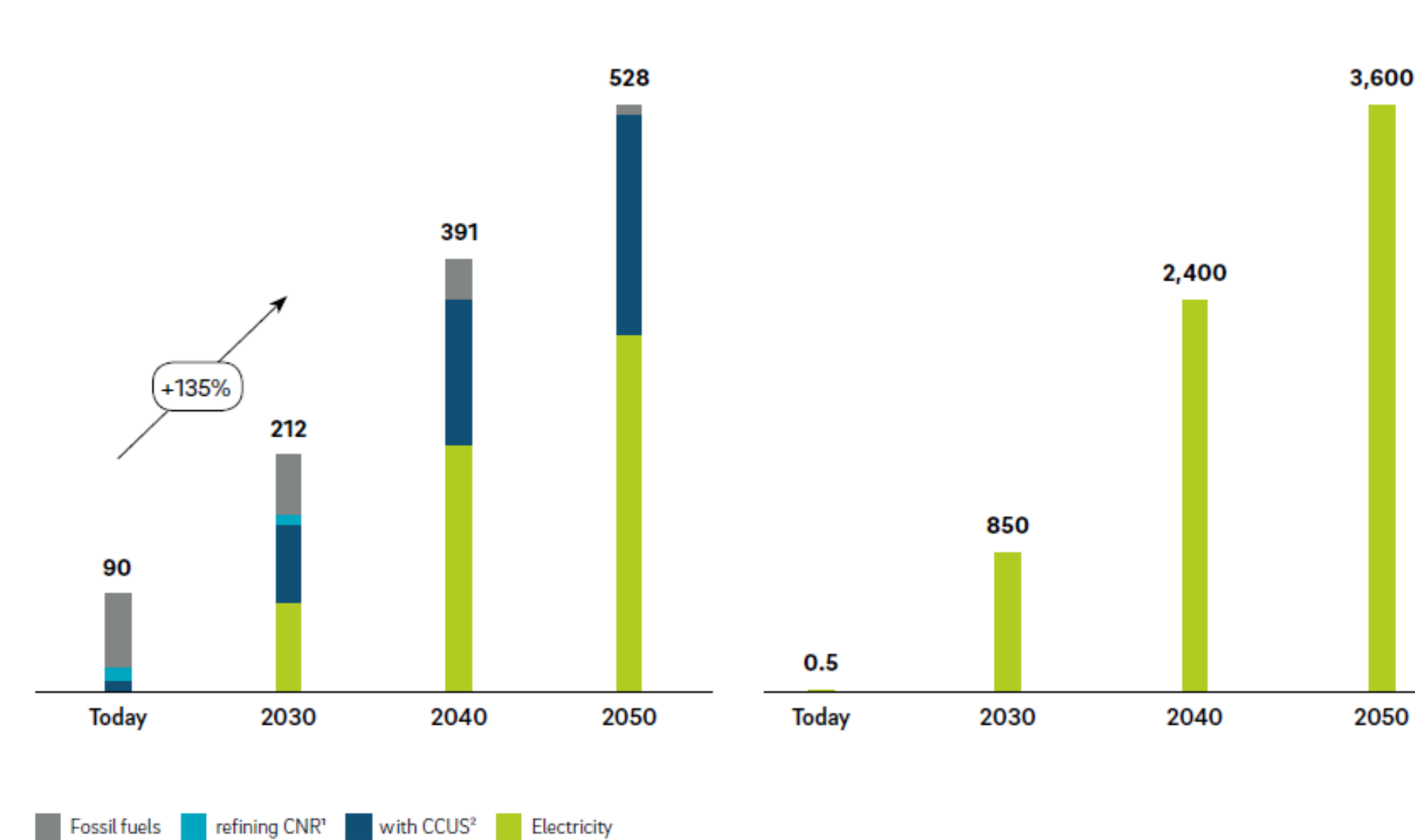


Source: IEA, Roland Berger

## B: Hydrogen supply and resulting electrolyser capacity needs in the IEA's Net Zero Emission Scenario

NEED FOR GLOBAL H<sub>2</sub> SUPPLY [Mt]

REQUIRED ELECTROLYSER CAPACITY [GW]



Source: IEA, Roland Berger

1) Catalytic Naphtha Reformer 2) Carbon Capture (Utilisation) and Storage

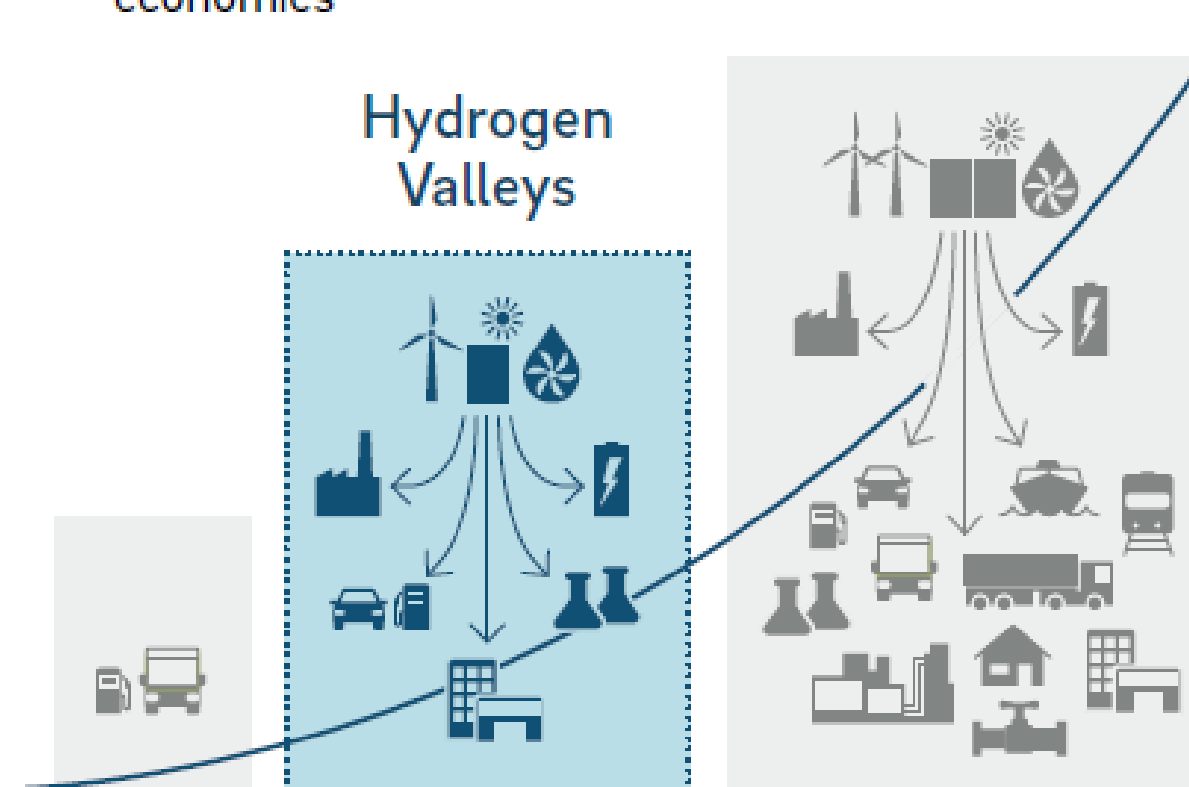
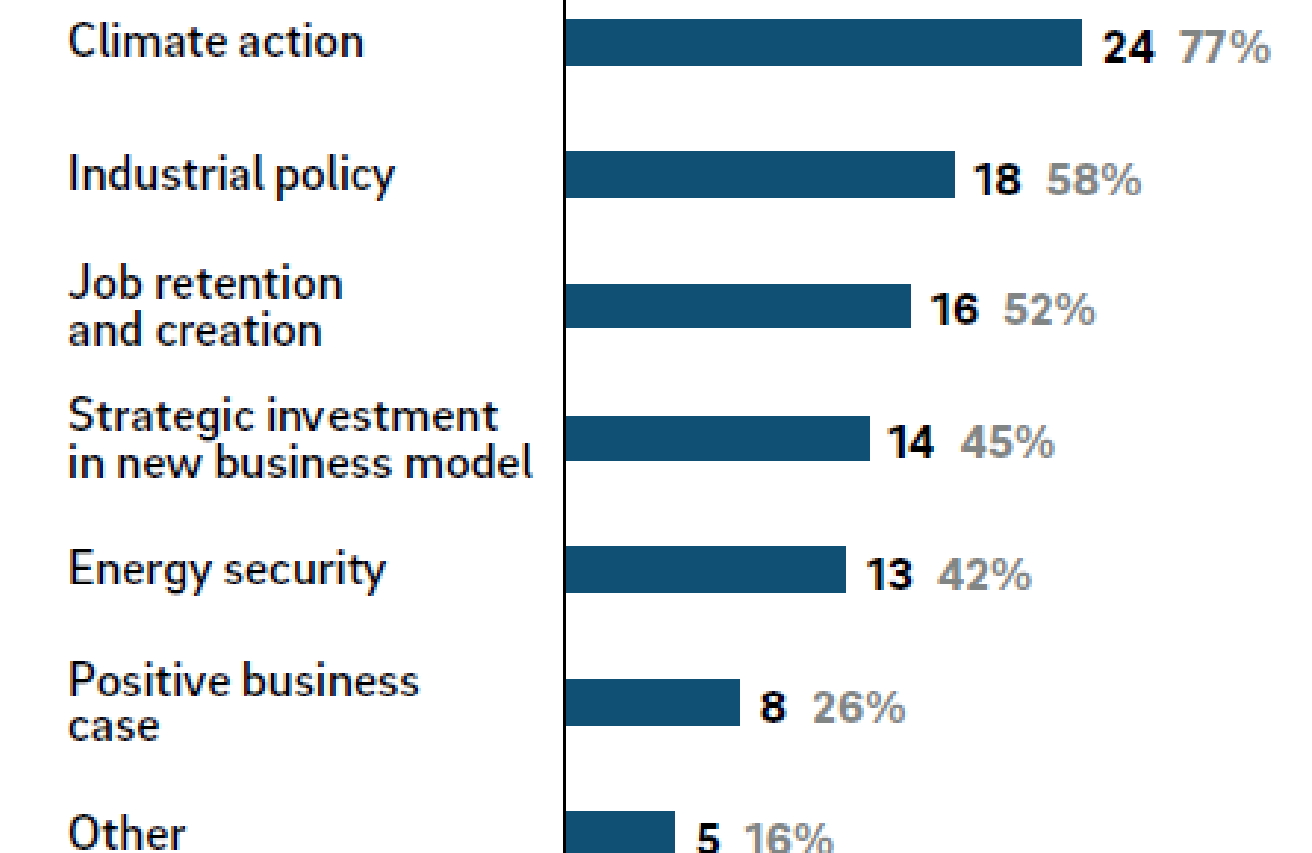
## D: Hydrogen Valley project drivers

### THE AMBITION

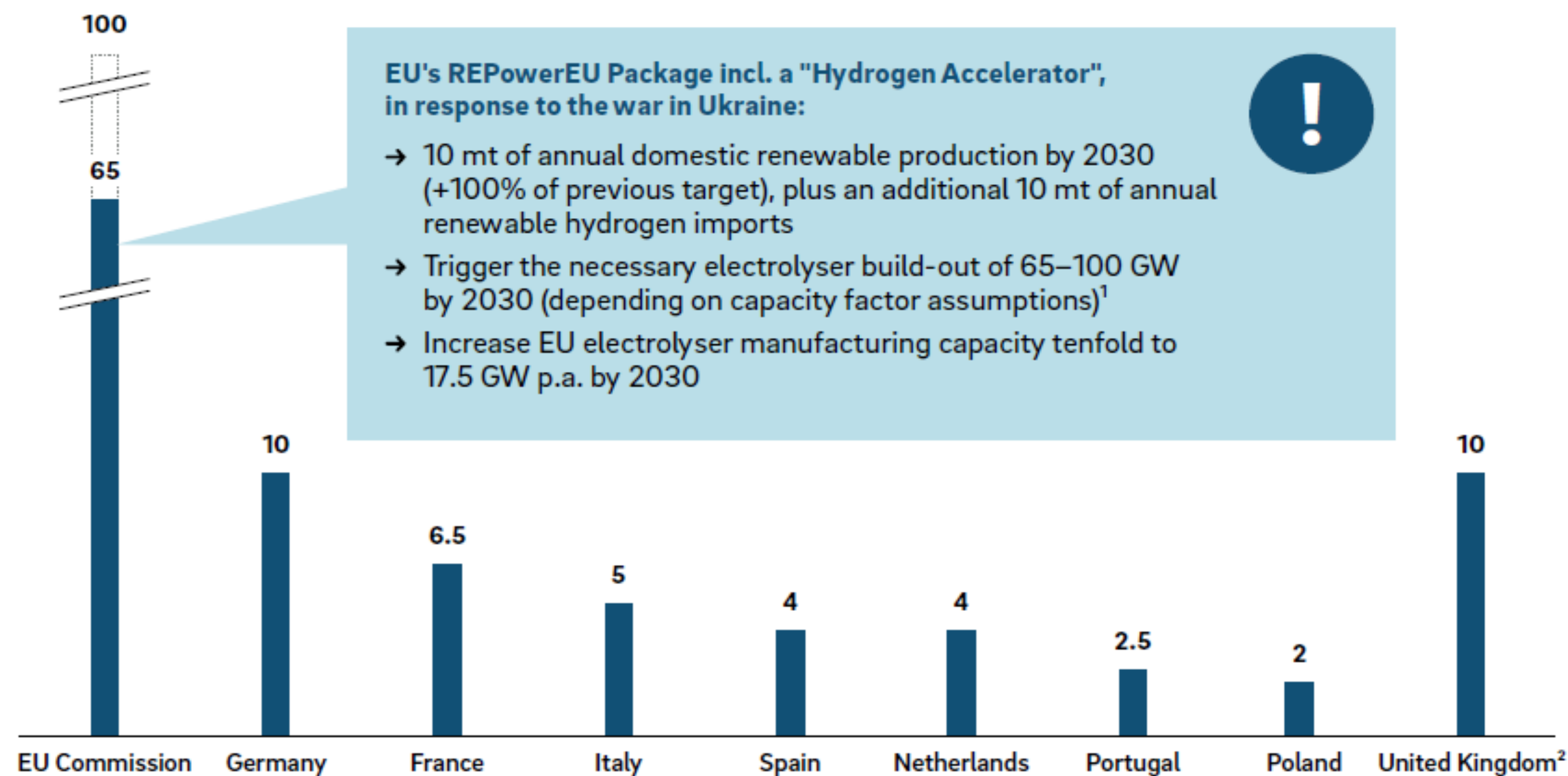
- Next-generation market development
- Integrated (and larger-scale) projects covering more and more of the value chain – "mini hydrogen economies"

### THE UNDERLYING DRIVERS

Question: "What are the main drivers for your project?" (n=31)<sup>1</sup>



Source: Clean Hydrogen JU, Roland Berger



## C: National electrolyser capacity targets for 2030 in major European economies [GW]

Source: European Commission, national governments, Roland Berger

- 1) The range reflects varying assumptions on capacity utilisation factors and efficiencies underlying the EU green hydrogen production targets.
- 2) Including installed capacity for production of low-carbon hydrogen

<sup>1</sup>) Multiple answers possible





## Mission Innovation Hydrogen Valley Platform

Showcasing hydrogen flagship projects around the world: A platform for project developers

LEARN MORE

New Update Report Available

38 Hydrogen Valleys

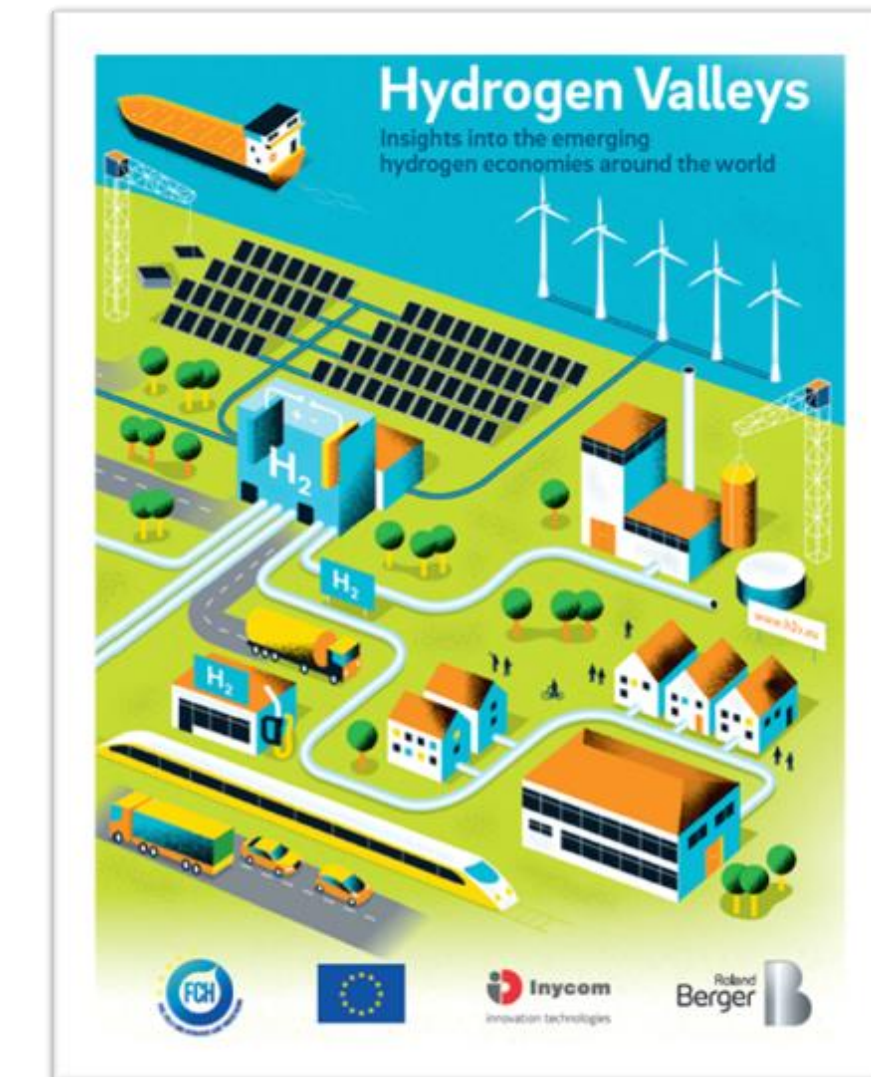
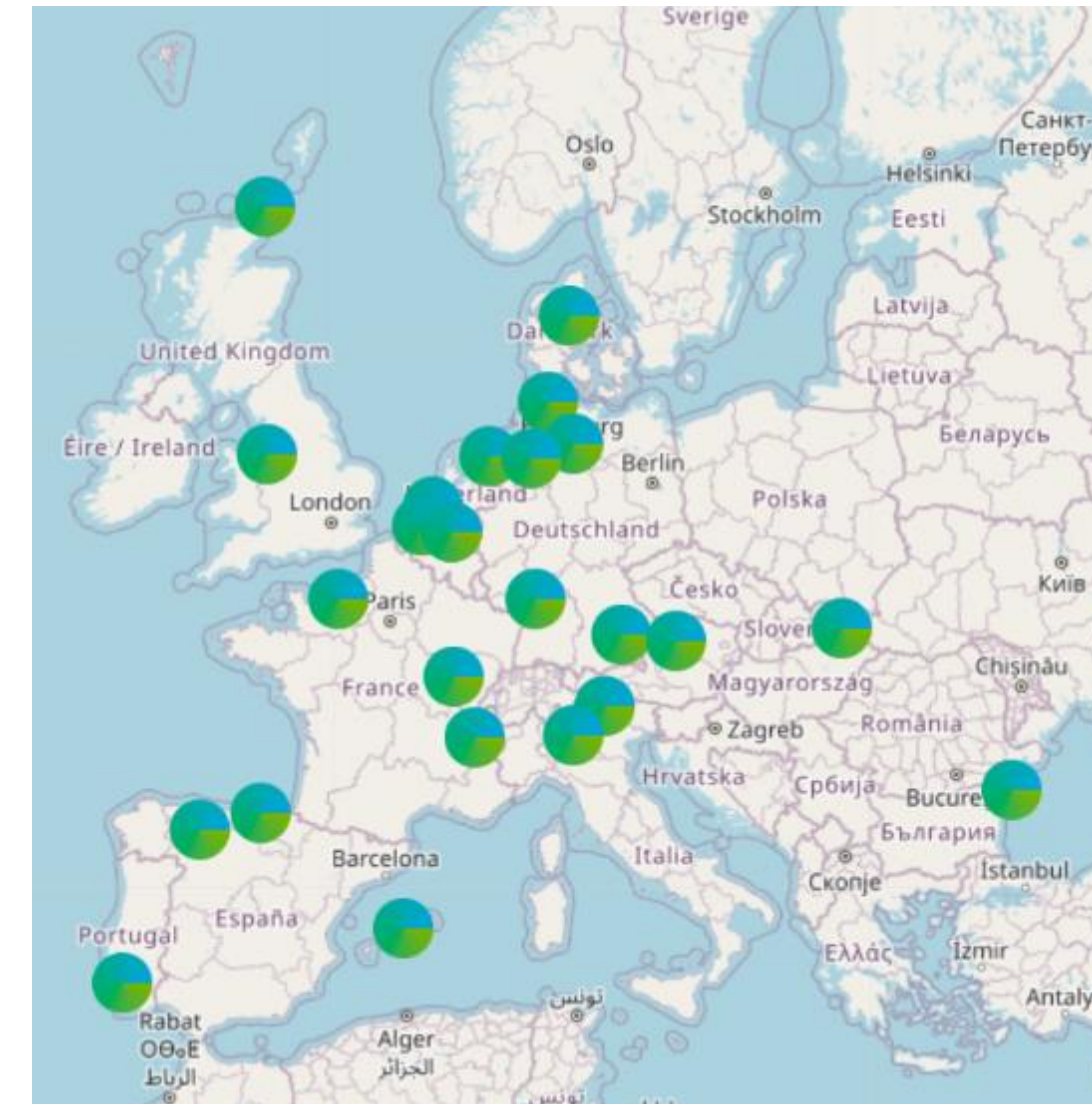
20 Countries

38,995 Total investment (M€)



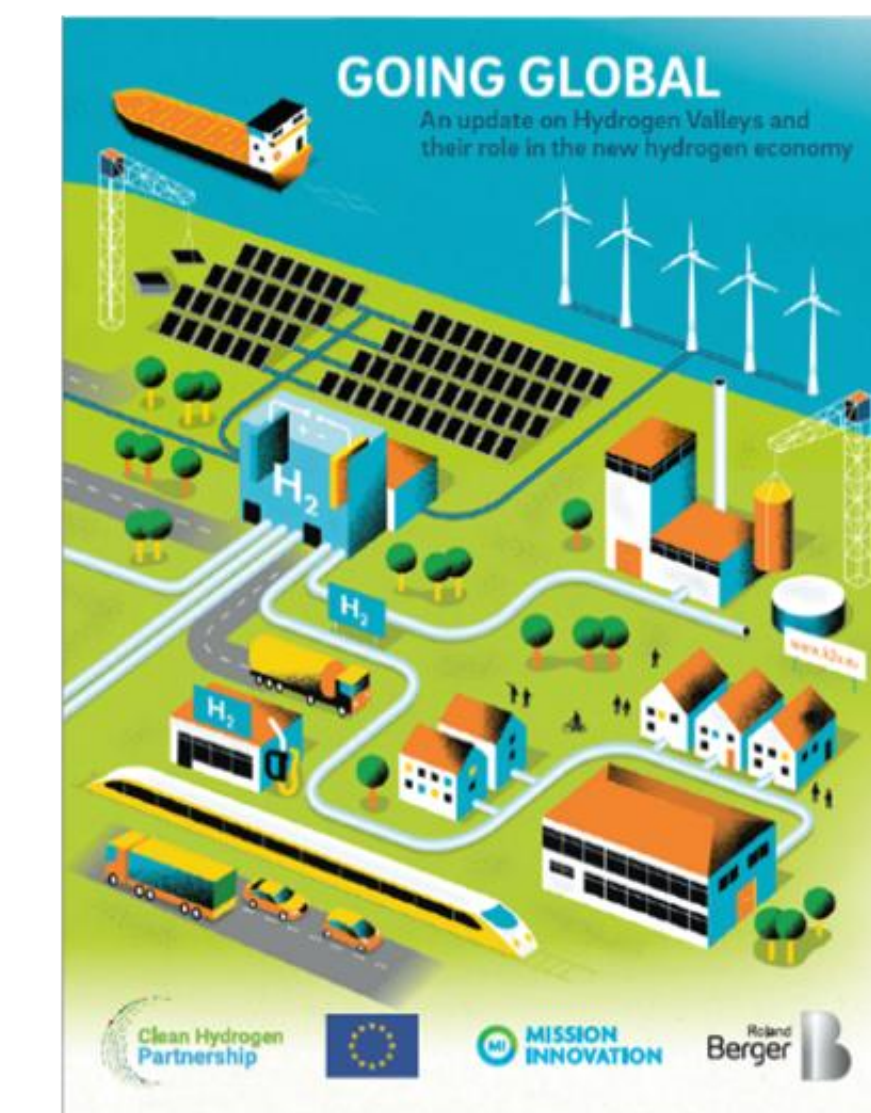
### Next steps under MI 2.0:

- Further development and enhancement of the MI Hydrogen Valley Platform
- Target of 100 Hydrogen Valleys and minimum three in each member country by 2030



## 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.)

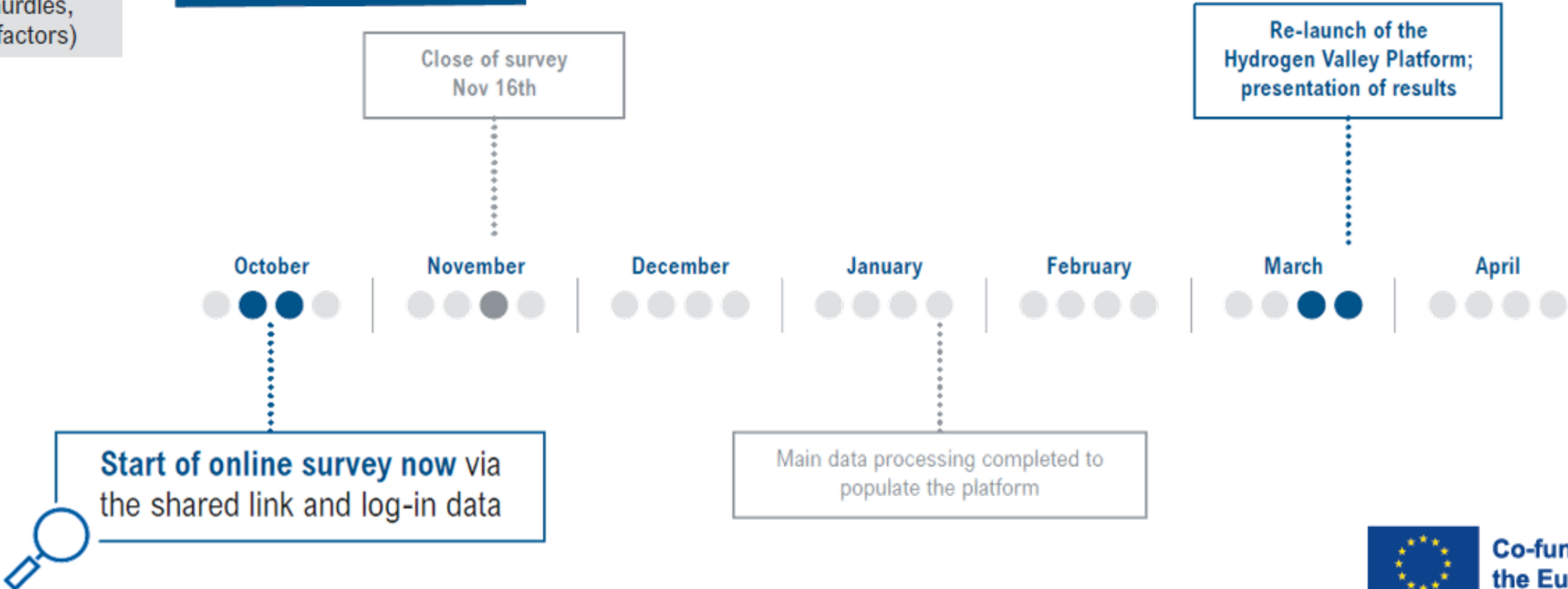




We have developed a new data request around five key topics of typical hydrogen valley development – Final survey will be online-based with confidentiality options

## Key topics of the survey

1. Project fundamentals	2. Value chain & technologies	3. Preparation & execution	4. Commercials & financing	5. Impact & analysis
<b>Key project facts</b> (contact, website, short description)	<b>Technologies along the value chain</b>	<b>Timeline</b> (planned time vs. actual, permitting)	<b>CAPEX</b> (total budget, spent budget, overhead share)	<b>CO<sub>2</sub> abatement</b>
<b>Location</b> (country, city, geo-coordinates, second location, covered area/region)	<b>Primary energy sourcing</b> (renewables, natural gas, etc.)	<b>Parties involved</b> (stakeholders, staff members)	<b>Funding</b> (main funding sources, instruments, duration)	<b>Project benefits</b> (economic value added, jobs created, industrial policy elements)
<b>Stakeholders</b> (lead developer, partners, sponsors, project connections, new joiners)	<b>H<sub>2</sub> production</b> (electrolysis incl. tech, SMR+CCUS, etc.)	<b>Preparation funding</b> (budget, funding source for preparation)	<b>LCOH</b> (sales prices of H <sub>2</sub> )	<div> <b>The survey</b> <ul style="list-style-type: none"> <li>Different levels of confidentiality ("opt-out")</li> <li>Online survey, easy to complete</li> <li>Validated with selected project developers</li> </ul> </div>
<b>Production and end uses</b> (capacity, volumes, consumption, offtakers)	<b>H<sub>2</sub> storage / conversion</b> (cylinder, cavern, ammonia)	<b>Governance</b> (lead entity, risk sharing mechanism, governance mechanism)	<b>Anticipated average input costs</b> (electricity, natural gas)	
<b>Investment and team</b> (total investment, staff members)	<b>H<sub>2</sub> transport / distribution</b> (pipeline, truck, ship, HRS)	<b>Permitting</b> (Regulatory provisions / hurdles, clarity on procedures, status)	<b>Green H<sub>2</sub></b> (costs, share (%))	
<b>Motivation and timeline</b> (main drivers, start date, exp. COD, status, planned expansions)	<b>End-use applications</b> (mobility, energy, industry)	<b>Best practices</b> (activities, hurdles, barriers, key success factors)	<b>Blue H<sub>2</sub></b> (costs, share (%), CCUS, capture rate)	
			<b>Other zero/low-carbon sources of H<sub>2</sub></b>	
			<b>Best practices</b> (competitiveness, activities, resources, hurdles, barriers, key success factors)	



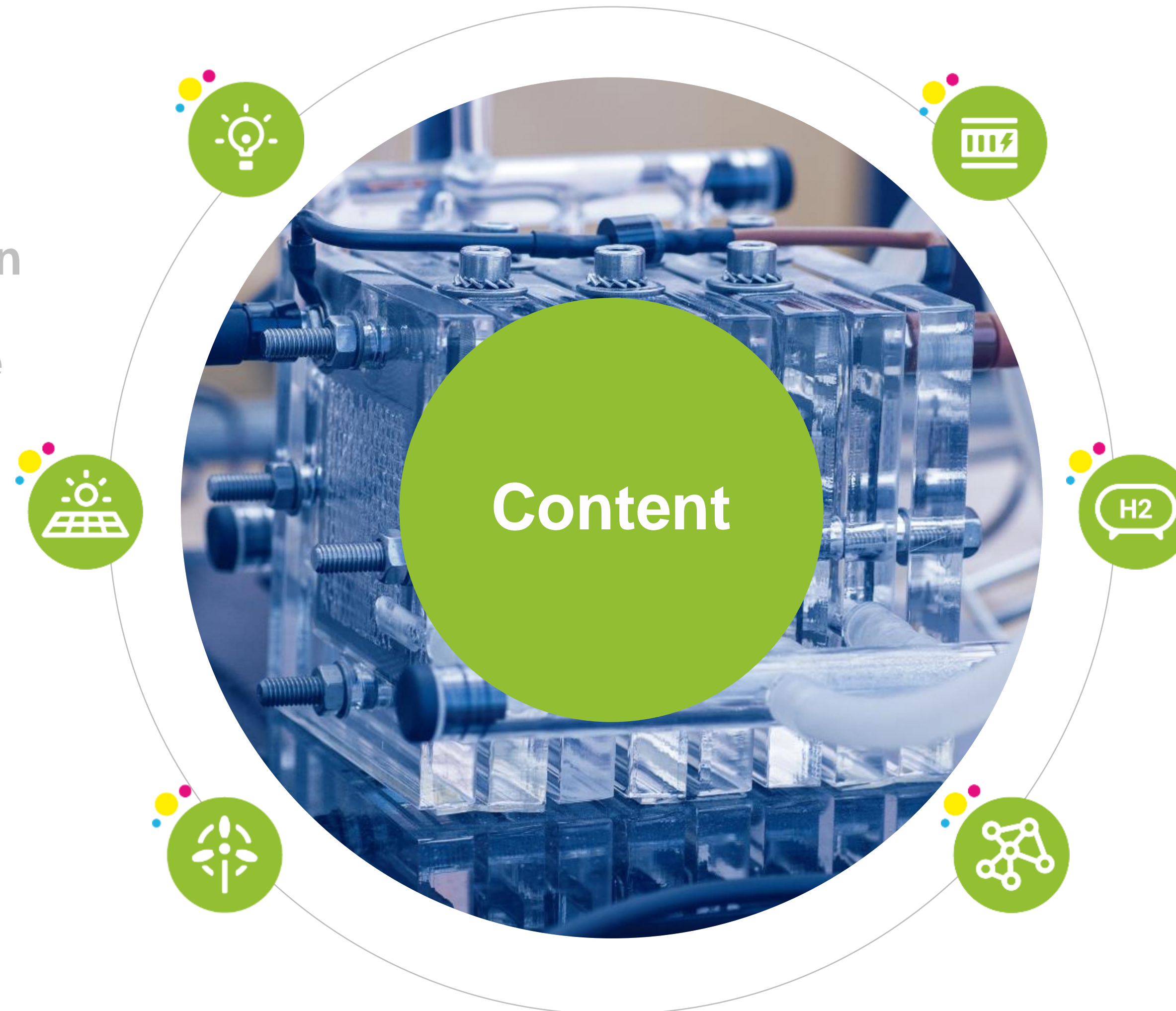


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## ★ Main Take-aways

### Top-Down ambition feeding Bottom-Up aspirations

- ✓ Clean hydrogen as an energy carrier that can address the **decarbonisation of hard-to-abate sectors** like the long-haul heavy-duty transportation and industry (as feedstock or *high-heat grade* fuel)
- ✓ H2Valleys reveal the **true potential of H2 as a clean energy carrier**. Green H2 as enabler of increased cheap and intermittent RES penetration and Sectoral Integration. Most H2Valleys in the MI Platform will reach commercial maturity by 2025
- ✓ Until 2030, **H2Valley** concept to boost the market uptake and de-risk projects' deployment, shifting and mitigating risks within its own structure (Special Purpose Vehicle) - e.g. shifting risk from RES to H2 offtake via cPPAs; Support still required until then
- ✓ **Synergies** between funds are key for initial market uptake
- ✓ Takes time and expertise to see projects off the ground – PDA, TA
- ✓ **Economically attractive at all levels:** to Cities&Regions, Countries and Regional blocks



# Keep in touch

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## For further information

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