



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

Hydrogen Regions and Valleys



SLOVAKIA

Vodíkový
WORKSHOP

**Creation of Hydrogen
Ecosystems in Regions**

Bart Biebuyck
29 / 03 /2021 Virtual

Strong public-private partnership with a focused objective

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



FUEL CELLS AND HYDROGEN JOINT UNDERTAKING



Industry grouping
>185 members
50% SME



Research grouping
83 members



Energy

H₂ production and distribution
H₂ storage
F/C for CHP



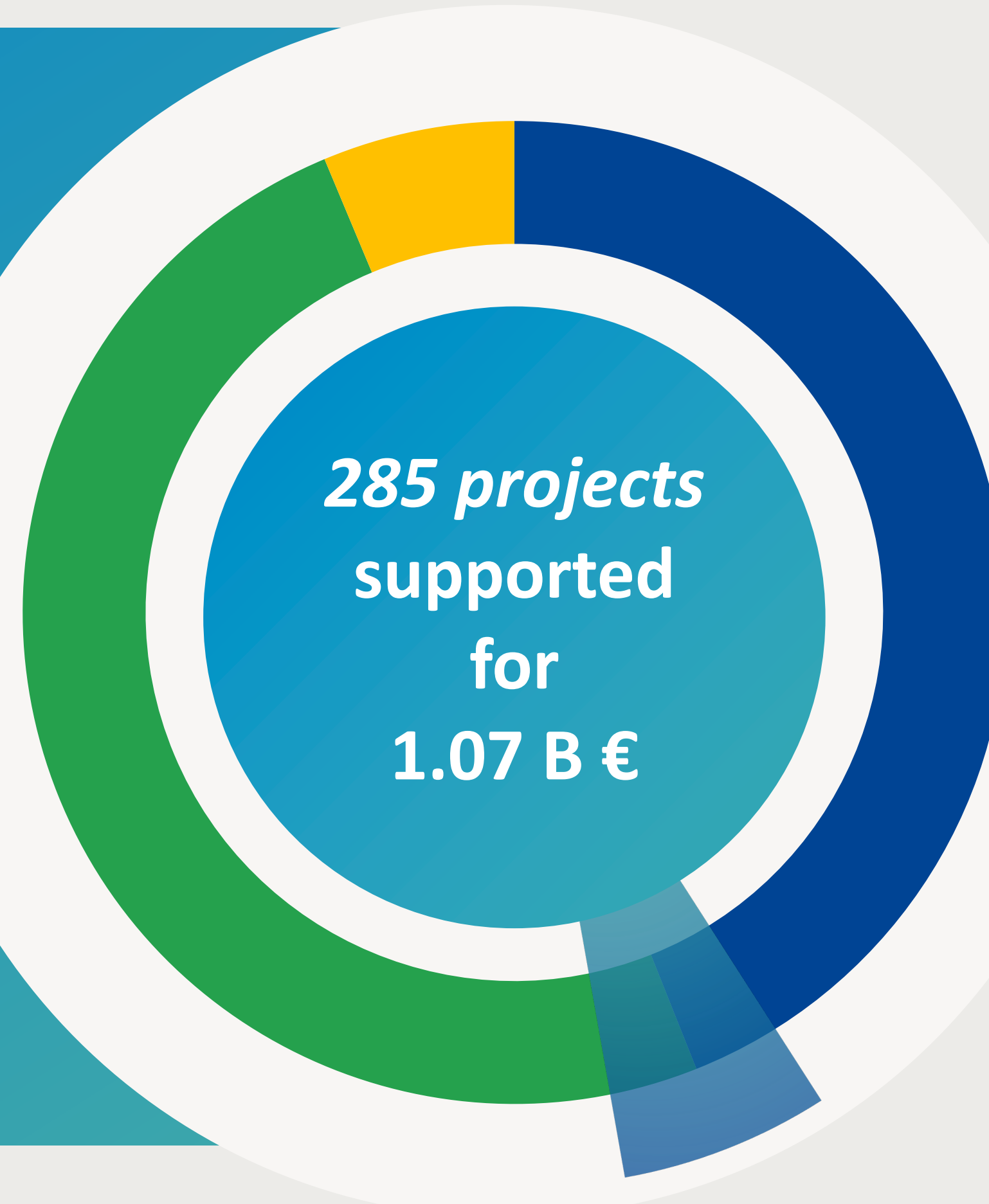
Transport

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



Cross-cutting

standards, safety, education, consumer awareness, ...



285 projects supported for 1.07 B €

45 %



481 million euros
153 projects

41.4 %



443 million euros
77 projects

6.3 %



67 million euros
48 projects

7.3 %

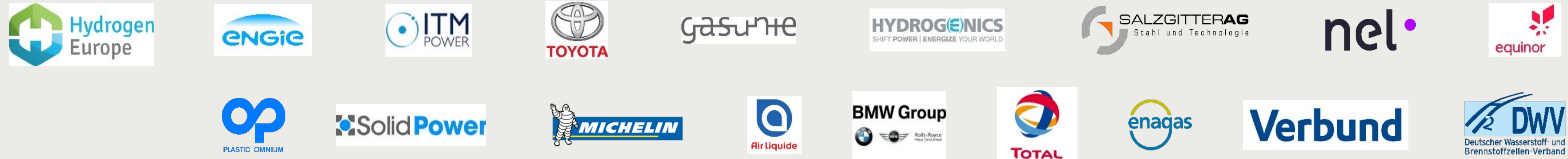


79 million euros
7 projects



Similar leverage of other sources of funding: 1.08 B €

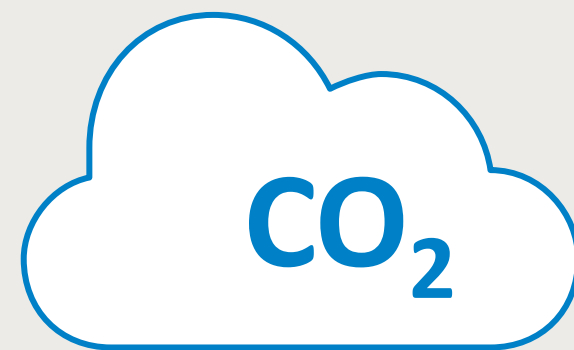
Besides CO₂ abatement, deployment of the hydrogen roadmap also cuts local emissions, creates new markets and secures sustainable employment in EU



2050 hydrogen vision

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~560 Mt

annual CO₂ abatement²



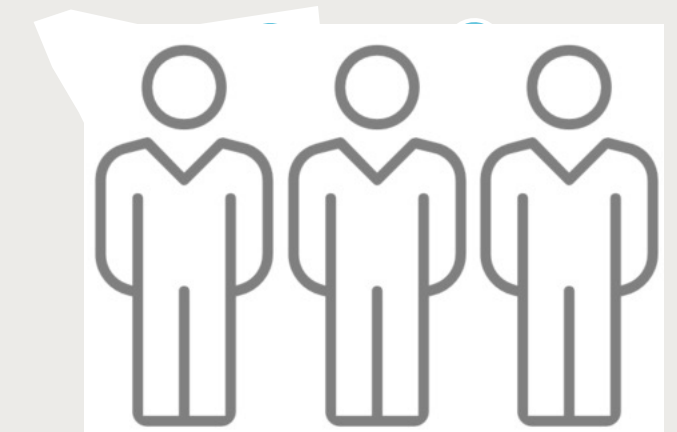
~EUR 820bn

annual revenue (hydrogen and equipment)



~15%

reduction of local emissions (NO_x) relative to road transport



~5.4m

jobs (hydrogen, equipment, supplier industries)³

~24%

of final energy demand¹



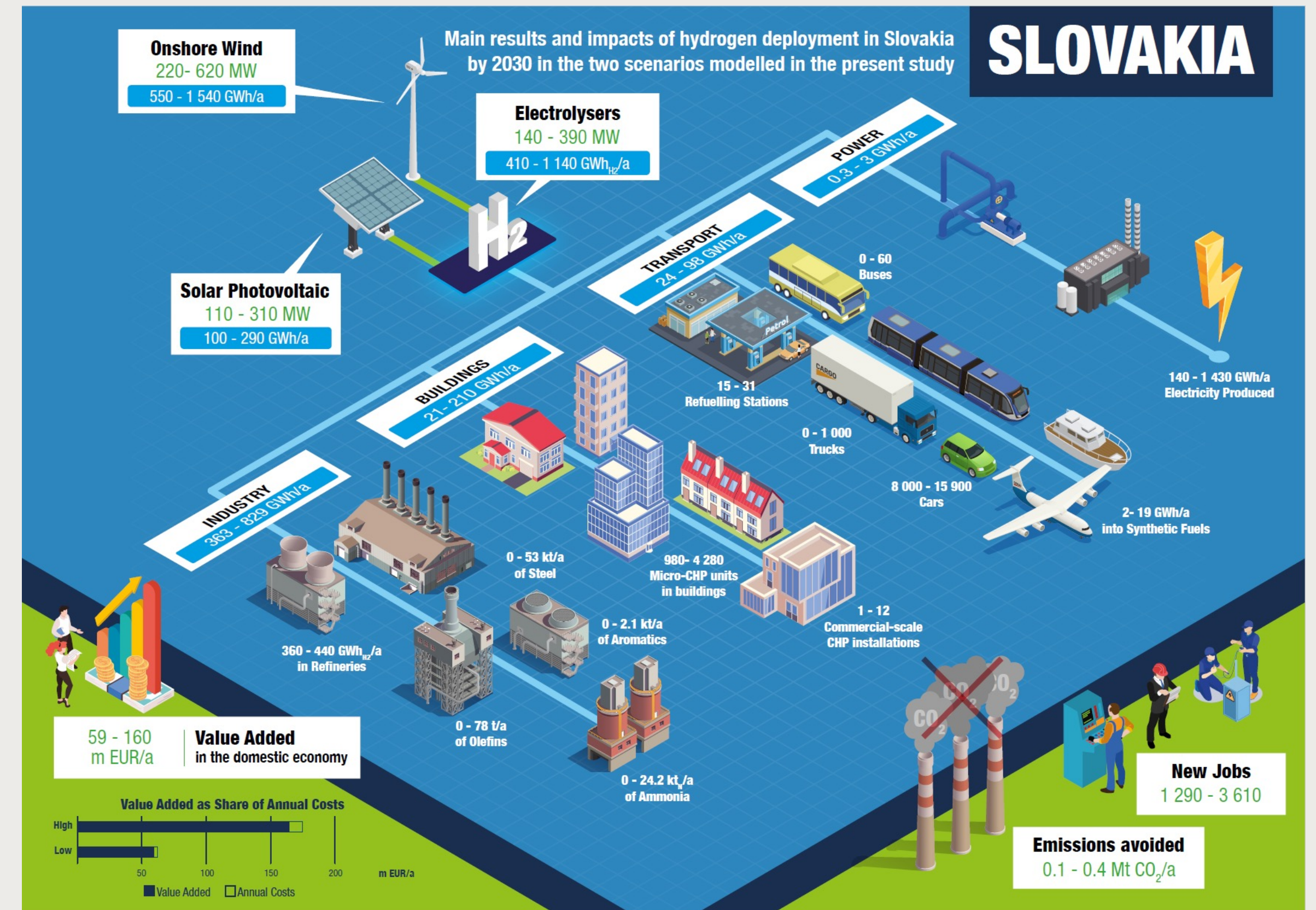
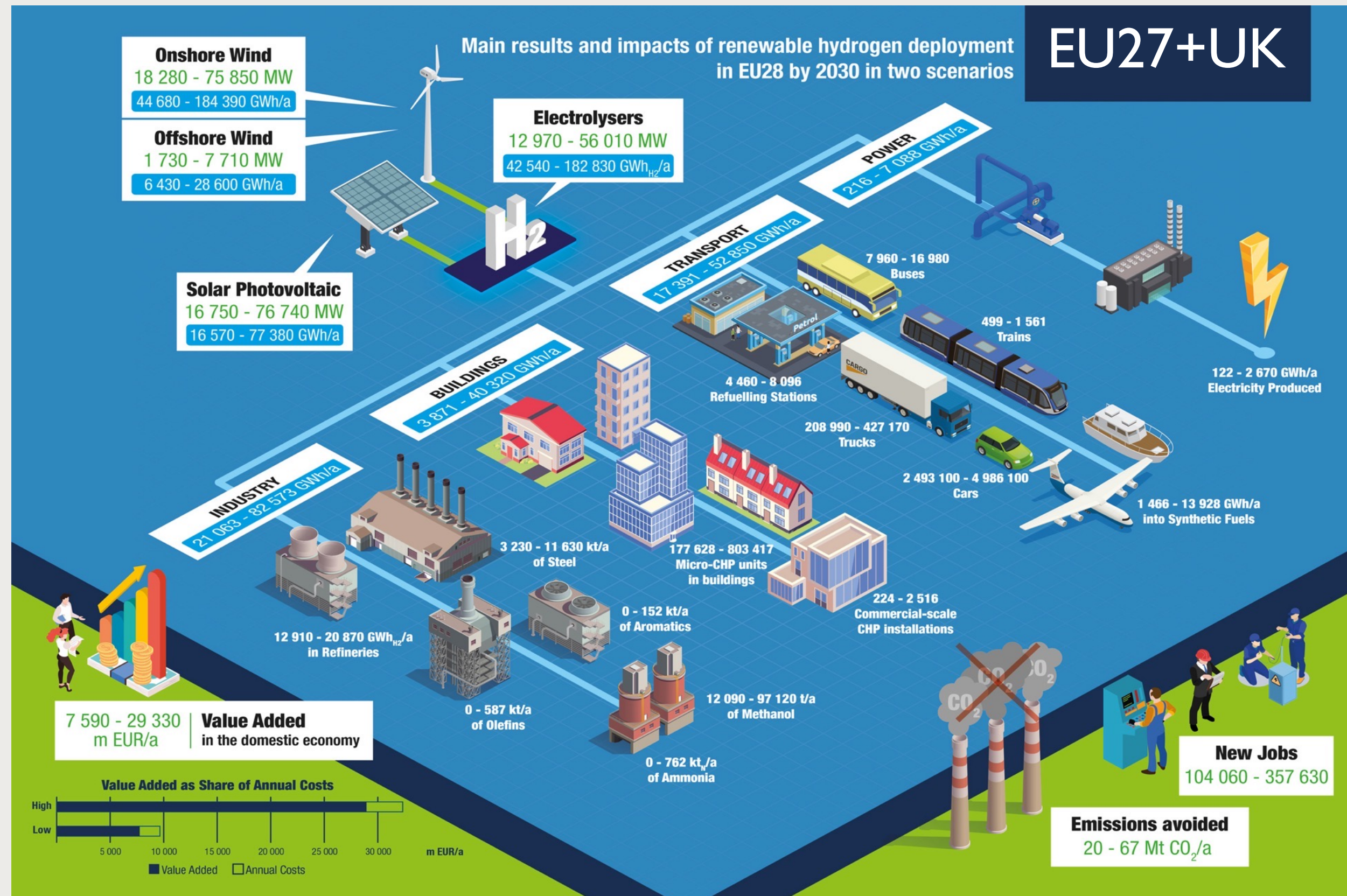
1 Including feedstock 2 Compared to the reference technology scenario 3 Excluding indirect effects

SOURCE: Hydrogen Roadmap Europe team

Opportunities from the inclusion of Hydrogen in NECPs by 2030

EU27+UK NECPs were analyzed on the national opportunities for hydrogen deployment.

<https://www.fch.europa.eu/publications/opportunities-hydrogen-energy-technologies-considering-national-energy-climate-plans>



In EU27+UK by 2030 depending on the scenario, 13-56 GW of electrolysers (4800Hrs full load) are needed reducing 20-67MtCO₂/a, creating 7.5-29 bn € added value and 104k-358k jobs.

Slovakia can contribute (high scenario) : 0.4 GW electrolysers, 160 m € added value and nearly 4000 jobs.



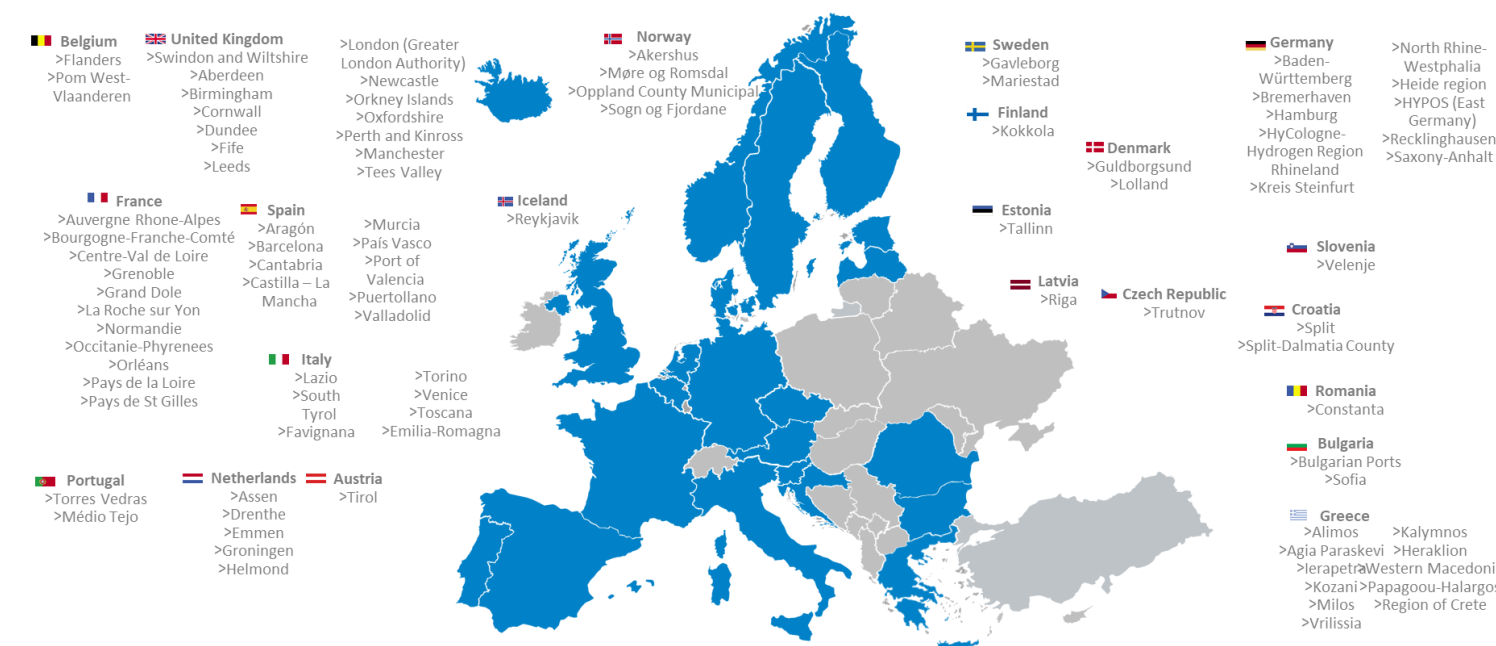
FCH-JU region initiative was key to boost the hydrogen awareness in EU

The regions initiative led to the H2 Valley partnership, PDA and a call topic on H2 Valleys

<https://www.fch.europa.eu/page/about-initiative>



Supporting regions and cities in assessing various FCH applications



European Hydrogen Valleys Partnership launched May '19 at EVS 32 in Lyon

Partnership led by:
North of Netherlands (NL)
Auvergne-Rhône Alpes (FR)
Le Normandy (FR)
Aragon (ES)
40 regions joined

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

Project Development Assistance (PDA) launched Jan '20 (38 applications / 19 countries)



Great opportunity to bring on-board and share learnings with 'less FCH ready' but highly interested EU13 regions

<https://www.fch-regions.eu/>

End of 2021 another PDA will be launched focus on EU13!



"I want NextGenerationEU to create new European Hydrogen Valleys to modernise our industries, power our vehicles and bring new life to rural areas."

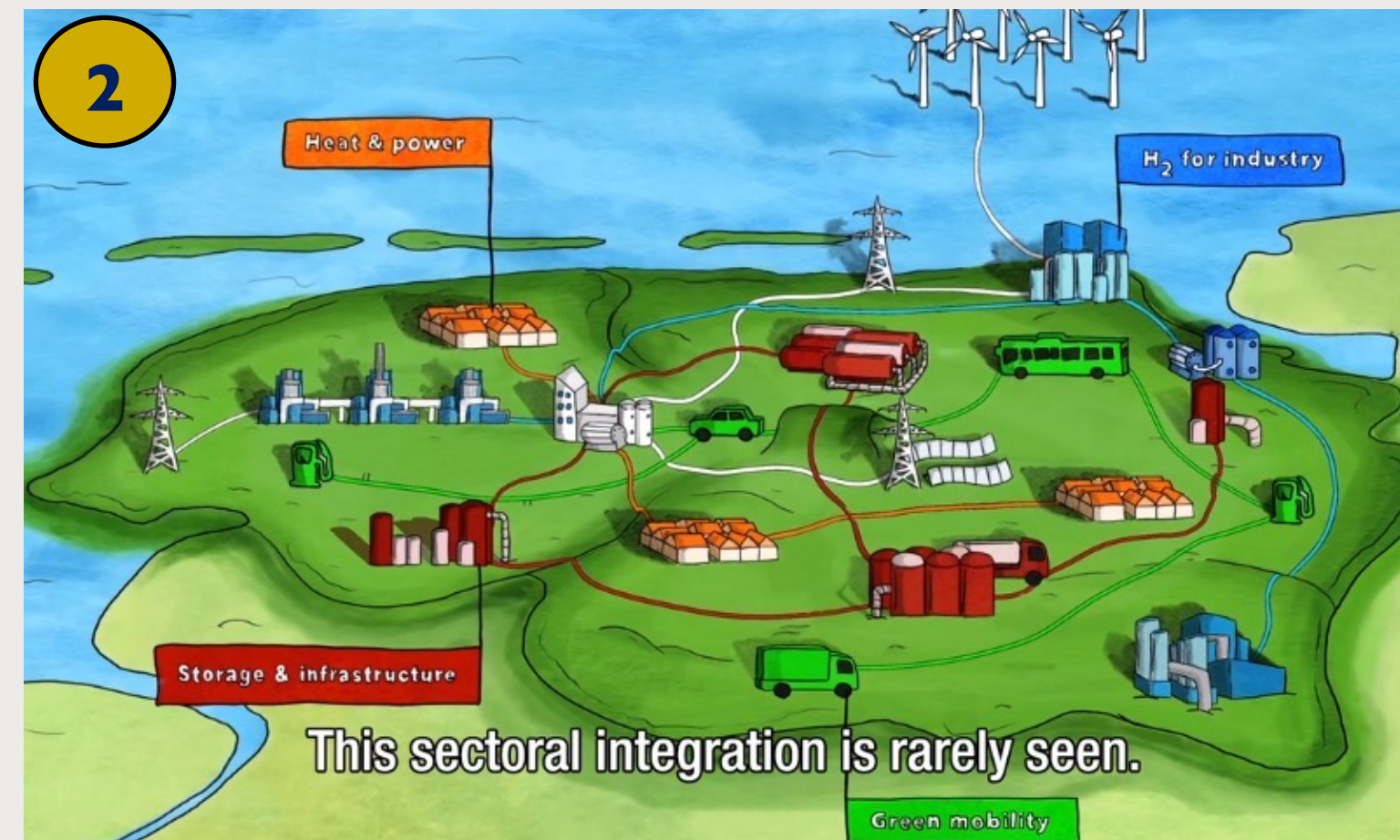
Examples of Hydrogen valleys in Europe today

Its scope is system integration: Production of renewable H₂, storage, distribution and end use (transport, stationary & industry)



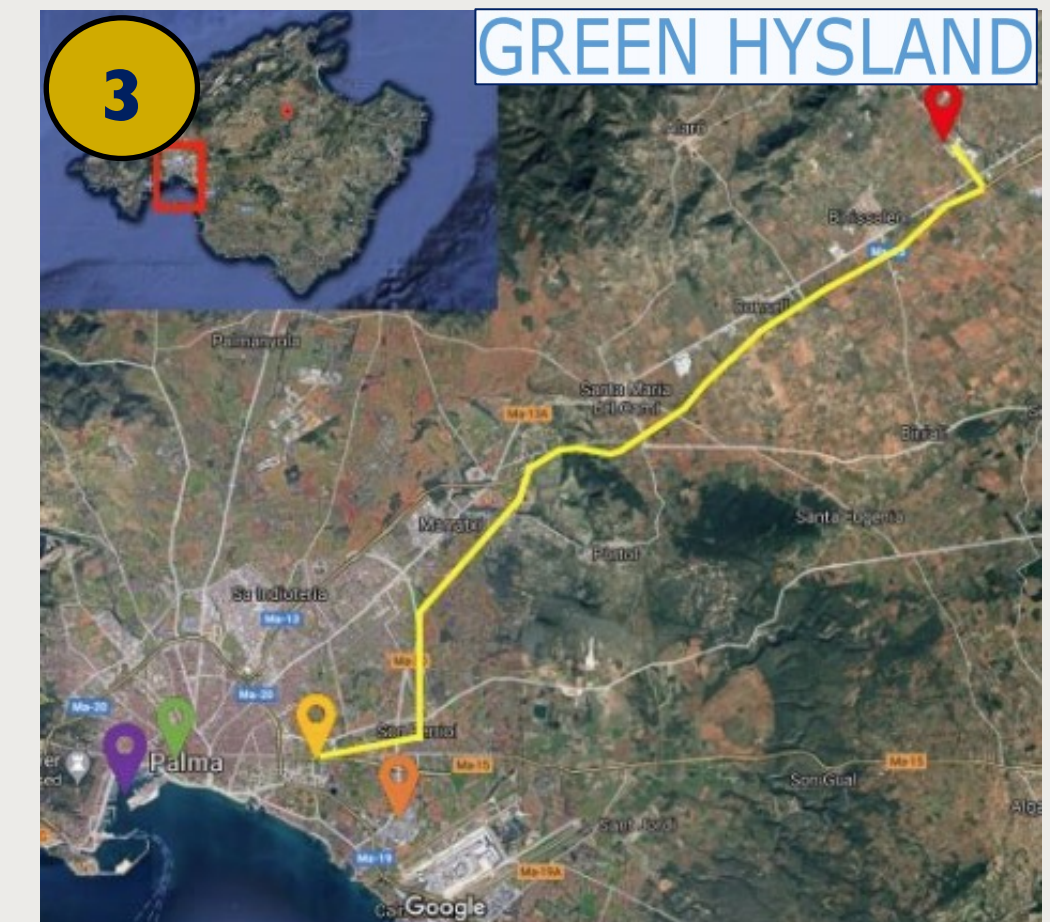
Orkney's Island (Scotland):

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



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)



Hydrogen Island (Spain)*

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

(*) Subject of successful signing the grant by Dec 2020



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

Hydrogen Valleys to accelerate the energy transition

Renewable and Clean Hydrogen Challenge (IC8) under 



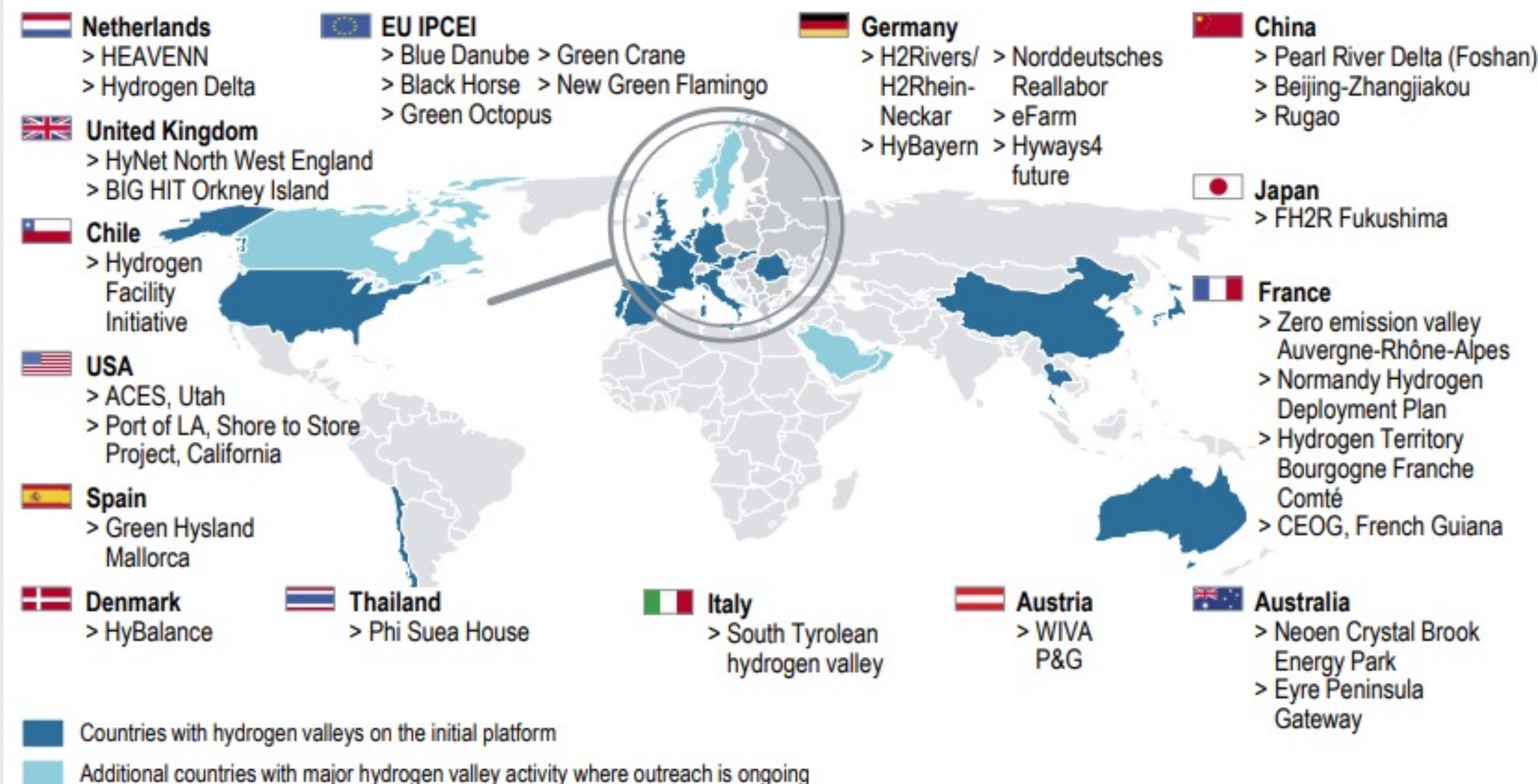
Mission Innovation




Hydrogen Valleys have become a global phenomenon, with integrated projects emerging all around the world

A fast-growing landscape of globally leading projects ...

» ... featured on a new platform



-  > 30 valleys from 18 countries
-  > 3,000 data points
-  10 in-depth best-practice profiles

- ✓ Peer-to-peer exchange among H2 valleys
- ✓ Raise awareness among policy makers
- ✓ Advance clean energy transition
- ✓ EU (EC+FCH JU) in the lead also in terms of gathering and sharing lessons learnt

<https://www.h2v.eu/>



FCH Regions' Hub

<https://www.fch.europa.eu/page/fch-regions-hub>



The screenshot shows the top navigation bar of the FCH Regions' Hub website. It includes the FCH logo, the text 'FUEL CELLS AND HYDROGEN JOINT UNDERTAKING', and social media icons for Twitter, LinkedIn, YouTube, and a Newsletter sign-up button. A search bar is also present. Below the navigation bar, there are menu items: ABOUT US, INITIATIVES (highlighted), PROJECTS, PROCUREMENTS, STAKEHOLDER FORUM, PROGRAMME REVIEW, CALLS FOR PROPOSALS & PROCUREMENTS, and NEWS, EVENTS & MEDIA. An AWARDS section is also visible.

- Home » Initiatives
- STUDIES
- FCH REGIONS' HUB**
- Background info FCH Regions' initiative
- Latest News and Publications
- On-going FCH JU PDA for Regions
- Alternative funding opportunities for PDA
- Initiatives to support networking among regions
- Tools to support the development of business models
- Reference Studies and Reports
- Demo Projects Hub
- H2 Islands

FCH REGIONS' HUB

Supporting European Regions and Cities to Launch Investments

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 FCH JU 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.

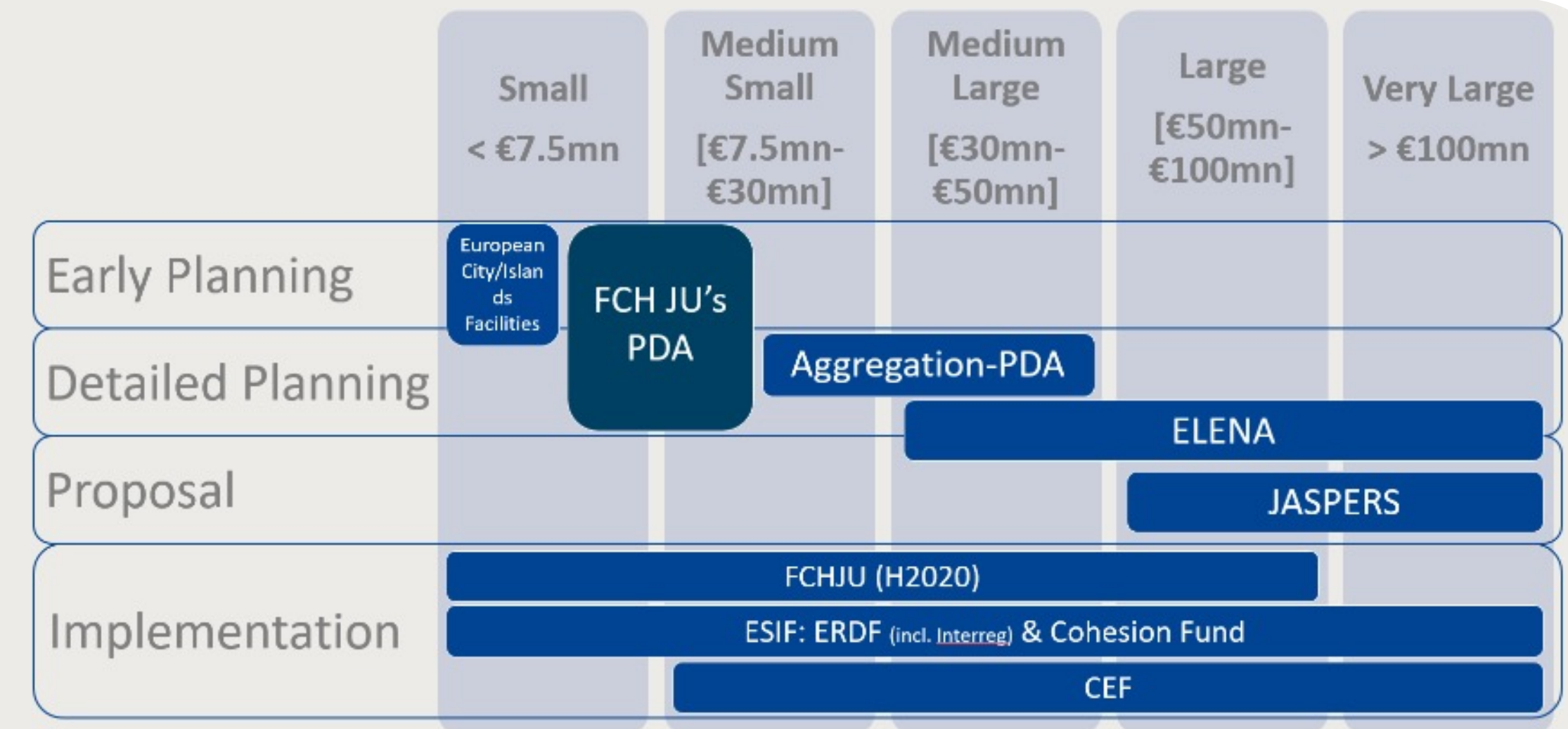
Latest News and Publications

On-going FCH JU's Project Development Assistance (PDA) for Regions Initiative

Hubs for Regions

- [Opportunities for other PDA support](#)
- [Initiatives to support networking among regions and to learn from frontrunner peers](#)
- [Tools to support business models development](#)
- [Reference Studies and Reports](#)
- Demo Projects to access specific expertise on the deployment of different FCH solutions
- 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)	https://www.fch.europa.eu/page/advice-complex-business-models	
Business cases/models	Teaser for Coupling wind farms (or any RES) and Electrolysers	Funding and Finance (FCH JU website)	https://www.h2v.eu/https://www.fch.europa.eu/page/advice-complex-business-models#PtH2	
Modelling tools	Mobility business case tool	FCH Regions Initiative (FCH JU Excel sheet)	Excel file	27/03/2018
Funding tools	FCH Funding and Financing navigation tool	FCH Regions Initiative (FCH JU; Roland Berger; Excel sheet)	Excel file	08/02/2018



European Hydrogen Safety Panel (EHSP) initiative

Expert group on hydrogen safety assisting the FCH 2 JU at project and programme level



EHSP Launched and running!

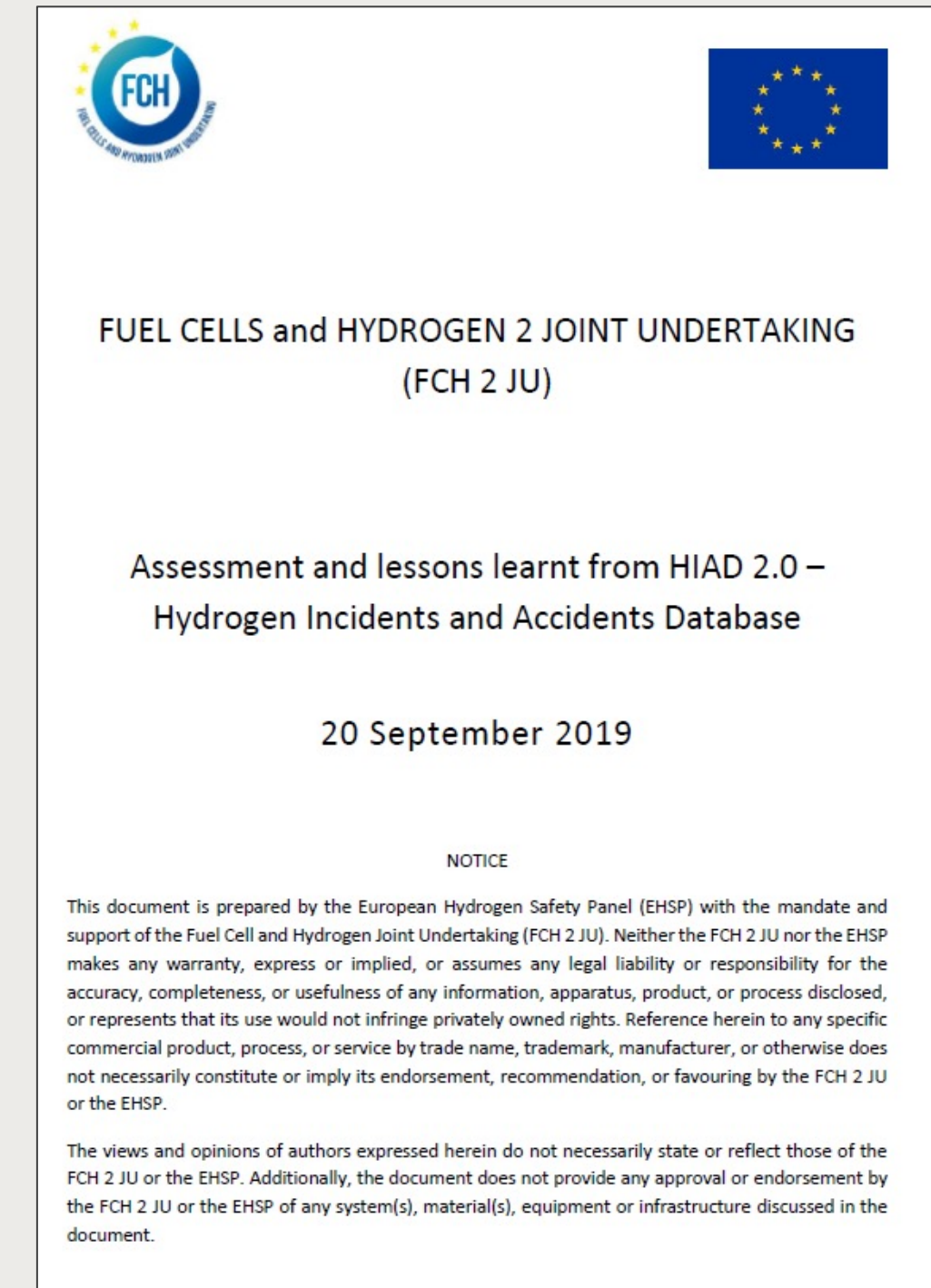
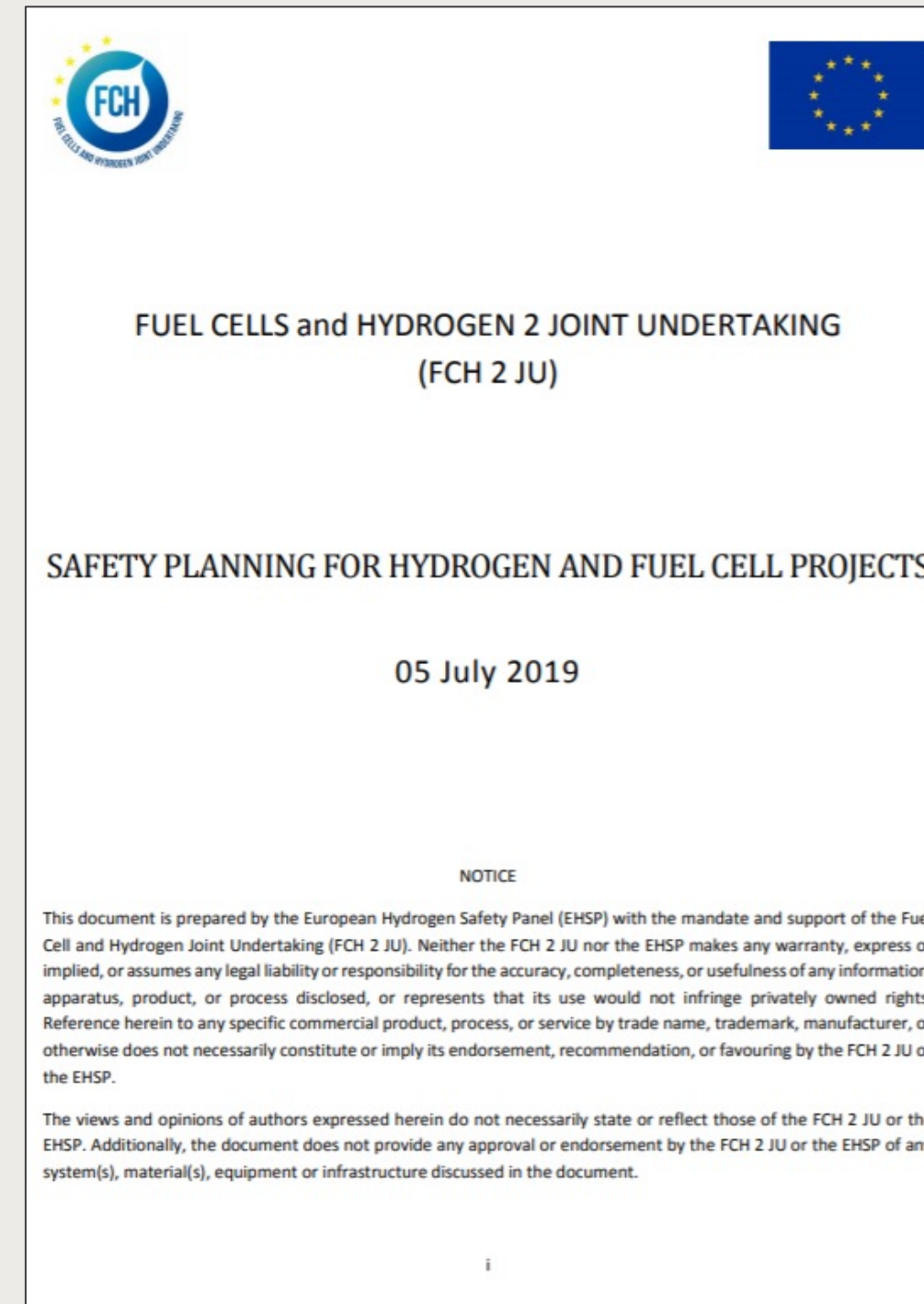


16 experts from industry & research

**Assuring that H2 safety is adequately handled
Promoting and disseminating H2 safety culture**



The EHSP released the first 2 reports on:
- Safety planning in FCH projects
- Lessons learnt from HIAD



Fuel Cells and Hydrogen Observatory (Launched 15 Sept '20)



One stop shop to understand where the FCH sector is at and how it is evolving

➤ Go to resource for all things on fuel cells and hydrogen

➤ User friendly and reliable output

- charts, graphs and data downloads
- reports

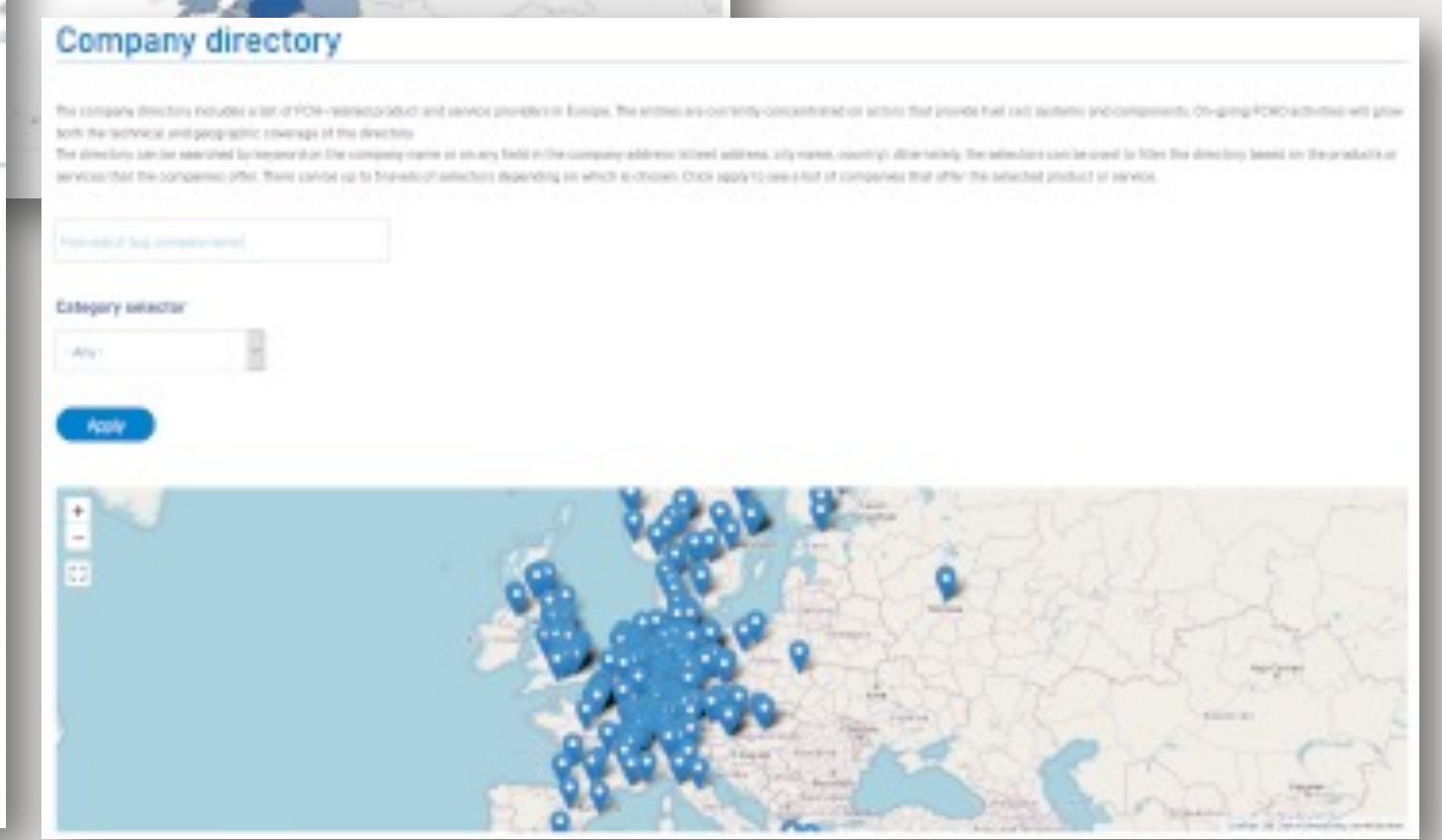
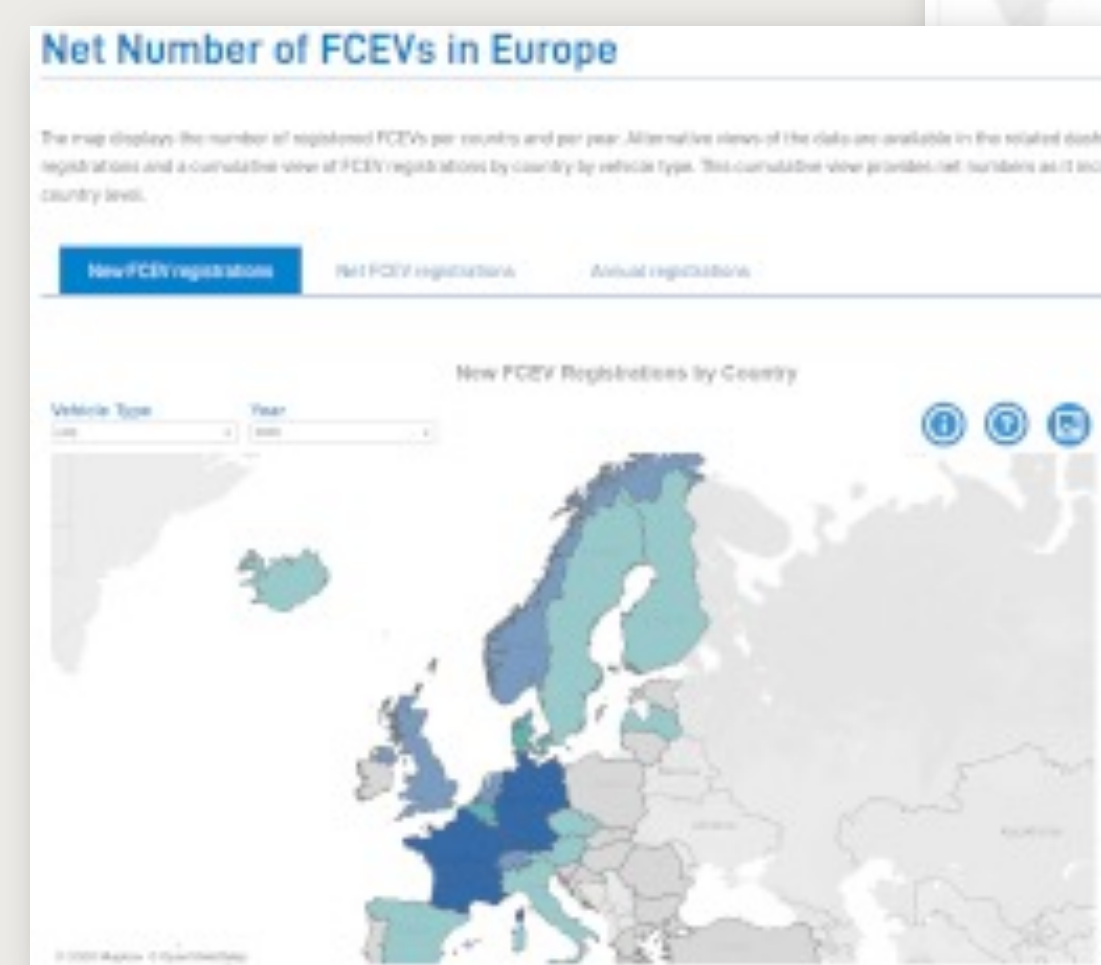
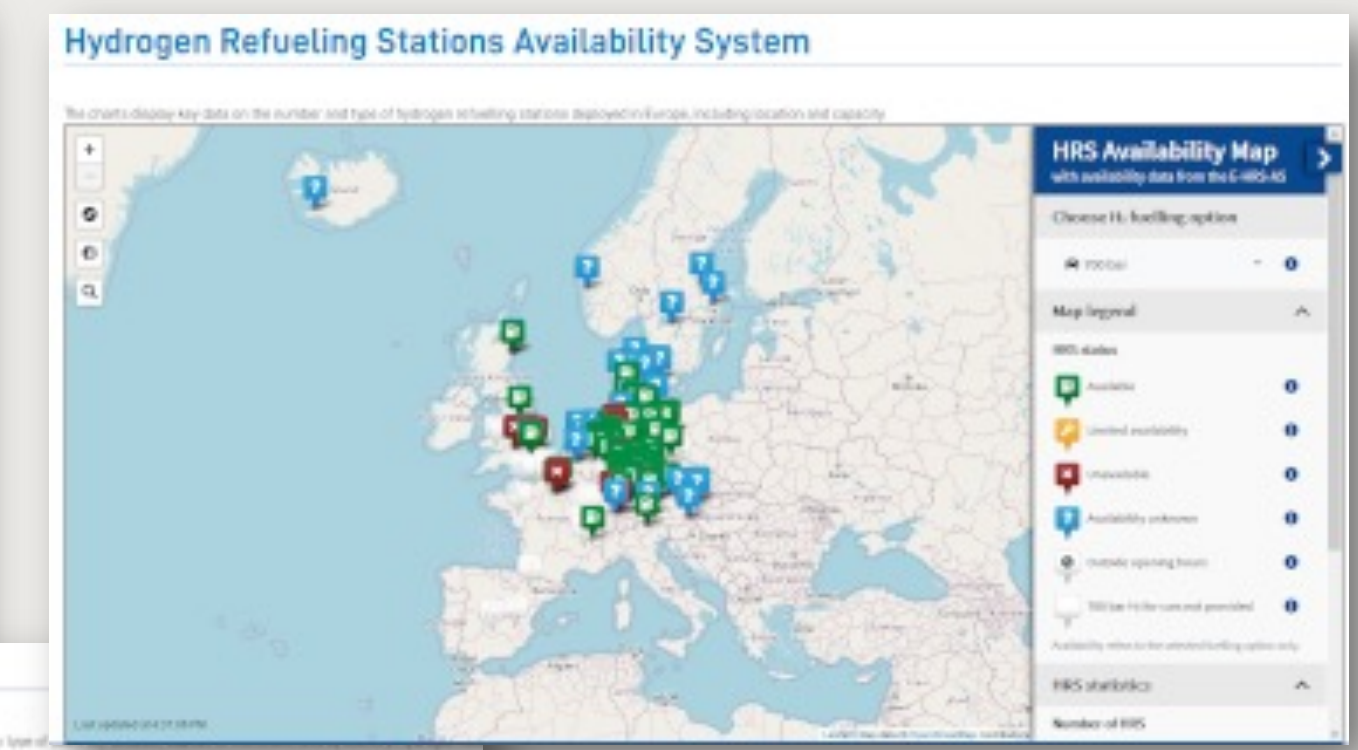
➤ It covers

- Technology & Market
- Policies & regulation
- Codes & Standards
- Patents & Publications
- Funding
- Education & Training

➤ Global resource

➤ www.fchobservatory.eu

info@fchobservatory.eu



@FCHObservatory



Funding instruments at EU level

Future European Funding opportunities for hydrogen

Depending on the project seize and goal, the right funding instrument should be chosen, FCH can help you



Horizon Europe

THE NEXT EU RESEARCH & INNOVATION PROGRAMME (2021 – 2027)

New partnership: CLEAN HYDROGEN

PILLAR H2 PRODUCTION

SO1 Low carbon H2 production

1. Electrolysis
2. Other modes of production

SO2 Integration of renewables

3. Role of electrolysis in the energy system

PILLAR H2 DISTRIBUTION

SO3 Storage & delivery of H2

4. Large scale storage
5. Pipeline transport (grid)
6. Liquid carriers
7. Non-pipeline transport
8. Key technos for distribution

SO4 Refuelling infrastructure

9. HRS for multiple applications

PILLAR H2 END USES

SO5 Transport vehicles

10. Building blocks
11. Trucks & large vans
12. Maritime (inc. ports)
13. Aviation
14. Rail
15. Coaches

SO6 Heat & Power

16. Stationery H2 fuel cells
17. H2 burners and turbines

SO7 Industry

18. H2 in industry

SO8 Hydrogen Valleys
Integrated H2 ecosystems combining multiple applications (ports, industrial hubs, cities, etc.)

S10 Cross-Cutting
Regulations, Codes, Standards, Training, Safety, social, etc.

SO9 Supply Chain
Manufacturing & scale-up

Comms
Knowledge
Safety
Int'l coop.

+

H2 is split in 7 partnerships in EU:

- Clean Hydrogen
- Processes4Planet
- 2ZERO
- Waterborn
- Clean Steel
- Clean Sky
- EU Rail

Start expected by end 2021 with an increased budget

Connecting Europe Facility

Investing in Europe's growth

INNOVATION FUND

Driving clean innovative technologies towards the market

First call for projects in 2020

€10 billion to invest up to 2030 in EU's climate neutral future

Avoid emissions and boost competitiveness

Supporting innovation in:

Energy intensive industries

Renewables

Energy storage

Carbon capture, use and storage

Funded by: EU Emissions Trading System

IPCEI

Hydrogen for Climate Action

Important Project for Common European Interest

Next Generation EU

#NextGenerationEU #EUBudget

EU



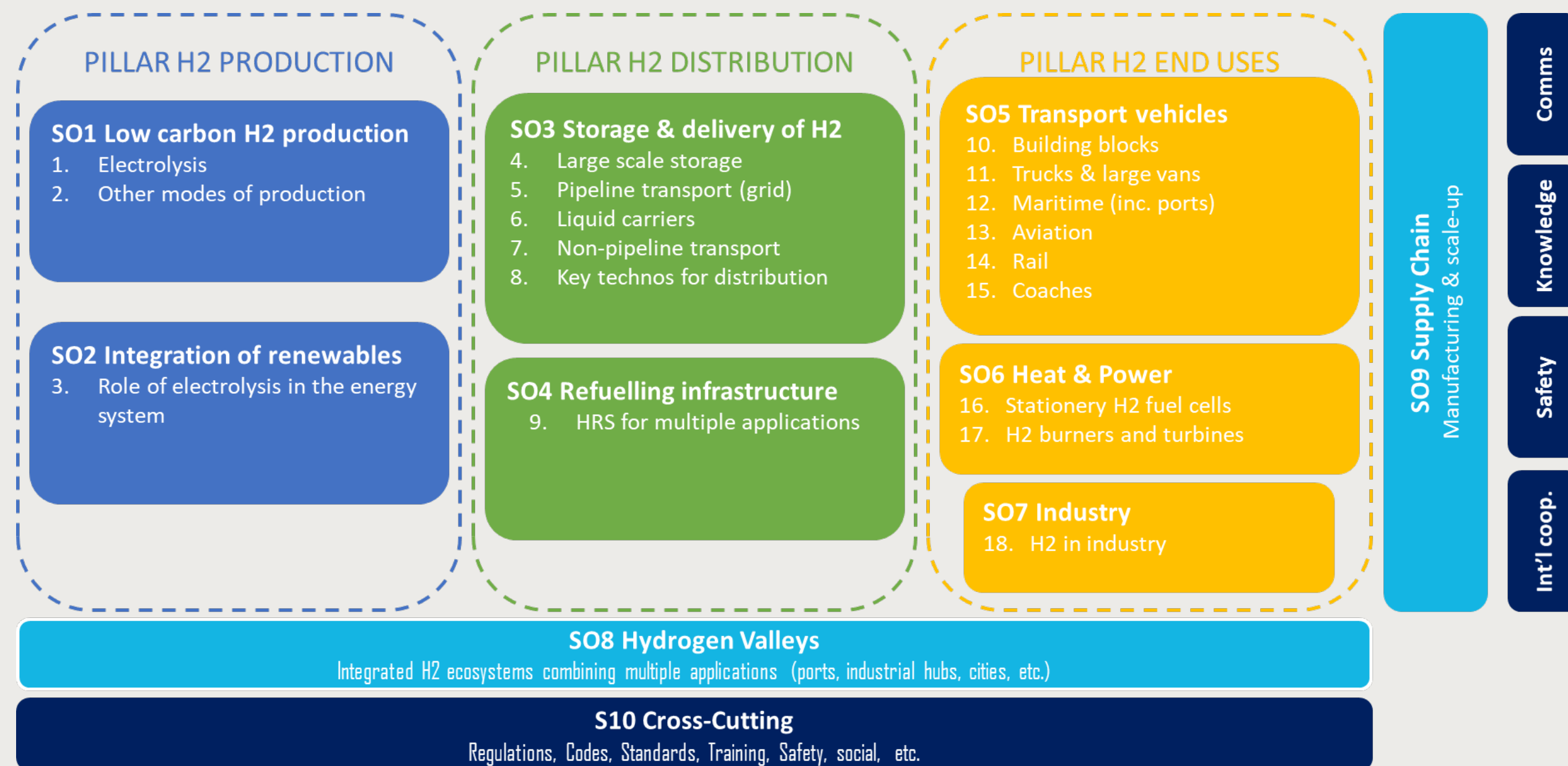
Hydrogen – Research and innovation

Partnership under Horizon Europe Programme



Maintain and strengthen EU's global leadership role through support:

- Establish Clean Hydrogen Partnership (successor of FCH-JU) by end 2021 with a budget of **1 billion EUR**
- Targeted research and innovation in Horizon Europe
- ETS Innovation Fund
- Interregional Innovation Investment Instrument with pilot action on hydrogen technologies



H2 is split in 7 partnerships in EU:

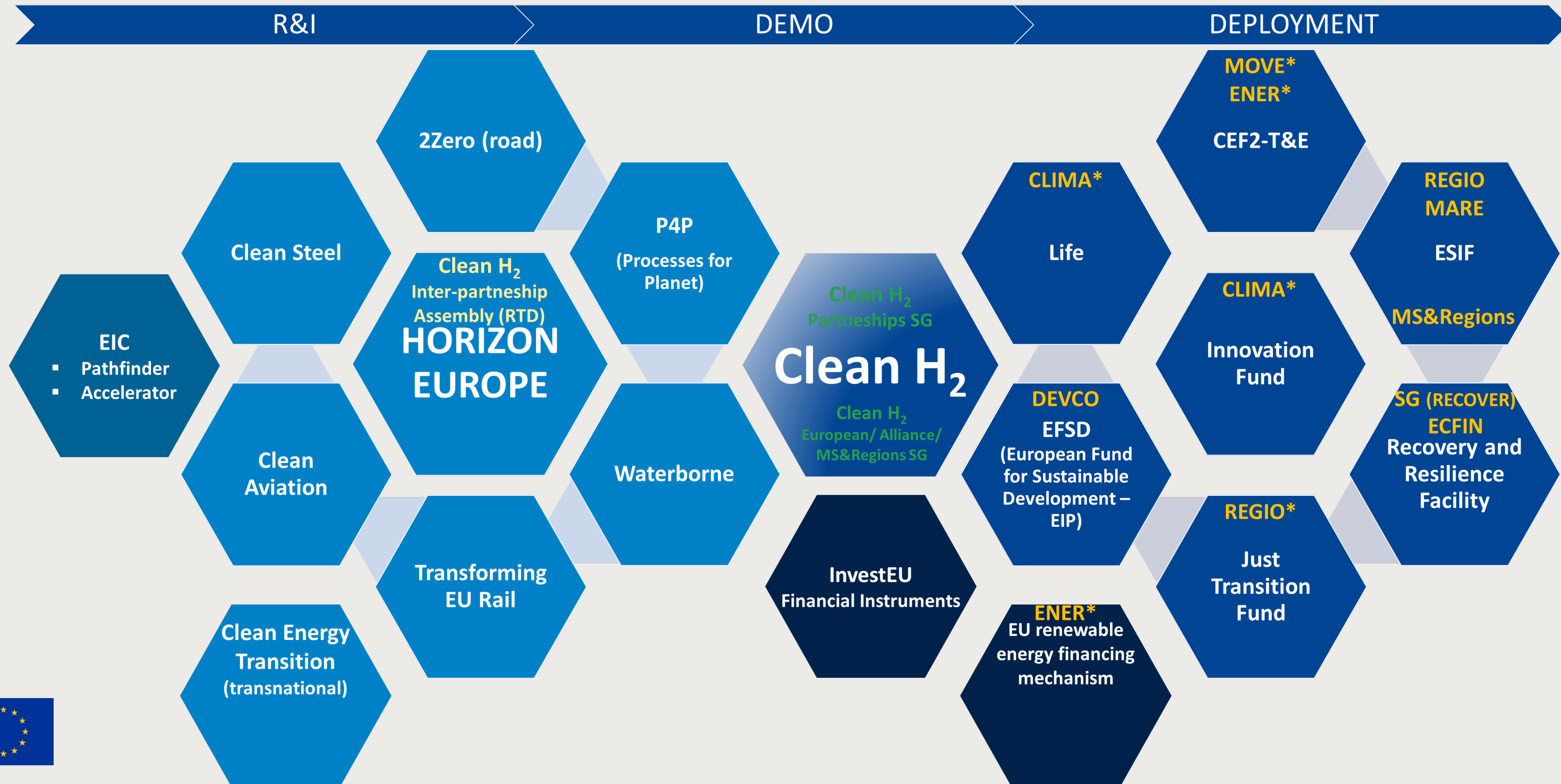
- Clean Hydrogen
- Processes4Planet
- 2ZERO
- Waterborn
- Clean Steel
- Clean Sky
- EU Rail



SYNERGIES: Strong cooperation is Key to deal with bigger yet fragmented EU Funds



H2 evolving and growing: from R&D&I to large Demos and full Market Deployment

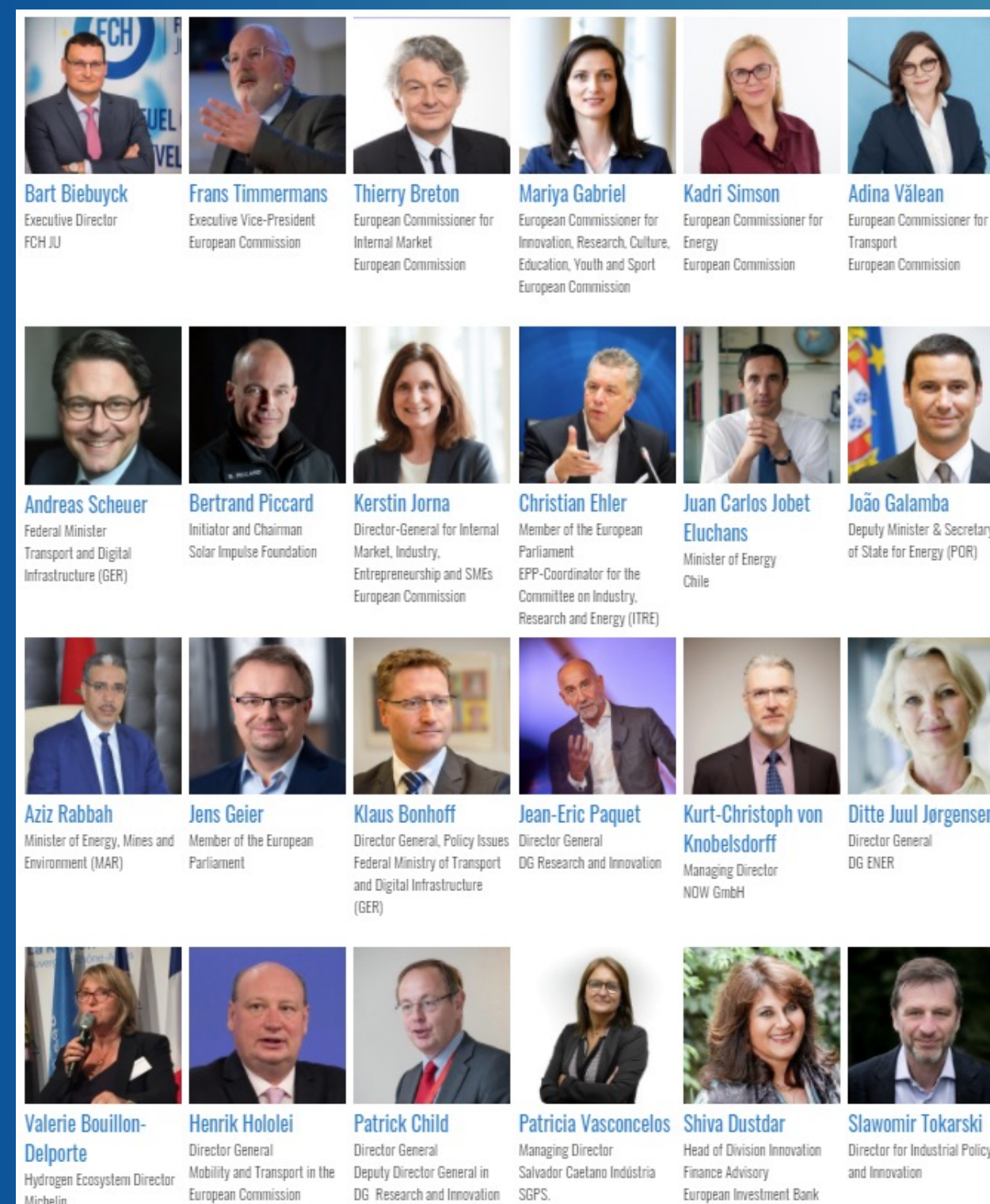


The 1st European Hydrogen Week

A huge success with many high level speakers



More than 10.000 people from 63 countries joined



The 2nd European Hydrogen Week + Launch of Clean H₂JU

29th Nov. – 3rd Dec. 2021

Brussels, Belgium

