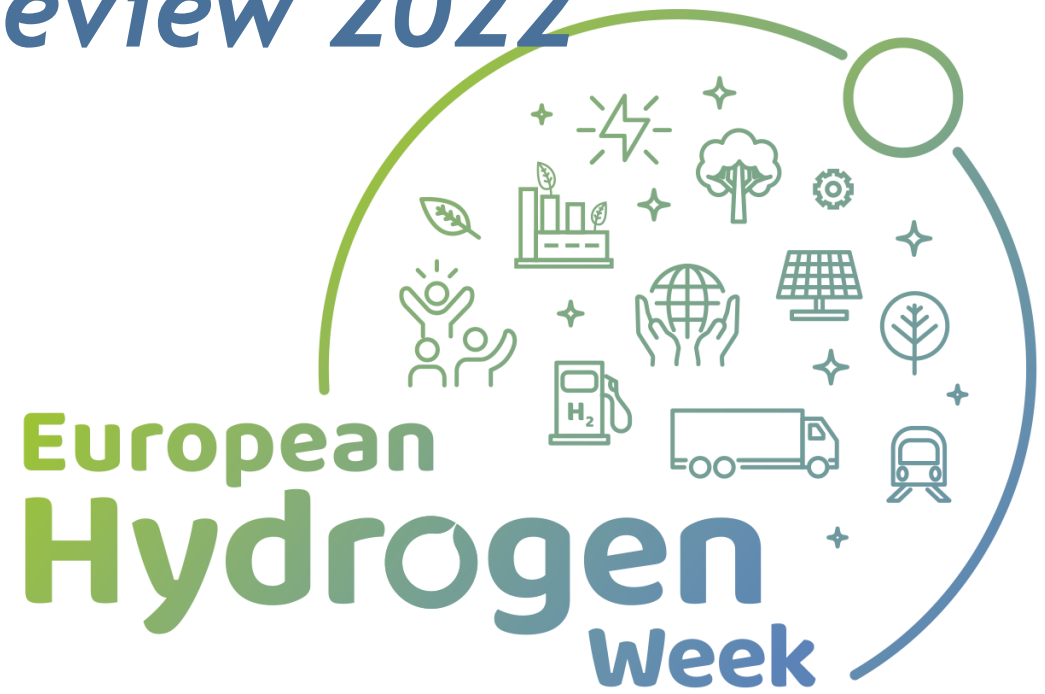
EU Hydrogen Research Days and Programme Review 2022



Mirela Atanasiu
Head of Unit Operations
and Communication

Clean Hydrogen JU Programme Status

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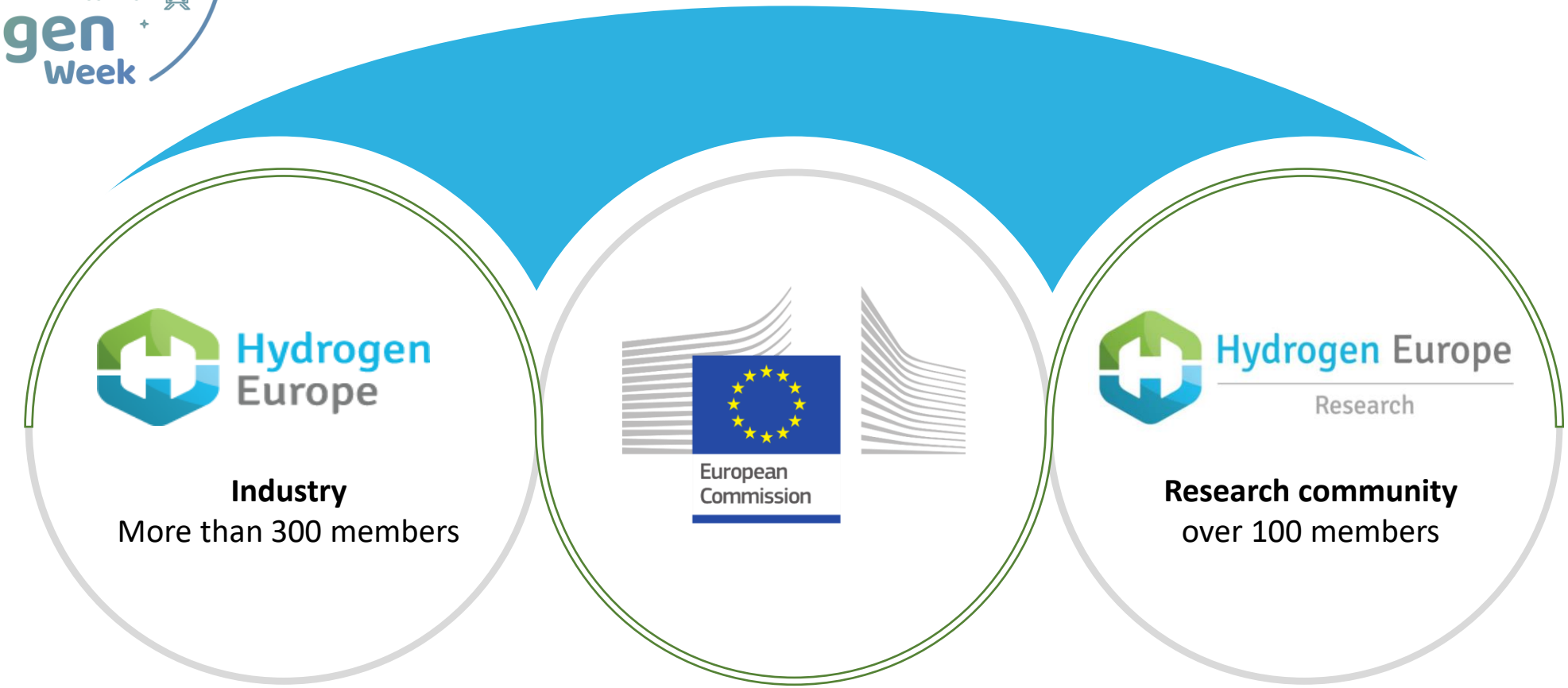
#EUResearchDays
#PRD2022
#CleanHydrogen

Clean Hydrogen Joint Undertaking



Industry
More than 300 members

Research community
over 100 members

1 billion EURO from Horizon Europe* to implement R&I activities and facilitate the transition to a greener EU society through the development of hydrogen technologies

**** additional 200 million EURO for Hydrogen valleys (under RePowerEU)***

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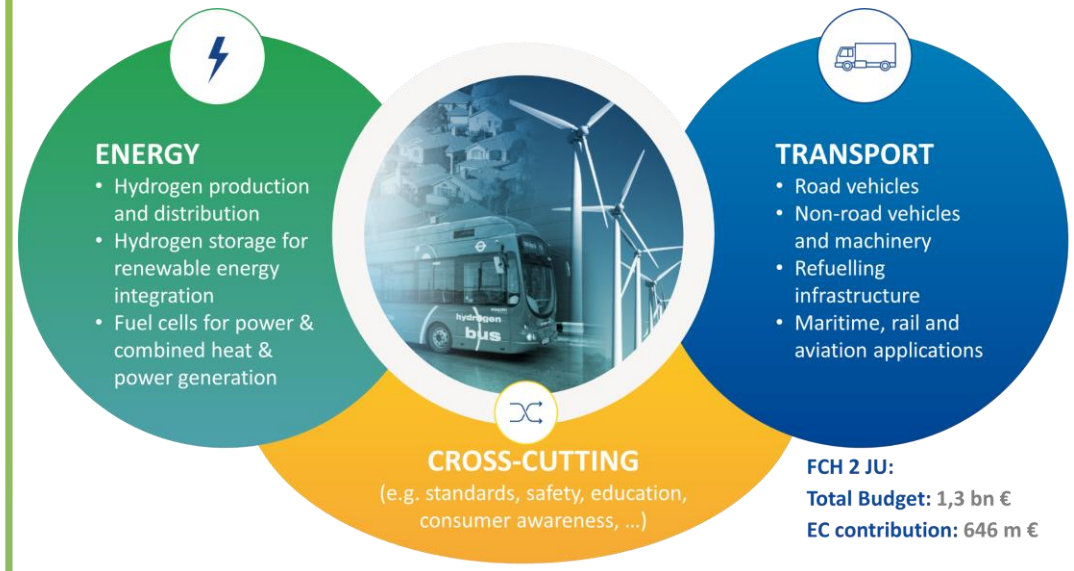
European Hydrogen Week

Continuing the work of FCH JU…

- A 14 years journey of the JU (FCH JU, FCH 2 JU)
- From research to delivering hydrogen solutions/innovations in the market
- Clean Hydrogen Partnership is the successor of FCH 2 JU, taking over all its activities



FCH 2 JU:
Total Budget: 1,3 bn €
EC contribution: 646 m €


Manufacturing


Green H2 production


Buses


ships


Aviation

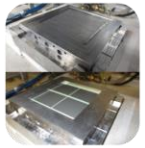

Research PoC


Domestic heat and power


Heat and power for industry


Heavy duty trucks


Logistics machinery


Materials


Gensets


Light duty vehicles


Trains

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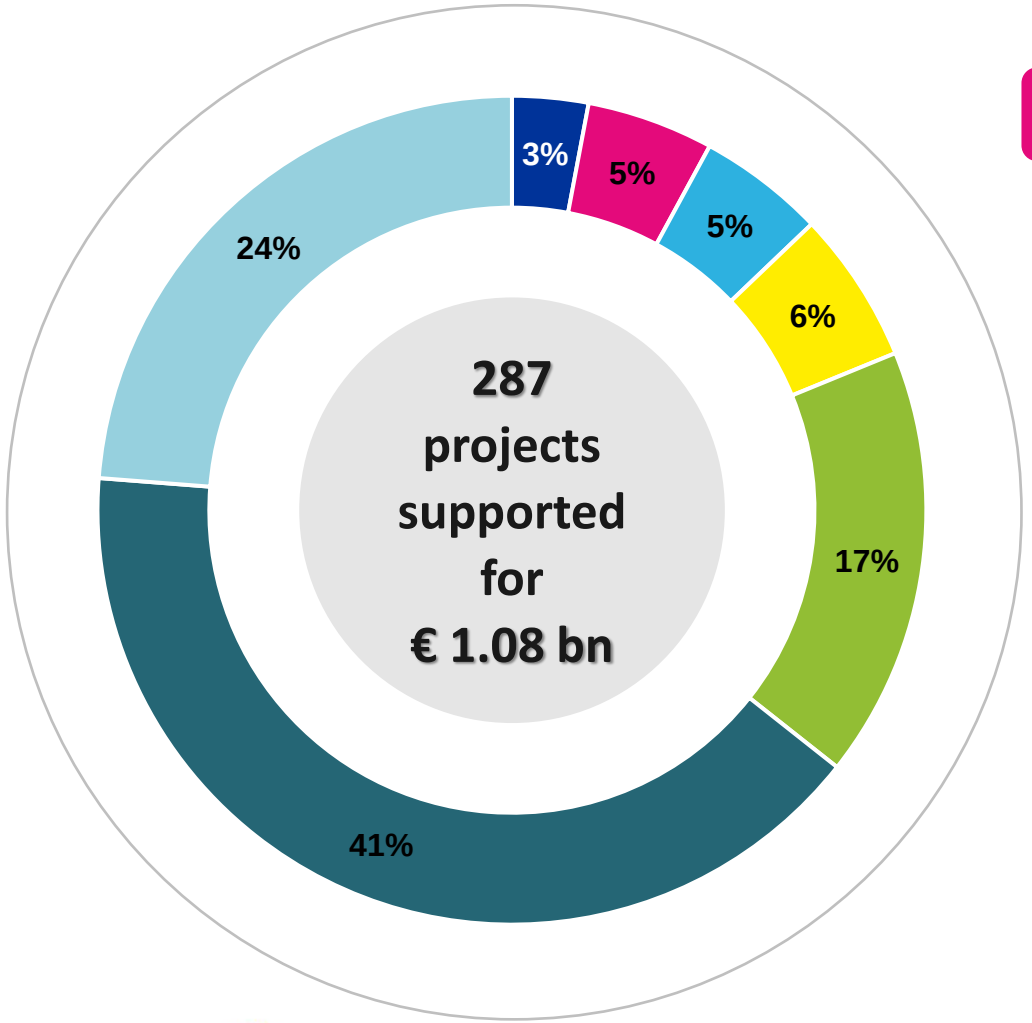
FCH JU legacy projects



H_2 Valleys

3 Projects

€ 35 million

H_2 End Use

- Transport Applications

  67 Projects

  € 436.8 million

- Clean Heat and Power

  77 Projects

  € 257 million

Supply Chain

17 Projects

€ 51.4 million

H_2 Storage & Distribution

21 Projects

€ 51.1 million

Cross-cutting

46 Projects

€ 65.1 million

H_2 Production

- Electrolysis
- Other routes

  56 Projects

  € 180.2 million

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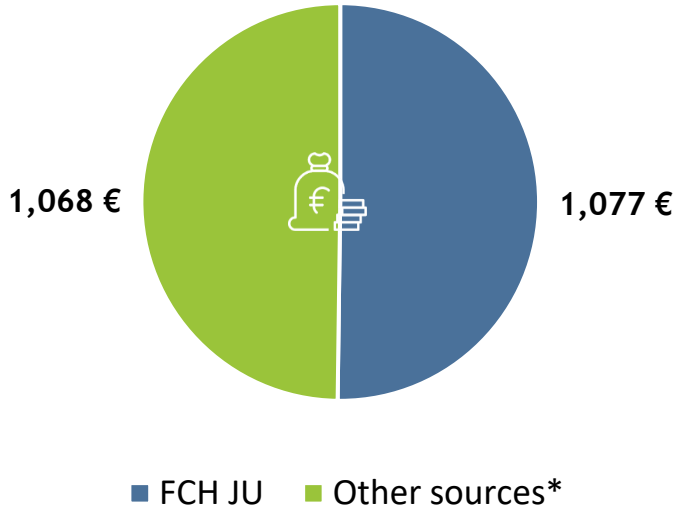
Attracting investment from industry and research

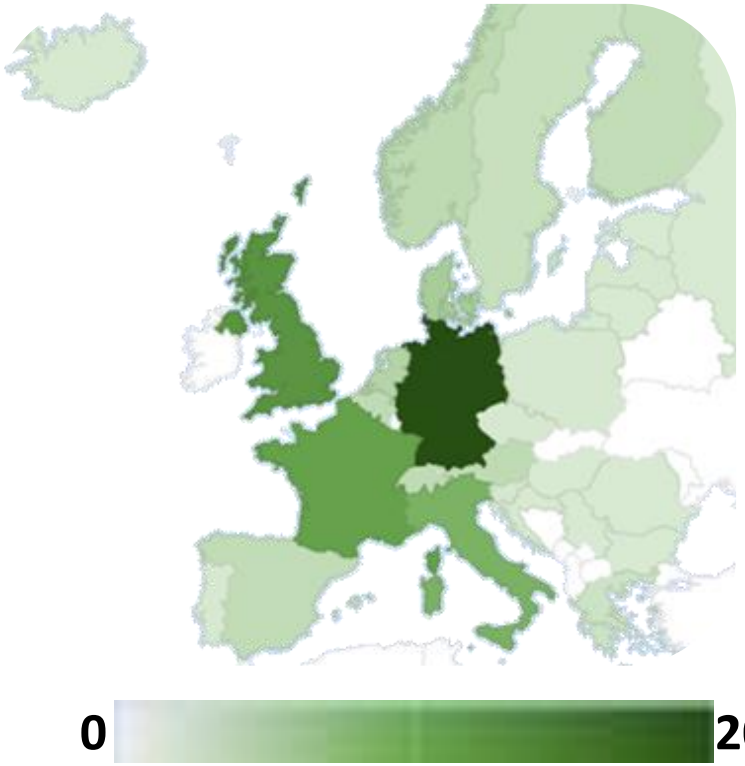
287 projects, 1.077 B€ public support, both research and innovation activities

FCH JU projects funding in M€

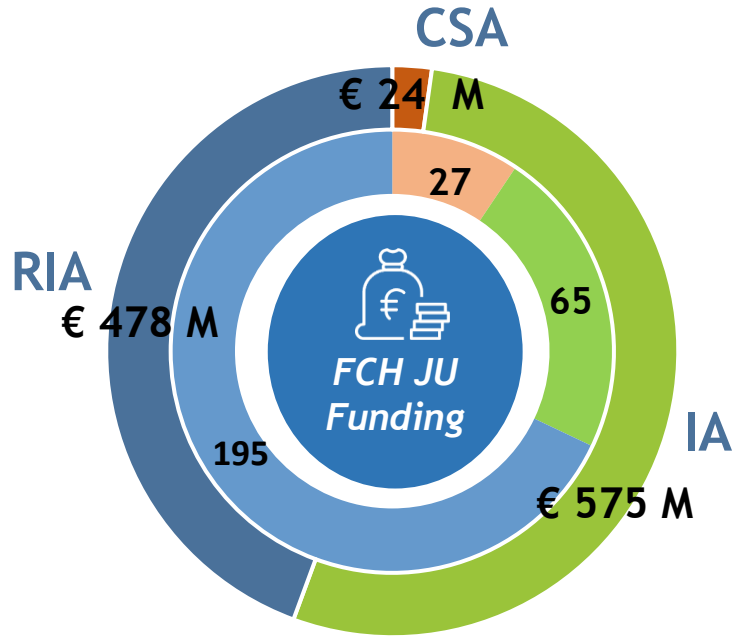


** Other resources including private and national/regional funding in projects (and additional 1 bill € in private investments/additional activities)*

Funding allocation in M€



No. projects, M€



RIA=Research and Innovation action
IA=Innovation actions
CSA=Coordination and Support action

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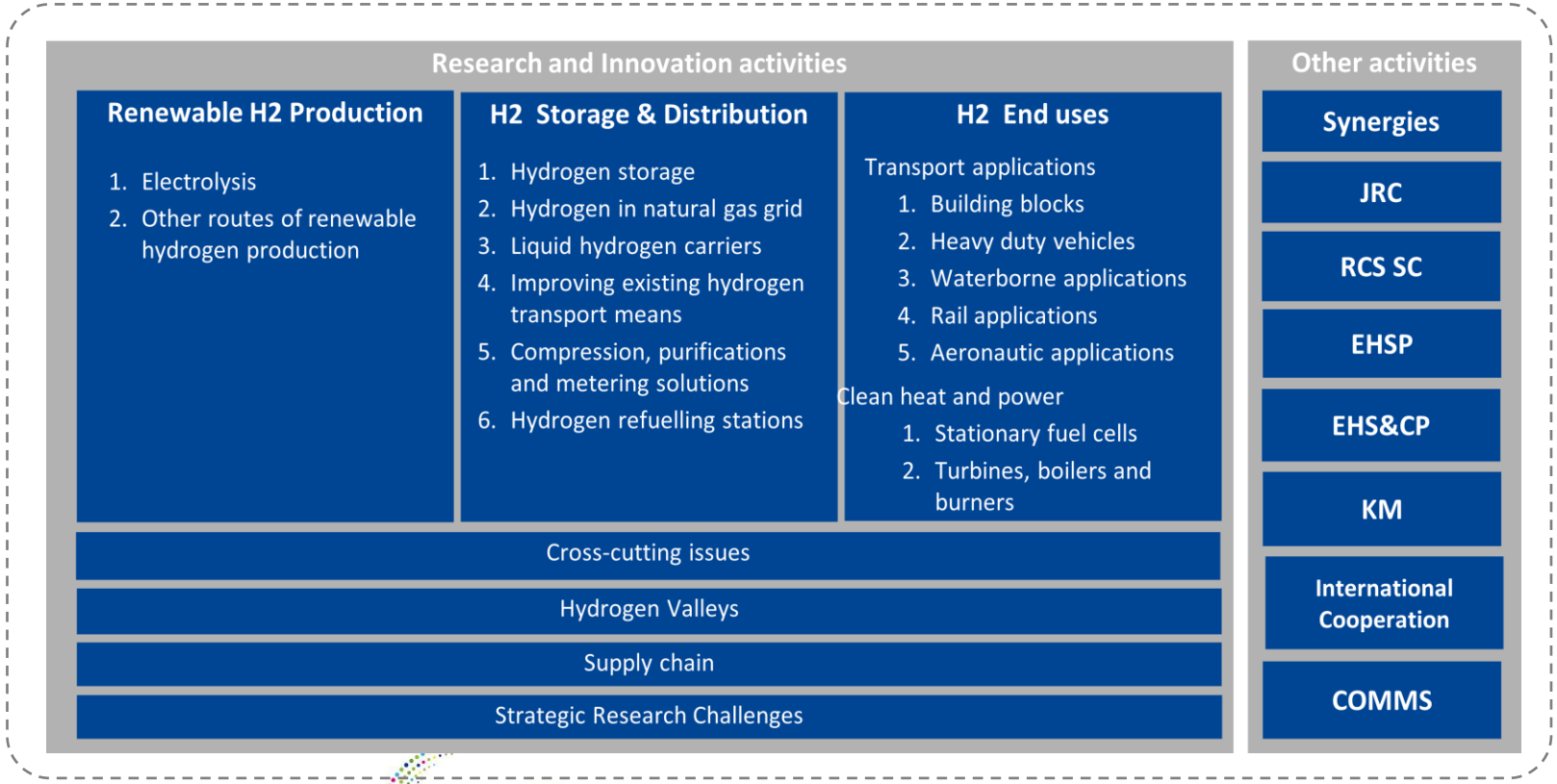
… but with change in its focus

Clean Hydrogen JU Mission:

Facilitate the transition to a greener EU society through the development of hydrogen technologies



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European Hydrogen Week

Clean Hydrogen JU Objectives

General

- Support the implementation of the Commission's Hydrogen Strategy
- Stimulate research and innovation on clean hydrogen production, distribution, storage and end use applications
- Strengthen the competitiveness of the EU clean hydrogen value chain
- Contribute to the EU ambitious 2030 and 2050 climate ambition

Specific

- Improve the cost-effectiveness, efficiency, reliability, quantity and quality of clean hydrogen solutions across entire value chain
- Strengthen the knowledge/capacity of scientific and industrial actors along the Union's hydrogen value chain while supporting the uptake of skills
- Demonstrations of clean hydrogen solutions with a view to local, regional and Union-wide deployment, aiming to involve stakeholders in all Member States and across entire value chain
- Increase public and private awareness, acceptance and uptake of clean hydrogen solutions

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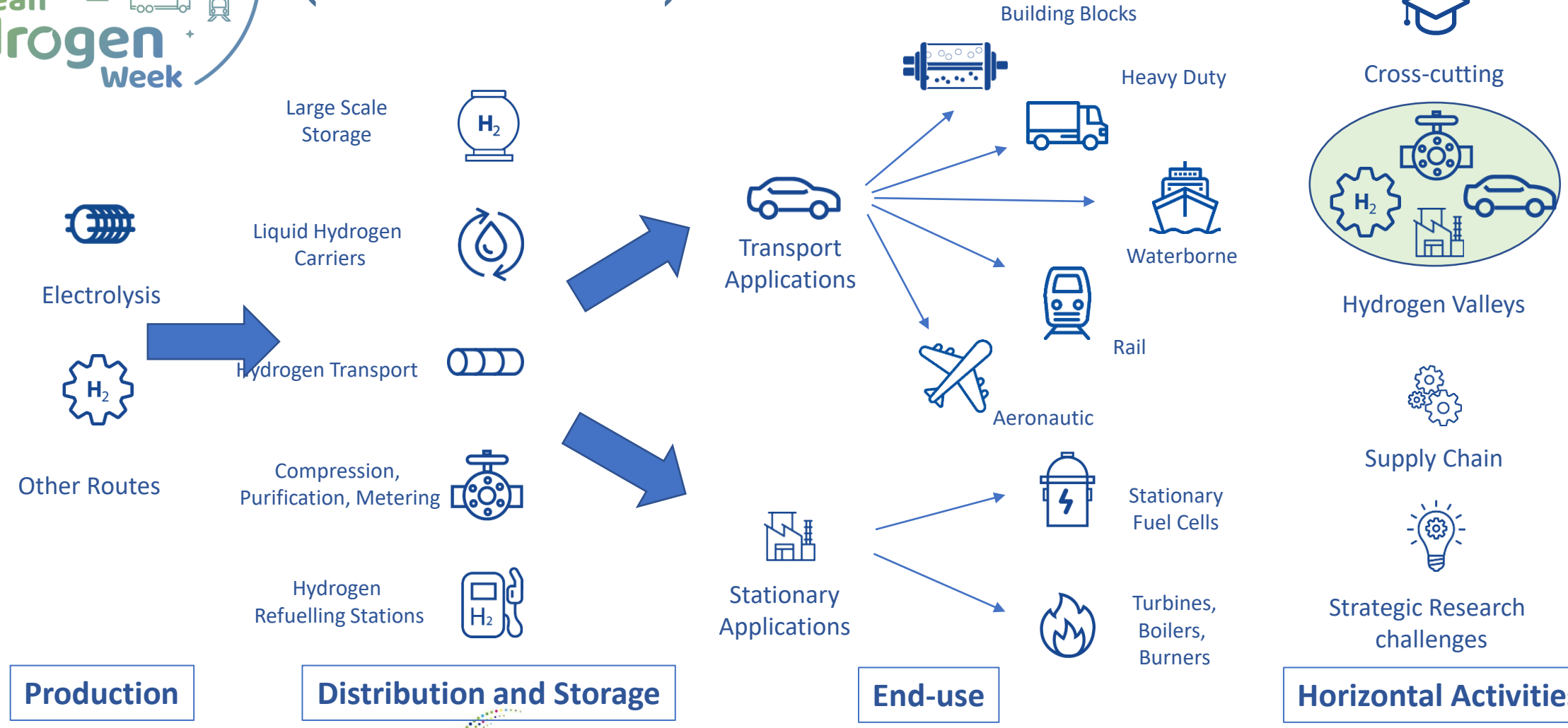
Research & Innovation Activities (2021 - 2031)



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Call for Proposals 2022

Call: HORIZON-JU-CLEANH2-2022

Total budget: 300.5 M€

41 topics

	Budget (EUR 300.5 million)	Publication	Deadline	# Topics
First deadline (2022-1)	179.5	1st March 2022	31st May 2022	26 Topics
Second deadline (2022-2)	121.0	1st March 2022	20th September 2022	15 Topics

Other Activities

Additional activities (along the calls/grants support) are necessary to fulfil the Clean Hydrogen JU objectives

- Developing **synergies** with other partnerships and programmes
- Regulations, Codes and **Standards** (especially **PNR contribution**)
- European Hydrogen **Safety** Panel
- European Hydrogen **Sustainability and Circularity** Panel (NEW)
- **Knowledge management** (monitoring and reporting, Observatory, TRUST)
- **International Cooperation** (MI 2.0 H2Valleys Platform, IPHE, IEA tasks)
- Communication activities, **public awareness/acceptance**

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Synergies

Strong cooperation is key to deal with bigger yet fragmented EU and National/Regional Funds to meet EU Green Deal Ambition!

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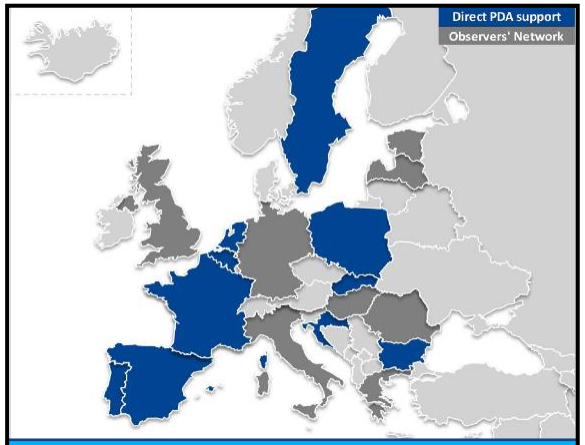
The JU's Regions Initiative boosted H2 awareness in EU

The approx. 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

Project Development Assistance (PDA)



Great opportunity to bring on-board and share learnings with 'less FCH ready' but higly interested central and eastern European regions

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

EU H_2 Valleys Partnership

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

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

Creation/funding of H_2 valleys

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

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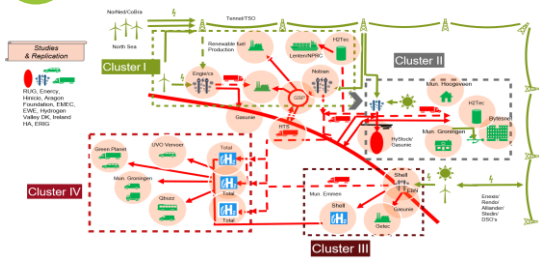
Hydrogen valleys: An accelerator for a European hydrogen economy

1

BIG-HIT:

- Pioneering H2 Ecosystems, set the basis for the H2 Valleys that followed
- H2 production by wind on Islands
- Storage & transportation by truck
- End uses: heat (school), power (ferries) & mobility (municipality cars)

2 www.heavenn.org



2019: North Netherlands

- Large number of public + private partners
- H2 production via electrolysis
- Mobility: buses, passenger cars, inland water vessel, trucks + HRSs
- E-Kerosene for aviation, gas turbine. residential heating
- H2 pipelines + H2 injection in gas grid, tube trailers
- Underground H2 storage
- 1,500 tons H2/year

3 www.greenhysland.eu

2020: Hydrogen Island (Spain)

- Public + Private collaboration
- H2 production from solar PV
- H2 injection in gas grid + H2 pipeline + tube trailers
- Heat and power (hotel, municipal building, port of Palma)
- Mobility (public buses, light duty vehicles + HRS)
- 300 tons H2/year

- Additional support to Hydrogen Valleys foreseen in the JU SRIA 2021-2027
- 200 MEUR top-up fort he acceleration of Hydrogen Valleys deployment in Europe
- Call 2022 includes support to Hydrogen Valleys: large-scale (>5,000 tH2/y) & small-scale (>500 tH2/y)
- Ports, Airports, Industrial hubs, Logistical hubs, H2 city (area),cross border, etc.

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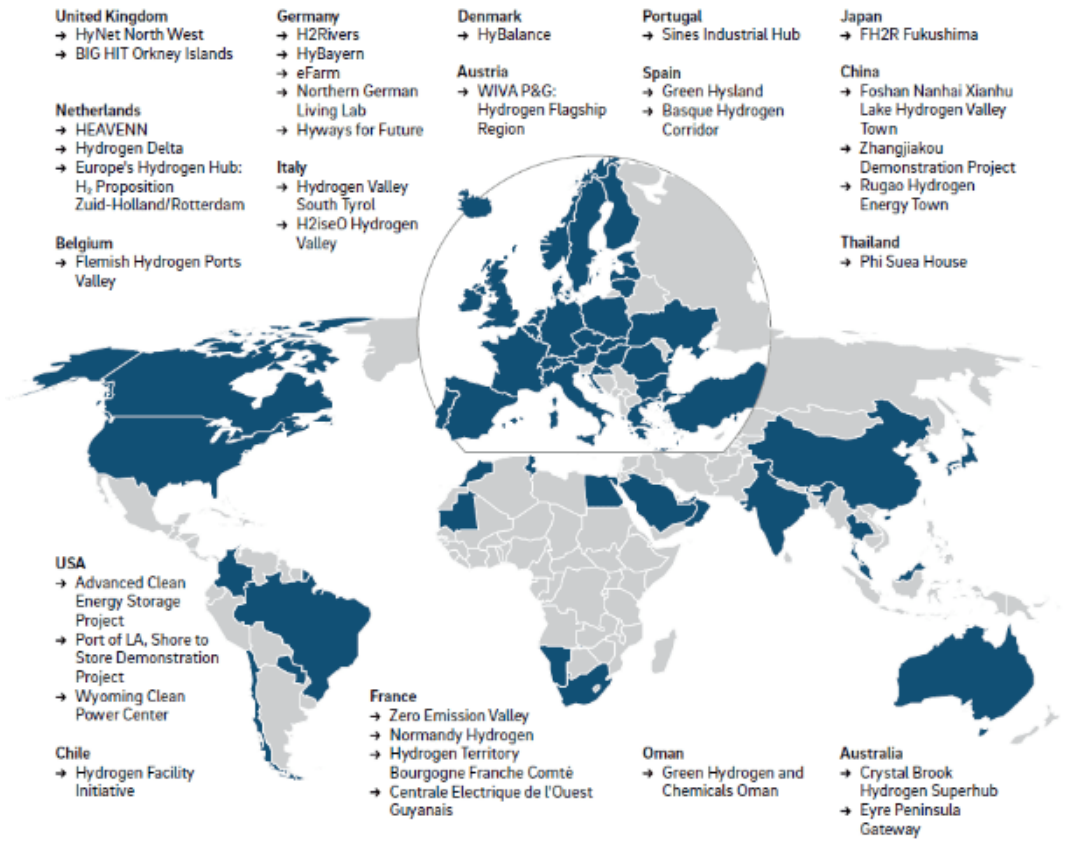
Hydrogen Valleys have become a global theme

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

MISSION INNOVATION

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

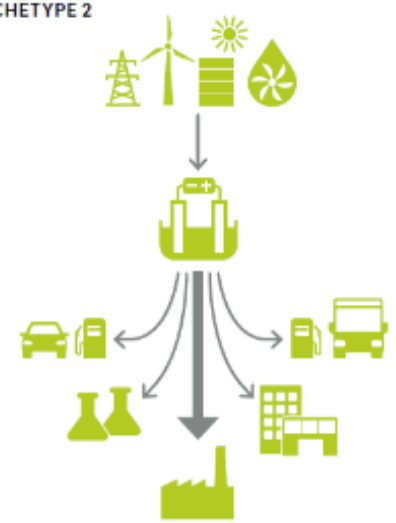


Source: Clean Hydrogen JU, Roland Berger

ARCHETYPE 1

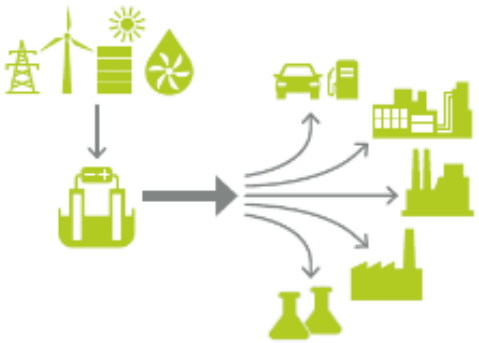
→ Smaller-scale local mobility-centred Hydrogen Valleys (typically 1–10+ MW of local electrolyser capacity)

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)

www.h2v.eu

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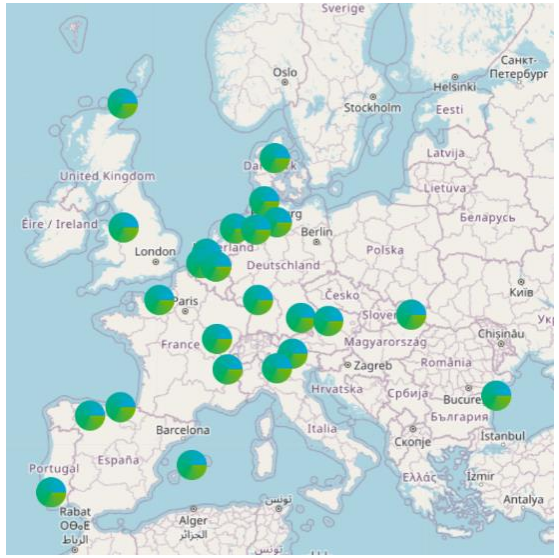
Next steps under MI 2.0:

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



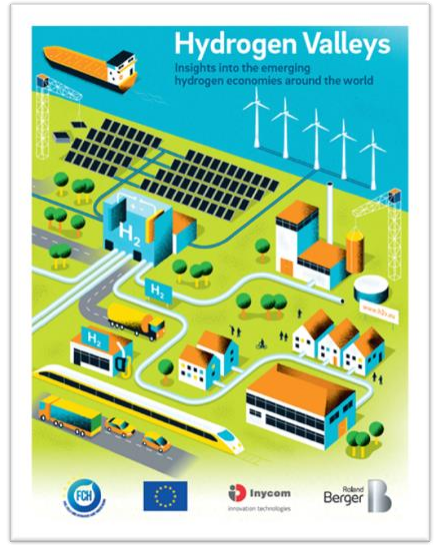
Key remaining barriers for Hydrogen Valleys

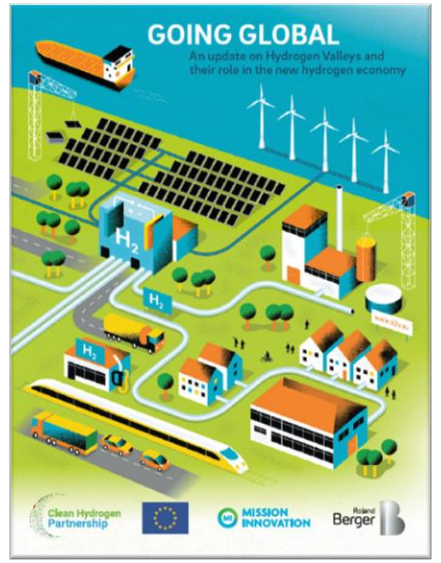
> Obtaining public funding support to close the remaining funding gaps

> 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.





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Project Development Assistance (PDA) for Regions

Building a pipeline of regional/local projects across Europe
Final report and summary slides published in October 2021 (closing Webinar)

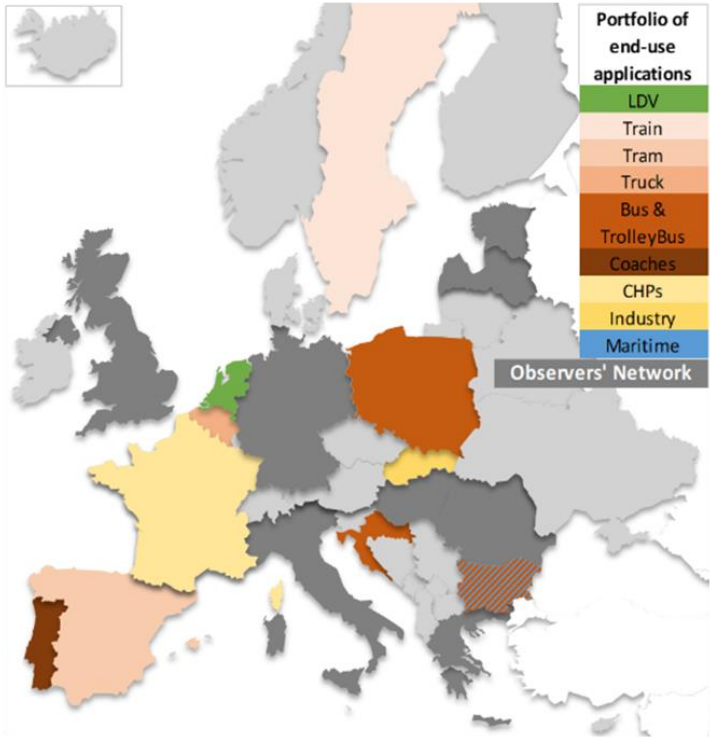
Project Development (11)

Concept → Plan

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

June-2020 – June-2021

FCH PROJECT DEVELOPMENT ASSISTANCE FOR REGIONS



Observers' Network (+24)

Survey to define scope → Wide offer of webinars

- Webinars
  - 1st tech - FCH buses and trucks (15/10/2020)
  - 1st peer review (17/11/2020)
  - Funding & Financing (16/12/2020)
  - 2nd tech - HRS and H2 distribution (11/02/2021)
  - 3rd tech – H2 production (26/05/2021)
- *Database of suppliers*
- *Request for Information (template)*
- Policy (white paper) support for H2
- FCH Regions' Hub

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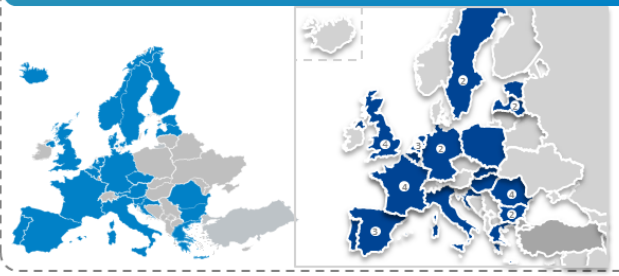
PDA for Regions (II)

Focus on Cohesion Countries, Outermost Regions and Islands

Supporting regions and cities in assessing various FCH applications (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

Planned Schedule:

Call for EoI **21/10/2022** (deadline)

Awarding: **Dec-2022**

Implementation: **2023**

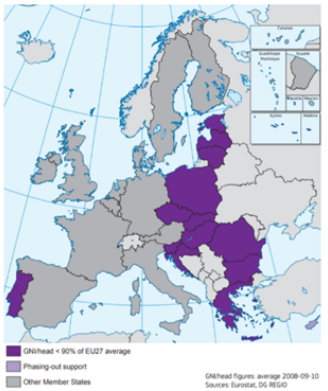
Tasks

- 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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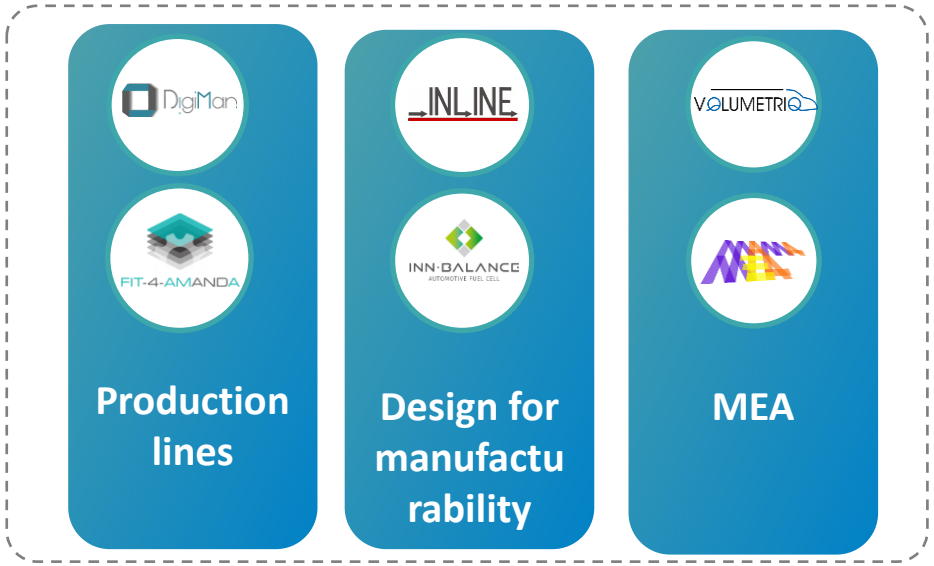
Sustainable supply chain and manufacturing

Support the development of innovative manufacturing and monitoring the supply chain for mass-production and competitive industry

Scaling up production of fuel cell components



Upcoming study (end 2022) on supply chain and industrialisation of hydrogen technologies

- Analyse the European manufacturing capacity
- Update the EU entities list
- Identify the strengths and bottlenecks/gaps in the supply chain
- Evaluate the competitiveness and socio-economic aspects
- Address the sustainability and recycling

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European Hydrogen Safety Panel

Expert group supporting the JU in safety-related issues

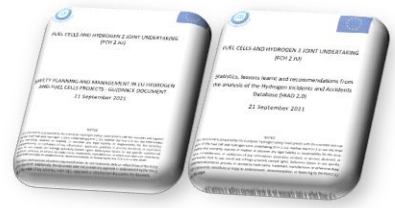
Assuring that hydrogen safety is adequately managed
Promoting and disseminating a high-level hydrogen safety culture

EHSP Working Groups

- Project level
- Program level
- Data Collection
- Public Outreach

2022 Outcomes

- ✓ Projects' safety plans reviews
- ✓ Webinar on Safety planning
- ✓ EHSP reports
  - Safety Planning guidance
  - Lessons learnt from past events
  - CFD models, risk assessments, etc.



www.clean-hydrogen.europa.eu/get-involved/european-hydrogen-safety-panel-0_en

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Developing an EU wide Guarantees of Origin (GO) Scheme for Hydrogen

Green and Low-Carbon Hydrogen – more than 100,000 GOs issued already

Facilitating the EU-wide roll-out of an efficient and harmonized H2 GOs market

- Vertogas, appointed as H2 GO Issuing Body in the Netherlands, has adopted the CertifHy scheme for renewable and low-carbon H2, regarding renewability and GHG footprint methodology.
- CertifHy has actively contributed to the establishment of the AIB's EECS rules adaptation for gas and hydrogen (via AIB Gas Scheme Group)

Design an EU Voluntary Scheme for the certification of hydrogen as RFNBO

- Developed an architecture to accommodate the complex framework for hydrogen certification, considering not only RFNBO certificates but also GOs, as well as the future Union Database.
- Certification Pilot has already been planned

Relaunching the CertifHy Stakeholder Platform and the Working Groups

- Expanding the case studies (SOEC, HyCo, waste to hydrogen etc)
- Published the GHG methodology document pending approval from the Stakeholder Platform
- CertifHy training for certification bodies and auditors already conducted (Recording will be available)

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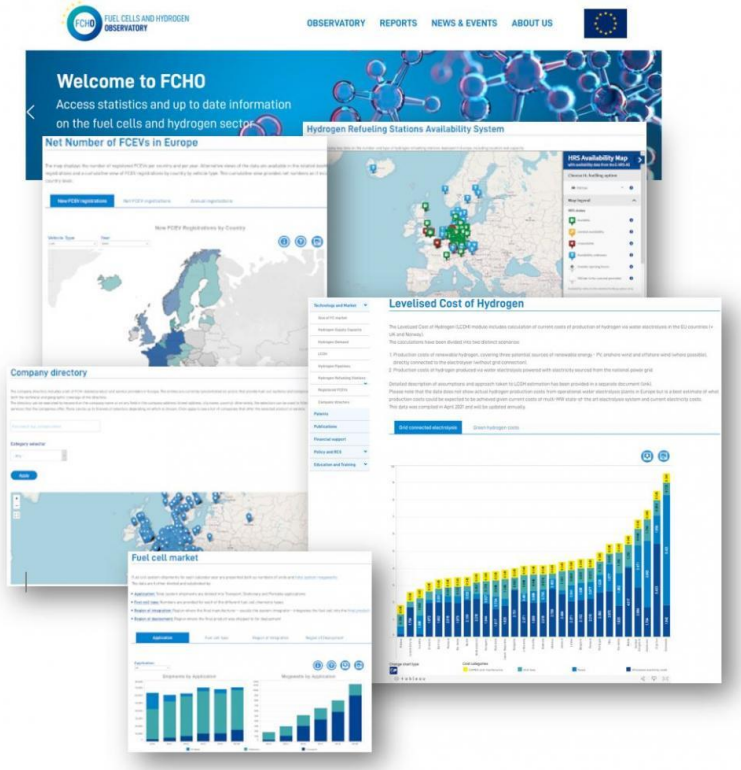
Clean Hydrogen JU fact-based Studies and Publications

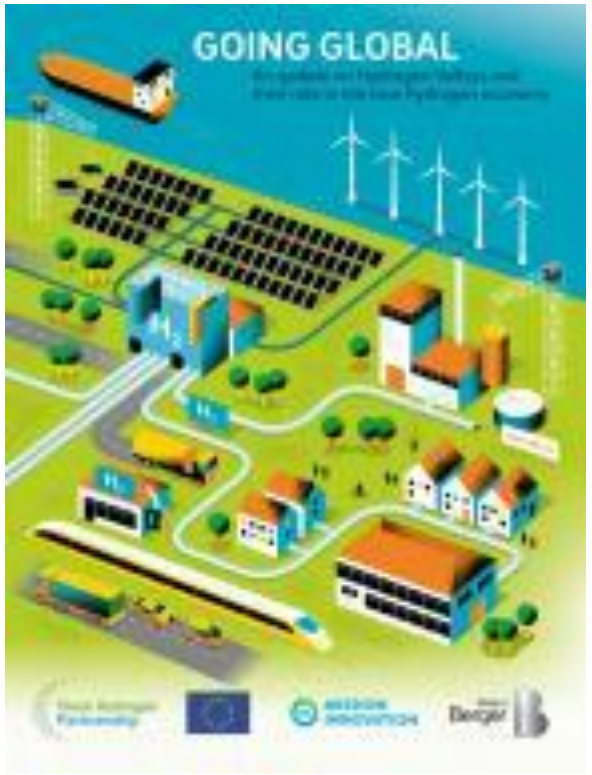
Providing guidance on key matters

FCHO REPORTS



HYDROGEN VALLEYS

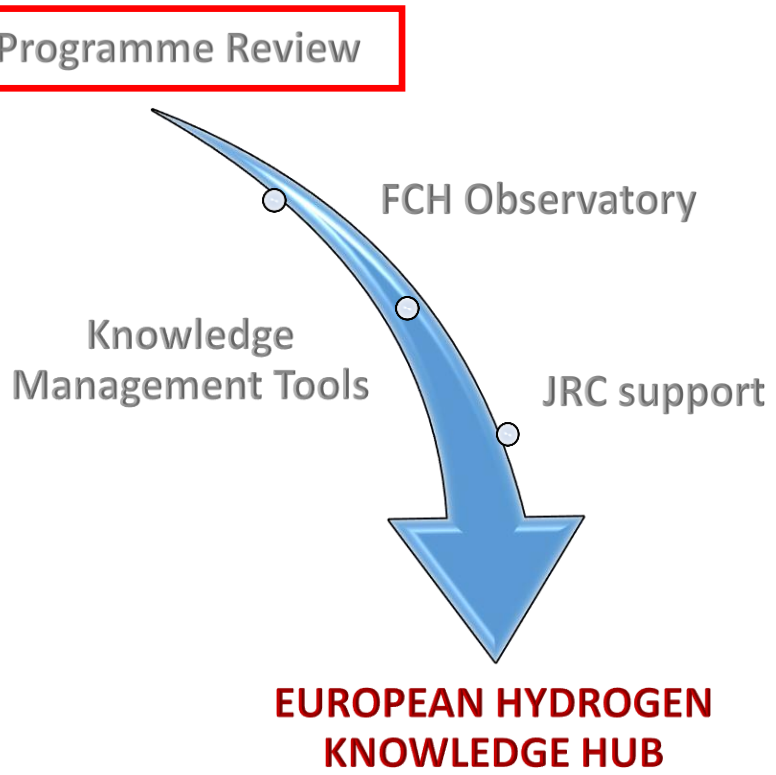
Updated report



IMPACT OF BEV AND FCEV INFRASTRUCTURE

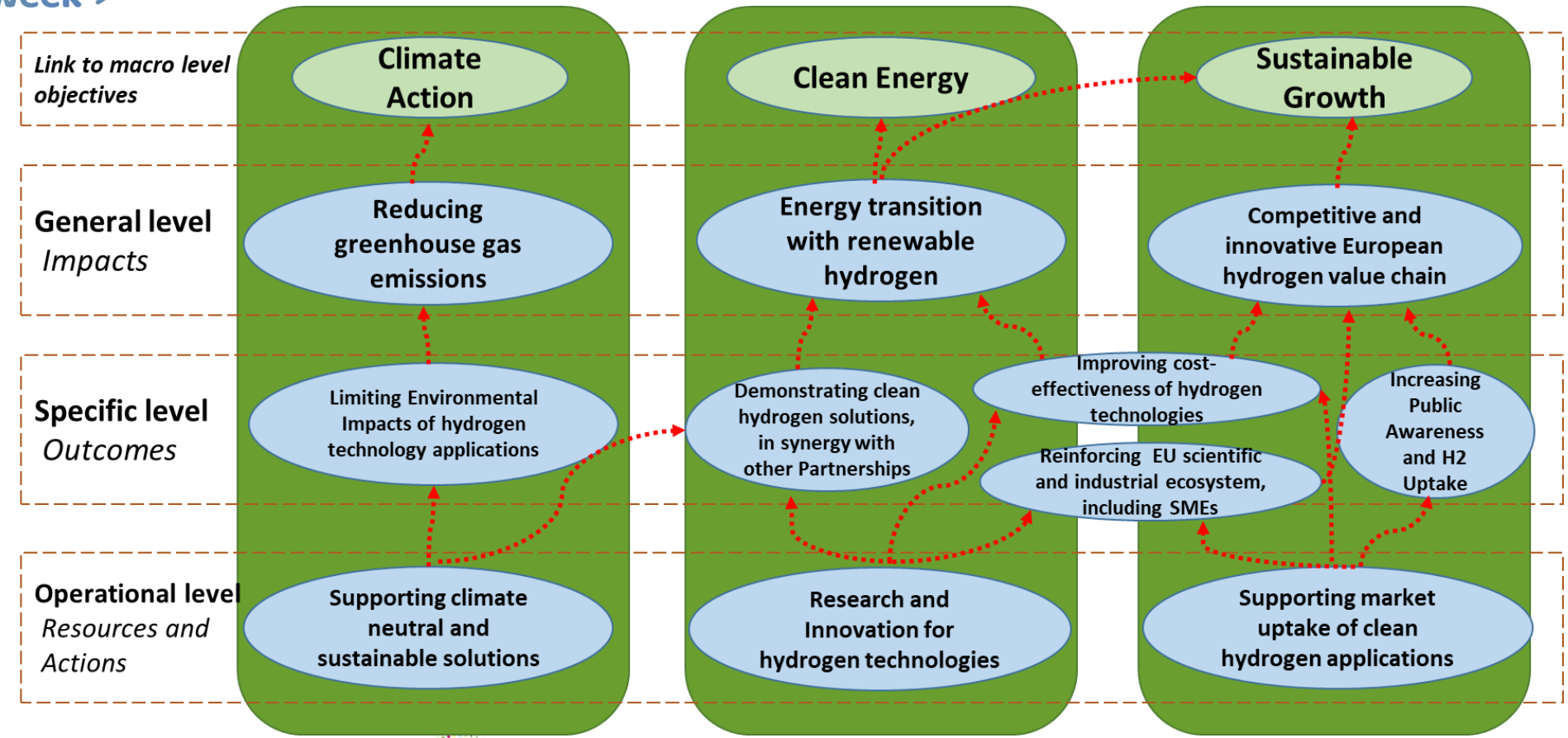
Knowledge Management in the JU

- **Based on following pillars:**
  - Annual Programme Review (with the aim to cover all hydrogen EU funded projects) and incl **'wider scientific community' consultation**
  - Fuel Cell and Hydrogen Observatory (FCHO)
  - Other Knowledge Management Tools
  - Complemented by support from JRC and targeted studies
- **Main inputs for:**
  - Programme and technology monitoring (KPIs)
  - Feedback to Policy
  - Topic definitions for new programming/Calls for Proposals
- **Goal:**
  - Gradually become the **European Hydrogen Knowledge Hub**, serving the entire hydrogen community



Programme Monitoring

Clean Hydrogen Partnership Strategy Map



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Annual Programme Review

European Hydrogen Week

Clean Hydrogen JU Projects Previous Calendar Year

EU-SURVEY

Online Questionnaire

- General Information, complementary to TRUST
- Progress, Impact, SoA
- Interactions with other projects & initiatives
- Dissemination and communication activities

Programme Technical Assessment performed by JRC

TRUST*

- Focus on technology KPIs and deployment data
- User-friendly, secure online tool
- Descriptive & Operational data
- Public & Confidential data

Clean Hydrogen JU Projects Previous Calendar Year

Programme Review Report incl 'wider scientific community' consultation

*Technology Reporting Using Structured Templates

Clean Hydrogen Partnership EUROPEAN PARTNERSHIP

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Annual Programme Review 2022 (on-going)

Annual exercise (as of 2011) with the support of Joint Research Centre of the European Commission (as independent body/experts)

Scope of the Programme Review will be broader in 2022, while JRC Programme Technical Assessment will remain at its core.

Review of 98 projects active in 2021 against SoA, targets and **Key Performance Indicators.**

Collection of annual input from projects:

- **EU-Survey Questionnaire**
- Data collection exercise **through TRUST (tech. monitoring) templates**
- Contractual documents and project reports;
- **95 project factsheets** published on event's webpage

European Hydrogen Week

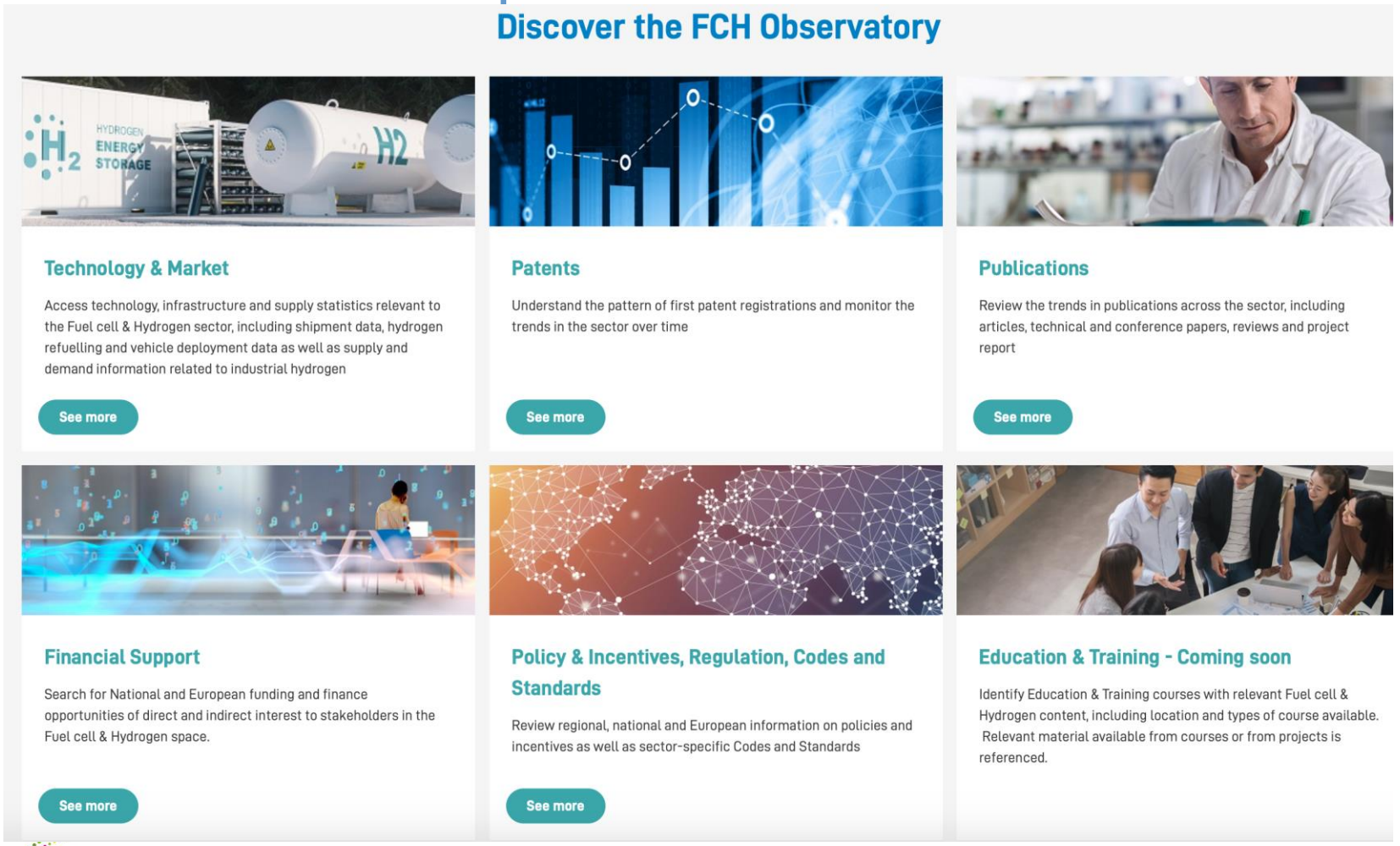
Fuel Cells and Hydrogen Observatory

One stop shop to understand where the FCH sector is at and how it is evolving - in collaboration with private members

- **Resourcing all aspects on fuel cells and hydrogen area**
- **User friendly and reliable output (**charts, graphs and data downloads, annual reports…)
- **Global resource**

  www.fchobservatory.eu

  info@fchobservatory.eu
- **New tender(s) in 2022**



FCHO FUEL CELLS AND HYDROGEN OBSERVATORY

@FCHObservatory

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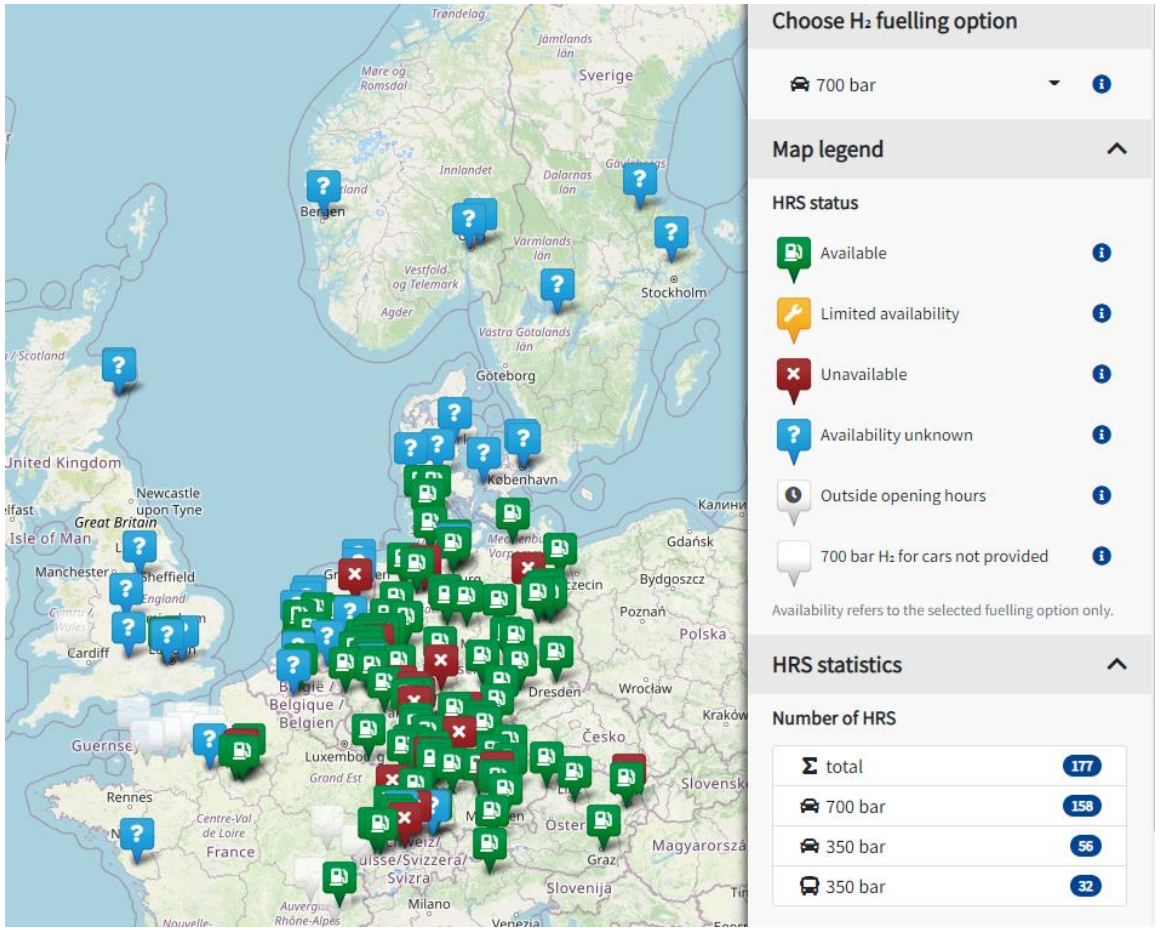
European Hydrogen Refuelling Station Availability System

Free access to
Real-time information
system on the
availability of
publicly **accessible** HRS
in Europe

https://h2-map.eu/



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European Hydrogen Week

A collection of continuous Success Stories & Innovations

Clean Hydrogen JU AWARDS 2022

6 NEW Success Stories

7 NEW Best Innovations

Public Voting for:

- ✓ Best Success Story
- ✓ Best Project Innovation

Other Awards:

- ✓ Best Outreach Award
- ✓ European H2 Valley of the Year

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D&E, Publications & Patents 2021

Exploitation
45 Projects
78 Activities

EU SURVEY
94 Projects answered

Dissemination
60 Projects
302 Activities

KERs
57 Projects
141 Results

67
Scientific Publications

1
Patent

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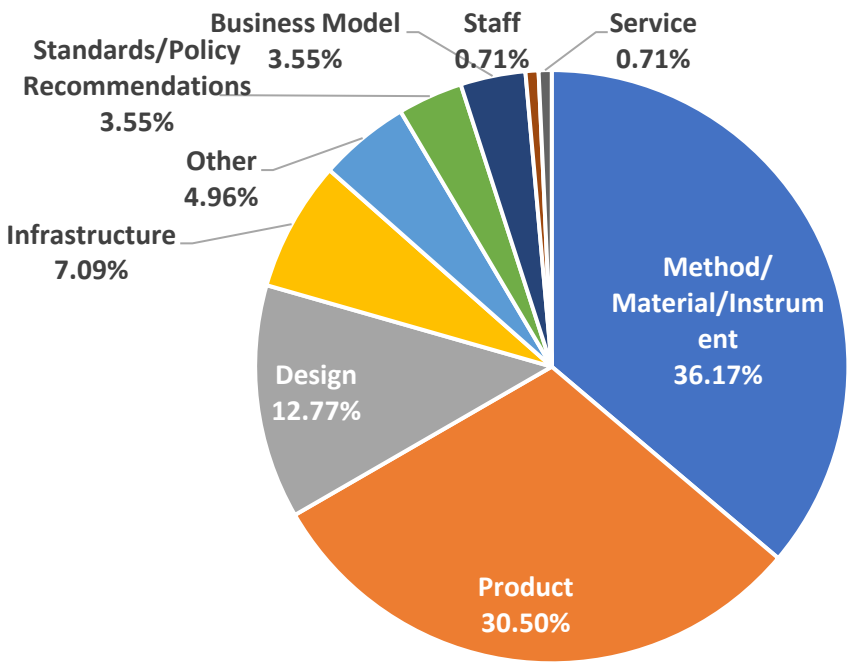
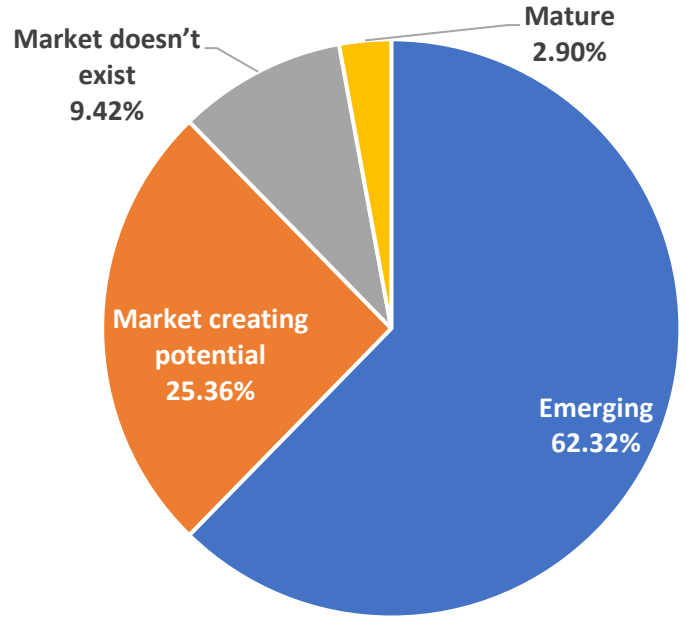
Results reported by the projects

141 Key Results in 2021 from 57 projects

Type of Results



Market Maturity



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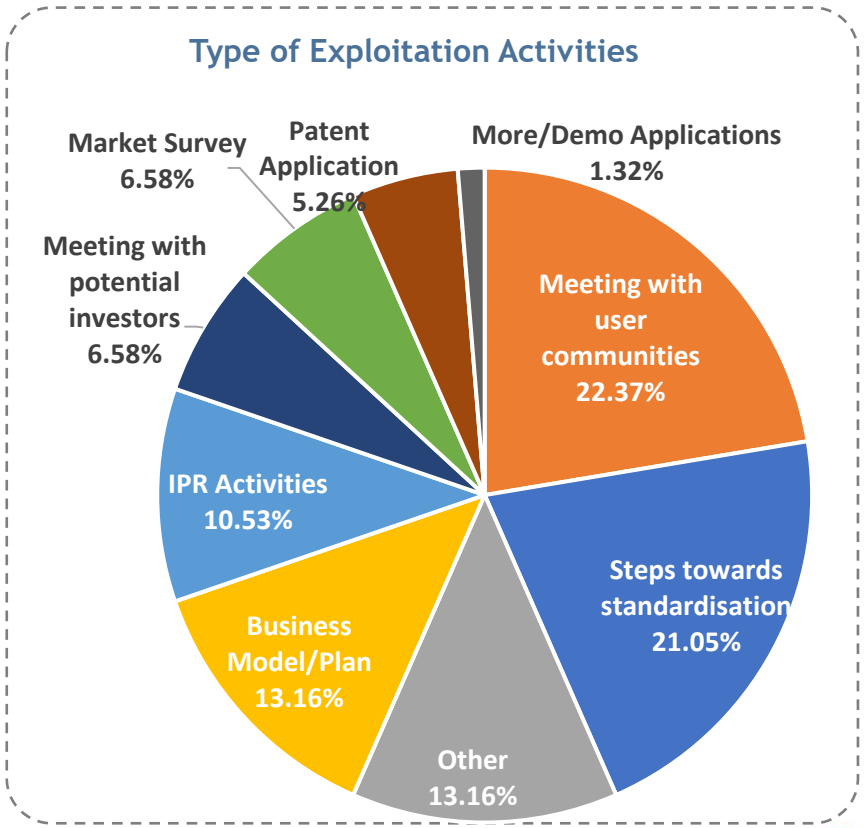
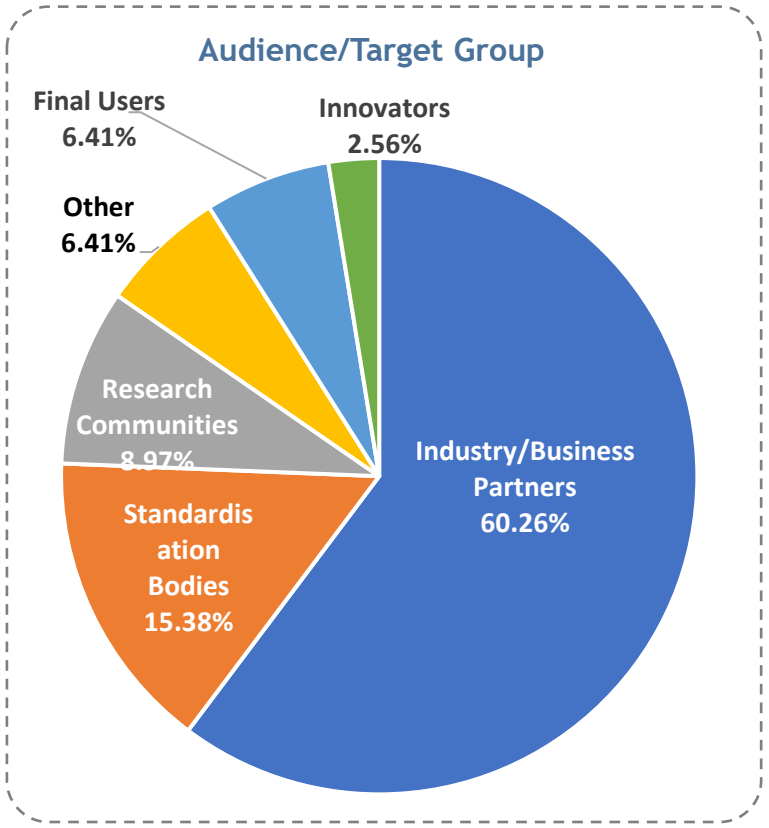
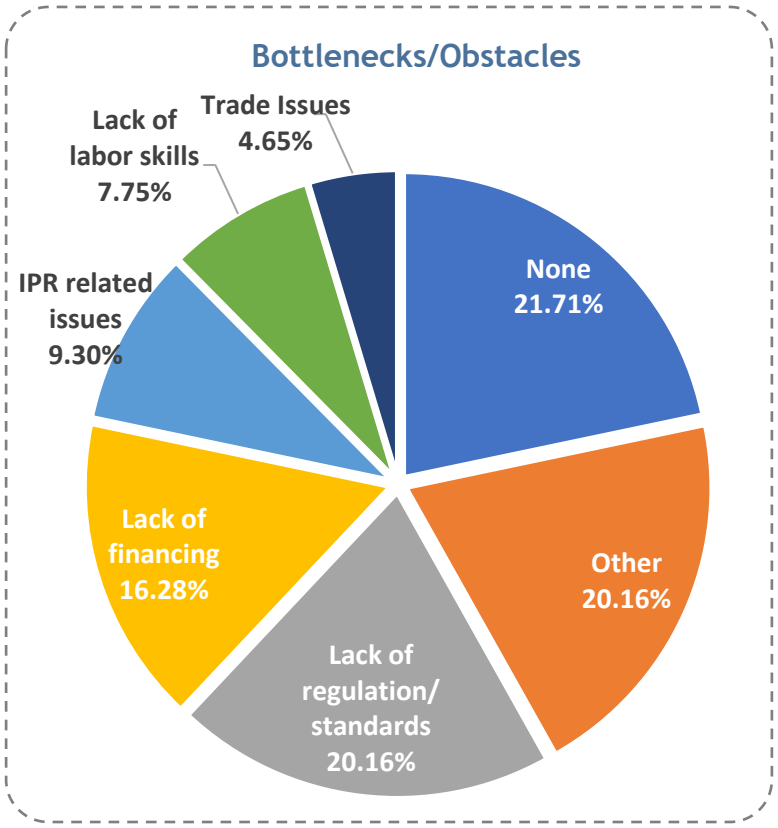
Exploitation of results







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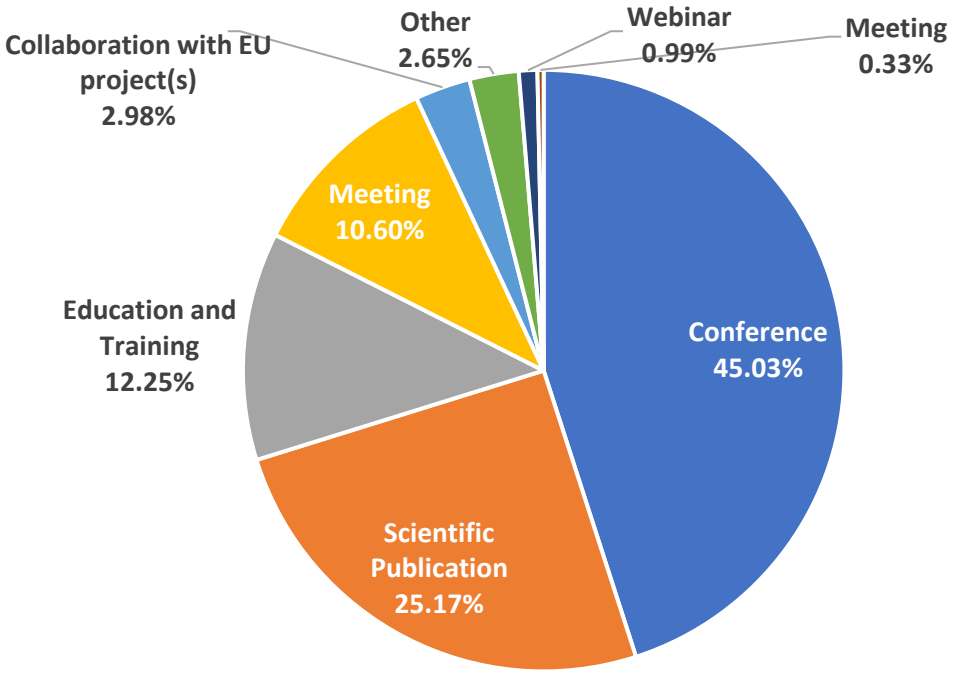
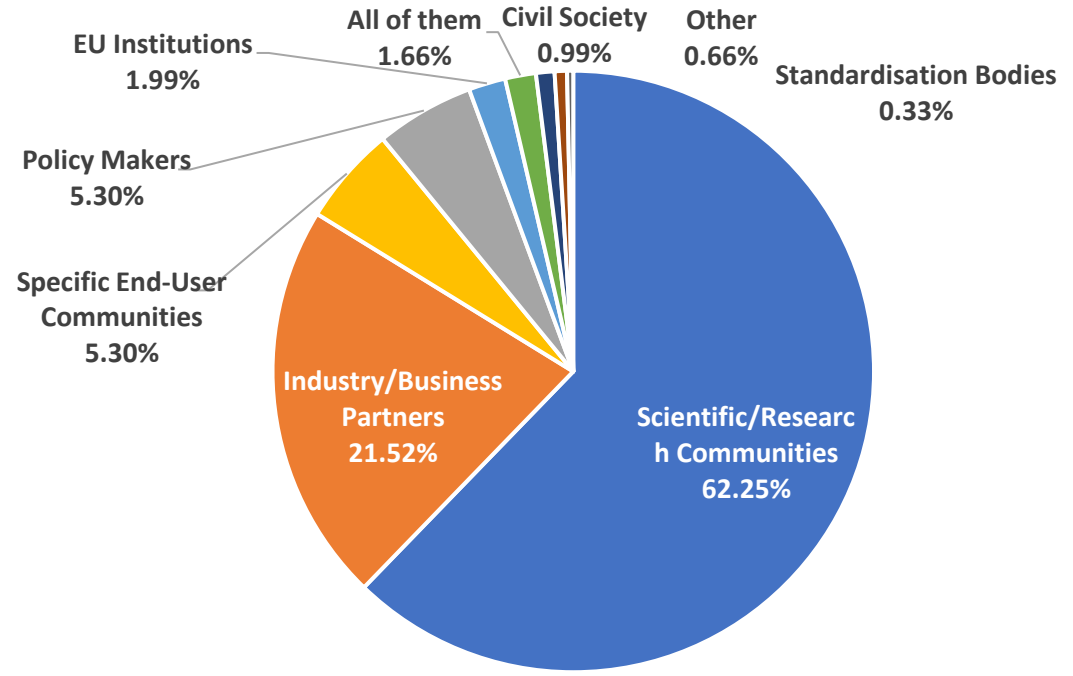
Dissemination Activities

302 dissemination activities were reported by 60 projects

Type of Activities (%)



Activities per target audience (%)



Public Opinion Survey - ongoing

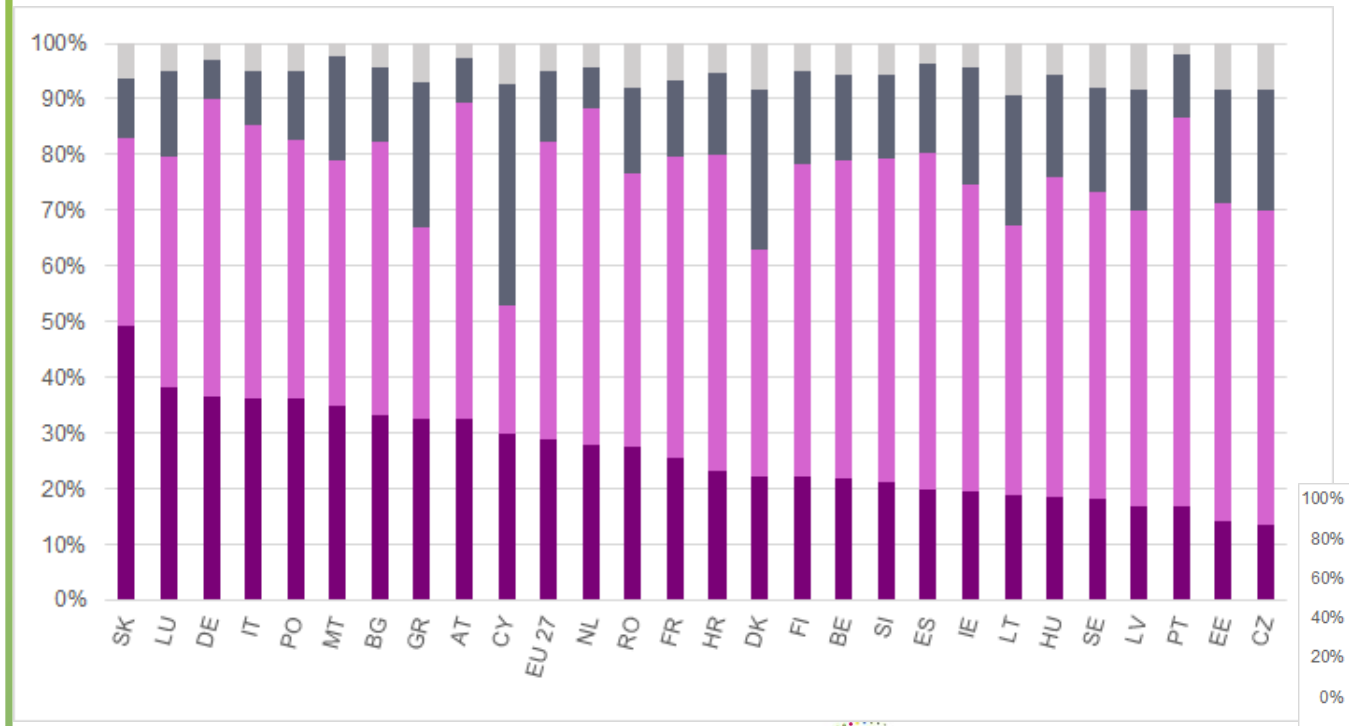
Analysis of European citizens' attitudes towards hydrogen technologies across the whole value chain

Objectives of the survey:

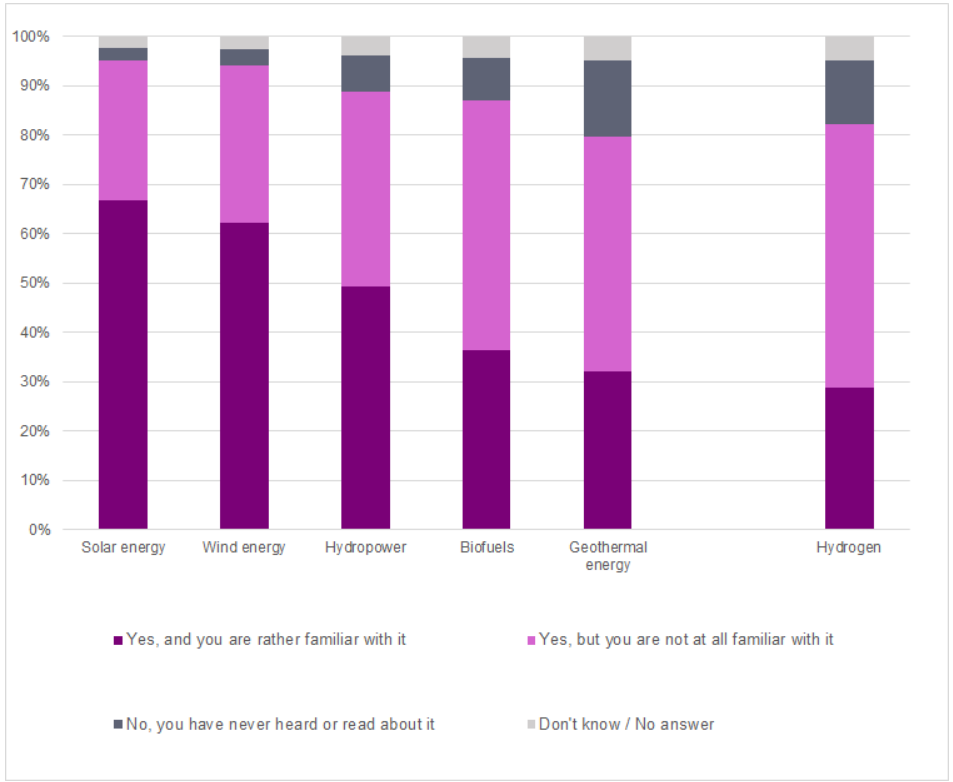
- Gaining insights into **overall awareness, acceptance and uptake** of
  - **hydrogen technology**
  - **safety**
  - hydrogen as an **efficient** and **sustainable** energy vector
  - possible applications of hydrogen technologies
- Identifying differences related to specific criteria (e.g. age, gender, nationality, regions)
- Benchmarking to monitor changing perceptions across Europe
- Guidance on how to raise awareness and build confidence to the public

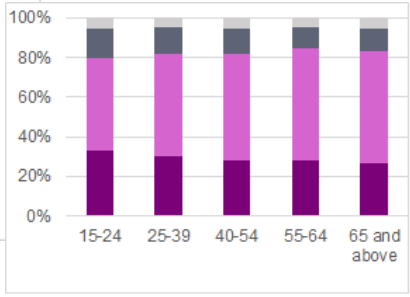
Preliminary results (1)

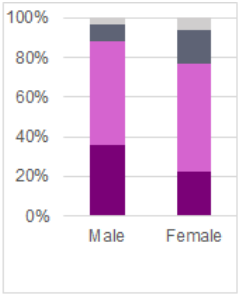
HAVE YOU SEEN, READ OR HEARD ANYTHING ABOUT EACH OF THE FOLLOWING ENERGY SOURCES? HYDROGEN

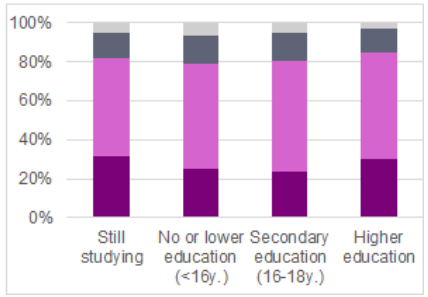


HAVE YOU SEEN, READ OR HEARD ANYTHING ABOUT EACH OF THE FOLLOWING ENERGY SOURCES?









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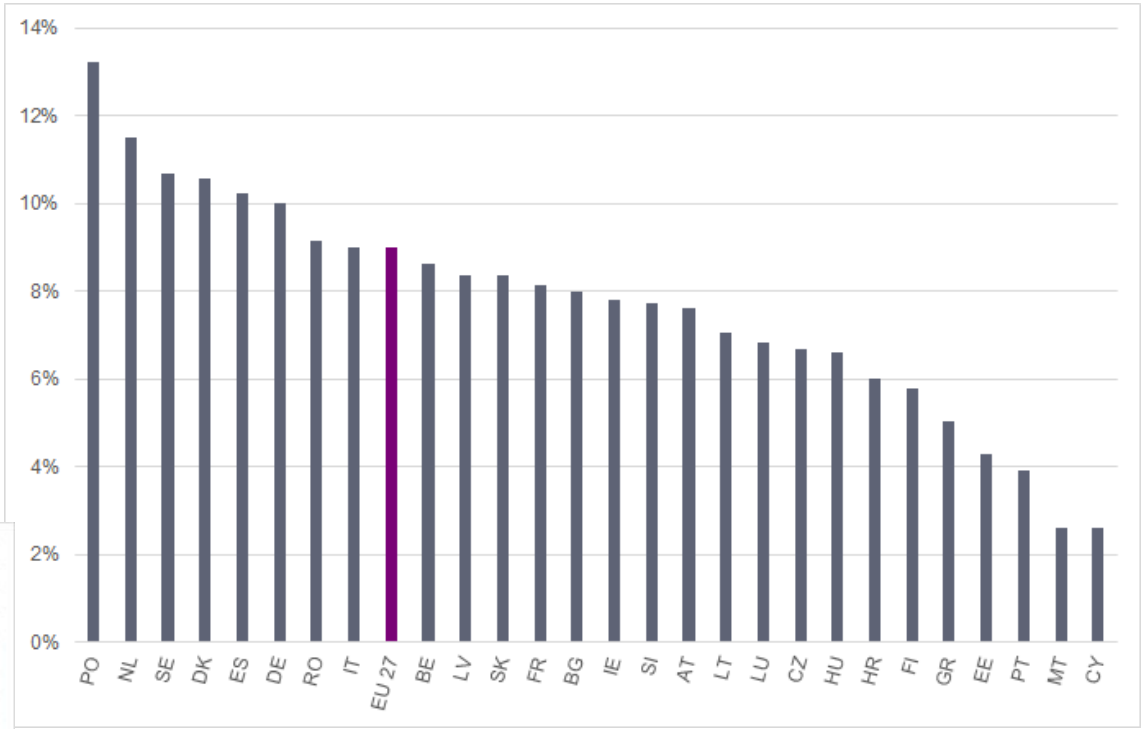
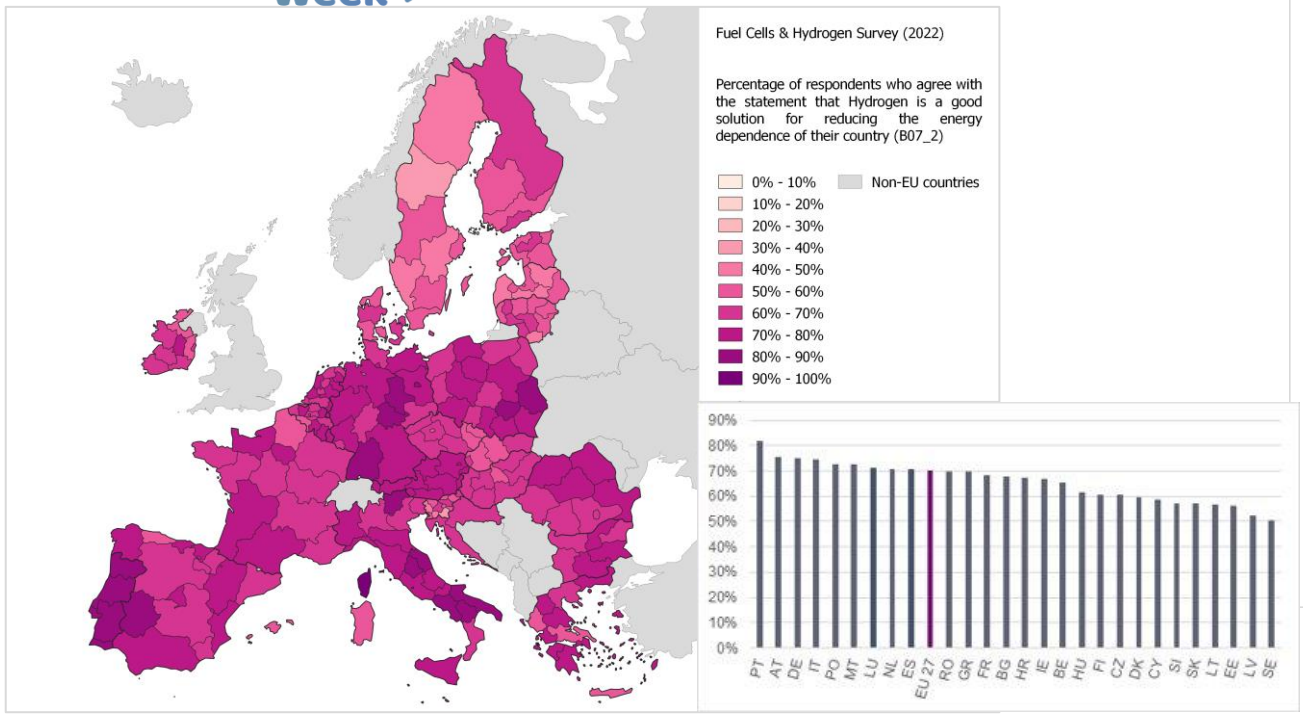
Preliminary results (2)

HAVE YOU PERSONALLY OR AT YOUR WORKING PLACE EXPERIENCED ANY OF THESE HYDROGEN APPLICATIONS?

FUEL FOR TRANSPORT, HEATING, IN INDUSTRIES

"YES"





"TOTALLY AGREE" & "TEND TO AGREE"

TO WHAT EXTENT DO YOU AGREE OR DISAGREE WITH EACH OF THE FOLLOWING STATEMENTS REGARDING HYDROGEN ENERGY AND TECHNOLOGIES? HYDROGEN IS A GOOD SOLUTION FOR REDUCING THE ENERGY DEPENDANCE OF [COUNTRY]

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EU Research Days including Programme Review
Parallel Sessions

Thursday, 27 October

- European Hydrogen Valleys
- Manufacturing (for Supply Chains)
- End-Uses: Clean Heat & Power
- Pre-Normative Research for Standards

Friday, 28 October

- Hydrogen Production
- End-Uses: Transport
- Hydrogen Storage and Distribution
- Building Blocks for Transport Applications

- Closing session and Key Take-Aways

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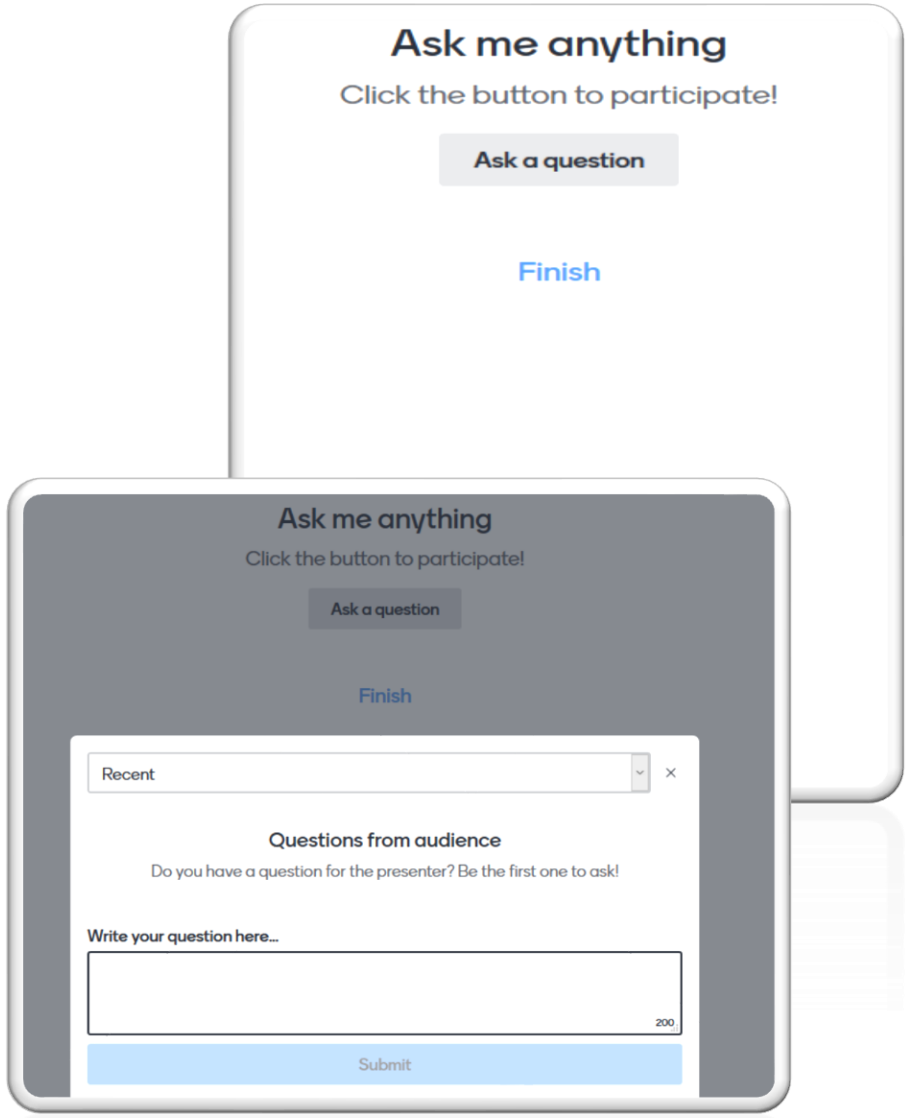
Live Q & A

On the top right of your screen, you have the possibility to pose LIVE your questions

- ✓ Select the button and then submit your question to the presenter pressing the enter
- ✓ Voters can up vote each other's questions
- ✓ **Questions** are asked **anonymously**, creating an open and safe environment.

Please do not forget to name the speaker/project in your question



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