//EU HYDROGEN RESEARCH DAYS 15-16 NOVEMBER

Clean Hydrogen Partnership - Programme Status

Mirela Atanasiu

Executive Director ad Interim and Head of Unit Operations and Communication

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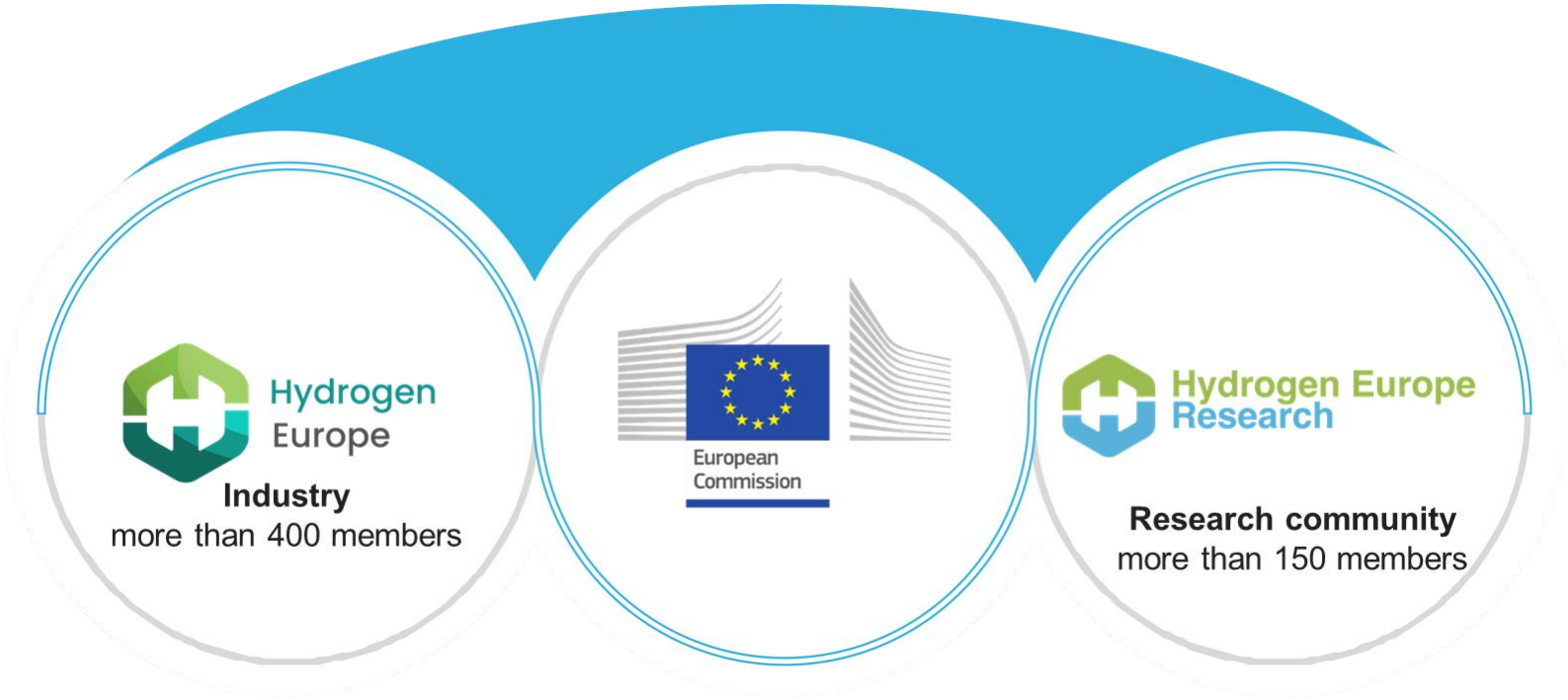
Clean Hydrogen Joint Undertaking

EU Institutional Public-Private Partnership (iPPP)



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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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 incl Green Deal

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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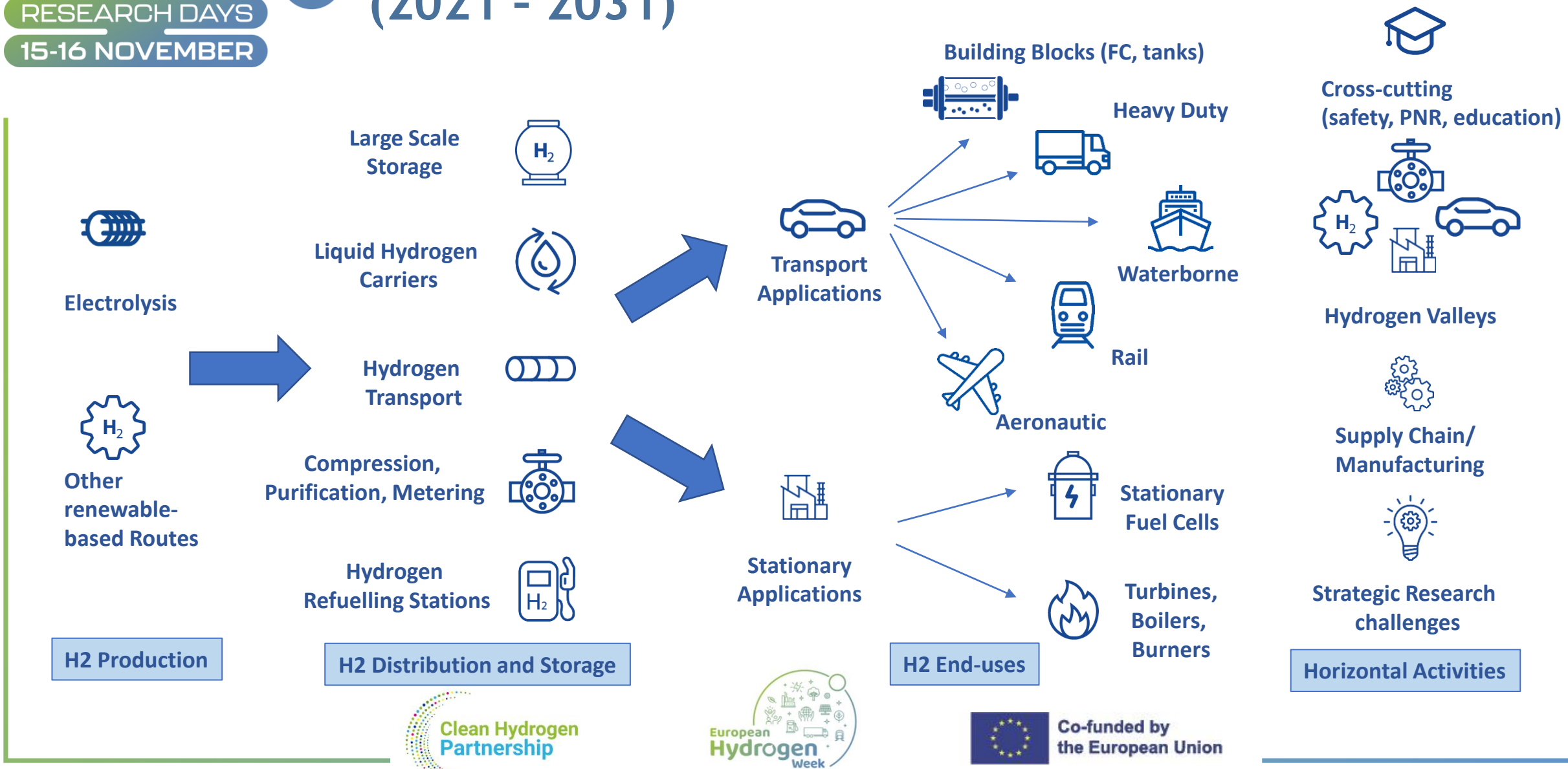
Strategic Research & Innovation Activities, SRIA (2021 - 2031)



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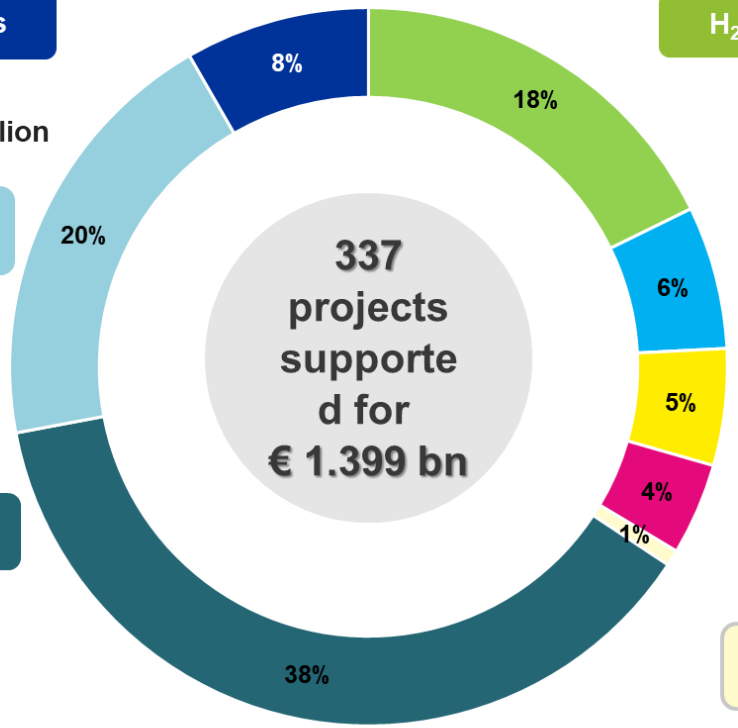
Clean Hydrogen JU Programme including the legacy of FCH JU



H_2 Valleys
9 Projects
€ 116.4 million

H_2 End Use: Clean Heat and Power
81 Projects
€ 274.7 million

H_2 End Use: Transport
76 Projects
€ 528.3 million

H_2 Production
69 Projects
€ 248.4 million

H_2 Storage & Distribution
32 Projects
€ 90 million

Cross-cutting
51 Projects
€ 73.5 million

Supply Chain
18 Projects
€ 58 million

Strategic Research Challenge
1 Project
€ 10 million

*Some projects of Call 2022-2 are still under preparation and thus excluded from the figures above

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15 years journey of the Joint Undertaking

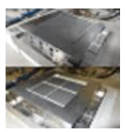
From research to delivering hydrogen solutions/innovations in the market

Continuing the work of predecessor FCH JU…







Large scale field trials

Next generation of products

Manufacturing

Large scale field trials

Next generation of cells and stack

Small scale field demonstrations

Early PoC fuel cell

Degradation and lifetime

Materials

Component improvements

New applications

Market Pull

Developing new business cases

Market potential studies

End users strongly present in projects

Industries, regions, cities

Research and Industry working together

Early research

Supporting also policy with scientific evidence!

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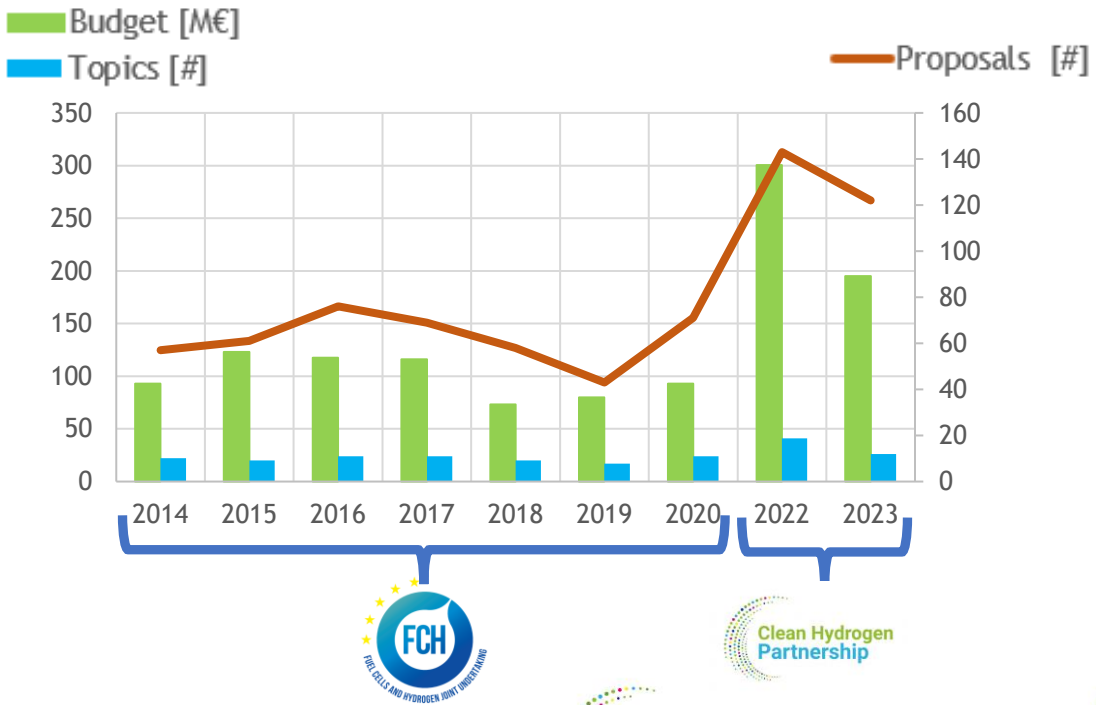
Overview Calls for Proposals 2022-2023

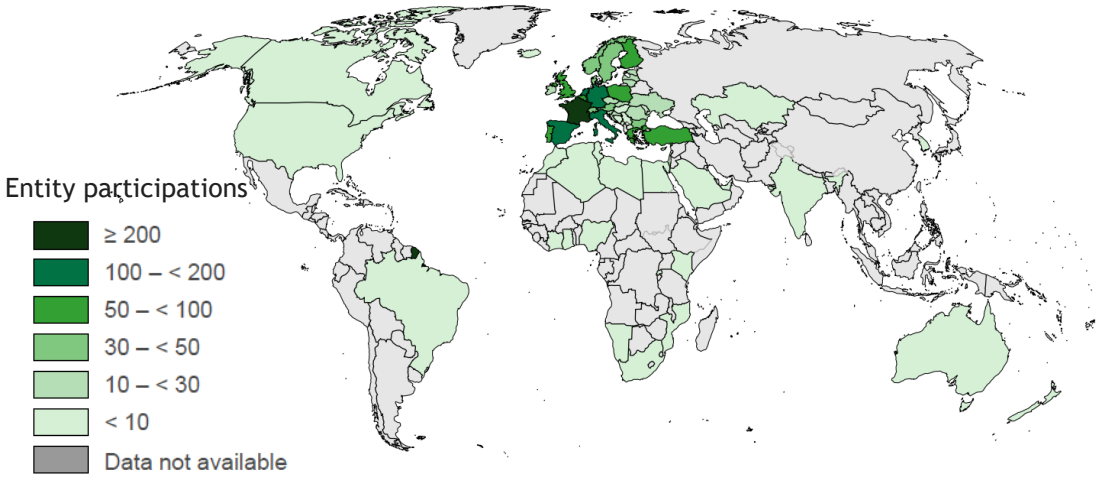
Yearly funding support to R&I projects on hydrogen technologies

Commitment to further develop H2 technologies with 500 M€



Increased international cooperation

Increased international cooperation (+35%) to overall 65 countries (incl EU and Assoc Countries)



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Other Activities

Additional activities are necessary to fulfil the Clean Hydrogen JU objectives

- Developing synergies with other partnerships and programmes
- Regulations, Codes and Standards
- European Hydrogen Safety
- European Hydrogen Sustainability and Circularity
- Knowledge management
- Competitiveness, SMEs
- International Cooperation
- Communication activities

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Working in 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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Working with regions - Raising awareness, developing ideas and implementing hydrogen projects

Regions initiative (2016-2018)

To support cities and regions with an interest in FCH technologies

Engagement

- Business cases for FCH applications;
- Mapping of local assets;
- Identification of existing funding;

Report

- FCH applications: status and potential;
- FCH plans and ambitions;
- Way forward;

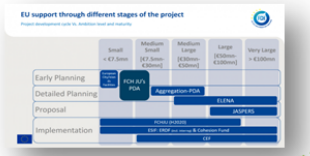
MOU

- 89 European Regions;
- 22 countries
- ¼ of Europe's population, surface & GDP;

JU Annual Work Plans

Support to investments

Project Development Assistance (2021-onwards)



From idea to project plan

MI2.0 H2V Platform

Global collaboration

Hydrogen Valley S3P Platform

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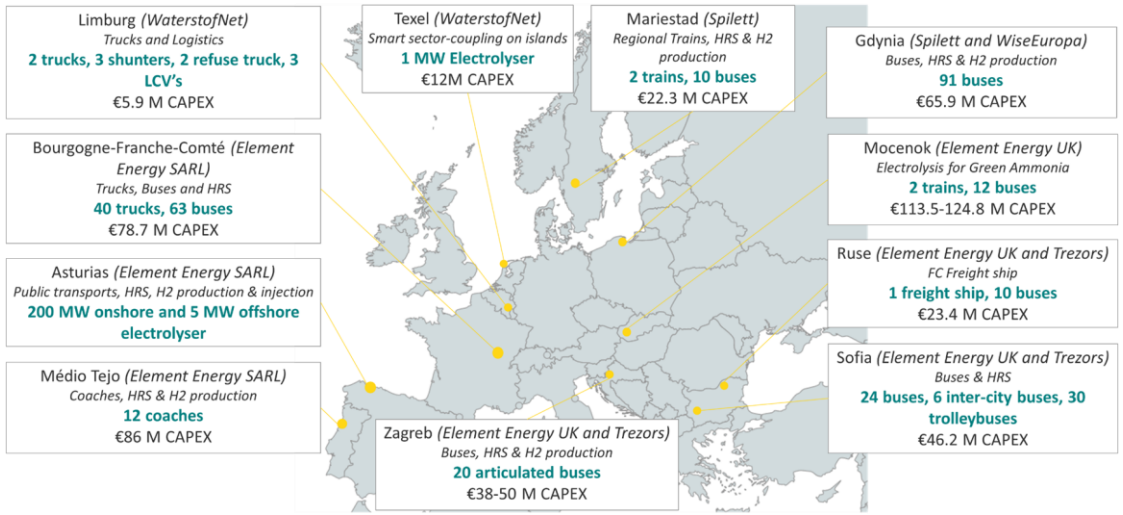
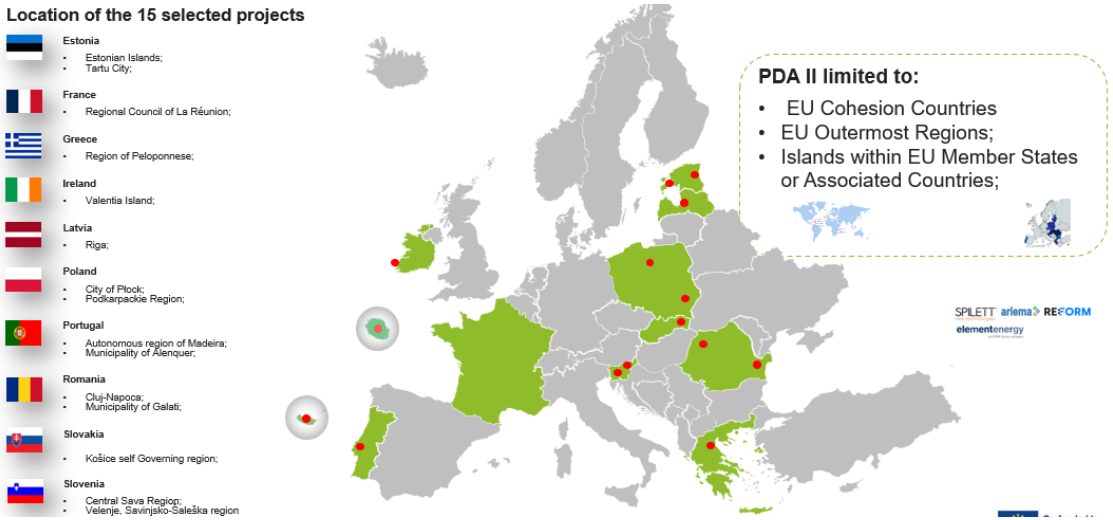
26 Regions (and Cities) supported to move from Project Ideas to Concrete Hydrogen Plans

Project Development Assistance (2021-2022)



Led by: SPILETT new technologies, elementenergy, Waterstofnet

Supported by: WiseEuropa, TREZORS



Project Development Assistance (2023-2024)

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Technical Assistance for national and regional authorities to generate Synergies with the Clean Hydrogen JU

To identify synergies between our JU (EU level) and National and Regional Public Authorities

State-of-Play
- Assess policy
- Identify gaps and potential

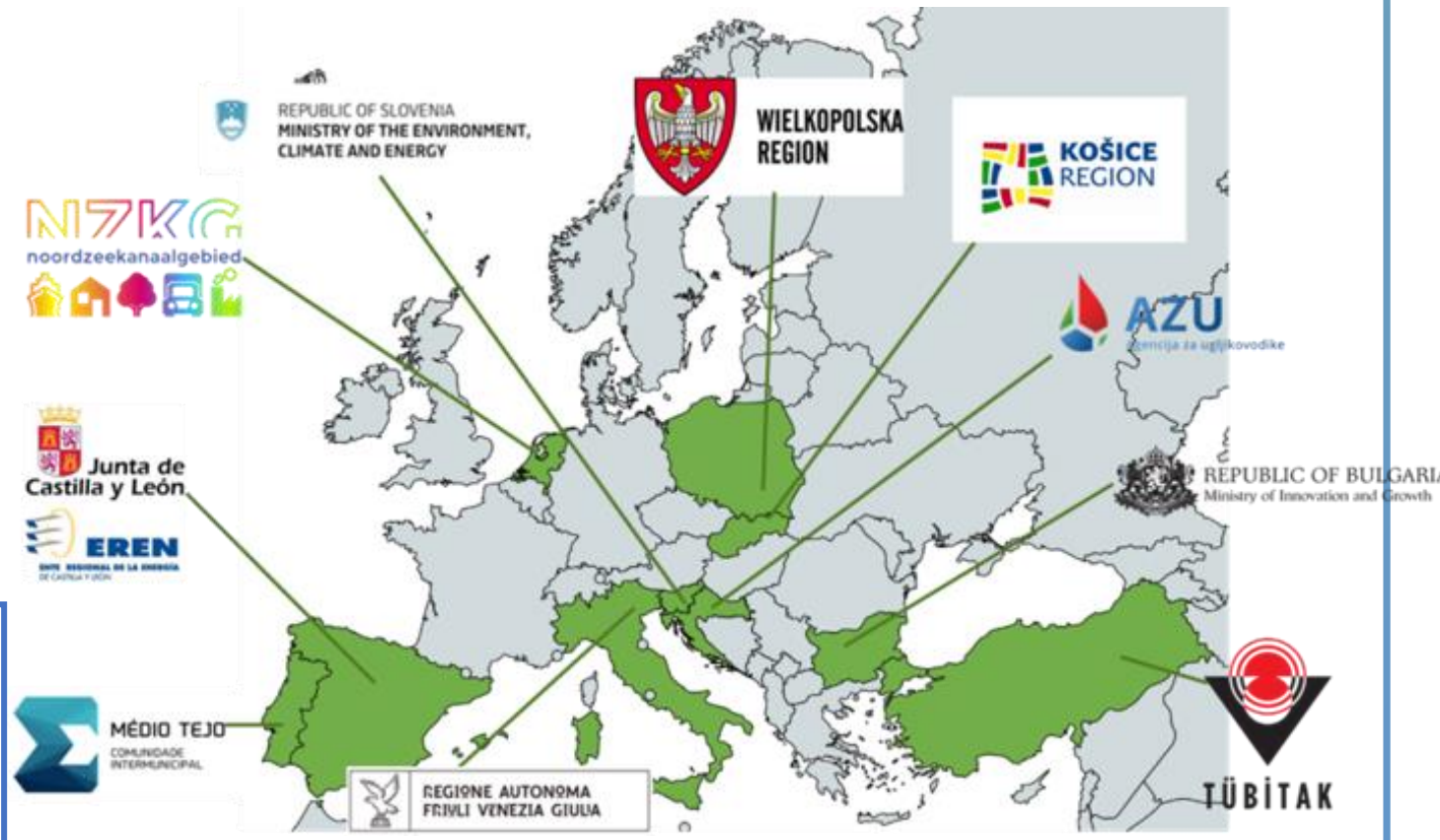
RESEARCH

Select Managing Authorities
- Call of Expression of Interest (Jun/Jul 2023)

ENGAGE

Cooperation Agreements
- Focusing on capacity building, knowledge management and funding opportunities (ongoing)

OPERATIONALISE



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Hydrogen valleys:
An accelerator for a European hydrogen economy

JU Annual Work Plans	Projects	JU contribution
AWP 2015	BIGHIT	€ 5 MEUR
AWP 2019	HEAVENN	€ 20 MEUR
AWP 2020	GREEN HYSLAND	€ 10 MEUR
AWP 2022	9 valleys*	€ ~ 105 MEUR*
AWP 2023	4 selected	GAP stage

REPowerEU Plan
€ 200 for H2 valleys

*Grant signature ongoing, figures may change

RepowerEU plan for Hydrogen Valleys

+ EUR 200 million over 3 years to double H2V in EU by 2025 (60 in 2023; 60 in 2024 and 80 in 2025)

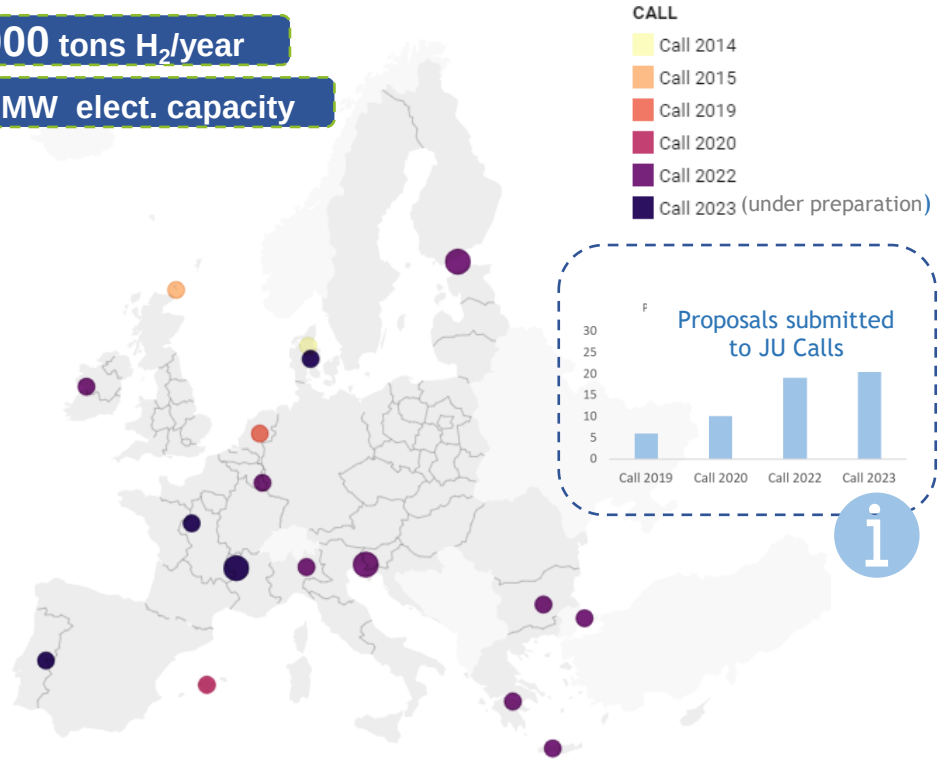
9 H2 Valleys selected for Grant Preparation under the Call 2022
- Total funding requested EUR 105.4 mill
- North Adriatic, Baltic Sea Corridor, Bulgaria (Stara Zagora), Greece (Crete and Corinthia), Ireland (Galway), Italy (Lombardy), Turkey (South Marmara) and Luxembourg.

Additional 4 H2 Valleys selected for Grant Preparation under Call 2023

Hydrogen Valleys in the Clean Hydrogen JU

21,000 tons H_2/year

+200 MW elect. capacity



~75 MW+ electr. capacity (H2 for industry demo projects)

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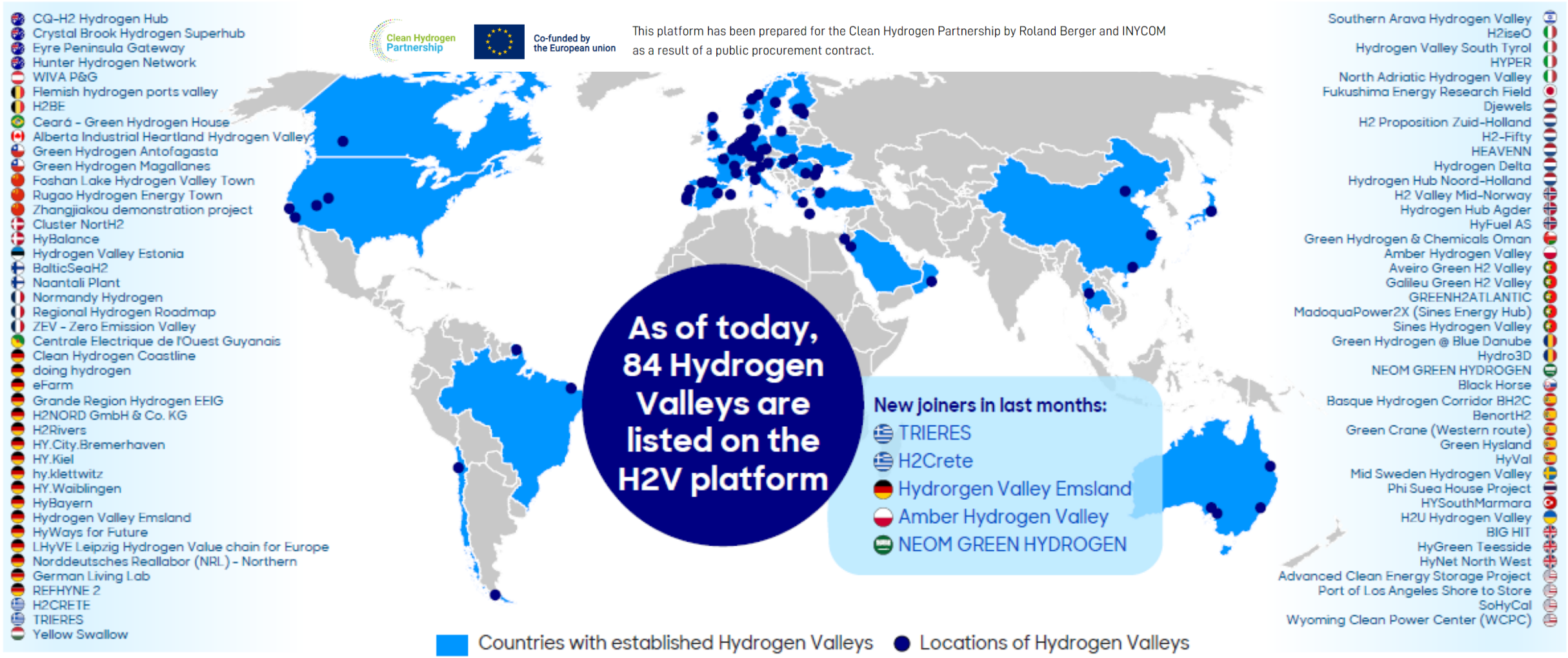
Conceptualized in Europe, Hydrogen Valleys have become a truly global phenomenon

MISSION INNOVATION

~ 60 Hydrogen Valleys are located in Europe



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JUST GREEN AFRH2ICA project

JUST-GREEN AFRH2ICA

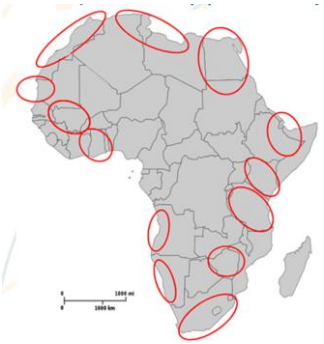
Promoting a just transition to green Hydrogen in Africa

Approach

- Use of existing tools and Hydrogen experiences in Africa and Europe
- A robust participatory approach
- Boost green hydrogen in Africa via a JUST TRANSITION Approach

Main Activities

- Green hydrogen scenario development, simulation and multi-impact assessment
- Training, capacity building and stakeholders matchmaking
- Technology – policy – investment roadmap



EUROPEAN UNION

AFRICAN UNION

African Hydrogen Partnership

A 2-year CSA project of 1MEuro; open to collaborations

https://just-green-afrh2ica.eu/

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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 components for fuel cell and electrolysers

- **Production lines** — DigiMan, FIT-4-AMANDA
- **Design for manufactu rability** — INLINE, INN-BALANCE
- **MEA** — VOLUMETRIQ
- **AEMEL** — HERACLES

Ongoing study (to end early 2024)

on supply chain and industrialisation of h2 tech

- Analyse the European hydrogen supply chain focusing on 14 major technologies
- Identify the strengths and weaknesses in the supply chain, e.g. SWOT and future evolution
- Update the EU entities list
- Address the sustainability and recycling
- Large Advisory Board involved

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JU Experts Panels

Expert groups supporting the JU

European Hydrogen Safety Panel

Assuring that hydrogen safety is adequately managed
Promoting and disseminating a high-level H2 safety culture

Working Groups

European Hydrogen Sustainability & Circularity Panel

Help the integration of sustainability and circularity aspects at both the JU programme and project levels, encompassing environmental, social and economic aspects

Call for experts for the EHS&CP (to be launched soon!)

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

Expanding its scope from GO to RFNBO certification

CertifHy

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 applied as an ICS (Independant Criteria Scheme) within the AIB

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.
- Scheme submitted in March 2023

CertifHy Stakeholder Platform and the Working Groups

- Final Plenary Session took place on the 25th of October 2023
- New Governance model presented
- Newly elected Steering Committee

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JU Fact-based Studies and Publications (2023)

Providing guidance on key matters

Study on hydrogen in ports and industrial coastal areas - Reports

Clean Hydrogen Partnership: Apply for funding

Public Awareness of Hydrogen Technologies - Survey Report

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Study - Hydrogen for ports and industrial coastal areas

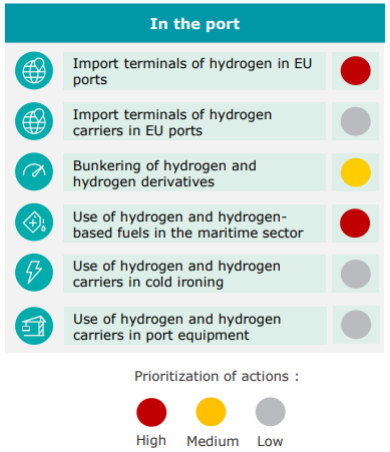
Supporting European ports to become "hydrogen hubs"

Objectives

- **Forecast**: visibility on the market potential of hydrogen, and a clear roadmap to implement it
- **Community building**: collaborative resolution of common issues, and developing case studies that can act as blueprints to accelerate take-up of financial assistance for hydrogen plans in ports

Link with CEM - Global Ports Hydrogen Coalition

HYDROGEN INITIATIVE
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL



- Start: November 2021
- Duration: 24 months

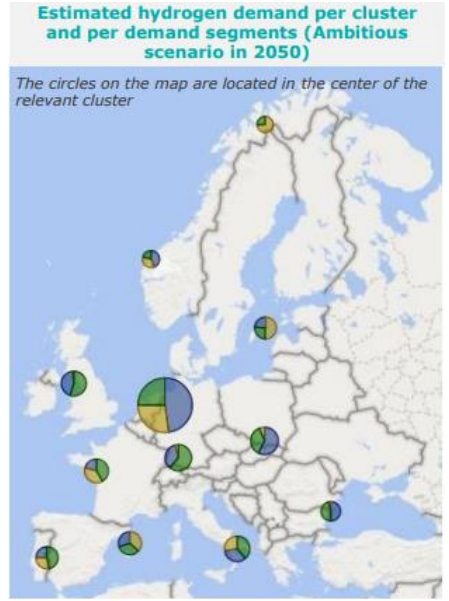
Structure

- Task n°1. Hydrogen demand and market potential
- Task n°2. Hydrogen supply, storage and distribution
- Task n°3. Definition of business models
- Task n°4. Priority for R&I, safety, RCS and non-technical enablers
- Task n°5. Coalition building
- Task n°6. Case studies

→ Ports dashboard + Report 1

→ Report 2

→ Final event: During H2 week



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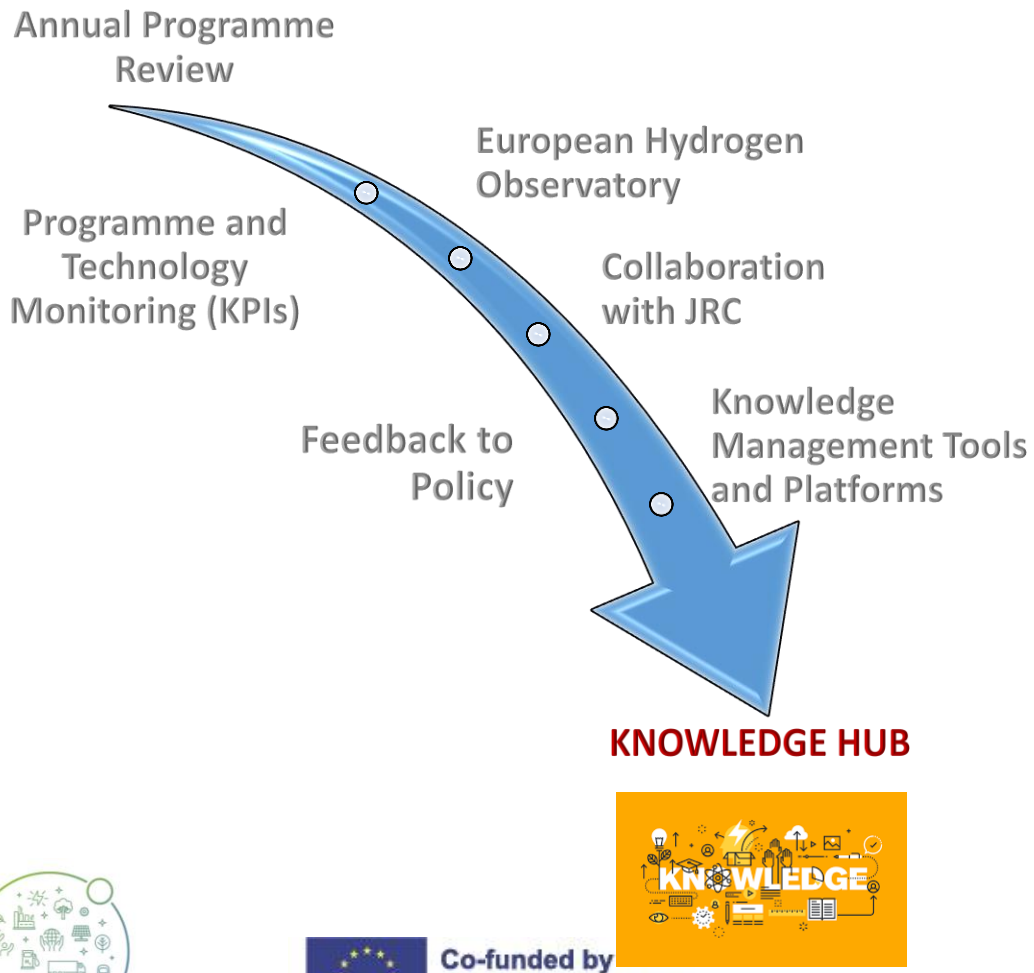
Knowledge Management Activities

- **Horizontal activity,** collecting and handling data and results from JU projects and other sources, in order to create and share knowledge.
- **Main activities:**
  - Annual Programme Review
  - Programme and technology monitoring (KPIs)
  - European Hydrogen Observatory (EHO)
  - Feedback to Policy
  - Collaboration with JRC
  - Maintain other Knowledge Management Tools and Platforms
- **Goal:** Clean Hydrogen JU to become the European Hydrogen Knowledge Hub, serving the entire hydrogen community.



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Data Collection Methodology

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Clean Hydrogen JU Projects Previous Calendar Year

Project Fiche

- General Information, complementary to TRUST
- Progress, Impact, SoA
- Interactions with other projects & initiatives
- Integration of information already existing in other platforms

JRC EUROPEAN COMMISSION

Annual Programme Technical Assessment performed by JRC

Annual Programme Review Report

TRUST

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

Technology Reporting Using Structured Templates

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Annual Programme Review 2023 (just published!)

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

Scope of the Programme Review is broader since 2022, with JRC's Programme Technical Assessment at its core.

Review of 80 projects active in 2022 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;
- **79 project factsheets** published on this event's webpage

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European Hydrogen Observatory

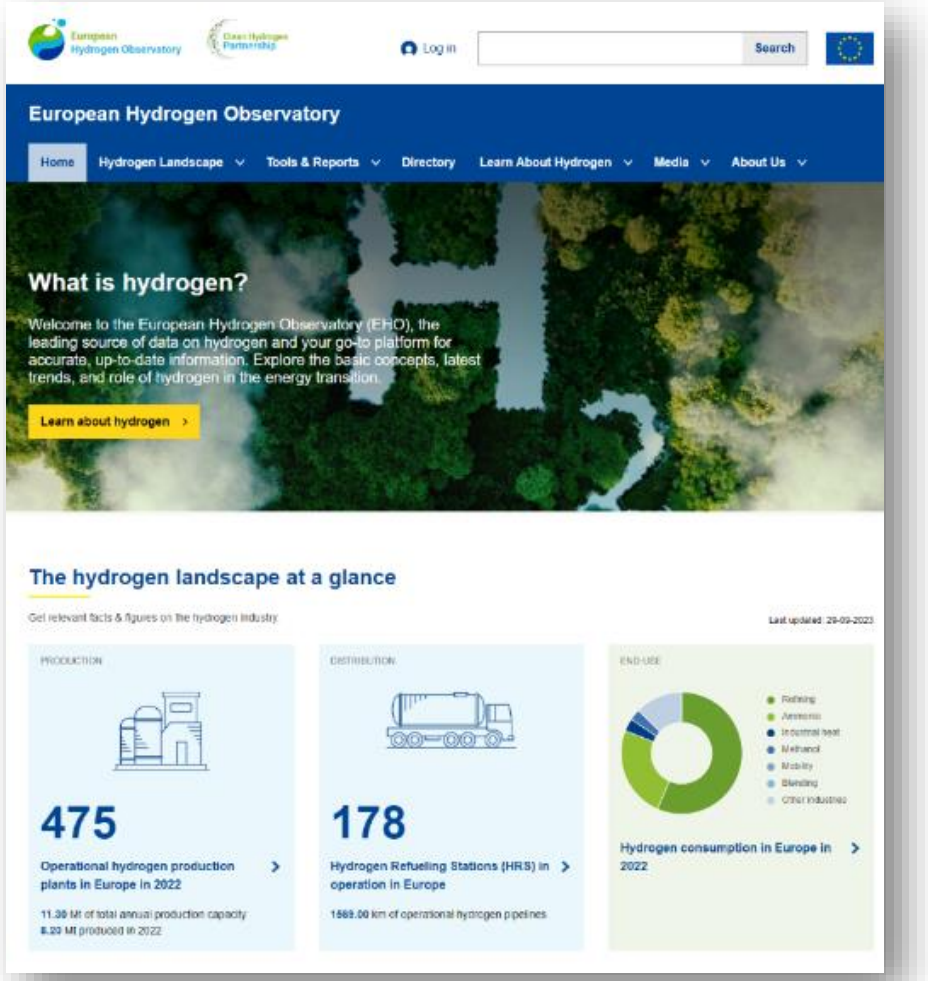
Relaunched September 2023

Highlights:

- Many **new data sets regarding all the steps in the hydrogen value chain**;
- Customisable and interactive geomap;
- Levelised Cost of Hydrogen Calculator;
- News and events interface;

Target audience:

- Industry
- Policy makers
- Academics
- Opinion leaders
- Citizens



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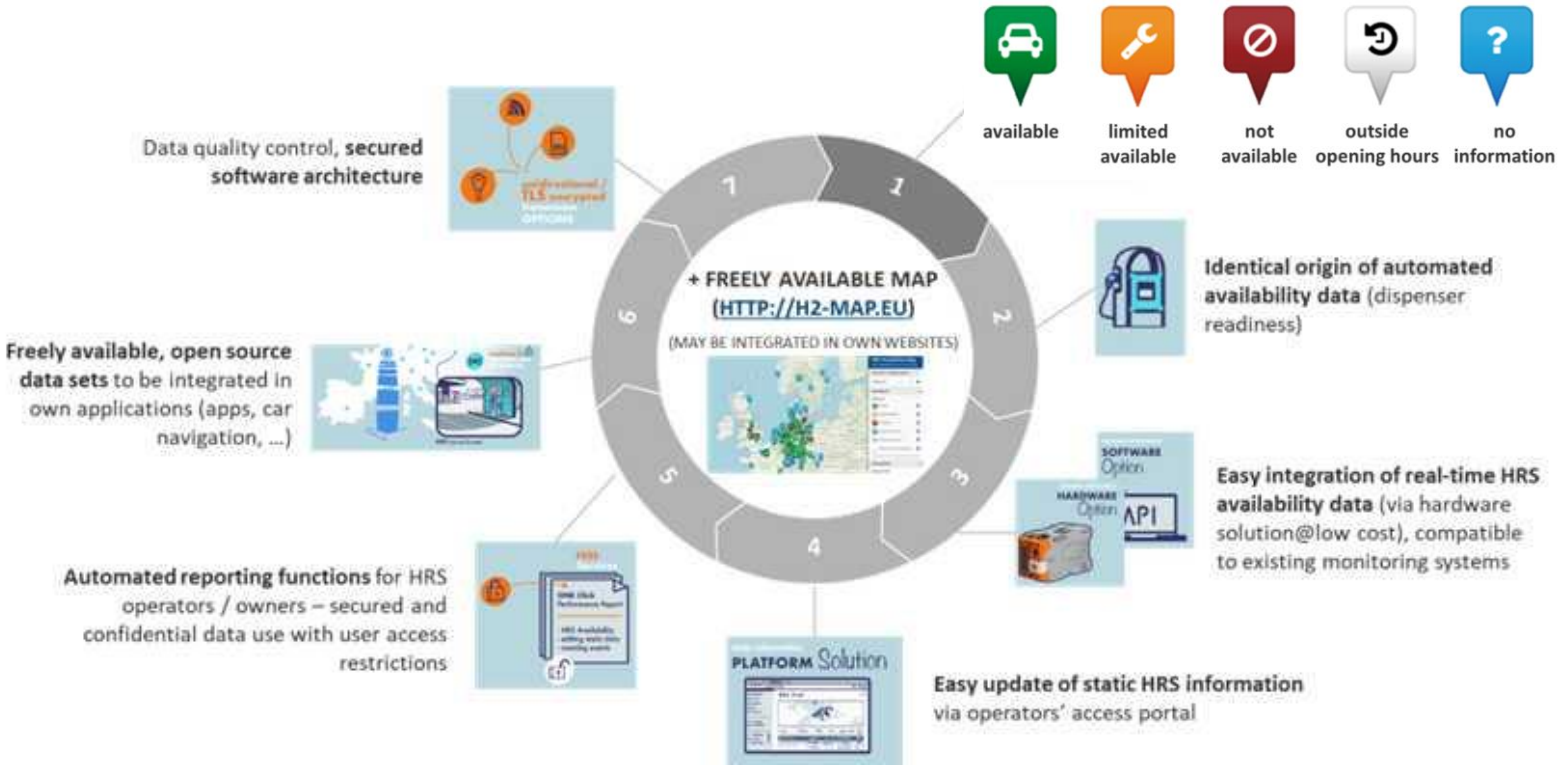
European Hydrogen Refuelling Stations Availability System

The only independent and free HRS data service in Europe.

- **370 HRS** integrated of which 183 HRS are in public operation
- **149 HRS** send real-time availability information
- **85** registered HRS owners and operators
- **72** individual dataset users

HRS owners and operators **register their stations** and maintain their datasets **at no cost.**

The system is ready as reporting availbility will become a requirement for Member States with the AFIR.



E-HRS-AS@clean-hydrogen.europa.eu
www.H2-Stations.eu

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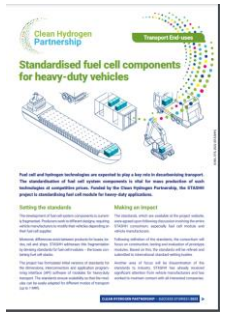
A collection of continuous Success Stories & Innovations

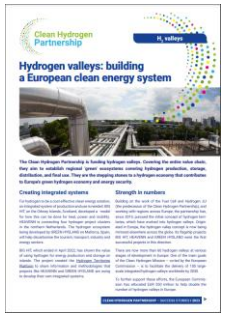
Public Voting for:

- ✓ Best Success Story
- ✓ Best Project Innovation

Clean Hydrogen JU AWARDS 2023

7 NEW Success Stories





7 NEW Best Innovations

STASHH
COSMHYC DEMO
INNOVATIVE H2 COMPRESSION
prometeo
GREEN HYDROGEN FROM SUNSHINE
MULTIPLHY
H2 PORTS
HEAVEN
Cryogenic Hydrogen Tech Aircraft
hypster
Hydrogen Storage

AWARD CEREMONY
22 Nov 17h20
European Hydrogen Week

Other Awards:

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

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D&E, Publications & Patents 2022

Exploitation
38 Projects
94 Activities

75 Projects reported

Dissemination
73 Projects
640 Activities

KERs
71 Projects
131 Results

86
Scientific Publications

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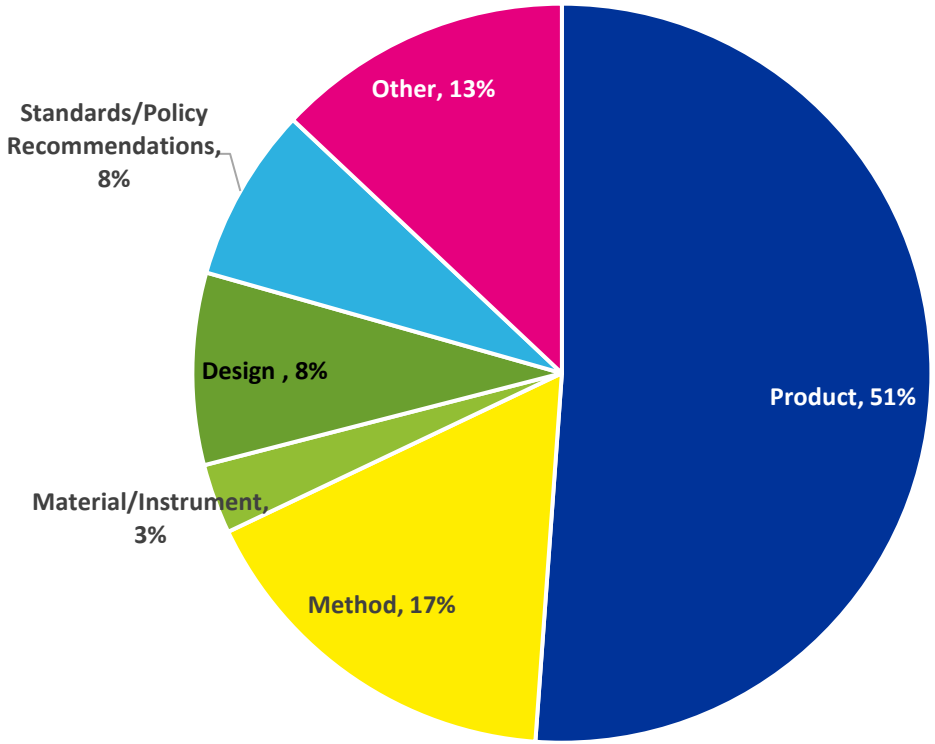
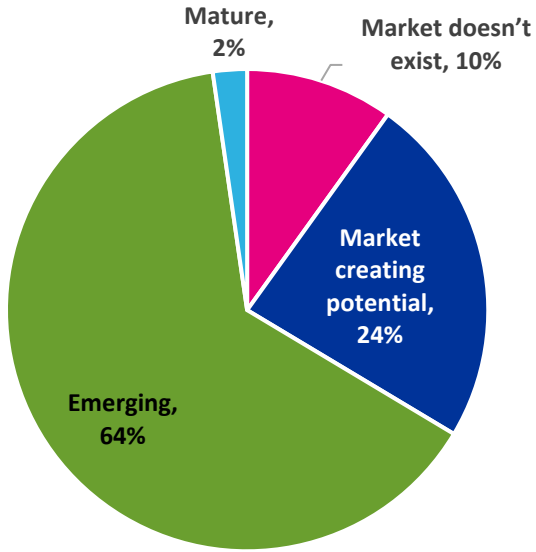
Results reported by the projects

131 Exploitable Results in 2022 - 62 projects

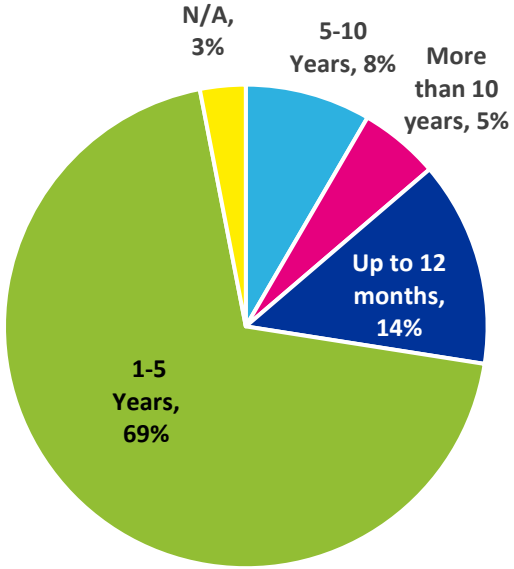
Type of Results



Market Maturity



Time to Impact



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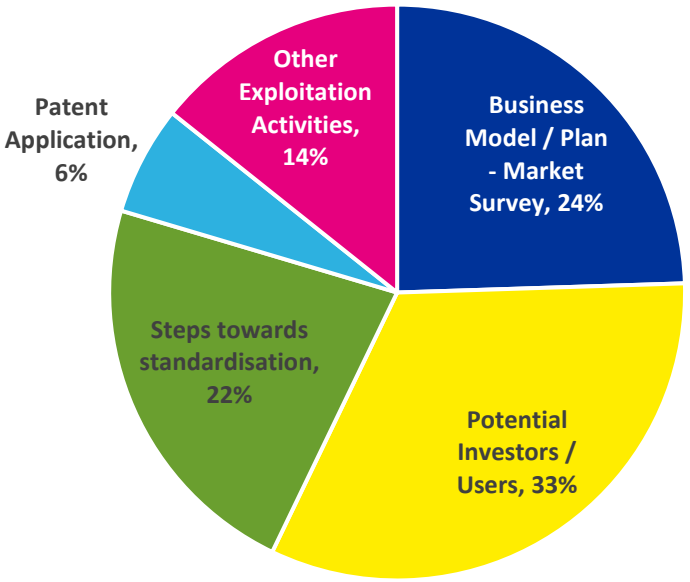
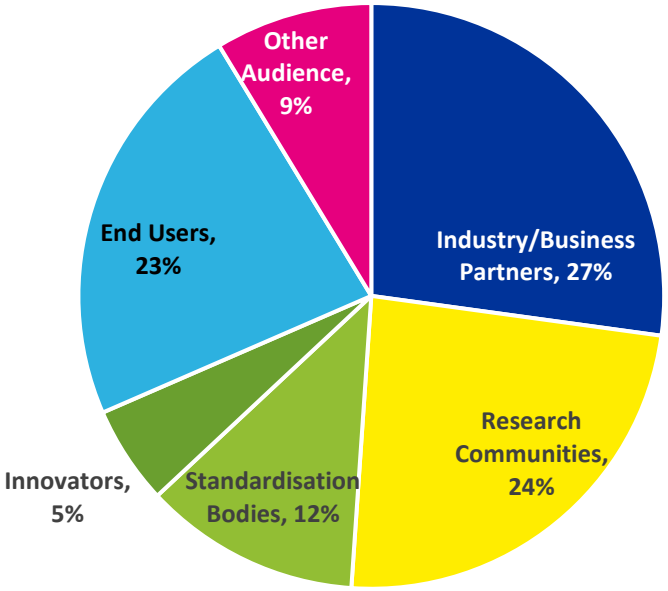
Exploitation of results

94 exploitation activities were reported by 38 projects

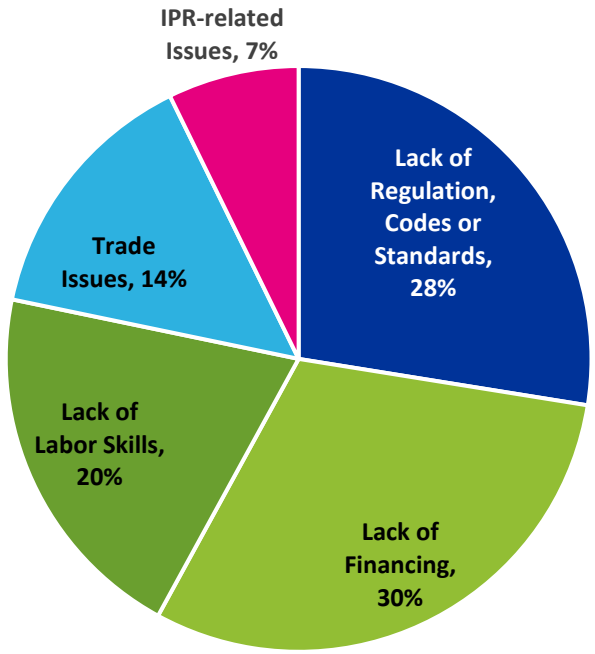
Type of Exploitation Activities



Audience/Target Group



Bottlenecks/Obstacles



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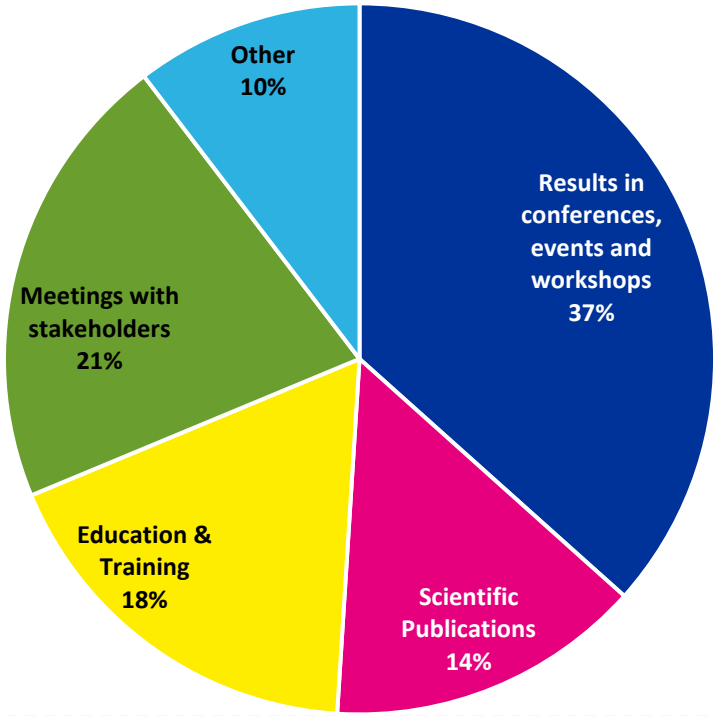
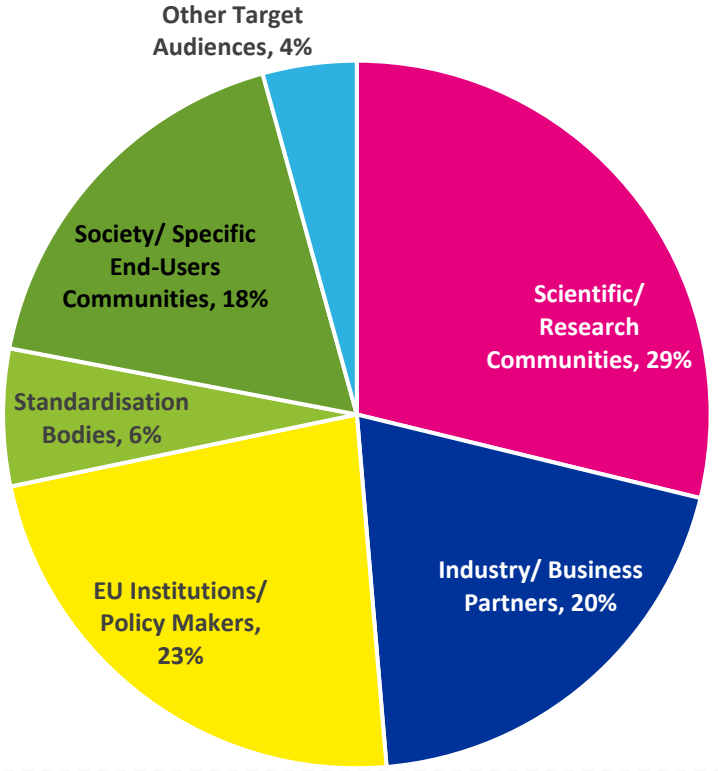
Dissemination Activities

640 dissemination activities were reported by 73 projects

Type of Activities (%)



Activities per target audience (%)



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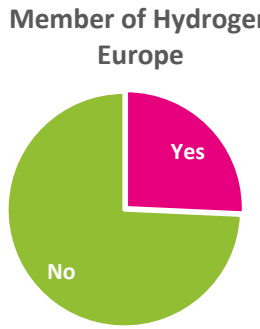
Wider Scientific Community

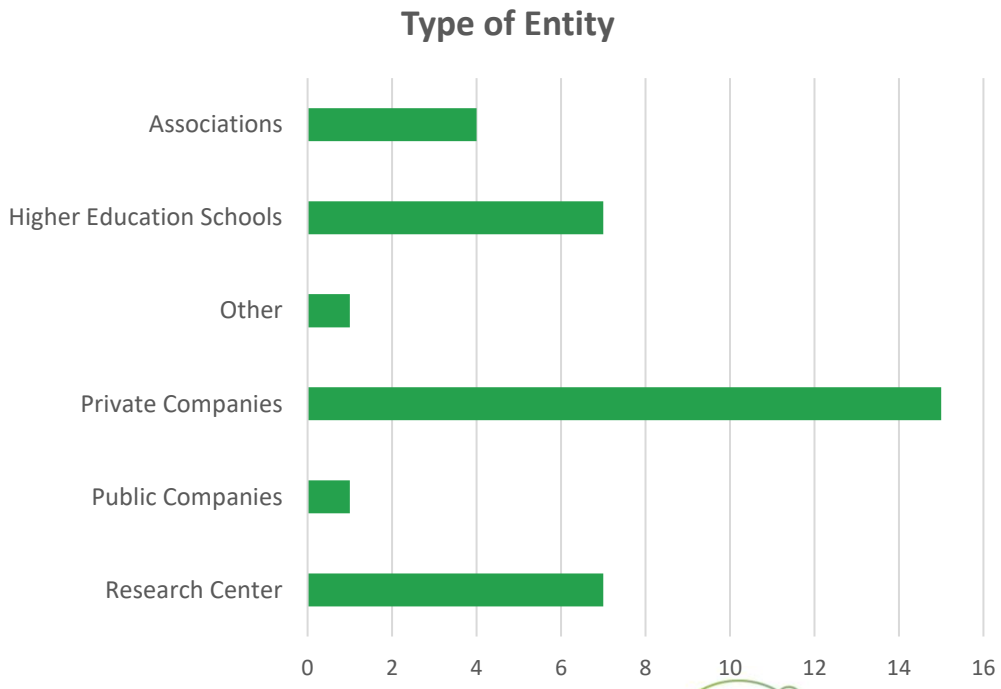
Survey 2023

- EU Survey, 9 June - 31 July 2023
- 35 participants (25 EU-based)

Article 82(d) of the SBA:

"(The Governing Board must) ensure that independent opinions and advice of the wider scientific community on the Strategic Research and Innovation Agenda (SRIA), work programmes and developments in adjacent sectors are gathered through an independent scientific advisory workshop as part of the European Clean Hydrogen partnership forum."





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Public Opinion Survey (2023)

90%
of Europeans feel that the provision of energy being dependent on other countries represents an important issue facing their country

9%
of Europeans have experienced these hydrogen applications

69%
of people in EU27 consider hydrogen to be a sustainable energy source

70%
of people in EU27 feel that hydrogen is a good solution for reducing the energy dependance of their country

71%
of people in EU27 interested to know more about hydrogen

59%
of Europeans believe that hydrogen is as safe as other energy sources

63%
of people in EU27 are ready to pay more for a cleaner energy

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EU Research Days incl Programme Review

Parallel Sessions

Wednesday, 15 November

- European Hydrogen Valleys
- Hydrogen Production
- End-Uses: Clean Heat & Power

Thursday, 16 November

- End-Uses: Transport
- Sustainability and Supply Chain
- Hydrogen Storage
- Building Blocks for Transport Applications
- Pre-Normative Research
- Cross-cutting issues - Skills

Closing session and Key Take-Aways: Challenges in H2 Research and Innovation – Way Forward

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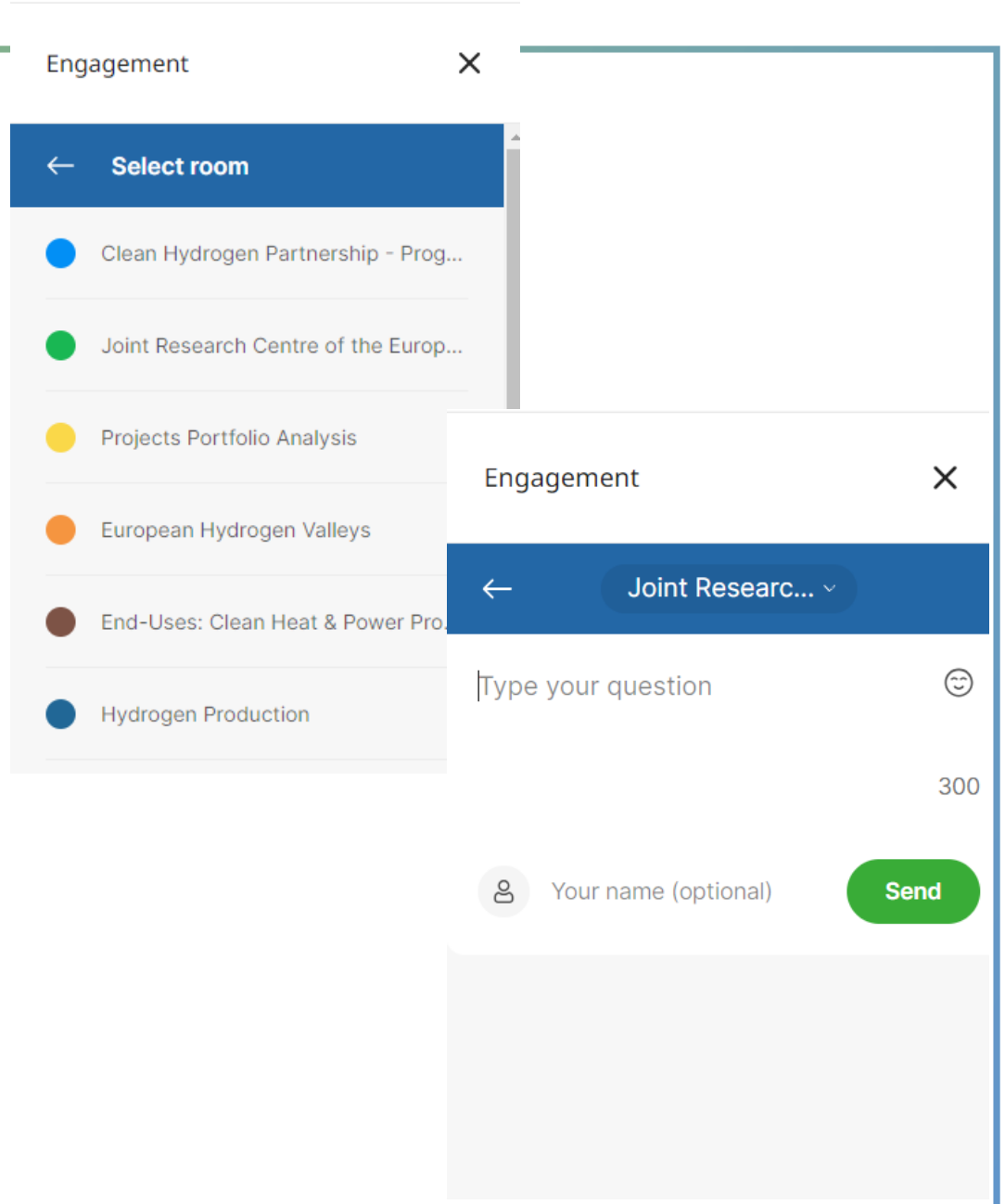
Live Q & A

On the right side of the live web stream player on your screen, you have the Engagement section where you have the possibility to pose LIVE your questions

- ✓ Select the room by scrolling through the title of your session in the list. Then, type your question on the box, then press the “Send” button at the bottom.
- ✓ 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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Thank you!

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