Hydrogen Europe Research

Fuel Cells & Hydrogen Research in Europe

Hydrogen as an enabler for a low-carbon society

National Info Day, Turkey – 30th of January 2024

Louis Mazurkiewicz, Innovation Manager

Hydrogen Europe Research

Mission, structure & activities

Hydrogen Europe Research

Our vision and mission

Hydrogen Europe Research aims to contribute to the achievement of carbon neutrality by strengthening the European hydrogen industry and ensuring high-level research in Europe. We actively support Research Institutes and Universities involved in the development of a new industrial ecosystem based on hydrogen.

Our mission is based on **4 pillars**:

RESEARCH

Supporting the excellence of European research on hydrogen and fuel cells – low Technology Readiness Level (TRL) research is still needed to develop the next generations of materials, components and products.

INFRASTRUCTURES

Enabling Research & Technology Infrastructures to scale up and speed up innovation – development of RIs and TIs is essential to bringing new technologies into the market.

SUSTAINABLE DEVELOPMENT

Ensuring sustainable development standards for a clean hydrogen ecosystem – evaluation of the carbon and environmental footprint related to the production, distribution, and usage of hydrogen is fundamental.

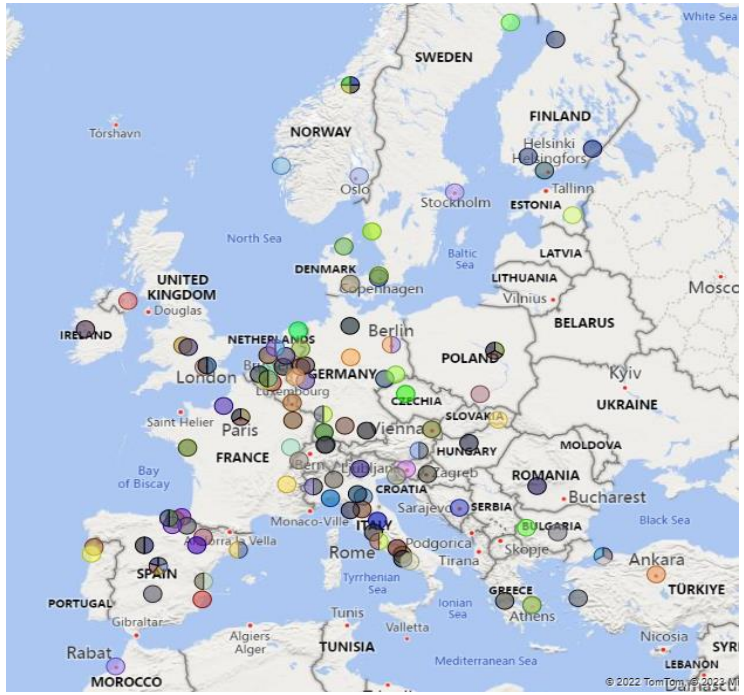
EDUCATION

Developing education and trainings to provide a skilled workforce for the European hydrogen economy – an educational framework should be a priority of European and national policies.

Hydrogen Europe Research

Hydrogen Europe Research at a glance

We represent the European Hydrogen Scientific Community with **150 members** in **29 countries.**



900+ scientists

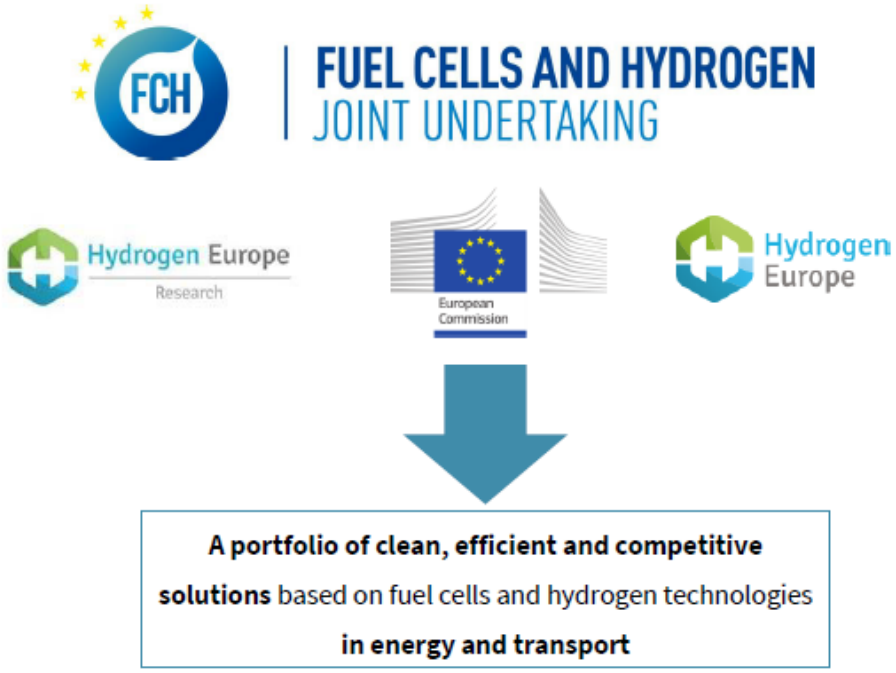
involved in defining priorities for the FCH sector

75 Higher education establishments

75 Research organisations

Our history

From 2008 to 2013, and then from 2014 to 2020, HER respectively participated in FCH JU and FCH 2 JU:



& continues to participate in the **Clean Hydrogen Partnership** during the 2021-2027 financial period

Clean Hydrogen Partnership

Hydrogen Europe Research

Our structure

GENERAL ASSEMBLY

EXECUTIVE BOARD

SECRETARIAT

Hydrogen Europe Research

General Assembly

All members are invited to participate in the General Assembly.

Meetings usually take place twice a year, once in Brussels and once hosted by one of our members.

The next General Assembly will take place in June in Budapest in hybrid format – You are welcome to join us in person!

More information regarding the next GA will be sent to you in early 2024.

The following topics are discussed during the meeting:

- Updates on the association's activities
- Determination of the general policy of the Association
- Network with other members

Two relevant reference documents for our members are the Statutes and the Internal rules.

Our Statutes were modified and approved by members on 6 April 2022.

For more detailed information on the General Assembly's powers, please check our Statutes.

Hydrogen Europe Research

Executive Board

The Executive Board oversees the **business of the Association** and **supervises the Secretariat**.

The Board is composed of 10 members elected for 2 years:

- a President;
- a Treasurer and Vice President;
- a Chair for External Affairs;
- 7 Technical Committee leaders.

The next Board election will take place in June in Budapest during the General Assembly.

Board meetings are held every month to discuss the activities of the association.

For more detailed information on the Board's powers, please check our Statutes.

Hydrogen Europe Research

Our partners

Hydrogen Europe

Hydrogen Europe is the European association representing the interest of the hydrogen **industry** and its stakeholders and promoting hydrogen as an enabler of a zero-emission society.

Hydrogen Europe is different organisation from us, with their own membership and their own structure, but we share an office space and work together on several topics.

Clean Hydrogen Partnership

We are one of the three members (alongside the European Commission and Hydrogen Europe) of the Clean Hydrogen Joint Undertaking (JU), an Institutionalised European Partnership which aims to accelerate the development and deployment of a European value chain for clean hydrogen technologies.

The underlying aim of the Clean Hydrogen JU is to contribute to the achievement of the European Union's objectives for a climate-neutral Europe by 2050.

Hydrogen Europe Research

Our activities

Clean Hydrogen Partnership

Participation in the Clean Hydrogen Partnership

Policy recommendations and position papers

Education and training via the Skills Working Group

Intelligence for our members

Communication and networking for our members

H2 GREEN SKILLS FOR HYDROGEN

FCHO FUEL CELLS AND HYDROGEN OBSERVATORY

Participation in Horizon Europe projects
Fuel Cells and Hydrogen Observatory & GreenSkills4H2

Policy Working Group

A Policy Working Group is held monthly in Hydrogen Europe Research.

Activities organised:

Discussion and identification of potential issues for HER's research community stemming from existing or upcoming European policies

Defending the view of RTOs and universities by **drafting position papers and taking action to voice our opinion.**

Hydrogen Europe Research

Skills activities

HER has set up **together with Hydrogen Europe a joint** Working Group on Skills to reflect on the topic of skills, trainings, and education in the field of hydrogen and fuel cells.

The main topics to be dealt with as a starting point will be (non-exhaustive list):

- Understanding the trends and needs for hydrogen skills
- Presentation of projects and best practices on skills, trainings and education
- Identification of relevant funding opportunities
- Matchmaking to build consortia / find new contributors for projects
- Monitoring of EU policies on employment and skills in relation with hydrogen and green skills

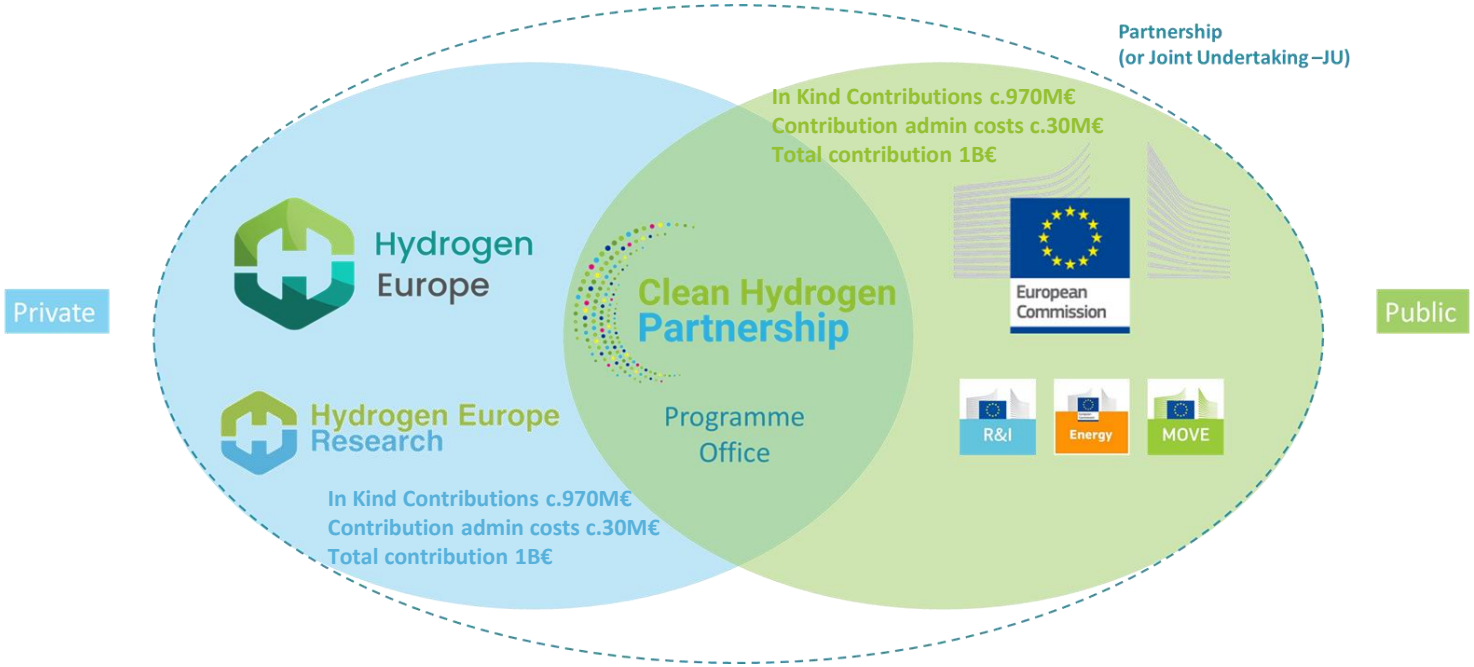
HER is involved in projects related to skills and trainings such as the FCH Observatory and the recently awarded project GreenSkills4H2.

Hydrogen Europe Research

Clean Hydrogen Partnership

Clean Hydrogen Partnership

In collaboration with the public and private members of the Clean Hydrogen Partnership, Hydrogen Europe & Hydrogen Europe Research participate in the **identification of annual and multi-annual research & innovation priorities** and the **elaboration of research topics** included in yearly Annual Work Plans.



- **Budget: 1B€ + 200M€** *(extra funding from REPowerEU for Hydrogen Valleys)*
- The Strategic Research and Innovation Agenda (SRIA) outlines the Research and Innovation activities that will be covered during the course of the Partnership

Hydrogen Europe Research

Clean Hydrogen Partnership – Financial Obligations

Legal foundation

- Single Basic Act (SBA) Regulation
- Clean Hydrogen JU Financial Rules
- Association Statutes (HE & HER)

Type of action	Research/Non-profit	Industry
RIA	100%	100%
IA	100%	70% (or capping)
CSA	100%	100%
Flagship	Capping	Capping

Types of financial contributions

- In Kind contribution to OPerational activities: calculated directly from Clean Hydrogen JU projects with a funding rate <100%.
- In Kind contribution to Additional Activities: projects on hydrogen funded outside the Clean Hydrogen JU reported by HE-HER members.
- Contribution to administrative costs for the Clean Hydrogen JU: ~30M€ from 2021 to 2030.

Administrative costs contribution approach

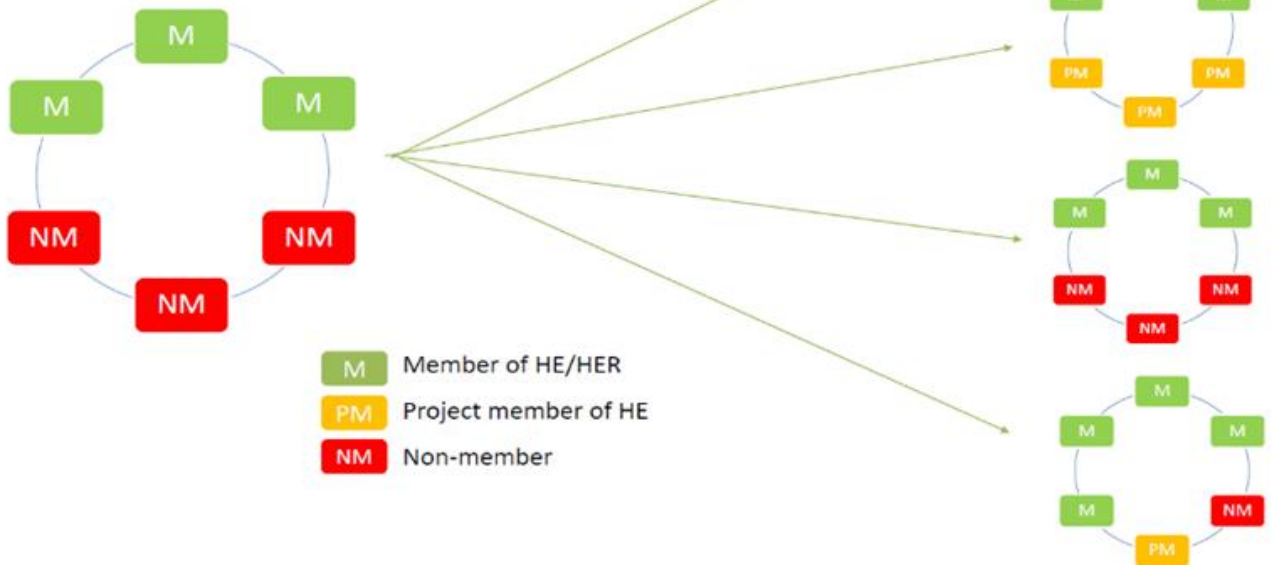
- 3.5% project contribution from HE-HER members.

Key principles

- Only members of HE-HER contribute to project contribution.
- Participation to the project contribution is enshrined in the Statutes of the associations.
- SBA encourages membership of HE-HER to contribute to the success of the Partnership and the hydrogen ecosystem as a whole.
- Non-members can join Hydrogen Europe as full members or project members.

Clean Hydrogen Partnership – Consortium administrative costs

Example 2: Consortium with 3 members of HE/HER and 3 non members
➔ **3 options + combination**



The three non-members become **full members of HE/HER**
-
They all pay a 3,5% project contribution

The three non-members become **project members of HE**
-
They all pay a 3,5% project contribution

The three non-members remain **non-members**
-
They do not pay the contribution
-
The three members then pay

Combination of the 3 options

➢ **NB: this is an illustration**

Clean Hydrogen Partnership – Strategic Research and Innovation Agenda

Strategic Research and Innovation Agenda (SRIA) – Adopted on the 25th of February 2022

- The fruit of nearly two years of work between Hydrogen Europe Research, Hydrogen Europe and the European Commission.
- The Strategic Research and Innovation Agenda outlines the Research and Innovation activities that will be covered during the course of the Partnership, **as well as the targets to be achieved**.

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

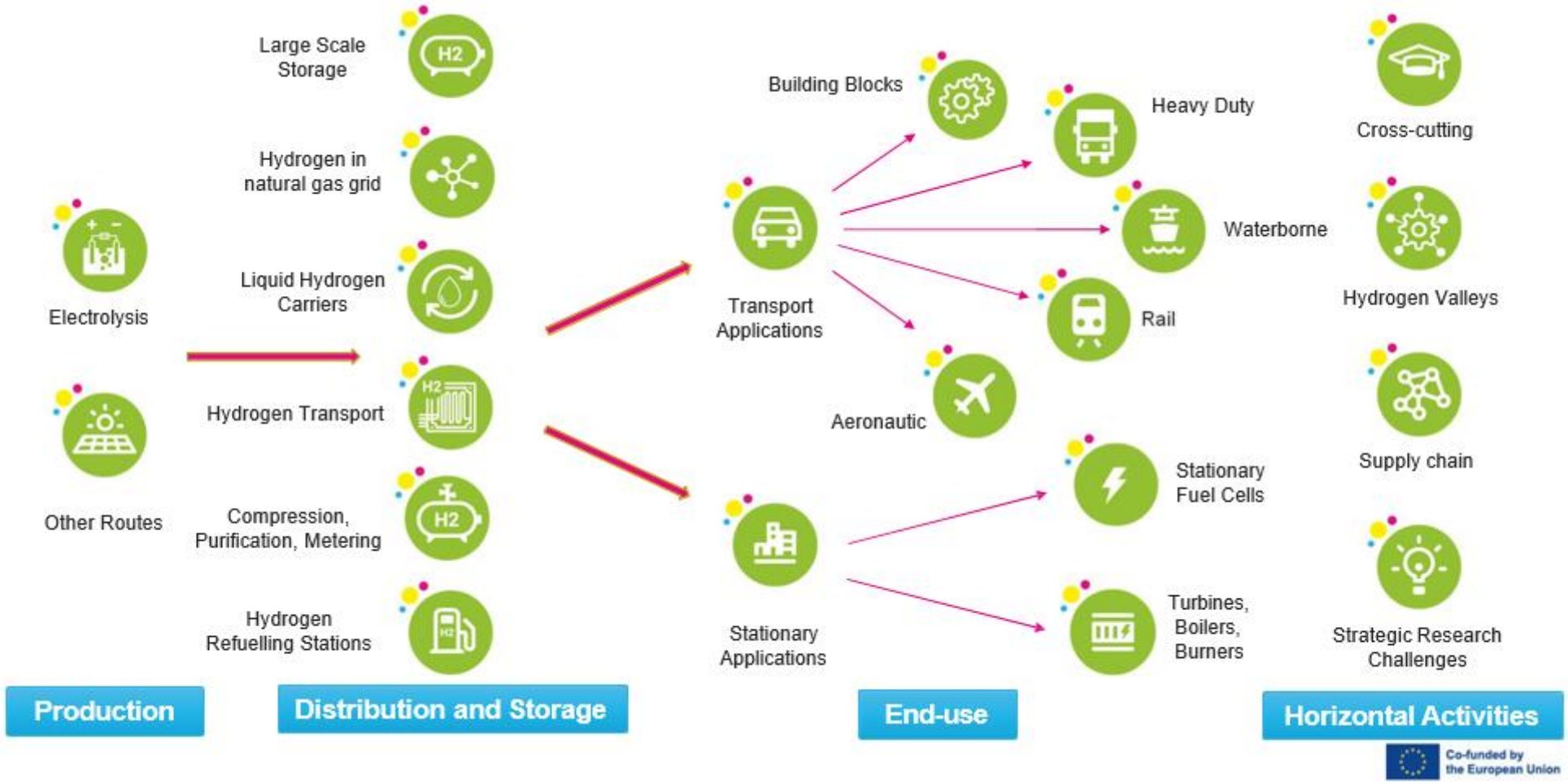
Specific

- 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

Hydrogen Europe Research

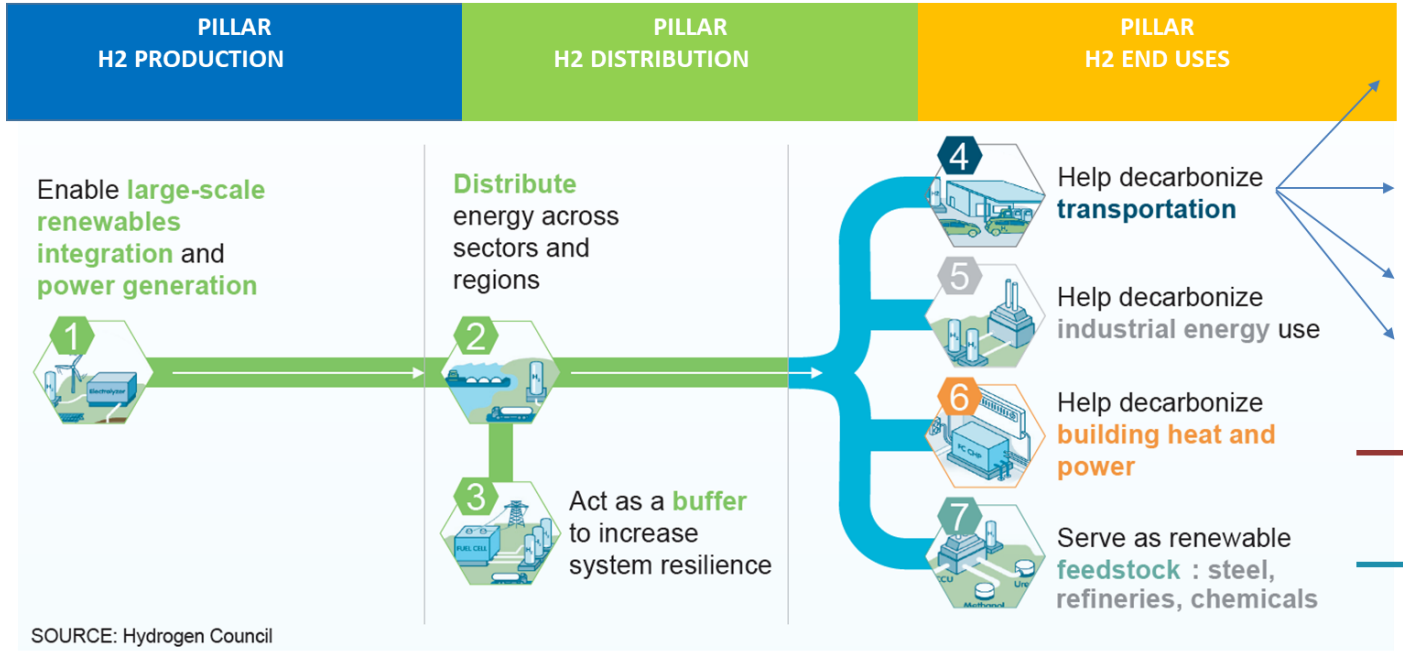
Clean Hydrogen Partnership – Strategic Research and Innovation Agenda

- **The SRIA covers the full hydrogen value chain**



Hydrogen Europe Research

Clean Hydrogen Partnership – Synergies with other European Programmes



Trucks (car, bus, coaches)

Ships and ports

Trains

Aircrafts, drones, aiport

2ZERO (COP)
Batteries (COP)
Zero Emission Waterborne (COP)
Transforming EU rail system (JU)
Clean Aviation (JU)
Built Environment (COP)
Clean & low carbon steel (COP)
Process for Planet (COP)
Circular and Climate Neutral Industry (COP)

Clean Energy Transition (COF)

EIT Climate

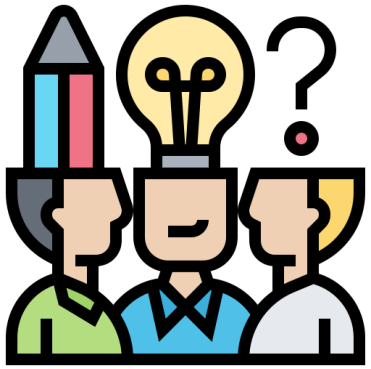
EIT Raw Materials

EIT Inno Energy

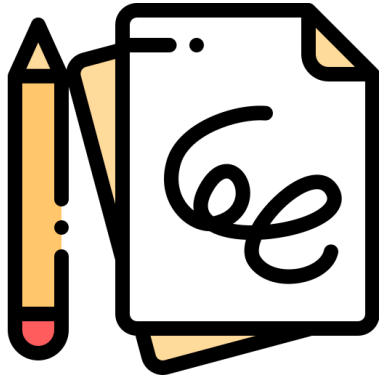
- **Inter-Partnership Assembly** created by the European Commission to discuss synergies between European Programmes

Clean Hydrogen Partnership – Stakeholder Involvement

Hydrogen Europe Research , Hydrogen Europe and the European Commission are active in:



Identification of Annual (Annual Work Plans) and Multi-Annual (SRIA) priorities at Roadmap-level

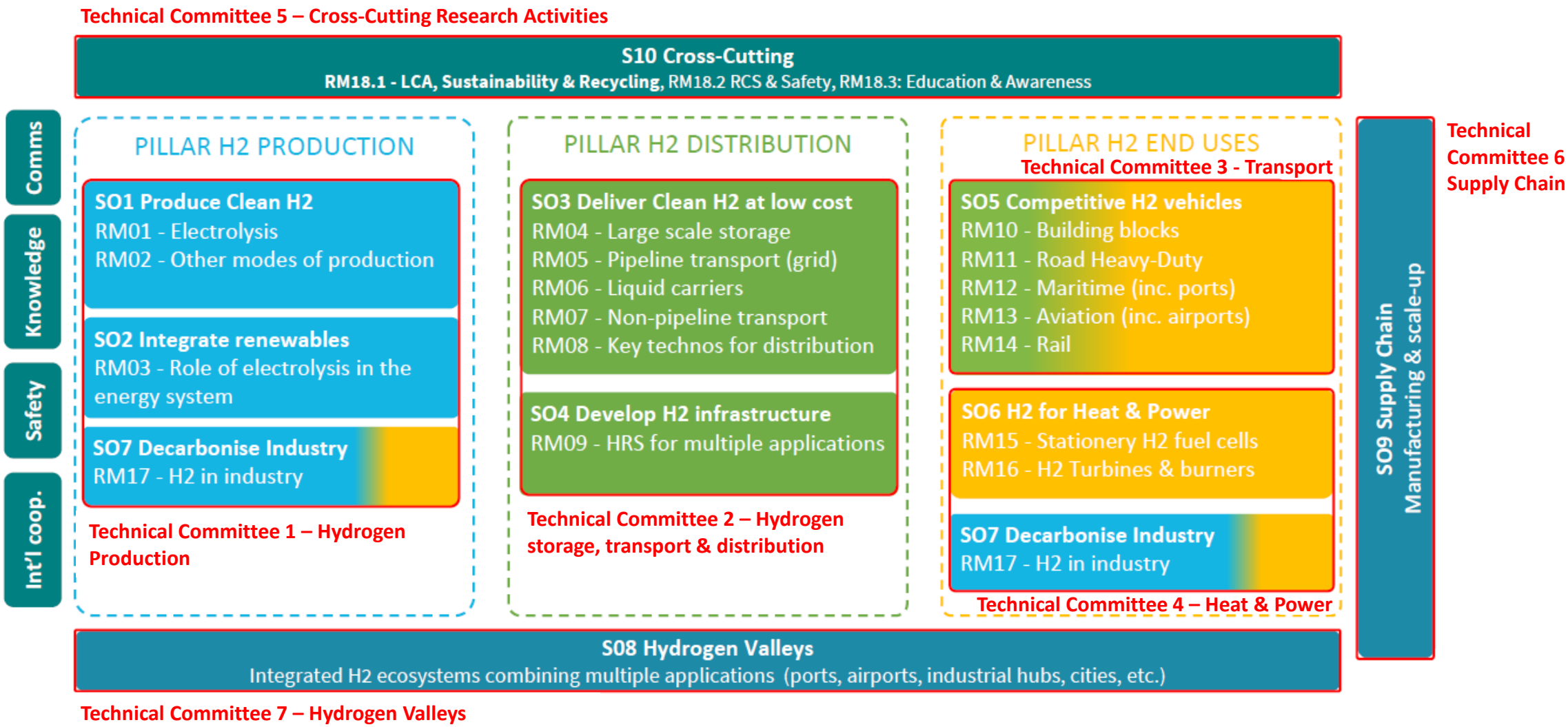


Drafting of Research and Innovation topics included in the Annual Work Plans

Participation in Technical Workshops organised by the Commission & JRC

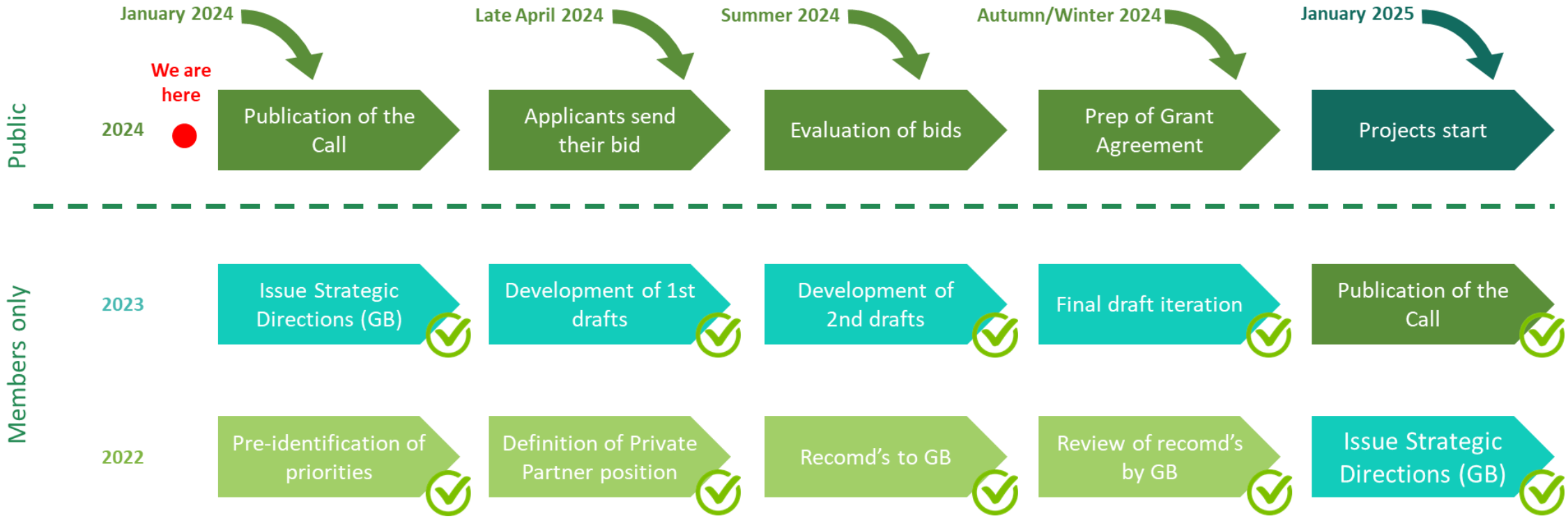
Hydrogen Europe Research

Set of 20 Roadmaps to address our objectives



Hydrogen Europe Research

Clean Hydrogen Partnership – Process



- Interactive process between Hydrogen Europe, Hydrogen Europe Research and the European Commission.

Hydrogen Europe Research

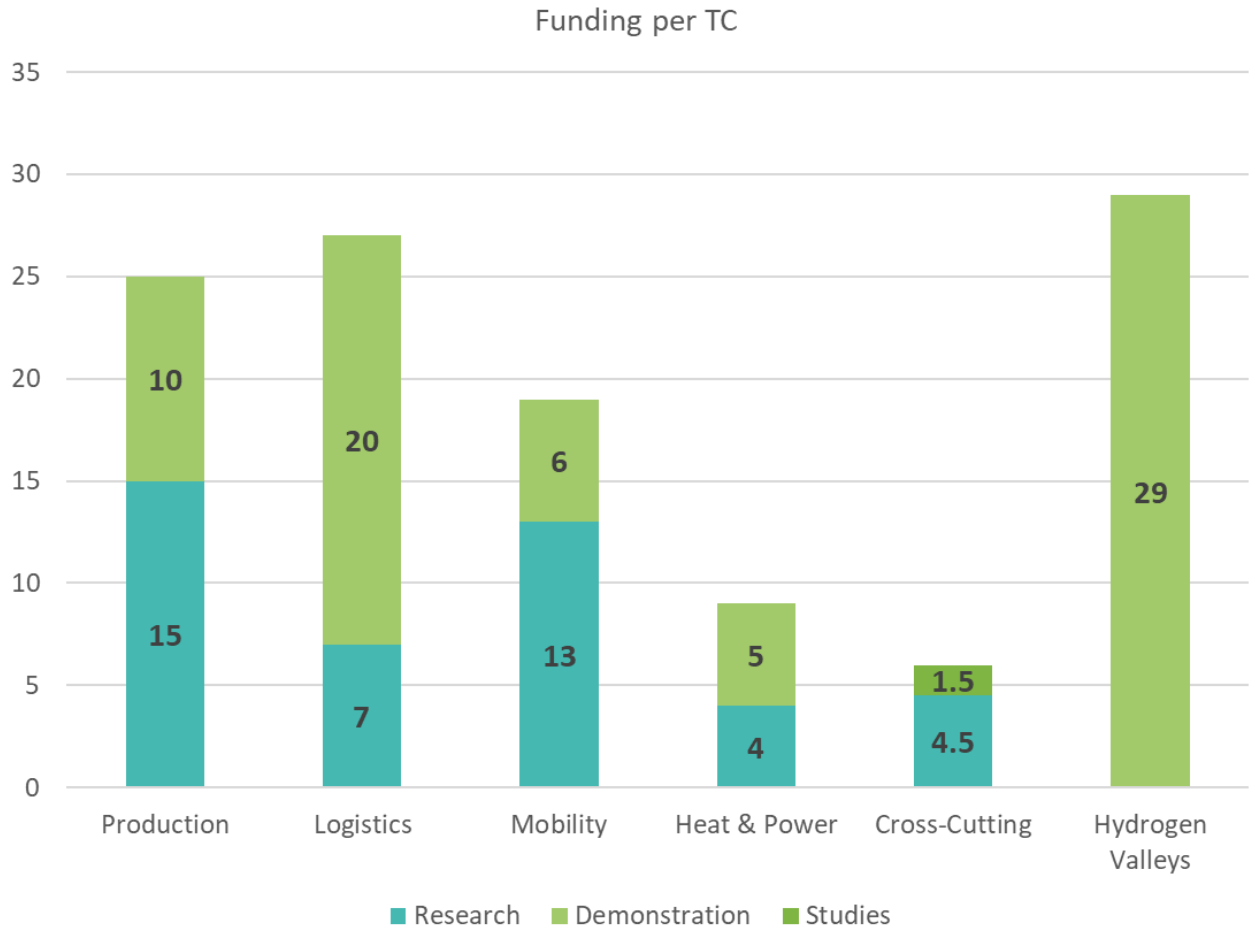
2024 Call for Proposals

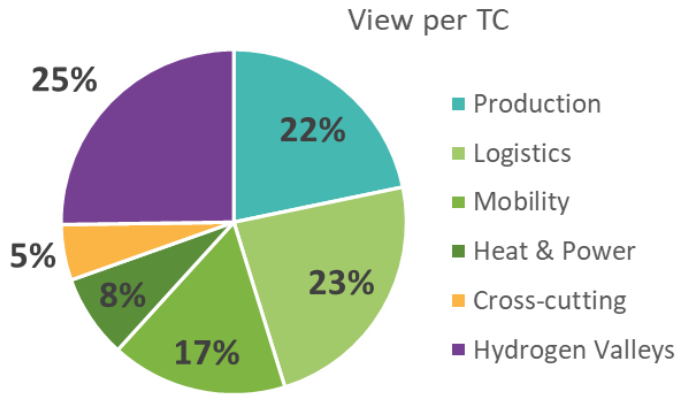
Hydrogen Europe Research

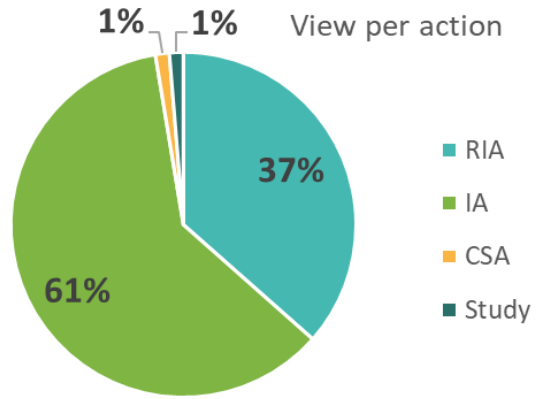
2024 Call for Proposals

Total budget: 113.5 M€
Publication date: 17 January 2024
Deadline: 17 April 2024

2024 Call for Proposals – Budget overview







Hydrogen Europe Research

2024 Call for Proposals – Hydrogen production

Main Focus

- Electrolysers:
  - Improving PCCEL and AEMEL
  - Revisiting monitoring & diagnostic tools for electrolysers
- Circular Hydrogen production
  - Optimal integration of hydrogen production in industry

What is new

- Direct sea water electrolysis

Hydrogen Europe Research

2024 Call for Proposals – Hydrogen production

Topic	Type of Action	Ind. Budg (M€)
HORIZON-JTI-CLEANH2-2024-**01-01**: Innovative proton conducting ceramic electrolysis cells and stacks for intermediate temperature hydrogen production	RIA	3
HORIZON-JTI-CLEANH2-2024-**01-02**: Advanced anion exchange membrane electrolysers for low-cost hydrogen production for high power range applications	RIA	4
HORIZON-JTI-CLEANH2-2024-**01-03**: Development of innovative technologies for direct seawater electrolysis	RIA	4
HORIZON-JTI-CLEANH2-2024-**01-04**: Development and implementation of online monitoring and diagnostic tools for electrolysers	RIA	4
HORIZON-JTI-CLEANH2-2024-**01-05**: Hydrogen production and integration in energy-intensive or specialty chemical industries in a circular approach to maximise total process efficiency and substance utilisation	IA	10

Hydrogen Europe Research

2024 Call for Proposals – Hydrogen logistics

Main Focus

Hydrogen Storage

- Microbiological interactions in H_2 underground storage in porous media
- Next generation aboveground storage solutions

Hydrogen Distribution

- Scaling up and demonstrating purification prototypes
- Flexible compressor coupled to RES

What is new

- Multi-purpose HRS up to 3,000kgH_2/day

Hydrogen Europe Research

2024 Call for Proposals – Hydrogen logistics

Topic	Type of Action	Budget (M€)
HORIZON-JTI-CLEANH2-2024-**02-01**: Investigation of microbial interaction for underground hydrogen porous media storage	RIA	3
HORIZON-JTI-CLEANH2-2024-**02-02**: Novel large-scale aboveground storage solutions for demand-optimised supply of hydrogen	RIA	4
HORIZON-JTI-CLEANH2-2024-**02-03**: Demonstration of hydrogen purification and separation systems for renewable hydrogen-containing streams in industrial applications	IA	6
HORIZON-JTI-CLEANH2-2024-**02-04**: Demonstration of innovative solutions for high-capacity, reliable, flexible, and sustainable hydrogen compression technologies in commercial applications	IA	6
HORIZON-JTI-CLEANH2-2024-**02-05**: Demonstration and deployment of multi-purpose Hydrogen Refuelling Stations combining road and airport, railway, and/or harbour applications	IA	8

Hydrogen Europe Research

2024 Call for Proposals – Hydrogen mobility

Main Focus

- Maritime and Heavy-Duty (with spill over to other applications);
- Balance of Plant (BoP design, architectures and operational strategies);
- Integration and demonstration for maritime application;

What is new

- Scale up of BoP components
- New storage solutions for maritime applications;
- Synergy between topics of the same call and existing projects (StaSHH)

Hydrogen Europe Research

2024 Call for Proposals – Hydrogen mobility

Topic	Type of Action	Ind. Budget (M€)
HORIZON-JTI-CLEANH2-2024-**03-01**: Balance of plant components, architectures and operation strategies for improved PEMFC system efficiency and lifetime	RIA	4
HORIZON-JTI-CLEANH2-2024-**03-02**: Scaling-up Balance of Plant components for efficient high-power heavy-duty applications	RIA	4
HORIZON-JTI-CLEANH2-2024-**03-03**: Next generation on-board storage solutions for hydrogen-powered maritime applications	RIA	5
HORIZON-JTI-CLEANH2-2024-**03-04**: Demonstration of hydrogen fuel cell-powered inland or short sea shipping	IA	6

Hydrogen Europe Research

2024 Call for Proposals – Heat & power

Main Focus

- Next generation fuel cell: Portable robust and long-term autonomous FC systems for quick integration into the power system of a critical user, providing backup power in an uninterruptible manner
- Hydrogen-fired Gas Turbines

What is new

- Portable FC to power critical infrastructures under demanding operational conditions
- Covering knowledge gaps on premixed hydrogen combustion at high pressure

Hydrogen Europe Research

2024 Call for Proposals – Heat & power

Topic	Type of Action	Ind. Budget (M€)
HORIZON-JTI-CLEANH2-2024-**04-01**: Portable fuel cells for backup power during natural disasters to power critical infrastructures	IA	5
HORIZON-JTI-CLEANH2-2024-**04-02**: Improved characterisation, prediction and optimisation of flame stabilisation in high-pressure premixed hydrogen combustion at gas-turbine conditions	RIA	4

Hydrogen Europe Research

2024 Call for Proposals – Cross-cutting activities

Main Focus

- Continue raising the environmental sustainability of fuel cell and hydrogen (FCH) systems by developing bespoke guidelines
- To research novel materials environmentally friendly for PEM-based hydrogen technologies

What is new

- Development of ‘safe and sustainable-by-design’ (SSbD) guidelines for systems across the hydrogen value chain
- Development of non-fluorinated components

Hydrogen Europe Research

2024 Call for Proposals – Cross-cutting activities

Topic	Type of Action	Ind. Budget (M€)
HORIZON-JTI-CLEANH2-2024-**05-01:** Guidelines for sustainable-by-design systems across the hydrogen value chain	CSA	1.5
HORIZON-JTI-CLEANH2-2023-**05-02**: Development of non-fluorinated components for fuel cells and electrolysers	RIA	3

Hydrogen Europe Research

2024 Call for Proposals – Hydrogen Valleys

Main Focus

- Demonstrate an ecosystem built on the complete value chain of hydrogen;
- Large and small-scale hydrogen valleys acting as testbeds to showcase first regional "hydrogen economies";
- Topic open to foster the emergence of the widest possible array of valleys configurations;
- Innovation in Hydrogen Valleys is not about the technology development of an application, but on system integration of hydrogen production, its distribution and storage, and its subsequent use (TRL >=6-8)

Hydrogen Europe Research

2024 Call for Proposals – Hydrogen Valleys

Topic	Type of Action	Ind. Budget (M€)
HORIZON-JTI-CLEANH2-2023-**06-01**: Hydrogen Valleys (large-scale)	IA	20*
HORIZON-JTI-CLEANH2-2023-**06-02**: Hydrogen Valleys (small-scale)	IA	9*

*For the Call for Proposals 2024, up to 60 MEUR additional budget is available to top-up the allocated budget for hydrogen valleys under the Call for Proposals 2024. More than one (Hydrogen Valley) project per topic will be funded, according to the final ranking at the end of the evaluation process.

!! The maximum JU contribution that can be requested is an eligibility criteria !!

Hydrogen Europe Research

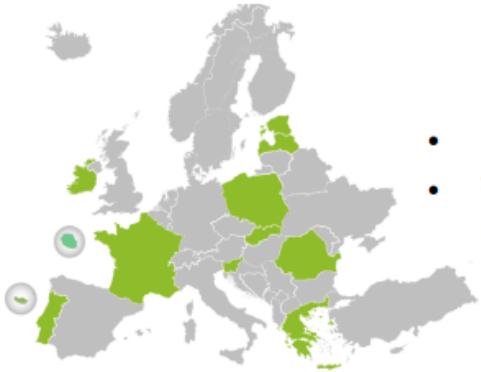
2024 Call for Proposals – Hydrogen Valleys Facility

PDA I

2020 – 2021

- 11 Projects supported;
- Observers' Network;

PDA II



2023 – 2024

- 15 Projects supported;
- Workshops and supporting knowledge;

Hydrogen Valley facility

Duration: 2024 …
Budget: € 12.5 m

Project development assistance

Support Hydrogen Valleys at different level of maturity to investment decision

Horizontal Activities

- Gather knowledge & lessons learnt
- Maintain Mission Innovation Hydrogen Valley Platform;

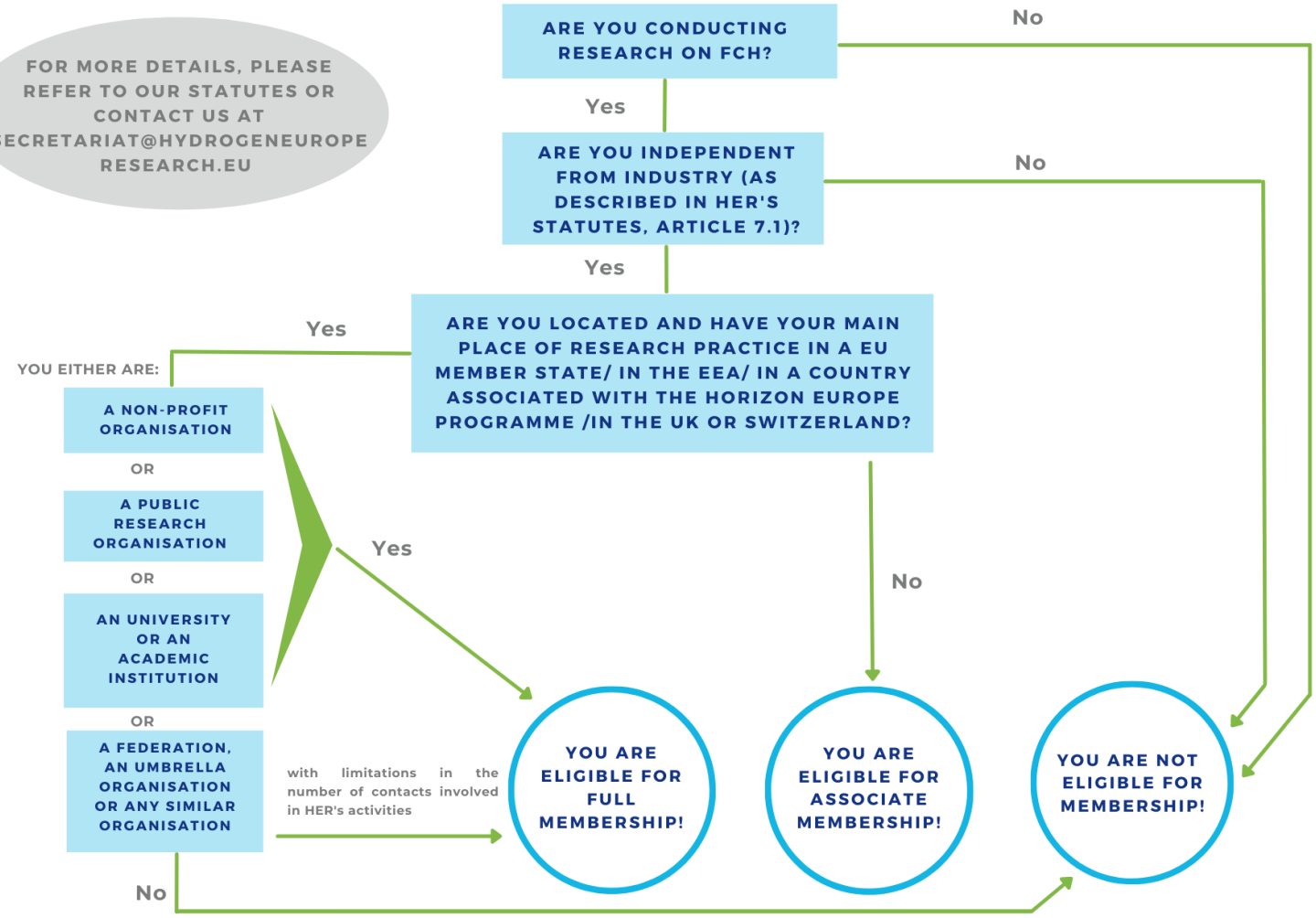
Hydrogen Europe Research

Join us!

Hydrogen Europe Research

Become a Hydrogen Europe Research member!

FOR MORE DETAILS, PLEASE REFER TO OUR STATUTES OR CONTACT US AT SECRETARIAT@HYDROGENEUROPERESEARCH.EU



Full member: 3,500€/year

Associate member: 1,000€/year

Secretariat – contact details

Innovation Manager – Louis Mazurkiewicz

- Main contact point for the Clean Hydrogen Partnership
- l.mazurkiewicz@hydrogeneuroperesearch.eu
- +33 628 433 076

Project Manager – Julia Cora

- Main contact point for the Policy Working Group and the Skills Working Group
- j.cora@hydrogeneuroperesearch.eu
- +32 472 051 015

Communications and Membership Manager – Simona Vitali

- Main contact point for Communication and Secretariat-related issues
- s.vitali@hydrogeneuroperesearch.eu
- +32 466 432 902

Hydrogen Europe Research

Thank you for your support!