

## Status of R&I activities and future challenges (incl plans/calls)

Mirela Atanasiu Head of Unit Operations and Communication





EUROPEAN PARTNERSHIP

## **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)





€ 181 million

3



## 15 years journey of the Joint Undertaking

From research to delivering solutions in the market





## Low Temp Electrolysis Demonstration projects

In only 10 years electrolyser capacity increased 500× and funding per MW installed reduced 100×  $\,$ 







## Decarbonizing transport: Moving from automotive to heavy-duty Addressing the main challenges of demanding transport modes



![](_page_5_Picture_3.jpeg)

![](_page_6_Picture_0.jpeg)

## **Clean Heat and Power with Hydrogen**

Residential, commercial buildings, service sector, industry

![](_page_6_Figure_3.jpeg)

![](_page_7_Picture_0.jpeg)

## Safety

Addressing key safety-related aspects

![](_page_7_Figure_3.jpeg)

![](_page_7_Picture_5.jpeg)

![](_page_8_Picture_0.jpeg)

## Pre-normative research (PNR), Regulations, Codes, and Standards (RCS)

Supporting and facilitating adequate frameworks for market uptake

![](_page_8_Figure_3.jpeg)

![](_page_8_Picture_5.jpeg)

Co-funded by

the European Union

![](_page_9_Picture_0.jpeg)

## 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

![](_page_9_Picture_4.jpeg)

- 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)

![](_page_9_Picture_14.jpeg)

![](_page_10_Picture_0.jpeg)

## **Clean Hydrogen Partnership/JU**

Council Regulation establishing the Joint Undertakings under Horizon Europe

(adopted 19 November 2021 & into force 30 November 2021)

- Budget: 1 billion EURO from Horizon Europe (to commit until 2027 and implement until 2031)
- Governance: Governing Board (three members: Commission, HE, HER) + advisory bodies (SRG, SG)
- Need also to collect independent opinions of the wider scientific community, through a scientific advisory workshop (during H2Week/H2Forum)

## **Research & Innovation Activities (SRIA multi-annual doc)**

- Renewable hydrogen production
- Hydrogen transmission, distribution and storage
- End-use technologies in transport, buildings and industry (incl. fuel cells, burners, boilers, etc.)

![](_page_10_Picture_11.jpeg)

![](_page_11_Picture_0.jpeg)

# **Clean Hydrogen JU Objectives**

### General

![](_page_11_Picture_3.jpeg)

**(**)

Support the implementation of the Commission's Hydrogen Strategy

![](_page_11_Picture_5.jpeg)

![](_page_11_Picture_6.jpeg)

Improve the cost-effectiveness, efficiency, reliability, quantity and quality of clean hydrogen solutions across entire value chain

![](_page_11_Figure_8.jpeg)

Strengthen the knowledge/capacity of scientific and industrial actors along the Union's hydrogen value chain while supporting the uptake of skills

![](_page_11_Figure_10.jpeg)

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

![](_page_11_Picture_12.jpeg)

Increase public and private awareness, acceptance and uptake of clean hydrogen solutions

![](_page_11_Picture_14.jpeg)

![](_page_11_Picture_15.jpeg)

Stimulate research and innovation on clean hydrogen production, distribution, storage and end use applications

![](_page_11_Picture_17.jpeg)

Strengthen the competitiveness of the EU clean hydrogen value chain

![](_page_11_Picture_19.jpeg)

Contribute to the EU ambitious 2030 and 2050 climate ambition

![](_page_12_Figure_0.jpeg)

the European Union

![](_page_13_Picture_0.jpeg)

## **Other Activities**

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

![](_page_13_Picture_3.jpeg)

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

![](_page_14_Picture_0.jpeg)

## Synergies

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

![](_page_14_Figure_3.jpeg)

15

![](_page_15_Picture_0.jpeg)

## 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)

![](_page_15_Picture_5.jpeg)

**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<sub>2</sub> Valleys Partnership

![](_page_15_Picture_9.jpeg)

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

#### Creation/funding of H<sub>2</sub> valleys

![](_page_15_Picture_12.jpeg)

"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."

![](_page_15_Picture_14.jpeg)

![](_page_16_Picture_0.jpeg)

## Definition of a Hydrogen Valley

Used in the call topics and the Mission Innovation platform

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

![](_page_16_Picture_4.jpeg)

![](_page_16_Picture_5.jpeg)

![](_page_16_Picture_6.jpeg)

## Clean Hydrogen Partnership

## <sup>n</sup> Hydrogen valleys as an accelerator for an EU hydrogen economy

![](_page_17_Figure_2.jpeg)

![](_page_17_Figure_3.jpeg)

- H2 Refueling stations
- E-Kerosene for aviation
- H2 for an inland water transport barge
- Domestic Heat applications
- Underground H2 storage (Hystock)
- 1,500 tons H2/year
- https://heavenn.org/

![](_page_17_Figure_11.jpeg)

![](_page_17_Picture_12.jpeg)

Ports, Airports, Industrial hubs, Logistical hubs, A H2 city (or area)

![](_page_18_Picture_0.jpeg)

#### Hydrogen Valleys have become a global theme

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

![](_page_18_Picture_3.jpeg)

![](_page_18_Figure_4.jpeg)

www.h2v.eu

![](_page_18_Figure_6.jpeg)

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

![](_page_18_Figure_8.jpeg)

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

![](_page_18_Picture_10.jpeg)

Countries with ongoing Hydrogen Valley activities

![](_page_19_Picture_0.jpeg)

# Mission Innovation Hydrogen Valley Platform Showcasing hydrogen flagship project seround the world: A platform for project developers TERN WORK New Update Report Available 38 Mages 20 Curree 38,995 for investment

![](_page_19_Picture_2.jpeg)

#### Next steps under MI 2.0:

- Further development and enhancement of the MI Hydrogen Valley Platform
- Target of 100 Hydrogen Valleys by 2030
- (while doubling those in Europe by 2025)

![](_page_19_Figure_7.jpeg)

![](_page_19_Picture_8.jpeg)

#### 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.

![](_page_19_Picture_14.jpeg)

![](_page_19_Picture_15.jpeg)

![](_page_20_Picture_0.jpeg)

## **Project Development Assistance (PDA) for Regions**

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

![](_page_20_Picture_3.jpeg)

#### Project Development (11)

![](_page_20_Figure_5.jpeg)

![](_page_20_Picture_6.jpeg)

#### **Observers' Network (+24)**

![](_page_20_Figure_8.jpeg)

![](_page_20_Picture_9.jpeg)

![](_page_21_Picture_0.jpeg)

# **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

![](_page_21_Figure_13.jpeg)

![](_page_21_Picture_14.jpeg)

22

![](_page_22_Picture_0.jpeg)

## 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

**Discover the FCH Observatory** 

![](_page_22_Picture_4.jpeg)

- 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

![](_page_22_Picture_10.jpeg)

EUROPEAN PARTNERSHIP

![](_page_22_Picture_11.jpeg)

Co-funded by the European Union

![](_page_23_Picture_0.jpeg)

# Public Opinion Survey - ongoing

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

![](_page_23_Picture_3.jpeg)

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

![](_page_23_Picture_13.jpeg)

![](_page_24_Picture_0.jpeg)

## Annual Work Programmes 2022-2023

![](_page_24_Picture_2.jpeg)

|                 | EU/JU budget<br>(EUR million) | Publication                      | Deadline                       |
|-----------------|-------------------------------|----------------------------------|--------------------------------|
| Single deadline | 195                           | 17 <sup>th</sup> of January 2023 | 18 <sup>th</sup> of April 2023 |

Call 2022 UPDATE:

Call 2022-1: <u>27 projects/grants</u> just signed for approx. 155 MEUR funding Call 2022-2: <u>26 proposals</u> under Grant Agreement Preparation (GAPs), to be signed by June 2023 (for additional approx. 200 MEUR, incl 9 proposals for H2 Valleys)

\* Synergies through expected co-funding from reginal/national funds for the H2 Valleys

![](_page_25_Picture_0.jpeg)

OROGEN

## Thank you

Mirela ATANASIU Head of Unit Operations and Communications <u>Mirela.Atanasiu@clean-hydrogen.europa.eu</u>

For further information <u>https://www.clean-hydrogen.europa.eu/</u>

![](_page_25_Picture_4.jpeg)

Co-funded by the European Union