Webinar

Clean Hydrogen at Scale: Strengthening Europe's Competitiveness Through Sustainable Water Use

Friday 10 July 2026 | 10:00 - 11:30 CEST

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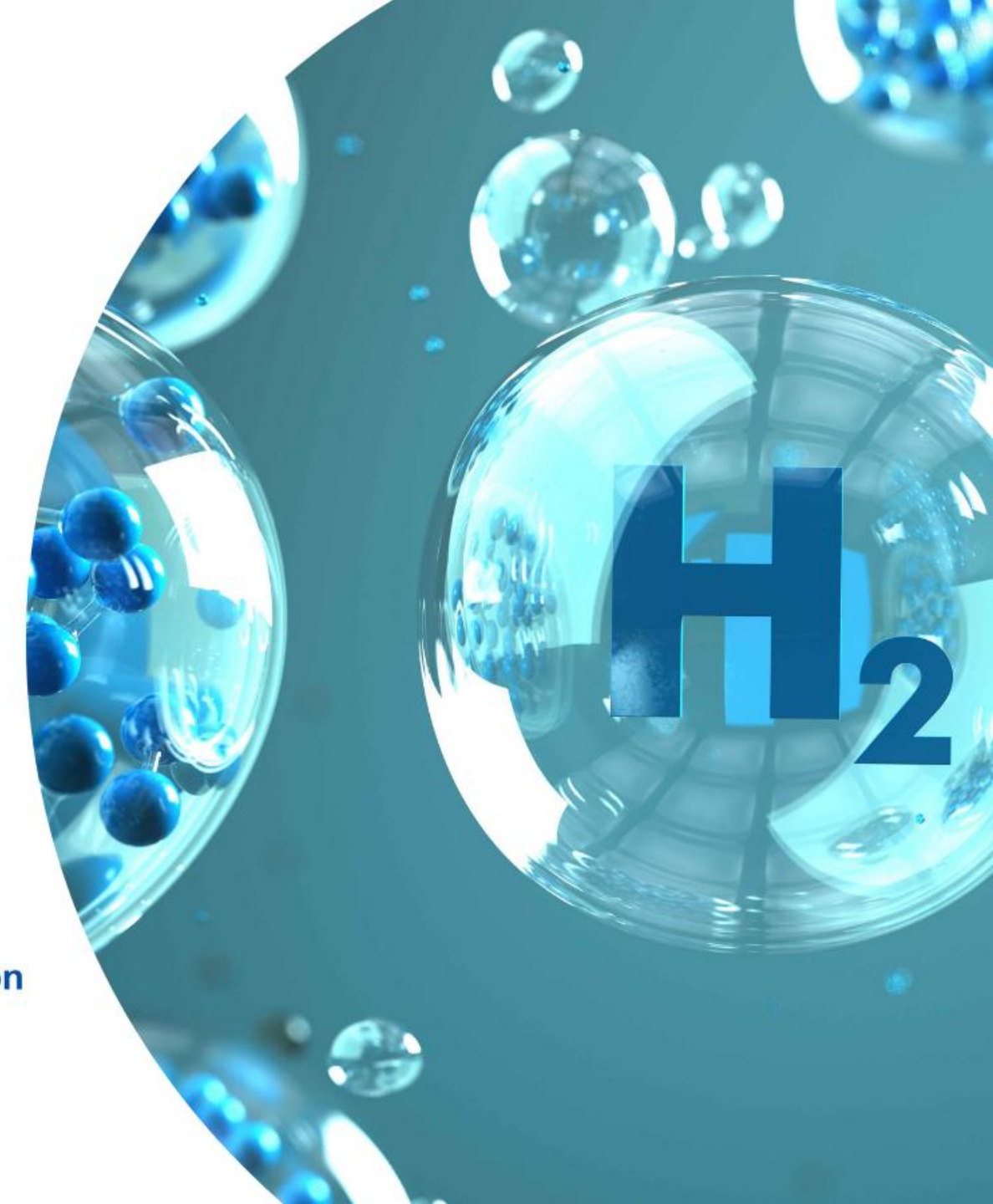

Clean Hydrogen at Scale: Strengthening Europe's Competitiveness Through Sustainable Water Use

Agenda

10.00 – 10.15	**Opening remarks** **Mirela Atanasiu**, *Head of Unit Operations and Communications,* Clean Hydrogen Partnership **Luigi Crema,** *President,* Hydrogen Europe Research **Alessandra Cuneo,** *Head of Hydrogen and Power Generation R&D,* RINA
10.15 – 10.40	**Session 1 – Sustainability of water use and management in renewable Hydrogen production** *Presentation of Study results from the involved project partners* • *Water Availability and Hydrogen Deployment: the Clean Hydrogen Explorer* [**Marco Micotti,** SoftWater] • *Insights from Regional Case Studies* [**Gianluca Greco,** Fundación Hidrógeno Aragón] • *Key Takeaways for Water-Smart Hydrogen Deployment* [**Alessandra Cuneo,** RINA]
10.40 – 10.50	Audience – Q&A
10.50 – 11.20	**Session 2 – How can renewable hydrogen scale without compromising water resources?** *Moderated panel discussion focused on connecting project outcomes with EU policy and industrial relevance, and sharing lessons learned with other EU initiatives* **Luca Feola,** *Project Officer,* Clean Hydrogen Partnership **Marco Vavassori**, *Sales Manager for Energy Transition & Hydrogen Business Unit*, De Nora **Julie Mougin,** *Deputy Director for Hydrogen Technologies,* CEA **Marco Serafini,** *Scientific Project Officer,* Joint Research Centre **Arno van den Bos,** *Analyst,* Irena Moderated by **Alessio Tarantini,** *Innovation proposal and Project Management Executive Director* in RINA
11.20 – 11.30	Closing remarks

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House rules

- All attendees are muted by default to avoid background noise
- Questions could be addressed via the Q&A tab
- Webinar will be recorded and published on the Clean Hydrogen Partnership YouTube channel
- Presentations will be made public on the Clean Hydrogen Partnership webpage

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Strengthening Europe's Competitiveness Through Sustainable Water Use

Clean Hydrogen Partnership Introduction

Mirela ATANASIU

Head of Unit for Operations and Communications

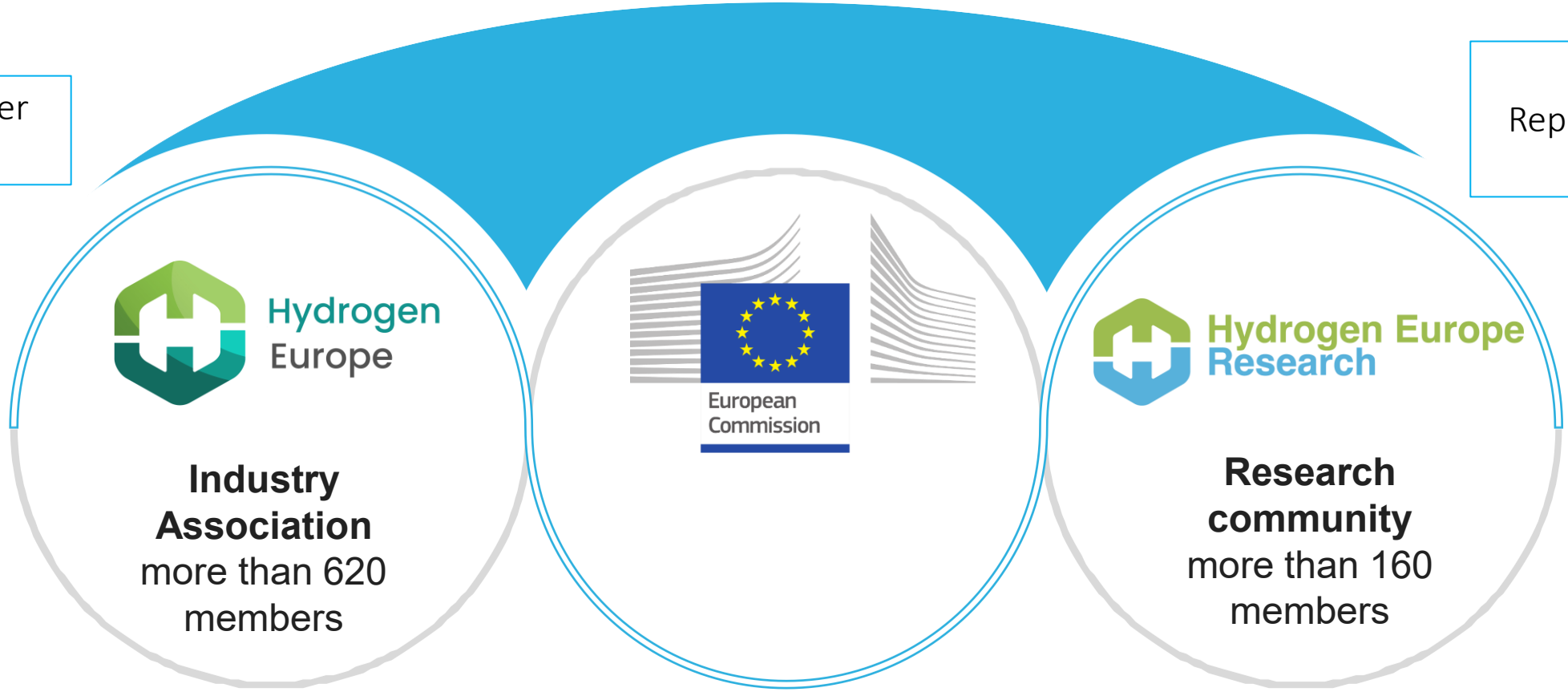
Brussels, 10th July 2026

Clean Hydrogen Joint Undertaking

EU Institutional Public-Private Partnership (IPPP)

Stakeholder Group

States Representative Group



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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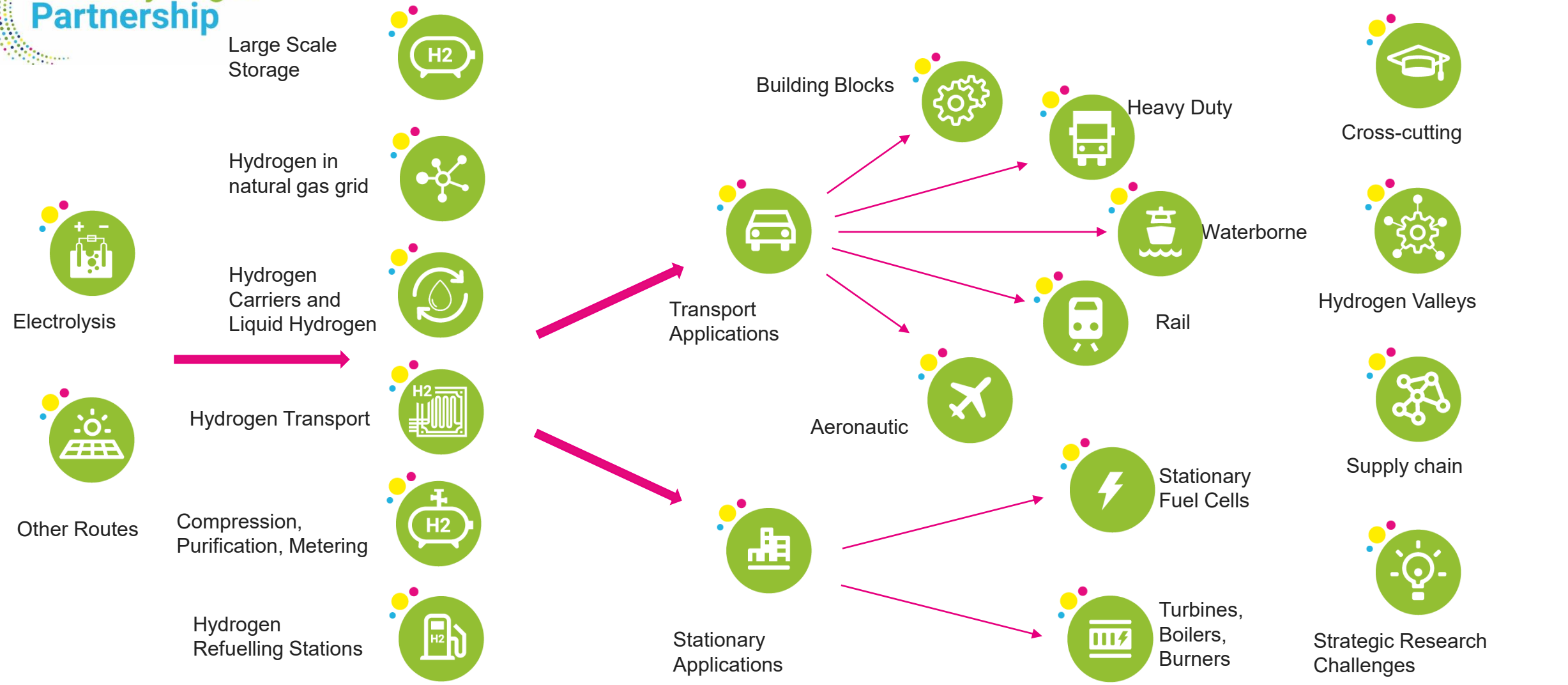
SRIA: Research & Innovation Activities, 2021-2027



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17 years of the Joint Undertaking

From **research and innovation** to delivering solutions in the market











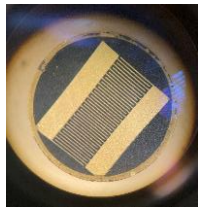

Large scale field trials

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



Early research

Large scale field trials

New applications

Hydrogen Valleys

Developing new business cases

End users strongly present in projects

Industries, regions, cities

Research and Industry working together

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17 years of the Joint Undertaking

Competitiveness: in the “DNA” of the Partnership

• Partnership as a competitiveness enabler

- The JU fosters collaboration across the hydrogen value chain, involving industry, research institutions, and policymakers

• Driving….

- Strengthening the competitiveness of the EU hydrogen value chain with attention to both SMEs and industrial players;
- Stimulating research and innovation to improve cost-effectiveness, efficiency, and scalability of clean hydrogen technologies.

•…and monitoring competitiveness

- The JU monitors progress through Key Performance Indicators (KPIs) focusing on cost reduction, TRL improvements and market uptake of innovations

European Partnerships under Horizon Europe 2028-2034

New call for evidence on the joint undertakings to be included in Framework Programme 10

- Shape FP10 Joint Undertakings by sharing practical evidence and experience.
- Support a clearer legal framework with aligned objectives and harmonised procedures.
- Influence the impact assessment for the Single Basic Act; deadline: 14 July.

EUROPEAN PARTNERSHIP

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Check out the QR code with link to our webpage

- Key messages in support of the JU
- Short Guidance document

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Thank you!

Mirela ATANASIU
Head of Unit for Operations and Communications
Mirela.Atanasiu@clean-hydrogen.europa.eu

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

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Opening Remarks

Luigi CREMA

President, Hydrogen Europe Research

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Sustainability of water use and management in renewable Hydrogen production study

Alessandra CUNEO

Head of Power Generation and Hydrogen R&D, RINA

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Why this study matters: hydrogen scale-up has a water dimension

The study frames water not as a marginal input, but as a strategic condition for sustainable deployment.

Hydrogen production needs water

Electrolysis requires high-quality water directly, while upstream electricity, treatment and cooling can add indirect demand.

Water risk is local

Aggregate volumes can look manageable, but stress may emerge where hydrogen growth overlaps with drought, scarcity and competing uses.

Planning must be integrated

Carbon performance, water availability, siting, permitting and social acceptance need to be assessed together.

How can renewable hydrogen scale without compromising long-term water resilience?

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Study objectives

Quantify future water/H2 need

- Need for **sustainable water management**
- Address the **challenges** of water use in hydrogen production
- Detailed understanding of **future water resource challenges**

Objectives

- Technical assessment of **water requirements** for REN-H2 production
- Feasibility of **alternative water sources** for REN-H2 production
- Assess **policy effectiveness** on climate-related water scarcity

Outputs

- **Recommendations** for sustainable hydrogen production in water stressed regions
- **Numerical modelling** of water consumption for hydrogen production

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Methodology

TASK 1

State-of-the-art of H2 production technologies with related environmental and economical aspects

TASK 2

Impact assessment of current and future green H2 production **on water availability** in the target countries

TASK 3

Case studies validation

TASK 4

Conclusion and recommendations for water stressed regions

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Session 1 – Sustainability of water use and management in renewable Hydrogen production

Presentation of Study results from the involved project partners

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Water Availability and Hydrogen Deployment

The Clean Hydrogen Explorer

Marco MICOTTI

Co-founder and Senior Researcher, SoftWater

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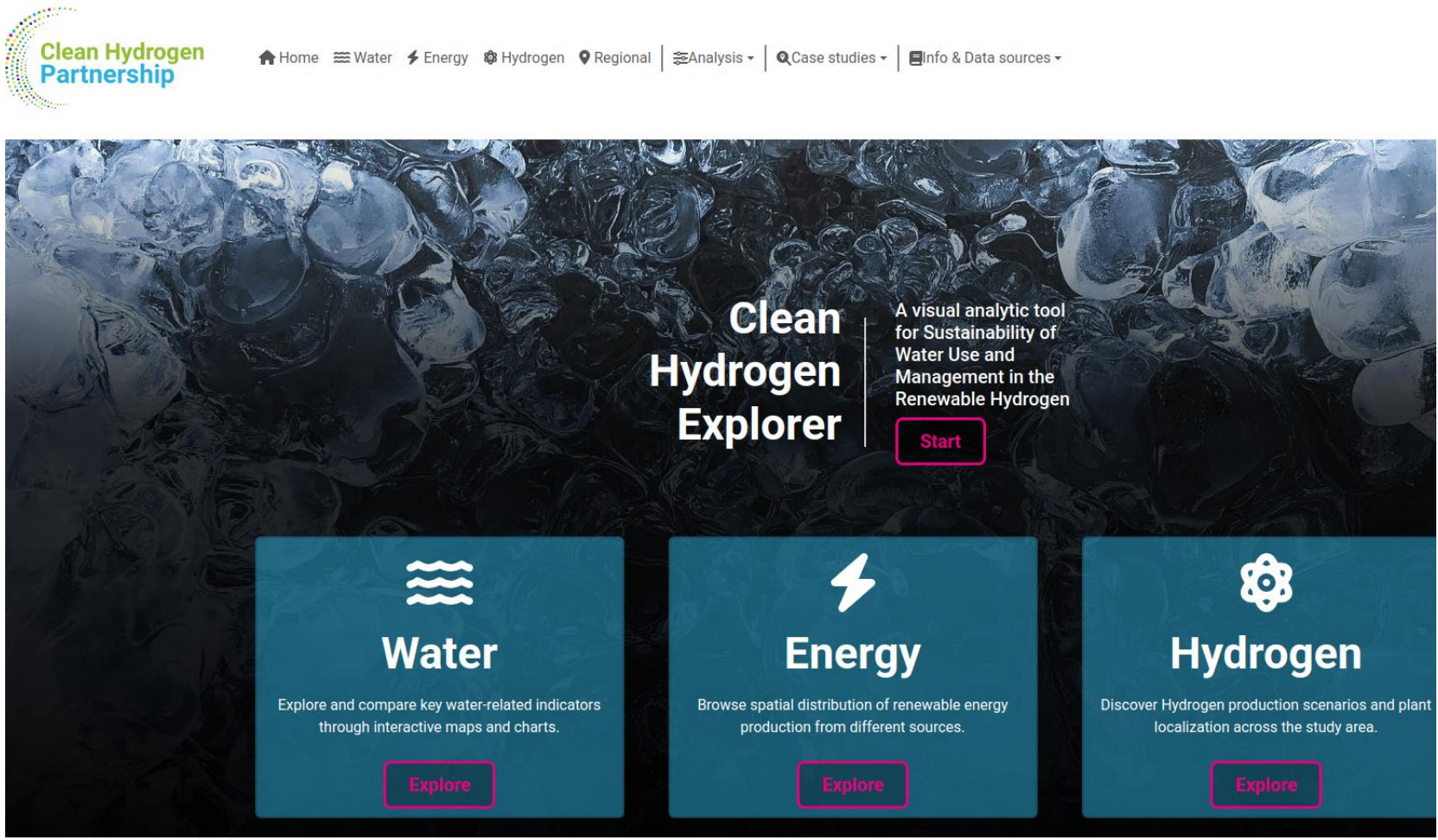
Clean Hydrogen Explorer

- Visual analytics web tool
- Data-driven platform

Two sections

- Pan-European regional scale
- 5 Case study analysis, with integrated modelling

https://cleanh2.soft-water.it



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Regional analysis - Processing pipeline

Data ingestion
PECD, ISIMIP3, GEM, IEA

Preprocessing
Harmonization, temporal resampling, spatial aggregation at NUTS2 Level

Index computation
Water availability, Renewable energy production, Hydrogen production

Database and visual tool setup
Organizing data to support aggregation, filtering and browsing functionalities

Web interface
Platform design and implementation
Interactive charts, maps and analytical tools

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Regional analysis - Water

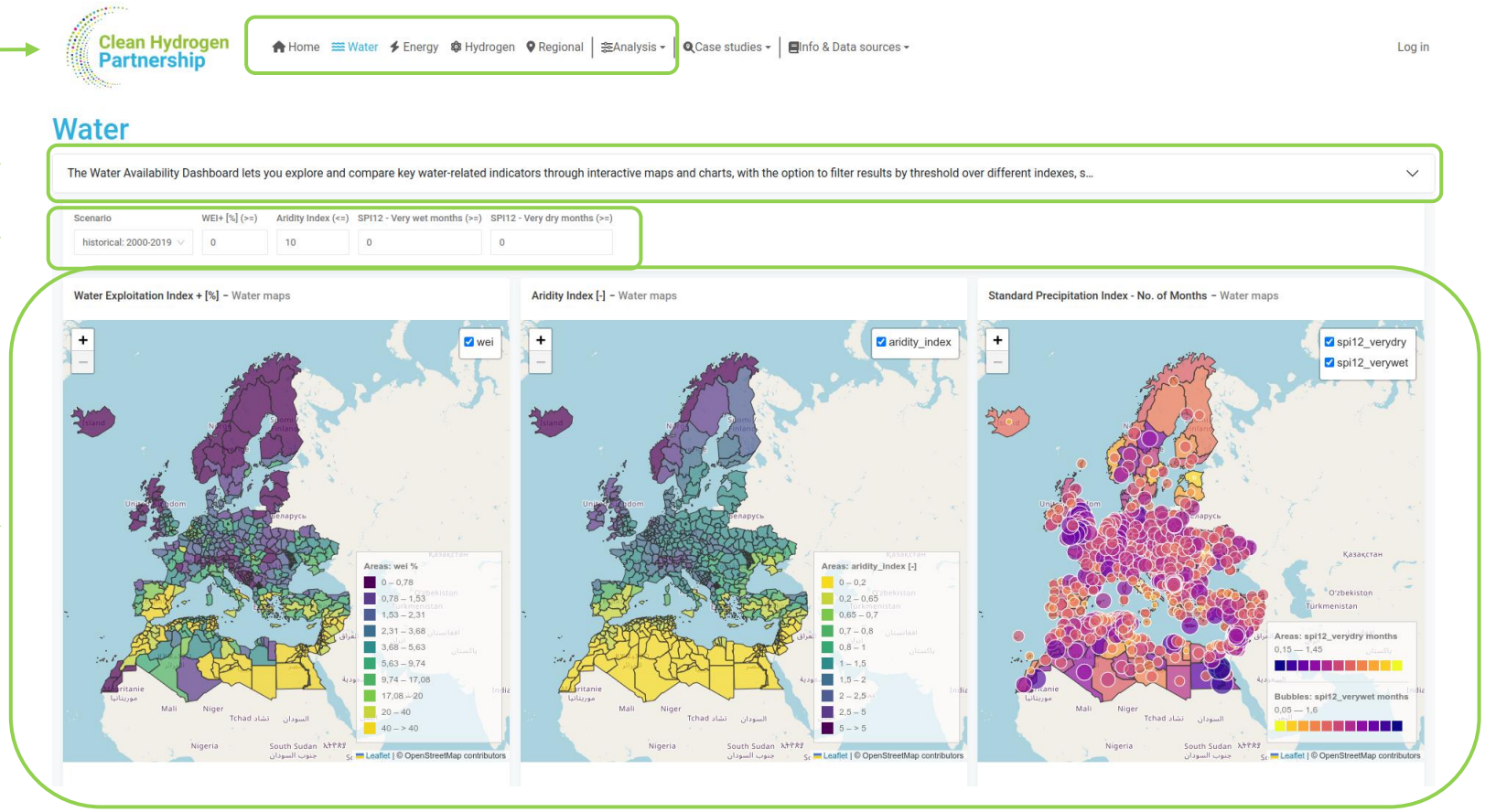
Regional analysis menu

Page description

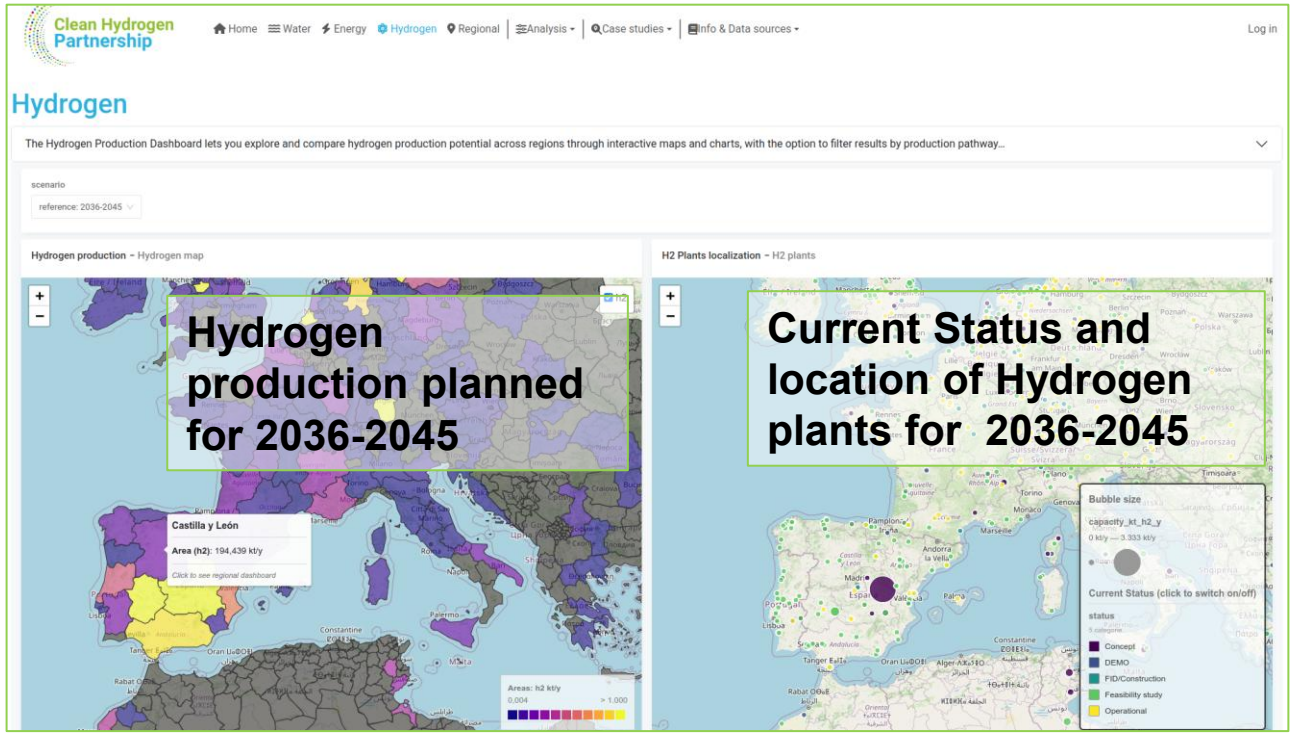
Time and index value-based filtering

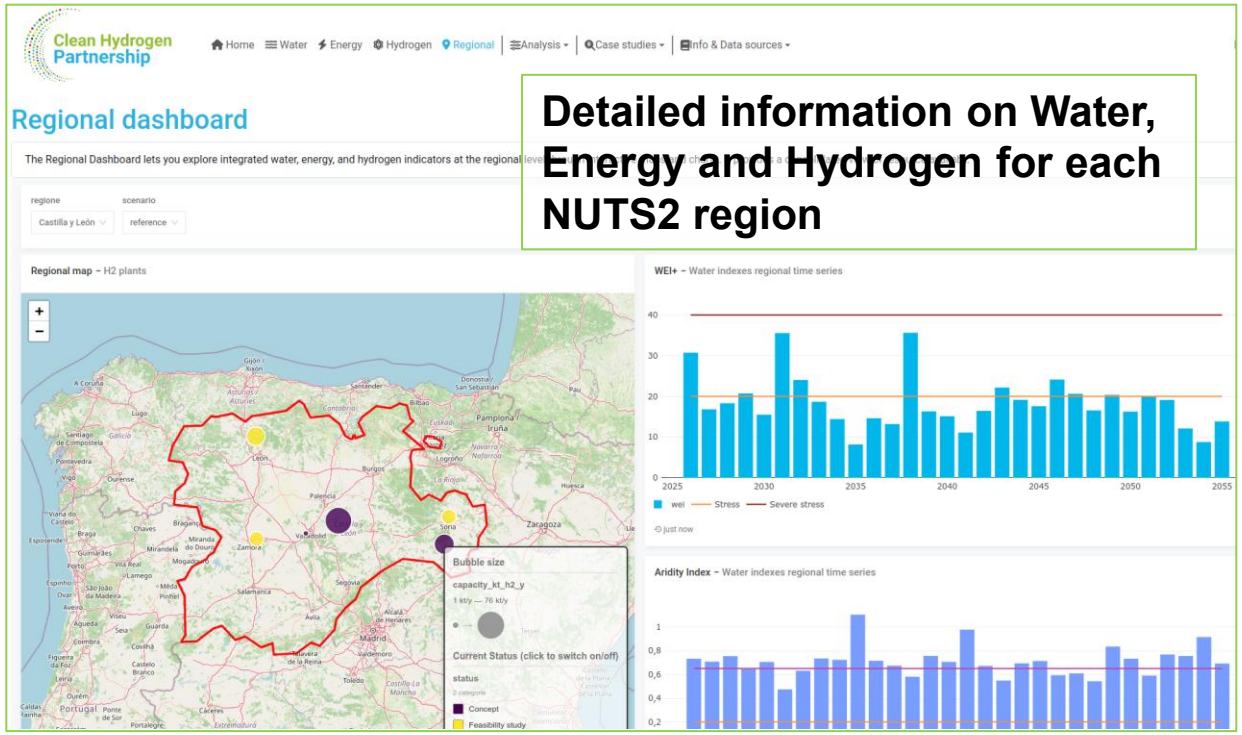
Distributed water availability indexes:

- WEI+
- Aridity Index
- SPI12



Regional analysis - Hydrogen





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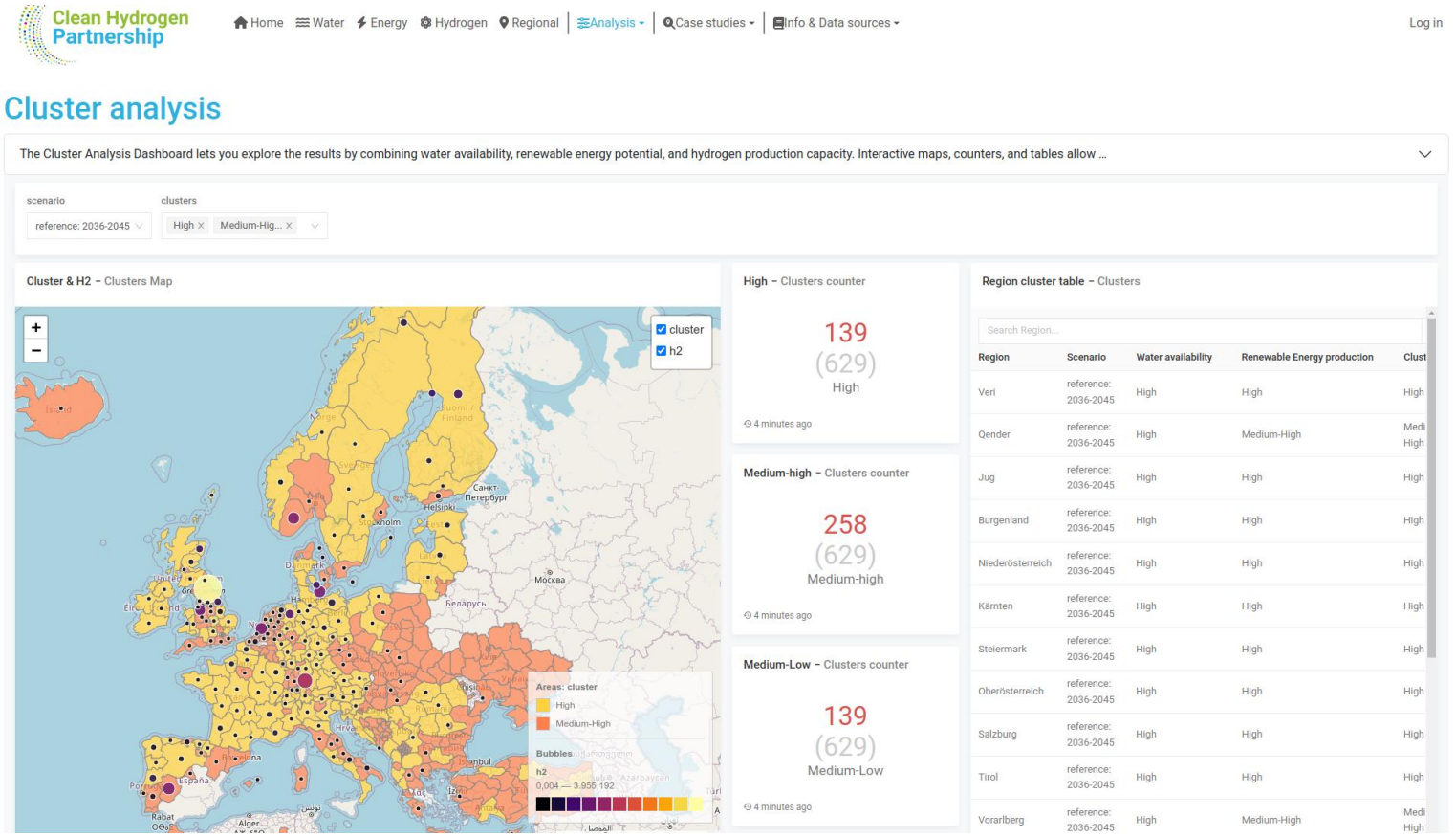
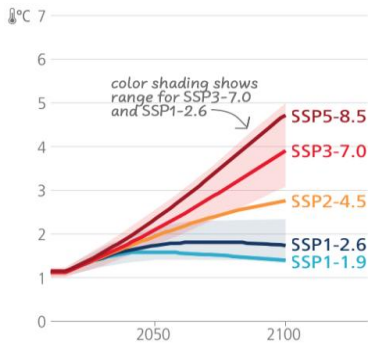
Cluster Analysis

- **Potential suitability** of different regions for clean Hydrogen development
- Clusters combine **projected water availability and renewable energy production**
- **Example for reference scenario 2036-2045**
  - **High:** hydrogen development plans exist, but with limited capacity
  - **Medium-high**: several areas in Eastern Europe and Turkey with unexploited potential



Case study simulations

Top-down (or scenario-based) framework widely used for climate analysis



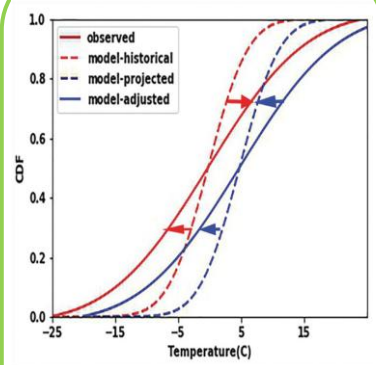
Emission scenario

IPCC Shared Socioeconomic Pathway
- SSP3-7.0
- SSP5-8.5

Global climate model (GCM)

GCM simulation to derive meteorological variables from the SSP

- MRI-ESM2



Statistical downscaling

Bias correction

- Empirical Quantile Mapping (EQM)

Integrated model

Simulation of processes related to

- Hydrology (LISFLOOD)
- H_2 production

Impact indicators

- Water availability
- H_2 production
- H_2-related water fluxes

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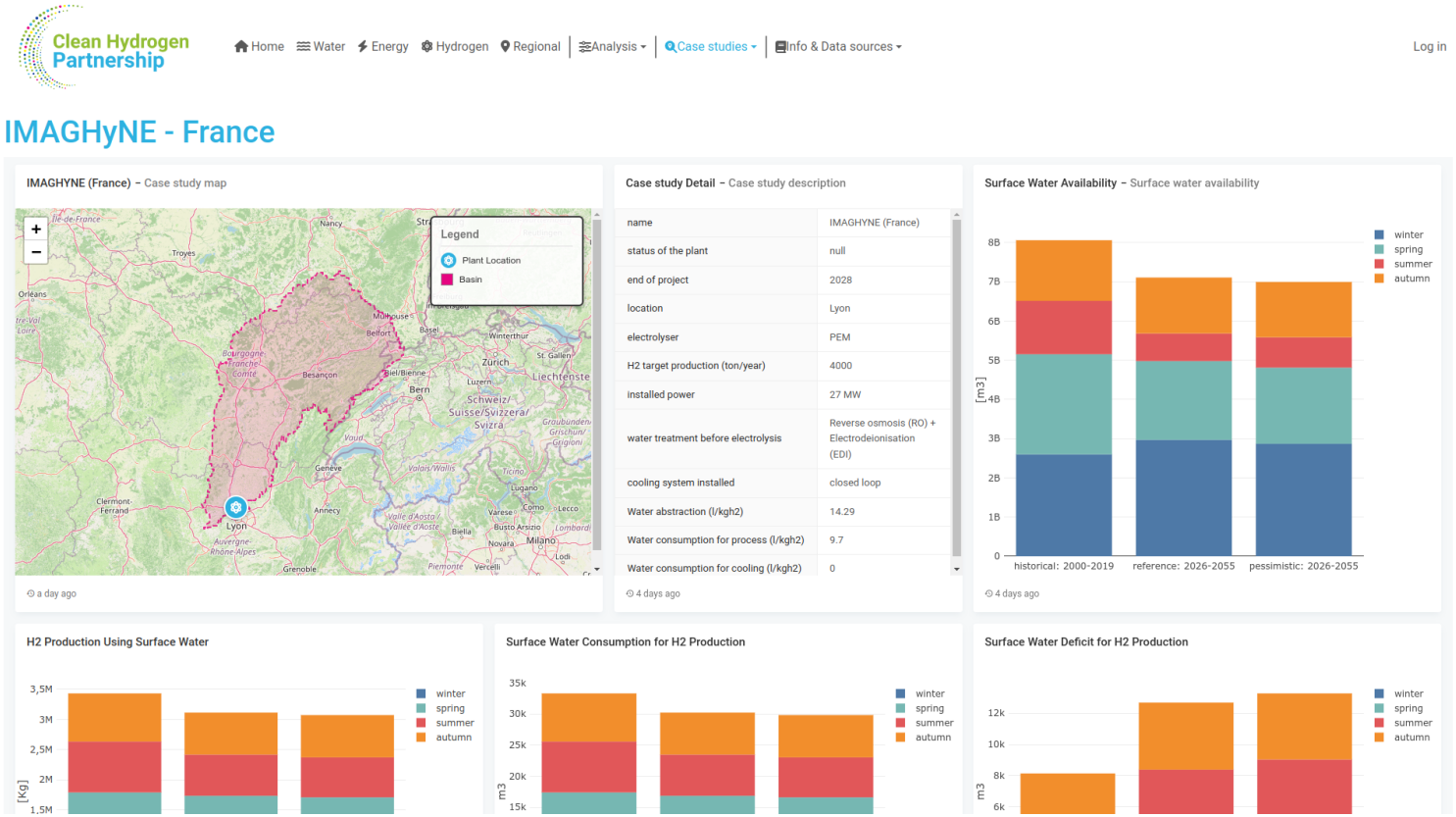
Case study results

- Hydrological simulations for historical and future periods
- Simulation of surface water availability and requirements for H2 production in the different scenarios
- Quantification of potential water deficit to meet H2 production target
- Seasonal analysis to identify recurring critical periods



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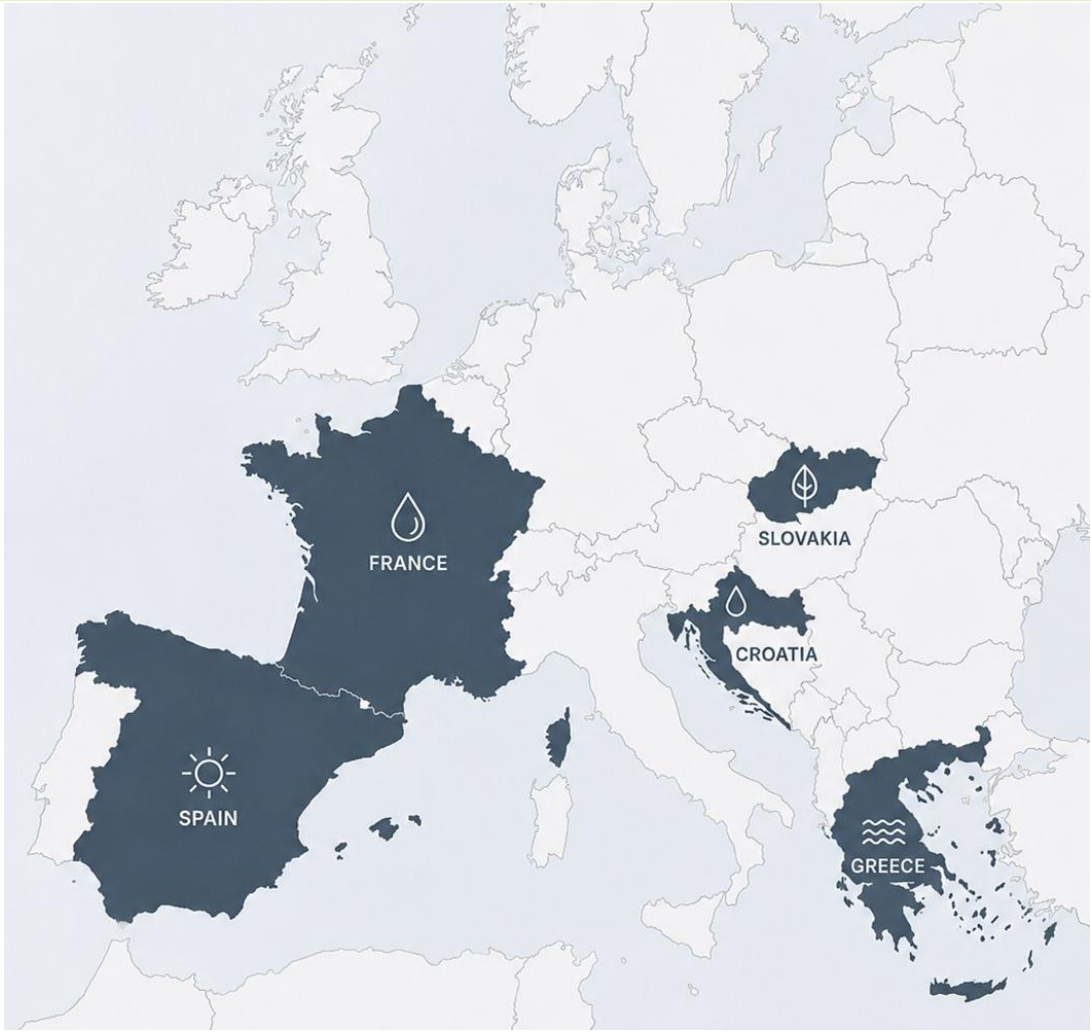
Insights from Regional Case Studies



Gianluca GRECO

Head of the Consulting Department, Fundación Hidrógeno Aragón

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Five Hydrogen Valleys

Five Hydrogen Valleys representing **diverse climatic** and **hydrological conditions** were assessed using **a common methodology** to explore how **regional water contexts** influence renewable **hydrogen deployment.**

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Case studies characteristics

	Green Hysland	IMAGHyNE	EPHYRA	EastGateH2V	NAHV
Country	Spain	France	Greece	Slovakia	Croatia
Electrolyser, size	PEM, 2.5 MW	PEM, 27 MW	ALK, 30 MW	PEM, 2 MW	PEM, 10 MW
Status	Operational	Pre-FID	Under construction	Pre-FID	Pre-FID
H2 production (ton/year)	300	4,000	4,989	500	315
Electricity source	Solar PV + PPA	Solar PV + Hydropower	Solar PV + Wind + PPA	Grid	Solar PV + PPA
Water consumption (electrolysis process) (L/kgH2)	25	9.7	11.11	16.29	9.76
Pre-treatment water before electrolyser	RO+EDI	RO+EDI	RO+EDI	RO+EDI	Filtration+ RO+EDI
Cooling system	Closed circuit/loop	Closed circuit	Closed circuit	Closed circuit	Closed circuit
Water consumption (cooling) (L/kgH2)	0.21	1.16E-3	9.952E-4	9.91E-2	9.36E-2
Water abstraction (L//kg H2)	37.03	14.30	16.37	24.10	15.07
Water source	Tap water	Tap water	Tap water	Tap water	Well water

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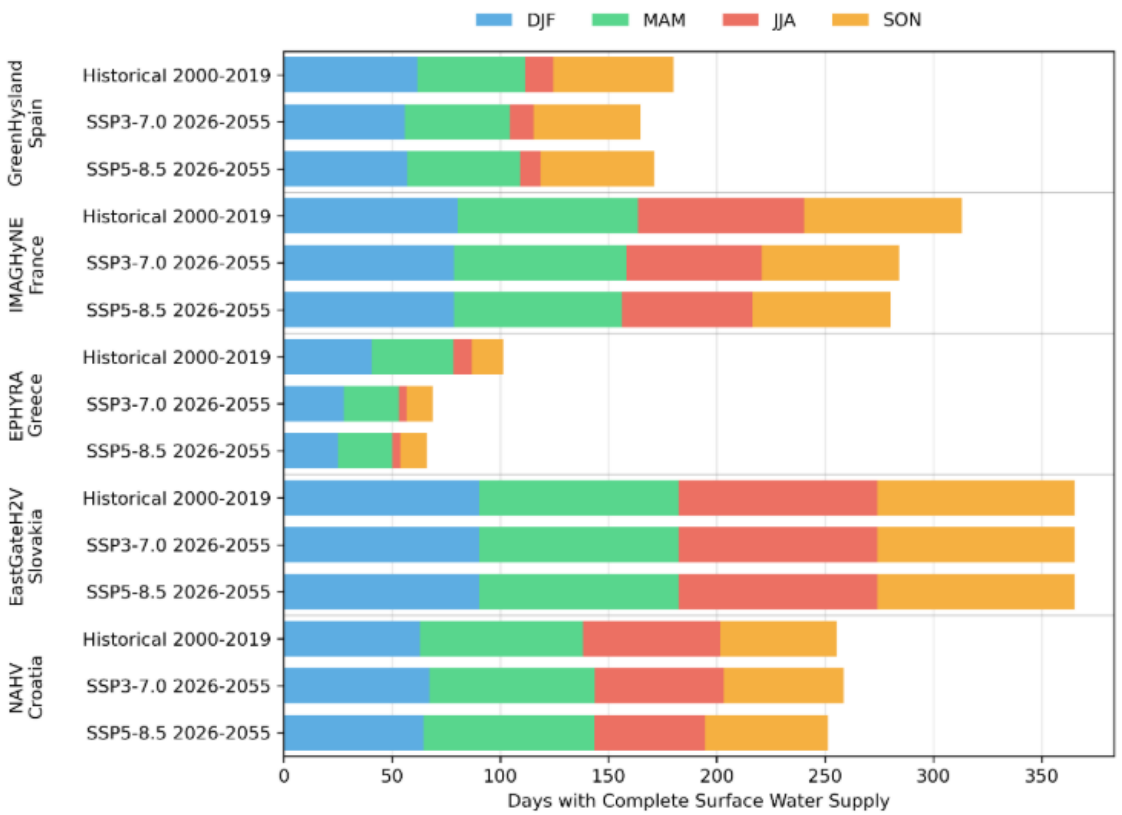
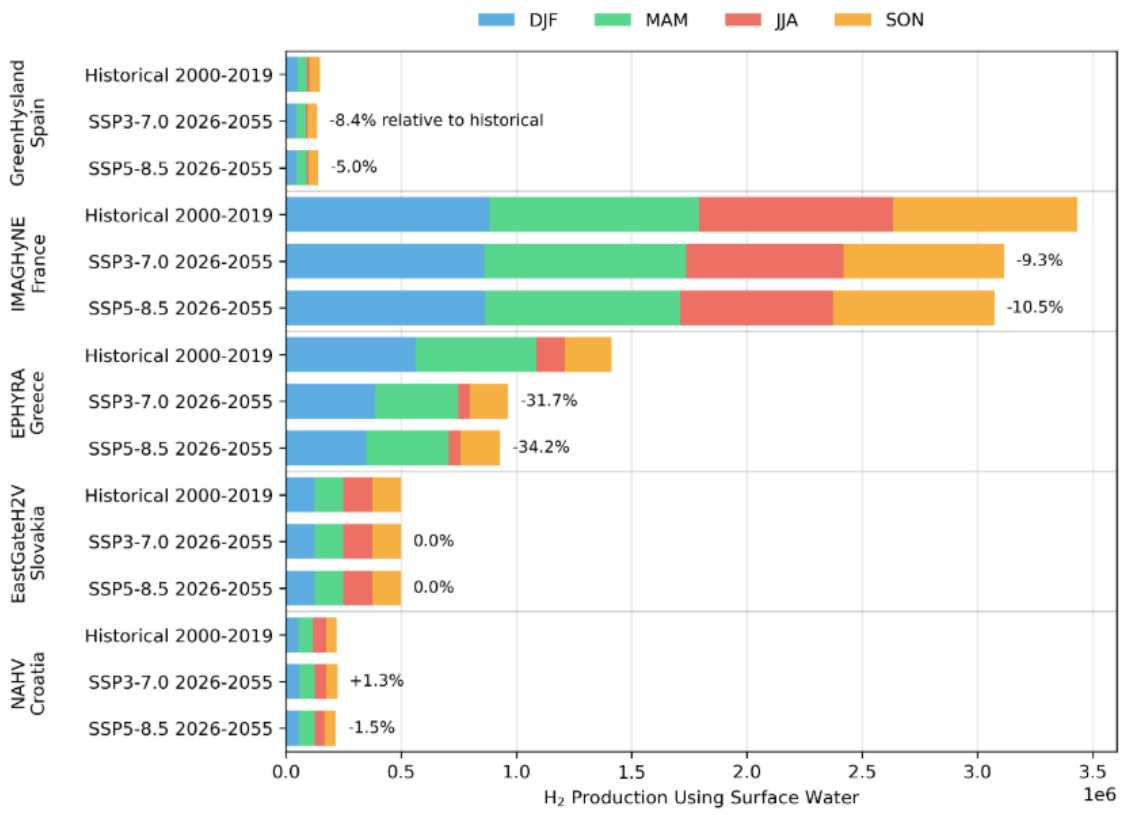
Impact indicators





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What did we observe across the case studies?

The same methodology was applied to five Hydrogen Valleys across Europe, revealing **clear differences between regions.**

Mediterranean Valleys

Green Hysland
Spain

EPHYRA
Greece

Continental Valleys

IMAGHyNE
France

EASTGATEH2V
Slovakia

NAHV
Croatia

Mediterranean regions

- Higher seasonal variability.
- Greater exposure to summer deficits.

Continental regions

- More stable water availability.
- Lower operational vulnerability.

Local context

determines the most appropriate water management strategy.

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Stakeholder consultations: adding practical perspectives

Greece

- Desalination as the preferred water source
- Interest in alternative water sources
- Concerns regarding wastewater reuse

Spain

- Tourism and seasonal pressure on water resources
- Biodiversity protection
- Land-use constraints
- Limited local hydrogen demand

Croatia

- Water quality more relevant than water quantity.
- Water treatment and quality assurance.
- Economic viability as a key factor.

Slovakia

- Climate resilience.
- Water retention and management.
- Early integration into planning and permitting.

France

- Water considered from the early planning stage.
- Alternative water sources where appropriate.
- Careful communication of water-related results

Stakeholder consultations confirmed that water management is **not a one-size-fits-all solution**.

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Key takeaways

Our analysis across five Hydrogen Valleys highlights the importance of **integrating water management** into renewable hydrogen deployment.

Regional context matters

Water-related challenges vary considerably across Europe, requiring context-specific management strategies.

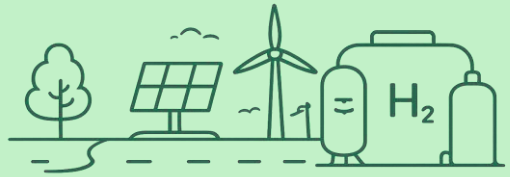
Modelling & stakeholder engagement are complementary

Regional assessments identify potential risks, while stakeholder knowledge provides the practical context for implementation.

Water management supports resilient hydrogen deployment

Integrating water considerations into project planning strengthens long-term resilience and sustainability.

Effective water management is not about finding a single solution, but about selecting **the right solution for each regional context.**



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Key Takeaways for Water-Smart Hydrogen Deployment

Alessandra CUNEO

Head of Power Generation and Hydrogen R&D, RINA

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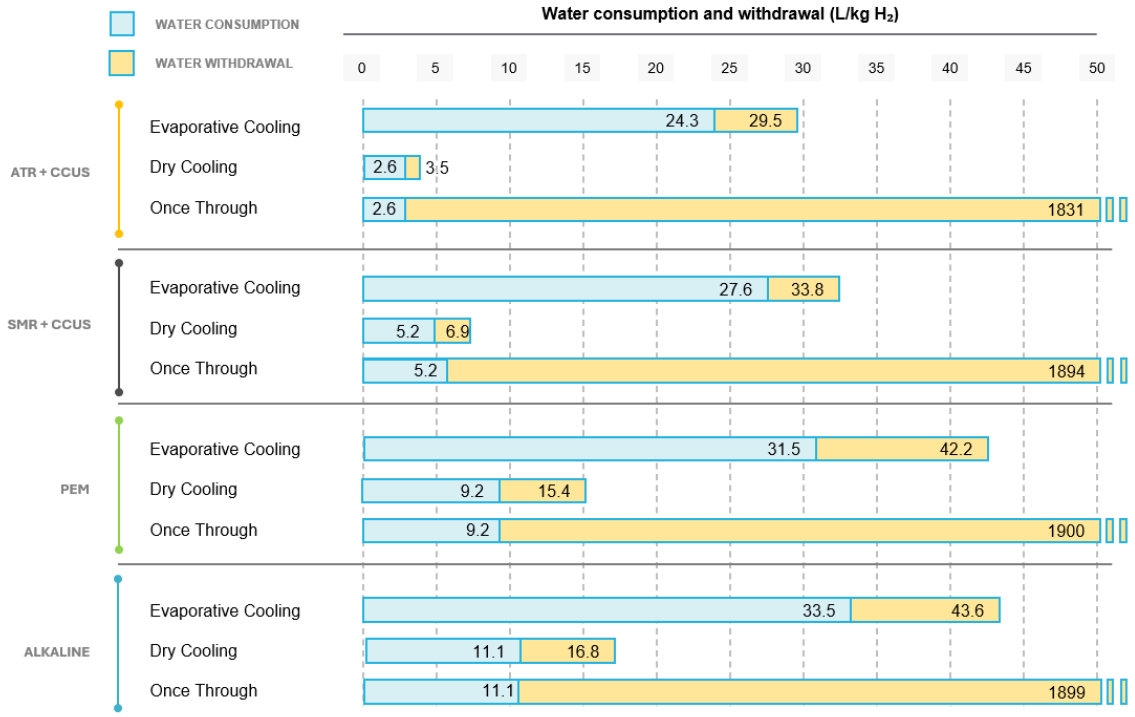
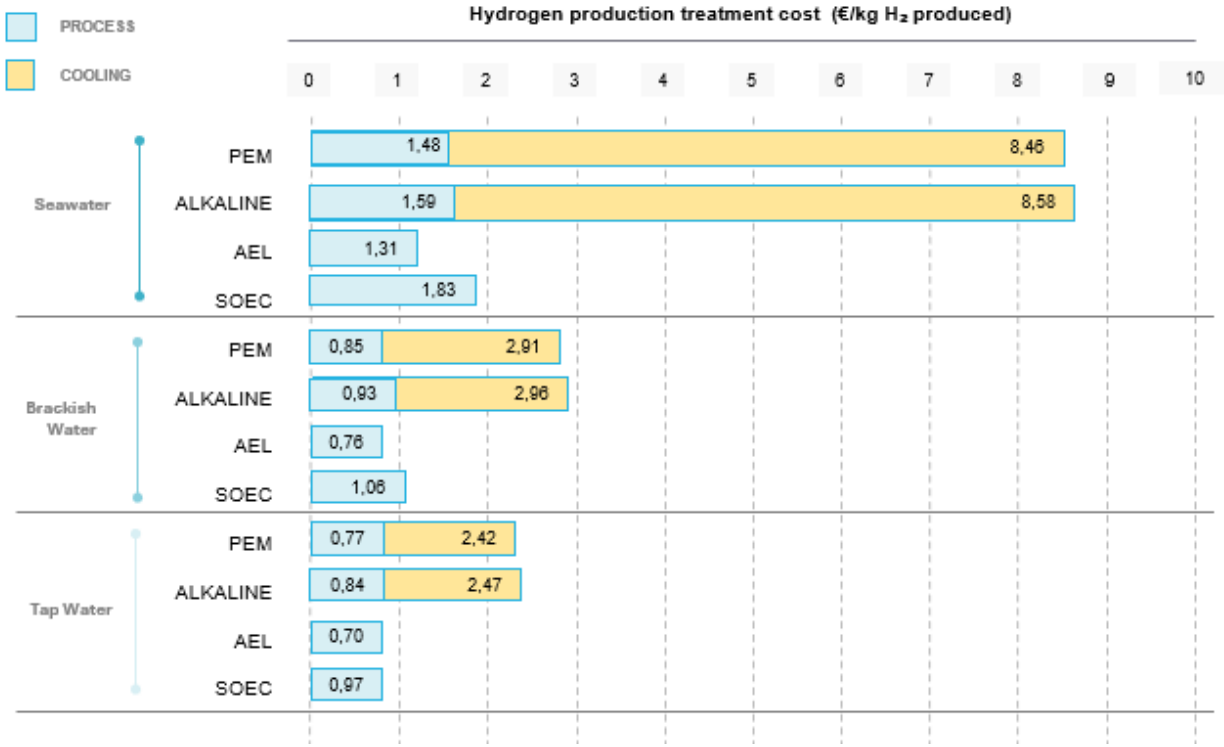
Water footprint





Tap Water as Source

Key takeaway: water footprint varies by technology and source assumptions; process water alone underestimates total pressure.

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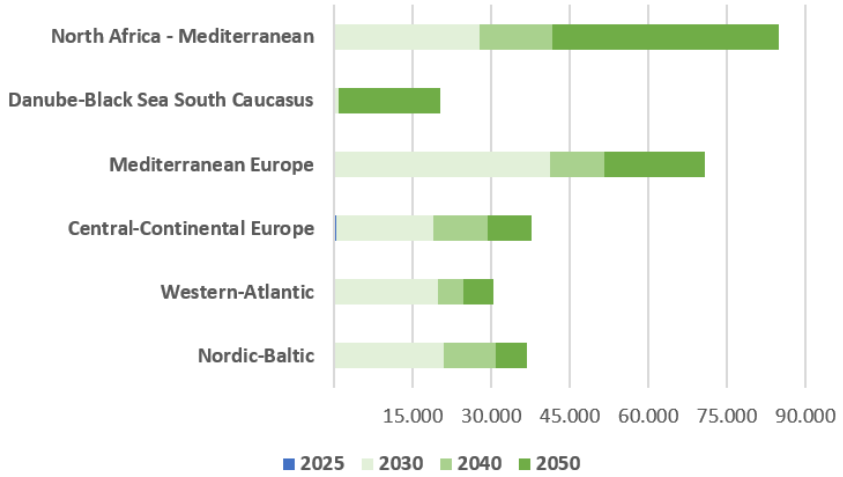
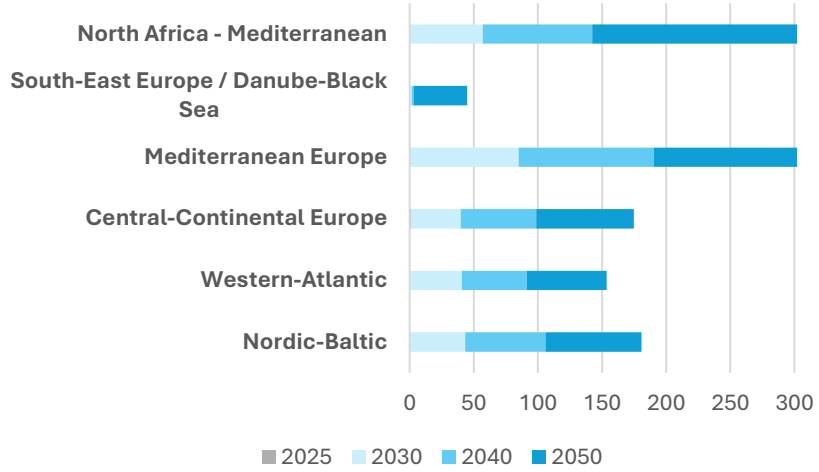
Impact of renewable hydrogen production in water-stressed regions



Projection of MWel of hydrogen active capacity across all the macro-regions



Millions of m^3/year of water needed to support expected active capacity of hydrogen production

Key takeaway: aggregate water demand remains limited, but risk depends on where hydrogen capacity is concentrated.

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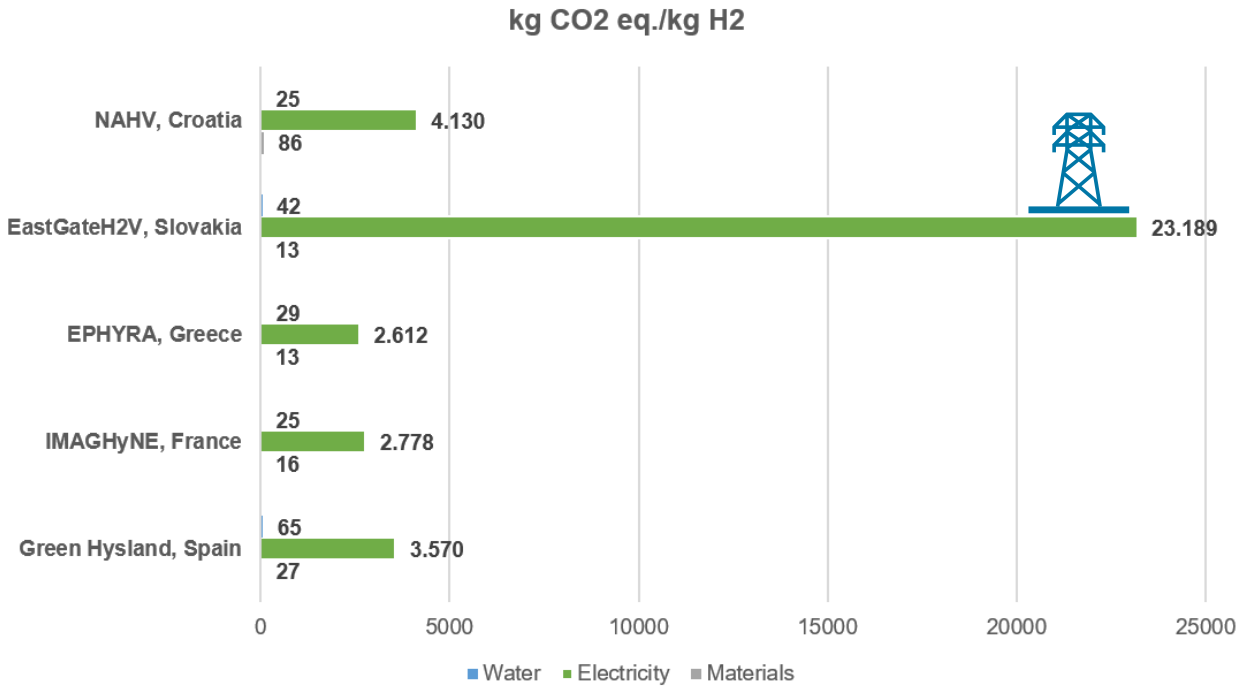
Environmental impacts



Comparative LCA analysis of the different Case Studies for Climate Change

- ✓ **EastGateH2V** electrolyser demonstrates the higher environmental impacts associated with grid-connected electricity
- ✓ **Electricity** is the most impacting parameter in the computation of kg CO_2 eq./kg H_2
- ✓ **Water** and **Materials** play a minor role in the computation of kg CO_2 eq./kg H_2

Key takeaway: climate impacts are driven mainly by the electricity supply configuration.

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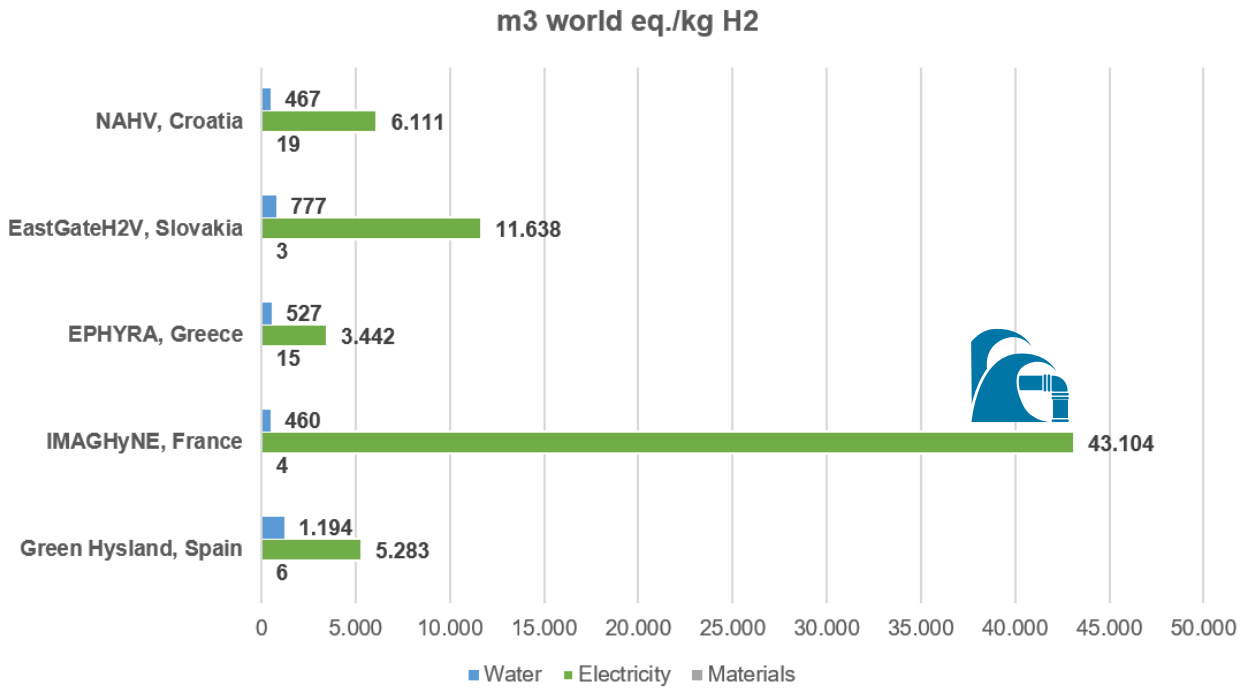
Impacts on water



Comparative LCA analysis of the different Case Studies for Water Use

- ✓ **IMAGHyNE** electrolyser underlines the drawbacks associated with **hydropower-based electricity systems**
- ✓ **Electricity** is the most impacting parameter also in the computation of m^3 world eq./kg H_2

Key takeaway: water-use impacts reflect electricity mix, source water and local hydrological pressure.

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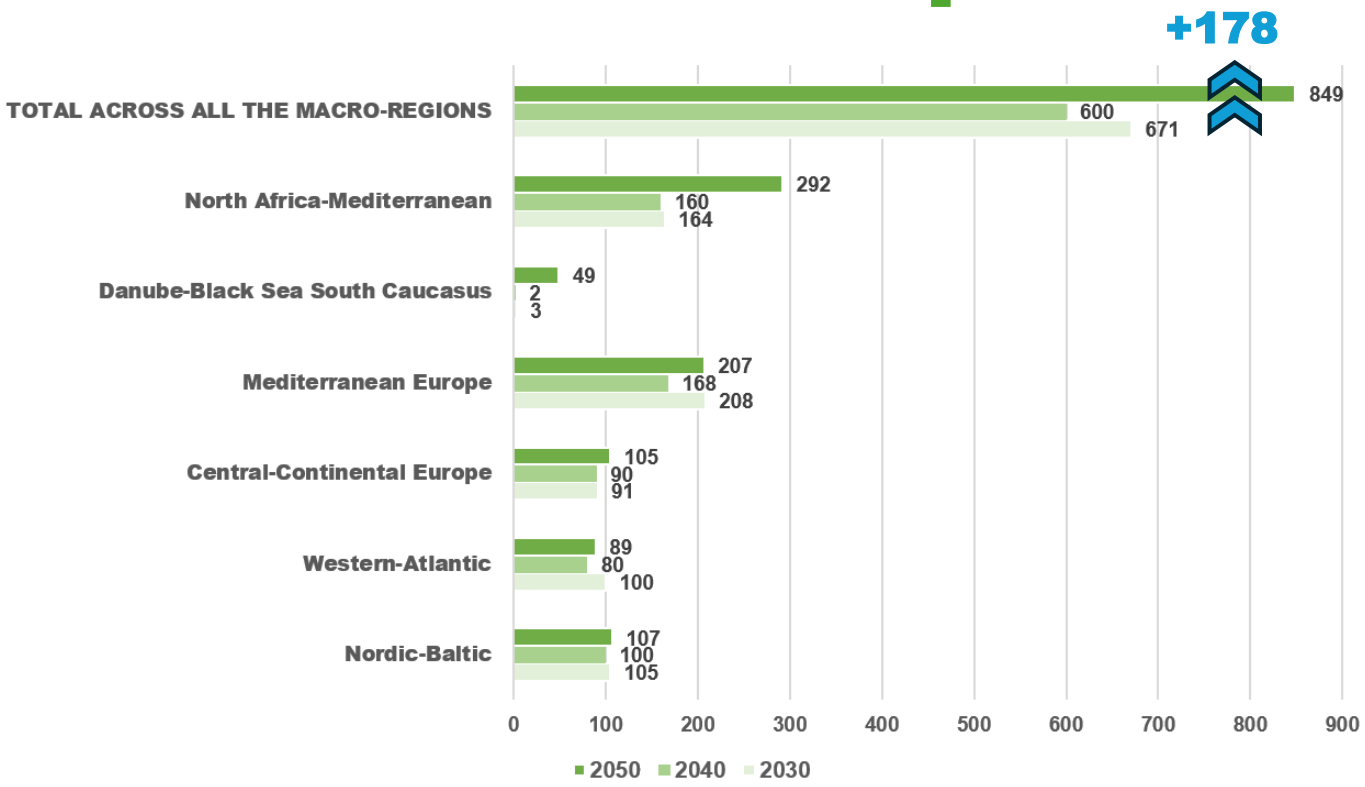
Socio-economic impacts



Full Time Equivalent (FTE, thousands) employment by macro-region

- ✓ Total increase of almost **180 FTE from 2030 to 2050** across all the macro-regions
- ✓ **North Africa-Mediterranean** area drive the increase underlining the growth potential
- ✓ High % increase in **Danube-Black Sea South Caucasus** area

Key takeaway: employment gains grow by 2050, with benefits concentrated in specific macro-regions.

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Recommendations: water management, alternative sources and siting

Water Management

- **No one-size-fits-all solution:** the most effective strategies depend on local hydrology, seasonality and project design
- **Integrated water** management is more important than total annual volumes
- Water should be **managed from the start of project development**

Alternative Water Sources

- **Seawater:** viable today with higher treatment burden, energy use and brine management - best suited to coastal and water-stressed regions
- **Treated wastewater:** can be a circular source, but its variation in quality still poses concerns

Siting

- Do not site plants on **renewable potential alone**;
- Prioritise areas with **lower competition for water** or access to **alternative sources**;
- Move from regional screening to **basin- and site-level assessment** before FID

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Conclusions: water-aware planning enables sustainable hydrogen scale-up

Hydrogen is water-sustainable only when deployment is water-aware.

Water must be treated as a strategic planning variable — alongside electricity supply, siting, permitting and local governance.

water | energy | territory nexus

01 Water-aware siting
Scale projects to basin conditions, not only renewable potential.

02 Integrated metrics
Assess carbon, water-use impact and local pressure together.

03 Adaptive source strategy
Use alternative sources where vulnerability requires them.

04 Governance & acceptance
Plan permitting, resilience and social licence early.

Key message: align hydrogen strategies with the hydrological realities of each territory.

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Session 2 – How can renewable hydrogen scale without compromising water resources?

Connecting project outcomes with EU policy and industrial relevance, and sharing lessons learned with other EU initiatives

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Clean Hydrogen at Scale: Strengthening Europe's Competitiveness Through Sustainable Water Use

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Arno van den Bos,
Analyst,
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Sales Manager, Hydrogen Business Unit,
De Nora

Julie Mougin,
Deputy Director for Hydrogen Technologies,
CEA

Marco Serafini,
Scientific Project Officer,
Joint Research Centre

Alessio Tarantini,
Innovation proposal & Project Management Executive Director,
RINA

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Webinar

Clean Hydrogen at Scale: Strengthening Europe's Competitiveness Through Sustainable Water Use

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