Clean Hydrogen Partnership

Topics in the call 2026

Hydrogen Production

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Hydrogen Production Overview

Main Focus

Electrolysis

- Hydrogen from low-quality water
- Safety in challenging dynamic conditions

Other routes

- H_2 production from renewable gases & biogenic waste sources
- Direct solar hydrogen production

What is new

- Addressing non-technological challenges

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Hydrogen Production Overview

Topic	Type of Action	Budget (M€)
HORIZON-JU-CLEANH2-2026-**01-01**: Development and validation of innovative approaches, catalysts, electrolytes and components for electrolysis technologies based on low-quality water	RIA	3
HORIZON-JU-CLEANH2-2026-**01-02**: Cost-efficient and reliable designs towards gigawatt-scale electrolytic hydrogen production plants	RIA	2.5
HORIZON-JU-CLEANH2-2026-**01-03**: Improved components and tools to increase the safety of electrolysers	RIA	3
HORIZON-JU-CLEANH2-2026-**01-04**: Innovative business models advancing renewable electrolysis integration in industry	CSA	1.5
HORIZON-JU-CLEANH2-2026-**01-05**: Sustainable hydrogen production from renewable gases and biogenic waste sources through innovative modular reactor design, process intensification and integration	RIA	3
HORIZON-JU-CLEANH2-2026-**01-06**: Scalable and high efficiency materials and reactors for direct solar hydrogen production	RIA	3

Hydrogen Production - Topics

HORIZON-JU-CLEANH2-2026-01-01: Development and validation of innovative approaches, catalysts, electrolytes and components for electrolysis technologies based on low-quality water

Overcoming challenges in the electrolysis of low-quality water, excluding saline and seawater (TRL 2→4)

- Addressing limitations: stabilisation of pH, suspended solids, contaminants, material corrosion, low activity, durability of electrocatalysts
- Experimental, computational and theoretical work on impurity-driven degradation mechanisms, impacting performance and durability
- Relevant wastewater sources compared against conventional electrolysis (e.g. techno-economic, environmental, social aspects)
- Innovative solutions at material, component, cell architecture level. Validation at >2kW scale for >2000 hours

HORIZON-JU-CLEANH2-2026-01-02: Cost-efficient and reliable designs towards gigawatt-scale electrolytic hydrogen production plants

Developing a fully replicable plant concept towards GW scale

- Innovation on plant designs, architectures, and deployment models, supported by advanced modelling and optimisation tools
- System-level integration using existing, proven electrolyser stacks
- Validating the approach via a representative case study, designed system targeting ≥400 MW with a clear scale-up pathway to ≥1 GW
- Ensuring replicability: key actors (e.g. at least 2 system manufacturers), sectorial clusters and associations and public material

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Hydrogen Production - Topics

HORIZON-JU-CLEANH2-2026-01-03: Improved components and tools to increase the safety of electrolysers

Ensuring safety of low temperature electrolysers under challenging dynamic conditions (TRL 3→5)

- Focusing on: eliminating the risk of gas crossover, enhancing gas separation, reducing potential leak points
- Innovative solutions at material, cell, stack and BoP configurations & intelligent monitoring and control tools, adopting and contributing to EU harmonized protocols
- Validation at scale of 100 kW for PEM & AEL, 50kW for AEMEL, 5kW, for emerging LT: for >1000 hrs under diverse operating regimes
- Multidisciplinary consortium (components/system, digital, certification/regulatory); clearly build on and beyond prior projects/initiatives.

HORIZON-JU-CLEANH2-2026-01-04: Innovative business models advancing renewable electrolysis integration in industry

Addressing challenges related to cost competitiveness

- Diversified revenue streams, new ownership/licensing/service arrangements, variable-revenue schemes, etc.
- At least one real industrial case to apply the Business Model (BM) innovations and check their bankability
- Bringing together key stakeholders (e.g., investors, regulators, financial institutions) through the consortium & collaboration platforms
- Public (up to date) results and materials for uptake, including a BM innovation compendium, open modelling templates, simplified contractual checklists and policy briefs

Hydrogen Production - Topics

HORIZON-JU-CLEANH2-2026-01-05: Sustainable H_2 production from renewable gases & biogenic waste sources through innovative modular reactor design, process intensification & integration

Hydrogen production through thermochemical and/or biological pathways (TRL 3→5)

- Focusing on: increasing efficiency and H_2 yield, reducing costs, ensuring sustainability, supported by relevant KPIs
- Innovative reactor designs, fermentation routes and process configurations, including process intensification schemes, catalyst development, biocatalysis routes and relevant Balance of Plant
- Demonstration of a functional process producing from 1 to 10 kgH_2/h (>1000 hours), with a purity acceptable for the proposed direct application

HORIZON-JU-CLEANH2-2026-01-06: Scalable and high efficiency materials and reactors for direct solar hydrogen production

Solar thermo-chemical (TCC) or photoelectrochemical/photocatalytic (PEC/PC) cycles (TRL 3→5)

- Focusing on: system-level integration, including materials, devices, reactors, control systems, etc.
- Higher efficiencies, lower costs, lower CRM, scalability
- Demonstration at relevant scale over substantial demonstration periods, which will support a clear scale-up strategy towards competitive solutions at 250-500 kW scale for the TCC and at >10 kW for the PEC/PC

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