Topics in the call 2024

Hydrogen Storage and Distribution

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Hydrogen Storage and Distribution Overview

Main Focus

Hydrogen Storage
- Microbiological interactions in H₂ 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 3,000kgH₂/day
# Hydrogen Storage and Distribution Overview

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Hydrogen Storage- Topics

HORIZON-JTI-CLEANH2-2024-02-01: Investigation of microbial interaction for underground hydrogen porous media storage

Comprehensive assessment of the risks due to microorganisms in porous media (TRL 2→4)

- Characterisation of microbial populations present in various EU porous media formation.
- Develop methodologies that enable cross-laboratory sample testing.
- Definition of guidelines and protocols to support SSOs in the identification of risks of storing H2 in porous media.
- Consortium should include wide coverage of SSOs across EU.

HORIZON-JTI-CLEANH2-2024-02-02: Novel large-scale aboveground storage solutions for demand-optimized supply of hydrogen

Enabling low-cost bulk storage of hydrogen (TRL 3→5)

- Reduce the footprint of the storage solutions by targeting 40kgH₂/m3
- Target a CAPEX of 600€/kgH₂ when the solution is scaled to 20 tonnes.
- Single or modular system should be demonstrated at TRL5 at a scale of minimum 100kg H₂
Hydrogen Distribution - Topics

**HORIZON-JTI-CLEANH2-2024-02-03: Demonstration of hydrogen purification and separation systems for renewable hydrogen-containing streams in industrial applications**

- Large scale prototype demonstration of a purification system at 100kg/day (TRL 5 → 7)
  - Reduction of energy consumption by 25% compared to the standard technology
  - Solution should demonstrate its applicability on 2 different types of streams (e.g. <20% and >98% H₂ content).
  - The 100kgH₂/day system should be demonstrated at TRL7 for a minimum of 3,000 hours.
  - Levelized cost of hydrogen separation/purification of less than 1€/kg

**HORIZON-JTI-CLEANH2-2024-02-04: Demonstration of innovative solutions for high-capacity, reliable, flexible, and sustainable hydrogen compression technologies in commercial applications**

- Direct coupling of the compressor to RES system and a demonstration of at least 24 months (TRL → 8)
  - Innovative non-mechanical compression or a hybrid consisting of at least one non-mechanical innovative element
  - Demo site should be secured ahead of proposal submission that allows access to a real RES production profile.
  - Flexibility both in terms of inlet pressure (from 1 bar to 200bar) but also in terms of the operation coupled to RES.
  - Able to cope with challenging conditions (hot/cold climates, marine environment, high altitude, remote etc)
Designing an HRS that can cope with the upcoming requirements of heavy-duty fleets (TRL 5→7)

- Develop high throughput stations:
  - Focus on heavy-duty vehicles with capacities ranging from 1,000 to 3,000 kg/day.
  - Individual fills of more than 200 kg should be achieved in less than 20 minutes.

- Reduce CAPEX and OPEX through innovation:
  - Implement innovative technological components (e.g., compressors, cooling systems, dispensers).
  - Optimize integration into the design and operation of the HRS to lower capital and operational costs.

- Standardize and industrialize HRS equipment:
  - Develop protocols for safe and reliable refueling in collaboration with OEMs and distributors.
  - Set specific targets for improved reliability, safety, and availability of HRS equipment and infrastructure.
Questions?
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