Clean Hydrogen Partnership

Topics in the call 2024

Hydrogen end uses: Clean Heat & Power

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Hydrogen end uses: Clean heat & power Overview

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

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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

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HORIZON-JTI-CLEANH2-2023-04-01:Portable fuel cells for backup power during natural disasters to power critical infrastructures

Development and demonstration of a lightweight, robust, containerised and modular zero-emission transportable FC (TRL 5 → 7)

- Portable FC: ≥**50 kW** (one generator module and a fuel tank brought in two separate containers), >**2,000 operating hours** epitomising the real load profiles
- Specific conditions to be considered (e.g. ambient temperature, pressure, etc.), fuel storage (> 2 weeks), green H_2 + 1 more fuel
- Availability >99%, warm start time <10 minutes since connection, cold start time <90 minutes since the installation
- Competitive to already commercially available gensets and batteries

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HORIZON-JTI-CLEANH2-2023-04-02: Improved characterisation, prediction and optimisation of flame stabilisation in high-pressure premixed hydrogen combustion at gas-turbine conditions

Bridging knowledge gaps for the adaptation of existing and the development of advanced Dry Low Emission (DLE) combustion systems for premixed flames at high pressure (TRL 3 → 5)

- Experimental **data and reliable model** estimates about the burning rate and the boundaries of static flame stabilization in turbulent pre-mixed combustion of up to 100% H_2 and high pressure (up to 10 bar)
- **Prediction of the thermo-acoustic response** and the boundaries of dynamic flame stabilization
- **Optimization** of combustion process and combustion system layout (Flame stabilization/NOx performance)
- Preparing gas turbines to run on 100% hydrogen, maintaining low NO_x emissions, while minimising the cycle efficiency reduction during hydrogen operation (max 2%)
- Participation of GT OEM will strengthen industrial relevance
- Collaborating and exploring synergies with running projects of the CH JU and the CA JU

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Questions?
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