Clean Hydrogen Partnership

Topics in the call 2022

Hydrogen End Uses
Clean heat and power

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Clean Heat and Power Overview

Main Focus

- Cost reduction through manufacturing
- Fuel and technology diversification
- Enhanced system flexibility

What is new

- Automation of manufacturing, equipment manufacturers at the core of the action
- Gas turbines running on 0-100% H2 in gas

Co-funded by the European Union

Clean Hydrogen Partnership

Clean Heat and Power Overview

Topic	Type of Action	Ind. Budget (M€)	Deadline
HORIZON-JTI-CLEANH2-2022-**04-01**: Design and industrial deployment of innovative manufacturing processes for solid oxide fuel cells systems and fuel cell components	IA	7	20/09/2022
HORIZON-JTI-CLEANH2-2022-**04-02**: Ammonia powered fuel cell system focusing on superior efficiency, durable operation and design optimisation	RIA	4	31/05/2022
HORIZON-JTI-CLEANH2-2022-**04-03**: Reversible SOC system development, operation and energy system (grid) integration	RIA	5.5	31/05/2022
HORIZON-JTI-CLEANH2-2022-**04-04**: Dry Low NOx combustion of hydrogen-enriched fuels at high-pressure conditions for gas turbine applications	RIA	2 x 4	31/05/2022

Clean Heat and Power - Topics

HORIZON-JTI-CLEANH2-2022 -04-01: Design and industrial deployment of innovative manufacturing processes for solid oxide fuel cells systems and fuel cell components

Automation of time-consuming manufacturing steps and time/resource efficient quality control

- adaptation & development of manufacturing processes on prototype tool, progress measured by increase in MRL
- automation/equipment manufacturer/s at the core -> beneficial to all SOC manufacturers
- several manufacturing processes can be targeted; synergies with Made in Europe partnership to be explored
- stack production cost <800 €/kW @ annual production volume of 100 MW (single manufacturing line)

HORIZON-JTI-CLEANH2-2022-04-02: Ammonia powered fuel cell system focusing on superior efficiency, durable operation and design optimisation

Design, manufacture and validation in relevant environmental of an ammonia driven fuel cell system

- 5-15 kWe system, Elec. Eff.>50%, Degradation <3% over 1000 hours, availability>90%, >3,000 hours validation,
- Fuel cell system including BoP + integrated ammonia cracker; fuel cell manufacturers should be part of the consortia
- CAPEX< 5,000 €/kW @ 100 MW annual production

Clean Heat and Power - Topics

HORIZON-JTI-CLEANH2-2022 -04-03: Reversible Solid Oxide Cell system development, operation and energy system (grid) integration

Design, develop and validate a rSOC system (>5 kWe in fuel cell,>15 kWe in electrolysis) in relevant environment

- Able to operate with 0-100% H2 in gas; scalable system; electrical load following capabilities
- Connected to gas and electricity grids; able to take gas from grid in FC mode and inject H2 to gas grid in electrolyser mode
- System Roundtrip efficiency >38%, stack degradation rate<0.4%/1000hours, >3 months of continuous operation
- Common BoP for all operating modes -> CAPEX< 6,000 €/kW with views to <3,500 €/kW (2030)

HORIZON-JTI-CLEANH2-2022-04-04: Dry Low NOx combustion of hydrogen-enriched fuels at high-pressure conditions for gas turbine applications

Design and demonstrate a scaled and full-size combustion system in a relevant environment

- Capable to operate with 0-100% Vol.H2 in natural gas whilst keeping performance and NOX emissions to the levels of gas turbines
- Gas turbine manufactures expected to be part of consortia; access to required infrastructure should be demonstrated
- 2 projects with complementary approaches (medium and large-scale sized turbines)