PROMETEO

HYDROGEN PRODUCTION BY MEANS OF SOLAR HEAT AND POWER IN HIGH TEMPERATURE SOLID OXIDE ELECTROLYSERS

Project ID	101007194
PRR 2025	Pillar 1 - H_2 Production
Call Topic	FCH-02-2-2020
Project Total Costs	2 765 206.25
Clean H_2 JU Max. Contribution	2 499 531.25
Project Period	01-01-2021 - 30-06-2024
Coordinator Beneficiary	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE, IT
Beneficiaries	ANGUITA FOTOVOLTAICO SL, GREEN CAPITAL POWER SL, CAPITAL ENERGY SERVICES SLU, SNAM S.P.A., STAMICARBON B.V., NEXTCHEM TECH SPA, SOLYDERA SA, Fundacion IMDEA Energia, FONDAZIONE BRUNO KESSLER, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE

https://prometeo-project.eu

PROJECT AND GENERAL OBJECTIVES

PROMETEO aims to produce hydrogen from renewable heat and power sources using solid oxide electrolysis (SOE) in areas with low electricity prices associated with photovoltaics or wind. A 25 kWe SOE prototype (approximately 15 kg/day of H_2 production) will be developed and validated in a real production environment, combined with intermittent sources; non-programmable renewable electricity and high-temperature solar heat with thermal energy storage (TES). Partial-load operation, transients and hot stand-by periods will be studied.

NON-QUANTITATIVE OBJECTIVES

Demonstrate the capability to transfer the technology from component developers to system integrators and end-users.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

- Definition of end-user cases.
- Setting up preliminary process flow diagrams.
- Identification and laboratory-validation of TES system.
- Development of process modelling tools.

FUTURE STEPS AND PLANS

- Experimental determination of the performance map for the SOE stack and the plant balance on laboratory-scale.
- Finalisation of process flow diagrams for the 25 kWe pilot plant under different operation modes.
- Design and construction of integrated pilot plant (25 kWe).
- Shipping of pilot plant to project site.
- Analysis of case studies on multi-MW scale based on finalised process flow diagrams for the pilot plant (25 kWe).

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Demonstrate the production of hydrogen by operation of >1 000 hours: Hours of experimental validation runs of the prototype.	hours	1 000	
	Obtain Solar-to-Hydrogen energy conversion efficiency from global solar radiation to H_2 energy (LHV basis).	%	10	

Clean Hydrogen Partnership
Co-funded by the European Union