



prometeo
GREEN HYDROGEN FROM SUNSHINE

Hydrogen **PRO**duction by **ME**ans
of solar heat and power in high
TEmperature Solid **O**xide Electrolysers

Press Release

“PROMETEO” PROJECT LAUNCHED WITH FUNDING FROM EUROPEAN FCH JU

International consortium coordinated by Italy’s Energy Agency ENEA to develop innovative solid oxide electrolyser using concentrated solar power for a zero-emission industry

- PROMETEO is an ambitious three- and a half-year project supported by funding of € 2.5 million from the European Fuel Cells and Hydrogen Joint Undertaking (FCH JU).
- PROMETEO will develop an innovative prototype based on high-temperature solid oxide electrolysis (SOE) for the production of green hydrogen by making the most efficient use of heat and power generated from solar energy.
- PROMETEO will use the solid oxide technology to build a 25 kWe prototype electrolyser capable of producing 15 kg of hydrogen per day, with the potential to be replicated on the MWe industrial scale.
- PROMETEO will address the intermittent supply of solar energy by developing an innovative system to manage the energy conversion and re-generation phases.
- Industrial end-users will steer the R&D activities to meet end-users’ needs for green hydrogen in industrial applications: injection of hydrogen into the gas grid (SNAM, Italy), chemical storage of renewable electricity (Capital Energy, Spain) and use of hydrogen for ammonia and fertiliser production (Stamicarbon, the Netherlands).
- By working in close connection with leading European industrial companies, PROMETEO will contribute to move a step forward in decarbonising the energy, chemical and nitrogen fertiliser sectors, in line with the EU decarbonisation targets by 2030.
- PROMETEO’s consortium includes 1 SME technology manufacturer (SOLIDpower), 1 engineering firm (NextChem), 3 large companies in the energy and chemical sectors, and 4 leading academic/research organisations.



The project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (JU) under Grant Agreement n° 101007194. The JU receives support from the European Union’s Horizon 2020 research and innovation programme, Hydrogen Europe and Hydrogen Europe Research.



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

Rome (Italy), 25th March 2021 – ENEA, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development, will lead an interdisciplinary consortium of nine European partners to develop an innovative prototype for high-temperature solid oxide electrolysis (SOE) using renewable solar heat and power to produce green hydrogen in a continuous way. The project will use the solid oxide technology to build a 25 kWe prototype electrolyser capable of producing 15 kg of hydrogen per day. The prototype will be modular, with the potential to be replicated on the MWe industrial scale. To overcome the intermittency of renewable solar energy, PROMETEO will build an innovative system to manage the energy conversion and re-generation phases by minimising the withdrawal of electricity from the distribution grid and by optimising self-production from renewables when solar energy is not available. The project will use input from industrial end-users to fit the prototype's performance with the requirements for hydrogen production in final applications. The final prototype will be characterized by improved efficiency, reliability and flexibility for meeting the energy demands of the energy and chemical industries. ENEA will work in collaboration with the research institutes Fondazione Bruno Kessler (Italy), IMDEA Energy (Spain) and EPFL, the Swiss Federal Institute of Technology in Lausanne (Switzerland) to model the prototype and its integration with renewable solar energy. The Italian-Swiss SME SOLIDpower will supply solid oxide electrolysers and the thermo-regulation system. Maire Tecnimont Group (Italy) will be involved through two of its subsidiaries: the engineering, prototyping and start-up of the plant will be performed by NextChem (Italy), the Group's company dedicated to green chemistry and energy transition, while its innovation and licensing hub Stamicarbon (the Netherlands) will support the development of activities for the use of green hydrogen in chemical industries such as ammonia and fertilisers production. Snam (Italy) will contribute to fit PROMETEO for the injection of green hydrogen into the gas grid. Capital Energy (Spain) will provide input for the use of PROMETEO in the chemical storage of renewable electricity. By making the most efficient use of solar heat and power in green hydrogen production, PROMETEO aims to contribute to the penetration of Renewable Energy Sources in the European industrial sectors in line with the challenging goals set by the FCH JU.

"This is a great challenge for us", says Giorgio Graditi, Head of Department of Energy Technologies and Renewable Sources at ENEA. "PROMETEO will allow us to take an important step towards the production and use of green hydrogen in industry. We are starting from the most efficient way of producing hydrogen from water, namely by high-temperature electrolysis, to integrate it in the best possible way with renewable sources, in particular with solar energy and other intermittent sources. The aim of the project is to build a technology that can increase the penetration of renewable sources in various sectors of our economy. In order to do this, we have built a consortium made up of excellent European research centres and all the components of the supply chain, from basic component manufacturers to engineering and industrial end-users".

“The first major challenge is to produce hydrogen with zero emissions on a large scale and at low costs to decarbonise the energy-intensive industry and heavy mobility”, states Dina Lanzi, Head of Technological Development at Snam’s Hydrogen business unit. “The project PROMETEO will help to develop and scale-up efficient production technologies thanks to high temperatures, reducing the costs of green hydrogen production and increasing its competitiveness. The second goal consists in integrating this technology into the energy infrastructure, coupling the gas and the electricity networks, to overcome the current and future challenges of the Italian and European energy system. We are happy to participate in this project by pooling our infrastructural and technological skills from a value chain perspective”.

Luigi Crema, Director of FBK's Sustainable Energy Centre, comments: "The project PROMETEO represents an excellent opportunity for developing the European value chain in the green hydrogen sector. By working in close connection with the industry, PROMETEO will build an innovative prototype that can contribute to decarbonise the industrial sectors most involved in the clean energy transition such as the energy, chemical and in particular nitrogen fertiliser sectors. It is a great challenge that we will face with passion and commitment”.

Barbara Morico, Project Manager for NextChem, comments: “PROMETEO is a relevant project in the framework of NextChem and Maire Tecnimont Group’s green hydrogen initiatives, finalized to the development of a new process based on the high temperature solid oxide electrolysis technology. PROMETEO represents a relevant step for decarbonization, as it aims at improving the integration of water electrolysis with renewable power sources (solar thermal, photovoltaics, wind). NextChem, inside the Consortium, is in charge of transforming this proposal into a prototype for the demonstration of the technology, also contributing at the definition of the strategies for the scale-up on industrial base.”

About ENEA

ENEA is the Italian National Agency for New Technologies, Energy and Sustainable Economic Development, a public body aimed at research, technological innovation and the provision of advanced services to enterprises, public administration and citizens in the sectors of energy, the environment and sustainable economic development. ENEA has highly qualified personnel, advanced laboratories, experimental facilities and excellent instruments for the realization of projects, studies, tests, assessments, analyses and training services, with particular reference to product and process innovation and the valorisation of results to contribute to the development and competitiveness of the national economic system. Since its foundation in the 1960s, its strengths have been applied research, technology transfer and technical-scientific support to companies, associations, territories, central and local administrations: for this reason - unlike other research institutions - the Agency depends on the Ministry of Economic Development. Its focus sectors are energy technologies (renewable sources, energy storage, smart grids), for which the Agency is also the coordinator of the Energy National Technology Cluster, nuclear fusion and nuclear safety (the Agency is the reference national research coordinator), energy efficiency (with the National Agency for Energy Efficiency), technologies for cultural heritage, seismic protection, food safety, pollution, life sciences, strategic raw materials, climate change.

For further information, please visit: <https://www.enea.it/en>

About the Fuel Cells and Hydrogen Joint Undertaking

The Fuel Cells and Hydrogen Joint Undertaking is a unique public private partnership that has supported research, technological development and demonstration (RTD) activities in fuel cell and hydrogen energy technologies in Europe since 2008. Its aim is to accelerate the market introduction of these technologies, realising their potential as an instrument in achieving a carbon-clean energy system. The three members of the FCH JU are the European Commission, the fuel cell and hydrogen industries represented by Hydrogen Europe and the research community represented by Hydrogen Europe Research. The successor JU, the Clean Hydrogen Partnership, will build on the work of the Fuel Cells and Hydrogen Joint Undertaking to accelerate the development and deployment of a European value chain for clean hydrogen technologies.



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Further information on the project partners:

- ENEA - : www.energia.enea.it/
- Capital Energy: <https://capitalenergy-group.com/>
- Fondazione Bruno Kessler: www.fbk.eu/
- SOLIDpower: www.solidpower.com/
- IMDEA Energy: www.energy.imdea.org/
- SNAM: www.snam.it/
- EPFL, the Swiss Federal Institute of Technology in Lausanne www.epfl.ch/
 - EPFL, Swiss Federal Institute of Technology in Lausanne - Group of Energy Materials
<https://www.epfl.ch/labs/gem/>
- NextChem: www.nextchem.it/
- Stamicarbon: www.stamicarbon.com/

Enquiries:

Dr Alberto Giaconia, Project Manager at ENEA alberto.giaconia@enea.it

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