

HYdrogen as a FLEXible energy storage for a fully renewable European POWER system

Fact Sheet

Project Information

HYFLEXPOWER

Grant agreement ID: 884229

Status

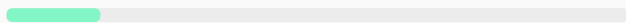
Ongoing project

Start date

1 May 2020

End date


30 April 2024



Funded under
H2020-EU.3.3.2.

Overall budget
€ 15 252 168,50

EU contribution
€ 10 475 081,60

Coordinated by
SIEMENS ENERGY GLOBAL
GMBH & CO. KG
 Germany

Project description

First demonstration of an integrated power-to-hydrogen-to-power plant

Generating renewable electricity is an important way to reduce CO₂ emissions and tackle climate change. However, sources of renewable energy such as wind and solar suffer from supply and demand imbalances. Energy storage in the form of hydrogen could provide a remedy for this problem: excess renewable electricity is fed into an electrolyser to split water into oxygen and hydrogen. The green hydrogen is stored and subsequently used in gas turbines to produce electricity when needed, releasing the stored energy back to the grid. The EU-funded HYFLEXPOWER

project will develop and operate the first fully integrated power-to-hydrogen-to-power industrial scale power plant, including an advanced dry-low emissions hydrogen gas turbine. The already installed SGT-400 gas turbine package will be upgraded with the ultimate goal to produce 12 MW electrical energy using fuel mixtures that contain up to 100 % hydrogen.

Objective

Clean, reliable and secure energy supply is a key requirement for the further development of the European economy. At the same time, the Paris Agreement and its aim to limit the global warming to well below 2° C call for a quick and significant reduction of CO₂ emissions, including the energy sector. In the energy sector this can only be achieved by a significant increase of the share of renewable energy sources (RES). As the most abundant RES, wind and solar, are intermittent by nature, there is a need for energy storage technologies, to provide back-up power when wind and solar output are low and more generally for load levelling and grid stabilisation.

Chemical storage appears to be the most promising long-term energy storage technology. Among chemical storage technologies, hydrogen is expected to dominate as it can be produced by electrolysis of water using excess energy from RES, easily compressed and stored, and finally re-electrified using gas turbines. The goal of HYFLEXPOWER is the first-ever demonstration (at TRL7) of a fully integrated power-to-H₂-to-power industrial scale installation in a real-world power plant application. The project will update and enhance an existing power plant within an industrial facility in Saillat-sur-Vienne, France. It will include the integration of energy conversion (power-to-H₂) in the demonstration plant using excess energy from RES and necessary storage capabilities. The Siemens SGT-400 gas turbine will be upgraded to operate with different natural gas / H₂ fuel mixtures. A key objective is the operation at full load and production of 12 MW electrical energy with high-hydrogen fuel mixtures of at least 80% by volume H₂ up to 100%. The tests will also demonstrate that EU emission limits for such installations can be not only met, but also reduced. Finally, the development of an economic assessment for this Power-to-H₂-to-Power pilot plant demonstration will be conducted to show the economic benefits of this application.

Field of science

/social sciences/economics and business/economics/sustainable economy

/engineering and technology/environmental engineering/energy and fuels/fossil energy/gas

/engineering and technology/environmental engineering/energy and fuels/energy conversion

Programme(s)

Topic(s)

Call for proposal

H2020-LC-SC3-2019-NZE-RES-CC

Funding Scheme


IA - Innovation action

Coordinator



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Activity type

Private for-profit entities
(excluding Higher or
Secondary Education
Establishments)

EU contribution

€ 4 548 122,76

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Participants (9)



ENGIE ENERGIE SERVICES

 France

EU contribution

€ 3 831 975

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Activity type

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CENTRAX LIMITED

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UNIVERSITAET DUISBURG-ESSEN

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EU contribution

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**Higher or Secondary
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DEUTSCHES ZENTRUM FUR LUFT - UND RAUMFAHRT EV

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LUNDS UNIVERSITET

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UNIVERSITY COLLEGE LONDON

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ARTTIC

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SIEMENS AKTIENGESELLSCHAFT

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EU contribution

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