

Consortium runs world's first hydrogen-powered gas turbine

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A European consortium on Wednesday said it had in a world first successfully tested a gas turbine fully powered by hydrogen, opening the way to slashing carbon emissions in energy-intensive industries like

cement.

Hydrogen has been touted as a potential alternative to the polluting fossil fuels primarily responsible for the [greenhouse gas emissions](#) warming the planet.

But [technical challenges](#), [high costs](#) and a lack of infrastructure have hampered its development, while the amount of emissions it saves has generated debate depending on the production methods.

French energy company Engie, the German Aerospace Center, Siemens Energy, Britain's Centrax and European universities were part of the EU-funded consortium Hyflexpower that carried out the test at a Smurfit Kappa paper packaging factory near the French city of Limoges.

The experiment used a Siemens Energy SGT-400 gas turbine whose combustion system was adapted for hydrogen, a process comparable to replacing the carburettor of an internal combustion car engine, said Engie vice president Frank Lacroix.

"We've just achieved a world first which involves injecting 100-percent hydrogen into a [gas turbine](#) to produce electricity," he told reporters.

"The long-term advantage is being able to convert existing turbines through simple modifications," said Gael Carayon, head of the Hyflexpower project at Engie.

Hydrogen is produced through a process called water electrolysis and is only considered "green" if the electricity used to generate electrolysis is obtained from [renewable sources](#).

The hydrogen used in the test was produced by an on-site electrolyzer powered by [renewable energy sources](#) and stored in a reservoir before

entering the turbine.

The promoters said the test showed that hydrogen can be a flexible way of storing electricity like batteries, potentially allowing the rapid decarbonization of energy-intensive industrial sites.

Cement, steel, refineries and any industry where "decarbonization is complex" are the main targets of the innovation, according to Engie.

Unlike the gas usually used, hydrogen has a "quicker" and "hotter" flame, which meant the developers had to overcome significant security hurdles, said Lacroix.

These included the resistance capacity of the materials, the cladding of the combustion chamber and the settings for the combustion process.

"The next step will be not only to produce electricity, but also heat," said Lacroix, with the aviation and shipping sectors potentially in line to benefit afterwards.

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