

# Rolls-Royce begins tests on using hydrogen for commercial airlines

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Rolls-Royce on Wednesday announced the start of a new set of tests aimed at using hydrogen to power commercial airliners.

Rolls-Royce and its partner EasyJet, said they are “committed to being at the forefront of the development of hydrogen combustion engine capable of powering a range of aircraft, including those in the narrowbody market segment, from the mid-2030s onwards.”

Hydrogen combustion engines use hydrogen as fuel instead of petrol or diesel. Conventional internal combustion engines generate energy through the combustion of fossil fuels, while hydrogen combustion engines generate energy through the reaction between atmospheric hydrogen and oxygen.

Since the only products of combustion are water vapour and energy, hydrogen combustion engines significantly reduce greenhouse gas emissions.

Consequently, hydrogen combustion engines are highly efficient



**Hydrogen combustion engines generate energy through the reaction between atmospheric hydrogen and oxygen**

and can generate more energy than conventional internal combustion engines. Vehicles with hydrogen combustion engines will have longer range, lower fuel consumption and, therefore, lower operating costs.

Hydrogen combustion engines produce water vapour instead of greenhouse gases emitted by conventional internal combustion engines. This benefits companies seeking to reduce their carbon footprints and improving their public image.

Several challenges remain

to be addressed before hydrogen combustion engines become commercially viable. First, hydrogen is highly flammable, making it difficult to store and transport safely. The infrastructure needed to produce, store, and distribute hydrogen is expensive and still under development.

Furthermore, the efficiency of hydrogen production is low. Most hydrogen is produced from natural gas, which emits large amounts of carbon dioxide.

The latest tests, aimed at proving aerospace cryogenic

liquid hydrogen pump systems, are being carried out at Rolls-Royce’s facility at Solihull, UK. These tests will address the key engineering challenge of taking low-pressure liquid hydrogen, chilled below  $-250^{\circ}\text{C}$ , and pressurising it so that it can then be pumped into an engine to be combusted.

Last year, Rolls-Royce and EasyJet set a world first by successfully running a modern aero engine, an AE2100, on 100 per cent green hydrogen at Boscombe Down, UK.

The pump research tests receive financial support through the UK government’s Aerospace Technology Institute, while the broader hydrogen test programme receives funding from easyJet.

Simon Burr, the engineering chief of Rolls-Royce, said the company has identified three technology challenges in the process of enabling hydrogen for use in aviation: Fuel combustion, fuel delivery, and fuel systems integration with an engine. All elements must be confirmed to operate safely.