ROLLS-ROYCE BUILDS NEW FUEL CELL DEMONSTRATOR

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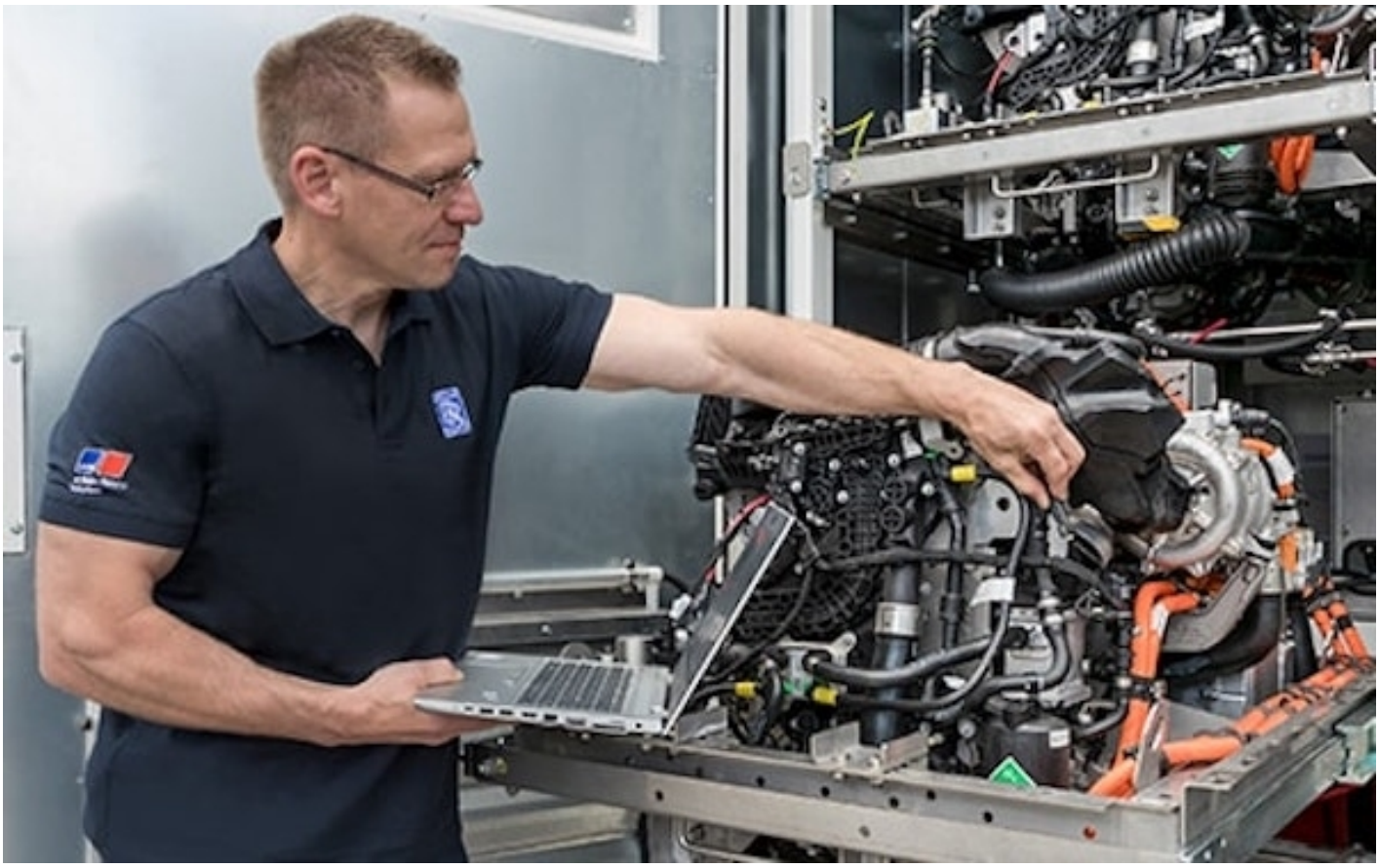

Another new technology – the hydrogen fuel cell – is currently making in-roads at the Friedrichshafen plant of Rolls-Royce's Power Systems division where a 250 kW demonstrator is in the process of being set up to test future zero-carbon energy systems and present these to customers. “We firmly believe that fuel cell technology is set to make a huge contribution to a successful energy turnaround. That's why Rolls-Royce sees it as its mission to assume a pioneering role in fuel cell applications,” said Andreas Schell, CEO of Rolls-Royce Power Systems. “Fuel cells will form an elementary part of our product portfolio for sustainable solutions.”

Why fuel cells? Fuel cells have very high efficiency levels when generating electricity from hydrogen and oxygen. When run on pure hydrogen, they give off zero emissions – only water vapor – as well as being low-noise, low-maintenance, and vibration-free. “The greatest benefit is when they are run on regeneratively produced hydrogen because this enables polluting and climate-damaging gas emissions to be fully eliminated. This gives fuel cells a huge potential to become a major technology for decarbonizing propulsion and electrical power supply systems,” added Dr. Peter Riegger, Vice President Rolls-Royce PowerLab.

Much has already happened at the Friedrichshafen plant in recent months, with the complex hydrogen infrastructure now installed and the container all set up, complete with its four low-temperature polymer electrolyte membrane (PEM) fuel cell modules. Indeed, this took quite a lot of work by engineers across a variety of sites. Designed at the company's plants in Ruhstorf, Bavaria, and Friedrichshafen, safety dictates that the container has two separate compartments for fuel cells and batteries, plus a host of power electronics. The control system has now been fully refined, cooling and air conditioning are on the roof, and a rack system enables simple maintenance, allowing individual system modules to be replaced as required.

The energy systems, using fuel cell modules from the automotive sector, have been put through their paces on a test stand, and the Rolls-Royce engineers are more than happy with the results: “Power flexing characteristics and performance are excellent, and as expected there are no vibrations or no loud noises,” explained Dr. Peter Riegger. The next step is to connect all four demo modules together in the container and hook up the batteries and power circuit. Commissioning is slated for the second half of 2021.

The demonstrator will be used for test purposes and to show interested parties which applications the system is suitable for. These include standby power, prime power, uninterruptible power supplies (UPS) and ‘black start’ capability, allowing the system to be started from scratch without a mains connection. The system consists of fuel cell modules, batteries, fire protection, air conditioning and safety systems, cooling, gas supply and automation.

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