

Press release



FEV is Investing in Test Facilities for Hydrogen Propulsion as Part of the France Relance Plan

Trappes, France, November 2021 – As part of the France Relance plan, FEV France has invested in a test bench dedicated to fuel cell system tests of up to 200 kW. At the same time, the company has adapted two test benches for the development of hydrogen combustion engines at its site in Saint-Etienne-du-Rouvray (Seine Maritime). FEV France is one of the eight winners of the automotive sector selected as part of the “France Relance” plan initiated by the French Government. The objective is to support investments of leading companies through dedicated funds to drive the transformation of the automotive and aerospace sectors.

Ongoing discussions regarding the reduction of CO₂-emissions of more than 30% for trucks and 50% for passenger vehicles by 2030 point to hydrogen as a promising solution to ensure a reliable environmental transition and to meet these figures. FEV – a globally leading engineering provider – has more than 40 years of experience in the development of hydrogen internal combustion engines and more than 25 years in the field of fuel cell development.

“Thanks to the France Relance plan, at the beginning of 2021 we were able to expand our battery characterisation testing building,” said Nadim Andraos, President of FEV France, Spain and North Africa. “Today, we are pleased to have the opportunity to update our Saint-Etienne-du-Rouvray facility, which will then be able to provide testing and development of future technologies including hydrogen fueled propulsion solutions.”

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Hydrogen Engine Development

One updated test bench has been specifically designed for medium power, high load applications such as buses or trucks, another one focuses on high power, high load marine applications.

The hydrogen internal combustion engine solution can be easily implemented utilizing existing infrastructures. However, this technology poses certain development challenges, which FEV - based on the company's cutting-edge know-how - is successfully tackling:

- Dedicated design of combustion chamber layouts and piston liner interfaces to maximize reliability and efficiency
- Research conducted in collaboration with RWTH Aachen University, Germany, to address the unique behavior of hydrogen in the injection and mixing process
- Collaboration with major suppliers, especially regarding lubrication and ignition system and with spark plug manufacturers
- Improved crankcase ventilation counteracting H₂-accumulation
- Rapid control prototyping to develop software tailored for H₂-engines, thus obtaining optimized transient performance and low NO_x emissions

Fuel Cell Development

During the past 25 years, FEV has become the top address for the development of fuel cell (FC) solutions for various applications. Among the company's capabilities in terms of a 360-degree FC development, comprehensive benchmarking activities are included to provide customers with complete evaluations of according vehicles, components and full FC-systems. FEV even created a database of fuel cell system installations, which is regularly updated, and includes the control of the FC at the level of the system, subsystem and actuator. For system simulation and

controls, FEV's modular approach facilitates the tailoring of software to a wide variety of systems and topologies. As a result of this innovative approach, our team is able to identify the ideal fuel cell system for each application, and develop a tailored strategy for each customer.

The fuel cell test bench developed by FEV will allow FC-systems of up to 200 kW to be tested at the Saint-Etienne-du-Rouvray site. Within the global FEV network, even testing of systems of up to 400 kW is possible.

FEV's capabilities for fuel cell development include:

- Developing fuel cell systems in house, FEV provides customized fuel cell powertrain solutions including vehicle integration
- Complete FEV-owned FCCU software IP and white-box solutions for hardware and software
- Structured benchmark approach to generate deep insights and valuable analyses
- Durability, environmental & performance testing from cell to system level

The planned start for future customer projects at FEV France's facilities is set for March 2022 regarding the updated, and for September 2022 regarding the new test benches. The facilities will also meet the demands of adjacent markets to the automotive industry like the marine or aircraft sectors.

Also, construction and operation of FEV France's new testing and development assets will enable the creation of around fifteen direct and indirect jobs on technical, commercial and managerial levels. The project is aligned with both the regional policy of the Normandy region, which seeks to develop a strong ecosystem around hydrogen energy, and the French and European energy transition policy, which aims on zero CO₂-emission industries.

About FEV

FEV is a leading independent international service provider of vehicle and powertrain development for hardware and software. The range of competencies includes the development and testing of innovative solutions up to series production and all related consulting services. The range of services for vehicle development includes the design of body and chassis, including the fine tuning of overall vehicle attributes such as driving behavior and NVH. FEV also develops innovative lighting systems and solutions for automated driving and connectivity. The electrification activities of powertrains cover powerful battery systems, e-machines and inverters. Additionally, FEV develops highly efficient gasoline and diesel engines, transmissions, EDUs as well as fuel cell systems and facilitates their integration into vehicles suitable for homologation. Alternative fuels are a further area of development.

The service portfolio is completed by tailor-made test benches and measurement technology, as well as software solutions that allow efficient transfer of the essential development steps of the above-mentioned developments, from the road to the test bench or simulation.

The FEV Group currently employs 6,300 highly qualified specialists in customer-oriented development centers at more than 40 locations on five continents.

About FEV France

With more than 650 employees in France, FEV offers its engineering expertise, services and equipment in order to develop innovative powertrains, including combustion, hybrid and electric. The company offers environmentally friendly cutting-edge solutions, with high ambitions in terms of quality, compliance with deadlines, safety, performance and reliability. FEV is also the preferred partner for the major players in the French transport industry: manufacturers, equipment manufacturers, test laboratories, schools and universities.

