

# FCH<sub>2</sub>RAIL

## FUEL CELL HYBRID POWERPACK FOR RAIL APPLICATIONS



<b>Project ID</b>	101006633
<b>PRR 2024</b>	Pillar 3 – H <sub>2</sub> end uses: transport
<b>Call topic</b>	FCH-01-7-2020: Extending the use cases for FC trains through innovative designs and streamlined administrative framework
<b>Project total costs</b>	EUR 13 378 484.93
<b>FCH JU max. contribution</b>	EUR 9 999 999.12
<b>Project start - end</b>	1.1.2021–31.12.2024
<b>Coordinator</b>	Deutsches Zentrum für Luft- und Raumfahrt EV, Germany
<b>Beneficiaries</b>	Administrador de Infraestructuras Ferroviarias, CAF Digital & Design Solutions SA, CAF Power & Automation SL, CAF Turnkey & Engineering SL, Centro de Ensayos y Analisis SL, Centro Nacional de Experimentación de Tecnologías de Hidrógeno y Pilas de Combustible Consorcio, Construcciones y Auxiliar de Ferrocarriles Investigacion y Desarrollo SL, Construcciones y Auxiliar de Ferrocarriles SA, Faiveley Transport Leipzig GmbH & Co. KG, Infraestruturas de Portugal SA, Renfe Operadora, Renfe Viajeros SA, Stemann-Technik GmbH, Toyota Motor Europe NV

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### PROJECT TARGETS

Target source	Parameter	Target achieved?
Project's own objectives	System lifetime/durability	
	Hydrogen and electricity consumption	

### PROJECT AND GENERAL OBJECTIVES

The project consortium is developing and testing a new train prototype. At the heart of the project is a hybrid, bimodal driving system that combines the advantages of an electrical power supply from an overhead line with a hybrid power pack consisting of fuel cells and batteries. This system enables more sustainable and energy-efficient rail transport. The project will show that this type of bimodal power pack is a competitive and environmentally friendly alternative to diesel power.

### NON-QUANTITATIVE OBJECTIVES

An expert network with external stakeholders has been created to support the analysis of gaps in the normative framework. Work package 7 network meetings were held in 2023 and the gap analysis was shared with and commented on by the work package 7 network.

Exchanges and collaboration with other EU projects (standard-sized heavy-duty hydrogen (Stashh), Virtual & physical platform for fuel cell system development (Virtual-FCH), European hydrogen train the trainer programme for responders (Hyresponder), Europe's rail flagship project 4 – sustainable and green rail systems (Rail4Earth)) and national projects (H2goesrail, Use of hydrogen fuel cell drives in local transport in the district of Barnim, operated with 100 % renewable hydrogen (H2BAR)) have taken place.

### PROGRESS AND MAIN ACHIEVEMENTS

- Fuel cell hybrid power pack (FCHPP) development and tests on a Centro Nacional del Hidrógeno test bench were successfully completed.
- The physical integration of two FCHPPs into the demonstration train was successfully completed.
- The first static test of a FCHPP in a train was

conducted.

- The dynamic testing of the demonstration train on closed tracks was conducted.
- Technology readiness level 7 authorisation was obtained for the demonstration system for Spain.
- The functioning of the first H<sub>2</sub>-powered train was demonstrated on the Spanish railway network.
- The train demonstration was finalised in Madrid and Galicia.
- Technology readiness level 7 authorisation was obtained for Portugal.
- More than 4 600 km were demonstrated in H<sub>2</sub> mode before the end of 2023.
- Train demonstration is ongoing on several lines in Spain.

### FUTURE STEPS AND PLANS

- Demonstration of a bimodal train in Portugal.
- Receipt of theoretical track authorisation for Germany.

