



Launch of the HyShunt project for the development of the first French hydrogen-powered shunting locomotive bringing together HDF Energy and Captrain France

HDF Energy and Captrain France officialize their collaboration on the development of an innovative, zero-emission hydrogen shunting locomotive for logistics operations on industrial sites.

Paris, May 11, 2022 - Hydrogène de France (Euronext Paris: HDF - HDF Energy) and Captrain France, a subsidiary of SNCF, today signed a partnership agreement for the development of hydrogen locomotives in order to provide a decarbonization solution for French and European rail freight. The first step in the collaboration between HDF Energy and Captrain will be the launch of the HyShunt project: a retrofit project¹ of a locomotive currently powered by a diesel engine. With a power of about 700 kW, this locomotive will be retrofitted with a decarbonized electric propulsion system powered by green or low-carbon hydrogen, via a high-powered fuel cell system manufactured and integrated by HDF Energy.

A zero-emission locomotive to decarbonize rail freight

Today, rail freight accounts for only 9% of goods transported in France², compared to 17.3% in the European Union. The French government wishes to revitalize this mode of transport, which is less polluting and less dangerous than road transport. The government's goal is to double the modal share of rail freight by 2030 and then increase it to 25% by 2050. With only 58% of the French rail network electrified³, the development of dual-mode electric and hydrogen solutions will enable the entire network and industrial sites to be covered with zero emission solutions. The aim of the project is to demonstrate that retrofitting a locomotive can achieve strong decarbonization objectives for rail freight.

This project will also enable HDF Energy to pursue the development of high-powered fuel cell systems dedicated to rail mobility. The complementary nature of the two partners in the project enhances French industrial know-how in the service of decarbonizing freight transport. Lastly, HyShunt is helping to create a new sector of expertise and associated jobs.

A frugal and virtuous project

In addition, the HyShunt project is a virtuous and frugal project that favors the reuse of existing equipment. Captrain France will provide a locomotive built in the 1950s for the project. It will be upgraded and its life span extended.

¹ Transformation of vehicles with thermal engines into battery or fuel cell hydrogen electric engines

² Source: Ministry of Ecology

³ Source: IRG-Rail 2017



A French and regional industrial sector

This first French hydrogen shunting locomotive is part of the hydrogen ecosystem being developed in Moselle in the Grand-Est region. This locomotive retrofit project will also be part of the *Grande Région Hydrogen* initiative, the first cross-border Hydrogen Valley, involving French, German and Luxembourgish industrial partners. The high-power fuel cell will be produced in the future HDF Energy plant in Blanquefort which will be operational in 2023.

Damien Havard, Chairman and CEO of HDF Energy, said: *"We are very pleased to unveil today this ambitious project to develop an essential solution for decarbonizing rail transport. In our strategic roadmap, we announced our ambition to seize opportunities to accelerate the development of the hydrogen industry worldwide. Today we are demonstrating our ability to accelerate the movement through this partnership, which will enable us to combine the unique technological know-how of Captain France in the field of heavy rail mobility and HDF Energy in the field of high-powered fuel cells."*

Stéphane Derlincourt, President of Captrain France, said: *"I am delighted to sign this partnership with HDF, whose level of expertise is unique. At Captrain France, we are very enthusiastic about the idea of developing the very first zero-emission locomotive for our customers' industrial sites. The urgent concerns about global warming are generating adaptations on all sides and freight transport is no exception. This locomotive will be completely innovative and equipped with future-oriented technology. Thanks to it, no more greenhouse gases, which are harmful to our health and our planet."*

ABOUT HYDROGEN DE FRANCE (HDF ENERGY)

HDF Energy is a global pioneer in hydrogen energy. HDF Energy develops high-capacity Hydrogen-Power plants and is active, through dedicated project companies, in their operation. These plants will provide continuous or on-demand electricity from renewable energy sources (wind or solar), combined with high power fuel cells supplied by HDF Energy.

HDF Energy develops two types of Hydrogen-Power plants:

- **Renewable® (POWER TO POWER):** Multi-megawatt power plants, producing stable electricity 24h/day, composed of an intermittent renewable source and on-site hydrogen energy storage.
- **HyPower® (GAS TO POWER):** Multi-megawatt power plants producing electricity on demand from green hydrogen from gas transportation networks.

HDF Energy has integrated key fuel-cell know-how under a memorandum of understanding with Ballard (seven-year exclusive license agreement) and has developed the world's first mass production plant for high-power fuel cells for energy, which will be commissioned in France (Bordeaux Metropole) in 2023. Through this activity, HDF Energy will also serve the mobility, maritime and rail markets, and data centers.

HDF Energy has positioned itself as a powerful accelerator of the energy transition by offering non-intermittent, grid-friendly and on-demand renewable power.

HDF shares have been listed on the regulated market of Euronext Paris compartment B since 24 June 2021.

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ABOUT CAPTRAIN FRANCE

CAPTRAIN France, a railway company of the SNCF Group, is the 3rd largest player in the rail freight market. CAPTRAIN France operates more than 100 commercial trains daily in France and abroad and also provides rail logistics on some 30 industrial sites for all types of customers and goods (automotive, wood, cereals, waste, aggregates, hazardous materials, metals, consumer products, etc.). The company also puts its skills and its machines at the service of work companies and track renewal.

Ever more concerned about its ecological footprint, in 2019 Captrain France was the very first company to run a dual-mode diesel/electric locomotive in Europe.

As part of its strategy, Captrain France is committed to reinforcing modal transfer as well as the development of efficient and competitive logistics and rail solutions that consume less energy and pollute less, in order to contribute to environmental protection.

With a fleet of more than 180 locomotives, CAPTRAIN France transported more than 11.5 million tons of goods in 2021 and achieved a turnover of €180 million. As one of the most dynamic private companies in the sector, CAPTRAIN France employs 1,000 people (including 850 train drivers, ground operators and industrial operators) and plans to hire more than 150 people by 2022.

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