

Use case of the TMB Barcelona Station

FEDECOM (FEDERated - "system of systems" - approach for flexible and interoperable energy COMMunities) is a Horizon Europe project demonstrating sector coupling by federating energy communities. FEDECOM provides a scalable and adaptable cloud-based platform including analytical, modelling and optimisation services for planning, supervision and control of integrated local energy systems.

FEDECOM project partners:



Before FEDECOM

The **TMB Barcelona Station** is a pioneering site for green hydrogen production dedicated to public transport, as part of Iberdrola's efforts to decarbonize heavy-duty transport and industrial activities. The hydrogen refueling station, located in the Zona Franca industrial park, supports the operation of TMB's hydrogen bus fleet and represents a major step towards reducing reliance on fossil fuels. It is the first public and commercial hydrogen facility in Spain



capable of producing and supplying green hydrogen, thereby setting a precedent for a sustainable hydrogen ecosystem.

By **integrating with the FEDECOM platform**, the station aims to optimize energy flows, support hydrogen distribution across other nodes, and enhance trading opportunities, paving the way for an expanded network and energy independence

Existing Technologies

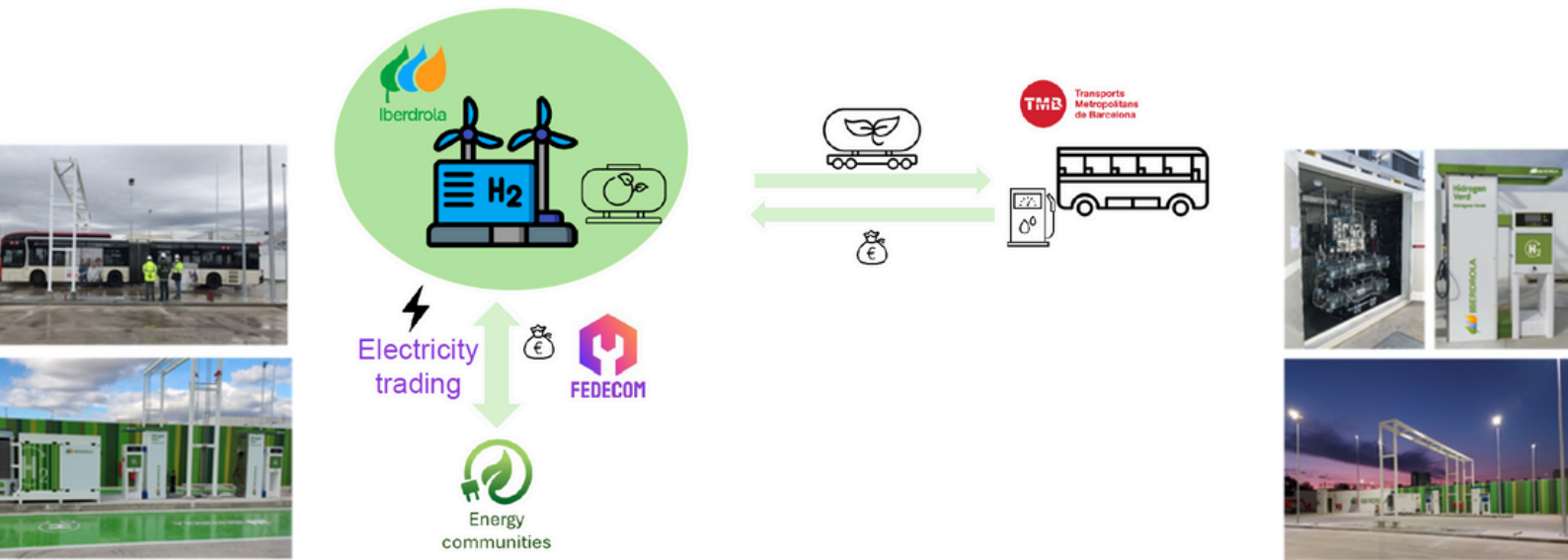
- ▶ 2.5 MW PEM electrolyser for green hydrogen
- ▶ Low, medium, and high-pressure hydrogen storage (23 kg at 30 bar, 1,060 kg at 305 bar, 42 kg at 450 bar)
- ▶ Hydrogen compression and chilling systems
- ▶ High-flow hydrogen dispensers (350 bar)
- ▶ Tube trailer interface for distribution
- ▶ Safety and auxiliary systems (fire protection, leak detection, air compression)

After FEDECOM

The FEDECOM project introduces upgrades to the TMB Barcelona Station, enhancing flexibility and operational efficiency in hydrogen production and distribution. The primary innovation is the implementation of an advanced energy and flexibility trading platform, optimizing energy flows and enabling integration with broader green hydrogen networks.

Installation upgrades *(no subsidies from FEDECOM project)*

- ▶ Addition of 2 containerised 2-stage compression systems to increase hydrogen pressure from 30 to 305 bar and then up to 450 bar.
- ▶ Expansion of hydrogen storage system with a capacity of 1 tonne at 305 bars.
- ▶ Installation of 4 new hydrogen dispensers with ancillary systems.
- ▶ Integration of advanced data and communication systems for improved monitoring, remote operation, and energy flow management.
- ▶ Capacity scale-up to accommodate an increased fleet of hydrogen-powered buses.



Project's benefits for the pilot

- **Enhanced** hydrogen production, distribution efficiency, and energy flow management through integration with the FEDECOM platform.
- **Increased** capacity and scalability of the refueling infrastructure to support a larger fleet of hydrogen-powered buses.
- **Reduction in emissions** by transitioning to green hydrogen, supporting decarbonization and energy independence.
- **Improved** capability for future energy trading within a connected green hydrogen network, fostering collaboration and economic growth.

Innovations of the FEDECOM Platform

- Integration of **advanced data and communication systems** for real-time monitoring, remote management, and secure hydrogen transactions.
- **Optimized hydrogen distribution** and energy flow management on local areas, close to hydrogen consumers to maximize flexibility and reduce costs.
- Support for **future energy trading** within a virtual green hydrogen federation, enabling collaboration with other hydrogen-producing sites.

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Interested in Replicating this Use Case in Your Community?

Do not hesitate to contact us for more details:

