

Innovative Hydrogen Storage Solutions Empower Local Energy Systems at Demo#3 in Huesca, Spain



DEMO#3

1. Presentation and European Involvement

The SINNOGENES project, a European initiative, aims to revolutionize energy storage technologies by integrating electricity, hydrogen, and heating solutions, in line with the Paris Agreement and the UN's 2030 Agenda.

Located at the Walqa Technology Park in Huesca, Spain, Demo#3 exemplifies SINNOGENES' vision by incorporating innovative Power-to-Gas storage technology into a Local Energy Community. Power-to-Gas technology focuses on producing hydrogen for mobility and other various applications. It does not involve re-electrifying hydrogen with fuel cells or injecting it into the gas distribution network.

The key partners involved are the Aragon Hydrogen Foundation (FHa), Inycom, and Schneider Electric, contributing expertise and state-of-the-art technology.

2. Facilities Involved at FHa

The Aragón Hydrogen Foundation is utilizing its advanced hydrogen facilities and expertise to implement and validate Inycom's innovative optimization tools at Demo#3.

Key facilities include:

- ✿ **Renewable Energy Sources-** The site integrates 160 kW of photovoltaic systems.
- ✿ **Electrolysers-** A 15-kW Anion Exchange Membrane (AEM) electrolyser and a 60-kW alkaline electrolyser.
- ✿ **Hydrogen Storage-** A versatile storage setup includes: 11 kg in buffer storage, 23 kg in HRS350 cascade storage, and 62 kg in HRS700 cascade storage.
- ✿ **Two Hydrogen Refuelling Stations (HRS)-** The site integrates 160 kW of photovoltaic systems.

The Energy Management System optimizes energy production, consumption, and storage by converting surplus renewable energy into hydrogen through electrolysis. This system enables efficient energy storage for later use, including supplying Fuel Cell Electric Vehicles. It also adapts to fluctuating renewable energy availability and market electricity prices.

3. Used Technologies and Progress

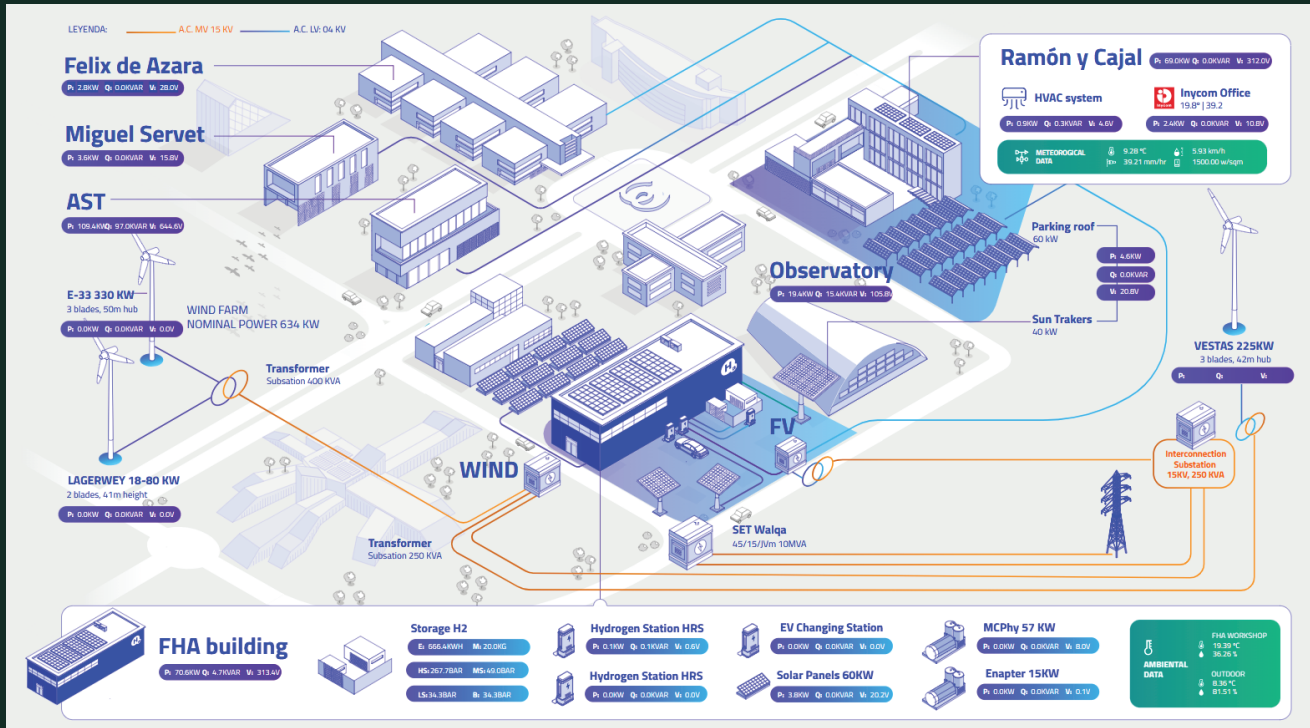
For being able to archive optimal dispatch 4 modules are being developed:

- ✿ **Module 1: Electricity market tool** - The system provides an hourly energy price estimate for the wholesale market, varying based on the availability of hydrogen storage.
- ✿ **Module 2: Building & HRS load prediction** - The electrical and hydrogen loads, including those of the two HRS (350 and 700 bar), are not only read and visualized but also predicted to optimize their use in the coming days.
- ✿ **Module 3: Optimization engine** - Local Energy Community (LEC) uses an automated dispatch module to dynamically control electrolyzes and EV chargers, balancing renewable power production, converting excess energy into hydrogen, and making optimal energy purchases and sales.
- ✿ **Module 4: Power Purchase Agreements and sustainability module** - It enables a better and more efficient use of the energy produced.

The tool for managing renewable energies, allowing visualization of power and hydrogen load data, and integrating all modules is in advanced development.

4. Next Steps

By collaborating with European partners and sharing insights from Demo#3, SINNOGENES promotes the adoption of innovative energy storage solutions across the EU. As for the next steps, the development of the solutions will be finalized, and the piloting and validation phase will begin. Together, these facilities and their seamless integration demonstrate how advanced energy storage technologies can enable a sustainable, flexible, and decarbonized energy future.



Collaborating Partners



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