



## STORAGE RESEARCH INFRASTRUCTURE ECO-SYSTEM

### RI Information sheet 2022

Fundación para el Desarrollo de las Nuevas Tecnologías del Hidrógeno en Aragón – FHa,TA30 IHER

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Project Acronym	StoRIES
Call	H2020-LC-GD-2020
Grant Agreement No.	101036910
Project Start Date	01-11-2021
Project End Date	31-10-2025
Duration	48 months

1. Photo (if only 1 photo is possible, please select the 1<sup>st</sup> one)





## 2. Geographical coordinates (°, ′, ... N/S, E/W)

42.108688, -0.459662

## 3. Description of the research infrastructure for the webpage

FHa performs at its facilities R&D&i activities across the entire hydrogen value chain. The facility is an ideal and unique installation in Europe to work with large hydrogen equipment - 1,200 m<sup>2</sup> building with offices, laboratories and a workshop are offered as an experimental test bench on hydrogen technologies integrated in a microgrid with intermittent RES (635 kW wind and 160 kW PV).

The three main low temperature electrolysis technologies (alkaline, PEM and AEM) are present in different test benches, in power levels varying from 10 to 250 kW, and up to 60 bar of working pressure.

- i. With a trajectory of many years in alkaline electrolysis EU projects, the testbench dubbed NIEBLA (in-house design and construction) for testing of alkaline electrolyser stacks allows the characterisation and performance evaluation of up to 6-cell stacks and a maximum hydrogen production of 2 Nm<sup>3</sup>/h, to carry out Accelerated Stress Tests (AST) at partial loads and long-term tests, to perform I-V curves and the possibility to testing at any low and medium pressure (up to 60 bar). Voltage per cell and stack, and hydrogen and oxygen purities are monitored.

- ii. An off-grid PEM electrolyser was installed thanks to the European project ELY4OFF. The 50 kW stack works at 20 bar of pressure and is connected directly to PV trough DC/DC converters. There is an isolated micro-grid associated with this project designed for the energy management of the entire system.
- iii. A commercial electrolyser with AEM technology is available for integration studies of H<sub>2</sub> production in power systems. The system consists of 4 modules of 0.5 Nm<sup>3</sup>/h @35 bar, water purification and circulation system, and drying.

The existing facility also has the other elements of the hydrogen value chain, i.e. H<sub>2</sub> compression and storage. On the one hand, there is an electric membrane compressor with a capacity of 10 Nm<sup>3</sup>/h at 350 bar. And on the other hand hydrogen storage at two pressure levels: 4 m<sup>3</sup> at 35 bar, and 0.9 m<sup>3</sup> at 350 bar. The final use of hydrogen is mainly in fuel cell subsystems and also in mobility through a hydrogen refuelling station for fuel cell electric vehicles, buses, forklifts and other applications at 200 and 350 bar. The installation described above could be modified to suit specific requirements that may be proposed.

The research infrastructure is completed by a R&D testing platform devoted to recreating the injection of different flows of electrolytic H<sub>2</sub> into a natural gas with variable composition (HIGGS Project)

#### 4. Availability of the research infrastructure

(Please indicate time periods in which infrastructure will not be available for StoRIES in the next 2 years – if already known)

PEM electrolyser is unavailable during 2022 (ELY4OFF)

NIEBLA testbench will be unavailable during the last quarter 2023

R&D hydrogen injection platform in the NG grid is unavailable during 2022 (HIGGS)

#### 5. Special considerations (confidentiality / NDA agreements, insurance requirement, special training, HSE training)

NDA and preliminary internal HSE training may be needed

6. Energy storage technology that can be analysed/studied by using the research infrastructure

- Electrochemical
- Chemical
- Thermal
- Mechanical
- Superconducting Magnetic
- Cross-cutting  (Specifically: ... )

7. Key words for the webpage

Hydrogen, green hydrogen, electrolysis, electrolyser, fuel cell, storage, gas compressed, hydrogen refuelling station, blending, e-fuels

8. TRL level (if applicable):

- 1-3
- 4-6
- Above