H2 CoopStorage

Development of tools enabling the deployment and the management of a multi-energy (electric, heat, hydrogen) Energy Community integrating hybrid storage

> *H2 Coopstorage aims to remove barriers hampering the integration of a hydrogen storage solution into an Energy Community*

H2 CoopStorage responds to the challenges posed by the deployment of renewable energy production means, by improving local balancing, by reducing renewable intermittences and by intensifying the production of renewable energy.

More specifically, the project aims to develop methodological tools and software allowing the deployment and management of a multi-energy (electric, heat, hydrogen) energy community (EC) integrating hybrid storage (electrochemical and fuel cell) to be able to respond to the storage of daily and seasonal energy needs. The tools will be developed on the real Mortsel pilot site, responding in a global manner to the challenges posed by technological, societal and legal barriers.

The project is also innovative in its approach because the actors of the EC will participate in the development of tools through a co-construction process. This is fundamental to ensuring that the tools developed meet the needs of all stakeholders.

Main Objectives

The project aims to create tools for the creation and management of a CEC / CER integrating hydrogen: Methodological tools and Softwares.

These tools will allow the deployment and management of a multi-energy energy community (electricity and heat) integrating hybrid storage (electrochemical and hydrogen) to be able to respond to daily and seasonal intermittences.

The project will provide a comprehensive response to the challenges posed by technological barriers, but also societal, regulatory, environmental.

Project Duration

14.09.2020 - 31.12.2022

Project Budget

Total Budget: € 770,000.-
Funding: € 559,500.-

Project Coordinator

CLEF sc (Belgium - Wallonia)

Project Partners

- ULB (Belgium - Wallonia)
- Ceanaero (Belgium - Wallonia)
- Fabricom (Belgium - Wallonia)
- Memoco (Belgium - Wallonia)
- NTNU (Norway)
- SIF (Iceland)
- ZuidtrAnt (Belgium – Flanders)

Project Website

https://h2coopstorage.eu/

Contact - Project coordinator

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ERA-Net Smart Energy Systems

ERA-Net Smart Energy Systems Joint Call 2019 (MICall19)

This project has been awarded funding within the ERA-Net SES Joint Call 2019 for transnational research, development and demonstration projects. EUR 16.5 Mio of funding have been granted to 14 projects active in 15 regions and countries.

This project has received funding in the framework of the joint programming initiative ERA-Net Smart Energy Systems. The initiative has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements no. 646039 and no. 755970.

Expected Key Results

Technology

- **Sizing tool** – performed through a bottom-up approach. Based on the pilot, we will first fine-specify the sensor scheme and data necessary for the EMS and the main components to model for the sizing. We will develop a dynamic model library for sizing the heating/cooling production and storage systems, using opensource libraries (ex. IDEAS). We will also generate demand/production prosumer profiles synthetically, using dynamic simulation tools, commonly used for building design, in order to develop a catalogue of modelled building archetypes.
- **EMS** – will be dedicated to the demand-side management (<1/4h) of the different active systems, based on cooperative predictive approaches.

Market

- **Business model** - taking into account technological (cross-energy interfaces), environmental, regulatory (flexibility services, energy community), societal (expectation of stakeholders, need to include all user). We will envisage and compare both data-driven approaches (machine learning methods trained with sensor data) and physics-based approaches (theoretical models developed in the sizing tool and calibrated with a limited set of data).

Adoption

- **Risk-analysis** - Development of a 3D predictive methodology for the dispersion of hydrogen gas in its environment, making it possible to predict the risks in the event of a leak or explosion
- **Stakeholder analysis** - performed through quantitative surveys and qualitative interviews. The results will be quantified and visualized using causal mapping as described by Vögeli and Finger (2020). Software algorithms will be used to identify interactions of keywords in the answers provided by stakeholders.
- **Environmental analysis** – performed through LCAs for the different options of producing hydrogen. Softwares GABI and Ecoinvent will be completed with project-specific data from H2 CoopStorage.
- **Regulatory analysis** - Regulatory aspects related to H2 use in energy systems and in/near buildings, with a specific analysis on the variability of the permitting situation and requests in function of the country / region where you apply.

Joint Programming for Flourishing Innovation – from Local and Regional Trials towards a Transnational Knowledge Community

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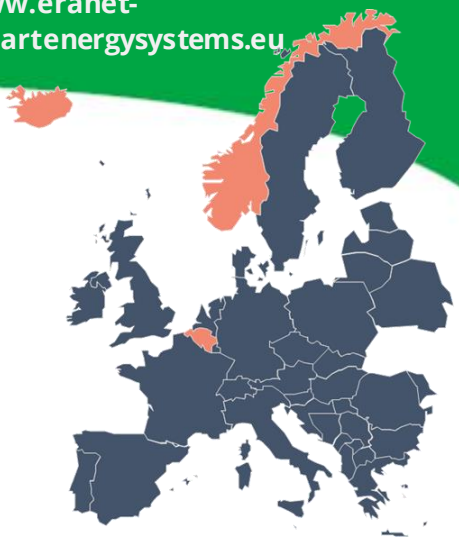

NTNU

HÁSKÓLINN Í REYKJAVÍK
REYKJAVIK UNIVERSITY

CLEF

ENGIE Fabricom

ULB

memoco

ZuidtrAnt energiecoöperatie

Cenaero

- **Holisitic metohodology** – Including previous results and communication tools to set up an Energy Community including hybrid storage

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