



FEDECOM project Newsletter #1



Welcome to our project newsletter and back on our first 6 months of activities

We are delighted to share with you the first newsletter of our FEDECOM project - FEDERated "system of systems" approach for flexible and interoperable energy COMmunities. A Horizon Europe project, coordinated by Veolia, kicked-off on October 4th, 2022 involving 17 European partners from 7 countries.

This 48-month project focuses on the implementation of integrated local energy systems through sector coupling and cross-energy vector integration. FEDECOM will provide a scalable and adaptable cloud-based platform consisting of analysis, modelling, and optimisation services for the planning, monitoring and control of integrated local energy systems. Our partnership revolves around three large scale project pilots in Spain, Switzerland and Benelux region, involving all relevant stakeholders in the design, implementation and evaluation of FEDECOM solution: service providers, grid operators and final consumers.

In the following weeks, we will make available in the project's website (<https://fedecom-project.eu/>) reports with summaries and details of the activities and progress that the team has carried out during this first half year.. To stay up to date, register to our newsletter and follow us on social networks (<https://www.linkedin.com/company/fedecom-project/> & https://twitter.com/FEDECOM_project).

We are looking forward to the next general assembly, taking place in Lugano, Switzerland, on April 25-26, 2023. We will update you on the events and developments of the meeting.

On the menu of this newsletter, a description of our expected results, a zoom on the pilot projects and also our participation in the General Assembly of the Bridge initiative in Brussels at the end of March.

Do not hesitate to contact us to find out more or join in future activities.

Happy reading from the coordination team,

Estibaliz Castrillejo
Gorka Naveran
Iván. Pasarín

Insight on FEDECOM's Exploitable Results



The exploitation management process has already started in FEDECOM! Thought the project is only in its sixth month, all partners involved in the development of the fifteen exploitable results have already agreed on a preliminary characterization of the shared results and started designing the exploitation vision. The complete list of exploitable results is available in FEDECOM's website (<https://fedecom-project.eu/project/>).

The core result of FEDECOM is an ICT cloud-based platform enabling sector coupling, together with energy (e.g., electricity) and energy flexibility (e.g., excess storage capacity) trading. Thanks to its functionalities, the tool will support FEDECOM's main objectives: to couple renewable energy sources (RES), energy storage and power-to-X technologies available in the pilots (i.e. community assets) with the necessary know-how and ICT expertise, ensuring efficient, stable and reliable grid operation.

The different exploitable results of FEDECOM will enable the following functionalities and integrate them in a single platform geared towards aggregators, ESCOs, energy communities' managers:

Monitoring of data generated by energy assets of energy communities: e.g., thermal behaviour and energy loads of buildings, storage system status, generation of electricity from installed RES, potential energy flexibility of each asset, etc.

Monitoring of the status of the local grid both with the purpose of suggesting an improved short term distribution grid (i.e., low and medium voltage) management strategy and to support long-term planning of the distribution grid.

Orchestration of all modules/functionalities to propose optimised scenarios for the optimal usage of energy assets in a community, unlocking economic and energy savings while supporting grid infrastructure management.

In particular, the final aim of the platform will be to facilitate intra- and inter-community peer-to-peer energy and energy flexibility trading, using a blockchain-based local marketplace, with smart billing and energy certificate issuance.

Let's dive into the heart of our 3 large pilot projects

The D2.2 report informs on the FEDECOM three large-scale pilot sites that will validate and implement the demonstration scenarios: Spanish Virtual Green Hydrogen (H2) Federation, Swiss Residential Hydropower Federation, and BE-NL Cross-country E-Mobility Federation. Each of the federations are further composed of multiple demo sites or communities. The project pilot sites consist of different energy systems and requirements, covering residential, commercial, tertiary, and industrial sectors. The demo scenarios or use cases at each pilot site are developed with a focus on enabling sector coupling in the local energy network and unlocking the flexibility potential across energy communities. The use cases identify the energy systems and resources (RES electricity, grid, heating/cooling, gas, e-mobility, hydrogen, storage) and link these sectors, also known as Power-to-X (P2X) technologies, to describe control strategies specific to each pilot site. D2.2 also evaluates optimisation of the control strategies by employing demand side management techniques to maximise RES consumption and flexibility. Furthermore, D2.2 identifies and formulates a list of key performance indicators (KPIs) for the validation of the demo scenarios.

PILOT 1

Virtual Green Hydrogen Federation (ES)



The Spanish Federation consists of three communities: Ur Beroa Community and Bilbao Townhall (residential and tertiary), Puertollano Green Hydrogen Plant (industrial), and TMB Barcelona Station (mobility). The demo scenarios planned for Pilot 1 aim to integrate renewable energy generation with P2X technologies (heating, hydrogen, and mobility), optimise the district heating and cooling systems, aggregate and unlock flexibility across the communities, and validate advanced control strategies under feasible business models.

The Ur Beroa residential complex, made up of 570 dwellings, has a heating and domestic hot water (DHW) system that will have PVs, an H2 boiler, and potential storage added by the FEDECOM project. Bilbao Townhall is composed of 4 buildings and a service centre, and has PVs, electric vehicle (EV) chargers and a battery system on site. Ur Beroa will be clustered with Bilbao Townhall, with designated heating and cooling systems for provision of grid services.

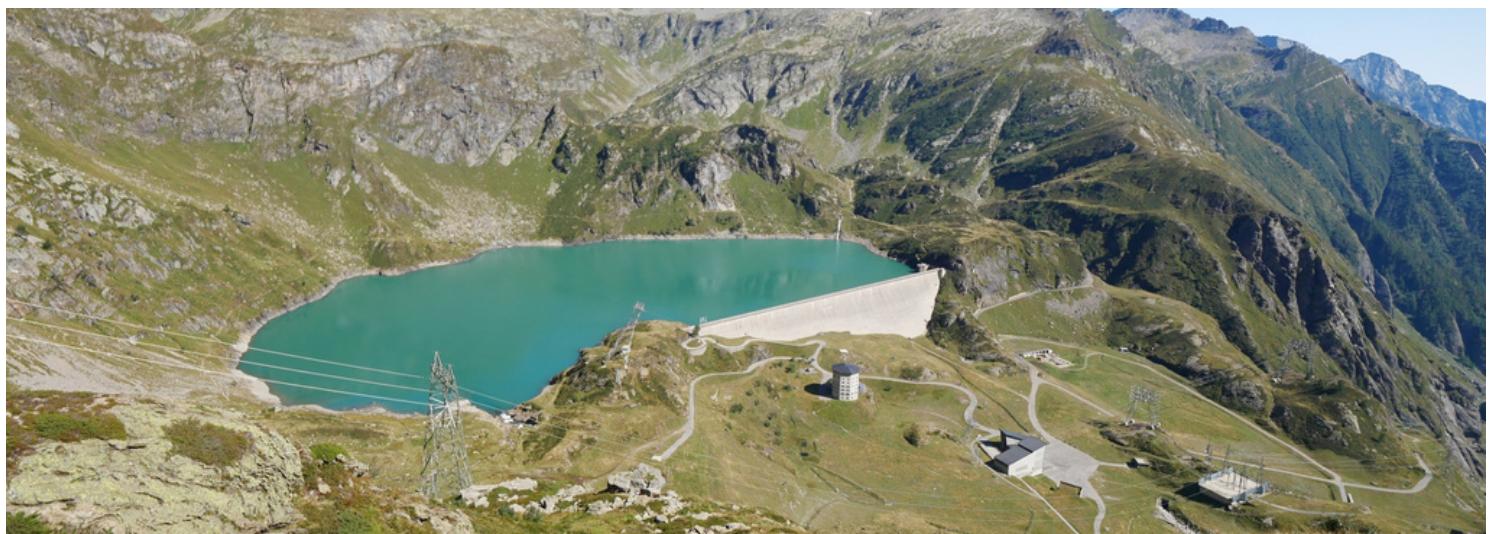
The Puertollano Plant is to be powered with 100% renewable energy, mainly from a 100 MW PV plant coupled with a battery storage system. The plant aims to be the biggest green hydrogen producer in the EU with annual production figures of around 1,100 tonnes of hydrogen and 8,800 tonnes of oxygen, with 3,200 operating hours. The site requires optimisation of the power flows between the PV/battery and the grid.

The TMB Station in Barcelona has a PEM electrolyser, powered by PVs, for on-site generation of green hydrogen and six refuelling points for a fleet of up to 60 hydrogen buses. The system needs optimised control among the hydrogen generation, the hydrogen supply level, and the hydrogen storage for maximum efficiency in operation.



PILOT 2

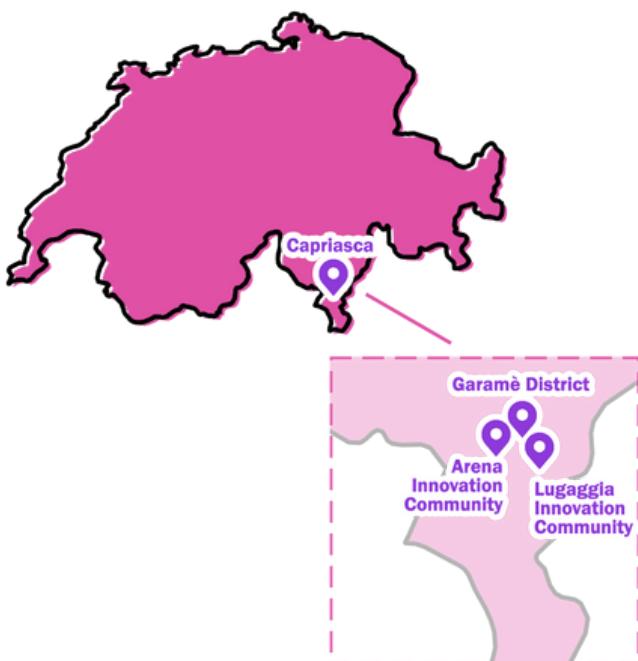
Residential Hydropower Federation (CH)



The Swiss Federation is made up of: Luggaglia Innovation Community (residential and tertiary), Arena Innovation Community (residential and tertiary), and Garamè District (residential).

The use cases for Pilot 2 aim to increase the efficiency of the overall system through data analysis and user feedback, increase the hosting capacity by enabling cross-vector flexibility and local energy trading, engage users in an optimal trading mechanism, and integrate vertical flexibility by aggregating all the assets present in the federation to participate in ancillary services.

The Luggaglia site consists of 18 single-family units, housing about 75 residents, and a kindergarten. Luggaglia has 77.7 kWp of PV installed, a district battery, and a 11 kW EV charging station, while the heating and DHW demands are met via heat pumps and electric boilers.



The Arena Community is made up of 11 single-family homes, 3 residential buildings, and 3 service buildings. The installed PV system has a capacity of 52.4 kWp, and a further 85 kWp system is planned to be installed by the end of 2023. The 11 kW EV charging station has V2G functionality, enabling bi-directional flow between the vehicles and the local grid.

Heating and hot water demands are fulfilled by a heat pump and a biomass district heating system. The community at Garamè District consists of 7 buildings with a PV installed capacity of 49 kWp, 6 heat pumps, and 3 electric boilers.

A group of pumped hydro storage units will act as a seasonal storage, storing excess generated electricity during the summer and releasing the stored energy during the winter.

PILOT 3

Cross-country E-Mobility Federation (BE-NL)



Pilot 3 spans across two countries and is composed of three sites: Brussels Brico Retail Community (commercial and residential), Voorhout Village (residential), and Besix HQ and Eemnes Community (tertiary and residential).

The demo scenarios here aim to maximise the exploitation of locally generated renewable energy across multiple sectors, unlock the demand flexibility by integrating with the EV charging infrastructures, enable peer-to-peer trading of the locally generated energy, and demonstrate cross-country interaction and energy exchange.

The Brussels Brico Retail Community consists of two outlets of the Brico retail stores located at Vilvoorde and Zemst, along with a total of around 100 family homes in the vicinity, that are part of the project activities.

The retail outlets will have PV systems, stationary batteries, and EV charging ports installed to form local energy communities with the surrounding residential units. Voorhout Village, located in the province of South Holland, is a community of 46 houses and each house is a net producer of solar energy.

The local heating and DHW demands are met by the use of heat pumps, and the existing singular V1G charger is to be supplemented with 10 new V2G chargers.

Besix HQ, an office building, is a tertiary demo type with an 80 kWp PV system, a district battery, and 40 V1G EV charging poles installed on its premises.

Eemnes is a residential community with a PV system and a community battery, and imports surplus generated energy from the Besix building.



FEDECOM has participated in the Bridge 2023 General Assembly



On March 28th, 29th and 30th, FEDECOM participated in the General Assembly of the BRIDGE initiative. BRIDGE is a European Commission initiative gathering H2020-funded projects to compile their findings to improve European and national policymaking. Since the 2022 General Assembly, up to 60 projects, including FEDECOM, have joined the BRIDGE.

These three days made for a great opportunity to exchange with European policy-makers on the different upcoming legislative acts (the Electricity Market Design, the Smart Grid Task Force on Interoperability and Cybersecurity).

We further discussed different use cases explored by completed projects, the difficulties and regulatory barriers they faced, on the benefits brought by BRIDGE to overcome these problems, and finally received their recommendation for new H2020 projects.

BRIDGE was crucial to integrate FEDECOM in the ecosystem of European projects. We exchanged with projects of similar scope to foster future cooperation with, for example, the organisation of common events on joint issues. Cooperation with other projects is essential to extend the reach of our Federation of Energy Communities.

For more information and to explore cooperations with FEDECOM, do not hesitate to contact us



www.fedecom-project.eu



@FEDECOM_project



fedecom@energies2050.org



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