

Use case of the Ur Beroa Residential Community

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 **Ur Beroa neighbourhood** consists of 600 private dwellings, of which 50 are integrated in a FEDECOM energy community pilot. The pilot is optimising district heating and domestic hot water network management, as well as adding PV and electric storage to the existing gas boilers, biomass boiler and CHP engine, thus increasing RES and flexibility.

The FEDECOM project aims to transition the Ur Beroa community towards greater energy independence and reduced reliance on fossil fuels. By optimising the use of RES, the FEDECOM platform balances generation with demand and fosters potential energy trading within the community.

Existing Technologies

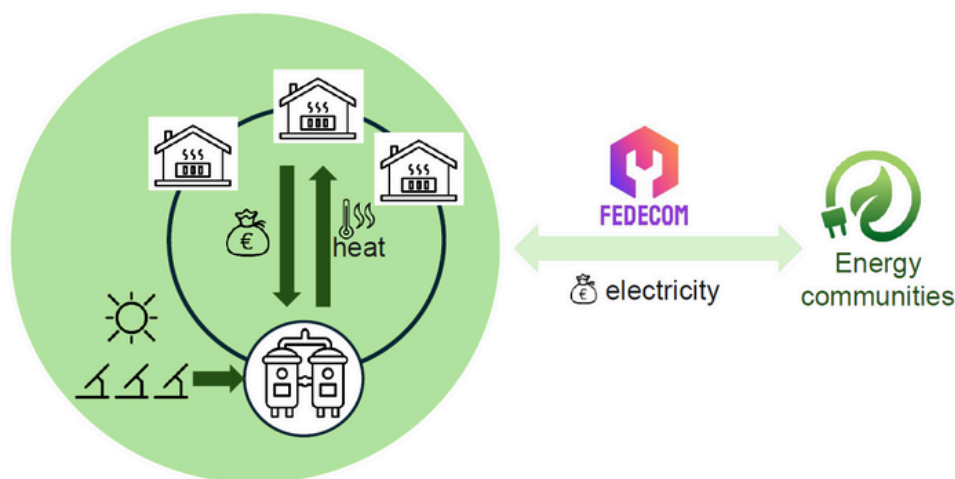
- ▶ A 1200 kW (thermal) + 1000 kW (electric) combined heat and power (CHP) engine
- ▶ 3 natural gas boilers with a combined capacity of 6800 kW
- ▶ Energy storage systems and PV panels, generating 100 kW
- ▶ Seven substations for thermal distribution

After FEDECOM

The upgrades that FEDECOM has brought to Ur Beroa have two goals: to **provide higher flexibility in the operation of individual elements**, enabling optimal operation on a broader range of conditions, and the **integration of RES**, reducing dependence on fossil fuels and electricity from the grid to power ancillary and support systems.

Installation upgrades

- ▶ Addition of 37 kWp photovoltaic (PV) panels to increase renewable energy capacity
- ▶ Addition of 60 kWh electric storage to increase flexibility in the operation of ancillary systems (pumps, control valves, small heat pumps, etc.)
- ▶ Decoupling of condensing and conventional boilers' circuits to optimise management, and including a heat pump to improve boilers operation point
- ▶ Upgrade of control algorithms with better cascading protocols and to include weather and energy price forecasts
- ▶ Testing phase change material (PCM) for thermal storage (2 m³) in Substation 4



Community benefits

- **Improved self-consumption and efficiency** through advanced controls and upgrades
- **Cost savings** from renewable integration and efficiency improvements
- **Reduced emissions and enhanced resilience** with diverse energy sources
- **Readiness** for future **energy trade** via the FEDECOM platform

Innovations of the FEDECOM Platform

- Real-time **monitoring of energy production** and consumption for dynamic adjustments
- **Optimisation of renewable integration**, including PV, and biomass
- Preparation for **community energy trading** to share surplus renewable energy

 www.fedecom-project.eu

 fedecom@energies2050.org

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Interested in Replicating this Use Case in Your Community?

Do not hesitate to contact us for more details:

