

Use case of the Swiss Residential Hydropower Federation

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



Lugaggia Innovation Community



Arena Innovation Community



Garamè District

The **Swiss Residential Hydropower Federation** is a federation of energy communities with the purpose of fostering energy exchange and flexibility services among its members, in addition to the aggregation of resources to provide services outside the federation. It consists of three energy communities: Lugaggia Innovation Community (LIC), Arena Innovation Community (AIC), and Garamè District (GD), located in southern Switzerland.

The main objective of each energy community is to maximise self-consumption by optimally managing and controlling locally available Renewable Energy Sources (RES). The FEDECOM initiative focuses on optimizing energy efficiency and flexibility within and across these communities through a multi-asset coordination platform, facilitating energy exchange, storage, and demand-side management.

Existing Technologies

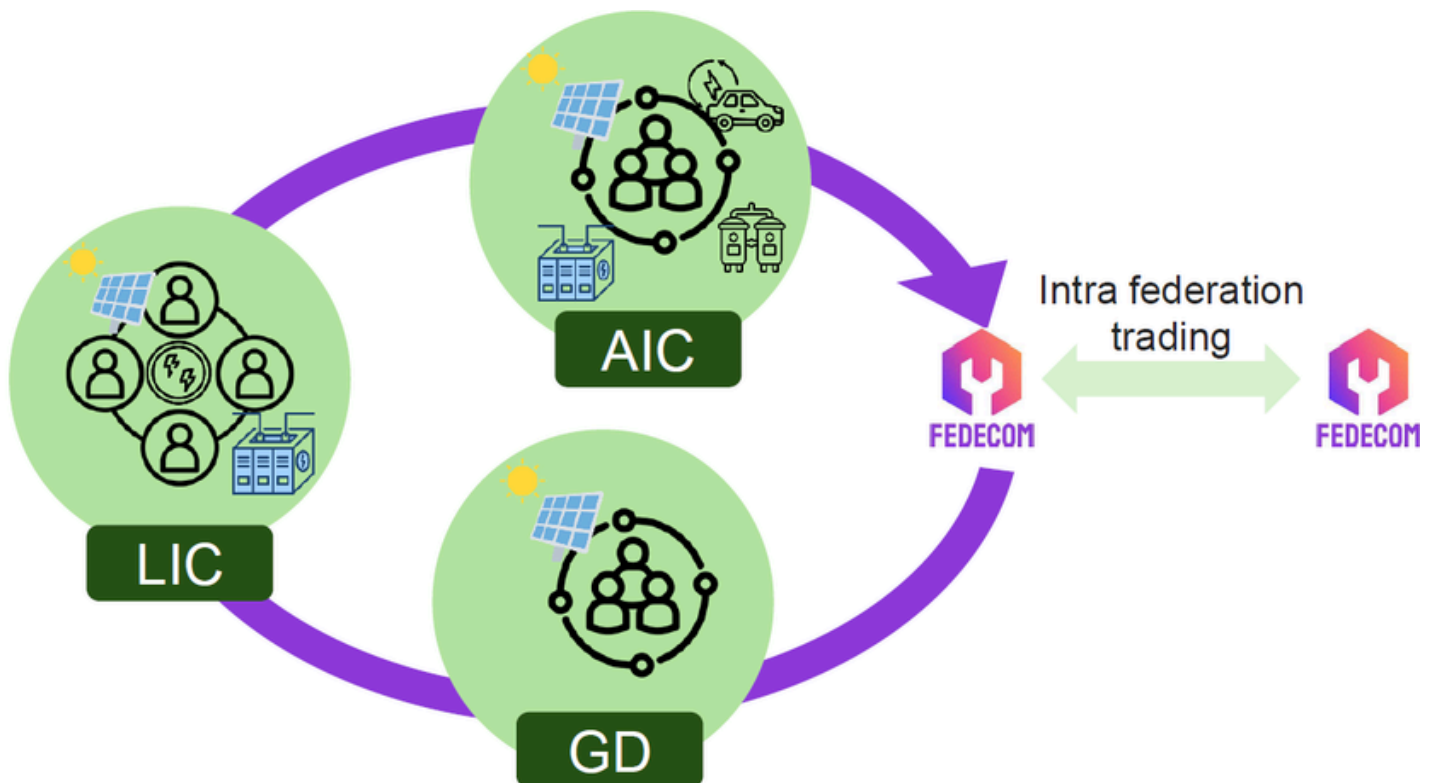
- ▶ PV systems with total capacity approximately 251.4 kWp across all communities
- ▶ Battery storage including 50 kW/70 kWh
- ▶ Heat pumps with a combined capacity of approximately 78 kW
- ▶ Electric boilers totaling 110 kW across the communities
- ▶ District heating service based on a biomass thermal plant (present in the AIC)
- ▶ EV charging infrastructure
- ▶ Fully deployed Advanced Metering Infrastructure (AMI) with flexibility control capabilities
- ▶ Smart Meters 15-minutes energy data collection and management platform (Flexo)

After FEDECOM

Following the **integration of the FEDECOM platform**, the Swiss Residential Hydropower Federation has undergone transformative upgrades aimed at **enhancing operational flexibility, optimizing renewable energy utilization, and boosting overall efficiency**. Advanced monitoring and control enable improved energy management, reduced reliance on conventional sources, and greater community resilience.

Installation upgrades

- ▶ Installation of 13 energy submeters for improved monitoring in a selected batch of residential buildings in LIC equipped with PVs, Heat Pumps, El. Boilers and for two of them EV chargers and batteries
- ▶ Integration of 12 indoor temperature and humidity sensors for detailed environmental data of each floor in a selected batch of residential buildings
- ▶ Installation of 2 grid monitoring devices to measure data from the secondary side of the MV/LV transformer supplying LIC and AIC
- ▶ Installation of a new district battery 20 kWh/20 kW in AIC
- ▶ Enhanced Flexo platform REST API to provide the project partners with data from the Smart Meters of the pilot site
- ▶ Setup of a dedicated server for AEM R&D team, creation of a new data management platform to collect and store data from all the sensors and devices other than the Smart Meters
- ▶ Create a second REST API for project partners to access anonymised data from the pilot site
- ▶ Proof-of-concept of peer-to-peer trading within and across communities empowered by Grid Singularity Decentralised Exchange

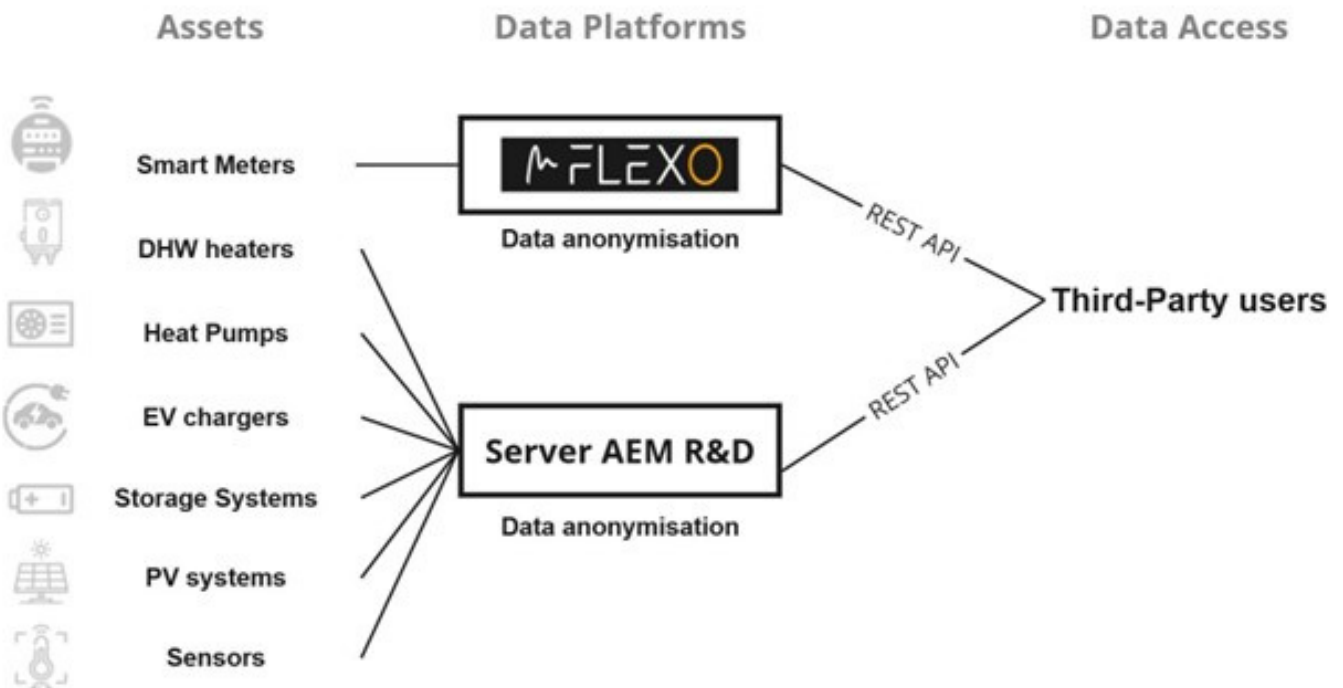


Community benefits

- Enhanced the overall federation and communities energy efficiency by optimally **managing the local available Renewable Energy Sources (RES)**.
- **Improved self-sufficiency and self-consumption** within each community through improved asset coordination by means of enhanced data management and energy trading.
- **Increased the local distribution grid stability** using the flexibility available in the federation and at the community level to perform peak shaving at the transformation cabins.
- **Assess the potential of flexibility aggregation** across the energy communities in the federation to make it accessible to the local Balance Service Provider (BSP).
- **Readiness for community energy trading** and external service provision via the FEDECOM platform.

Innovations of the FEDECOM Platform

- **Real-time monitoring** and data-driven control of energy assets, including PV, battery storage, and EV chargers.
- **Optimization of energy consumption** and storage using advanced predictive algorithms.
- **Facilitation** of intra- and inter-community **energy trading** to maximize renewable energy usage, with economic and environmental benefits.
- **Integration of multi-asset systems**, including thermal, electrical, and mobility assets, for holistic energy management.



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Interested in Replicating this Use Case in Your Community?

Do not hesitate to contact us for more details:

