

Concept proposal PED-call

SolarPluggers: Collective Energy Systems for Apartment Buildings

Summary

SolarPluggers develops an integrated, cooperative business model that combines collective photovoltaic (PV) generation, smart electric-vehicle (EV) charging, and preparation for collective low-temperature heating in apartment buildings. The project addresses one of Europe's hardest decarbonisation challenges: making multi-owner dwellings technically ready, financially viable, and socially acceptable for clean, flexible energy systems. By integrating solar production, shared consumption (heating, ventilation, lighting, elevators) and smart load coordination, SolarPluggers turns apartment buildings into renewable micro-PED's that operate safely within their grid capacity limits. The model builds on cooperative third-party investment model financing, open technical standards, and replicable governance structures that empower residents and local authorities to co-own their energy future.

Context and Challenge

Across Europe, apartment buildings represent a rapidly growing share of the housing stock—almost one million units in Flanders alone—yet they lag behind in renewable integration. Most are electrically under-dimensioned and administratively fragmented. The growing use of electric vehicles and the foreseeable switch to collective heat pumps will quickly exceed the available network capacity when charging and heating remain uncoordinated.

In parallel, rooftops of these buildings often remain underused for PV generation, even though the shared consumption of solar power for lighting, ventilation, elevators, and parking infrastructure could significantly cut energy bills and emissions. The absence of harmonised regulations on underground charging, fire safety, and load management further complicates implementation.

Europe therefore needs a scalable technical and business model that enables energy communities and cooperatives to equip multi-apartment buildings with interoperable, safe, and future-proof collective systems—building blocks of clean and flexible districts.

Objectives and Innovation

SolarPluggers aims to develop, demonstrate, and validate an integrated multi-energy concept combining PV, EV charging, and collective heating readiness.

Main objectives:

- Integrate shared PV systems with EV charging, ventilation, elevators, and future heating solutions through an intelligent control platform that manages all electrical flows dynamically.
 - Develop interoperable technical standards (cabling, metering, fire safety, communication protocols) suitable for replication across different European grid codes and building typologies.
 - Design a cooperative third-party investment business model, allowing long-term third-party financing, transparent cost allocation, and community participation via energy-sharing principles explore combinations of cooperative capital, municipal co-investment, and third-party loans.
 - Create a phased investment strategy, allowing gradual addition of charging points and heating systems without lock-ins.
 - Strengthen citizen engagement through cooperative governance, ensuring inclusiveness and affordability for all residents.
- The innovation lies in the integration of renewable generation, smart control and cooperative finance—enabling apartment buildings to evolve stepwise into self-sustaining energy communities.

Approach and Pilot Setup

The project will bring together energy cooperatives, municipalities, research institutions, and technology partners in a multi-country pilot programme.

Aim to establish four pilot sites in different European to validate the model under diverse climatic, legal, and social conditions.

Each pilot will implement shared PV generation, shared charging, and building-level load management with standardised monitoring.

ECoOB's role could be:

- As a citizen energy cooperative and third-party investment operator, ECoOB brings extensive experience with financing, designing, and operating renewable systems through third-party models.
- ECoOB will host up to two pilot installations in its region (e.g., Leuven and Tienen), combining rooftop PV, collective charging, and preparation for integration with future collective heating systems.
- With deep experience in engaging VME's (associations of co-owners) and local energy communities, ECoOB will co-develop the stakeholder engagement playbook and pricing templates.
- ECoOB will also involve at least one municipality or city partner from its working area to demonstrate how local authorities can facilitate collective retrofits through planning, permitting, and citizen communication.
- Technical tasks will include modelling of energy flows, load-balancing algorithms, and validation of safety and capacity compliance. The social and governance

dimension will be explored through workshops with residents, syndics, and cooperatives across all pilot countries.

Expected Impacts

- Higher renewable self-consumption (up to 40% increase) by synchronising solar generation with charging, heating, and communal loads.
- Grid-capacity optimisation, cutting peak loads by a factor of ten versus uncoordinated individual charging.
- CO₂ reduction of approx. 10 t/year per pilot and 80 MWh/year renewable generation, assuming full displacement of grid electricity at 120 g CO₂/kWh.
- Replicable standards and open-source documentation for energy-sharing, safety compliance, and load management applicable across EU member states.
- Enhanced social acceptance and inclusion through cooperative financing, citizen participation, and municipal support.

SolarPluggers thus bridges technology, governance, and finance to make apartment buildings active, flexible components of Europe's clean-energy districts — accelerating the just and local energy transition.