



Master project, 2025-2026

Influence of the allocation key and economic model on the attractiveness
of renewable energy communities

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Context

Energy Communities have emerged as a promising challenge towards the climate mitigation and comply with the 2050 decarbonization goals. In this context, the Clean Energy Package for All Europeans establishes the terms of Renewable and Citizen Energy Communities respectively to deliver environmental, economic and/or social benefits for their members.

Objective

The aim is to determine the rules for energy exchange and remuneration of prosumers within renewable energy communities that lead producer-consumers to prefer collective self-consumption over individual self-consumption and encourage investment in renewable energy production and storage facilities. Flexibility and its economic model will also be studied. The economic model should make the community attractive and encourage members' loyalty. The investigation will be based on optimization and sensitivity analysis tools.

Work steps

1. State of the art on individual and collective self-consumption, renewable energy community, economic model, microgrid energy management, open-data for electricity consumption and renewable production, optimization, and game-theory.
2. Define a case-study of renewable energy community: number of households, consumption profiles and flexibilities, photovoltaic productions, energy storage systems.
3. Define an optimization problem to minimize electricity bill for individual self-consumption and find the optimal energy management strategy.
4. Extend the optimization problem to find the optimal surface of photovoltaic panels and storage capacity.
5. Define allocation key and economic model for collective self-consumption, clarify attractiveness of renewable energy community.
6. Investigate the influence of the allocation key and economic model on the attractiveness of renewable energy communities

Key word

Renewable energy community, Flexibility, Power-flow, Optimization, Self-consumption

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