WHITE PAPER

# Renewable energy communities and the future of collective prosumership

New Energy Coalition

## The question

*Are Renewable Energy Communities the Future of Collective Prosumership?* We often hear that citizens are set to play an active role in the energy transition by transforming from 'passive' consumers to 'active' prosumers. What this means in terms of the possibilities for European citizens to become prosumers is the question that Shubhra Chaudhry aimed to answer in her research on Renewable Energy Communities in Germany.

## The background

Citizens have been participating in local energy initiatives since the early 90s, especially in Denmark and Germany, due to a trifecta of favourable factors: intrinsically-motivated citizens, a strong history of cooperative movements and a supportive policy framework. There was no harmonized regulation at the European Union (EU) level on how citizens could collectively participate in local energy initiatives and there was a wide variety in organizational forms, technologies and activities. In 2018, the EU formally defined the umbrella term of Renewable Energy Communities (RECs) to encompass the spectrum of possibilities for citizens to become active participants in the energy transition.

## The research

A holistic understanding of RECs is essential to identify the benefits and challenges that citizens might face in becoming prosumers and co-owners of local renewable energy (RE) projects. RECs have been widely studied from either a techno-economic lens or socio-political perspective or from a legal/regulatory angle, but not often from an integrated and multi-disciplinary perspective. A wide variability in how the results are reported also discourages comparison across studies.

We tried to tackle this challenge by proposing an integrated methodology that can be used by citizens, investors, and public authorities to evaluate the benefits of RECs. We use a neighbourhood in Germany that is being redeveloped into a climate-neutral, mixed-use district as a case study to test out our proposed methodology.

- First, we checked if energy cooperatives, which are the most prevalent form of citizen energy initiatives in Germany, were compliant with the definition of RECs. We found that energy cooperatives may no longer be suited to form RECs since they do not meet all the criteria set out in EU regulations. So, we used an innovative organizational structure – the Consumer Stock Ownership Plan – to design the REC.

- Second, we modelled the technical possibilities of collective prosumership using energy flow analysis based on consumption and generation profiles of solar plants.
- Third, we modelled the economic impacts of prosumership from two perspectives:
  - from the consumers' perspective: in terms of the annual energy bill.
  - from the investor's perspective: in terms of the net present value (NPV) of the investment.
- Fourth, we used the model to quantify the ecological impact of prosumership by calculating the annual greenhouse gas emissions of energy consumption (expressed in kg $CO_2$ equivalent).
- Lastly, a set of key performance indicators (KPIs) were proposed to be used to interpret and compare the results of simulations.

The approach proposed in this study offers a single, replicable model that can be used to simulate RECs in the different Member States of the European Union. The KPIs can be used to compare the impact of combinations of various prosumership activities within the same REC or to compare two different RECs on the benefits offered vis-a-vis the investments incurred. The KPIs also offer insights into the aligning and conflicting objectives of the stakeholders of the REC, which is often overlooked because it is assumed that all actors have the same or similar goals in forming a REC.

## The results

We used the case study to show that when citizens pursue a combination of activities (self-consumption, energy sharing and feeding excess energy back to the public grid), they can meet 35% of their demand, get maximum greenhouse gas savings of 35% and locally consume 61% of the energy that they generate. Not only do they become co-owners of their energy system, but by self-consuming their RE, they reduce the congestion problems in the grid. By working with professional actors like local energy suppliers, the REC also become more 'professionally' run.

The benefits of RECs are many but under the current German regulations, citizens save a maximum of 5% on their annual energy bills, which is not a significant amount when compared to the investments and effort required to set up the REC. Moreover, the REC has a negative Net Present Value (NPV) after 25 years of operation.

A combination of these factors reduces the attractiveness of RECs. Contrary to what is envisioned by the EU, citizens may be discouraged from forming RECs and they may forgo the technical and ecological benefits of prosumership.

## Key takeaway

RECs hold promise in being the future of collective prosumership. However, for their application in Germany, dedicated subsidies, one-time grants or price support for operators are needed. Specific incentives for sharing energy between small-scale parties over a public grid are also needed for improving the business case of RECs.

For more details, please see the two-part article "Renewable Energy Communities as Modes of Collective Prosumership: A Multi-Disciplinary Assessment"

**Part I - Methodology:** https://www.mdpi.com/1967108 and
**Part II - Case Study:** https://www.mdpi.com/1969174

## About Shubhra Chaudhry

Shubhra Chaudhry is a Project Manager with New Energy Coalition.
She has a double Master's in Sustainable Energy Systems and Business Administration. Her work focuses on the techno-economic aspects of energy systems and how diverse stakeholder groups (citizens, governments, comapnies and organizations) can collaborate to collectively accelerate local energy transitions.

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