

Today, one of the greatest worldwide challenges is global warming, largely due to fossil fuel combustion to generate heat and power. To counteract the negative and long-term effects of climate change, an energy transition is essential, in which renewable energy sources and energy efficiency play a crucial role. Additionally, due to the difficult geopolitical situation in eastern Europe, energy security has received special attention from EU countries that relate their increase in energy independence to renewable energy technologies such as photovoltaic, wind turbines, and green hydrogen. As one of the responses to the aforementioned changes, the concept of the Renewable Energy Community (REC) came up, applying the latest digital technologies to unlock the potential of renewables and create an environmentally friendly ecosystem, in which the community can produce, store, and consume energy locally. As a new entity, REC may alter existing electricity market models by transforming passive consumers into active prosumers, or even flexumers. Moreover, the REC concept has the potential to be not only innovative but, more importantly, an impactful solution for society as a whole, not just individuals. The literature review indicates that factors influencing the interest of local communities in participating in REC projects vary depending on their economic status, or environmental awareness. Since the participation of society determines the success of REC projects, the aim of this project is to analyze incentives and social barriers to participation in REC and to identify actions to increase the willingness of the community to participate in REC initiatives.

**The objectives of the project are as follows:** assess the awareness of prosumers of the REC concept and its solutions applying to the latest technologies; identify the REC attributes relevant to prosumers; identify and characterize the types of prosumers depending on the barriers and motivation to participate in REC; build an agent-based model that adjusts the types of interventions/ external stimuli that will have the most effective impact on the decisions of identified individual groups of prosumers about participation in REC projects. In our study, we will verify seven **hypotheses** related to, among others, dependence of participation in REC on economic and environmental benefits and access to advanced technologies, impact of local community and the number of prosumers in the neighborhood on the willingness to participate in REC and to share the benefits with the neighbors, relation between the willingness to engage in REC on the ability to resign from it at any time, and the willingness to share the data regarding energy consumption only if economic or environmental benefits are guaranteed, and finally that interventions based on price and environmental incentives are more successful in enhancing REC diffusion than interventions based on information or education.

The project will use a **triangulation of research methods**, starting with desk research and individual in-depth interviews with N=10 experts operating in the energy and IT industries, representatives of local government and nongovernmental organizations, who lobby to promote the concept of energy communities and peer-to-peer energy trading. Then we will conduct a longitudinal study starting with a questionnaire-based online survey among N=1000 prosumers from Poland, representing various regions and parts of the country. From this sample, N=200 participants will be recruited to the second stage of the study, consisting of empathy interviews according to the design thinking methodology and a discrete choice experiment. The obtained data will be analyzed by means of statistical and econometric techniques, and visualized with the help of Power BI. The analysis of consumers' preferences, chances and barriers of social acceptance towards the concept of REC will be used to create and calibrate the agent-based model (ABM). ABM will be useful to investigate what if scenarios, examining the effectiveness of various government and market strategies in the continued deployment of energy communities.

From the point of view of **basic research**, the project contributes to the development of the research field in behavioral and energy economics and in sustainable development management. From the point of view of **economic and societal impact**, this project sheds some light on the motivations and attributes of people, which can improve understanding of the intentions behind people's interest and engagement in energy communities concept in general, and peer-to-peer energy trading in particular.