https://doi.org/10.7250/CONECT.2024.046

REMOTE SOLAR PARKS FOR BUILDING DECARBONISATION: A LITHUANIAN CASE STUDY ON VIRTUAL PROSUMERS

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Abstract – To reduce the carbon footprint of buildings, the concept of virtual prosumers (consumers who both consume and produce) using remote solar energy parks represents a novel method in Europe. In 2019, Lithuania became the first country in Europe to introduce a digital platform that enables the buying or renting of parts of a remote solar park, making it the first such platform in the world to operate on a national scale. This study examines the effectiveness of this model in Lithuania, assessing the model's success, public engagement, and success factors. The main study focuses on evaluating the impact of remote solar parks on the decarbonization of buildings, particularly through the prism of virtual prosumer participation. Applying a mixed research method, this study integrates both qualitative and quantitative data. The quantitative analysis includes a detailed case study, evaluating the amount of energy produced by two selected remote solar parks in Lithuania, as well as their impact on the carbon dioxide emissions and primary energy use of the two individual houses (a detached house and a unit within an apartment building) connected to these remote power plants. Concurrently, qualitative methods involve analyzing the existing legal and economic frameworks in Lithuania and Europe, which either facilitate or impede the prosumer model, in addition to examining the necessary technological infrastructure. Key findings of this study highlight the potential of remote solar energy parks to significantly reduce the carbon emissions of buildings. This model is especially beneficial for structures where onsite solar energy solutions are impractical. It fosters greater inclusivity in adopting renewable energy, enabling a variety of stakeholders to participate in and benefit from clean energy production. However, the study identifies several major challenges, including regulatory restrictions, the need for infrastructure development, a shortage of developers, state contributions, public awareness, and the creation of a unified platform.

Keywords – Building Decarbonization; clean energy accessibility; digital energy solutions; renewable energy participation