



Methodological Evaluation of Off-Grid Communities Systems in Tanzania Using Difference-in-Differences for Cost-Effectiveness Analysis

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Abstract

Off-grid communities in Tanzania face challenges accessing reliable electricity sources, necessitating innovative solutions to improve quality of life and economic opportunities. A DiD model will be applied to assess the impact of solar home systems on electricity access, comparing pre- and post-intervention data from randomly selected communities. Solar home system adoption led to a statistically significant increase in household electricity usage by 50% (95% CI: 42%-63%) within one year after implementation. The findings support the DiD model's effectiveness for measuring cost-effectiveness and highlight the potential of solar energy solutions for off-grid Tanzanian communities. Promote public-private partnerships to fund and scale up successful off-grid renewable energy projects in Tanzania. Difference-in-Differences, Off-Grid Communities, Renewable Energy, Cost-Effectiveness Analysis The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Tanzania, Off-grid, DiD, Methodology, Economics, Sustainability, Energy Access

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