



Methodological Evaluation of Off-Grid Communities Systems in Rwanda Using Multilevel Regression Analysis for Cost-Effectiveness Measurement

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Abstract

This research protocol focuses on evaluating the cost-effectiveness of off-grid communities systems in Rwanda. A multilevel regression analysis will be employed to measure cost-effectiveness. The model will include variables such as community size, technology type, and geographic location. The preliminary findings suggest that community size significantly influences the cost-effectiveness of off-grid systems ($p < 0.05$). This study aims to provide a robust method for assessing the cost-effectiveness of off-grid communities in Rwanda using multilevel regression analysis. The findings will be used to inform policy and future research efforts on sustainable energy solutions in rural areas. The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Rwandan, Multilevel, Regression, Sustainability, Development, Analysis, Evaluation*

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