



Solar Panels and Access Programmes in Central African Republic Villages: Household Impact Evaluations

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Abstract

The Central African Republic (CAR) faces significant energy access challenges in rural areas, where over half of the population lacks reliable electricity. This study aims to evaluate the impact of solar panel-based energy programmes on households' energy consumption and quality of life. A mixed-methods approach was employed, combining quantitative surveys to measure changes in energy consumption and qualitative interviews to explore user experiences. Data were collected from 100 households across five randomly selected villages, using a stratified sampling method. Households reported a significant increase ($p < 0.05$) of 25% in daily electricity usage after the solar panel installation, with an average daily savings of 3 per household, reflecting a positive shift towards more sustainable energy practices. The study highlights that $\hat{\theta} = \operatorname{argmin}_{\theta} \sum_i \ell(y_i, f_{\theta}(x_i)) + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: Sub-Saharan, African, Solar, Panels, Remote, Villages, Ethnography, Qualitative, Innovation

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