



Adoption Rate Analysis of Renewable Energy Microgrids in Off-Grid Rural Kenyan Villages: Financial and Environmental Impacts Over One Decade

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Abstract

Renewable energy microgrids have been introduced in off-grid rural Kenyan villages to provide electricity and improve living standards. A cross-sectional survey was conducted among 500 households in off-grid rural Kenyan villages. Data on household demographics, income sources, electricity usage patterns, and grid connection status were collected using structured questionnaires. The adoption rate of renewable energy microgrids increased from 20% at the beginning to over 40% by the end of the decade, with a notable trend in households with higher incomes adopting these systems more quickly. Renewable energy microgrids have been successfully implemented and are gradually becoming mainstream in off-grid rural Kenyan villages, offering significant financial savings and environmental benefits. Government incentives should be expanded to encourage wider adoption of renewable energy microgrids among low-income households.

Keywords: *Kenyan, microgrid, renewable energy, rural electrification, sustainability, econometrics, GIS, participatory approach*

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