African Materials Engineering

Urban Renewable Energy Systems in Lagos Slums: A Methodological Approach to Cost Savings and Community Engagement Analysis

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Abstract

Urban renewable energy systems (RSES) are crucial for sustainable development in resource-constrained urban areas like Lagos slums. However, their implementation faces challenges related to cost and community engagement. A mixed-methods research design was employed, integrating quantitative surveys ($N = 150$) $with\, qualitative\, interviews\, (n = 20)$. Statistical analyses were conducted using regression models and bootstrapping to estimate confidence intervals. Survey data revealed that the average cost savings per household reached $30 per month from installed solar panels. Qualitative insights highlighted community engagement levels varied significantly, necessitating tailored strategies for different groups. The methodological approach successfully identified key factors influencing cost and community outcomes but requires further validation through larger-scale studies. Communities should be actively engaged in RSES planning to ensure sustainability and acceptance. Policy makers must consider subsidies and incentives for low-income households.

Keywords: *Geographical Information Systems (GIS), Renewable Energy Technologies (RETs), Cost-Benefit Analysis (CBA), Participatory Rural Appraisal (PRA), Stakeholder Analysis, Sustainability Indicators, Project Evaluation Framework (PEF)*

ABSTRACT-ONLY PUBLICATION

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