



Green Energy Microgrids in Burkinabe Communes: Efficiency Assessment by Year End

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Abstract

Green energy microgrids have been proposed as a sustainable solution for off-grid communities in Africa, offering decentralized power generation and distribution. A mixed-method approach combining quantitative data analysis with qualitative site visits was employed, focusing on renewable energy deployment and operational metrics. The average solar panel efficiency recorded across the microgrids was $15\% \pm 3\%$, indicating moderate performance in harnessing sunlight for electricity generation. Despite challenges such as unreliable grid connections and limited financial resources, the study demonstrates that green energy microgrids can be viable solutions with incremental improvements needed. Communities should prioritise renewable resource integration while governments provide subsidies or incentives to support sustainable energy infrastructure development. Green Energy Microgrids, Renewable Energy Deployment, Efficiency Assessment, Burkinabe Communes The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Sub-Saharan, African, Microgrids, Solar, Panels, Hybrid, Renewable, Energy

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