



Impact Assessment of Renewable Energy Microgrids on Northern Ghanaian Educational Facilities

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Abstract

Renewable energy microgrids are increasingly adopted to provide reliable electricity in off-grid communities, including educational facilities. A mixed-methods approach combining surveys with case study analysis was employed to gather data from schools and community representatives. Microgrids significantly reduced electricity costs by up to 40% for selected schools, leading to improved maintenance schedules and enhanced educational activities. The integration of renewable energy microgrids in Northern Ghanaian educational facilities has demonstrated substantial economic benefits and operational improvements. Further implementation should focus on expanding the reach of these technologies and addressing potential challenges related to local acceptance and infrastructure development.

Keywords: *Sub-Saharan, microgrid, sustainable development, renewable energy, rural electrification, hybrid systems, impact evaluation*

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