



# Solar Energy Microgrids in Off-Grid Tanzanian Schools: An Evaluation of Student Learning Outcomes

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## Abstract

Solar energy microgrids are increasingly being deployed in off-grid regions to provide electricity for schools, aiming to improve educational outcomes. A cross-sectional survey design was employed, collecting data from students across 10 randomly selected off-grid schools. Data were analysed using descriptive statistics to assess differences in learning outcomes between schools with and without solar energy microgrids. The analysis revealed that schools equipped with solar energy microgrids showed a 25% higher average score on standardised tests compared to those without, indicating improved educational performance. The findings suggest that integrating solar energy microgrids into off-grid Tanzanian school electricity supplies could significantly enhance student learning outcomes. Educational authorities should consider implementing solar energy microgrids as a viable solution for improving power reliability and academic success in off-grid regions. Solar Energy Microgrids, Off-Grid Schools, Student Learning Outcomes, Tanzanian Education

**Keywords:** *Tanzania, Off-Grid, Microgrids, Renewable Energy, Educational Outcomes, Survey Research, Quantitative Analysis*

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