



Solar Microgrids in Off-Grid Senegalese Villages: Financial Savings and Emissions Reductions over Two Years in Guinea

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Abstract

Solar microgrids have been implemented in off-grid Senegalese villages as a sustainable energy solution. The study utilised data collected through surveys and monitoring of energy consumption patterns. Energy consumption patterns showed an average reduction of 40% in electricity bills compared to previous non-solar methods, with a standard error of $\pm 5\%$. Solar microgrids significantly reduced financial costs and carbon emissions over the two-year period. Communities should be encouraged to adopt solar microgrids for sustainable energy solutions. solar microgrid, off-grid villages, financial savings, emissions reductions Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{Vert}^2$, with performance evaluated using out-of-sample error.

Keywords: *Geographic, Senegalese, Off-Grid, Microgrids, Sustainability, EnergyHarvesting, Monitoring*

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