



# Methodological Evaluation of Power-Distribution Equipment Systems in Kenya: Quasi-Experimental Design for Efficiency Gains

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## Abstract

In Kenya, power distribution systems often suffer from inefficiencies, leading to reduced service quality and increased costs for consumers. A mixed-methods approach was employed, combining quantitative data analysis with qualitative interviews. The study used a difference-in-differences (DID) model to assess changes in system performance over time. The DID model revealed a statistically significant increase of 15% in power distribution efficiency when comparing pre- and post-intervention periods for systems A and B, with robust standard errors indicating the reliability of these results. This quasi-experimental design successfully highlighted areas where system performance could be optimised, providing actionable insights to stakeholders. Stakeholders are advised to implement the identified optimizations in their power distribution equipment systems for enhanced efficiency and cost savings. The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u + \varepsilon$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Kenya, Power Distribution Systems, Methodology, Quasi-Experimental Design, Efficiency Measures, Rural Electrification, Performance Evaluation

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