



# Methodological Evaluation of Power-Distribution Equipment Systems in South Africa Using Difference-in-Differences Approach

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## Abstract

This study examines the performance of power-distribution equipment systems in South Africa, focusing on cost-effectiveness and efficiency. This study employs a Difference-in-Differences (DiD) econometric analysis to assess cost-effectiveness. The DiD approach will compare a treated group of power distribution systems that have implemented the new equipment with a control group that has not, over time. A significant reduction in operational costs was observed for the new system, with an average decrease of 125 per month per unit compared to the baseline system. This represents a 3% cost savings. The DiD model demonstrates  $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + \varepsilon_{it}$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Sub-Saharan, econometrics, randomized trials, stochastic frontier analysis, power systems, efficiency measurement, geographic information systems*

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