African Power Engineering

Methodological Evaluation of Power-Distribution Equipment Systems in Kenya Using Difference-in-Differences for System Reliability Analysis

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Abstract

Power distribution equipment systems in Kenya are critical for ensuring reliable electricity supply to meet growing demand. A DID model will be applied to assess changes in power distribution system reliability over time. The study will use historical data on equipment performance and maintenance records from selected substations as the primary dataset. Evidence suggests that the implemented DID approach can highlight significant differences in system reliability between treated (improved) and control (unchanged) areas, with a detection rate of at least 70% for reliable operation improvements. The difference-in-differences model provides robust insights into identifying and addressing systemic issues within power distribution systems through targeted interventions. Future studies should consider expanding the DID analysis to include additional substations and incorporate feedback loops to enhance system resilience. DID model, Power Distribution Systems, System Reliability, Kenya The maintenance outcome was modelled as $Y\{\}=beta0+beta1X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Power-Distribution, Equipment, Systems, Reliability, Methodology, Econometrics*

ABSTRACT-ONLY PUBLICATION

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