

A Methodological Evaluation of Power-Distribution Equipment Systems in Kenya

A Panel-Data Estimation for Cost-Effectiveness, 2000–2026

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ABSTRACT

Background: The expansion and modernisation of power-distribution networks in sub-Saharan Africa require robust, evidence-based frameworks for evaluating equipment investments. Existing life-cycle cost analyses often lack longitudinal rigour, particularly in dynamic operational environments.

Purpose and objectives: This case study aims to develop and apply a panel-data econometric model to assess the cost-effectiveness of prevalent power-distribution equipment systems, providing a methodological framework for infrastructure investment planning.

Keywords: *Power distribution networks, Panel-data estimation, Cost-effectiveness analysis, Sub-Saharan Africa, Life-cycle costing, Infrastructure investment, Kenya*

Article Highlights

- Panel-data model reveals long-term cost dynamics of power equipment.
- Imported systems showed significant cost premium over locally serviced alternatives.
- Methodology provides replicable framework for infrastructure investment planning.
- Findings advocate for life-cycle cost analysis in procurement policies.

Methodological Contribution

Novel application of panel-data econometrics to power infrastructure evaluation in sub-Saharan Africa, offering a replicable model that accounts for operational heterogeneity over time.

This study presents a longitudinal framework for evaluating infrastructure cost-effectiveness.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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