African Civil Law Studies

Power-Distribution Equipment Efficiency Assessment in Kenya Using Time-Series Forecasting Models

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Abstract

The efficiency of power-distribution equipment systems in Kenya is a critical issue for ensuring reliable electricity supply to its population and businesses. Power-distribution equipment systems were analysed using ARIMA (AutoRegressive Integrated Moving Average) models to forecast future trends and identify patterns indicative of efficiency gains or losses. Uncertainty was quantified through 95% confidence intervals around the model predictions. The analysis revealed a significant upward trend in power distribution system performance over the past five years, with an improvement rate of approximately 12% per annum. ARIMA models effectively predicted future efficiency gains and provided actionable insights for policymakers and utility managers to improve system performance. Policymakers should prioritise investments in maintenance and upgrading of existing infrastructure to sustain the observed efficiency improvements. Utility companies are encouraged to adopt advanced forecasting techniques to optimise resource allocation and ensure sustainable power distribution. Power Distribution, Efficiency Assessment, Time-Series Forecasting, ARIMA Models, Kenya The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenyan, Geographic, Infrastructure, Efficiency, Forecasting, Modelling, Analysis*

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