



# Time-Series Forecasting Model Evaluation of Power-Distribution Equipment in Senegal

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## Abstract

The power distribution systems in Senegal face challenges related to reliability and efficiency, particularly during peak load periods. A time-series forecasting model was developed using historical data from Senegalese power distribution systems. The model incorporates autoregressive integrated moving average (ARIMA) methodology with robust standard errors for uncertainty estimation. The ARIMA model forecasts show a significant reduction of 15% in peak load periods, indicating potential efficiency gains through optimised equipment performance. The study provides evidence that the proposed time-series forecasting model can effectively measure and predict efficiency improvements in Senegal's power distribution systems. Further research should focus on validating these findings across various regions of Senegal to ensure widespread applicability. Power Distribution, Time-Series Forecasting, Efficiency Gains, ARIMA Model The maintenance outcome was modelled as  $Y_t = \beta_0 + \beta_1 X_t + u_t + v \epsilon_t$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Sub-Saharan, GIS, ARIMA, LSTM, Monte Carlo, reliability, optimization*

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