



# Methodological Evaluation of Power-Distribution Equipment Systems in Nigerian Environments: A Comparative Field Trial

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## Abstract

Nigeria experiences significant power outages due to inadequate infrastructure, necessitating a robust methodological evaluation of power-distribution equipment systems. A comparative study involving four distinct power-distribution system configurations was implemented across various Nigerian environments. Randomization ensured that all trials were conducted under controlled conditions, minimising external variables. The analysis revealed a significant improvement in power distribution yield by up to 25% when using the optimised configuration of equipment compared to traditional setups, with an average increase measured over six months. The study concludes that employing the optimised system configuration significantly enhances power-distribution efficiency in Nigerian environments. Based on these findings, it is recommended that policymakers and infrastructure developers adopt this optimised method for future installations to mitigate power outages and improve energy supply reliability. The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u_i + \varepsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Nigerian, Geographic, Methodology, Infrastructure, Distribution, Efficiency, Optimization

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