African Aerospace Engineering

Power-Distribution Equipment Systems Risk Reduction in Senegal: A Panel Data Evaluation

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Abstract

Power distribution equipment (PDE) systems are critical for reliable electricity supply in Senegal, yet their performance varies widely across different regions. A mixed-method approach combining econometric analysis and field observations was employed. Panel Data Estimation (PDE) was used to assess the impact of various factors on system reliability. Panel Data Analysis revealed that investment in maintenance and upgrading had significant positive effects, reducing risks by approximately 15% over a two-year period. The study supports the efficacy of targeted interventions for improving PDE systems' resilience in Senegal's electricity grid. Policies should focus on enhancing maintenance routines and encouraging technological upgrades to ensure sustainable power distribution. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, econometric, infrastructure, reliability, stochastic*

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