Power-Distribution Equipment Systems Yield Improvement in Senegal: A Difference-in-Differences Analysis

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Abstract

Power distribution systems in Senegal have seen significant challenges in reliability and efficiency. A DID model was applied to assess the effect of PDE installations across different regions in Senegal over two consecutive years. The analysis controls for potential confounders such as regional economic activity and infrastructure development. The estimated DID coefficient suggests a substantial increase (p<0.01) in system yield post-installation, with an average improvement of 25% across all monitored PDE units. PDE upgrades significantly improved power distribution systems' efficiency and reliability in Senegal, highlighting the effectiveness of targeted interventions for infrastructure development. Further research should explore long-term effects and scalability of these improvements to inform broader policy decisions. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Geographic Information Systems, econometric models, power reliability, efficiency metrics, regional disparities*

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