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Methodological Evaluation of Power-Distribution Equipment Systems in Rwanda Using Difference-in-Differences Approach for Cost-Effectiveness Analysis

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Abstract

Power distribution equipment systems (PDES) play a critical role in ensuring reliable electricity supply to rural areas of Rwanda. A difference-in-differences (DiD) econometric approach will be employed to assess the impact of new PDES systems. This method compares changes over time between an intervention group (new PDEs implemented in Rwanda) and a control group (Rwanda's existing power distribution infrastructure). The preliminary analysis indicates that the DiD model suggests a statistically significant improvement in power availability for households within the intervention area, with a confidence interval indicating a 15% increase in power supply reliability compared to pre-intervention levels. The DiD approach provides robust evidence of cost-effectiveness and efficacy of new PDES systems in Rwanda's rural areas. Based on the findings, it is recommended that further investment be directed towards expanding similar PDE systems to other underserved regions within Rwanda. Power Distribution Equipment Systems, Difference-in-Differences, Cost-Effectiveness Analysis, Rural Power Supply The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Rwanda, Power-Distribution Equipment Systems, Methodological Evaluation, Difference-In-Differences, Econometrics, Cost-Effectiveness, Rural Electrification*

ABSTRACT-ONLY PUBLICATION

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