African Materials Engineering

Evaluating Power-Distribution Equipment Systems in Rwanda Using Panel Data for Yield Improvement Analysis

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Abstract

Power-distribution equipment systems in Rwanda are critical for ensuring a stable energy supply to households and businesses. However, their efficiency and reliability vary significantly across different regions. Panel-data estimation methods were employed to analyse the impact of various factors on energy yield from power-distribution systems. The dataset includes historical records and geographical information, covering a period since . Data analysis revealed that improving maintenance schedules could increase power distribution system efficiency by approximately 15% in regions with frequent equipment failures. The findings suggest potential for yield improvement through targeted interventions such as upgrading infrastructure and enhancing maintenance protocols. Local authorities should prioritise investment in regular equipment inspections and maintenance to enhance the overall performance of power-distribution systems in Rwanda. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Panel data, Rwanda, Energy efficiency, Econometrics, Distribution systems, Supply chain management, Power engineering*

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