



Adoption and Adaptation of Wind-Solar Hybrid Generators in Off-Grid Villages of Madagascar: Energy Access and Economic Impacts

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Abstract

Wind-solar hybrid generators are increasingly used in off-grid villages of Madagascar to address energy access challenges. Qualitative research methods were employed, including semi-structured interviews and focus group discussions in five off-grid villages across Madagascar. Data analysis involved thematic coding of interview transcripts and discussion notes. In one village, wind-solar kits provided an average of 6 hours of electricity per day, with over half the households adopting at least one such system, indicating a significant adoption rate. The study highlights how local conditions influenced technology adaptation, leading to varied energy access and economic benefits among villages. Future research should assess long-term sustainability in different climate zones and explore synergies with other renewable technologies. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Madagascar, hybrid systems, renewable energy, qualitative methods, adaptation studies, off-grid, community engagement

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