



Storage Solutions for Grid Stability and Renewable Intake in Djibouti: A Qualitative Exploration

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Abstract

This study explores energy storage solutions for enhancing grid stability in Djibouti, a country with limited conventional power sources and high dependency on renewable energy. A qualitative study involving interviews with key stakeholders, including government officials, utility companies, and renewable energy developers, to gather insights into current challenges and future needs for grid stabilization and renewable integration. Interviews revealed that there is a strong interest in hybrid battery systems (proportion: 70%) as the most viable solution due to their scalability and reliability. However, concerns regarding initial investment costs remain significant. The findings suggest that Djibouti needs tailored energy storage solutions informed by local conditions to achieve sustainable grid stability with renewable energy uptake. Recommendation 1: Conduct a pilot project to evaluate the effectiveness of hybrid battery systems in real-world scenarios. Recommendation 2: Develop financial models to assess and mitigate high initial investment costs for energy storage projects. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Djiboutian, renewable integration, qualitative analysis, energy security, storage technologies, grid resilience, sustainable development*

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