



Hydrogen Adoption in Central African Republic: Exploring Potential as an Emerging Energy Source

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Abstract

Hydrogen is emerging as a promising energy source due to its zero-emission potential in various sectors, including transportation and power generation. Central African Republic (CAR), with its abundant natural resources, presents an ideal testing ground for exploring the feasibility of hydrogen adoption in this context. Qualitative research methods were employed, including semi-structured interviews with key stakeholders (government officials, industry leaders, and technical experts) and a literature review of existing policies and technologies related to renewable energy in CAR. Data analysis focused on thematic content coding to identify patterns and themes. Semi-structured interviews revealed that current energy infrastructure is predominantly hydrocarbon-based, with limited technological readiness for hydrogen applications. Key barriers identified include high initial investment costs and insufficient policy support. Themes of technical feasibility and potential market entry points emerged from the data. The study concludes that while significant challenges exist in CAR's transition to hydrogen as a fuel source, strategic interventions such as increased government funding and supportive policies could accelerate this process. The results suggest that targeted investments in R&D and policy frameworks are essential for unlocking the full potential of hydrogen energy in CAR. Recommendations include developing a comprehensive roadmap for hydrogen adoption, fostering collaboration between public and private sectors to address technological limitations, and implementing pilot projects to demonstrate feasibility and build investor confidence. The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, renewable energy, hydrogen economy, sustainability studies, qualitative methodology, energy transition, green fuels*

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