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Accessing the value-based impact of optimizing Renewable Energy solution to enhance Public Health Emergency Centers in Nigeria

About eHealth Africa

Since 2012, eHA has partnered with government & non-governmental organizations in Africa to improve health systems through the design of data-driven solutions.



Public Health
Emergency
Management



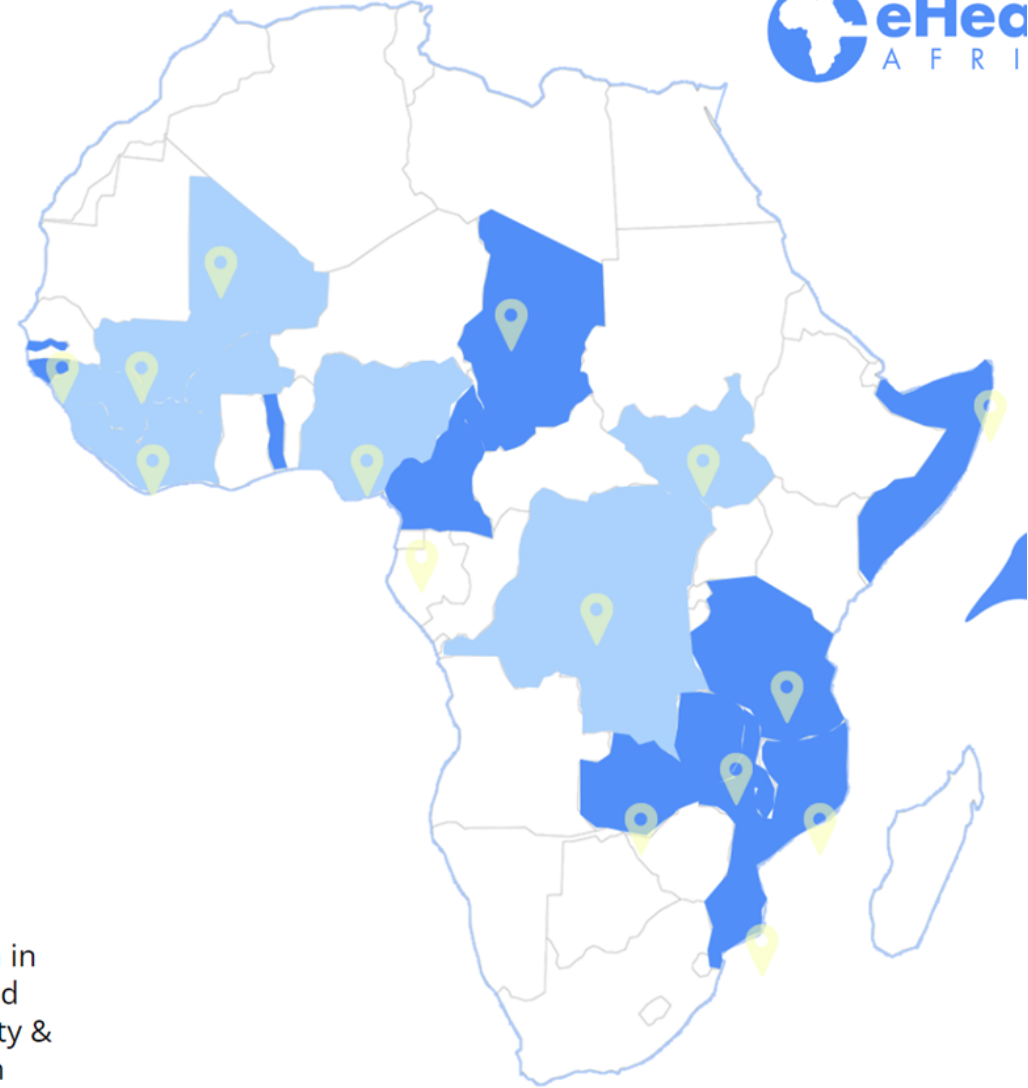
Disease
Prevention and
Monitoring



Laboratory
Systems &
Diagnostics



Climate
Adaptation in
Health and
Food Security &
Nutrition



Country and project presence in over **19 African countries**, across several regions, over the past

Study Background

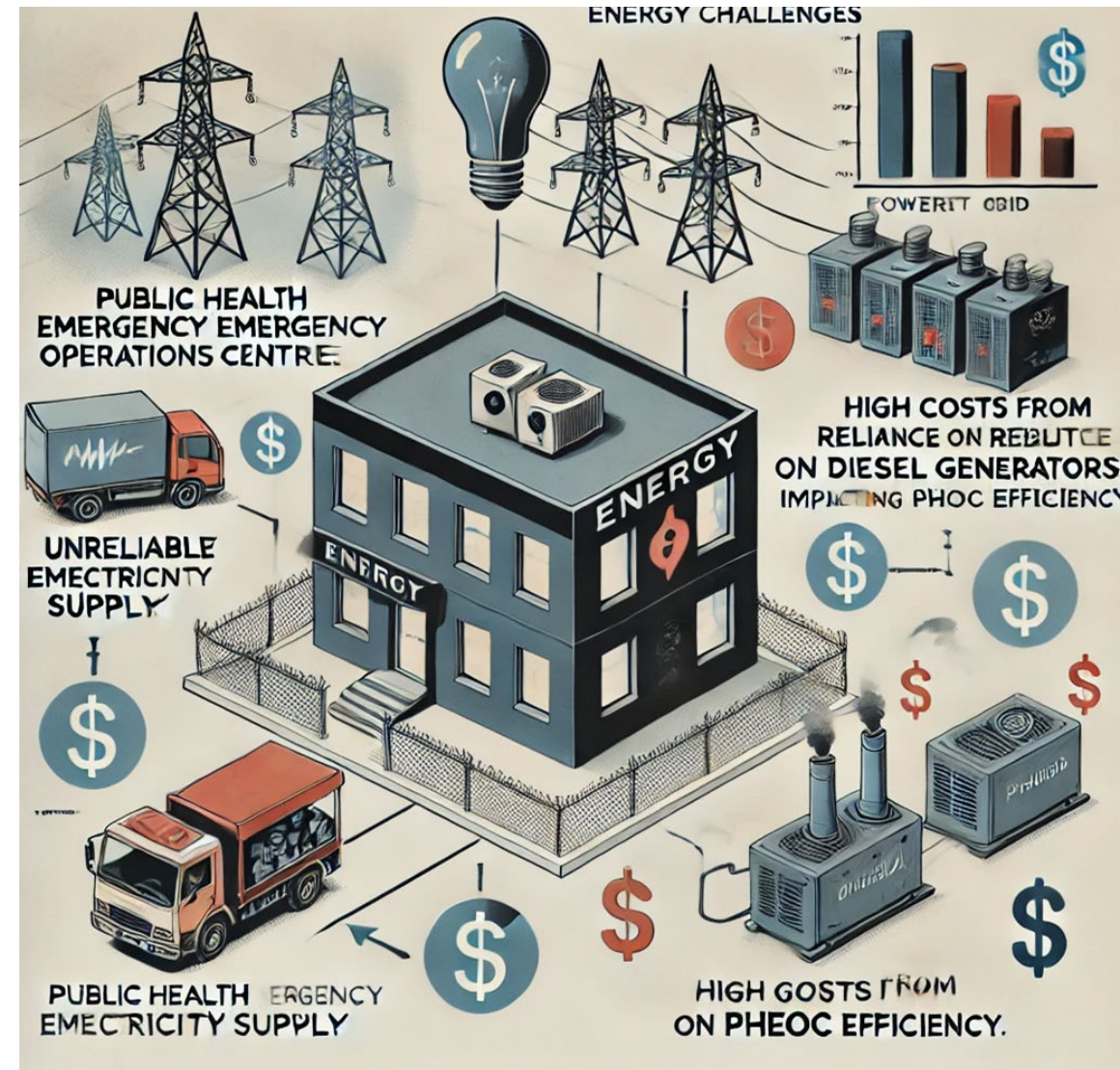
- Public Health Emergency Operations Centres (PHEOCs) are crucial for coordinating outbreak responses and emergencies
- They function as epidemic intelligence hubs, managing multi-sectoral activities and real-time data analysis
- However, inconsistent access to sustainable energy hinders their optimal function
- Reliable power infrastructure is essential for uninterrupted operations and timely data access, and solar energy offers a potential solution
- The study investigates the impact of solar energy installations on the functionality of Nigerian PHEOCs



Problems

In Nigeria, energy challenges include:

- Unreliable electricity supply and power quality.
- Frequent grid collapse due to weak and aging infrastructure
- Hike in electricity tariff
- Vandalism and sabotage of transmission and distribution network
- High costs from reliance on diesel generators, impacting PHEOC efficiency.
- Increased greenhouse gas emissions from the use of diesel generators, contributing to climate change and higher CO2 levels.
- Recent Flooding affecting transmission and distribution power network



Study Objectives

- 1 Determine the RE contributions to the consistent power supply at the assessed PHEOCs.
- 2 Determine the costs savings with the utilization of RE at the assessed PHEOCs.
- 3 Determine the impact CO2 emissions reduction at the assessed PHEOCs.
- 4 Determine the payback period on RE investment at the assessed PHEOCs.
- 5 Assess the impact of consistent quality power supply on PHEOC planning activities at the assessed PHEOCs.

Methods

Mixed methods research conducted across six PHEOCs in Bauchi, Kaduna, Katsina, Borno, and Yobe states, Nigeria,

Data sources

- Quantitative data from energy monitoring platforms: Optics Renewable Energy (Outback System)
- Victron Remote Monitoring Portal (Victron Energy)
- Fronius Solar Web.

Data Analysis

- Descriptive analysis (frequency and percentage) conducted using Google Sheets
- Visualized through tables and graphs

Comparative cost analysis

- Compared 24-hour generator use (costing \$0.51 per liter of diesel for 31 days) against renewable energy solutions with minimal generator use as backup.

We utilised a semi-structured questionnaire to gather qualitative information.

Method Cont'd

Target Group:

- PHEOC users across Public Health centers.

Focus:

- To elicit information on the impact of consistent access to quality power supply via renewable energy and backup generators on planning and coordination activities.
- 46 PHEOC actors from 23 development organizations and state stakeholders participated.

Data Analysis:

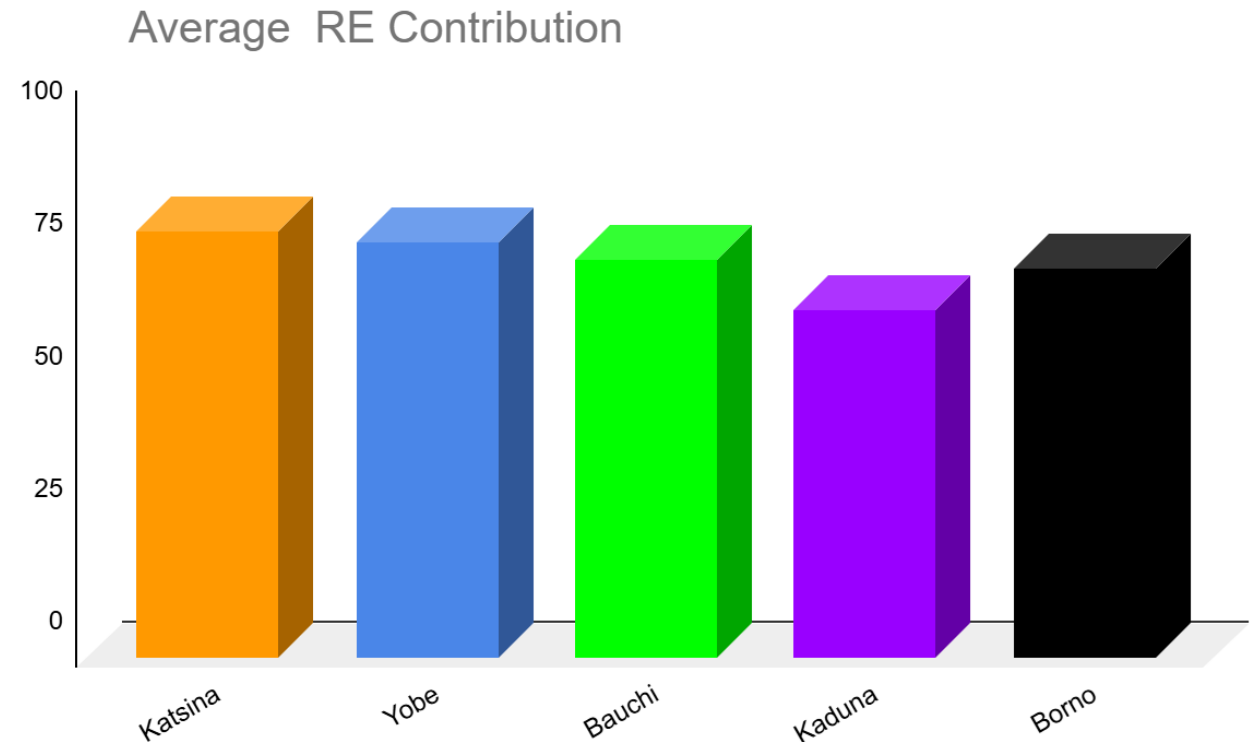
- Quantitative data analyzed descriptively (frequency and percentages).
- Visualization of data in tables and charts using Google Sheets.
- Open-ended questions analyzed thematically through manual coding

Results

Renewable energy significantly contributed to consistent power supply, **with solar energy accounting for 80% of energy mix in Katsina and 78% in Yobe.**

Renewable Energy Contribution Across Selected PHEOCs in Nigeria

Renewable energy (RE) significantly contributes to consistent power supply across PHEOCs.

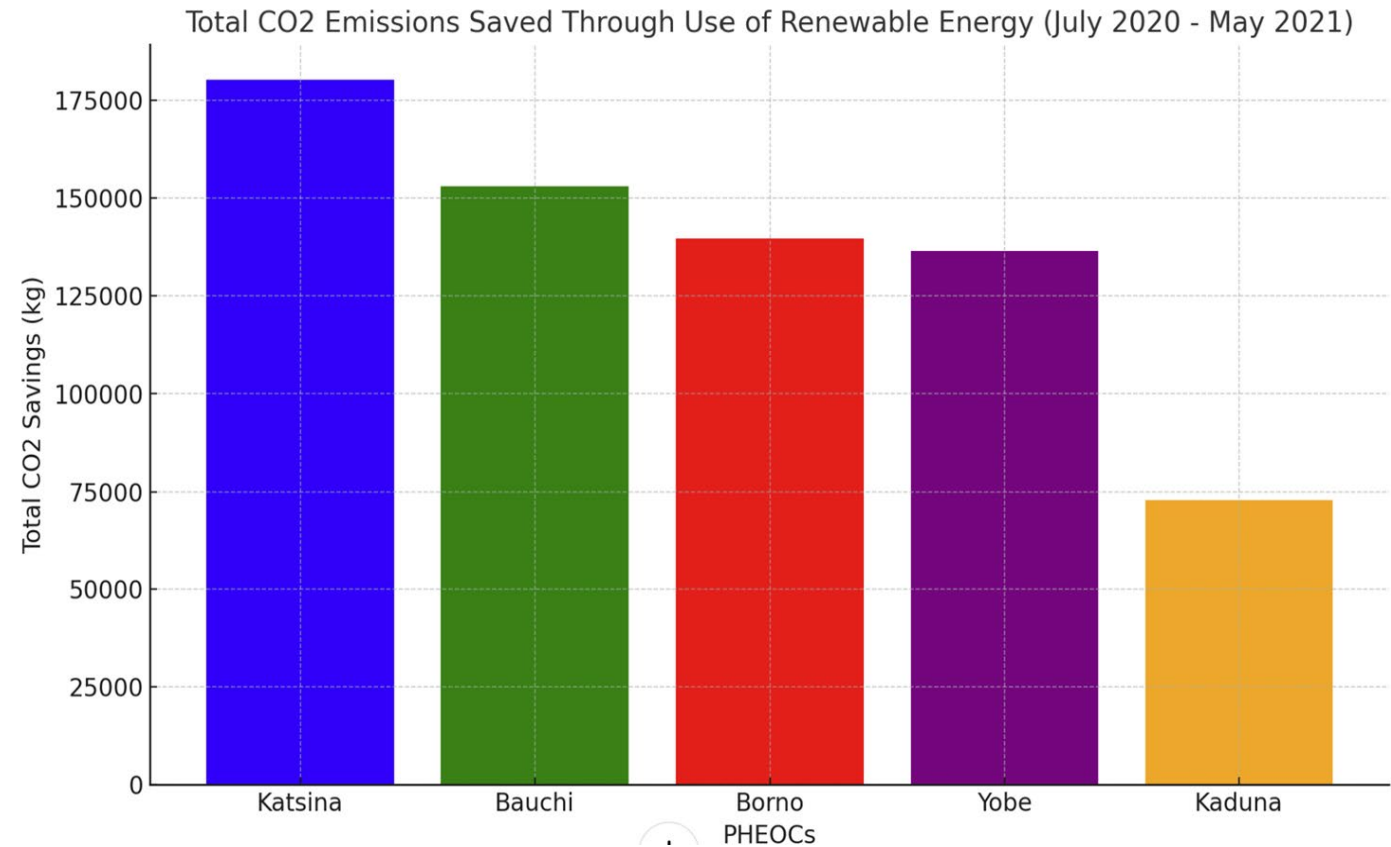


Results cont'd

CO2 emissions were drastically reduced, with Katsina saving 180398kg of CO₂ over 11 months.

Carbon dioxide (CO₂) Emission Reduction Across the PHEOCs

Our monitoring platform analytics revealed that carbon dioxide (CO₂) emissions were drastically reduced with the introduction of renewable energy



Results cont'd

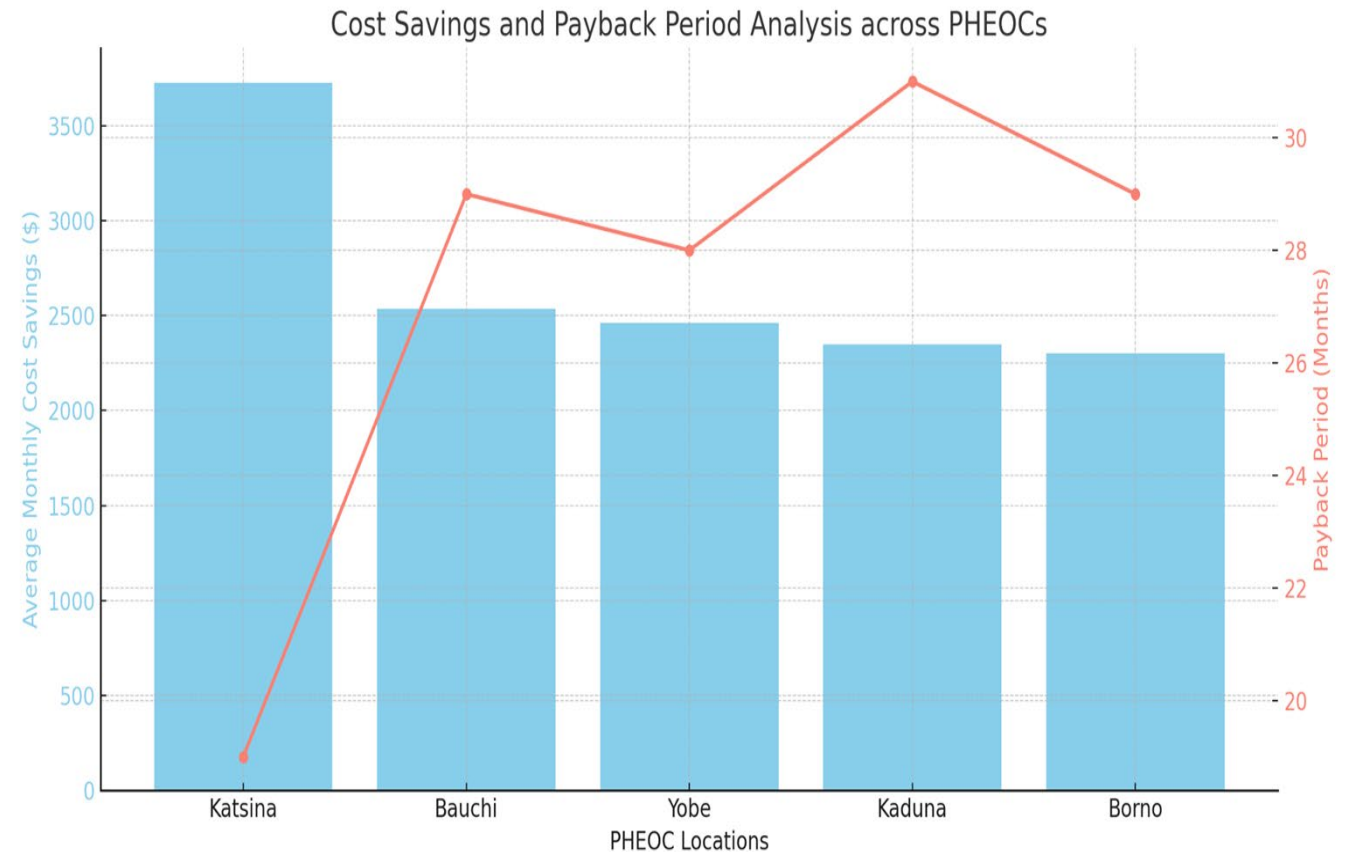
Payback Period on Solar Energy Investments Across the PHEOCs. Cost savings were substantial, with an average monthly savings of \$2461 in Yobe.

Each PHEOC has an estimated average solar energy implementation cost of \$72,227.

Renewable energy usage generates significant monthly savings across PHEOCs.

Kaduna state has a Payback period of 31 months (less than 3 years) before returns begin on the solar investment.

Bauchi state has a Payback period of 19 months (less than 2 years) to recover investment costs and start profiting.





Impact of Consistent Access to Energy on Emergency Preparedness and Response Interventions

Key Findings

88% of respondents reported improved functionality of PHEOCs after the introduction of renewable energy.

Implications of Consistent Power Supply

- Increased numbers of development partners utilizing the PHEOCs for coordinated emergency meetings.
- PHEOCs served as reliable mobilization centers for COVID-19 vaccination campaigns. and other public health disease campaigns
- Improved real-time monitoring of data during emergency SIA campaigns.

Testimonials

WHO Staff – Borno state:

- *"We benefit from renewable energy at the Borno Polio EOC. Without it, fuel shortages would have hindered our operations."*

Layifa Program Staff – Kaduna state:

- *"The PHEOC was a reliable venue for meetings and planning with government and stakeholders."*

McKing Consultant – Yobe state:

- *"Surveillance requires effective coordination, which consistent power and internet facilities enable."*

Conclusion/Implication

- The study confirmed the positive impact of utilizing solar systems and minimal generator usage to provide consistent energy at PHEOCs in Nigeria.
- Renewable energy (RE) contributed significantly to maintaining a reliable power supply across all assessed centers.

Benefits of Solar Systems:

- **Environmental Impact:** Reduced CO2 emissions which directly contributes to better air quality by reducing harmful pollutants that affect respiratory and cardiovascular health.
- **Cost Efficiency:** reduce operational cost through Lower diesel/generator maintenance expenses with a payback period of less than 3 years for the investment.

Consistent Energy Access Enabled:

- Improved coordination of emergency response activities.
- Enhanced functionality of PHEOCs as effective and reliable operational centers.

