



Centre for Energy, Petroleum  
and Mineral Law and Policy  
University of Dundee

## Renewable Energy for Resilient Health Systems in Nigeria

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UK Research  
and Innovation



### Policy Recommendations

- Develop a Renewable Energy (RE) programme for Nigerian health facilities, focusing on rural and marginalised areas.
- Provide a framework for a massive incentive package for RE financial investments in health facilities.
- Commit to a fully collaborative relationship between energy and health state agencies.
- Prioritise data collection to identify the viable health facilities (i.e., productive and functioning) and their electrification needs.
- Ensure long-term, total funding in all stages of the RE development (installation, operation, maintenance, replacements) for a sustainable and durable business model.
- Create a supportive energy community ecosystem by integrating the energy initiatives of healthcare facilities with those of households and businesses, covering the operation/ maintenance costs of RE in health facilities.

### Overview

Despite having fewer COVID-19 cases, Nigeria's healthcare system was crippling even before the pandemic. The poor health infrastructure threatens the access and treatment of COVID-19 and other non-related diseases. About 48% of the Nigerian population lives in rural areas, where access to public/private health facilities is poor. The main challenges include the lack of testing, poor health infrastructure, few privately-run hospitals, and inadequately trained health professionals.

In 2020, the off-grid energy impact investing company All-On and the Rural Electrification Agency (REA) announced the funding to provide solar energy infrastructure coupled with battery storage as a technical solution for energy concerns in the health facilities during the COVID-19 pandemic. Solar power for health facilities can ensure reliable and uninterrupted electricity supply to power water pumps, ventilators, medical devices, laboratory tests, and refrigerated vaccines and medicines. It can improve access to health services for vulnerable people in marginalised areas, decrease electricity costs, ensure power supply throughout the day, and reduce carbon emissions.

Another advantage to solar panels is their relatively swift speed of deployment. RE investments in the health sector require innovative business models for sustainable impact. To support roll out, public and private cooperation must address funding limitations for the delivery of essential medical services and uncertainty that the costs of RE can be met.

With the decreased costs of the RE technologies over the last two decades and several incentives from governments, donors, and NGOs to support the installation costs, putting solar panels in health facilities is no longer the primary concern. Such infrastructures require financial and human resources to ensure the systems work long term, avoiding the risks to become 'stranded assets.' Therefore, the business models of RE for health facilities must create opportunities for continued funding for long-term operation and maintenance from external sources.



## Key Findings

Overall, Nigeria has an adequate regulatory framework to support the adoption of RE.

Currently, only a few specific initiatives address RE for the health sector in Nigeria, and investments are very few and far between.

There is a need for a huge capital outlay to facilitate health facility electrification in Nigeria.

While there are many solutions to cover the upfront capital required for RE equipment, the business model has to address the long-term need of revenues streams for the operation and maintenance of such equipment, where lies the significant risk of non-payment.

Generally, health facilities in Nigeria have limited budgets for their basic operational needs. Therefore, it is unrealistic to expect that they will have a continuous flux of capital to cover the RE expenses at all stages (installation, operation, maintenance, replacements).

Nigeria can benefit from a RE for health facilities national programme to prioritise and ensure that RE investments are channelled to this relevant and deprived sector. Additionally, it is a way to coordinate existing initiatives from different international development agencies nationally.

Public and private initiatives introduced during the COVID-19 crisis have focused on emergency responses. But RE for health will not be practical without a sustainability plan.

A RE for health programme should create incentives to attract investments. Several measures can support and foster RE investments in health facilities, and one single approach will not suffice. Those measures include fiscal incentives, subsidies for upfront costs, foreign exchange stability, expanding the scope of venture capital, skills training, and infrastructure for local content manufacturing.

Although the tax and import duty exemptions can be added to such a list of measures, there is a caveat for batteries. Since there are multiple battery applications, any special exemptions for those use in battery storage for energy generation should be clear, for example, including a cap on the number of batteries deployed for renewable energy purposes that will be exempted.

Understanding the health facilities' energy and medical services needs is crucial for the longevity of the RE system. It implies the collection of data on the actual

energy demands and the offered health services. Future changes and improvements are common, particularly in health facilities that are under-equipped or lacking energy efficiency medical appliances.

Previous experiences of durable and sustainable RE for health include a supportive energy community ecosystem surrounding the health facility. Under such a model, other households and businesses cover the RE costs of the health facilities.

Nevertheless, this could be complex to implement. Since there is no 'one size fits all' approach for every small community, such models' scaling up entails adaptation to different contextual factors.

Implementing such a model would require certain revenue levels to cover the health facilities RE costs in the long term. However, the low incomes of dwellers could make such levels of healthcare revenue challenging to achieve, affecting the quality and affordability of healthcare services. Ultimately, questions may arise about the reasoning underlying the payment for the power used for the public good and the incentives for the private sector to take on risk.

## Project at a Glance

Professor Volker Roeben and Dr Maria Augusta Paim of the Centre for Energy, Petroleum and Mineral Law & Policy (CEPMLP), University of Dundee, have led the 2020-2021 project 'Strengthening Nigeria's Responses to COVID-19: Renewable Energy for Resilient Healthcare Systems in Rural Areas', including colleagues Dr Xiaoyi Mu and Dr Smith Azubuike, and supported by UKRI and the Scottish Funding Council.

The team in Nigeria comprises researchers from the Covenant University Centre for Economic Policy and Development Research, led by Dr Obindah Gershon, members of the REA, represented by Dr Sanusi Ohiare, Dr Kabir Salihu, and Ted Emecho, as well as Dr Adebola Adeyemi, Partner at PAC solicitors.

This interdisciplinary research project identified business models for health facilities in rural Nigeria using reliable RE-related investments for an effective response to COVID-19 and beyond. We undertook interviews with university, government and private sector energy experts in Nigeria. They provided invaluable insights on how best to enable health facilities to bear the costs of RE operations and maintenance long term. The members of the Advisory Board, composed of a small group of high-level stakeholders, have reviewed the interviews' results, adding inputs from their experience in renewable electrification of health facilities in the Global South.



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