UKNIAF
United Kingdom Nigeria Infrastructure Advisory Facility

Women on the Grid Hub

BRIDGING NIGERIA'S ENERGY ACCESS GAP, ONE 'MIDDLE CHILD' AT A TIME

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THE MINI-GRID AS 'THE MIDDLE CHILD'

By Jumoke Delano

When you flip a switch, do you ever wonder how the electric power reaches you? Most people think of two options: the national grid ("Up NEPA!") with its estimated 5,000MW available capacity and self-generation using diesel generators (approx. 42,000MW capacity installed) or solar home systems.

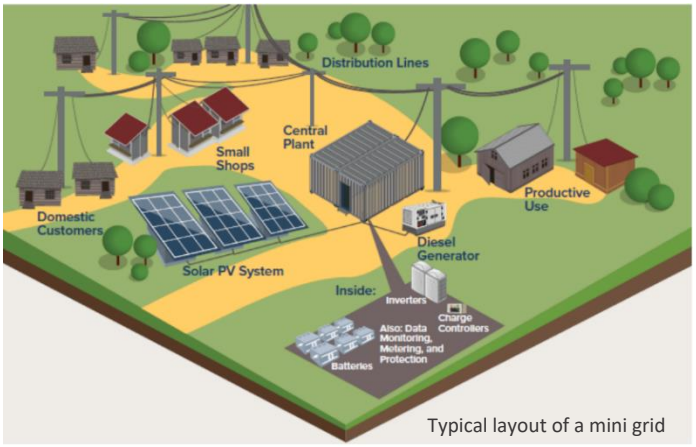
But what about the often-overlooked "middle child" of energy access—the mini-grid? Adaptable and innovative but not historically the center of attention in the electricity delivery

value chain, mini-grids are the unsung heroes in electricity supply. This is especially true considering Nigeria's huge energy deficit (about 92 million people lack electricity access).

What is a Mini-Grid?

A mini-grid is an independent power system that generates and distributes electricity to localized areas like estates, villages, markets, schools, hospitals and plazas.

These systems can operate in isolation or interconnect with a distribution network. Often powered by renewable energy sources like solar or wind, mini-grids are particularly effective in areas where the primary grid is unreliable or inaccessible.



Typical layout of a mini grid

The Case for Mini-Grids

While mini-grids are gaining traction, greater adoption is necessary to accelerate energy access. As subnational electricity markets develop, mini-grids present a viable pathway for Sub-National control of power generation, transmission, and distribution. Mini-grids offer:

Reliable Power Supply: They provide consistent, scalable electricity for households, businesses, and community services.

Resilience and Independence: Mini-grids remain operational during national grid failures, minimizing blackout risks.

Quick Deployment: Mini-grids, unlike lengthy grid extension projects, can be operational within months.

Cost-Effectiveness: They eliminate the need for expensive long-distance transmission infrastructure, making them ideal for remote locations.

Scalability: Mini-grids are modular and can expand with growing community demand.

Ease of Installation: Pre-designed components and local labour simplify setup.

Attract Funding: Initiatives like the World Bank's DARES project highlight their appeal for sustainable development financing.

Eco-Friendly: Using renewables and mini-grids reduces diesel reliance and lowers carbon emissions.

Economic Boost: They empower businesses, enable digital connectivity, and drive local economic growth.

How They Work

Mini-grids can supply power directly to remote locations or connect to a centralised grid. The customer reach per mini-grid can be as little as 20 and as many as over 500 customers. They can be powered using solar, hydro wind, or biomass and operated by large utility companies, private companies, communities, or a community/ government hybrid. The Rural Electrification Operations and Maintenance Guidelines (2023), which UKNIAF supported, advocates the latter model because this leverages the strengths of each group.

The Road Ahead

Addressing Nigeria's energy access challenge will require a balanced approach combining grid extensions, mini-grids, and standalone solar systems. With a 2060 universal access goal and a problematic national grid, this 'middle child' certainly requires more attention than it currently receives.

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INTERCONNECTED MINI-GRIDS AND THE ELECTRICITY ACCESS GAP: THE WHAT'S AND HOW'S

By Habiba Ali

At Sosai Renewable Energies Company, we have direct experience nurturing 'the middle child'. We build mini-grid solutions in communities and have, over the years, become a forerunner in implementing the Interconnected Mini Grid (IMG).

The Kaura Namoda Case Study

Kaura Namoda is a Local Government Area in Zamfara State, Nigeria. It has an area of 868 km^2 and a population of 281,367 at the 2006 census. In 2020, we were one half of a team selected to deliver an interconnected mini-grid in Kaura Namoda under the Rural Electrification Agency's (REA's) Interconnected Mini Grid Acceleration programme (IMAS). IMAS was a joint initiative of the REA (REA) and the Nigerian Energy Support Program 2 (NESP). It was implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in collaboration with The Federal Ministry of Power, Works, and Housing, funded by The European Union and the German Government.

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How We Implemented the Project

We combined resources and expertise rather than trying to implement independently.

In 2019, Sosai and Protergia, two of Nigeria's leading renewable energy companies, formed a joint venture (JV), a Solar-Powered Developer called Sosai-Protergia, to develop and operationalise an interconnected mini-grid. The partnership aimed to combine the complementary strengths of both companies into a formidable JV.

The Sosai-Protergia JV signed a Tripartite Agreement with the local community and Kaduna DisCo.
As part of the project, a grant from NESP provided the distribution assets required for the initiative. The project's initial focus is on the Sabongeri and Kungurki suburbs, which have approximately 14,000 inhabitants and 3,741 buildings. These areas include over 308 small and large businesses, both formal and informal, that require a reliable power supply to meet their growing service demands.

Under this model, the JV purchases electricity in bulk from Kaduna DisCo while also generating energy locally as a grid supplier. Metered connections enable the community to pay NERC-approved tariffs for greener and more reliable electricity. This dual approach ensures an improved supply while reinforcing the local grid's sustainability.

The project aims to extend its impact across the seven zones of the emirate.
This involves metering previously unconnected households and businesses, reinforcing existing distribution infrastructure, and replacing poles and transformers. The enhancements are expected to increase daily electricity supply from four to twenty-four hours, significantly improving the quality of life and supporting local economic growth. The introduction of proper metering and remote monitoring further allows

The Challenge with this Middle Child

The Kaura Namoda project was delayed for some time. In addition to the COVID-19 pandemic, one of the reasons for the delay was the time it took to move equipment to the community. This is a challenge, which mini-grid developers often grapple with as they try to reach previously left-behind communities.

An Increasingly Relevant Family Member

Part of the learning from the Kaura Namoda project is that Nigeria cannot meet its energy access goals without large-scale deployment of mini-grids.

IMG projects help to mitigate and navigate sector-specific challenges relating to liquidity, metering, and high technical and commercial losses. They also catalyse economic participation through local participation in operations and maintenance, which is especially critical, where the national grid requires serious investment to achieve stability and reliability.