case study on off grid solution: Initiatives and business plans that work

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Power Africa Model

Our partnerships provide the resources to help us achieve our collective goals to electrify the continent.

Power Africa’s model focused on practical solutions:

• Deep knowledge of the power sector
• A private-sector-led engagement approach
• Experience working with governments, development partners and civil society to improve policies and governance
Power Africa goal: Double Access to Electricity in sub-Saharan Africa

- 30,000 MW of new, cleaner power generation capacity
- 60 million new household and business connections
THE ROADMAP
A Guide to Reaching 30,000 Megawatts and 60 Million Connections
Power Africa Beyond the Grid


- Over 60 investor and practitioner partners have committed to invest over $1 billion into off-grid and small-scale solutions.

- Sub-initiative of Power Africa (Roadmap pillar 2.2) to unlock investment and growth for off-grid and small-scale energy solutions on the African continent.
  - 25-30 million connections through BTG efforts by 2030

“With close to 600 million people without access to modern-day electricity, it is clear that centralized grid access is not a comprehensive solution for these countries in one of the world’s least urban continents. But through solutions including off-grid and small scale energy projects, we can bring electricity to these rural areas.”

- U.S. Energy Secretary Ernest Moniz.
• Two strategic BTG priorities:
  
  • Addressing recurring market constraints in the **household energy** market by increasing access to financing and providing technical assistance.
    • Goal: **17-20 million connections - solar home systems**
  
  • Striving to achieve scalable, cleaner **community-level solutions** that offer electricity access greater than the first tier of task lighting. Ensuring enabling environments are supportive through regulatory and policy regimes is critical to facilitate private sector success.
    • Goal: **8-10 million connections - micro-grids**
Expanding access via off-grid solutions:

Aligned with the BTG strategy above, there are broadly two approaches to addressing the access to energy through off-grid solutions:

- **Mini/micro-grid operators** – These are companies that operate like commercial utilities, providing retail service through their distribution network embedded to a generator connected in its network.

- **Distributed Energy Service Companies (DESCOs)** - DESCOs are also comparable to a commercial utility companies. However, in contrast to typical utilities – national or private – the DESCOs do not focus on delivering “free-flow kWhs”. Rather, it provides its market segment with desired energy services. M-Kopa is an example of a DESCO.
In developing countries, many successful and sustainable rural electrification programs have been established over the years that have employed a diverse variety of service provider business models.

Characteristics of successful programs include those that have systematically expanded access to electric service to an increasing number of rural communities, households, rural businesses, farmsteads, and small industrial/agro-industrial consumers.

For years successful programs have been documented in Latin America, South and Southeast Asia, and Northern Africa employing service provider models that include national utilities (in Thailand and Mexico), rural electric cooperatives (Cost Rica, Philippines and Bangladesh), public-private partnerships (Chile), and local municipal utility (China) approaches.
In more recent years, some of the models mentioned above have been adopted in some sub-Saharan countries.

One notable example of a successful rural community based utility is found in Njombe, Southern Tanzania through the 300 kW Mawengi hydropower scheme.

The Mawengi scheme is a multi-donor integrated rural development and electrification program funded by Italian government, European Commission and the Tanzania Rural Energy Agency.

The Mawengi scheme is a locally governed, owned and operated as a rural utility by The Lumama village energy association.
The tariffs are set by an autonomous Lumama board and are reviewed on an annual basis. The tariffs are set at reasonable levels and the consumer uptake has been steady, already topping 1300 members.

Lumama employs prepaid metering system served by an underground low voltage distribution system resulting in no reported commercial losses.

The initial success of the Lumama project is due in part to the fact that the system was financed through a development grant at no cost to the village association; Lumama is not burdened with debt repayments.

However, the tariffs of Lumama do not include a depreciation allowance for the generation and distribution plant and thus there is no accumulation of a reserve to finance future replacements and repairs that will be required. Future projects need to employ a mechanism to either include a depreciation allowance for assets or a replacement reserve account as an integral part of the tariff setting process.
Lumama has excess capacity relative to demand for energy and power which could be used productively to support income growth in the community.

Lumama is in consultation with REA to find ways to develop a productive uses program to better utilize the available hydroelectric energy to not only to improve the revenue streams but to also support income growth and to support quality of life improvement. Available energy resources could be used to support small businesses, agricultural process, potable water projects, and public health and educational needs.

Lumama is also planning to extend its service to seven additional villages.
In order to replicate successful models:

• Creating and/or implementing a well-defined program plan to systematically expand access through grid and/or off-grid infrastructure development. This need not mean development of a master plan, but developing a strategy that provides a logic for deployment of program resources and facilitates investment through economically effective projects.

• Long-term, significant political support for electrification agencies. Government and Development Partners support is needed to provide the technical and financial support required for electrification programs.

• Employing tariffs that allow full cost recovery. Long-term financial sustainability is the goal of all infrastructure projects and for electrification projects this has been a particularly challenging objective. Many programs require significantly lower tariffs to be applied for rural communities – so low that the tariffs result in a failure to recover the cost of operating and maintaining the infrastructure.
Power Africa Beyond the Grid

• Program leadership and adequate oversight of nascent rural energy service providers. Some of these providers depending the business model deployed, are required to manage technology, business operations, personnel, customer relations and local political issues.

  • Institutions like REA need to continue to provide guidance, oversight and support these the rural energy service providers to ensure they achieve self-sufficiency.

• Engage local communities in implementation of rural electrification projects and programs. Local community participation key factors contributing to success due to the need for trust to be established between the service provider and consumers to achieve high collection rates, as well as to increase sales through promotion of productive uses of electricity.

  • In the case of the Lumama example, the community engagement was captured through the community members having an equity stake in the service provider. The same results may also occur through active consumer engagement programs managed by municipal or private, for profit utilities.
Asante sana