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October 2024

New Funding for Energy Access Creates an Opportunity

Three Tweaks to Strengthen Rural Electrification Programs

The Bottom Line: Achieving universal electricity access will require more than $270 billion in infrastructure investment between now and 2030 — most of it in sub-Saharan Africa.[1] We need more investment — *but we also need to invest differently.* Doing more of the same will not solve Africa's electricity access crisis. This memo recommends three ways development partners, governments, and regulators can make rural electrification programs more efficient, effective, and financially sustainable.

The context

Energy and social and economic development go hand in hand. No rich country is energy-poor.[2] In Africa, the COVID-19 pandemic and global energy crisis have reversed hard-won gains in rural electrification: the number of people without electricity increased from 580 million in 2019 to 600 million in 2022.[3] In response, development agencies and other financiers have renewed their focus on reversing this trend. The World Bank and the African Development Bank — in partnership with The Rockefeller Foundation, Sustainable Energy for All, and the Global Energy Alliance for People and Planet — have committed to connect 300 million people to electricity by 2030, backed by $30 billion of funding.[4] Large new sums of private equity funding are also preparing to deploy in the energy access space. This new capital is crucial, but won't solve the problem unless we change how it gets deployed.

We won't solve energy poverty unless we invest differently

We need a new approach. Consider the following:

- **Utilities struggle to expand service.** Most African electric utilities face massive financial and operational challenges: less than a quarter of utilities in sub-Saharan Africa generate enough revenue to recover costs.[5] Worse, adding customers usually compounds a utility "death spiral" in which every new connection increases costs and generates progressively less revenue.[6]
- **Mini-grid companies struggle to secure equity investment and raise debt.** Most companies lack scale, with portfolios of just tens of small (<50 kW) systems. Husk, the largest mini-grid developer, has just about 200 systems globally.[7] Commercial financiers don't invest because of ambiguous electrification strategies, a lack of regulations to protect assets, developers' limited track records, and rural consumers' marginal power demand. As a result, mini-grids have relied on non-commercial grant or equity investors that cannot afford the level of funding necessary for the market to mature.[8]

- **Solar home system companies struggle to secure their next round of investment.** Revenue growth has plateaued as companies expand service to increasingly poorer customers. Investments in the off-grid solar industry dropped 43% in 2023.[9]

Three key recommendations

As new capital flows into the energy access space, we have an opportunity to reflect on past efforts and deploy funding in more impactful ways. Three tweaks to the design and financing of rural electrification efforts would help make them more effective and help scale the businesses that will ultimately determine long-term success.

1. **Avoid the grid / mini-grid / solar-home-system trichotomy in planning and service territory design and set minimum service requirements instead.** People care about energy services (think cold beers and hot showers), not electrons — let alone where those electrons come from. Assigning specific technologies to serve certain geographic areas reinforces biases toward preferred technologies and creates a false choice between superior and second-best service. It also no longer makes sense: globally, the distinction between traditional grids, mini-grids, and stand-alone solar systems is collapsing. Twelve-hour outages can occur daily in power grids in many countries. Remote heavy industry sites are increasingly powered by stand-alone hybrid renewable systems. Utilities in fully developed power systems increasingly use an "all-of-the-above" strategy, mixing centralized and distributed solutions. Pacific Gas and Electric in Northern California is installing mini-grids to support grid stability and reduce failures, and National Grid provides 227 MW of capacity through assets in nearly 100,000 distributed customer premises.[10] Using rigid technology-based approaches risks both unnecessary spending and the creation of a brittle grid that will almost immediately require modernization.

   Instead, planners should set service level parameters for a concession area (e.g., provide light for 12 hours each night, power motors for irrigation and refrigeration, etc. or at least parameters like kW of load supported, kWh of energy to be delivered, and reliability requirements) and allow developers to deploy a mix of technology solutions to reduce cost, increase service, and reduce the time required to complete projects. This aligns with the Integrated Distribution Framework approach proposed by the Commission to End Energy Poverty and the African School of Regulation; it has also shown a credible path to electrification in countries like Uganda.[11]

2. **Make service territories larger, use an equivalent revenue approach, and include an obligation to serve.** Today most rural electrification plans identify areas for grid expansion and assign thousands of other, often deeply rural, villages to off-grid electrification. This limits scale and makes cross-subsidization (wherein customers that generate more revenue at less cost subsidize those that generate less revenue at higher cost) more difficult.

   Instead of having thousands of small off-grid areas in a country, make a few larger ones, and define the areas by their potential to generate revenue so that they all have roughly the same appeal to developers, service providers, and their investors. The opportunity to sell in an area should be coupled with an obligation to serve everyone: cross-subsidization will happen within the service territory by default. Countries with poorly functioning utilities should consider

breaking up existing utility service territories and integrating those customers with new territories to electrify to make them even more attractive to private investment.

3. **Transition from capex subsidies to volumetric subsidies with payment guarantees.** Rural electrification will always require subsidy. Today most rural electrification subsidies take the form of payment per connection. These one-time payments can range from $350 to more than $1,000. While this helps developers weather short-term cash crunches, it also implicitly reduces their incentive to take a long-term view because it concentrates most of the revenue upfront and fails to unlock access to longer-term, lower-cost debt.

   Programs should shift to a volumetric ($ per kWh sold) subsidy with a minimum revenue guarantee (e.g., $2 per connection per month) and a maximum monthly subsidy limit (e.g., $6 per connection per month). This would mirror the structure of the take-or-pay contracts backed by government guarantees that traditional independent power producers use to raise billions of dollars of investment. It requires shifting from three-year programs focused on capex to longer programs (e.g., 20 years) that align with the lifetime of most power-sector infrastructure. Some capex subsidies will likely still be needed, but a long-term guaranteed revenue stream, coupled with the cross-subsidization described in the second recommendation, would enable developers to raise lower-cost debt and reduce the total amount spent on subsidy over the life of the assets.

Conclusion

These three recommendations, coupled with concessional capital and clear and credible government partners and policies, can bring the scale and commensurate lower costs of hardware and finance that are needed to address the energy access crisis and drive economic development. We can't do more of the same; we must do more and do it differently.

Endnotes

1. IEA.2024. Tracking SDG7.
2. Energy For Growth Hub. 2021. The Modern Energy Minimum.
3. IEA. 2023. SDG7: Data and Projections.
4. Rajiv Shah. 2024. Want to End Poverty? Focus on One Thing.
5. World Bank 2024. The critical link: empowering utilities for the energy transition.
6. Simone Fobi et al. 2018. A longitudinal study of electricity consumption growth in Kenya.
7. Husk. 2024. Husk Power Secures $100+ Million in Equity and Debt to Supercharge Growth of Community Solar Minigrids in Rural Sub-Saharan Africa and South Asia.
8. Sustainable Energy for All. 2024. State of the Global Mini-Grids Market Report 2020.
9. GOGLA. 2024. Challenging conditions slow progress on off-grid solar investment in 2023.
10. Pacific Gas and Electric. 2024. Microgrids & remote grids. and RMI. 2024. Virtual Power Plant Flipbook.
11. African School of Regulation. 2023. The Integrated Distribution Framework. and The European Union Global Technical Assistance Facility for Sustainable Energy. 2022. Stocktaking in the energy sector in Uganda - Electricity distribution.