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Utilities 2.0: How Integrated Energy Accelerates Global Access

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Utilities 2.0 shows significant market potential toward 2030 in Uganda:

6.7M
PEOPLE IN UGANDA CAN BE ELECTRIFIED FASTER AND CHEAPER BY UTILITIES 2.0

30%
LOWER INVESTMENT COST TO DELIVER UTILITIES 2.0 CONNECTIONS IN UGANDA

4x
INCREASE IN CUSTOMER LIFETIME VALUE

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The global community is not on track to achieve the Sustainable Development Goals (SDGs), partly because SDG 7—universal energy access—is integral to nearly half of all SDGs but is itself lagging behind. Globally, 685 million people still live without electricity, while at least 2.6 billion more have unreliable access[1–4].

The next five years present a vital window to reverse course. By prioritizing investment in catalytic goals like energy access and urgently scaling approaches that significantly reduce costs and time—even if they challenge business-as-usual—the global community can make decisive progress in delivering power for all while accelerating efforts toward the remaining SDGs.

Utilities 2.0 Integrated Energy (IE) Model

Utilities 2.0 is a groundbreaking model that combines the strengths of main grid infrastructure with distributed renewable energy (DRE) technologies to electrify households, schools, health clinics, and small businesses for the first time, at scale. Utilities 2.0 addresses a major challenge for utilities—expanding grids into underserved areas often strains operational resources due to fixed budgets and tariffs. This disparity forces utilities to manage expanded infrastructure and serve more customers with the same resources, leading to inefficiencies and financial pressure. Utilities 2.0 bridges this gap by combining the scale and financial strength of main grid utilities with the flexibility and innovation of DRE companies to deliver a scalable solution that improves operational efficiency and financial performance, and promotes growth for utilities and DRE companies.

As global priorities evolve, scaling solutions like Utilities 2.0 will be critical in achieving SDG 7 faster and at a lower cost than previously thought possible, accelerating progress to #EndEnergyPovertyFaster.

Uganda Pilot Results

Piloted in Uganda, Utilities 2.0 prepared customers for future grid connection by initially electrifying them with a solar mini-grid while securing community support along the way. Once 80% of the village was electrified, asset financing and business training were provided to local small businesses. Commercial facilities, such as maize mills and ice-making units were identified and developed as micro-industrial loads to increase consumption. When demand reached 75% of the mini-grid's capacity, the site was interconnected to the main grid, and ownership was transferred to the utility. The mini-grid developer then relocates the solar generation assets to a new unelectrified site, restarting the process.

Scaling Utilities 2.0 in Uganda can provide 1.5 million connections—14% of the total needed—and add 70MW of renewable energy installed capacity by 2030. This approach cuts investment costs by 30% and connection costs by 64%, and increases the mini-grid market share from 100,000 to 1.5 million connections.

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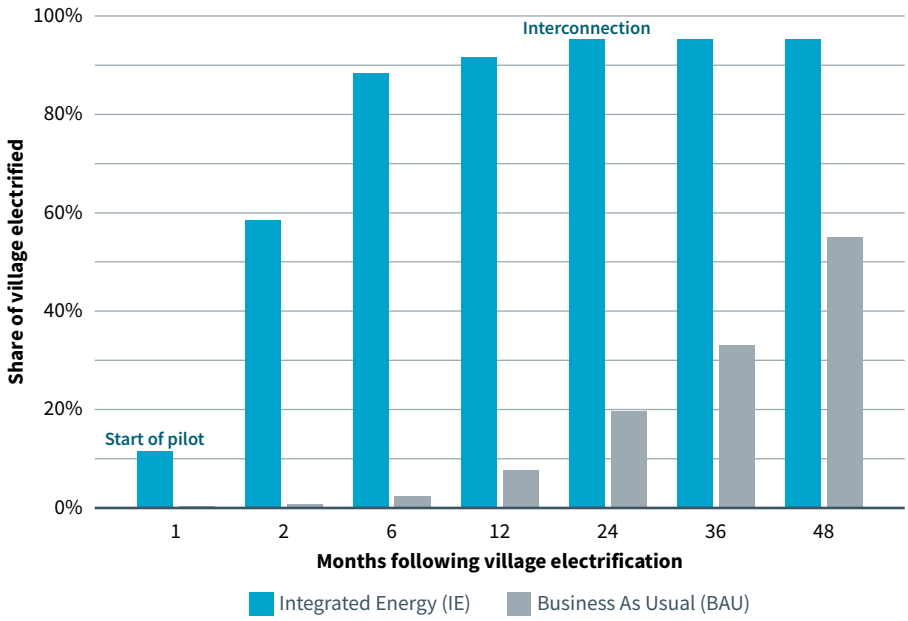
FIGURE 1: VILLAGE ELECTRIFICATION TIMELINE



Faster access and reduced losses. Utilities 2.0 bypasses infrastructure delays and urgently addresses energy access gaps—connecting underserved communities in weeks instead of years, while halving distribution losses—proving that integrated energy solutions can be both rapid, and scalable.

- » Equatorial Power designed and operated the IE mini-grid site connecting 92% of Kiwumu village (370 connections) in just one year.
- » Nearly 90% of the village was connected within six months—a milestone the business-as-usual (BAU) control site has yet to reach (Figure 1).
- » Smart metering technology reduced distribution losses by 56%.
- » Strong security measures eliminated theft and safety incidents.

Least cost. Utilities 2.0 offers a more cost-effective way to electrify communities, ensuring underserved areas gain reliable electricity access.

- » The cost of home and business connections dropped from $1,213 to $1,026.
- » The levelized cost of energy decreased by two-thirds at pilot, to $0.40 per kWh, compared to the BAU control site.
- » The integrated energy model's cost-reflective framework supports a path toward $0.20/kWh, making mini grid power as affordable as main grid rates[5].
- » Connection subsidies ($186/connection) aligned with the national policy, enable widespread adoption without compromising sustainability.

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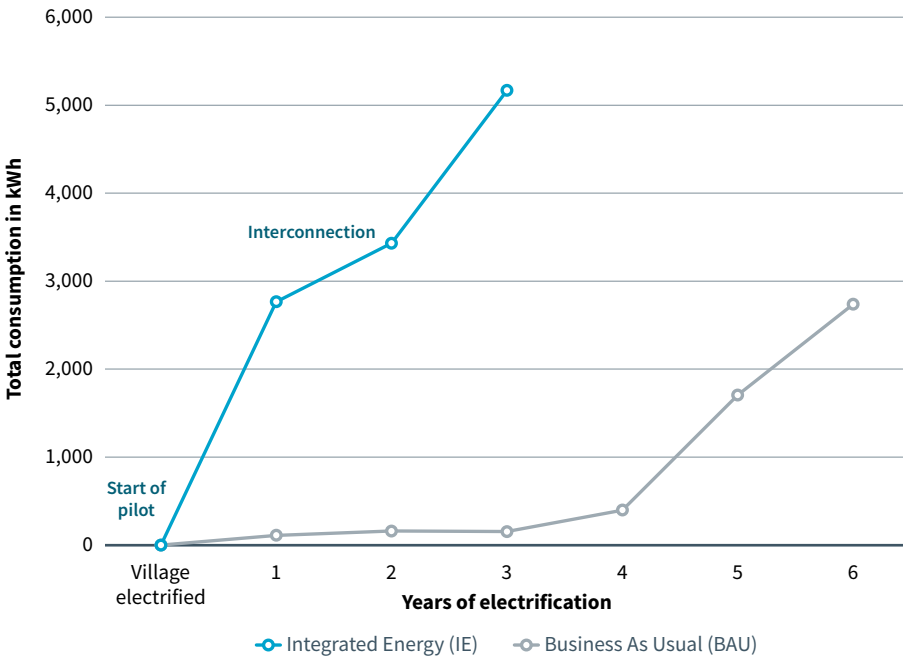
FIGURE 2: ELECTRICITY CONSUMPTION IN PILOT SITE VS. CONTROL SITE



Increased consumption, faster. Electricity consumption increased 30x in one year through expanded connections and demand stimulation.

- » EnerGrow, the pilot's asset financing partner, funded assets for households and over 40% of businesses.
- » Businesses that accessed appliance financing—nearly half of which were women-led—consumed 75% more electricity, highlighting the critical role of demand stimulation in electrification projects.
- » Revenues increased by 68% for businesses that acquired appliances compared to those that didn't.
- » East African Power developed the EMPWR PODS, containerized agricultural milling and drying units, in partnership with a local miller, providing a model for micro-industrial customers.
- » Overall, 20 new enterprises emerged in the community, boosting local business activity by 33%.
- » Consumption reached 2,765 kWh/month in one year, compared to six years for the control site. These accelerated economics redefine energy investment in Africa (Figure 2).

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Enabling environment. Policy and regulatory innovation are essential to encourage collaboration and enable new energy models.

» The Ministry of Energy and Mineral Development and the Electricity Regulatory Agency provided pioneering new licenses to support interconnection.
» Subsidies in the Electricity Connections Policy (2018) ensured affordability and sustainability of the integrated energy model.
» Umeme, the utility, recognized the need for innovation, new business models, and partnerships with DRE providers to achieve national electrification goals.
» Implementing this model at scale requires establishing simplified licensing schemes, such as bulk or rolling licenses, and mutually-beneficial commercial frameworks between the utility, mini-grid developer, and asset providers.

Toward 2030. Utilities 2.0 has the potential to be a key pathway to universal energy access by 2030 when scaled effectively.

» Utilities 2.0 ensures economic benefits for all stakeholders: consumers benefit from lower tariffs and upfront costs, small businesses gain new revenue streams, utilities improve financial performance, DRE companies expand their markets, and governments and funders save billions by optimizing public investments, leading to faster, more cost-effective energy access.
» Community benefits are significant. The Utilities 2.0 pilot showed that schools can extend hours and offer boarding options, while health facilities remain open late, enabling progress in both education and healthcare outcomes.
» This cost-effective model strengthens local economies, delivering affordable, equitable, and financially viable energy solutions.

The next phase of Utilities 2.0 will develop the commercial, operational, and regulatory blueprint to rapidly scale this model across Africa.

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Notes

1. SDG 7.1 - Access to energy - SEforALL https://www.seforall.org/goal-7-targets/access
2. Goal 7: Affordable and Clean Energy - UN Environment Programme https://www.unep.org/topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-7
3. International Energy Agency. (2020). World energy outlook 2020. https://www.iea.org/reports/world-energy-outlook-2020
4. Global Energy Alliance for People and Planet. (2023, March). The global challenge. https://energyalliance.org/powering-people-planet-2023/the-global-challenge/
5. The Nicholas Institute for Energy, Environment & Sustainability. (2020). Business model innovations for utility and mini-grid integration: Insights from the Utilities 2.0 Initiative in Uganda.

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Utilities 2.0 Coalition Partners

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RESEARCH PARTNERS

FUNDING PARTNERS

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