

## Kenneth Lee and Edward Miguel: Despite foreign aid, Africa is still in the dark

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When President Barack Obama made his first presidential visit to Kenya over the weekend, he visited not just his ancestral home, but one of the target countries in his \$7 billion signature foreign aid initiative, Power Africa.

Launched in 2013, Power Africa aims to boost electricity access in Sub-Saharan Africa. The initiative has prioritised expanding the continent's capacity to generate electricity, with an additional focus on small-scale renewable energy investments. This is a useful first step.

But investing in generation alone will be useless without addressing the economic and institutional obstacles to distributing electricity to homes and businesses.

Power Africa is tackling a critical global challenge. All of Sub-Saharan Africa, with 961 million residents, currently only consumes about as much power as New York City. Expanding energy access will be vital for driving Africa's economic transformation over the coming decades.

Yet our research in Kenya shows that most households and businesses still face major barriers to accessing electricity. In recent years, hundreds of millions of dollars have been spent to expand the grid across most of the countryside, leaving the majority of Kenyans "under grid," or within a half-mile of power grid infrastructure. The same holds in several other African countries.

Yet the electrification rate in Kenya is still only 30 per cent, and in our data just 5 per cent of rural households and 20 per cent of private businesses within a half-mile of the infrastructure have electricity. The low connection rate holds even years after the grid is in place. Clearly, building more infrastructure isn't enough.

Why not? In a study conducted with the University of California, Berkeley and the non-profit Innovations for Poverty Action, we document a host of challenges in trying to connect hundreds of rural Kenyan households to the grid. The price of connections remains very high for most, few financing options are available for rural families, and there are not enough skilled workers to oversee the design, construction and electrical wiring.

Even after the households in our study had paid in full for their electricity connections, it took seven months on average for electricity to flow for the first time. Once connected, households experience regular blackouts – sometimes lasting days or weeks – due to a shortage of maintenance staff and materials. Given these conditions, it's really no wonder that so few Kenyans have chosen to connect to the power grid.

Some argue that decentralised technologies such as solar microgrids and lanterns are the solution to these problems. Yet no industrial country has ever powered its economic growth with solar lanterns. We see the popularity of these small-scale technologies as a symptom of the problems with the electrical grid, rather than their solution. While decentralised generation may be cost-effective for a small number of isolated rural communities, it can never reap the

massive economies of scale of a national – or even international – power grid.

As in textbook economic models, energy companies serving more customers will rapidly see their cost per customer fall. Similarly, larger power plants are able to generate electricity at a tiny fraction of the price of small-scale systems, such as home solar, and are particularly cost effective in countries like Kenya where the network infrastructure is rapidly expanding.

One thing is clear. The electricity grid – especially one built today – does not have to be damaging to the environment or contribute to climate change. Large power plants increasingly rely on renewable energy sources, including those in Kenya, where several major geothermal and wind projects are under development. Energy infrastructure is long-lived, so the choices that Kenya and other African countries make in the next decade will have major implications for both their economic development and global climate change.

By 2060, the United Nations projects that Sub-Saharan Africans will make up nearly one in four people on the planet. Their demand for power will surely rise steadily over the coming years. But funding power generation alone will not improve African lives if electricity never reaches those who need it to work, play and study.

Powering Africa will require not just technological investments, but also economic and institutional solutions to the many barriers to access.

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