

# StanfordSOCIAL INNOVATION<sup>Review</sup>

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*Viewpoint*  
**Scaling Power for Global Prosperity**  
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## VIEWPOINT

# Scaling Power for Global Prosperity

Ending energy poverty to address systemic inequality requires a much more ambitious plan than philanthropic and nonprofit leaders currently envision.

BY SHEILA HERRLING & TODD MOSS

**M**ore than a billion people worldwide live without access to basic electricity: One in every six people on Earth doesn't have enough energy at home for indoor lighting or even to charge a mobile phone. But as appalling as that figure is, it has misled policymakers, nonprofits, and funders about the true extent of global energy poverty. This misunderstanding has come with profound consequences, from squandering human capital and crippling emerging economies to short-circuiting discussions about how to solve energy poverty once and for all.

The real number of people living with energy poverty is *more than three billion*—that is how many people live in countries that lack the high-energy systems that fuel job creation, global competitiveness, and prosperity in the rest of the world.

The absence of 24/7 energy infrastructure has profoundly destructive effects in emerging economies. Only one in every three health facilities in Africa can count on reliable electricity needed to store vaccines or operate a clinic. Entrepreneurs in Senegal pay among the world's highest rates for power, while businesses in Nigeria routinely rely on costly diesel generators instead of the country's power grid. Cement plants in Uganda have cut production because of intermittent electricity. An aluminum smelter in Ghana that once employed more than 1,200 people and created at least 50,000 downstream jobs has been forced to run at just 20 percent capacity for the past decade because of chronic power shortages.

These are just some examples of the *systemic energy poverty* that thwarts any

attempt to meaningfully improve lives. If we don't help countries solve this larger systemic problem, it will consign many emerging economies to remain permanently emerging—their populations underemployed, shut out of commercial opportunities and consumer choice, and increasingly distrustful of a global system that benefits too few.

While policymakers, foundations, and a handful of nonprofits have been paying more attention to energy poverty over the last decade, the solutions they have implemented have been predominantly small scale and focused on addressing the energy needs of low-income household consumers. These efforts—such as providing solar-powered lanterns and expanding off-grid solar to run small household units—will certainly help millions of impoverished people. Many

funders have been attracted to less complex, feel-good programs that provide electricity to a home so that a child can read at night or a farmer can charge her phone.

But improving household access is, at best, an elementary step for these societies on a steep energy-consumption ladder. At worst, this approach in isolation can be a dead end that condemns people to chronic long-term poverty. Solar home systems cannot create jobs and rising incomes. When it comes to solving systemic energy poverty, we need to think big.

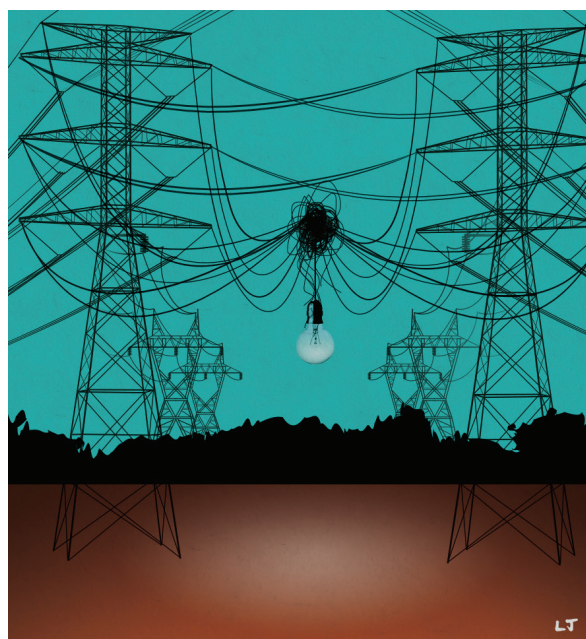
## A HIDDEN LESSON

No country in history has achieved prosperity for its people and global competitiveness for its economy through small-scale, household-facing energy approaches. In the United States, electrification was an essential driver of American industrialization and economic strength. More recently, heavy investment in large-scale power has been indispensable to the fast-growing economies of East Asia. Today, every high-income economy relies on a high-energy system that delivers abundant, reliable power at scale.

High-energy systems will continue to be a necessity on the road to prosperity. The traditional path to industrialization is built

on steel, concrete, and heavy machinery—which require huge volumes of low-cost energy. But energy at scale is also required for countries pursuing services-led growth, where computers, data, and communications technology are the lifeblood of labor and productivity. Even in agriculture, energy is a significant input for mechanization, fertilizer, and irrigation. A modern, competitive economy cannot exist without abundant, reliable energy.

The effects of climate change will hit developing economies in tropical



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climates the hardest. Perhaps counterintuitively, they will require *even more energy*: more steel and concrete to build resilient infrastructure in response to extreme weather; more cold storage and air conditioning to cope with rising temperatures; and more pumped irrigation and desalination to compensate for freshwater shortages. These technologies of adaptation and resilience are all hugely energy intensive.

The mobile phone revolution is often cited as an example that can be replicated for energy. But mobile communications technology actually exemplifies the need for high-energy systems. Charging phone batteries accounts for less than 1 percent of the energy required for a smartphone to operate. The other 99 percent is needed by the wider economy to manufacture the phone, and to run the cell towers and data centers that enable the phone to function. The mobile phone is a high-energy technology masquerading as a low-energy one.

These kinds of high-energy consumer technologies are a huge part of the prosperous modern life that people everywhere desire. New technologies and growing expectations don't allow emerging economies to leapfrog grids and power plants; they actually increase the need for these high-energy systems. If everyone on the planet deserves a job and a modern lifestyle, then we cannot avoid large-scale energy solutions.

### LOW ENERGY'S LOOMING THREATS

A future built entirely on small-scale energy not only means a future of persistent poverty, but it also greatly risks wasting human potential and heightening global insecurity. World Bank data show that the cost and reliability of power is a top constraint on job creation in Africa. A new study estimates that living in a community with power shortages reduces the likelihood of employment by a whopping 35 to 41 percent. An educated but underemployed generation shut out of the opportunities from the global economy is a recipe for widespread political and social unrest.

These realities have ramifications for national, regional, and global security.

Nigeria exemplifies this worrying combination of low energy and low job creation undercutting economic growth and increasing the risk of insecurity. Home to Africa's largest population, Nigeria is already the world's most underpowered country relative to its income—nearly 80 percent below global trends. Lack of electricity is consistently cited among the biggest barriers to firm expansion in the country.

Nigeria's situation is projected to get alarmingly worse. Around 2045, Nigeria will have a population larger than that of the United States; yet, it is on track to have less than 2 percent of America's electricity-generation capacity. For Nigeria, economic growth and job creation can't possibly keep up if infrastructure isn't dramatically improved and national power generation does not expand by orders of magnitude. Failure to solve this problem will leave tens of millions of new Nigerian consumers and job seekers angry at their exclusion. A Nigeria that cannot come close to meeting its own population's demands for jobs and modern lifestyles—all underpinned by high-energy systems—would have profound ripple effects, turning a potential engine of opportunity into a dangerous source of transnational threats.

### BUILDING A HIGH-ENERGY FUTURE

There are abundant opportunities to mobilize new funding, new policies, and new approaches for building a high-energy future for everyone. Here are some ideas:

**Path-breaking capital** | High-energy systems are all about large-scale, high-impact infrastructure projects tailor-made for investors. Trailblazing social impact funds and public-sector development finance institutions can catalyze private capital to invest in these projects. For example, Kenya's Lake Turkana Wind Power, Africa's largest wind farm, was made possible through a partnership with South Africa pension funds and a consortium of Nordic development finance groups. The Azura-Edo project, which will utilize Nigeria's own natural gas to bring 450 megawatts online, benefited from a loan from the Overseas

Private Investment Corporation. These actors can be first movers, helping to build the market and attract more traditional global capital.

**Policy change** | Policymakers are central to prioritizing and constructing high-energy systems. In markets such as Kenya and Ghana, public officials are reforming tariffs and making other changes to create the environment for investors to make a decent return while also delivering on the power needs of their people and businesses. Power Africa, a multiagency US government initiative, is supporting these efforts with technical assistance and seed capital.

**A new energy philanthropy** | Systemic energy poverty deeply affects the ability of nonprofits and philanthropy to achieve their goals. That's why the MacArthur Foundation supports anti-corruption oversight in the Nigerian electricity sector, and the Rockefeller Foundation backs mini-grids for small industry in India. And that's why consortia of high net worth individuals and foundations are scaling impact investing to deploy private capital for public good. Energy philanthropy has huge potential, such as funding new research, backing innovation in business and technology, and supporting policy change.

**Research and data** | A tremendous wellspring of innovative energy research and data is coming out of leading academic institutions. But too little research has been translated into useful jargon-free insights for policy makers or delivered in a practical form. To address this gap, we have formed a new nonprofit network, the Energy for Growth Hub, to facilitate that translation and to connect pertinent research directly with policy demand.

Human progress has always been about harnessing energy. Today's fight against global energy poverty is no different. Economist and former United Nations sustainable energy representative Kandeh Yumkella once said, "The provision of one light to poor people does nothing more than shine a light on poverty." If the future is going to be more prosperous, fair, and stable, we're going to have to help build a high-energy future for everyone. ■