1,106 views | Dec 12, 2019, 11:13am

Electrifying India May Require Convincing People Power Is Something Worth Paying For

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A tangle of power lines hangs over a street in New Delhi, India. Photographer: Adam ... [+] BLOOMBERG NEWS

In 1879, the year Thomas Edison invented a workable light bulb, the population of the world was 1.2 billion, all living without electric lighting. One hundred and forty years

later, electricity remains inaccessible for a little more than 800 million people. For hundreds of millions more, flicking a light switch is a roll of the dice—sometimes the light turns on, but all too often power outages mean that candles and kerosene lamps need to be pressed into service.

For many decades, this situation has posed a stubborn hurdle for efforts to reduce poverty globally. Yet, research from different parts of the world has shown that electrification can transform economies and increase incomes by opening the door to commercial activity of all kinds—from small-scale manufacturing to shops that stay ope after dark. In Brazil, for example, the expansion of hydro-electricity led to significant improvements in income and productivity and higher levels of education. In South Africa, improvements in electricity access helped increase female labor employment. Unreliable power has also been shown to increase the cost of manufacturing and lower productivity, while likely making it impossible to start many businesses. It is therefore no exaggeration to say that solving the energy access problem is one of the greatest development challenges of this generation.

So why do so many of the rural poor in large parts of Asia and Africa still live without power? Contrary to what one might think, it is all too often not because of a lack of money to generate enough electricity. India, for example, not only has more than enou generation capacity to meet current demand, in 2018-19 only about 50% was used.

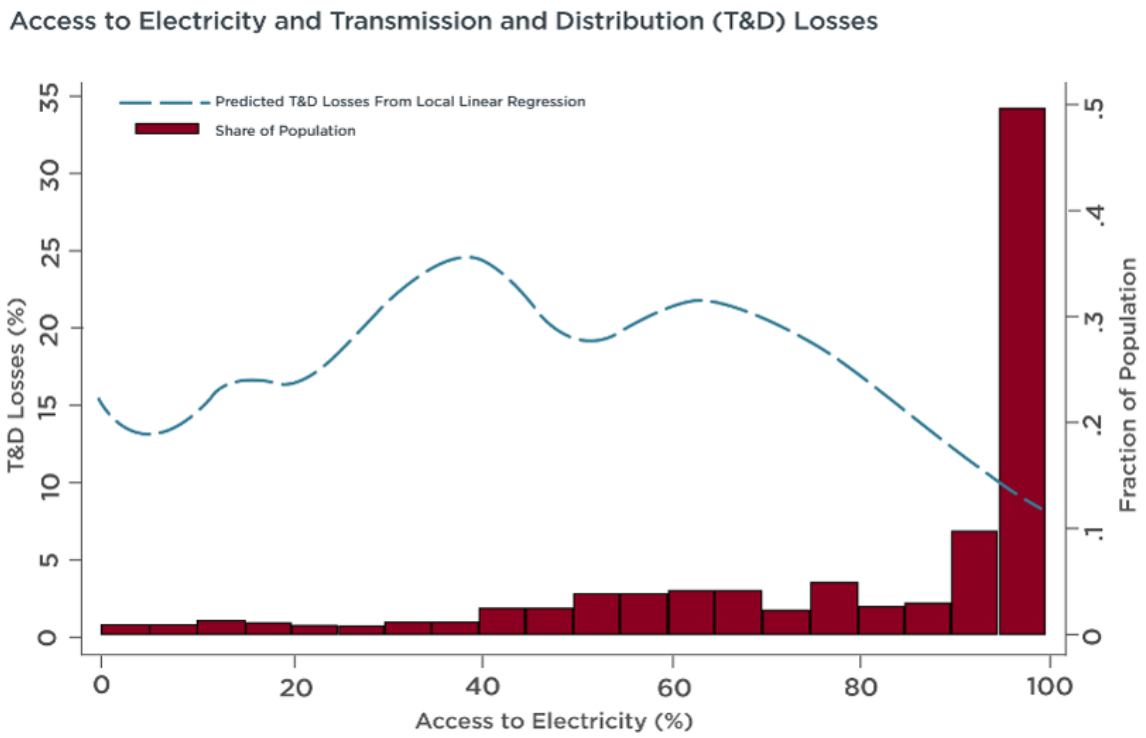
Today In: Business

Over the last eight years, we have worked with Robin Burgess and Nicholas Ryan in the Indian state of Bihar to explore why electricity consumption is so low and how it might be increased. We posit that a primary cause lies in a deep-rooted social norm that electricity is a right and not a private good that must be paid for. As a result of this soci norm, a vicious cycle is created. Customers—even the relatively rich—do not pay their bills. In turn, the state loses money for every unit of power that is consumed and to avo bankruptcy has no choice but to limit how much electricity is purchased. So in contrast to typical businesses, these distribution companies try to sell *less* of their product. The resulting low quality supply makes consumers even less willing to pay.

This has created broken electricity markets where countries that could supply more power to their energy starved citizens choose not to. The result is that there are consumers who value increases in electricity consumption more than it costs to produc it, but the distribution companies won't supply it.

To dig into the situation globally, my colleagues and I collected data on electricity price and utility losses from around the world and found a large number of low-income countries have transmission and distribution losses far above the norm in the develope world. These losses could include everything from technical breakdowns to electricity theft. Many of these countries also price power below cost because they are supplying t a poor population. In low-income countries it costs an average of 6.4 cents per kWh to buy power and average tariffs are only 3.6 cents per kWh. If the costs of losses for technical reasons and non-payment are included, the effective cost rises to 7.8 cents pe kWh. Thus, the average utility in a poor country makes 46 cents per dollar of input.

In the developed world things look very different. Prices are higher than marginal costs for the average consumer, losses are low, and thus selling power is profitable.



Each point represents one country and year, for all 142 countries and years from 1990-2014 for which ... [+] ENERGY POLICY INSTITUTE AT THE UNIVERSITY OF CHICAGO

No business can run indefinitely while selling a product that loses money, and ultimate the way to avoid the brick wall of bankruptcy is to settle for frequent outages – in some countries through leaving homes entirely unserved. Indeed, my colleagues and I uncov a striking pattern in how losses vary across countries all over the world. As the chart shows, as countries connect more and more households to the grid, losses steadily rise. Then, a tipping point occurs after which there is a move towards high quality supply, universal access and low losses.

The challenge before developing countries is to cross over this tipping point, and to fin a way to expand access without going completely bankrupt in the process. That is wher breaking the social norm that electricity is a right and not a private good, must come in Some countries, such as India, present some progress. Between 2000 and 2016, an astonishing 80 percent of homes around the world that received electricity for the first time were in India.

A particularly impressive example comes from Bihar, one of the poorest states in the country. The government of Bihar declared universal electrification in October 2018, having connected about 14 million new households in the previous two years. Furthermore, as Bihar increased access, it also increased the quality and duration of supply. Between 2014 and 2019, the average hours of supply in Bihar rose from 12 hou to 18 hours. The promise of electricity in Bihar is close to being fulfilled—wires are live, children can study at night, and businesses can serve their customers even when the su goes down. Most importantly, all of this happened while keeping loss rates constant, suggesting that it is possible to reduce rationing without losing prohibitive amounts of money. Perhaps this is because Bihar has been at the forefront of innovation and experimentation to improve revenue collection. As an example, Bihar utilities partnere with my colleagues and I to implement a variety of new ideas, including carefully designed employee incentives, new technology such as smart meters, and sustained behavior change campaigns.

Bihar is not a case study to demonstrate a perfect solution. Losses remain far higher than in the developed world. It is apparent that the path to 24/7/365 electricity and all its benefits lies with breaking the social norm that electricity is a right. Without this fundamental change, we will still be talking about the stubborn problem of energy acce for several more decades.

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