

Simple Energy Efficiency Measures Can Eliminate Electricity Shortage in India: Report

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(PhysOrg.com) -- Electricity in India can be a dicey proposition. Half the population lacks access or is too poor to afford it. The other half is using so much that demand far outstrips supply, resulting in daily power outages. And with a growing middle class buying more TVs, air conditioners and the like, the situation will only get worse. As chaotic as things are, there is a solution: simple energy efficiency measures, according to a new report from Berkeley Lab, can eliminate the electricity deficit as early as 2013.

As chaotic as things are, there is a solution: simple [energy efficiency](#) measures, according to a new report from Lawrence Berkeley National Laboratory (Berkeley Lab), can eliminate the electricity deficit as early as 2013. What's more, doing so will add \$505 billion to India's gross domestic product (GDP) between 2009 and 2017 (compared to India's total GDP of \$911 billion in 2007-2008), as businesses that have had to cut back due to electricity shortages can restore production.

"None of these measures are retrofits; they are all new sales of items such as [light bulbs](#) and refrigerators. We tried to keep it as simple as we possibly could—no buildings, no transport," said report co-author Jayant Sathaye, a Berkeley Lab senior scientist who leads the International [Energy Studies Group](#) in the Environmental Energy Technologies Division. "Air conditioners alone are growing at 25% per year in India. But because of this rapid growth, you can capture the new sales, sell only efficient products and make a difference."

For the report, Sathaye and co-author Arjun Gupta, also of Berkeley Lab, assumed all new sales of some basic appliances would be of energy efficient models, including electric fans, TVs, air conditioners, motors, some industrial processes and water pumps for agriculture; they exclude

retrofits of existing technologies. With these steps, they find that the rate of demand growth for electricity declines, allowing the supply to meet and eventually exceed the demand, thus preventing 65 million tons of carbon dioxide emissions by 2017. By 2020, the cumulative benefits increase to \$608 billion added to the GDP and 333 million tons of CO2 emissions avoided.

Although some investment would have to be made in energy efficient equipment, the amount is more than offset by the money saved by not building power plants that otherwise would have been needed.

The measures are feasible, Sathaye says, because in fact India has had energy efficiency programs in place in various sectors since at least 2001, when the government passed the Energy Conservation Act, which, among other things, created the Bureau of Energy Efficiency (BEE). "Most developing countries hadn't done anything like that in 2001," Sathaye said. "It's very unique. Neither the U.S. nor China have a bureau dedicated to energy efficiency."

Berkeley Lab has played a role in India's energy efficiency programs, working with state regulators and utilities to set up demand-side management programs and working with BEE on building codes and appliance standards and labeling. Currently, four appliances in India, including refrigerators and air conditioners, have mandatory labels with ratings of 1 star (meaning it meets a minimum energy performance standard) to 5 stars (highly efficient). "We look at LBNL as a major resource in providing us policy options and analyses to create an environment that allows people to make energy efficient choices," said BEE Director Ajay Mathur, who visited Berkeley Lab this month.

Still, the gap between electricity supply and demand continues to grow; India is now importing coal as well as natural gas to keep up with energy consumption. “Energy demand is increasing dramatically due to rising incomes, industrialization, urbanization and population growth,” said Mathur. “The demand will increase by a factor of two over the next 20 years and possibly by three. We’re in a very tight situation.”

Under a new U.S. Department of Energy (DOE) program, and with some technical assistance from Berkeley Lab, India plans to step up its energy efficiency plans by focusing on appliances. Part of a plan announced by Energy Secretary Steven Chu last December in Copenhagen, the Super-efficient Equipment and Appliance Deployment program (SEAD) seeks to introduce highly efficient products at a global scale through various market mechanisms. Recognizing that increased use of lighting and household appliances is estimated to account for more than half of the future growth in electricity consumption worldwide, the U.S. will provide at least \$15 million for SEAD over its first five years.

“DOE believes India and the world have much to gain from India’s participation in the SEAD energy efficiency initiative and we look forward to continued collaboration in promoting energy efficiency globally,” said Rick Duke, DOE’s Deputy Assistant Secretary for Climate Policy. “India is an important partner in our efforts to combat climate change and ensure mutual energy security.”

Mathur said India will start by focusing on ceiling fans, then move to TVs and possibly air conditioners. “It’s a powerful mechanism, giving manufacturers incentive to produce super efficient appliances,” said Mathur. “We’ll establish through both technical analysis and market price discovery what kind of incentive needs to be paid, then establish the process for utilities to pay the incentive to the manufacturer.”

Most homes in [India](#) have several fans, at least one in each room, and even the poorest homes have at least one fan. (“The first thing people buy when they get electricity is a light and a fan,” said Mathur.) According to Sathaye’s report, efficient

fans can offer more than 27% energy savings.

Mathur said Indian consumers are starting to become more energy-conscious. When it comes to buying appliances, efficiency has jumped from the eighth most important factor to the fourth, behind brand, price and color. Politicians are catching on too. “In the last year, I have had five state electricity ministers come to my office, something I have never had happen,” Mathur said.

More information: Read the report, “Eliminating Electricity Deficit through Energy Efficiency in India: An Evaluation of Aggregate Economic and Carbon Benefits” - ies.lbl.gov/node/429

Provided by Lawrence Berkeley National Laboratory

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