



In the Dark:

How Much Do Power Sector Distortions Cost India?



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India has made enormous progress in expanding electricity access and reducing power shortages over the past few years. But it still faces enormous needs to meet the electricity demand of a rapidly growing economy while protecting the environment and public health.



In 2017, roughly **178 million people in India were not connected to the electricity grid**, and the International Energy Agency predicts electricity demand could almost triple by 2040.



Power cuts harm economic productivity, with the 2018 *Global Competitiveness Report* ranking India **80th** among 137 economies in the reliability of electricity supply.



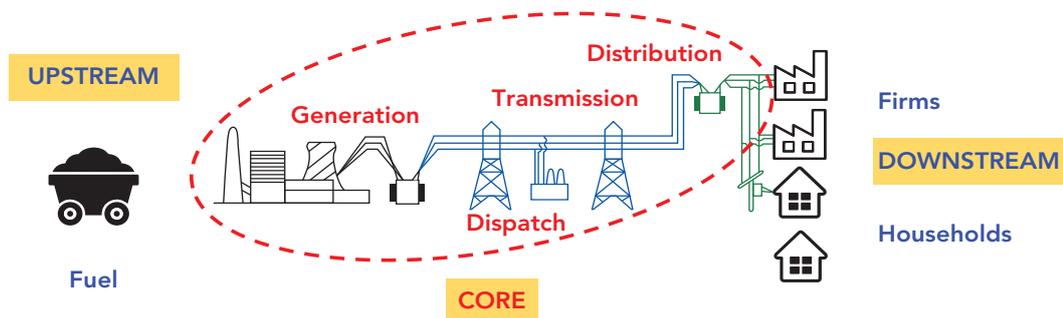
Reliance on coal as its main energy source means heavy pollution, with exposure to fine particulate matter from coal-powered plants contributing to **82,900 deaths** and a loss of 2.3 million years of healthy life in 2015, according to the Health Effects Institute.

While India's power sector needs urgent investments to boost sustainable energy supply, it also requires reforms to overcome **inefficiencies in every link of the electricity supply** chain that harms economic growth and contributes to health and environmental damage.

Distortions in the power sector cost India's economy the equivalent of **\$86.1 billion** (four percent of GDP) in fiscal year 2016. Addressing these distortions through power sector reforms could help India make the most use of existing facilities, avoid waste, and increase cleaner electricity supply.

What Are the Distortions?

Despite having the world's fourth-largest coal reserves, India fell 14 percent short of meeting demand in fiscal year 2016. Multiple problems affect **upstream** coal supply:



Lack of competition led to overstaffed and unproductive underground mines. Only **1 out of 10 underground coal mines in India is mechanized**, and the average output per labor shift at Coal India's underground mines was less than one ton in fiscal year 2016 — compared to 25 tons in the United States.



India's Ministry of Coal reported the price of coal is 17 percent lower for power generation than for consumers in unregulated sectors, which encourages waste.



India's freight tariffs were among the highest in the world on a purchasing power parity basis, and its passenger tariffs were among the lowest. Cross-subsidization of railway passenger tariffs by freight squeezes the revenue of the rail system, discourages investments and contributes to bottlenecks for coal delivery.



India's environmental tax on coal consumption is insufficient to offset the damages caused by pollution from coal-based power-generation. Imposing a full environmental tax on coal would reduce coal consumption by about 30 percent and generate net health and environmental benefits estimated at **\$35.4 billion a year**.

At the CORE of the sector, electricity subsidies and inefficient electricity generation, transmission, and distribution also contribute to power shortages:



State government-owned power plants used 16 percent more coal per unit of electricity produced than plants owned by independent power producers during fiscal year 2000–2012. This is so after controlling for differences in plants' physical and technical characteristics, such as age, capacity, design heat rate, location, and dispatch.



More than 20 percent of electricity was lost in transmission and distribution in fiscal year 2016 — a much higher rate of loss than the international norm of 10 percent.



Subsidies cause the average agriculture and residential tariffs for electricity to be well below the cost of supply, with direct subsidies reaching **\$8.8 billion** in fiscal year 2016.



Free electricity for irrigation pumping by farmers made India the world's largest user of groundwater — a non-renewable resource — with consumption increasing 700 percent from 1950 to 2014.

Downstream, the lack of reliable access to electricity lowers living standards and slows business growth:



Connecting the remaining population to the grid and increasing the supply of electricity to 24 hours a day would increase the income of rural households by **\$9.4 billion a year**, while eliminating power shortages would increase profits of businesses by **\$22.7 billion a year**.



Reliable access to electricity leads to lower use of kerosene lamps and captive power generation, which would improve health and environmental outcomes. Children's study time and women's employment also increase.



More affordable electricity tariffs for industry, if the cross-subsidization of agricultural and residential consumers by industry came to an end, would **boost export competitiveness**. Removing cross-subsidies could increase India's net manufacturing exports by **1-3 percent**, depending on the sector.

How Can Distortions Be Reduced?

Power sector reforms would expand access to electricity, improve its reliability, reduce waste, boost economic activity and benefit the poor. Few other reforms can quickly yield economic gains of a similar magnitude.

The *In the Dark* report quantifies the cost from each of the key power sector distortions affecting India and makes concrete recommendations for reform, including:

- ▶ **Achieving universal access to electricity, along with ensuring reliability of power.** Merely ensuring connectivity is not enough. The gains from electrification depend critically on whether the "connected" households receive an adequate level of service. Removing electricity subsidies can help boost investment resources for utilities and eliminate perverse incentives to underserve loss-making customers;
- ▶ **Addressing institutional distortions** by promoting competition and implementing performance-based regulation. Providing adequate incentives would help improve the operating performance of utilities; and,
- ▶ **Prioritizing the rapid increase of efficiency in the power sector**, with prices raised gradually and targeted social assistance provided to mitigate the impact. **Avoiding a narrow focus on liberalizing the price of energy**, because in the absence of other reforms, inefficiencies in the system would lead to an excessively high cost of electricity, causing distress for the poor and vulnerable.

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