
Why Expensive Electricity Hurts Growth

Sustainable Development Goal 7 is to “ensure access to affordable, reliable, sustainable and modern energy for all.” However, due to cross-subsidization schemes, firms in developing countries continue to grapple with unaffordable electricity prices. A study on the manufacturing sector in India found that, in response to high electricity prices, firms switch to less electricity-intensive production processes, which can have negative implications for their growth.¹ The resulting loss in the country’s output and, hence, income, exceeds the subsidies provided to users. This implies that eliminating cross-subsidies can drive growth and still allow the country to generate more than enough income to provide affordable electricity to the poor.

Firms in developing countries tend to face relatively high electricity prices due to cross-subsidization

In most developed countries, industrial users pay lower prices for electricity compared to other users because the cost of supplying electricity to industrial users is typically lower.² This is due to the fact that industrial users are able to consume electricity at higher voltages, which eliminates the additional cost of stepping down the voltage for other users such as residential users. Industrial users also tend to be connected to centralized portions of the electricity network, which reduces transmission and distribution losses. However, about three-quarters of developing countries use a system of cross-subsidization among customer groups, with residential users typically paying less than half the price paid by commercial and industrial users.³ This system is usually driven by the desire to appeal to politically-favored groups as well as the social goal of making power affordable for the poor.

In India, the price per kWh of electricity paid by industrial users has been as high as 15 times the price paid by agricultural users, who are an influential voting bloc in India, and twice the price paid by residential users (Figure 1). Although India is less wealthy than the average OECD country, the price paid by its industrial users is similar to that paid by industrial users in OECD countries, whereas the price paid by residential users is less than half the price paid by residential users in OECD countries. This can significantly undermine the global competitiveness of Indian firms.

FIGURE 1: Average Electricity Price for Different Categories of Users in India⁴



Firms cannot mitigate high electricity prices with self-generation, and instead switch to less electricity-intensive production processes leading to lower productivity growth

While firms, particularly large ones, can cope with unreliable electricity supply by [using generators](#) to produce their own electricity, this strategy is not a viable one for coping with high electricity prices. This is due to the fact that self-generated electricity is substantially more expensive than grid electricity. Electricity generation entails a high fixed cost which leads to economies of scale - the unit cost of generating electricity for a larger number of users is lower than that of a firm generating electricity only for itself in almost all cases. Diesel, the fuel typically used for self-generation, is also costly and exposes firms to unpredictable price swings. Self-generated electricity can therefore be, on average, about four times as expensive as grid electricity.⁵

Consequently, the study on India finds that firms do not increase self-generation in response to high electricity prices. Instead, firms switch to less electricity-intensive and more manual production processes (for instance, a fish processing firm may switch from using a fish dehydrating machine to sun-drying fish). This ultimately reduces firms' output and productivity growth since most productivity-enhancing technologies rely on electricity. Therefore, the evidence suggests there is little a firm can do to retain competitiveness when faced with high power prices.

Implications of reducing the cost of power

Reducing the extent to which firms cross-subsidize other users could result in gains in aggregate output and, hence, income that would be more than sufficient to offset the reduction in subsidies. As an example, in 2008, India used about 14 percent (89 billion rupees) of the electricity revenues from industrial users to subsidize residential and agricultural users. Estimates from the study suggest that reducing industrial users' electricity prices by eliminating this cross-subsidization could have led to about a 20 percent (1.4 trillion rupees)

increase in manufacturing output, which would have been more than enough to cover the subsidies to residential and agricultural users. Policymakers can, therefore, generate overall income gains for the economy by increasing the affordability of electricity for firms via the elimination of cross-subsidization schemes.

Further, because industrial users consume energy consistently throughout the day, relative to residential users whose consumption is concentrated in the morning and evening, they provide a steady source of income for utilities. This increases the financial viability of utilities and can drive down the average cost of supplying power, making the presence of industrial users critical to providing affordable energy.⁶ Thus, losing industrial users due to high prices from cross-subsidization could hamper the goal of affordable energy for all.

Endnotes

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