Power Subsidies

A Reality Check on Subsidizing Power for Irrigation in India

After almost a decade of high-level efforts to bring electricity tariffs closer to the cost of supply, India has barely made a dent in the long-standing and increasingly uneconomical practice of subsidizing power for irrigation. Progress has been slowed by concern that higher tariffs would harm farmers and thus undermine the achievements of the green revolution package—cheap power and water, new seeds and fertilizer—aimed at enabling the country to feed itself. But a new study shows that a package of rapid electricity sector reforms, including a move toward cost-covering tariffs and investments to improve the quality of power supply, would increase farmers’ incomes by 40–100 percent over a six-year period.

Electricity tariffs for farmers in India amount to less than 10 percent of the cost of supply. That means a power subsidy for the agricultural sector of an estimated US$6 billion a year—equivalent to about 25 percent of India’s fiscal deficit, twice the annual public spending on health or rural development, and two and a half times the yearly expenditure on irrigation. At the same time, the quality of supply to farmers has worsened over the years. Operational inefficiencies and high distribution losses due to pilferage have contributed to the financial insolvency of power utilities across India. With little or no investment funding available to rehabilitate the electricity system, power outages and voltage fluctuations have become increasingly frequent. Consumers’ dissatisfaction has grown, and so has their unwillingness to pay even highly subsidized charges. As users delay paying electricity bills and resist tariff increases, cost recovery diminishes for the utilities, perpetuating the problem.

A study covering two states—Andhra Pradesh and Haryana—assessed the impact of cutting subsidies as part of broad reforms of governance and regulation aimed at reducing losses, controlling theft, strengthening metering and collection, and moving to independent tariff setting, competition, and privatization (box 1). As a first step the study assessed the current approach to delivering services—in particular, the costs arising from poor-quality service and poor subsidy design.
Repairing a burned-out motor costs about half the yearly electricity tariff that farmers pay for each pump. The costs of repairing motor burnout are regressive, amounting to 10 percent of gross income for marginal farmers but less than 2 percent for large farmers. Moreover, marginal farmers face other disadvantages. Some farmers cope with the poor quality of power supply by purchasing backup diesel pumps, or overinvesting in larger pumps in the hope of pumping more water when electricity is available. But small and marginal farmers can least afford these coping strategies—and about 40 percent of farmers who own electric pumps in Haryana, and 48 percent in Andhra Pradesh, are small and marginal.

Beyond the costs of the repairs and the lower crop yields caused by lack of water while motors are being repaired, the poor quality of power supply has several other important effects on farmers. Using Haryana survey data, the study developed a regression analysis to isolate the effect of different power supply indicators on the net incomes of electric pump users. It found that three factors have a large and statistically significant impact on farmers’ incomes: the days lost due to transformer burnout, power unavailability, and unscheduled power cuts.

The costs of theft
The electricity subsidies take the form of a flat rate paid by farmers per unit of horsepower per pump; farmers’ actual power use is not metered or recorded. These flat-rate subsidies help to camouflage theft.

To estimate farmers’ actual power use in Haryana, meters were installed on a sample of 584 pumpsets and their readings recorded every other week for a year. The results show that farmers consume 27 percent less than the utilities estimate—and that transmission and distribution losses are therefore correspondingly higher than the utilities claim (47 percent, compared with the official 38 percent).

These incremental losses cost the utilities about US$160 million a year, undermining their ability to provide reliable service to farmers. A large part of the losses is due to pilferage by residential, commercial, and low-voltage industrial customers.
The costs of poor targeting

Large farmers are more vocal in arguing for retaining the subsidized flat rate because it represents a manageable share of their gross income. Moreover, paying a flat tariff for every pump enables them to irrigate a large area at a low per unit cost. But for small farmers who can afford electricity for irrigation, the cost per hectare is significantly higher. These small farmers need pumps of a minimum size, and they must pay the same tariff per pump as large farmers to irrigate a much smaller area. As a result, while electricity tariffs represent 6 percent of the gross farm income of large farmers, they amount to 13 percent of income for marginal farmers.

But electricity subsidies do not even reach most small and marginal farmers. Many lack access to electricity and rely mostly on rainfall to irrigate their fields. In Haryana, for example, farmers owning electric pumps have net incomes a third higher than the average for the state’s farmers and four times those of farmers relying exclusively on rainfed cultivation.

Reality check on reform

To gain a better understanding of the potential impact on farmers of different reform packages, the study simulated several policy reform scenarios.

- **Business as usual**—with tariff increases but deteriorating quality.
- **Gradual reform**—with steeper tariff increases and some improvement in quality.
- **Accelerated reform**—with the same tariff increases but more aggressive improvements in quality.

The accelerated reform scenario envisions more aggressive institutional, regulatory and technical reforms than the gradual reform scenario. These accelerated reforms would reduce theft, improve billing collection, shorten the wait for service, and improve the utilities’ capacity to manage loads. And they would lead to greater reductions in the duration of power cuts (70 percent, compared with 40 percent for gradual reforms) and in days lost because of transformer burnout (70 percent, compared with 40 percent; table 1).

The study carried out the simulations for a six-year period to allow for the introduction of tariff reforms and for investments to rehabilitate the transmission and distribution network. The results show that tariff increases for agriculture, matched by improvements in quality, would benefit farmers, particularly small and marginal farmers (figure 1). Under the business as usual scenario the incomes of small farmers would drop by 100 percent and those of large farmers by 50 percent. With accelerated reform, the incomes of small farmers would rise by 100 percent and those of large farmers by 40 percent.

Implications

Small and marginal farmers in Haryana have shown a high willingness to pay for improved reliability of power supply because the poor quality of supply has affected them so severely. By contrast, medium-size and large farmers (about 60 percent of those owning electric pumps) are less willing to pay in the short run because of their expensive backup arrangements, which reduce their vulnerability to
Many farmers understand that improved electricity service depends on higher tariffs and metering. Fewer understand the need to invest in more efficient pumpsets. To ensure continued and increasing support as power sector reforms are put into action, policymakers must clearly define, communicate, and build consensus for a strategy that balances higher costs of power with improved service performance over a time frame that small and marginal farmers find acceptable. The key will be to offer incentives and support that make the transition as painless as possible.

**Note**

1. The Note draws on a World Bank study carried out in collaboration with the states of Andhra Pradesh and Haryana (World Bank 2001). The World Bank team for the study included Lucio Monari, senior economist in the South Asia Energy and Infrastructure Group and task leader, Djamil Mostefai, Dina Umali-Deminger, Sunil Khosla, Bhavna Bhatia, and Chandra Govindaraju. The contribution of several consultants and government officials is also acknowledged. The study is available at [http://lnweb18.worldbank.org/sur/sa/nsf/hidia](http://lnweb18.worldbank.org/sur/sa/nsf/hidia).

**Reference**

World Bank 2001 “India Power Supply to Agriculture” South Asia Region, Washington, D C

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Telephone 001 202 458 7281
Fax 001 202 522 3181
Email ss smith7@worldbank.org

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