

# privatesector

## Reforming the Power Sector

### Controlling Electricity Theft and Improving Revenue

**The state government of Andhra Pradesh, India, launched a campaign in January 2000 to control the theft of electricity from government-owned power supply companies and improve their revenue collection. The initiative, now in its fourth year, has reduced losses, boosted revenues, and improved customer service. The improvements seem likely to be sustainable: the utilities have institutionalized new business processes and made visible changes in their organizational culture. This Note reviews the experience.**

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Many developing countries confront widespread theft of electricity from government-owned power utilities. In India electricity theft leads to annual losses estimated at US\$4.5 billion, about 1.5 percent of GDP. Who are the losers? Honest consumers, poor people, and those without connections, who bear the burden of high tariffs, system inefficiencies, and inadequate and unreliable power supply.<sup>1</sup>

What stops governments from eliminating electricity theft? Vested interests of such stakeholders as politicians, bureaucrats, labor unions, utility employees, and consumers. Because of political interference and weak accountability, state-owned utilities have little incentive to improve their performance. Privatization could be a solution. But high political risk, low cost recovery through tariffs, and large-scale theft make the power distribution business in developing countries unattractive to the private sector.

Can utilities improve efficiency even under government ownership? Yes, as shown by Andhra Pradesh, where state-owned power companies reduced theft and losses.

#### The context

The Andhra Pradesh State Electricity Board, a government-owned vertically integrated power utility serving about 12 million customers, suffered large and growing financial losses in the 1990s, adding up to Rs 40 billion (US\$0.9 billion) by 1997. The utility's operational and financial performance deteriorated, adversely affecting the power supply. Power subsidies grew to 1.6 percent of state GDP while public spending on health and education fell from 4.7 percent of state GDP in 1987 to 3.6 percent in 1998.

In 1998 the government of Andhra Pradesh initiated comprehensive reform in the power sector, a phased program to establish a new legal,



regulatory, and institutional framework; develop a new industry and market structure; and privatize distribution. So far Andhra Pradesh has enacted an electricity reform law; unbundled the utility into one generation, one transmission, and four distribution and supply companies; and established an independent regulatory commission responsible for licensing, setting tariffs, and promoting efficiency and competition.

The new distribution utilities inherited a weak system of energy accounting—and rampant electricity theft that, together with revenue leaks and other factors, undermined financial performance. In fiscal 1999 only 42 percent of the electricity flowing into the distribution system was billed on the basis of metered consumption. The balance was accounted as consumption by the unmetered agricultural customers (about 2 million) or as transmission and distribution losses. The unverifiable estimates of sales and losses allowed the utilities to camouflage inefficiency and theft and thus to deflect public scrutiny of their poor performance, hide political and bureaucratic corruption, and obscure the public debate about agricultural subsidy. The theft occurred in several ways, including tapping power lines and tampering with or bypassing meters, often with the connivance of utility staff. Revenue leaks resulted from weaknesses in metering, billing and collection, internal control systems, and enforcement of the disconnection policy.

The first step to reform was to move beyond denial and accept the existence of theft. An energy audit program led to more realistic estimates of transmission and distribution losses (at 38 percent in fiscal 1999, up from an earlier estimate of 18 percent) and recognition of “non-technical losses”—a euphemism for electricity theft. Public expectations from the reform program, and regulatory reviews that increased public accountability, brought the theft and losses under sharper public scrutiny. In January 2000 the government launched a major campaign to control theft.

### **The plan**

A comprehensive plan for controlling theft and improving accountability was prepared, focusing on four measures: enacting a new law to address

electricity theft, strengthening enforcement mechanisms, reorganizing the anticorruption function in the utilities, and reengineering business processes to improve management control and customer service.

In July 2000 the state government amended the Indian Electricity Act of 1910 to make electricity theft a cognizable offense and impose stringent penalties.<sup>2</sup> A separate law, unprecedented in India, provided for mandatory imprisonment and penalties for offenders, allowed constitution of special courts and tribunals for speedy trial, and recognized collusion by utility staff as a criminal offense.

Advance preparations ensured that the government was able to constitute special courts and appellate tribunals as soon as the new law came into force. The utility service areas were divided into 24 “circles” coinciding with the state’s 24 administrative districts. A special court and police station were established in each circle to ensure rapid detection and prosecution of electricity theft. And the state police and anticorruption units of other government departments were directed to support utility employees in inspections to control theft.

The government also initiated institutional changes in the utilities. Their anticorruption department was strengthened by promoting its head from an advisory to an executive position on the board, and the organizational structure was modified to strengthen the department’s coordination with other departments. In addition, the anticorruption department’s procedures were made simple and transparent. Inspecting officers provide an inspection report with an identification number to customers on the spot and carry numbered receipts so they can accept payments of fines. Police stations provide public notification of all theft cases. And a new tracking system follows the progress from inspection to payment of fine or prosecution. More than 2,000 inspection teams were deployed throughout the state to launch the theft control drive.

To reengineer business processes, a new management control system, the “customer analysis tool,” was developed. The system uses a centralized customer database to analyze metering, billing, and collection performance—allowing monitoring of staff’s performance against their collection

targets—and generates focused management reports useful for initiating corrective action. The substantially faster processing for analyzing data and generating reports allows quick action.

A key capability is the generation of risk profiles of customers based on their payment history, enabling utility staff to prioritize and target nonpayers. While the past practice was to inspect entire neighborhoods to detect a few thieves, the new system helps target inspections to defaulting customers and high-loss service areas. The paradigm shift from “inspect and detect” to “detect and inspect” has significantly increased the detection of irregularities. Most important, it has reduced the alienation of honest customers, who no longer have to suffer the indignity of police raids and neighborhood searches.

### Implementation

The campaign has achieved impressive results thanks to careful planning, political commitment, and efforts to build a constituency for change through consultation with stakeholders and improvements in customer service.

### Consulting with stakeholders

The government launched a communication program through media ads, posters, and videos, and a public outreach program through visits by special teams and regular public meetings with utility managers. The outreach campaign deployed about 600 teams to conduct town hall meetings in all settlements with more than 200 residents. The teams informed people about the proposed new law and the penalties for electricity theft and gave everyone the opportunity to obtain an authorized connection on the spot after paying a connection fee. They also explained the utilities’ deteriorating financial situation and the effect of electricity theft on their costs and tariffs.

In addition, teams held consultations with the labor unions about the proposed legal provisions for making collusion by utility staff a criminal offense. Assurance that old cases would be excluded under the new law helped secure the unions’ consent to punitive action against staff caught colluding in theft.

The credibility of the communications, and the government’s political resolve to combat theft, were tested when some politically powerful

people (including a member of the legislature) were charged with electricity theft. The cases went forward, and the proof that even the most powerful were subject to the new law, and that utility officials would be protected from interference, generated broad support for the program among the public as well as utility employees.

### Providing adequate resources

Adequate funds were provided for advertising, holding public meetings, purchasing high-quality meters and remote meter reading instruments, and adopting advanced communications technology—all of which helped to sustain the momentum and credibility of the change.

- *High-quality metering.* More than 2 million high-quality meters for energy customers were installed in two years, compared with a past average of 600,000 a year. High-accuracy meters were installed for high-value customers, and the old meters recalibrated and installed for low-value customers.
- *Better information flows for management control.* To support energy auditing, electronic meters with data logging devices and facilities for transmitting the data through a satellite communications system were installed on all 11-kilovolt distribution feeders.
- *Transparency in estimating agricultural consumption.* While agricultural customers remain unmetered for sociopolitical reasons, meters were installed on the transformers serving mainly these customers to allow better estimation of sales to agriculture.

### Setting priorities

In the initial phase the theft control program focused on high-value customers. Dedicated feeders were constructed to supply large industrial customers, which were also provided high-quality, tamper-proof electronic meters, and protective boxes were installed on transformers. Meter reading instruments were provided to inspection teams to download monthly data, allowing analysis to identify customers whose monthly consumption varied by more than 2 percent. Irregularities in metering and billing were found for about 15 percent of the 23,000 industrial connections—and 10 percent of the 36,000 commercial connections—inspected in

fiscal 2001. For residential customers inspections focused on 11-kilovolt feeders with high line losses and on 114 towns accounting for 53 percent of consumption and 60 percent of revenue.

### Building a constituency for change

The campaign also gave high priority to connection delays and poor customer service—two major reasons for customer dissatisfaction. Utilities introduced a spot billing system to allow meter reading in the presence of customers and thus minimize billing complaints, established a special cell in each operation circle to authorize new connections and address customer complaints, and opened collection centers at convenient locations and mobile collection centers in rural areas. Utilities also set up computerized customer care centers serving as one-stop windows for handling complaints, receiving payments, and following up on electricity supply problems.

### Monitoring results

The campaign was closely monitored, including at the highest level of the government. All district offices were linked to headquarters through the satellite network for quick transfer of data, and district administrators and engineers submitted daily reports on the connections regularized and fees collected. The information system developed to monitor the campaign was improved and integrated into the management control systems of the companies, and continues to be used for monitoring.

### The results

The campaign has made a big difference in the utilities' bottom line. Monthly billing has increased substantially, and the collection rate has reached more than 98 percent. Transmission and distribution losses were reduced from around 38 percent in 1999 to 26 percent in 2003, in large part through theft control, with the utilities regularizing 2.25 million unauthorized connections. Moreover, enforcement of the new antitheft law has proved effective. Disciplinary action has been taken against 218 employees and criminal cases launched against 87 employees involved in stealing electricity and misappropriating funds and materials. In the first three years after the law's enactment the authorities pur-

sued more than 150,000 cases, compared with 9,200 in the previous 10 years, and arrested more than 2,000 defaulting customers.

### Conclusion

In an environment of limited commercialization, deeply entrenched vested interests, and politicized operations and management in the power sector, Andhra Pradesh's efforts to control electricity theft are impressive. The program, now in its fourth year, has sustained the improvements. Whether the program will remain immune to political interference has yet to be seen; there is always a risk that populist electoral politics will undermine governance and accountability. But the program includes actions that, together with strong political commitment, are key to sustaining any such initiative:

- Creating a constituency for change through effective communication with key stakeholders and building confidence in the government's assurances by ensuring that the communication is followed by actions that back it up.
- Modifying the legal framework and enforcement mechanisms to remove legal impediments and empower enforcement authorities.
- Ensuring that punitive actions are seen as judicious and equitable and giving those with illegal connections a chance to become lawful customers.
- Institutionalizing new business processes by adopting modern technology, improving management information systems, and introducing new management control systems.
- Changing the incentives of managers and staff by punishing collusion and poor performance.

### Notes

1. While 80 percent of Indian villages are electrified, only 44 percent of rural households have access to power.
2. The Indian constitution allows state governments to amend federal legislation, with the consent of the president of India, for application in their state.

## viewpoint

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