CHAPTER - 3
INDIAN POWER SECTOR

For much of the history of post-independence India, the electricity sector has been an entrenched symbol of the nation’s state-led economic development approach. Publicly owned, and operated and managed by state employees, the sector was conceived of and run as an instrument of development policy. Beginning in 1991, however, these basic assumptions began to be challenged. Sector reform efforts have been as much about contesting this mindset as about undertaking changes in ownership, investment, and management practices. Electricity sector reform in India has become polarized. Efforts to shrink the role of the state and replace it with greater private sector participation allowed little or no place for state stewardship of a public benefits agenda. On the other hand, efforts to continue operating the sector as an instrument of Development policy failed to recognize the dire state of the sector. There have been four overlapping but distinct periods of electricity sector policy approaches:

(1) Pre- 1991

(2) The 1991 independent power producer (IPP) policy and its aftermath;

(3) The World Bank-led restructuring policy, which began to be implemented around 1993 in Orissa

(4) The period shortly after 1998, when the restructuring model was scaled up through national legislation and state-level reforms.

(5) Electricity Act 2003

In this report, these periods are described thematically rather than sequentially. Nonetheless, distinguishing between them is useful in order to recognize how and when different types of institutional arrangements were “locked in” with considerable impact on the electricity sector.

During the 1990s, electricity sector reforms were part of a seismic shift in India from a closed toward a more open economy. From Indian independence in 1947 until the mid-1980s, the state played a strong role in planning and implementing strategies for economic development. Internal and external pressures to rethink this approach
emerged in the 1980s, as the country went through a moderate recession. These views were endorsed primarily by strong statements from development agencies that their borrowers would henceforward have to increasingly look to international capital markets for their financing needs. The immediate impetus for action was a serious balance of payments crisis in 1991. The response was to liberalize investment in key sectors of the economy, including electricity, to reduce licensing restrictions on industry, lift government controls on the financial sector, and partially free currency transactions. Both the intent, and the actual policies, marked a significant departure from the previous 40 years of government policy.

3.1 The Electricity Sector Before 1991

Operating under the Electricity Act of 1910, private companies or local authorities supplied more than 80 percent of the total generation capacity in the country prior to independence in 1947 (World Bank, 1993b). In 1948, the Electricity Supply Act 1948 brought all new generation, transmission, and distribution facilities within the state’s purview. Each state subsequently established its own vertically integrated state electricity board (SEB). Significantly, SEBs were financed through state government loans and were run as extensions to state energy ministries. As a result, SEBs were “indebted in perpetuity,” and were forced to continue in a relationship of financial dependence and administrative thrall to energy ministries. Nonetheless, SEBs were the backbone of the electricity infrastructure, and by 1991 controlled 70 percent of electricity generation and almost all distribution (World Bank, 1991). *Electricity sector reforms were part of a shift from a closed toward a more open economy.*

Under the Indian constitution, the electricity sector is a “concurrent” subject, allowing both the central and state governments some authority in the sector. SEBs are under the control of state governments, which also controlled the critical tariff-setting function. The central government was responsible for electricity policy, long-term planning, technical analysis, and project approvals through the Power Ministry, Planning Commission, and Central Electricity Authority. In addition, in response to

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7 There were clear warnings from the donor community that only about one fifth of required finance for developing countries’ projected electricity needs would be available from multilateral sources (Churchill & Saunders, 1989).

8 A small number of private companies continued operation, particularly in large cities, largely buying electricity from SEBs.
declining SEB performance and to establish a “model of modern operational practices that the SEBs could emulate,” the central government established two central power generation corporations—the National Thermal Power Corporation (NTPC) and the National Hydroelectric Power Corporation (NHPC) (World Bank, 1999a).9 NTPC, now the world’s sixth largest thermal power company, is widely considered an efficient and well-respected public corporation.10 By 1991, the first four decades of public-sector-led electricity development had chalked up some notable accomplishments. Between 1948 and 1991, generation capacity increased by a factor of 50 with an annual growth rate of 9.2 percent—considerably greater than the economic growth rate (World Bank, 1991). Moreover, official reports claimed that electrification rates were 80 percent.

Fig 3.1 The Indian power sector pre-1991

![Diagram of the Indian power sector pre-1991](source: World Report 2002-03)

Despite these accomplishments, there were reasons for concern about the future of the sector. Well before 1991, the sector had been locked into arrangements with electricity users, and into management practices with negative long-term implications. These arrangements constrained future reform efforts. Perhaps the most damaging practice was the political decision in many states to provide highly subsidized or free

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9 The World Bank was supportive of this move, and directed more than half of its total allocation of $7 billion in sector funding between 1970 and 1991 to NTPC (World Bank, 1999a).
10 This record has been tarnished recently by the reports of human rights abuses at Singrauli in Madhya Pradesh.
electricity to farmers. Provision of electricity to run irrigation pumps was an important ingredient in the Green Revolution technology package aimed at increasing the productivity of Indian agriculture. However, from 1977 onward, electricity increasingly became an instrument of populist politics. By offering electricity at flat rates—based on pump capacity rather than metered consumption—or even completely free, several state governments cultivated farmers as a vote bloc. Subsidized electricity imposed high costs and compounded the technological, institutional, and political problems in the sector. These practices had several negative effects. First, by the mid-1990s, the World Bank estimated that SEBs paid an annual subsidy of about $4.6 billion (1.5 percent of GDP) to agricultural and residential users (World Bank, 1999a). Second, since flat rate or free electricity rendered the meter redundant, existing meters were no longer monitored and were often broken or removed. This “de-metering” has increased the financial and organizational challenge to the re-introduction of a consumption-based tariff. Third, agricultural tariff policy has had negative spillover effects on overall management practices of the SEBs. Since electricity load for agriculture is not well measured, technical losses as well as theft throughout the sector are conveniently allocated to agricultural consumption (Reddy and Sumithra, 1997). Finally, although agricultural electricity subsidies have been introduced in the name of social benefits, poor farmers typically do not benefit from this subsidy, and indeed may be hurt by it.11 However, wealthier farmers have successfully organized themselves to lobby for continuation of this policy. Other negative effects followed. Although many states had a declared social policy to provide agricultural subsidies, they did not always pay the SEBs directly to compensate for the loss of revenue. Indeed, agricultural de-metering meant that the actual level of compensation required was often a mystery. Instead, SEBs developed an elaborate and self-defeating system of cross-subsidies from industrial consumers to make up for the growing revenue losses from agriculture and theft. Over time, industrial consumers found it more cost-effective to set up their own captive power plants to supplement, or replace, SEB electricity. In 1960, industrial consumption accounted for 67 percent of SEB sales; by 1991, its share had dwindled to 40 percent. Over the same period, agriculture consumption leaped from 10 to 25

11 (Sant & Dixit, 1996) suggest that the benefits flow largely to landed farmers who can afford mechanized irrigation, and who use irrigation to grow high-value cash crops. Landless populations do not benefit from this policy.
percent (Tata Energy Research Institute, 1993). Losses from theft also seemed to be a serious problem. SEBs seemed reluctant to acknowledge the extent of such losses, perhaps because it was so difficult to distinguish theft from technical losses and unmetered consumption.

Recent evidence suggests that while the focus has been on agricultural losses, industries using high-tension lines may be responsible for much of the theft and loss (Purkayastha, 2001; Mahalingam, 2002). Hence, the SEBs found themselves in the unenviable position of facing growing loss-making segments of their business, and a shrinking profit making segment. Considerable staff development and morale problems followed, with wages stagnant and sales per employee among the lowest in the world (Gutiérrez, 1993). The quality of the electricity provided inevitably suffered, with low frequency, brownouts and blackouts, and billing problems increasingly common. Poor service quality hastened the exit of industrial users from the grid, and diminished the willingness of consumers to accept higher tariffs, both of which accelerated the spiral of deterioration.

Through the 1980s and early 1990s, various efforts at SEB reform led by the central government, the World Bank, and independent researchers all suffered from either insufficient or weak implementation. In 1991, the central government attempted to solve the problem of electricity supply to farmers. A committee recommended the establishment of a common minimum agricultural tariff, and a subsequent Chief Ministers’ conference proposed that agricultural tariffs meet the modest target of 50 percent of the average cost of supply. However, in the face of mobilized farmer vote banks, state governments took little action. The World Bank provided loans to SEBs for financial restructuring, tariff adjustment, improved metering and collection, and other measures to increase distribution efficiency and revenue flow (World Bank, 1999a). In addition, World Bank support for NTPC was intended, at least in part, to promote good management practices within SEBs. By 1993, however, the World Bank had decided that SEBs had sunk into both a political and institutional quagmire and that institutional reform under the current ownership structure was a lost cause. In 1991, an independent team of scholars published the DEFENDUS (Development-Focused, END-Use oriented, Service-directed) model, a unique Integrated Resource Planning approach that emphasized access, equity, and efficiency improvements.
Using this model, an analysis for the state of Karnataka showed that the requirements of electricity and installed capacity would only be about 40 per cent of what would be required in 2000, according to a conventional projection commissioned for the state. But administrators only seemed to have a perfunctory, academic interest in this approach and in Integrated Resource Planning in general.\textsuperscript{12} It was never seriously examined, despite several appeals to develop long-term electricity policy for the country. By the beginning of the 1990s, there was broad consensus that the electricity sector was in dire straits and that the status quo was unsustainable, particularly in financial terms. If there was a memento seriously consider re-regulation of the sector to reassert the independence of SEBs from their political masters, devise mechanisms of accountability, and cut through the Gordian knot of politically influential consumers pampered by subsidies, this was it. But the moment passed without any considered reflection about policy reform. With the growing consensus favoring a shift in macroeconomic policy, spurred by the balance of payments crisis, India was set to press the accelerator and motor into the next century. The electricity sector was at the forefront of the new liberalizing India.

The reforms themselves unfolded in four stages. In 1991, the central government invited private investment in generation. When this approach failed to address the root problems in the sector, a World Bank-supported reform effort in the state of Orissa, organized around unbundling and privatization in the sector, heralded a new stage in the reform process. This model was then followed by several other states. Finally, the central government reentered the debate by proposing a sweeping legislative reform package.

3.2 Evolution of Electricity Reforms in India

In late 1991, the Ministry of Power swept away four decades of public monopoly in an act of great Political significance. The new Independent Power

\textsuperscript{12} Within the U.S. context, IRP has a rather specific meaning applicable to traditional (vertically integrated)utilities, which are required to submit plans to regulators for integrating demand side as well as generation options in their tariff submissions. We use he term here more broadly to refer to any attempt to identify, analyze, and acquire cost-effective resources, which would lower the long-term cost of energy services. In this definition, long-term resource planning (taking into account supply side and demand side efficiencies) would be conceivable even in an unbundled situation as long as a regulator could develop and implement incentives structures to promote more cost-efficient resource use.
Producer (IPP) policy was greeted with enthusiasm. However, little actual investment materialized, and decade later, the IPP policy is broadly viewed as a flawed and halfhearted approach to reforms. The Electricity Laws (Amendment) Act of 1991 allowed private entities to establish, operate, and maintain electricity generation plants as Independent Power Producers (IPPs) and to enter into long-term power purchase agreements with SEBs. Industry groups and urban middle class consumer groups welcomed the diminution of a public sector role and the entry of the private sector (Desai, 1999).

Believing that private investors would be reluctant to come to India without generous incentives, the government acted with extravagance. IPPs were offered a guaranteed 16%-percent return on equity, with bonuses for improved capacity utilization, a five year tax holiday, and low equity requirements equivalent to 20 percent of project costs (Ahluwalia & Bhatiani, 2000). To further hasten implementation, the central government subsequently declared eight of the most promising projects “fast track” projects with expedited clearance procedures, and provided government counter-guarantees and escrow accounts against nonpayment of dues by SEBs. These incentives had the desired effect. By mid-1995, project developers and financiers had put forward 189 project offers totaling over U.S. $100 billion, which would have increased capacity by 75 gig watts. Believing that private investors would be reluctant to come to India without generous incentives, the government acted with extravagance. Despite the initial “euphoric” reaction, as one senior bureaucrat put it, there were also early grumbles of discontent from various quarters, which steadily grew louder as the IPP policy failed to deliver (Pillai & Krishnamurthy, 1997). While supporting the policy, IPPs grew increasingly critical of bureaucratic delays and hurdles in implementation, and ever more concerned about recovery of dues from SEBs. In reaction, an Independent Power Producers Association of India (IPPAI) was established in 1995 to serve as a “neutral proactive forum.” IPPAI did create an important space for articulation of concerns about the reform process, although there was also prevailing “negative opinion” within government ranks of IPPAI’s perceived emphasis on winning special favors for IPPs. The central government was by no means unified on the IPP policy. The Ministry of Power was perceived as the primary promoter of the policy, with support from the Ministry of Finance. One widely held view was that
although the IPP policy was” flawed,” it had “been the most promising option at that
time.” However, within each ministry there were stronger dissenting voices, with some
at the Ministry of Finance who argued that concessions to IPPs might lead to net
foreign exchange outflows rather than inflows. Moreover, the Ministry of Power’s
suspension of technical and environmental clearance for smaller projects aroused the
ire of agencies responsible for those clearances. Multilateral donors played a curious
dual role in the IPP policy. While welcoming private electricity initiatives in principle
(World Bank, 1991), the World Bank delivered a strong critique of the highest profile,
the Enron project, in a confidential memo to the Government of India. The memo
stated that the project was “not economically viable, and thus could not be financed by
the Bank,” but urged the government to “explore ways to sustain the interest of the
project sponsors” (Vergin, 1993). That the World Bank expressed its concerns about
the project is laudable; that it did so only in a muted fashion is problematic. The IPP
policy itself was widely viewed as faulty, since it threatened to further weaken the
fiscal situation of states. Since the World Bank was actively supporting SEB reform at
this time, it could well have been more public with its views. While there is no direct
evidence on this point, Bank staff may have faced pressures to reconcile an IPP policy
they viewed as flawed with the Bank’s enthusiastic support for India’s liberalization
efforts. As a result, an important moment for critical reflection on the IPP policy was
lost.13 The long-term impacts of the IPP policy were several and diverse, and are well
illustrated by the high-profile case of the Enron project.

First, key institutions responsible for long-term planning, technical and
economic clearance were weakened. Officials at well-functioning public agencies such
as NTPC felt that the IPP policy created an uneven playing field in favor of foreign
investors. Second, the reckless focus on capacity expansion excluded consideration of a
more rational least-cost planning approach to electricity development. Finally, in its
conception and implementation, the IPP policy offered opportunities for graft and

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13 It is important to bear in mind, however, that sections of civil society were very active during this time
in formulating their own responses to IPP policy. In various newspaper and magazine articles and
other public forums, journalists, former bureaucrats, academics, and environmentalists criticized
specific projects as well as the overall framework. One group of critics formed a “National Working
Group on Power,” and organized workshops and campaigns against IPP policy. Public interest
litigation was filed on behalf of citizens against the government as well as specific IPPs on grounds of
corruption, environmental damage, and constitutional violation.
malfeasance. Projects were not typically selected through competitive bids, and power purchase agreements were kept secret even though they contained “take-or-pay” contracts involving public financial obligations for decades to come.\(^{14}\) While no accusations have been conclusively proved, some high-profile projects have been caught in a swirl of accusations concerning human rights abuses, flawed environmental clearances, and corruption.\(^{15}\) Moreover, the IPP policy had a polarizing effect at multiple levels. Early support by urban middle class consumer groups and industry associations, who saw in the policy the promise of efficient power delivery, translated into anger toward public interest advocates who were seen as unnecessarily obstructionist (Desai, 1999). Within government ranks, those who saw the policy as the best option at the time were pitted against those who viewed the policy as flawed from the start. Thus, technically, economically, and politically, the policy created a hangover effect for future attempts at reform.

### 3.3 The Enron Affair

In October 1992, the Congress-led government of Maharashtra announced to the world that it had signed a memorandum of understanding with the Dabhol Power Company (DPC), the Indian subsidiary of the U.S. based Enron Corporation, for a liquefied natural gas plant of 2000 to 2400 megawatt capacity and to purchase electricity for 20 years. In what would be later become a source of controversy, the deal was completed with alacrity and secrecy, despite the considerable size and financial obligations of the project, amounting to an expenditure of roughly $1.3 billion per year.

Despite strong reservations expressed by some state and central government bureaucrats and Central Government bureaucrats and by the World Bank, the project was cleared. Just as lending arrangements were being concluded, the newly elected state government, whose election platform in 1995 has stressed national self reliance, canceled the contract and proposed to invite competitive bid. The international response was primarily negative with concerns expressed about the viability of India’s reform

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\(^{14}\) The World Bank held a workshop on competitive bidding at Hyderabad in 1994, (personal communication, World Bank staff, February 2002).

\(^{15}\) For example, in the case of the Mangalore Power Corporation, where Cogentrix Corporation was the developer, public interest litigation was filed by a consumer activist in the Karnataka High Court alleging offshore payments by Cogentrix’s partners through a subsidiary in the British Virgin Islands. The company has since withdrawn from the Karnataka project, citing delays in gaining government approvals and in resolving the litigation.
program and India’s commitment to contractual obligations.

Yet, there were good grounds for concern about the project. Journalists found indication of complicity among officials to bend laws to accommodate Enron’s demand and obtain the necessary clearances. Others predicted that the financial terms of the deal were highly unfavorable to the Maharashtra State Electricity Board and that the public funds were being jeopardized with counter-guarantees.

In addition, following charges of violence against opponents of the project, a Human Rights Watch investigation found that the state governments had engaged in the systematic suppression of freedom of expression and assembly amid that the Dhabol Power Company and Enron Corporation were complicit in these violations.

Despite the growing rumble of protest, within two months of the project being canceled, a new project Purchase Agreement (PPA) was signed on the recommendation of a government committee with few changes to the original project. All clearances were subsequently awarded and counter-guarantees approved. Despite a pending public interest law-suit challenging the final clearances that were given to the project and alleging fraud, the first phase of the project has been commissioned.

By 2001 the project started to create serious financial problems for Maharashtra. The SEB which has been profitable in 1998-1999 plunged into losses exceeding $300 million (excluding subsidies received from the state governments) in 1999-2000. In order to honor its contract, the state had to buy power from the Dabhol plant at accost twice that of the average production cost of the electricity in the state. Following a series of defaults on the payment of the SEB, Dabhol invoked its financial guarantee from the state. When the Maharastra Government expressed it unwillingness to pay the state’s credit rating was downgraded. DPC subsequently invoke the counter-guarantee, by which time the SEB has countered that the proper forum for settling all disputes with the company is the state regulatory agency, a dispute that has since moved to the Supreme Court.

3.4 An Experiment with SEB Reform: The World Bank-Led Orissa Model

On a parallel track to the IPP process, the World Bank played a major role in arguing for fundamental reforms of SEBs, and in persuading a few states—led by Orissa—to initiate reforms. Having unsuccessfully tried in the 1980s to reform SEBs
within the existing structure, World Bank efforts in the 1990s were directed at unbundling and privatizing SEBs. Hence, these reforms were considerably more far reaching than the IPP policy. Within India, there was broad agreement that the root causes of the problem were the technical, financial, and management problems of SEBs, but there was no agreement on the solution and on how to address the political thicket that SEB reform entailed. The World Bank stepped into this morass, armed with its new 1993 policy for lending to the electricity sector (World Bank, 1993a). At a workshop for Indian policymakers, the Bank highlighted the experience of ongoing reform experiments in the United States, United Kingdom, Argentina, and Chile.

It offered to provide lending to support “… the boldest…most deserving state-level power sector reforms,” but it would not finance or provide guarantees for electricity projects in states that did not undertake restructuring (World Bank, 1993b). Of the few states that expressed interest in the World Bank’s offer, the state of Orissa in eastern India was the first to proceed with a reform program. By the early 1990s, Orissa’s electricity sector was in shambles. Transmission and distribution losses were estimated at 43 percent, only 17 percent of bills were recollected, and the ratio of customers to staff was an astonishingly low 29:1 (Thillai Rajan, 2000). However, the Bank selected Orissa mainly for political reasons.

The Chief Minister of the state demonstrated strong political support for carrying through reforms.\textsuperscript{16} Orissa also had a small electricity load in the agriculture sector and a weak farmer lobby (Thillai Rajan, 2000).\textsuperscript{17} With low levels of political mobilization and a minor national profile, Orissa was “an experimental rat” for reforms. While local political support was undoubtedly necessary, the World Bank was the driving force for reform and the most consistent motivator of change. For example, the Bank urged increases in tariffs to lay the groundwork for reforms. World Bank staff candidly described their role as overcoming” natural resistance to change” within the state. Reform consultants, NGOs, government officials, and the media eventually

\textsuperscript{16} The initial reason for support was the World Bank hint that funding for a favored hydroelectric project would be more forthcoming if the state undertook broad reforms. While this tactic was instrumental in initially getting the Chief Minister’s attention, several interviews with senior state officials (July 20, 2000) indicate that he very quickly developed a deep personal belief in the need for fundamental reforms in the sector. (Thillai Rajan, 2000) confirms this account.

\textsuperscript{17} Agriculture accounted for 6 percent of load in Orissa versus around 40 percent in many other states (Thillai Rajan, 2000).
referred to electricity sector reforms in Orissa as the “World Bank model.” These opinions were often not cast in a negative light, but as an appreciation of the Bank’s proactive role in building momentum for change, and of the effort and commitment of particular staff members. The World Bank’s “Orissa Power Sector Restructuring Project” required $997.2 million, and was partially funded by the then-Overseas Development Agency of the United Kingdom. Almost three fourths (74 percent) of the financing went to rehabilitation of distribution and transmission. A second component (23 percent) was allocated to demand side management, with the remainder going to support the reform process (World Bank, 1996). International consultants brought in by the World Bank and other donors played a considerable role in shaping reforms.

While consultants were hired for their technical knowledge, they frequently also had to assess the sociopolitical and institutional context for reforms. For example, consultants decided on a single-buyer system for Orissa, based on an assessment that the underlying technical, institutional, and commercial capabilities in the state were insufficient to support wholesale competition. In considering approaches to unbundling public utilities, they had to consider the need to minimize layoffs to avoid union opposition. Some national actors questioned the appropriateness and ability of international consultants playing these roles. One domestic public official said that consultants “sought to fit Orissa into their patterns,” while another argued that their approach was like “applying principles of aviation to a jeep.”

Some national consultants with considerable experience in the sector resented being placed in junior positions, although they were well-placed to educate international consultants on local conditions. Since national and international consultants compete for contracts, these comments should not be uncritically accepted at face value. However, international consider the need to minimize layoffs to avoid union opposition. Some national actors questioned the appropriateness and ability of international consultants playing these roles. One domestic public official said that consultants “sought to fit Orissa into their patterns,” while another argued that their approach was like “applying principles of aviation to a jeep.” Some national consultants with considerable experience in the sector resented being placed in junior positions, although they were well-placed to educate international consultants on local
conditions. Since national and international consultants compete for contracts, these comments should not be uncritically accepted at face value.

However, international Consultations and a media campaign were intended to reach out to the broader public. Critics of the consultation process charge that the goal was to” achieve consensus on a model rather than to evolve model through a consensual process.” Interviews support this view. Participants saw the role of consultations as explaining changes and “reducing tension.” NGOs reported that their concerns—including the impact on access for electricity to the poor—did not result in any changes to the approach. Indeed, the process appeared designed to usher reforms through rapidly, based on a political judgment that a long process would allow vested interests time to mobilize opposition to reforms.

The Content of Reforms

Reforms in Orissa, following the Bank’s approach being implemented in much of the world, consisted of:

- Unbundling generation, transmission, and distribution;
- Allowing for private participation in generation and transmission utilities;
- Privatizing existing thermal generation and distribution utilities;
- Establishing an autonomous regulatory agency; and
- Reforming tariffs at the bulk electricity, transmission, and retail levels.*

As part of this reform, the SEB has been divided into three entities:

- Orissa Power Generation Corporation (OPGC), which controls thermal units in the State.
- Orissa Hydel Power Corporation (OHPC), which controls hydel generation.
- Grid Corporation of Orissa, which controls the transmission and distribution

OPGC has been privatized through the sale of a 49 percent stake to AES of the USA through a competitive bidding process.

The distribution function under GRIDCO has been divided into four zones operated by subsidiary companies of GRIDCO. One of these zones was handed over to
a private utility, BSES for operation through a management contract. However, BSES pulled out of the contract following disputes with the regulator. The four distribution subsidiaries are being privatized through a bidding process.

Fig 3.2: Orissa model of power reforms

The lynchpin of the reform process was the passing of the Orissa Electricity Reform Act in 1995, which provided for the establishment of an independent regulatory commission and the divestment of equity in generation and distribution to the private sector. Public officials and Indian consultants suggest that the reforms were single-mindedly focused on financial issues and on privatizing the sector. According to one official, international donors were obsessed with removing subsidies and increasing tariffs. Another characterized the donor approach as “privatization must be done; let’s do it somehow.” A representative of a donor agency confirmed this perspective when he described the Orissa Reforms as “basically a bankruptcy workout.”

International consultants emphasized that they received instructions to promote
rapid privatization, and to “create a process that was irreversible.” Donor agencies saw financial issues at the heart of the restructuring and enhanced private participation in the sector as the best solution. It was anticipated that private finance would develop new generation capacity and enhance availability of existing capacity. Private participation in distribution was expected to improve service quality and increase financial performance. Donor agencies were not alone in this view. Some senior national and state officials held the same position. Others reluctantly agreed, only because they felt that all other options, notably continued public ownership, had been exhausted. Yet, attracting investors for privatization in Orissa proved to be a difficult task. To make the distribution sector more attractive, 75 percent of the shared financial liabilities were transferred to the publicly held transmission sector. To make generation more attractive, generation companies were allowed to increase the price they charged to the public transmission company, but the transmission company was not allowed to pass on higher prices to distribution companies. As a result, the only public component, the transmission company, built up enormous liabilities that undermined its long-term viability. Ultimately, privatization was carried out, but there was limited interest and few bids.

The results have not been positive. Since privatization, the new owners have brought neither new funds nor discernible management skills to the newly established companies.

The public has faced substantial tariff increases but seen few benefits in service, which hassled to growing political discontent with the reform process and a call to bring back the publicly owned system. Revenues from privatization were not plowed back into the sector, but absorbed into the government budget for other purposes. Report of the Committee on Power Sector Reform in Orissa. Bhubaneswar, Orissa, India. The private operator of one distribution zone, which also operates one generation unit, believes that the government has neither ceded management control nor paid its

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18 Indeed, the Bank adopted a reform mantra, “Failure is not an Option” to emphasize “the importance of relentless pursuit of reform implementation at times of difficulties.” (World Bank, 1996).
19 For details see (Mahalingam, 2000).
20 One company, Bombay Suburban Electricity Supply purchased three of the four distribution zones, and sought to purchase the fourth, but was turned down in order to introduce some competition (Mahalingam 2000, p. 96).
21 According to one report, only 3 percent of the privatization revenues from the sale of the Orissa Power Generation Corporation were re-invested in the sector.
own bills. As result, this company has taken steps to withdraw from the sector in Orissa. Consequently, the Government of Orissa established a high-level committee to reconsider the reforms. The committee found that the new distribution companies had failed to bring insignificant additional financing and that reductions in transmission and distribution losses had been minimal. Despite these problems, the fact that Orissa had embarked on and been through several stages of a reform process, including privatization, provided a powerful demonstration effect within India. Other states soon lined up to follow Orissa’s lead.

Fig: 3.3 New structure of electricity sector in Orissa

A number of states followed suit in creation of their own state regulatory commissions either through the enabling provision of the central Act or their respective state Acts. At present, twenty-four states namely Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, and West Bengal have either constituted or notified the constitution of the SERCs (State Electricity Regulatory Commission). The Joint Electricity Regulatory Commission has been notified for Mizoram and Manipur. The constitution of Joint Regulatory Commission for union territories is also under process.
Eighteen SERCs namely, Andhra Pradesh, Assam, Delhi, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttaranchal, Uttar Pradesh, and West Bengal have already issued their first tariff orders in the direction of rationalizing.

By 1998, Orissa had managed to demonstrate that it could privatize its distribution business, and the more problematic aspects of the Orissa experiment had not yet materialized. Growing disenchantment with the IPP policy left states with few alternatives other than reform of SEBs to address an electricity sector crisis that showed no signs of abating. Moreover, as economic liberalization grew more palatable, opposition to privatization faded. Even states with avowedly communist governments competed to invite private investors (Echeverri-Gent, 2000).

Finally, the World Bank continued to stand ready to support states that wished to embark on a reform program. As a result, since 1995, several large and politically significant states have concluded (or are in an advanced stage of negotiating) loan agreements with the World Bank to reform their electric power sectors. These states have followed the basic parameters of the Orissa model, in many cases guided by the same consultants, but there have also been some significant differences. First, in subsequent efforts, electricity reforms have been part of the broader framework—articulated in the World Bank’s Country Assistance Strategy for India—of state-level financial restructuring. This approach is relatively new for the World Bank, since it involves providing a broad macroeconomic restructuring loan at the state level rather than to a national government. Second, most of the new World Bank loans are structured as” Adaptable Program Loans” (APLs) that release small amounts of funds over many years, with each tranche dependent on the fulfillment of conditions. Compared to a single large loan, this approach enables the World Bank to provide a down payment on future support, to signal seriousness of intent to investors, and to provide the World Bank flexibility in adapting to future conditions (World Bank, 1997b). Finally, in response to difficulties faced by private distributors in Orissa,

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22 For example, the Andhra Pradesh Adaptable Program Loan was structured around five sets of conditions: (1) pass a reform bill and reform tariff setting; (2) notify the bill, establish a regulatory commission, and unbundle the SEB; (3) partially privatize distribution; (4) further privatize distribution and list shares of the generation company on the stock market; and (5) privatize distribution completely and list shares of the transmission company (World Bank, 1999c).
subsequent efforts have sought to mitigate risks that tariffs will not be raised, payments will not be collected, or thefts will not be reduced.\textsuperscript{23} Attracting investors for privatization in Orissa proved to be a difficult task. The World Bank has not been the only donor agency active in the sector in India. The U.K.’s Department for International Development (DFID), Canadian International Development Agency (CIDA), and U.S. Agency for International Development (USAID) and Japanese aid agencies have also provided funding for elements of the reform. Of these, DFID has provided considerable funds for technical assistance with the reform program. Much of DFID’s contribution has been in the form of a grant rather than a loan. According to one World Bank observer, DFID’s grant support for basic technical work was critical to implementation of reforms. It is important to note that not all states have decided to follow Orissa. A few states, including Gujarat, Madhya Pradesh, and Tamil Nadu, have decided to focus on commercialization of their SEBs rather than going down the road toward privatization. In some cases, they are receiving support from the Asian Development Bank. While it is too early to compare experiences across states, in the future these varied approaches will provide valuable material for a comparative assessment.

Establishment of Central Regulatory Agency:- With many states following the Orissa approach; the central government took steps to provide a legislative framework for state-level reforms. In 1998, the Ministry of Power championed an Electricity Regulatory Commission Act, creating a central regulatory agency (CERC) and providing an umbrella framework for each state to establish its own agency.\textsuperscript{24} This act marked the first formal sign of recognition by the central government of the significance of Orissa’s reform efforts, and was a late effort to provide template for state-level reforms. CERC is a statutory body functioning under sec-76 of the Electricity Act 2003 (CERC was initially constituted under the Electricity Regulatory Commission Act, 1998 on 24th July, 1998). As entrusted by the Electricity Act, 2003 the Commission has the responsibility to discharge the following functions:-

\textsuperscript{23} For example, in the state of Karnataka, one proposed mechanism is the introduction of a “distribution margin” that guarantees income to the distribution company during a transition phase. This approach has been criticized as unduly insulating the private investor from risks that are within their ability to manage, and potentially limiting the authority of the regulator (Menon, 2002).

\textsuperscript{24} Under the Act, each state had the choice of establishing a commission on the basis of the central government Act or through state level legislation, as Orissa had done.
Mandatory Functions:—

(a) to regulate the tariff of generating companies owned or controlled by the Central Government;

(b) to regulate the tariff of generating companies other than those owned or controlled by the Central Government specified in clause (a), if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one State;

(c) to regulate the inter-State transmission of electricity;

(d) to determine tariff for inter-State transmission of electricity;

(e) To issue licenses to persons to function as transmission licensee and electricity trader with respect to their inter-State operations.

(f) to adjudicate upon disputes involving generating companies or transmission licensee in regard to matters connected with clauses (a) to (d) above and to refer any dispute for arbitration;

(g) to levy fees for the purposes of the Act;

(h) to specify Grid Code having regard to Grid Standards;

(i) To specify and enforce the standards with respect to quality, continuity and reliability of service by licensees.

(j) to fix the trading margin in the inter-State trading of electricity, if considered, necessary;

(k) To discharge such other functions as may be assigned under the Act.

Advisory Functions:—

(i) formulation of National electricity Policy and tariff policy;

(ii) promotion of competition, efficiency and economy in the activities of the electricity industry;

(iii) promotion of investment in electricity industry;

(iv) Any other matter referred to the Central Commission by the Central Government.
But there was a growing realization that these incremental changes are not helpful in managing, regulating and co-coordinating the developments of the electricity industry in India.

In 2000, the Ministry of Power initiated the drafting of a comprehensive Electricity Bill to replace all existing legislation in the sector. This bill is the most dramatic initiative taken to date by the central government to exercise some leadership over the direction of the sector. In contrast to the state reforms, preparation of this bill has been a domestic effort, initiated and led by the Ministry of Power. The World Bank has limited itself to comments on drafts. The bill requires states to unbundled their SEBs, establish independent regulatory commissions, facilitate open access to transmission (wholesale competition), develop a spot market for electricity, and meter all electricity supply (Suri, 2000). Although the Ministry of Power now does support privatization, the bill does not explicitly require privatization, but gives the states some flexibility on how to organize ownership of an unbundled sector. Plans to introduce the bill in Parliament, originally intended for 2000, were postponed after the sudden demise of then-Minister of Power Kumaramangalam. After much debate and discussion, the draft got parliamentary approval. The Act received President assent on May 26 2003, and was published in the Official gazette on June 2\textsuperscript{nd}, from which it became effective (Economic Times, 2001).

3.5 Electricity Act 2003

With effect from 2\textsuperscript{nd} June, 2003 India has adopted a new legislation called Electricity Act 2003 to replace some age-old existing legislation operating in the country.\textsuperscript{25} The new act consolidates the position of the existing laws and aims to provide for measures conducive to the development of the electricity supply industry in the country. The act has attempted to address certain issues that have prevented or slowed down the reform process in the country and consequently, has generated new hope in the electricity sector.

The Act has made an attempt to create multi-buyer, multi-seller system of some sort without introducing a balancing system and provided for some retail competition by allowing them choice of supply to certain consumers. Thus us somewhat different

\textsuperscript{25} The act is downloadable from http://powermin.nic.in/The Electricity Act 2003.pdf
from the previous structure followed in India.

Generation: - Electricity generation has been made a non-licensed activity\(^{26}\) and the techno-economic clearance from the Central Electricity Authority (CEA) has been done away with for any power plant, except hydro-electric power stations above certain amount of capital investment.\(^{27}\)

The provision of direct sale of electricity by the generators, when and where allowed, would promote more IP participation in the power generation as these consumers are more creditworthy and bankable compared to any SEB. However, the act provides for imposition of a surcharge by the regulatory body to compensate for some losses in cross-subsidy revenue to the SEB due to direct sale of electricity by generators to the consumers.\(^ {28}\)

Earlier, captive power generation required approval from the SEB (exercising regulatory power) or the regulatory commission. The ESA-1948 required the decisions on captive power to be based on two considerations: whether the SEB could supply the power at a cheaper rate than its costs to the consumers to produce and whether the SEB could ensure the supply of the required volume at the desired time. Removal of restrictions on captive generation acts as a real threat to maintaining cross-subsidies, as many such creamy customers would find it cheaper to set up their own captive stations. In the states where reform was initiated earlier, the commissions gave allowed captive power to come up relatively freely. Even relatively small consumers who are subjected to cross-subsidy may find it beneficial to set up co-operatives or associations for the purpose of setting captive power plants as allowed in the act.\(^ {29}\)

While removal of entry barriers to captive generation is likely to erode the cross-subsidy base of the electric utilities and thereby exert pressure to reduce the level of cross-subsidies in tariffs, promotion of captive power is likely to result in sub-optimal use of resources and systems. Proliferation of grid-connective captive power plants could also lead to system instability, difficulties in grid management and energy

\(^{26}\) The generators can sell electricity to any licensees or where allowed by the state regulatory commissions, to consumer directly.

\(^{27}\) Section 8 deals with this. The act does not specify the limit but leaves it to the central government to specify it by its notification.

\(^{28}\) In addition, no restriction is placed on setting up of captive power plant by any consumer group or group of consumers for their own consumption.

\(^{29}\) However, sale of excess power to third parties would require approval off the appropriate commission.
accounting and increase in related disputes.\textsuperscript{30}

Transmission:- Transmission, both at the inter-state and intra-state levels is a regulated activity.\textsuperscript{31} The act prohibits transmission utility to undertake generation\textsuperscript{32} or trading.\textsuperscript{33}

This provision is quite contrary to the state reform acts, where the state transmission utility performs both the functions of transmitter and bulk supplier. This condition helps avoiding conflict of interest in transmission and supply activities but as the condition is in contradiction with the state reform acts, the state transmission utilities of those states where the reform act is in operation would have to undertake necessary changes to rectify contradiction.

In line with provisions of the earlier acts, the act requires the central government to designate one government company as the central transmission utility (CTU), which would be deemed as a transmission licensee. Similarly, each state government would designate one government company as state transmission utility (STU), which would be deemed as a transmission licensee.\textsuperscript{34} Allowing more than one licensee could result in duplication of assets that may be underutilized, resulting in an inefficient use of resources and producing a desirable outcome.

While the act requires the licensee to provide open access to the grid by any other licensee or generator\textsuperscript{35}, the act does not address the issue if ensuring fair and efficient use of transmission capacity by different users.

A transmission licensee can engage in other businesses by intimating the Commission. A part of the revenues from such other businesses may be required to reduce the transmission charges but the transmission business shall not be required to

\textsuperscript{30} Although entry barriers to the generation segment have been removed, the regulatory commissions would determine the tariff for sale of generated electricity to any distribution licensee.

\textsuperscript{31} Transmission requires the approval of the government in the form of license.

\textsuperscript{32} This restriction applies only to the central transmission utility.

\textsuperscript{33} Trading is restricted for all the transmission licensees or deemed transmission licensees such as central transmission utility and state transmission utilities.

\textsuperscript{34} Each transmission licensee would normally enjoy monopoly over a geographical service area but he act allows for licensing more than on utility in the same service area subject to the condition that the central government can specify additional requirements before granting license.

\textsuperscript{35} However, an appropriate commission may direct ay transmission licensee on payment of fees and charges either mutually agreed or set by the commission.
subsidize the other business. Separated accounts have to be maintained for each business.

Trading: -The act specifies trading as a licensed activity\textsuperscript{36} but provides little detail about traders functions. This could involve wholesale supply (i.e. purchasing from generators and selling to the distribution licensees) or retail supply (i.e. purchasing from generators or distribution licensees for sale to end consumers). As the act does not make distinction between distributions and retail supply, it is not clear whether a licensed trader would require a distribution license for retail supply.

Distribution & Retail Supply: - The act does not make any distinction between distribution and retail supply of electricity. It appears that distribution has been considered to imply both distribution and supply activities. Distribution is a licensed activity and distribution licensees are allowed to undertake trading without any separate license.

Thus a distribution licensee can undertake three activities trading, distribution and supply through one license. The reason for combining these three activities in a license is not clear. The activity provides for progressive introduction of retail competition in electricity supply but leaves the timings and degree of such competition in electricity supply but leaves the timing and degree of such competition to the discretion of the state commissions.\textsuperscript{37} This new provision coupled with fairly easy entry to captive power would imply that the commissions would have little option but to allow choice to large consumers, at least. This is expected to set in competition among generators to search for consumers, by-passing the unhealthy distribution licensees.

Unregulated rural markets: - The licensing requirement does not apply for generation and distribution of power in notified rural areas\textsuperscript{38} but the supplier has to comply with the requirements specified by the CEA. It is understood that this exclusion aims at promoting rural electrification. The activity doesn’t specify any market structure for such rural areas and it does not appear to prohibit vertically integrated monopolies to operate in such areas. It is not clear who will monitor the supplier in the

\textsuperscript{36} Trading has been defined as purchase of electricity for resale.
\textsuperscript{37} Generators could sale electricity to consumers at a mutually agreed rate, which lies outside the scope of tariff regulation by the commission.
\textsuperscript{38} This provision makes certain rural markets outside the purview of the regulatory regime and would create regulated and unregulated markets in the country
unregulated rural market and how the consumers would be protected.\textsuperscript{39}

Roles of key organizations and players: - The activity retains the existing organizations created under the previous acts and streamlines some of their functions to bring more effective operation of the electric power system. In addition, the activity has created a few new organizations such as an appellate tribunal and special courts. It also clarifies the role of governments (central and state) in the functioning of the power sector. This section examines the clarity of the roles as outlined in the activity.

Central and State Governments: On the policy front, the central government is responsible for preparing and publishing the following in consultation with the state government.\textsuperscript{40}

1. National electricity policy and tariff policy.
2. National policy for stand-alone systems for rural areas based on renewable and non-conventional energy sources
3. National policy for rural electrification and local distribution in rural area.

The central government can give directions to the CEA and CERC.\textsuperscript{41} It is also empowered to issue such directions in case of joint commissions where the participants ask it to issue directions.\textsuperscript{42}

The activity now replaces the responsibility of formulating the tariff policy on the central government\textsuperscript{43}, and the commissions have to take the guidelines into consideration for fixing the tariff.\textsuperscript{44}

The central government appoints the chairperson and members of the central electricity regulatory commission (CERC). The CEA and the Appellate Tribunal.\textsuperscript{45}

The central government designates a CTU and establishes the National load

\textsuperscript{39} It is likely that the rural electrification policy paper would deal with these issues.

\textsuperscript{40} It is also responsible for approving the national electricity plan prepared by the CEA every five years.

\textsuperscript{41} Incase of matters of Public interest government can issue written directions to the appropriate authority.

\textsuperscript{42} The directions may be issued incase the participants fail to reach an agreement among themselves about such directions.

\textsuperscript{43} The tariff policy is an area which led to lot of litigation and confusion under the earlier regime.

\textsuperscript{44} Central government decides on their salary and allowances. It approves the appointment of the secretary of the CEA, and provides the requisite staff and employees to the appellate tribunal.

\textsuperscript{45} The central government is also responsible for suspending a member of the CERC and appellate tribunal, including the chairperson can submit their resignation to the central government.
dispatch centre (NLDC), Regional load dispatch centers (RLDC), the Appellate Tribunal, the Coordination Forum, and the Regulators forum. It has the power to vest the property of a CTU in a company or companies and decides on the jurisdiction of benches of the appellate tribunal. It also has the power to amend the schedule of states where reform acts continue to be applicable, except where they are inconsistent with this activity.

It is responsible for inter-alia

- Specifying additional requirements for granting more than one distribution licensee
- Providing no-objection certificates for granting license if the service areas includes central government installations such as cantonment, aerodrome, defence area etc.
- Demarcating the country into transmission, regions for the purpose of the inter-state transmission
- Approving the salary and benefits of the employees of the CEA, CERC and appellate tribunal.
- Referring cases to the tribunal for removal of members on the ground of misbehavior
- Prescribing the procedures for inquiry into misbehavior by members.

It appoints the members of the state regulatory commission including the chairman, approves the terms and conditions of appointment of the secretary to the commission and other staff, and can remove or suspend a member. It is also responsible for constituting the selection committee for appointing members of the state commission.

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46 Duties and functions of the CEA, NLDC and RLDC are decided by central government, and makes rules on a wide range of areas and has the power to remove difficulties through issue of orders within two years of commencement of the activity.
47 Government issues guidelines for transparent bidding process
48 Government prescribes the procedures for inquiry into misbehavior by members.
49 The state government has relatively less statutory role.
50 State and Central Government may exercise powers for appointing/designating powers, provides funds and makes rules/notifications
It establishes the SLDC, notifies the STU, vests property of STU in companies, draws up reorganization of the SEB through acquiring its assets and re-vests it through a transfer scheme. It can also transfer employees through a transfer scheme.

The state government creates the state ERC fund and can provide loan or grants for running the ERC. The state government can also provide subsidy to the consumers, but the activity requires it to compensate the license in advance by the amount of loss expected to be suffered by the licensee in implementing the subsidy.

Learning from the past experience, the activity has provided more clarity in defining certain roles of the government and removing difficulties faced with earlier acts. For example, under the earlier acts, funding of electricity commissions became a serious issue. Certain SERCs saw their activities severely affected due to inadequate funding either due to poor financial health of the state go or due to political vindictiveness if the government. All fees collected by the commissions went to the government and payments from the government were often less than the fees received. Creation of an ERC fund where all the contributions of the government and all other income are collected from where all expenses are made should prove beneficial to the ERCs.

Another novelty of the activity is the requirement of advance payment of subsidy compensation by the state government willing to provide some subsidy to any class of consumers. A particular problem with the previous acts was with the interpretation of policy directives. Governments have the power to issue policy directives to the commissions or the CEA and at times there were differences in opinion as to whether they are really policy directives or not. The activity now makes it clear that the government would be the authority to decide on this issue and such directives should not be inconsistent with the intent of the activity. However, governments may misuse this authority to impose their unjust wishes on the commission.

Central Electricity Authority: - Central Electricity Authority (CEA) was an agency created under the ESA-1948 and the present activity retains the agency by

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51 State government empowered to constitute special courts, and state coordination forum.
52 State government decides how the ERC should utilize the fund and how it should maintain accounts.
53 The earlier acts required a promise of compensation from the state government, which proved inadequate as much state government did not keep their promises. The new requirement is likely to discourage state government to provide large subsidies.
relegating it mostly to a consultative role. There was some overlap of duties and power between the central commission and the CEA in the earlier period, which the activity has now removed. The technical clearance required for power projects by the ESA-198, which made the CEA a powerful agency and created a technocratic system, has been eliminated, except for hydro projects above certain capital investment.

Commissions: The activity retains the two-level regulatory system for the power sector. At the central level, the Central Electricity Commission would be responsible for regulating tariff of generating stations owned by the central government, or those involved in generating stations or supplying in more than one state, and regulating inter-state transmission of electricity. The state commissions on the other hand regulate intra-state transmission and supply of electricity within the jurisdiction of each state. The commissions would have quasi-judicial powers as before and the activity provides protection to members against any arbitrary removal.

Appellate tribunal:-This a new organization created by the present act to deal with appeals against the orders of the commissions or adjudicating officers set up by the commissions in settling disputes. The Appellate Tribunal would help reduce the burden of the High Courts and would settle disputes more expeditiously. The tribunal would possess certain amount sector specific expertise, which should help in discharging its duties better than a High Court.

Tariff Related Provisions

Tariff policy: - As mentioned earlier, the activity empowers the central government to formulate the national tariff policy in consultation with the state governments and the CEA. Earlier, there was no national tariff policy as such for retail tariffs, although the ‘common minimum programme’ provided some guidance. There was also a policy guideline for determination of generation tariff. The national tariff policy is expected to provide a general perspective on the government’s vision about generation, transmission and retail supply tariff to shape up and how it wants to achieve

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54 Earlier the High Court was the appellate authority and they have dealt with most cases quite logically.
55 The orders of the tribunal can be challenged in the Supreme Court by the aggrieved party. The activity however does not specify any specific funding mechanism for the Appellate Tribunal.
the goal.\textsuperscript{56} The commissions would be guided by the tariff policy in discharging their duties.

The commissions however should be guided by the principles set out by the central commissions regarding tariffs of generating companies and transmission licensees, multi-year tariff principles, and national tariff principles, and national tariff policy formulated by the central government.\textsuperscript{57}

Licensing:- The activity generally retained the licensing procedure of the earlier acts, with a few exceptions. The activity ensures non-refusal of grant of licenses to all acceptable applicants\textsuperscript{58}, even if it implies duplication of licensees for a particular area of supply. The activity imposes a time limit on commissions for taking a decision on license applications, which would restrict the cases of prolonged inaction on the part of the commissions on such applications. The notice period for receiving objections has been reduced to 30 days, where as earlier acts allowed for 60 to 90 days of notice period. The license period has been fixed at 25 years, which is somewhat strange for traders, which would make the markets less flexible.

Supply through meters:- The activity makes it mandatory to supply electricity through correct meters within two years of the date of the commencement of the act.\textsuperscript{59} However; this requirement can be relaxed by the state commission for a class or classes of consumers or for specific areas.

The distribution licensee has to supply electricity to a premise within one month of receipt of application from the owner or occupier of the premise in normal circumstances (implying absence of natural calamities).\textsuperscript{60} In case of non-electrified villages or hamlets, the Commission may specify a time limit for achieving rural electrification. Failure to supply electricity within the specified time shall attract a penalty of 1000 rupees per day for each day of default.

\textsuperscript{56} Unfortunately the draft policy issued by the ministry of power provides on the guidance of principles of tariff determination rather than providing guidance on policy issues related to tariff setting.

\textsuperscript{57} The tariff principles should encourage efficiency, competition, economic use of resources, good performance and optimum investments, and should allow companies to run their businesses on commercial principles.

\textsuperscript{58} This means those applicants who meet all requirements.

\textsuperscript{59} Metering or lack was a major problem in setting correct prices and undertaking improvement of the system.

\textsuperscript{60} Where system extension is required, the supply shall be given on completion of the necessary work or within the time as specified by the Commission.
Consumer protection: standards of performance: - The activity has made strict provisions to deal with electricity theft by consumers and reduce employee-consumer nexus in this regard. The act empowers the licensee to impose punitive tariffs on consumers upon detection of theft of power and the offence could attract imprisonment and/or penalty. No civil court would have power to give injunctions to such cases. The act similarly provides for stringent penal measures for offending employees of the utility.

The penal provisions are much stricter than the earlier laws on electricity. This should act as a deterrent for theft by common consumers. However, the activity does not provide any protection against misuse of these powers by licensees or utilities. The onus now lies on the consumers to prove that they are not stealing power. This presumption can prove to be dangerous and potentially a source of much consumer dissatisfaction.

Development of Ultra Mega Projects:-The Government of India has envisaged in its mission, Power to All by 2012. Achievement of this target requires development of large capacity projects. Section 63 of the Electricity Act 2003, provides that the Regulatory Commissions shall adopt the tariff if it is determined through transparent process of bidding in accordance with the guidelines issued by the Government. This aims at moving away from cost plus support for tariff determination and it is expected to further encourage private investment. The policy stipulates that all future requirement of power needs to be procured competitively except in cases of expansion of existing projects and where regulators will need to resort to tariff determination based on norms.

Recognizing the fact that economies of scale leading to cheaper power can be secured through development of large size power projects, Ministry of Power, CEA and Power Finance Corporation are working together for development of mega power projects under tariff based competitive bidding route.

These projects will be awarded to developers on Build, Own, and Operate (BOO) basis. The Ultra Mega power projects each with a capacity of 4000 MW would

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61 UMPP’s are a series of ambitious power projects planned by the Govt. of India. The capacity of these projects is 4000 MW or above
also have scope for further expansion. The size of these projects being large, they will meet the power needs of a number of states through transmission of power on regional and national basis.

Mundra in Gujrat: The project was handed over to the successful bidder i.e. Tata Power Company Ltd. On 23.04.2007. As per available information, two units of 800 MW each are expected to be commissioned in the XI Plan.

Sasan in Madhya Pradesh: The project was handed over to the successful bidder i.e. M/s Reliance Power Ltd. On 07.08.2007. Financial closure has been achieved and order for main plant equipment has been placed by the developer.

Krishnapatnam in Andhra Pradesh: The project was handed over to Reliance Power Ltd. on 29...01.2008. The development work is being undertaken by the developer.

Tiliya in Jharkhand: The financial bids of the project were opened on 28.01.2009. M/s Reliance Power Ltd. was the successful bidder.

With respect to UMPP in Tamil Nadu, the site at Cheyyur is finalized, alongwith captive port which is under finalization. Consultants have been appointed by the SPV of the PFC for carrying out various studies.

As far as the other UMPP in the states of Chattisgarh, Karnataka, Maharashtra and Orissa are concerned, requisite inputs regarding land availability and water linkage are being examined in consultation with the concerned State Governments. The further progress of these for UMPPs is therefore dependent on early finalization of the site and water availability.

Power Trading in India :- In India, while there is a huge gap section of consumers, who are power deprived, there are a lot of Captive Power Plants (CPPs) that are under utilized and a lot of merchant capacity also expected to be added in the near future, there is a need to encourage the peaking power plants and bring the surplus captive generation in the grid.62

The Electricity Act, 2003 mandated development of power markets by

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62 Power trading inherently means a transaction where price of power is negotiable and option exists about whom to trade with and for what quantum
appropriate commissions through enabling regulations. This paved the way for the new trends to emerge like Open Access and the one in February, 2007, when the Central Electricity Regulatory Commission (CERC) issued guidelines for grant of permission for setting up operation of power exchanges within overall regulatory framework. The emerging trends will help in proper flow of power from surplus regions to deficit regions and thus try to bring about a balance in the power sector (Hattori, 2004).

The National Electricity Policy, pronounced in February 2005, stipulated that enabling regulations for inter-and-intra-state trading, and also regulations on power exchange, shall be notified by the appropriate commissions within six months.

On 6th February 2007, the Central electricity Regulatory Commission (CERC) issued guidelines for grant of permission for setting up and operation of power exchanges within an overall regulatory framework. Private entrepreneurship is allowed to play its role. Promoters are required to develop their model power exchanges and seek permission from CERC before start of operation.

Inter State Trading of Electricity:- The Central Electricity Regulatory Commission (CERC) has issued final Regulations for inter-State Trading of Electricity after taking into account the suggestions and comments received from stakeholders. The Electricity Act, 2003, recognizes trading as an independent activity and accordingly prescribes issue of trading licenses by the CERC for inter-state trading. The Commission earlier received applications from various companies for issue of trading licenses immediately after the enactment of the Electricity Act, 2003 and the Commission had permitted all of them to continue trading till 31.3.2004 or till the issue of Regulations by the Commission whichever was earlier. After Notification of Trading Regulations, the interested parties could file fresh applications before CERC, seeking inter-state trading licenses, in accordance with these Regulations.

Of the total power generated in the country, short term transactions amount only to 6.83 percent. Of this, about 3.2 percent is traded bilaterally, unscheduled interchanges (UI) comprise 3.1 percent and the remaining 0.6 percent is traded through power exchanges. This level of transactions can be attributed to inadequate interregional links coupled with coupled with problems in intra state open access. With the National Power Grid expected to be in place by the end of Eleventh Five Year Plan,
the interregional capacity us likely to be augmented from 17,000 MW at present to 37,700 MW, enabling scheduled and unscheduled exchanges of power, boosting open access and encouraging competition in the power market.\textsuperscript{63}

Open access means enabling non-discriminatory sale/purchase of electricity between two parties, utilizing the transmission and distribution system if a third party, and not blocking it on unreasonable grounds.

Though there has been considerable improvement in inter state open access, a lot needs to be done for intra-state open access so that the investments of the smaller players are harnessed properly.

3.6 Power Market in India

The Indian Power system operates on a to-market concept; a day-ahead spot market, where the market clearing price (MCP) represents the electricity energy price; and a real-time market, where the price represents the system capability to balance generation and consumption in real time. The real time market is operated by the regional load dispatch centers (RLDC’s), which are in turn operated by the central transmission utility.

A power exchange contributes significantly to the facilitating trade and distribution of market information, promoting competition and creation of liquidity in a deregulated power market. The day –ahead spot market provides a neutral, transparent reference price for both the wholesale and retail markets. Further,

1. It provides a reference price for bilateral power trade.
2. It serves as a reliable counter party.
3. it provides easy access to a physical market a low transaction costs
4. It serves as a grid congestion management tool
5. It creates the possibility if balancing portfolios close to the operation
6. It distributes relevant neutral market information

\textsuperscript{63} As per the Electricity Act 2003. Open access means the nondiscriminatory access of the transmission lines, distribution system and associated facilities for use by any licensee, consumer or person engaged in generation, in accordance with the regulations specified by the appropriate commissions
7. It is a non-mandatory power exchange, as an alternative to bilateral contract.

Exchange Operations so far: - Indian Energy Exchange (IEE) was the first exchange in the country to start operations, June 27, 2008. Power Exchange India Limited (PXIL) started operations on October 22, 2008. Both exchanges have been operating successfully. The MCP of both exchanges follows a similar pattern and remains at maximum during peak periods and minimum during off-peak periods. The exchanges are very close to each other, there are instances if various bilateral transactions taking place based on the hourly MCP of the power exchange.

At present, both the exchanges provide a platform for next-day physical delivery. The spot concept is based on the bids for purchase and sale of proper contracts of one-hour duration that cover all 24 hours of the next day. As soon as the 12-hour dead line to submit bids has passed, all buy and sell orders are compiled into two curves for each power-delivery hour-an aggregate demand curve and aggregate supply curve. The MCP for each hour is by the intersection of the supply and demand curves. Buy trades are settled at or below the quoted price and sell trades are settled at above the quoted price, thereby ensuring maximum benefits to buyers and sellers of electricity.\textsuperscript{64}

The power system is divided into two synchronous grids, the NEW grid comprising the northern region, eastern and north-eastern region and western region; and the SR grid comprising the southern region. Power exchanges have already witnessed congestion between the NEW grid and the SR grid for certain hours of the day, quite often resulting in market splitting.

Matching Philosophy:-The trading engine may operate either through the auction method or the continuous method. The auction trade system is based on pairs of price/volume bids that are submitted to the PX. The PX accumulates all demand and supply bids and form an aggregate demand and supply curve for each hour. An MCP

\textsuperscript{64} The power market is currently partitioned into 10 separate bidding areas that can have separate prices if there is constrained flow between bidding areas. If there is no such constraint, the MCP will be uniform across the country. However, in case of constraint congestion management is done by market splitting that is by increasing the price in the surplus area so as to facilitate power flow from surplus to deficit area.
and corresponding volume is determined for each hour at the intersection of the demand and supply curves. Except for the ELEX and inter-day market at the Nord Pool Elbas, all major spot markets exchanges in the world are based on the auction concept. In a continuous trade system, the participants’ palace orders /bids on purchase and sale of spot contracts continuously thorough out the opening period of each day. An agreement is made wherever two participants meet on price. Unlike an auction trade where all the trades are based on different prices for each trade.

Supporting Regulations:-In line with the CERC Open Access Regulations, 2008 effective April 1, 2008, collective transactions are a set of transactions discovered in PX by anonymous, simultaneous competitive bidding by buyers and sellers. It mandates:

- The National Load Dispatch Centre (NLDC) to be the nodal agency for collective transactions.
- Both buyers and sellers to absorb the loss with the buyer drawing less than the contracted power and the seller injecting in excess of contract by loss.
- Transmission charges at Rs. 5000 per day to the NLDC for each state involved and at Rs. 2000 per day for the SLDC involved for each point of transaction.
- State Load Dispatch centre concurrence, specifying the MW quantity to which the entity may submit a buy or sell bid.

3.7 Challenges for Electricity Market in India

There are indeed exciting times for the power sector the winds of change have significantly impacted the business. Starting with the reforms in 1990s which focused on power generation, the current reforms are targeted at the distribution side of the business. There us also an attempt at establishing a well functioning power market by allowing power trading as a separate licensed business (Prayas, Energy Group, 2003).

These changes are apparent in the rising level of private participation, increasing scale of operation, complex fuel procurement plans, initiation of power trading activity and competitive tariff determination. These changes coupled with an estimated with an estimated demand of 2227 GW by 2012 indicate significant challenges.
1. Meet the unmet demand as exists today

Figure 3.4 Per capita electricity consumption in India

![Per Capita Electricity Consumption](image)

Source: Annual Report 2008-09 CEA

Figure shows per capita electricity consumption (units consumed per person annually) in India, shows a rising trend. The national objective is to achieve 1000 units consumption per person by 2012 which is daunting task to achieve.

Cope with the incremental demand created with rapid economic growth. According to an estimate a commercially viable end-user demand for an incremental capacity of 95 GW will exist by 2012.

Fig 3.5: Energy shortages in India

![Energy Shortages in India](image)

Source: Annual Report 2008-09, CEA
2. The supply response to this shortfall has been more rapid than in the previous years. It is estimated that 65 GW of capacity will come on stream by 2012, which will translated to a 13.2% peak deficit (in case of an 8% GDP growth) and a 77% peak surplus (in case of 4% GDP growth).

Fig 3.6: Peak Power shortages in India

3. India has five regional grids and each grid is monitored and operated by a regional dispatch center. The inter-regional transmission capacity is around 17 GW which is inadequate and leads to network congestion. To address this issue, the Government plans to increase the interregional capacity to 37GW by 2012.

4. Although set by Independent Electricity Regulatory Commission, state level differences exist in retail tariff and they vary across consumer categories as well. Tariffs are still to reflect the cost of service to the consumers. Domestic and Agriculture consumers pay lower tariffs in comparison to industrial and commercial users i.e. the former tow being subsidized by the latter. Despite the cross subsidization overall revenue receipt are short of the overall expenditure in many states. This is mainly on account of cost of service being compounded due to high T&D losses in India (31%). On an India-wide basis,
the gap between the Average Cost of Service and Average Realization was 0.57 INR/unit in 2004-05. Often, part of this gap is met by the subsidies from the state government.

Fig. 3.7: Gap between cost of supply and tariff in India

![Graph showing the gap between cost of supply and tariff in India]

Source: Annual Report 2009-10 CEA, PFC

Fig 3.8: Year wise Percentage AT&C losses in India

![Graph showing year wise percentage AT&C losses in India]

Source: Annual Report 2008-09 CEA, PFC
5. Multiple clearances. Up to 13-15 clearances are required from the land, environment, forest, and civil aviation and water departments. The clearances are required from a combination of State and Central level bodies and the cumulative process can take up to two years.

6. Lack of transparency in the Fuel Supply. State bodies control over 95% of Domestic Coal Production. An objective and transparent process for awarding a fuel linkage to consumers is lacking. The existing process takes time and could affect the time lines for setting up a plant. Price increased of both Domestic Coal and Gas is uncertain and not linked to international market considerations.