Chapter 7

Power

7.1. Introduction

Deficiency in physical infrastructure in India is perhaps one of the most acute in the power sector. The per capita consumption of 354 kWh per annum in India (Table 7.1) is relatively low even among the developing countries such as Venezuala (2761 units), Chile (1627 units), Uruguay (1479 units), Brazil (1463 units), Argentina (1438 units) and Mexico (1072 units) (Council of Power Utilities, 1997). Within India, Uttar Pradesh is one of the lowest among the major states with per capita power consumption of about 316 units (Table 7.1). In addition to the low level of electricity consumption, Uttar Pradesh is characterised by very low level of accessibility, with only 32 per cent of households having electricity facility as compared to all-India average of 56 per cent (Census, 2001). Electricity being a vital input for most economic activity, it is not surprising that economic performance of states is positively associated with the consumption of electricity (UPERC *Tariff Order 2001/02*). The implication is that if Uttar Pradesh were to accelerate growth, a healthy and sustainable power sector is an essential prerequisite.

TABLE 7.1

Gross Annual Per Capita Consumption 2002-03 (kWh)

State		*State*	
Goa	1843	Jharkhand	468
Delhi	1426	Uttaranchal	464
Punjab	1227	Kerala	378
Gujarat	1193	West Bengal	367
Haryana	997	Meghalaya	336
Maharashtra	848	**Uttar Pradesh**	**316**
Tamil Nadu	815	Mizoram	300
Chhattisgarh	676	Sikkim	247
Andhra Pradesh	673	Tripura	227
Karnataka	611	Manipur	206
Himachal Pradesh	599	Assam	160
Jammu & Kashmir	592	Nagaland	139
Rajasthan	566	Arunachal Pradesh	132
Madhya Pradesh	520	Bihar	82
Orissa	470		
		All India	**567**

Source: Central Electricity Authority.

Note: Per capita consumption equals gross generation divided by population.

Over the last 10 years or so, the power supply growth in Uttar Pradesh has remained sluggish, plunging Uttar Pradesh into a chronic deficit situation. The overall shortage of power has remained within the range of 10-14 per cent and shortages in periods of peak demand ranging at even higher levels (Planning Commission, 2001, 2002). The separation of Uttaranchal has added to both overall and peak period deficit. The shortages have resulted in poor and unreliable power supply with rampant power cuts and prolonged periods of low voltage. As a result, industrial investment in Uttar Pradesh has been constrained, with industries preferring to locate themselves elsewhere. In many cases, industries have been compelled to go off-grid and set up captive power plants.[1] Also, several farmers have been forced to switch to pump sets run by diesel, which is a poor substitute for power. Erratic power supply with highly fluctuating voltage is believed to have resulted in widespread damages to electric appliances and equipment used by all kinds of users.

1. The captive power capacity in Uttar Pradesh is higher than the industrial load contracted with the grid of 1400 MW (Uttar Pradesh Government Energy Policy, 2003).

In addition to limiting the real sector growth potential, the under-developed power sector has persistently hemorrhaged state government finances. The budgetary support (without taking into account state government loans written off etc.) by the Government of Uttar Pradesh (GoUP) to the sector has been about one per cent of GSDP over the 1990s (World Bank, 2000). This has constrained the state's expenditure in areas of social development such as education and public health. An efficient power sector is, thus, critical for attaining not only a higher economic growth, but also greater fiscal sustainability.

Rest of the discussion in the chapter is organised as follows: Section 7.2 provides a profile of the industry and the market structure. The problems faced by this sector are discusses in Section 7.3. Section 7.4 gives the recent reform measures and their appraisal. The way forward is described in Section 7.5.

7.2 Profile of Industry and Market Structure[2]

The power industry in Uttar Pradesh is fairly large even after separation of Uttaranchal and is predominantly government-owned. Uttar Pradesh accounts for 4.4 per cent of installed generation in the country. In all its segments, the industry is dominated by the public sector. As of March 2002, about 60 per cent of the total installed capacity of 7368 MW was owned by state utilities and the rest by central government utilities. So far, there has been no generation capacity (other than captive power) created by the private sector in the state[3], although in the country as a whole, the private sector accounted for 28 per cent of the new capacity (other than captive) created in the Ninth Plan. Even in the public sector, the capacity addition in the past decade has been limited.

The geographical distribution of generation capacity and connected load is skewed. Bulk of the installed capacity is located in Eastern Uttar Pradesh, owing to huge coal deposits in that region. A district of Eastern Uttar Pradesh called Sonebhadra accounts for nearly 4395 MW or over 59 per cent of the total capacity in the state. The load distribution in the state is also lopsided, with heavy concentration in Western Uttar Pradesh. Such distribution patterns of generation capacity and connected load have meant that most generating stations are very far from load centres.[4] This has posed a challenge to the transmission system, which has to be so designed as to satisfy technical parameters such as optimal technical losses, proper voltage levels and adequate power flows.

In terms of fuel-type mix, there has been a shift in favour of thermal capacities. The share of hydel power in total capacity in the state sector in undivided Uttar Pradesh had fallen to about 27 per cent by the end of 1999-00 from 40 per cent in 1976-77, mainly reflecting a sluggish growth in hydel capacity. The separation of Uttaranchal—where most of the hydro plants are located- aggravated the situation in Uttar Pradesh, as the share of the hydel component has since fallen sharply to 12 per cent. (In 2001-02, installed hydel capacity of 978 MW had been transferred to Uttaranchal, which does not have any thermal capacity.) This created problems in maintaining a balanced energy flow, since thermal energy is not well suited for meeting peak demand.

The contribution of state generating plants to availability at the busbar level has declined progressively, from 96 per cent in 1980-81 to 50 per cent in 2001-02, implying growing dependence on purchases from central utilities. During the 1990s, the contribution of central utilities to total power supply has remained at a higher level in Uttar Pradesh (38–43 %) than for the country as a whole (30-35 %).

The assets of power industry have aged across the board, reflecting a slowdown in addition to capacities. The weighted average age of installed generation capacity has risen from 13 years in 1991 to 19.7 years in 2001.[5] Eighteen thermal generating units (1459 MW) out of 28 have already crossed their useful life and eight units (460 MW) have been closed down (UPRVUNL). Unsurprisingly, hydel plants have aged more than thermal plants. Similarly, nearly 80 per cent of transmission lines and 70 per cent of secondary and distribution lines (66 KV and below) are more than 15 years old.

The market structure has broadly remained unchanged, although the power sector in Uttar Pradesh has undergone some restructuring. Except for a small part of the state, i.e., Greater NOIDA (connected load of about 35 MW), which is operated by a private distribution company, power distribution and

2. Based on data given in *Statistics at a Glance*, UPPCL, Government of Uttar Pradesh.
3. The sole exception has been a small municipal solid waste project (15 MW).
4. Most generation stations are also very far from other constituent states of the northern region.
5. This is the age of all state-owned generation plants weighted by their relative capacity (*Source*: UPPCL, 2001).

transmission in the state are carried out by Uttar Pradesh Power Corporation Limited (UPPCL), a state government owned utility.[6,7] Generating companies sell their power to UPPCL—the single buyer—who, in turn, has exclusive rights to sell power to consumers within the state. UPPCL is responsible for both retail and bulk supply. Generators supplying power to UPPCL have widely varying cost structure; but are paid a price—fixed by the regulator—that covers their costs and includes a reasonable rate of return. Retail prices are also set by the regulator and vary according to consumer category and consumption size.

7.3. Problems and their Origin

Since the balance sheet of Uttar Pradesh State Electricity Board (UPSEB) was restructured in January 2000 (see below), the post-restructuring performance is not comparable to the Board's past performance. In this section, the performance of UPSEB during the pre-restructuring period has been analysed.[8] During this period, the power sector suffered from large cash losses and got into financial trouble (Table 7.2). As of March 31, 1999, the accumulated losses of UPSEB were Rs. 10300 crores or six per cent of SGDP.

Due to its poor liquidity position, the UPSEB was often unable to meet its obligation to suppliers of power and fuel and debt servicing. In 1999, payables to power suppliers and fuel suppliers were estimated at about Rs. 3400 crore (almost 20 months of power purchases) and Rs. 2100 crores (almost 13 months of fuel purchases) respectively. Also, the UPSEB defaulted on debt service to commercial lenders. The dismal financial performance of UPSEB reflected growing pressure on cost of power supply on one hand and inadequate revenue on the other.[9] The business expanded even as the average tariff realisation progressively fell short of average cost of power supply. The problem was compounded, as the government subsidies were not forthcoming. The Board's inability to control costs or raise revenue can be attributed to four inter-related factors: slow and lopsided investment, poor operational efficiency, irrational tariff structure, and inadequate government support.

TABLE 7.2

Historical Profit and Loss Statement

(in Rs. Billion)

Year Ended March 31	*1993*	*1996*	*1997*	*1998*	*1999*
Total Revenue	35.9	57.2	58.8	70.3	79.1
of which,					
Revenue from Sale of Power	24.8	38.3	39.9	47.9	53.0
Subsidy	9.1	15.2	15.6	18.4	21.6
Total Expenditure	23.0	37.8	38.3	45.5	48.9
of which,					
Power Purchase	10.2	18.3	16.8	19.5	20.3
Fuel Consumption	6.7	10.0	10.5	12.6	13.9
Repairs & Maintenance	1.6	2.3	2.4	2.9	3.6
Salaries	4.9	6.7	8.2	9.3	9.8
Profit before Interest & Depreciation	12.9	19.3	20.4	24.8	30.2
Operating Profit/(Loss)	3.9	0.2	-1.8	1.0	6.7
Profit after Tax	3.9	0.2	-1.8	1.0	6.7
Profit after Tax (without Subvention)	-5.2	-15.0	-17.3	-17.4	-14.9

Source: World Bank, *Report No: 20250-IN*, 2000.

7.3.1. Inadequate and Distorted Investment

During the 1990s, the pace of investment in the power sector slowed down in Uttar Pradesh, as reflected in a marked decline in capacity addition (Table 7.3),

TABLE 7.3

Capacity in Generation and Transmission

	At the End of the Period				
	1979-80	*1984-85*	*1989-90*	*1998-99*	*1999-00*
Generation Capacity (MW)	3254	4144	5496	6065	6033
Transmission Lines (Ckt Lines)					
400 KV	762	1625	1877	2819	2819
220 KV	3210	4558	5539	6131	6131
132 KV	7476	9064	9613	10453	10538
66 KV	3005	3021	3027	3139	3139
44/37.5/33 KV	19597	21641	23024	25902	26575
11 KV and LT	222607	299500	361141	426259	428014

Source: UPPCL, 1999-00.

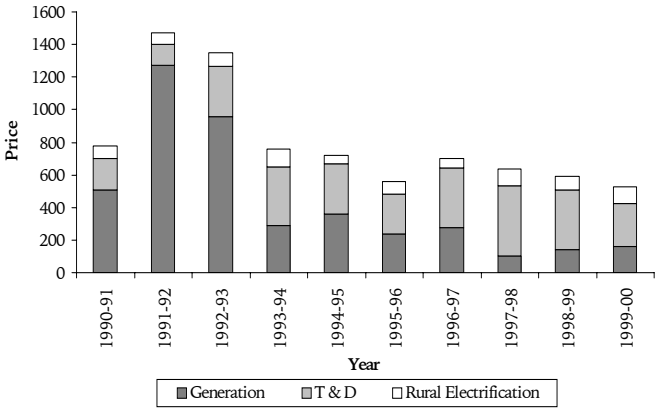
6. The right to distribute power in Greater NOIDA was sold in 1993 to Noida Power Corporation Limited (NPCL), an Indian company.
7. UPSEB was earlier responsible for this. It has now been functionally separated (see below).
8. The performance of UPPCL, which succeeded UPSEB following the restructuring, has been analysed in the next section in the context of reforms.
9. The fastest growing cost components were power import expense and depreciation, which increased by nine times and eight times respectively between 1988-1989 to 1998-99. During this period, the number of electricity units imported increased by 3.3 times. Revenue on the other hand suffered on account of non-technical losses due to theft, subsidy to agriculture and low Plant Load Facto (PLF). UPSEB's PLF remained unchanged at 49 per cent during 1989-90 to 1998-99.

despite continuing growth in demand for power, mainly due to the resource crunch of the government.

Investment in the power sector has been not only inadequate, but also distorted (Figure 7.1). Traditionally, there has been an over-emphasis on generation and a neglect of transmission and distribution. This is reflected in the high share of generation in total investment.[10] Investment in areas such as system strengthening and metering have been far short of requirement. Also, no serious attempt was made by the state to introduce demand side management.

FIGURE 7.1

Investment Expenditure in Uttar Pradesh at 1990-91 Prices



Source: UPPCL, 1999-2000.

Note: Investment expenditure is at 1990/91 prices. Current expenditures have been discounted by wholesale price inflation.

Furthermore, there has been a far more rapid expansion of low-tension (LT) lines (11KV and below) as compared to high-tension (HT) lines (Table 7.3). The rising share of LT lines reflects the government's attempts to electrify more and more villages with limited resources. However, in the process, technical losses in the system have grown. Also, the scope for theft has increased, since it is much easier to pilfer from low-tension lines than from high-tension lines.

7.3.2. Low Operational Efficiency

7.3.2.1. Generation

Table 7.4 gives a comparative picture of Uttar Pradesh's performance in generation. Uttar Pradesh is way behind not only National Thermal power Corporation (NTPC) and A.E. Co (a private company), but also some of its neighbouring states such as Madhya Pradesh and Rajasthan. What is more striking is that during 1992-93 to 2001-02, when most states were successful in improving their operational efficiency in the face of sluggish growth in capacity creation, efficiency growth in Uttar Pradesh remained lacklustre (Table 7.5).

TABLE 7.4

Performance Parameters, 2000-01

	Uttar Pradesh	*Madhya Pradesh*	*Rajasthan*	*NTPC*	*A.E.Co*	*National Average*
Availability Factor (%)	64.3	79.0	86.5	...	...	80.3
Plant Load Factor (%)	49.8	69.4	82.3	79.7	81.7	67.3
Forced Outages Factor (%)	25.6	10.6	3.7	5.2	6.2	13.1

Source: *Annual Report on the Working of SEBs and Electricity Departments*, 2002.

TABLE 7.5

Change in Performance Over Time

	Uttar Pradesh		*Madhya Pradesh*		*Rajasthan*		*All India*	
	1992-93	*2001-02*	*1992-93*	*2001-02*	*1992-93*	*2001-02*	*1992-93*	*2001-02*
Availability Factor (%)	69.0	64.3	72.0	79.0	83.0	86.5	74.7	80.3
Plant Load Factor (%)	50.5	49.8	52.5	69.4	77.0	82.3	57.1	67.3
Forced Outage Factor (%)	27.6	25.6	14.6	10.6	7.2	3.7	16.2	13.1

Source: Planning Commission, 2001-2002.

Note: PLF of thermal stations in Uttar Pradesh remained in the range of 44 per cent to 51 per cent during 1992-93 to 1998-99.

7.3.2.2. Transmission and Distribution (T&D)

The power sector in Uttar Pradesh, as elsewhere in the country, is plagued by high T&D losses. Although these losses have been traditionally reported to be in the range of 18 to 27 per cent, there is now evidence that these figures were consistently understated. UPSEB, which had originally put the T&D loss figure at 26.9 per cent for 1998-99, has restated the figure at 41.5 per cent. The revision is based on studies

10. It is only since 1993-94, the investment focus has shifted to transmission and distribution.

indicating that a large part of T&D losses reflected pilferage, which were masked by inflated sales to agricultural and rural consumers. Further, the collection efficiency—defined as revenue collected in a year as a percentage of demand— in Uttar Pradesh has been low (78-85%), while a number of states have collection efficiency of more than 90 per cent (Karnataka, Haryana, Maharashtra and Delhi). The government departments have been the biggest defaulters.

The high T&D losses partly reflect a failure by the utility to provide adequate metering and to carry out energy audits of metered consumers. Unmetered consumption includes consumption by not only unmetered category consumers (rural households, public lighting, PTWs, etc.), but also metered category consumers who have defective or non-functional meters. It is estimated that about 64 per cent of all UPPCL consumers have defective meters or no meters at all (UPERC, *Tariff Order 2001/02*).[11]

7.3.3. Irrational Tariff Structure

Adequate and timely tariff adjustments have not been made in Uttar Pradesh due to political expediency. For example, although the UPSEB had decided in January 1992 to revise the tariff every year, no tariff revision was made during 1992-93, 1993-94, 1995-96 and 1997-98.

As in other states, the Uttar Pradesh Government has traditionally used the power tariff as a tool to fulfil its social and political objectives. Tariff in agricultural and domestic segments, street lighting and public water works have been kept at persistently low level as compared to the average cost of power supply. For example, during the five years ending March 1999, there was no revision in agricultural tariff; indeed, the fixed rate for private tube-wells was reduced by 20 per cent over this period. (CAG Report, Uttar Pradesh, for the year ending March 1999). As a result, the burden of rising cost of power supply has over the years fallen on industrial and commercial segments.

7.3.4. Inadequate Government Support

As the UPSEB experienced growing deficit, it looked to the government for financial support. The indirect support that the government provided (by foregoing debt service, and providing loans in perpetuity), was not adequate. Further, although in its accounts each year, the Board took credit of government subsidy for sale of energy to the agricultural sector, the state government paid no subsidy on the ground that the Board's tariff approved by the government already included subsidy element (CAG Report, Uttar Pradesh, for the year ending March 1999). As a result, the cumulative subsidy receivable from the government by the UPSEB rose from Rs. 1715 crore in March 1991 to Rs. 11266 crore in March 1999 (UPPCL).

7.4. Recent Reform Measures and their Appraisal

7.4.1. Recent Initiatives

It is against the background of bankruptcy of UPSEB, a near halt in investment and unsustainable fiscal pressures, that the power sector reforms were introduced. The government issued a power sector policy statement in January 1999, which set out the following goals:

- provide cost efficient and good quality electricity to all categories of consumers for economic development/social uplift of the state;
- make the energy sector commercially viable so that it ceases to be a burden on the state budget; and
- protect the interest of consumers.

Realising that UPSEB was operating as an extension of the state government and that the organisational, institutional, financial and ownership arrangements were not conducive to the realisation of these goals, the GoUP decided to distance the power industry from state administration and provide the power sector with the autonomy required to operate on commercial principles. An appropriate legislation "Uttar Pradesh Electricity Reform Bill" to support reforms was passed by the state and The Uttar Pradesh Electricity Reforms Act was notified in July 1999.

The reform measures taken so far in pursuit of this strategy have four major components:

- unbundling;
- financial restructuring;

11. In the absence of adequate metering, critical parameters such as power consumption by different categories and T&D losses are estimated largely on the basis of norms. The inherent arbitrariness in the determination of these norms has undermined the reliability of these estimates. It has been observed that, "In addition to acting as an impediment to the inflow of private investment into distribution, this uncertainty could lead to post-privatisation disputes and crisis" (UPERC).

- tariff rationalisation and multi-year tariff; and
- one-time settlement of overdues.

7.4.1.1. Unbundling

With the ultimate aim of introducing competition in generation and distribution, the government unbundled UPSEB into three functionally separate, autonomous and separately accountable corporations: a thermal generation company (UPRVUNL), a hydro company, Uttar Pradesh Jal Vikas Nigam Limted (UPJVNL) and a company responsible for managing the transmission and distribution system (UPPCL). The assets, liabilities and staff of the UPSEB were transferred to these three corporations under a statutory transfer scheme. These companies are currently state owned. In a second round of unbundling, a separate distribution company was created in each of the four geographically contiguous zones that the state (barring NOIDA and Kanpur) was divided into. These four companies were carved out from UPPCL through the notification of a transfer scheme in August 2003.[12] The discoms are envisaged to be board-managed and have organic links with the UPPCL. To strengthen governance in the discoms, the selection of the MDs has been done through open advertisement. Future unbundling plan of the UPPCL includes separation of the ownership of transmission network from system operation.[13] At present, UPPCL Transco is the operator of SLDCs in Uttar Pradesh. It is envisaged that by June 2005, discoms would take up the business of purchase and sale of power on their own.

Unbundling and corporatisation has facilitated the emergence of a clearer picture and helped identify the sources of inefficiency. Thus, the true cost of generation and distribution (of different discoms, which have recently been created) is now revealed. This would not have been possible under the vertically integrated entity.

7.4.1.2. Financial Restructuring

In January 2000, a cleanup of the balance sheet of the UPSEB was carried out as a prelude to the transfer of business to successor utilities to enable the sector to inherit a relatively healthy opening balance sheet, which would facilitate a quick restoration of the sector's creditworthiness (World Bank, 2000). The restructuring was done by write-off and provisioning of doubtful and obsolete assets, recognition of liabilities that were either understated or not reflected in the balance sheet, and settlement of cross dues between the government and UPSEB. More specifically the cleanup involved the following measures:

- Tanda thermal plant was transferred to NTPC in lieu of their dues;
- overdues from state government (Rs. 2120 crore) and doubtful current assets such as fuel stocks and other inventory (Rs. 1300 crore) were written off; and provisions for receivables were made (Rs. 3430 crore);
- subsidy receivable from the state government (Rs. 11270 crore) was written off;
- outstanding government loans were written off to the tune of Rs. 16600 crore and loans worth Rs. 2940 were converted into equity; and
- payables to fuel suppliers and creditors were set off by issuing bonds worth Rs. 1160 crore.

As a result of the restructuring, the balance sheet size fell from Rs. 33800 crore to Rs. 14500 crore; the debt equity ratio fell from 23:1 to 3:1; net receivables for sale of power declined from 440 days to 61 days because of provision made for doubtful receivables; and payables on power came down from 615 days to 52 days (World Bank, 2000). The restructuring has clearly improved the financial viability of the sector, thereby creating appropriate conditions for future privatisation.

7.4.1.3. Tariff Rationalisation and Multi-year Tariff

The responsibility for setting tariff was transferred from the government to an independent regulatory commission, which was established in September 1999. The Commission has been mandated to adopt a tariff structure that would meet the objectives of efficiency, economy and equity. Tariff proposals are now subject to public scrutiny and the utilities have to defend their requests for tariff revision in an open hearing. Further, state governments have to specify the class of consumers that would be charged less-than-cost tariff. To the extent the tariffs suggested by the state government deviates from that fixed by the regulator,

12. They are Varanasi, Agra, Lucknow and Meerut distribution companies. In addition to these four, Uttar Pradesh has two more discoms operating at Kanpur and NOIDA respectively.

13. The Ministry of Power, GoI, has extended the deadline for separating trading from transmission to June 2005 from the earlier deadline of June 2004.

the state government has to commit itself to pay the required subsidies.

The Regulator has issued four tariff orders so far, which have set performance targets for utilities, with the aim of realising efficiency improvement and passing on the benefits to the consumers. Although the utility has been incurring loss, the Regulator has not been treating the losses as regulatory assets, implying that consumers will not be required to bear the burden of poor performance by the utility. Further, to reduce cross subsidy, the tariff increase relating to the subsidising segments (industrial, commercial, railway traction, etc.) has been kept at lower levels than the subsidised sectors. As a result, the cross subsidisation by railway traction, for example, has fallen from 47 per cent in 2000-01 to 30 per cent in 2002-03; similarly, the cross subsidy received by domestic consumers fell from 41 per cent to 25 per cent over the same period.

Further, the UPERC's has adopted a multi-year tariff (MYT) framework since 2002, outlining performance targets—for the next five years—to improve viability through reduction in T&D losses and collection efficiency, assuming 2000-01 as the base year.[14] The targets have been based on two unambiguous numbers-power purchase and revenue collection-that not only incorporated the impact of both T&D loss and collection efficiency-but also circumvented the problem of data reliability.

7.4.1.4. One-time Settlement of Overdues

Because of the non-viability of operations, most SEBs-including UPSEB-accumulated unsustainable level of dues to central Public Sector Units (PSUs), which became a major impediment to reforms. Part of the dues of UPSEB to central PSUs was settled in the past through transfer of generating stations at Unchahar (1992) and Tanda (1999) to NTPC. Despite these two measures, by the end of February 2001, among all the states in India, Uttar Pradesh accounted for the largest share of overdues to central PSUs.

Following the formulation of a well-designed scheme by an expert group set up by the GoI, recommending a one-time settlement of outstanding dues (as on October 1, 2001), a tripartite agreement (between each state government, GoI and RBI) incorporating the scheme is in operation.[15] The key feature of the scheme is that it brings into focus the payment of current dues in the future by linking it to the settlement of outstanding dues through an incentive mechanism. If states adhere to some specified conditionalities, which include making timely payments of current dues in future and achieving certain performance milestones, 60 per cent of the surcharge currently outstanding will be waived and some cash incentives will also be given to them[16]. On the other hand, if they default, they would be penalised through graded reduction in the supply of power from central power stations and in coal supplies[17] and through suspension of APDRP grants.

Uttar Pradesh is one of the states that have signed this agreement. Consequently, power purchase payables of erstwhile UPSEB to central generating stations of about Rs 6000 crores have been securitised. As the GoUP would service this liability, the burden on the sector would be considerably reduced.

7.4.2. Appraisal of Current Reforms

7.4.2.1. Impact on Performance

Following the introduction of reforms, there have been some improvements in the sector's performance. The T&D loss has fallen from 41.5 per cent in 1998-99 to 33 per cent in 2003-04 and collection efficiency has risen from 78 per cent in 2000-01 to 85 per cent in 2003-04 (UPPCL, various issues). The UPERC, however, has raised doubts about the UPPCL's claim relating to loss levels in 2003-04. "The performance can be evaluated only when actual consumption data for the whole year is available to the Commission. Further, the sharp fall in revenues as compared to the approved levels in the tariff order … does raise serious doubts about the maintainability of the stand of the licensees that the loss position has considerably improved, as compared to the previous year. Till the time that there is credible estimation of unmetered consumption and the billing data on slab-mix can be relied upon, the

14. The process of tariff setting on the basis of performance targets set each year by the regulator increases the uncertainty of investor/utility about their respective future revenue streams. This is borne out by the KESCO privatisation exercise. The practice also increases the burden on the financial and human resources of the utilities. Finally, such a process fails to offer correct incentives for a long-term view of investment, maintenance and use. A multi-year incentive-based approach to regulation can rectify these shortcomings.

15. For details, see "Report of the Expert Group on Settlement of SEB Dues", March 2001 by Ministry of Power.

16. The balance arrears would be securitised through tax-free bonds issued by respective state governments.

17. If defaults exceed 90 days from the date of billing, the Ministry of Finance should recover these dues through adjustment against releases due to them from the centre.

stand of the licencees has little value" (UPERC, *Tariff Order 2004/05*). In terms of physical performance parameters, while there has been moderate improvement in PLF and oil consumption since 2000-01, the increase in generation has been insignificant. Further, the subsidy as decided by the UPERC is being paid by the government on a regular basis.

On the negative side, the UPPCL, like its predecessor the UPSEB, continues to be in financial trouble. The total accumulated loss of consolidated UPPCL had risen to Rs. 5072 crores in March 2003, up from Rs. 3753 crores in March 2002. In the past few years, the UPPCL has not been collecting enough revenue to pay even for its power purchases. A large part of the commercial losses of the UPPCL can be attributed to the repeated failure of UPPCL to reach target levels of T&D losses and collection efficiency—which are the basis for tariff setting (Table 7.6) and which UPPCL has committed itself to. Problems such as high T&D losses, huge unmetered consumption, inadequate investment in system improvement, etc. still persist.

TABLE 7.6

Performance Parameters

	2000/01	*2001/02*		*2002/03*		*2003/04*	
	Actual	*Target*	*Actual*	*Target*	*Actual*	*Target*	*Estd.*
T&D Loss (%)	39.0	33.4	41.0	31.3	36.0	30.4	32.8
Collection Efficiency (%)	78.3	85.0	81.0	88.0	79.0	91.0	84.0
AT&C Loss (%)	...	45.9	52.7	41.4	49.2	36.7	43.6
Generation (Billion Units)	19.6	...	20.5	...	20.9	...	20.7
PLF (%)	57.2	...	59.8	...	61.2	...	60.2
Oil Consumption (KL/MU)	2.7	...	2.3	...	2.2	...	2.1

Source: UPPCL, UPRVUNL & UPERC's tariff orders (2001/02, 2002/03 and 2003/04)

Note: AT&C: Aggregate, Technical & Commercial.

Generation, PLF & Oil Consumption relate to thermal plants.

Further, the UPPCL has not made satisfactory progress in most of the directions issued by the Commission, which ranged from introduction of MCBs to database management (UPPCL, *Tariff Order 2003/04*). It has also failed to honour the commitments it made to the Government of India as per the MOU signed in February 2000 (Box 7.1). For example, although the MOU required the UPPCL to introduce online billing in 20 selected towns by March 2001, only one locality of the city of Lucknow was reported to have made some progress by that date.

On balance, it appears that following the introduction of reforms more than five years ago, the improvement in sector performance in Uttar Pradesh has been moderate. While some may argue that it is too early to expect any substantial improvement in operations, and that the investment in recent years in the primary and secondary systems (including metering of feeders, implementation of energy audits, etc.) would show results in the coming years, there are clear indications that in its current dispensation, the utility is not very responsive to reform stimulus.

BOX 7.1

Memorandum of Understanding with GoI

The Government of India had signed a Memorandum of Understanding with the Uttar Pradesh Government to facilitate further reforms in a time-bound manner. The memorandum signed on 24th February 2000, *inter alia* states:

- Energy audit will be undertaken at all levels in order to reduce system losses. This would be done in a time-bound manner with the following milestones :
  1. Installation of metering at all 11 KV feeders by September 2000.
  2. Hundred per cent metering of all consumers by December 2000.
  3. Online billing in 20 selected towns through computerisation by March 31, 2001.

The Government of India would provide financial assistance/loans to the tune of around 7000 crores for renovation and modernisation of thermal generation stations, repair and maintenance of hydro-electric stations, repairing critical transmission and sub-transmission lines, etc.

Source: http://powermin.nic.in/

7.4.2.2. Absence of Fundamental Reforms

As shown in sections 7.4.1.1 to 7.4.1.4, the recent initiatives have yielded some benefits, but clearly not at the desired pace, primarily because they have not been followed by more fundamental reforms. For example:

- Unbundling has created a potential for competition, but there is no competition since the appropriate market structure is lacking;
- Similarly, while the balance sheet restructuring has prepared the ground for future privatisation, it has not introduced any structural changes to address the fundamental causes of bankruptcy, since it involves only book adjustments. In other

words, unless followed by fundamental reforms, the balance sheet can rapidly deteriorate;

- While the adoption of MYT approach is certainly a step in the right direction, UPPCL's performance has remained largely indifferent in the face of progressively stiffer targets. The UPERC has rightly observed in its 2003-04 tariff order that the UPPCL's explanation for its poor performance is "an attempt to blame extraneous factors for its … low level of efforts". The upshot is that the MYT system can hardly work as an incentive scheme in a setting such as UPPCL, where commercial orientation is lacking and accountability is difficult to establish.
- UPPCL has submitted that it purchased less power during 2002-03 than its own projection, so as to meet the payment conditions in the Tripartite Agreement. The UPPCL did this by cutting down power supply rather than executing measures to improve T&D losses and collection efficiency. This shows that a well-designed scheme can have little meaning if not complemented by appropriate changes in governance.

7.4.2.3. Shortcomings of Current Dispensation

Firstly, there is a complete absence of competition in the sector. For improving sector efficiency, there is a need to introduce and foster competition at more and more levels. It is doubtful if there can be any meaningful competition among the recently formed distribution companies if they all continue to be owned by the government. Further, the two state generating companies have signed long-term Power Purchase Agreements (PPAs) with UPPCL, whereby generation tariff is determined on a cost-plus basis and there is no scope for competition among generating companies.

Secondly, the government has continued to interfere in the day to day operations of the newly formed corporations, whose managements hold the same bureaucratic attitudes and promote the same organisational cultures as before. Their relationship *vis-a-vis* the state government has also remained unchanged. For example, GoUP in an effort to stall tariff increase had given a direction to the UPPCL to file their tariff application to the State Electricity Regulatory Commission (SERC) for 2000-01 with reduced T&D loss target, without giving any strategy for achieving the target. The utility, being a government company, had to oblige.[18] Although the immediate result was that the tariff hike was moderated, ultimately the T&D losses remained at the previous year level and the UPPCL incurred large commercial losses. Similarly, while the GoUP decided in 2003 to increase power supply to rural areas from eight hours a day to 14 hours a day, the UPPCL was not promptly compensated for the additional loss that it had to incur because of this decision. Not surprisingly, with government interference eroding the autonomy of the utility, it has been difficult to establish accountability for the utility's performance.

Finally, despite a resolve by the government to privatise distribution, the progress towards this end has been very slow. The government had formally recognised that privatisation of the distribution business was critical to the viability of the sector in its Power Sector Reform Policy Statement in January 1999. In fact, as stated earlier, the privatisation of Greater NOIDA was done as early as 1992 and the results were encouraging (Box 7.2). The subsequent attempt to privatise distribution was in the case of Kanpur. While the first attempt of the GoUP to privatise KESCO was unsuccessful, the subsequent decisions to invite private bids have been postponed several times (Box 7.3). Further, four distribution companies were carved out from UPPCL three years after the formal decision to do so.

7.4.2.4. Assessment

The upshot is that the reform measures taken so far may be necessary initial steps, but are clearly not enough to make the sector financially viable. So, if the current attempts to achieve higher productivity through regulatory fiats continue without addressing the fundamental problems of incentives and institutions, the sector will continue to be in financial trouble and there is a danger that reforms will be discredited. Recognising privatisation to be the answer is not enough; the task has to be implemented quickly. If privatisation is delayed, commercial losses of the UPPCL will continue to mount and all the benefits of the balance sheet clean-up in 2000 will disappear. Since at the time of privatisation, these losses would have to be dealt with, delays in privatisation will increase the

18. The SERC, on its part, had even felt that the target spelt out in the tariff application was inadequate and called for even higher loss reduction target.

financial burden on the government and make privatisation increasingly difficult.

BOX 7.2

Noida Power Company (NPCL)-A Successful Distribution Company

Background

NPCL is the first private distribution company in India, which took over a network from a state undertaking. It was jointly promoted by New Okhla Industrial Development Authority (NOIDA) and Greater NOIDA Industrial Development Authority (GNIDA) in 1992 to take over distribution of the new industrial township. Currently, NPCL has an equity base of Rs 9.2 crores, of which 73 per cent is held by RPG group and the balance by GNIDA.

Performance

The company inherited a dilapidated distribution network, inadequate to meet the rising load growth. Through extensive operational revamping and high consumer focus, the company has been able to achieve a turnaround. Between 1994-95 and 2002-03, its asset base has grown from Rs. 14 crores to Rs. 60 crores and sales revenues from Rs. 19 crores to Rs. 70 crores. Its T&D loss level is about 20 per cent, one of the lowest in the country. NPCL also has one of the lowest distribution manpower cost (at Rs. 0.05 per unit sold). In 2000-01, the company made a net profit of Rs. 2 crore, up from Rs. 0.5 crore in 1996-97.

Minimising revenue loss

To minimise revenue loss, the company follows a thorough energy auditing process, which entails aggregation of the quantum of energy consumed in downstream distribution on a periodic basis for reconciliation with input energy. The 11 kv feeders are provided with electronic meters at substations, which enable accurate assessment of energy sent out to the system. To develop the rural distribution network, NPCL has developed the concept of 'cluster supply' in villages, whereby multiple small-sized transformers are introduced for providing supply to localised groups of consumers. By extending the high-tension network to almost the doorstep of consumers, NPCL has reduced energy pilferage opportunities. The company's consumer focus is reflected in the fact that connections are activated within six days of application for domestic consumers and 15 days for industrial consumers.

Source: NPCL Annual Report (various issues), *UPERC Order, 2003/04, Prayas Occasional Report No. 2, 2003.*

BOX 7.3

KESCO Privatisation

GoUP indicated its intention to privatise power distribution in Kanpur city in the first quarter of 1999. Although more than five years have since passed, distribution in Kanpur has yet to be privatised.

Experience

In April 1999, the government had pre-qualified four bidders for the privatisation, namely, BSES Limited (BSES), Calcutta Electricity Supply Company Limited (CESC), Larsen & Toubro Limited and AES Combine (L&T–AES), and Tata Electric Company (TEC). The bidders sought and obtained a postponement of the final date for submission of bids until after the issue of the first tariff order—which came in July 2000—since bidders (rightly) expected future viability of KESCO to be contingent on regulatory decisions on a number of issues such as the bulk tariff payable by KESCO to UPPCL, the consumer tariffs chargeable by KESCO, and the allowable level of T&D losses. Bidding took place in July 2000. However, since only one company submitted its bid, the bid was not opened. Since then, although the bidding deadline has been postponed a number of times, bidders have not responded.

Why Did the Auction Fail?

The main factor contributing to the failure of auction has been the lopsided allocation of risk-adjusted return between the seller (UPPCL) and the prospective buyer, entailed by the tariff order. This is borne out by the following analysis. The privatisation of KESCO would have entitled UPPCL to realise the full bulk supply tariff (Rs. 2.15 per unit) announced for KESCO, as compared to a realisation of Rs 1.60 per unit of sale without privatisation. This meant a large increase in income for UPPCL which would have been associated with relatively low (default) risk, since part of the default risk of the privatised KESCO was to be mitigated through an escrow arrangement. By contrast, the new private owner of KESCO could have expected a meagre gain, provided that it reduced the T&D loss from the prevailing level of 30.2 per cent to 25.2 per cent and raised the collection ratio from the prevailing 80 per cent to 100 per cent, within a year. If, however, the distribution company fell short of the T&D loss target by just two percentage points, it would actually have made a loss. In addition, bidders also had to accept the transfer of Rs. 60 crore of existing receivables, a large part of which was doubtful at face value. Bidders found the efficiency targets and other conditions difficult to achieve and not worth committing to. The bidders' concerns which have yet to be addressed explain not only the failure of the first auction, but also continuing delay in conducting subsequent auction.

Source: Tadimalla, *Privatisation of Kesco—A Case Study*, 2000.

7.5. Moving Forward

The Electricity Act, 2003, notified in June 2003, has been a landmark legislation in the power sector. The Act aimed at promoting competition, protecting consumer interests and expanding access, through a well-designed strategy. Against the backdrop of the new Act, the GoUP had formulated its Power Policy 2003, which was expected to constitute the blueprint for the second round of reforms in the state.[19] The key features of the Policy are:

General

- Attracting private capital into the power sector is the cornerstone of the strategy.
- To create new capacity in generation, transmission and distribution, the GoUP would provide subsidised, long-term loans—albeit limited—to large private investors. The GoUP would assist private investors in acquisition of land for power projects and in obtaining rights of way.

Generation

- For renovation and modernisation (R&M) of existing plants, the GoUP would consider outright sale of plants—that have efficiencies below benchmark levels and that require substantial investment in R&M—through a competitive bidding process. The other options include joint ventures with the private sector and lease-rehabilitate-operate-transfer.
- Underutilised captive capacity would be supported by way of purchase of power at appropriate tariff with the approval of the Regulatory Commission.

Transmission and Trading

- Transmission is to provide open access. Distribution companies would have the freedom to purchase from any generator.
- Transmission and trading functions would be carried out by separate agencies. The SLDC and State Transmission Utility would remain government companies. The government would however encourage private participation in transmission for strengthening and expanding the transmission system.

Distribution

- The GoUP would pursue privatisation of distribution business on a priority basis. This would be done through a transparent process of competitive bidding.
- The GoUP would continue to support the sector at least during the transition period till the distribution entities become financially viable. The GoUP would involve private sector participation for as large a consumer base as possible in both rural and urban areas.
- If required, the GoUP would rework the configuration of the distribution companies.

Rural Electrification (RE)

- Power supply to all households as well as agricultural tube wells in the future would be on a metered basis.
- The funding for RE would be channelled through the utility, which would be committed to achieving 100 per cent rural electrification by March 2009 and universal access by 2012.

Our analysis in Section 7.3 shows that improvements in operational efficiency will be difficult to achieve as long as the ownership and management remain with the public sector. The new policy, with competition and private sector participation at its centre stage, is clearly a step in the right direction. In fact, Uttar Pradesh has already taken some steps towards setting the stage for eventual privatisation such as unbundling and rationalisation of tariff. Yet, privatisation has been unduly delayed. The repeated failure to privatise KESCO and the poor experience of privatisation in Orissa have begun to send wrong signals. Similarly, although a number of private projects have been initiated and PPAs have been signed (Appendix A-7.1), none of them has achieved financial closure. To accelerate privatisation and make reforms a success, there is a need to take new initiatives as well as to correct the flaws in the existing strategy.

19. UP was the first state to announce a policy in line with the Electricity Act, 2003.

7.5.1. Make KESCO Privatisation a Success

Even though KESCO privatisation can potentially be a major breakthrough in the reform path, it has proved to be difficult because of a number of factors (Box 7.3). To make KESCO privatisation a success, the following measures need to be taken:

- formulate a comprehensive privatisation strategy by spelling out how risks would devolve on the prospective investor;
- pronounce views on some important regulatory issues for a period of at least five years, which has been partially done by the UPERC (see below);
- involve the regulatory commission, *ex-ante*, in the process of estimating the existing level of losses and the quality of receivables; and
- do not pass on any liabilities of the previous owner to the new (private) investor.

7.5.2. Abandon Single-Buyer Model

Uttar Pradesh continues to follow the single-buyer model, although it is widely recognised that the model is fundamentally flawed. The single-buyer model, as it is currently understood, entails a state-owned transmission company, which acts as the sole buyer of all power from generating companies. All distribution companies can buy only from this company and consumers can buy from distribution companies alone. All tariffs are based on cost-plus basis and no competition is allowed at any level. There are two problems associated with this model. First, since there is no competition and all tariffs are based on cost-plus basis in this industry structure, there is no incentive for the utility to make any efficiency gains. Second, being a state-owned entity, the transmission company is amenable to day-to-day control by the government, which jeopardises its commercial operations. Any alternate strategy to single-buyer model must address both these problems.

The experience of Orissa, which adopted this model in the context of privatisation, has not proved to be satisfactory. With T&D losses continuing to be high, the distribution companies in Orissa have persistently defaulted on their payment obligation to GRIDCO, the sole buyer. GRIDCO, in turn, has been unable to make full payments to generating companies. However, despite defaults, flow of power continues from generation companies to GRIDCO and from GRIDCO to distribution companies, reflecting an absence of hard budget constraints.[20] Gridco is evidently no more creditworthy than a typically bankrupt SEB (Tadimalla, 2001). The financial performance of the four newly formed private distribution companies is also dismal.

Moving forward, if Uttar Pradesh does not correct this flaw and continues with the single-buyer model, it would face similar consequences as Orissa. The losses of UPPCL are already large and will continue to accumulate, and ultimately, the state government will be required to bail out UPPCL. Given the poor state of the state's fiscal situation, it will be a very difficult task. It may be noted in this context that the Expert Group on Restructuring of SEBs has recommended Open Access Model as an alternative to the single-buyer model (Box 7.4).

BOX 7.4

Open Access—An Alternative to the Single-Buyer Model

The essential features of Open Access Model recommended by the Expert Group are:

- Generating companies will compete with each other to sell directly to distribution companies or bulk consumers. This way, market forces will determine efficiency levels, investment and pricing.
- New generators can sell directly to bulk consumers, which will,
  - encourage new investment, since new producers will not be compelled to sell power to bankrupt entities, and
  - release power absorbed from SEB supply to be used elsewhere.
- To address the concern of distribution companies that they may lose their best consumers who provide critical cross subsidy, allowable cross subsidy is to be identified and recovered as wheeling surcharge or duty to be paid by the bulk consumer.
- Transmission company will wheel power for a regulated charge. It will not buy or sell electricity and will not be owned or controlled by a generating or distribution company. This will eliminate scope for conflict of interest and promote non-discriminatory open access.
- An independent system operator, who will be subject to the oversight of the state regulator, will replace the regional state and regional load dispatch centres.
- Sale to a distribution company under a long-term PPA will be subject to regulatory clearance, while sale to bulk consumers or distribution companies in an environment of competition need not be subject to such approval.
- To avoid any disruption of power to any existing consumers, all extant agreements for generation and supply of electricity by existing generating companies should stay in force. Competition and open access should be in respect of new, additional capacities, which will be allowed to access bulk consumers directly.
- Open access should be allowed without waiting for privatisation of distribution.

20. Generating companies have been unable to discontinue for fear of punitive action under ESMA.

The GoUP had not been able to honour its commitment to abandon the single-buyer model by June 2004, although some preparatory steps have been initiated.[21]

7.5.3. Redesign Distribution Zones

As stated earlier, Uttar Pradesh has adopted a mixed zone model for distribution, whereby the state has been divided into four geographically contiguous zones besides KESCO. These four zones are mixed in the sense that each represents a combination of both rural and urban zones. They have been configured in a manner that makes them more or less comparable on the basis of size, load profile and balance between subsidising and subsidised consumers (Table 7.7).

TABLE 7.7

Uttar Pradesh Profile of Distribution Companies 1999-2000 (Actual)

	Varanasi	*Agra*	*Lucknow*	*Meerut*
Total No. of Consumers (Lakhs)	21	13	18	21
Industrial Load (MW)	533	683	533	904
Agricultural Load (MW)	962	672	553	1201
Total Load (MW)	3404	2906	3017	4465

Source: UPPCL, 2001.

There is, however, a growing recognition of the merits of concentrated zoning; for example, the second part of the Godbole Committee Report has recommended such an approach (Maharashtra Model). Even Uttar Pradesh started by attempting to privatise concentrated zones (KESCO), which failed because of some implementation issues. It would be a mistake to abandon the strategy, which is superior to mixed zoning for the following reasons:

First, concentrated zones, which constitute a large part of the power market, are relatively more attractive to prospective investors on account of the ease of revenue collection. Second, since these zones account for a large part of power theft in the state and since it is easier for companies to control theft in these zones, their privatisation will help address the T&D loss problem relatively more efficiently. Thirdly, the option for claiming subsidy encourages distribution companies in mixed zones to camouflage theft and inefficiency (rather than to improve distribution efficiency) by over-reporting consumption of subsidised categories, and thereby raising the subsidy burden on the government.[22] Such options do not exist for concentrated zone distribution companies, who, by definition, would have no access to subsidy flows. In fact, these zones can be made to cross-subsidise rural zones through a transparent electricity surcharge, which can be routed through a Fund (below).

In operational terms, the suggested approach implies that distribution in the major cities in Uttar Pradesh, say the 11 municipal corporations are privatised first. The privatisation can be made quick and simple if the lessons are learnt from the attempts to privatise KESCO (Box 7.3). It is often argued that segregation would ultimately lead to all the rural zones, which are generally unremunerative, to remain with the government, while the private sector gets to pick the cherries. This need not necessarily be so if the distribution in the non-urban areas can be privatised on a minimum-subsidy-bidding basis. International experience shows that this is possible (Box 7.5). The important point to note is that even if privatisation of rural zone takes a long time, or does not occur, segregation would still be a better option, since privatisation of only concentrated zones can yield important benefits such as reduced burden on government finances and better targeted subsidies—which will not be available under mixed zoning—while imposing no additional costs. Furthermore, the fear that concentrated zones (which are typically smaller than mixed zones) do not attract large private players is unfounded as evidenced by the KESCO experience.

The Power Policy 2003 recognises that "...GoUP would consider reworking the configuration of the distribution companies also," implying that re-configuration is still an available option. The policy, however, does not emphasise the need for privatisation of concentrated zones on a priority basis. It appears that the modalities of privatising the distribution of power are not well defined. Therefore, it is imperative that wider discussions are held to weigh the available options and reach an early conclusion. Because, delays would lead to further accumulation of utility's losses, and make privatisation progressively difficult.

21. The technical requirements of transferring PPAs to distribution companies are being looked into. A consultant has been appointed to assist in setting up an alternate model with multiple buyers and multiple sellers. Regulations for open access have already been subject to public hearing and are likely to be finalised soon.

22. To scrutinise the validity of the claims for subsidy by distribution companies, the regulator will have to verify the actual consumption by subsidised categories, which is a very cumbersome exercise.

BOX 7.5

Minimum Subsidy Bidding for Rural Electrification (RE) in Chile

Motivation

Rural electrification in Chile had traditionally been through state-owned power companies, which followed centrally developed plans and relied on government subsidies and cross-subsidies. Lack of funding made electrification slow. By early 1990s, half of the rural population, mostly poor, had no access to power. To increase rural access to electricity, Chile, in 1994, launched a rural electrification programme based on competition, private investment and decentralised decision making. The goal was, with the help of a subsidy, to turn rural electrification into an attractive business opportunity.

The Programme

Chile used a rural electrification fund with a planned life of 10 years (ended in 2004) to allocate a one-time direct subsidy to private electricity companies to cover part of their investment costs in RE projects. Bids are conducted annually. Local operators, often working with community groups, commit to a target of new connections. Their proposals are scored against a checklist of objective criteria, including a cost-benefit analysis, the operator's investment commitment, and social impact. Although grid connections are preferred, renewable off-grid systems also get support. Operators receive the subsidy upfront and must make a minimum contribution to project costs according to a formula set by the government.

Source: Jadresic, A., "Promoting Private Investment in Rural Electrification-the Case of Chile", The World Bank (2000).

7.5.4. Accord Higher Priority to Generation Efficiency than Capacity Addition

It has been shown that generation plants in Uttar Pradesh are operating at very low levels of efficiency, partly due to lack of adequate R&M.[23] This implies that there is scope for efficiency improvement of the existing capacity, which could go a long way in addressing the problem of power shortages. More importantly, this can be achieved with relatively much lesser investment and time than through capacity addition. A study commissioned by the UPERC indicates that, "… On an average the thermal power stations of UPPVUNL can increase their existing output levels by 37 per cent without additional resources … this would involve proper utilisation of technology and adoption of the practices followed in the best plants." (UPERC *Tariff Order 2003/04*) The experience of Unchahar Thermal Power Plant also shows that, given the right incentives and management culture, power plants can be turned around substantially within 2-3 years (Box 7.6). Here again, the new policy accorded high priority to R&M and favoured private sector participation, but no concrete step had been taken.

BOX 7.6

Turnaround of Unchahar Thermal Power Plant (TPP)

The Unchahar power project (420 MW) in Uttar Pradesh, which was not able to pay its dues to NTPC because of its poor operational efficiency, was taken over from the UPSEB by NTPC in February 1992. The takeover meant a win-win deal—NTPC reduced its receivables from UPSEB, while the UPSEB's debt liabilities were reduced to that extent. (The net price for transfer to NTPC was valued at Rs. 925 crores.) The remarkable speed and extent of turnaround that the project achieved after the takeover can be seen from the table given below.

Parameter	*Prior to Take-over*	*1994-95*	*1995-96*	*1996-97*	*1997-98*	*1998-99*	*1999-00*
PLF (%)	18.02	52.31	84.21	80.19	80.1	82.2	85.30
Availability (%)	27.22	59.35	93.95	90.41	90.8	90.13	85.80
Specific Oil Consumption (Ml/kWh)	21.83	2.15	1.25	1.28	1.03	1.18	1.06

A languishing power plant could be converted into a productive asset through a process of cultural transformation together with the financial and managerial inputs from NTPC.

The cultural transformation took place through comprehensive HRD intervention. For example, immediately after the takeover, all critical areas of operation were identified and within a month or two all key executives were replaced, with a view to usher in NTPC systems of operations and maintenance management. The executives who were replaced were repatriated back to the UPSEB. Also, to provide orientation about NTPC systems and procedures, training programmes for managers and supervisors were conducted. Further, unions and employees were taken into confidence to reduce the scope for any undue apprehension relating to the takeover.

Financial and managerial inputs also played an important role. Financial constraints, which affected maintenance, were promptly relaxed. For example, the problem of shortage of spares could be addressed within 100 days of the takeover. As for managerial inputs, an important improvement was the transition from philosophy of breakdown maintenance to that of preventive maintenance. With a view to streamline O&M practice, daily operation meetings were held, which were attended by sector heads of various operation groups. Performance was monitored through daily plant performance reports, equipment availability reports, chemistry report, etc.

Source: NTPC website *www.ntpc.co.in* and Shahi, S.V. (1994).

23. The worst affected have been the hydro power plants, where the machinery have deteriorated due to continuous running for more than 40 to 50 years.

7.5.5. Eschew Escrows and Long-term Contracts

Escrow is a mechanism, which creates security of payment for an identified group by establishing the group's primacy of claim on the revenue stream. Since SEBs, which buy power from IPPs under a single-buyer model, are nearly bankrupt, many states including Uttar Pradesh, have attempted to attract IPPs by offering them escrow facility. Currently, part of the revenue stream from large and medium consumers in each of the 14 zones in Uttar Pradesh, for example, has been escrowed in favour of the upcoming IPPs.[24] The prospect of pre-emption of revenue by generating companies through escrows, however, makes distribution business less attractive for prospective private investors—especially in the face of poor revenue generation in the sector—as has been seen recently in the case of Central Zone in Orissa.

Another instrument that impedes privatisation of distribution is the long-term power purchase agreement (PPA) that generators have with SEBs. In the context of restructuring, the long-term PPAs of erstwhile UPSEB have been transferred to UPPCL, which now contemplates passing them on to the distribution companies. This move may be re-examined. This is because, on the one hand, it would be inappropriate to force prospective private owners of distribution zones to inherit contracts, which were framed without their consent. On the other hand, long-term PPAs would deprive the consumers from realising the potential benefits of competition among generation companies, because the tariff entailed by PPAs is based not on competitive bidding, but on capital costs and operating norms as approved by the Central Electricity Authority (CEA) and the respective state government.

Following the Electricity Act, 2003, new IPPs are coming out with proposals, in which escrows and long-term contracts are dispensed with. Even so, the government should notify a policy clearly eschewing contracting of new capacities through PPAs and escrows as security mechanisms and the existing PPAs and escrows should be terminated to allow for competitive sale of power in the market. This will ensure that newly privatised distribution companies have the freedom to enter into their own voluntary contracts to suit their needs.

7.5.6. Create Power Sector Fund

Establishment of a Uttar Pradesh Power Sector Fund (PSF), which would give credence to the GoUP's commitments to pay timely and adequate subsidies and to meet its liabilities *vis-à-vis* central PSUs, can inspire confidence among the stakeholders such as prospective lenders and investors and thereby make privatisation of distribution easier.

A broad outline of the structure of the Fund is as follows. The Government of Uttar Pradesh would credit the privatisation proceeds and its subsidy contributions into the Fund. Similarly, the surcharge on the consumers in the urban zones to cross-subsidise rural consumers can be routed through this Fund. Also, all existing payables and receivables of UPPCL need to be transferred to the PSF. This would imply that the existing receivables become PSF assets, while labour-related dues and dues to NTPC and CIL become PSF liabilities. The loans for identifiable assets could, however, be passed on to the prospective investors. The PSF would be drawn upon in a pre-specified order of priority, to meet GoUP obligations in discharging the liabilities and meeting subsidy commitments. It is important to ensure that the revenue and expenditure streams are ring-fenced.

In addition to convincing prospective stakeholders about future government support, the creation of such a fund will serve two useful purposes. First, it will improve transparency in the government's financial transaction *vis-à-vis* the power sector. Second, it would ensure greater certainty about the assets and liabilities that the bidders would assume, thereby stimulating better bidder response.

7.5.7 Make Rural Electrification Viable

Supply of electricity to rural areas in Uttar Pradesh has been a challenge. The percentage of villages electrified in Uttar Pradesh (57%) is substantially lower than neighbouring states such as Madhya Pradesh (97%), Punjab (100%), Haryana (100%). (Central Electricity Authority).[25] It has to be borne in mind that the percentage of villages electrified is not a true indicator of access to power by households. Thus, while 57 per cent of Uttar Pradesh villages have been

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24. However, since no IPP has come into being, these escrow arrangements have not been made operational.

25. The figures from *All India Electricity Statistics: General Review (2002-03)* quoted here are based on new definition (October 1997), according to which a village is deemed to be electrified if electricity has reached an inhabited locality in the village. Using the old, less restrictive definition (electricity reaching revenue boundary of a village), 79 per cent of UP's villages are electrified.

electrified, only 20 per cent of rural households (Census, 2001) have access to power.

Why has rural electrification suffered? It is widely recognised that the cost of expanding the grid to cater to sparsely populated rural habitations is high as compared to the thickly populated urban areas. As stated in Section 7.1, although rapid expansion of transmission at low voltages was possible with low initial investment, it has turned out to be costly, because it is prone to high line losses. Moreover, households have not been keen on getting authorised connections because of high cost of access and poor quality of service. The utility, on its part, has become reluctant in recent years to expand access in rural areas partly because of financial constraints and partly because of the fear of incurring large losses due to low revenues, difficulties in billing and collection, etc.

Expanding households' access and improving quality of rural power are critical for the reform process, because they would not only increase welfare, but also help build a greater consensus on reforms. The Blueprint for Power Sector Development prepared by Ministry of Power (GoI) in 2001 envisages electrification of bulk of the remaining villages by 2007 and full coverage of all households by 2012 and identifies some financing sources. These targets are achievable, provided the framework and the strategy for rural electrification are appropriate. The first issue to address is to identify the provider.[26] A number of options are available. The provider could be a private corporate entity (chosen on the basis of minimum subsidy bidding, as described earlier), or a cooperative like the Palli Vidyut Samiti (rural cooperatives) of Bangladesh, or a state government enterprise. The last option is the least preferred one, because it is prone to political interference. Politicians interfere by directing that favoured constituents be connected first or by preventing constituents from being disconnected for not paying their bills. What needs to be noted is that successful and sustainable rural electrification programmes are almost always implemented by an agency with a high degree of autonomy—one that can pursue rural electrification as its primary objective.

In addition to finding an appropriate provider, a number of other issues have to be sorted out. A significant initial step is to raise the tariff for the farm sector, which is currently at a very low, unsustainable level with the aim of achieving a pre-defined level (in terms of cost of supply) within a given time frame. It may be noted here that people are generally willing to pay more if there is an improvement in the quality of service provided. Secondly, an efficient delivery system for subsidies should be devised, which can support expansion of access to a larger number of households (see below). Thirdly, use of renewable sources of energy and off-grid technological solutions need to be encouraged in remote areas.

7.5.8. Devise a Sustainable Subsidy Mechanism

With growing demands for higher expenditure in more deserving areas such as education and health, Uttar Pradesh cannot afford the high levels of financial assistance (in terms of subsidies and loan write-offs) that it has traditionally given to the power sector. While loan write-offs should be avoided since they create moral hazard problems, subsidies have to be gradually reduced to a minimum sustainable level. It has to be emphasised that a sudden and substantial cut in state support may jolt the reform process, as was the case in Orissa. In this context, it is needless to add that reduction in line losses, rationalisation of tariff and decentralisation of the rural electricity supply system in the coming years will help boost revenue and reduce the level of financial support required from the GoUP.

BOX 7.7

Payment of Agricultural Subsidy through Coupons

It has been suggested that instead of paying subsidy to the utility, it should be paid through coupons directly to farmers. For example, coupons worth Rs. 6000 per pump set (as compared to current average subsidy of Rs. 11000 per pump set per year) could be distributed to farmers, who could pay their power bills partly through coupons and partly through cash. This way, small farmers whose power bills do not exceed Rs. 6000 will get 100 per cent subsidy, while those with higher bills will get a lower level of subsidy. Coupons will be given only to those who get meters fixed. To further encourage farmers to obtain metered power supply, the flat rate on non-metered supply should be set at a very high, deterring level.

This system has several benefits. First, it reduces the scope for open-ended fiscal demand. Second, it encourages metered supply, thereby promoting more efficient use of water. Third, it promotes transparency in subsidy transactions and reduces scope for misuse by the utility, since farmers are empowered to raise questions. Some implementation issues may arise; but there seems to be little doubt that the coupon system is inherently more efficient than the existing system.

Source: Workshop on "Power Sector Reforms: Review of Experience", Administrative Staff College of India

26. For a detailed analysis of international experience in rural electrification, see "Report of the Energy Review Committee" (Godbole Committee), Part II.

There is also a need for an efficient subsidy delivery system.[27] What should be the characteristics of such a system? First, an efficient subsidy system entails an articulation of criteria that determines who should benefit from the system and by how much. Second, the system should ensure that subsidies are well targeted. Third, the targeted groups should have only limited access to subsidised power; excessive subsidies will not only put pressure on state finances, but also lead to an inefficient use of power.

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27. Decisions on the extent of subsidies during a period-coinciding with the multi-year tariff horizon set by the regulator are to be made upfront by the state government. The government needs to pay subsidies in cash and on time.

APPENDIX A-7.1

Upcoming Private Power Projects*

A. Thermal	
• Jawaharpur	800 MW
• Rosa	567 MW
B. Hydro	
• Vishnuprayag	400 MW
• Srinagar	330 MW
• Twenty-nine small hydro projects	144 MW
C. Municipal solid waste	
• Two projects	15 MW
D. Liquid fuel based projects	
• Seven projects	700 MW
E. Naptha-based Thermal	
• Kosi	355 MW

Source: UPPCL, March 2003.

Note: * Although PPAs have been signed for all these power projects, none of these projects has attained financial closure.