Looking back at power sector restructuring in the state of Madhya Pradesh

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(This paper was published in Economic and Political Weekly, Vol. XL, No 48, November 26, 2005)

ABSTRACT

The paper reviews the decade long restructuring of power sector of the state of Madhya Pradesh (MP) in India, a process that began in early 1990s, supported by the Asian Development Bank (ADB). The failure of private sector in power sector in the state is attributed to a lack of proper planning, unaffordable tariffs and inability of the state electricity board to judiciously grant escrow covers. The ADB assisted restructuring plan was pushed through in complete disregard of the lessons from Orissa's power sector restructuring exercise. In effect, it has been a lost decade; there has been no improvement in the performance of the power sector in MP. Small consumers are burdened with multifold tariff hikes and the state government with subsidies. The paper also examines the role of the MP State Electricity Regulatory Commission.

1. INTRODUCTION

Power Sector all over the globe and especially in developing countries is experiencing a radical change in policies and paradigm. India is no exception to this and almost all states in the country have gone ahead with power sector restructuring. Restructuring exercise in the state of Madhya Pradesh started in the early 1990s and was mainly supported by Asian Development Bank (ADB). Large power cuts, Transmission and Distribution (T&D) losses above 40%, power theft, mounting bad debts, increasing dependence on power purchase, multifold increments in tariff for small consumers and rising burden on government subsidy remain highlights of the power sector in Madhya Pradesh even after 10 years of restructuring exercise. This paper gives an overview of major developments in the state's power sector in last decade or so on various parameters such as operational performance, private sector participation and regulatory process. We would divide the paper into 4 sections. First section gives a brief overview of how has the power sector in Madhya Pradesh developed historically while second section evaluates its performance over years. Third section tries to analyze what happened in the restructuring exercise of about 10 years starting from entry of private capital into electricity generation. The last section discusses what has been the role of the Madhya Pradesh Electricity Regulatory Commission in the sector. The study has been done from the documents available in the public domain such as ARR petitions, tariff orders, annual reports, reports by the Central Electricity Authority and Planning Commission, and government white papers.

2. BRIEF HISTORICAL OVERVIEW

2.1 Madhya Pradesh State

The original state of Madhya Pradesh (MP) was formed in 1956. MP is one of the largest states in India in terms of area and one of the poorest in terms of economic development. Most of the economic and human development indicators for MP fall below the national average. Table 2.1 gives a brief statistical overview of the state.

Table 2.1: Statistical outline of the new MP state and comparison with national averages

	Madhya Pradesh	**All India**
Population (million, 2001)	60.4	1028.7
Area ('000 sq km)	308	3287
Per capita income in current prices (Rs/year, 2002)	12027	17823
GDP growth rate (real, 2002)	9.1%	6.0%
Per capita electricity consumption (kWh/year, 2002)	333	559
Population below poverty line (2000)	37%	26%
Literacy rate (2001)	64%	65%

Infant mortality rate per 1000 live births (2002)	85	63

[Source: GoI, 2005 and GoMP, 2003a]

Main economic activity in the state is agriculture, which contributes about 44% in the state's economy and employs about 78% of the state's work force. Crops are normally taken twice a year – Kharif (June- August) and Rabbi (November-February) with monsoon and ground water irrigation as the main sources of water. [GoMP, 2005]

2.2 Power Sector

Madhya Pradesh Electricity Board (MPEB) was established under the Indian Electricity (Supply) Act, 1948. Like other State Electricity Boards (SEB) in the country, MPEB was a vertically integrated monopoly and functioned under the guidance of the state government, interacting with the central power utilities for planning and co-ordination. Table 2.2 gives an overview of power sector of the new MP state.

Table 2.2: Power sector in the new MP state (2004)

Total Installed capacity MW	2,273
T&D infrastructure ('000 circuit km)	583
Energy handled Million Units (MU)*	28,558
Consumers (million)	6.44
Employees	60,028
Number of agricultural pumps energized (million)	1.3
Villages electrified	51,806 (97%)
Electrified households (Rural) million	8.13 (62%)

[Note: All figures refer to financial year 2004]

* This includes power purchase. MU stands for Million Units (Million kWh)

[Source: MPSEB 2005, CEA 2005]

Since early 1990s, MPEB started facing problems of mounting negatives in the balance sheet, rising T&D losses, perennial power shortages and poor quality of power supply. The peak power deficit reached as high as 25% and dependence on power purchase from the Central Sector Generating Stations (CGS) started increasing, which inflated the total expenses. Since 1992, MPEB could never achieve the minimum return of 3% over Net Fixed Assets as stipulated by The Electricity Supply Act, 1948 through its revenues. *This caused revenue subsidy from the state government to grow from Rs. 380 Cr*[1] *in 1993 (19% of revenue) to Rs 1697 Cr in 1999 (40% of revenue).* [Planning Commission, 2002] One of the major impacts of such worsening financial situation was MPEB's inability to raise funds for investments in generation and T&D, which further aggravated sector's poor condition. With power sector trapped in such a grave situation, MP decided to join the bandwagon of other states for power sector reforms in the early 1990s, albeit with little success till now as discussed in subsequent sections.

[1] Cr stands for Crore. 1 Crore = 10 Millions. Rs. stand for Indian Rupees (INR)

2.3 Bifurcation of the State

In November 2000, the state of Chhattisgarh was carved out of the erstwhile state of Madhya Pradesh. MPEB was therefore split into (i) Madhya Pradesh State Electricity Board (MPSEB) and (ii) Chhattisgarh State Electricity Board (CSEB). However, the bifurcation raised a lot of issues about apportionment of assets and liabilities between MPSEB and CSEB.

Table 2.3: Allocations between MPSEB and CSEB

Parameter	MPSEB	CSEB
Population	73%	27%
Power Consumption	79%	21%
Energy Consumption	78%	22%
Installed Capacity (MW)	3000 (68%)	1250 (32%)
CGS share (MW) [2]	1116	498
Peak Demand (MW)	5700	1100
Peak surplus / deficit (MW)	-1690	758
Agricultural pumps (million)	1.18 (94%)	0.06 (6%)
Employees	78%	22%
Revenues	64%	36%
Liabilities	78%	22%
Annual profit / loss (Rs Cr)	-2100	930

[Note: All figures refer to November 2000]
[Source: GoMP, 2003]

It could be observed from table 2.3 that, the assets and project related liabilities were apportioned on a geographical location basis but non-project related liabilities were apportioned on the basis of the population. Accordingly, MPSEB assumed nearly 79% of the long-term debt but only 67% of the revenue base and 94% of agricultural consumers of the erstwhile MPEB. [GoMP, 2003] Excess generating capacity was awarded to CSEB. This not only skewed the power availability but also impacted MPSEB finances. With CSEB running into profits, MPSEB is realizing negative balances.

2.4 Vertical and horizontal disintegration of MPSEB

A little over three years ago, in July 2002, MPSEB was disintegrated into 5 separate state owned companies – one each for generation and transmission and 3 for distribution.

MP Power Generation Corporation Ltd. (MPPGCL) today controls about 65% of state's generation while rest is power purchase. There is no generation from private generators in the state except small quantum of hydro and wind projects. Transmission business in the state is solely managed by MP Power Transmission Corporation Limited (MPPTCL) while distribution

[2] MPSEB was awarded the first right over excess power in Chattisgarh at a rate mutually agreeable between the two states. Allocation of power from CGS in eastern region and from unallocated quota in Western Region to the undivided state would remain allocated to new MP.

of electricity is looked after by three companies namely (i) MP Poorva Kshetra Vidyut Vitaran Company Ltd (The Eastern Discom)[3], (ii) MP Madhya Kshetra Vidyut Vitaran Company Ltd (The Central Discom) and (iii) MP Pashchim Kshetra Vidyut Vitaran Company Ltd (The Western Discom). For about three years since their formation, the new companies functioned just as the agents of MPSEB. All transactions including filing tariff revision petitions were performed under the head of MPSEB. Finally, on 1st June 2005, the companies started their independent operations. All transactions including filing tariff revisions would now be done independently by these companies.

Madhya Pradesh Electricity Regulatory Commission (MPERC) is in place in the state since 1998.

3. ANALYSIS OF MPSEB'S PERFORMANCE

As the companies have started independent operations very recently, separate data for each of them is not easily available in the public domain. Therefore, for a preliminary analysis we will examine performance of MPSEB as an integrated utility on various aspects. Secondly, as the state was bifurcated in FY 2001, there is discrepancy about the data for that year. So, we would not include performance of MPSEB in 2001 in our analysis.

3.1 Operational Performance

Table 3.1 shows the operational performance indicators of MPSEB for last 7 years.

Table 3.1: Operational Performance of MPSEB over years

Financial Year è		**1998**	**1999**	**2000**	**2002***	**2003**	**2004**
Installed Capacity (MW)	Thermal	2968	2968	3388	2273	2273	2273
	Hydro	848	848	873	785	835	835
	Total	3816	3816	4261	3058	3108	3108
Firm allocations from CGS (MW)		1770	1770	1718	1299	1372	1347
Purchase from other sources (MW)		75	189	300	300	300	350
Gross Own Generation (MU)		19441	20552	21813	14731	16451	14523
Power Purchase (MU)		12892	14063	14500	13684	13002	14035
Sales (MU)		24428	26483	23456	13960	15143	16006
T&D Loss %		19.1%	20.9%	44.0%	51.0%	47.7%	44.2%
Collection Efficiency %		+	+	+	92.0%	91.2%	86.7%
Peak Power Demand (MW)		5947	6295	6791	5344	5650	5313
Peak Power Availability (MW)		4922	4651	5018	3872	3913	3824
Peak Power Shortage %		17.2%	26.1%	26.1%	27.5%	30.7%	28.0%
Energy Shortage %		3.0%	5.0%	7.1%	13.4%	13.6%	12.3%
Average Cost of Supply (Rs/kWh)		2.30	2.46	2.68	4.71	4.46	3.94
Average Realisation (Rs/kWh)		1.78	1.60	1.78	2.66	2.77	3.03

[3] Discom stands for Distribution Company

*Data for 2002 onwards pertains to bifurcated state (MPSEB) and is not directly comparable with previous years.
+ Figures not available.
[Source: MPEB 1999, MPSEB 2001, MPSEB 2004, MPSEB 2005, MPERC 2004]

As it is evident from table 3.1, the state has been facing acute peak power shortage as well as energy shortage since many years. Demand for power has been increasing at a steady rate but there was no generation capacity addition either by the state or the private sector. As we have seen, bifurcation of the state further aggravated the power shortages. Moreover, there is no significant improvement in T&D loss levels, which hover around 45%. Because of these factors, quantum of power purchase has not gone down significantly even after the bifurcation. It is worthwhile to note that Average Cost of Supply (ACoS) is coming down. Surprisingly, collection efficiency levels show a downward trend.

3.2 Financial Performance

Table 3.2: Various operating expenses for MPSEB (Rs Cr)

Financial Year è	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2002**	**2003**	**2004**
Generation Expenditure	413	520	668	735	969	1231	1262	1015	1108	1240	1262
Power Purchase	719	904	1003	1376	1827	1910	2329	2449	2558	2518	2680
R & M Costs	103	116	155	171	214	253	251	198	272	167	157
Employee costs	349	421	532	557	660	836	901	822	712	769	989
Depreciation	249	273	415	436	426	455	475	557	534	485	476
Interest and Finance Charges	493	523	563	648	640	590	649	865	1132	488	661
Other*	76	92	104	92	137	211	539	264	-225*	166	-82*
Total Expenses	**2402**	**2849**	**3440**	**4015**	**4873**	**5487**	**6405**	**6169**	**6090**	**5833**	**6143**

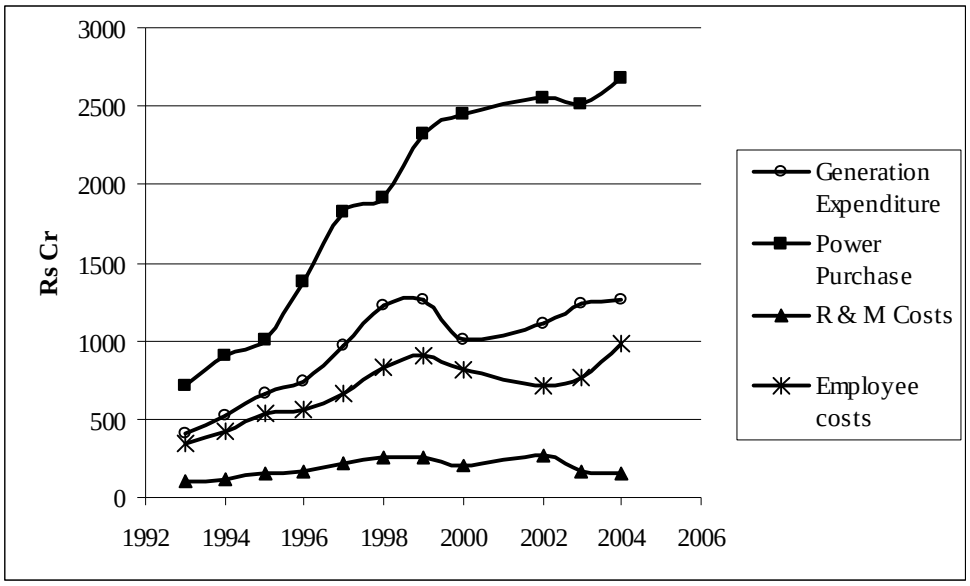
[Note: All figures in Rs Cr.]
* Some figures are negative as they include prior credits receivable by MPSEB.
[Source: MPEB 1997, MPEB 1999, MPSEB 2001, MPSEB 2004, MPSEB 2005]

A careful look at table 3.2 indicates that the rate of increase of power purchase expenses is higher than other expenses. Like most other SEBs in the country, power purchase expense and its share in total expenses for MPSEB started rising in early 1990s. Today, it forms the largest share (more than 40%) of total expenses since nearly 50% of the demand is met by power purchase. Figure 3.1 depicts various expenses of MPSEB in nominal rupees for last 12 years. It clearly shows the sharp increase in the power purchase expenditure over other costs. Though the quantum of actual electricity purchased in 2004 is about 1.6 times that in 1993, power purchase expense has grown to 3.75 times during the same period. The average rate for power purchase during this period has increased from Rs 0.83/kWh (1993) to Rs 1.91/kWh (2004) at a CAGR[4] of nearly 8%. During 1996 and 1999, this CAGR (with respect to 1993) was as high as about 12 - 14%. Therefore, very high power purchase expense is primarily responsible for increasing the

[4] CAGR means Compounded Annual Growth Rate

total expenditure of MPSEB and hence the deficit. However, it must be noticed here that, almost all of the power purchased by MPSEB is from CGS. During the same period, many expensive private power projects were envisaged to be put up in the state. Had MPSEB purchased power from any of these private projects, its financial situation would have been even worse!

Figure 3.1: Various expenses of MPSEB over years



Another major contributor to the expenses is the employee cost. In 2004, employee costs were about 16% of total expenses, which translate to more than Rs 0.60/unit of electricity sold. The same figures for the neighboring states of Gujarat and Maharashtra were Rs 0.24/unit and Rs 0.42/unit respectively. [MPERC, 2004] However, increased number of employees and their cost need be seen in context of old generation plants and consumer mix of MPSEB.

Table 3.3 shows financial performance of MPSEB on various parameters.

Table 3.3: Financial performance of MPSEB

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2002**	**2003**	**2004**
Total Revenue Realized	2123	2552	3057	3555	4661	4609	4552	4451	4594	4425	5262
Aggregate Revenue Requirement (ARR)	2503	2967	3572	4149	5000	5609	6522	6294	6090	5833	6143
Deficit (without subsidy)	-380	-415	-515	-594	-339	-1001	-1970	-1843	-1496	-1408	-881
Revenue subsidy actually received from State Govt	380	415	515	592	338	876	1697	433	543	668	736
Cumulative Bad debts	394	486	578	733	1045	1045	1695	2042	2166	2421	2516
Outstanding dues to CSUs[5]	78	+	717	787	+	+	+	+	3737	3326	+

[Note: All figures in Rs Cr.]

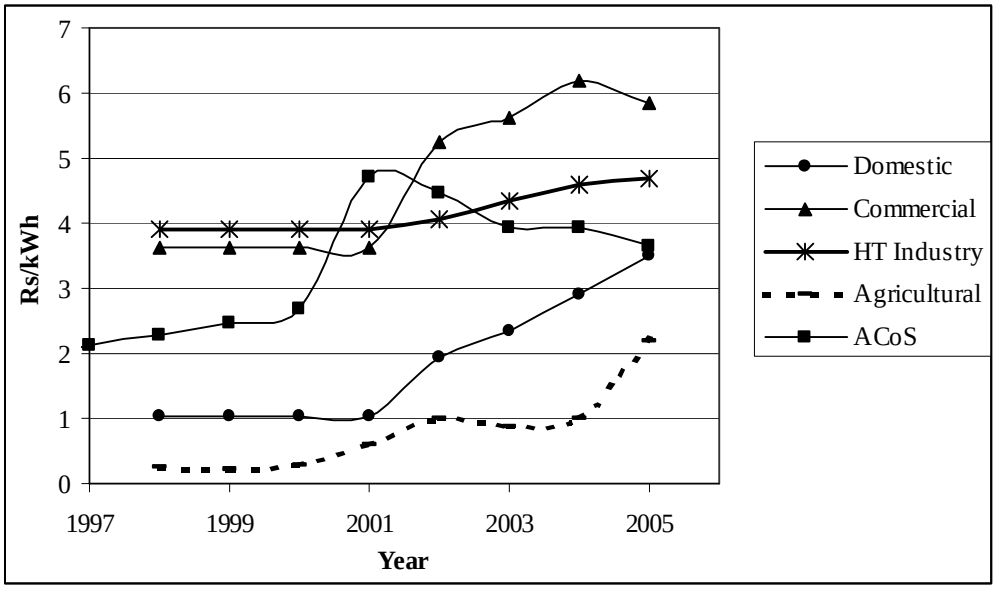
[5] CSU means Central Sector Utility such as NTPC, REC, and PFC etc.

[Source: MPEB 1997, MPEB 1999, MPSEB 2001, MPSEB 2004, MPSEB 2005, Planning Commission 2002, PFC 2004]

Huge accumulated bad debts in addition to power purchase expense place MPSEB finances further into a grave situation. However, with increasing burden on the state government subsidy and rising tariffs, deficits of MPSEB are slowly reducing. Tariff for hitherto subsidized categories like domestic and agricultural have tripled in last few years and are almost in line with the draft National Tariff Policy 2005[6]. In short, in spite of external assistance[7], share of efficiency improvement in reducing deficits has been very limited.

Figure 3.2 plots revenue realizations from various categories. It clearly shows the increasing tariff levels after 2001.

Figure 3.2: Revenue realisation per kWh from various categories



[Note: Figures for 2005 are as approved by MPERC in FY05 tariff order and not actual realisation]

ADB, while granting the loans for power reforms in the state, has designed a turnaround plan for the restructured MPSEB and has projected that MPSEB would achieve financial breakeven by 2008. ADB's projections are shown in table 3.4.

Table 3.4: ADB's projections of Surplus / Deficits and government subsidies

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Net income before subsidies or subventions	-2072	-1268	-1178	-1420	-1234	-1068	-919	-916	-626

[6] Draft as circulated to states, utilities and Regulatory Commissions on 15th March 2005.
[7] The power reforms in the state were mainly assisted by Asian Development Bank (ADB). ADB offered two loans for this program totaling US$ 350 million. This has been covered in detail in subsequent sections.

Net income after subsidies or subventions	-1489	-558	-432	-605	-372	-157	43	106	466
Subsidy support envisaged from GoMP	583	710	745	815	861	911	962	1022	1092

[Note: All figures are in Rs Cr.]
[Source: ADB, 2001]

However, ADB's plan has substantial government subsidy component and if it is removed, MPSEB is no way near the breakeven even in 2010!

3.3 Generation performance

Table 3.5 shows performance of the generating stations of MPSEB. Almost all generating plants of MPSEB are very old - average age of thermal power plants in the state is 20 years!

Table 3.5: Performance of generating plants of MPSEB

		1998	1999	2000	2002	2003	2004
Gross Generation MU	Thermal	17118	17701	19306	12522	14560	14015
	Hydro	2324	2851	2507	2209	1891	2713
PLF of thermal plants %		66%	68%	69%	62%	73%	70%
Auxiliary Consumption (thermal)%		9.54%	9.24%	9.36%	9.77%	9.58%	9.89%
Station Heat Rate of thermal plants kCal/kWh		2910	2939	3119	3148	3103	3101
Secondary Oil Consumption ml/kWh		4.02	3.07	2.16	4.57	2.87	3.05
R&M expenditure on generation Rs Cr		+	149	132	108	98	98
R&M cost per MW of generation capacity Rs Million/MW		+	0.39	0.31	0.35	0.32	0.32

[Source: MPSEB 2001, MPSEB 2004, MPSEB 2005]

Plant Load Factor (PLF) and secondary oil consumption of the plants have improved over years while, Station Heat Rate (SHR), which is a measure of the plant efficiency, remains way below the norm stipulated either by either the Central Electricity Authority (CEA) or by MPERC. MPSEB maintained that the plants are very old and adequate R&M activities have not been done due to paucity of funds. Last row of the table shows the actual R&M expenditure on generation per MW of the total installed capacity.[8] These figures are roughly constant and are about Rs 0.35 Million/MW. The neighboring state of Maharashtra also has quite a few thermal plants of similar vintage to that of MPSEB's plants. Maharashtra plants are running strictly in accordance with the norms set by MERC that are more stringent than MPERC norms. But, R&M expenditure in Maharashtra in 2002 and 2003 was Rs 0.29 and 0.36 million/MW of total installed capacity

[8] Total installed capacity also includes hydro generation. However, in practice most of the R&M expenditure is done on thermal plants.

respectively! [MERC, 2004] This suggests there is no link between expenditure and performance for MPSEB's thermal units!

Considering current power shortages, the GoMP has decided to add about 5200 MW of power (including purchase) by 2010. Out of 5200 MW, generation capacity addition envisaged by MPSEB would be about 3200 MW. This includes expansion of Amarkantak (210 MW) and Birsinghpur (500 MW) thermal plants and revival of Indira Sagar (1000 MW) and Omkareshwar (500 MW) hydro plants.

3.4 Agricultural Consumption and T&D losses

Estimation of agricultural consumption is always an issue of debate, as nearly 80% of agricultural connections are not metered. MPSEB does not follow any scientific methodology for determining agricultural consumption and sample readings over wider area and diverse crops are not taken. Therefore, many times the estimated consumption appears to be unrealistically high and is not found commensurate with the hours of supply in rural area.

Accurate estimation of agricultural consumption is crucial for three reasons:

1. Estimating total sales by the utility
2. Estimating T&D loss
3. Determining agricultural tariff and quantum of subsidy

If the agricultural consumption is estimated at a value higher than actual, utility sales would appear inflated or T&D loss would appear lower. Inflated agricultural sales would expect more revenue from agricultural consumers. Therefore, they would have to pay more or government would have to increase the subsidy support! Also, average cost of supply, which equals total costs divided by total sales, would reduce! Table 3.6 gives an idea of the agricultural consumption, production, average rainfall, and average cost of supply and hours of power supply in rural area over last 4 years.

Table 3.6: Agricultural Consumption, Production and average rainfall

	2000	**2002**	**2003**	**2004**
Agricultural Consumption MU	9619	3560	4825	5342
Share of agriculture in total electricity sales %	41%	26%	32%	33%
Average agricultural usage hours/week *	67.2	31	35	42
Average hours of 3-ph supply to rural area hours/week	+	36	37	62
T&D Loss %	44.0%	51.0%	47.7%	44.2%
Total Kharif & Rabbi agricultural production MT	21.8	18.3	12.9	16.0
Rainfall as % of average **	113%	89%	86%	118%
Gross Hydro Generation MU	2507	2209	1891	2713

Average Cost of Supply (Rs/kWh)	2.68	4.71	4.46	3.94

* Assuming pump usage for 8 months in a year. It is a conservative estimate.

** Approximate estimates

[Source: MPSEB 2001, MPSEB 2004, MPERC 2004, GoMP 2005]

In 2003, a sudden increase in the agricultural consumption is observed. MPSEB justifies such increase on account of low rainfall in 2003. This implies that had the rainfall been satisfactory, agricultural consumption would have reduced. Now, we look at 2004 figures. Despite rainfall being good, agricultural consumption has gone up! Moreover, as agricultural consumption increases, T&D losses come down!

3.5 Free supply of power

In February 1994, the newly elected state government declared free supply of power to all agricultural consumers with pump rating below 5 hp. Moreover, it decided to give free Single Light Point (SLP) connections to the people below poverty line. However, in January 2001, owing to weak financial situation of MPSEB, the government withdrew this policy and made it applicable only for backward caste (SC or ST) consumers. Because of rising electricity tariffs and low rainfall in 2001 and 2002, many farmers could not pay the electricity bills and faced disconnections. As on September 2002, out of total 1.2 million agricultural consumers, about 0.75 million were disconnected! Till March 2003, only about 0.16 million were reconnected under the state government's reconnection scheme (Samadhan Yojana) [GoMP, 2003]. Now, we again look at the agricultural consumption estimated for FY 2003 (March 2002 – April 2003) in table 3.6!

4. PRIVATE SECTOR PARTICIPATION IN GENERATION - INDEPENDENT POWER PRODUCERS (IPP)

4.1 Background

In 1991, in response to severe foreign exchange crisis and lack of capital for expanding generation capacity, the Central Government opened up power generation for foreign and Indian private investment. Government offered concessions such as 100% foreign ownership, long-term purchase agreements and assured profits (as high as 32% post tax return on equity in the currency of investment). In the initial years the state governments and the State Electricity Boards (SEBs) were allowed to enter into negotiated contracts with IPPs without bidding competitively. Initial response to this was enormous and within three years SEBs signed about 243 such contracts (MoUs) non-competitively with proposed capacity addition of over 90,000 MW (more than the national installed capacity then!). Very few of these projects could realize into commercial operation.

During this period, MP also joined the bandwagon of other states signing MoUs with 22 private generation companies with proposed capacity addition of about 8235 MW. (Total Installed capacity of MPEB was 3500 MW at that time!)

In its zeal to sign as many IPP contracts as possible GoMP and MPEB like most other states gave a go by to even elementary power system planning like demand forecasts and evolution of least cost plans based on comparative costing of different options of sites and fuels. Only 16 of these MoUs turned into Power Purchase Agreements (PPA) and 13 (5339 MW) could receive the Techno-Economic Clearance (TEC) from CEA. [GoMP 2003] However, none of the IPPs in the state could reach commercial operation!

4.2 The escrow controversy

Risk sharing between SEBs and IPPs was quite distorted and most of the risks in project construction and operation were borne by SEBs. These risks included foreign currency variation, delays in project construction by the EPC contractor, variations in projected demand growth, payment to IPP etc. Risk of payment of energy bills to IPP was covered through escrow mechanism. In this mechanism, Revenue receivables by SEB from a particular area / zone are channeled directly to a separate escrow account with the IPP having the first right over them to recover its defaults.

Madhya Pradesh was one of the first states in India to implement such escrow cover.
When the IPPs went to Financial Institutions for obtaining finances, the Financial Institutions insisted upon getting an escrow cover as security. GoMP also in a scurry of streaming maximum private capital into the sector, awarded escrow cover to all 13 IPPs. However, in June 1998 MPEB appointed CRISIL to study its real escrowable capacity which revealed to be only 2561 MW as against 5339 MW declared by the GoMP. [GoMP, 2003]

Following this, MoP directed GoMP to award escrow cover based on the least tariff criterion. Accordingly 12 IPPs were asked to submit their revised tariff proposals with 2% of the total project cost as security deposit. Only 9 out of 12 submitted the proposals. Interestingly, though not surprisingly, Maheshwar hydroelectric power project was exempted from this exercise being the only hydro project.
In July 1998, other promoters challenged this decision of re-allocation of escrow cover in the High Court. After a year of tribulations, in June 1999, the High Court ruled in favor of the state government. An appeal was lodged in the Apex Court, which in February 2000, also ruled in favor of the Government.

In the meanwhile, in December 1999, another study by CRISIL revised the escrowable capacity of the state to only 900 MW. This was only about 35% of the escrowable capacity estimated just over a year ago! [Parikh, 2000]

Finally the controversy ended with escrow cover being granted to 4 IPPs (2 coal based, 1 hydro and 1 CCGT) as shown in table 4.1.

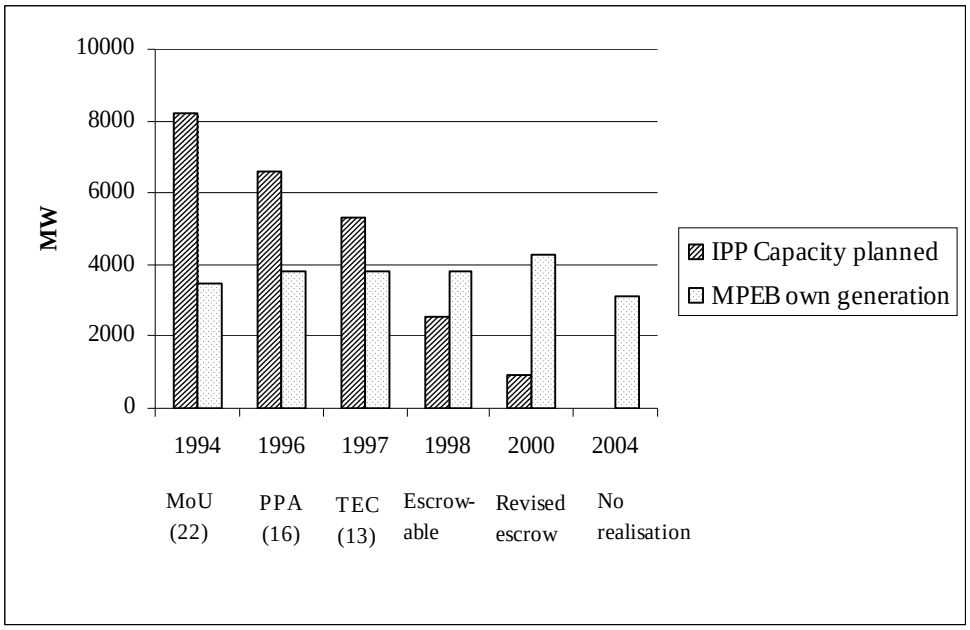
Table 4.1: Grant of escrow cover

IPP Name	Technology	Capacity (MW)	Present Status
Maheshwar	Hydro	400	Project caught in dispute because of opposition from the affected people.
Bina	Thermal	578	Financial closure could not be achieved despite assistance from GoMP
Guna	CCGT	330	No financial closure because of unavailability of gas
Korba	Thermal	1070	Now a part of Chattisgarh

[Source: GoMP, 2003]

None of these IPPs have come online and have generated a single unit of electricity! Figure 4.1 depicts entire IPP process in the state.

Figure 4.1: IPP process in Madhya Pradesh



4.3 The Maheshwar Story

4.3.1 Background

Maheshwar dam is a part of the large dams of Narmada Valley Development Project, which involves construction of 30 large and 135 smaller dams in the Narmada Valley.

It was planned in 1978 and envisages construction of a dam toe powerhouse on river Narmada in Nimad region in M.P. The powerhouse comprises of 10 turbines of 40 MW each and entails construction of a 3,420 meters long barrage with of a height of 36 meter of which 22 meters will be above the current water level. [NBA, 2005]

Initially, the project was overseen by the Narmada Development Authority and then by erstwhile MPEB since 1989. The cost of the project estimated then was about Rs 465 Cr. However, this cost kept on increasing sharply as the years went by. With withdrawal of The World Bank and other bilateral agencies from Sardar Sarovar Project, aid from other developmental organizations became unlikely. Subsequently, the project was handed over to S. Kumar's group in 1993 making Maheshwar the first hydroelectric IPP in India. This newly formed private venture was named as Shree Maheshwar Hydro Power Corporation Ltd.

4.3.2 Foreign Investment

After withdrawal of the World Bank and other international aid agencies, an American utility, PacifiCorp, invested in the project but withdrew in May 1998, stating concerns over social impacts and local opposition. Its stake was then taken over by the German utilities Bayernwerk and VEW, which withdrew in April 1999, raising similar concerns. Another foreign investor, Ogden Energy of US stepped in and took over 49% equity stakes from its German counterparts. However, following the same course, Ogden also withdrew from the project in December 2000.

4.3.3 Financial Structure and present status

Table 3.2: Details of Maheshwar hydro project

Installed Capacity		400 MW
Promoters		S. Kumar's Group
PPA with MPEB		May 1996 for 30 years
TEC from CEA		Dec 1996
Environmental clearance		Jan 2000
Financial Closure		Not achieved yet
Project Cost	Mar 1988	Rs. 465 Cr
	Dec 1996	Rs. 1570 Cr
	Apr 2000	Rs. 1670 Cr
	Present	Rs. 2234 Cr

The project was awarded TEC in December 1996 at an estimated cost of about Rs. 15.7 Billion (base year 1996-97). In April 2000, the CEA approved the final financial package with the completed cost of about Rs. 16.7 billion (base year 2000). However, the project could not achieve financial closure because of withdrawal by Ogden Energy, creating an equity gap of about 330 Cr. This gap put the project work at standstill since October 2001.

As a solution to this financial crisis, the lenders have proposed to issue fully convertible debentures of 350 Cr, which could be converted to equity later. GoMP has extended guarantee for these debentures. The present cost of the project stands at about Rs. 22.34 billion (Rs. 5.6 Cr/MW). Apart from these issues, there were serious concerns raised about the economic viability of the project. The promoters and government consistently underreported project costs. According to government figures, the levelised tariff of the project for 30 years would be Rs 1.8/kWh. However, an analysis based on realistic assumptions estimates the same figure at Rs 5.24/kWh! [Prayas, 1998]

According to the latest news reports, the work on the project is supposed to resume by December 2005.

4.3.4 Affected people's concerns

Nearly 61 villages lie in the submergence zone due to increased water level because of this project. About 35,000 people are endangered to lose their only source of livelihood. These include titled landowners, long-term encroachers and a number of landless communities. However, their compensation from the promoters is currently uncertain. In response to the opposition from NBA and the affected people, GoMP set up a task force in 1998, which involved representatives of all stakeholders like the promoters, GoMP, NBA and the affected people. The task force recommended halting construction of the dam pending the completion of a comprehensive and participatory review of the project's cost-benefit analysis, and of the viability of alternative forms of water and energy development. The state government, ignoring these recommendations, continued with the dam construction. Resettlement of the affected people has been a major issue of debate for almost all big dams in India and Maheshwar is no exception. Illegal measures, such as forced acquisition of land and cash compensation instead of land-for-land resettlement, were used in complete disregard of the government's resettlement policies. Moreover, the level of wealth and infrastructure in the villages, and proportion of the irrigated land was consistently underestimated. It implies that the affected people may not be adequately compensated for their losses. [NBA, 2005]

5. MOVE TOWARDS POWER SECTOR RESTRUCTURING

5.1 Rationale behind restructuring

In early 1990s, like most other states in the country, MPEB was going through a crisis. This crisis had three important dimensions: performance crisis (low efficiencies and lethargic

administration), financial crisis (stagnant revenues, increasing expenditure, increasing arrears, increasing losses, lack of capital) and the credibility crisis (loss of credibility in the eyes of consumers, common citizens and financing agencies). Although, these three components of the crisis were of equal importance, the main preoccupation of the government remained as the financial crisis. Economic reforms that got underway during the same period provided the government an easy way to resolve financial crisis in power sector by inviting private capital and opening hitherto closed gates of the sector to foreign investors. This was start of the IPP phase in power sector reforms. The multilateral Development Agencies like The World Bank, Asian Development Bank (ADB) etc and Indian industry welcomed this step and are in fact pushing further on private participation and reforms.

Around 1995, power sector restructuring in other states in India especially Orissa had moved ahead with assistance from The World Bank. The restructuring program for Orissa was finalized and efforts for disintegration and subsequent privatisation of Orissa State Electricity Board (OSEB), formation of the regulatory commission and cost based tariffs were already under way.

5.2 Tata Rao Committee

The Government of MP (GoMP) also chose to follow the same untested route of Orissa restructuring with a clear objective of increasing private sector participation in the sector and in 1996, appointed an expert committee (Tata Rao Committee) to suggest a framework for the post-reform power sector. In June 1997 the committee came out with its report recommending fundamental changes in the prevailing institutional structure and major policies and procedures. Few of the major recommendations are given below:

1. Functional division of MPEB
2. Private sector investments in all functional areas
3. Formation of electricity regulatory commission
4. Fundamental changes in free power policy
5. Transparency in granting subsidies
6. No separation of urban distribution system from rural.
7. Uniform tariff across Discoms

[ADB, 2001]

5.3 Assistance from International Agencies

Following the committee's recommendations, GoMP approached the Asian Development Bank (ADB) for its assistance in the restructuring exercise. In December 1997, GoMP, GoI and ADB agreed to perform a comprehensive set of 6 studies as groundwork, irrespective of the reform model to be chosen. These studies are called as Technical Assistance (TA) projects. In the meanwhile, The Canadian International Development Agency (CIDA) expressed its interest in working with ADB on these TA projects. Based on its strengths and grants, CIDA decided to

perform 4 studies mainly focused at improving managerial and operational efficiency of the sector. The most critical studies for the reform model and policies and post-reform institutional structure were to be performed by ADB. These studies consisted of:

(i) Review of electricity legislation and regulations
(ii) Solicitation for private sector implementation of a generation project

Surprisingly, neither GoMP nor ADB could endorse a single project dedicated to addressing access barriers to electricity in rural areas. (Even today, there are nearly 38% rural households in MP, which are not electrified!) In the meanwhile, Department for International Development (DfID) of Government of UK also were involved in managing reforms.

5.4 Loan from ADB

Following strong "commitment" of the state government to the reform process, in November 2001 ADB sanctioned a loan of US$ 350 Million (about Rs 1700 Cr at the prevailing exchange rate) to support the reform process in MP. The loan was sanctioned under ADB's Sector Development Program (SDP) and had two components - (i) a policy loan of US$ 150 million and (ii) an investment loan of US$ 200 million.

5.4.1 The Policy loan

This loan of US$ 150 million would be made available for 15 years. Broad objectives of the loan were (i) to improve the policy environment and governance of the sector, (ii) initiate financial restructuring of MPSEB and (iii) establishment of commercial and competitive business environment. The period of release of loan was December 2001 to June 2003 and it was to be released in three installments. Every installment, however, had several pre-conditions to ensure further commitment from GoMP. Table 5.1 lists all preconditions.

Table 5.1: Pre-conditions of ADB policy loan

Installment	Pre-condition
Installment 1 : US$ 65 million	1. Reform Act is enacted 2. MPERC awards first tariff order 3. MPSEB is unbundled and corporatised. 4. GoMP and MPSEB reach an agreement on outstanding dues 5. GoMP issues an order allowing MPSEB to disconnect all defaulting municipalities
Installment 2 : US$ 40 million	1. Not less than 7500 energy audit meters are installed 2. Boards of directors for the Generation Company and Transmission Company are recruited with majority from non-government services 3. Distribution reconfiguration is decided by GoMP 4. Satisfactory debt restructuring plan of MPSEB is submitted 5. Second tariff filing by MPSEB before MPERC
Installment 3 :	1. All new discoms are registered under the Indian Companies Act

US$ 45 million	2. MPSEB assets are transferred to the successor entities 3. GoMP clears all the defaults by municipalities 4. Third tariff filing by MPSEB before MPERC

[Source: ADB, 2001]

Even during finalising the policy and directing the reform model, neither ADB nor GoMP could prescribe any significant clause on providing access to unelectrified houses!

5.4.2 The Investment loan

This loan of US$ 200 million was made available for 20 years at an interest rate of 12%. This loan mainly targets reduction in T&D losses, which includes strengthening the transmission and distribution system, setting up of computerised revenue and information management and provision of three phase meters etc. Total project cost was estimated at about US$ 319 million, out of which GoMP would pay US$ 119 million (Rs 560 Cr at the prevailing exchange rate) in Indian Rupees (INR). Project implementation was supposed to start by January 2002 and is to be completed by December 2005.

5.5 Post-Reform Model

The entire reform process was split into two stages. Stage I of the reforms, which is supported by ADB was very critical and focused mainly at designing legal framework and institutional arrangements. Reform model for Stage I looks like as follows:

1. Functional segregation of MPSEB into three independent companies for Generation, Transmission and Distribution with MPSEB as the holding company.
2. Establishment of independent regulator (MPERC was already established in August 1998 under the central act)
3. Rationalisation of tariff by reducing cross-subsidies
4. Formation of legal and regulatory framework and enabling business environment for private sector involvement in all three functional areas
5. Setting up an institutional framework for managing power sector reforms.

[ADB, 2001]

Reform model for Stage II mainly deals with increasing the private participation in the sector and creating a regulated electricity market. The sector would be characterized by the following:

1. Full operational control of the regulator
2. Multiple private / public generators and Discoms
3. Single transmission company also doing job of the system operator
4. Single or multiple buyer market

[ADB, 2001]

This reform model has some striking similarities such as overall market structure etc with that adapted by Orissa. By this time (end –2001), the Kanungo report on Orissa reforms was out and

it had seriously questioned outcomes of the reform process. However, ADB pushed the reforms along the same model.

In the meantime, GoMP signed a MoU with the central government in May 2000 to set out the reform process in the state and support from GoI. It touched upon many important issues such as unbundling of the MPSEB, an extra share to MPSEB from CGS, preference to financial assistance from PFC and GoI etc. In addition to reforms and tariff rationalisation, GoMP assured 100% rural electrification and metering. [MoP and GoMP, 2000]

5.6 The Reform Act 2000

Drafted in 2000, the MP Reform Act (Madhya Pradesh Vidyut Sudhar Adhiniyam, 2000) was formally enacted in July 2001. GoMP was assisted by ADB in drafting this act. It is cited by ADB as one of the most "progressive" reform acts in India [ADB, 2001]. The act included provisions for following items:

1. Restructuring of MPSEB
2. Establishment of an independent regulator
3. Meterisation of all consumers in the state
4. Over a period of 5 years, tariff rationalisation so that all consumers would pay at least 75% of cost of supply
5. Direct allocation of subsidy from GoMP budgets

In accordance with the MP Reform Act and pre-conditions for obtaining ADB loan, vertically integrated MPSEB was unbundled into 5 independent corporations with MPSEB as the holding company in July 2002.

6. REGULATORY PROCESS

6.1 Institutional structure

Madhya Pradesh Electricity Regulatory Commission (MPERC or the commission) was constituted in August 1998 under the Electricity Regulatory Commission Act, 1998. Like all other ERCs in India, MPERC comprises of three members including the chairman. MPERC has constituted a State Advisory Committee (SAC) to advise the commission on major issues. SAC presently constitutes of 14 members. Out of these, 7 members represent industry and commerce, 2 represent NGOs, 2 come from consumer groups, and one each from educational institute, agriculture and labor union. MPERC has issued 4 tariff orders and several other regulations so far.

6.5 First Tariff Revision

In March 1999, MPSEB revised its electricity tariff without any approval of MPERC. This tariff revision was obviously challenged by many groups before MPERC and the commission stayed its implementation. This move was challenged by MPSEB in the High Court and the Court stayed implementation of MPERC's order. Finally, GoMP made a specific provision in the MP Reform Act 2000 to legalise this tariff hike.

The utility then filed its very first comprehensive tariff revision proposal for all categories in April 2001 for the financial year of 2001-02. MPSEB had suggested an average tariff hike of 53% to cover the revenue gap. It proposed the T&D loss reduction target of about 8% (from 51% to 43%). The agricultural consumption was estimated at 1555 hours/year i.e. 4.3 hours/day throughout the year! However, there was not any scientific basis to this estimation. Public hearings were held at many places in the state. Several consumer groups, farmers' organizations, industries, industry groups and other stakeholders participated in these hearings. In the tariff order dated 26 September 2001, the commission introduced Time of Day (ToD) tariff for the HT industrial consumers and gave an average tariff hike of 31%. It approved the T&D loss estimated by MPSEB for the ensuing year and set the efficiency improvement targets from 2002 to 2006. Agricultural consumption was approved at 4659 MU i.e. 1296 hours/year or 3.6 hours/day and MPSEB was directed to conduct sample studies for estimating agricultural consumption in all regions of the state. The commission discussed several other issues such as feeder and consumer metering, operational performance of the utility, method for estimation of agricultural consumption etc. However, neither of these issues was diligently followed up by the commission in the future.

6.6 Second Tariff Revision

In its second petition for tariff revision (for FY 2003) MPSEB demanded a total tariff hike of about 35%. It asked for creation of a regulatory asset of the past revenue gaps and losses. The commission in its order in November 2002 restricted the total hike to about 15%. Out of this, tariff for HT consumers (mainly industries) was raised by 3% and that for LT consumers (mainly domestic and agricultural) by 29%. MPSEB's demand for creation of the regulatory asset was ruled out because of not providing any concrete ground. To incentivise the metered connections, tariffs for metered agricultural consumers are kept 10% lower than the unmetered consumers. Owing to less hours of supply to rural area, the commission offered a rebate to rural consumers. However, the quantum of rebate becomes significant only when the consumption is more than about 200 kWh per month! MPSEB was asked to submit its Aggregate Revenue Requirement (ARR) for the next year i.e. (2003-04) by December 2002 i.e. just after a month after tariff order has been passed!

6.7 Third Tariff Revision

MPSEB could not submit it's the FY2004 ARR in December 2002. After many rounds of submissions and rejections by the commission, finally the ARR for FY04 and FY05 together submitted in August 2004 was accepted by the commission. In total, MPSEB submitted 6 ARR proposals – 4 for FY04 and 2 for FY04 and FY05 combined. Revision of tariff was requested only for FY05. Following table gives a snapshot of all these proposals.

Table 6.1: ARRs and Deficits projected by MPSEB

Date	FY04		FY05	
	ARR	Deficit	ARR	Deficit
April 2003	6657	1650		
June 2003	7147	1984		
August 2003	6777	1614		
September 2003	6911	1749		
December 2003	6587	1498	6932	1431
August 2004	6439	965	7186	1536

(All figures in Rs Cr)
[Source: MPERC, 2004]

It is really disturbing to see such series of applications and rejections going on for about 18 months especially after MPSEB having prior experience of filing two tariff proposals and with a fairly mature regulatory process in place. For FY05, MPSEB proposed to convert previous losses into a regulatory asset of Rs 976 Cr, which was denied by the commission in the order. T&D loss reduction targets were proposed only at 2.1% and 1.5% for FY04 and FY05 respectively. Surprisingly, though ADB offered Investment Loan towards T&D infrastructure strengthening, the loss reduction targets did not reflect this. The commission, unlike past years, held public hearings only at Bhopal and passed its third tariff order in December 2004. It gave an overall tariff shock of 14% and approved the T&D losses at 40.5% and 37% i.e. reduction of about 3% each for FY04 and FY05 respectively. Agricultural consumption was approved as projected by MPSEB. But the commission directed to install meters on at least 30% Distribution Transformers (DT) on predominantly agricultural feeders.

6.8 Fourth Tariff Revision

The next tariff revision proposal (for FY06) was filed in March 2005. It revealed that there is no significant improvement in MPSEB's performance. T&D losses, generation performance, collection efficiency etc almost remained the same. The commission passed an operative order in June 2005. Detailed analysis and order is not yet released.

6.9 Impact of regulatory process

6.9.1 Tariff movements

Tariff setting by MPERC is in line with the reform structure. Cross-subsidization is reducing over years and tariffs are approaching the cost of supply. All tariff hikes by MPERC were highly skewed. This is evident from the fact that the present tariff for domestic and agricultural (LT) consumers is more than 3 times that of 2001 (i.e. increase of more than 200%), while that for industrial consumers is only about 1.2 times (increase of 20%). Actual revenue realisation, which reflects tariff, for different categories is depicted in figure 3.2. Now, according to the Draft National Tariff Policy 2005, cross subsidization should be minimized with tariffs for all categories to be at least 80% of the Average Cost of Supply (ACoS) by 2011-12. At the tariff levels of FY 2005 tariff order, all consumers in the state are charged above 80% of ACoS except agricultural who are charged at 60%.

6.9.2 T&D loss

The commission had set a trajectory for T&D loss till 2006 in its very first tariff order. For all these years, the losses hover in the range of 43 - 45%. As indicated by a study conducted by M/s Descon Consultants in 2001, real technical loss of MPSEB was found to be only about 20% while theft accounted for the rest (about 27% then). [MPERC, 2001] With ADB's investment loan, the technical performance of T&D was supposed to improve through reduction in losses and better quality of supply. However, these claims do not seem to have realized. The commission did not take any strict action against MPSEB for not reducing theft. The following table tracks the trajectory of T&D losses as stipulated by the commission in its tariff orders and actual figures.

Table 6.2: T&D loss (%) trajectories stipulated by MPERC and actual

Year	TO FY02	TO FY03	TO FY05	Actual
2001	51.0%			51.0%
2002	42.9%			47.7%
2003	37.0%	43.8%		44.2%
2004	32.0%	40.0%		44.0%
2005	28.0%	37.0%	40.5%	43.1%
2006	25.0%		37.0%	

Note: TO means tariff order

[Source: MPERC Tariff Orders]

However, as we have seen in previous section, main problem in determining T&D losses lies with estimation of agricultural consumption. MPSEB's methodology for estimation of agricultural consumption was not scientific and sampling was not diverse. Moreover, there were significant discrepancies in consumption estimates of MPSEB and MPERC's consultant in the same area. In absence of any scientific methodology, the commission accepted MPSEB's claims of agricultural consumption. This left hardly any room for determining T&D losses accurately.

Table 6.3 shows agricultural consumption projected by MPSEB and the commission in every tariff order versus actual.

Table 6.3: Estimation of agricultural consumption by MPSEB and MPERC in MU

Year	MPSEB (ARR)	MPERC (TO)	Actual estimated by MPSEB
2002	5591	4659	4176
2003	4773	4773	4825
2004	5160	-	5342
2005	5342	5342	-

[Source: MPSEB ARRs and MPERC Tariff Orders]

7. IN THE NUTSHELL

In early 1990s, MPEB was going through a crisis. This crisis had three important dimensions viz.: performance crisis, financial crisis and credibility crisis. Performance of MPEB in terms of T&D loss, quality of supply and service (especially to rural areas) and performance of thermal generating plants has shown little improvement over the last decade. Such operational inefficiencies and failure to curb power theft increased dependence on power purchase, which had the effect of making MPEB financially fragile. Instead of improving these deficiencies in the sector, the state government remained preoccupied with bringing more capital into the sector. These efforts started with the IPP experiment in early 1990s, where even elementary principles of power system planning were given a go by. This experiment failed mainly because lack of proper planning, unaffordable tariffs of IPPs and failure of MPEB to grant escrow cover judiciously. Same happened in case of ADB assisted power sector restructuring plan, which was prepared in complete disregard to the fate and lessons from Orissa restructuring exercise. Small consumers in the state are facing multifold tariff hikes and state government is increasingly burdened with revenue subsidy. However, there is no improvement in sector's performance. This implies that not only the financial paradigm of the sector but other two dimensions viz. performance and credibility are equally important. Unfortunately, these issues were never addressed seriously, effectively resulting in more than a decade being lost in chasing mantras of new era – IPPs and ADB led restructuring model, without any benefits to consumers and citizens of the state and the power sector continues to be a stumbling block in the welfare of the state.

Hence, to come out of this crisis the state power sector is facing today, we need to resort to a fundamentally different approach. This approach should address two of the most important challenges the sector is facing today viz.:

(i) Improvement in operational performance of the utilities such as heat rates of the thermal power stations and T&D losses. Reduction in T&D loss would require commendable improvement in metering, billing and revenue collection.

(ii) Secondly, efficient procurement of power to meet current shortages and future demand. Power purchase being one of the largest cost head of MPSEB; it would be rational to curtail the growing cost of power purchase.

However, to achieve this, key lies in the professional management of the sector, which would be independent of political considerations and interference. Increasing transparency, accountability and public participation in the sector's affairs would play a significant role in achieving this. Strengthening the regulatory process and ensuring that it remains credible is another key challenge in front of the sector, as path for revival would certainly involve some major and difficult decisions to be taken. For smooth implementation of these decisions, confidence and support of people is crucial which would come only through a credible decision making process that addresses the concerns of the marginalized and weaker sections of the society such as poor households and agricultural consumers.

This becomes all the more important in the context of likely sharp increase in demand for electricity in rural area because of Rajiv Gandhi Rural Electrification Scheme that envisages 100% rural electrification within next 5 years. Moreover, with the advent of Electricity Act 2003 and consequent policies/orders of the government/ERCs, heavy industries have started shifting towards open access and captive power plants. Such a shift is going to further weaken the financial situation of MPSEB. Even the state government can seldom fill in this financial gap owing to fragile finances of its own.

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LIST OF ABBREVIATIONS USED

ACoS	Average Cost of Supply
ADB	Asian Development Bank
ARR	Annual Revenue Requirement
CEA	Central Electricity Authority, India
CGS	Central Generating Station
CIDA	Canadian International Development Agency
CSEB	Chhattisgarh State Electricity Board
CSU	Central Sector Utility
DfID	Department for International Development, Government of UK
Discom	Distribution Company
DT	Distribution Transformer
ERC	Electricity Regulatory Commission
FY	(Indian) Financial Year (March to April)
GoI	Government of India
GoMP	Government of Madhya Pradesh
IPP	Independent Power Producer
KWh	Kilo Watt Hour = 1 unit of electricity
MoP	Ministry of Power of Government of India
MoU	Memorandum of Understanding
MP	(The State of) Madhya Pradesh (India)
MPEB	Madhya Pradesh Electricity Board (Before bifurcation of the state)
MPERC	Madhya Pradesh Electricity Regulatory Commission
MPSEB	Madhya Pradesh State Electricity Board (After bifurcation)
MU	Million Units of electricity
MW	Mega Watt (1 MW = 1 Million Watt)
NBA	Narmada Bachao Andolan
NTPC	National Thermal Power Corporation
Paise	1 paisa = 1/100 Indian Rupee
PFC	Power Finance Corporation
PLF	Plant Load Factor
PPA	Power Purchase Agreement
R&M	Repairs and Maintenance
Rs	Indian Rupees
SAC	State Advisory Committee
TA	Technical Assistance
T&D	Transmission and Distribution
TEC	Techno Economic Clearance (for generation projects)
TO	Tariff Order
ToD	Time of the Day

ACKNOWLEDGEMENTS

I am thankful to my colleagues at Prayas, Shantanu Dixit, Girish Sant and Dr. Subodh Wagle who helped me in every stage of this paper, right from evolving scope of the paper to concluding the analysis. I am grateful to Dr. Anjula Gurtoo of IISc, Bangalore for sharing key documents and for reviewing the paper. I also thank Pradnya Phagre, Abhay Dhamdhere and other staff of Prayas for helping in documentation and providing research support.

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