A Critical Review of the Performance of Delhi's Privatized Distribution Companies and the Regulatory Process

Prayas Occasional Report – 1/2006

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About Prayas :

PRAYAS means determined efforts in a definite direction.

At PRAYAS, we apply our professional knowledge and skills to understand the issues afflicting society especially in the areas of health, energy, resources & livelihoods, as well as learning & parenthood. Further, we strive to translate this understanding in strategic but sensitive responses.

Underlying these responses is our belief that, if equipped with adequate information, sound analyses, and necessary skills, even disadvantaged sections of society can tackle their problems and shape their own future.

Our activities-research, policy analyses, information dissemination, public interest advocacy, skill development, provision of counseling support - are geared to the objective of equipping the disadvantaged and facilitating people's own action.

About Energy Group :

The Energy Group of Prayas has been active since 1990, though Prayas was officially registered in 1994. The group started working in the energy sector, but soon focused its work on electricity sector policies, covering techno-economic, financial, legal, procedural, planning, political, and institutional issues. In the last fifteen years, the group has worked on a wide range of issues and themes such as integrated resource planning, agricultural subsidy, policies of the international financial institutions, power purchase agreements of independent power producers, electricity sector restructuring and reforms, and regulatory commissions.

Our Activities :

A diverse type of advocacy and public-education efforts based on the sound analysis has been the key feature of group's work. The activities of the group include, research, conceptual as well as empirical analysis, public education activities, media campaigns, advocacy, participation in national and international conferences, legal and regulatory as well as policy interventions at the state and national level. At times, the group also works at the international level to contribute to efforts of like-minded people and organizations.
Our activities are supported through project-based grants from charitable foundations from India and abroad.

About the Report

Restructuring of Delhi's power sector and the subsequent events have attracted a lot of attention. The Delhi model of restructuring is different from the Orissa model, the first Indian experiment of fundamental restructuring of the power sector and privatization of distribution. Some of the distinguishing features of the Delhi model are the use of efficiency gains (i.e. loss reduction) as the bidding criterion and significant government support during the transition period.

Some stakeholders with diverse perspectives have raised questions about the process of restructuring and there have been even been calls for inquiries into the decision-making regarding the restructuring. In addition, many cases have been filed in the court on a variety of issues connected to the restructuring and privatization, In the recent past, several stakeholders, such as representatives of resident welfare associations and consumer groups have protested against the tariff increase and there have been controversies on issues such as fast meters and billing problems.

On the other hand, the Delhi power sector has witnessed some major efficiency gains (i.e. significant reductions in the aggregate technical and commercial losses) after restructuring, and improvements in some aspects of quality of supply and consumer service. Some examples are: (1) distribution transformer failures have been almost eliminated; and (2) many consumer care centers and other facilities have come into existence to improve consumer service.

In this context, this report focuses on an area that has not received as much attention: the regulatory process and its relationship to the performance of the privatized distribution companies in Delhi. The objectives of the report are to identify critical issues that merit the attention of Delhi consumers, regulators and other stakeholders in the coming years and to draw lessons for improving the regulatory process in other states and other restructuring efforts.

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Abbreviations

ABR:	Average Billing Rate
APDRP:	Accelerated Power Development and Reform Program
ARR:	Annual Revenue Requirement
AT&C:	Aggregate Technical and Commercial losses
B/C:	Benefit to Cost Ratio
BIS:	Bureau of Indian Standards
BOY	Beginning of Year
BRPL:	BSES Rajdhani Power Limited
BSES:	Bombay Suburban Electric Supply Company
BST:	Bulk Supply Tariff
BYPL:	BSES Yamuna Power Limited
C&I:	Commercial and Industrial
CAG:	Comptroller and Auditor General of India
CEA:	Central Electricity Commission
CPRI:	Central Power Research Institute
CY:	Current Year
DERA:	Delhi Electricity Reform Act
DERC:	Delhi Electricity Regulatory Commission
DESU:	Delhi Electric Supply Undertaking
Discom:	Distribution Company
DSEB:	Delhi State Electricity Board
DSIDC:	Delhi State Industrial Development Corporation
DT:	Distribution Transformer
DTL:	Delhi Transco Ltd.
DVB:	Delhi Vidyut Board
EOY	End of Year
ERC:	Electricity Regulatory Commission
EY:	Ensuing Year
FOR:	Forum Of Regulators
Genco:	Generation Company
GNCTD:	Government of the National Capital Territory of Delhi
GRF:	Grievance Redressal Forum
Holdco:	Holding Company
IM:	Information Memorandum provided as part of the RFP
JJ:	Jhuggi-Jhopri (small low income tenements / slums)
LIP:	Large Industrial Power
MoP:	Ministry of Power
MOY	Middle of Year
MU:	Million Units (same as Giga Watt-Hours)
MYT:	Multi Year Tariff
NDMC:	New Delhi Municipal Council
NDPL:	North Delhi Power Limited
PFC:	Power Finance Corporation
PGCIL:	Pwer Grid Corporation of India Limited
PPA:	Power Purchase Agreement
QoS:	Quality of service
RFP:	Request For Proposal
RFQ:	Request for Qualifications
RIMS:	Regulatory Information Management System
RoE:	Return on Equity
RST:	Retail Supply Tariff
RWA:	Residents Welfare Association
SAIDI:	System Average Interruption Duration Index
SCADA:	Supervisory Control And Data Acquisition
SIP:	Small Industrial Power
TCE:	Tata Consulting Engineers
TO:	Tariff Order

Currency Conversion – 1 US $ ~ 45 Indian Rs. , Crore = 10 Million, 1 lakh = 100,000

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PART I. BACKGROUND

Chapter 1. Introduction and Objectives

The power sector in India is facing a severe financial crisis and many state electricity boards have become almost bankrupt. Over the last decade many efforts have been made to improve the power sector. These include establishment of electricity regulatory commissions as well as unbundling and restructuring. Privatization of electricity distribution has been projected by many as one of the important options to improve the financial health of the power sector. In 1999 distribution in Orissa was privatized, but since then many lacunae in the Orissa model of restructuring have come to light (Kanungo Committee Report, 2001). During this period, the Delhi government also initiated a process to reform its power sector. As a result of the initial studies, it decided to undertake a fundamental restructuring of Delhi's power sector and to privatize distribution in Delhi. The Delhi model of restructuring is said to be an improvement over the Orissa model in a number of aspects, such as the use of aggregate technical and commercial losses (AT&C losses) as the measure of efficiency instead of the more conventional T&D losses, and the use of bidding for selection of private parties for taking over distribution function on the basis of committed efficiency improvement targets (i.e. reduction in AT&C losses). Starting last year, Delhi's experience with electricity supply has attracted considerable attention. After the tariff increase passed by the Delhi Electricity Regulatory Commission (DERC) in August 2004, there were widespread protests against the tariff increase, fast-reading meters and faulty billing. Some of the protests had political overtones and there were even calls for the Chief Minister to resign. This year after the filing of the ARR petitions, concerns have been raised about the revenue deficit due to increased power costs and about possible ways to cover the deficit.

Delhi's experiment with power sector restructuring is an important event in the evolution of India's power sector. Therefore, we decided to analyze the performance of Delhi's power sector, specially the distribution sector in the post-privatization phase. This study is based mainly on publicly available data from various regulatory proceedings. The distribution companies' (discoms') tariff filings before the Delhi Electricity Regulatory Commission (DERC) and DERC's tariff orders form the major sources of data for this study. We focused our attention on the few critical issues that have a direct bearing on consumers: (1) setting of efficiency improvement targets and the actual efficiency improvements achieved by the discoms; (2) capital investments by discoms; (3) billing and revenue collection by discoms; and (4) quality of service for consumers. In the restructured sector, regulatory commissions play a crucial role and have great responsibility to protect and promote consumer interests and to ensure financial viability of the utilities. Hence, the study also looks at the role of DERC in the context of the above issues,

Delhi's power sector restructuring scheme, including its process, design, implementation and outcome certainly needs to be studied and compared with possible alternative approaches but such a study is beyond the scope of this particular report. This report focuses mainly on the performance of the distribution sector after restructuring and the associated regulatory process.

Our study covers mainly the three-year period from FY2002-03 to FY2004-05 for which complete data is available from DERC's orders. In early April 2006, DERC made public the ARR petitions for FY 06-07 filed by the companies and asked for

comments from the public. These filings contain data on actual costs and revenues for the first half of FY05-06 and projections for the remaining half of FY 2005-06 and the entire FY 2006-07. We have not included data from these petitions in our report because these data have not been approved by DERC as yet, and will probably undergo changes after a review by the Commission and as actual data for the remaining half of FY 2005-06 becomes available. Nonetheless, to update the reader about the data available in these ARRs we present a quick analysis of the ARRs for 06-07 in Chapter 10 of the report. We felt that while the revenue and cost numbers are likely to change, the ARR petition data give us an idea of the direction in which the Delhi power sector is moving.

This report is organized in three parts. Part I deals with what happened. This part provides background information to enable a better understanding of the analysis presented in subsequent sections related to the performance of the distribution sector. In Part II we provide our observations and analyses about the critical issues identified above. Part III is a short section that gives our core conclusions.

The restructuring of the Delhi power sector has been a complex and evolving process. This report is the outcome of a study that required more than a year. In order to ensure the accuracy of our data and findings and also to get the views of those who are, or have been involved in the Delhi power sector first hand, we circulated a draft of the report in January 2006 to the three discoms, DERC, and other reviewers including representatives from civil society. Most of our reviewers submitted written comments. Subsequently we met with some of them in person. These comments have greatly helped in improving the report. Even though we sent the draft report to GNCTD and Delhi Transco also, unfortunately, they did not respond with comments.

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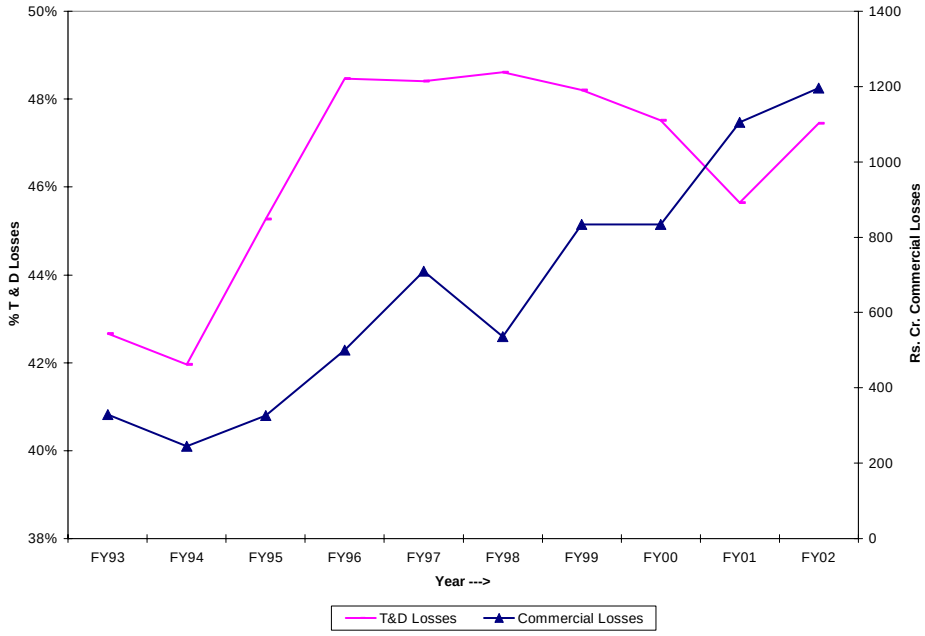
Chapter 2. Delhi Electricity Sector Restructuring- Process and Events

For the benefit of readers not familiar with the history of Delhi's power sector and the restructuring process, this chapter provides a quick overview of the processes and events leading upto the restructuring of the power sector in Delhi.

Before restructuring and privatization that occurred in July 2002, the Delhi Vidyut Board (DVB), a public sector enterprise was responsible for Delhi's power sector. The organizational history of the DVB starts with the formation of the Delhi State Electricity Board (DSEB) in 1951. It was renamed Delhi Electric Supply Undertaking (DESU) in 1958 and then renamed again as DVB in 1997. Losses of the organization started accumulating in the 1970's and the performance of the organization deteriorated rapidly particularly during the 1990s (Sagar, 2004:163). Figure 2.1 depicts the increase in T&D as well as commercial losses of DVB in the last decade.

Figure 2.1 DVB's T&D Losses and Commercial Losses



Source: Sagar, 2004

Some of the problems with the performance were caused by the rapid growth in the size of the system in the 1990s. From 1994-95 to 2000-01, the peak demand increased by about 50% from 1898 MW to 2670 MW with a corresponding increase in energy supplied from 11987 MU to 17362 MU (IM:1). By the late 1990s, the crisis had assumed alarming proportions. Demand continued to grow but no new capacity had been added in the last few years. By the Government's own admission, power cuts had become a regular feature and theft of power was occurring at record levels and Delhi had T&D losses of 49%[1] (in 1997-98) which were extraordinarily high particularly for an urban area (IM:1, Sagar, 2004:164 and GNCTD Strategy Paper:1). In addition to the crisis in performance in terms of high T&D losses and financial bankruptcy, there was degradation in the functioning of the organization and its systems. The level of degradation can be judged from the fact that the audited financial statements of the utility were not prepared and it was only in 2001-02 that they were brought up to date but remained to be audited for the period after 1991-92 (Sagar, 2004:163, fnote 6).

[1] There are some differences in the loss numbers in the Strategy Paper and (Sagar, 2004). We have reported the numbers given in (Sagar, 2004).

Describing the financial health of DVB as "extremely precarious," the Government of the National Capital Territory of Delhi (GNCTD) said that this was getting in the way of modernizing the system (GNCTD Strategy Paper:1) and it decided to restructure the electricity sector in the State.

In 1998, a new government headed by Sheila Dixit took office on the wings of a substantial electoral victory. The Dixit Government treated the victory as a mandate for reform of the power sector (Sagar, 2004). In the next three years the power sector restructuring scheme was implemented with considerable speed. Table 2.1 shows the timeline of major steps. This chapter provides a brief overview of these major events in the restructuring of Delhi's power sector.

Table 2.1 Timeline of Delhi's Power Sector Restructuring

Feb-99	Strategy Paper
Mar-99	DERC Set Up
Apr-99	
May-99	
Jun-99	
Jul-99	
Aug-99	
Sep-99	
Oct-99	
Nov-99	SBI Caps hired as consultant
Dec-99	DERC operational
Jan-00	
Feb-00	
Mar-00	
Apr-00	SBI Caps submits Inception Report
May-00	
Jun-00	
Jul-00	
Aug-00	
Sep-00	
Oct-00	DERA issued; and Tripartite Ag signed
Nov-00	
Dec-00	
Jan-01	GNCTD Cabinet accepts Inception Report; Investors' Conf.; MYT proposal submitted to DERC
Feb-01	RFQ issued
Mar-01	
Apr-01	
May-01	DERC rejects MYT proposal
Jun-01	
Jul-01	SBI Caps submits Final Report
Aug-01	
Sep-01	
Oct-01	GNCTD accepts restructuring model
Nov-01	Policy Directions & Transfer Scheme issued; RFP issued
Dec-01	
Jan-02	
Feb-02	BST and Opening Loss Level Order issued
Mar-02	
Apr-02	Initial bids received,
May-02	Policy Directions and Transfer Scheme modified; Share Acq Ag signed
Jun-02	All agreement to effect transfer signed.
Jul-02	Private parties take over

2.1 Delhi Government's Strategy Paper on Power Sector Restructuring

In response to the deplorable condition of the Delhi power sector, the new Government formed a committee to recommend a strategy for its restructuring. Based on the recommendations of the committee, the Government issued a strategy paper in February 1999. It recommended that:

- Generation and transmission should be separated from distribution and a separate company be formed to take over these functions.
- Private sector participation in generation should be encouraged through the Build-Operate-Tranfer (BOT) or Build-Own-Operate-Transfer (BOOT) route.
- New distribution companies should be set up to cover the six circles of DVB. These companies could be organized as joint ventures with participation of the private sector.
- Delhi Electricity Regulatory Commission (DERC) should be established.
- The interests of the employees of DVB must be protected as part of the restructuring. Staff matters were to be resolved through consultation with the unions and employees. More specifically, there was to be no retrenchment or change in service conditions of the staff.

2.2 Creation of Delhi Electricity Regulatory Commission (DERC)

DERC was created in March 1999 under the Electricity Regulatory Commissions (ERC) Act of 1998. However, it did not become operational for another nine months until the Chairman was appointed in December that year.

2.3. The Restructuring Consultant's Recommendations

Based on their experience with attempts to privatize distribution in Kanpur, SBI Caps was selected as a consultant in November 1999. In April 2000, SBI Caps submitted their inception report where they recommended that:

- DVB be unbundled into: a transco, a genco, three distribution companies (discoms). Each of the three discoms was to have two circles: one circle with low losses and another with high losses.
- Business valuation was to be used to value assets using revenue projections with assumptions of loss reductions and tariff increases.
- The ratio of units realized to units input be used to measure losses. This would later become known as Aggregate Technical and Commercial (AT&C) losses.
- GNCTD to assume all unserviceable liabilities.

The recommendations for restructuring of DVB made in the inception report were approved in January 2001 by GNCTD.

2.4 Delhi Electricity Reform Act

The Delhi Electricity Reform Ordinance was promulgated in October 2000 and after receiving the assent of the President of India it became the Delhi Electricity Reform Act. The Act described the role and functions of the Commission. Regarding restructuring it allowed unbundling and corporatization but did not mandate a particular industry structure. Instead it allowed the Government to develop a transfer scheme,

which would provide the new structure for the industry without having to amend the Act.

2.5 Tripartite Agreement with Employees

In order to allay the fears of the employees regarding restructuring and at the same time to ensure the cooperation of the employees, DVB and the GNCTD signed a tripartite agreement with the employee unions. The main features of the Agreement were:

- There would be no retrenchment of the then current employees.
- The terms and conditions of service for the employees would not change after restructuring. All benefits and welfare schemes would be retained.
- Effective duration of service for the purpose of computing benefits would not be affected by the restructuring.
- GNCTD took over liability of benefits for existing employees and retirees by creating a Pension Trust Fund.
- All employees would receive a pay increase of Rs 500 per month upon transfer to the new companies, at an annual cost of about Rs. 14 crores (for all successor companies put together) and Rs. 11 crores for just the discoms.

2.6 Delhi Government Approval of Restructuring Scheme

In early January 2000, with some modifications, the GNCTD Cabinet accepted the recommendations of the SBI Caps Inception Report to restructure DVB. It was decided to add a holding company to the structure proposed by SBI Caps. Thus the new structure was to have six companies: Holdco, Transco, Genco and three discoms. In addition, in order to reduce the required tariff increases to make the discoms financially self-sufficient, the Government agreed to provide support of Rs. 2600 crores over a five year transition period during which the discoms would improve their performance.

2.7 Investors' Conference and Request for Qualifications

The approval of the restructuring proposal was followed by an investors' conference by GNCTD, DVB, and PFC. This was followed by a Request for Qualifications (RFQ) for the purchase of the distribution business issued on February 15, 2001. Out of the 32 entities that purchased the RFQ, only 7 sent in their Statement of Qualifications, and 6 of them were qualified to receive the RFP.

2.8 Multi-Year Tariff Proposal by DVB

It was felt that in order to attract investors to Delhi's distribution business, some certainty would need to be provided to investors. Multi-year tariffs was considered as a way to provide this certainty. Therefore, DVB proposed multi-year tariff principles for the years 2002-06 in a petition to DERC. Citing the lack of required information, the Commission (which had been operation for less than six months) declined to implement a multi-year tariff regime. DERC said, "In conclusion, the Commission finds that although multi-year tariff setting principles is an issue that merits consideration it is not the mature stage for fixation of multiyear tariff principles for the purpose of this Tariff Order (DERC Order dated 23rd May 2001)."

In light of DERC's refusal to set multi-year tariffs, SBI Caps came up with the proposal to make the loss reduction targets themselves the bidding parameter. Their proposal

was to use the Aggregate Technical and Commercial (AT&C) Loss as the bidding parameter. This resulted in AT&C targets being central to the discussion on performance of Delhi utilities.

2.9 Transfer Scheme

In November 2001, GNCTD notified the Delhi Electricity Reform (Transfer Scheme) Rules for the transfer of assets, liabilities, proceedings, and personnel of DVB to successor entities. The Transfer Scheme also specified the opening balance sheets of the new companies. The transfer of assets and liabilities was effected through the following steps. This is also shown graphically in Figure 2.2.

1. All assets and liabilities of DVB were acquired by the government (GNCTD).
2. All the liabilities of DVB were transferred to the Holding Company and entire equity of the Holdco was issued to GNCTD.
3. All the assets were transferred from GNCTD to successor entities. Assets to be assigned a value equal to serviceable liabilities arrived at through business valuation using assumptions about load growth, tariff increases, changes in costs, etc.
4. Equity and debt in the successor entities in the ratio 40:60, with a total equal to the value of serviceable liabilities was issued in favor of the Holding Company.

Effectively, this made the Holdco the owner of the five successor companies, each of which had a clean balance sheet with a net asset value that could be supported with appropriate returns based on assumptions of reasonable tariff increases, cost increases, load growth, etc. The Holdco, owned by the Delhi government, also carried on its books the excess liabilities from the DVB days.

As mentioned above GNCTD wanted the restructured entities in the Delhi power sector to start with clean opening balance sheets. Therefore, it decided not to pass on the past liabilities and losses of DVB to the successor entities. We look at three components of these past liabilities and losses of DVB that were taken over by the government entity, the Holdco: (1) long term liabilities of DVB; (2) terminal benefit liabilities; and (3) past receivables from consumers for sale of power.

2.9.1 Long Term Liabilities of DVB

The level of long-term liabilities (debt and equity) that was passed on to the new entities was limited to what could be serviced through reasonable tariff increases and loss reductions. This amount of serviceable liabilities for all the new entities (3 discoms, Genco, and Transco) totaled to Rs. 3160 crores. However, as on March 31, 2000, the long term liabilities and power purchase dues of DVB amounted to Rs. 22,250 crores.

These long term liabilities of DVB were made up of three components: (1) Rs 12,953 crores from the DESU period (upto February 25, 1997); (2) Rs 4840 crores to GNCTD; and (3) Rs. 4457 crores of power purchase and fuel dues. As a result, the Holdco took over about Rs 19,000 crores (22250 less 3160) of DVB long term liabilities.

2.9.2 Past-Receivables from Sale of Power to Consumers.

There were outstanding receivables from sale of power to consumers of Rs. 3439 crores as of October 2000. The discoms were to realize these receivables to the extent possible

and pass on 80% of the realized amount to the Holdco and keep 20% as commission. At the end of the three years, the discoms had collected only Rs 322 crores of these past DVB arrears. The amount recovered has been declining every year so it is unlikely that a significant amount will be recovered. Also, as discussed later even the recovered amount has not been passed on to Holdco but has been used by DERC to reduce the tariff increase in Delhi.

2.9.3 Terminal Benefit Liability

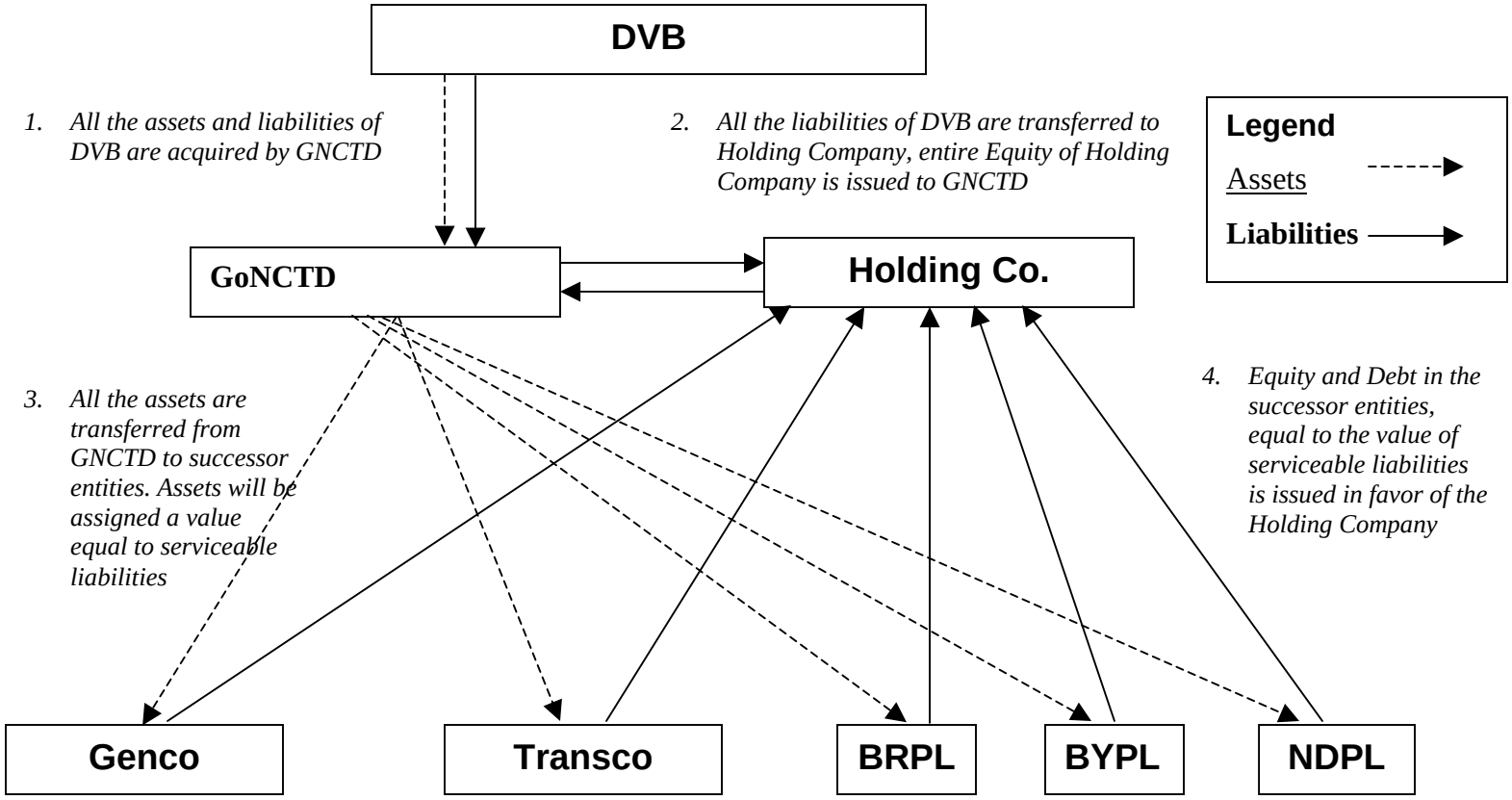
As discussed earlier, according to the Tripartite Agreement between GNCTD, DVB, and the employees unions, GNCTD has funded a trust to cover the terminal benefit liabilities until the date of transfer of DVB employees to the new entities. The total liability was Rs 1329 crore out of which Rs 443 crore were already available with DVB; GNCTD funded the balance (i.e. Rs 886 crore) (IM:68).

2.10 Delhi Government's Policy Directions to DERC

Section 12 of the Delhi Electricity Reform Act (DERA) states that the Commission is to be guided by policy directions that the Government may issue from time to time. Furthermore, if there are any questions about whether any such direction relates to matter of policy involving the public interest, the decision of the Government is final. Broadly to enable restructuring and privatization of DVB, and more particularly to bind DERC to honor the outcome of the bidding process for the transition period from 2002 to 2007, GNCTD issued policy directions on 22nd November 2001. The specific directions covered the following issues:

- AT&C losses to be used to measure the efficiency of discoms.
- AT&C loss reduction targets for the five year transition period to be set on the basis of bidding.
- Opening loss levels to be set by DERC.
- In case a discom was able to reduce the AT&C losses below the target level, the additional revenue generated was to be shared 50%-50% between consumers (through lower tariffs) and the discom.
- Retail tariffs were to be set so that the discoms earned at least 16% on their equity invested in the company, provided they met the AT&C loss reduction targets and their claimed expenditures were considered prudent and reasonable by DERC.
- The retail tariffs for all three discoms were to be uniform until the end of the transition period.
- The Government would provide support of approximately Rest. 2600 crores (revised to Rest 3450 crores as we discuss later) during the transition period 2002-07 in the form of a loan to Transco which Transco would use to bridge the deficit between its revenue requirements and what it receives from the discoms. The loan is to be repaid by the Transco in a manner agreed to between the Transco and GNCTD. So far nothing has been said about if and how this loan will be repaid by Transco to GNCTD.

Figure 2.2 Transfer Scheme



Source: Information Memorandum, Annexure 8

2.11 Bidding Process

Of the six entities that qualified to receive the RFP, only two (Tata Power and BSES) submitted bids. The bids were in the range 13-14% cumulative AT&C loss reductions and were well below the minimum amount of about 20% stipulated by the Government in the RFP.

The Government decided to negotiate with the two bidders. As a result, loss reduction targets of about 17% over five years were agreed upon, about mid-way between the Government stipulated minimum and the initial bids. The bidders agreed that the benefits of any loss reductions beyond the target but below the initial Government minimum would be given to consumers entirely. Only the benefits of reductions beyond the Government minimum would be shared equally between the consumers and the discom. Any revenue loss due to underachievement in loss reduction would be borne by the discom. In addition, the bidders were able to obtain some other concessions from the Government. Specifically:

- The moratorium on loan repayment to HoldCo was extended to four years instead of three as earlier decided. The moratorium could be extended to the fifth year in case of underachievement in the fourth year.
- Over and under-achievement of loss reduction targets was to be based on the cumulative loss reduction until the respective year.
- Unanticipated liabilities arising from litigation and other claims prior to the takeover date would be borne by the discom upto a cap of Rs. 1 crore. Amounts beyond the cap would be borne by Holdco.
- A mechanism was put in place to ensure that the discoms receive timely payments for electricity from Delhi Jal Board (only for HT connections).

2.12 Final Restructuring Package

All agreements making the transfer effective were signed on June 27, 2002 and on July 1, 2002 the private parties took over the distribution business in Delhi. Let's let look at some of salient features of the package not already covered.

2.12.1 Profile of the Delhi System

The Delhi electric system covers a territory that is almost entirely urban with a high load density. Table 2.2 provides some information of the Delhi service territory. Providing a background of the Delhi system, Sagar (2004: 163) states that by Indian standards, Delhi has a high per capita consumption marked by sharp diurnal and seasonal variations resulting in large differences in peak and off-peak consumption The advantages of low agricultural consumption are offset to some extent by the presence of a large number of unauthorized colonies and jhuggi-jhopri (JJ) clusters. The Delhi Electricity Control Order in force from 1959 until it was withdrawn in 1999 restrained the utility from supplying power to unauthorized structures or for unauthorized use, compelling these consumers to steal electricity. It is estimated that about 14% of Delhi's consumption in the pre-privatization era was going unmetered and unbilled to the unauthorized colonies and JJ clusters (Sagar, 2004).

2.12.2 Distribution companies

Out of the three distribution companies created pursuant to the restructuring scheme, two companies, namely BSES Rajdhani Power Ltd. (BRPL), BSES Yamuna Power Ltd

(BYPL) were taken over by Reliance Group whereas the third company North Delhi Power Ltd. (NDPL) was taken over by Tata Group. Table 2.3 provides a profile of these three companies.

Table 2.2 Pre-privatization Profile of Delhi System

Area of Supply	1480	Sq. km
Population	13.8	Million
Peak Load	2879	MW
Energy Input	17362	MU
Per Cap Consumption	1260	kWh

Source: Information Memorandum, page 9
Note: Data is for mid-2001.

Table 2.3 Pre-privatization Profile of Delhi Discoms

	BRPL	BYPL	NDPL	Total
Number of Consumers	849,059	861,225	742,895	2,453,179
MU Billed (MU and (%))	3627 (45%)	1967 (24%)	2518 (31%)	8112 (100%)
Revenue Billed (Rs. Cr.)	1326	740	965	3031
Revenue Collected (Rs. Cr.)	1200	650	856	2706
Collection Efficiency	90%	88%	89%	89%

Source: Information Memorandum, pages 19-28.
Note: Data is for mid-2001.

2.12.3 Beginning Capital Structure

Table 2.4 shows the opening capital structure of three distribution companies in Delhi.

Table 2.4 Opening Capital Structure of Delhi Discoms

(All amounts in Crore Rs)

	BRPL	BYPL	NDPL	Total
Equity (Private Party)	235	59	188	481
Equity (GNCTD)	225	57	180	463
Loan from HoldCo	690	174	552	1416
Net Fixed Assets	1150	290	920	2360
Equity (Private Party)/Net Fxd Assets	20%	20%	20%	20%

Source: Transfer Scheme, 2001

As can be seen from the table above, the private parties have put in Rs. 481 crores for all three discoms combined which is about 20% of the net fixed assets of Rs. 2,360 crores. The value of net assets being equal to Rs. 2,360 crore was arrived at through a business valuation. It should be pointed out that the land that was part of DVB's distribution business was not transferred to the private parties. The private parties that bought the distribution business were entitled to use the land as a licensee on the payment of a token fee of Rs. 1 per month while they carry out the distribution business in Delhi. If and when the distribution license is revoked or withdrawn or the area of supply where the land is situated is withdrawn from the private party, the license regarding the use of land will stand cancelled.

The business valuation of BYPL was much lower compared to other two companies on a per MU basis. The valuation was kept low because it had higher losses and lower revenue potential.

2.12.4 Organizational Structure

The Board of Directors of each of the discoms is to have directors nominated by the private party and Holdco in proportion to the shares held by them. The initial board consisted of five directors – three nominated by the private party and two nominated by the Holdco. On the following matters, the discom cannot take a decision without the assent of the directors nominated by the Holdco as long Holdco has at least 10 percent of the paid up capital of the company:

- Closure of the company or merger of the company with another company;
- Any amendment to the Articles of Association of the company, or any significant changes to accounting policy.
- Subscription of any shares, debentures etc in another company other than except short term investments upto Rs 5 crores; or write-off of any investment exceeding Rs. 5 crores.
- Giving corporate guarantee for another person or business.

2.13 Summary of Delhi's Restructuring Process

Starting with a strategy paper in 1999, the then new Delhi Government moved quickly to restructure the electricity industry in the territory and privatize the distribution business. In a little over three years, in July 2002, the distribution business was handed over to private parties.

The process adopted by GNCTD was different than the process used to privatize distribution in Orissa. First, a new measure for efficiency of a discom was introduced – AT&C losses which covered not only the technical losses but also the non-technical losses and the collection losses. Reductions in AT&C losses were to be the bidding parameter. Business valuation was used to set the value of the distribution assets, whereby the assets were valued at a level at which the company would be able to earn a suitable return based on assumptions of (1) reasonable tariff increases, (2) the bid schedule of loss reductions and (3) gradually declining Government support provided over a five year transition period.

GNCTD decided to provide a clean balance sheet and therefore, assumed most of the liabilities from the DVB and DESU era which amount to Rs. 19,000 crores[2]. Recognizing that loss reductions would take some time and that therefore the newly privatized discoms would not be financially self-sufficient for some time, GNCTD agreed to provide Rs. 3450 crores of support over a five-year transition period.

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[2] This is difference of the DVB's long term liability of Rs. 22, 250 crores less the long term liabilities of Rs. 3160 crores assumed by DVB's successor entities including the discoms, Delhi Transco, and Genco (IM:65).

Chapter 3. Overview of the Tariff Setting Process in the Post-Privatization Era

At the time of privatization, the Government envisaged that the discoms would gradually improve their performance and thus the gap between their costs and the revenues earned would narrow every year. However, during the transition period it was anticipated that Government support would be required to bridge the revenue gap. The Government estimated the required support to be Rs. 3450 over the five year period. It was expected that by the end of the five year transition period the discoms would be self sufficient and not require any further support from the Government.

In this chapter, we see to what extent events unfolded according to plan. We do this by providing a summary of the annual costs, revenues, and revenue gaps over the three year period since privatization. However, before doing that we give a brief description of the tariff setting process that is being followed in Delhi during the transition period, because the process followed in Delhi is different from that in other Indian states.

The tariff determination process for the three discoms is different from the conventional process because of two requirements given in the policy directions issued by GNCTD:[3]

1. Tariffs are to be set so that the discoms earn a 16% return on the equity invested in fixed assets of the respective companies, provided the AT&C loss reduction targets are met.
2. Retail tariffs for the three discoms are to be identical until the end of the transition period, March 31, 2007.

3.1 Conventional Tariff Setting Process

Under the conventional tariff-setting method when retail tariffs do not have to be uniform across discoms, the bulk supply tariff (BST) for the Transco is set by dividing the ARR for the Transco by the total energy purchased by the discoms and other licensees. Normally, the BST for all the discoms would be identical.

Under these conditions, the ARR for the discom is calculated by adding all prudent expenditures for the discom including the return on equity and the power purchase costs as determined by the BST. The average retail tariff is then equal to the ARR divided by the total units billed by the discom. It can be seen that in the conventional process, the retail tariffs would be different for each discom because the costs per unit are likely to be different.

From the above discussion, it can be seen that in the conventional tariff setting process, the ARR and BST for the Transco is independent of the ARRs and retail tariffs of the discoms. Furthermore, the ARR and tariff of a discom depend on the BST and the costs of the particular discom. The retail tariffs of a particular discom are independent of the tariffs and costs of the other discoms.

[3] The discussion in the next two sections on the tariff-setting process in Delhi and how it is different from the conventional tariff-setting process is based on the discussion of these issues in DERC's orders for the discoms for FY02-03 and FY03-04. See for example DERC's order for NDPL for 02-03 and 03-04, pages 93-96.

3.2 Tariff Determination Process in Delhi During the Transition Period

The tariff determination process in Delhi does not have the features of the conventional tariff setting process. Instead, there is interlinkage between the ARRs of the discoms, the retail tariffs of the discoms, and the BST.

As the first step in setting of tariffs, the ARR (excluding power purchase costs) of a discom is calculated so as to recover all its prudently incurred expenses and to provide a 16% return on the equity invested in the discom. This amount is subtracted from the projected retail revenues and the residual is the capacity of the discom to pay the Transco for power purchases. Therefore, the BST for a particular discom is equal to the residual from the retail revenues divided by the units purchased from Transco. In this way, the BST for each discom is different because it represents the paying capacity of the discom and not the cost of the power purchased. The BSTs for the discoms do not cover the actual cost of the purchased power. Hence, the Government has agreed to provide support to the Transco to cover the deficit during the transition period. As mentioned earlier in the report, it estimated that this required support would be Rs. 3450 crores over the five year transition period. The following two equations summarize how the BST and Government subsidy are interlinked.

BST 1 = Discom 1's (Projected Revenue – Allowable Costs – Profits) / Units purchased from Transco

Similarly the BST for other discoms would be calculated.

Government Subsidy = TRANSCO Costs – sum of (BST x Mus sold to discoms) for all three discoms

It can be seen that in this tariff setting process, after determining the allowable costs of discoms and Transco, there are two variables that can be used to ensure that the revenue requirements of the discoms and Transco are met: (1) the retail tariffs of the discoms (identical for all discoms); (2) the amount of Government support during a particular year. By increasing the retail tariffs of the discoms, DERC can increases the paying capacity of the discoms for power purchases, until the Government support available in that year is just sufficient to bridge the Transco's revenue gap. From this discussion, we can see the necessity for DERC to process all the tariff petitions simultaneously because of the interlinkages.

3.3 Tariff Orders by DERC

The erstwhile DVB was required to file an ARR petition every year by December 31 of that year. However, DVB did not file an ARR petition for the year 2002-03 in time despite reminders from DERC. The reason given by DVB was that an estimation of revenues was not possible until the bids by the prospective purchasers of the distribution business were known. Further, the DVB contended that the tariff determination process would take some time even after the bids were opened and the ARR was filed. Therefore, it requested DERC to continue the retail tariffs that had been put into place in May 2001. Consequently, there was no ARR filing for 2002-03 until November 2002 and no tariff increase for the year 2002-03.

Later the filings for 2002-03 and 2003-04 by the discoms and DTL were consolidated and the Commission issued a joint order in late June 2003 covering 2002-03 and 2003-04 for each of the companies. In December 2003, the companies filed ARR petitions

for 2004-05. The Commission issued orders on these petitions on June 9, 2004. In the subsequent year companies filed ARR petitions for the year 2005-06 in late December 2004. However, because of incompleteness the petitions were not admitted until March 14, 2005, and the order for FY 05-06 was issued in early July 2005[4]. Table 3.1 provides data on the orders and petitions for each of the years.

Table 3.1 Discoms Consolidated Revenue Gap and Tariff Increase Trends

(All Amounts in Rs. Cr.)

Description	FY02-03	FY 03-04	FY 04-05	FY 05-06
Revenue Gap at Existing Tariffs	1185	1735	1862	520
Tariff Increase	0	5.02%	9.80%	6.66%
Revenue from Tariff Increase	0	103	379	319
Government Support	1364	1260	690	138
DVB Arrears Collected (80%)	-	210	103	55
Regulatory Assets	-	0	697	
Total Increase in Revenue	1364	1573	1869	512

Source: DERC Tariff Orders

Notes:

1. *The revenues, costs, and revenue gap shown here are those estimated by DERC at the start of the respective year. The actual values for these variables, known only at the end of the year, were naturally somewhat different. Actual revenues and consumption are discussed in Chapter 7.*
2. *At the start of 04-05, DERC had estimated that a regulatory asset of Rs. 697 crore would be required to close the revenue gap. However, at the end of 04-05 it was found that the revenue gap was lower due to improved loss reduction and the actual regulatory asset required was Rs 343 crores after accounting for savings due to loss reductions beyond the targets.*

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As we mentioned earlier, there was no tariff increase in the year 2002-03. The Commission used the entire amount of Rs. 1364 crores of Government support allocated for that year to bridge the revenue gap[5]. In fact, there was a surplus of Rs. 179 crores. Because the 02-03 and 03-04 proceedings were consolidated and the orders passed together, the tariffs for 03-04 were set lower to compensate for the over-collection.

For the year 2003-04, seeking to rationalize tariffs, DERC removed minimum charges, implemented two part tariffs and merged some slabs and sub-categories, and also drastically reduced misuse charges. It also increased tariffs so that on average the billed revenue for various classes increased by about 5%. The increased revenue along with Government support of Rs 1260 crores, the surplus from the previous year, and DVB arrears of about Rs 200 crores was used to bridge the revenue gap.

As per the order for 02-03 and 03-04, DERC ensured that the increase in the tariff for domestic consumers for 2003-04 would be less than 5%. Consequently, the tariff for commercial and industrial consumers increased a little more than 5%. For example, for BRPL the commercial tariff increased by 5.61% and the industrial tariff increased by 6.91%.

For the year 2004-05, DERC gave a larger tariff increase of about 10%. The tariff increase for domestic consumers was limited to the average increase of 10%. The tariffs for commercial and industrial consumers was also around 10% or a little less.

[4] The companies have filed ARR petitions for the year 06-07. However, DERC is still reviewing these filings and no order has been issued yet regarding the tariffs for 06-07. Therefore, we have not covered data for 06-07 in this chapter. A brief overview of the ARR Petitions for 06-07 is provided in Chapter 10.

[5] The revenue gap is based on the expenditure approved by DERC, and thus includes only those expenditures the Commission considers reasonable and prudent.

For example for BRPL the commercial tariff was increased by 8.2% and the industrial tariff by 9.5%. Larger tariff increases of 14% and 25% for the agriculture consumers and for streetlight maintenance kept the average tariff increase at 9.3%. Even with the Government support of Rs. 690 crores, the revenue gap in 2004-05 would have necessitated a tariff increase of 30%. Consequently, the Commission created regulatory assets worth Rs. 697 crores to close the gap and keep the tariff increase to 10%. The carrying cost of regulatory asset was to be financed with a mix of loan and equity in the ratio of 70:30.

In actuality, in 04-05 the revenue gap turned out to be smaller because of reduced power purchase costs and over-achievement of loss reduction targets. In particular, NDPL performed very well reducing its losses by 7 percentage points beyond the target, resulting in increased revenues of Rs. 159 crores of which the discom retained Rs. 37 crore as reward and the rest was shared with consumers, as per the restructuring scheme contracts (refer chapter 2 for details of incentive scheme). BRPL and BYPL also exceeded their targets and generated additional revenue but it was smaller – Rs 71 crores and Rs 12 crores respectively and the entire additional revenue was passed on to consumers, as the performance was short of the original government stipulated minimum loss reduction levels. The regulatory asset for each discom was amortized in proportion to the extent that it exceeded its target and thus generated additional revenue to reduce the revenue gap. After this amortization, the net regulatory asset left for to cover the deficit in 04-05 was Rs 343 crores.

For 05-06, DERC determined that an average tariff increase of 6.6% was required to bridge the revenue gap after government support and DVB arrears were taken into account. DERC argued that in keeping with the principle of reducing cross-subsidy, the domestic tariff would be increased by about 10% and the commercial and industrial tariffs would be increased by 4-5%.

However, the tariff increase of 10% domestic consumers coupled with complaints of faulty metering and billing raised consumers' ire and there were widespread protests against the tariff increase. Some consumer organizations or associations urged consumers not to pay the increased tariff. [6] Initially GNCTD stood firm in support of the tariff hike but later relented and announced that the tariff increase would be rolled-back with GNCTD providing a subsidy for fifty percent of the tariff increase for domestic consumers and hundred percent of the increase for agricultural consumers. The remaining fifty percent of the tariff increase for domestic consumers would be covered by the discoms. In their petition to DERC regarding the roll-back, the discoms asked that the loss of revenue due to the roll-back be adjusted against any gains from over-achievement of loss reductions. In response, DERC said that, "…the Discoms are given the liberty to raise the issue of the recovery of the incentive in their ARR petition for 2006-07, which would be examined by the Commission, on merits, based on the provisions of law (DERC Order dated 23.09.05)." In other words, the 50% rebate may not be provided by the companies but will be paid from the expected additional revenues due to overachievement in AT&C losses, that would have otherwise been used to reduce the tariff increase next year. According to DERC, the total value of the rebate to domestic and agricultural consumers is Rs. 180 crores of which Rs. 91 crores is being provided by GNCTD and Rs. 89 crores is being covered by the discoms. The combined return on equity for the three discoms in 05-06 is expected to be around Rs. 225 crores and thus the rebate that they are covering amounts to about 40% of their expected

[6] NDPL claimed that this did not occur in their service territory. This may be true, but we have no way to verify the claim.

return. Hence, it is unlikely that such large part of equity return will be passed on as rebate, and the final treatment of the rebate by DERC is awaited.

As we have seen in this chapter, the cumulative increase in tariffs over the four year period since privatization (FY 2002-03 to 2005-06) has been about 23% which works out to an average increase of about 5.3% per year. These tariff increases are comparable to tariff increases given in the pre-privatization era[7]. Given these tariff increases by DERC, how did the discoms fare in terms of revenue increases and achieving financial self-sufficiency? We cover these issues in Chapters 6 and 7.

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[7] Data provided by Mr. Sagar in his comments on the draft report, indicate that the tariff increases in the pre-privatization era were larger but happened after longer intervals.

PART II. ANALYSIS OF SELECTED CRITICAL ISSUES

Chapter 4. Aggregate Technical and Commercial Losses

As we noted in the previous chapter, the level of AT&C loss reductions was the bidding parameter that was used by GNCTD in its privatization of electricity distribution. Given the importance of loss reduction in the reform program, in this chapter we briefly review the process that was used to arrive at the loss reduction targets. The Government had decided that the loss reduction targets should be set through competitive bidding or "through the play of market forces rather than being pre-determined unilaterally… (GNCTD Notification, 2001)" By so doing, it expected that the competitive bidding process would produce an acceptable program of loss reduction or efficiency gain. Did that happen? We attempt to answer that question in this chapter. Then we turn our attention to how the companies fared in their efforts for loss reductions. The financial turn around expected in the Delhi's restructuring scheme hinges critically on discoms' achievement of AT&C loss reduction targets. Based on data available in DERC orders and discoms ARR submissions this chapter analyses the AT&C loss reduction over the period 2002-03 to 2004 –05, i.e. the first three years of the five-year transition period.

4.1 Procedure Used to Set Minimum AT&C Loss Reduction Targets

DVB had hired SBI Caps to evaluate the options to restructure DVB and privatize distribution in Delhi. SBI Caps, in turn, retained the services of Tata Consulting Engineers (TCE) to conduct a technical study of DVB's generation, transmission, and distribution business. The report on the distribution business was submitted in July 2001. As part of the study of the distribution system, TCE was required to estimate T&D losses. Specifically, TCE was required to carry out the following functions for each distribution zone:

- Estimate total losses and divide them into technical and non-technical losses.
- Provide a voltage-wise break-up of the technical losses;
- Determine the reasons for non-technical losses such as deficiencies in metering, billing, collections, consumption by unauthorized colonies, JJ clusters etc
- Provide a broad allocation of the non-technical losses to each of the above causes of non-technical losses.
- Allocate the non-technical losses to the various consumer categories.

TCE estimated the total technical losses for the DVB system to be 8.6% (IM:43). And the non-technical losses to be 45.3%[8]. It listed measures that could be used to reduce technical and non-technical losses. It also estimated the reductions in T&D losses that could be achieved with these measures. The estimated reductions are shown in Table 4.1. It should be noted that the initial loss reductions estimated by TCE did not include improvements in collection efficiency, i.e. TCE estimated reduction in T&D losses, whereas AT&C was used as the bidding parameter. Hence, to enable comparison between TCE estimates and AT&C targets, it is essential to increase TCE targets assuming certain improvements in collection efficiency. Here we assume the collection efficiency improvement of 5% points (i.e. from 90 % to 95%) for each discom spread over five years of the transition period. Table 4.1 compares these modified loss estimates by TCE with AT&C loss targets stipulated by government.

[8] These estimates are from the IM and are a little higher than the ones in the TCE report. But the IM says that these estimates are from TCE.

In its report, TCE said it would be relatively easy to reduce non-technical losses in Delhi for the following reasons (TCE, 2001:51):

- Delhi has a small area and a high load density therefore, "small incremental efforts will lead to large incremental gains."
- Creation of three discoms would "facilitate effective energy management and stricter vigilance with better administrative control."
- Because DVB had installed a new billing system, billing discrepancies would be minimized in the first year itself. Furthermore, vigilance would be easy and quick because the new billing system would provide on-line data.
- The non-technical losses were at an "extremely high level and therefore, substantial reduction in losses is possible with minimum efforts."
- Because tariffs were low compared to other utilities in similar areas, there would not be much resistance from consumers regarding the improvements in billing and collection.
- The service territory of the discoms does not cover the area where majority of the political personalities and senior Government officials reside and so there would not be much resistance from them.

It is not clear how the Government used the recommendations made by TCE. In the Request for Proposals (RFP) issued to all the bidders, the Government set minimum level of AT&C Loss Reduction. These too are shown in Table 4.1

4.2 Results of the Bidding Process

As discussed earlier, the initial bids had targets that were below the stipulated minimum. In addition, there was great similarity between the bids put up by the two bidders – Tata Power and BSES. Both private players had bids that started out very low in the beginning and then increased. The bids for the three discoms by the two bidders fall into a fairly narrow range: 0.5%-0.75% in the first year; 1.25% - 1.75% in the second year; 2.00% – 2.50% in the third year; 4.50% - 4.55% in the fourth year; and 4.50% – 5.25% in the fifth year. The total AT&C loss reductions bid have even less variation. The total AT&C loss reductions bid by the two bidders for the three discoms fell in the range 13.35% - 14.00%. This similarity between the bids is brought out more starkly in the Figure 4.1. Generally, we would not expect such similarity in the bids for two reasons: (1) because of the difference in the characteristics of the discoms, we would expect that the loss reduction potential of the three discoms would be different; and (2) because of the different perceptions of loss reduction potential that we would expect two independent bidders to have, we would expect their bids to be different too.[9]

[9] In their comments on the draft report, the companies contended that similarity in the bids was to be expected because the Government's stipulated minimum loss levels were similar for BRPL and NDPL, and also because both bidders were experienced companies and would have similar perceptions about the loss reduction potential.

Table 4.1 Setting of AT&C Loss reduction targets

(All figures in %)

	2002-03	2003-04	2004-05	2005-06	2006-07	Total Reduction
BRPL - Opening Level 48.1%						
TCE Recomm.with coll. Improv.	3.38	3.71	4.47	5.05	5.49	22.11
Govt Stipulated Minimum Red.	1.25	5.00	4.50	4.50	4.00	19.25
Winning Bid Target	0.55	1.55	2.05	4.55	4.65	13.35
Negotiated Target Reduction	0.55	1.55	3.30	6.00	5.60	17.00
Negotiated Target Level	47.55	46.00	42.70	36.70	31.10	
BYPL - Opening Level 57.2%						
TCE Recomm.with coll. Improv.	3.81	4.96	5.86	6.31	6.44	27.37
Govt Stipulated Minimum Red.	1.50	5.00	5.00	5.00	4.25	20.75
Winning Bid Target	0.75	1.75	2.50	4.50	4.50	14.00
Negotiated Target Reduction	0.75	1.75	4.00	5.50	5.00	17.00
Negotiated Target Level	56.45	54.70	50.70	45.20	40.20	
NDPL - Opening Level 48.1%						
TCE Recomm.with coll. Improv.	3.44	3.96	4.32	4.61	4.97	21.30
Govt Stipulated Minimum Red.	1.50	5.00	4.50	4.25	4.00	19.25
Winning Bid Target	0.50	1.25	2.00	4.50	5.25	13.50
Negotiated Target Reduction	0.50	2.25	4.50	5.50	4.25	17.00
Negotiated Target Level	47.60	45.35	40.85	35.35	31.10	

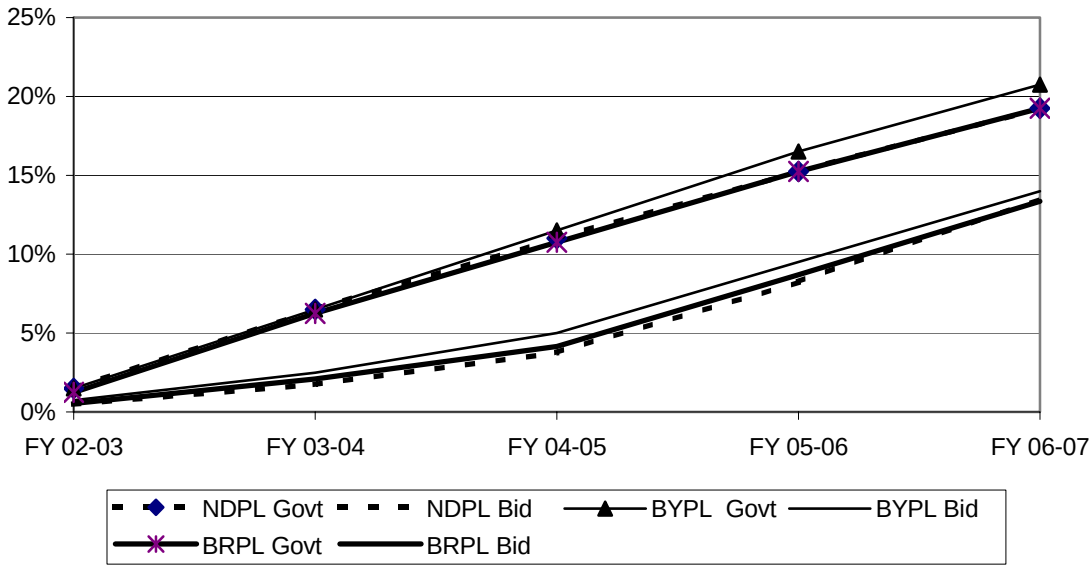
Note: The TCE targets did not include improvements in collection efficiency. This can be seen from Section 3.4 on page 23 of SBI Caps Final Report, where collection inefficiency is treated separately from non-technical losses. Using the collection efficiency for 2000-01 given in IM page 40-41and assuming a target collection efficiency of 95%, we have added the appropriate amount to the TCE targets for improvements in collection.

Source: (TCE, 2001) Report, GNCTD Press Handout on Unbundling and privatization of DVB, from Delhi Transco web-site www.delhitransco.com.

Even though none of the bids met government stipulated minimum AT&C reduction targets, the Government did not reject the bids, but instead negotiated with the two bidders and finally set targets that were about mid-way between the Government's initially stipulated minimums and the bids submitted by the private parties.

The negotiated targets were accompanied by a sharing mechanism that ensured that consumers would not lose because of the lowering of the loss reduction targets. It was agreed that the revenue benefits of any loss reduction between the negotiated target and the Government stipulated target would accrue to consumers through reduced tariffs. As given in the policy directions of the Government, the benefits of reductions beyond the Government stipulated targets would be shared between consumers and the company in a 50-50 ratio, and any losses due to under-achievement below the negotiated target would be borne by the company. The modified sharing mechanism outlined in this paragraph allowed GNCTD to reduce the risk for the companies without reducing the benefits for consumers.

Figure 4.1 AT&C Loss reduction targets



4.3 Loss Reductions Achieved by the Companies

Having reviewed the process used to set AT&C loss, we now turn our attention to how the companies fared in their efforts for loss reductions. The financial turn around expected in the Delhi's restructuring scheme hinges critically on the discoms' achievement in terms of AT&C loss reductions. Based on data available in the DERC orders and discoms' ARR submissions, this chapter analyses the AT&C loss reduction over the period 2002–03 to 2004-05, i.e. first three years of the five-year transition period[10].

Table 4.2 shows the loss reduction targets and achievements of each of the companies over the three year period from 02-05. It can be seen that except for BYPL in 02-03, the companies have been meeting or exceeding the loss reduction targets. In the case of NDPL it beat the loss reduction target by a significant amount in 04-05. Figure 4.2, shows graphically the trajectory of AT&C losses post privatization. It is evident from the Figure 4.2 that three discoms together have been successful in reducing the AT&C losses. This reduction in losses results in savings of about Rs. 880 Cr. for the electricity consumers of Delhi.[11]

Some of the reviewers pointed out that there are other factors such as government not having to give plan support, which should be considered as savings. In effect, the commenters are suggesting that we do a comprehensive assessment of the benefits of Delhi's restructuring. But this would entail consideration of several additional factors (such as a forecast of performance of DVB versus that of private companies, need for government support in future etc.). Such a calculation is beyond the scope of this report.

[10] In their comments on the draft report, the discoms said that the opening loss levels were higher than the levels determined by DERC in its order. They claim that therefore the actual loss reductions achieved by them post-privatization are higher than those determined by DERC in its tariff orders. However, for the purposes of this report, we have used the DERC numbers for loss reduction which correspond to the committed loss levels.

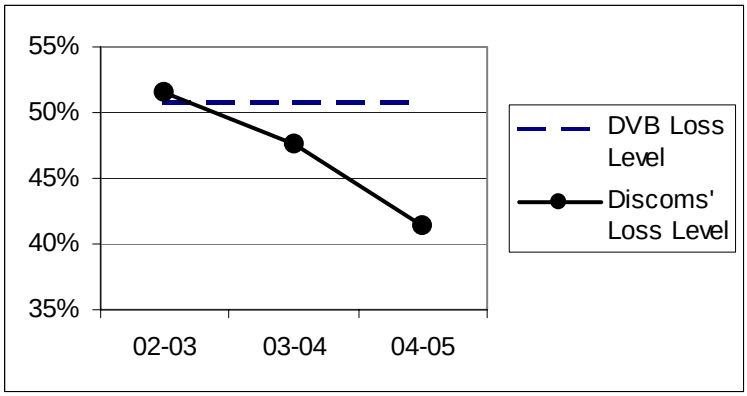
[11] The savings were estimated by taking the difference between the DVB level (50.7%) and the actual average AT&C loss level for all three discoms combined on a year by year basis and calculating the additional units that would have been realized. The additional units realized are then multiplied by the Average Billing Rate (ABR) for the year. The year by year differences are then added to get the total difference. If the losses had remained at 50.7% then consumers would have paid for the foregone loss reduction either through tariff increases or through taxes.

Table 4.2 AT&C Loss Reductions – Targets and Achievements

(All figures in %)

	BRPL			BYPL			NDPL		
Financial Yr	**02-03**	**03-04**	**04-05**	**02-03**	**03-04**	**04-05**	**02-03**	**03-04**	**04-05**
AT&C Loss Achieved	47.40	45.06	40.64	61.90	54.30	50.13	47.80	44.87	33.79
AT&C Loss Target	47.55	46.00	42.70	56.45	54.70	50.70	47.60	45.35	40.85
Diff = Target - Actual	0.15	0.94	2.06	-5.45	0.40	0.57	-0.20	0.48	7.06

Figure 4.2: Trajectory of ATC losses Post Privatization



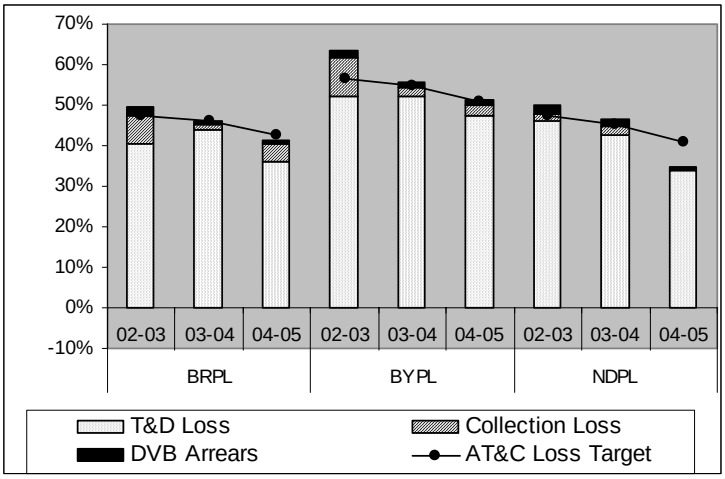
4.4 Components of AT&C loss reduction

In addition to reviewing the overall reduction in AT &C losses it is important to also analyze the contribution of different components of loss reduction. Figure 4.3 shows the contribution of different components.

Figure 4.3 reveals some interesting facts:

- None of the companies met the target in either of the first two years after privatization if DVB arrears are not counted as revenue in the calculation of AT&C loss. It is only when DVB arrears collected were included as revenue collected, that AT&C Loss targets were met by the companies (except for BYPL in 2002-03).
- Even when DVB arrears are counted as revenue, the AT&C loss reductions achieved by the companies in the first two years were within one percentage point of the targets.
- In the year 04-05, NDPL exceeded its target by 7 percentage points. This is a significant achievement because high loss levels have been the bane of the power sector in India.
- For BRPL and BYPL, particularly in the first two years, the loss reductions have been achieved mostly by reducing collection losses. If we look at the components of AT&C loss reductions, we find that BRPL and BYPL did not show any improvement in T&D losses. In fact, the T&D Losses for BRPL increased by 3.5 percentage points in 03-04. For BYPL also the T&D losses increased in 03-04 but by a small amount. For BRPL, the achievement was due to a large improvement in collection efficiency – which seems to have fallen again in the next year (with some improvement in T&D losses). These trends are puzzling.

Figure 4.3 Components Contributing to Reduction of AT&C Losses



	BRPL			BYPL			NDPL		
	02-03	**03-04**	**04-05**	**02-03**	**03-04**	**04-05**	**02-03**	**03-04**	**04-05**
T&D Loss	40.46	43.91	35.88	52.17	52.29	47.43	46.28	42.44	33.92
Collection Loss	6.93	1.15	4.76	9.74	2.00	2.70	1.51	2.43	-0.13
DVB Arrears	2.11	1.16	0.72	1.50	1.55	1.02	2.36	1.52	0.91
AT&C Loss Target	47.55	46.00	42.70	56.45	54.70	50.70	47.60	45.35	40.85

Note: The numbers shown under the heading of DVB arrears in this figure and table are collection losses that have been offset by DVB arrears If there were no DVB arrears collected, then the collection losses would increase by an equivalent amount.

Interestingly, it has been reported that government entities have significant arrears even arising from bills in the post-privatization period. The companies claimed that if these dues are paid by the government then the AT&C losses of companies would fall by as much as 3%. The companies also expressed dissatisfaction with insufficient action by the government in terms of timely set up of special courts and difficulty in getting police assistance to reduce theft.

4.5 Conclusions

With the presence of just two bidders, there was not much competition in the sale of the distribution assets. Perhaps, the uncertainty in the amount losses could be reduced led to a perception of greater risk for the bidders with the result that the loss reduction targets were not very ambitious. Learning from the experience in Delhi and the very significant loss reductions being made in Andhra Pradesh and other states, it is possible that the norms for loss reduction will change with more ambitious loss reduction targets being set in future cases specially for urban discoms.

Analysis of discom performance in the first three years of the transition period regarding AT&C loss reduction reveals that all discoms have been successful in reducing AT&C losses. In the case of BRPL and BYPL, improvements in collection efficiency and recovery of past DVB arrears have been the main contributors to AT&C loss reduction. In contrast, NDPL has achieved loss reductions mainly through reduction of T&D loss reduction. For example, both NDPL and BYPL have achieved roughly the same level of AT&C loss reductions of 12%-14% over three years. However, NDPL has reduced T&D losses by nearly 12% whereas BYPL has reduced T&D losses by only about 5%, even though the starting level of T&D losses were higher for BYPL.

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Chapter 5. Capital Investments by Discoms – Plans and Implementation

The magnitude and appropriateness of capital investments by distribution licensees is an important parameter to evaluate the performance of the discoms. On one hand substantial investments in new equipment may be required to upgrade the system and improve the quality of service for consumers and to improve efficiency. In the case of Delhi, efficiency improvements should primarily mean reduction in AT&C losses and improvement in quality of service (QoS). On the other hand, very large capital investments are likely to result in significant increases in retail tariffs. Therefore, it is important to ensure that appropriate and essential capital investment is carried out while the unnecessary capital expenditure is avoided so that increases in tariffs are moderated.

The first section of this chapter looks at the magnitude and nature of capital investments proposed by the discoms in Delhi, and the second section looks at issues regarding implementation and regulatory oversight.

5.1 Capital Investment Plans for Delhi's Distribution Sector:

As we mentioned earlier, SBI Caps had carried out fairly detailed financial projections in order to determine the level of Government support that would be required during the transition period. As part of the financial projections, they had estimated the level of capital expenditure that would be required. The SBI Caps projections of capital expenditure were based on a survey of the Delhi distribution system done by TCE to determine the condition of the assets. For estimating critical investments needed in Delhi's distribution sector, TCE held numerous meetings and had detailed discussions with DVB officials and engineers; carried out a systematic documentation of the distribution network data and drawings; collected data and carried out due diligence on system parameters, operational norms, metering and billing data; and physically inspected substations, distribution network and consumer-metering arrangements (TCE, 2001: 2) SBI Caps' projected levels of capital expenditure are shown in Table 5.1.

As mentioned above, these projections were based on cost estimates made by TCE of critical investments that it determined would be needed for upgradation of the system These critical investments were in three categories: (1) Additional equipment required for improving the system including transformers, capacitors, meters and switchgear; (2) Network expansion to meet load growth; and (3) Electrification of JJ clusters and un-authorized colonies (TCE, 2001: 59).

Table 5.1 SBI Cap Projections of Capital Investment Requirement in Delhi Discoms

Company	02-03	03-04	04-05	05-06	06-07	Total for 5 Yrs
BRPL	65	74	66	74	74	353
BYPL	66	75	67	75	75	358
NDPL	57	65	58	65	65	310
Total for All 3 Discoms	188	214	191	214	214	1021

Source: SBI Caps Financial Projections, 2002

5.1.2 Discoms' Plans for Capital Expenditure

After privatization, PGCIL and CEA carried out a study at the behest of MoP to identify steps needed to be taken to improve the reliablity of the power system. Citing

these reports, the discoms claim that the amount of capital expenditure required was significantly more than that envisaged by SBI Caps. Taking these studies into account, the discoms developed their own capital expenditure plans.

Every year, in their ARR petitions, the discoms provide information about the capital investment to be carried out during the current year (CY) and the ensuing year (EY). (i.e. the next year, the year for which the ARR is being filed). Subsequently, the Commission conducts technical sessions with the discoms where they update their estimates particularly for the CY because by early April they have information on how much capital expenditure was actually carried out in the CY.

Table 5.2 shows the actual investment made in the three years since privatization by the discoms as per their claims.

Table 5.2 Actual Capital Investments by Discoms during FY 02-03 to FY 04-05

	02-03	03-04	04-05	Total (02-05)
BRPL	76	112	923	1111
BYPL	56	85	418	559
NDPL	49	287	328	664
Total for 3 Discoms	181	484	1669	2334

Source: DERC Orders

We also looked at the capital investment plans for the entire five-year transition period made by the discoms from time to time. In Table 5.3 we compare these five year planned capital investments with the projections made by SBI Caps for the five year period.

Table 5.3 Comparison of Discoms five year cumulative investment projections

	SBI Caps	From 04-05 Order	From 05-06 Order
BRPL	353	1590	2511
BYPL	358	1841	1759
NDPL	310	1196	1461
Total for 3 Discoms	1021	4627	5731

Source: DERC Orders

The projections labeled “From 04-05 order” were arrived at by adding the actual investments made in 02-03 and 03-04 to the three year projections for 04-07 made by the companies as reported in DERC’s orders for 04-05. In the next column, for BRPL and BYPL, the projections labeled “From 05-06 Order” are an addition of the actual investments made in the three years 02-05 with the capital investments proposed for 05-06 as reported in the order for 05-06. For NDPL, the projection under the column “From 05-06 Order” is from NDPL’s revised capital investment plan as reported in the order for 05-06. The projections from the 05-06 Order for BRPL and BYPL do not include any investments in 06-07. It is possible that including projected investments for 06-07 will increase the projected capital investment for BRPL and BYPL even higher.

The capital investments projected by the discoms are very large compared to SBI Caps projections. BRPL, BYPL and NDPL have projected that the capital investments needed are 5-7 times more than the level SBI Caps determined was necessary. While commenting on these differences, the distribution companies raised questions about the the reasonableness of SBI Caps’ projections.

As a way to assess the reasonableness of the capital expenditure, we compared the net fixed assets of the companies at the beginning of privatization with the proposed capital expenditure during the five-year transition period FY 02-03 to FY 06-07[12]. Table 5.4 shows the results. Considering the combined Delhi distribution sector, the companies propose to triple the asset base within five years. A comparison of capital expenditure with the net fixed assets at the beginning of privatization is relevant because business valuation was used to determine the level of net fixed assets that could be supported with reasonable tariff increases. Now if the net fixed assets increase dramatically (to seven times in the case of BYPL!), the whole business valuation is called into question. Specifically, the issue comes up about whether such large capital investments can be supported by "reasonable" tariff increases.

Table 5.4 Comparison of Net Fixed Assets and Discoms Capital Investment Projections

Company	Net Fxd Assets at beginning of pvtztn	Proposed 5 Yr CapEx	Net Fxd Assets After Propsd CapEx	Ratio Final / Beginning Net Fxd Assets
BRPL	1150	2511	3661	3.18
BYPL	290	1759	2049	7.07
NDPL	920	1461	2381	2.59
Total for 3 discoms	2360	5731	8091	3.43

5.1.3 Comparison with Andhra Pradesh Discoms

In addition to the comparison with the initial level of net fixed assets, we thought that it would be worthwhile to compare the discoms in Delhi with the discoms in another state which was aggressively trying to reduce losses and improve the QoS. Andhra Pradesh (AP) is one such state. It has drawn attention over the last few years because of its significant reductions in losses. In fact AP is using a very similar strategy to the Delhi discoms to reduce losses in terms of its reliance on technology. Table 5.5 shows how the capital expenditures made by AP discoms over the 6 year period after reforms compare with the capital expenditures made and projected to be made by Delhi discoms over the 5 year period after privatization. As the table shows, the expenditure by the Delhi discoms on a per MW basis are about three times those made by the AP discoms. So even compared with other discoms which have made significant loss reductions and improved the QoS, the capital expenditure made by the Delhi discoms are very high. This is particularly surprising because AP's distribution network is spread over a larger area than Delhi so we would expect its capital expenditure per MW to be higher.

Table 5.5 Comparison of Capital Expenditures by Delhi Discoms and AP Discoms

	CapEx (Rs. Cr.)	Peak Demand Met (MW)	CapEx (Rs Cr/MW)
AP (2000-2006)	4354	7903	0.55
Delhi (2002-2007)	5731	3490	1.64

Note: Capitalized expenses and IDC are not included.
Source: CapEx data for AP from APERC Tariff Orders

The data presented in these sections clearly indicate that the discoms have proposed very high capital investments, compared with the opening asset block and compared with other utilities in the country. The impact of these large investments needs to be examined from the consumers' perspective. With cost-plus regulation, the tariff impact

[12] The Discoms said that it is inappropriate to compare the net fixed assets with the planned capital expenditure, as the net fixed assets are based on business valuation. However, we found that the book value of the assets were not much different from the value arrived at through business valuation (See CAG Report, 2003:213)

of such huge investments could be very large. As we show later in this chapter, every Rs. 100 crores of investment adds about Rs. 16 crores every year to the ARR when the capital project is completed. Even while the capital work is in progress, Rs. 100 crores of investment adds about Rs. 10 crores every year to the ARR.

5.2 Implementation of Capital Investments by Discoms and Regulatory Oversight

5.2.1 Planned and Actual Capital Investments

As we have shown, the capital investments proposed by the discoms are very large and the appropriateness of the investments needs to be evaluated carefully before the resulting tariff impact is passed on to consumers. This section looks at the efforts of DERC in this matter.

In the initial post-privatization period the discoms submitted capital investment proposals along with the ARR petition. But DERC realized that the discoms' plans were very high and that the claims in the ARR petitions were unrealistic. The discoms were carrying out only a fraction of the proposed capital works. Table 5.6 shows that in the first year after privatization (2002-03) all three companies' actual capital investments were far short of the projected amounts in the petitions. The actual investments were in the range of about 29 to 44 percent of the amount in the petition. In the following year (i.e. FY 03-04), NDPL's performance improved considerably with the company's actual investments of Rs 287 crores coming up to 85 percent of the amount claimed in the petition. However, the performance of BRPL and BYPL deteriorated significantly on this count. The actual investment was only 25-26 percent of the amount in the tariff order issued for that year. Perhaps even more difficult to understand is that the actual investment was also only 26 to 27 percent of the amount that was claimed by the companies in their petition which was filed on 12th and 13th of January, just two and half months before the end of the fiscal year. It is difficult to understand how BRPL and BYPL over-estimated their investments by such a large percentage, so close to the end of the year.

In the subsequent year (i.e. FY 04-05), the performance of NDPL in terms of actually investing the projected amount was quite good. In the case of BRPL and BYPL, matters were more complicated. Though the amount invested was significant, DERC pointed out several lacunae in the claims by the companies and considered only a limited amount for the purpose of tariff computation.

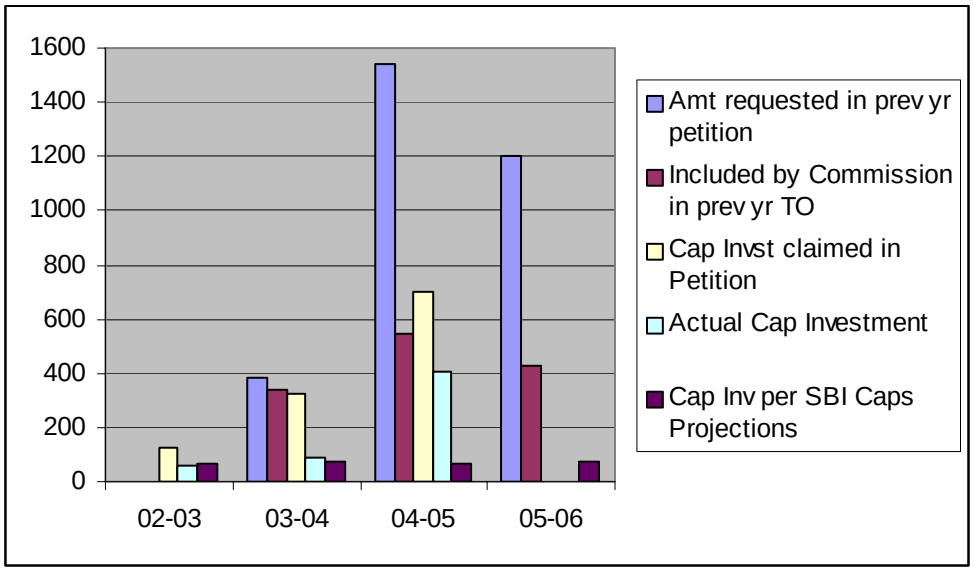
Table 5.6: Discoms Capital investments – Plans and Implementation

	BRPL				BYPL				NDPL			
	02-03	03-04	04-05	05-06	02-03	03-04	04-05	05-06	02-03	03-04	04-05	05-06
Amt requested in prev yr petition		482	1149	1400		386	1539	1200		301	303	361
Included by Commission in prev yr TO	NA	423	526	477	NA	336	548	426	NA	287	303	361
Cap Invst claimed in Petition	177	408	800		129	325	700		165	339	303	
Actual Cap Investment	76	112	526		56	85	405		49	287	328	
Cap Inv per SBI Caps Projections	65	74	66	74	66	75	67	75	57	65	58	65

Source: DERC Orders

Figure 5.1 gives a visual picture of the above data for one company (BYPL). One can notice that in 03-04 as well as in 04-05, the actual capital expenditure accepted by DERC is much lower than what was proposed by the company in the ARR.

Figure 5.1: BYPL Capital Expenditure – Proposed, Approved and SBI Caps Estimates



5.2.2 DERC observations about capital investments by discoms

In it's tariff order for FY 04-05, on the implementation of capital investment plans in the first two years, DERC says

> The Commission is deeply concerned about the substantial underachievement in the progress of the capital works for the second year in succession, and its consequent impact on AT&C loss reduction, system augmentation, load shedding reliability and safety of the Delhi Power System (DERC Tariff Order for BRPL for FY 04-05, pg. 3-78).

While pointing out the substantial underachievement of the capital investment by the discoms, DERC also recognized the need to carefully scrutinize the proposed investment plans of licensees both for its impact on tariffs and an assessment of the benefits versus the costs. DERC directed licensees to submit complete DPRs for all capital investment schemes with expenditure above Rs. 2 Cr. along with a cost-benefit analysis. In the tariff orders for FY04-05, it further directed the licensees to submit DPRs for the Commission's approval before September 2004 for schemes to be executed in FY 05-06, and also decided that the approval of capital investment schemes will be undertaken separately from ARR process, as it requires significant resources and time. During this period the commission undertook site visits and physical verification of licensees claims regarding status of different schemes. This is an important and very positive step by DERC, which is not common in other SERCs in the country. But the result of physical verification, and site visits is not discussed in the DERC orders.

Apart from the issue of actual investment claims and levels of proposed investments, the cost of different schemes was also a cause of concern, and was raised during the ARR process by none other than Delhi Transco.

DERC Orders for 2004-05:

> Delhi Transco Limited has pointed out that the Petitioner has proposed large investments on land, building, establishment of a new corporate office, IT and communication, vehicles, testing equipment, tools and tackles, automatic meter reading, distribution automation, LT cleaning, meter and metering accessories, etc. It has further stated that the expenditure proposed to be incurred on SCADA, laying of new service lines, electrification of unauthorized colonies, establishment of new grid substations and improvement of 11 kV network seems to be **highly inflated** taking into consideration the recent trend in market prices and the expenses being incurred by DVB on similar works in the past. [In the case of BRPL and BYPL] It has further highlighted that the Petitioner have not indicated any resultant gain derived out of such heavy investments, which are disproportionate to the net block of the Petitioners, as is evident from the Table 2.1 below:
> ……
>
> Delhi Transco Limited has requested the Commission to evaluate whether the main objectives should be to incur essentially required expenditure to reduce the AT&C losses in a gradual manner besides improving the quality of supply and whether the consumer should bear upfront the cost of hi-tech projects such as substation automation, IT and Communication facility, etc. before the Distribution Companies become financially viable." (DERC Orders for 04-05, BRPL page2-22 to 2-23; BYPL page 2-22to 2-23; NDPL page 2-24, Emphasis Added)

During the review of the petition for the year 04-05, when the Commission expressed doubts about the preparedness to execute capital investments, which were proposed to be many times higher than actual performance in previous year, BRPL and BYPL said that they had developed a detailed network optimization study with the help of ABB and Alstom – a equipment supplier. However, when the Commission directed the companies to submit the report, they instead submitted a report on network upgradation based on an in-house review of the results of the Network Optimization study carried out by ABB and Alstom (BRPL Order 04-05, page 3-79)[13].

Subsequently, during the ARR process for FY 05-06 tariff DERC made remarks on the actual performance of BRPL and BYPL in terms of execution of capital investments. For example, in its order for BRPL for 05-06, DERC states:

"As against the scheme wise approval for capital investment of Rs. 284 Cr. the petitioner has incurred total capital expenditure of Rs. 923 Cr. including capitalization of interest and employee expenses during FY 2004-05. On examination of details of actual capital investments, the Commission has observed that most of the capital expenditure incurred by the petitioner does not correspond to the schemes approved by the commission. While examining the actual capital expenditure for FY 2004-05 the Commission noticed that the capital cost as claimed by the petitioner for the various approved schemes was higher than the costs approved by the Commission." (DERC Order for BRPL 05-06, page 3-16, Emphasis Added)

[13] In their comments on our draft report, BRPL and BYPL say that the complete report along with a soft copy was submitted to DERC for review.

The Commission further noted that the inventory at the end of the year had substantially increased compared to the previous year and that "out of Rs. 923 Cr. capital expenditure Rs. 545 Cr. is financed through sundry creditors and Rs. 207 crore through the commercial borrowings availed in the month of March". Based on these findings the commission concluded that "though the petitioner has purchased substantial equipment / material by incurring capital expenditure during FY 04-05 the same is yet to be utilized in works."

5.2.3 DERC Treatment of Claimed Capital Investment by Discoms

The treatment of capital investment is a crucial part of the ARR review process. Once some capital investment is complete and the equipment is brought into service, the fixed assets account is credited with an amount equal to the capital investment. This process of converting capital investment into fixed assets is known as asset capitalization. Until the assets are put to work, they are treated as work in progress, and are not capitalized. These assets attract a slightly different treatment as discussed later.

The Commission has established the following priority to fund capital investment:

1. Consumer Contribution;
2. Un-utilized depreciation,
3. APDRP Funds,
4. The balance of the requirement is to be met through a mix of debt and equity in the ratio 70:30.

Capitalized assets affect the tariff through three variables:

1. Return of 16% on the equity used to support the investment,
2. The interest on the debt used to support the investment,
3. The annual depreciation of the capital investment; which is added to the depreciation amount in the ARR.

The additional return, interest payments, and depreciation will increase the ARR of the discom by an equivalent amount.

The investment that is under debate would generally be financed through a balance of debt and equity (as the first three low cost options of finance would be used up for un-debated / essential capital expenditure). Hence, each block of say Rs 100 Cr result in increasing the ARR by about Rs. 16 Cr p.a. (Rs. 4.8 as RoE, Rs. 4 Cr as depreciation and Rs. 7 Cr as interest) from the following year.

If a capital investment scheme is initiated in a particular year but does not get completed in that year, it is called work in progress. This also has an impact on the ARR for the discom. Investments in works in progress interest earn interest. Depreciation is not included until the capital investment is complete and the equipment or system is put into service. Rs 100 Cr of capital work in progress would add about Rs 10 Cr to the ARR.

At the beginning of the year when the Commission uses an estimated ARR to develop tariffs for the ensuing year, it includes an estimate of the capital investment for the ensuing year. At the end of the year, the actual capital investments along with their contributions to the ARR are trued-up and any differences are adjusted in the following year's ARR.

In light of the findings described in section 6.2.1 and 6.2.2, DERC slashed significantly the discoms' claims in the ARR petitions for FY 05-06 regarding capital investment made in FY 04-05. Table 5.7 shows the discoms' claims of capital investment and what DERC considered in the tariff order for FY 06. It is evident that DERC has considered significantly less capital investment for BRPL and BYPL, whereas it has accepted the claims of NDPL indicating that DERC probably found NDPL claims more reasonable.

Table 5.7 Discoms Capital Investment Claims and DERC Approval

BRPL				BYPL				NDPL			
04-05 Order	Petition Claim	Revised Claim	DERC	04-05 Order	Petition Claim	Revised Claim	DERC	04-05 Order	Petition Claim	Revised Claim	DERC
525	800	923	525	548	700	418	416	303	303	328	328

In its orders for 05-06 while commenting on the capital investments approved for 04-05, the Commission stated that because the companies had not submitted DPRs and other information related to the capital expenditure schemes, it was not in a position to scrutinize the claimed capital expenditure by the companies. Therefore, the Commission considered the total investment as indicated here based on the following considerations: (1) the amount approved in the 04-05 order (BRPL); (2) the actual investment made by the company (BYPL and NDPL). In including these amounts in the calculations for the 04-05 ARR, the Commission said that this did not imply approval of these amounts, and the discoms had to obtain scheme-wise approval for the capital expenditure incurred in 04-05. Not approving the company claims without full examination is a welcome step. But DERC has not yet said that it will only approve the capital expenditure for the schemes it has approved or will limit the capital expenditure to its approved amount. Hence, there remains a possibility of DERC changing these numbers as and when the companies approach it with full details.

In addition to the actual amount of capital investment, and assets capitalized, three factors listed above (return on equity, depreciation, and interest) determine the impact of capital investment on consumer tariff. Correcting the discoms' claims regarding these factors, DERC reduced company claims about capital investment related component of ARR, by as much as 37%, 40% and 20%, respectively, for BRPL, BYPL and NDPL. The total reduction in tariff due to this was about Rs. 160 Cr. in FY 04-05.

Here it is essential to note that the final consideration of discom claims regarding the capital investment in a particular year is made in the subsequent tariff order through the mechanism of truing-up as explained above. The final impact of the claimed capital investments by discoms in 04-05 will be known after the DERC tariff order for FY 06-07, in which DERC will reconcile capital investment claims for FY 04-05.

Based on a brief review of the ARR petitions for 06-07, we note that BRPL and BYPL have been more restrained in their proposals for capital expenditure now compared to their petition for 05-06. For example, in the 06-07 petition, BRPL is claiming capital expenditure of Rs. 496 crores for 05-06 and is proposing capital expenditure of Rs. 452 crores for 06-07. Together these proposals for two years are lower than the earlier proposal of Rs. 1400 crores for a single year 05-06. Similarly, BYPL is claiming capital expenditure of Rs. 348 crores and 322 crores for 05-06 and 06-07, both much lower than its proposal of capital expenditure of Rs. 1200 crores in 05-06 in its petition for that year.

5.3 Conclusions and Recommendations

The level of capital investments requested by companies, specially BRPL and BYPL, are very large based on three measures: (1) in comparison with the projections made by SBI Caps; (2) in comparison with level of investments in another aggressively reforming state (AP); and (3) in comparison with the net fixed assets of the companies. Even assuming that SBI Caps was off by 100% in its estimation of required capital investment, the companies' projections for five years would require an investment that is even higher by Rs 3700 Cr.[14] This expenditure if allowed would raise the distribution costs by about 45 paisa/kWh (realized), an increase of about 50% in distribution costs. In terms of overall tariffs, the additional capital investment costs would raise tariffs by about 10%.
DERC has substantially reduced the demands by companies (specially BRPL and BYPL) for the capital expenditure. This has prevented large increase in ARR and hence consumer tariff. It is a welcome step that DERC has been pointing out the problematic issues such as last minute advances by the companies.

But even the amounts allowed by DERC are large. Special attention needs to be paid by consumers and DERC to the level of capital investments, due to its long-term impact on tariff.

The next area of concern is the appropriateness of the capital investments. Generally, distribution investments are carried out for the following reasons:

1. to accommodate growth of the network;
2. to reduce technical losses;
3. to increase reliability;
4. to reduce commercial losses;
5. to reduce manpower requirements;
6. to increase operational convenience (SCADA, AMR, distribution automation, etc)[15]

When cost recovery is the most important consideration, then essential investment for maintaining service quality and reducing the cost of power should be given preference. Automation and system operation convenience should be much lower in priority. These can be taken up when cost recovery is not such a major problem. Even in such cases, the benefits of the investment must exceed the costs. As mentioned in sections 5.4.10 and 5.4.12 of the National Electricity Policy, such automation should be introduced only after taking into account techno-economic considerations and conducting a cost-benefit analysis.

Given the high level of losses in Delhi right now, reduction of commercial losses should be carried out on a war footing. However, what we find is that T&D losses remain high and have even increased in some instances while the companies seem interested in massive investments in many high tech measures which will increase system operational convenience.

We applaud the Commission for the considerable efforts it expended in verification of the capital investments. In particular, it carried out physical verification through site visits and has required the filing of quarterly reports so that the progress of capital

[14] Rs 5700 Cr – 2x SBI Caps Estimate of 1000 Cr = 3700 Cr.
[15] NDPL pointed out that SCADA also helps in increasing reliability, preventive maintenance as well as loss reduction. We feel the issue of Benefit: Cost ratio is still applicable for such investments.

expenditure schemes can be monitored. While these efforts are commendable, DERC still approved capital expenditure at levels that were high. We think that more needs to be done to scrutinize the level and the type of capital investments being made by the companies. We notice that DERC did not mention the outcome of the verification in its order. It is clear that DERC felt the need for the extensive effort of verification and it should have recorded the results of such an exercise. Similarly DERC has not recorded its conclusions on the objections raised by Transco about the cost of equipment being excessively high compared to market prices.

Given the magnitude of capital investments and evidence of organizational weakness in implementing plans particularly at BRPL and BYPL, the Commission needs to make significant improvements in the manner in which it deals with capital investments.

We suggest two modifications to the process used to approve capital improvements. First, we recommend greater transparency and public participation in the process. This can be brought about by web-based disclosure of capital investment schemes, along with their status. Second, we recommend the evaluation of long-term (say five year) plans rather than scheme-wise evaluation only.

Theoretically, the development of the plan should follow the following steps:

1. Statement of objectives. While most of us know that losses have to be reduced and QoS improved, it would help to make these objectives more concrete and perhaps even establish goals such as bringing the System Average Interruption Duration Index (SAIDI) down to x hours per year.
2. List the various alternatives that can be used to achieve the objectives.
3. Rank the objectives on the basis of ratio of benefits to costs (B/C).
4. Develop a year by year plan where the measures with the highest B/C ratio are implemented first. This will ensure that the "low hanging fruits are picked first" and that the tariff remains low even as system improvements are occurring. Then when the system is economically viable, it can be decided whether or not to implement those measures that have a lower B/C ratio.

DERC is following some of these steps, but we think that the process should be followed in its entireity. The process for developing the plan must be open so that a full range of alternatives can be developed. The comments of Delhi Transco highlight the concern that the utilties are incurring high costs for equipment and are pursuing expensive high-tech options with a possibility that they are ignoring low cost options (such as managerial/administrative changes) that may have much higher pay-off in terms of reduced losses and improved QoS. Therefore, we also recommend that benchmarks and databases for costs of capital equipment be developed in a centralized fashion by an organization such as the Forum of Regulators (FOR) or MoP.

The impact of capital expenditure is long lasting and if not contained, can eat away the benefit of efficiency improvement. This, in turn, can prevent a reduction in tariff or even lead to a tariff increase; while the companies keep making expenses with doubtful benefit to consumers – such as for hi-tech, high-cost inessential investments.

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Chapter 6. Analysis of Power Purchase and Discom Costs

We now look at how the costs of the Delhi power system have changed and how, and to what extent, they have been balanced by the revenues, subsidies, and loss reductions. We first look at the overall system, and then we focus on each of the three discoms.

6.1 SBI Caps Projections

As part of the Information Memorandum that was given to the prospective bidders, SBI Caps had included financial projections for the Delhi power sector. Using estimates of load growth, loss reduction, and tariff increases, SBI Caps projected the level of government support that would be required

The initial financial projections were done using the minimum loss reductions stipulated by the Government. At that time SBI Caps estimated that Rs. 2,600 crores of government support would be required. Subsequently, when lower loss reduction targets were negotiated with BSES and Tata Power, the required Government support was increased to Rs. 3,450 crores. We have the original financial projections only.

In addition to lower loss reduction targets there are other factors which would increase the amount of Government support required. First, the level of tariff increases. SBI Caps had projected tariff increases of 10%, 10%, 10%, 5%, and 3% for each of the Financial Years from 02-03 to 06-07. As discussed earlier, the actual tariff increases have been lower. Another factor that is likely to have increased the revenue gap and the need for increased support is the level of capital expenditure. As we noted earlier, the level of capital expenditure carried out by the discoms has been greater than the amount included in the SBI Caps projections.

There are also other factors that should have led to the reduction of Government support. First, is the cost of power purchased. This cost has actually declined in the three years since privatization while the SBI Caps projections were based on significant increases in the price of power. Second, the fact that the discoms particularly NDPL have exceeded their targeted loss reductions which should lead to a reduced need for Government support.

In addition to the above factors, DERC decisions have also kept current costs low. Some examples of such decisions are: (1) Ploughing back of DVB arrears to reduce costs; (2) Not allowing collection of deferred taxes[16]; (3) Creation of regulatory assets. Some of these decisions have lowered costs by deferring them costs to later years.

We now look at in some more detail how the revenues and costs of the Delhi power sector have changed.

6.2 Total Costs for System

Let us first look at how the overall costs of the Delhi system have changed. Table 6.1 shows the total costs for Delhi system.

[16] NDPL pointed out that if tax rules change, then not including deferred taxes in tariffs now results in a shift of the financial risk to the companies.

Table 6.1 Changes in costs for Delhi's power sector

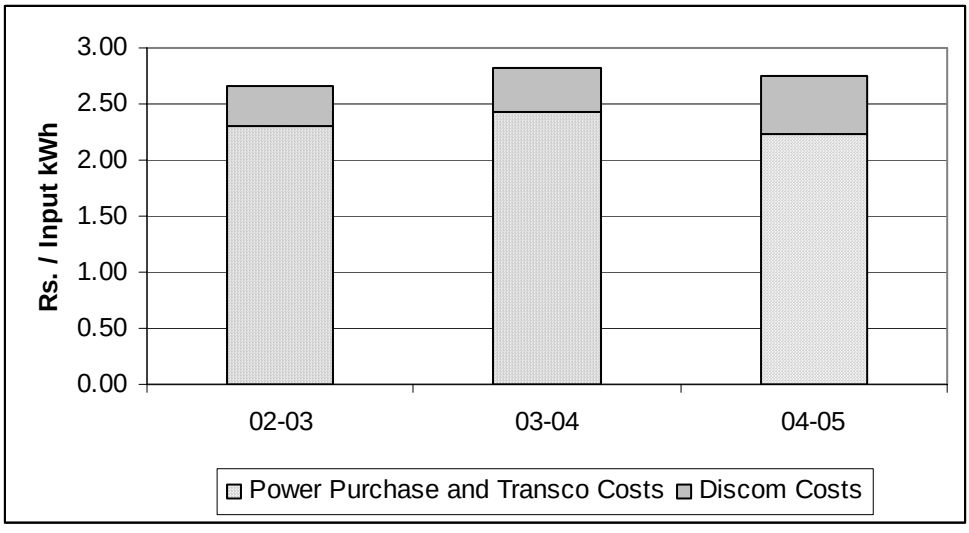
Year	Input Energy Actual (MU)	Billed Energy (MU)	Realized Energy (MU)	Power Purchase Rate incl Transco cost (Rs/kWh)	Power Purchase Costs (crores)	Net Discom Costs (crores)	Total Costs (crores)	Govt Support (crores)	Total Costs after Govt Support (crores)
02-03 #	13121	7159	6361	2.31	3027	475	3502	1364	2138
03-04	18840	10214	9882	2.42	4553	763	5316	1260	4056
04-05	19292	11862	11325	2.24	4258	987	5245	690	4555
TOTAL							14063	3314	10749

NOTES
 # - FY 02-03 data is for nine months (post privatization)
1. Net discom costs were calculated by starting with the total ARR for the three discoms in each year and subtracting (1) the DVB arrears that are passed on to the Holdco but are shown as costs in the ARRs of the discoms; and (2) true-up amounts that were shown as costs but are not costs for our purposes. An example is the overpayment of Rs. 82 crores by the discoms in 02-03 which was later refunded. We have also added back the revenue retained by the discoms as reward for over-achievement of loss reduction targets, effectively showing it as a cost here.
2. Does not include NDMC and MES

6.2.1 Total Costs per input kWh

Figure 6.1 shows the costs in per input kWh. Revenue sharing with discoms for over-achievement of loss reduction targets has been small (Rs. 37 crores), so there are basically two component of costs – power purchase costs (including Transco costs) and distribution costs[17]. Delhi has been fortunate in that the cost of power purchase has not changed dramatically. It started off at Rs 2.31 per kWh in 02-03, increased to 2.45 in 03-04 and then dropped back to Rs 2.23 per kWh in 04-05. The power purchase costs were lower in 04-05 for two reasons: (1) higher recovery from sales to other states and underdrawals of power; and (2) lower transmission charges and lower taxes. The average distribution cost has hovered around Rs 0.50 per kWh. Thus the total cost per kWh of input has not changed in Delhi and is at the level of Rs 2.80 in 04-05, the same level that it was at in 02-03.

Figure 6.1 Total costs per input kWh for Delhi

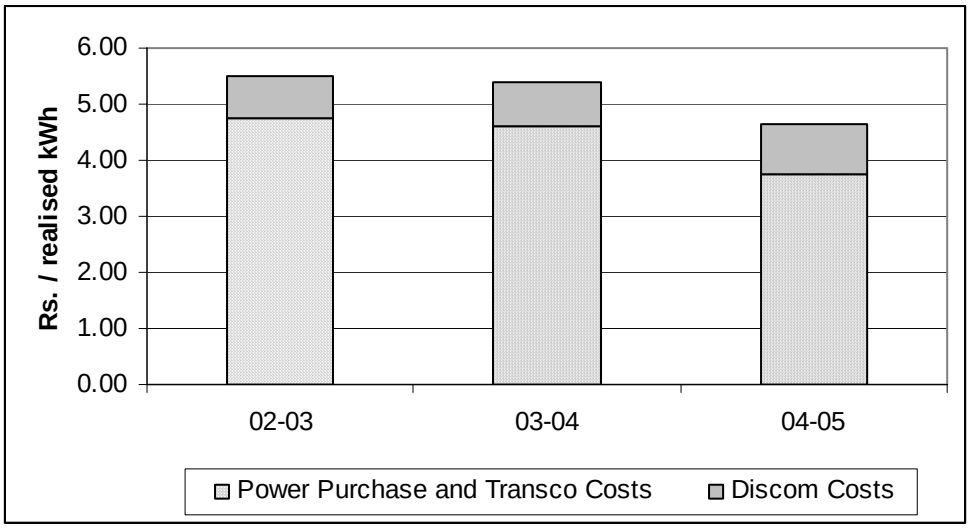


[17] Distribution costs include the various costs incurred by discoms to provide service and include items such as: employee costs; administrative and general costs; repair and maintenance costs; and depreciation, interest charges and return on equity associated with the capital invested in the distribution business. Distribution costs do not include power purchase costs.

6.2.2 Total Costs per Realized kWh

Another way of evaluating costs is to look at costs per kWh realized This measure also captures the effect of reductions in AT&C losses. As shown in Figure 6.2, the total costs per realized kWh has decreased significantly, (from Rs. 5.51 per kWh in 02-03 to Rs. 4.63 per kWh in 04-05) largely due to reduction in power purchase cost and reduction in T&D losses.

Figure 6.2 Total Costs Per Realized kWh for Delhi



6.3. Discom-Specific Analysis of Costs

We look at the discom-specific cost of electricity using two measures: (1) using costs per input kWh. By using cost per input kWh we are normalizing for the size of the utility and thus this measure enables us to look at how "costly" the utility is; and (2) using costs per realized kWh. This measure combines the "costliness" of the utility and its efficiency.

Costs using these two measures are shown in Figures 6.3 and 6.4 for the three discoms. The cost per input kWh mirror the overall system costs and while the level increased in 03-04 due to an increase in power costs, it declined in 04-05 to the same level it was at in 02-03. While the pattern of costs per input kWh mirror the system costs, there are some significant differences between the discoms. First, BRPL is the only discom whose distribution costs decreased over the three year period, albeit by a very small amount. BYPL's distribution costs started out at a low level of Rs 0.40 per kWh but increased to Rs 0.48 per kWh in 04-05. NDPL's distribution costs not only started out at the highest level among the three discoms at Rs 0.59 per kWh, they increased to Rs 0.69 per kWh in 04-05. This makes NDPL the costliest among the three discoms on the basis of cost per input kWh.

On the basis of costs per realized kWh, all three discoms show a reduction in costs. On this measure, NDPL's costs are the lowest among the three discoms, because even though it has the highest distribution costs, it has the lowest losses.

These graphs highlight the importance of rapid loss reductions in bringing benefits to consumers in reduced cost per realized kWh. They also point to the requirement for

regulatory scrutiny to ensure that gains in loss reductions are not overshadowed by increases in distribution costs.

Figure 6.3 Components of Rs. Per Input kWh Costs for Three Discoms

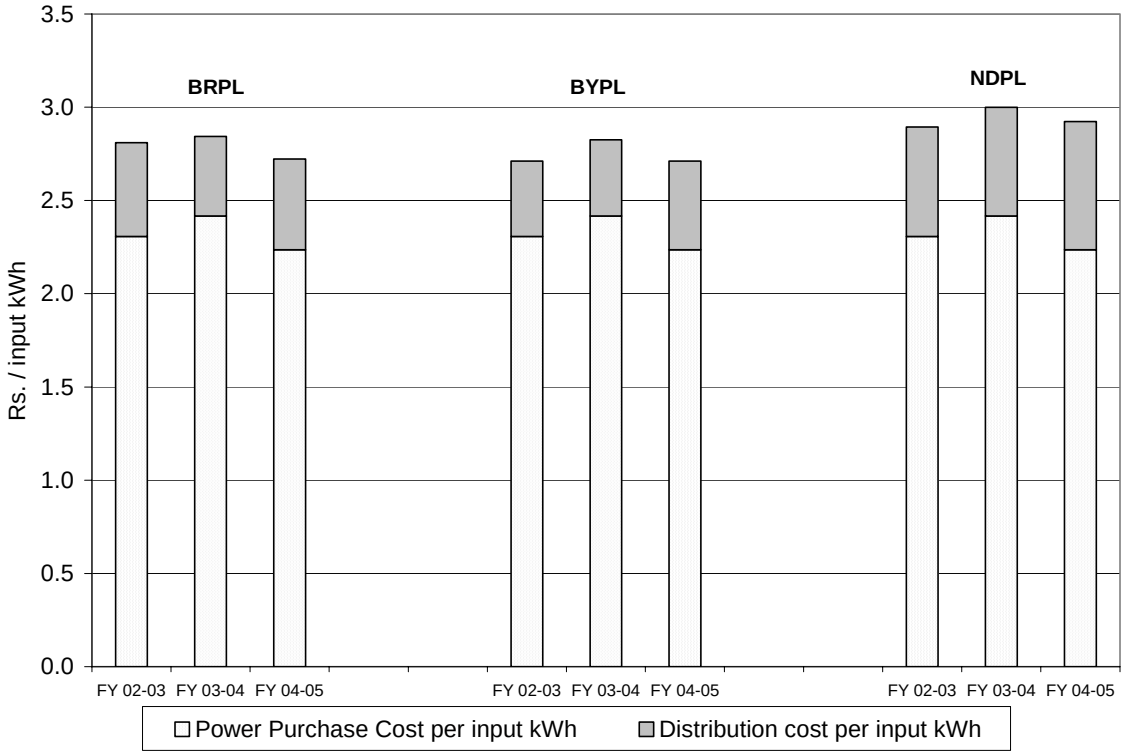
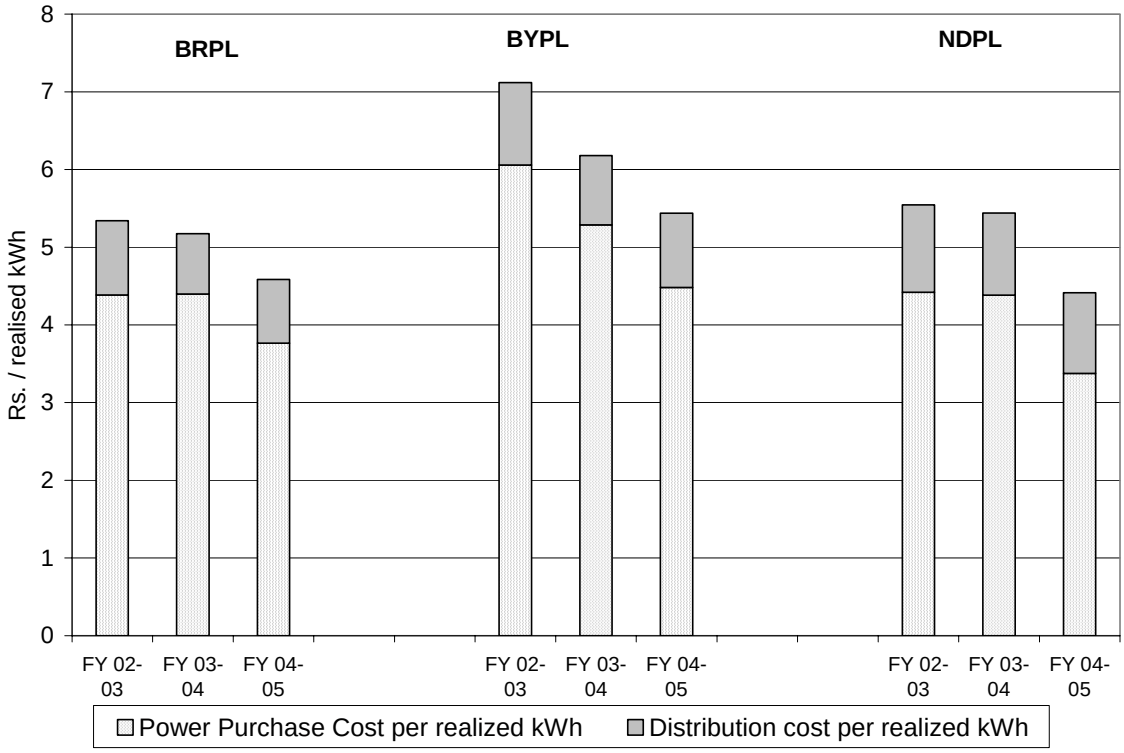


Figure 6.4 Components of Rs. Per Realized kWh Costs for Three Discoms



6.4 Regulatory Oversight of Discom Costs

Discom costs have been controlled by the Commission mainly through significant reductions in the costs claimed by discoms in their ARR petitions. Table 6.2 shows the total costs claimed by discoms in different ARR petitions and the amounts approved by DERC.

As Table 6.2 shows, from the time of privatization to the beginning of 2004-05, the projections by all three companies were higher by 35% to 90% compared to the amount approved by the Commission in its order at the beginning of the year or at the end of the year. However, more recently in the revised estimates in 2004-05 and initial estimates for 2005-06, the difference has become smaller. In this recent period, NDPL's estimates have come closer to the Commission's estimates and have been higher by about 15-20% but BRPL's and BYPL's have been higher by 20-50%.

These gaps between the companies' estimates and the Commission's approval, particularly in the early years lead us to two conclusions. First, the companies may have been over-estimating their costs by large amounts. The companies pointed out that part of the gap also comes from differences in the method for calculating depreciation and RoE, and from the creation of regulatory assets to defer costs. However this supports the conclusion that the Commission has been vigilant, has held the present costs to more reasonable limits, albeit at times by deferring the cost to the future.

Table 6.2: Discom Costs – Company projections and DERC Approval

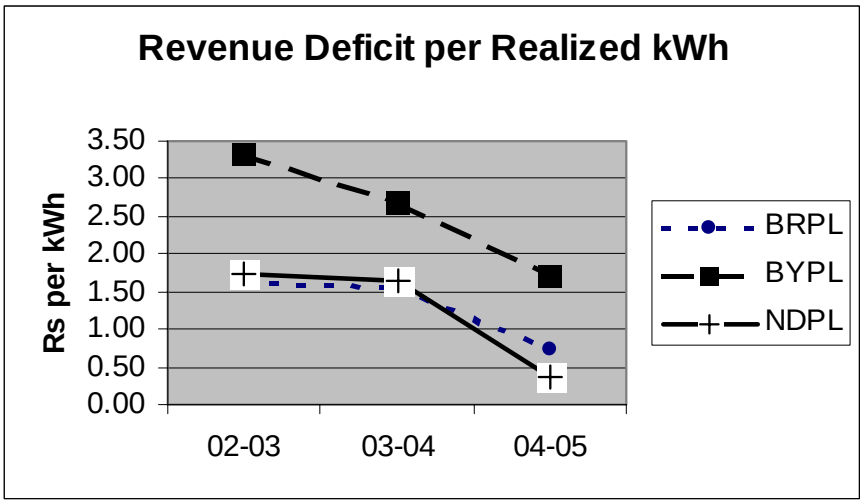
Sequential Estimates		02-03 (Annlzd)	03-04	04-05	05-06
BRPL	Company Projection (ARR Petition)		574	752	636
	DERC Projection (Order, BOY)		391	392	468
	Revised Co. Estimate (Following Year ARR Petition, MOY)	504	575	547	
	DERC Approval (Order, EOY)	373	345	420	
BYPL	Company Projection (ARR Petition)		306	507	454
	DERC Projection (Order, BOY)		213	303	308
	Revised Co. Estimate (Following Year ARR Petition, MOY)	280	292	362	
	DERC Approval (Order, EOY)	196	212	302	
NDPL	Company Projection (ARR Petition)		507	573	506
	DERC Projection (Order, BOY)		329	388	423
	Revised Co. Estimate (Following Year ARR Petition, MOY)	430	613	505	
	DERC Approval (Order, EOY)	308	322	434	

Note: BOY = Beginning of Year; MOY = Middle of Year; EOY = End of Year

6.5 Revenue Deficit of the Discoms

Having looked at how the costs of the discoms and Transco have changed over the three years since privatization, we now look at what effect this has had on the revenue deficit of the discoms. We arrived at the revenue deficit per kWh by subtracting the average realization rate per kWh (same as the actual average billing rate (ABR)) from the cost per realized kWh shown in Figure 6.2. The results are shown in Figure 6.5. The revenue deficit is an important performance measure because it indicates the extent to which the sector is becoming financially self-sufficient.

Figure 6.5: Revenue Deficit Per Realized kWh of Discoms



As Figure 6.5 shows, all three discoms have shown considerable improvement in reducing the revenue deficit; some of this has occurred because of the tariff increases and some of it because of the loss reductions by the discoms. BYPL has made the largest reductions but still has a way to go with a revenue deficit of Rs. 1.71 per kWh. NDPL is very close to being financially self-sufficient with a revenue deficit of Rs. 0.35 per kWh only. BRPL has a bit larger deficit of Rs. 0.73 per kWh. [18]

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[18] While commenting on the draft report, BRPL and BYPL had suggested that looking at BSTs of the three discoms would show that in 05-06, BRPL with the highest BST was subsidizing the other two discoms given that the RSTs were the same for all three discoms. Using BSTs to determine who is subsidizing whom in one year is inappropriate because the benefits of reduced costs and improved efficiency by a discom affect the BST in the following year. Thus there is a one year lag between improved performance and increased BST. A second reason is that there are regulatory assets on the books of the discoms. So the better performance of NDPL in 04-05 did not lead to a increase in its BST in 05-06 because the increased revenue from improved performance was used to amortize its regulatory asset.

Chapter 7. Analysis of the Revenues and Consumption Patterns of the Distribution Companies

Having reviewed the costs of the Delhi power system, we now review the revenues collected by the discoms since July 2002 to see the contribution of various factors such as tariff increases, loss reductions, load growth etc to the overall increase in revenues. Chapter 3, provided an overview of the financial performance of the Discoms, based on the revenue collection estimates by DERC at the beginning of the year. Naturally, one expects some difference between the actual revenue collected and the estimate by DERC. In this chapter, we start with an analysis of the overall revenues for the Delhi system which leads us to a more detailed analysis of the revenue and consumption patterns for each discom by category of consumers.

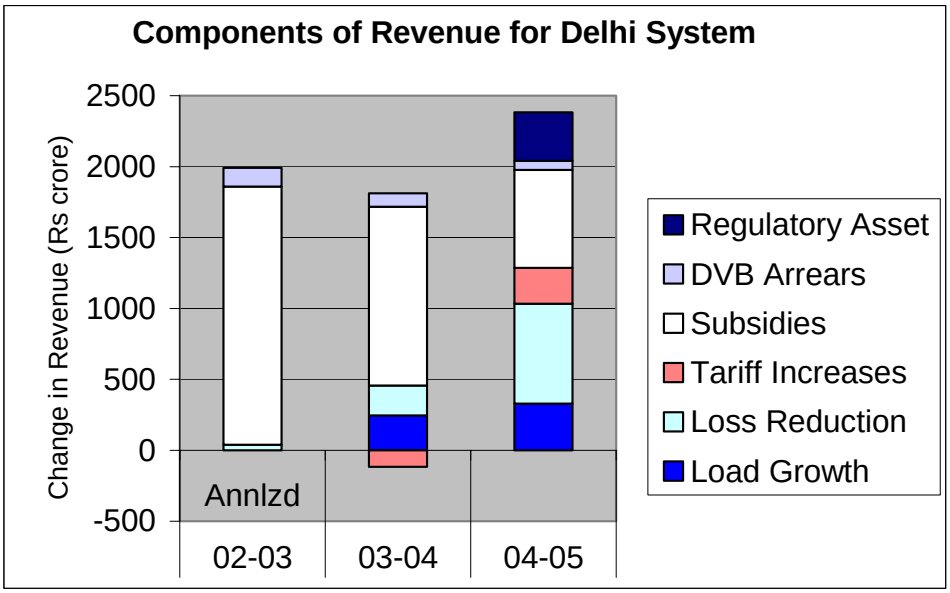
7.1 Overall Revenue Changes in Delhi System

The following equation, using the example of FY2003, shows conceptually how these various factors contribute to meeting the costs of the Delhi system.

Total Costs in FY 2003 = Existing Revenue in FY 2002 + Revenue Increases in FY 2003 due to sales increase, tariff increases, and loss reductions + Government support + contribution from DVB arrears + regulatory assets (if any).

Figure 7.1 shows the extent to which each of these factors contributed to meeting the costs of the system. For ease of presentation, we have shown only the increases in revenues since privatization in 2002.

Figure 7.1 Contributors of Revenue Increase for Delhi System



Note: In order to calculate the total revenues in a particular year, one would need to add the base revenues in FY 2002-03 (about Rs. 3200 crores) to the increases shown in the figure for that year.

Actual revenue collected in FY 05-06 would be known only after it is vetted by DERC in its tariff order for FY 06-07[19]. Hence, the figure shows only the first three years.

From the graph, it can be seen that government support is being steadily replaced by additional revenue due to loss reduction and load growth. The additional revenue in 04-05 due to loss reductions, is about equal to the Government support. This importance of loss reductions in generating additional revenue and making the sector financially self-sufficient is expected to increase even more dramatically in 05-06 and 06-07. The Government was committed to provide support of Rs. 138 crores only in 05-06 and none in 06-07 or thereafter.

Another important insight from Figure 7.1 is the revenue decrease in FY 03-04. Generally one associates a revenue increase with a tariff increase. However, even though the tariff was increased in that year, the Rs. billed per kWh sold (average billing rate (ABR)) decreased resulting in a decrease in total revenue. That is why the revenue from tariff increase in 03-04 is shown as negative in Figure 7.1. We explore this unexpected behavior of revenue next.

7.2 Revenue and Consumption Patterns Reported by the Companies

There are many factors, which can cause the actual revenues and energy consumption to deviate from the revenues and consumption projections by the Commission at the start of the year. For example, factors such as the weather or the level of economic growth, which cannot be predicted with much accuracy, have considerable influence on the amount of electricity consumed over a year. Therefore, the Average Billing Rate (ABR) is often used as a diagnostic tool in the analysis of consumption and revenue patterns. The ABR (which is equal to the billed revenue divided by the sales in kWh) is not expected to change, unless there are significant changes in the consumer mix or tariff structure. Therefore, in our analysis, we use ABR as a diagnostic tool.

In addition, ABR is also important because of the role it plays in the calculation of the AT&C loss level. Box I describes the relationship of ABR and AT&C losses. As the box shows, for a given overall realization rate, if a company understates its ABR, then the AT&C losses appear lower than the actual value. In other words, even if the actual efficiency does not improve, with the same revenue collected, if a company reports a lower ABR, it will seem that AT&C losses have been reduced which in Delhi is a measure of efficiency improvement. Thus the ABR is a critical component in the validation of AT&C losses.

Delhi Transco also recognized the importance of ABR and drew attention of the Commission to the issue of ABRs. In its tariff order for 05-06, DERC noted Delhi Transco's comments, which we quote here:

"TRANSCO has drawn attention of the Commission to the fact that per unit realisation in FY 2004-05 over the period FY 2003-04 does not exhibit increase in proportion to the tariff hike and reduction in AT&C loss achieved during the period." ***(page 2-35 of the 05-06 order for the BYPL)***

[19] The ARR petitions for 06-07 as filed show a revenue gap of about Rs. 1250 crores for 06-07 assuming that DVB arrears are not to be ploughed back into the sector. This would imply a tariff increase of about 20%. The actual tariff increase given by DERC is likely to be different because it may reduce or disallow some expenditures.

Before we delve into a review of how the ABRs changed, we discuss a number of corrections to the ABRs that need to be made to ensure a fair comparison.

Box I : The Working of the ATC formula

This box shows the linkage between the Aggregate Technical and Commercial (ATC) loss and the Average Billing Rate (ABR). The ATC losses are worked out in Delhi by the following formula.

$$1 - \text{ATC} = (1 - \text{T \& DLoss}) \times \text{CollectionEfficiency}$$

$$\therefore\ 1 - \text{ATC} = \frac{\text{MUBilled}}{\text{MUinput}} \times \frac{\text{RsRealised}}{\text{RsBilled}} = \frac{\text{RsRealised}}{\text{MUinput}} \times \frac{\text{MUBilled}}{\text{RsBilled}}$$

But

$$\frac{\text{RsBilled}}{\text{MUBilled}} = \text{AverageBillingRate} \quad \text{and} \quad \frac{\text{RsRealised}}{\text{MUInput}} = \text{Overall RealisationRate}$$

$$\therefore 1 - \text{ATC} = \frac{\text{OverallRealisationRate}}{\text{AverageBillingRate}}$$

The Overall Realization Rate per unit input comes from division of two firm numbers (money coming in the company bank accounts and MU input, as metered by the TRANSCO). Whereas the Average Billing Rate (ABR) figure is not a hard number; and comes from the company fillings. ABR is expected to match with the DERC projections, as the billing is expected to happen only as per the DERC decided tariff. In case the ABR does not match DERC projection, there should be obvious and clear reasons, such as change in consumption pattern or deviation from RC decided tariff.

From the formula above, it can be seen that for the same Overall Realization Rate, a lower ABR makes the ATC losses appear lower (because 1–ATC value increases). Hence, even if the actual efficiency does not increase, a lower ABR used in the formula would make it seem that the ATC losses have reduced. This makes ABR a critical component in the validation of ATC losses. Therefore, DERC should have checked the ABR reported by the company with its own projection, and ascertained the reasons for deviation if any.

7.3 Corrections Applied for a Fair Comparison of Actual Revenues with Expected Revenues

In the case of the Delhi, one reason for the difference in expected and actual revenues is the near removal of the provisions of misuse charges in 03-04 that existed in 02-03 (DERC Order for BYPL for 02-03 and 03-04, pages 98-99). While setting tariffs for 03-04, the Commission took several measures to rationalize tariffs. One of these was the removal of misuse charges on account of non-availability of a license from Municipal Council of Delhi (MCD), and a reduction in the misuse penalty. The revenue from misuse charges was expected to decrease substantially. We have excluded misuse charges in our subsequent analyses.

The second possible reason for the actual revenues being lower than the expected revenues relates to the tariff applicability date - the new tariffs established by the Commission are not applied until some time after the start of the financial year. At the time of issuing the tariff order the Commission calculates the revenue making the assumption that the revised tariff will be applicable for all twelve months in the financial year. However, the new (and increased) tariffs are not applied for the entire year resulting in somewhat lower revenues than expected by the Commission. In our subsequent analyses of discom-wise, category-wise, and sub-category wise ABRs and

consumption, we have corrected for this factor and have calculated revenues based on the actual tariff applicability dates for each tariff revision. The revised tariff were applicable for only 271 days in FY 03-04 and 286 days in FY04-05. This correction for the tariff applicability date is necessary only when comparing reported ABRs with expected (or calculated) ABRs.

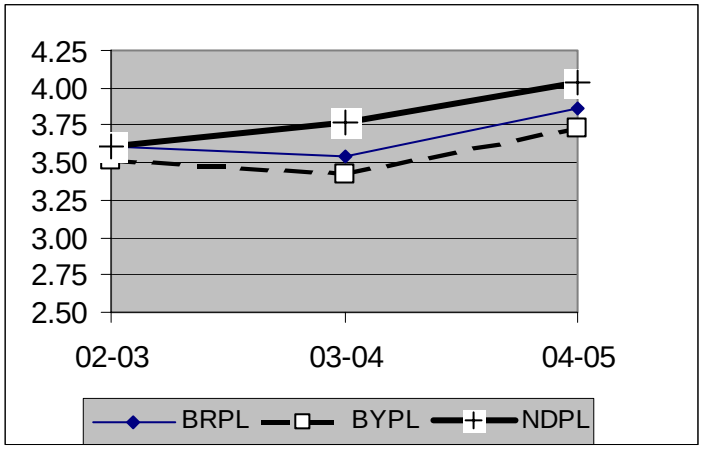
Even after correcting for these two factors, there are other factors that could lead to a difference in ABRs between the discoms. One such factor is a change in consumption patterns. The growth in the consumption of lower tariff categories may be different than that of high consumption categories. Therefore, we need to look beyond a comparison of ABRs on a discom-wide basis and look at category-wise ABRs, particularly if there is significant variation between discoms in the consumption patterns of the various categories.

The next sub-section analyzes the overall ABR for the three discoms and then goes on to analyze the category-wise ABR.

7.4 Comparison of Average ABRs for the Three Discoms

We analyzed how the corrected ABRs (averaged for all consumer categories) changed over the three-year period since privatization. The results are shown in Figure 7.2. NDPL's ABR increased from year to year as expected. However, the trajectory of the ABRs departed significantly from expectations for BRPL and BYPL. Both BRPL and BYPL showed a decline in the ABR in 03-04 even though the tariffs were increased in that year. The dip in BYPL's case is more pronounced. Furthermore, even though BRPL started with an ABR about equal to NDPL, it had a lower ABR both in 03-04 and in 04-05 compared to NDPL. In 03-04, BRPL had sales of 4506 MU (excluding misuse), and an ABR lower than NDPL's ABR (in the same year) by 22 paisa per unit corresponding to a reduction in revenue by almost Rs 100 crores.

Figure 7.2 Comparison of Company-Wide Average Billing Rate



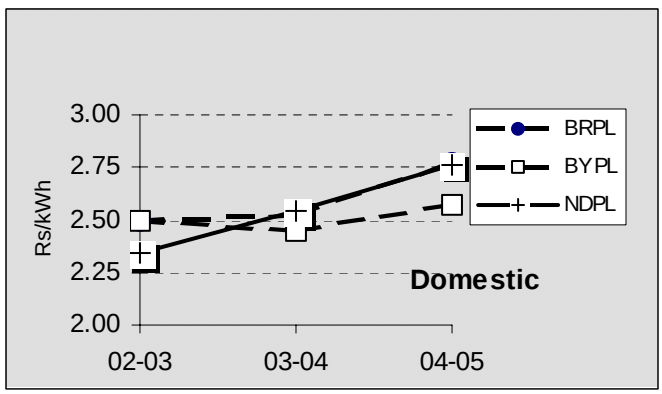
The tariff varies by consumer category. Hence, projecting average ABR is insufficient for a correct comparison. A category-wise comparison of ABRs is essential for correct comparison. The ABR of different discoms for a particular category of consumers, such as domestic consumers, should follow the same trend. Therefore, we decided to review the category-wise ABRs for the three discoms.

In the next few sections, we review the revenue and consumption patterns by category. We expected that the category-wise ABRs would match for the three discoms, and the trajectory of the ABR for each category would match the tariff hikes. As we discuss in the following sections, the results did not match our expectations.

7.5 Analysis of the Revenue and Consumption Patterns of Domestic Consumers

Figure 7.3 shows ABRs for domestic consumers for the three discoms.

Figure 7.3 Comparison of Domestic ABRs



As can be seen from Figure 7.3, the ABR of NDPL has increased steadily but the ABR of the two Reliance companies have either decreased (BYPL) or remained the same (BRPL) in 03-04 even though the tariff was increased by 5% that year. Furthermore, while BRPL's ABR increased and matched NDPL's in 04-05, BYPL continued to be lower than NDPL's by about 20 paise per kWh even though in 02-03 it had started with a higher ABR.

In residential consumers the tariff changes substantially with the consumption slabs. For example the tariff for 05-06 had three slabs of 0 to 200 unit per month, 201 to 400 units and more than 400 units. The respective tariff for these slabs were Rs 2.40, Rs. 3.90, and Rs. 4.60 per kWh. Hence slab-wise analysis is essential to understand the change in the ABR.

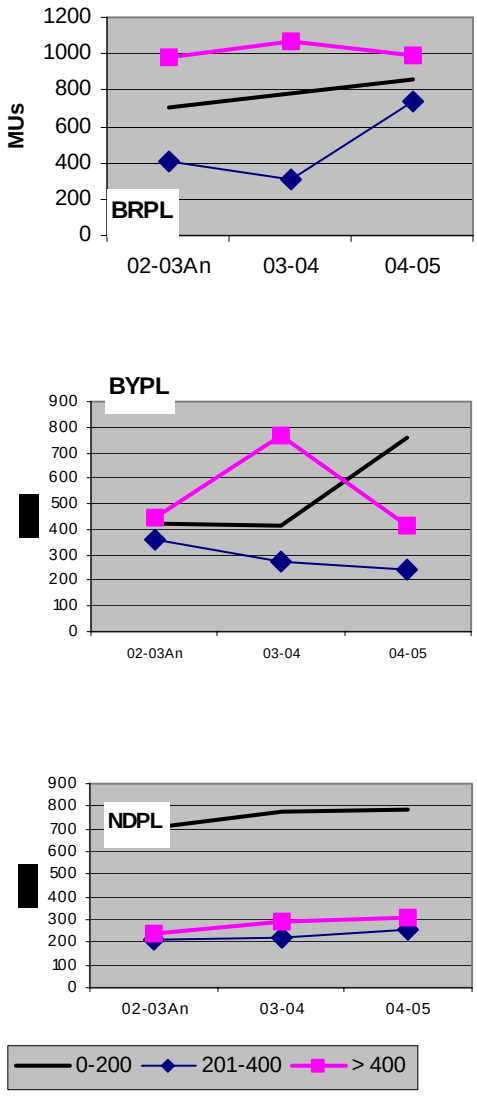
7.5.1 Slab–Wise Analysis of the Consumption Pattern of Domestic Consumers

We first review how the consumption in the various tariff slabs changed for domestic consumers for the three discoms over the three-year period 02-05.

Figure 7.4 shows the slab-wise consumption pattern of residential consumers for the three companies[20]. For convenience, slabs are merged in all years to represent domestic consumers in three slabs of 0-200, 201-400 and above 400 units per month.

[20] BYPL and BRPL report the consumption of the domestic category of consumers in a different way from NDPL. NDPL reports the consumption by applicable tariff (e.g. first 100 unit consumption of a consumer is reported in the '*0 to 100*' slab although the consumer may have monthly consumption of 500 units, and hence may fall in '> *400 unit*' category.). Whereas, BRPL and BYPL report the full consumption of such a consumer in the '> *400 unit*' category. The initial consumption of 400 units of such consumer attracts a lower tariff corresponding to lower slabs. Hence, part of the consumption (i.e. 400 units x 12 months x number of consumers) of the consumption reported by BRPL and BYPL in '>*400 unit*' slab attracted a lower tariff and only last 100 units for the consumer with 500 units of consumption attract the higher tariff of '>*400 unit*' slab.

Figure 7.4 Slab-Wise Consumption Patterns for Domestic Consumers



We observed the following anomalous trends in the figure.

- For BYPL, the consumption of the > 400 units category increases substantially in FY 03-04 and then drops to nearly half (a fall of about 350 MU) in the next year. Whereas the consumption of the 0 to 200 units category was stable for FY 02-03 and 03-04, but increases suddenly by nearly the same amount (about 350 MUs) ! It should be noticed that the tariff applicable to the > 400 category is Rs 4.10 per unit whereas, for consumption up to 200 units, it is only Rs 2.20 per unit (a difference of Rs 1.90 per unit). This sudden shift in consumption in 04-05 results in a reduction in revenue of Rs 66 crore.
- Taking the BYPL analysis further, we find more anomalies. Since the consumption of > 400 units doubled in FY 03-04, one would expect the billing rate to increase significantly, but instead it decreased.
- Similar unexplained sudden changes are seen for BRPL for the 200-400 units category.
- The slab-wise consumption and billing rates of NDPL do not show such sudden shifts.

The consumption in each slab is a multiplication of the average consumption per consumer and the number of consumers in that slab. In order to understand these anomalies in the patterns of consumption and ABRs further, we analyzed these two factors independently.

7.5.2 Average Consumption of consumers in different Slabs

Figure 7.5 show the average monthly consumption of consumers in different slabs.[21] Once again we see consumption behavior that is difficult to explain. Specifically, there are several cases where the average consumption of the slabs is equal to the upper level of the slab.

[21] This is obtained by dividing the annual consumption billed in the slab by the number of consumers in the slab and the number of months in the year i.e. 12. This represents the average monthly consumption of all consumers falling in the slab. (data from Form 2.1a)

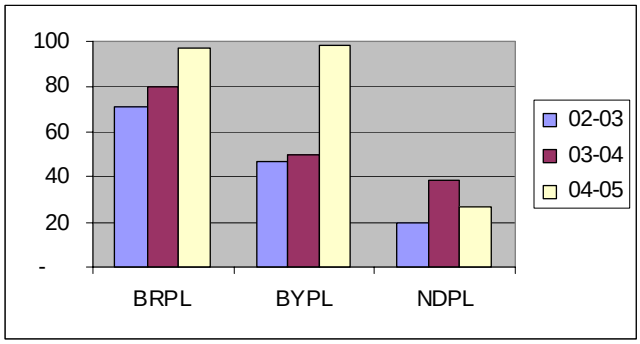
This is peculiar because one expects that the consumption within a slab will be spread out throughout the slab. For example, in the 0-100 units slab one would expect to see some consumers whose consumption is very low, others at the upper level (100 kWh per month) and the remaining in the middle. With this spread of consumption within a slab, the average consumption in the slab would be expected to fall in the middle of the slab. It would be very unusual to have everyone in the slab consuming exactly 100 kWh per month for all the twelve months in the year! Yet this is the sort of consumption that is shown in the figures specially for BYPL (in 0-100 as well as 100-200 slab).

For example, in the case of BYPL in the year 04-05, the two lower slabs 0-100 kWh and 100-200 kWh are both filled to the maximum level. This is very unusual. Obviously there has been some error in the reporting of these data. A similar situation occurred for BRPL in 04-05. Interestingly, for BRPL the consumption of the 200-400 kWh slab is at the upper limit in 02-03 also.

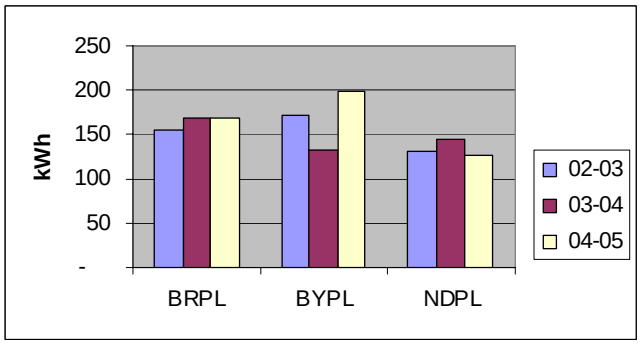
If all the approximately 300,000 consumers of BYPL from 0-100 unit per month slab had not consumed exactly 100 units each month in FY 04-05 but had consumed fifty units per month (as in the previous two years); then it translates into reduced consumption of 180 MU in this slab. We would expect this 180 MU to then be recorded in one of the other slabs having a higher tariff. Considering that 0-100 is the lowest tariff category, the revenue impact would be substantial.

Figure 7.5: Average monthly consumption of households in different slabs

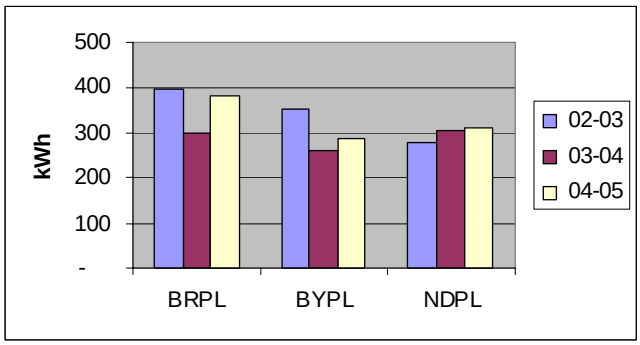
A) Slab 0 to 100 U/month



B) Slab 101 to 200 U/month



C) Slab 201 to 400 U/month



7.5.3 Number of consumers in different Slabs:

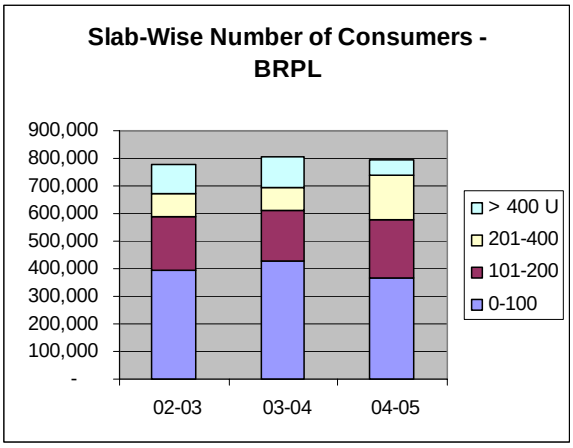
In our search for explanations for this highly unusual consumption pattern in the slabs, we also looked at the number of consumers in each of the slabs. The results are shown below in Figures 7.6.

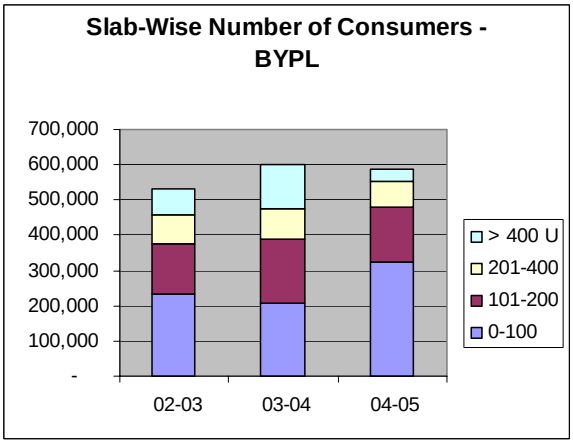
In order to understand the significance of the variations of number of consumers in the slabs, it is instructive to ask how would we expect the number of consumers in each of the slabs to change over time. First, assuming that the domestic category is growing, we would expect the overall (total) number of domestic

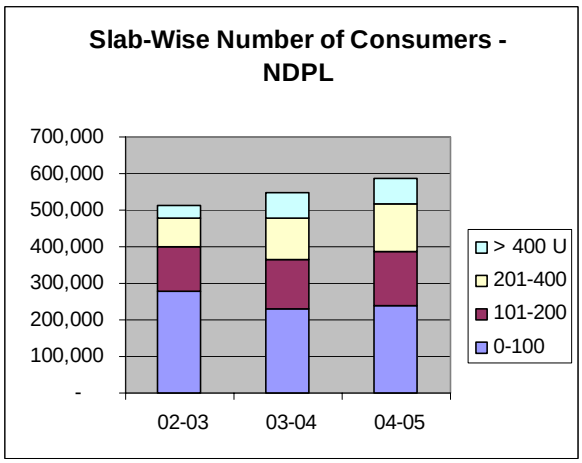
consumers to increase from year to year. Second, because of reduction in theft, correction of under-reporting of consumption, and increased metering, we would expect the number of consumers in the lower slabs to decrease (or increase at a lower rate) and the number of consumers in higher slabs to increase.

How does the trend of number of consumers in Figures 7.6 match our expectations. For NDPL, the trend follows our expectations. However, for BRPL and BYPL, the reported trend is difficult to explain. First, the total number of consumers for both companies decreases from 03-04 to 04-05. This is particularly surprising because BYPL was projecting a growth of 18.1% during the year 2004-05, (although the Commission assumed a 9% growth rate). We assume that this increased consumption was based, at least partly on an increase in the number of consumers.

Figure 7.6 Slab-wise Number of Consumers for the three Discoms







More important is the variation in the number of consumers for each slab. The most perplexing case is that of BYPL. Not only does the number of consumers in the lower slabs increase over the three years, the number of consumers in the upper most slab decreases. In the case of BRPL too, the number of consumers in the upper most slab decreases. Furthermore, the migration of consumers from one slab level to another seems very erratic unlike the case with NDPL. This is particularly true for the highest slab for which the number of consumers increases from 02-03 to 03-04 but then decreases from 03-04 to 04-05. The Commission's orders did not even mention these issues.

7.5.4 Significance of the Results of the Slab-Wise Analysis

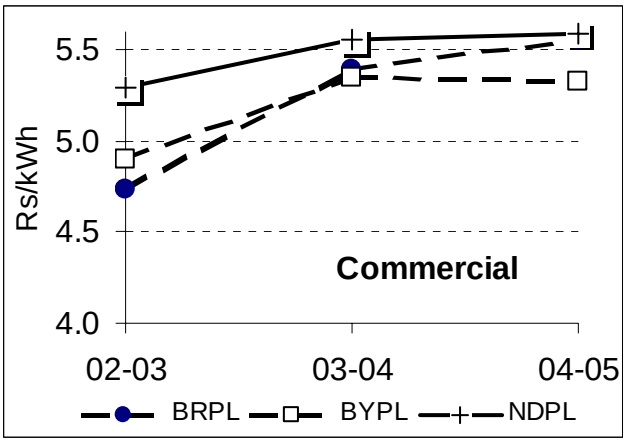
One might ask why does it matter if there were errors in reporting the slab-wise data. As we discussed earlier, the tariff that consumers pay changes substantially as the consumption level moves from one slab to the next. In 05-06, the tariffs for the three slabs (0-100, 200-400, and >400 kWh) is Rs. 2.40, Rs. 3.90 and Rs. 4.60 per kWh. The tariff for the highest slab is almost twice the tariff for the lowest slab. Thus errors in reporting of slab-wise consumption implies errors in the revenues, and can have serious financial implications.

7.6 Revenue and Consumption Patterns of Commercial and Industrial Consumers

7.6.1 Analysis of the ABR for Commercial Consumers

The behavior of the ABR for commercial consumers showed an interesting pattern. Specifically, the ABR increased for all three companies in 03-04, but for 04-05, the ABR change did not match expectations. For BRPL, the ABR increased but only by about 3% in 04-05 even though the average commercial tariff was increased by 8.2%. For both BYPL and NDPL, the ABR remained essentially the same as 03-04 even though the average commercial tariff was increased by about 9.5% for both companies.

Figure 7.7 Comparison of Commercial Average Billing Rates



Given this deviation from expectations for the commercial category of consumers, we decided to analyze the data on a sub-category level. We chose the sub- category with the largest consumption – small commercial customers with loads less than 10kW. We compared the revenue reported by the companies with a detailed calculation based on the MW and MUs reported by the companies in the Forms 2.1a submitted during the ARR review process. The results are shown in Table 7.1.

Table 7.1 Revenue Comparison - Commercial Consumers with Loads Smaller Than 10kW, FY 04-05

Company	Revenues (Rs. Crores)		Difference (Expected Rev – Reported by Co.)	
	Reported by Co.	Expected	Rs. crores	Percent
BRPL	251	270	19	7%
BYPL	212	233	21	9%
NDPL	79	82	3	3%

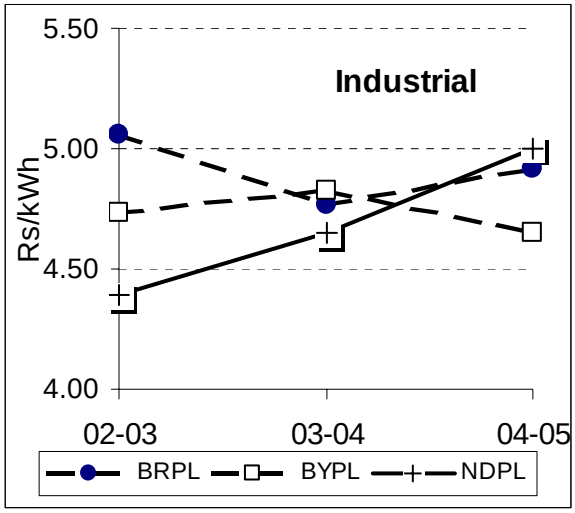
As Table 7.1 shows, the revenues reported by BRPL and BYPL are lower than the expected revenues by 19 and 21 crores (7% and 9%) respectively. NDPL's reported revenues are lower by Rs 3 crores (3%).

7.6.2 Analysis of the Industrial ABR

Figure 7.8 shows how the ABR for the industrial consumers has varied over the three year period since privatization for all three discoms. NDPL's ABR increased in both 03-04 and 04-05 as one would expect given the tariff increases in the two years. However, the trajectory of the ABR for industrial consumers of BRPL and BYPL did not match expectations. BRPL's ABR decreased in 03-04 in spite of the tariff increase of almost 7% for industrial consumers in that year. Its ABR did increase in 04-05 but the increase was only about 3%, far less than the 9.5%[22] tariff increase for industrial consumers given that year by DERC. In the case of BYPL, the ABR did increase in 03-04 but only by about 2% while the industrial tariff was increased by 4.5% by DERC that year. Even more surprising was the decline in BYPL's industrial ABR in 04-05 in spite of a 10% tariff increase.

DERC should have analyzed the reasons for different trajectory of billing rates as well as much lower billing rate of NDPL compared to BRPL in the starting year (02-03).

Figure 7.8 Comparison of Industrial Average Billing Rates



[22] Retail tariffs for all three discoms are identical. When we refer to average tariff increases in this chapter, we are referring to the increase in revenue per kWh projected by the Commission. Because there are some differences between the consumption patterns of consumers in the three discoms, the percentage revenue increase and hence the average tariff increase could be different for the three companies. That is the reason for referring to company-specific average tariff increases for a consumer category even though retail tariffs are uniform across discoms.

As with the commercial category of consumers, we carried out a detailed calculation of the expected revenue based on the MUs and MWs reported by the companies for the year 04-05, and compared it with the revenue reported by the companies. As mentioned earlier, our calculation of the revenue took into account the fact that the "new tariff" does not go into effect at the beginning of the financial year. The results are shown in Table 7.2.

Table 7.2 Revenue Comparison – Small Industrial Power Consumers, (FY 04-05)

Company	Revenues (Rs. Crores)		Difference (Expected Rev - Reported by Co.)	
	Reported by Co.	Expected	Rs. crores	Percent
BRPL	219	231	12	5%
BYPL	147	162	15	9%
NDPL	477	475	-2	0%

As can be seen from the Table, the revenues per our calculation were higher by 12 and 15 crores compared to the revenues reported by BRPL and BYPL respectively. In contrast, NDPL's reported revenues differed from our calculated revenue by only two crores. Furthermore, NDPL's reported revenues were higher than the revenue calculated by us. In percentages, the differences in revenues were 5% and 9% for BRPL and BYPL respectively, while the difference for NDPL was – 0.36%.

We note that there was considerable migration between the industrial and commercial categories by consumers of the discoms. Therefore, we also explored the behavior of the commercial and industrial categories together and our results are discussed next.

7.6.3 Pattern of C&I Consumption

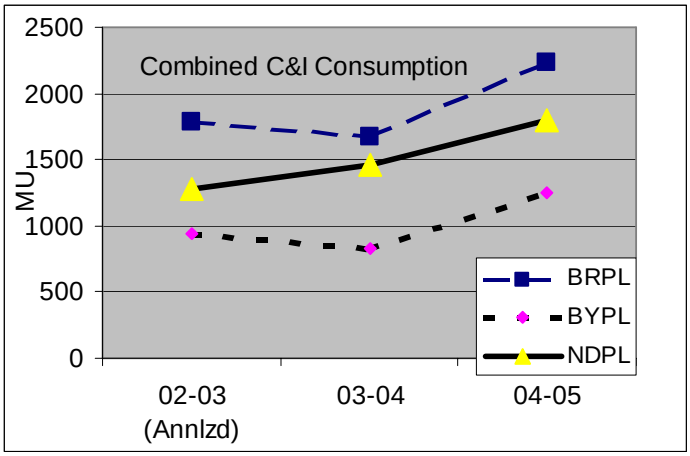
A large number of consumers of BRPL and BYPL were shifted from the industrial to commercial category. This could lead to unexpected behavior of consumption of industrial or commercial category taken separately. Therefore we decided that it would be more appropriate to analyze the combined consumption of these two categories. Figure 7.9 shows the results. Both BRPL and BYPL showed a decline in the combined consumption in the year 03-04 with a subsequent increase in 04-05. In contrast, the combined consumption for these categories for NDPL showed a steady increase.

BRPL and BYPL were projecting an increase in the combined consumption of industry and commercial categories for FY 03-04, in the ARR filed in early March 2003. DERC also concurred with the companies. But there was a drastic drop of about 10% and 17% in the consumption for BRPL and BYPL respectively.

It is interesting to note that the T&D losses for the two companies also increased in 03-04.

The commercial and industrial consumer categories are the revenue generating categories. Therefore, an unexpected and large decline in consumption for these categories should have been investigated by DERC.

Figure 7.9 Combined Consumption of Commercial and Industrial consumers – for three Discoms



7.7 Companies' Comments on Deviations in Consumption and Revenue Patterns

As discussed in the previous sections of this chapter, there were significant deviations from expectations in the consumption and revenue patterns of BRPL and BYPL. Most of these deviations could potentially have very significant financial implications. While commenting on our draft report, in the context of these deviations in consumption and revenue patterns, BRPL and BYPL gave several reasons for these deviations , and the major ones are discussed below:

1. Adjustments to Accounts in 02-03. BRPL and BYPL said that they made significant adjustments to the billing in 02-03, which are not reflected in DERC orders and therefore, the companies argue that it would not be correct to use the data for 02-03 from the order to make comparisons of overall ABR or category-wise ABRs. These changes were reflected in provisional accounts which were submitted to DERC on June 5, 2003. DERC did not include the changes in its tariff order for 02-03 (which was consolidated with the 03-04 order).

   The companies filed their provisional accounts with DERC three weeks before the tariff order was issued. BRPL and BYPL reversed billing worth Rs 154 crores and Rs 165 crores respectively (12% and 25% of their total billing for FY 02-03, respectively). This is certainly a major issue. We find it surprising that DERC did not find it worth mentioning in its order nor did the companies find it worth pursuing with the Commission.

   The submission by companies did not contain details of MU sales reversal or the associated changes in Form 2.1 a (reversal of category-wise consumption). Hence, we assume that the numbers as given in the commission order remain valid. Otherwise, this raises other issues such as: (a) questions about incorrect data in the Commission's orders and (b) a much lower billing rate (ABR) in FY 02-03 compared to NDPL which would be difficult to explain.

2. Rationalization of Tariffs Regarding the dip in the overall ABR in 03-04, the companies say that tariff rationalization in 03-04 by DERC reduced the ABR and therefore an adjustment needs to be made for these changes in order to make a fair comparison. Specifically, the companies refer to two changes:
   a. Abolition of minimum charges and meter rent component in the tariffs.

b. Merging of the domestic power category which paid the highest slab rate of the domestic tariff in 02-03 with the domestic light and fan category.

Regarding the abolition of minimum charges and meter rent, we note that DERC estimated the revenue from the existing tariffs and the approved tariffs at the start of 03-04 (DERC Order for BRPL for 02-03 and 03-04, page 127). In order to make such a calculation, DERC must have applied all the components of the tariff for both the existing and approved tariffs. Therefore, we assume that the Commission accounted for the effects of removing minimum charges and meter rent on billed revenues while determining the required tariff increase. Moreover, we wonder why the same trend is not visible for NDPL.

3. Changes in Industrial and Commercial Consumption Explaining the decline in the category-wise consumption for industrial and commercial consumers, the companies gave two reasons:
    a. Relocation of industrial consumers due to the Court Order resulted in a decline in the consumption of industrial consumers due primarily to a reduction in the number of LIP (large industrial) consumers.
    b. Because of a drive to correct the category of use, a large number of customers were shifted from the industrial to the commercial category.

    While the Court Order could have reduced industrial consumption to some extent, we would have expected most of the change to have occurred in the small industrial category (SIP). The reasons are: (1) we expect that it would be hard for LIP facilities to come up in residential areas, and so the unauthorized facilities that had to relocate would have been mostly SIP consumers; (2) Delhi State Industrial Development Corporation (DSIDC) reports that almost all the facilities that have relocated to Bawana have been SIP consumers.

    In response to the companies' contention that industrial consumption has reduced because of a shift to the commercial category, we note that the combined consumption of commercial and industrial consumers showed a dip in 03-04 for both BRPL and BYPL. Based on the companies' contention we would not have expected that to happen.

4. Shifts in Consumers from Domestic Categories to Commercial and Industrial Categories The companies said that as part of the drive to correct use, consumers were also shifted from the domestic category to the industrial or commercial category. When that happened in the middle of a financial year, the entire consumption for the year for that consumer was included in the new and usually more expensive category. Because the consumption before the shift was at a lower tariff, this meant that the ABR for the new category (most likely industrial or commercial) would be lowered because the pre-shift consumption was also included in the higher paying category.

    We are surprised that the billing software of the companies has this feature. Normally, only that consumption that is billed as industrial consumption is recorded under the industrial category. The companies were not able to provide us details of how much consumption was affected by this feature and when the shift in category occurred for the consumers. In fact, this points to a serious shortcoming in the software and data management.

5. Incorrect Query to Billing Software The companies also said that the domestic slab data in 03-04 could not be relied upon because an incorrect query to the billing software had been used.

   We are surprised that DERC made no reference to these problems in the slab-wise billing data in its orders. It is not clear if the companies informed the Commission of these problems.

6. Correction Due to Tariff Applicability Date Regarding our correction for the applicability date of the new tariff in each financial year, the companies pointed out that the actual date from which bills are issued using the new tariff would be later than the tariff applicability date because of the metering and billing cycle. Therefore, a greater proportion of the billed revenue would be based on the "old" tariff than the proportion based just on when the tariff became applicable.

   However, if this practice is being followed, assuming that the metering cycle extends over two months, on average the application of the new tariff would be delayed by a month. This would result in a change in ABR of only about one percent[23]. In actuality, the difference would be smaller because not all consumers have a two month billing cycle; some, such as industrial and commercial consumers have a one month billing cycle. These shorter billing cycles would reduce the net impact of the billing cycle to well below one percent of revenues. Whereas the difference in revenue (or ABR) pointed out earlier is much larger.

Box II – Change in BRPL Revenue for 04-05 in ARR for 06-07

As part of their ARR filings for 06-07, the companies filed Forms 2.1a (which provide revenue data by sub-category of consumers) for the year 04-05 also. BRPL now reports that its overall revenue in 04-05 was higher by Rs. 100 crore compared to the revenue reported during the ARR review process for 05-06. Rather than a change in one sub-category, this increase in revenue is the result of increases in revenues of almost each of the major sub-categories by 5%-6% each. Furthermore, there is no change in the consumption (MUs) of the sub-categories compared to the consumption data given during the 05-06 ARR review process.

Even though this is a significant change, no explanation has been given for the increase in reported revenue for BRPL. The Commission should look into this issue. If the revenue in 04-05 is revised as reported now in the revised Form 2.1a, then effectively, BRPL's ABR for 04-05 will increase by Rs. 0.17 per kWh, bringing it up to the same level as NDPL. In that case, some of our findings in this chapter will also need to be revisited. Furthermore, this increase in revenue will lead to a reduction in the tariff increase required for 06-07. There has been no change in the revenues or consumption for BYPL.

[23] Assuming a tariff increase of ten percent, the difference in ABR due to the metering cycle would be 1/12 x 10% which is less than one percent.

Box III – Need for Increased Transparency in DERC Orders

As we reviewed DERC's orders, we found that there was considerable lack of clarity in the calculations, which inhibited a detailed check of the calculations of the Commission.

This is particularly troublesome when it comes to truing up revenues for the current year (CY). Usually the commission order contains a lot of details of projections of the Ensuing Year (EY) but limited details for the current year.. The actual data for the current year is only partially available in the petition (only until about September of the CY). For the remaining part of the CY (September to March), the companies make projections. As the ARR proceeding progresses, the companies file actual data for the complete year, which the Commission uses for its calculations of a surplus or deficit in the revenue for CY. However, these data are not readily available to the other stakeholders . This incompleteness of data in the petition and in the order coupled with the lack of transparency in the calculations in the orders make it very difficult for stakeholders to validate the truing up of revenues for the CY.

We also found that there were several shortcomings in the way data is presented in the orders. We list some of these shortcomings here:

- At times billed revenues are not clearly distinguished from collected revenues, leading to considerable confusion.
- Electricity duty is included in some places and excluded in others. For example, electricity duty may be excluded from the revenue for a discom in the company-specific order but included in the order for Transco. This makes it difficult to reconcile numbers between orders or even within the same order.
- There needs to be greater clarity in the treatment of misuse and miscellaneous charges.
- There needs to be a comparison of commission projections for consumption and revenue with actual values.

DERC should also make available soft copies of all the worksheets of the Commission calculations to all interested stakeholders. DERC must direct licensees to make available all regulatory filings on the website (along with formulae and all data / assumptions). Similarly DERC's own spreadsheets should also be put up on the website.

A related issue is with respect to how commission deals with the objections / comments of stakeholders. At present the objections are listed in one section of the order this de-links commissions decision from the objection. Listing the objections along with the commission analysis and decision will improve transparency of the commission order.

7.8 Summary and Conclusions

A review of the overall revenues of the Delhi power sector shows that it is moving towards financial self-sufficiency. Loss reduction with load growth is steadily replacing government support. While the tariff increase in 04-05 also provided additional revenue, we found that in 03-04 in spite of a tariff increase, the average billing rate (ABR) actually declined. This anomaly led us to a more detailed analysis of the revenues, consumption, and ABRs of the companies.

Comparing the ABRs of the three discoms, we found that NDPL's ABR behaved as expected and increased from year to year, but BRPL's and BYPL's showed a dip in 03-

04. This led us to analyze the revenue and consumption on a category-wise and sub-category-wise level. Our analysis revealed that in several places the trend of ABRs and consumption deviated significantly from expectations. Furthermore, we found that these deviations were more widespread and larger for BYPL and BRPL.

For BRPL and BYPL, we also found that there were anomalies in the way in which consumption in the various categories changed from year to year. For domestic consumers of the two companies, the slab-wise data on consumption and number of consumers were not consistent with expectations. These anomalies indicated a possible over-statement of consumption in the lower slabs and a possibility of a corresponding under-statement in the higher slabs. Because, the large tariff difference between these slabs , these errors could have serious financial implications.

We also found problems with the pattern of C&I consumption reported by the companies. We found that for BRPL and BYPL, the combined C&I consumption declined in 03-04 by 10% and 17% respectively. In contrast, for NDPL the combined C&I consumption showed a steady increase in both years 03-04 and 04-05. On further investigation we found that the for BRPL and BYPL, the consumption for the three major sub-categories (retail industrial, retail commercial less than 10 kW, and retail commercial greater than 10kw) all declined in 03-04. We are at a loss to explain this decline.

In an attempt to understand the deviations in ABR and revenues from expectations, we carried out a calculation of the expected revenue for a sub-category from both the commercial and industrial category based on the consumption and other data provided by the discoms, and compared the results with the revenues reported by the companies for those sub-categories. Our results showed that the revenue reported by BRPL for the two sub-categories together was less than the calculated revenue by 32 crores, and this error amounts to 6% of the total revenue of the company in 04-05. For BYPL the revenue reported for these two sub-categories was Rs 36 crores less than the calculated revenue, and this error amounts to 9% of the company's total revenue. For NDPL the difference was just Rs 1 crore which is only 0.14% of the company's revenues. We found that such discrepancies existed with other sub-categories of consumers also and that the total of these discrepancies for each of BRPL and BYPL could be very large.

The unexpected behavior of ABRs and consumption that we have discussed here all have significant effect on the revenues and tariffs, and are also linked to the validity of the AT&C loss reduction calculations. Yet these issues were not investigated by DERC.

In fact, they were not even mentioned by DERC in its orders. This lack of attention on the part of DERC occurred in spite of Delhi Transco drawing the Commission's attention to them.

While commenting on the draft report, BRPL and BYPL, gave several possible reasons for these inconsistencies in the revenues and anomalies in the consumption patterns such as errors in the data, limitations of the billing software, shifts between consumer categories, and the long time it would take for them to provide further data which may help explain some of the unexpected results. While the reasons given by the companies could partially explain some of the anomalies, this certainly points to serious deficiencies in the way in which critical data that relates to company revenues and loss reduction are maintained and reported.

We find it difficult to understand why the Commission did not address these issues and direct the companies to improve their systems so that the Commission had accurate data for its decision-making. Wrong or doubtful data would result in wrong or doubtful decisions by DERC.

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Chapter 8. Quality of Service and Regulatory Oversight

Improving the quality of service (QoS) for consumers was one of the promises of privatization of the Delhi distribution system. In this chapter, we review what has happened in this area and DERC's oversight of QoS of the discoms.

8.1 Power Outages

As part of their ARR petitions, the discoms are required to file data on load shedding, feeder trippings, transformer failures, and the status of metering. The companies have been filing these data as part of their ARR petitions. However, because the petitions are filed in the middle of the financial year, the data cover only about half the year. Unlike data on expenses and revenues, the data on QoS are not updated through supplementary filings, and therefore remain incomplete. So far, there has been no action or comment from DERC on the completeness or validity of the data. In fact, DERC's orders do not even mention QoS.

These data on power outages and associated performance measures could be very useful because based on them, one can segregate the amount of load in MU that was shed over the year to control drawal, or due to problems on the transmission network, or due to problems/faults on the distribution system. In this way one can separate the change in outage levels due to the discoms' efforts from changes in outage levels that are caused by factors beyond the control of the discom such as load-shedding due to shortage of supply.

As part of their comments on our draft report, BRPL and BYPL claimed that there had been considerable improvement in the quality and reliability of service provided by their companies after privatization. In support of their claims, the companies provided data on DT failure rates, load shedding and reliability index. They show for example that for BRPL and BYPL, the DT failure has gone down from a peak of 132 in July 2002 to almost zero in April 2005. NDPL has also reported significant improvements in QoS. A press release by NDPL said that "No Power Supply" complaints had come down by 75% since the time of takeover, and billing complaints which were 3% during the pre-privatization era had been brought down to about 0.50%. We were unable to rely on the data provided by the companies because it has not been vetted by the Commission. Furthermore, we are unable to understand why the companies did not file the data with the Commission when it was available and why the Commission did not ask for this data.

8.2 Billing and Metering Problems

8.2.1 Suo-Moto Proceeding by DERC

There were a large number of complaints by consumers regarding metering and billing by the discoms. Consumers complained about (1) incorrect meter reading and bills, (2) provisional bills, (3) arrears reappearing in the bills, and (4) bills being issued to disconnected connections (DERC, 2004). Prodded by the volume of complaints, DERC initiated a suo-moto proceeding and issued a show-cause notice to the discoms.
In its order on the issue, the Commission noted that the discoms had been in existence for 18 months at the time and had had sufficient time to recover from the transition to privatization. The Commission also observed that when the metering and billing

regulations had been notified in August 2002, the discoms had requested a delay in the enforcement of penalties on the discoms in case of poor performance.

In his appearance before the Commission in the proceeding on this issue, the BSES CEO blamed the problems on the old system and described the new data systems that were being put in place. He also conceded that BSES was issuing provisional bills to some consumers on a normative basis rather than on the average past bill which is stipulated in the Metering and Billing Regulations.

The NDPL CEO claimed that NDPL had reduced the number of metering and billing complaints from 3 percent to 0.37 percent. He attributed the problems on arrears reappearing etc on the presence of touts and agents who hung around the collection centers and corrupt cashiers.

Further, both CEOs agreed that before imposing penalties for misuse of power, individual notices would be sent to consumers to give them a chance to change their categories.

The Commission urged the discoms to work diligently towards remedying the metering and billing problems. It noted that the problems were mostly managerial and therefore the top management of the companies should make the necessary effort to improve the situation. The Commission further pointed out that metering and billing problems were more acute in the case of the BSES companies.

The Commission issued several directives to the Companies most of which are already in the Metering and Billing Regulations. It put the companies on notice that their performance on metering and billing would be under scrutiny.

8.2.2. Protests About Metering and Billing Issues and Tariff Roll-Back

However, the dissatisfaction among consumers with the metering and billing by the discoms increased and reached a peak shortly after the tariff increase was passed by DERC on August 7, 2005. It seemed as if the tariff increase provided the spark that caused consumer frustration to explode into widespread protests, calls not to pay the increased bills etc. Subsequently, there have been several meter testing drives.

8.2.3 DERC's Meter Testing Drive

DERC had its own meter testing drive that started in October 2005 and ended in January 2006. Teams made up of personnel from DERC, the Central Power Research Institute (CPRI), the Bureau of Indian Standards (BIS) and the discoms carried out the tests. Public notices were issued inviting requests for testing of meters. In addition, RWAs were requested to forward the names of two consumers each whose meters were suspected of being faulty. A total of 536 meters were tested.

Out of 536 meters only four were found to be running fast. While the meters were found to running well within the stipulated error bands, there were many cases of bunching of neutral wires which could lead to errors in reading consumption. Of the 536 consumers whose meters were tested, 96 had problems with a common neutral! The common neutral became a problem after the introduction of electronic meters. Consumers should have been informed about these potential problems.

DERC and the discoms have developed and implemented steps to draw the attention of the public to the problem of bunching of neutrals and assist them in solving the problems.

8.2.4 Review of Billing Systems

DERC initiated two reviews of the billing systems of the companies. The first study to be carried out by ICRA was to study the process of measurement and reporting of AT&C losses and was started in November 2004. The study was to be finished in six weeks but had not been completed when we met DERC in February 2006. During our meeting DERC told us that the study was expected to be completed by the end of March 06.

For the second study, DERC engaged STQC IT Services of the Ministry of Communications and Information Technology, GoI as an independent third party testing authority to carry out the following three tasks: (1) functional testing of the billing system operated by the discoms; (2) process audit of the billing system; and (3) information security system audit. The agreement for the study was signed on 12th January 2006, and is also expected to be completed by the end of March 06.
We do not know the events or circumstances that prompted the commissioning of these studies. Nor do we know why a second study was required before the results of the first study by ICRA were available. DERC should have made the reasons for initiating the studies public and should make the reports from the studies public when they are completed.

8.3 DERC's Supply Code and Performance Standards Regulation

Recently, DERC released Draft Supply Code and Performance Standards Regulation and invited comments until October 31, 2005. These draft regulations which are required by the EAct of 2003 are an attempt to address QoS. DERC has laid out standard procedures and practices to be followed by licensees for a variety of issues such as new connections, changes to connections, handling of metering and billing complaints, disconnection, theft and unauthorized use of energy, and complaint handling. In addition, DERC has established Guaranteed Performance Standards regarding restoration of power supply, quality of power supply, meter complaints, billing complaints. Consumers are entitled to compensation for each violation of these guaranteed standards. In addition, DERC has proposed Overall Standards of Performance for restoration of power supply, reliability indices (standards yet to be laid down), and billing and metering mistakes.

We applaud the Commission for developing these standards. However, in order to ensure that consumers benefit from improved QoS, regulatory oversight will be necessary. Further, while the overall standards are comprehensive and a good first step, there is no penalty imposed on the licensee for failing to meet these overall standards. The Commission must devise means to ensure adherence to the Overall Performance standards.

8.3.1 Complaint Handling Procedures

In this context, we would like to point out that for all three companies, DERC approved complaint handling procedures on June 3, 2003 and they became effective from July 1, 2003. The procedures have many of the features that are now included in the Supply

Code and Performance Standards Regulation. These existing procedures provide a list of categories according to which complaints are to be recorded. In addition, they provide time limits for restoration of power supply or other correction required to respond to the complaints. Furthermore, the companies are required to file with DERC on a quarterly basis MIS reports giving the category-wise number of metering complaints received, number of meters tested, and number of meters found to be defective. However, these quarterly reports are not mentioned by DERC anywhere and so we do not know if they are filed and what action has been taken by DERC.

In addition, per section 43(iv) of the Performance Standards – Metering and Billing Regulation, 2002, the companies were also required to submit MIS reports on billing, metering, and theft/DAE cases. While DERC gave us MIS reports on other issues it did not give us any related to metering and billing issues. Further, it would not confirm or deny that reports related to metering and billing issues were being filed.

A review of the complaints handled by the Grievance Redressal Forums (GRFs) indicates that complaints about billing and metering form the bulk of the complaints. Because the complaints handled by the GRFs are a small fraction of the complaints received by the companies, it would be interesting to know the composition of complaints by category filed with companies. This would give an idea of the issues regarding quality of service that are of concern to consumers. However, we do not know if DERC has sought this information The discoms' complaint handling processes should be modified to ensure mandatory and regular reporting of this information to DERC on a periodic basis. Currently, there is simply no publicly available data on the number of complaints filed by consumers in the last two years that are related to billing and metering!

8.3.2 Customer Care Initiatives

As part of their comments on our draft report, BRPL and BYPL claimed that they had undertaken several initiatives to improve the quality of service customers received. These include initiatives such as (1) improving and increasing the number of customer care centers; (2) a more stream-lined complaint handling process; (3) putting relevant customer data on their websites; (4) easier and more numerous options for paying bills; and (5) consumer education and awareness campaigns. NDPL has also claimed improvements on these fronts in other venues (Singh and Sinha, 2004).

We commend the companies for these initiatives but wonder why they were not mentioned at all by DERC in its orders.

8.4 Monitoring QoS

Consumer satisfaction is an important aspect of the distribution service provided by the discoms. Furthermore, many consumers may be willing to pay higher tariffs for electricity as long as it is matched by improvements in QoS. However, so far, QoS has received scant attention. DERC's tariff orders do not even mention QoS. Going forward, it is important that the Commission continuously monitors the QoS being provided by the discoms in Delhi. The establishment of the Supply Code and Performance Standards Regulation by the Commission is an important first step. But consumers will benefit only if these standards are followed by the discoms. Therefore, the Commission should monitor the compliance with these codes and standards.

To ensure transparency and to provide consumers data on quality of service, we recommend that the following data should be available on the companies' and DERC's web-sites: (1) data on load shedding, feeder trippings, status of metering, and transformer failures etc. as filed in the format of Forms 5.1 through 5.14 submitted by the discoms with their ARR petitions; (2) quarterly reports summarizing the number of complaints of each category and how many were not corrected within the stipulated time; (3) summary reports from the Consumer Grievance Redressal Forums and the Ombudsman.

It is unfortunate that data on the number and category of complaints received and the average time for redressal has not been monitored or made public. Similarly, the companies are using remote-reading meters even for the some medium-sized consumers but are not monitoring electronically all 11kV feeder trippings. In fact, it would cost a fraction of the capital expenditure allowed each year to install an automated system of monitoring one or two critical parameters on each DT. In order to improve things rapidly, the Commission should ensure the appropriate use of IT to make companies accountable for QoS so that the consumers receive improved service.

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Chapter 9. Unresolved Post-Transition Issues

The five year post-privatization transition period will end on March 31, 2007. In this chapter, we look at what will happen after the end of the transition period, and discuss certain issues that have not been resolved leaving considerable uncertainty. We also look at some issues regarding the long term performance of the companies.

9.1 Tariff Setting in Post Transition Period

One of the more important issues for the Delhi power sector in the post-transition period is how tariffs will be set. During the transition period the retail supply tariffs (RSTs) have been kept uniform for all three discoms in accordance with the policy directives. It was expected that after the transition, company-specific RSTs would be applied. How will the State move to company-specific tariffs? If the transition to company-specific tariffs is done all at once, there could be a tariff shock for the consumers of one or more discoms. If a more gradual approach is used, then GNCTD and DERC need to decide how long it will be before the RSTs are completely independent of one another.

Another issue related to tariffs is the type of tariff regime that will come into effect at the end of the transition period. The National Electricity Policy favors a multi-year tariff (MYT) process. If an MYT process is to be implemented, then the Commission must start the ground work now because several decisions need to be made such as:

- The choice of MYT framework.
- The duration of the control period;
- Determination of controllable and uncontrollable factors. One particularly important controllable factor is the level of AT&C losses and therefore, the expected trajectory of these losses will have to be specified. If the discoms meet the loss reduction targets for the transition period, the average losses for Delhi would have decreased from about 50% to 33%. Internationally, T&D losses are 8-11%, so there will still be plenty of scope for improvement. Because the privatization agreement between the discoms and GNCTD was designed to ensure a financial turn-around of the sector by the end of five years, it does not address issues related to the period beyond the five-year transition. Therefore, the issue of the pace of further loss reductions needs to be addressed.
- Whether or not to have a sharing of profits due to over-achievement of targets and losses due to under-achievement.

In addition to these issues regarding the tariff-setting framework, there remains the question of the regulatory assets that are on the books of the discoms. How will the regulatory assets be amortized? What if the amortization leads to tariff shock for the consumers of one or more discoms that may not have performed well? Will there be further support from the Government?

9.2 Repayment of Loan

The debt portion of the opening balance sheets for the three discoms is covered by loans that they took from the HoldCo. The loans total Rs. 1416 crores (BRPL 690, BYPL 174, and NDPL 552 crores). The moratorium on principal and interest gets over on June 30, 2006, and the companies will have to start paying half-yearly installments after that. In an effort to avert an increase in the ARR due to these payments, the companies had sought to meet with GNCTD. However, GNCTD has said that the installments will

be due as per the agreements signed by the companies (NDPL ARR Petition for 06-07). This could have a noticeable effect on the tariff. Assuming that the companies refinance these loans, as NDPL proposes to do, the interest payments would add about 3% to the overall costs for BRPL and NDPL. For BYPL, the impact is expected to be smaller, and the increase in overall costs will be around 1%.

9.3 Recovery of Government Support of Rs. 3450 crore

The support of Rs. 3450 crores provided by GNCTD over the transition period was a "…loan to be repaid by the Transmission Company to the Government in a manner agreed to between the Transmission Company and the Government" (GNCTD Notification, 2002). If the loan is to be paid back, then some thought needs to be given to how that will be carried out.

9.4 Purchase of Power by the Discoms

During the transition period, the Transco bought power for all the consumers of Delhi and this was sold at the different BSTs to the three discoms. How will the discoms source the power they require. Because Transco is the SLDC, it will not be able to trade in electricity and it seems that the discoms will have to procure their own power. This raises the question of what will happen to the various PPAs that are held by Transco and are used to procure power for Delhi. This question becomes particularly important because of the very large power shortage in the Northern Region which limits the availability of power.

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Chapter 10. Brief Review of FY 06-07 ARR Petitions

In early April, 2006, DERC made public the ARR petitions for FY 06-07 filed by the companies and asked for comments from the public. We have not included data from these petitions in our report because these data have not been approved by DERC as yet, and might undergo changes after a review by the Commission. Nonetheless, to update the reader about the data available in these ARRs we present a quick analysis of the ARRs for 06-07. Furthermore, we felt that while the revenue and cost numbers are likely to change, the ARR petition data give us an idea of the direction in which the Delhi power sector is moving.

Based on actual data for half of FY 05-06 and projections for the other half of 05-06 and 06-07, the discoms are claiming that with existing retail tariffs and BSTs, they will have a surplus of revenue instead of a revenue gap. However, Delhi Transco is projecting a combined revenue deficit for 05-06 and 06-07 of about Rs. 1300 crores. Table 10.1 shows some of the details of the tariff increase that will be necessary and compares it with previous tariff increases.

Table 10.1 Discoms Consolidated Revenue Gap and Tariff Increase Trends

Description	FY02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07
Revenue Gap at Existing Tariffs	1185	1735	1862	520	1250
Tariff Increase	0	5.02%	9.80%	6.66%	21.93%
Revenue from Tariff Increase	0	103	379	319	1250
Government Support	1364	1260	690	138	0
DVB Arrears Collected (80%)	-	210	103	55	0
Regulatory Assets	-	0	697		0
Total Increase in Revenue	1364	1573	1869	512	1250

Note- Data for FY 02-03 to FY 05-06 is from the respective tariff orders and data for FY 06-07 is based on the companies' ARR petitions and DERC has yet to issue an order regarding these petitions.

As can be seen from Table 10.1, if the Commission were to accept all the costs and revenues of the companies, there would be a net revenue gap of Rs. 1250 crores which would require a tariff increase of about 22%. Please note that as of now, there is no plan to provide government support because the total government support of Rs. 3450 crores for the transition period has been exhausted. Further, this calculation assumes that DVB arrears are not being ploughed back into the power sector. In fact, the revenue requirements calculated by the DTL include Rs. 210 crores of DVB arrears for 02-03 and 03-04 that the Commission had earlier said would be passed on to DTL but were not. We do want to remind the readers that the revenue gap based on company calculations is usually revised downwards by the Commission, so we expect that the actual revenue gap and tariff increase for FY 06-07 is likely to be much smaller than shown here.

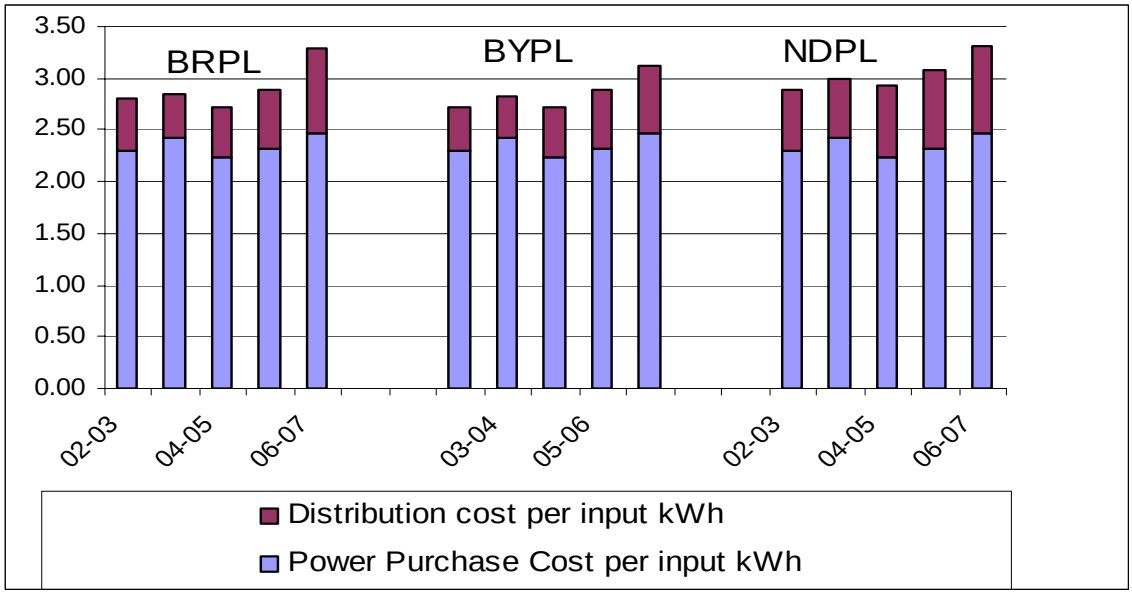
One reason why the actual revenue gap is smaller than the initial estimate based on the ARR filings is that the companies actual loss reduction is usually greater than assumed in the filings. The companies generally assume that they will simply meet the target while in reality they are likely to beat the target. Table 2 shows the assumptions regarding loss reductions made by the discoms in their ARR filings.

Table 10.2. AT&C Loss Assumptions

	05-06		06-07	
	Assumed by Co.	Agreed Target	Assumed by Co.	Agreed Target
BRPL	36.70%	36.70%	31.10%	31.10%
BYPL	45.20%	45.20%	40.20%	40.20%
NDPL	32.84%	35.35%	31.10%	31.10%

Given the fact that the discoms are projecting surpluses at existing BSTs, one naturally thinks that they are reducing their costs. An examination of the costs of the discoms reveals that the discom costs have been roughly consistent with what was allowed in the 05-06 Tariff Order unlike in the past where discom costs were higher than those approved by the Commission. However, we notice that the discom costs both in absolute numbers and on the basis of per input kWh are increasing. This increase is most dramatic with BRPL where distribution costs on a per input kWh basis are projected to increase by more than 40% for FY2006-07 from Rs. 0.57 per kWh to Rs. 0.81 per kWh. In fact, if all these costs are approved, then BRPL's distribution costs on a per input kWh basis will be almost the same as NDPL's costs for 06-07. One major reason for this increase is an increase of about Rs. 110 crores in interest and finance charges, about 60% of which is due to repayment of the loan from Holdco. BYPL and NDPL's costs have also increased but by much more modest amounts. Figure 10.1 shows graphically the costs on per input kWh basis for the three companies for five years. The figure also shows the increase in power purchase costs.

Figure 10.1 Components of Costs for Discoms on a Per Input kWh Basis



Another difference in the performance of the discoms this year is that the capital expenditure plans are much more restrained. This can be seen in Table 10.3. The expenditure (part actual and part projected) for 05-06 is lower than the capex in 04-05 for BRPL and BYPL. Once again the difference is most noticeable for BRPL where the capex in 05-06 is almost half of the amount in 04-05. A reduced level is also projected for 06-07. However, the overall capital expenditure is still high; about four times the level projected by SBI Caps.

Table 10.3 Actual and Projected Investment by Discoms

Actual and Projected Investments by DISCOMS						
						Total
	02-03	03-04	04-05	05-06	06-07	02-07
BRPL	76	112	923	496	452	2059
BYPL	56	85	418	348	322	1229
NDPL	49	287	328	361	272	1297
Total for 3 Discoms	181	484	1669	1205	1046	4585

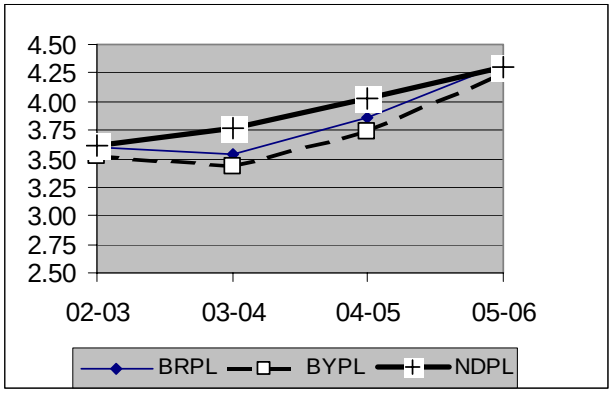
We also noticed that, as shown in Table 10.4, the claimed capital expenditure in 05-06 from the filings is quite consistent with the levels approved by DERC in its tariff order for 05-06. This is in contrast to earlier years where the claimed expenditure for BRPL and BYPL was much higher than the approved level.

Table 10.4: Capital Expenditure: Proposed, Approved, and Actual

						(All amounts are in crores of rupees)									
		BRPL					BYPL				NDPL				
	02-03	**03-04**	**04-05**	**05-06**	**06-07**	**02-03**	**03-04**	**04-05**	**05-06**	**06-07**	**02-03**	**03-04**	**04-05**	**05-06**	**06-07**
Amt requested in prev yr petition		482	1149	1400	452		386	1539	1200	322		301	303	361	272
Included by Comm-ission in prev yr TO	NA	423	526	477		NA	336	548	426		NA	287	303	361	
Cap Invst claimed in Petition	177	408	800	496		129	325	700	348		165	339	303	361	
Actual Cap Investment	76	112	526			56	85	405			49	287	328		
Cap Inv per SBI Caps Projections	65	74	66	74	74	66	75	67	75	75	57	65	58	65	65

We also examined how the overall ABRs changed in 05-06 using data from the ARR petition. The overall ABR for 05-06 is Rs. 4.34 per kWh for BRPL, Rs. 4.24 per kWh for BYPL, and Rs. 4.31 per kWh. The most notable feature of these projections of ABR is that for both BRPL and BYPL the improvement is greater relative to NDPL. In fact, BRPL has overtaken NDPL and has a slightly higher ABR and BYPL has almost caught up with the other two discoms. Figure 10.2 puts these results in historical perspective. As before, we want to point out that these data have not been vetted by the Commission and that the final numbers in DERC's orders may be different.

Figure 10.2 Comparison of Company-Wide Average Billing Rates Including Projections to 06-07



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PART III. CONCLUSIONS

Chapter 11. Salient Observations and Lessons

Salient observations:

1. No real competition in privatization of Delhi Discoms

In the case of Delhi, although half a dozen companies showed an initial interest in the process, at the final stage only two bidders submitted bids. Furthermore, these two parties' bids for loss reduction were lower than the Government stipulated minimum (about 20% in five years). Moreover, the loss reduction trajectory projected by these two bidders were quite similar. All these factors indicate that there was no real competition in the privatization of the Delhi's discoms.

Both the lack of interest in the distribution assets in Delhi and the less-than-ambitious loss reduction targets may be a reflection of the level of risk that is perceived by potential bidders. The difficulties in Orissa of reducing losses may have made the private players more cautious. Further, the bids may have been low because of the financial risk to the discoms of under-achievement in loss reduction. In the case of Delhi, a discom has to bear the entire cost of under-achievement in loss reduction which amounts to 20 to 30 crores for each percentage point that the discom misses its target.

However, with the experience in Delhi, particularly with NDPL exceeding its target loss reduction and in AP where T&D losses are being reduced significantly, the perception among potential bidders may change to some extent, and help in raising the benchmark of what can reasonably be expected from a well-managed loss reduction program.

2. Significant Reduction in Losses

Loss reduction has been a particularly recalcitrant problem for the Indian power sector. So it is a significant achievement that the privatized discoms have succeeded in reducing AT&C losses. Though the loss reductions in the first two years were limited, the performance of NDPL in the third year indicates that by the end of transition period the discoms are likely to achieve loss reductions beyond their respective targets. In fact, the loss reductions that have already been made over the three years since privatization have resulted in savings of about Rs. 880 crores for Delhi consumers. A recent newspaper story reports that NDPL has reduced its AT&C losses to about 28% by the end of FY 05-06, beating its target by seven percentage points again. The loss reductions achieved by discoms in FY 05-06 would add substantially to the estimate of savings for consumers.

3. Financial Turnaround – On the right path but big challenge ahead

One of the critical features of the power sector restructuring in Delhi has been the large financial support by GNCTD. Through the restructuring scheme GNCTD provided clean balance sheets to successor companies. In this massive financial reengineering process, nearly all past liabilities (around Rs. 19,000 Cr.) were taken over by GNCTD (i.e. essentially written off). Additionally, the government provided Rs. 3450 Cr. as transition support (over a 5 year period) and also contributed Rs. 886 Cr. towards employees pension trust.

As a result of this financial reengineering and significant AT & C loss reduction, discoms have made considerable progress in terms of achieving financial self-sufficiency and ability to pay full costs.

But in the coming years aggressive AT & C loss reduction will still be required to meet the goal of discoms' financial self-sufficiency. This is because, unlike the first three years of the transition period, in coming years, the cost of power purchase is likely to increase. Coupled with the start of repayment of the HoldCo loan by discoms and a progressive increase in discom costs is likely to necessitate continued tariff increases. Future tariff increases could be moderated if there are significant reductions in losses or if GNCTD decides to provide further subsidy. But in that case, one of the basic goals of restructuring and privatization – financial self-sufficiency -- will not have been achieved.

In short, the promised turn around of the Delhi's power sector is likely to take more time and resources compared to the estimates made at the time of restructuring.[24]

4. Shortcomings in Regulatory Oversight

Though DERC took positive steps on many issues, the analysis presented in this report shows that there were shortcomings also in the regulatory oversight. For example, the serious and large scale discrepancies in the consumption patterns as well as billing rates presented in chapter 7 of this report should have been noticed during the regulatory process and timely remedial action should have been initiated. Another example of a regulatory shortcoming is the lack of adequate and timely attention to quality of service issues. In the case of capital expenditure too, though the commission initiated some highly desirable measures (e.g. site visits), unfortunately there is no mention in tariff orders of either why DERC felt the need to initiate site visits or what was the outcome of such site visits. Also in spite of Delhi Transco pointing out that the capital cost claims of some discoms appear high compared to market rates, the tariff order is silent about commission's action on this issue.

[24] Some commenters have suggested that the turn around would have been accomplished within five years if DERC had given tariff increases in accordance with the assumptions used by SBI Caps. However, we think the picture is a bit more complicated. There were many deviations from SBI Caps' projections in addition to the level of tariff increases. For example, the power purchase costs have been lower than projected by SBI Caps, while the capital expenditure by discoms has been much greater than envisioned by SBI Caps. The deviation in power purchase costs made the turn-around easier while the deviation in capital expenditure made the turn-around more difficult.

Lessons:

1. The use of AT&C losses as a measure of efficiency is not fool-proof

It is tempting to think that the use of AT&C losses as an efficiency measure reduces the need for regulatory oversight on the assumption that only input energy and collected revenue need to be checked. However, as we have shown in Box I of Chapter 7, incorrect billing data can result in an incorrect estimate of AT&C losses even if the input energy and collected revenue are correct. Thus the use of AT&C losses does not obviate the need for regulatory vigilance with respect to several items such as revenues, consumption, and ABRs. The analysis and discussion in chapter 7 of this report amply demonstrates the need for such improved scrutiny and the consequences of delayed or lax scrutiny.

Other measures have been suggested such as the use of revenue per unit input. Even these require regulatory vigilance. If the revenue per unit input is used, then the SERC must ensure that the discom is not favoring its high-paying consumers at the cost of lower-paying consumers or that the discom is not compromising on quality of service or overcharging. Similarly, even in the case of other suggested approaches such as distribution margin, the need for effective regulatory oversight remains.

Another difficulty that the AT&C approach introduces is artificial merging of two very different and unconnected parameters of T & D losses and collection efficiency. Improvements in these two parameters entail quite different approaches. While quick improvements in collection efficiency may be feasible through better managerial processes, reduction in T & D losses over a long term may require sustained actions and investments.

In this context the provisions of National Tariff Policy asking SERC's to undertake third party data validation merits particular attention.

2. Need for validation of metering, billing, and collection systems

Metering, billing, and collections systems are the backbone of the distribution business and are crucial to meet the information requirements of the regulatory process. It is essential that the software and processes used for these purposes are error-free and reliable. In order to ensure this, measures such as periodic third party audit and certification, software design and quality standards need to be implemented.

3. Need to ensure that efficiency gains are not eroded by increasing costs

The analysis presented in this report demonstrates that discoms' costs (distribution costs) have decreased when considered in terms of Rs./ realized kWh (i.e. after considering the effect of loss reduction), but in absolute terms distribution costs have shown an increasing trend. As discussed in chapter 5, discoms' capital expenditure plans have a significant bearing on distribution costs. Hence, it is essential for the regulatory process to ensure that efficiency gains are not eroded or overshadowed by an increase in distribution costs.

4. Need for stringent monitoring of capital expenditure and quality of service

The magnitude and appropriateness of capital investments by distribution licensees are important parameters to evaluate the performance of discoms. On one hand substantial investments in new equipment may be required to upgrade the system and improve the quality of service for consumers and to improve efficiency. On the other hand, very large capital investments are likely to result in significant increases in retail tariffs. Therefore, it is important to ensure that appropriate and essential capital investment is carried out while unnecessary capital expenditure is avoided so that increases in tariffs are moderated.

With this perspective SERCs need to pay particular attention to the appropriateness and level of capital expenditure proposed by discoms. It is important that the annual capital expenditures by companies be consistent with a long term plan, vetted through a public process in order to ensure that the capital expenditures are necessary and least cost. Furthermore, there is an urgent need to develop benchmarks and database of capital costs of different equipment to ensure that costs are not inflated. The Forum of Indian Regulators (FOR) or Ministry of Power or CEA needs to take the initiative in this matter at the central level to enhance quality and effectiveness of such benchmarks and databases. SERCs also need to develop sound data management systems to track different capital expenditure schemes by discoms, and most importantly, all this information and database should be made public through the Internet. Such an approach, on one hand would increase the scrutiny of this crucial cost component of regulated companies, and on the other would foster greater transparency and hence public confidence in the regulatory process.

Without this level of regulatory scrutiny on capital expenditure, increases in discom costs may erode the benefits of loss reduction. Similar to capital expenditure, quality of service issues also need more detailed scrutiny. Like many other SERCs and as required by the E. Act 2003, DERC has also put in place a QoS framework in terms of supply code, standards of performance and grievance redressal forums. But as discussed in chapter 8, there exist significant gaps in terms of DERC's effective monitoring of QoS. Also DERC has not made much effort to make public the status of various QoS parameters laid out in DERC regulations. There is an urgent need for DERC to institute an effective mechanism to monitor QoS and discoms' compliance with DERC regulations. Effective use of information technology will be very critical to ensure this and to increase transparency regarding QoS.

5. Need to strengthen regulatory process to meet the challenges of restructured sector

The analysis presented in this report clearly demonstrates the need for significant improvement in the regulatory process, specially in the context of privatized discoms where multi-year tariff frameworks are being used. For example, regulatory capacity to monitor issues such as, metering, billing and revenue collections, capital investments and quality of service, needs to be enhanced.

This study again highlights the need for more capable and vigilant consumer intervention in the regulatory process. It would have been far more effective and useful, if many of the issues brought out in this report (e.g. discrepancies in sales and billing rates, lack of QoS monitoring) were studied earlier and appropriate regulatory interventions initiated.

BOX IV : The Regulatory Process in Delhi

Establishment of regulatory commissions has been an important institutional change in the Indian power sector. Regulatory commissions, with significant authority and autonomy, were expected to address ills of the power sector; by giving balanced consideration to the concerns of all stakeholders, enhancing transparency, enhancing public participation in the regulatory process, and thereby de-politicizing decision making process. To assess the effectiveness of Delhi Electricity Regulatory Commission in this context requires a comprehensive study, which is beyond the scope of this report. This Box highlights some of the major observations about the regulatory process in Delhi.

Proactive actions on some issues: As discussed earlier, on some issues the regulatory commission took pro-active and positive steps. These include: (1) setting performance standards for metering and billing (before E Act 2003 mandated the RCs to do this); (2) initiating suo-moto proceedings on billing and metering problems; (3) conducting a detailed process for approval and verification of capital expenditure – requiring DPR submission, carrying out site visits for verification etc. ; (4) linking the amortization of the regulatory assets with the performance of the discoms; (5) requiring payments over Rs. 4000 by consumers by check.

Failure to scrutinize critical issues: On the other hand, the regulatory process failed to scrutinizes some very critical issues such as, 1) Quality of service 2) Anomalous consumption patterns 3) Discrepancies in average billing rates 4) Development and review of long term (5 yrs.) capital investment plans of discoms and most importantly 5) Verification of achievements in loss reductions We recognize that not many SERCs in India look into the issues we are discussing here or carry out these processes to which we are referring. But considering the nature of problems and the situation in Delhi (use of MYT, privatization etc.) it is unfortunate that DERC did not pay sufficient attention to these issues. .

Need to enhance transparency and clarity of orders: In many cases, the regulatory processes of DERC have not been transparent. Some examples are cited in Box III in Chapter 7. At times even simple actions such as putting the publication date on the order are not carried out. The commission's documentation processes leave a lot to be desired; however, we believe that the commission has initiated action to improve it.

DERC also does not make public the spread-sheets that underlie its calculations. This is a major limitation of some commissions in the country. This allows mistakes / errors of the commission to go un-noticed and makes its difficult to analyze commission orders. Further, the observations and conclusions of the site visits to verify the capital works have not been made public.

Lack of Government support for Regulatory Strengthening: For the first five year, DERC was manned by a single person (the Chairman). This deprived DERC of the benefit of different views and diverse expertise. For over a month after retirement of the Chairman, the Government did not appoint new commissioners, even though the Chairman's retirement was well anticipated. In fact, as per the provisions of the E Act 2003, the selection (search) committee would have recommended names of the prospective members / chairman well in advance of his retirement. It is worth noticing that the Delhi Government has only recently appointed the Chairman of DERC.

The two new commissioners were appointed in mid Jan and early Feb 2005 after the last date for tariff filling by utilities. They were faced with several urgent actions including drafting of important new regulations under E Act 2003. In addition, the lack of continuity in the commission staff also probably handicapped the Commission.

The manpower in DERC is limited. There are only about 6 technical staff members. Most of them are on deputation and have a short tenure at DERC, and this constrains the building of institutional memory. We do not know if this limitation of staff was caused due to inaction by DERC or due to refusal or delay by GNCTD in agreeing to create new posts. DERC seems to depend extensively on consultants. In our opinion, that is fine as long as there is a balance between development of the institutional memory within DERC and expertise coming from outside.

Information management is another area that requires urgent attention. During the course of this study we interacted with DERC on several occasions to seek information and documents submitted by discoms in earlier ARR processes. Many times we found that the commission staff had difficulties locating documents and at times had to rely on the discoms to update their records. With the number of licensees increasing, SERCs will typically have to process three or more ARRs at a time. In that scenario unless sound information management systems are put in place, it will be difficult for the SERCs to cope with deluge of information in the ARR process, leading to high chances of weak regulatory oversight. The recent initiative of establishing Regulatory Information Management Systems (RIMS) is a welcome step in this direction. To make this more effective it is essential to involve consumer groups at the design stage itself and to ensure that the entire system is designed to make all information available to public.

In many cases, the regulatory processes of DERC have not been transparent. Some examples are cited in Box III in Chapter 7. At times even simple actions such as putting the publication date on the order are not carried out. DERC also does not make public the spread-sheets that underlie its calculations. This is a major limitation of some commissions in the country. This allows errors of the commission to go un-noticed and makes its difficult to analyze commission orders. Further, the observations and conclusions of the site visits to verify the capital works have not been made publicly available.

Another critical area that needs urgent attention is the 'institutionalization' of regulatory processes within the commission. DERC has seen a rapid turnover of key technical staff and has been depending on consultants extensively. It appears that in this process the institutional memory as well as information management have suffered seriously. DERC's inability to provide comments on our draft report highlights this. We had circulated a draft version of this report to DERC (amongst others) for comments. Though the report raises serious questions about consumption and average billing rate patterns, DERC could not explain why it failed to scrutinize these issues during the ARR process. Such instances clearly highlight the need to ensure that SERCs adopt sound human resource development policies with the aim of long term institution building rather than just looking at a 5 year tenure of commission members. Related to this is the issue of ensuring that vacancies in the Commission (Chairperson and Members) are filled in a timely manner so that there is a continuity in the decision making and institutional memory is strengthened.

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ANNEXURE I – Details of Distribution Costs

		02-03	03-04	04-05
	Transco and Power Purchase costs (per input MU)	2.31	2.42	2.24
BRPL				
	ARR excl power purchase	373.34	345	409.71
	Mus input	7424	8096	8405
	Mus realized	3905	4448	4989
	AT&C Loss Reduction	47.40%	45.06%	40.64%
	Power Purchase Cost per input kWh	2.31	2.42	2.24
	Power Purchase Cost per realized kWh	4.39	4.40	3.77
	Distribution cost per input kWh	0.50	0.43	0.49
	Distribution cost per realized kWh	0.96	0.78	0.82
	Total cost per input kWh	2.81	2.84	2.72
	Total cost per realized kWh	5.34	5.17	4.59
BYPL				
	ARR excl power purchase	195.63	212	254.34
	Mus input	4833	5192	5338
	Mus realized	1841	2373	2662
	AT&C Loss Reduction	61.91%	54.30%	50.13%
	Power Purchase Cost per input kWh	2.31	2.42	2.24
	Power Purchase Cost per realized kWh	6.06	5.29	4.48
	Distribution cost per input kWh	0.40	0.41	0.48
	Distribution cost per realized kWh	1.06	0.89	0.96
	Total cost per input kWh	2.71	2.82	2.71
	Total cost per realized kWh	7.12	6.18	5.44
NDPL				
	ARR excl power purchase	307.56	323.46	381.8
	Mus input	5237	5552	5549
	Mus realized	2734	3061	3674
	AT&C Loss Reduction	47.79%	44.87%	33.79%
	Power Purchase Cost per input kWh	2.31	2.42	2.24
	Power Purchase Cost per realized kWh	4.42	4.38	3.38
	Distribution cost per input kWh	0.59	0.58	0.69
	Distribution cost per realized kWh	1.12	1.06	1.04
	Total cost per input kWh	2.89	3.00	2.92
	Total cost per realized kWh	5.54	5.44	4.41

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ANNEXURE II - Comparison of Projected and Actual Consumption

In an effort to understand the unexpected behavior of the consumption patterns for the three companies, we decided to look at the relationship between the projected and actual consumption for the domestic and combined C&I categories for the three discoms. For each year, we looked at four estimates for the companies made at the following times:

1. The projection made by the discom in its ARR petition for that year. This projection was made around the middle of the preceding financial year.
2. The projection made by the Commission in its order for that year.
3. The estimate made by the discom in the subsequent ARR petition. This estimate was made around the middle of the financial year under consideration.
4. The actual consumption as approved by the Commission in its order for the subsequent year. Because this was the actual consumption, it was determined after the end of the financial year under consideration.

The following figure shows the results. The figure shows the anomalous behavior of the combined C&I categories for BRPL and BYPL in 03-04 and the domestic categories for BYPL in 04-05 that we discussed earlier.

In addition, we notice that NDPL's estimates for domestic consumption both in its ARR petition for a particular year and its mid-year estimate as given in the subsequent ARR have consistently been higher than either DERC's estimate in its order or the actual consumption as determined at the end of the year. The reverse is true for NDPL's estimates for the joint consumption of the C&I categories in 04-05 and 05-06.

Delhi Transco had drawn attention to this issue in its comments as reported in the 04-05 orders. It had recommended careful scrutiny of the assumptions made by the discoms regarding sales, consumer mix, and revenue realization for the various categories of consumers (BYPL Order for 04-05 page 2-28) . More specifically, it had pointed out that NDPL had projected high growth in the domestic category but low growth in high tariff categories such as industrial and commercial.

To the credit of DERC, it did correct the projections of consumption made by NDPL and DERC's projections have matched actual consumption better.

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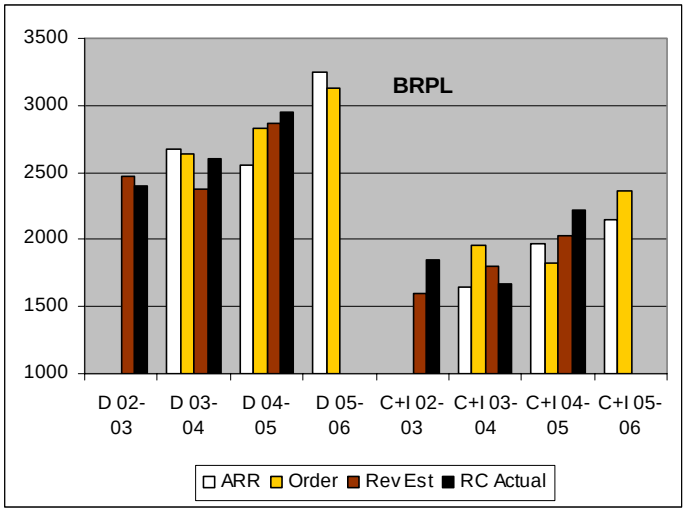
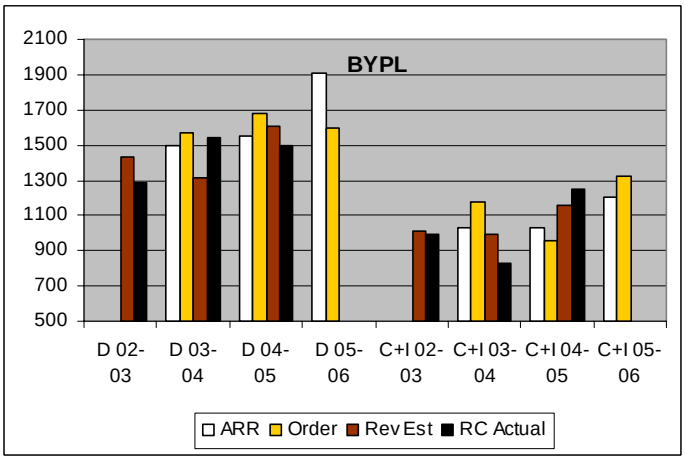
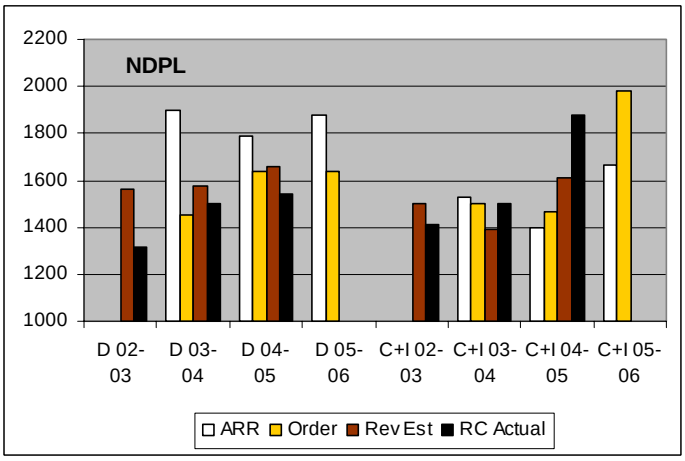
Figure A Comparison of Forecast and Actual Consumption for Domestic and C&I Consumers







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