Power distribution reforms in Maharashtra

October 2009
Introduction

Traditionally, the power sector in Maharashtra, excluding Mumbai, was served by Maharashtra State Electricity Board (MSEB) which was set up in 1960 to generate, transmit and distribute power to all consumers in Maharashtra excluding Mumbai. Mumbai is served by three power utilities – Tata Power Company Ltd., Bombay Suburban Electric Supply (BSES) Ltd. and Bombay Electric Supply & Transport Undertaking (BEST). MSEB was the largest SEB in the country in terms of units of power sold till 2005-06. Its generation capacity grew from 760 MW in 1960-61 to 9771 MW in 2001-02. MSEB’s customer base of 107,833 in 1960-61 grew to 14,009,089 in 2001-02. MSEB’s thermal power stations were also efficient as they achieved high power availability of 86% and plant load factor of 74% in 2001-02. By 2001-02 MSEB had a large Transmission & Distribution (T&D) network of 6.67 lakh ckt kms.

Imperative for reforms in the state

Over time the predominance of social objectives led to a lack of commercial orientation in the operations of MSEB. Further, tariffs for domestic, power looms and agricultural segments were lower than the average cost of supply of power, and were subsidized by industrial and commercial consumers. For the year 2000-01 average cost of supply for MSEB was Rs 3.65 KWh whereas average realization was Rs 2.93/KWh. As shown in Figure-1 revenue realized from agricultural connections was far lower than cost of supply.

The distorted tariff structure led to more and more high-paying industrial consumers setting up their own captive generating stations. This led to decline in consumption of power from the MSEB grid by high-paying industrial consumers, while consumption by subsidized consumer categories grew over the years. Share of electricity sold to agricultural customers grew from 25% in 1993-94 to 34% in 1998-99 in

![Average Cost and Realization of Power in 2000-01](Figure 1)

*Average PLF (thermal) for various utilities was 69.9% in 2001-02*
Maharashtra. During the same period share of industry fell from 35% to 32%.

Further, the low tariff for subsidized consumers led not only to deterioration in financial performance, but also to wasteful consumption from these consumers. The impact of lack in commercial focus of company was reflected in both quality of supply as well as performance of MSEB as shown in Box 1.

The above factors contributed to decline in financial health of MSEB. MSEB made commercial profits without subsidy till 1994-95. Commercial profits (without subsidy) as reported in 1994-95 were Rs 276 Crores. These profits declined overtime and MSEB reported a commercial loss (without subsidy) of Rs 1479 Crores in the year 1999-2000. However, MSEB showed commercial profits during the year if the subsidy of Rs 2084 Crores provided by the state government is taken into account. The commercial profits stood at Rs 605 Crores.

With deterioration in its financial health, MSEDCL found it difficult to invest in maintenance and up-gradation of infrastructure. This led to further deterioration in quality of supply and increase in technical losses. Caught in this downward spiral, MSEB was finding it hard to escape from declining performance. Due to financial deterioration and ever increasing need for subsidies, need for reforms became eminent.

**Box 1: MSEB’s Performance Review**

- **Power Deficit**: The state faced a shortage in meeting overall as well as peak load requirements. Energy deficit grew from 4.5% to 8.8% between 1991-92 and 2001-02. The peak deficit during the same period grew from 8.7% to 12.5%.

- **Transmission and distribution losses** (T&D losses): Ageing infrastructure, inadequate O&M of the network and low investments in new infrastructure and increased power theft led to an increase in T&D losses from 17.7% in 1995-96 to 30.5% in 1999-2000.

- **Gap in cost and revenue realized**: The difference between cost of power supply and the average tariff realized from the customers denotes the margin for a power distribution business. This difference grew from 16.3 paise /KWh in 1995-96 to 48.8 Paise/KWh in 1999-2000.

- **Increasing subsidy**: The increasing difference between cost of supply and revenue realization per unit led to increase in subsidy requirements. From 1994-95 to 1999-2000 the subsidy provided by the state government to MSEDCL increased from nil to Rs 2084 Crores.
Reforms undertaken

Given the deteriorating financial health of MSEB and its impact on the state, the Government of Maharashtra (GoM) decided to review the power situation in the state and undertake reforms required. GoM constituted the State Electricity Restructuring Committee and the Energy Review Committee (ERC) to review the power situation in the State and suggest broad future course of reforms for the power sector in the State. GoM came up with a white paper in August 2002, indicating reforms to be undertaken and the timelines for the same. Summary of various suggestions made in this white paper are discussed in Box 2. This white paper specifically mentioned that employees and unions of MSEB were opposed to unbundling and/or privatization and stated that full operational autonomy must be given to MSEB and internal reforms should be carried out first.

In less than a year of this initiative of GoM, Electricity Act 2003 was passed. As per Electricity Act 2003, the states were required to unbundle SEBs and at the minimum the transmission activity was to be separated from SEB. Consequently, the GoM unbundled the MSEB in June 2005 into one holding and three units.

Box 2: White Paper on Maharashtra Power Sector Reforms

*Participants:* Prior to preparation Government of Maharashtra (GoM) invited suggestions from various stakeholders comprising industry, employees, consumers and the Maharashtra Electricity Regulatory Commission (MERC)

*Reforms requirements identified*: Reform process was expected to bring about changes under 3 broad categories:

- **Internal reforms**: These reforms were expected to focus on developing human resources, implementing loss reduction measures and anti theft measures. To improve quality of service demand side management and consumer grievance redressal system were to be set up.
- **Independent regulatory mechanism**: GoM did setup MERC under the provisions of the Electricity Regulatory Commissions Act, 1998. GoM committed to ensure smooth and independent functioning of MERC. Tariff rationalization was also considered as an important measure to ensure recovery of cost of power supply.
- **Structural Changes**: It was identified that a vertically integrated MSEB catering to the diverse needs of a customer base has inherent limitations. GoM proposed that MSEB be restructured in order to promote and encourage efficiency, autonomy and accountability in decision making and functional specialization.

*Milestones*: GoM identified following milestones –

- **Legislative milestones**: To make Anti Theft legislation effective from October 2002 and pass the Maharashtra Electricity Reform Bill in December 2002
- **Efficiency improvement milestones**:
  - To develop Consumer Charter of Rights in six months
  - To reduce technical losses by 1% and commercial losses by 3% per year in urban areas. In rural areas, technical losses to be reduced by 0.5% and commercial losses by 2% per year
  - To increase overall collection efficiency to 94% in two years
  - To ensure metering of all agricultural consumers by December 2004
subsidiary companies. The new entities formed were:

- MSEB Holding Company
- Maharashtra State Generation Company
- Maharashtra State Transmission Company
- Maharashtra State Electricity Distribution Company

MSEB Holding Company was expected to function as a think tank and take necessary decisions relating to investment in three companies.

Maharashtra State Electricity Distribution Company Limited (MSEDCL) came into existence as a result of this unbundling on June 6, 2005. MSEDCL is also known as Mahavitaran or Mahadiscom. MSEDCL inherited a number of problems from its predecessor, MSEB which showed in its results for the year 2005-06:

- **Low collection efficiency**: Collection efficiency reported by MSEB for the year 2005-06, when unbundling was done, was less than 90%\(^5\).
- **Inadequate distribution infrastructure**: MSEDCL also inherited an inadequate infrastructure which had a negative impact on technical losses as well as reliability of supply. The LT to HT ratio of distribution lines at that time was high at about 2:1 which lead to high technical losses.
- **Aggregate technical and Commercial Losses (AT&C)**: AT&C losses for the year 2005-06 stood at 36.74% for MSEDCL.
- **Power Deficit**: By the year 2005-06 the peak deficit reached 23.1%\(^3\).
- **Gap in cost and revenue realized**: For the year 2005-06 average cost of supply (ACS) and average revenue realized (ARR) stood at Rs 2.49/ KWh and Rs 2.43/KWh respectively.
- **Consumer related problems**: When MSEDCL came into existence, a number of problems existed on consumer front:
  - No separate Consumer care centers
  - No Call Center for Complaints
  - No system for Feedback to consumers
  - Huge time taken for supply restoration against complaints
  - No system for tracking status of consumer complaints

Due to high level of consumer dissatisfaction caused by low quality of supply and high losses, MSEDCL decided to undertake a number of initiatives.

**Initiatives taken post-reforms**

MSEDCL decided to undertake a number of initiatives to bring about concerted changes in...
the distribution business and power scenario in the state. These initiatives were clubbed under what is called a ten point program. The program is as follows:

1. Preventive maintenance
2. Distribution network planning
3. Consumer Grievances Redressal Systems
4. Distribution system loss reduction
5. Improvement in Collection efficiency
6. Circles to act as profit centers
7. Efficient use of Technology
8. Improved services to Ag. Consumers
9. Improving working conditions of employees
10. Demand Side Management

It can be seen from the ten point program that the Initiatives taken by MSEDCL focused on three broad areas:
- Initiatives to improve Quality of Supply
- Initiatives to minimize AT&C losses
- Customer centric Initiatives

**Initiatives to improve Quality of Supply (QoS)**

Quality of Supply (QoS) is determined by keeping in view a number of factors like reliability of supply, load shedding etc. To improve QoS MSEDCL decided to start initiatives that can ensure better management of existing infrastructure by optimizing allocation of infrastructure and better load management on demand side. Initiatives introduced to achieve better QoS by MSEDCL are:

- *Gaonthan Feeder Separation Scheme*: under this scheme, MSEDCL is separating the rural feeders that service homes from those that feed agricultural pump sets. Expected to be completed in two phases, this scheme sought to ensure better power supply to homes in rural areas. Guaranteed 8 hours of electricity to Agricultural Water Pumps this would help in shifting the agricultural load to non-peak hours, thereby enabling better load management on part of MSEDCL. Gaonthan Feeder Separation Scheme has been planned for more than 15000 villages. This scheme will be implemented with an estimated total cost of Rs 2389 Crores for both the phases. This scheme is expected to provide multiple benefits to MSEDCL and is also expected to bring relief to consumers by providing reliable power supply through load management. Some of the benefits this scheme is expected to provide are:
  I. Uninterrupted power supply to homes in villages and sub-urban areas
  II. As agricultural connections are low tariff connections, separating them will lead to better power accounting
  III. Flattening of load curve: A typical load curve in MSEDCL shows peak demand for the day at around 22:00 in the evening. At that time of the day demand supply gap is largest for MSEDCL. Schemes like Gaonthan feeder scheme can help MSEDCL to achieve flattening of this load curve in a judicial way, thereby reducing the cost on power purchase and reducing the penalty for unscheduled interchanges.

Phase-I of Gaonthan Feeder Separation Scheme has covered 5185 villages till April 2009. 1318 Feeders have been commissioned and a load management of the order of 1592 MW has been achieved under this phase.

- *Akshay Prakash Yojana*: Akshay Prakash Yojana (APY) is a demand side management measure, whereby, MSEDCL has attempted to restrict rural feeder loads to 20% of actual value by reducing pilferage, removing...
inefficient devices and better load management. The programme rests on collective responsibility of the inhabitants of the village and is carried out voluntarily for ensuring better quality of supply.

This scheme was triggered by children demanding electricity for education from MSEDCL. Some MSEDCL officials made them understand that electricity is a scarce commodity and is being used through pilferage and inefficient devices in their village. The school students had then grouped together and approached the gram panchayat with the MSEDCL officials where it was communicated that if the villagers prudently managed their consumption, then the entire village could have better quality of supply. Later this initiative spread to other villages through the efforts made by MSEDCL.

Under this scheme villagers voluntarily restrict the use of any 3 phase load during 5p.m.-11p.m. on week days. Only lighting load is utilized. During 5p.m.-11p.m. the load is restricted to 20% of full load. Load restrictions are supplemented by removal of hooks and unauthorised heavy consumption devices like heaters and hotplates. Apart from this the scheme envisages adoption of energy saving lighting, pumps and use of capacitors. To supervise the usage restriction and reduction in unauthorised access surveillance committees (Veej Dakshata Committee – VDC) have been formed by the villagers.

This scheme was intended to benefit both the consumers as well as the utility by providing:

I. Reducing transformer breakdowns due to reduction in usage of high consumption devices and unauthorised connections
II. Reducing load shedding due to better load management
III. Increasing supply of power and lesser load shedding improves conditions for rural people and help cottage industries

The graph above shows gap between power supply and demand for MSEDCL on a typical day. Power requirement are high at certain times of the day, due to which peak daily deficit is high. As shown in the graph the peak deficit is of the order of 2573 MW at 10:00 pm, whereas there is no deficit at 3:00 am. Schemes like Gaothan and Akshay Prakash Yojana allow MSEDCL to shift the agricultural load from high deficit time to non-deficit periods, thereby reducing daily peak load requirements. This leads to reduced load shedding.
IV. Reducing commercial losses and maintenance costs

- **Single Phasing Project**: The Single phasing scheme is also aimed at providing rural areas with uninterrupted power supply. It envisages supplying single phase rural lighting load through three single phase transformers.

Single Phasing of the selected rural mixed load feeders is carried out by use of changeover switches at substation. During the normal operation, the agricultural load continues to be supplied from the three phase transformers. On operation of the changeover switch, there is no supply to the 3-phase load on the 11kV distribution network whereas single phase supply is available to the lighting and fan load. On revising changeover switch, normal 3-phase supply is restored.

This scheme is being implemented in three phases out of which two have been completed already. Under these two phases, 11,962 villages were covered. Third phase is expected to cover 1,536 more villages.

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III*</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Sub-station</td>
<td>424</td>
<td>296</td>
<td>459</td>
</tr>
<tr>
<td>No. of feeders</td>
<td>1186</td>
<td>768</td>
<td>-</td>
</tr>
<tr>
<td>No. of villages covered</td>
<td>8085</td>
<td>3877</td>
<td>1536</td>
</tr>
<tr>
<td>Expected Load</td>
<td>1153 MW</td>
<td>722 MW</td>
<td>-</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Cost</td>
<td>235 Cr.</td>
<td>213 Cr.</td>
<td>205 Cr.</td>
</tr>
</tbody>
</table>

* All figures for Phase III are expected no.
Source: MSEDCL Website

- **Pune load shedding model**: This distributed generation model was designed to achieve zero load-shedding in the Pune urban circle. It was developed by MSEDCL in consultation with the Confederation of Indian Industry (CII). CII proposed to utilise surplus power available from Captive Power Producers (CPPs) during peak hours by implementing a workable alternative for harnessing distributed generation on a pilot basis.

CII proposed that industries with captive or standby gensets that were drawing power from the MSEDCL grid on a 24 hour basis should reduce their off-take of power from the grid during certain specified peak periods and instead operate their own generators. The additional grid power made available through this strategy could then be diverted by MSEDCL to low voltage customers to mitigate load shedding. This would eliminate the need for load shedding in the Pune urban circle. The CPPs were reimbursed the incremental cost for electricity they generated on-site during the specified peak periods.

### Initiatives to minimize AT&C losses

In order to minimize AT&C losses MSEDCL had to concentrate on its ageing infrastructure. High technical losses result from inadequate and sub-optimal infrastructure. The commercial losses are majorly caused by power theft. As the existing AT&C losses were very high it was essential for MSEDCL to take a number of steps to contain and minimize them:

- **Investment in Infrastructure**: MSEDCL has started a 3 year infrastructure up-gradation plan, to be executed in two phases. The objective of this project is to improve existing infrastructure along with increasing the capacity of current system in order to support expected future demand. Improved infrastructure is expected to reduce losses that arise because of outdated equipment and over-loading across the grid lines. Heavier loads result in frequent tripping of power along with transformer burning out. Hence improvement in infrastructure will lead
to increased reliability of power along with lower distribution losses. MSEDCL has set following milestones for this scheme:

- Reduce loading of the Distribution Transformers to 80% in the Horizon year from the present level ranging from 100% to 150%
- Use of SCADA, Call Centers, Consumer Facility Centers in all Municipal Corporation areas
- Bring down the DTC failure rate from 16.14% in FY 2005-06 to 5% for urban areas and 7% for rural
- Bring down the Ag. pending connections to one month in three years;
- Meet the standard of performance given by MERC
- Power Factor to be brought to 0.90, 0.95 and 0.99 in Rural, Urban and Industrial areas respectively

As per the plan company is expected to set up 76,182 km of power distribution lines in order to improve the HT-LT ratio of the distribution network. MSEDCL is also expected to set up 565 new substations and augment the existing substations. Total project cost for infrastructure investment in 119 divisions is expected to be Rs 8918 Cr.

For speedy and qualitative development of electricity distribution grid in Maharashtra state, the Maharashtra State Electricity Distribution Company Ltd (Mahavitaran) has decided to engage professional services from project management consultants (PMCs) for speedy implementation of its ambitious infrastructure development and upgradation plan.

To ascertain cost control and quality management under this program MSEDCL has taken following steps:

- Setting up 6 Quality Control Labs with State of the art testing equipments at Kolhapur, Pune, Bhandup, Nasik, Aurangabad & Nagpur
- Formation of Quality control department to ensure purchase of best quality material
- Formation of Material specifications Cell

Theft Detection Drive: MSEDCL launched a theft detection drive in order to improve its collection efficiency. Six dedicated police stations have been established in Maharashtra to handle power theft cases only. During FY 2007-08 about 90,000 cases of power thefts amounting to Rs. 55.41 Cr. were detected. Speedy disposal of vigilance cases and strict action against default. As a result, more than 9000 FIRs were registered against the power theft accused. This drive was implemented consecutively for 15 days every alternate month. During April to September 2008, the drive resulted in 36383 cases and recovery of Rs. 25 Cr. as penalties and FIRs against 3559 persons.

MSEDCL also took strict disciplinary action against delinquent employees. This is evident from the fact that, in initial days, FIRs were filed against 22 employees. Also disciplinary action against 389 Employees was taken.

- **Metering and energy audit related initiatives:** MSEDCL started an initiative for metering of Agricultural Consumers and feeders. It also started carrying out feeder wise energy audit (EA) to obtain feeder wise distribution loss data. MSEDCL started to undertake Monthly Energy Accounting at Division, Feeder and DTC level.

By 2009 MSEDCL has achieved following milestones:

- Over 5 million old consumer meters replaced in three years. This addressed concerns/complaints of meters not being
read, under or over reporting, manipulations
- Metering of 9339 feeders and carries out feeder wise EA for all of them
- Metering of 150,000 distribution transformers completed
- Monthly Energy Accounting at Division and DTC level

**Distribution franchisee (DF) arrangement:** MSEDCL was the first distribution utility in the country to implement urban distribution franchising DF arrangement, wherein it franchised the circle of Bhiwandi to the private sector. Under the franchisee agreement, MSEDCL to supply power at specified input points as per MERC regulations & directives (viz. load shedding schedule) and DF to pay agreed input rate. DF was allowed to procure power and supply additional power over and above supply received from MSEDCL; but no guidelines given for such power procurement or for recovery of related costs from consumers. DF to pay to MSEDCL wheeling charges specified by MERC for distribution of such power. The DF is required to bring about a reduction of T&D losses to 10% and increase of collection efficiency to 98% at the end of the franchise period.

The DF arrangement at Bhiwandi has yielded successful results as shown in Table-2. Plans are afoot to give other circles (Nagpur, Aurangabad, Jalgaon, etc.) to private parties on similar terms.

**Performance based incentives:** MSEDCL introduced the concept of annual performance reports based on improvements in area specific Aggregate Technical & Commercial (AT&C) losses and collection efficiency for its employees. Such an initiative has led to involvement of employees in the reform process. Company also conducts management classes for its staff and sends them for training courses, besides sharing best practices with employees.

**Customer centric initiatives**

Along with concentrating on technical issues MSEDCL introduced a number of initiatives to provide better customer services. With the usage of IT, MSEDCL has been able to connect to its customer and handle their issues in a much better way. MSEDCL has established customer database of over 15 million customers. Initiatives taken by MSEDCL to serve its customers better are:

- **Photo metering:** to address Billing complaints: wrong meter reading/ more consumption by consumers, MSEDCL took a first of its kind initiative in the country. MSEDCL has started

| Table 2 |
|------------------|------------------|------------------|
| Power Scenario in Bhiwandi – Before and After Franchising |
| | Handover to DF – Dec 2006 | At the end of 2008-09 |
| Aggregate Technical & Commercial (AT&C) losses | 58% | 24% |
| Transformer failure rate | 40% | 7.5% |
| Status of consumer metering | Poor with few accurate meters | 95% meters accurate |

Indicators for Quality of Supply

| | Feb 2007 | Jan 2009 |
|------------------|------------------|
| System Average Interruption Frequency Index (SAIFI) | 47.63# | 13.57* |
| System Average Interruption Duration Index (SAIDI) | 23.56# | 3.55* |
| Consumer Average Interruption Duration Index (CAIDI) | 0.49# | 0.26* |

*Feb 2007  * Jan 2009  Source: MSEDCL, TPL
taking Digital Photograph of Energy Meters is taken & displaying this photo image on energy bill & Billing as per meter reading in photograph.

This initiative of providing photo of meters along with the reading on bills has a number of inherent benefits.

I. It results in higher customer satisfaction as actual readings are printed on bill

II. It also ensures reduction in the chances of malpractices like over or under billing by MSEDCL’s own employees

For this purpose, it has developed an indigenously devised software program that captures the details which, besides showing the readings, also ensure that the meters were not tampered with or manipulated by magnetic devices. This scheme has led to reduced number of disputes over billing, which ultimately leads to better collections and reduced litigations. MSEDCL has covered more than 1 crore consumers under this scheme till September, 2008

New format also included past consumption pattern in the bill sent to consumer. Such a step was helpful as earlier consumers were not sure of past consumption which led to disputes.

- **Complaint handling initiatives**: MSEDCL has initiated various activities for improving its response to consumers and improving complaint handling:

  I. To take care of consumer complaints and having a system for feedback, 11 Consumer Grievance Redressal Forums have been established at various locations and internal grievance redressal units established in all O&M Circles. Central Grievance Redressal System has been set up at Head Office

  II. For handling supply related consumer complaints 15 Call Centers have been set up

  III. About 50 Consumer Facilitation Centers (CFCs) have been set up for resolution of billing and related matters at sub-division level

  IV. Grievance redressal meetings with industries and consumer associations are also organized

  V. Single coordinating agency set up to deal not only with customer but also to monitor the operational resolution of the complaint within MSEDCL.

- **Ease of billing**: MSEDCL has started a number of initiatives to make it easy for consumers to access and pay their bills. All bills have been put on the internet for providing easy access to the consumers. The payment gateways available to consumers have been increased by commissioning ATM Cash Collection Centers, Drop Boxes and offering the consumers the facility to make e-payments.

MSEDCL started all these initiatives to ensure economic viability of the business and to provide better services to its customers. The decision to unbundle MSEB had made employees apprehensive, as they saw unbundling as first step for eventual privatization of the utility. Employees also feared mass layoffs from the utility. Therefore, one of the most important tasks before MSEDCL was to increase employee morale.

To ensure the success of initiatives taken MSEDCL’s decisions had to be backed by dedication and drive in MSEDCL’s employees. Hence the first thing that MSEDCL did was to strengthen communication initiatives towards internal Employees. To this end, it undertook...
Workshops with field staff and with unions
- Workshops conducted by Unions for members
- Staff Meetings at Division/Circle Level
- In-House Journal “Maha Vitaran Veej Varta” was used to convey the management’s viewpoint and communicate to employees. Communicate new initiatives/plans etc.

**Outcome of reforms and initiatives**

The overall impact of reforms and initiatives taken by MSEDCL has started producing favorable results. While the success of each initiative cannot be measured individually, a number of parameters indicating the overall health of power distribution sector in the state are discussed below:

- **Aggregate technical and Commercial Losses (AT&C):** AT&C losses reported by MSEB in 2005-06 were very high at 50.4%. These losses have been reduced to 24.8% through various initiatives by MSEDCL.

- **Collection Efficiency:** The collection efficiency has improved to the level of 96.57% in FY 2008-09 from the MSEB’s collection efficiency of 82.96% in 2005-06.

**Financial viability of MSEDCL:**

1. **Profitability:** MSEDCL registered a profit of Rs. 117 Cr. during the year 2007-08 as compared to losses of Rs 303 Crores in 2005-06. However without subsidy from state MSEDCL is still making losses. This loss has decreased since MSEDCL has come into existence but change has not been significant.
2. **Arrears**: MSEDCL’s arrears have increased from Rs 9288 Crores in March, 2007 to Rs 12547 Crores by March 2009. Increase in arrears over the years reflects MSEDCL’s inability to collect earlier dues.

3. **Gap in cost and revenue realized**: The gap in ACS and ARR has declined from 11 paisa/KWh in 2004-05 to 3 paisa/KWh in 2007-08 as shown in the graph below. The gap between ARR without subsidy and ACS however is still high at 26 paisa/KWh in 2007-08.

### Table 3

<table>
<thead>
<tr>
<th>MSEDCL’s Profits (in Rs Crores)</th>
<th>2005-06</th>
<th>2006-07</th>
<th>2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profits with subsidy</td>
<td>-303.4</td>
<td>-133.9</td>
<td>117.2</td>
</tr>
<tr>
<td>Profits without subsidy</td>
<td>-1865.9</td>
<td>-1817.9</td>
<td>-1712.1</td>
</tr>
</tbody>
</table>

Source: PFC Report, MSEDCL Annual Report 2007-08

### Table 4

<table>
<thead>
<tr>
<th>MSEDCL’s Arrears (in Rs Crores)</th>
<th>March 07</th>
<th>March 08</th>
<th>March 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receivables</td>
<td>9288.5</td>
<td>10719.0</td>
<td>12547.4</td>
</tr>
</tbody>
</table>

Source: MSEDCL Annual Report 2007-08, MSEDCL Website

- **Quality of Supply (QoS)**: Investment in infrastructure and other load management initiatives have led to better quality of supply. Reliability indicators like SAIFI, SAIDI and CAIDI have improved due to decreased load shedding and tripping. SAIFI, SAIDI and CAIDI improved from 10.30, 292.96 and 28.46 in April 2007 to 8.02, 159.78 and 19.92 respectively in March 2009.

### Figure 6

The gap between ARR without subsidy and ACS however is still high at 26 paisa/KWh in 2007-08.

### Figure 7

- Average revenue realized (ARR) without subsidy, Average cost of supply (ACS) & Gap between them over the years for Maharashtra post reforms

### Figure 8

- SAIFI
- SAIDI
- CAIDI

Source: MSEDCL Website
Conclusion

MSEDCL has been in existence for a little over four years and it will be too soon to comment on sustainability of the reforms undertaken. However given the scale and the kind of problems it inherited, MSEDCL has done a commendable job in improving the situation of power distribution sector in Maharashtra. This improvement has been reflected by decrease in AT&C losses, improved collection efficiency and better QoS parameters.

However rising arrears are a cause of concern for MSEDCL. Also the subsidy from state has risen over the years for MSEDCL. MSEDCL is still far from breaking even without subsidy and the gap in ARR (without subsidy) and ACS is quite high.

MSEDCL’s sales mix has not reflected any significant change over the years whereas revenue mix shows a declining contribution from agriculture and domestic sector (refer Annexure 1). This reflects that commercial and industrial sectors are still facing cross subsidizing these sectors. Revenue contribution from agriculture and domestic sector has to increase to improve MSEDCL’s financial viability.

Power deficit faced by Maharashtra from April 2008 to March 2009 was 21.4%\textsuperscript{15}. Going forward MSEDCL has to cater to remote and rural areas facing load shedding and bad quality of supply. With increasing arrears and huge gap in ARR and ACS, MSEDCL has a tough task ahead of itself to achieve the targets of being financially viable and providing quality customer service.
References

3. All India Electricity Statistics General Review 2006, CEA
11. Demand Side Management to Support Electricity Grids, MSEDCL’s Perspective, 26 March 2008
12. Challenges of Electricity Sector in a Developing Economy, Maharashtra Case Study, 23 April 2009
17. http://www.mahadiscom.in/soa/Final_statementofaccount0506.pdf
18. http://www.mahadiscom.in/Gaothan_Feeder_Separation_Scheme_Project-01.shtm
Sales mix: Sales mix has not changed significantly over the years after reforms. As shown in the table below share of agriculture has declined and that of industrial and commercial segment has grown over time.

<table>
<thead>
<tr>
<th>Sales Mix (as % of total units sold)</th>
<th>2004-05</th>
<th>2005-06</th>
<th>2006-07</th>
<th>2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>16.7%</td>
<td>16.6%</td>
<td>17.1%</td>
<td>16.4%</td>
</tr>
<tr>
<td>Commercial</td>
<td>4.3%</td>
<td>4.2%</td>
<td>4.5%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Agricultural</td>
<td>22.5%</td>
<td>21.8%</td>
<td>19.2%</td>
<td>22.1%</td>
</tr>
<tr>
<td>Industrial</td>
<td>43.0%</td>
<td>45.6%</td>
<td>50.2%</td>
<td>47.8%</td>
</tr>
<tr>
<td>Others</td>
<td>13.6%</td>
<td>11.9%</td>
<td>9.0%</td>
<td>8.6%</td>
</tr>
</tbody>
</table>

Revenue mix: Post reforms MSEDCL has witnessed a change in its revenue mix. Revenue contribution of industrial sector has gone up from 48% in 2004-05 to 55% in 2008-09. Consequently, despite insignificant change in sales mix, the revenue share of agriculture and domestic sector has decreased over the years.

<table>
<thead>
<tr>
<th>Revenue Mix (as a % of total revenue)</th>
<th>2004-05</th>
<th>2005-06</th>
<th>2006-07</th>
<th>2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>16.1%</td>
<td>15.7%</td>
<td>15.8%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Commercial</td>
<td>6.7%</td>
<td>6.3%</td>
<td>6.5%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Agricultural</td>
<td>12.9%</td>
<td>12.6%</td>
<td>11.0%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Industrial</td>
<td>48.4%</td>
<td>51.0%</td>
<td>56.3%</td>
<td>55.2%</td>
</tr>
<tr>
<td>Others</td>
<td>15.9%</td>
<td>14.4%</td>
<td>10.4%</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

Cost components: The cost components of MSEDCL’s total expenses are as shown in table below.

Over the years power purchase cost has not changed much as a percentage of total cost. However MSEDCL has seen a significant rise in its interest and financing costs. Rise in interest costs is due to capital expenditure being incurred by MSEDCL for upgrading its infrastructure. MSEDCL’s administration expenses have also increased due to rise in vigilance activities.

<table>
<thead>
<tr>
<th>Expenses as a percentage of Total Expense</th>
<th>2005-06</th>
<th>2006-07</th>
<th>2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase of Power</td>
<td>83.01%</td>
<td>81.09%</td>
<td>81.76%</td>
</tr>
<tr>
<td>Repairs and Maintenance</td>
<td>1.49%</td>
<td>2.07%</td>
<td>2.53%</td>
</tr>
<tr>
<td>Employee Costs</td>
<td>9.34%</td>
<td>10.15%</td>
<td>8.63%</td>
</tr>
<tr>
<td>Admin &amp; General Expenses</td>
<td>0.91%</td>
<td>1.03%</td>
<td>1.32%</td>
</tr>
<tr>
<td>Depreciation</td>
<td>2.89%</td>
<td>2.50%</td>
<td>2.60%</td>
</tr>
<tr>
<td>Interest and Finance Charges</td>
<td>2.36%</td>
<td>3.15%</td>
<td>3.17%</td>
</tr>
</tbody>
</table>

Source: PFC Report, MSEDCL Annual Reports