

**Before the Maharashtra Electricity Regulatory Commission**  
**Case No. 1 of 2001**

**Comments / Objections on MSEB's Tariff Revision Proposal**

**By**

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**INDEX**

1. Comments on Tariff Revision Process and Data / Calculation Formats
  2. Reduction in Uncovered Revenue Gap
    - 2.1 Need for Reducing Revenue Requirement by Rs. 836 Cr.
    - 2.2 Need for Increasing Projected Revenue at Existing Tariff by Rs. 162 Cr
    - 2.3 Need for Increasing Revenue from Reduction in Theft by Rs. 245 Cr.
    - 2.4 Reduction in Uncovered gap from Rs. 1455 Cr. to Rs. 211 Cr.
  3. Other Issues
    - 3.1 Enhancing Generation by 1000 MW from Coal and Uran Gas Plants
    - 3.2 Performance of Koyna Power Station
    - 3.3 Demand Side Management
    - 3.4 Service Quality Monitoring and Improvements
    - 3.5 Periodic Disclosure of Critical Data and Performance Parameters
  4. Comments on Reduction of Cross-Subsidy
  5. Prayers
- Annexure 1: Details of Calculations in Section 2 - Reduction in Uncovered Revenue Gap
- Annexure 2: Analysis of Energy Audit Data:
- Metering and Billing Inefficiency at EHV and HV Level
  - Large Theft in Concentrated Areas
- Annexure 3 : Performance Monitoring Systems  
(Extract from Prayas Submission dated 6<sup>th</sup> April 00 in Case 1/ 99)

## Comments / Objections on MSEB Tariff Revision Proposal (Case 1 of 2001)

### 1. Comments on Tariff Revision Process and Data / Calculation Formats:

Tariff revision is one of the most important aspects of regulatory process, as it offers an opportunity to consumers as well as the commission to comprehensively review the performance of utilities in terms of overall economy and efficiency. Several complex issues such as generation performance and merit order dispatch, prudence of capital expenditure and the resultant reasonable interest costs, compliance with various directives of the commission, need to be analyzed in detail in order to ensure that consumers are not burdened with unjustifiable costs due to inefficiency and poor performance of the utility and at the same time financial viability of the utility is ensured. Considering the present status of MSEB, in terms of uncertainty about costs, performance improvements etc. it not feasible and desirable to set tariff for a longer timeframe (of say 3-5 years) and tariff revision process would continue to be an annual exercise. In this situation for ensuring smooth and fast decision on tariff revision application without compromising transparency and public participation in the regulatory process, it is essential to set regulations / guidelines for i) Data requirement and formats, and, ii) Tariff revision process timeframe. Such guidelines would reduce uncertainty in the tariff revision process and would help all stakeholders (consumers and public at large, state government, utility as well as the commission) to effectively address various challenges before the sector. Utility would know what data it needs to provide, and in what form resulting in substantial reduction in time required for preparation of the proposal and data gathering / synthesis. Consumers would also benefit, as they would be aware about what to expect in the proposal and the expected time lines. Standardized proposal / data formats would also enable faster and easier analysis of the proposal reducing need for seeking additional time etc. Such guidelines would enhance public participation in the process, as well as quality and credibility of the regulatory process. As such we request the commission to include such guidelines / directives in the present order.

Considering the complexity and critical importance of the data requirement and formats we request the commission to direct MSEB to submit a proposal for the same for commission's approval and the commission should approve the proposal (with necessary amendments) after consultation with consumers.

In terms of time frame for tariff revision process we request the commission to adopt a schedule similar to the one in table 1 below. Most electricity reform Acts such as Orissa, Andhra Pradesh and Karnataka stipulate a time frame of 2 to 3 months (60 -90 days) for tariff revision process after RC accepts the proposal (i.e. stage at which supplementary data required by RC is submitted). The below-suggested time frame is also in line with these time frames. Further RC can consider directing to submit Annual Revenue Requirement (ARR) in the standard format at least three months before the beginning of the ensuing financial year, as required by many reforms Acts.

**Table 1: Suggested timeframe for tariff revision process**

<b>Day</b>	<b>Milestone / Remarks</b>
-30	Submission of tariff proposal to MERC MERC to check if all data in proper format is submitted MSEB to designate an officer to address clarifications etc.
-27	Preliminary validation of the proposal by MERC Directive to send proposal to consumer groups Fixing up technical validation dates
-12 to -10	Technical validation
0	Submission of amended proposal (with additional data etc. if any) Acceptance of the "Complete Proposal" by MERC Making available the proposal in various offices of MSEB and on website Public Notice inviting comments
45	Receipt of comments / objections from consumers
50 - 60	Public hearings MSEB to ensure that its rejoinder to objections is made available to respective objector at least three days before the respective public hearing
65	Final date for rejoinders, data etc. by consumers as well as MSEB
75	Tariff order
	Publication of new tariff in newspapers (by MSEB)
	New tariff becomes effective

## **2. Reduction in Uncovered Revenue Gap:**

### 2.1 Need for Reducing Revenue Requirement by Rs. 836 Cr.:

MSEB has estimated a revenue requirement of Rs. 13,280 Cr. for the FY 01-02. Analysis of various data and calculations provided by MSEB indicate that a large part of this revenue requirement is either on account of MSEB's inefficiency and /or failure to adhere to MERC's various directives. Details of such items and reasoning for the same is given in the Table 2 below.

**Table 2: Reduction in Revenue Requirement**

**(Rs. Cr.)**

<b>Revenue requirement</b>	<b>MSEB Proposed</b>	<b>Requested Dis-allowance</b>	<b>Remarks / Objections</b>
<b>Particulars</b>	<b>2001-02</b>		
Generation	3791.6	100	MSEB's cost estimate includes Transit loss of coal, which the commission has disallowed repeatedly. This amounts to approximately Rs. 100 Cr. Also from the data provided it is not clear whether MSEB costs are based on MERC's heat rate (HR) norm of 2740 kCal/ kWh. If MSEB estimates are based on HR higher than MERC norm then appropriate generation expenses should be disallowed in addition to Rs. 100 Cr. on account of transit loss. Ref. MSEB Data of fuel cost for March 01 (Annex 8 of supplementary data provided to Prayas) and Table 8.4 in Volume I of the proposal. Further, we take strong objection to MSEB's attempts to recover transit loss without explicit request to the commission and attempting to hide the same.
Employee cost	1840.0	244	This consists of Rs. 244 Cr. towards provision for arrears. This provision should be disallowed as the same pertains to previous years (provisions should have been made in previous year's expense, as these are predictable expenses). Also MERC has disallowed Fifth pay commission revision in last order. Due to these reasons Rs. 244 Cr. from this head should be disallowed.
A&G	277.6	155	This includes Rs. 155 Cr. on account of interest due to late payment of electricity duty. The late payment is clearly due to MSEB's inefficiency and consumers' should not be burdened of the costs arising out of such inefficiency. This cost of Rs. 155 Cr. should be disallowed.
Interest	1308.4	159	MSEB has sought to recover Rs. 246 Cr. towards interest on working capital (WC). MSEB has sought to raise entire working capital need at commercial rate through commercial sources. WC requirement is estimated at Rs. 2171 Cr. But, MSEB collects security deposit from consumers, which in fact is akin to advance payment of electricity consumed and is reflected in "Current Liabilities" in the balance sheet. The interest on security deposit is also charged to revenue requirement. As such additional WC requirement should be only to the tune of difference in WC need (as per 2 months receivables etc.) and already collected security deposit. As such interest on only this additional WC should be allowed. This would result in disallowing interest to the tune of Rs. 159 Cr. )

			Refer Annexure 1 for calculations.
Other Exps	250.7	14	Under this head MSEB has sought to recover Rs. 9 Cr. towards late fee of guarantee charges and Rs. 5 cr. bad debt write off. Out of this former is on account of MSEB's inefficiency and later a double counting of write off (as there is already a provision of Rs. 200 Cr. for the same). As such both these expenses should be disallowed.
<b>TOTAL EXPENSES</b>	<b>12787.0</b>		
<b>Add: Surplus @ 4.5%</b>	493.2	164	MSEB has estimated surplus at 4.5 % even though the government has not issued any notification to that effect. MERC has clearly directed in last tariff order that unless such a notification is issued only 3% surplus would be allowable. This would require disallowing Rs. 164 Cr. on this account.
<b>Revenue requirement (B)</b>	<b>13280.2</b>	<b>836</b>	Based on above considerations / objections we request the commission to reduce the total revenue requirement of MSEB by Rs. 836 Cr. i.e. total revenue requirement should be restricted to <b>Rs. 12,444 Cr.</b>

### 2.2 Need for Increasing Projected Revenue at Existing Tariff by Rs. 162 Cr.:

MSEB has projected FY 01-02 revenue at existing tariff as Rs. 10,795 Cr. In these calculations MSEB has assumed continued un-metered supply to power loom as well as HT agriculture consumers. MSEB in its last tariff proposal (March 2000) had proposed to meter these (power loom and HT agriculture) consumers before December 2000 (i.e. meter these around 43,000 consumers within 9 months). MSEB should have achieved its own target at least before March 2001. Had it been so MSEB would be getting revenue from these categories as per metered tariff, which is higher than un-metered tariff. This failure to meter these consumers have resulted in under representation of revenue by Rs. 117 Cr. and Rs. 46 Cr. from power loom and HT agriculture category respectively. Revenue loss due to such failure by MSEB to achieve its own targets and to implement MERC's related order for metering, should not be passed on to paying consumers. Hence estimated revenue at existing tariff should be increased by Rs.162 Cr. (Rs. 117 Cr. + Rs. 46 Cr.) Details of this calculation are given in Annexure 1.

### 2.3 Need for Increasing Revenue from Reduction in Theft by Rs. 245 Cr.:

In its May 2000 tariff order MERC had directed MSEB to recover Rs. 600 Cr. through reduction in theft of power. Energy balance for FY 00-01 clearly demonstrates that (even after assuming average LT agricultural consumption at 1600 hrs./yr. and reduced un-metered power loom consumption) MSEB's T & D losses have increased rather than decreasing by 5 % as directed by MERC. Hence we request the commission to direct MSEB to achieve target of Rs. 600 Cr. revenue from theft reduction set by MERC for last year (FY 00-01) at least for the ensuing year (i.e. FY 01-02).

Further as shown in Annexure 2, energy audit data for EHV Level, MIDC areas and Express Feeders reveal substantial metering / billing inefficiency even at the EHV and HV level. Also energy audit data of division level energy audit demonstrates that losses are much higher in urban areas (where assessed energy is less) and concentrating on these handful of divisions for theft reduction would yield substantial revenue as in these areas average revenue is much higher. This would result in increase in revenue by Rs. 245 Cr. as compared to MSEB projection.

At average realization (excluding agricultural sales) of Rs. 3.58 / unit at existing tariff, MSEB needs to convert only around 1,700 MU (i.e. ~ 3 % of total input energy) from theft to revenue earning sales. In this situation, it should be possible for MSEB to meet the target of theft reduction and increase in revenue of Rs. 600 Cr. in the ensuing year (FY 01-02) at least by one year delay (as same was directed by MERC for FY 00-01).

#### 2.4 Reduction in Uncovered gap from Rs. 1455 Cr. to Rs. 211 Cr.:

Based on various factors / objections listed above we request the MERC not to allow average tariff increase of over Rs. 211 Cr. as shown below.

**Table 3: Real Uncovered Gap for FY 01-02**

					<b>Rs. Cr.</b>
<b>A]</b>	<b>Uncovered Gap as per MSEB Proposal</b>				<b>1456</b>
<b>B]</b>	<b>Less: Reduction in Revenue Requirement</b>				
		Generation		100	
		Employee cost		244	
		A&G		155	
		Interest		159	
		Other Exps		14	
		Surplus		164	
			Sub-Total B	836	836
<b>C]</b>	<b>Less: Increase in Revenue at Existing Tariff</b>				
		Due to Metering of Power Loom		117	
		Due to Metering of HT Agriculture		46	
		Due to Additional Reduction in Theft		246	
			Sub-Total C	408	408
<b>D]</b>	<b>Uncovered Gap to be Bridged Through Tariff Increase</b>		<b>( A - B -C)</b>		<b>211</b>

### **3. Other Issues:**

First two parts of this submission covered aspects relating to uncovered gap and tariff revision process. This part focuses on some other issues that are critical from the medium / long term perspective for ensuring overall economy and efficiency as well as protecting consumer interests. We request the commission to direct MSEB to take effective steps (as described below) on five crucial aspects namely, i) Enhancing generation by 1000 MW from MSEB's coal thermal and Uran gas plant, ii) Performance of Koyna power station iii) Demand Side Management, iv) Supply quality monitoring, v) Periodic, routine disclosure of critical data and performance parameters

#### 3.1 Enhancing Generation by 1000 MW from MSEB's Coal Thermal and Uran Gas Plant:

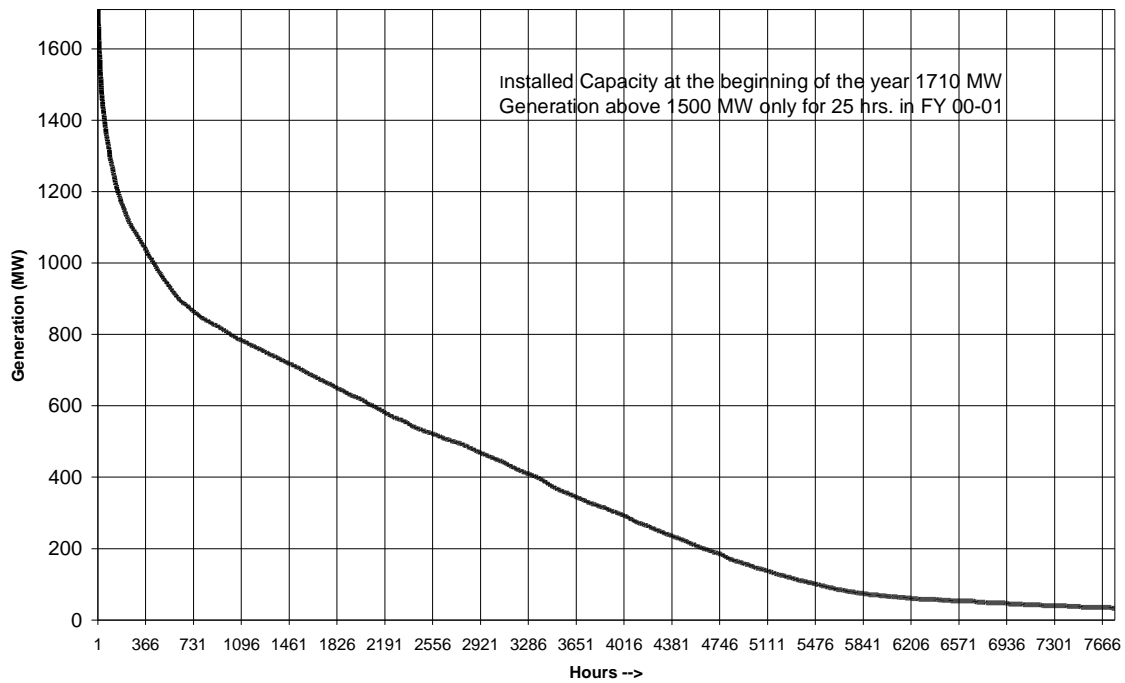
During Case 1 of 1999, MSEB claimed that due to poor quality of coal (high ash content, low calorific value etc.) generation from existing coal thermal plants reduces by around 650 MW. Also due to low gas availability generation from Uran power plant is low. During Case 1/ 99, Prayas had pointed out that it would be feasible to overcome these problems by measures such as coal import, additional boilers / coal washing (in the long term) and use of liquid fuels at Uran. Our preliminary analysis at that time demonstrated that it would be economical to implement such measures and increase generation from MSEB's existing plants. The Energy Review Committee's (Godbole Committee) second report also corroborates these findings and points out that generation from existing plants of MSEB can be increased by around 1,000 MW (650 MW from coal plants and 350 MW from Uran) (ERC report Pg. No. 37) . During the technical validation session we had raised this issue. MSEB has responded to this saying that importing coal is costlier than using indigenous coal and Naptha can not be used at Uran due to constraint in bringing and storage. MSEB has not provided any detail analysis or calculations. Considering the importance of the issue (if MSEB has to erect additional 1000 MW plant then the investment would be in the range of Rs. 3000 -4000 Cr !) we request the commission to direct MSEB to submit a detail techno-economic analysis for various options such as i) coal import ii) coal washing iii) additional boiler, and iv) use of liquid fuels for Uran plant. This analysis should clearly bring out the economics of these options (how costly they are (if at all)) as well as technical and other constraints if any. We further request MERC to get this analysis verified from independent consultants. Since, this is a vital issue affecting overall economy and efficiency in the medium / long term we request the commission to take serious note of this issue.

#### 3.2 Performance of Koyna Power Plant:

Sole purpose of expanding Koyna capacity by 1000 MW was to increase peak generation. MSEB's Statement of Accounts for FY 1999-00 indicate installed capacity of Koyna as 1710 MW (600+320+750+40) as on 31-03-2000 i.e. beginning of FY 00-01. But it is surprising that throughout FY 00-01 Koyna operated above 1500 MW only for 25 hours as shown in Figure 1 below. MSEB's usual argument for such generation pattern is

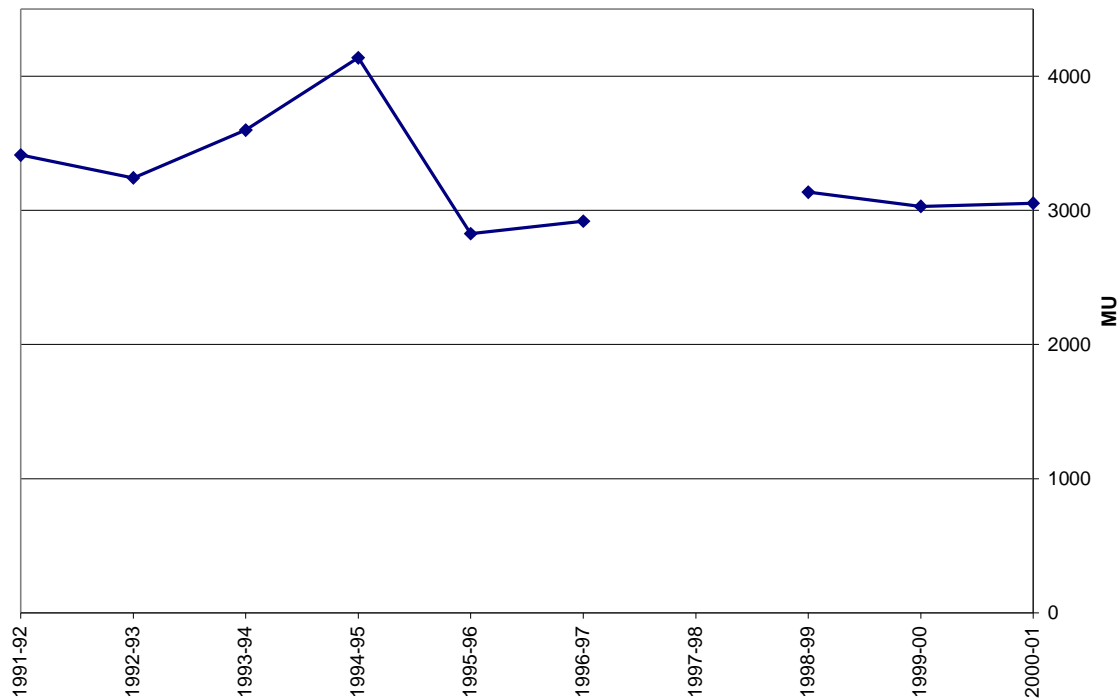
limitation on water use at Koyna dam. But as shown in the Figure 2 total generation from Koyna in FY 00-01 is not much different than generation in previous years. Thus it is clear that Koyna expansion has not resulted in expected peaking generation as yet. Hence, we request the commission to investigate this issue in and if necessary order a capacity test of Koyna station.

**Figure 1: Generation (MW) from Koyna Power Station in FY 00-01**





**Figure 2: Annual Generation (MU) From Koyna Power Station**



### 3.3 Demand Side Management:

Several studies, by independent researchers as well as MSEB appointed consultants, have revealed that demand side management is one of the cheapest options to meet growing demand for power. For example, a Prayas study (carried out in 1992-94) titled "Least Cost Power Planning: Case Study of Maharashtra State" clearly demonstrated that adopting integrated least cost plan (including DSM and de-centralized generation) would imply substantial reduction in our dependence on large centralized fossil fuel based plants and at the same time it would result in reduced costs (by over 30% ). Thus, it is amply clear that for ensuring overall efficiency and economy as well as environmental protection it is imperative that MSEB should adopt integrated least cost power planning in the medium term. Considering that MSEB has still not implemented any DSM scheme, unless few pilot DSM programs are implemented it would not be possible to develop a realistic integrated resource plan. Energy Review Committee (Godbole Committee) has also emphasized need to undertake comprehensive DSM programs. Further, experience world over indicate that Regulatory Commissions have to take a lead and direct utilities to undertake such programs. In the absence of regulatory directives utilities evade possibilities of capturing benefits of DSM program under one pre-text or other.

In light of this discussion we request the commission to direct MSEB to submit a pilot DSM project for the approval of the MERC within six months. This proposal should target peak demand reduction (by measures other than ToD tariff) and should address issues such as implementation difficulties and how to overcome the same, measuring program benefits, low program implementation costs and capturing lessons for large scale replication.

#### 3.4 Supply Quality Monitoring:

Poor supply and service quality is one of the factors adversely affecting consumer satisfaction (and willingness to pay). In the medium term it is essential to develop a well designed system to monitor various supply and service quality parameters such as voltage levels, interruptions, efficiency of releasing new connections, billing efficiency etc. Several of these parameters are being monitored by MSEB in a routine manner as part of its internal performance monitoring system. MSEB claims that it is already following a reasonably satisfactory method of monitoring power failures. MSEB maintains records of supply interruptions as well as reasons for the same (load shedding, tripping etc.), at 11 KV and above feeders at its substations. A monthly summary of these records is then forwarded to division / circle / zone offices. Also various divisional offices of MSEB prepare "Progress Report" and "Consultative Council / Public Grievances Report". As a first step towards monitoring supply and service quality we request the commission to direct MSEB to make available to general public these **circle wise quarterly i) Interruptions report ii) Progress report, and, iii) Consultative Council / Public Grievances report.** Also these reports should be put up on MSEB's website and this quarterly compilation should be made available to general public at circle office one month after the end of respective quarter.

#### 3.5 Periodic, Routine Disclosure of Critical Data and Performance Parameters:

MERC has already directed MSEB to periodically make public data relating to FOCA. We request the commission to direct MSEB to periodically (say every quarter) make public crucial data relating to its performance (Refer Annex 3 for details). Routine disclosure of such vital data along with disclosure of service quality monitoring reports (mentioned in earlier section) would have several benefits. First it will give public opportunity to continuously monitor MSEB's performance and not wait till the time of tariff revision. Also such requirement for disclosure would help in forcing MSEB staff to take these reporting requirements seriously and complete the same in a time bound manner. Routine disclosure of this desegregated data would also help consumer groups to compare performance of various local units of MSEB.

#### **4. Comments on Reduction of Cross-Subsidy:**

In this tariff application the MSEB has requested MERC to substantially reduce the cross-subsidy. This includes reduction of the tariff for the high consumption households, most commercial establishment as well as industries. We wish to point out that no

increase in tariff is itself a reduction in tariff (in real terms). But MSEB suggests major reduction in tariff (in nominal terms for these categories). Simultaneously it seeks a major increase in tariff for the low consumption houses, and agricultural consumers.

As per the ERC Act the pace and manner of reduction of cross-subsidy is at the discretion of the Regulatory Commission. The MERC is hence expected to balance the pros and cons to ensure a smooth transition from the earlier tariff principles to the new tariff principles. Tariff rationalization has been much needed but we are not at all sure if the said goal of **uniform tariff** is a desired direction. There has been little debate on this.

The act is quite vague on this aspect. It suggests movement towards "Average Cost of Supply" but has no clear direction as to how to calculate this "Average Cost". The average cost for supplying interruptible and bad quality of power is radically different than supplying fairly reliable good quality power. We wonder if the MSEB or the MERC has conducted any study in this context. The evidence of the A.P. in this context clearly shows that the average cost of supplying power to the agricultural consumers is much less than the cost of supplying power to the industry. The MERC should look into such studies before accepting any definition of "Average Cost"

More over the new evidence in the last two years is clearly showing that the main reason for the problems of the SEBs in general and MSEB in specific is much more due to (a) its inefficiency in distribution (i.e. high theft and T&D losses), (b) lower than optimum level of generation, (c) the high cost IPP contracts it has signed and (d) inappropriate investments; than the cross-subsidy to poor and agriculture. It is also being revealed that the actual quantum of cross-subsidy given to agriculture was far too over played by the SEBs by hiding their inefficiency under agricultural consumption. In fact, the level of inefficiency due to above four factors is far more than the real cross-subsidy offered to these two sections.

It is far easier to curb the inefficiency in the MSEB than the social and economic impacts of radical increase in tariff - as suggested by MSEB - on the society as a whole. Accepting such a radical increase in tariff for the poor without appropriate increase in efficiency of MSEB cannot be said to be balancing interests of consumers - as required by the ERC Act.

We request the commission to consider following points before taking any major steps towards tariff uniformity.

1. There is little rational for decreasing the tariff of high consuming commercial and residential consumers - especially when the sector is faced with serious financial crisis. The tariff for these consumers should be at most frozen in the nominal terms.
2. The increase in tariff for the subsidized consumers should balance with the improvement in efficiency of the utility (as the later aspect is a bigger quantum than the preceding),
3. There should be a detailed study of impacts on different sections of society due to the proposed changes in tariff principle. The study should look at the impacts on

employment and consider the high levels of inequity prevalent in our society (and especially in the state of Maharashtra).

The commission should convince itself (based on such a study), so as to fulfill its mandate of on one hand to ensure that consumers' interests are protected and on the other to ensure financial viability of utilities. Pending this we request the commission to follow the above said principles in tariff setting.

## **5. Prayers:**

Based on various issues and analysis in the above sections we specifically request the commission to ;

- a) Specify time frame and data / proposal format for tariff revision through guidelines / regulations,
- b) Restrict average tariff increase to around Rs. 250 Cr. as discussed in section 2 - Reduction in Uncovered Revenue Gap,
- c) Direct MSEB to submit a detail techno-economic feasibility plan for increasing generation from coal thermal plants by around 650 MW and from Uran gas plant by around 350 MW,
- d) Investigate generation from Koyna power station,
- e) Direct MSEB to submit a proposal for reduction in peak demand through a pilot Demand Side Management (DSM) program (apart from Time of Day metering for industry),
- f) Direct MSEB to periodically make public data about service quality and other performance parameters (including energy audit).

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**Annexure 1 :**  
**Details of Calculations in section 2 - Reduction in Uncovered Revenue Gap**

1. Increase in Revenue Due to 100% Metering of Power Loom Consumers:

No. of Con.	MU	Demand kW/kVa	DC	EC	DC Rev.	EC Rev.
27440	838	328180	80		31.7	
0-300 Units	497			2.1		104.3
301-1000 Units	103			2.1		21.5
1001-15000 Units	202			3.2		64.5
Above 15000 Units	38			3.6		13.5
<b>TOTAL</b>					<b>236</b>	
<b>REVENUE</b>						
Revenue by MSEB				119	pg.	6.16
Additional Revenue				<b>117</b>		

Note: Slab wise consumption is assumed as per MERC Order 2000

2. Increase in Revenue Due to 100 % Metering of HT Agriculture Consumers:

No. of Con.	MU	Demand kW/kVa	DC	EC	DC Rev.	EC Rev.
827	587	163097	27	1.2	5.2	70.4
Total Revenue				76		
Revenue by MSEB				30	Table on pg. 6.19	
Additional Revenue				<b>46</b>		

DC - Demand Charge, EC - Energy Charge

3. Interest on Working Capital:

Security deposit (SD) from consumers (End 2000) last year (Rs. Cr.)	1122
Increase March 2000 SD over March 1999 SD	10%
Beginign of FY 01-02 deposit	1234
Working capital need as per MSEB	2171
SD As % of Working Capital (WC)	0.57
WC interest claim	279
WC interest reduction (57% of claim)	159

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**Annexure 2:  
Analysis of Energy Audit Data**

In section 2 we have requested the commission to maintain target of Rs. 600 Cr. revenue from theft reduction. This section analyses the energy audit data made available by MSEB. This analysis reveals substantial metering / billing inefficiency at EHV and HV level also and possibility of highly concentrated nature of power theft in MSEB system. Considering these factors (elaborated in latter sections) it should be feasible for MSEB to achieve a target of Rs. 600 Cr. revenue from reduction in theft at least for FY 01-02 as against MERC directive of achieving this target for last year i.e. FY 00-01.

1. Metering and Billing In-efficiency at EHV and HV Level:

MSEB has claimed that energy audit at EHV level, Express Feeders and MIDC areas has been completed. (Ref. Proposal pg. 1.8). Analysis of these data reveal substantial metering and billing (theft) inefficiency even at EHV and HV level.

A | EHV Level Energy Audit: Table A 2. 1, below shows CEA guidelines as well as MSEB's estimate of EHV losses (technical) as per MSEB's March 2000 proposal.

**Table A 2.1: EHV Loss Benchmark (%)**

	System Element	CEA Guideline	MSEB
a)	Step-up transformers and EHV Transmission System	0.5 to 1.0 %	1.2 %
b)	Transformation to intermediate voltage level, transmission system and step down to sub transmission voltage level	1.5 to 3.0 %	4 %

MSEB Tariff Proposal (March 2000, Pg. 515)

Compared to these guidelines / estimates of EHV level technical losses, MSEB's energy audit for EHV level indicate substantially higher losses at EHV level as shown below.

**Table A 2.2 : EHV Losses (MSEB Proposal August 01)**

Month	% Energy Loss
Jan - 01	8.4%
Feb - 01	8.3%
March - 01	6.9%
April - 01	5.4%
May - 01	6.5%
June - 01	4.8%

Even if we consider that **losses above 5 % are excessive** and un-reasonable then at EHV level these excessive losses amount **around 1200 MU / yr. !** This is clearly an indication of metering / billing (theft) inefficiency at EHV level.

B| Express Feeders Energy Audit: As requested by Prayas during the Technical Validation session, MSEB has made available data of Express Feeders Energy Audit. Express feeders are HT feeders originating at the sub-station and terminate at HT consumer end. Largely these feeders supply only one HT consumer. Hence, it is expected that the losses on these feeders would very reasonable. Further, for energy audit MSEB staff needs to maintain and properly report only one meter at the sub station and one meter at the consumer end. MSEB has provided express feeders energy audit data for six months. Data of some feeders is at times not included (or reported) in the monthly summary or some feeders have temporarily or permanently disconnected. Excluding 50 such feeders (i.e. either disconnected or reported for less than 2 months) we have considered 221 feeders data for our analysis. Considering that these reports are for six months, there should be 1626 data points of % losses on each feeder. (221 \* 6). Table A 2.3 below shows the break - up of these 1626 data points.

**Table A 2.3: Break-up of Data Points of Express Feeders Energy Audit**

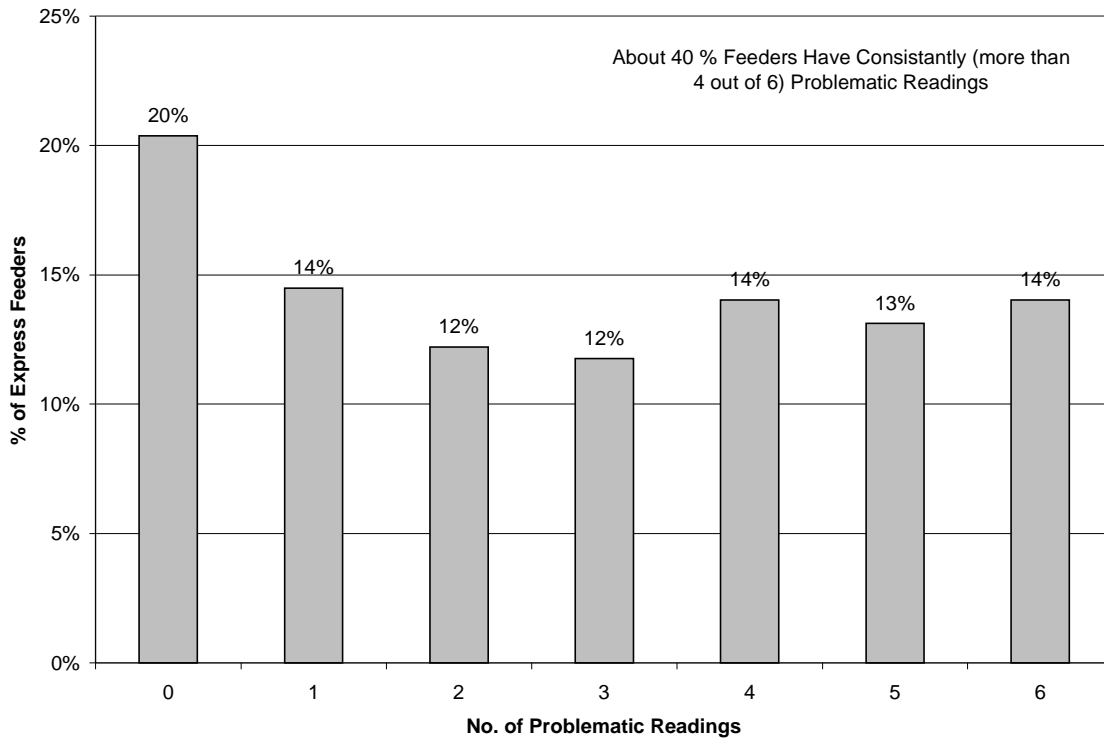
Sr. No.	Particulars	No. of Data Points	% of Total Required Data Points
1	Total Required Data Points	1626	100 %
2	Actual Available Data Points	1116	69 %
3	Data Points With Losses $\leq - 0.5$ %	329	20 %
4	Data Points With Losses between $-0.5$ % to $5$ %	741	46%
5	Data Points With Losses $> 5$ %	46	3%

*Note:*

1. *Actual available data points are those where energy audit report indicate a % energy loss value. The difference in required and actual data points is the number of data points which are either not reported or reported as meter problem.*
2. *Whenever any reading (data point) is either not available or falls out side the range of  $- 0.5$  % to  $+ 5$ % the reading / data point is considered as problematic. Considering that these are HT express feeders this range of non-problematic readings is highly conservative (i.e. shows less number of problematic readings.)*

From above table it is clear that for about 54 % of required data points, the readings are problematic and un-justifiable. Further there are several feeders where readings are consistently problematic. Figure A 2.1 below shows the % distribution of feeders in different categories of consistently problematic readings.

**Figure A 2.1: Distribution of Express Feeder's by Consistency of Problematic Readings**



Above figure reveals that about 40 % Express Feeder's have consistently (i.e. 4 out of 6) problematic readings. Also around 30 (14%) feeder's have not shown a single non-problematic reading.

From this analysis of Express Feeder's energy audit it is apparent that there is ample scope to improve metering and billing of these HT consumer's. Considering that proper energy audit of these less than 250 express feeder's implies proper metering at just 500 HT points (half of which are within MSEB premises) ! For an organization of the size and capabilities of MSEB achieving nearly 100 % success in energy audit (and resultant commercial loss reduction) with in a short span of say 6 months should not be a difficult task.

C] MIDC Areas Energy Audit: MIDC area is another level at which MSEB claims to have completed energy audit. Range analysis of these energy audits also reveal substantial metering / billing (theft) inefficiency. For example, considering that loss level between 0 % to 6 % is reasonable for MIDC areas (where HT consumption is around 85 % of total billed energy) around 20 % MIDC areas fall outside this range, indicating either metering or billing (theft) in-efficiency. (Analysis for the month of July 01)



**Table A 2.4: Range Analysis of Losses in MIDC Areas**

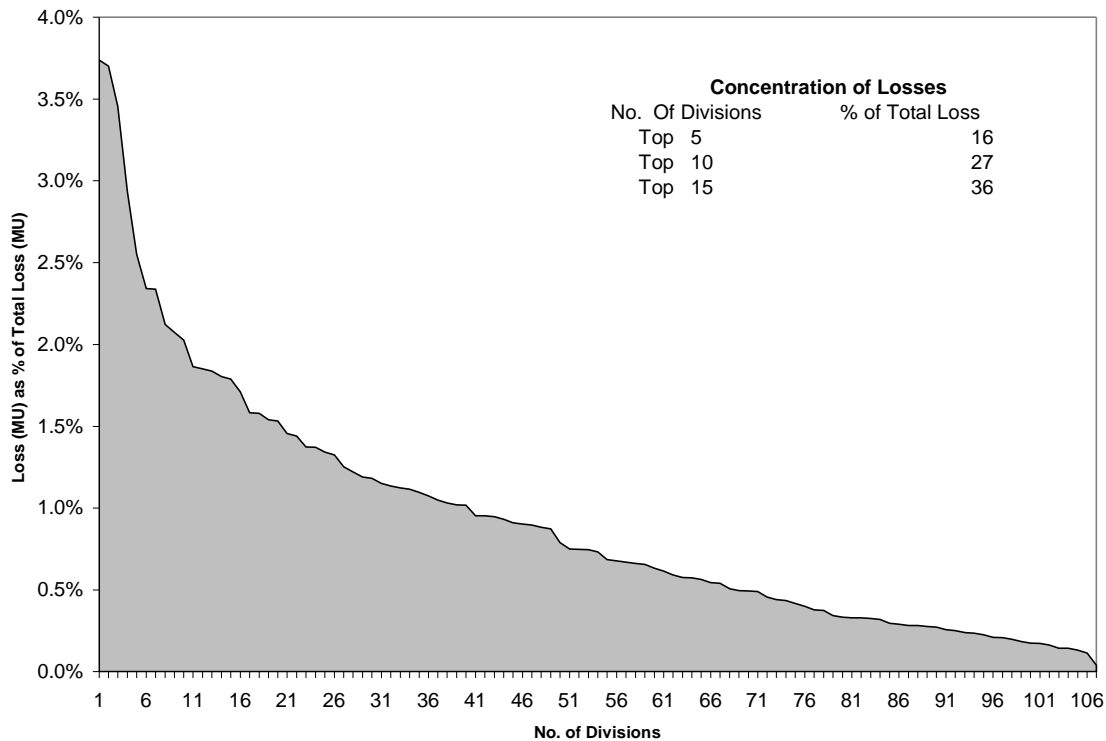
	No. of MIDCs	Input MU	Loss MU	% of Input MU
Total MIDCs	81			
No Reading	1			
Negative losses	7	32	-0.7	9.2%
Loss 0 - 1.5 %	11	84	1.2	24.3%
Loss 1.51 - 3 %	13	59	1.5	17.1%
Loss 3 - 6 %	29	135	6.1	39.0%
Loss 6 % +	20	36	3.9	10.4%

Sub sections A, B and C above clearly demonstrate that MSEB's metering / billing (theft) performance even at the EHV and HV level is highly inefficient and there is ample scope for rapid improvement in the same as these are known areas / consumers in very small geographical areas.

## 2. Large Theft in Concentrated Areas:

Apart from EHV, MIDC and Express Feeders energy audit MSEB has also provided data for Division Level energy audit. Even though MSEB has not claimed that energy audit for these areas is complete, a preliminary analysis of these results indicate that T & D losses are concentrated in a handful of divisions. Figure A 2.2 shows division wise T & D losses as % of total losses in June 01. As shown in the accompanying table in the figure just 15 divisions out of nearly 120 divisions account for over 35 % of losses in the that month. Further, these "high loss" divisions have less than 10% assessed (un-metered) consumption. Thus, it is clear that MSEB's T & D losses are concentrated in urban / semi urban areas with high proportion of metered consumption. This also implies that these losses can be curbed in a short period with proper metering and vigilance.

**Figure A 2.2: Division wise Losses (MU) as % of Total Losses (June 01)**



Note: Figure shows concentration of T & D losses in MSEB in a handful of divisions. For example one division (out of ~ 120) with highest (MU) losses account for around 3.7 % of MSEB's total losses. Similarly top 15 divisions with highest (MU) losses account for nearly 36 % losses in MSEB system.

**Conclusion:** At average realization (excluding agricultural sales) of Rs. 3.58 / unit at existing tariff, MSEB needs to convert only around 1,700 MU (i.e. ~ 3 % of total input energy) from theft to revenue earning sales. The analysis in above sections clearly indicate that i) MSEB's metering / billing performance even at EHV and HV level is highly inefficient, and ii) T & D losses are highly concentrated in small urban / semi urban areas with high metered consumption. In this situation, it should be possible for MSEB to meet the target of theft reduction and increase in revenue of Rs. 600 Cr. in the ensuing year (FY 01-02) at least by one year delay (as same was directed by MERC for FY 00-01).

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**Annexure 3:**  
**Performance Monitoring Systems**  
(Extract from Prayas Submission dated 6<sup>th</sup> April 00 in Case 1 / 99)

**A. Power Plant Performance and Merit Order Dispatch Evaluation System**

In order to enable the regulatory commission to scrutinize the power plant performance and reasonableness of the merit order dispatch following data would be needed:

1. Unit wise hourly data of MSEB's plants: (i) Availability; (ii) Actual generation; (iii) Reasons for the difference in availability and generation<sup>1</sup>
2. Hourly availability and generation by DPC
3. Hourly purchase from and sales to: i) TEC; ii) NTPC /NPC; iii) Other states

**B. Metering and Billing Performance Evaluation System**

§ The data / information according to **tariff-categories and tariff-slabs** (i.e. Domestic slab 0-50, 50-100 etc. for all categories and slabs as per revenue calculation tables, pg. 16-21 of the proposal) on the following parameters should be provided on **monthly basis.**

- i) No. of bills issued
- ii) Consumption in Units
- iii) Billed demand. Contract Demand, Maximum Demand (for HT consumers)
- iv) Connected load (for LT category)
- v) Energy Charge (Rs.)
- vi) Demand Charge (Rs.)
- vii) Fixed Charge (Rs.)
- viii) FCA (Rs.)
- ix) Delayed Payment Charges (Rs.)
- x) Other Charges (Rs.)
- xi) Adjustments relating to past billing
- xii) Actual amount received each month
- xiii) B – 80 Original assessment
- xiv) B – 80 Net Assessment

This data is to be submitted separately for each of the following categories:

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<sup>1</sup> *These reasons should be categorized in simple groups such as non-availability and poor quality of coal, problems within plant, problem related to transmission lines, and grid-related problems (such as poor voltage, frequency, power factor, load dispatch instructions). Each group could be given a code for easy data entry and analysis.*

- § For each billing unit (i.e. for 20 EDP centers) and
- § For bills issued on the basis of actual meter reading and
- § For bills not issued on the basis of actual meter reading –

Additional data for bills not issued on the basis of actual meter reading

- § Reasons for bills not issued on the basis of meter reading
- § Number of bills not issued on the basis of meter reading for each of the following reasons: (a) Unmetered Tariff Category; (b) Meter could not be read; (c) Faulty meter.
- § Separately indicate the no of consumers in each category whose bills are not based on actual meter readings for more than 3 months in a year of account of following parameters: (a) Meter could not be read; (b) Faulty meter.

**C. Performance of Flying Squads**

The following data by consumer categories for each Flying Squad should be submitted:

- § Number of raids carried out by each Flying Squad,
- § Number of cases involving increased revenue assessment
- § Total Assessment
- § Actual revenue received from these cases
- § No. of pending cases
- § Number of staff in the flying squad.

**D. Energy Flow Accounting**

The following data should be submitted for each of the 20 billing (EDP) units.

Voltage Level	Energy Received in the unit	Energy Converted to Lower Voltage (specify voltages)	Energy Sent out to another circle
440 KV			
132 KV			
66 KV			
33 KV			
11 KV			
> 11 KV to > 440 V			
440 V			

A similar consolidated table for all twenty billing units should be given as shown below:

Voltage Level	Energy Received	Energy Converted to
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		lower voltage (specify voltages)
440 KV		
132 KV		
66 KV		
33 KV		
11 KV		
> 11 KV to > 440 V		
440 V		

Conversion losses (transformation losses) can be considered either at higher voltage side or at lower voltage side. But this should be consistent for all voltage levels and across all billing circles.

#### **E. Material Purchase and Contracting Evaluation System:**

The expenditure on R&M or of ‘capital expenditure’ nature should be reported in the following format. The report should include all expenditure of more than Rs 1 crore in the case of R&M expenditure and Rs 5 crore in the case of capital expenditure.

Following information should be supplied in each instance.

Item / Work	Item XYZ 1	Item XYZ 2
Category (R&M / Capital)		
Sector (Gen/Trans/Distribution)		
Brief Description of Item		
Date of sanctioning item		
Estimated Amount (Rs Crore)		
Date of Tender Advertisement		
Tender Closing Date		
Number of valid bids received		
Lowest Valid Bid (Rs Crore)		
Contract awarded to the lowest bidder (Y/N)		
Reasons for the same if answer is “No”		
Post of Authority Accepting the Bid		
Contract award / Purchase order (PO) date		
Contract / PO amount (Rs. Crore)		
Details if any changes in closing date/ scope / specifications from the original tender notice		
Actual Amount Paid (Rs Crore)		

For all expenditure above Rs 5 crore in the case of R&M expenditure and Rs 15 Crore in case of capital expenditure following information should also be provided.

1. Detailed (1 page) description of the work,
2. Cost benefit, need / justification of the expenditure,
3. Make or Buy analysis
4. Measures taken to ensure quality of work / material

### **Feasibility and Advantages of Such Systems**

The commission must have noticed several times during the process of tariff revision that MSEB has been hiding massive and crucial data which would have enabled the Commission and the public to undertake proper and reasonable scrutiny of the MSEB's claims of revenue requirement. In order to avoid such hiding of data in future it is essential that elaborate data collection and compilation procedures are established. Five such systems outlined in this annexure cover a wide span of MSEB's operations and are in-fact the systems MSEB itself should have put in place to identify weak areas and to take corrective actions. Though the systems outlined in the annexure appear to be very comprehensive and detailed, in reality, these systems can be put in place by simple changes in the MSEB's existing systems and would not cause substantial increase in work load on MSEB.

For example, take the case of metering and billing system mentioned above. MSEB has achieved nearly 100 % computerization. In fact as mentioned by MSEB several times during the technical sessions it has just shifted to a more advanced billing system. With such computerization level, the systems for data collection, entry, validation and processing are already in place. Most of the parameters mentioned in the metering and billing system in this annexure are already available in these formats. In order to generate reports in the desired formats, some changes in the software program might be needed, which would not be a difficult task.

Similarly, in the case of power plant performance and merit order dispatch system, most parameters such as unit wise hourly availability, generation and purchase data is already being logged on and stored in the electronic form. The only addition required is to develop a proper system of coding for maintaining the data regarding reasons for difference in availability and actual generation. Since this is a crucial data required for evaluation of reasonability of merit order dispatch it should be possible for MSEB to institute this system in a short time.

For instituting a system for energy flow accounting mentioned above, some investment by MSEB might be required. For collecting valid data of energy flow for each billing unit, it is essential that the physical boundaries of billing units match with the electrical boundaries. In other words, transmission and distribution lines running from one circle to other circle should have meters. But, the investment needed for additional meters would be negligible as there are only 20 billing units in MSEB system. Further, lack of metering facility should not be a constraint for providing the above mentioned energy flow account

as most of the data to be collected is at substation level where meters are already installed. Further, MERC may specifically direct MSEB to make provision for the additional expenditure for such meters and which could be considered in the revenue requirement (over and above the revenue requirement submitted by MSEB).

With regards to the system of flying squads and material purchase and contracts, it would not be possible to institute any automatic systems. But considering that there are only 25 flying squads in MSEB and for material purchase / contracts only transactions above Rs. 1 Cr. or Rs. 5 Cr. are required to be reported it is expected that such data can be compiled manually as the number of transactions would be limited.

Data compilation and presentation in the above format will have substantial advantages. For example, based on metering data it would be possible to judge the performance of MSEB in terms of repairing / maintaining meters. Further, this data when integrated with the energy flow data will help identify the real transmission and distribution losses. The data regarding the material / contracting will allow the RC and the public to judge the processes adopted by MSEB to ensure that its purchases are reasonable and cost effective.

Most importantly, the Commission should direct MSEB to submit internally consistent information in the above formats every quarter. The Commission may not comment on this information every time, but this will give the Commission an opportunity to ask pointed questions and demand further information / data well in advance of the next tariff revision process.

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