

Before the
MAHARASHTRA ELECTRICITY REGULATORY COMMISSION
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CASE No. 5 of 2005

In the matter of
Detailed Order regarding Principles and Protocol to be adopted for Load Shedding by MSEB

Dr Pramod Deo, Chairman,
Shri A. Velayutham, Member

ORDER

Dated: 3 August, 2005.

In its Order dated March 4, 2005 on an Application for compliance of Tariff Order provisions in respect of load shedding undertaken by the Maharashtra State Electricity Board (MSEB) and related issues, the Commission had, inter alia, observed that there were significant variations in the implementation of load shedding. The Order cited Chairman, MSEB's statement that such variations are based on commercial decisions. On this, the Commission had stated (at para 17.1.7 of the Order) that:

“This raises the basic issue of whether a distribution licensee is free to decide the manner in which a shortage of power is to be allocated as between different areas and/or consumers, and the principles on which such rationing is to be based... Such rationing has to be fair and equitable, and the principles on which load shedding is undertaken have to be known... Within such a framework, technical exigencies requiring variations would be within the domain of the State Load Dispatch Centre to decide independently.

Considering the above, and in the context of Sections 42(1), 43, 61, 86 and other provisions of the Electricity Act (EA), 2003 and of the Supply Code and Standards of Performance Regulations notified recently, MSEB should submit to the Commission, within the next one month, the principles and protocol proposed to be adopted for load shedding, the other alternatives that might also meet the tests of equity, fairness and reasonableness, and the likely impacts. Thereafter, this matter would be separately considered and addressed by the Commission.”

2. In its initial response dated April 1, 2005, MSEB set out the various considerations underlying the load shedding undertaken by it and the distinctions made between different areas and consumer categories. MSEB's proposal also stated that, at present, MSEB's system demand during evening peak hours ranges between 11,000 MW to 13,000 MW, as compared to the online capacity during those hours of 8500 MW to 9400 MW, thus necessitating load shedding of the order of 2500 MW to 3600 MW. The load shedding necessary during non-peak hours is around 2200 MW. MSEB has stated that the shortfall is after considering all the avenues available to MSEB including the purchase of costly power. MSEB has added that apart from the primary reason of prevailing supply and demand gap, the specific reasons for load shedding are:



- (a) Steep periodic increase in demand (seasonal agricultural requirements)
- (b) Forced outage due to breakdowns
- (c) Planned outage for routine maintenance including Renovation and Modernisation (R&M) and Life Extension Programmes.
- (d) Restriction of usage of water (Koyna hydro generation is limited to 67.5 TMC)
- (e) Limited availability of gas for Uran gas turbine project.

3. MSEB submitted the general load profile in its licence area against the average load of 11748 MW is as follows, and stated that approximately 27% load requirement is from industries, MIDC and water works, 28% from urban areas, and 45% from rural areas:

Sl.	Area	Load (MW)
1	Express Feeders for industrial, MIDC & Water works	3108
2	Urban area	
a	Metropolitan areas - Bhandup, Mulund city area	202
b	Major cities – Thane, Vashi, Pune, Nashik, Aurangabad, Nagpur	960
c	Other Corporation/Municipal areas – large cities/ towns with population of 50,000 and above, and ‘C’ class Municipalities and villages with population of 25,000 & above	2149
	Sub-total – Urban area	3311
3	Rural feeders, including agricultural pumps	5329
	TOTAL	11748

4. MSEB submitted the rationale underlying its load shedding plan with the objective of satisfying the following mutually conflicting considerations, viz.

- i. As far as possible, equitable distribution of shortages
- ii. Consideration for consumers/areas whose dependence on electricity is comparatively high
- iii. Commercial considerations of catering to consumers as well as areas with higher tariff as well as higher collection efficiency and paying culture.
- iv. Uniformity of criteria throughout the State.

5. Accordingly, MSEB proposed to address the load requirement of the five major categories in the following manner:

- (a) Industries, MIDC areas and public water works – would be excluded due to the following reasons:
 - complete dependence of industries on electricity
 - industry is the backbone of the State’s economy
 - overall productivity of the State depends primarily on the industrial activity
 - it is very difficult for industries to plan their production cycles based on interruptible power supply
 - most of the water works run on 24 hour basis due to various factors, including capacity of pipelines and water pumps
 - high collection efficiency and paying culture in respect of industries and MIDC consumers
 - extremely low loss levels
 - financial sustainability of MSEB
 - approximate load of 1200 MW in respect of continuous process industries like textiles, plastics and steel
 - as ToD tariff is already in force, activities that are not on continuous basis have in all probability shifted to off-peak hour slots due to concessional tariff.



- though there is no load shedding, weekly staggering day is scrupulously observed in this category also.
- (b) Metropolitan areas - would be excluded due to the following reasons:
- Areas within Municipal limits of Greater Mumbai such as Mulund and Bhandup are indistinguishable from other parts of Mumbai, and have a very high dependence on electricity.
 - These areas have a great deal of economic importance for the State as well as the country.
 - AT&C losses of Mulund and Bhandup are very low, i.e., 20% and 26%, respectively.
 - The average revenue realization per unit in these areas is very high
- (c) Major cities like Thane, Navi Mumbai, Pune, Nashik, Aurangabad and Nagpur are vital contributors to the development of the State in terms of industry and commerce, and would hence be excluded from load shedding
- (d) Other urban centres, i.e. Corporation/Municipal areas are also excluded from load shedding
- (e) Rural areas cover all the agricultural and non-agricultural loads in respect of towns and villages with populations below 25,000. The entire requirement of load shedding is proposed to be achieved through rural feeders for the following reasons:
- Dependence of rural areas on electricity is less as compared to that of urban areas
 - Agricultural sector normally does not require power for 24 hours
 - Except in isolated pockets, the water availability is so low that pumps cannot run for more than 12 hours
 - The entire agricultural pumping activity load can be met during the time when power is available.
 - Due to non-separation of agricultural feeders, exclusive shedding of agricultural load is not possible
 - There is extremely low collection efficiency in respect of agricultural consumers, which is severely affecting the financial stability of MSEB.
6. MSEB has stated that the above load shedding dispensation keeps the following factors in view:
- Certain Naxalite affected areas notified by the Government are excluded from load shedding.
 - The Districts of Sindhudurg and Ratnagiri have negligible agricultural loads, and are hence excluded from load shedding.
 - The load shedding in Maharashtra in rural areas and in respect of agricultural consumers is much lower than the load shedding undertaken in adjoining states.
 - Load shedding is undertaken in the rural areas not merely on commercial considerations, but rather because the system requirement can be achieved by resorting to load shedding where dependence is less and activities can be completed by shifting the time of usage of electricity.

7. Subsequently, under a separate Application dated April 9, 2005, MSEB sought directions under Section 23 of the EA, 2003 to all Distribution Licensees in the State to take certain measures for a limited period of time to curb electricity demand, particularly during the evening peak hours, considering the serious demand-supply gap necessitating load shedding on an extensive scale. By its Orders dated April 26, 2005 and May 4, 2005 on that Application, issued after hearing the Licensees and consumer representatives, the Commission directed all the Licensees to take certain emergent measures. The Commission also touched on the separate matter of load shedding principles and protocol, and the Order dated May 4, 2005 stated that:



“15. At its hearing on April 26, 2005, the Commission also considered the principles that should be adopted for undertaking load shedding by MSEB, as a part of separate proceedings flowing from directions given in its Order dated March 4, 2005. In addition to the various points suggested by MSEB, the Commission directed that the T & D losses and collection efficiency in different areas need to be taken into account while deciding the load shedding protocol. MSEB should revert to the Commission with its further submissions in this regard. The Commission will pass Orders on the principles and protocol for load shedding separately later. In the meantime, MSEB should publish their load shedding programme on their website also.”

It may be mentioned that, in addition to other relevant provisions, S. 23 of EA, 2003 has a direct nexus with the present Order.

8. Separately, on various Writ Petitions concerning load shedding and related issues, the Honorable Bombay High Court (Nagpur Bench) passed an interim Order on May 4, 2005 addressing, inter alia, the discriminatory application of load shedding, and clarified some aspects further on May 6, 2005. On a Special Leave Petition filed by MSEB, the Honorable Supreme Court of India stated on May 12, 2005 that:

“In terms of Order dated 6th May, 2005 the High Court, considering the difficulties of the petitioner in rescheduling the power supply as per interim order dated 4th May, 2005, has directed that it would do so in consultation with the Maharashtra Electricity Regulatory Commission. The further direction that there should be no discrimination amongst consumers irrespective of geographical allocation is modified for the time being and the matter is left to be determined by the petitioner in consultation with the Regulatory Commission.”

The High Court extended the time for the Commission to decide the load shedding principles upto June 30, 2005.

9. MSEB submitted its revised proposal on the principles and protocol of load shedding on May 16, 2005. MSEB based its revised proposal on the following principles:

- (a) Equitable sharing of shortages – MSEB proposed to form categories of consumers who can be segregated geographically and whose dependence on electricity is of a similar order, and rank them in descending order of dependence, as in its original proposal
- (b) Incentivising loss reduction and payment culture – MSEB proposed to reward areas which have lower loss levels and higher collection efficiency by considering Aggregate Technical and Commercial (AT&C) losses rather than just the loss levels per se. MSEB clarified that since HT industrial consumers are being monitored separately for loss levels and for payment and are also already subjected to load shedding through the staggering day mechanism, only AT&C loss levels on the LT side have been taken into account while formulating the load shedding plan. On the basis of LT AT&C losses, Circles were grouped into three categories, viz.,
 - Low loss level Circles (loss levels upto and including 30 %)
 - Medium loss level Circles (loss levels between 31% to 50 %)
 - High loss level Circles (loss levels of 51% and above)

MSEB added that, although Division-wise categorization based on loss levels would be ideal, being a smaller unit, Division-wise load data is not yet available, and hence it would be difficult to work out the load shedding programme on that basis, though this could be considered subsequently.



(c) Avoiding distress load shedding – MSEB has stated that the load shedding plan in force from April 21, 2005 has ensured that there is no distress load shedding through EHV openings, and can cater to a demand supply gap of upto 3800 MW, giving a relief of 54.5 MU. As the required load relief varies from month to month depending on a number of factors, MSEB has proposed to formulate 3 contingency plans for load shedding levels of:

- 3000MW to 3800 MW
- 2500 MW to 3000 MW
- upto 2500 MW

(d) Incentivising energy conservation - MSEB has submitted that there is a need to promote energy conservation among the consumers. One of the best ways to do so would be to introduce the concept of ‘load sharing’, under which a city or a Circle is given a ‘quota’ of available power within which it would have to limit its loads. If it succeeds in doing so either through loss reduction or through energy conservation, there would be no need for load shedding in that city. This quota would not be constant, but would dynamically vary depending on the availability declared by the generating station. In a sense, this is a miniature version of the way in which a State’s load is regulated within a regional grid. For this concept to be implemented, proper metering arrangements and a load control center at the city level are required. The city ‘quota’ also needs to be fixed.

(e) The proposed load shedding to achieve load relief of 3800 MW based on the categorization of the Circles as above was:

Sl	Particulars	AT&C loss	Urban/Rural	Load Shedding Hours
1	Loss level upto & including	30%	Urban	Nil
			Rural	3 hours
2	Loss level between	31% & 50%	Urban	3 hours
			Rural	8 hours
3	Loss level above	51%	Urban	4 hours
			Rural	9 hours

(f) Difficulties in implementation of load shedding programme - MSEB has added that any load shedding programme is dynamic in nature, and as such has to undergo changes in view of system conditions. The system stability being of paramount importance, at times heavy load shedding is resorted to by opening EHV lines also. In order to reduce the difficulties of common consumers, such EHV lines opening programme is worked out meticulously and is finalized for implementation during emergencies. The primary reasons for such emergency load shedding entailing opening of EHV lines are as under:

- Low frequency in regional grid.
- Low generation in the region/State
- Low frequency due to high demand
- Over drawal by the other constituents, causing low frequency
- Low generation in MSEB
- Tripping of major transmission lines /Units
- Over-drawal by Tata Power Company (TPC) and Reliance Energy Ltd. (REL)
- Less bilateral power than contracted power
- Restriction of Transmission Corridor
- Restriction of Koyna water
- Restriction of Gas.



10. The Commission notes that, although load shedding has been a common occurrence in many parts of the country as well as in Maharashtra in the recent past, the load shedding schedule was being determined by the MSEB without taking into consideration the views of its consumers or other stakeholders, and without a clearly enunciated and justified basis. This Order constitutes perhaps the first exercise of its kind to settle certain transparent and equitable principles through a public regulatory process after the coming into force of the EA, 2003. As such, the Commission felt it essential to involve the public also in a participative process of consultation to settle these principles and to sensitize consumers regarding the prevailing supply-demand gap, so that their co-operation could be harnessed for the successful implementation of any load shedding programme. This was essential, the more so considering that the shortage of power is expected to prevail to a greater or lesser extent for quite some time to come. In such a situation, rationing of the available power as between consumers or areas has to be done in a fair and rational manner.

11. Accordingly, the Commission issued a Public Notice on May 16, 2005 making MSEB's proposal available, inviting written comments and suggestions from the public, and intimating dates of Public Hearings for those who wished to be heard in person. Thereafter, Public Hearings were conducted at Thane, Nashik, Aurangabad, Pune, Nagpur and Amravati from May 26 to June 3, 2005. Around 150 individuals/organizations participated in this public process through written or oral submissions, or both. The list of persons who participated in the public process is at **Annexure 1**. The main comments and suggestions received from the participants have been summarized below. The Commission's views and its decisions have been set out subsequently.

Reasons for LS

12. Several stakeholders submitted that the present situation could have been averted had the MSEB complied with the earlier directives of the Commission regarding reduction of T & D losses, and had planned its generation capacity addition more adequately and in a scientific manner.

Distress Load Shedding

13. It was urged that, once the load shedding schedule is announced, the MSEB should not deviate from it, unlike at present when distress load shedding is carried out over and above the scheduled load shedding, resulting in power supply being cut for over 15 hours in some instances. Consequently, consumers were unable to plan their activities and power consumption.

Region-specific claims

14. Several participants urged that their region should be spared from load shedding. Some in Vidarbha submitted that since most of the electricity is produced in that region, it should not be subjected to load shedding. Nashik and Pune consumers stated that, since the service sector, a major contributor in these cities and to the State as a whole, is heavily dependent on electricity, they should not be subjected to load shedding. It was submitted that the electricity requirement of agricultural consumers in Vidarbha was very low as compared to that in Western Maharashtra, and hence they should be supplied electricity during both the morning and evening hours.

Category-specific claims

15. It was argued that various consumer categories should not be subjected to load shedding, or that their load shedding should be minimised. Some of these claims and the rationale submitted are as below:

- (a) The load shedding schedule should be such that powerloom production can be undertaken in a manner that allows the large number of workers employed to cover their cost of living and retain their livelihoods.
- (b) Continuous process industries should not be subjected to any load shedding, even a day's staggered load shedding in a week, in view of the existing agreement with MSEB which provides for such a dispensation. Metallurgical industries work 7 days a week. Staggering could result safety hazards such as explosion in a furnace. Moreover, re-melting the stuff inside the furnace would require much more energy, and would also adversely affect the equipment.



- (c) Industrial units located in MIDC areas should be exempted from load shedding
- (d) Cooperative and other industrial estates and powerloom industries and clusters (even those outside MIDC areas) should be treated at par with industries in MIDC as they share the same characteristics.
- (e) For agricultural pumpsets, load shedding should not extend beyond 6 hours a day even in rural areas.
- (f) Public water works need continuous electricity supply to serve public needs and should be exempted from load shedding, considering also the systems and requirements of pumping.
- (g) Lift Irrigation Societies should be exempted as they have to lift water at multiple places, and with load shedding they will not be able to function.
- (h) Government and other hospitals should be exempted from load shedding as the life of patients is at stake.

Measures to reduce Load Shedding

16. Some consumers stated that load shedding should be a last resort. The need for load shedding can be reduced by optimizing the consumption of electricity by means such as and considering the following :

- (a) Decorative lighting, bright illuminations, etc. should be controlled and should be given supply for restricted hours, so as to facilitate availability for other purposes.
- (b) High consumption by hotels during evening peak hours should be discouraged.
- (c) Since the agricultural load would reduce significantly during the monsoon season, there would be no need for load shedding during this period. Agricultural consumers are seasonal consumers, and would require around 4500 MW during October to March during Rabi Season. After April, the load reduces to 500 MW, which amounts to 4000 MW load relief during April to September.
- (d) Considering the shortfall in supply, there is a need to give priority to existing connections. Hence, new connections should not be given.
- (e) 3 hour load shedding should be carried out at non-strategic locations of Mumbai, and the electricity saved should be diverted to the MSEB area.
- (f) Planned shutdowns of the generating stations should be timed such that they are not closed for annual maintenance when power shortage is acute.
- (g) Single-shift industries should be asked to operate during non-peak hours. Two-shift industries should operate at least one shift during non-peak hours.
- (h) Markets should be asked to operate during off-peak hours
- (i) 50% of the street lighting load can be reduced by switching off alternate streetlights
- (j) Marriage/function halls should be prohibited from using electricity beyond 5 kW
- (k) Flood lighting and other heavy illumination around petrol pumps, garages, showrooms, road side hotels, dhabas, etc should be avoided.
- (l) HT consumers should be asked to reduce their peak load.

Energy Conservation & DSM

17. It was observed that energy conservation and other Demand-Side Management (DSM) measures would enable the MSEB to permanently reduce the demand for power and hence the need for load shedding. Towards this end, some participants suggested that energy conservation measures should be promoted widely by giving rebate/subsidy to consumers who adopt them, for instance by installation of Compact Fluorescent Lamps (CFLs) or other methods. One consumer suggested that the adoption of energy conservation measures should be made compulsory for all. He gave the example of his own housing Society where, through their efforts in undertaking energy audit and keeping a close watch on consumption, the energy bill has been reduced by 20% .



Tariff related issues

18. Several participants submitted that it was unfair to have the same electricity tariff for different hours of supply. The tariff should be linked to the hours of supply. Others submitted that the fixed charges were payable for supply during the entire month, and it was unfair to levy the same level of fixed charges when the Licensee has published a load shedding schedule specifying the reduction in the number of hours of supply. Therefore, fixed charges should be reduced in proportion to the extent of load shedding.

Utilisation of surplus captive power

19. The Confederation of Indian Industry (CII) and others suggested that the considerable surplus captive capacity in cities like Pune should be utilized to increase the supply and minimise the load shedding requirement. The idle standby/surplus capacity available in Pune was estimated to be more than 125 MW. Selected industries could generate and consume the power themselves during peak as well as agreed hours with no feeding to the grid, and no requirement for banking and wheeling of electricity. This would reduce the load on MSEB, who could supply the balance requirement of power in the city. However, there was a need for a mechanism to compensate such captive producers for the difference in the variable cost of generation (ranging between Rs. 6.85 per kWh to Rs. 8.60 per kWh, depending on the fuel used, LDO or HSD, respectively) and the HT industrial tariff. The alternatives proposed to meet the difference in cost ranged from charging all the consumers in the city equally, to selling this power to selected consumers who could be asked to pay a higher rate for the supply of assured power.

Load Shedding Protocol and Criteria

20. Several other suggestions were also received on the various aspects to be kept in mind while formulating the load shedding protocol:

- (a) There should be no discrimination between areas/regions and consumer categories in load shedding, though the extent of load shedding could vary.
- (b) There were differing views on the choice of parameters such as T&D loss and collection efficiency for determining the extent of load shedding for different areas or groups. While many consumers agreed with the Commission's approach of considering T&D loss and collection efficiency as two of the key parameters considering that the better-performing areas and consumers should not be penalized on account of others or else there would be no incentive to improve such performance, some others opined that the consumers were not responsible for either the level or improvement in these indicators, which were attributable to MSEB, and hence the protocol should not be based on them. It was also urged that the load shedding was related only to the supply availability and not to the level of losses, since reduction in losses would not increase supply. Hence, T&D losses should not be used as a criterion for rationing of power.
- (c) The load shedding protocol should be based on the loss level at the smallest accountable unit, such as the Division, Sub-division or feeder, depending on data availability.
- (d) Consumers should be given an opportunity to reduce AT&C losses before implementation of load shedding based on such losses.
- (e) Many participants opined that urban consumers should not be given any preference over rural consumers.
- (f) Geographical and other such characteristics as well as paying capacity also need to be considered, in addition to T&D losses and collection efficiency.
- (g) There were differing views on considering dependence on electricity as one of the factors. Some added that the climate profile of different areas also needs to be taken into account as people cannot survive without electricity because of the extreme weather conditions in places such as parts of Vidarbha.



- (h) One of the suggestions received was that the first 2000 MW of load shedding could be done on a differential basis on some selected criteria. Any additional load shedding requirement beyond this should be shared equally by all consumers/areas.
- (i) Some participants submitted that the overall shortage of electricity in the State should be shared by all consumers, including those in Mumbai who were supplied by other licensees, who were supported by standby arrangements with MSEB. The energy saved by shedding load in Mumbai city could be used by MSEB to reduce load shedding in its areas.
- (j) Many suggested that the load shedding should not exceed 3 to 4 hours at one stretch. It could be undertaken in blocks of 3 to 4 hours at a time, which would be more convenient to consumers.
- (k) Some participants argued that MSEB's proposal to exempt Naxalite affected areas from load shedding would send the wrong signals for obvious reasons, and should not be accepted by the Commission.
- (l) There was a suggestion that the cut-off level for zero load shedding (<30% AT&C losses in MSEB's proposal) should be kept dynamic to ensure continuous improvement, and the roadmap for progressive reduction of AT&C losses level (below which no load shedding would be applicable) should be laid down.
- (m) Strict compliance with the load shedding schedule should be ensured through conditional approval of the programme and regular monitoring with consumer inputs.
- (n) The load shedding principles and protocol should be reviewed through a public process after 6 months.
- (o) Some participants submitted that T&D loss levels should include both LT and HT sales, since the actual overall losses in different areas were based on both.
- (p) It was suggested that population density could be one criteria for designing the load shedding schedule.
- (q) Several participants submitted that the data furnished by MSEB, particularly with regard to the Circle-wise losses and the estimation of load-shedding requirements, needs to be scrutinized further.

21. The Commission's views on the wide range of comments and suggestions received during the public process is set out below:

- (a) The Commission agrees that the present critical situation could have been mitigated to a large extent had MSEB achieved the targeted T&D loss reduction trajectory stipulated in its Tariff Orders, and had planned its generation capacity addition in a better manner. The Commission had assessed the T&D loss levels in FY 1999-2000 as 31.87%, and had specified a T&D loss reduction trajectory such that the T&D loss levels would reach around 16% in five years' time. However, in its ARR & Tariff Petition for FY 2001-02, MSEB claimed that additional energy audit data had revealed that the T&D loss levels were much higher, and were estimated to be around 39.5% in FY 2000-01. The Commission attempted to balance the twin objectives of reduction in T&D losses and to maintain a balance between the interest of the consumers and the needs of MSEB, in its Tariff Order of FY 2001-02, through the levy of a 'T&D Loss Charge', and a 'Regulatory Liability Charge' in the Tariff Order for FY 2003-04 and the subsequent period until next revision. Nevertheless, MSEB's T&D loss levels have hovered around 35%, leading to a higher requirement of energy, resulting in increased load shedding at a time of short supply.
- (b) The Commission agrees that instances of distress load shedding should be minimised to the extent possible, and the load shedding should be in line with the planned and publicized schedule. Obviously, if the actual need for load shedding turns out to be less than planned, there can be a reduction in the time for which load is shed. However, equally importantly, in emergent situations in which distress load shedding becomes inevitable, then the balance load shedding requirement should be managed in such a way that its effective duration is in line with the scheduled load shedding to the extent possible. It should not happen, as many have pointed out, that not only is distress load shedding carried out, but the planned load shedding



- is also undertaken over and above it on the same day for the same set of consumers, which would cause avoidable and unjustified hardship to them.
- (c) The Commission believes that the region-specific claims based on location of generation are not well-founded, and thus cannot be acceded to. It is necessary to recognize that the generation resources are intended for the licence area as a whole and not for a particular region alone.
 - (d) The Commission agrees with the MSEB's proposal to exempt industrial consumers from daily load shedding as far as practicable, in view of their importance to the State's economy and to avoid any adverse direct and indirect impact on employment. Similarly, continuous supply to the public water works is also necessary in order to maintain water supply. At the same time, operational practicalities also have to be taken into account. Unfortunately, since many industrial and water works are not connected through separate or dedicated/express feeders, it is not possible to segregate them for ensuring supply. Consequently, all such industrial and public water works that are connected to mixed feeders would be subject to load shedding as per the schedule. As a general rule, all HT consumers who are connected to separate or dedicated feeders should be spared from load shedding. In case of hospitals also, special consideration needs to be given, as lives may be at stake. The MSEB should pursue the provision of separate or alternate/emergency connections, at least to major hospitals.
 - (e) The Commission agrees that the need for planned load shedding may reduce significantly in the monsoon months due to the reduction in the agricultural load (although breakdowns and failures may increase, the load requirement may vary more sharply depending on the timing of rainfall, and planned generation shutdowns for maintenance, etc. may be more). However, even during the monsoons considerable load shedding is likely to be required, and would have to be based on fair and equitable principles and criteria as at other times.
 - (f) As regards the grant of new connections at a time of shortfall in supply, the Commission is of the view that MSEB cannot refuse new connections on this ground alone considering the statutory provisions. Moreover, the problem of shortage is expected to prevail for quite some time to come, and it would be untenable to bind MSEB against granting new connections until the supply-demand gap is eliminated. Further, obviously, the new consumers enter the system on the condition of sharing shortages.
 - (g) Apart from a limited area with MSEB in the suburbs, most of the Brihanmumbai Municipal Corporation area is being supplied by other distribution licensees, viz., TPC, REL and BEST, the first two of whom also have substantial generation of their own. The procurement of power as well as the cost recovery have been assessed separately by the Commission, and these licensees have been in a position of surplus, with TPC often selling some amount of power to MSEB on a net basis. Hence, the licence areas, entities and sources of power being separate, it cannot be argued that load shedding and shortage in the area of one licensee (MSEB) must necessarily be passed on and shared by consumers in the areas of other licensees. However, the Commission recognizes the need for promotion and adoption of energy conservation and efficiency measures in the remaining areas of Mumbai also, which may allow additional power to be supplied to MSEB. Separately, the Commission has given certain directions to both MSEB and other licensees in this regard.
 - (h) The Commission has analysed the supply availability in terms of on-line capacity (OLC) projected by the MSEB. It has noted that a significant part of MSEB's capacity is not really available, for various reasons discussed subsequently. Prima-facie, the timing and duration of the planned shutdowns/ outages require further explanation. The Commission finds that the planned outages of some of the large capacity generation stations have been scheduled during the peak load months of April and May, rather than the monsoon months. Moreover, the amount of time allocated for such planned outages also appears to be quite prolonged, with the average duration being around 45 days. Further details are necessary to assess its appropriateness, but there is an urgent need for MSEB to review the timing and duration of the planned outages and to outline the measures to be taken to minimise the shutdown time.



- (i) The Commission has noted the various suggestions made to mitigate the need for load shedding, many of which may be implemented after proper study. Suggestions regarding restricted supply to certain consumer categories can be evaluated depending on the results of the levy of the Load Management Charge/ Rebate and restrictions on hoardings directed by the Commission for May and June, 2005 under its Orders dated April 26, 2005 and May 4, 2005. The MSEB should examine the feasibility of implementing the following suggestions, based on discussions with the respective consumers, categories, or clusters, so as to elicit their participation in shifting the load to non-peak hours:
- i. Operation of single shift industries during non-peak hours, and operation of at least one shift in two-shift industries during non-peak hours.
 - ii. Operation of markets during off-peak period and on the day of weekly off for industries.
 - iii. Switching off of alternate streetlights during evening peak hours
 - iv. Avoidance of flood lighting/ heavy lighting around petrol pumps, garages, showrooms, road side hotels, dhabas, etc. during evening peak hours.
- (j) The Commission agrees with the suggestions regarding energy conservation and DSM. The Commission has been repeatedly asking MSEB to design DSM programmes with the active participation of equipment suppliers and consumers through structuring of appropriate rebates. The MSEB has submitted that it is in discussion with the equipment suppliers for implementation of a CFL programme, which the Commission is pursuing separately.
- (k) The Commission understands the concern expressed regarding the levy of full tariff (particularly demand/ fixed charges) for partial supply. However, consumers should appreciate that MSEB's costs have to be recovered through tariff. The Commission has endeavoured to design the fixed charges such that a reasonable portion of MSEB's fixed costs are recovered through them, while the balance fixed costs as well as the variable costs are recovered through energy charges. Thus, at present, the entire fixed costs are not recovered through fixed charges. Hence, as and when load shedding takes place, the recovery of fixed costs as well as variable costs by MSEB is also reduced. In this manner, the consumers are already getting some benefit of reduction in tariff against reduction in the quantum of supply.
- (l) The Commission's views on the suggestions regarding load shedding principles and criteria suggested by participants are as follows :
- i. As already stated, the Commission is of the opinion that the HT industrial consumers and public water works connected to separate or express feeders should not be subjected to load shedding.
 - ii. The Commission also agrees that all other consumers and areas should share in load shedding, in such a manner that the more efficient regions in terms of lower distribution losses and higher collection efficiency should be subjected to lower load shedding. This is based on the premise that, in times of scarcity, the available energy should be rationed amongst the consumers such that more efficient usage is encouraged, since there is no merit in dumping electricity in areas which do not efficiently utilize a scarce resource.
 - iii. In its Tariff Order for FY 2001-02 dated January 10, 2002, the Commission was of the opinion that the consumers and the MSEB are equally responsible for the prevailing T&D losses. As regards collection efficiency, it can be argued that MSEB has a greater responsibility, though there is no denying that many consumers are also responsible and the payment culture also differs from one area to another. However, in the present context of shortfall in electricity supply, the primary thrust is one of how to manage the load rather than determine the apportionment of responsibility. Accordingly, considering the two parameters of distribution loss and collection efficiency, the Commission has ascribed them weightage in the ratio of 70:30 for the purposes of ranking the Divisions.



- iv. The Commission has designed the protocol considering the distribution loss and the collection efficiency at the Division level, based on the available data. No detailed validation was possible due to the exigencies of time.
- v. As for giving further time to allow different areas to reduce the level of AT&C losses, the Commission is of the opinion that the targets for improvement have been known for quite some time now, through the tariff determination and other processes. Divisions in which distribution losses decline and collection efficiency improves over time would graduate to lower relative load shedding categories when the position is next reviewed or according to modalities which may be laid down by the Commission at a later stage.
- vi. Analysis of the sheddable load (after excluding the HT industrial load and public water works connected to separate/express feeders) shows that the contribution of the major urban, other urban and rural Divisions (as defined by MSEB), to the sheddable load is 1063 MW, 2227 MW, and 5100 MW, i.e., approximately in the ratio of 1:2:5. In effect, 1 hour of load shedding in rural areas will give load relief equal to that achieved by 5 hours of load shedding in major cities and 2 hours of load shedding in other urban areas. Hence, the desired load relief can be achieved by shedding load in proportion to the contribution to the total load of these different types of areas.
- vii. The Commission is of the considered opinion that factors such as general dependence on electricity, geographical conditions, population density and paying capacity, are highly nebulous and subjective in nature and cannot be factored into the load shedding protocol, particularly considering equity aspects. The criteria and parameters for load shedding need to be easily verifiable and measurable objectively. The Commission also notes that Government of Maharashtra (GoM) did not make submissions in these proceedings regarding any exemptions or relaxations from load shedding. As mentioned at para 20(k), those participants who referred to MSEB's proposal to exempt Naxalite affected areas contended that it was not warranted. Subsequent to the summary Order, GoM drew attention (under letter dated July 8, 2005) to the pre-existing decision to exempt these areas from load shedding at night, i.e. from 6 p.m. to 6 a.m. The Commission notes that the dispensation contained in its summary Order (and detailed further in the present Order) does not require MSEB to necessarily shed load during these hours. It should be possible for MSEB to undertake load shedding, in accordance with the principles laid down, at other times in Naxalite affected areas, particularly considering the relatively low loads in many such places.
- viii. The Commission agrees with the view that it may be inappropriate and unwarranted for consumers to be subjected to load shedding continuously for more than a certain period without a break. Generally, therefore, MSEB should not shed load for more than 4 hours at a stretch in any Division. If the total load shedding required to be undertaken is more than 4 hours, it should preferably be undertaken in two or more blocks. The Commission recognizes, however, that depending on the mix of consumers and activities, and on area differences, in some places consumers may prefer load shedding to be undertaken at one stretch, even if it exceeds 4 hours. Where this is the case, MSEB may exercise its judgement considering the local circumstances and preferences, and devise the load shedding programme in such Divisions accordingly.
- ix. The Commission accepts that, by its very nature, this dispensation would have to be reviewed and refined periodically by it considering actual working and the ground realities obtaining from time to time, further data and analysis, other measures that are undertaken, the performance of different Divisions, and other factors.



- x. The Commission agrees that there is no purpose in laying down principles for load shedding if they are not implemented in the field and arbitrary decisions are taken. For this purpose, MSEB should form a team of suitable officers to monitor the implementation of the load shedding protocol on a continuous basis, and also to guide the Division level and other field officials. MSEB should submit a Division-wise report to the Commission every month on the daily quantum of load shedding planned, actual load shedding carried out, and grid frequency (in 15 minute blocks) for each day during the month, identifying deviations with reasons. MSEB should also analyse this data to assess the scope for reduction in the planned load shedding and optimize it while maintaining the requisite grid frequency.
- xi. MSEB should also submit the consumer category-wise load curves, based on adequate sample studies, within four months of this Order.

22. The Commission has also interacted separately with MSEB for better understanding of the operational constraints, for refinement of the data, and for simulating various scenarios.

23. MSEB's proposal dated May 16, 2005 essentially sets out different categories of consumers and areas for application of load shedding depending on the quantum of shortage, on the inter se Aggregate Technical and Commercial Loss (ATC) levels, and considering certain exclusions and exemptions which are detailed in the proposal. Some of the proposed area exemptions cite State Government instructions. As mentioned earlier, no submissions in this regard were made by GoM during these proceedings.

24. The Commission notes its mandate and powers under Sections 23, 42(1), 43, 61, 86 and other provisions of the Electricity Act (EA), 2003, which are directly or indirectly relevant to the issues involved in these proceedings. The Commission has carefully considered the various submissions made and inputs received by it in this matter. The Commission also notes that the supply-demand gap is not a short-term phenomenon, and will persist to a greater or lesser extent for a considerable further period of time.

25. Keeping in view the urgency of the matter, the Commission issued a summary, operative Order on June 16, 2005, pending the issue of this detailed Order, containing the Commission's substantive directions with regard to the principles and protocol to be adopted for load shedding. These are briefly set out as follows (with some further elaborations considering the discussions in the foregoing paragraphs):

- (a) The EA, 2003 casts certain obligations on Distribution Licensees with regard to supply of electricity to their consumers, except in certain circumstances outside their control. However, it is inevitable that, when there is a shortage of available power vis-à-vis the requirement of consumers, load shedding would have to be undertaken in order to maintain the system frequency and to ensure its security. These Orders deal with the basis on which such shortage should be apportioned among different consumers and areas through load shedding, rather than the actual extent of shortage that may prevail at any point of time. Thus, they should not be construed as the Commission having validated or accepted the figures presented by MSEB with regard to the shortfall or its reasons. Moreover, the load shedding requirement is dynamic, and would vary from time to time depending on the system demand-supply gap, system frequency, season, time of day, etc.
- (b) The thrust of the EA, 2003 is on efficiency and economy of operations. Moreover, the immediate issue of concern in these proceedings is the equitable management and regulation of the load in a situation of shortage. In order to do so in a fair and equitable manner, the Commission believes that it is necessary to distinguish between areas with better performance, and undertake lesser load shedding in areas with lower Distribution losses and higher collection efficiency, all else being equal. This would be in keeping with the principle



that, at a time of scarcity, areas where energy is not being efficiently utilized or paid for should rank lower in the rationing order.

- (c) In its proposal, MSEB has considered Circles (comprising several Divisions) as the area unit to which such principles should be applied. However, MSEB also stated that

“Division-wise categorization based on loss levels would ideally be most suitable. Although Division-wise loss statistics are available, Division-wise load data is not yet available and hence it would be difficult at the moment to work out the load shedding programme on that basis. This refinement can be incorporated subsequently.”

Many participants in the public process stressed that, for obvious reasons, the application of such principles would be more meaningful the greater the level of disaggregation and the smaller the unit. This would also help to focus awareness and accountability better. The Commission has accordingly decided to adopt the Division as the basis for the present. An exception has been made in the metropolitan and other major cities, where it is more appropriate to consider the city as a compact unit, clubbing the Divisions comprising it in case there are more than one.

- (d) MSEB had proposed the ranking of Circles or other units on the basis of their Aggregate Technical & Commercial (AT&C) losses. However, the Commission believes that it is necessary to separate the two components, being essentially different in nature, and also to give greater weightage to Distribution losses (after excluding transmission losses as described below). It is worth recalling that, in an earlier Tariff Order dated January 10, 2002, the Commission had decided that the burden of Transmission & Distribution losses above a benchmark level of 26.87% should be shared equally by consumers and MSEB, and the resultant charge to consumers shown separately in their bills. This dispensation was challenged in various Writ Petitions, but the Bombay High Court upheld it. In its judgment dated February 11, 2004, the High Court observed, inter alia, that

“the Commission has adopted an unorthodox and innovative method in dealing with T & D losses... The Board and the consumers are pari delecto in preventing T&D losses on account of theft... The Commission has also noted that it will be improper to require the consumers in areas which show better compliance to pay for the thefts by consumers in other areas which show less compliances and higher thefts... We are inclined to ignore the criticism that the Commission has proposed to do something which has not been done before.”

(Subsequent to that Tariff Order, the Commission exempted Circles with T&D losses below the benchmark level from the charge. Separate T&D loss charges were discontinued altogether from December 1, 2003, in the last Tariff Order issued by the Commission in respect of MSEB. The Commission introduced the concept of ‘Regulatory Liability Charge’ as an interim measure to solve the current predicament of the MSEB, and stated that once more reliable estimates of Circle-level T&D losses are available, the Commission may revert to the differential T&D loss charge mechanism). Although there may be correlation between some of the factors responsible for losses as well as low recovery (such as organizational inefficiency and malpractices, local social ethos and paying culture, etc.), the emphasis for the present purpose has to be on the losses criterion considering the primary objective of managing the load, and this is reflected in weightage in the ratio of 70:30 for the Distribution loss and collection inefficiency, respectively, adopted now by the Commission. This ratio is also based on the Commission’s judgement regarding the impact and contribution of these efficiency parameters.



- (e) Only Distribution losses have been taken into account, considering that Transmission losses are at the higher levels of voltages and outside the control of the Divisions. For the time being, for want of a better alternative, the loss figures considered for this purpose are as assessed by MSEB. Validation of the data has not been undertaken by the Commission, and is not in a form comparable to the data submitted earlier on energy accounting and merit order despatch in compliance of various Tariff Order directions.
- (f) Distribution loss has been computed from EHV Sub-station output levels, after excluding the segregatable industrial load in order to give a more representative picture, since it tends to skew the loss levels. Moreover, since HT industry is largely excluded from the load shedding mechanism based on the criteria and rankings adopted (but not altogether from load shedding per se), it is appropriate to exclude the HT industrial load from the Distribution loss computations. The broadly representative MIDC feeder loss levels assessed by the Commission in its Tariff Order for FY 2003-04 have been considered to estimate the corresponding HT input from the HT sales, so as to derive the balance LT input (including unavoidably, some HT input on mixed feeders) from the total energy input to the Division. Collection efficiency has also been computed excluding HT recovery for the application of the 70:30 criterion, since the Commission finds that such recovery is generally very high, requires little effort to maintain, and is likely to give a misleading picture of such effort even in Divisions where there may be a few large consumers of this type, and skew the overall collection efficiency figures. For the time being, both Distribution loss and collection efficiency have been considered taking into account the period from April, 2004 to March, 2005, so that seasonal and other variations are captured.
- (g) Weightage has also been given to the fact that the technical Distribution losses in rural areas will generally be higher than in urban areas, given the wider spread of the LT network in the former and other factors. The Commission has for the moment considered a difference of 3% for the purpose of these Orders, based on discussions with MSEB. However, this difference will be reassessed after further data and analysis is submitted by MSEB. MSEB is directed to undertake and submit loss calculations by simulation for representative rural Divisions and urban areas (with both overhead wiring as well as underground cabling). In order to address the issue of regional and geographical differences, the MSEB should undertake the loss calculation for one Division in each Circle.
- (h) The Divisions have been ranked on the basis of the weighted average loss levels, computed as described earlier. The contribution of the Divisions in each of three types of areas, viz., major urban areas, other urban areas, and rural areas (as categorized by MSEB) to the daily total load has been segregated. As discussed earlier, the desired load relief can be achieved by shedding load in proportion to the contribution to the total load of these different types of areas, which works out to 1:2:5.
- (i) Applying the above principles, the Divisions have been ranked in four Groups as follows, such that all Divisions within a Group would be subject to the same level of load shedding (except for Divisions comprising a major city, which would be clubbed):

	Group	Weighted average loss and collection efficiency level	
		Urban	Rural
1	Group A	0% to 25%	0% to 28%
2	Group B	> 25% to 35%	> 28% to 38%
3	Group C	> 35% to 50%	> 38% to 53%
4	Group D	Above 50%	Above 53%



(It may be noted that the first bracket is upto 25%/28%, for which a parallel can be drawn with the benchmark T&D Loss level of 26.87% considered in the Commission's first Tariff Order, although the components of these percentages are of course somewhat different.)

- (j) All Divisions in the MSEB area of supply will be subject to load shedding as and when it is required, but the number of hours of load shedding in one Division as compared to another would differ on the basis of the above principles and the total load required to be shed.
- (k) The maximum hours of planned load shedding during any day in any Division should not be more than 8 hours. In circumstances in which the application of the principles in this Order would result in this ceiling being exceeded in any Division category (e.g. rural), the load shedding in the same category in the next higher Group will be increased upto the ceiling of 8 hours. For example, if rural Divisions in Group D require 10 hours of load shedding as per these principles, they would be subject only to 8 hours. The load equivalent to the excess 2 hours will be shed by adding to the load shedding in rural Divisions of Group C to the extent necessary (subject also to the ceiling of 8 hours), and so on till the load can be met. This will ensure that, in such circumstances, the load ratio between categories is still followed, but not Group-wise.
- (l) When it is found that the quantum of load relief actually required is less than planned, it should be distributed by pro-rata reduction in the hours of load shedding in Group A Divisions. The MSEB should prepare ready reference charts/sample load shedding schedules for the field personnel indicating the priority for lifting the load shedding and which would enable them to implement the load relief in a systematic and consistent manner.
- (m) MSEB should generally not shed load for more than 4 hours at a stretch in any Division. Thus, if the total load shedding to be carried out is more than 4 hours, it should be undertaken in two or more blocks. This prescription is based on the Commission's broad perception of consumer preferences and requirements. These are likely, however, to differ from one area to another depending on various factors, and MSEB may deviate from it any Division according to local preferences and convenience of consumers without reference to the Commission.
- (n) MSEB will have to ensure that, taking its supply area as a whole, the load shedding programme is drawn up in such a way that the load withdrawal or addition related to load shedding does not result in frequency jerk endangering grid security.
- (o) The above principles will not apply to Railway traction loads, and those public water works (including MIDC, CIDCO, and Maharashtra Jivan Pradhikaran, etc. as may be relevant), continuous process industries and hospitals which are on separate feeders, nor will these be subject to load shedding. They will also not apply to those industries and MIDC, Co-operative and other such industrial areas/estates which are supplied through separate or dedicated/express feeders. However, such industries (excluding continuous process industries) and industrial areas will be subject to load shedding for 16 hours on the day of the area-wise staggered weekly-off set out in GoM's Maharashtra Electrical Energy (Regulation of Distribution, Supply, Consumption or Use) Order, 1995 dated 1st December, 1995. The MSEB should submit data on the actual load relief achieved in each Division and Circle by the staggering weekly off for each day of the week. In this context, it will be recalled that the Commission's Order dated May 4, 2005 had stated that

“In order to remove any doubt or uncertainty, the Commission directs that the contents of that Order, as amended to date, will remain protected and shall continue to be in force until further orders”.

With the Commission's present Orders, the rest of the GoM dispensation will not survive.



- (p) Based on the above Grouping and principles, and in consultation with MSEB, the Commission simulated different scenarios for various levels of load shedding across these Groups, with further differentiation between major urban, other urban, and rural areas according to the rationale discussed earlier, to achieve the load relief desired. An illustrative simulation using a shortfall level of around 2500 MW during the evening peak, given purely as an example for providing greater clarity on the application of the principles adopted by the Commission, is at **Annexure 2**. **Annexure 3** lists the MSEB Divisions Group-wise considering the criteria set out above. The Annexures also set out the meanings of the relevant terms used, as defined by MSEB. As noted elsewhere in this Order, the figures are as presented by MSEB and have not been validated by the Commission.
- (q) The Commission would like to stress that this dispensation is intended only for planned load shedding. Even in this case, some rounding off (particularly to the advantage of Divisions in Group A) may have to be resorted to in micro-planning while adhering broadly to the load ratio differentiation in the number of hours of load shedding in different Divisions and types of areas. There may also be exigent situations such as forced outages, etc., in which the State Load Despatch Centre would require deviations from these principles in actual operation. However, while the detailed load shedding programme itself may change from time to time depending on changes in estimates of expected load or the shape of the daily load curve due to seasonal or other factors, planned load shedding should be undertaken in accordance with these principles. The concerned Division officials must be held accountable for deviations, and action taken against them. At the same time, it is necessary to recognize consistent and sustained improvements in loss and collection efficiency parameters beyond a benchmark level through an incentive scheme for the concerned Division personnel. Similarly, consistently poor performance should be penalised through the instrument of the Annual Confidential Reports and other means. MSEB should report the mechanism adopted for the purpose by the end of August, 2005.
- (r) MSEB was directed to publicize (including hosting on its website) and implement its load shedding programme on the basis of the summary Order within a week. However, considering a subsequent representation by MSEB citing difficulties in immediate implementation of the load shedding protocol due to the failure of the transmission system in the Chandrapur – Padghe corridor, and in order for the field machinery to understand and gear up the operational modalities, the Commission permitted its implementation from July 1, 2005.

26. The Commission obtained the following additional data from MSEB after the issue of the summary, operative Order, and has analysed it in an effort to understand MSEB's approach to load shedding and programming of its planned outages:

- i. Unit outages (planned and forced) from April 2004 to March 2005
- ii. MSEB demand over the period April 2004 to March 2005
- iii. Koyna water utilization from the year 2001 till date
- iv. OCM report for the months of April and May, 2004, and April and May, 2005
- v. Hourly Central Sector schedule and drawal data maintained at SLDC for two dates, viz April 19, 2005 and May 14, 2005
- vi. Data on actual drawal and schedule drawal from the Central Sector during every 15 minute block for the above sample dates from WREB
- vii. Proposed/planned versus actual load shedding (hourly) for two sample dates during the months of April and May in 2004 and 2005
- viii. Hourly load data and Central sector drawal on the sample dates of April 19, 2005 and May 14, 2005
- ix. Central sector share and receipt, and overdrawal/underdrawal for May 14, 2005
- x. The impact of the Load Management Charge/Rebate devised by the Commission for the month of May, 2005 on HT and LT consumption during peak hours, as well as the revenue earned/rebate given accordingly .



27. The Commission's analysis has thrown up certain questions and issues which need to be addressed by MSEB, including the following:

- (a) The actual on-line capacity (OLC) is significantly lower than the name-plate installed capacity. The average OLC during May, 2005 was around 7000 MW as against the installed capacity of around 9100 MW, after accounting for auxiliary consumption. The lower OLC appears to be the result of de-rating of the capacity, coal shortage and quality issues, and the timing and duration of the planned outages of MSEB's stations. From the data submitted by MSEB, it appears that the duration of such planned outages has been over 45 days on an average, and that the 210 MW units have been taken for planned outage in April and May. MSEB needs to conduct a detailed review of the timing as well as duration of such planned shutdowns considering technical norms and benchmarks, and submit a report to the Commission, within a month of this detailed Order, giving reasons for deviation, if any, and the steps being taken to achieve the relevant time norms for annual maintenance, etc. As suggested in earlier Tariff Orders also, and obviously subject to assessment of the comparative economics from time to time with respect to different generating stations, MSEB should also consider importing higher-quality coal. In sum, all possible avenues should be explored to try to minimize the load shedding requirement itself.
- (b) Even when the frequency has been over 49.5 Hz, MSEB has undertaken considerable load shedding on several occasions. For instance, on April 19, 2005, there were two such instances which, if properly managed, could have reduced the load shedding requirement by 0.1 MU. On May 14, 2005, the position was much worse, with 35 such instances (15 minute blocks) when the frequency was over 49.5 Hz, and yet MSEB was underdrawing from its share of Central Sector power. The possible savings in load shedding were in the range of 2.25 MU, which amounts to around 4% of the total scheduled drawal for that day. If this was the position for two sample dates analysed by the Commission, it is quite likely that this pattern was repeated on many occasions throughout the year. MSEB does not seem to have made adequate efforts to assess the need for load shedding vis-à-vis the prevailing system frequency. Moreover, it is not clear why MSEB has not drawn power up to the scheduled drawal and shed load instead, when there was no problem with the system frequency. MSEB is directed to present to the Commission a detailed analysis on this matter for the period of the last one year, within a month .
- (c) There is an urgent need for MSEB to install a communication system that would enable two-way transmission of data from the field to the LDC and vice-versa, so that the actual load shedding can be fine-tuned based on the prevailing system frequency, and to ensure that the load shedding programme is being implemented in the desired manner and as scheduled. MSEB has made a presentation to the Commission wherein it has proposed to extend the existing SCADA system to lower voltage levels, which would enable two-way communication from its 11 kV feeders and provide information which would be useful for energy audit as well as load shedding. The MSEB may also consider posting a suitable officer from the commercial department at the SLDC to ensure that the load shedding is minimised when the system frequency is above specified levels, as this would reduce revenue losses due to load shedding.
- (d) The MSEB has consistently utilized 67.5 TMC of water for generation from the Koyna hydel station over the years. In the Water Year 2005-06 (June, 2004 to May, 2005), however, the water utilization has been increased to 75.7 TMC, after requests were made to Andhra Pradesh. However, there seems to be no clear pattern of utilization of water for generation from Koyna over the months, except that the utilization has tended to increase in the quarter December to February over the last two years, with this quarter having around 30% share of the total generation. MSEB should explore the possibility of continuing with the utilization of the higher water availability. Moreover, considering the opportunity cost of power during peak hours, MSEB should maximize the use of hydel stations during peak hours, and minimize such usage during off-peak hours.



- (e) Analysis of the OCM data shows that the demand in the MSEB system has increased significantly in April and May, 2005 over the corresponding months in 2004, whereas the OLC has been stagnant at the same level. This has resulted in a steep increase in the quantum of load shedding in 2005 as compared to that in 2004, as shown in the Table below. MSEB should undertake a detailed analysis of the reasons for the steep increase in demand, and wherever possible identify the consumers/categories of consumers contributing to it, through a study of the load curves.

	Apr 04	Apr 05	May 04	May 05
Morning Peak (MW)	10346	11751	9697	11330
Evening Peak (MW)	11707	12838	10796	12987
Max. MSEB On Line Capacity	9709	9371	9603	9591
Max. MSEB LS in the Month	2534	3685	2045	3682

- (f) Analysis of the comparative area-wise HT and LT consumption data for the months of May, 2004 and May, 2005 after the introduction of the Load Management Charge/Rebate shows that, while consumption in some Circles/Divisions has fallen in May, 2005 as compared to May, 2004, the consumption of some others has increased significantly, and the amount of revenue collected is also significant. For instance, the HT ToD consumption during evening peak hours has increased significantly in the Divisions of Ganeshkhind, Kalyan (R), Pen, Pune, Vasai, Wardha and Vashi, while peak hour consumption in Kalyan (U) and Rastapeth Divisions has reduced considerably. In the case of LT, the net additional revenue of Rs. 7.90 crore earned from the Load Management Charge by MSEB in May, 2005 seems to indicate that the scope for reduction in consumption at the LT level during peak hours may be less. MSEB is directed to analyse the data after obtaining the details for June, 2005. There also appears to be some scope for further fine-tuning of the ToD tariff structure for HT consumers, considering the reduction in the consumption during the evening peak hours in some areas. The MSEB should undertake a more detailed analysis at the field level to understand the reasons for this shift in the consumption pattern so as to propose further fine-tuning in the ToD tariff structure in the next tariff revision process. There may also be a case for extending the ToD tariff to other consumer categories, including domestic and commercial, above a certain load limit. MSEB should also analyse the probable quantum of shiftable and non-shiftable load through discussions with major consumers, so as to persuade them to move such shiftable load to off-peak hours. If required, MSEB may involve the Energy Service Companies (ESCOs) for assistance in this process.
- (g) There are instances of EHV opening occurring very frequently on the same day, despite the published load shedding schedule. This highlights the fact that the load shedding schedule is not adhered to strictly by the field personnel, thus forcing the SLDC to go in for EHV opening. EHV opening should be undertaken only as a last resort. MSEB should ensure that strict discipline is enforced in this regard at the field level so that the load shedding schedule is adhered to, except when there is scope for relieving the load shedding depending on system frequency, or as required by the SLDC. As mentioned earlier, in case of non-compliance, strict disciplinary action should be taken against the defaulting officials.
- (h) MSEB appears to be estimating the total unrestricted demand by arithmetically adding the OLC to the quantum of load shedding, without accounting for parameters such as the diversity factor, EHV losses, and consumer category-wise load curves. The MSEB needs to refine its demand projection methodology to enable it to plan its capacity addition and R&M programmes better.



- (i) Considering the severe shortage of electricity in the State, MSEB has been procuring power from inter-State electricity traders at high prices which have not been approved by any authority, and are ostensibly market-determined. The Commission believes that a check is necessary on the prices charged by such traders to mitigate the impact of the high cost of power to consumers in the State. Under the EA 2003, it is mandatory for the trading licensees to disclose their source of power and the price at which it was purchased. In the Commission's view, considering the objects and intent of EA, 2003, the functions and powers of the Central and State Commissions, the tariff determination and other provisions, the chain by which the tariff of distribution licensees is determined, and the various relevant Regulations, the tariff for sale of electricity by generating companies and distribution licensees to traders can be regulated by the 'Appropriate Commissions'. This is quite apart from the explicit provision by which they can regulate the trading margin. In this light and considering the present circumstances, it would be appropriate for MSEB to approach the Central Electricity Regulatory Commission (CERC) to obtain this data and check whether the price of power has been determined by any Commission, and to seek legal remedies to ensure that there is no profiteering that is not duly mandated in the trading transaction.
- (j) Discussions with MSEB indicate that it is recording only the current consumption at the sub-station level (11 kV outgoing feeder), since either meters capable of recording kW/kVA demand are not installed on the outgoing 11 kV feeders, or the meters are not appropriately wired. This needs to be rectified immediately. Meters capable of recording kW and kVA through remote metering should be installed on all 11 kV outgoing feeders, appropriate wiring (3 phase, 4 wire) should be done, and the MW/MVAR should be recorded on an hourly basis.

28. The Commission has not been able to validate MSEB's submissions regarding the Division-wise distribution losses (after excluding HT sales) in the absence of comparable data. MSEB is directed to continue to submit this data, and fine-tune the same after excluding all HT sales.

29. During the public process, the Confederation of Indian Industry (CII), Western Region pointed out that large captive generation capacity is available with industries around Pune. Considering the significantly higher running costs of such plants, some dispensation is required to compensate such industries for operating them throughout the day and thereby reducing the load on MSEB and enable it to better supply other consumers. Alternatively, a link can be established with industrial and other consumers who are willing to pay more for reliable, uninterrupted power. This would also relieve MSEB to that extent. The Commission's Order dated September, 8, 2004 on fossil-fuel based Captive Power Plants does not fully address such variants. In this context, it will be recalled that, in an earlier Tariff Order, the Commission had mooted the concept of a 'Reliability Charge' to be proposed by MSEB, and reiterated it in its last Tariff Order. Considering the cluster of surplus captive power capacity at Pune, MSEB was directed through the summary Order dated June 16, 2005 to revert within 3 weeks of the issue of the operative Order to the Commission with detailed, workable alternatives for harnessing it on a pilot basis, which might provide a model for other such clusters. The Commission notes that a preliminary submission has recently been made by MSEB in this regard, which is being separately examined.

30. It is now evident that significant levels of shortages will continue to prevail in the MSEB area for a considerable period. The Commission has been stressing the urgent need for MSEB to undertake Demand-Side Management measures and to intervene pro-actively through energy conservation and efficiency promotion schemes so as to build a critical mass of consumer awareness and adoption. The Commission has already taken up these issues separately. Another aspect of such measures is joint load management with the participation of consumers rather than load regulation. Based on analysis of the data for the period of May and June, 2005 (when the Load Management Charge/Rebate was applied under the Commission's Orders dated April 26 and May 4, 2005), MSEB should undertake a more in-depth study at the local level to assess the feasibility of introducing a load management target. MSEB should identify clusters of consumers in each Division with whom to work out an arrangement for a ceiling on load at different times of the day. MIDC areas, for instance, may be suitable to begin



with, but there would be several other such types of consumers or clusters which can be approached on priority. MSEB's Akshay Prakash scheme of joint, voluntary self-regulation by villages is one variant of this approach, though it is difficult to take up villages in isolation considering the mixed nature of feeders at present.

31. In its Order dated March 4, 2005 the Commission had emphasized the need for separation of feeders, which would also give greater flexibility in agricultural and other load management. Thereafter, MSEB has submitted a very limited 1st-phase programme for capital expenditure approval, which is being examined separately. Agricultural feeder separation needs to be undertaken on priority because it is essential for better management of the rural loads, and ultimately reducing the load shedding in other rural areas. MSEB need not await the Commission's approval for the capital expenditure related to the agricultural feeder separation programme before taking all the actions required so as to be in readiness to implement it

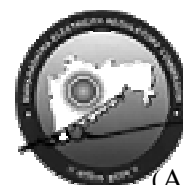
32. The dispensation set out in this Order is based on the data currently available with the Commission, and has been evolved on the basis of interactions with various stakeholders and the public, including through the public process. It is quite likely that, following its initial implementation, periodic modifications may be required to be made by the Commission. Considering the persistence of power shortages, by its very nature this dispensation will have to be seen as 'work in progress', to be reviewed and refined periodically by the Commission considering actual working and the ground realities obtaining from time to time, further data and analysis, rationalization of definitions currently used by MSEB (in the classification of urban and other areas, for instance), other measures that are undertaken in future, changes in the performance of different Divisions over time, and other factors.

33. On issue of the operative Order, MSEB prepared draft Circulars which were submitted to the Commission for approval. However, the Commission finds that these Circulars do not elaborate in simple terms how implementation is to be done by field officials. There is an urgent need for such operational guidelines.

34. Recently, MSEB has given way to three functional (generation, transmission and distribution) successor entities and a holding company . However, the term 'MSEB' has been used throughout this Order for convenience.

Sd/-
(A. Velayutham)
Member

Sd/-
(Dr Pramod Deo)
Chairman, MERC



(A.M. Khan)
Secretary, MERC