

**EXPLANATORY NOTES**

**FOR**

**DRAFT**

**GUIDELINES FOR OPERATION OF MERIT ORDER  
DESPATCH**

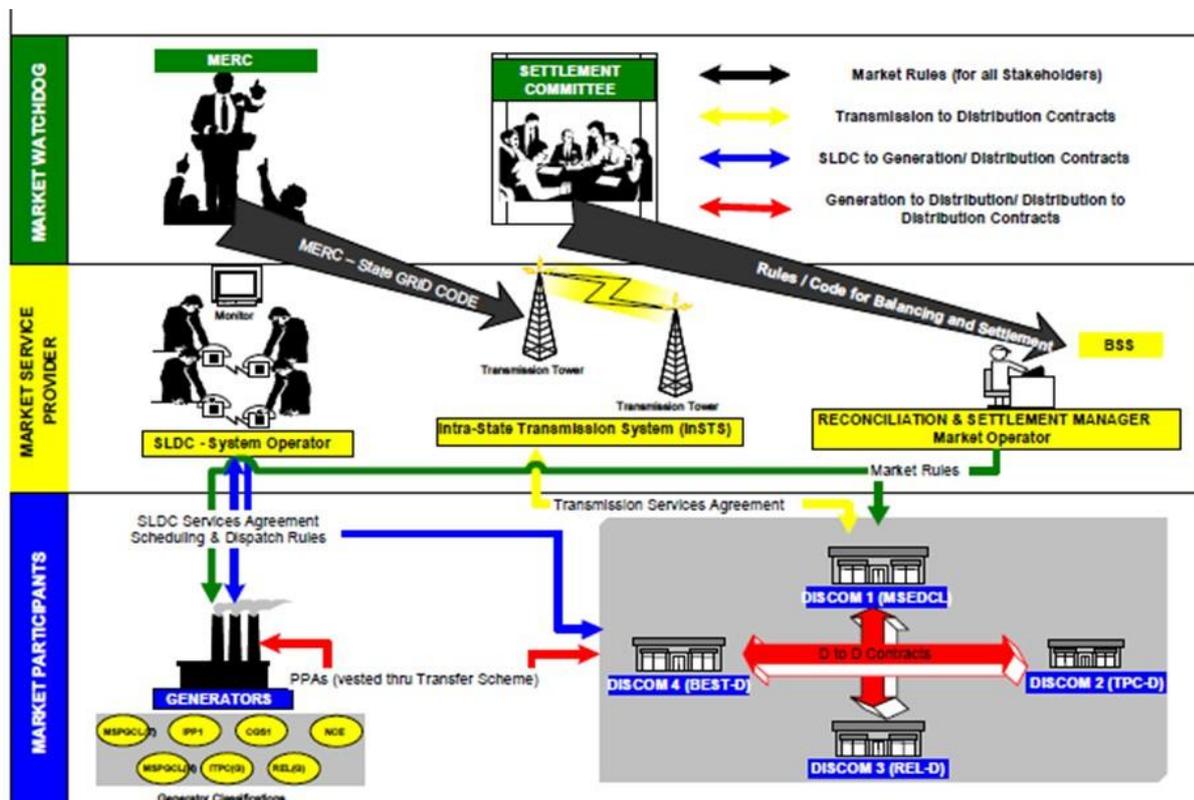
**OCTOBER, 2018**

# 1 BACKGROUND

## 1.1 Regulatory Framework

- 1.1.1 The Tariff Policy notified by the Ministry of Power, Government of India on 6 January, 2006 stipulated that a two-part tariff structure should be adopted for all long-term contracts to facilitate MOD.
- 1.1.2 The MERC (State Grid Code) Regulations, 2006 ('State Grid Code') specify the rules, guidelines and standards to be followed by various agencies and participants in planning, developing, maintaining and operating the Intra-State Transmission System (InSTS) of Maharashtra, which is a part of the Western Region Grid System, in the most efficient, reliable and economic manner, while facilitating healthy competition in the generation and supply of electricity.
- 1.1.3 The Commission issued the ABT Order on introduction of ABT regime at the State Level and related issues on 17 May, 2007 (Case No. 42 of 2006), in which it stipulated the mechanism for introduction of intra-State ABT within Maharashtra.
- 1.1.4 The State Grid Code (Part E) provides for a Scheduling and Despatch Code to be prepared by the Maharashtra State Load Despatch Centre (MSLDC) consistent with the Scheduling and Despatch Code under the Indian Electricity Grid Code (IEGC) specified by the Central Electricity Regulatory Commission (CERC). That Code was to conform with the ABT Order, in which the scheduling process and time-lines have been set out. The Scheduling and Despatch Code for Maharashtra was finalised by MSLDC with the concurrence of the Commission.
- 1.1.5 In its ABT Order, the Commission has elaborated on the market structure, various entities, their roles and responsibilities, rules for their operation, and contractual framework for the market operation under the intra-State ABT regime in the State. The ABT Order laid down the basic principles for least-cost despatch in the State. Based on these principles, MSLDC is currently scheduling various Generating Stations/Units by applying MOD principles.
- 1.1.6 The established contractual framework for power market operations in Maharashtra is as follows:

**Figure 1: Contractual Framework for Power Market Operations in Maharashtra**



1.1.7 As spelt out in the ABT Order, the Maharashtra State Power Pool comprises the following tiered structure for market operations:

- **Market Participants** – Generating Companies, Distribution Licensees, Power Trading Companies, and Open Access (OA) Users.
- **State Pool Participants**–Distribution Licensees and Transmission OA Users operating in the electricity market of Maharashtra.
- **Market Service Providers** – Transmission Licensees in the State, MSLDC-OD (Operations Division of MSLDC), and MSLDC-CD (Commercial Division of MSLDC).
- **Market Operator** – Maharashtra State Power Committee (MSPC), comprising the Distribution Licensees in the State and MSLDC.

1.1.8 The roles and responsibilities of each of the participants has been elaborately dealt with in the ABT Order, and is hence not being repeated here though it

would be referring to these subsequently in these Guidelines.

- 1.1.9 Regarding the implementation of Least-cost Despatch principles, the ABT Order envisages the Merit Order for the State as a whole on a real time basis, and para. 4.1.1 (b) stipulates as follows:

“Based on the availability schedule forecasted by Generating Stations and load requirement forecasted by State Pool Participants, the MSLDC-OD shall draw up the least-cost despatch schedule for the State as a whole in accordance with the merit order principles approved by MERC from time to time.”

- 1.1.10 Further, para 4.7 of the ABT Order stipulates as follows:

“Premises for Least-cost Despatch

(a) The MSLDC-OD shall be responsible to prepare Least-cost Despatch Schedule after taking into account the requirement of the State as a whole. The process of scheduling and despatch and role/responsibility of the MSLDC-OD shall be in accordance with the procedure outlined under ‘Scheduling and Despatch Code’ of the State Grid Code, modifications / amendments thereto and any such Order issued by the MERC from time to time. Further, MSLDC-OD shall determine the target despatch schedules and target drawal schedules by undertaking load-generation balancing and adopting MOD principles at reference frequency of 50 Hz.

(b) The least-cost despatch planning shall be based on the ‘Merit Order Stack’ to be adopted by the MSLDC-OD on day-ahead basis based on the available capacity declaration furnished by the Generating Stations on a day-ahead basis corresponding to each trading period. During real-time operations, SLDC may seek to verify available capacity upto ‘declared capacity’ and issue despatch instructions accordingly.”

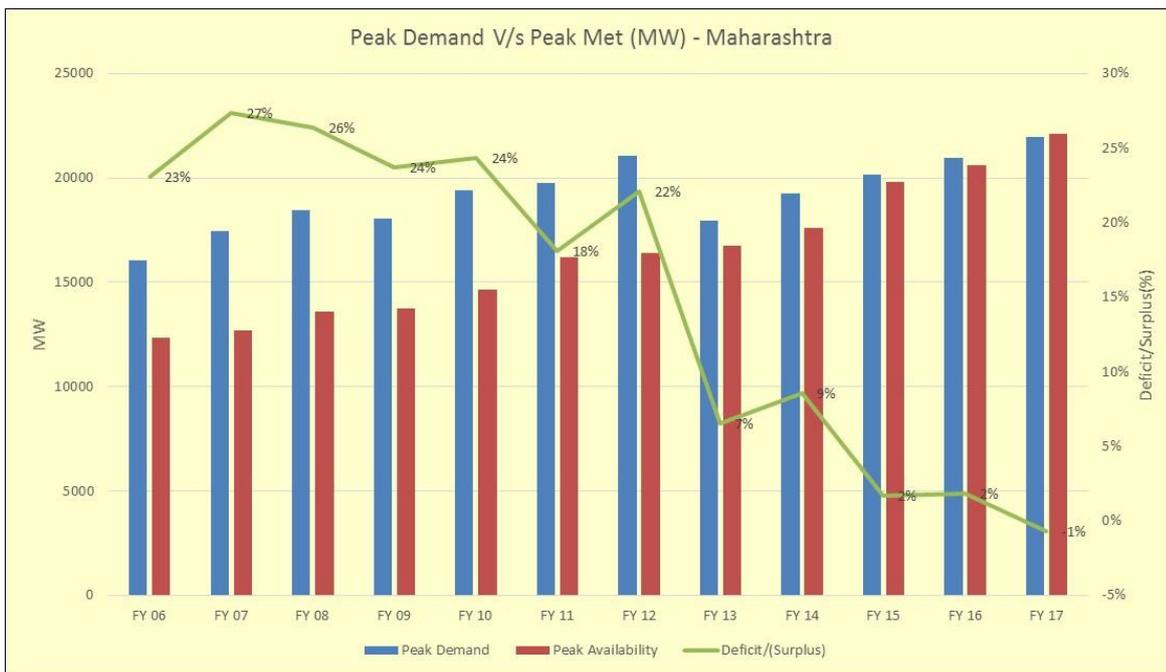
- 1.1.11 From these provisions of the ABT Order regarding least-cost despatch, it is clear that the State-wise MOD is to be implemented by MSLDC on real time basis considering the requirement of the State as a whole and the available capacity declaration.

## **1.2 Demand Supply Position of Maharashtra**

- 1.2.1 When the ABT Order was issued, Maharashtra was facing a severe power

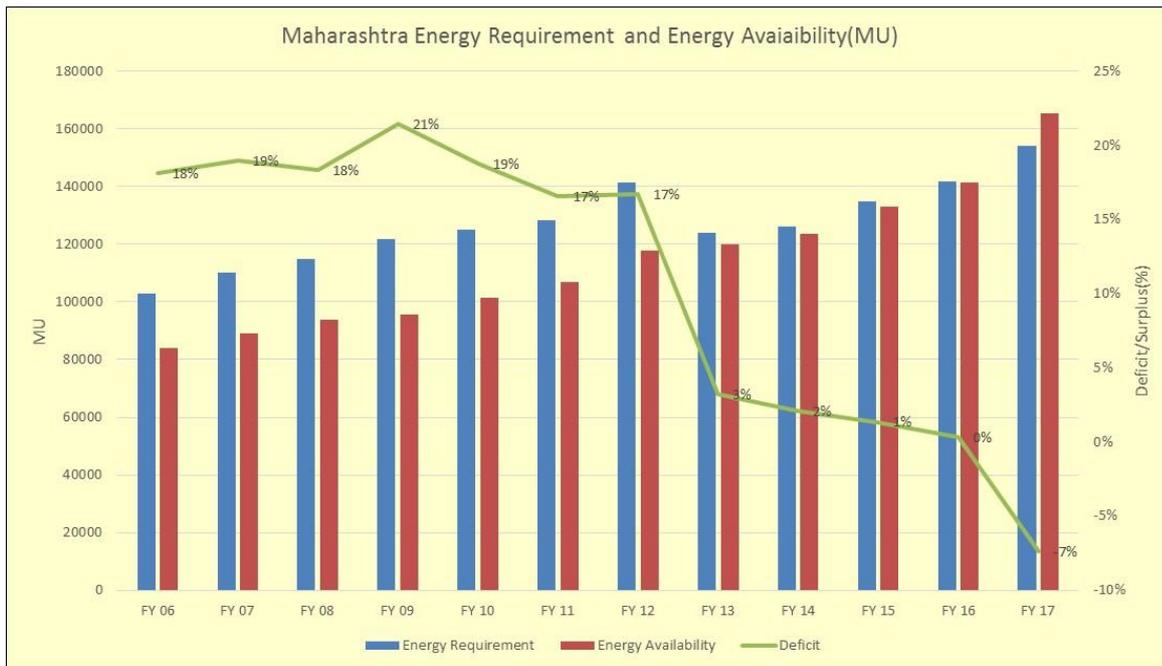
deficit. With significant generation capacity addition in the State and contracting of power through competitive bidding, and the power demand within the State not increasing commensurately, the power availability for the State is now far in excess of the power demand. The actual year-wise demand-supply position in terms of peak demand and demand met as well as energy requirement and energy availability from FY 2006-07 to FY 2015-16 and projected for FY 2016-17 is depicted below:

**Figure 2: Peak Demand Vs. Peak Availability**



*Source: Annual Reports of CEA; LGBR for FY 2016-17*

**Figure 3: Energy Requirement Vs. Energy Availability**



*Source: Annual Reports of CEA; LGBR for FY 2016-17*

1.2.2 It will be seen from the above Graphs that the peak deficit has reduced from 23% (3709 MW) in FY 2005-06 to 2% (379 MW) in FY 2015-16, and a surplus of 1% (157 MW) is projected in FY 2016-17. Similarly, the energy deficit has decreased from 18% (18648 MU) in FY 2005-06 to a negligible quantum (456 MU) in FY 2015-16, and a surplus of 7% (11333 MU) is projected in FY 2016-17. From the submissions of the Maharashtra State Power Generation Co. Ltd. (MSPGCL) in its Multi-Year Tariff (MYT) Petition for the 3<sup>rd</sup> Control Period from FY 2016-17 to FY 2019-20, it is understood that significant generation capacity (around 2500 MW) is at advanced stages and is expected to be commissioned in FY 2016-17. Thus, the surplus situation may continue as the demand growth has not been commensurate with the generation capacity addition. With substantial capacity addition, the surplus capacity is likely to increase over time, and having a robust framework in place would be critical for achieving least-cost despatch for the State.

### 1.3 Regulatory proceedings

1.3.1 Considering the issues (and disputes) raised in several regulatory proceedings and other interactions with Utilities, Consumer Representatives and others in the recent past, the Commission is of the view that the existing modalities for the application of MOD principles in Maharashtra, and the principles themselves, need to be reviewed, clarified and elaborated further. This is particularly so in view of the changing demand-supply scenario: unlike in the past, when there was large and persistent power shortage, power availability is

has now been exceeding the demand of Distribution Licensees. Hence, the Commission has initiated these proceedings to formulate Guidelines for the operation of MOD, which would be finalised after public consultation.

1.3.2 In this background, the Commission obtained actual information for FY 2015-16 in order to identify the specific issues that need to be addressed. The following information was obtained from MSLDC:

- (i) Month-wise MOD Stack prepared for each month in FY 2015-16;
- (ii) Supporting documents provided by Distribution Licensees and Generating Companies on the basis of which the MOD Stack was prepared for each month.
- (iii) Initial Schedules and Final Implemented Schedules for 96 time blocks for 3 days in each month, viz., a) the day of maximum system demand, b) the day of minimum system demand, and c) Sunday or a public holiday, i.e., the day in which the maximum demand recorded was minimum during the month.
- (iv) Demand forecast uploaded by Distribution Licensees for 96 time blocks for the respective days.
- (v) Availability Forecast uploaded by Generating Companies for 96 time blocks for the respective days.
- (vi) Note on approach followed by MSLDC for giving despatch instructions to Generating Stations/Units on real time basis.
- (vii) List of 'Must Run' Generating Stations/Units in FY 2015-16.
- (viii) Details of 'zero schedules' given by Distribution Licensees, along with names of the concerned Generating Stations and Units in FY 2015-16.
- (ix) 'Reserve Shutdown' considered during FY 2015-16 along with its basis.

1.3.3 The Commission also sought the following information from Reliance Infrastructure Ltd. (Generation)(RInfra-G) and Tata Power Co. Ltd. (Generation) (TPC-G):

- (i) Basis of norms of operation considered for projecting the Variable Charge for the following month.
- (ii) Basis of fuel prices considered for projecting the Variable Charge for the subsequent month.
- (iii) Basis of Gross Calorific Value (GCV) of fuels considered for projecting the Variable Charge for the subsequent month.
- (iv) Month-wise fuel details in the specified format.
- (v) Details of whether 'Other Variable Charges' have been considered in projecting the Variable Charge for the subsequent month.

#### 1.4 Analysis of Demand-Supply projections made by entities

1.4.1 The following analysis of the demand-supply projections made by the entities highlight the significance of the current proceedings.

1.4.2 The days selected for analysis of the initial schedules and final implemented schedules for 96 time blocks were as follows:

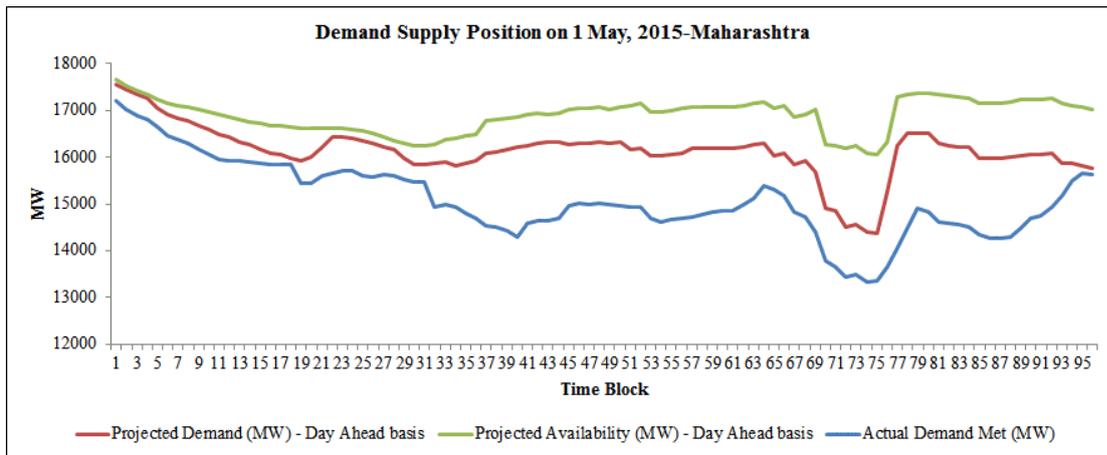
**Table 1: Days selected for Analysis**

Month	Maximum Demand Day	Minimum Demand Day	Minimum of Maximum Demand Day
April 2015	22.04.2015	12.04.2015	14.04.2015
May 2015	11.05.2015	01.05.2015	10.05.2015
June 2015	04.06.2015	22.06.2015	21.06.2015
July 2015	14.07.2015	24.07.2015	26.07.2015
August 2015	26.08.2015	15.08.2015	05.08.2015
September 2015	29.09.2015	18.09.2015	17.09.2015
October 2015	19.10.2015	03.10.2015	04.10.2015
November 2015	09.11.2015	12.11.2015	11.11.2015
December 2015	02.12.2015	26.12.2015	25.12.2015
January 2016	14.01.2016	27.01.2016	26.01.2016
February 2016	09.02.2016	08.02.2016	14.02.2016
March 2016	22.03.2016	01.03.2016	04.03.2016

1.4.3 For representative purposes, the analysis for the month of May, 2015 has been elaborated here.

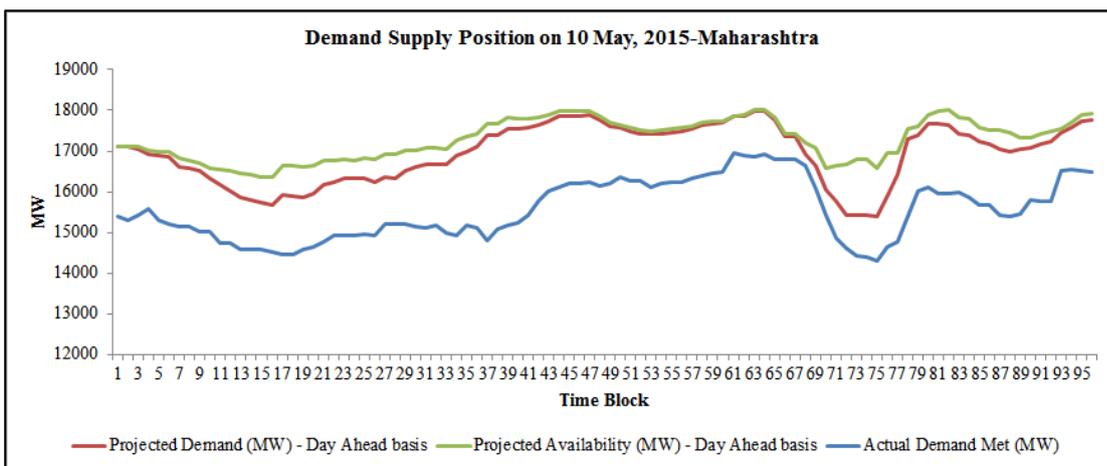
1.4.4 The system condition as on 1 May, 2015, a public holiday (Minimum Demand Day) is as shown below:

**Figure 4: System Condition as on 1 May, 2015**



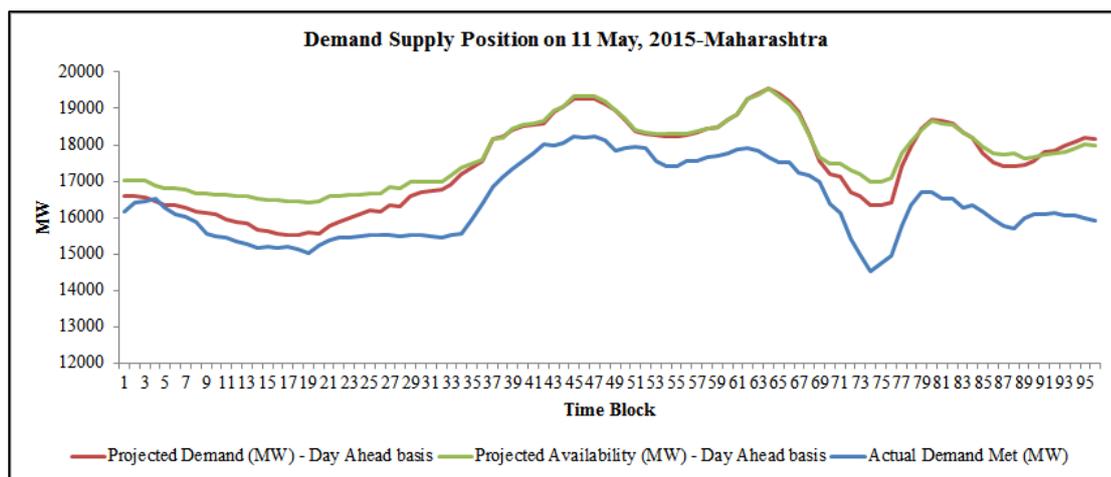
1.4.5 The system condition as on 10 May, 2015 (Minimum of Maximum Demand Day) is as shown below:

**Figure 5: System condition as on 10 May, 2015**



1.4.6 The system condition as on 11 May, 2015 (Maximum Demand Day) is as shown below:

**Figure 6: System condition as on 11 May, 2015**



1.4.7 The above graphs indicate the following for the 3 selected days of May, 2015:

**Table 2: Analysis of Demand-Supply on 3 days of May, 2015**

Particulars	1 May, 2015		10 May, 2015		11 May, 2015	
	Maximum (MW)	Minimum (MW)	Maximum (MW)	Minimum (MW)	Maximum (MW)	Minimum (MW)
Difference between Projected Demand and Actual Demand met	2191	138	2569	304	2235	-87
Difference between Projected Availability and Projected Demand	1695	62	1390	-12	930	-173
Difference between Projected Availability and Actual Demand met	3227	443	2873	569	2481	353

1.4.8 From the above, it is clear that the power availability for the State was much higher than the power demand. Similar trends were also observed for the other months of FY 2015-16.

1.4.9 It is also observed that there is wide variation, of around 12-15%, in the actual peak demand with respect to the projected peak demand on day-ahead basis. The Distribution Licensees need to address this issue by improving their methodology and systems for demand projections for the 96 time blocks on day-ahead basis.

## 1.5 Least-Cost Despatch principles

1.5.1 The Commission is of the view that the least-cost despatch principles need to be applied at three levels to take into account the demand fluctuations and surplus available capacity:

- (i) Seasonal variations in demand

- (ii) Declining trend in demand in the near future
- (iii) Least-cost Despatch on Day-Ahead basis and for real time operations.

1.5.2 The Distribution Licensee has to optimise the procurement cost of the first level by taking into account seasonal variations in demand. The demand on the system of the Distribution Licensee for a reasonably foreseeable future period needs to be assessed in advance taking into consideration the actual demand recorded during the past years and then projecting the demand for a reasonable future period, say a quarter or a month. The power availability for the corresponding period needs to be re-assessed considering the actual generation over a reasonable past period (say, 5 years) and the new sources of power expected or contracted for supply during the future period under consideration. After meeting the peak demand requirement starting from the least-cost source in the Merit Order, any generation capacity available over and above the maximum demand projected for the future period would be the surplus available for the Distribution Licensee. The Distribution Licensee should not procure power from such costlier sources, and would thereby not incur the associated variable charges. For system security purposes, an adequate reserve margin also needs to be kept and grid constraints, if any, also need to be taken into consideration. This issue is discussed further in subsequent Sections.

1.5.3 MSLDC has to address the second level of optimising the procurement cost in case of a declining trend of the system demand for the State as a whole on account of monsoons or public holidays, etc. At these times, optimising the total power procurement cost is possible by not procuring power from costlier sources in the Merit Order for such short periods (for few days or few time blocks). For system security purposes, however, an adequate reserve margin needs to be maintained and grid constraints, if any, must also be taken into consideration.

1.5.4 MSLDC has to achieve the third level of optimising procurement cost on Day-Ahead and real time basis to address the variations in Day-Ahead demand projections submitted by Distribution Licensees and Day-Ahead schedules given by Generating Companies for 96 time blocks, and also address any sudden dips in demand which would necessitate backing down of the costlier Generating Units in the Merit Order to their Technical Minimum level.

1.5.5 In this background, the Commission has analysed the information submitted by MSLDC, Distribution Licensees and Generation Companies. Accordingly, the following issues have been identified and addressed in this Draft Guidelines:

- (i) **Periodicity and Date of preparation of MOD Stack.**

- (ii) **Basis of preparation of MOD Stack, including the Variable Charge to be considered.**
- (iii) **Guidelines for operating the Generating Units.**
- (iv) **Guidelines for Zero Schedule instructions to the Generating Units.**
- (v) **Guidelines for Reserve Shut Down (RSD) instructions to the Generating Units.**
- (vi) **Identification of 'Must Run' Stations, and guidelines for operating Hydro Stations**
- (vii) **Technical Minimum of Generating Units.**

## 2 PERIODICITY AND DATE OF PREPARATION OF MOD STACK

### 2.1 Procedures stipulated by the Commission

- 2.1.1 The ABT Order stipulates that the MOD Stack shall be prepared by MSLDC-OD for the State as a whole once in a month:

*“4.7 Premises for Least-cost Despatch*

...

- (e) *The Generating Stations shall furnish the details of the prevalent fuel charge including, details of the delivered cost of fuel during the month to the MSLDC-OD from time to time at least once during the month and not later than fifth day of the month to enable the MSLDC-OD develop centralized 'Merit Order Stack' for the State as a whole...*”

### 2.2 Analysis and Proposed Guidelines

- 2.2.1 The Commission observes that the MSLDC is preparing the month-wise MOD Stack on the 11<sup>th</sup> day of each month based on the submissions of the Distribution Licensees and Generating Companies till the 10<sup>th</sup> day of the respective month. Such MOD Stack is effective from the 12<sup>th</sup> day of the corresponding month to the 11<sup>th</sup> day of the next month, provided there are no revisions in the MOD Stack during this period. Once it is prepared, the MOD Stack is subject to revision in case of commencement of supply of power under a new Power Purchase Arrangement (PPA), revision of Variable Charges relevant to the MOD Stack, etc. An overview of the MOD Stack implemented in FY 2015-16 is shown in the Table below:

**Table 3: Overview of MOD Stack implemented in FY 2015-16**

Sl. No.	Month	Revision	MOD Stack Prepared on	MOD Stack Implemented from	Reasons for Revision
1	Apr-15	R0	11-Apr-15	12-Apr-15	
		R1	14-Apr-15	15-Apr-15	Revision of Rates of EMCO (Warora)
		R2	21-Apr-15	22-Apr-15	Commencement of STOA from WPCL to MSEDCL w.e.f.

Sl. No.	Month	Revision	MOD Stack Prepared on	MOD Stack Implemented from	Reasons for Revision
					22.04.2015
2	May-15	R0	11-May-15	12-May-15	
3	Jun-15	R0	11-Jun-15	12-Jun-15	
4	Jul-15	R0	11-Jul-15	12-Jul-15	
5	Aug-15	R0	11-Aug-15	12-Aug-15	
		R1	20-Aug-15	21-Aug-15	Revision of Rates of Adani and Rattan India due to Change in Law as communicated by MSEDCL
6	Sep-15	R0	11-Sep-15	12-Sep-15	
7	Oct-15	R0	12-Oct-15	13-Oct-15	
8	Nov-15	R0	11-Nov-15	12-Nov-15	
9	Dec-15	R0	11-Dec-15	12-Dec-15	
		R1	16-Dec-15	17-Dec-15	COD of MSPGCL Koradi Unit 8
10	Jan-16	R0	11-Jan-16	12-Jan-16	
11	Feb-16	R0	11-Feb-16	12-Feb-16	
12	Mar-16	R0	11-Mar-16	12-Mar-16	
		R1	18-Mar-16	19-Mar-16	Revision of Rates of MSPGCL
		R2	19-Mar-16	20-Mar-16	Revision of Rates of MSPGCL Khaperkheda (Units 1-5) and Rattan India

2.2.2 The ABT Order stipulates that the MOD Stack is to be prepared once a month, which is being followed. The Commission does not find any need to revise this as the bills for power supplied by Generating Companies are raised on a monthly basis.

2.2.3 The MOD Stack is being prepared on the 11<sup>th</sup> day of each month and implemented from the 12<sup>th</sup> day of that month. It seems that these extended dates were agreed to between the Generating Companies, Distribution Licensees and MSLDC on account of operational difficulties expressed by Generating Companies in providing the information by the 5<sup>th</sup> of every month as envisaged in the ABT Order. However, MSLDC ought to have apprised the Commission of the difficulties in this stipulation of the ABT Order and taken its prior approval.

2.2.4 The Commission sought details of the basis of the Variable Charges being considered for drawing up the MOD Stack. The Commission observes that, in case of certain Generators, the Variable Charge for the second preceding month (n-2) is being considered, and a different period is considered for some others. The Commission has dealt with the lack of uniformity in the basis of

Variable Charge considered for the MOD Stack subsequently. However, the Commission cannot see why it was necessary to extend the date of submission by six days without ensuring uniformity in the basis for the Variable Charge considered by MSLDC for the MOD Stack.

2.2.5 In the light of the above discussion, the Commission finds it necessary to stipulate again the date for preparation of the MOD Stack while ensuring that the latest Variable Charges (at normative performance parameters) of the immediately preceding month is factored in. As per the provisions of the PPAs, the monthly bills for power supplied by Generating Companies are raised on the 5<sup>th</sup> or 7<sup>th</sup> of the following month. Hence, the concerned entities may face operational difficulties in submitting the Variable Charge based on the bills for the immediately preceding month by the 10<sup>th</sup> day of the following month.

2.2.6 In view of the above, the Variable Charge of the immediately preceding month and in case the Variable Charge of immediately preceding month is not available, the latest available Variable Charge for preparation of the MOD Stack needs to be submitted to MSLDC-OD by the 14<sup>th</sup> day of every month. MSLDC-OD shall prepare the MOD Stack on the 15<sup>th</sup> day of the month, which would be effective from the 16<sup>th</sup> day of the month till the 15<sup>th</sup> of the subsequent month unless revised by MSLDC-OD. MSLDC shall upload the monthly MOD Stack on its website in the format given at Annexure-1 of Draft Guidelines by 15:00 hours on the 15<sup>th</sup> of every month.

2.2.7 The MOD Stack uploaded on the 15<sup>th</sup> of the month may be subsequently revised in the following circumstances:

- **Commencement of supply of power by a Generating Unit under a new arrangement/agreement,**
- **Revision of Variable Charges for preparing the MOD Stack due to a Tariff Order issued by this Commission for State Generating Stations and the Central Electricity Regulatory Commission (CERC) for Central Generating Stations,**
- **Impact of Change in Law in the PPAs as notified by the Distribution Licensee.**

2.2.8 The Commission notes that third-party sampling and GCV testing of Coal has been initiated by the subsidiaries of Coal India Limited (CIL). The Commission was apprised in various proceedings of the time it takes for Generating Companies to be provided the GCV test results after the collection of samples of received coal. However, the Commission is of the view that any

issues that may arise on account of such third-party sampling and GCV measurement of coal should not result in the Generating Company not being able to consider the latest possible actual GCV of Coal for furnishing Variable Charges for MOD purposes. The Generating Company shall consider the latest possible actual GCV of Coal for the immediate preceding (n-1) month for furnishing Variable Charges for MOD purposes. However due to uncontrollable factors, in case the GCV of coal of immediately preceding month is not available, the latest available GCV of coal shall be considered.

### **3 BASIS OF PREPARATION OF MOD STACK, INCLUDING VARIABLE CHARGE TO BE CONSIDERED**

#### **3.1 Regulations and Procedures specified by the Commission**

3.1.1 The provisions of the ABT Order regarding the Variable Charge relevant to the preparation of the MOD Stack are as follows:

***“4.6 Basis for computation of Ex-Post Imbalance Pool Price (Settlement Price)...***

*(e) The variable cost of each Generating Station for the purpose of Merit Order Stack and for computation of ‘Ex-Post Imbalance Pool Price’ shall be the per unit energy charge outlined in the energy bill for the instant calendar month corresponding to the settlement period in respect of each Generating Station. In case of Generating Stations having billing cycle spread over two calendar months, the latest information as available pertaining to previous billing cycle shall be considered for the purposes.*

*(f) The per unit energy charge in the energy bill shall be in accordance with the heat rate, auxiliary consumption factor, the formula for energy charge as approved by the Appropriate Commission and the delivered cost of fuel for that month in respect for each Generating Station....*

***“4.7 Premises for Least-cost Despatch***

*(a) The MSLDC-OD shall be responsible to prepare the Least-cost Despatch after taking into account the requirement of the State as a whole. The process of scheduling and despatch and role/responsibility of the MSLDC-OD shall be in accordance with the procedure outlined under ‘Scheduling and Despatch Code’ of the State Grid Code, modifications / amendments thereto and any such Order issued by MERC from time to time. Further, MSLDC-OD shall determine the target despatch schedules and target drawal schedules by undertaking load-generation balancing and adopting MOD principles at reference frequency of 50 Hz.*

- (b) *The least-cost despatch planning shall be based on the 'Merit Order Stack' to be adopted by the MSLDC-OD on day-ahead basis based on the available capacity declaration furnished by the Generating Stations on a day-ahead basis corresponding to each trading period. During real time operations, MSLDC may seek to verify available capacity upto 'declared capacity' and issue despatch instructions accordingly.*
- (c) ...
- (d) *The 'Merit Order Stack' shall be based on the energy charge inclusive of fuel cost adjustment charge, if any, of various Generating Stations. The energy charge of the Generating Stations shall be based on the heat rate, auxiliary consumption factor, the formula for determination of energy charge as approved by appropriate Commission and the delivered cost of fuel at respective Generating Stations.*
- (e) *The Generating Stations shall furnish the details of the prevalent fuel charge including, details of the delivered cost of fuel during the month to the MSLDC-OD from time to time at least once during the month and not later than fifth day of the month to enable the MSLDC-OD develop centralized 'Merit Order Stack' for the State as a whole.*
- (f) *For the purpose of Merit Order Stack, the Must run Generating Stations, constrained Generating Stations such as Hydro Generating Station linked to irrigation shall be ranked earliest in the Merit Order Stack...*

### **7.3.1 PPA and commercial information ...**

- (e) *All generators shall furnish details of their per unit variable cost of generation to the MSLDC-OD to enable it propose a Merit Order Stack of Generating Stations, after taking into account Must run and constrained Generating Stations.*
- (f) *The details for determining 'per unit variable charge' for the purposes of Merit Order Stack' shall include computation of energy charge inclusive of fuel cost adjustment charge, if any, of various Generating Stations as applicable for extant month. The computation of energy charge shall be based on the heat rate, auxiliary consumption factor, the formula for determination of energy charge as approved by Appropriate Commission and the delivered cost of fuel at respective Generating Stations.*
- (g) *The Generating Stations shall furnish the details of the prevalent fuel charge including, details of the delivered cost of fuel during the month to the MSLDC from time to time at least once during the*

*month and not later than fifth day of the month to enable the MSLDC develop centralized Merit Order Stack for the State as a whole.*

*(h) To enable MSLDC to determine the weighted average system marginal cost (WASMC) of contributing State Pool Participants, all State Pool Participants shall furnish details of the per unit variable cost of Generating Stations contracted by them as per monthly energy bills received by them from the generating companies/traders. This information shall be furnished to the MSLDC within seven days from expiry of calendar month from the month for which the information relates.”*

3.1.2 The MERC (Multi-Year Tariff (MYT)) Regulations, 2015 (‘MYT Regulations’) specify that, for the purpose of billing/Fuel Surcharge, the Energy Charges shall be worked out Station-wise on the weighted average rate based on actual generation from the Units of each Station.

3.1.3 Regulation 48.5 of the MYT Regulations specifies the formula for determination of Energy Charge as follows:

$$ECR = \frac{[P_p \times (Q_p)_n + P_s \times (Q_s)_n]}{[1-(AUX_n)]} \text{ (Rs/kWh)}$$

Where,

$P_p$  = landed cost of primary fuel, namely coal or lignite or gas or liquid fuel and limestone, if applicable, in Rs/kg or Rs/cum or Rs/litre, as the case may be;

$(Q_p)_n$  = Quantity of primary fuel required for generation of one kWh of electricity at generator terminals in kg or litre or standard cubic metre, as the case may be, and shall be computed on the basis of normative Gross Station Heat Rate (less heat contributed by secondary fuel oil for coal/lignite based Generating Stations) and gross calorific value of coal/lignite or gas or liquid fuel as received at unloading point less actual Stacking loss subject to the maximum Stacking loss of 150 kcal/kg;

$P_s$  = landed cost of Secondary fuel oil in Rs./ml,

$(Q_s)_n$  = Normative Quantity of Secondary fuel oil in ml/kWh as per Regulation 44.11 and 44.12, and

$AUX_n$  = Normative Auxiliary Energy Consumption as % of gross generation as per Regulation 44.13 to 44.18.”

3.1.4 The MYT Regulations also specify that:

- the landed cost of primary and secondary fuel for tariff determination shall be based on the actual weighted average cost of primary and secondary fuel of the three preceding months; in the absence of the landed costs for the three preceding months, the latest procurement price of primary and secondary fuel for the Generating Station/Unit, preceding the first month for which the Tariff is to be determined for existing stations, and immediately preceding three months in case of new Generating Stations/Units shall be taken into account.
- the landed cost of fuel shall include the price of fuel corresponding to the grade/quality/calorific value of fuel inclusive of royalty, taxes and duties, transportation cost by rail/road/gas pipe line or other means; and, for the purpose of computation of Energy Charges, shall be arrived at after considering the normative transit and handling losses as a percentage of the quantity of fuel despatched by the fuel supply company during the month.
- the Energy Charges, for the purpose of billing/Fuel Surcharge, shall be worked out Station-wise/Unit-wise based on the weighted average rate considering the actual generation from each Unit.

### **3.2 Analysis and Proposed Guidelines**

3.2.1 The focal point of the above provisions of the ABT Order is the Variable Charge to be considered for preparation of the MOD Stack. The issues to be examined in this regard are:

- (i) Entity responsible for intimating the Variable Charge to MSLDC for preparation of the MOD Stack.
- (ii) Information to be provided to MSLDC for preparation of the MOD Stack.
- (iii) Basis of the Variable Charge to be considered for the MOD Stack.

#### **Issue 1: Entity responsible for intimating the Variable Charge to MSLDC for preparation of MOD Stack**

3.2.2 As regards the responsibility for submitting the Variable Charge to MSLDC, the ABT Order stipulates as follows:

##### ***“7.3.1 PPA and commercial information***

.....

(e) All generators shall furnish details of their per unit variable cost of generation to the MSLDC-OD to enable it propose a Merit Order Stack of generating stations, after taking into account MUST run and constrained generating stations.

(g) The generating stations shall furnish the details of the prevalent fuel charge including, details of the delivered cost of fuel during the month to the MSLDC from time to time at least once during the month and not later than fifth day of the month to enable the MSLDC develop centralized Merit Order Stack' for the State as a whole.

(h) To enable the MSLDC to determine the weighted average system marginal cost (WASMC) of contributing State Pool Participants, all State Pool Participants shall furnish details of the per unit variable cost of generating stations contracted by them as per monthly energy bills received by them from the generating companies/traders. This information shall be furnished to the MSLDC within seven days from expiry of calendar month for the month for which the information relates.”

3.2.3 MSLDC has informed the Commission that the Variable Charge is being submitted by the following entities for the preparation of MOD Stack:

**Table 4: Intimation of Variable Charge for preparation of MOD Stack**

<b>Generating Station</b>	<b>Variable Charge submitted by</b>
MSPGCL's Stations	MSPGCL & MSEDCL
VIPL-G	VIPL
DTPS	RInfra-G
TPC-G Trombay	TPC
Central Sector Stations	MSEDCL
IPPs (Section 63 PPAs)	MSEDCL

3.2.4 As per the ABT Order, State Generating Companies regulated by the Commission have to submit information on Variable Charge for their Generating Stations/Units to MSLDC for preparation of MOD Stack. Further, Distribution Licensees also have to submit per unit variable cost of generating stations/units contracted by them as per monthly energy bills received by them from the generating companies/traders. For CSGS and IPPs having PPAs with Distribution Licensees under Section 63 of the EA,2003 information on Variable Charges has to be submitted by Distribution Licensees as these generating stations are not directly submitting any information to MSLDC. For State Generating Stations regulated by the Commission, both Generating Company and Distribution Licensee have to submit information on Variable Charge to SLDC. Hence, the ambiguity as to whose information is to be

considered by MSLDC for preparation of MOD stack needs to be clarified.

- 3.2.5 The Commission observes that in the peculiar case of Maharashtra wherein the same company (such as TPC and RInfra) is functioning as a generation utility, transmission licensee and a distribution licensee under regulatory ambit of the Commission, it is difficult to differentiate as to which functional body i.e., generation utility or distribution licensee is submitting the variable charge to MSLDC for Merit Order Stack purposes. This is also substantiated from the correspondence from TPC.
- 3.2.6 The Variable Charge for MSPGCL's Stations is being submitted by MSPGCL and the Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) (the Generator and the procuring Distribution Licensee respectively), which is in accordance with the ABT Order.
- 3.2.7 The Variable Charge for VIPL-G is being submitted by VIPL-G, and for DTGS by RInfra-G. The power from VIPL-G and DTGS is being procured by RInfra-Distribution (RInfra-D). The Variable Charge for TPC-G's Trombay Units is being submitted by TPC. The power from TPC-G's Trombay Units is being procured by TPC-Distribution (TPC-D) and the Brihanmumbai Electric Supply and Transport Undertaking (BEST). RInfra-D and TPC-D are not submitting the Variable Charge for their corresponding generation sources. BEST is also not submitting the Variable Charges to MSLDC for preparing the MOD Stack. RInfra-D, TPC-D and BEST are required to act in accordance with the ABT Order.
- 3.2.8 The Variable Charges of Independent Power Producers (IPPs) which have PPAs with MSEDCL under Section 63 of the EA, 2003, and Central Sector Generating Stations (CSGS) which supply power to MSEDCL are being submitted by MSEDCL. The Commission finds this practice to be correct as the same are not mandated to enter into correspondence with MSLDC as the tariff for the same is not being determined by the Commission.
- 3.2.9 The Distribution Licensees recover the cost of power procurement from electricity consumers, and hence the onus is on the Licensees to promptly provide the data based on which the MOD is operated. As the MOD principle is intended to optimise the power procurement cost of Distribution Licensees, **it is the Distribution Licensees who must intimate to MSLDC the Variable Charges of all the Generating Stations/Units from which they are procuring power for preparing the MOD Stack.**

**Issue 2: Information to be provided to MSLDC for preparation of MOD Stack;  
and Issue 3: Basis of the Variable Charge to be considered for MOD Stack**

3.2.10 For the preparation of the MOD Stack, the Variable Charge as submitted by the entities every month is being considered by MSLDC. The Commission sought copies of the correspondence between the entities and MSLDC regarding the Variable Charge submitted for preparation of the MOD Stack for the months of April, 2015 to March, 2016. The Commission observed the following:

- MSPGCL furnishes only the Variable Charge of its Stations to MSLDC for preparation of MOD Stack, stating that the same are based on the fuel prices and GCV for Fuel Surcharge Adjustment (FSA) billing corresponding to preceding second month,
- TPC submits only the Variable Charge for each Unit of TPC-Trombay without reference to any other parameters. The correspondence from TPC does not reflect any details on the fuel prices considered, norms of operation, FSA, etc.
- VIPL and RInfra submit details of normative performance parameters, actual fuel prices adjusted for normative transit loss for the preceding month and projected fuel prices and Variable Charge for the current month.
- MSEDCL submits the Variable Charges for its sources of procurement based on the power purchase bills for the second preceding month (n-2).
- BEST does not submit the Variable Charge for its sources of procurement.

3.2.11 It will be evident that the basis and reference period of the Variable Charges intimated to MSLDC differ widely and are not comparable.

3.2.12 The ABT Order stipulates that, for the purposes of the MOD Stack, the Variable Charge should be based on the normative performance parameters, the fuel parameters for the previous month or the latest available information, and the formula for Energy Charge approved by the Commission.

3.2.13 From the information provided by TPC, RInfra-G and VIPL-G regarding the basis of the Variable Charge being intimated by them to MSLDC for preparation of the MOD Stack, the Commission observes as follows:

3.2.13.1 The Variable Charge being submitted by VIPL, RInfra -G (for DTSP) and TPC (for TPC-Trombay) are based on the normative performance parameters

approved by the Commission and the projected fuel parameters (price and GCV), and not the actual fuel parameters for the previous period.

3.2.13.2 The Variable Charge being submitted by MSPGCL for its Stations are based on the normative performance parameters approved by the Commission and the fuel parameters (price and GCV) for the second preceding month (n-2), rather than the preceding month (n-1). Further, MSPGCL is re-computing the Energy Charge every month based on normative performance parameters instead of the approved Energy Charges.

3.2.13.3 The Variable Charges intimated by MSEDCL are based on the actual power purchase bills for the second preceding month.

3.2.14 The ABT Order had stipulated that the formula approved by the Commission be applied for the determination of Energy Charges. The formula for Energy Charge specified by the Commission in the MYT Regulations, 2015 takes into consideration the price and quantum of primary fuel, the price and normative quantum of secondary fuel oil, and the normative auxiliary energy consumption. Apart from the cost of fuel, 'other generation-related costs/other variable charges' are charges relating to electricity generation incurred within the Plant premises after the delivery of fuel at the Plant by the fuel supplier. Such costs typically comprising of indirect costs related to fuel handling inside the power station premises were historically considered by the Commission in determining the Energy Charge of MSPGCL Stations as they had been predominantly categorised and claimed as fuel related costs by MSPGCL. Such 'other generation-related costs/other variable charges' are included in the determination of Energy Charge for MSPGCL and VIPL-G. For other Generating Stations, these charges are embedded in the Operation and Maintenance (O&M) expenses.

3.2.15 MSPGCL has been re-computing the Energy Charge every month for the purpose of the MOD Stack based on normative performance parameters rather than the approved Energy Charges, while MSEDCL has been submitting the Variable Charge for MSPGCL's Stations based on the power purchase bills. As a result, the Energy Charges submitted by MSPGCL for its Stations and those submitted by MSEDCL for these Stations differ, although both pertain to the same month. In this situation, MSLDC has been considering the Energy Charge as submitted by MSPGCL for its Stations.

3.2.16 RInfra and TPC are submitting the projected Variable Charges for the subsequent month, although the ABT Order requires the latest available actual data. Where the Variable Charge is being submitted based on projected fuel parameters, from the actual data for FY 2015-16 it is seen that the Variable Charge submitted to and considered by MSLDC for the MOD Stack is

significantly less than the Variable Charge based on the actual fuel parameters.

3.2.17 Another issue is the impact of Change in Law for PPAs under Section 63 of the EA, 2003. Delays in submission of claims towards Change in Law events affecting the Energy Charge may result in the concerned Generating Units getting despatched despite having a higher Variable Charge, at the expense of Units of another Generator with a lower Variable Charge. This would increase the Average Power Purchase Cost of the procuring Distribution Licensee and thereby the tariff charged to its consumers. A mechanism has to be put in place to avoid such eventualities.

3.2.18 Although MSLDC is responsible under the EA, 2003 for optimum scheduling and despatch of electricity within the State, the Commission observes that it has never approached the Commission on these issues.

3.2.19 In this background, the following Guidelines needs be followed:

**3.2.19.1 For Generating Stations/Units whose Tariff is being determined by the Commission under Section 62 of the EA, 2003, the Variable Charge for MOD purposes shall be the Energy Charge (including ‘other variable charges’, if any) approved by the Commission in the relevant Tariff Orders plus the actual Fuel Surcharge Adjustment (FSA) billed in the immediately preceding (n-1) month. In case the FSA for the preceding month has not been billed by the Generating Company to the Distribution Licensee, the last FSA billed by it shall be considered by the Distribution Licensee.**

**3.2.19.2 No deviations of any kind from the approved Energy Charge should be taken.**

**3.2.19.3 For CSGS, the Variable Charge for MOD purposes shall be the landed variable cost at the State periphery for the immediately preceding month, including the injection losses.**

**3.2.19.4 (a) For the PPAs entered into under Section 63, the Variable Charge for MOD purposes shall be the Energy Charge payable as per the terms of the PPA for the immediately preceding month.**

**(b) The impact of any Change in Law event affecting the Energy Charge should be submitted by the Generating Company to the Distribution Licensee within one month of its occurrence. The Distribution Licensee should take into account such Change in Law impact in the Variable Charge that it intimates to MSLDC for preparation of the MOD Stack. However, the payments for such Change in Law claims will be made by Distribution Licensee after the approval**

**of the Commission in accordance with the provisions of PPA.**

**(c) The Change in Law claimed by the Generating Company for its contracted source for a particular month shall be the ceiling claim. The actual impact of Change in Law shall be determined by the Commission through appropriate proceedings.** The PPAs for procurement of power from thermal generating stations through tariff based competitive bidding under Section 63 of EA,2003 stipulate that any claims towards a Change in Law event should be brought to the notice of the Procurer within reasonable period of time of occurrence of such event. The relevant extract of Standard PPA published by Ministry of Power is given below:

*“If the Seller is affected by a Change in Law in accordance with Article 10.1 and the Seller wishes to claim relief for such a Change in Law under this Article 10, it shall give notice to the Procurer(s) of such Change in Law as soon as reasonably practicable after becoming aware of the same or should reasonably have known of the Change in Law.”*

**In case the Generating Company has not submitted its claim towards a Change in Law event affecting the Energy Charge within one month of its occurrence, the Generating Company shall not be allowed to raise such claim thereafter.**

3.2.20 Consequently, the following details of the Variable Charge for MOD purposes shall be submitted to MSLDC:

- (i) Energy Charge approved by the Commission in the relevant Tariff Order, or the landed Energy Charge at the State periphery as per the terms of the PPA, as the case may be;**
- (ii) FSA billed in the immediately preceding month, or the last available at the time of submitting information to MSLDC;**
- (iii) Impact of Change in Law, if applicable.**

3.2.21 As the Variable Charge ultimately impacts the power purchase cost of the Distribution Licensee, the MSLDC should consider the Variable Charge for the purposes of preparation of the MOD Stack as submitted by the Distribution Licensees.

3.2.22 However, these directions do not absolve the entities of their other obligations, roles and responsibilities stipulated under the ABT Order.

## 4 GUIDELINES FOR OPERATING GENERATING UNITS

### Analysis and Proposed Guidelines

- 4.1.1 Scheduling is being done on a day-ahead basis. MSLDC is entrusted with the crucial function of maintaining the State Grid system in consonance with the National Grid. While doing so, MSLDC is required to balance the power demand and availability within the State and the inter-State allocations, keeping within limits the drawal from the National Grid.
- 4.1.2 MSLDC is operating the State Grid in accordance with the Scheduling and Despatch Code. In various regulatory proceedings, concerns have been raised regarding the increasing surplus power availability in the State and, in this context, the requirement of operating the Generating Units at Technical Minimum. The Commission, while partly agreeing with the concern of the stakeholders, stresses that grid security should be the prime concern in the real-time operation of the State Grid. Any decision taken by the System Operator should be put to test first in the context of maintaining the grid security. When the system is experiencing high power demands, the Units would be scheduled to the highest possible capacities (above Technical Minimum) upto their respective installed capacities. However, when the system is experiencing low power demands, some of the Units may be required to be backed down till their respective Technical Minimum and some of the Units may be required to be shut down, for system security. Allowing the operation of some of the Units at Technical Minimum will ensure that the capacity shall be readily available for meeting the increasing demand in the subsequent time periods.
- 4.1.3 The Commission issues the following guidelines for operating the Units real time operation:
- **MSLDC shall endeavour to attain the load generation balance on any given day by finalising the schedule of the maximum capacity available, starting from the Station/Unit with the lowest Variable Charge in the Merit Order Stack. MSLDC shall also endeavour to finalise the schedule for the Units required to be operated at technical minimum to the least extent possible.**
  - **No special treatment shall be given by MSLDC to any particular Generating Unit, and Units shall be backed down or ramped up strictly as per the MOD Stack.**

- The operation of Generating Units at Technical Minimum shall be strictly guided by the Scheduling and Despatch Code.
- The Distribution Licensees should be in continuous consultation with their respective Suppliers and MSLDC, for procuring the highest possible capacity from the Units permitted by the system, rather than scheduling the Units at Technical Minimum.
- As a basic principle, MSLDC is required to finalise the despatch schedule based on least-cost principles. In exceptional cases, however, some Units with higher Variable Charges which would not normally be permitted under MOD principles to operate, may be required to operate for various uncontrollable reasons such as transmission constraints in any part of Maharashtra, grid security constraints in importing power to the island city of Mumbai, etc.). MSLDC shall maintain details of such deviations from the MOD principles in the format at Annexure-3 and upload them on its website daily. MSLDC shall also prepare the daily backing down report in the format at Annexure-2 and upload it on its website daily.

## 5 GUIDELINES FOR ‘ZERO SCHEDULE’ FOR GENERATING UNITS

### 5.1 Analysis and Proposed Guidelines

5.1.1 Scheduling is being done on a day-ahead basis. When the availability of power consistently exceeds the demand of a particular Distribution Licensee resulting in a large power surplus, the Distribution Licensees must optimise the power purchase cost so that its consumers are not unduly burdened.

5.1.2 From the data for FY 2015-16, the Commission observes that MSEDCL is carrying out such cost optimisation by giving ‘zero schedules’ to some Generating Units to address seasonal fluctuations in the demand-supply position. The Units withdrawn under Zero Scheduling in FY 2015-16 and the periods of withdrawal are as follows:

**Table 5: Units withdrawn under Zero Scheduling in FY 2015-16**

S. No.	Unit	Trip Date	Trip Time	Synch. Date	Synch. Time	Reason
1	Koradi Unit 7	30/Jan/2016	00.12	18/Feb/2016	09.00	Zero Schedule by MSEDCL

S. No.	Unit	Trip Date	Trip Time	Synch. Date	Synch. Time	Reason
2	Nashik Unit 3	30/Jan/2016	00.02	06/Feb/2016	06.35	Zero Schedule by MSEDCL
3	Bhusawal Unit 5	10/Feb/2016	23.55	14/Feb/2016	07.48	Zero Schedule by MSEDCL
4	Bhusawal Unit 4	14/Feb/2016	12.10	13/Mar/2016	10.48	Zero Schedule by MSEDCL
5	Rattan India Pvt. Ltd. (RPL) Amravati U-2	16/Feb/2016	01.14	15/Mar/2016	06.43	Zero Schedule by MSEDCL
6	RPL Amravati) U-3	16/Feb/2016	01.17	15/Mar/2016	08.02	Zero Schedule by MSEDCL
7	Koradi Unit 5	18/Feb/2016	11.21	16/May/2016	18.42	Zero Schedule by MSEDCL
8	Koradi Unit 7	01/Mar/2016	23.55	13/May/2016	19.54	Zero Schedule by MSEDCL
9	RPL Amravati U-1	20/Mar/2016	00.00	13/Apr/2016	05.23	Zero Schedule by MSEDCL
10	Bhusawal Unit 2	24/Mar/2016	00.05	28/Mar/2016	07.24	Zero Schedule by MSEDCL
11	Nashik Unit 4	24/Mar/2016	00.10	28/Mar/2016	06.00	Zero Schedule by MSEDCL

5.1.3 It will be seen that the Zero Schedule given by MSEDCL ranges from 4 days to 3 months.

5.1.4 One issue that arises in this background is whether, when a particular Distribution Licensee expects that it will have substantial surplus power for some time, such Zero Schedule is to be given by that Licensee based on its own MOD Stack, or instead by MSLDC based on the MOD Stack of the State as a whole. In this context, the Commission notes that:

- The ABT Order assigns MSLDC the role of ensuring least-cost despatch on a Day-Ahead basis and real time basis.
- Although wide variation is observed in the anticipated demand as submitted and the actual demand in case of some Distribution Licensees, the Licensees themselves may be in a better position to estimate their own likely demand over a period of time. Hence, it may not be appropriate to assign the responsibility of demand projections for each Distribution Licensee to MSLDC.
- Each Distribution Licensee has entered into agreements for procuring power to meet their demand, and the extent of surplus capacity tied up by them varies substantially.

Considering these factors, the Commission is of the view that assigning the responsibility of determining Zero Schedules to MSLDC on the basis of the MOD Stack of the State may lead to disputes between the Distribution Licensees and Generating Companies. Hence, the Commission considers the present practice of the concerned Licensee giving Zero Schedules as more appropriate.

5.1.5 However, at the same time, a fair and transparent mechanism should be in place for such Zero Scheduling by the Distribution Licensees. Hence, **the Commission issues the following Guidelines to be applied when instructing Zero Schedule:**

- (i) **In case of anticipated generation availability in surplus of anticipated demand, the Distribution Licensees need to optimise their cost of power procurement considering the contracted sources for the period of anticipated surplus.**
- (ii) **If the anticipated generation availability is more than the anticipated demand, the Distribution Licensee may consider giving Zero Schedule to some of its contracted sources for the period during which the demand is expected to be lower than the total contracted sources availability put together. This should be a conscious decision of the Distribution Licensee in consultation with MSLDC taking into account the demand supply position and transmission constraints.**
- (iii) **Distribution Licensee shall ensure that the Zero Scheduling does not result in all the Units of a Generating Station whose entire installed capacity is tied up with Distribution Licensee in the State of Maharashtra, being shut down. For such stations, one Generating Unit (in case there are more than one) should be operational to meet the Auxiliary Consumption of the Generating Station.**
- (iv) **If grid constraints prevent the Zero Scheduling of the Unit with the highest Variable Charge in the MOD Stack, the Unit with the next highest Variable Charge needs to be considered. However, MSLDC should publish the details of such grid constraints on its website, along with the period for which it is likely to persist.**
- (v) **A Reserve Margin equivalent to twice the contracted capacity of the largest Generating Unit of a Power Station, contracted by a Distribution Licensee, when resorting to Zero Scheduling.**

- (vi) **The Distribution Licensee must give the Generating Company 24 hours prior notice of the Zero Scheduling to enable it to take steps for smooth removal of the Unit from the Grid.**
- (vii) **In case a particular Unit is, in fact, required to be scheduled during the pre-declared Zero Scheduling period, the Distribution Licensee must intimate the Generating Company at least 72 hours in advance for the Unit(s) to come on bar in cold start.**
- (viii) **Zero Scheduling has to be carried out by Distribution Licensee keeping in consideration its roles and obligations under the corresponding PPAs. The Commission clarifies that any additional cost implication in Variable Charges (by means of inferior norms of operation or minimum fuel off-take conditions) that arises on account of Zero Scheduling will not be allowed as pass through while truing up the power procurement cost.**
- (ix) **It is not possible to anticipate and provide for every eventuality that may arise in this regard. It should be the intention of the Distribution Licensees and their suppliers that the PPAs between them shall operate with fairness and without detriment to the interest of either Party.**

## **6 GUIDELINES FOR INSTRUCTING RESERVE SHUT DOWN OF GENERATING UNITS BY MSLDC**

### Analysis and Proposed Guidelines

- 6.1.1 MSLDC's procedure, published on its website, for addressing sudden changes in the demand-supply position when some Generating Units are under RSD provides inter alia as follows:
  - (i) *“When the situation arises, all the Generating utilities and Distribution licensees agreed that SLDC shall initiate for RSD of long term PPA with intimation to all Distribution licensees*
  - (ii) *RSD will be implemented based on MOD rates and at least one Generating Unit must be on bar in at the respective power station to meet its own auxiliary consumption*

- (iii) *The Generating Units where transmission constraints do not permit the shutdown of units or where real-time islanding schemes are implemented, such units may not be taken for RSD*
- (iv) *The decision of SLDC would be final in respect to further continuation or cancellation of the RSD*
- (v) *During RSD period, unforeseen problems/situations if any, shall be dealt within the frame work of scheduling and dispatch code*
- (vi) *While taking the unit on bar, notice will be issued by SLDC before 24 Hrs to the respective Generating Station*
- (vii) *The other unit/units which are in the process of boiler light up after instruction of RSD to particular unit will be to lit up only after permission of SLDC*
- (viii) *During RSD period, other units tripped and available after short duration will be permitted for light up depending upon system condition, however if SLDC directs for continuance of shut down after giving due consideration to MOD, then for such period as directed by SLDC the unit outage shall be treated as under RSD.*
- (ix) *The proposed RSD shall be minimum for the period of 72 hrs and may be extended as per the system condition.”*

6.1.2 The Commission notes that, in FY 2015-16, MSLDC had instructed the RSD of MSPGCL’s Nashik Units 4 and 5 in January, 2016 for a short period of 3 anticipating low demand around Republic Day.

6.1.3 The Commission finds the procedure adopted by MSLDC for RSD is broadly appropriate, but requires the following modifications:

- (i) **A Reserve Margin equivalent to the contracted capacity of the largest Unit of the Power Station, contracted by the Distribution Licensee needs to be maintained.**
- (ii) **The RSD should be implemented for the capacity available in excess of the largest Unit contracted by the Distribution Licensee.**
- (iii) **The RSD should be applied to Units with higher Variable Charges in the MOD Stack, subject to grid conditions permitting the same.**

**MSLDC shall upload details of the RSD of the previous month in the format at Annexure 4 on its website by the 3<sup>rd</sup> of every month.**

## **7 ‘MUST RUN’ AND HYDRO GENERATING STATIONS**

### **7.1 Commission’s Analysis and Ruling**

7.1.1 As per the Scheduling and Despatch Code, Administered Gas Price Mechanism (APM) Gas-based Thermal Generating Stations and Nuclear Power Stations are considered by MSLDC as ‘must run’ Stations. Under Regulation 12.1 of the MERC (Terms and Conditions for Determination of RE Tariff) Regulations, 2015, certain Renewable Energy (RE)-based Generating Stations also have ‘must run’ status:

*“Subject to the provisions of the Indian Electricity Grid Code and the State Electricity Grid Code, all RE Power Projects, except for Biomass-based Power Projects and Co-Generation Projects, shall be treated as ‘Must Run’ Projects and shall not be subjected to ‘merit order despatch’ principles.”*

The Commission does not have any issue with regard to this dispensation.

7.1.2 The Hydro Generating Station at Koyna is being operated for balancing the grid operations. In this regard, the Scheduling and Despatch Code stipulates as follows:

#### ***“7. General...***

*(xix) The InSGS Hydro Generating Stations scheduling shall be done separately for Koyna HGS, the Hydro stations of TPC and the third consolidated group consisting of all Small Hydro Stations below 25 MW capacity.*

*(xx) While scheduling generation of InSGS Hydro Generating Stations, the MSLDC shall give consideration to the following factors:*

- i. Irrigation/drinking water requirements shall be met and spillage of water shall be minimised*
- ii. Full time generation shall be scheduled for Hydro station where the reservoirs are overflowing*
- iii. Priority shall be given to reservoir-based Hydro stations during peak hours. Koyna HGS is primarily intended to meet peaking requirement and shall be scheduled accordingly.*

- iv. *MSLDC, taking into consideration grid security, may regulate dispatch from Koyna and other Hydro stations, which shall be complied with by such Hydro stations.*
- v. *Optimum utilisation of water shall be achieved between pumped storage Hydro power plants and tail race Hydro power plants with due consideration to irrigation requirements.*
- vi. *TPC-Hydro Generation is primarily intended to meet peak demand of Mumbai discoms in accordance with the PPA/Contracts/Allocation and will be operated as per commission directives given in its order.”*

7.1.3 The Hydro Generating Stations are primarily intended to meet peaking power requirements. However, depending on the grid requirements, they may be operated during off-peak hours also. With significant generation capacity addition in the State, MSLDC needs to ensure that the intended purpose of Hydro Generating Stations is not defeated and indiscriminate use of Hydro power is avoided.

7.1.4 As the Hydro generation capacity is flexible capacity to meet the needs of real-time operations, MSLDC shall be responsible for operating Hydro Generating Stations on a daily basis considering the month-wise water availability indicated by the Distribution Licensees. The Hydro Generating Stations shall be operated by MSLDC to meet the system requirements and conditions subject to water availability and meeting irrigation and drinking water needs. In order to meet system contingencies, MSLDC may keep Hydro capacity equivalent to the capacity of largest thermal Unit as a spinning reserve. The Hydro capacity in the State is spread across the State and owned by two Generating Companies i.e., MSPGCL and TPC-G. Further, the Hydro Capacity is contracted by multiple Distribution Licensees. Hence, to avoid the situation that the contracted capacity of only one Distribution Licensee is kept at spinning reserve, it is important to ensure that that the hydro capacity to be kept as spinning reserve should be a mix of hydro units from different generating stations of different generating companies (in proportion to contracted capacity of such hydro generating stations) instead of hydro units from single generating station or hydro units of one generating company. Further, MSDLC shall operate the hydro units kept as spinning reserve in consultation with the respective Distribution Licensees, who have entered into contract with respective Generating Company for such hydro units.

## 8 TECHNICAL MINIMUM OF GENERATING UNITS

### 8.1 Commission's Analysis and Ruling

8.1.1 Clause 9(12) of the Scheduling and Despatch Code stipulates as follows:

*“MSLDC shall finalize drawal schedule on the basis of following criterion:*

- a) In case the demand estimate for any 15-minute time block exceeds or equals to the generation availability in that 15-minute time block, the drawal schedule shall be equal to generation availability of that time block.*
- b) If the generation availability for any 15 minute time block exceeds the demand estimate, the drawal schedule shall be prepared in the following order:*
  - i. Generation from run-of-river Hydro stations;*
  - ii. Generation from ‘must run’ Gas Stations, CPPs [Captive Power Plants] and Nuclear Stations.*
  - iii. CGS, ISGS, InSGS, firm commitments against bi-lateral contracts based on merit order*
  - iv. Generation from other hydel-stations for peaking requirement;*
  - v. Generation against Firm off-take commitment*
  - vi. Generation from InSTS Thermal /Gas Generating Stations according to variable cost and above the minimum technical limit of the respective unit.*
  - vii. Generation from CPPs according to variable cost...”*

8.1.2 Thus, while operationalizing the MOD, MSLDC has to consider the minimum Technical Limit of the respective Units in case of Thermal/Gas Generating Units. Pursuant to the Commission's Order dated 2 August, 2012 in Case No. 109 of 2011, the/s Central Power Research Institute (CPRI) had certified the Technical Minimum of the relevant Generating Units operating in Maharashtra at that time. Accordingly, the Technical Minimum of Generating Units considered by MSLDC is as given in the Table below:

**Table 6: Technical Minimum of Generating Units as considered by MSLDC**

Station	Unit No.	MCR capacity	Gross Generation at Technical Minimum	Corresponding to Technical Minimum		Technical Minimum load for Monitoring (Rounded off)	Technical Minimum load for Scheduling & SMP Calculation (Rounded off)
				Auxiliary Power (UAT+ST)	Auxiliary Power (UAT only)		
		MW	MW	MW	MW	MW	MW
1	2	3	4	5	6	7=4-6	8=4-5
MSPGCL BHUSAWAL	2*	210	160.00	16.11	12.66	147	144
	3	210	160.00	16.11	12.66	147	144
MSPGCL CHANDRAPUR	1	210	145.00	12.92	9.86	135	132
	2	210	150.00	13.37	10.20	140	137
	3	210	163.00	14.52	11.08	152	148
	4	210	160.00	14.26	10.88	149	146
	5	500	365.00	32.52	23.73	341	332
	6	500	360.00	32.08	23.40	337	328
	7	500	360.00	32.08	23.40	337	328
MSPGCL NASHIK	3	210	161.00	19.00	14.17	147	142
	4*	210	161.00	19.00	14.17	147	142
	5	210	160.00	18.88	14.08	146	141
MSPGCL KHAPERKHEDA	1	210	161.89	16.06	10.96	151	146
	2	210	159.33	15.96	10.96	148	143
	3	210	158.00	17.11	13.48	145	141
	4	210	161.00	18.55	14.86	146	142
	5	500	360.00	24.88	19.88	340	335
MSPGCL PARLI	3	210	157.00	18.79	13.27	144	138
	4*	210	157.00	18.79	13.27	144	138
	5	210	157.00	18.51	13.00	144	138
	6	250	187.00	21.31	18.36	169	166
	7*	250	187.00	21.31	18.36	169	166
MSPGCL PARAS	3	250	186.00	22.08	19.01	167	164
	4	250	190.00	21.70	18.79	171	168
Abhijeet MADC Nagpur Energy Pvt. Ltd., NAGPUR	1	61.5	40.80	5.20	2.37	38	36
	2*	61.5	40.80	5.20	2.37	38	36
	3*	61.5	40.80	5.20	2.37	38	36
	4*	61.5	40.80	5.20	2.37	38	36
Gupta Energy Pvt. Ltd., CHANDRAPUR	1	60	20.90	5.10	1.90	19	16
	2	60	20.50	4.95	1.90	19	16
JSW Energy Ltd., JAIGAD	1	300	225.32	25.44	25.44	200	200
	2	300	224.37	27.40	27.40	197	197
	3	300	224.60	15.81	15.81	209	209
	4	300	225.05	17.17	17.17	208	208

Station	Unit No.	MCR capacity	Gross Generation at Technical Minimum	Corresponding to Technical Minimum		Technical Minimum load for Monitoring (Rounded off)	Technical Minimum load for Scheduling & SMP Calculation (Rounded off)
				Auxiliary Power (UAT+ST)	Auxiliary Power (UAT only)		
				MW	MW		
Reliance Infrastructure Ltd. , DAHANU	1	250	189.00	20.01	13.96	175	169
	2	250	188.00	20.51	12.81	175	167
Tata Power Company Ltd., TROMBAY	5	500	314.00	22.40	20.30	294	292
	6	500	155.70	10.40	9.70	146	145
	8	250	189.00	17.00	13.80	175	172
Wardha Power Company Ltd., WARORA	1	135	94.70	13.50	10.80	84	81
	2	135	94.80	13.50	10.80	84	81
	3*	135	94.80	13.50	10.80	84	81
	4	135	93.60	13.50	10.80	83	80

\* Technical Minimum values for the Generating Units not in operation at the time of CPRI's field visit, are considered equal to that of other Units of identical capacity at the same location having same fuel linkage, as approved by the Commission.

8.1.3 For the Generating Units which were not operational during the tests conducted by CPRI and for new Generating Units commissioned after the CPRI study, MSLDC applies the Technical Minimum considering the CPRI certification for Units of identical capacity at the same location and which have the same fuel linkage. For new, large size Units, MSLDC is considering the technical minimum as 70% of the full load capacity.

8.1.4 The Central Electricity Regulatory Commission (CERC) vide the CERC (Indian Electricity Grid Code) (Fourth Amendment) Regulations, 2016 decided the technical minimum of 55% of the installed capacity of the respective generating unit. While deciding so, it observed as under:

*“We appreciate the concern of the generators and the difficulties in unit operations due to technical minimum scheduling to the extent of 55% of MCR capacity but the question is whether it is avoidable under the changed conditions under which power system has to operate now and perceivable future. The answer is there is perceivable change in the conditions. Earlier under acute shortage situation units once available were getting full schedule and the supply of domestic coal was also not in short supply most of the time. As such, the most of stations in the country use to run as base load stations except in eastern region where due to lack of demand units were required to be back down and taken under reserve shut down. However, the position*

*has changed drastically in recent years and power deficit has come down drastically to about 3.57% in 2014-15 due to large capacity additions during XI and XII plans. Then there is lot of capacity addition of renewable sources of energy and there is an ambitious plan to add about 175 GW of generation capacity based on renewable energy sources by 2022 (100 GW of Solar plus 60 GW of Wind and balance others). Further there is shortage of domestic coal requiring blending of imported coal. It has been seen that there have been increase in energy charges due to blending of imported coal and state Discoms are finding it difficult to afford to schedule power at such rates. The grid frequency is also remaining close to 50 Hz most of the time or above 50 Hz for substantial period. Under these circumstances higher scheduling than the technical minimum cannot be ensured all the time. Further, mere scheduling the units /station above the technical minimum by itself would not increase the demand on the system and would lead to operation of grid above 50 Hz thereby wasting the fuel unnecessarily and is not desirable. Therefore, relying on the CEA recommendations we are not inclined to change the limit of technical minimum schedule corresponding to 55% of the Installed capacity of unit.”*

- 8.1.5 From the above, it can be seen that the increase in generation capacity and penetration of renewable generation is causing many of the thermal generating stations to be backed down. This issue is also prevalent in the State of Maharashtra as witnessed in the fall of PLF achieved by MSPGCL’s stations and the quantum of backed down generation during the recent years. Under these circumstances, higher scheduling than the technical minimum cannot be ensured all the time. CERC had determined the technical minimum of 55% of the installed capacity after taking into due consideration the views of Central Electricity Authority (CEA) on this issue of technical minimum. Hence, the Commission finds it deems it fit to adopt the technical minimum of 55% of the installed capacity for the thermal generating stations connected to the STU.
- 8.1.6 However, the Commission is of the view that the generator should be adequately compensated for the loss of operational parameters due to operation of generating units at the revised technical minimum level. The Commission shall devise an appropriate methodology, in due course of time, for compensating such thermal generating stations for the loss of operational parameters on account of revised technical minimum level vis-à-vis the present technical minimum level.



**Annexure 1: State MOD Stack of Variable Charges (VC) for the month of \_\_\_\_\_**

**(Effective from 16..20\_\_ to 15..20\_\_)**

<b>S. No.</b>	<b>Generating Station</b>	<b>Variable Charge (Rs./kWh)</b>
	<b>Above Rs. 4/kWh</b>	
1		
2		
....		
	<b>Rs. 3/kWh to Rs. 4/kWh</b>	
3		
4		
.....		
	<b>Rs. 2/kWh to Rs. 3/kWh</b>	
5		
6		
....		
	<b>Below Rs.2/kWh</b>	
7		
8		
....		

**Notes:**

**Annexure 2: Backing Down report for the date \_\_\_\_\_**

S. No.	Generating Station / Unit	Backing Down period (Time Blocks)		Target Despatch Schedule (MW)		Backing Down quantum (MW)	Remarks
		From	To	Declared Capacity	Despatched Schedule		
1							
....							

**Notes:**

**Annexure 3: Exception Report to Merit Order Despatch for the Date \_\_\_\_\_**

S. No.	Generating Station/Unit	Declared Capacity (MW)	Period to be backed down as per MOD principles (Time Blocks)		Quantum to be backed down as per MOD principles (MW)	Actual Quantum backed down (MW)	Reasons for deviation from MOD principles
			From	To			
1							
....							

**Notes:**

**Annexure 4: Report on Reserve Shut Down for the Month of \_\_\_\_\_**

S. No.	Generating Station (with Number of Units and Unit Capacity)	Total Capacity under Reserve Shut Down (Unit No and Capacity)	RSD Period (Date)		Reasons for RSD	Rank in MOD	Generating Station(s) with higher Variable Charge than the Station/Unit which was given MOD	Reasons for not selecting the Generating Station with higher Variable Charge for RSD
			From	To				

**Notes:**