MAHARASHTRA ELECTRICITY REGULATORY COMMISSION

EXPLANATORY MEMORENDUM

ON

DRAFT MAHARASHTRA ELECTRICITY REGULATORY COMMISSION (DEVIATION, SETTLEMENT MECHANISM AND RELATED MATTERS) REGULATIONS, 2018

October, 2018

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1. INTRODUCTION

1.1 Context

1.1.1 The Maharashtra Electricity Regulatory Commission (MERC) issued Suo-Motu Order in Case No 42 of 2006 on 17May 2007, wherein the Commission, had introduced the Weighted Average System Marginal Pricing (WASMP) based on Balancing and Settlement Mechanism in the State. The Balancing and Settlement Mechanism in Maharashtra was implemented in two phases as below:

(a) Interim Balancing and Settlement Mechanism (IBSM): IBSM was implemented from October 2006 to July 2011.

(b) Final Balancing and Settlement Mechanism (FBSM): The FBSM was implemented from 01August 2011 after approval of the Commission on 23 August, 2009 and after overcoming the constraints in its implementation.

1.2 Salient Features of the Existing FBSM framework in the State

1.2.1 Key objectives of the FBSM framework are as below:

(a) An enabling mechanism for operation including roles and responsibility of each entity which shall be put in place considering an emerging market structure and emerging new entities such as market service providers, market participants and market operator.

(b) Maximizing the available generation which would facilitate reduction in load shedding and improve grid frequency as well as quality of supply.

(c) To instil forecasting and load management discipline in Distribution Licensees and dispatch discipline in Generators.

1.2.2 Key considerations for designing of the intra-state Balancing and Settlement Mechanism was based on the following principles:

a) Cost of power in the Maharashtra system should not increase: Any increase in the cost must be borne by the end consumer. Hence, the Balancing and Settlement Mechanism implemented should not increase the cost of the system.

b) Quality of supply and the efficiency of various entities should improve: The generating stations were expected to dispatch in most efficient manner considering the economy of operations and merit order dispatch (MoD)principles for the power system irrespective of the ownership. Tapping of excess generation projected to improve the frequency profile of the system, thus leading to improve the quality of supply.

c) The system shall promote development of market, i.e., encourage participation by many buyers and sellers: The objective behind the reform process was market development in the long term. The proposed system was expected to offer

opportunities to many buyers and sellers to take part in the market and maximise economic gains.

d) Fair and equitable sharing of risks amongst various State participants: The proposed mechanism was designed considering the existing contractual arrangements and agreed risk sharing arrangements amongst the State participants.

e) System Operations and Stability: The ABT mechanism should not have any adverse impact on system parameters which are of critical importance for example frequency of the grid, line loading, voltage profile, transformer loading etc.

1.3 Petition Filed by SLDC in Case No. 56 of 2012

1.3.1 The Maharashtra State Load Dispatch Centre (SLDC) had filed a Petition before the Commission in Case No. 56 of 2012 on 08 June, 2012 citing various difficulties in the operation and implementation of the intra-state ABT Order dated 17 May, 2007 in Case No. 42 of 2006.

1.3.2 The Commission constituted a Committee in Case No. 56 of 2012 to carry out a "De-Novo Zero Base Review of FBSM" as compared with the prevalent National Level inter-state ABT mechanism.

1.3.3 The Committee submitted its Report to the Commission and recommended that scheduling process needs to be decentralized and settlement of deviation needs to be linked to the frequency.

1.3.4 The Commission disposed of the Case No. 56 of 2012 on 11 April, 2014 wherein it has ruled that:

"

5.1 The Commission after considering the issues raised by the Petitioner, recommendations of the Committee on Zero Base Review and comments/suggestions of distribution licensees & Petitioner on the Committee Report, rules the following:

A. Implementation of de-centralized scheduling and frequency linked deviation settlement mechanism in Phase I; and

B. Implementation of State level customization in Phase II, for improving Balancing and Settlement Mechanism after ensuring successful implementation of Phase-I.

5.2 The Commission entrusts Maharashtra State Power Committee (MSPC) the responsibility to lead the revision of Balancing and Settlement code in Maharashtra by carrying out the steps identified above in the present Order. The steps are to be carried out by MSPC in close coordination with the Commission and various stakeholders. MSPC should consult with the Commission for designing and finalizing the envisaged mechanism from time to time.

5.3 The Commission will consider the submissions of MSPC and undertake appropriate proceedings in the aforesaid matters."

1.4 New Intra-State Balancing and Settlement Concept Paper Submitted by Maharashtra State Power Committee (MSPC)

1.4.1 According to the directions of the Commission in Case no.56 of 2012, MSPC submitted the 'Concept Paper on New Intra-State ABT Mechanism' on 16 February, 2015 to the Commission. Recommendations of MSPC for introducing new intra-state ABT mechanism in the State are summarised as below:

i. All Generators including State Generators, Captive Power Producers and Independent Power Plants connected to InSTS shall be considered as State Pool Participants.

ii. Generator payments shall be linked with Scheduled Energy instead of Actual Energy.

iii. Distribution companies (DISCOMs), Deemed Distribution Licensees, open access (OA) consumers connected to of intra-state transmission system (InSTS), thermal, gas generators, merchant generators, captive power producers, renewable energy (RE) generators connected to InSTS will be the participants in State Pool.

iv. Transmission Loss in Maharashtra State Electricity Transmission Company Limited (MSETCL) area and Mumbai transmission loss shall be separately accounted.

v. Deviation/Imbalance charges shall be computed considering the below formula:

- For Drawal–Deviation = Actual Drawal – Schedule Drawal
- For Generation– Deviation = Actual Generation – Schedule Generation

vi. Deviation Charges shall be payable for over-drawal by the buyer and under-injection by the seller. Deviation Charges shall be receivable for under-drawal by the buyer and over-injection by the seller based on the average frequency at specified rates. Deviation Charges shall be Linked to frequency in line with the Central Electricity Regulatory Commission (CERC) DSM price vector.

vii. Transition to Frequency based Unscheduled Interchange (UI) mechanism would be aligned with regional UI, such that State pool can settle with regional UI pool seamlessly.

viii. Additional DSM charges shall be payable for over-drawal above the UI limit specified by the CERC.

ix. Decentralised scheduling and despatch process shall be adopted and no centralized MoD stack to be considered. However, schedules for hydro/infirm RE generation shall be replaced with actual generation.

1.5 Petition Filed by Global Energy Private Limited (GEPL)

1.5.1 In addition to Case No. 56 of 2012, GEPL filed a Petition before the Commission in Case No. 181 of 2014 for grant of short-term OA permission and consideration of traders as State Pool Participant (SPP) in the State pool. The Commission disposed of the matter vide its Order dated 27 April, 2015 with following observations:

> *"Since May, 2007 when the ABT Order was passed, the power market scenario has evolved considerably with operationalization of OA for more than a decade, development of power exchanges and Maharashtra State no longer being deficit in power. Hence, there is an urgent need to review the existing dispensation in the changed context, and to make appropriate changes for promotion and development of the market (including trading) as mandated under S. 66 of the EA, 2003, after due public consultation……."*

1.6 The MERC F&S Regulations, 2018

The Commission has notified MERC (Forecasting, Scheduling and Deviation Settlement for Solar and Wind Generation) Regulations, 2018 on 20 July, 2018 for facilitating grid integration of wind and solar energy generated in Maharashtra while maintaining grid stability and security as envisaged under the State Grid Code and the Act, through forecasting, scheduling and a mechanism for the settlement of deviations bysuch variable RE generators.

These Regulations specifies the treatment for deviation and settlement of wind and solar generators in the State. Hence, the Deviation Settlement Treatment proposed in the Draft DSM Regulations shall not be applicable to wind and solar generators in the State. However, all conditions as mandated for forecasting, scheduling and deviation settlement shall be governed as per the provisions outlined under MERC F&S Regulations, 2018 as applicable for wind and solar generating stations.

1.7 Approach and Regulatory Process

Accordingly, the Commission has initiated regulatory process for review of existing FBSM Framework operational in the State and introducing Deviation Settlement Framework in the State. The details of DSM Framework to be introduced in the State is discussed in subsequent sections of this explanatory memorandum.

2. DEVIATION SETTLMEENT MECHANISM (DSM) AT NATIONAL LEVEL

2.1 Evolution of DSM Framework at National Level

2.1.1 To bring in grid discipline, frequency linked UI mechanism was introduced by imposing UI charges on the deviations from their scheduled generation or drawl. The UI mechanism was designed considering the overall deficit scenario. CERC introduced its Regulations on UI charges and related matters. The UI charges are carried out based on the average frequency of a time block at the rates specified in the UI price vector.

2.1.2 CERC introduced the Availability Based Tariff (ABT) mechanism vide its Order dated 04 January, 2000 at inter-State level. The ABT mechanism was implemented in different regions in a phased manner in the period from FY 2002-2003. ABT mechanism was implemented in western region and northern region in 2002 and in southern region, eastern region and north-eastern region in 2003.

2.1.3 The imbalance handling mechanism has been in operation at the inter-state level for nearly 15 years. The evolution of deviation price (erstwhile unscheduled interchange [UI]) vector over the years is tabulated in the following table.

Table 1: Evolution of Deviation Price (erstwhile UI) Vector

Period	Operational Frequency Band	Ceiling Rate (paise/kWh)	Benchmarking of Ceiling Rate	Slope (paise/kWh)	Step size
1st July 2002 – 31st March 2004	49.0 Hz – 50.5 Hz	420	DG set	5.6	0.02 Hz
1st April 2004 – 30th Sept 2004	49.0 Hz – 50.5 Hz	600	DG set	8	
1st October 2004 – 29th April 2007	49.0 Hz – 50.5 Hz	570	DG set	9	
30th April 2007- 6th Jan 2008	49.0 Hz – 50.5 Hz	745	Domestic Naphtha (Liquid Fuel)	6 (50.5-49.8) 9 (49.8-49.5) 16 (49.5-49.0)	
7th Jan 2008 – 31st March 2009	49.0 Hz – 50.5 Hz	1000	Combined cycle plants -Naphtha/RLNG	8 (50.5-49.8) 18 (49.8-49.0)	
1st April 2009 – 2nd May 2010	49.2 Hz – 50.3 Hz	735	RLNG based generating station with variation in fuel prices of around 5%	12 (50.3-49.8) 17 (49.8-49.2)	
3rd May 2010 to 16th Sep 2012	49.5 Hz – 50.2 Hz	873	Gas/liquid fuel based thermal generating stations of NTPC & NEEPCO	15.5(50.2-49.7) 47 (49.7-49.5)	
17th Sep 2012 to 16th Feb 2014	49.7 Hz – 50.2 Hz	900	Highest cost of generation is 896.02 Paise/kWh @Auraiya CCGT Station	16.5 (50.2-50.0) 28.5 (50.0-49.8) 28.12 (49.8-49.5)	
17th Feb 2014 onwards	49.90 Hz - 50.05 Hz	824	Highest cost of generation is 8.24 Rs/kWh @ Auraiya Gas Power Station	20.84 (49.70 - 50.00) 35.60 (50.01 - 50.05)	0.01 Hz

2.1.4 A coordinated multilateral scheduling model has been adopted in India. Schedules can be revised and the entities can deviate within specified limits from the schedule. Large quantum of deviations from scheduled power flows may lead to uncertainties in power

flow and consequential power system security issues. The deviations are settled as per the UI/DSM rate vector administered by the CERC.

2.1.5 Over the period, utilities are relying on the grid for meeting their short-term energy demand which has increased serious threat to grid security. The twin blackout of the national grid in 2012 was a result of over reliance of the constituents on the UI mechanism. Post this incident, a Committee was appointed by the Government of India (GoI)to analyse the issues. Based on the Committee's recommendations, the Central Commission, tightened the operating band of grid frequency and prepared stringent deviation charges to discourage the utilities from deviation schedule.

2.1.6 Consequently, National Load Despatch Centre (NLDC) filed a Petition before the Central Commission, for amendment of CERC (UI charges and related matters) Regulations, 2009 and suggested certain changes for incorporation. The NLDC had sought in its proposal the following three major changes:

a) Narrowing down frequency band further to 49.9 Hz to 50.1 Hz, so that system operates close to 50 Hz.

b) Imposing limits on UI injection/withdrawal and making its truly inadvertent interchange.

c) Introduction of locational bias in the UI settlement rate.

2.2 CERC (Deviation Settlement Mechanism and Related Matters) Regulation, 2014

2.2.1 CERC in its Explanatory Memorandum for Draft CERC (DSM and Related Matters) Regulations, 2013, has discussed that, the UI mechanism acts as a market in the grid frequency range above 49.8 Hz. There is a perverse signal for over-drawal/under-drawal or under-injection/over-injection without any regard to other grid parameters like transfer capability, voltage level, fault levels, etc., which is ignored. The recent grid failures have made it evident that the grid frequency is not the only parameter to be monitored and controlled for the grid security. Other grid parameters, such as, transfer capability of transmission lines, voltage, etc., are equally important and required to be watched and controlled. Large quantum of unscheduled over-drawal/ under-drawal even when the frequency is within the normal band can give rise to transmission constraints and jeopardize grid security. 'Frequency is not the only consideration in reliable operation as there can be instances where system frequency is within the range and large unscheduled power flows on certain elements can result in catastrophic grid failure." Hence, it appears necessary to put strict volume limits on over-drawal/under-drawal and over-injection/under-injection irrespective of the grid frequency.

2.2.2 Accordingly, the Central Commission notified its CERC (Deviation Settlement Mechanism and Related Matters) Regulation, 2014 on 6 January 2014, to maintain grid discipline and grid security as envisaged under the Grid Code through the commercial mechanism for Deviation Settlement through drawal and injection of electricity by the

users of the grid". The important key features of CERC (DSM and related matters) Regulations, 2014 are as below:

Parameter	Description
Objective	• To maintain grid discipline and grid security as envisaged under Grid Code through commercial mechanism for Deviation Settlement through drawal and injection of electricity by users of the grid.
Applicability	• Buyers and sellers involved in transactions facilitated through short term/medium term/long term OA in inter-state transmission of electricity.
Deviation	• Total Actual Injection – Total Scheduled Generation (*for seller*) • Total Actual Drawal – Total Scheduled Drawal (*for buyer*)
Pricing Framework	• Charges payable (over-drawal/under-injection) and receivable (under-drawal/over-injection) for each timeblock. • Linked to average frequency for each time block (15 minutes duration) in steps of 0.01 Hz over range from 49.7 Hz to 50.05 Hz.
Other Conditions for Deviation Charges	• Capping of Deviation Charges for generating stations regulated by CERC. • Cap rate of 303.04Paise/unit. • Volume cap of 150 MW or 12% of schedule (different volume caps for RE Rich States). • Additional Charges for exceeding volume cap.
Limits for Deviation	• Volume cap of 150 MW or 12% of schedule (different volume caps for RE rich States). • No over-drawal/under-injection when frequency below 49.7 Hz. • Additional charges at rate of 20%, 40%, 100% of applicable Deviation Charges in steps of deviation 12%-15%, 15%-20%, > 20% or 150-200 MW, 200-250 MW, > 250 MW.
Institutional Arrangement	• Regional Power Committee to prepare statement for Deviation Charges on weekly basis. • Regional load despatch centres to operate and maintain 'Regional Deviation Pool Account Fund'.

2.3 Overview of FOR Technical Committee Deliberations

2.3.1 As per the provision of Electricity Act, 2003, forum of regulators (FOR) is an advisory forum to all the Electricity Regulatory Commissions in India. Given the variation in technical and commercial frameworks from one State to another, and to build capacity at the State level, a Technical Committee of States has been formed on 18 November, 2015. The Committee has been mandated to develop a roadmap for implementation of the following:

a) Introduction/Implementation of ABT Framework at the State level as mandated in the National Electricity Policy and Tariff Policy

b) Deployment and implementation of framework on forecasting, scheduling and deviation settlement of wind & solar generating stations at the State level.

c) Introduction of ancillary services and reserves at the State level.

d) Implementation of AGC and primary control within the States.

e) Provide periodic reports to the FOR.

Developing the roadmap for implementation of ABT/DSM mechanism at the State level is an important mandate given to the Technical Committee. The Technical Committee of FOR upon detailed deliberations have evolved Model DSM Regulations at the State level, which was presented and endorsed by FOR in its 57th Meeting held at Raipur.

2.3.2 SAMAST Report

To facilitate implementation of the DSM Framework, a comprehensive study and preparedness assessment at State level was carried out. Technical Committee of FOR formed a subcommittee chaired by CEO, Power System Operation Corporation (POSOCO) with the following terms of reference (ToR):

i. Evolve a detailed action plan with time lines for the implementation of ABT/DSM at the State level.

ii. Suggest modification of all technical and accounting procedures as may be necessary for rolling out ABT/DSM Framework.

iii. Assist in drafting of requisite State regulations or amendments to the existing regulations.

iv. Submit a report on the progress of the sub-group to the Technical Committee of States in every two months.

2.3.3 The Report titled SAMAST- "Scheduling, Accounting, Metering and Settlement of Transactions in Electricity" was submitted to the Technical Committee of FOR during the Fifth Technical Committee Meeting on 15 July, 2016 with an objective of presenting the available experience of various aspects of energy accounting, metering, deviation settlement at the inter-state/intra-state level and evolving a uniform procedure for SAMAST in Electricity. The SAMAST report provides the roadmap for implementing a robust, scalable and dispute free scheduling, metering, energy accounting and settlement system in the States. The report lays down the basic framework and governance structure of SAMAST including information technology (IT) infrastructure and human resources required for market operations discharged by the SLDCs.

The report also aims at reducing complexities in the grid integration of renewables and aims to facilitate better grid management of the Indian Grid with an increased penetration of the variable renewable sources in the upcoming years.

2.3.4 The FOR in its 55thMeeting held on 22 July,2016, approved the SAMAST Report presented by Technical Committee. Following are the key recommendations for implementing SAMAST at the State level:

1 Elaborate roles and responsibilities of the governance structures (involving entities such as National Load Despatch Centre (NLDC), Central/State Transmission Utility (CTU/STU), site owner, State Load Despatch Centre /Regional Load Despatch Centre and Regional Power Committee /State Power Committee).

2 Enable a comprehensive IT for market operation functions other than just SCADA/EMS.

3 Demarcate interface boundary and identify the pool members.

4 Uniform energy accounting system.

5 Implement DSM in a systematic manner.

SAMAST Report categorises the States in four groups, considering the experience of States in the implementation of intra-state ABT mechanism. Accordingly, the States could be categorized into Group-A, Group-B, Group-C and Group-D. The State of Maharashtra is considered in Group-A, States where SLDCs have a first-hand experience of all the aspects of intra-state accounting and settlement system.

2.3.5 SAMAST Report also recommends that, the State Regulatory Commissions shall review their Regulations for implementation of intra-state DSM Framework to maintain grid discipline and grid security as envisaged under the Grid Code.

2.3.6 As majority of the states have not implemented intra-state DSM within their states, FOR prepared the Model Regulations for DSM at State level which are expected to be

adopted by SERCs for their States. Since, the Maharashtra State is implementing FBSM for energy accounting and settlement within the State, it would be appropriate to review the same in line with the Model DSM Regulations prepared by FOR and DSM Framework of Central Commission.

2.4 FOR Model DSM Regulations for State Level

2.4.1 Upon deliberations during the 57th Meeting of FOR held at Raipur on 16 December, 2016, FOR recommended an introduction of DSM Framework at State level to be aligned with the framework prevalent at regional/national level. Some of the key recommendations of the FOR while endorsing the model DSM Regulations at State level are as under:

a) The State-level DSM Framework should provide for a non-zero-sum deviation pool.

b) The Deviation Charges at the State-level should be aligned with those at the inter-state level.

c) Keeping in view the volume limit for deviation at the inter-state level, each State Regulator should specify volume limits for the State Pool participants.

d) The State level DSM Framework should provide 'Zero Crossing' concept, thereby discouraging persistent deviation in one direction.

e) Further, studies shall be carried out to bring in the concept of Area Control Error (ACE), which could form basis for grid monitoring and disciplinary actions, in future.

The important features of the FOR-Model DSM Regulations are as below:

Sr. No.	Parameter	FOR Model DSM Regulations
1	Objective	To maintain grid discipline and grid security as envisaged under the Grid Code through commercial mechanism for Deviation Settlement through drawal and injection of electricity by the users of the grid.
2	Applicability	Seller(s) and buyer(s) involved in the transactions facilitated through short-term or medium-term OA or long-term access in intra-state transmission or distribution of electricity(including inter-state wheeling of power), as the case may be.
3	Limits for Deviation	• No over-drawal/under-injection when frequency is below 49.8 Hz. • No under-drawal/over-injection when frequency is above 50.05 Hz. • Volume Cap for intra-state entities proposed are as under: • For Generators/Sellers: 10 MW or 12% of schedule, whichever is lower. • For DISCOMs/buyers: X limit or 12% of schedule, whichever is lower.

Sr. No.	Parameter	FOR Model DSM Regulations
		• In case schedule is less than 40 MW, volume cap of 5 MW or 12% of schedule, whichever is higher. • Additional Charges at rate of 20%, 40%, 100% of applicable Deviation Charges in the steps of deviation 12%-15%, 15%-20%, >20% or X+10 MW, X+ 20 MW, >X+ 20 MW
4	Charges for Deviation	• Charges payable (over-drawal/under-injection) and receivable (under-drawal/over-injection) for each timeblock with slope of 50 Paise/unit per 0.01 Hz. • Linked to average frequency (15 minutes duration) in 0.01 Hz range from 49.9 Hz to 50.05 Hz. • Change in sign of deviation once every six time blocks- violation attracts additional charges @10% of Deviation Charges applicable for the continuance of violation. • Cap rate of 303.04Paise/unit (indicated to be linked through imported coal power plant). • Charges for over-injection/under-drawal more than 12% of the schedule or 10 MW shall be zero.
5	Institutional Arrangement	• State Power Committee to prepare Statement for Deviation Charges on Weekly basis. • State Load Despatch Centres to operate and maintain 'State Deviation Pool Account Fund'.

2.5 Expert Group's Report for Power System Operation Close to 50Hz and Review of the Principles of DSM

2.5.1 Central Commission vide order dated 27 April, 2017 constituted an Expert Group chaired by Shri. A.S Bakshi, Member, CERC with representatives from CEA, POSOCO and CTU and others with the mandate to suggest further steps required to bring power system operation closer to the national reference frequency of 50 Hz and review of the principles of DSM. The ToR of the Expert Group were as under:

1) Review the experience of grid operation in India.
2) Review international experience and practices on grid operation including standards/requirement of reference frequency.
3) Review the existing operational band of frequency with due regard to the need for safe, secure and reliable operation of the grid.
4) Review the principles of DSM rates, including their linkage with frequency, in the light of emerging market realities.
5) Any other matter related to above.

2.5.2 The Expert Group submitted its Reports to the CERC in two volumes:

Volume-I: Expert Group to review and suggest measures for bringing power system operation closer to National Reference Frequency

Volume-II: Review of the Principles of DSM, including linkage with frequency, considering emerging markets

Key Recommendations of the Expert Group under both volumes are summarised as below:

1) The reference frequency for frequency control is considered as 50.0 Hz, and the same is notified in the Indian Electricity Grid Code
2) For frequency stability, inertia of the system needs to be monitored at the regional and all India level in real time to establish baseline and monitoring during low net load periods.
3) The CEA may notify the Technical Standards for connectivity to the grid in respect of the RE generation at the earliest mandating primary control from the RE sources.
4) The current frequency band of 49.90-50.05 Hz would be further tightened to 49.95-50.05 Hz by 2020 when secondary and tertiary reserves would be operationalized in substantial quantum both at the inter-state and intra-state levels.
5) Expanding the ambit of existing ancillary services framework and introduction of slow tertiary ancillary services at the intra state level through regulations by Appropriate Commission. Introduction of fast tertiary services through Reserves Regulation Ancillary Services (RRAS) using hydro could be introduced suitably at the inter-state level.
6) Monitoring of Area Control Error (ACE).
7) Need for improved forecasting and planning for procurement by the utilities.
8) Implementation of the quantum of reserves as per the CERC Roadmap for Reserves.
9) Implementation of more iterations of the Electricity Market in Power Exchanges, e.g., evening market, four/six-hour ahead market.
10) Change in monitoring of simple deviations to monitoring of "ACE"
11) Need for introduction of gate closure concept in the scheduling process.
12) Linkage of DSM price vector to the existing market discovered prices (day-ahead market). It is suggested that the average daily Area Control Price (ACP) be used as a reference and linked to the DSM rate at 50 Hz.

2.6 Draft Amendment to CERC DSM Regulations, 2018

The DSM Regulations of Central Commission were notified in 2014. Several developments have taken place in the power sector since 2014. In this backdrop, the Central Commission has considered it necessary to review the existing operational band of frequency with due regard to the need for safe, secure and reliable operation of the grid and review the principles of DSM rates, including their linkage with frequency in the light of emerging market realities.

CERC has published draft CERC (Deviation Settlement Mechanism and Related Matters) (Fourth Amendment) Regulations, 2018 on 29 June, 2018 and initiated regulatory process for further public consultation.

The Central Commission in its explanatory memorandum has elaborated that, the highest variable cost generator dispatched in Ancillary Services on daily basis during the period April 2016 to October 2017 has crossed the mark of more than Rs. 8 per unit on multiple occasions. Further, the Deviation Price is the lowest amongst bilateral, Power Exchange, Day ahead Market (DAM), DSM prices and the ancillary services. From design perspective, the prices for deviation from schedules are the real-time prices and should be such that they provide enough incentive to the market participants to plan and procure adequately in the market in advance.

Salient features of draft amendments to CERC DSM Regulations are as follows:

a. Revised DSM price vector proposed to link with daily average area clearing price.

b. Revised reference frequency band (viz. 49.85 Hz to 50.05 Hz) is proposed for DSM price vector.

c. The DSM rate vector is proposed to have a dynamic slope determined by joining the identified price points at 50 Hz. (daily average ACP), low frequency of 49.85 Hz (Rs. 8 per unit) and 50.05 Hz (zero) on a daily basis.

d. The maximum ceiling limit applicable for average daily ACP discovered in the DAM segment of power exchange at 50.00 Hz is proposed to be 800 Paise/kWh.

e. The day-ahead market price of the power exchange having a market share of 80% or more in energy terms daily is proposed to be taken into consideration for linking the DSM price vector. If there is no single power exchange having a market share of 80% or more, the weighted average day-ahead price is proposed to be used for linking the DSM price.

f. It is proposed to link the cap rates for generators using coal/lignite/APM gas to the energy charges as billing for the previous month is proposed.

g. Reduction in number of time blocks (from 12 to 6-time blocks) for change of sign in case of sustained deviation in one direction is proposed.

h. Levy of an additional surcharge of 20% on the daily base DSM payable/receivable in case of violation of the stipulation regarding change in sign.

i. It is proposed that the total deviation from schedule during a day should not be more than 3% of the total schedule for the drawee entities and 1% for the generators and in case of violation 20% of the daily base DSM payable/receivable be levied.

The Draft Amendment to DSM Regulations proposed by the Central Commission are under further regulatory process and yet to be notified.

It is proposed to specify enabling provision in the MERC Draft DSM Regulations, for linking the DSM price vector with CERC DSM price vector as and when it is revised by the Central Commission.

2.7 Other Developments at National level

In addition, there are several other developments and work in progress on the electricity market, ancillary services, real time market operations that is currently underway by the Central Commission, Ministry of Power/CEA and in consultation with the FOR Technical Committee. Some of the important developments/deliberations and discussion papers are as follows:

a) Discussion Paper by CERC on 'Re-Designing Real Time Market Operations in India on 25 July, 2018
b) Discussion Paper by CERC on 'Re-Designing Ancillary Services Mechanism in India on 06September, 2018
c) Consultation Paper by POSCO on 'Security Constrained Economic Despatch of ISGS on Pan India on 28 September, 2018.
d) Scheme of Flexibility in Generation and Scheduling of Thermal Power stations to reduce cost of power to consumer, formulated by Ministry of Power vide its letter no. 23/21/2018-R&R dated 30 August, 2018

All these developments would have a bearing on the evolution of market mechanism and Balancing and Settlement Framework which is evolving and adopting to the emerging market requirements. Hence, the intra-state DSM Framework and other mechanism incl. scheduling, energy accounting and deviation/imbalance settlement mechanism at the State level needs to be aligned with this emerging scenario. The intra-state DSM Framework should be robust, flexible and scalable to cater to these requirements.

Accordingly, the DSM mechanism and draft DSM Regulations have been formulated to cater to these requirements.

3. KEY DESIGN ISSUES OF DRAFT DEVIATION SETLEMENT MECHANISM FOR MAHARASHTRA

This chapter covers the objective, scope and applicability of DSM Framework for Maharashtra, deliberations on the key design issues such as Identification of State entities, MoD principles, volume limits for intra-state entities, DSM pool design, need of zero crossing and conditions thereof, treatment to gaming, curtailment and despatch, metering and Automated Meter Reading (AMR) Structure. This chapter also summarises the suggestions on the key design issues of DSM Framework for Maharashtra.

3.1 Objective, Scope and Applicability of DSM at the State Level

3.1.1 Objective

The objective of the DSM regulation is to maintain grid discipline and security as envisaged under the Grid Code, through commercial mechanism for deviation settlement through drawal and injection of electricity by the users of the grid.

To maintain grid discipline, security and reliability, the buyers and sellers shall operate within the specified frequency band and volume limits. Any deviation shall be considered as inadvertent flow of energy and shall be treated as specified in the Regulations. All the buyers and sellers and system operators are bound to achieve the objective of the DSM Regulations.

3.1.2 Scope and Applicability

In 2007, while framing the intra-state ABT mechanism for the State, the Commission had not considered generators as part of imbalance pool settlement.

In the existing FBSM mechanism, only those generators were considered as State Pool Participant (SPP) which undertakes inter-state power transactions or operating on merchant basis. Excerpts of MERC Order in Case 42 of 2006 is provided below for reference:

> *"Accordingly, generators have not been considered to be members of the State imbalance pool. However, the Commission clarifies that proposed market structure for introduction of ABT regime per se does not prohibit any Generator from becoming member of 'State Imbalance Pool' arrangement, if it wishes to sell its entire generation as 'Merchant Generator', provided it meets the qualification criteria and the membership conditions/norms to be laid down by MSPC in line with Balancing and Settlement Conditions as approved by Commission under this Order."*

It is observed that although the generators were not considered as SPP; however, considering that the energy input to the imbalance pool from all the generators is the primary input to the imbalance pool accounting, the generator was required to undertake the following activities:

1. Provide availability on day-ahead basis for each 15-minute duration of trading period on the following day.
2. Receive an "unconstrained despatch schedule" from MSLDC, detailing how much a generator will produce and when (based on the State-wide Merit Order drawn upon by the MSLDC).
3. Provide revised availability, if any, based on the actual generation available, before the finalization of the despatch schedule.
4. Despatch generation as per the "constrained schedule", received from the MSLDC.
5. Back-down or ramp-up the generation, within the available capacity, as per the despatch instruction from the MSLDC depending on system conditions including high frequency.
6. Abide by the terms and conditions outlined under State Grid Code and conform to the instructions issued by MSLDC from time to time.

Further, with the commissioning of number of generators in the State, Maharashtra has moved from being energy deficit to an energy surplus State. Since the intra-state generating stations are not subjected to balancing and settlement regime yet, the opportunities for further optimization are not being utilised. The intra-state generating stations have no incentive presently to maximize their generation in peak-load hours and to back down during off-peak hours.

Going forward, the in-state generators are therefore, being proposed to be considered as State Pool Participants in the new DSM Framework. Bringing generators under the State Deviation Settlement Mechanism will incentivize the generators to be within the schedule and optimize resources within the State.

Further, in line with CERC DSM Regulations and FOR Model DSM Regulations, users procuring electricity through a transaction scheduled in accordance with the OA regulations (long term, medium term or short term) shall be considered as buyer(s) whereas generating station, supplying electricity through a transaction scheduled in accordance with the OA regulations (long term, medium term or short term) shall be considered as sellers.

Accordingly, the DSM under these Regulations shall be applicable for

A. All seller(s), including OA generators, captive generators (excluding In-Situ captive generators) connected to InSTS but excluding wind and solar generating station(s).
B. However, forecasting, scheduling and deviation settlement related matters in respect of wind and solar generation shall be governed as per the provisions of "MERC (Forecasting, Scheduling and Deviation Settlement for Solar and Wind Generation) Regulations, 2018" and its amendments thereof.

C. All buyer(s) including distribution licensee(s), deemed distribution licensee(s) located in the State and full OA consumers connected to InSTS.

However, Deviation Settlement of partial OA consumers connected to InSTS and all OA consumers connected to distribution network shall be in accordance with the provisions of MERC (Transmission Open Access) Regulations, 2016 and MERC (Distribution Open Access) Regulations, 2016 and its amendment thereof.

3.2 Pre-Conditions for Participation in DSM

To meet the above stated objectives, necessary pre-conditions and covenants for participation by the State entities shall be as under:

(A) All State entities shall have equal and non-discriminatory treatment about the DSM as specified in the Regulations.
(B) The State entities shall inform the SLDC of all contracts they have entered for exchange of energy.
(C) The State entities shall operate their equipment and loads in a manner that is consistent with the provisions of the Indian Electricity Grid Code and the State Grid Code.
(D) The State entities shall enter into Bulk Power Transmission Agreement (BPTA) and Connection Agreement with the concerned Transmission Licensee, which shall specify the physical and operational requirements for a reliable operation and gain physical access and connection to the InSTS or enter into Connection and Use Agreement with concerned distribution licensee for use of distribution system.
(E) SLDC shall publish all such information as required for all other State entities to be aware of the energy exchanges taking place within the pool as well as exigency conditions, if any.
(F) All the State entities shall make necessary arrangements to construct suitable meters, capable of recording energy flows at 15-minute time intervals or any other time interval as specified by the Central Commission or this Commission, at the points of injection and drawal of the electricity.

3.3 Identification of State Entity

State entity means a buyer or seller who is in the MSLDC control area and whose metering and energy accounting is done at the State level. All the buyers and sellers considered under DSM Framework specified in this Regulation shall be treated as State entities for this Regulation.

Since the Commission has defined the buyers and sellers and considered them as State entities for DSM, the Commission does not find it necessary to consider Trader as separate entity for State DSM Pool settlement. The buyer or seller for whom trader is transacting energy shall be considered as State entity and not the trader.

3.4 MoD Guidelines (Centralised MoD) During Operation of FBSM Framework

3.4.1 The Commission vide its Order dated 17 May, 2007 in Case No. 42 of 2006 ('FBSM Order') the Commission has specified the principles of MoD, scheduling process and time lines for regulating electricity purchase and procurement process of the Distribution Licensees. Based on the principles set out in the FBSM Order, MSLDC prepared the Scheduling and Despatch Code for Maharashtra which was approved by the Commission. Considering the principle of least cost option as specified in the FBSM Order, MSLDC is currently scheduling various Generating Stations/Units by applying MoD principles.

3.4.2 When the FBSM Order was issued, Maharashtra was facing a severe power declaration deficit. With significant generation capacity addition in the State and contracting of power through competitive bidding, the power availability for the State is now more than the power demand for most of the times through the year. This surplus situation may continue as the demand growth has not been witnessed as against the growth in generation capacity addition. Besides, several measures of energy conservations and energy efficiency improvements through energy efficient lighting programs, agriculture pumpset efficiency, industrial efficiency improvement schemes have also influenced the demand growth to some extent. Under the circumstances, the least-cost despatch principles shall be applied to cater to the variation in demand with available generation capacity.

3.4.3 Considering the above issues raised in several regulatory proceedings and other interactions with Utilities, the Commission has proposed to review the existing modalities for the application of MoD principles in Maharashtra and published the draft MoD guidelines for the operation of MoD and has invited public comments by end of the October 2018. The Commission in Draft MoD Guidelines and Explanatory Note identified the following issues for operationalisation of MoD Guidelines:

1. Periodicity and date of preparation of MoD stack.
2. Basis of preparation of MoD stack, including the Variable Charge to be considered.
3. Guidelines for operating the generating units.
4. Guidelines for zero schedule instructions to the generating units.
5. Guidelines for Reserve Shut Down (RSD) instructions to the generating units.
6. Identification of 'Must Run' stations, and guidelines for operating hydro stations.
7. Technical minimum of generating units.

3.4.4 The MoD Guidelines proposes that, MSLDC shall endeavour to attain load generation balance on any given day by finalising the schedule of 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. As a basic principle, MSLDC is required to finalise the despatch schedule based on least-cost principles.

3.4.5 Treatment for Hydro Projects Scheduling and Use of Ghatghar Pumped Hydro Project

- The Hydro Generating Stations is primarily intended to meet peaking power requirements. As the Hydro generation capacity is flexible to meet the needs of real-time operations, MSLDC shall be responsible for operating hydro generating stations daily 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. MSLDC to ensure 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, MSLDC shall operate the hydro units kept as spinning reserve in consultation with the respective distribution licensees entered into contract with respective generating company for such hydro units.

3.4.6 These Draft Guidelines shall be finalised after due stakeholder consultation process. These Guidelines shall be suitably modified to the extent of operationalisation of the provisions of the proposed DSM Regulations.

3.5 Merit Order Operation (De-Centralised and Centralised) During Operationalisation of DSM Framework

The existing mechanism specified under Case No. 42 of 2006, is of unified State wise MoD and centralized scheduling. MSLDC vide its submission in Case No. 56 of 2012, had submitted that preparation of State-wide schedule under a single State-wide MoD stack is complex considering there are constraints like ramp up and ramp down rate and technical minimum associated with each generator.

Considering these technical limitations, despatch schedule is not always least cost but constrained. Thus, allocation of least cost generation as per the MoD stack is not always possible under the current FBSM. Generators lower in the MoD stack are backed down and replaced with higher cost generator constrained by ramp rate or technical minimum. This leads to higher cost of electricity and prone to dispute.

Under the existing FBSM Framework, SLDC needs to operate centralised MoD and schedule the drawal for DISCOMs and Despatch for Generators. In the process, SLDC is required to take commercial responsibility on behalf of State Pool Participants. With deepening and widening of electricity market operations, the distribution licensees and buyers should be proactive to undertake efficient power procurement and must take commercial decisions for its demand forecasts, schedules and undertake power procurement contracts to meet the scheduled demand. The variation demand-supply in real time and inadvertent power flows shall be managed through efficient system operation. The Balancing and Settlement Framework and DSM should enable market participants to take informed decisions and be commercially responsible for their actions and system operator be responsible to ensure reliable, secure grid operations with optimal, efficient coordinated scheduling and despatch within its control area.

Thus, it is proposed to adopt decentralised utility-wise MoD principles for load-generation balancing during day-ahead basis and centralised MoD for in real time despatch (during system emergency conditions). SLDC could follow the MoD Guidelines (as amended from time to time) for system operations in real time taking into consideration the system requirement and grid conditions for reliable, secure and optimal and cost-efficient despatch. Such hybrid approach (de-centralised on day ahead basis and centralised) would be compatible with emerging framework for power market operations.

It is noted that DSM Framework at State level should be in line with DSM Mechanism at regional/national level as per the Central Commission and FOR Model DSM Regulations. This has necessitated adoption of hybrid approach with Decentralised Utility-wise MoD on day-ahead basis and centralised despatch on real time (on day of operation) as per the system conditions. Further, this framework would be completely aligned with National/regional level framework evolving with the introduction of new concepts such as:

a. Gate closure
b. Redesigning real time market operation in India – Introduction of hour ahead market operations
c. Redesigning ancillary services in India – Expanding the role/scope of ancillary services
d. Modification to DSM pricing mechanism aligned to DAM price vector etc.

CERC has already floated Discussion Paper(s) for public consultation on these concepts. In continuation, POSOCO/NLDC has published Consultation Paper on 28September,2018, namely, Consultation Paper on Security Constrained Economic Despatch of ISGS.

This Consultation Paper has also recognised the coordinated multilateral scheduling model (i.e., decentralised scheduling/despatch) with a thin layer of optimisation coordinated through system operator by modelling algorithm (centralised despatch) for

optimisation of energy and ancillary services (in centralised manner). This is in line with the hybrid approach (decentralised/centralised) that is proposed under the DSM Framework at State level. Key extract of the POSOCO Consultation Paper is reproduced hereunder:

> *"Given the federal structure with the coordinated multilateral scheduling model, there is a need for thin layer of optimization at the inter-state level duly factoring technical constraints such as technical minimum, maximum generation, transmission constraints, etc. Towards this end the Staff of the Commission has already come up with Discussion Papers on "Real Time Energy Market" and "Re-designing Ancillary Services Mechanism in India". While the Real Time Energy Market is expected to help the stakeholders manage their energy portfolio closer to Real Time, the proposed framework of co-optimization of energy and ancillary services is intended for optimal utilisation of the generation resources at least cost. It will take some time for these frameworks to be fully operational and there is a scope for immediate savings in system costs through security constrained economic despatch of inter-state generating stations on pan India basis."*

Thus, the proposed DSM Framework at State level for Maharashtra shall be compatible and in line with the emerging new concepts at national/regional level. However, to operationalise the same, all design parameters (such as inclusion of generators in scheduling/deviation accounting, introduction of volume limits for intra-state entities, applicable deviation charges, additional deviation charges, zero-crossing etc.) as outlined under Model DSM Framework at State level and as notified by the Central Commission for regional/national level, will be incorporated at the State level. Hence, these factors were considered while formulating DSM Regulations.

The details of scheduling period and scheduling process is discussed in subsequent paragraphs.

3.5.1 Scheduling and Load Generation Balancing Process (Day Ahead)

3.5.2 Scheduling Period

The scheduling period shall comprise of 96-time blocks, each of 15-minute duration starting from 00:00 hours (IST) ending with 24:00 hours (IST). The first-time block of scheduling period shall commence from 00:00 hours (IST) to 00:15 hours (IST), second time block of scheduling period shall commence from 00:15 hours (IST) to 00:30 hours (IST) and so on.

The Commission notes the ongoing development at National level regarding revision of time block to 5 minutes. The Draft Regulations provides the enabling provision to revise the time block to 5 minutes as and when revised by the Central Commission at regional level. Accordingly, the scheduling period shall be revised to 288-time blocks,

each of 5-minute duration starting from 00:00 hours (IST) ending with 24:00 hours (IST).

The SLDC while planning for new metering infrastructure need to ensure that, Interface Metering, Energy Accounting and Deviation Settlement should be capable to undertake transactions with 5-minute duration. All future resource planning, IT and communication system requirement and infrastructure development shall be undertaken to cater to this requirement.

3.5.3 Day Ahead Scheduling Process

SLDC shall formulate detailed procedure for scheduling in line with the principles outlined under the DSM Regulations followed by all the buyers and sellers covered under the DSM Framework. The schedule shall be furnished in accordance with the format devised for the purposes. In this context, the SLDC shall prepare detailed scheduling codes and procedures considering the principles specified in this Regulations and submit to the Commission for approval upon due consultation process.

1. Sellers shall forecast the availability for day ahead on 15-minute time block basis and inform to the buyers with whom they have PPAs or any other power procurement arrangement and to the SLDC.

2. SLDC shall also receive availability of inter-state generators for day ahead on 15-minute time block basis from the Western Regional Load Despatch Centre (WRLDC) which SLDC shall inform to beneficiaries connected in the State. Beneficiaries shall inform their consent to SLDC which SLDC shall inform to ISGS through WRLDC. Based on the consent received, WRLDC will inform the entitlement of ISGS to SLDC.

3. Buyers shall forecast the load requirement for day ahead on 15-minute time block basis considering the availability declared by the generators with whom they have Power Purchase Agreement. Buyers shall also consider the availability of inter-state generation for which buyers have informed the consent through SLDC and WRLDC. Buyers shall follow the de-centralised MoD principles, i.e., least cost generation within their PPAs shall be proposed while scheduling. Buyers shall submit the drawal schedule to SLDC as per the detailed scheduling code to be prepared by SLDC.

4. While furnishing the load forecast schedule, the Distribution Licensees shall consider the load requirements of the 'Open Access Consumers' (DOAU and partial TOAU) located within their area of DISCOMs as well. The DISCOMs, while furnishing its overall load forecast schedule to the SLDC shall include forecasted load requirement of only those 'OA consumers' (DOAU and partial TOAU) which are not State Pool Participants.

However, in case 'Open Access Users' (Full TOAU) fulfil the qualification criteria to be 'State Deviation Pool Participant', such OA consumers shall also furnish the schedules corresponding to their forecasted load requirement to the SLDC on day-ahead basis in accordance with the format devised for the purposes.

5. MSLDC shall prepare the load generation balance considering the availability provided by the sellers and entitlement of ISGS and load forecast by the buyers considering the buyer-wise MoD principle (de-centralised MoD).

6. Qualified Co-Ordinating Agencies (QCA) for each wind and/or solar pooling sub-station[1] [for installed capacity of 5 MW and above connected through pooling sub-station] shall prepare 15-minute time block wise schedule as per the provisions of the MERC (Forecasting, Scheduling and Deviation settlement related matters in respect of wind and solar generation) Regulations, 2018 and submit to the SLDC.

7. All other RE generators with installed plant capacity more than 25 MW other than wind and/or solar generators shall prepare 15-minute time block wise schedule considering their availability based on the generation sources like water, biomass, bagasse etc. and submit to the SLDC.

8. Based on the scheduling and availability related data received from all buyers and sellers including RE generators and entitlement of ISGS, SLDC shall prepare target despatch schedules for all sellers, QCAs, RE generators connected to InSTS and target drawal schedule of buyers by undertaking load-generation balance and adopting de-centralised MoD principles as specified above at reference frequency of 50 Hz and publish the same on SLDC's website. While preparing target despatch and drawal schedule for the state as a whole, SLDC shall consider all the relevant provisions of the IEGS and State Grid Code such as Transmission constraints.

9. SLDC shall also publish information about the availability of surplus power or shortfall of power if any on SLDC's website. While furnishing surplus availability of the generation in the State and ISGS entitlement for day ahead despatch, SLDC shall follow the least cost despatch principle and prepare the centralised MoD stack in line with approved MoD Guidelines.

10. Based on the information furnished by SLDC, buyers/distribution licensees may undertake any short-term contracts or inter-state trade transactions or may participate in the power exchange transactions to meet its drawal shortfall or optimise its power procurement cost, if any. As the Generators/Sellers have contracted their generation capacity through long term/medium term contract to Buyers/Distribution Licensees, such exchange of available surplus capacity shall be effected inter-se amongst Buyers/Distribution Licensees without need to amend

[1] In line with conditions specified under MERC F&S Regulations, 2018

existing PPAs with their respective generating stations. Such inter-se exchange of surplus power capacity between buyers/distribution licensee shall be settled between buyers at their respective marginal cost of power procurement (Utility-wise MoD published on MSLDC website) as applicable for the relevant monthly period. It is necessary that Distribution licensees undertake such inter-se exchange of surplus available power in order to reduce their overall cost of procurement for the benefit of their consumers. SLDC shall maintain and publish separate account of such exchange of surplus power capacity amongst the Buyers/Distribution licensees and also published monthly report indicating incidences where Distribution Licensee failed to contract available cheaper surplus power. The Commission shall verify and ascertain the efficacy of power procurement/sale vis-à-vis un-availed cheaper surplus capacity while undertaking scrutiny and approval of annual revenue requirement of the distribution licensee.

11. In future as the intra-state power market matures, the Generators/Sellers including merchant generators may also exercise the option to schedule their generation within the State by undertaking short term contract or inter-state trade transactions or may participate in the power exchange transactions. In that case, the rate for settlement of such bilateral transactions shall be linked to prevalent market clearing price applicable for the time-block as per power exchange transactions.

12. Above transactions if undertaken by the buyers or sellers, shall ensure the principle of least cost despatch and compliance of relevant provisions of their respective PPAs or any other contractual arrangement. MSLDC shall maintain and publish separate account of such exchange of surplus power capacity amongst the Buyers/Distribution licensees.

13. Buyers shall submit their revised drawal schedule to SLDC, if they undertake any bilateral contracts or participate in the Power Exchange Transactions. SLDC shall also receive revised schedules of ISGS from WRLDC and details of collective transactions for the State if any from the NLDC/Power Exchanges. QCAs on behalf of wind and solar generators may also submit the revised schedules in accordance with the provisions of the MERC (F&S and DSM) Regulations, 2018.

14. Based on the revised information received from the buyers and sellers, SLDC shall run revised load–generation balance for finalising the target despatch schedules for all sellers, QCAs, RE generators connected to InSTS and target drawal schedule of buyers at reference frequency of 50 Hz and same shall be published on the website by 23.30 hours.

15. MSLDC shall also publish information regarding the final availability of surplus power if any in Centralised MoD format by following the least cost despatch principle on the website.

16. The ‘Merit Order Stack’ shall be based on the energy charge inclusive of fuel cost adjustment charge, compensation for Change in Law events etc if any, of 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 the Commission and the delivered cost of fuel at respective generating stations. For determination of the ‘Merit Order Stack’ all conditions and principles outlined under MoD Guidelines including amendments thereof shall be strictly adhered to.

17. In accordance with the MoD Guidelines, The distribution licensees shall furnish the details of the prevalent fuel charge including, details of the delivered cost of fuel during the month for their contracted capacity of generating stations and in other cases, such Generating stations shall furnish said information to the MSLDC along with the day-ahead availability to enable that SLDC’s develop ‘Merit Order Stack’ for the surplus generation if any for the next day. All the buyer and sellers would strictly comply with the provisions of MERC (State Grid Code) Regulations, 2006 and its amendments from time to time and shall abide by the scheduling and despatch instructions issued by SLDC from time to time.

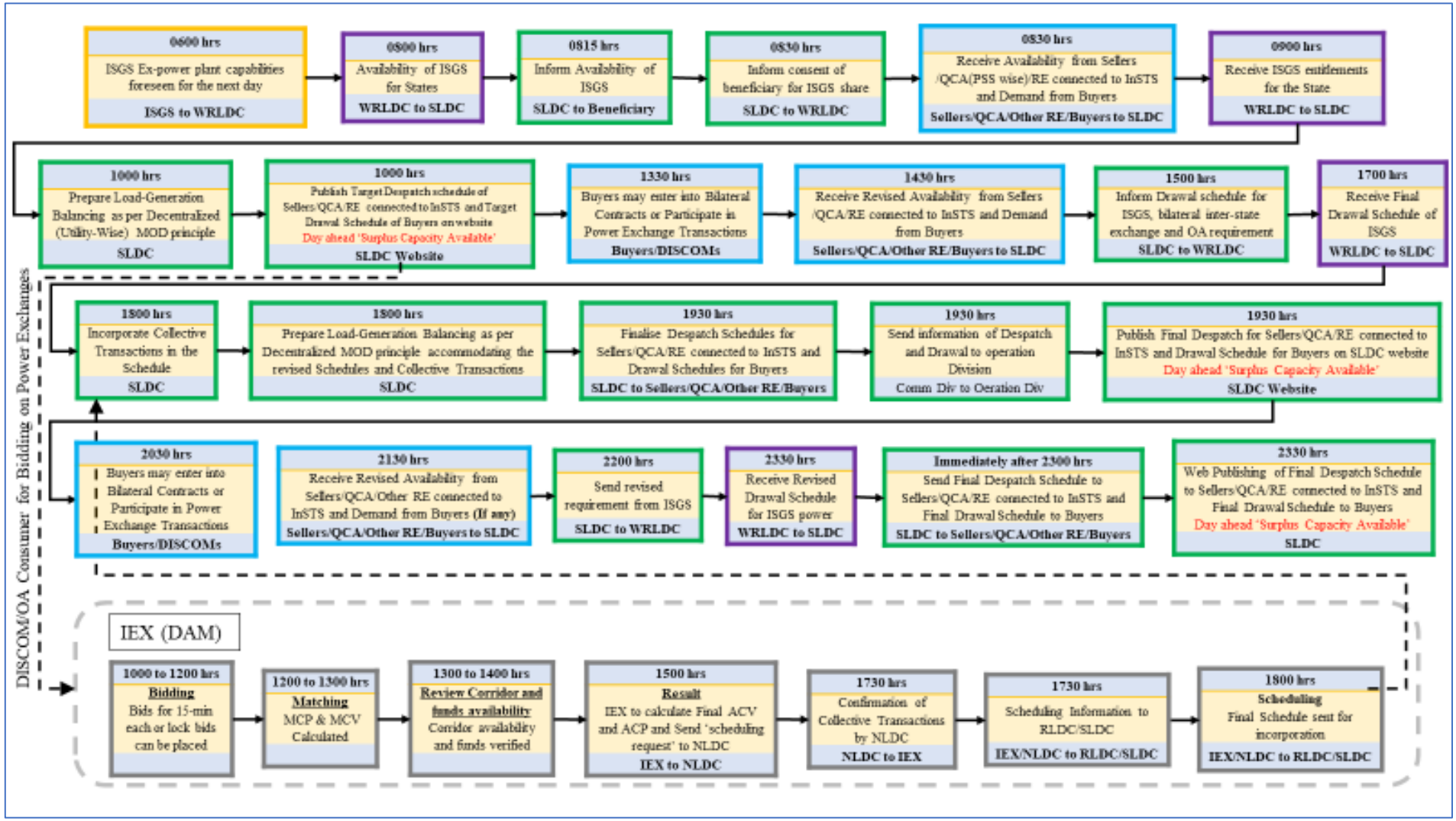
18. In case, the buyer fails to furnish schedule within the prescribed time limits to SLDC, the SLDC shall treat actual off-take by the buyers for the previous day (d-1) as the schedule for the following day (d+1). Such schedule as considered by the SLDC in the event of non-availability of schedule from the buyers shall be construed as the schedule of the buyers and the concerned buyer shall be responsible for adhering to such schedule.

19. While furnishing the availability forecasts, the sellers shall take into consideration the load requirement of their ‘captive consumers and OA consumers’ and present these requirements separately to be despatched fully up to the contracted OA load, i.e., the OA generators shall not be subjected to backing down instructions (subject to system emergency and transmission constraint) up to the requirement of their OA transactions.

20. In case the seller fails to furnish the schedule within prescribed time limits, the MSLDC shall consider the schedule of such generator as zero and entire generation injected by such generators shall be treated as deviation.

21. Based on the scheduling principles discussed above, a brief outline of timeframe for ‘day-ahead scheduling process’ is depicted below. MSLDC shall devise the detailed scheduling code and procedure considering the principles specified in this Explanatory Memorandum.

Schematic Diagram for Day-Ahead Scheduling Process:



3.5.4 Real Time Operation during Intra-Day

1. MSLDC shall operate the final despatch and drawal schedule as published on the website from 00.00 hours, i.e., 1st time block. MSLDC may modify the schedule during operation in a day only under exceptional circumstances (to be defined as force majeure/system emergency conditions) and shall be binding on all buyers and sellers.

2. Each constituent state entity shall take actions and suitable measures to manage their deviations within permissible limits of operating range. MSLDC shall take all the suitable measures to maintain load generation balance and all the grid related parameters as specified in the IEGC or State Grid Code as the case may be.

3. During real time operation, in case the grid parameters including frequency, voltage parameters and transmission line/substation loading conditions deviate beyond permissible operating range, MSLDC shall take suitable measures in the interest of reliable and safe grid operations and also operate the Centralised MoD stack of the surplus available generation published on the website to maintain the load- generation balance as and when required. In case of shortfall in 'availability', SLDC shall consider the available contracted capacity to each distribution licensee (or State Pool Participant) before issuing drawal curtailment instructions for respective distribution licensee. The load curtailment as may be necessary, shall be applicable on all distribution licensees in proportion to their shortfall beyond their 'available contracted capacity'.

4. However, if MSLDC needs to despatch additional generation from the surplus pool, MSLDC shall inform the buyers who are exceeding their volume limits in MW as specified in the Regulations and instruct them to tie up additional generation to meet the load requirement.

5. Based on the instructions received from MSLDC, buyers may enter into short term contract with the Buyer / Distribution Licensee whose generator availability has been declared on the MSLDC website as surplus or execute any other short-term bilateral contract and submit the revised schedule to MSLDC to meet the excess load requirement.

6. In the event of bottleneck in evacuation of power due to any constraint, outage, failure or limitation in the transmission system, associated switchyard and substations forming part InSTS, as certified by the MSLDC, necessitating reduction in generation, MSLDC shall revise the schedules which shall become effective from the 4thtime block, counting the time block in which the bottleneck in evacuation of power has taken place to be the first one. Also, during the first, second and third time blocks of such an event, the scheduled generation of the generating station shall be deemed to have been revised equal to the actual

generation, and the scheduled drawal of buyers shall also be deemed to have been revised equal to actual drawal.

7. Revision of declared capability by the seller(s) and requisition by the buyers for the remaining period of the day shall also be permitted with a notice. Revised schedules/declared capability in such cases shall become effective from the 6thtime block, counting the time block in which the request for revision has been received by MSLDC to be the first one.

3.5.5 Operating Range for Frequency

The normal operating range for average grid frequency for time block shall be in line with the range stipulated under IEGC and State Grid Code from time to time. No deviation shall be allowed beyond the specified operating range of frequency band by IEGC or the Commission from time to time.

3.6 Principle for DSM

3.6.1 Deviation

For the purposes of deviation settlement amongst State entities, the SLDC shall work out the deviation for 'State Deviation Pool Account' comprising over-drawal/under-drawal and over-injection and under-injection for each State entity corresponding to each scheduling period. The deviation in the actual injection or drawalshall be computed regarding the scheduled injection or scheduled drawal. The FOR-Model DSM Regulations and DSM Regulations of Central Commission defines,

- 'Deviation' in a time-block for Seller = Total actual injection – (*minus*) Total scheduled generation.
- Deviation' in a time-block for Buyer = Total actual drawal - (*minus*)Total scheduled drawal.

The Commission proposes to adopt the same definition for computation of deviation of intra-state entities.

3.6.2 Deviation Volume Limits for Intra-State Entities and Key Considerations

The Central Commission in its Explanatory Memorandum for DSM Regulations, 2014 discussed the necessity to introduce volume limits on the deviation by intra-state entities. The over-injection or under-injection by any seller with reference to its scheduled injection during the time block shall not allowed to exceed certain limits and certain percentage on a daily aggregate basis for all the time blocks, irrespective of grid frequency. Similarly, over-drawal or under-drawal of electricity by any beneficiary or a buyer during time block should not be allowed to exceed certain limits regardingthe scheduled drawal and certain percentage on a daily aggregate basis for all the time blocks, irrespective of grid frequency.

The Central Commission has also outlined conditions regarding levy of additional Deviation Charges to be made applicable for over-drawal or under-injection of electricity for crossing the volume limits for each timeblock, irrespective of grid frequency, at the rates to be specified by the Commission. Further, the Deviation Charges for under-drawal by the buyer or the beneficiaries or over-injection by a generating station or seller in a time block more than the volume limits specified by the Commission, should be made 'zero paisa/kWh, irrespective of grid frequency.

In the absence of volume limit and additional Deviation Charges thereof under DSM, the price signal with UI price vector within the operating frequency range is not sufficient to address over-drawal/under-injections. There is a perverse signal for over-drawal/under-drawal or under-injection/over-injection without any regard to other grid parameters like transfer capability, voltage level, fault levels, etc., which is ignored. The grid failures in the past have made it evident that grid frequency is not the only parameter to be monitored and controlled for grid security. Other grid parameters, such as, transfer capability of transmission lines, voltage, etc., are equally important and required to be watched and controlled.

Large quantum of unscheduled over-drawal/under-drawal even when the frequency is within the normal band can give rise to transmission constraints and jeopardize grid security. 'Frequency is not the only consideration in reliable operation as there can be instances where system frequency is within range and large unscheduled power flows on certain elements can result in catastrophic grid failure."

The Central Commission has also emphasised that the buyers should plan for procurement of power on long-term, medium-term and short-term basis instead of resorting to over-drawal through UI mechanism.

Accordingly, the Central Commission vide its Regulations for DSM has specified the volume limits for inter-state entities presently applicable to the State as a whole. As Maharashtra is RE rich State having RE installed capacity more than 3,000MW, current deviation volume cap for Maharashtra is 12% of its schedule or 250 MW whichever is lower.

Further, FOR Model DSM Regulations also specifies the formulation and conditions for determination of volume limits for intra-state entities as below:

Sr. No.	Parameter	FOR Model DSM Regulations

1	Limits for Deviation	• No over-drawal/under-injection when frequency is below 49.8 Hz.
		• No under-drawal/over-injection when frequency is above 50.05 Hz.
		• Volume cap for intra-state entities proposed as under:
		  • For generators/sellers: 10 MW or 12% of schedule, whichever is lower.
		  • For DISCOMs/buyers: X limit or 12% of schedule, whichever is

Sr. No.	Parameter	FOR Model DSM Regulations
		lower. • In case schedule is less than 40 MW, volume cap of 5 MW or 12% of schedule, whichever is higher. Additional charges at rate of 20%, 40%, 100% of applicable deviation charges in steps of deviation 12%-15%, 15%-20%, >20% or X+10 MW, X+ 20 MW, >X+ 20 MW.

The Commission is of the view that, volume limits of intra-state entities should be such that, the overall deviation of the State should be well within the volume limits specified by the Central Commission. The volume limits specified by the FOR-Model DSM Regulations for intra-state entities can be considered for this purpose.

Accordingly, the Commission has specified the volume limits for intra-state buyers and sellers in the Draft DSM Regulations as below:

Proposed Provisions:

- No over-drawal/under-injection when frequency is below 49.7 Hz.
- No under-drawal/over-injection when frequency is above 50.05 Hz.
- Volume limit for intra-state entities proposed as under:
  - For generators/sellers: 12% of schedule injection or 10 MW, whichever is lower.
  - For DISCOMs/buyers: 12% of schedule drawal or '**X**' MW limit, whichever is lower (linked with Non-Coincident Peak Demand [NCPD] of buyer).
- Additional charges at the rate of 20%, 40%, 100% of applicable Deviation Charges in the steps of deviation —12%-15%, 15%-20%, >20% or X+10 MW, X+ 20 MW, >X+ 20 MW.
- The volume limit of (X) MW for distribution licensee(s) and buyers shall be determined as under:
  i. Minimum of (12% of schedule, (Peak Demand of Distribution Licensee or Buyer/ ∑NCPD) X State Volume Limit).
  ii. Where NCPD represents the sum of Peak Demand of Distribution Licensee(s) and Buyer(s) subject to the condition stipulated under the following sub-clause (iii).
  iii. State volume limit shall be linked to volume limit (1L) applicable to the State as per the CERC (Deviation Settlement Mechanism and related matters) Regulations, 2014 and its amendments thereof.
  iv. Where, peak demand of the distribution licensee shall be recorded as peak demand in the previous financial year or projected peak demand of buyer in ensuing financial year, whichever is higher.

3.7 Need for Zero Crossing and Conditions Thereof

CERC DSM Regulations and FOR Model DSM Regulations specifies the provision of sign change for deviation in either direction continuously for certain time blocks. The CERC DSM Regulations specifies that, the sign of deviation from schedule shall be changed in every 12-time blocks. This would call for corrective action in every 12-time blocks and this would help in dissuading each control area from consistent deviation from schedule in one direction over long periods of time.

Accordingly, it is proposed to provide that each of the intra-state entity such as generating station, beneficiary, buyer or the seller shall make sign of their deviation from schedule changed, at least once, in every12-time blocks. In case of over-drawal to under-drawal and vice versa, continuous over-drawal/under-drawal shall be prohibited. However, it may be preferred to introduce such condition in stages and for Sellers/generating stations to begin with and to Buyers/Distribution licensees over the period, as the technologies for demand response and demand management are introduced into distribution system in wider scale.

Further, this additional condition of 'zero-crossing' for a change in sign of the deviation shall be met once every 12-time blocks by buyer/seller, failing which additional charges @10% of the Deviation Charges applicable shall be levied for the duration of continuance of violation.

To illustrate, if intra-state entity has positive deviation from07:30 hours to 10:30 hours, then it must have negative deviation in the 13thtime block, i.e., 10:30 hours to 10:45 hours.

3.8 Treatment to the Infirm Power and Start Up Power Prior to the CoD

(A) Any infirm injection of power by a generating station prior to CoD of a unit during testing and commissioning activities shall be exempted from the volume limit specified in the Regulations for a period not exceeding six months or the extended time allowed by the Commission in accordance with MERC (Transmission Open Access) Regulations,2016 as amended from time to time.

(B) Any drawal of power by a generating station prior to CoD of a unit for the start-up activities shall be exempted from the volume limit specified in the Regulations, when grid frequency is "49.70 Hz and above".

(C) Any drawal of power by a generating station prior to CoD of a unit for the start-up activities shall be exempted from the levy of additional charges of deviation.

(D) The infirm power injected into the grid by a generating unit during the testing, prior to CoD of the unit shall be paid at charges for deviation for infirm power injected into the grid, consequent to testing, for a period not exceeding six months or the extended time allowed by the Commission in its MERC(Transmission Open Access) Regulations,2016 as amended from time to time, subject to ceiling of Cap Rates [Note:

For the purpose of Draft DSM Regulations, the Cap Rate as per latest MTR Orders have been indicated. However, these Cap Rates could be published /revised through separate Order from time to time instead of notifying through Regulations.] corresponding to the main fuel used for such injection as specified below:

Domestic coal/Lignite/Hydro	[342.5[2]] Paise/ kWh sent out
APM gas as fuel	[232.4[3]] Paise/ kWh sent out up to the date of revision of price of APM gas by Government of India and thereafter, at the rate to be notified by the Commission separately
Imported Coal	[394.3[4]] Paise/ kWh sent out
RLNG	[705.3[5]Paise/ kWh sent out

3.9 DSM Price Vector and Additional Deviation Charges

3.9.1 Deviation Price Vector:

The CERC DSM Regulations specifies the price vector for deviations as below:

- Zero at 50.05 Hz and above
- Rs1.78/ kWh at "50 Hz – 50.01 Hz" (linked to the variable charges of a pit-head thermal (coal fired) station)
- Rs 8.24/kWh "below 49.70 Hz"(linked to the variable charges of the costliest generator (liquid fired).
- The price vector between these frequency bands shall be in steps of 0.01 Hz.

The price vector specified by CERC has two different slopes. Charges for deviation for each 0.01 Hz step is equivalent to 35.60 Paise/kwh in the frequency range of 50.05 to 50.00 Hz, and 20.84 Paise/kWh in frequency range 'below 50 Hz to 'below 49.70 Hz'.

Since, the same price vector is applicable to the State for regional level deviation settlement, the Commission is of the view that, the same price vector may be adopted for computation of Deviation Charges for intra-state entities. Accordingly, the same price vector is adopted and annexed as **Annexure-I** with the Draft Regulations. DSM

[2] Equiv. to highest approved ECR within state for domestic coal as per MTR Order i.e.[MSPGCL Nasik TPS] Case 196 of 2017 Table-8-14/Page 221

[3]Equiv. to highest approved ECR for APM Gas within state as per MTR Order (i.e. TPC-G Unit-5) Case 65 of 2018, Table-289, Pg 280

[4] Equiv. to highest approved ECR for imported coal within state as per MTR Order (i.e. TPC-G Unit-8) Case 65 of 2018, Table-289, Pg 280

[5]Equiv. to highest approved ECR for RLNG within state as per MTR Order (i.e. TPC-G Unit-7) Case 65 of 2018, Table-289, Pg 280

price vector may be revised from time to time to be aligned with the revisions in CERC DSM Regulations, as and when effected. Accordingly, enabling provisions have been provided in the Draft MERC DSM Regulations, which stipulates that, as and when the Central Commission revises its deviation price vector, the same will be applicable for intra-state entities under MERC DSM Regulations.

Regarding the provision of additional Deviation Charges, the Draft MERC DSM Regulations proposes applicability of additional Deviation Charges@10% of the Deviation Charges for the duration of continuance of violation, in case of failure of buyer/seller for change in sign of the deviation once in every 12-time blocks.

It may be noted that, the Deviation of Wind/Solar Generators, shall be treated as per the provisions of the MERC (Forecasting, Scheduling and Deviation Settlement and related matters for Wind and Solar Generation) Regulations, 2018.

3.10 Accounting of Charges for Deviation and Settlement of Deviation Charges

(A) Existing Deviation Pool under Balancing and Settlement Mechanism is Zero-Sum Deviation Pool and balanced in both the energy terms and value terms. Any difference in net payable and net receivable charges in a time block along with DSM charges payable/receivable to the regional pool are apportioned among all SPPs for such a time block based on the rules stipulated under FBSM Order, to arrive State Imbalance Pool as zero sum.
Report on SAMAST has advocated creation of buffer between State Pool and Regional Pool. Relevant extracts of SAMAST recommendation are as under:

> *"Every change or amendment in accounts or settlement at different layer should avoid sending ripple effect across all the seams thus making it an endless turbulence and never-ending accounting puzzle for all the entities. It is also caused by fundamental flaw of frequent truing up exercise to make the account exact and perfect. For instance, few States have a practice of post facto apportionment of metered losses. This make the exercise of energy accounting iterative/recursive and too clumsy to be executed. Seams management is to be appreciated. We need to borrow how financial world handles it. Say for example a change in one wrong entry detected in one vertical of any large group of companies does not demand a change in balance sheet of each of the sub division and the consolidated balance sheet. Similarly, the revision of regional Deviation Energy Account in the super pool should not cause cascading revisions of the Energy Accounts of the States. This should be equally relevant for the National Pool Account or the SAARC Pool Account whenever they are prepared. Adequate buffer/reserves should be maintained in a pool to absorb the ripples in the form of revisions in the super pool. Adequate Payment Security Mechanism should be in place for pool*

credits. Stringent regulatory / legal provisions for entities defaulting in pool payments are required for ensuring adequate deterrence for defaulters.

In addition, creation of 'RE Deviation Pool Account' settlement at State level with the need for socialising the deviations/Errors because of variable RE generation within State, also necessitate creation of the non-Zero-Sum Deviation Pool Account at State level. Thus, the shortfall in RE Deviation Pool Account can be met through surplus in State Deviation Pool Account.

Further, the FOR during its 57th meeting dated 16 December, 2016 emphasised the need for creation of Non-Zero-Sum Deviation Pool at intra-state level to ensure availability of fund for timely payment of regional Deviation Charges for the State.

(B) As discussed above, the Commission is proposing to adopt the Deviation Price Vector in line with that specified by the Central Commission. This Deviation Price Vector with associated conditions are structured to create Non-Zero Sum in the State Deviation Pool Account by designing differential pricing for seller deviation and buyer deviation and capping of generator deviation pricing.

(C) An amount of surplus funds in the State Deviation Pool Account at the end of the financial year shall be utilised for the purpose of improvements in power system operations, for undertaking such measures and studies for improvement in reliability, security and safety of grid operations, undertaking capacity building and training programs related to system operations and market operations and for such other purposes and schemes as may be devised in consultation with National Load Despatch Centre or Regional Load Despatch Centre with prior approval of the Commission. Further, MSLDC shall prepare scheme(s) and shall submit annual plan for utilisation of surplus funds and implement the scheme(s) only upon approval of the Commission.

(D) A statement of charges for deviations including additional charges for Deviation levied under this DSM Framework shall be prepared by MSLDC-Commercial Division (CD) on weekly basis based on the data provided by MSLDC-Operating Division (OD) by the Thursday of the week and shall be issued to all the constituents by next Tuesday, for a period of seven days.

(E) All payments of Charges for Deviation including additional charges for deviation levied under this DSM Framework and interest, if any, received for late payment shall be credited to the funds called the "State Deviation Pool Account", which shall be maintained and operated by MSLDC-CD in accordance with the provisions of MERC DSM Regulations. The Commission may by order, direct any other entity to operate and maintain the respective "State Deviation Pool Account.

3.11 DSM Fund Operationalisation: Utilisation rules, Application of Residual Fund

(A) The Commission has proposed to create "State Deviation Pool Account" as Non-Zero-sum Deviation Pool. Separate books of accounts shall be maintained for the

principal component and interest component of charges for deviation and additional charges for deviation by MSLDC-CD. The State Entities shall comply with statutory requirements of payment of applicable statutory levies, including but not limited to Goods and Service Tax (GST), Tax deduction at source (TDS). The State entities shall also facilitate MSLDC in meeting with the reporting requirements of Statutory Authorities, as necessary.

(B) Regional Deviation Charges are computed by the WRLDC, Regional Deviation Pool Account and Regional Reactive Energy Account is prepared by the Western Regional Power Committee (WRPC) on weekly basis. The claim raised by WRPC shall be settled by MSLDC on behalf of state entities on priority from ‘’State Deviation Pool Account’. MSLDC-CD, while preparing intra-state Deviation Account shall reconcile the payments made to WRPC towards intra-state deviation charges and all other charges paid by MSLDC on behalf of the State.

(C) All payments received in the “State Deviation Pool Account” shall be appropriated in the following sequence:

i. Any cost or expense or other charges incurred on recovery of charges for deviation.

ii. Towards Overdue or penal interest, if applicable.

iii. Towards Normal interest.

iv. Towards Next dues towards Regional Deviation Pool Account.

v. Lastly, towards charges for deviation and additional charges for deviation.

3.12 State Energy Account

(A) The MSLDC shall prepare statement of State Energy Account for each time block for the sellers and buyers on weekly basis. Data required for billing of OA consumers shall be passed on to the billing centre of the distribution licensee by the MSLDC. The billing centre of the distribution licensee shall be responsible for energy accounting, raising and settlement of bills with OA consumers. Payments of capacity and energy charges by the buyers to the sellers shall be as per the provisions in the respective power purchase agreements or agreement(s) with respect to the transactions through power exchange and through short term OA, as the case may be.

(B) Energy Account Statement for deviation settlement of partial OA consumers connected to InSTS and all OA consumers connected to the distribution network shall be in accordance with the provisions of MERC (Transmission Open Access) Regulations, 2016 or MERC (Distribution Open Access) Regulations, 2016.

(C) The State Load Despatch Centre shall be responsible for preparation of weekly deviation charges statement to all the State entities and billing and collection of

deviation charges as specified in the Regulations from the State entities. Provisional State Energy Account and Statements for Deviation Account Settlement should be available for scrutiny and verification by concerned State Entity for specified time period. The same would be finalised within stipulated time period upon addressing comments/discrepancies (if any) in time bound manner. Further, the State Energy Account and Deviation Account Statements shall be available for third party verification and audit on periodic basis and such third party verification/audit shall be carried out at least once a year.

(D) MSLDC shall prepare a detailed energy accounting procedure and upload on its website for stakeholder consultation. MSLDC shall revise the Draft detailed procedure considering the stakeholder's comments and submit for approval of the Commission.

(E) The measurement unit for State Energy Account and State Deviation Pool Account Volume preparation shall be kilowatt hours (kWh). Measurement unit for State Deviation Pool Account Value (payable and receivable) preparation shall be in Indian Rupees (INR). The decimal component of the energy unit (kWh) and amount (INR) shall be rounded off to the nearest integer value. In addition, the interface meters and the state energy account shall capture the reactive energy exchange over interface points, however, the reactive energy pricing framework and compensation for reactive energy exchange shall be dealt with separately.

3.13 Schedule of Payment of Charges for Deviation

(A) The payment of charges for deviation shall have a high priority and the concerned constituent shall pay the indicated amounts within 10 working days of the issue of statement of charges for deviation including additional charges for deviation into the "State Deviation Pool Account".

(B) If payments against the charges for deviation including additional charges for Deviation are delayed by more than two days, i.e., beyond 12 working days from the date of issue of the statement by MSLDC-OD, the defaulting constituent shall pay simple interest @ 0.04% for each day of delay.

(C) All payments to the State entities entitled to receive any amount because of charges for deviation shall be made within two working days of the receipt of payments in the "State Deviation Pool Account". In case of delay in the payment of charges for deviations into the State Deviation Pool Account and interest there on if any, beyond 12 working days from the date of issue of the Statement of Charges for Deviations, the State entities receiving payment for Deviation or interest thereon shall be paid from the balance available in the State Deviation Pool Account. In case the balance available is not sufficient to meet the payment to the state entities, the payment from the State Deviation Pool Accounts shall be made on pro rata basis from the balance available in the Deviation Pool Account.

The liability to pay interest for the delay in payments to the "State Deviation Pool Account" shall remain till the interest is not paid; irrespective of the fact that constituents who have to receive payments, have been paid from the "State Deviation Pool Account" in part or full.

(D) All State entities, which at any time, during the previous financial year failed to make payment of charges for deviation including additional charges for deviation within the time specified in the Regulations shall be required to open a Letter of Credit (LC) equal to 110% of its average payable weekly liability for deviations in the previous financial year, in favour of the MSLDC.

If any State entity fails to make payment of charges for deviation including additional charges for deviation by the time specified by the Commission during the current financial year, it shall be required to open a LC equal to 110% of weekly outstanding liability in favour of State Load Despatch Centre within a fortnight from the due date of payment. LC amount shall be increased to 110% of the payable weekly liability for deviation in any week during the year, if it exceeds the previous LC amount by more than 50%.

Illustration: If the average payable weekly liability for deviation of a State entity during FY 2017-18is Rs. `2.0 Crore, the State entity shall open LC for Rs. 2.2 Crore in FY 2018-19. If the weekly payable liability during any week in FY 2018-19 is Rs. `3.5 Crore which is more than 50% of the previous financial year's average payable weekly liability of Rs. 3.0 Crore, the concerned State entity shall increase the LC amount to Rs. `3.85 Crore (1.1*3.50) by adding Rs. 1.65 Crore.

(E) In case of failure of payment into the "State Deviation Pool Account" within the specified time of 12 working days from the date of issue of statement of charges for deviations, the SLDC shall be entitled to encash the LC of the concerned constituent to the extent of the default and the concerned constituent shall recoup the LC amount within three working days.

3.14 Governance Structure and Institutional Arrangement

(A) The Maharashtra State Power Committee (MSPC) constituted under FBSM Framework shall continue to operate under these MERC DSM Regulations subject to the conditions outlined under these Regulations. However, the Commission proposes to modify the composition of MSPC to include adequate representation of group of State entities representing generators, renewable energy generators, deemed distribution licensee(s) and TOAU. However, such representation in the MSPC shall be through invitation and subject to conduct of business rules to be formulated by MSPC with the approval of the Commission. It is necessary that existing structure of MSPC to be headed by representative of Distribution Licensee(s) through rotation shall continue. However, participation of various other State Entities in the MSPC to represent their suggestions and concerns will have to be addressed. Conduct of

Business Rules for MSPC operations and the business rules for participation of such representative from group of State Entity(ies) can be formulated and put into operation upon approval of the Commission.

As discussed above, MSLDC shall prepare and publish Provisional (Weekly/Monthly) State Energy Account and (Weekly/Monthly) State Deviation Pool Account Statement, which shall be published on its website for scrutiny and review by the State entities. The State entities shall provide comments and suggestions for rectification (if any) within the stipulated period as per the procedures formulated by MSLDC. Upon such scrutiny and rectification (if necessary), (Weekly/Monthly) State Energy Account and (Weekly/Monthly) State Deviation Pool Account Statement as prepared by MSLDC shall be finalised and binding on all the State entities.

The roles, powers and functions of MSPC as outlined under FBSM Framework shall continue to be in operation only to the extent the same are not inconsistent with the provisions under these Regulations. In such cases, the provisions of these Regulations shall apply. The Commission expects advisory or guiding role from MSPC, rather than reviewing the energy accounts and bills for inter-utility exchange of power.

(B) The Role of Maharashtra State Power Committee shall include:

i. Co-ordinate and facilitate the intra-state energy exchange for ensuring optimal utilisation of resources.
ii. Monitor compliance of these Regulations by the State entities and submit annual compliance report in the prescribed format within thirty days from close of financial year.
iii. Guide the SLDC for modification of procedure(s) to address the implementation difficulties, if any.
iv. Provide necessary support and advice to the Commission for suitable modifications/issuance of operating procedures, practice directions, and amendment to provisions of regulations, as may be necessary upon due regulatory process.

3.15 Treatment for Gaming/Curtailment/Despatch

(A) Gaming' in relation to these regulations, shall mean an intentional mis-declaration of declared capacity by any seller to make an undue commercial gain through charge for deviations.

(B) The Commission, either suo-motu or on a petition made by the SLDC, or any affected party, may initiate proceedings against any generating company or seller on charges of gaming and if required, may order an enquiry to be made by such officer of the Commission or such other party as the Commission may deem fit. The enquiry officer so appointed shall submit his findings within such time as may be fixed by the Commission and such investigating officer or authority shall exercise all powers as envisaged under Section 128 of the Act.

(C) If in the proceeding initiated by the Commission or in the enquiry made in this regard under Clause (1) above, it is proved that any generating company or seller has indulged in gaming, the Commission may without prejudice to any other action under the Act or Regulation made thereunder, disallow any charges for deviation to such seller or generating company during the period of such gaming.

4. PREPARATION FOR TRANSITION FROM FBSM TO DSM

4.1 Preparedness of SLDC for Implementation of DSM Framework at State Level

The SAMAST Report endorsed by FOR proposes necessary infrastructure requirement and outlines the conditions for preparedness for the States to implement the DSM at State level. The SAMAST Report categorises all the States into four categories. Maharashtra State falls Under Category 'A', the States, having experience of implementing intra-state Balancing Settlement Mechanism.

The SAMAST Report provides recommendations on various parameters. The key recommendations in Maharashtra's DSM Framework are discussed below:

4.1.1 Metering Infrastructure with AMR Facilities

SAMAST recommends reducing the time block from 15 minutes to 05 minutes which can increase the granularity of deviation measurement and energy accounting. Further, it also recommends that, the all the interface meters should have AMR facility to receive the meter data of all interface points for the processing by energy accounting software.

Since, the State has already implemented the FBSM, the State is having basic preparedness, however, the existing metering infrastructure may be required to upgrade for 05-minute compatibility. Further, all the interface points (G<>T and T<>D) needs to be metered.

The Commission, through its various Orders has directed State Transmission Utility (STU) to undertake time bound programme for providing metering infrastructure for all the interface points for energy accounting. It is also expected that; all the future metering arrangement need to be 05-minute time block compatible and AMR facilities and existing metering infrastructure also needs to be upgraded in time bound manner.

4.1.2 Communication Infrastructure

SAMAST Framework has recommended the requirement of communication infrastructure for meter data transfer using AMR facilities. This communication infrastructure shall be based on the meter location. Remotely located meter data need to be transferred through General Packet Radio Service (GPRS) or fibre optic cable network as the case may be. This will also include redundancy planning in case of failure of either of the communication arrangement. The Commission has directed STU to periodically submit the progress of development of necessary communication arrangement for fetching metering data of all interconnection points to SLDC for energy accounting purpose. STU/MSLDC should submit time-bound action plan within one month from the publication of DSM Regulations and publish monthly progress report covering the status of progress completion of metering and communication infrastructure for identified interface points on its website.

4.1.3 Energy Accounting Software Modification

Since, the State is already implementing Balancing and Settlement Mechanism, as specified under Case No. 42 of 2006, the MSLDC is using loadstar-based software for data processing. However, this software shall be modified and new software may be prepared for scheduling, deviation and energy accounting purpose. This software also needs to be compatible to process the data of regional bills received from WRLDC. The energy accounting software should interact with other modules such as energy accounting of wind and solar generation as specified under MERC (F&S and Deviation Settlement for Wind and Solar generation) Regulations, 2018, OA module and all other related modules.

4.1.4 Billing and Settlement Statement

The existing Billing and Settlement arrangement specified under FBSM shall be continued unless and until it is inconsistent with the provisions of these Regulations.

4.2 Implementation of DSM Framework at State Level in Phases

It is envisaged that upon notification of DSM Regulations through regulatory process, an implementation period of at least up to 12 to15 months including trial operation period would be necessary for various stakeholders to set up necessary components such as institutional, metering, communication and energy accounting before DSM Framework could be rolled out for commercial implementation. Accordingly, the Commission proposes to implement this DSM Framework in phased manner by April 2020, to allow adequate time for all key stakeholders including MSLDC for preparedness and to provide sufficient time to set up necessary hardware/software and to undertake pilot test runs. This would also coincide with the 4thControl Period of MYT Regulations commencing from 01 April, 2020.

Various stages involved from notification of DSM Regulations to its commercial implementation/roll out have been elaborated in the following paragraphs.

4.3.1 Stage-I – Formulation/Amendment of Codes and Preparation of Detailed Procedures

To operationalise the DSM Framework, following documentation shall be put in place including formulation of new code or modification of existing codes as outlined below:

a. Amendment of Balancing and Settlement Code
b. Amendment of Scheduling and Despatch Code
c. Formulation of Detailed Procedure for State Deviation Pool Account Operations
d. Amendment to MoD Guidelines

It is proposed that MSLDC will prepare detailed procedures and formulate necessary amendments to these Code considering the principles and provisions outlined under

MERC DSM Regulations. MSLDC would finalise the same upon detailed stakeholder consultation process. Upon addressing comments/suggestions received through stakeholder consultation process, MSLDC would submit the same to the Commission for its approval.

4.3.2 Stage-II –Establishment Hardware (Metering and Communication) Component

STU in consultation with MSLDC would undertake identification of all intra-state entities and interface points (G<>T and T<>D) across intra-state transmission periphery. Many of these activities have already been completed or at an advanced stage since FBSM Framework is already under operation within State. However, STU/MSLDC shall set up standard procedure/template for addition/modification to list the interface points and corresponding establishment of metering/communication infrastructure at these interface points as the list of intra-state entities keep growing.

STU/MSLDC shall ensure implementation of metering and establishment AMR and communication infrastructure and backend hardware infrastructure incl. data servers for data management and archives. STU/MSLDC should submit time-bound action plan within one month from the publication of DSM Regulations and publish monthly progress report covering the status of progress completion of metering and communication infrastructure for identified interface points on its website.

4.3.3 Stage-III –Establishment Software Component for DSM Framework

Implementation of the intra-state DSM at the State level requires scalable, agile, resilient and redundant software requirements. The software requirements range from scheduling, forecasting, energy accounting, OA, financial accounting and statutory compliance etc. Further, regulatory and user requirements consist of the need for regular updates/changes to the software to adapt to the changes.

DSM Framework implementation would necessitate MSLDC to undertake development and deployment of software using suitable platform broadly covering the following modules through engagement of suitable IT solution/service provider.

- Scheduling software module.
- Open access software module.
- Energy accounting software module.
- Billing and report module.
- Financial accounting and statutory compliance module.
- MIS reporting/data analytics module.

Necessary documentation of Functional Requirement Specification /Software Requirement Specifications in line with the approved principles/conditions outlined under DSM Framework shall be developed, before undertaking the tender process for selection of suitable IT solution/service provider.

4.3.4 Stage-IV –Undertaking Pilot/Run of DSM

Upon establishment of necessary hardware and software platform for implementation of DSM Framework, pilot/test run of the same shall be undertaken before its commercial roll out. The stakeholders shall conduct test runs for the entire cycle of day-ahead scheduling process, real time load-generation balancing, revision of schedule, metering, energy accounting and settlement of energy/deviation accounts for multiple settlement periods on trial run basis. The limitations of process and errors/bugs (if any) noticed through various stages shall be addressed carefully to avoid implementation difficulties and chances of litigation in future.

4.3.5 Stage-V –Modification to Governance Structure/MSPC

The constitution of existing MSPC structure shall be modified to allow wider participation/representation of diverse stakeholder groups such as generators, RE generators, TOAUs, deemed distribution licensees etc. Existing business rules of MSPC enabling such participation for different stakeholder groups shall be undertaken. The forms/formats and protocol for monitoring and reporting of compliance of regulations by the State entities/variance (if any) shall be devised.

5. CONCLUSION AND WAY FORWARD

5.1 Summarising Implementation Roadmap for DSM Framework

5.1.1 The Commission has taken note of submissions made by MSLDC and other stakeholders regarding the need for review/revision of FBSM Framework at State level, undertaken comprehensive review of existing Balancing and Settlement Mechanism operational in the State vide Order in Case 42 of 2006, considering the developments at national level and changing load-generation scenario at State level. The proposed DSM Framework is in line with the Model DSM Framework endorsed by FOR and CERC DSM Regulations and amendments thereof notified by the Central Commission at regional level.

5.1.2 It is envisaged that an implementation period of 12 months including trial operation period would be necessary for various stakeholders to set up necessary components such as institutional, metering, communication and energy accounting before DSM Framework could be rolled out for commercial implementation. Accordingly, the Commission proposes to implement this DSM Framework in phased manner by April 2020, to allow adequate time for all key stakeholders include MSLDC for preparedness and to provide sufficient time for setting up hardware/software and pilot test run. This would also coincide with the 4thControl Period of MYT Regulations commencing from 01 April, 2020.

5.2 Next Steps and Way Forward for Regulatory Process

5.2.1 This DSM Framework proposes enabling provisions linking with DSM Regulations as may be amended from time to time by the Central Commission. As and when the Central Commission revises the provisions like operational frequency band, number of allowable revisions for scheduling, linkage of DSM price vector to DAM, enabling real time/intra-day market operations, introduction of gate closure concept etc. the same can be made applicable with suitable modification/adoption through the MERC DSM Regulations upon due regulatory process.

5.2.2 The DSM Framework elaborated in this Explanatory Note is proposed to be introduced through the formulation of MERC DSM Regulations upon due regulatory consultation process. Upon notification, it is envisaged that MSLDC shall develop Scheduling and Despatch Code, Balancing and Settlement Code along with detailed procedures for operationalising MERC DSM Regulations and detailing out the implementation aspects in line with the principles outlined under DSM Regulations.