

# CENTRAL ELECTRICITY REGULATORY COMMISSION

## Draft Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024

### EXPLANATORY MEMORANDUM

#### Contents

<b>1. Background:</b> .....	2
<b>2. Expert Committee Recommendation:</b> .....	3
<b>3. Normal Rate of Charges for Deviation (NR) .....</b>	5
<b>4. Deviation charges for Sellers (generators).....</b>	7
<b>5. DSM Framework for Standalone Energy Storage System.....</b>	19
<b>6. Deviation Charges for Buyers:.....</b>	21
<b>7. Grid Security Charge.....</b>	30

## 1. Background:

1.1 The Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2022 (DSM Regulation, 2022) were notified on 14<sup>th</sup> March, 2022 which came into force with effect from 5<sup>th</sup> December 2022. After the DSM Regulations, 2022 were brought into force from 05.12.2022, the Commission regularly monitored the implementation of the DSM Regulations 2022 and observed that while the number of frequency excursions decreased, frequency fluctuations outside the operative band increased. While various players sought to align themselves with the new system put in place by the DSM Regulations, 2022, many states were not responding to bring frequency back into the operating band but rather continued under-drawal in high frequency periods and over-drawal in low-frequency periods. In the wake of the operational experience post 05.12.2022, the Commission issued directions on 26.12.2022 vide suo motu orders in Petition No. 16/SM/2022 stipulating inter-alia certain regulatory measures to contain frequency within the operating band and reduce wide frequency fluctuations.

1.2 The Commission also held detailed deliberations with the Stakeholders, including the regional generating stations, renewable energy associations, etc, on the operational experience. The Commission received operational feedback from Grid-India highlighting inter-alia the high and low frequency events and the status of primary, secondary and tertiary response from the regional generators while detailing the efforts to procure SRAS and RRAS to maintain frequency within the operative band. In the wake of operational experience and the feedback received from the stakeholders, the Commission, as an interim measure, issued further directions vide suo-motu orders in Petition No. 01/SM/2023, dated 06.01.2023 stipulating inter-alia certain regulatory measures by superseding the previous order in Petition No. 16/SM/2022.

1.3 The Commission also introduced High-Price Day Ahead Market (HP-DAM) in the Integrated Day Ahead Market (I-DAM) segment on its platform. This move aimed to enable high variable cost generators to participate, who might otherwise be unable to engage in the Day Ahead Market (DAM) due to their generation costs surpassing the prevailing price

ceiling in the I-DAM segment. With the introduction of the High Price Day Ahead Market (HP-DAM) in the Power Exchange and the revision in the price ceiling in various market segments in Power Exchanges, the Commission partially modified the directions issued in Petition No. 1/SM/2023 for treatment of deviation charges of seller whose bid is cleared in the HP-DAM market. In tandem with this, the Commission also adjusted the Normal Rate of Charge for Deviation to correspond with that of HP-DAM. This alignment prevents any potential arbitrage between HP-DAM and the DSM, ensuring consistency and coherence across different market mechanisms.

1.4 Frequency excursions revealed, inter alia inadequate primary response from the generators through their governors as mandated under the IEGC. Further, a secondary response through AGC was expected to correct the area control error (ACE), which has an element of both frequency control and tie-line flow control. The performance of neither was satisfactory as reflected in the Grid-India report and revealed from interaction with the generators and other stakeholders. The inadequate performance of both primary and secondary response mechanisms highlighted the need for a detailed investigation into the root causes. To address this, the Commission formed a high-level committee of experts tasked with conducting a thorough analysis of the performance of grid-connected buyers and sellers to ensure smooth and secure grid operation. The scope of work outlined for the Expert Committee included behavioural analysis of regional entities, a review of the adequacy of reserves, and an examination of design-related issues concerning the DSM.

## **2. Expert Committee Recommendations**

2.1 The Expert Committee (EC) conducted a thorough analysis of the Deviation Settlement Mechanism (DSM) to identify areas for improvement and fine-tuning the design of the DSM framework. The Committee observed that the existing pricing structure within the DSM was asymmetric, which led to perverse incentives and distorted behaviour of the market participants. This resulted in inefficient outcomes and undermined the effectiveness of the DSM. The Committee also noted that the DSM was over-incentivizing deviation from scheduled transactions, which could discourage market participants from actively participating in Ancillary Services (AS). Over-reliance on DSM incentives for deviation led to suboptimal grid operation and increased risks to grid stability. There was also a concern that the DSM might be perceived as another market mechanism rather than a tool for ensuring grid stability. This could lead to unintended consequences and undermine the

primary objectives of the DSM. The Committee further identified that generators were not providing adequate primary and secondary responses as required by the Indian Electricity Grid Code (IEGC). This lack of response could aggravate frequency deviations and impact grid stability.

### **Fine-tuning of the key Design of DSM Framework**

2.2 The Expert Committee (EC) recommended key design considerations for the DSM framework with a view to improving grid security, stability and flexibility in system operation and implementing a more balanced and symmetrical pricing structure within the DSM.

2.3 For General Sellers and Buyers, the deviation charges are graded within the operative frequency band, i.e., 49.90 Hz to 50.05 Hz. However, beyond the operative band, the deviation charges are kept flat irrespective of frequency. Further, graded deviation charges are limited to the initial volume limit of respective buyers and sellers beyond which the charges are proposed in such a way that any further deviation would be discouraged in order to promote the participation of such entities in the Ancillary Services Mechanism instead of relying on the grid.

2.4 Another crucial design aspect involves adjusting incentives within the DSM to prevent over-incentivizing deviations from scheduled transactions. This adjustment aims to promote adherence to schedules and encourage active participation in Ancillary Services. The key design ensures that the DSM remains focused on its primary objective of ensuring grid stability and is not perceived or utilized as another market mechanism with unintended consequences. The key design also incorporates provisions to capture the operation of generators in the FGMO as per the IEGC, 2023. This ensures compliance with grid operation requirements and enhances grid stability. In accordance with the aforementioned principles, the Expert Committee provided recommendations on the design aspects of the Deviation Settlement Mechanism (DSM).

2.5 The link provided <https://cercind.gov.in/2024/reports/DSM-Expert-Committee-Report-Final-with-Appendix.pdf> grants access to a comprehensive report prepared by the Expert Committee. This report delves into the reasoning and detailed explanation behind the various design aspects of the DSM framework. It offers thorough insights and analyses the principles guiding the design considerations, as well as the rationale for the proposed

recommendations. This serves as a valuable source of information for understanding the intricacies of the DSM framework and the thought process behind its development.

2.6 In this backdrop, based on the Expert Committee recommendations, the Central Electricity Regulatory Commission (hereafter referred to as “the Commission”) notified the Draft Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024 on April 30, 2024. These regulations aim to address the challenges identified in previous regulatory frameworks and improve the management of the electricity grid. The primary objective of these regulations is to ensure grid security and stability through a commercial mechanism. This mechanism is designed to encourage users of the grid, such as generators and consumers, to adhere to their scheduled patterns of electricity drawal and injection. By adhering to these schedules, grid operators can better manage the balance between electricity supply and demand, thus minimizing the grid instability and blackouts. The regulations establish a framework for the DSM and related matters, providing guidelines and procedures for managing deviations from scheduled electricity transactions. This includes mechanisms for calculating and settling deviations, as well as penalties or incentives for users based on their compliance with scheduled transactions.

2.7 The salient features of the proposed DSM Regulations are discussed in subsequent paragraphs.

### **Draft CERC (Deviation Settlement Mechanism and Related Matters) Regulations, 2024**

### **3. Normal Rate of Charges for Deviation (NR)**

3.1 As stipulated in the interim Order dated 06.02.2023 in Petition No. 01/SM/2023, the Normal Rate of Charges for Deviations for a time block is estimated as equal to the higher of [the weighted average ACP of the Day Ahead Market segments of all the Power Exchanges; and the weighted average ACP of the Real Time Market segments of all the Power Exchanges, for that time block] subject to a ceiling of Rs 12 per kWh, until further orders.

3.2 Subsequently, in view of the introduction of the High Price DAM segment, the Commission further revised the Normal Rate of Deviation charges for sellers cleared in the HP-DAM market as follows:

*“The Normal Rate of Charges for Deviation by way of ‘under-injection’ for a time block shall be equal to the highest of [the weighted average ACP of the HP-DAM Market segments of all the Power Exchanges; or the weighted average ACP of the Day Ahead Market segments of all the Power Exchanges; or the weighted average ACP of the Real Time Market segments of all the Power Exchanges, for that time block] for the quantum of power sold through HP-DAM.”*

3.3 The EC, in its recommendations proposed two alternatives for the estimation of the Normal Rate of Charges for Deviation for consideration of the Commission. While one alternative was to consider the Normal Rate of Charges for Deviation (NR) as the weighted average of ACPs of all the collective transactions in the Power exchanges (namely Integrated-DAM and RTM) and Ancillary Service charges based on the total quantum of deployment in paise /kWh, another alternative was to consider summation of ACP of IDAM, RTM and Ancillary Services with equal weightage to all.

3.4 The recommendations of the EC are reproduced below for ready reference:

*“The Normal Rate (NR), for a particular time-block, shall be equal to the Weighted Average of:*

*(a) ACP (in paise/kWh) of the Integrated-Day Ahead Market segments of all the Power Exchanges;*

*(b) ACP (in paise/kWh) of the Real Time Market segments of all the Power Exchanges;*

*(c) Ancillary Service Charge (in paise/kWh) computed based on the total quantum of Ancillary Services deployed and the net charges payable to the Ancillary Service Providers for all the Regions:*

*Provided further that in case of non-availability of ACP for any time block on a given day, ACP for the corresponding time block of the last available day shall be considered.*

*Provided further that in case of no despatch of Ancillary services in a time block or net charges for Ancillary services (due factoring Up and Down cost) is receivable in Deviation and Ancillary Service Pool Account, in that case Ancillary Service Charge and volume shall not be considered for computation of Normal Rate (NR).”*

*Alternatively,*

*“In order to capture the impact of Ancillary despatch in a time block, it is proposed that the Normal Rate (NR), for a particular time-block, shall be equal to the:*

- (a) ACP (in paise/kWh) of the Integrated-Day Ahead Market segments of all the Power Exchanges (1/3rd weight)
- (b) ACP (in paise/kWh) of the Real Time Market segments of all the Power Exchanges (1/3rd weight)
- (c) Ancillary Service Charge (in paise/kWh) computed based on the total quantum of Ancillary Services deployed and the net charges payable to the Ancillary Service Providers for all the Regions (1/3rd weight)

*Provided further that in case of no despatch of Ancillary services in a time block or net charges for Ancillary services (due factoring Up and Down cost) is receivable in Deviation and Ancillary Service Pool Account, in that case Ancillary Service Charge and volume shall not be considered for computation of Normal Rate (NR).” Further 50% weight shall be considered for ACP (in paise/kWh) of the Integrated-Day Ahead Market segments and 50% weight shall be ACP (in paise/kWh) of the Real Time Market segments of all the Power Exchanges.”*

3.5 As a natural corollary to the philosophy that the system imbalance is to be managed by the system operator through the deployment of ancillary services, the charges for deviation that causes an imbalance in the system should be such that the cost of deployment of ancillary services is recovered. Accordingly, the Commission deliberated on both the alternatives proposed by the EC and decided to adopt a second alternative with equal weightage to all three components in order to capture the impact of the Ancillary Service deployment.

#### **4. Deviation charges for Sellers (generators)**

##### **For General Seller other than a ROR generating station or a generating station based on municipal solid waste or WS seller**

4.1 The deviation charges for general sellers (generators) were relaxed through an interim order of the Commission dated 06.02.2023 in Petition No. 01/SM/2023. As per the said Order, a general seller has one volume limit of less than of 10% D<sub>GS</sub> or 100 MW for over injection (OI), and two limits of less than 10% D<sub>GS</sub> or 100 MW, 15% of D<sub>GS</sub> or 150 MW, and beyond for under injection (UI). D<sub>GS</sub> being Deviation of a general seller in percentage (%) as referred in the Order dated 06.02.2023.

4.2 Further, as per the said Order, the charges for deviation for a general seller are constant within different frequency ranges ('f') i.e. i)  $49.95 \text{ Hz} \leq f \leq 50.03 \text{ Hz}$ , ii)  $49.90 \text{ Hz} < f < 49.95 \text{ Hz}$ , iii) below  $49.90 \text{ Hz}$  iv)  $50.03 \text{ Hz} < f < 50.05 \text{ Hz}$  and v) above  $50.05 \text{ Hz}$ . The relevant provision for deviation charges for a general seller is reproduced below for ready reference:

**Table 1: Charges for Deviation for a General Seller as per Order dated 06.02.2023**

<i>Entity</i>	<b>Charges for deviation payable to Deviation and Ancillary Service Pool Account ( For <math>49.95 \text{ Hz} \leq f \leq 50.03 \text{ Hz}</math> )</b>	
<i>Seller</i>	<b>Deviation by way of over injection</b>	<b>Deviation by way of under injection</b>
<i>For a general seller other than an RoR generating station or a generating station based on municipal solid waste</i>	<i>Zero: Provided that such seller shall be paid back for over injection @ the reference charge rate for deviation upto [10% D<sub>GS</sub> or 100 MW, whichever is less].</i>	<i>(i) @ the reference charge rate up to [10% D<sub>GS</sub> or 100 MW, whichever is less];  (ii) @ 120% of the normal rate of charges for deviation by way of under injection beyond [10% D<sub>GS</sub> or 100 MW, whichever is less] and up to [15% D<sub>GS</sub> or 150 MW, whichever is less];  and  (iii) @ 150% of the normal rate of charges for deviation beyond [15% D<sub>GS</sub> or 150MW, whichever is less].</i>

Note: D<sub>GS</sub> means Deviation- general seller (in %)

When  $f < 49.95 \text{ Hz}$

- (a) The general seller other than an ROR generating station or a generating station based on municipal solid waste shall be paid back for deviation by way over injection (i) @ 120% of reference charge rate when  $[49.90 \text{ Hz} < f < 49.95 \text{ Hz}]$ ; and (ii) @ 150% of reference charge rate when  $[f \leq 49.90]$ ;
- (b) The general seller other than an ROR generating station or a generating station based on municipal solid waste shall pay for deviation by way under injection (i) @ 150% of reference charge rate or @ 120% of the normal rate of charge for deviation, whichever



is higher, when  $[49.90 < f < 49.95]$ ; and (ii) @ 200% of reference charge rate or @ 150% of the normal rate of charge for deviation, whichever is higher, when  $[f \leq 49.90]$ ;

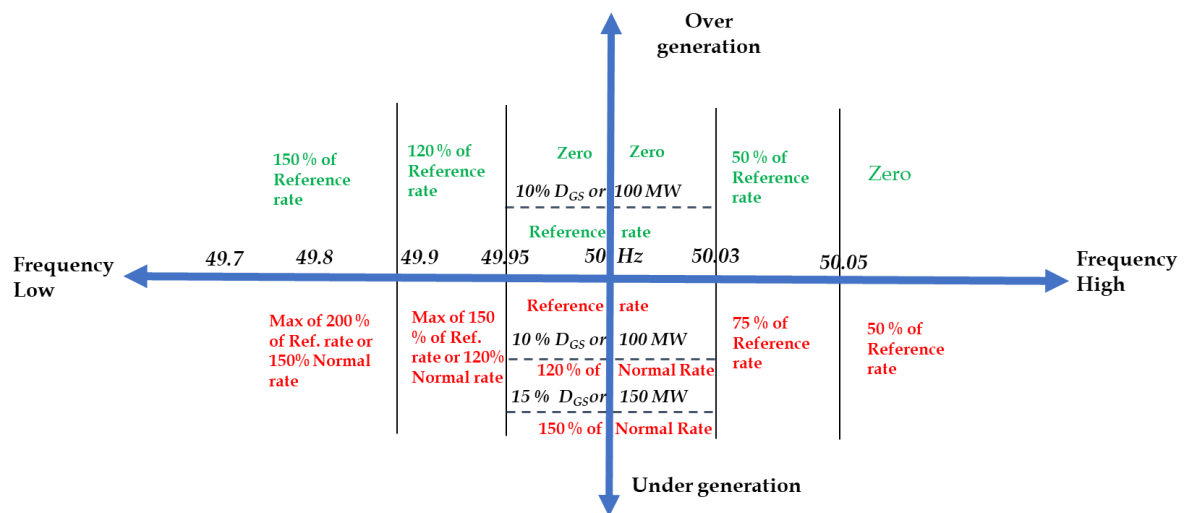
When  $f > 50.03$  Hz

(a) The general seller other than an ROR generating station or a generating station based on municipal solid waste shall be paid back for deviation by way over injection (i) @ 50% of reference charge rate when  $[50.03 < f < 50.05]$ ; and (ii) @ zero when  $[f \geq 50.05]$ ;

The general seller other than an ROR generating station or a generating station based on municipal solid waste shall pay for deviation by way under injection (i) @ 75% of reference charge rate, when  $[50.03 < f < 50.05]$ ; and (ii) @ 50% of reference charge rate, when  $[f \geq 50.05]$ ”

4.3 The following figure depicts the deviation charges for a general seller for deviation by way of over injection (OI) or under injection (UI) as per the existing DSM Regulations, 2022 and subsequent Order dated 06.02.2023 in Petition No. 01/SM/2023.

**Figure-1 DSM framework for a general seller – Order dt. 06.02.2023**

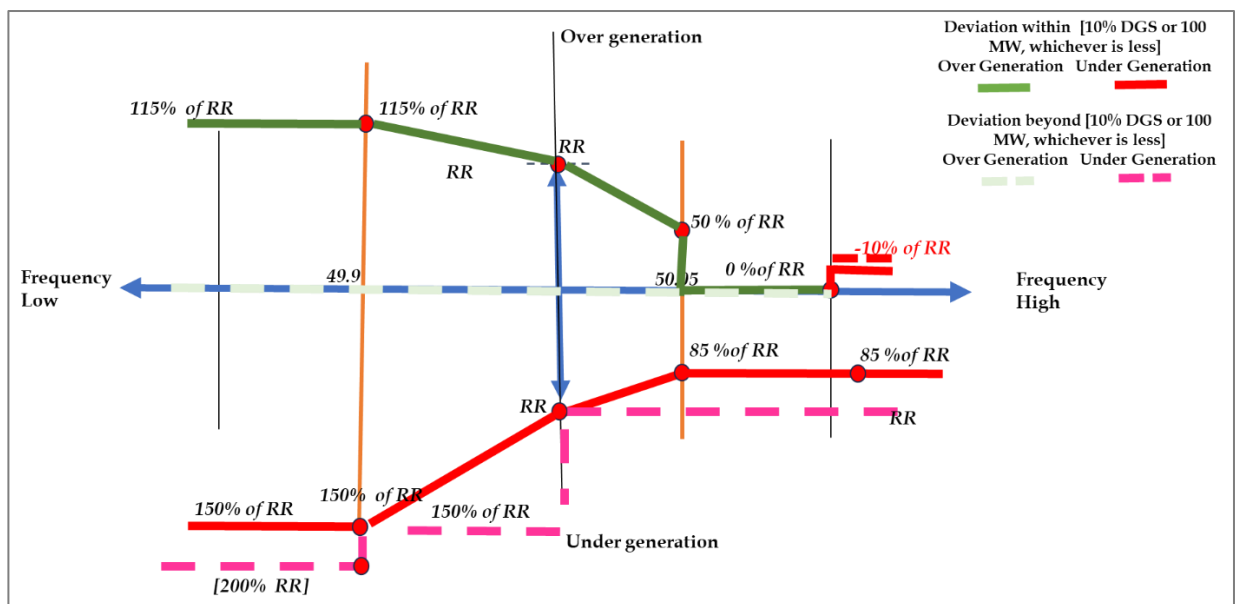


4.4 The EC observed that the deviation charges for a general seller have a certain asymmetry in the pricing structure. Within the frequency range of (49.95 Hz to 50.03 Hz), a general seller has only one volume limit of [10%  $D_{GS}$  or 100MW, whichever is less] while for under injection, there are two volume limits [i.e. (10%  $D_{GS}$  or 100MW, whichever is less) and (15%  $D_{GS}$  or 150MW, whichever is less)]. For a general seller, deviation by way of under injection

within a frequency range of (49.95 Hz to 50.03 Hz) is charged at reference rate (RR) upto [10% D<sub>GS</sub> or 100MW, whichever is less], however beyond this volume limit, at normal rate of charge (NR). Further, it was observed that outside the frequency range of (49.95 Hz to 50.03 Hz) incentive and disincentive are provided without any volume limits. For a general seller, an incentive at 150% of the reference rate when system the frequency is below 49.90 Hz might encourage the generator to support system frequency through DSM rather than through Ancillary Service Mechanism.

4.5 In view of the above observations, the EC recommended that for General Sellers, the deviation charges could be graded within the operative frequency band i.e. 49.90 Hz to 50.05 Hz; however, beyond the operative band, the deviation charges can be kept flat irrespective of frequency. Further, graded deviation charges could be limited to the initial volume limit of respective sellers beyond which the charges could be proposed in such a way that any further deviation would be discouraged in order to promote the participation of such entities in the Ancillary Services Mechanism instead of relying on the grid. Accordingly, the EC recommended charges for deviation for a general seller as depicted below:

**Figure-2 DSM framework for a general seller – Expert Committee Recommendations**



4.6 For ‘**General Seller**’, deviation charges are proposed such that a general seller would receive or get paid at its reference rate (RR) when the system frequency is at 50.00 Hz. **Over injection** by a general seller **at high frequency** needs to be discouraged. Accordingly, the seller should receive payment less than its RR such that the rate of deviation charge becomes zero when the frequency increases to 50.05 Hz and would remain zero till 50.10 Hz. Beyond the very high frequency of 50.10 Hz, a flat penalty or negative pricing has been proposed in which the seller has to pay back to the pool at 10% of its RR. While these charges are for deviation within volume limit (VL1), there are no charges receivable for deviation beyond VL1 for a general seller, except for very high frequencies beyond 50.10 Hz where a general seller would be penalized at 10% of RR for over injection.

4.7 **Over injection** by general sellers during low frequency is supportive for the grid and hence has been appropriately incentivized while avoiding any over-incentive, in order to encourage participation in Ancillary Service Mechanism. Accordingly, EC recommended that the rate of deviation charges would increase with decrease in system frequency in such a way that it becomes 115% of RR at 49.90 Hz and would stay constant at 115% of RR thereafter, as long as the deviation is within its volume limit. Beyond the volume limit, a general seller would be paid zero charges for any deviations by way of over injection.

4.8 For **Under injection** by a general seller, the EC recommended that such seller would pay into the pool @ RR at 50 Hz and charges would gradually decrease to 85% of RR when the system frequency is at 50.05Hz, staying flat at 85% thereafter. While this is within volume limit of [10% D<sub>GS</sub> or 100 MW, whichever is less] (i.e. VL1), it is proposed that such seller would pay at RR for any deviation beyond the volume limit (beyond VL1) for frequency greater than 50.00Hz. Within volume limit, by paying back into the pool at less than RR when system frequency in a 15 minute time block is higher than 50 Hz, there is an indirect incentive for the seller.

4.9 For deviation by way of **under -injection** by a general seller, within volume limit (1) [i.e. VL (1)], the EC recommended that such charges for deviation would gradually increase to 150% of RR when the system frequency is at 49.90Hz and below 49.90Hz charges would remain flat at 150% of RR. This is to discourage any under-injection at **low system frequency**. For any deviation beyond VL (1) the charges would be flat in different frequency ranges but relatively higher than that of VL (1) (e.g. @ 200% of RR when frequency is below 49.90 Hz), so that such seller is encouraged to participate in the Ancillary Service Mechanism

rather than on the DSM. The Deviation charges for a general seller are depicted in the schematic below for easy reference.

4.10 The Commission has accepted the recommendations of the EC and accordingly, proposed the following deviation charges for a general seller for deviation by way of over injection or under injection:

**Table-2: Deviation charges for a general seller other than an RoR generating station or a generating station based on municipal solid waste or WS seller**

<b>Deviation by way of over injection (Receivable by the Seller)</b>	<b>Deviation by way of under injection (Payable by the Seller)</b>
<b>(I) For Deviation up to [10% D<sub>GS</sub> or 100 MW, whichever is less] and <math>f</math> within <math>f_{band}</math></b>	
(i) @ RR when $f = 50.00$ Hz	(iv) @ RR when $f = 50.00$ Hz
(ii) When $[50.00 \text{ Hz} < f \leq 50.05 \text{ Hz}]$ , for every increase in $f$ by 0.01 Hz, charges for deviation for such seller shall be reduced by 10% of RR so that charges for deviation become 50% of RR when $f = 50.05$ Hz	(v) When $[50.00 \text{ Hz} < f \leq 50.05 \text{ Hz}]$ , for every increase in $f$ by 0.01 Hz, charges for deviation for such seller shall be reduced by 3% of RR so that charges for deviation become 85% of RR when $f = 50.05$ Hz
(iii) When $[49.90 \leq f < 50.00 \text{ Hz}]$ , for every decrease in $f$ by 0.01 Hz, charges for deviation for such seller shall be increased by 1.5% of RR so that charges for deviation become 115% of RR when $f = 49.90$ Hz	(vi) When $[49.90 \leq f < 50.00 \text{ Hz}]$ , for every decrease in $f$ by 0.01 Hz, charges for deviation for such seller shall be increased by 5% of RR so that charges for deviation becomes 150% of RR when $f = 49.90$ Hz
<b>(II) For Deviation up to [10% D<sub>GS</sub> or 100 MW, whichever is less] and <math>f</math> outside <math>f_{band}</math></b>	
(i) @ zero when $[50.05 \text{ Hz} < f < 50.10 \text{ Hz}]$ : Provided that such seller shall pay @ 10% of RR when $[f \geq 50.10 \text{ Hz}]$	(iii) @ 85 % of RR when $[f > 50.05 \text{ Hz}]$
(ii) @ 115 % of RR when $[f < 49.90 \text{ Hz}]$	(iv) @ 150 % of RR when $[f < 49.90 \text{ Hz}]$
<b>(III) For Deviation beyond [10% D<sub>GS</sub> or 100 MW, whichever is less] and <math>f</math> within and outside <math>f_{band}</math></b>	
(i) such seller shall be paid back @ zero when $(f < 50.10 \text{ Hz})$ : Provided that such seller shall pay @ 10% of RR when $[f \geq 50.10 \text{ Hz}]$	(ii) such seller shall pay @ RR when $[f \geq 50.00 \text{ Hz}]$ ; @ 150% of RR when $[49.90 \text{ Hz} \leq f < 50.00 \text{ Hz}]$ ; and @ 200% of RR when $[f < 49.90 \text{ Hz}]$

*Note: system frequency =  $f$  and  $f_{band} = [49.90 \text{ Hz} \leq f \leq 50.05 \text{ Hz}]$*

**For General Seller being an ROR generating station**

4.11 The deviation charges for a general seller being ROR generating station were relaxed through interim order of the Commission dated 06.02.2023 in Petition No. 01/SM/2023. As per the said Order, for a general seller being ROR generator, deviation charges by way of over injection or under injection are as follows:

**Table 3: Charges for Deviation for a General Seller being ROR generating station as per Order dated 06.02.2023**

<i>Entity</i>	<i>Charges for deviation payable to Deviation and Ancillary Service Pool Account</i>	
<i>Seller</i>	<i>Deviation by way of over injection</i>	<i>Deviation by way of under injection</i>
<i>For a general seller being an RoR generating station</i>	<i>Zero:  Provided that such seller shall be paid back for over injection @ the reference charge rate for deviation upto [10% D<sub>GS</sub> or 100 MW, whichever is less].</i>	<i>(i) @ the reference charge rate up to [10% D<sub>GS</sub> or 100 MW, whichever is less];  (ii) @ the normal rate of charges for deviation by way of under injection beyond [10% D<sub>GS</sub> or 100 MW, whichever is less] and up to [15% D<sub>GS</sub> or 150 MW, whichever is less];  and  (iii) @ 110% of the normal rate of charges for deviation beyond [15% D<sub>GS</sub> or 150 MW, whichever is less].</i>

4.12 The EC observed that charges for deviation for a general seller being ROR generating station shifts from reference rate (RR) to the normal rate of charge (NR) for under injection. The EC recommended linking the deviation charges for a general seller being ROR generating station with only reference rate while continuing delinking such charges from the system frequency. The Commission accepted the recommendation of the EC and proposed charges for deviation for a general seller being ROR generating station as follows:

**“Regulation 8.2: Charges for Deviation, in respect of a general seller being an RoR generating station shall be without any linkage to grid frequency, as under**

<b><i>Deviation by way of over injection (Receivable by the Seller)</i></b>	<b><i>Deviation by way of under injection (Payable by the Seller)</i></b>
<p>(i) @ RR for deviation up to [10% D<sub>GS</sub> or 100 MW, whichever is less];</p> <p>(ii) @ Zero for deviation beyond [10% D<sub>GS</sub> or 100 MW, whichever is less]</p>	<p>(iii) @ RR for deviation up to [10% D<sub>GS</sub> or 100 MW, whichever is less];</p> <p>(iv) @ 105% of RR for deviation beyond [10% D<sub>GS</sub> or 100 MW, whichever is less] and up to [15% D<sub>GS</sub> or 150 MW, whichever is less];</p> <p>(v) @ 110% of RR for deviation beyond [15% D<sub>GS</sub> or 150 MW, whichever is less].</p>

**For General Seller being a generating station based on municipal solid waste**

4.13 The deviation charges for a general seller being a generating station based on municipal solid waste were specified through the Commission Order dated 06.02.2023 in Petition No. 01/SM/2023. As per the said Order, for a general seller being a generating station based on municipal solid waste, deviation charges by way of over injection or under injection are as follows:

***Table 4: Charges for Deviation for a General Seller being a generating station base on Municipal Solid Waste as per Order dated 06.02.2023***

<b><i>Entity</i></b>	<b><i>Charges for deviation payable to Deviation and Ancillary Service Pool Account</i></b>	
	<b><i>Deviation by way of over injection</i></b>	<b><i>Deviation by way of under injection</i></b>
<b><i>For a general seller being a generating station based on municipal solid waste</i></b>	<p><b><i>Zero:</i></b></p> <p><b><i>Provided that such seller shall be paid back for over injection up to [20% D<sub>GS</sub>] @ contract rate, or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block.</i></b></p>	<p><b><i>(i) Zero up to [20% D<sub>GS</sub>]:</i></b></p> <p><b><i>Provided that such seller shall pay back for the shortfall in energy against its schedule in any time block due to under injection up to [20% D<sub>GS</sub>] @ 50% of the contract rate, or in the absence of a contract rate, @ 50% of the weighted average ACP of the Day Ahead Market segments of</i></b></p>

		<p><i>all Power Exchanges for the respective time block;</i></p> <p><i>and</i></p> <p><i>(ii) @ normal rate of charges for deviation beyond [20% D<sub>GS</sub>].</i></p>
--	--	---

4.14 The EC recommended to continue with the deviation charges in respect of a general seller being a generating station based on municipal solid waste in line with the Commission order dated 06.2.2023 in Petition No. 01/SM/2023 with the only change of shifting the normal rate of charge to reference rate for deviation beyond 20% D<sub>GS</sub> in case of under injection. The Commission accepted the recommendation of the EC and has proposed the same charges for deviation for a general seller being a generating station based on municipal solid waste as follows:

***“Regulation 8.3***

*Charges for Deviation, in respect of a general seller being a generating station based on municipal solid waste shall be without any linkage to grid frequency, as under:*

<b><i>Deviation by way of over injection (Receivable by the Seller)</i></b>	<b><i>Deviation by way of under injection (Payable by the Seller)</i></b>
<p><i>(i) @ contract rate for deviation up to [20% D<sub>GS</sub>];</i></p> <p><i>(ii) @ Zero for deviation beyond [20% D<sub>GS</sub>];</i></p>	<p><i>(iii) @ 50% of contract rate for deviation up to [20% D<sub>GS</sub>];</i></p> <p><i>(iv) @ RR for deviation beyond [20% D<sub>GS</sub>].</i></p>

**For WS Seller being a generating station based on wind or solar or hybrid of wind –solar resources**

4.15 The deviation charges for a WS seller based on wind or solar or hybrid of wind- solar resources were relaxed through the Commission Order dated 06.02.2023 in Petition No. 01/SM/2023. As per the said Order, for a WS seller based on wind or solar or hybrid of wind- solar resources, deviation charges by way of over injection or under injection are as follows:

**Table 5: Charges for Deviation for WS Seller as per Order dated 06.02.2023**

<b>Entity</b>	<b>Charges for deviation payable to Deviation and Ancillary Service Pool Account</b>	
<b>Seller</b>	<b>Deviation by way of over injection</b>	<b>Deviation by way of under injection</b>
<p><i>For WS seller being a generating station based on solar or hybrid of wind –solar resources</i></p>	<p><i>Zero: Provided that such seller shall be paid back for over injection as under: (i) @ contract rate, or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block, up to [10% Dws]; and (ii) @ 90% of the contract rate, or in the absence of a contract rate, @ 90% of the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block for deviation beyond [10% Dws ] and up to [15% Dws]</i></p>	<p><i>i) Zero up to [10% Dws] and (ii) @ 10% of contract rate or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block for deviation beyond [10% Dws] and up to [15% Dws] and (iii) @ 50% of contract rate or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block for deviation beyond [15% Dws]:  Provided that such seller shall pay back for the total shortfall in energy against its schedule in any time block due to under injection, @ the contract rate, or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges, for the respective time block.</i></p>



<p><i>For WS seller being a generating station based on wind resource</i></p>	<p><i>Zero:</i></p> <p><i>Provided that such seller shall be paid back for over injection as under:</i></p> <p><i>(i) @ contract rate, or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block, up to [15% D<sub>ws</sub>];</i></p> <p><i>and</i></p> <p><i>(ii) @ 90% of the contract rate, or in the absence of a contract rate, @ 90% of the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block for deviation beyond [15% D<sub>ws</sub>] and up to [20% D<sub>ws</sub>].</i></p>	<p><i>(i) Zero up to [15% D<sub>ws</sub>]</i></p> <p><i>and</i></p> <p><i>(ii) @ 10% of contract rate or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block for deviation beyond [15% D<sub>ws</sub>] and up to [20% D<sub>ws</sub>]</i></p> <p><i>and</i></p> <p><i>(iii) @ 50% of contract rate or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block for deviation beyond [20% D<sub>ws</sub>]:</i></p> <p><i>Provided that such seller shall pay back for the total shortfall in energy against its schedule in any time block due to under injection, @ the contract rate, or in the absence of a contract rate, @ the weighted average ACP of the Day Ahead Market segments of all Power Exchanges, for the respective time block.</i></p>
---	---	--

*Note: D<sub>ws</sub> means Deviation-WS seller (in %)*

4.16 The EC observed that the current dispensation (as per Order dt. 06 February 2023) has volume limit of 10% D<sub>ws</sub> for solar and 15% D<sub>ws</sub> for wind, going up to 15% D<sub>ws</sub> for solar and 20% D<sub>ws</sub> for wind. For intermittent sources like wind and solar, the deviation charges should continue to be without any linkage with the system frequency.

4.17 The EC noted that the Commission had notified the IEGC 2023 and made it effective since 01.10.2023. As the IEGC 2023 has provided for aggregation at the pooling station for inter-state wind and solar generating stations, the EC felt the need to modify the tolerance band for wind and solar generating stations.

4.18 The tolerance band for wind and solar generating stations in view of aggregation at the pooling station for inter-state wind and solar generating stations has been modified. For a generating station based on solar or a hybrid of wind –solar resources or aggregation at a pooling station, the tolerance band recommended is +/- 5% D<sub>WS</sub>; and for a generating station based on wind resource, the tolerance band recommended is +/- 10% D<sub>WS</sub>. EC has also recommended an additional volume limit of Deviation beyond 15% up to 20% for solar and beyond 20% upto 25% for wind with uniformity of pricing structure for over injection and under injection.

4.19 As regards the deviation charges with the recommended volume limits, the EC noted based on a detailed analysis that the asymmetry in DSM price structure for WS sellers (as provided in the Order dated 06.02.2023) led to a perverse tendency on the part of WS sellers to over-schedule and under-inject, with a magnitude of this behaviour higher for wind than for solar. To address this concern, the EC recommended symmetrical deviation charges within the recommended volume limits. The Commission accepted the recommendations of the EC on volume limits and DSM pricing mechanism for WS sellers and proposed as under:

“Regulation 8.4 Charges for Deviation, in respect of a **WS Seller being a generating station based on wind or solar or hybrid of wind–solar resources**, including such generating stations aggregated at a pooling station through QCA shall be without any linkage to grid frequency, as under:

<b>Deviation by way of over injection (Receivable by the Seller)</b>	<b>Deviation by way of under injection (Payable by the Seller)</b>
(i) for VL <sub>WS</sub> (1) @ contract rate; (ii) for VL <sub>WS</sub> (2) @ 90% of contract rate (iii) for VL <sub>WS</sub> (3) @ 50% of contract rate, (iv) beyond VL <sub>WS</sub> (3) @ Zero;	v) for VL <sub>WS</sub> (1) @ contract rate; (vi) for VL <sub>WS</sub> (2) @ 110% of contract rate; (vii) for VL <sub>S3</sub> @ 150% of contract rate; (viii) beyond VL <sub>WS</sub> (3) @ 200% of contract rate.

Note: Volume limits for WS Seller:

<b>WS Seller</b>	<b>Volume Limit</b>
A generating station based on solar or a hybrid of wind –solar resources or aggregation at a pooling station	VL <sub>WS</sub> (1) = Deviation up to 5% D <sub>WS</sub> VL <sub>WS</sub> (2) = Deviation beyond 5% D <sub>WS</sub> and up to 10% D <sub>WS</sub> VL <sub>WS</sub> (3) = Deviation beyond 10% D <sub>WS</sub> and up to 20% D <sub>WS</sub>

---

A generating station based on wind resource	$VL_{WS}(1)$ = Deviation up to 10% $D_{WS}$
	$VL_{WS}(2)$ = Deviation beyond 10% $D_{WS}$ and up to 15% $D_{WS}$
	$VL_{WS}(3)$ = Deviation beyond 15% $D_{WS}$ and up to 25% $D_{WS}$

---

*Note: In case of aggregation of WS sellers at a pooling station through QCA,*

*(a) the contract rate for the purpose of deviation shall be equal to the weighted average of the contract rates of all individual WS seller(s) opting for aggregation at the pooling station;*

*(b) Available Capacity shall be equal to the cumulative capacity rating of wind turbines or solar inverters that are capable of generating power in a given time block;*

*(c) depooling of deviation charges for WS seller(s) connected to the pooling station shall be as per the methodology mutually agreed upon between the QCA and such individual WS seller(s).”*

## **5. DSM Framework for Standalone Energy Storage System**

5.1 The EC has also considered the suggestions received from the stakeholders to provide treatment of deviation charges for Energy Storage System (ESS) standalone or co-located with any other generators. It has been proposed that standalone ESS should be treated at par with a generating company as per the recommendations of the Ministry of Power (MoP) vide letter dated 29.01.2022. The EC recommended that being a despatchable power standalone Energy Storage system (ESS) should be treated ion par with a general seller other than an RoR generating station or a generating station based on municipal solid waste or WS seller. Further in case of ESS is co-located with any other generation resources such as wind or solar, it was proposed that such resources should be provided with tolerance band of +/- 5% or 50MW without any linkage with system frequency, however beyond such tolerance band it would be treated like a general seller.

5.2 In view of the need to specify deviation treatment for such innovative technology that can act as a seller or a buyer, the Commission has accepted the recommendation of the EC for standalone and co-located ESS and proposed the draft regulations for further consultation with the stakeholders.

5.3 The Commission notes that various business models are emerging with respect to utilization of such innovative resources where such resource can sell/ lease / rent out storage space in whole or in part to any utility or may use such storage space himself. Hence it is important to bring further clarity on the scheduling and deviation treatment of such resource. Accordingly, the commission has specified that in case of an integrated system of

ESS such seller should provide a separate schedule for WS and ESS components through the lead generator or QCA at the interconnection point of such system. For such time block in which the schedule of WS seller is being provided the treatment of deviation should be similar to WS seller while for ESS component it would be treated like stand-alone ESS.

5.4 Accordingly, the deviation charges for ESS co-located with WS seller are proposed as follows:

*“Regulation 8.5 Charges for Deviation, in respect of a Standalone Energy Storage System (ESS), shall be at par with the charges for Deviation for a **general seller other than an RoR generating station or a generating station based on municipal solid waste or WS seller** as specified in Clause (1) of this Regulation*

*Regulation 8.6 Charges for Deviation, in respect of an ESS co-located with WS Seller(s) connected at the same interconnection point, shall be as follows:*

- i) Such seller shall provide a separate schedule for WS and ESS components through the Lead generator or QCA at the interconnection point;*
- ii) Deviation corresponding to WS component shall be charged at the same rates as applicable for WS Seller being a generating station based on solar or hybrid of wind-solar resource in accordance with clause (4) of this regulation; and*
- iii) Deviation corresponding to the ESS component shall be charged at the same rates as applicable for a standalone ESS in accordance with clause (5) of this regulation.*

<b><i>Deviation by way of over injection (Receivable by Lead generator)</i></b>	<b><i>Deviation by way of under injection (Payable by the lead generator)</i></b>
<b><i>(I) Any over injection up to 5% or 50 MW shall be receivable as per RR and for under generation shall be payable zero up to 5% or 50MW.</i></b>	
<b><i>(II) For Deviation from 5% to 10% <math>D_{GS}</math> or greater than 50 MW up to 100 MW, whichever is less] and <math>f</math> within <math>f_{band}</math></i></b>	
<i>(i) @ RR when <math>f = 50.00</math> Hz</i>	<i>(iv) @ RR when <math>f = 50.00</math> Hz</i>
<i>(ii) When <math>[50.00 \text{ Hz} &lt; f \leq 50.05 \text{ Hz}]</math>, for every increase in <math>f</math> by 0.01 Hz, charges for deviation for such seller shall be reduced by 10% of RR so that charges for deviation become 50% of RR when <math>f = 50.05\text{Hz}</math></i>	<i>(v) When <math>[50.00 \text{ Hz} &lt; f \leq 50.05 \text{ Hz}]</math>, for every increase in <math>f</math> by 0.01 Hz, charges for deviation for such seller shall be reduced by 3% of RR so that charges for deviation become 85% of RR when <math>f = 50.05\text{Hz}</math></i>

<b>Deviation by way of over injection (Receivable by Lead generator)</b>	<b>Deviation by way of under injection (Payable by the lead generator)</b>
(iii) When $[49.90 \leq f < 50.00 \text{ Hz}]$ , for every decrease in $f$ by 0.01 Hz, charges for deviation for such seller shall be increased by 1.5% of RR so that charges for deviation become 115% of RR when $f = 49.90\text{Hz}$	(vi) When $[49.90 \leq f < 50.00 \text{ Hz}]$ , for every decrease in $f$ by 0.01 Hz, charges for deviation for such seller shall be increased by 5% of RR so that charges for deviation becomes 150% of RR when $f = 49.90\text{Hz}$
<b>(III) For Deviation up to [10% D<sub>GS</sub> or 100 MW, whichever is less] and <math>f</math> outside <math>f_{band}</math></b>	
(i) @ zero when $[50.05 \text{ Hz} < f < 50.10 \text{ Hz}]$ : Provided that such seller shall pay @ 10% of RR when $[f \geq 50.10 \text{ Hz}]$	(iii) @ 85 % of RR when $[f > 50.05 \text{ Hz}]$
(ii) @ 115 % of RR when $[f < 49.90 \text{ Hz}]$	iv) @ 150 % of RR when $[f < 49.90 \text{ Hz}]$
<b>(IV) For Deviation beyond [10% D<sub>GS</sub> or 100 MW, whichever is less] and <math>f</math> within and outside <math>f_{band}</math></b>	
(i) such seller shall be paid back @ zero when $(f < 50.10 \text{ Hz})$ : Provided that such seller shall pay @ 10% of RR when $[f \geq 50.10 \text{ Hz}]$	(ii) such seller shall pay @ RR when $[f \geq 50.00 \text{ Hz}]$ ; @ 150% of RR when $[49.90\text{Hz} \leq f < 50.00 \text{ Hz}]$ ; and @ 200% of RR when $[f < 49.90 \text{ Hz}]$

Note : (a) Reference rate (RR) of such generators would be the daily weighted average ACP of the Day Ahead Market segments of all the Power Exchange.

(b) The DSM shall be computed based on the Net schedule, i.e., the sum of all generator schedule injecting/drawing power and net actual injection/drawal at the interconnection point

(c) Each generator shall be metered with SEM so that individual actual injection/drawal can be captured;

(d) Schedule shall be prepared separately for each type of generator. This shall help to understand the different profiles of each generator. ”

## 6. Deviation Charges for Buyers:

6.1 The deviation charges for a Buyer were relaxed through an interim order of the Commission dated 06.02.2023 in Petition No. 01/SM/2023. As per the said order, a buyer has two volume limits within the frequency range of 49.95 HZ to 50.03 Hz. Depending on the category of buyers the volume limits specified in the Order dated 06.02.2023 are as follows:

**Table:- volume limits for Buyer as per Order dated 06.02.2023**

<b>Buyer</b>	<b>Volume Limit</b>
--------------	---------------------

Buyer <u>other than</u> (the buyer with a schedule less than 400 MW and the RE-rich State)	<p>VL<sub>B</sub>(1) = Deviation up to [10% D<sub>BUY</sub> or 100 MW, whichever is less]</p> <p>VL<sub>B</sub>(2) = Deviation [ beyond 10% D<sub>BUY</sub> or 100 MW, <i>whichever is lower</i>] and up to [15% D<sub>BUY</sub> or 200 MW, <i>whichever is lower</i>]</p> <p>VL<sub>B</sub>(3) = Deviation beyond [15% D<sub>BUY</sub> or 200 MW, whichever is less]</p>
Buyer (with a schedule up to 400 MW)	<p>VL<sub>B</sub>(1) = Deviation [20% D<sub>BUY</sub> or 40 MW, whichever is less]</p> <p>VL<sub>B</sub>(2) = Deviation beyond [20% D<sub>BUY</sub> or 80 MW, whichever is less]</p>
Buyer (being an RE Rich State)	<p>VL<sub>B</sub>(1) = Deviation up to 200 MW</p> <p>VL<sub>B</sub>(2) = Deviation beyond 200 MW and up to 300 MW</p> <p>VL<sub>B</sub>(3) = Deviation beyond 300 MW</p>

6.2 Further, as per the said Order the charges for deviation for a buyer are different but constant within different frequency ranges ('f') i.e. i)  $49.95 \text{ Hz} \leq f \leq 50.03 \text{ Hz}$ , ii)  $49.90 \text{ Hz} < f < 49.95 \text{ Hz}$ , iii) below 49.90 Hz iv)  $50.03 \text{ Hz} < f < 50.05 \text{ Hz}$  and v) above 50.05 Hz. The relevant provision for deviation charges for a buyer is reproduced below for ready reference:

**Table 5: Charges for deviation for a buyer as per Order dated 06.02.2023**

<b>Entity</b>	<b>Charges for deviation payable to Deviation and Ancillary Service Pool Account</b>	
	<b>Deviation by way of under drawal</b>	<b>Deviation by way of over drawal</b>
<b>Buyer</b>		
<i>Buyer (other than the buyer with schedule less than 400 MW and the RE-rich State)</i>	<p><i>Zero:</i></p> <p><i>Provided that such buyer shall be paid back for under drawal as under:</i></p> <p><i>(i) @ 90% of normal rate of charges, for deviation up to [10% D<sub>BUY</sub> or 100 MW, whichever is lower];</i></p> <p><i>(ii) @ 50% of normal rate of charges, for deviation beyond [10% D<sub>BUY</sub> or 100 MW, whichever is lower] and up to [15% D<sub>BUY</sub> or 200 MW, whichever is lower]; and</i></p>	<p><i>(i) @ normal rate of charges for deviation up to [10% D<sub>BUY</sub> or 100 MW, whichever is lower];</i></p> <p><i>(ii) @ 120% of normal rate of charges for deviation beyond [10% D<sub>BUY</sub> or 100 MW D<sub>BUY</sub>, whichever is lower] and up to [15% D<sub>BUY</sub> or 200 MW, whichever is lower];</i></p> <p><i>and</i></p> <p><i>(iii) @ 150% of normal rate of charges for deviation beyond [15% D<sub>BUY</sub> or 200 MW, whichever is lower].</i></p>

<i>Buyer (with schedule up to 400 MW)</i>	<i>Zero: Provided that such buyer shall be paid back for under drawal @ 90% of normal rate of charges for deviation up to [20% D<sub>BUY</sub> or 40 MW, whichever is lower].</i>	<i>(i) @ normal rate of charges for deviation up to [20% Deviation-buyer (in %) or 40 MW, whichever is lower]; and (ii) @ 120% of normal rate of charges for deviation beyond [20% D<sub>BUY</sub> or 40 MW, whichever is lower].</i>
<i>Buyer (being an RE Rich State)</i>	<i>Zero: Provided that such buyer shall be paid back for under drawal as under: (i) @ 90% of normal rate of charges for deviation up to [200 MW]; and (ii) @ 50% of normal rate of charges for deviation beyond [200 MW] and up to [300 MW].</i>	<i>(i) @ normal rate of charges for deviation up to 200 MW; (ii) @ 120% of normal rate of charges for deviation beyond [200 MW] and up to [300 MW]; and (iii) @ 150% of normal rate of charges for deviation beyond [ 300 MW].</i>

*Note: D<sub>BUY</sub> means Deviation-buyer (in %)*

*When  $f < 49.95\text{Hz}$  ....*

- (c) The buyer shall be paid back for deviation by way of under drawal (i) @ 120% of normal rate of charge for deviation when  $[49.90 < f < 49.95]$ ; and (ii) @ 150% of normal rate of charge for deviation when  $[f \leq 49.90]$ ;*
- (d) The buyer shall pay for deviation by way of over drawal (i) @ 150% of normal rate of charge for deviation when  $[49.90 < f < 49.95]$ ; and (ii) @ 200% of normal rate of charge for deviation when  $[f \leq 49.90]$ .*

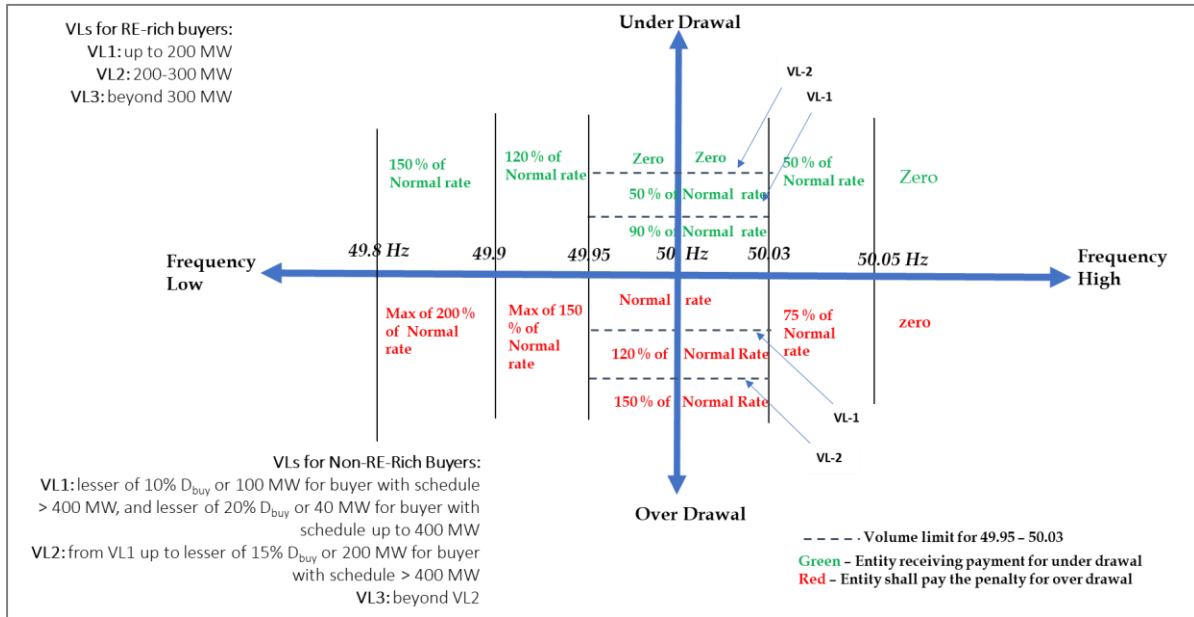
*When  $f > 50.03\text{ Hz}$*

- (c) The buyer shall be paid back for deviation by way of under drawal (i) @ 50% of normal rate of charge for deviation when  $[50.03 < f < 50.05]$ ; and (ii) @ zero when  $[f \geq 50.05]$ ;*

(d) *The buyer shall pay for deviation by way of over drawal (i) @ 75% of normal rate of charge for deviation when  $[50.03 < f < 50.05]$ ; and (ii) @ zero when  $[f \geq 50.05]$ .*”

6.3 The following figure depicts deviation charges for a buyer by way of over-drawal or under-drawal as per the existing DSM Regulations, 2022 and subsequent Order dated 06.02.2023 in Petition No. 01/SM/2023.

**Figure: Deviation charges for a buyer as per Order dated 06.02.2023**



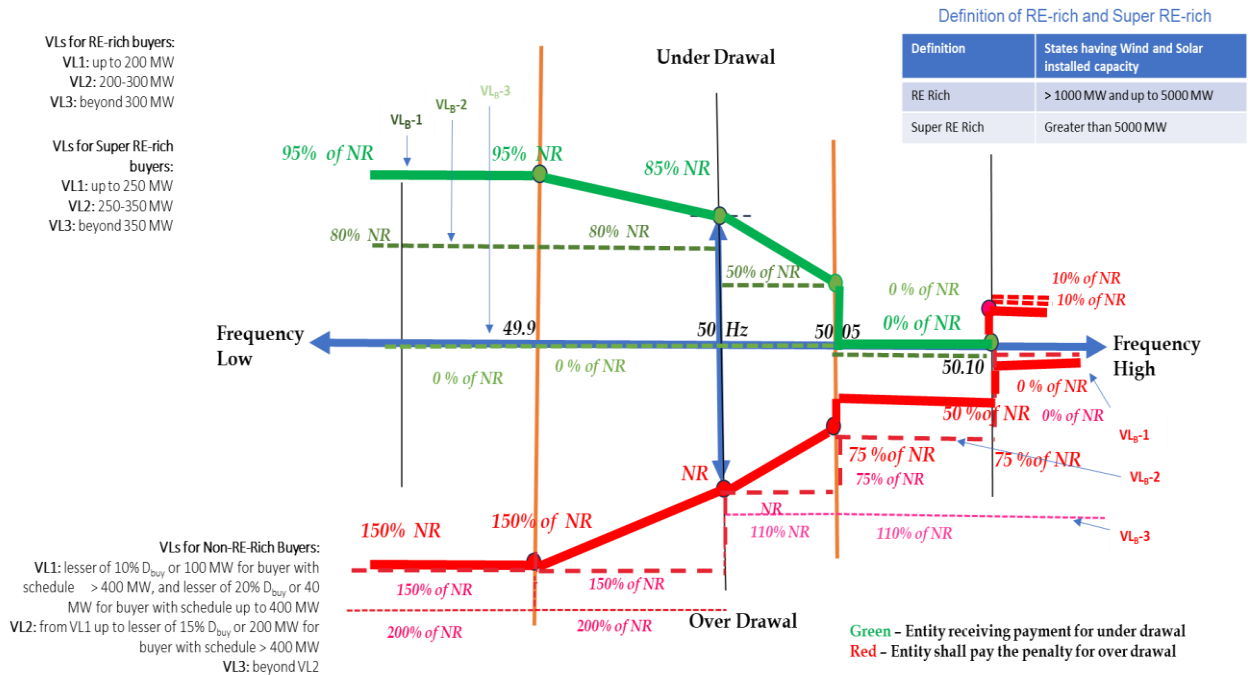
6.4 The EC observed that the deviation charges for a buyer have a certain asymmetry in pricing the structure. Further, it was observed that outside the frequency range of (49.95 Hz to 50.03 Hz) incentives and disincentives are provided without any volume limits. For a buyer incentive at 150% of the normal rate of charge when the system frequency below 49.90 Hz might encourage the buyer to provide support through DSM rather than through Ancillary Service Mechanism.

6.5 In view of the above observations, EC recommended that for a buyer, the deviation charges could be graded within the operative frequency band, i.e., 49.90 Hz to 50.05 Hz; however, beyond the operative band the deviation charges can be kept flat irrespective of frequency. Further, graded deviation charges could be limited to the initial volume limit of respective buyers beyond which the charges could be proposed in such a way that any further deviation would be discouraged in order to promote the participation of such entities in the Ancillary



Services Mechanism instead of relying on the grid. The deviation charges recommended by the EC are depicted below:

**Figure : Deviation Charges for a Buyer in draft regulations**



6.6 Deviation charges for **under-drawal** within volume limit (VL1) of the respective category of a buyer are proposed such that a buyer would receive or get paid at 85% of the Normal Rate of Charge (NR) when the system frequency is at 50.00 Hz. At **high frequency** any under drawal by a buyer needs to be discouraged and hence the buyer would receive or get paid at lesser rates when the frequency is more than 50.00 Hz, such that at 50.05 Hz system frequency rate of charge for deviation would become 50% of NR and beyond 50.05 Hz frequency rate of charge for deviation would become zero till the frequency remains below 50.10 Hz. At 50.10 Hz and above a flat penalty or negative pricing has been proposed in which the buyer has to pay back to the pool at 10% of NR.

6.7 On the other side, **under-drawal** by a buyer during **low frequency** is supportive for the grid and hence appropriately needs to be incentivized while avoiding any over -incentive, in order to encourage participation in Ancillary Service Mechanism. Accordingly, the EC recommended that the rate of deviation would increase with decrease in system frequency in such a way that it becomes 95% of NR at 49.90 Hz and would stay constant at 95% of NR

thereafter, as long as the deviation is within volume limit-1 i.e.  $VL_B(1)$  of respective category of a buyer. For any deviation beyond  $VL_B(1)$  the charges would be flat in different frequency ranges but relatively less than that of  $VL_B(1)$ , so that a buyer is encouraged for participation in the Ancillary Service Mechanism rather than on the DSM.

6.8 Deviation charges for **over-drawal** within volume limit (VL1) of the respective category of a buyer are proposed such that a buyer would pay into the pool at NR when the system frequency is at 50.00Hz, and charges would gradually decrease to 75% of NR when the system frequency is at 50.05 Hz. When the system frequency in a time block is higher than 50.05 Hz but below 50.10 Hz, then the buyer would have to pay into the pool at flat 50% of NR. By paying back to the pool at a lesser rate when system frequency is higher than 50.00 Hz is an indirect incentive for a buyer.

6.9 Deviation charges for **over-drawal** within volume limit (1) [i.e.  $VL_B(1)$ ] of the respective category of a buyer are proposed such that charges would gradually increase to 150% of NR when the system frequency is at 49.90Hz and below 49.90Hz charges would remain flat at 150% of NR. This is to discourage any over-drawal from the pool at **low system frequency**. For any deviation beyond  $VL_B(1)$  the charges would be flat in different frequency ranges but relatively higher than that of  $VL_B(1)$ , so that a buyer is encouraged to participate in the Ancillary Service Mechanism rather than on the DSM.

6.10 In view of the suggestions from various stakeholders to increase the volume limit for RE rich States having installed capacity of Solar and Wind resources of more than 5000 MW with an additional increase in volume limit the EC also recommended that RE-rich States could be further segregated into RE-Rich and Super RE-Rich states, depending on the total solar + wind installed capacity in the state. Any State with more than 5000 MW of installed capacity is categorised as a super RE-Rich State.

6.11 The Commission accepted the recommendations of the EC and proposed charges for a buyer for deviation by way of over drawal or under drawal as follows:

*“Regulation 8.7 Charges for Deviation, in respect of a **Buyer**, shall be receivable or payable as under*

<b>Deviation by way of under drawal (Receivable by the Buyer)</b>	<b>Deviation by way of over drawal (Payable by the Buyer)</b>
<b>(I) For VL<sub>B</sub>(1) and f within f<sub>band</sub></b>	
i) @ 85% of NR when $f = 50.00$ Hz;	iv) @ NR when $f = 50.00$ Hz;
ii) When $50.00 \text{ Hz} < f \leq 50.05 \text{ Hz}$ , for every increase in $f$ by 0.01 Hz, charges for deviation for such buyer shall be decreased by 7% of NR so that charges for deviation become 50% of NR when $f = 50.05$ Hz;	v) When $50.00 < f \leq 50.05 \text{ Hz}$ , for every increase in $f$ by 0.01 Hz, charges for deviation for such buyer shall be reduced by 5% of NR so that charges for deviation become 75% of NR when $f = 50.05$ Hz;
iii) When $49.90 \leq f < 50.00 \text{ Hz}$ , for every decrease in $f$ by 0.01 Hz, charges for deviation for such buyer shall be increased by 1 % of NR so that charges for deviation become 95% of NR when $f = 49.90$ Hz;	vi) When $49.90 \leq f < 50.00 \text{ Hz}$ , for every decrease in $f$ by 0.01 Hz, charges for deviation for such buyer shall be increased by 5% of NR so that charges for deviation become 150% of NR when $f = 49.90$ Hz.
<b>(II) For VL<sub>B</sub>(1) and f outside f<sub>band</sub></b>	
(i) @ zero when $[ 50.05 \text{ Hz} < f < 50.10 \text{ Hz}]$ : Provided that such buyer shall pay @ 10% of NR when $[ f \geq 50.10 \text{ Hz}]$ ;	(iii) @ 50% of NR when $[ 50.05 \text{ Hz} < f < 50.10 \text{ Hz}]$ ; (iv) @ zero when $[ f \geq 50.10 \text{ Hz}]$ ;
(ii) @ 95% of NR when $[ f < 49.90 \text{ Hz}]$ ;	(v) @ 150 % of NR when $[ f < 49.90 \text{ Hz}]$ .
<b>(III) For VL<sub>B</sub>(2) and f within and outside f<sub>band</sub></b>	
(i) @ 80% of NR when $f \leq 50.00 \text{ Hz}$ ; (ii) @ 50% NR when $[50.00 \text{ Hz} < f \leq 50.05 \text{ Hz}]$ ; @ zero when $[50.05 \text{ Hz} < f < 50.10 \text{ Hz}]$ : Provided that such buyer shall pay @ 10% of NR when $[ f \geq 50.10 \text{ Hz}]$ ;	(iii) @ 150% of NR when $f \leq 50.00 \text{ Hz}$ ; (iv) @ NR when $[50.00 \text{ Hz} \leq f \leq 50.05 \text{ Hz}]$ ; @ 75% NR when $[ 50.05 \text{ Hz} < f < 50.10 \text{ Hz}]$ ; @ zero when $[ f \geq 50.10 \text{ Hz}]$ .
<b>(IV) For VL<sub>B</sub>(3) and f within and outside f<sub>band</sub></b>	
(i) @ zero when $f < 50.10 \text{ Hz}$ : Provided such buyer shall pay @ 10% of NR when $[ f \geq 50.10 \text{ Hz}]$ ;	(ii) @ 200% of NR when $f < 50.00 \text{ Hz}$ ; (iii) @ 110% of NR when $[ f \geq 50.00 \text{ Hz}]$ .

Note: volume limits for Buyer:

**Buyer**

**Volume Limit**

Buyer other than (the buyer VL<sub>B</sub>(1) = Deviation up to [10% D<sub>BUY</sub> or 100 MW, whichever is less] with a schedule less than 400 MW and the RE-rich State)

	$VL_B(2) = \text{Deviation [ beyond } 10\% D_{BUY} \text{ or } 100 \text{ MW, whichever is lower] and up to [} 15\% D_{BUY} \text{ or } 200 \text{ MW, whichever is lower]}$
	$VL_B(3) = \text{Deviation beyond [} 15\% D_{BUY} \text{ or } 200 \text{ MW, whichever is less]}$
Buyer (with a schedule up to 400 MW)	$VL_B(1) = \text{Deviation [} 20\% D_{BUY} \text{ or } 40 \text{ MW, whichever is less]}$ $VL_B(2) = \text{Deviation beyond [} 20\% D_{BUY} \text{ or } 80 \text{ MW, whichever is less]}$
Buyer (being an RE Rich State)	$VL_B(1) = \text{Deviation up to } 200 \text{ MW}$ $VL_B(2) = \text{Deviation beyond } 200 \text{ MW and up to } 300 \text{ MW}$ $VL_B(3) = \text{Deviation beyond } 300 \text{ MW}$
Buyer (being Super RE Rich State)	$VL_B(1) = \text{Deviation up to } 250 \text{ MW}$ $VL_B(2) = \text{Deviation beyond } 250 \text{ MW and up to } 350 \text{ MW}$ $VL_B(3) = \text{Deviation beyond } 350 \text{ MW}$

## **Miscellaneous**

6.12 The Commission in its order dated 06.02.2023 clarified certain aspects of deviation charge in case of infirm power, start-up power, forced outage, multiple contracts and inter-regional and cross border transactions etc. in order to bring clarity in implementation of the DSM Regulations, 2022. The EC recommended that the same needs to be included in the regulations for clarity. Accordingly, deviation of charges in case of infirm power, start-up power, multiple contracts and inter-regional and cross border transactions were included in the draft regulations from Regulations 8.8 to Regulation 8.15.

6.13 The charges for deviation for injection of infirm power is zero. However, if such infirm power is scheduled, deviation charges will apply according to those applicable for a general seller or WS seller, as the case may be.

6.14 The charges for deviation for drawal of start-up power before the COD of a generating unit or for drawal of power to run the auxiliaries during the shut-down of a generating station shall be payable at the reference charge rate or contract rate or in the absence of reference charge rate or contract rate, the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block, as the case may be.

- 6.15 The charges for inter-regional deviation caused by way of over drawal or under drawal or over injection or under-injection shall be payable or receivable, as the case may be, at the normal rate of charges for deviation.
- 6.16 The charges for deviation in respect of cross-border transactions caused by way of over drawal or under drawal or over injection or under-injection shall be payable or receivable at the deviation charge rates and subject to volume limits as applicable to a seller (of the respective category) or to a buyer (other than a RE-rich State or a Super RE-rich State), as the case may be.
- 6.17 In case of multiple contracts, the contract rate or the reference rate referred to in this Regulation shall be the weighted average of the contract rates of all such contracts.
- 6.18 With the implementation of the HP DAM segment, the Sellers whose bids are cleared in the HP-DAM, the 'reference charge rate' for deviating through 'under-injection' for the amount of power sold via HP-DAM was defined. This reference rate will be equal to the weighted average ACP of all the Power Exchanges' HP-DAM market segments for that time block.
- 6.19 The relevant provisions specified in the draft Regulations are reproduced below for ready reference:

*“(8 The charges for deviation for injection of infirm power shall be zero:*

*Provided that upon such infirm power being scheduled, the charges for deviation for such power shall be as applicable for a general seller or WS seller, as the case may be.*

*(9) The charges for deviation for drawal of start-up power before the COD of a generating unit or for drawal of power to run the auxiliaries during the shut-down of a generating station shall be payable at the reference charge rate or contract rate or in the absence of reference charge rate or contract rate, the weighted average ACP of the Day Ahead Market segments of all Power Exchanges for the respective time block, as the case may be.*

*(10) The charges for inter-regional deviation caused by way of over drawal or under drawal or over injection or under-injection shall be payable or receivable, as the case may be, at the normal rate of charges for deviation.*

*(11) The charges for deviation in respect of cross-border transactions caused by way of over drawal or under drawal or over injection or under-injection shall be payable or receivable at the deviation charge rates and subject to volume limits as applicable to a seller (of the respective category) or to a buyer (other than a RE-rich State or a Super RE-*

*rich State), as the case may be.*

*(12) Notwithstanding anything contained in Clauses (1) to (5) of this Regulation, in case of forced outage of a seller, the charges for deviation shall be @ the reference charge rate for a maximum duration of eight time blocks or until the revision of its schedule, whichever is earlier.*

*(13) In case of multiple contracts, the contract rate or the reference rate referred to in this Regulation shall be the weighted average of the contract rates of all such contracts.*

*(14) For a Seller whose bids are cleared in the HP-DAM, the 'reference charge rate' for deviation by way of 'under-injection' for the quantum of power sold through HP- DAM shall be equal to the weighted average ACP of the HP-DAM Market segments of all the Power Exchanges for that time block;*

*(15) In case of a State having net injection at the regional periphery, the deviation charges for such State shall be as applicable to a buyer.”*

## **7. Grid Security Charge**

7.1 It is observed that during consistently high demand periods and with shortfall in reserves, additional generation was committed by NLDC to maintain grid security under Ancillary Services (AS) last year and such reserves were being dispatched under shortfall provisions. These generation capacities were generally costly gas-based generation (variable charges vary between Rs. 12-18/kWh depending on combined or open cycle operation) on RLNG and liquid fuel which are generally not requisitioned by their beneficiaries.

7.2 Further, the IEGC enables the system operator to procure adequate reserves through Security Constrained Unit Commitment (SCUC) starting from three days in advance for which the detailed procedures were approved by the Commission vide Order dated 16.04.2024 under Regulations 6(4)(i), 47(2), 46(4)(j), 46(5)(a), 46(5)(b) and 49(2)(a)(iv) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023. The payment towards procurement of reserves under SCUC would be from the Deviation and Ancillary Service Pool Account.

7.3 As per the present regulatory provisions, payment for all ancillary services is made through the respective Regional Deviation and Ancillary Services Pool Accounts. Since the generation being committed by NLDC under TRAS Shortfall conditions is generally costly gas-based generation, this involves large payments to be made leading to deficits in the pool accounts even after surplus in other regions has been utilized. DSM rates are

also linked to the market as a reference and are also subject to the implications of price caps in the market leading to less availability of funds for payment to ancillary services providers. Hence, it is leading to a shortfall in the DSM pool account. Grid India has communicated that there is a deficit of the order Rs. 400 Crore in the DSM and Ancillary Services pool account as on March 2024, resulting in delays in the payments to ancillary service providers.

7.4 The phenomenon of capacity crunch during the high demand period is clearly a reflection of inadequate resource adequacy (RA). The RA framework ensures generation resource planning to take care of peak demand, plus a planning reserve margin. The IEGC as well as the guidelines issued by the Ministry of Power have laid the ground work for this. Once the RA framework is put in place by the states, adequate reserve margin will be available in the system at all times, including during high peak periods, obviating the need for the system operator to separately procure reserves in advance. However, it will take time before the RA framework is institutionalized in the country.

7.5 In order to address the unprecedented surge in demand and to tackle challenges related to reserves and grid reliability, the Commission had released a discussion paper suggesting measures for ensuring the adequacy of reserves and the reliability of grid operations. The paper was uploaded on the website on 25th September 2023 seeking comments from the stakeholders till 31<sup>st</sup> October 2023.

7.6 Regarding the mechanism for recovery of cost towards Reserves/Ancillary Services, the paper proposed that the cost towards the reserves/Ancillary Services procurement by NLDC/RLDCs (including the reserves procured in advance) should first be met out of the surplus available in the DSM Pool account. However, in case of deficit in the DSM Pool, the balance amount i.e. the cost of Ancillary Services / Reserves over and above what is met out of the DSM Pool Account surplus shall then be recovered as Grid Security Charge. Under the IEGC 2023, if drawee DICs fail to maintain adequate reserves, NLDC/RLDCs are empowered to procure tertiary reserve capacity on behalf of the States to ensure grid reliability. The associated costs of such procurement are then allocated to the respective States. Keeping this in view, the paper presented three options for allocating this charge: Option-I suggested allocating the deficit among drawee Distribution Companies (DICs) in proportion to their shortfall against allocated

reserves. Option-II proposed allocation based on the General Network Access (GNA) quantum of DICs. Option-III suggested a balanced approach, allocating 50% based on the shortfall against allocated reserves and 50% based on GNA.

7.7 Some of the stakeholders have supported the proposal of allocating this deficit on the basis of the shortfall of reserves by the states, stating that such an approach will encourage proactive planning and procurement of reserves by the states in alignment with the evolving dynamics of the Indian Power Market. However, Grid India has highlighted that the basis of the shortfall is self-declaration by the States themselves. As, presently there is no framework for ascertaining the actual availability of reserves as maintained by States in real time, it is difficult to implement it in a dispute free manner.

7.8 The Commission acknowledges that in the face of anticipated significant growth in demand and the paramount need to ensure grid reliability, it is incumbent upon all states to maintain reserves capable of addressing contingencies. However, in the absence of a methodology to identify the shortfall on the part of States against their allocated share of reserves, it may not be correct to allocate the deficit on the basis of the shortfall of reserves by states at present. This option could be considered at a later date after the procedure in this regard is developed by the system operation. In the interim, the options discussed in the subsequent paras are considered.

7.9 States with higher drawal have a more significant impact on grid reliability, so linking the responsibility for maintaining grid reliability to the entities with high demand is imperative. Further, there are instances where the net drawal of a State at the regional periphery becomes negative, i.e. the State will have a net injection schedule. Allocating the deficit based solely on drawal might exempt these States from contributing to grid reliability, thereby relieving them of their responsibility to maintain the grid.

7.10 Accordingly, the Commission has decided that for the period from the date of effect of these regulations till 31.03.2025, deficit in the Deviation and Ancillary Pool account would be allocated such that 50% of the cost to be socialized among all DICs in proportion to their GNA quantum and the balance to be allocated among the DICs in proportion to their drawal at the regional periphery. However, from 01.04.2025, the deficit in the pool account would be allocated in the ratio of the shortfall of reserves



allocated by NLDC to such DICs. For this purpose, NLDC will issue detailed procedure on the methodology to identify shortfalls on the part of States against their allocated share of reserves with the approval of the Commission.

7.11 Accordingly, the relevant provision proposed in Regulation 9 (7) of the draft regulations is reproduced below:

*“Regulation 9 (7 : In case of deficit in the Deviation and Ancillary Service Pool Account of a region, the surplus amount available in the Deviation and Ancillary Service Pool Accounts of other regions shall be used for settlement of payment under clause (6) of this Regulation:*

*Provided that in case the surplus amount in the Deviation and Ancillary Service Pool Accounts of all other regions is not sufficient to meet such deficit, the balance amount shall be recovered from the drawee DICs - (i) for the period from the date of effect of these regulations till 31.03.2025, in the ratio of [50% in proportion to their drawal at the regional periphery] and [50% in proportion to their GNA]; and (ii) from 01.04.2025, in the ratio of the shortfall of reserves allocated by NLDC to such DICs in accordance with the detailed procedure to be issued in this regard by the NLDC with the approval of the Commission.”*

\*\*\*\*\*