

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 16/SM/2022**

**Coram:**

**Shri I. S. Jha, Member**

**Shri Arun Goyal, Member**

**Shri P. K. Singh, Member**

**Date of Order: 26<sup>th</sup> December, 2022**

**IN THE MATTER OF:**

Directions in the interest of grid security, in pursuance of the provisions of the Electricity Act, 2003 and the provisions of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2022

**ORDER**

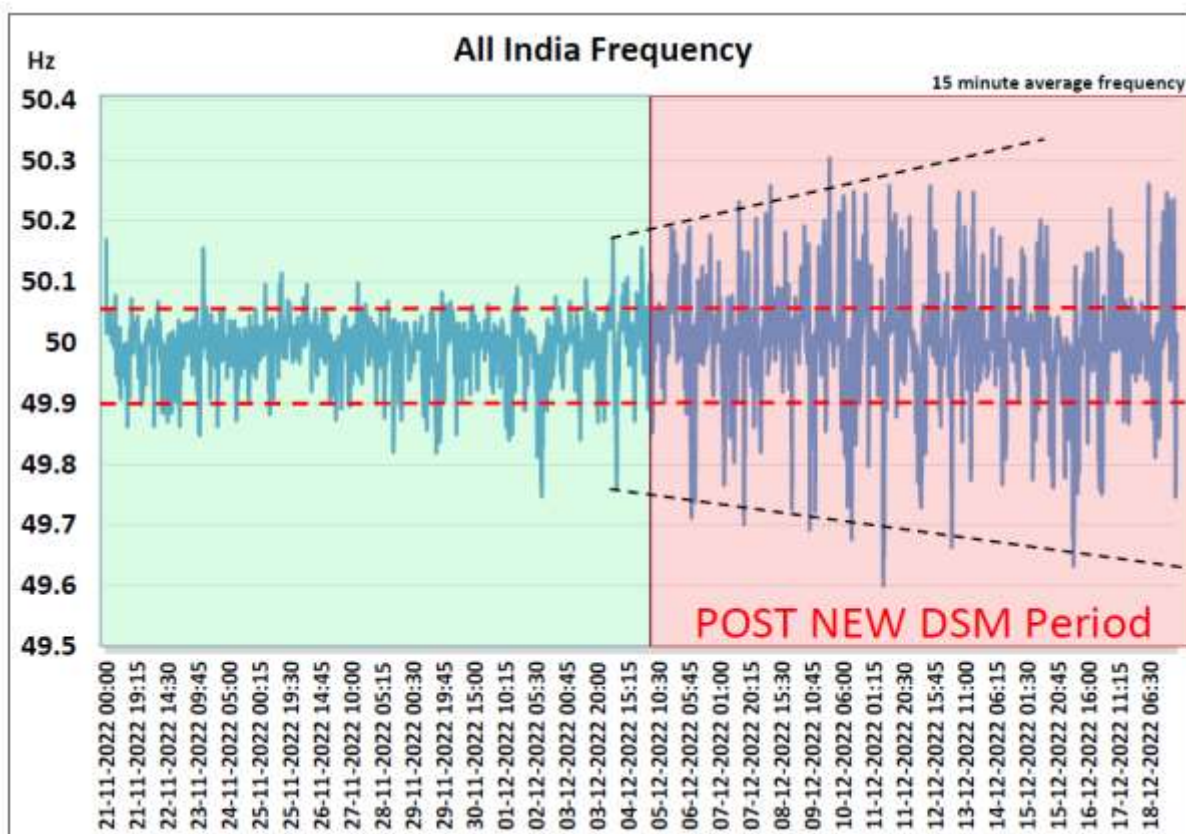
The Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2022 (hereafter, DSM Regulations, 2022) came into force with effect from 5<sup>th</sup> December 2022.

2. The Commission has been closely monitoring the implementation of DSM Regulations, 2022 from the date of its operation. The Commission has held detailed discussion with the Grid Controller of India Ltd (Grid-India) (formerly POSOCO) in this regard on 20.12.2022 and 23.12.2022 and has also received operational feedback on implementation of DSM Regulations from the Grid-India. The Commission further had interactions with regional entity generating stations on 23.12.2022 to assess the implementation challenges if any on DSM Regulations, 2022.

3. Based on the operational feedback received from the system operator and the preliminary analysis of the system profile for the first two weeks of implementation of the DSM Regulations 2022, it is observed that while the number of frequency excursions has decreased, the frequency fluctuations reflected in terms of percentage of time the system frequency remaining outside the operative band have increased by almost 20%. The All India Frequency Profile from 21.11.2022 and System Frequency Profile after 5.12.2022 are depicted below:



**Figure-1: All India Frequency Profile**



Source: Grid-India

**Figure-2: System Frequency profile after 5<sup>th</sup> Dec 2022**

| Date       | Percentage of Time      |                  |                |                |
|------------|-------------------------|------------------|----------------|----------------|
|            | Freq within 49.90-50.05 | Freq above >50Hz | Above 50.05 Hz | Below 49.90 Hz |
| 05.12.2022 | 61.62                   | 64.79            | 34.63          | 3.75           |
| 06.12.2022 | 51.40                   | 61.69            | 35.30          | 13.3           |
| 07.12.2022 | 54.79                   | 49.91            | 27.85          | 17.36          |
| 08.12.2022 | 56.97                   | 59.48            | 34.36          | 8.67           |
| 09.12.2022 | 54.53                   | 63.53            | 36.86          | 8.61           |
| 10.12.2022 | 44.04                   | 51.42            | 34.53          | 21.44          |
| 11.12.2022 | 55.07                   | 57.05            | 33.73          | 11.2           |
| 12.12.2022 | 54.98                   | 53.58            | 28.94          | 16.09          |
| 13.12.2022 | 55.42                   | 53.83            | 32.67          | 11.91          |
| 14.12.2022 | 60.86                   | 57.55            | 29.85          | 9.29           |
| 15.12.2022 | 57.34                   | 51.81            | 27.79          | 14.87          |
| 16.12.2022 | 48.89                   | 42.56            | 24.83          | 26.28          |
| 17.12.2022 | 57.88                   | 57.07            | 30.9           | 11.22          |
| 18.12.2022 | 57.42                   | 54.53            | 32.31          | 10.27          |
| 19.12.2022 | 59.56                   | 49.35            | 25.06          | 15.38          |
| 20.12.2022 | 45.05                   | 54.38            | 34.25          | 20.71          |

4. The analysis based on the above and related data reveals that though prime facie, the grid connected entities are trying to adhere to their schedule, there may be a tendency to over-schedule so as to avoid payment of deviation charge for over-drawal or under-injection. The combined effect of this tendency (especially over-injection by the generators and under-drawal by the discoms, coupled with Reserve Regulations of Ancillary Service (RRAS) Up dispatch in some blocks) has resulted in the system frequency remaining high for a significant amount of time. Grid -India in its operational feedback has also indicated that the primary response support from the generators has not been up to the desired level and in some cases, the response is observed to be less than what was seen in the period prior to the DSM Regulations, 2022.

5. It has been highlighted by Grid-India that capacity short-fall during the morning and evening peaks have made it challenging to deploy adequate resources under Secondary Reserve Ancillary Services (SRAS) and RRAS to manage large frequency fluctuations. During the first week starting 5.12.2022, the maximum SRAS Up and RRAS Up available with the Grid-India were only about 1330MW and 2942MW respectively. There have been occasions when the RLNG based gas generations have been brought in by the System operator to mitigate the capacity shortfall for Ancillary Services. As a result there have been occasions when the system frequency as also the applicable DSM rate have remained high .

6. The DSM Regulations, 2022 aim at ensuring that all grid connected entities adhere to schedules and that deviations should only be inadvertent to be managed by the system operator through deployment of Ancillary Services. The Commission would like to reiterate this basic objective of the DSM Regulations once again and urge all constituents to act accordingly. For this, the generators and the discoms need to do greater due diligence by carrying out regular plant maintenance and providing mandatory primary response (for generators) and engaging in scientific demand forecasting (for discoms). At the same time, the system operator also needs to estimate the need for and procure adequate reserves and deploy them prudently, so as to avoid frequency fluctuations. The Secondary Reserve Ancillary Services (SRAS) down and RRAS down (till TRAS comes into force) need to be deployed in case of high frequency so that frequency is improved. Grid-India during the meeting with the Commission on 20.12.2022 highlighted that Secondary Reserves are clipped at 5% of Unit capacity by generating stations. This limits the availability of reserves for maintaining grid frequency.

7. While the various players adjust to the new system put in place by the DSM Regulations, 2022, the Commission has taken serious note of the wide frequency fluctuations over the last couple of weeks. With due regard to the operational experience of the first two weeks of the roll out of the DSM Regulations, 2022 as highlighted above, the Commission has decided to intervene in the interest of grid security to induce the grid participants to behave in a manner that helps maintain grid frequency.

8. Regulation 12 of the DSM Regulations, 2022 provides as under:

***“12. Power to Remove Difficulty***

*If any difficulty arises in giving effect to these regulations, the Commission may on its own motion or on an application filed by any affected party, issue such practice directions as may be considered necessary in furtherance of the objective of these regulations.”*

9. The DSM Regulations, 2022 required the grid connected entities to adhere to schedule and the system operator to manage frequency through deployment of ancillary services. The system operator (Grid-India) has expressed difficulty in managing system frequency in the absence of adequate support from the grid connected entities in terms of providing the desired level of primary and secondary response, and by restricting under-drawal/over-injection and over-drawal/under-injection. While the detailed analysis of the factors and entities responsible for wide fluctuations in frequency will follow, the Commission feels it expedient to invoke its powers under Regulation 12 of the DSM Regulations, 2022 to remove the difficulty highlighted by Grid-India, so as to ensure smooth and secure operation of the grid. The Commission has also been vested with the inherent regulatory powers under section 79(1)(c) of the Electricity Act, 2003 (“the Act”) which requires the Commission “*to regulate the inter-state transmission of electricity*”. Accordingly, the Commission in exercise of its regulatory powers under section 79(1)(c) of the Act and the powers to remove difficulty under Regulation 12 of the DSM Regulations, 2022 issues directions herein as delineated in the subsequent paragraphs.

***Normal Rate of Charges for Deviation (Regulation 7 of the DSM Regulations, 2022)***

10. As per the DSM Regulations, 2022, at present the normal rate of charges for deviation for a time block is equal to the highest of the [weighted average Area Clearing Price (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; or the Weighted Average Ancillary Service Charge of all the regions]. The operational experience has revealed instances of very high deviation charge (close to Rs. 40/kWh) in some blocks due to high cost of ancillary services deployed. While this serves as a deterrent for over-drawal and under-injection, in cases where the receivables are linked to the normal rate of deviation charge, this has the potential of creating perverse incentive to under-draw or over-inject. Hence, the Commission feels it expedient to intervene by putting a cap on the normal rate of charges for deviation. Accordingly, the Commission decides that the Normal Rate of Charges for Deviations for a time block as specified in Regulation 7 of the DSM Regulations, 2022 shall be subject to the cap of Rs 12 per kWh, until further orders.

***Charges for Deviation (Regulation 8 of the DSM Regulations, 2022)***

11. As highlighted in the analysis in the preceding paragraphs, instances of high frequency and the frequency remaining outside the operating band of 49.90 Hz and 50.05 Hz have been witnessed on several occasions since the implementation of the DSM Regulations, 2022. Preliminary analysis reveals that this is the combined effect of over-injection and under-drawal coinciding in time blocks where such trend is seen. In order to contain this trend and ensure that the frequency remains within the operating band, the Commission decides as follows:

- A) Notwithstanding anything contain in Clauses (1) and (2) of Regulation 8 of the DSM Regulations 2022, the following shall apply irrespective of volume limit, in cases where the system frequency is at 50.05Hz or above in a time-block:
- i) The general seller other than an ROR generating station or a generating station based on municipal solid waste shall be paid from the Deviation and Ancillary Service Pool Account @ zero, for deviation by way of over injection in such time-block;
  - ii) The general seller other than an ROR generating station or a generating station based on municipal solid waste shall pay back to the Deviation and Ancillary Service Pool Account for the shortfall in energy against its schedule in any time block due to under injection @ 50% of the reference charge rate;
  - iii) The buyer shall be paid back from the Deviation and Ancillary Service Pool Account @ zero, for deviation by way of under-drawal in such time-block;

B) Notwithstanding anything contained in the Clauses (1) and (2) of Regulation 8 of the DSM Regulations 2022, the following shall apply irrespective of volume limit, in cases where the system frequency is at 49.90 Hz or below in a time-block:

- i) The general seller other than an ROR generating station or a generating station based on municipal solid waste shall be paid back from the Deviation and Ancillary Service Pool Account @ 150% of reference charge rate for deviation by way over injection in such time block;

12. The above directions of the Commission shall come into effect from 00.00 hours of 28.12.2022 and remain in force until further orders by the Commission in this regard. It is clarified that the directions as contained in this Order are being issued in exigency as an interim measure, in the interest of grid security and the Commission shall come up with suitable amendments to the DSM Regulations, 2022 separately based on further analysis of the implementation of the said Regulations. Grid -India is directed to give weekly report highlighting inter-alia (i) the entities (including renewable energy generators) responsible for causing frequency fluctuations, especially high or low frequency beyond the operating band as specified in the Grid Code; (ii) the status on whether and to what extent primary response (being mandatory) and the AGC support is being given by the generating stations; (iii) if the primary and AGC response from the generating stations is inadequate, the reasons for the same and remedial measures thereof; (iv) details of efforts being made by the system operators (NLDC and RLDCs) to procure and deploy SRAS and RRAS (Up and Down) to contain frequency in either direction. Grid-India is also directed to give wide publicity to this Order for information of and compliance by all concerned.

13. Accordingly, the Petition 16/SM/2022 is disposed of in terms of above.

Sd/-  
(P.K. Singh)  
Member

Sd/-  
(Arun Goyal)  
Member

Sd/-  
(I. S. Jha)  
Member