

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No. 01/SM/2023

Coram:

Shri I. S. Jha, Member

Shri Arun Goyal, Member

Shri P. K. Singh, Member

Date of Order: 06th February, 2023

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 05.01.2022.

2. After the Regulations came into effect, the Commission has been closely monitoring implementation of the DSM Regulations, 2022 from the date of its operation. While the various players sought to align themselves with the new system put in place by the DSM Regulations, 2022, the Commission was apprised that wide frequency fluctuations occurred post the implementation of the DSM Regulations, 2022. The Commission has since held detailed discussions and consultations with the Grid Controller of India Ltd (Grid-India) and with regional entity generating stations to assess the implementation challenges in this regard. In the wake of the operational experience post 05.12.2022 the Commission issued directions on 26.12.2022 vide suo motu Petition No. 16/SM/2022 stipulating inter-alia certain regulatory measures to contain frequency within the operating band and reduce wide frequency fluctuations.

3. The Commission further reviewed implementation of the DSM Regulations, 2022, post issuance of directions dated 26.12.2022. The Commission also received Operational Feedback from Grid-India on 10.01.2023 and held detailed deliberations with the Grid-

India, the regional entity generating stations, the Wind and Solar Generators represented by their Associations and the Regional Power Committees.

Grid-India Operational Feedback:

4. As directed by the Commission, Grid-India has been providing weekly operational feedback on implementation of DSM Regulations highlighting inter-alia the high and low frequency events, status on primary, secondary and tertiary response from the regional generators while detailing the efforts to procure SRAS and RRAS to maintain frequency within operative band.

5. The Weekly feedback from the Grid-India communicated vide 10.01.2023 highlighted that while some improvement in the frequency profile excursions above 50.05 Hz was observed, the overall frequency profile still remains a matter of concern. While the frequency remained within the operative band for ~75-80% of the time before 05.12.2022, it deteriorated to the level of ~54% during 5-26 December 2022 but consequently improved to ~60% post the issuance of directions dated 26.12.2022. After the issuance of the directions dated 26.12.2022, the frequency excursions and the percentage of times the frequency remaining within the operating band improved but is still short of the expected level of operation.

6. The number of excursions above 50.2 Hz has increased from a maximum of 5 times per day from 01.11.2022 to 05.12.2022, to ~23-24 times per day between 5-26 December 2022. Consequently, it reduced to a maximum of ~13-14 times per day post 26.12.2022 directions, which is still short of the expected level of operation.

7. It was mentioned that frequency response characteristics of individual generators could not be compared for primary response assessment due to lack of event involving large generation/ load loss during the week 26.12.2022 to 01.01.2023. However, the availability of secondary reserves continues to be inadequate even post 28.12.2022 due to reasons such as limited availability of down and up margins on account of 5% limits on the response provided by the generating stations, constraints in participation in SRAS by some regional generating stations due to issues of communication, stability issues cited by some lignite based thermal generating stations, and non-participation of Ultra Mega Power Plants (UMPP) generating stations.

8. On deployment of reserves for system security, the weekly report (26.12.2022 to 01.01.2023) by the Grid-India highlighted that Maximum SRAS Up and SRAS Down deployed for week were 1191 MW and 2072 MW respectively and that of RRAS UP and RRAS Down were 1394 MW and 2500MW. The reports also highlighted that the ISGS gas stations were also dispatched for RRAS, a few hours ahead of resource adequacy in anticipation of all India power supply scenario. Duration of dispatch of Gas units under RRAS and the maximum support are shown in the following table.

Date	Morning	Max. Support (MW)	Evening	Max. Support (MW)
26-Dec-2022	07:00 – 11:15	1092	-	
27-Dec-2022	07:45 – 10:45	847	-	
28-Dec-2022	08:00 - 11:00	1076	-	
29-Dec-2022	08:00 – 12:30	1073	14:15 – 17:30	879
30-Dec-2022	07:45 – 12:00	1246	12:00 – 15:45	693
31-Dec-2022	08:00 – 11:00	865		
01-Jan-2023	-	-		

9. During high and low frequency events, many States were not responding to bring grid frequency back into operative band. It was observed from the data provided by the Grid-India on deviation of States during high and low frequency events during the week 26.12.2022 to 01.01.2023 that some State entities had continued their under-drawal even in high frequency events (i.e. when grid frequency was above 50.05 Hz). While during low frequency period (i.e. grid frequency below 49.90 Hz), some States continued their over-drawal.

Consultation with other stakeholders:

10. The Commission also held meetings with the Regional Power Committees (RPCs), the regional entity generating stations and the wind and solar generating stations represented by their Associations to assess the implementation challenges and the operational behavior of the buyers and the sellers post implementation of DSM Regulations, 2022 and subsequent to the Order dated 26.12.2022. During the meeting held with RPCs, it was highlighted that there has been minor but not significant reduction in frequency excursion events post 28.12.2022.

It was informed that the ancillary resources are not being deployed as envisaged in the Ancillary Services Regulations to serve the required purpose and the reserves available with NLDC need to be assessed whether they are sufficient to control the grid frequency.

11. It was also suggested during the interaction with the RPCs that till the adequate reserves are made available with the system operator, appropriate incentive may be required for passive support from States to support the grid with available resources in their hand. It was suggested that indicative DSM rates may be made available ex-ante by the system operator to enable the States to take judicious actions to support frequency. RPCs also sought a few clarifications on various provisions of the DSM Regulations such as treatment of deviation for infirm power when it is scheduled by a generating station, treatment for deviation for drawal of start-up power, accounting of inter-regional and cross border entities etc.

12. The regional entity generators during their interaction with the Commission highlighted the difficulty in operating within the tight band of +/- 2% of schedule. They also requested for higher incentive for providing support during high and low frequency conditions.

13. The Commission also held discussion with the wind and solar generators represented by their Associations. They also expressed difficulties in their operation under the DSM Regulations, 2022. It was made out that the incentive / disincentive structure under the DSM Regulations, 2022 forced them to over schedule and under inject to avoid disincentive. It was made out that this affected the wind generators more adversely.

Analysis and Decision:

14. Based on the above feedback and consultation, the Commission observes that though some improvement in the frequency excursions above 50.05 Hz was observed, the overall frequency profile still remains a matter of concern. The required support from the buyers and the sellers in the form of Reserves and Ancillary Services, as was envisioned, under the Ancillary Services Regulations dated 31.01.2022, has not been forthcoming. The general impression given by the buyers and the sellers is that prior to 05.12.2022, when the deviation charges were linked to frequency, passive support from the buyers and the sellers used to come because of the inherent incentives in the Regulations which were applicable at that time.

15. The Commission would like to reiterate in this context that the basic intent of the Ancillary Service Regulations, 2022 was to transit the same sets of buyers and sellers, who were acting based on ‘commercial considerations’, to provide support for grid operation through an organized mechanism of Ancillary Services. Accordingly, the National Load Despatch Center and the Regional Load Despatch Centers were empowered to estimate, procure in advance and deploy various types of Ancillary Services to ensure that the frequency remains under control. Unfortunately, the desired behavior change in terms of participation through Ancillary Services has not happened.

16. As a result, there have been occasions when the costlier RLNG based gas generations were brought into service under RRAS to mitigate the likely capacity shortfall. Regular deployment of RRAS for a long duration is a matter of concern and reflects utter lack of Resource Adequacy in the system. The need for Resource Adequacy has been reiterated by the Commission time and again. It is desirable that every state balances load and generation within its control area and reduces Area Control Error (ACE). This is possible only when the State has robust Resource Adequacy plan on long term and short term (operational) time horizons, including provision for planning reserve margin (PRM). The States need to act on this aspect of procuring adequate resources in advance so as to meet demand reliably in all time frames. This will not only ease grid operation but also reduce the burden of the States in terms of DSM charges.

17. Further, reserves by design are meant to be preserved to meet contingency, but the trend is to use reserves to meet the ‘energy requirement’ of the system regularly leaving insufficient reserves for contingency. Power system as big as ours cannot sustain in such manner, more so when the country has embarked on an ambitious target of large scale of integration of variable renewable energy. Grid does not generate electricity and as such cannot be used as a platform for meeting energy needs or providing spinning reserves. Adequate generation resources and reserves must be maintained at all levels including at the State level.

18. Frequency excursions have revealed, inter alia inadequate primary response from the generators through their governors as mandated under the IEGC. Further, 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. Performance of neither has been satisfactory

as is reflected in the Grid-India report and revealed from interaction with the generators and other stakeholders. All this highlights the need for a detailed investigation into the causes and the Commission has accordingly decided to form a high-level committee of experts to go into detail the causes for inadequate primary and secondary response and suggest remedial measures. The Commission has also decided to roll out Tertiary Reserves Ancillary Service (TRAS) at the earliest and notification of date of effect of TRAS shall be issued shortly.

19. There is an urgent need for the system operator to estimate and procure adequate reserves and deploy them prudently, so as to avoid frequency fluctuations. System operators need to take all possible measures to enlarge the canvas of SRAS and RRAS/TRAS providers by enabling participation of State entities through necessary procedures. New and innovative technologies like energy storage systems and resources like aggregated demand response need be encouraged further for participation in SRAS and RRAS/TRAS.

20. While the market participants adjust to the new regime and align themselves to the vision of the Commission, it has become incumbent upon the Commission, given the continued frequency fluctuations, to intervene in the interest of grid security to induce the grid participants to behave in a manner that helps maintain grid frequency.

21. The Commission, therefore, feels it expedient to invoke its powers under Regulation 11 and Regulation 12 of the DSM Regulations, 2022 to relax and to remove difficulty in implementation of DSM Regulations highlighted by various stakeholders, as an interim measure, so as to ensure smooth and secure operation of the grid.

22. Regulation 11 of the DSM Regulations, 2022 provides as under:

“11. Power to Relax

The Commission may by general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected, may relax any of the provisions of these regulations on its own motion or on an application made before it by the affected party.”

23. 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.”

24. 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”. The relevant Section of the Act is reproduced below for ready reference:

“Section 79. (Functions of Central Commission): --- (1) The Central Commission shall discharge the following functions, namely: -

....

(c) to regulate the inter-State transmission of electricity;”

25. In the interest of grid security and based on the feedback of the stakeholders during consultations, the Commission in exercise of its powers under Regulation 11 and Regulation 12 of the DSM Regulations, 2022 and under section 79(1)(c) of the Electricity Act, 2003 (“the Act”) issues practice directions herein as delineated in the subsequent paragraphs.

26. Relaxation of Regulation 7 of the DSM Regulations, 2022:

The Commission hereby relaxes Regulation 7 of the DSM Regulations, 2022 to provide that the Normal Rate of Charges for Deviations for a time block as specified in Regulation 7 of the DSM Regulations, 2022 shall be 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.

27. Relaxation of Regulation 8 of the DSM Regulations, 2022:

The Commission hereby relaxes provisions of Regulation 8 of the DSM Regulations, 2022 and the said Regulation 8 shall be read as follows, until further orders:

- (1) The charges for deviation in a time block by a seller shall be payable by such seller as under:

Entity Seller	Charges for deviation payable to Deviation and Ancillary Service Pool Account	
	Deviation by way of over injection	Deviation by way of under injection
For a general seller other than an RoR generating station or a generating station based on municipal solid waste	Zero: Provided that such seller shall be paid back for over injection @ the reference charge rate for deviation upto [10% D_{GS} or 100 MW, whichever is less].	(i) @ the reference charge rate up to [10% D_{GS} or 100 MW, whichever is less]; (ii) @ 120% of the normal rate of charges for deviation by way of under injection beyond [10% D_{GS} or 100 MW, whichever is less] and up to [15% D_{GS} or 150 MW, whichever is less]; and (iii) @ 150% of the normal rate of charges for deviation beyond [15% D_{GS} or 150MW, whichever is less].
For a general seller being an RoR generating station	Zero: Provided that such seller shall be paid back for over injection @ the reference charge rate for deviation upto [10% D_{GS} or 100 MW, whichever is less].	(i) @ the reference charge rate up to [10% D_{GS} or 100 MW, whichever is less]; (ii) @ the normal rate of charges for deviation by way of under injection beyond [10% D_{GS} or 100 MW, whichever is less] and up to [15% D_{GS} or 150 MW, whichever is less]; and (iii) @ 110% of the normal rate of charges for deviation beyond [15% D_{GS} or 150 MW, whichever is less].
For a general seller being a generating station based on municipal solid waste	Zero: Provided that such seller shall be paid back for over injection up to [20% D_{GS}] @ 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) Zero up to [20% D_{GS}]: 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_{GS}] @ 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 all Power Exchanges for the respective time block; and (ii) @ normal rate of charges for deviation beyond [20% D_{GS}].

<p>For WS seller being a generating station based on solar or hybrid of wind –solar resources</p>	<p>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% D_{WS}]; 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% D_{WS}] and up to [15% D_{WS}]</p>	<p>i) Zero up to [10% D_{WS}] 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% D_{WS}] and up to [15% D_{WS}] 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% D_{WS}]: 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.</p>
<p>For WS seller being a generating station based on wind resource</p>	<p>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 [15% D_{WS}]; 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 [15% D_{WS}] and up to [20% D_{WS}].</p>	<p>(i) Zero up to [15% D_{WS}] 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 [15% D_{WS}] and up to [20% D_{WS}] 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 [20% D_{WS}]: 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</p>

		weighted average ACP of the Day Ahead Market segments of all Power Exchanges, for the respective time block.
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Note: D_{GS} means Deviation-general seller (in %); D_{WS} means Deviation-WS seller (in %)

- (2) The charges for deviation in a time block by a buyer shall be payable by such buyer as under:

Entity	Charges for deviation payable to Deviation and Ancillary Service Pool Account	
Buyer	Deviation by way of under drawal	Deviation by way of over drawal
Buyer (other than the buyer with schedule less than 400 MW and the RE-rich State)	<p>Zero: Provided that such buyer shall be paid back for under drawal as under:</p> <p>(i) @ 90% of normal rate of charges, for deviation up to [10% D_{BUY} or 100 MW, whichever is lower];</p> <p>(ii) @ 50% of normal rate of charges, for deviation beyond [10% D_{BUY} or 100 MW, whichever is lower] and up to [15% D_{BUY} or 200 MW, whichever is lower]; and</p>	<p>(i) @ normal rate of charges for deviation up to [10% D_{BUY} or 100 MW, whichever is lower];</p> <p>(ii) @120% of normal rate of charges for deviation beyond [10% D_{BUY} or 100 MW D_{BUY}, whichever is lower] and up to [15% D_{BUY} or 200 MW, whichever is lower];</p> <p>and</p> <p>(iii) @150% of normal rate of charges for deviation beyond [15% D_{BUY} or 200 MW, whichever is lower].</p>
Buyer (with schedule up to 400 MW)	<p>Zero: Provided that such buyer shall be paid back for under drawal @ 90% of normal rate of charges for deviation up to [20% D_{BUY} or 40 MW, whichever is lower].</p>	<p>(i) @ normal rate of charges for deviation up to [20% Deviation-buyer (in %) or 40 MW, whichever is lower];</p> <p>and</p> <p>(ii) @ 120% of normal rate of charges for deviation beyond [20% D_{BUY} or 40 MW, whichever is lower].</p>
Buyer (being an RE Rich State)	<p>Zero: Provided that such buyer shall be paid back for under drawal as under:</p> <p>(i) @ 90% of normal rate of charges for deviation up to [200 MW];</p> <p>and</p> <p>(ii) @ 50% of normal rate of charges for deviation beyond [200 MW] and up to [300 MW].</p>	<p>(i) @ normal rate of charges for deviation up to 200 MW;</p> <p>(ii) @ 120% of normal rate of charges for deviation beyond [200 MW] and up to [300 MW];</p> <p>and</p> <p>(iii) @ 150% of normal rate of charges for deviation beyond [300 MW].</p>

Note: D_{BUY} means Deviation-buyer (in %)

(2A) Notwithstanding anything contained in Clauses (1) and (2) of Regulation 8 of the DSM Regulations, 2022, the provisions of Clauses (2B) and (2C) as stipulated below shall apply irrespective of volume limit, in respect of the general seller other than an ROR generating station or a generating station based on municipal solid waste and in respect of the buyer, when the system frequency (hereinafter “f”) in a time block, is “below 49.95 Hz (i.e. $f < 49.95$ Hz)” or “above 50.03 Hz (i.e. $f > 50.03$ Hz).

(2B) When $f < 49.95$ 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 $[f \leq 49.90]$;
- (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 $[f \leq 49.90]$.

(2C) 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 $[f \geq 50.05]$;
- (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) @ 75% of reference charge rate, when $[50.03 < f < 50.05]$; and (ii) @ 50% of reference charge rate, when $[f \geq 50.05]$;
- (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 $[f \geq 50.05]$.

(3) (a) 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.

(b) The charges for deviation for drawal of start-up power before COD of a generating unit or for drawal of power to run the auxiliaries during 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.

(4) 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.

(4A) 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 respective category) or to a buyer (other than an RE-rich State), as the case may be.

(5) Notwithstanding anything contained in Clause (1) of Regulation 8 of the DSM Regulations 2022, 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.

(6) In case of multiple contracts, the contract rate or the reference rate referred to in Regulation 8 of the DSM Regulations, 2022 shall be the weighted average of the contract rates of all such contracts.

(7) 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.

28. The above directions of the Commission shall come into effect from 00.00 hours of 08.02.2023 and remain in force until further orders by the Commission. 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.

29. The directions in this Order are being issued in supersession of our Order in suo-motu Petition No. 16/MP/2022 dated 26.12.2022 which stands superseded after this instant Order taking effect. Accordingly, the Petition No. 01/SM/2023 is disposed of in terms of the above.

Sd/-
(P.K. Singh)
Member

Sd/-
(Arun Goyal)
Member

Sd/-
(I. S. Jha)
Member