CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

Petition No. 68/MP/2022

Coram:

Shri I. S. Jha, Member

Shri Arun Goyal, Member

Shri P. K. Singh, Member

Date of Order: 11.09.2023

In the matter of:

Petition under Sections 28(1), 28(3), 29 of the Electricity Act 2003 read with Regulation 2.3 of Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations 2010 (as amended) in the matter of dealing with over drawl from the grid by regional entities leading to insecure operation of the grid and other associated matters.

And in the matter of:
Western Regional Load Despatch Centre,
F-3, M.I.D.C. Area, Marol,
Andheri (East), Mumbai- 400 093 **……Petitioner**

Versus

1. Managing Director, Gujarat Urja Vikas Nigam Ltd.,
   Sardar Patel Vidyut Bhavan, Race Course, Gujarat, Vadodara-390 007

2. Managing Director, MP Power Management Co Ltd.,
   3rd Floor, Block No 11, Shakti Bhavan,
   Rampur, Jabalpur, Madhya Pradesh 482 008

3. Managing Director, Maharashtra State Electricity Distribution Co. Ltd.,
   5th Floor, Prakashgad, Bandra East, 400051
   Maharashtra Mumbai-400 051

4. Managing Director, Chhattisgarh State Power Distribution Co. Ltd.,
   PO - Sunder Nagar Chhattisgarh Raipur, Dangania - 492 013

5. Chief Engineer (LD), Gujarat Energy Transmission Corpn. Ltd.,

Gujarat, Vadodara- 390 021

6. Chief Engineer (LD), M P Power Transmission Company Ltd., SLDC, Madhya Pradesh, Jabalpur-482 008

7. Chief Engineer (LD), State Load Despatch Centre, MSETCL, Airoli, Maharashtra, Navi Mumbai - 400 708

8. Chief Engineer (LD), SLDC, Chhattisgarh State, Power Transmission Co. Ltd., Chhattisgarh, Bhilai-490 024

9. Member Secretary, WRPC, F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400 093

……Respondent(s)

Parties Present: Shri Aditya Das, WRLDC
Shri Ashok Rajan, WRLDC
Shri Alok Mishra, WRLDC
Shri Gajendra Sinh Vasava, WRLDC
Ms. Swapna Seshadri, Advocate, Gujarat SLDC
Shri Anup Jain, Advocate, MSEDCL
Shri Akshay Goel, Advocate, MSEDCL

ORDER

Western Regional Load Despatch Centre (WRLDC) (hereinafter to be referred as "the Petitioner") has filed the present Petition under Sections 28(1), 28(3) and 29 of the Electricity Act, 2003 read with Regulation 2.3 of Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations 2010 (as amended) for seeking appropriate orders from this Commission in the matter of dealing with over drawl from the grid by regional entities leading to insecure operation of the grid and other associated matters. The Petitioner has made following prayers:

i. R1-R4 to avoid overdrawing from the grid in compliance of Regulation 5.4.2 of the Grid Code and DSM Regulations of the Commission for reliable grid operation.

ii. R1-R8 to ensure generation adequacy of the state at all times as per their demand estimation & fuel supply position.

iii. *R1-R8 to ensure proper forecasting of demand and renewables & plan generation availability as per the profile of net demand (i.e. demand less RE generation) so as to avoid over-drawal from the grid.*

iv. *R1-R8 to implement of Automatic Demand Management Schemes (ADMS) / Load Trimming Schemes (LTS) in line with the Grid Code having its triggering signal linked to their deviation in a graded fashion.*

v. *R1-R8 for better coordination among hydro generation, agriculture load segregation and any specific load side ramp up/down limits to avoid large deviations.*

vi. *R1-R8 to take necessary actions for augmentation of intra state transmission system considering minimum internal generation scenario.*

vii. *R5-R8 to monitor intra-state ATC/TTC in real time & take corrective action as per the CERC (Measures to relieve congestion in real time operation) Regulations 2009 & the CERC approved Detailed Procedure under the said Regulations.*

viii. *R5-R8 to take up with their respective SERCs for implementation of intra-state reserves and ancillary support services framework as per recommendations of FOR-SANTULAN report.*

ix. *The Hon'ble Commission may issue any other direction as deemed just and proper under the facts & circumstances of the instant case.*

Submissions of the Petitioner

2. The petitioner WRLDC has mainly submitted as follows:

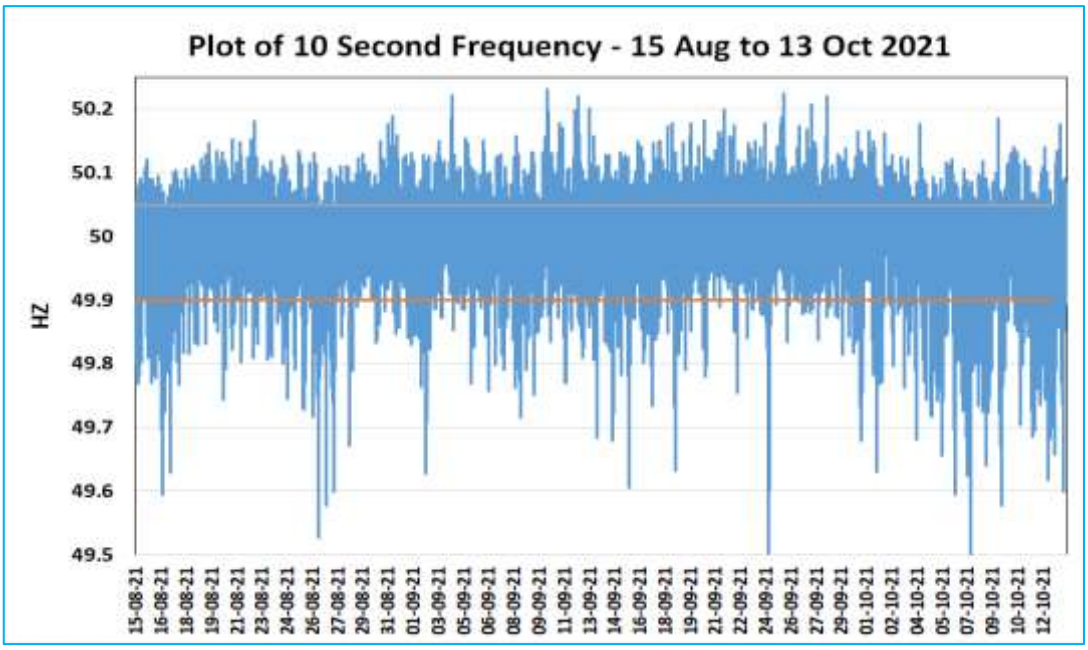
a. Petitioner is responsible for integrated operation of the electricity grid in Western Region which comprises of the power systems of Maharashtra, Gujarat, Madhya Pradesh, Chhattisgarh, Goa and union territories of Daman & Diu (DD) and Dadra Nagar Haveli (DNH).

The grid encountered critical operational conditions during Mid-August 2021 to Mid-October 2021 leading to an alert-state of the grid. The grid code (IEGC) has prescribed an operational band for grid frequency (49.90 Hz – 50.05 Hz). However, due to several reasons the frequency went below the lower limit (49.90 Hz) on multiple occasions during Mid-Aug to Mid-Oct 2021. Frequency remained below 49.90 Hz for a cumulative duration of 117 hours during the said period. On a few occasions, the grid frequency even touched very low values ranging from 49.5-49.7 Hz thereby driving the grid to an insecure state. Frequency remained below 49.7 Hz for a cumulative duration of 4.2 hours during the said period.

Frequency declined below 49.90 Hz on 42122 instances

Frequency declined below 49.70 Hz on 1507 instances

The frequency plot is as follows:



Time series plot of Grid Frequency from 15.08.2021 to 13.10.2021

b. Decline of grid frequency to such low levels makes the grid vulnerable to any large contingency during those periods of low frequency. The frequency dipped to 49.5 Hz on a few occasions on 26.08.2021 and 24.09.2021 making it extremely alarming.

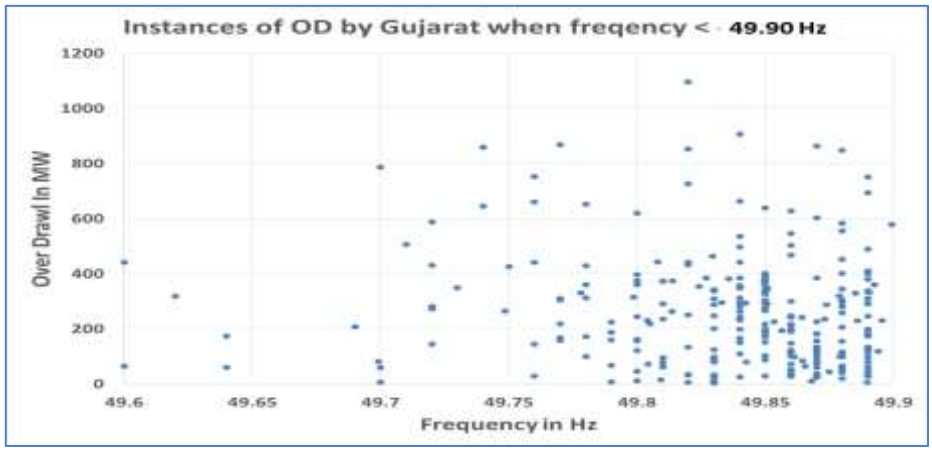
c. During the said period several factors contributed to a fast rise in electricity demand viz. extended dry weather spell due to early receding of monsoon, demand revival in many states after the 2nd wave of COVID etc. Apart from the demand side constraints there were challenges from the supply side viz. lower fuel supply for coal fired power plants, lower hydro reservoir levels, planned & forced generation outages, reduction in wind/solar generation etc.

d. Massive over-drawl from the grid by various constituents of Western Region due to various reasons aggravated the situation and led to prolonged periods of low frequency operation. Any untoward tripping or incident during such stressed operational condition would have led to a major disruption/disturbance in the Grid. e.g. on 26.08.2021 (at 11:13 hours) 1700 MW of solar generation at Badhla (in NR) led to fall in grid frequency from 49.91 to 49.75 Hz.

3. The state wise data of over drawal is as below:

Gujarat

a. From the 15-minute time block wise over-drawal (OD) from the grid during the period (mid Aug - Oct 2021) for Gujarat, it can be seen that over-drawal by Gujarat remained in the range of 400–1200 MW in several time blocks even at a frequency below 49.90 Hz which can be observed in the plot. Also, Gujarat's drawal from the grid also exceeded its import capability (ATC/TTC).



Gujarat over drawl in MW at frequency < 49.90 Hz during 15.8.21-13.10.21

b. Gujarat had met 0.5 % to 2.5% of its daily energy consumption by over drawing from the grid by 2-7 MUs. Gujarat had met around 20-35% of its daily energy consumption by purchase from various segments of the short-term electricity market i.e. STOA-bilateral, day ahead market and real time market.

c. During the said period, the thermal generation outage of the state of Gujarat was in the range of 5000 – 10000 MW out of which around 4000-6000 MW capacity was out on coal shortage as reported by SLDC which would be in the Range of 25%-50% of its installed capacity. 700-3000 MW generation capacity was out on reserve shut down (RSD).

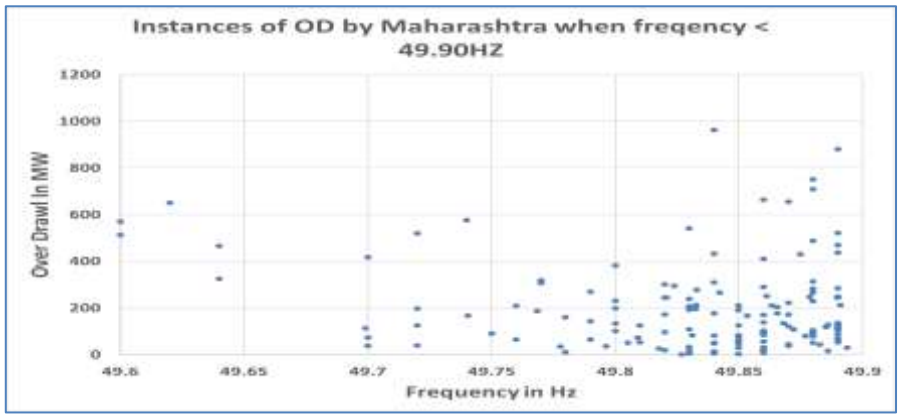
d. The internal generation declined significantly (by 100-120 MUs per day) from last week of August 2021 possibly due to planned/forced outage. The daily energy

consumption peaked up by 100 MUs from end of September to first week of October during which the low frequency operation was encountered.

e. Thus, the above-mentioned factors viz. higher thermal generation outage, low hydro, variable wind, declined internal generation etc. called for necessary planning well in advance by the state for meeting the rising demand post monsoon so as to avoid over-drawl from the grid.

Maharashtra

f. The over-drawal by Maharashtra remained in the range of 200-900 MW in several time blocks even at a frequency below 49.90 Hz as can be observed from the plot given below.



Maharashtra Over drawl during Aug-Oct 2021

g. Maharashtra has over-drawn in the range of 1-7 MUs during the said period. Maharashtra has met 0.5 % to 1% of its daily energy requirement by over drawing from the grid. Maharashtra has met around 4-8% of its daily energy consumption by purchase from various segments of the short-term electricity market. Short-term purchase peaked up to 12-14 % of daily consumption during 20-28th September 2021, out of which 2-4% was procured from the real time market.

h. The thermal generation outage of the state of Maharashtra was in the range of 3000-6500 MW which is 15% - 30% of the installed capacity. Around 500-800 MW thermal capacity remained out on coal shortage till mid-September which subsequently increased to around 3000 MW from last week of September till mid of October 2021 (as reported by SLDC Maharashtra). Significant capacity was

under RSD during the said period which could have been revived to reduce over drawal.

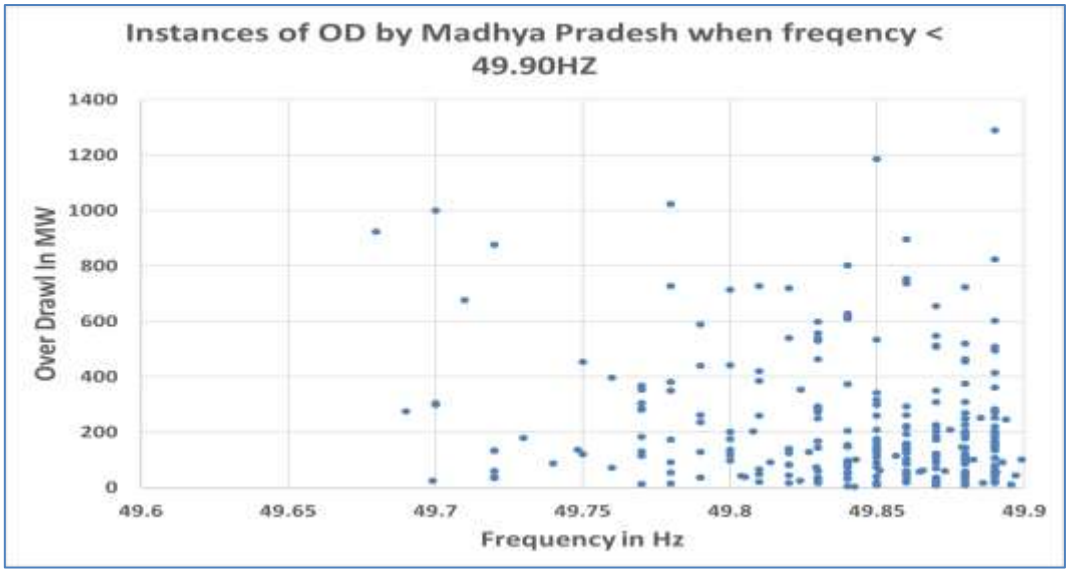
i. Maharashtra operated its hydro generation close to maximum capacity during the said period barring a few days in August & September 2021 and the daily wind generation of Maharashtra varied widely in the range of 10-50 MUs whereas solar generation remained comparatively steady (5-8 MUs).

j. The internal generation declined by 30-40 MUs per day from mid-September till first week of October 2021 possibly due to planned/forced generation outage during which the low frequency operation was encountered. There was no significant fall in energy consumption which remained around 450-460 Mus.

k. Thus, the above-mentioned factors viz. higher thermal generation outage, variable wind speeds, declined internal generation etc. called for necessary planning well in advance by the state for meeting the rising demand post monsoon so as to avoid over-drawl from the grid.

Madhya Pradesh

l. The over-drawal by Madhya Pradesh remained in the range of 400-1200 MW in several time blocks even at a frequency below 49.90 Hz as can be seen from the plot below.



Madhya Pradesh over drawl at frequency < 49.90 Hz

m. MP has over-drawn in the range of 2-9 MUs during the said period. MP has met 0.5% to 4% of its daily energy requirement by over drawing from the grid.

n. During the said period MP has sold energy in the range of 3% to 16% of its daily energy consumption (i.e. 5-30 MU) in short term market. The, short term sale by MP was in the range of 20-30 MUs during 19-Sep-21 to 03-Oct-21 during which MP was significantly overdrawing and it was during this period when the grid encountered very low frequency operation (49.5 Hz to 49.7 Hz).

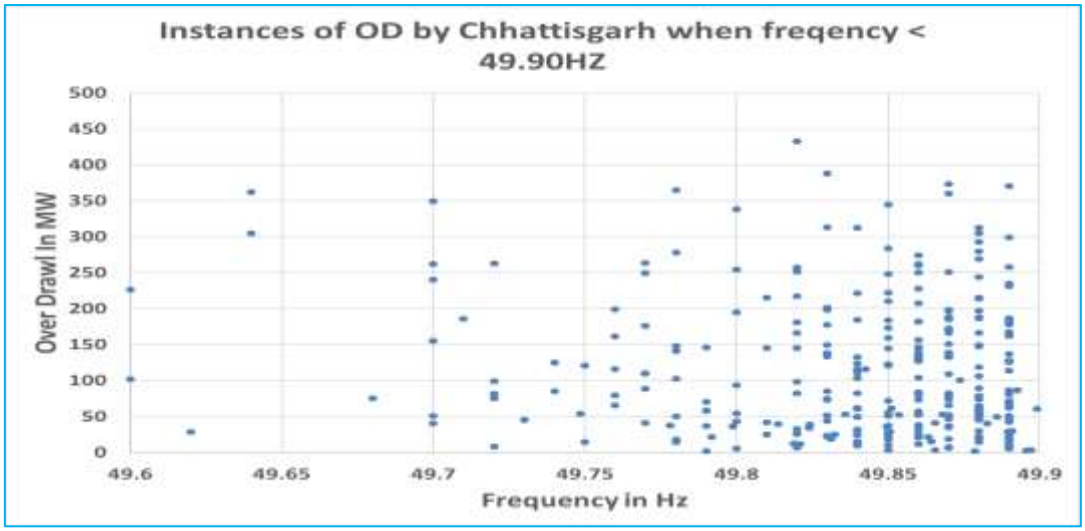
o. The thermal generation outage of MP was in the range of 2500-6500 MW which would be 20-30% of its installed capacity. Around 600-700 MW thermal capacity remained out on coal shortage as reported by SLDC MP. Further, MP hydro generation remained on lower side during Sep-Oct 2021 possibly due to low reservoir levels. The daily wind generation of MP varied widely in the range of 2-25 MUs whereas solar generation remained comparatively steady (4-8 MUs).

p. The internal generation declined by 20-30 MUs (per day) from end of August till last week of September 2021 possibly due to planned/forced outage. And during this period the grid operated at low frequency for a significant amount of time. During the said period, there was no significant fall in daily energy consumption of the state which remained in the range of 200-240 MUs barring 2-3 days in September 2021.

q. Thus, the above-mentioned factors viz. higher thermal generation outage, low hydro, variable wind speeds, declined internal generation etc. during the said period called for necessary planning well in advance by the state for meeting the rising demand post monsoon so as to avoid over-drawl from the grid.

Chhattisgarh

r. Even at a low grid frequency (below 49.90 Hz), the over-drawal by Chhattisgarh remained in the range of 200-450 MW in several time blocks (which would be ~20-30% of its drawal schedule). Further, such excessive drawal by Chhattisgarh, on several occasions, led to violation of import transfer capability (ATC/TTC) of the state thereby causing insecure operation of the grid:



OD by Chhattisgarh at frequency < 49.90 Hz

s. Chhattisgarh has over-drawn in the range of 0.5-3.5 MUs during the said period. Chhattisgarh has met 1% to 3% of its daily energy requirement by over drawing from the grid. From 19.09.21 to 05.10.21 Chhattisgarh has sold in the range of 3% to 15% of its daily energy consumption (i.e. 2.5-12 MUs) in short term market. This short term sale by Chhattisgarh was in the range of 8-12 MUs during 19.09.2021 to 26.09.2021 during which Chhattisgarh was significantly overdrawing.

t. The thermal generation outage of Chhattisgarh was in the range of 200-1000 MW which would be 2-12 % of its installed capacity. Around 200-500 MW thermal capacity remained out on coal shortage for most of the days in the said period as reported by SLDC Chhattisgarh.

u. The state has only one hydro power station (3x40 MW Hasdeo Bango) which has operated close to its maximum most of the time.

v. The internal generation declined by 10-12 MUs (per day) from 2nd week till last week of September 2021 possibly due to planned/forced outage. Further from 2nd week of September till mid-October 2021 there was significant rise in daily energy consumption (by 18-20 MUs) of the state whereas the rise in internal generation was not commensurate to this rising electricity demand post the monsoon season.

w. Thus, the above-mentioned factors viz. higher thermal generation outage, declined internal generation etc. during the said period called for necessary planning well in advance by the state for meeting the rising demand post monsoon so as to avoid over-drawl from the grid.

4. The Regulation 5.2 (m), 5.3 (c), 5.4.1 and 5.4.2 of the Grid Code requires that all entities including SLDCs and distribution licensees must take necessary precautions and plan in advance so as to contain their drawal from the grid so that there is no over-drawal. Accordingly, it is necessary that all regional entities viz. states/distribution licensees/bulk consumers must take requisite measures to adhere to their drawal schedule and must not over-draw from the grid for reliable & secure operation of the grid. Further, Regulation 7.1 of the CERC (Deviation Settlement Mechanism and related matters) Regulations also provide for inadvertent deviation by regional entities within a defined limit when the grid frequency remains within a specified band.

5. The CERC order dated 13.10.2015 in the suo moto Petition no. 11/SM/2015 in the matter of road map to operationalise reserves in the country also observed that un-scheduled inter-change (UI) mechanism cannot be used as platform for meeting the energy demand of the utilities. The Commission in the aforesaid order also observed that last mile imbalances are inevitable, but for this reliance on the grid is not desirable. This calls for planning of adequate reserves needed to address such last mile imbalances.

6. The summary of actions Taken by WRLDC is as follows:

Warning Messages

a. In compliance to the regulation 5.4.2 of the Grid Code, WRLDC regularly gives warning messages to the overdrawing constituents in western region (WR). A

brief summary of the number of such messages issued by WRLDC during the said period is given in the table below:

Constituent Name	Number of Violation Messages Issued by WRLDC u/s 5.4.2 of IEGC	Remarks
Gujarat	267	To control OD/UD
Maharashtra	164	To control OD/UD
Madhya Pradesh	194	To control OD/UD
Chhattisgarh	88	To control OD/UD

Emergency Measures

b. The latest version of the Operating Procedure for Western Regional Grid was issued in July 2021 after deliberation in 544th OCC meeting of WRPC. WRLDC was constrained to take several emergency measures during the above period by opening identified radial feeders to contain over drawal and to restore grid frequency to safe operating limits. Summary of emergency measures taken by WRLDC during the said period is summarized in the table below:

Constituent Name	Number of Emergency Measures implemented	Remarks
Gujarat	39	To control OD
Maharashtra	22	To control OD
Madhya Pradesh	27	To control OD
Chhattisgarh	7	To control OD

Discussion in OCC & Special meeting convened by WRLDC

c. The matter is being regularly taken up by WRLDC in the various OCC meetings of the WRPC. Apart from deliberations in OCC, WRLDC convened a special meeting on 25.09.2021 in view of then ongoing stressed operational scenario leading to very low frequency conditions (49.50 Hz on 24.09.21). Representatives from the four major states of WR attended the meeting wherein a detailed review of the current situation was taken by WRLDC and the future

plan to maintain load - generation balance in the grid was shared by the state representatives.

Taking up the matter with senior officials of the States

d. Several letters were issued by WRLDC to the Heads of various state utilities highlighting the over-drawl of the respective states and seeking their urgent intervention to contain the OD for reliable operation of the grid.

Operational conditions during October 2021 to January 2022

e. It was observed that similar pattern of over-drawal and low frequency operation continued even after October 2021. Even at a frequency below 49.90 Hz, Gujarat has over drawn in the range of 600-1100 MW, Maharashtra has over drawn by 800-1000 MW, Madhya Pradesh has over drawn by 700-1100 MW, Chhattisgarh has over drawn in the range of 200-300 MW.

f. During the period of stressed operation of the grid (Aug – Oct 2021), while the factors like poor coal supply leading to outage of a significant capacity of thermal generation, low reservoir levels leading to less hydro generation after September 2021, lower than normal wind generation contributed to the supply side constraints, the post COVID growth in electricity demand, early receding of monsoon (in August 2021) leading to sharp rise in demand added to stress from demand side. Under such stressed operational scenario, heavy over-drawal by major states resulted in sustained low frequency operation especially during peak hours.

   Accordingly, the following measures are proposed for implementation for avoiding recurrence of such conditions in future:

   i. **Avoiding Heavy reliance on Day Ahead market:** Heavy reliance on such last mile avenues for peak power portfolio management has apparently rendered the state utilities helpless and they resorted to overdrawing for meeting the peak demand thereby making the grid vulnerable, as considerable time would be lost in carrying out any unscheduled load shedding at last moment to control over drawl. Thus, the states must avoid over reliance on DAM & RTM for peak power.

ii. **Demand estimation & management:** Lack of adequate demand management measures as mandated under grid code [IEGC (5.3(c)] led to reliance on the grid which led to heavy over-drawal by the states. Thus, the states must ensure proper demand estimation in different time horizons as specified in IEGC and ensure necessary demand management measures (such as automatic demand management scheme (ADMS), load trimming schemes (LTS) etc. in advance as advised by respective SLDCs so as to avoid over drawl during real time operation.

iii. **Better Coordination for ramp management:** Proper coordination with hydro generator and agriculture load segregation should be done keeping in view the ramp constraints.

iv. **Better RE Forecasting & scheduling:** The states must improve their current forecasting infrastructure for better forecasting of demand and renewables.

v. **Measure for Addressing Generation Adequacy:** The states must ensure generation adequacy at all times (based on their forecasted demand) by reviving their generating units under outage (viz. reserve shut down) due to economic reasons.

vi. **Fuel Security and Adequacy statements:** The states may review the supply side issues periodically and take up with appropriate agencies / authorities well in advance to ensure fuel security for their generators. Based on the assessment of fuel supply & other constraints each state may prepare a quarterly generation adequacy statement. This would help in addressing the deficit scenario well in time & thus avoiding last minute distress measures.

vii. **Augmenting Intra-state transmission system and monitoring of TTC/ATC violation by SLDCs:** the internal networks within the states need to be adequately planned & augmented to handle such stressed scenarios caused by low internal generation & heavy over-drawal by states.

viii. **Reserves and ancillary services at state level:** the necessary spinning reserves must be maintained at all times by the SLDCs through periodic unit commitment. In Feb 2019, the Forum of Regulators (FOR) technical committee constituted an expert group for suggesting modalities for rolling out a framework for intra-state reserves and ancillary services which submitted its report namely 'SANTULAN' in January 2020. The recommendation of SANTULAN report needs to be implemented by all the states on priority. This would provide necessary tools to SLDCs for handling last mile imbalances by deployment of intra-state reserves as ancillary services (instead of over-drawing) for reliable operation of the grid.

ix. **Utilizing Pump Hydro Power Stations for peaking and ramping:** Pumped hydro storage units can be used as a source for providing peaking reserve and ramping reserve for managing imbalances. The energy required for pumping water from lower to upper reservoir may be drawn during off peak hours or high RE periods during the day and the stored energy can be utilized to provide peaking/ramping support during evening/morning peak hours.

Hearing dated 21.04.2022:

7. The matter was heard on 21.04.2022 and the Commission admitted the Petition and observed that while the Petitioner highlighted the critical grid conditions during the period in question, the prayers made in the Petition relate to generic directions to the constituents. The Commission directed the Petitioner to quote specific instances wherein constituents have repeatedly not complied with the directions issued by the Petitioner for maintaining the grid discipline and thus, violations of the concerned provisions of the Act and/or the Grid Code by such constituents. In response, the Petitioner sough liberty to file an additional affidavit bringing about such instances and to modify its prayers accordingly and the Commission allowed the Petitioner to file Additional affidavit along with details.

Submissions of the Petitioner

8. The Petitioner vide affidavit dated 04.05.2022 has mainly submitted as following:

Instances of repeated violation of the Act and the Grid Code:

a. Summary of violation of Regulations by the Respondents during 15.08.2021 to 13.10.2021 is as under:

Regulations violated	State	Number of occasions (No. of time blocks)
5.4.2(a) & (b) of Grid Code (Over-drawal in excess of schedule)	Gujarat	2891
	Maharashtra	2042
	Madhya Pradesh	3236
	Chhattisgarh	3524
5.4.1, 6.4.7 of Grid Code and 7.1 of DSM Regulations	Gujarat	856
	Maharashtra	406
	Madhya Pradesh	802

(Over-drawal in excess of DSM volume limit)	Chhattisgarh	616

b. Despite over-drawing in excess of the stipulated deviation limit (under DSM regulations) in several time blocks, no relief from any Automatic Demand Management Scheme (ADMS) could be seen which is in clear violation of regulation 5.4.2(d) and 6.4.7 of the Grid Code.

c. During the said period (Mid Aug-Oct 2021), as per regulation 5.4.2 and 6.4.12 of the Grid Code, WRLDC had issued a number of warning messages to the overdrawing constituents to control their over-drawal. However, despite such warning messages, many a time the overdrawing constituents failed to act upon and reduce their over-drawal, resulting in repeated non-compliance of WRLDC instructions. Consequently, on multiple occasions, WRLDC was constrained to take emergency measures (i.e. manual tripping of identified feeders to contain over-drawal). Number of emergency measures taken by WRLDC on each state during the said period are listed below, which clearly establish the repeated non-compliance of WRLDC instructions.

Constituent Name	**No. of Emergency Measures* implemented by WRLDC due to failure by the state to control OD despite repeated warning**
Gujarat	39
Maharashtra	22
Madhya Pradesh	27
Chhattisgarh	7
*NB: Each emergency measure by WRLDC can be attributed to non-compliance of WRLDC instructions to reduce over-drawal for safe & reliable operation of the grid	

d. The Petitioner requested to modify prayers and has mainly proposed to add another prayer *of "Initiate appropriate penal action against Respondents R1-R8 under section 29(6) and section 142 of the Act due to repeated violations/non-compliances as depicted at Para 8 to 11 of the instant affidavit.*

Reply of Maharashtra SLDC (MSLDC)

9. MSLDC vide affidavit dated 27.05.2022 mainly submitted as follows:

a. Maharashtra is the highest energy consuming state with the Maximum Demand of 28845 MW FY 2022-23. Further, Maharashtra is also a major constituent of the Western Region having demand of around 40 % to 45 % of the total demand in the Western Region.

b. As per 175th Load Generation Balance Report (LGBR) dated 31.03.2021 issued by WRPC, it is seen that the un-restricted demand of the state is fully met through long term procurement (long term availability) and a small surplus power ranging from 2-9% was available during Aug-21 to Oct- 21. The extract of the same is given in below table:

Particulars	Aug-21	Sept-21	Oct-21
Net Power Availability (MW)	24737	25417	24659
Max. Un-restricted Demand (MW)	23650	23940	24172
Surplus (+) / Deficit (-)	1087	1477	487
% age	4.59	6.16	2.01

c. Only 700 MW power purchase was planned under STOA that too in the month of Sept 21. However, maximum STOA purchased during the month Aug 21, Sept 21 and Oct 21 were 3762 MW, 4808 MW and 3603 MW respectively.

d. During the period Mid Aug-21 to Oct-21 the various thermal generating units were out for various reasons. Further Fifteen (15) Units of capacity of 5190 MW were under outage due to coal shortage.

e. Whenever there was over-drawal by Maharashtra, MSLDC utilised hydro generation quickly to reduce the over-drawl. Further, as most of the units were under outage due to shortage of coal & poor coal receipts, the state hydro generation was picked up to the full generation capacity in the second half of month of Aug-21 & full month of Sept-21 and Oct-21.

10. The actions already taken by MSLDC and proposed measures as below:

a. Demand management measures are implemented through directions and automatic demand management is done through under frequency load shedding

from 49.4 Hz onwards till 48.80 Hz in four steps as per the scheme developed by WRPC.

The ADMS scheme was prepared by MSLDC in 2016-2017, however due to some administrative decision the scheme could not be formulated & implemented. To control the state demand, ADMS is useful in today's scenario. Hence, it is decided to formulate new scheme with revised rates & MSLDC is in process of implementation of ADMS scheme in Maharashtra

b. LTS is installed & functional at various locations in the state of Maharashtra to relieve over loads due to contingencies & secure the power system. Existing LTS schemes to control 400kV line loadings connected to MMR & Mumbai area have been reviewed and revised LTS has been prepared. This revised LTS has been approved by WRPC. The Scheme has been sent to concerned transmission licensees /utilities for implementation

c. In Maharashtra due to availability of significant hydro generation in conjunction with thermal generation load ramp can be easily managed at present. Further, MSLDC is finalising Spinning Reserve of 780 MW for which procedure was already prepared which is pending for regulatory process & approval.

d. There are 3 nos. of engineers working in REMC Section. The real time desk of REMC is operative and total 5 nos. of outsourced personnel are working in shifts for real time operations & scheduling activities.

e. Fuel stock can be better managed by the generating companies and state/ regional level co-ordination can be done by WRPC & CEAA. However, while scheduling generation MSLDC takes care of fuel availability constraints. At present demand estimation is done by the respective Discoms. Further, MSLDC is maintaining the record of coal & oil stock positions in DSR [Daily system report].

f. LGBR is maintained by operating MoD in decentralized manner & purchasing of power in short term market is allowed as per ATC/TTC limits. Depending up on LGBR & fuel position, the RSD/Zero Schedule of generating units is managed. Koyna hydro station is having capacity of 1920 MW & is utilized during real time

operation to avoid over drawal in the grid. In addition, pumped storage units at Ghatghar are used as per System condition.

g. RE forecasting is operational in Maharashtra through REMC & dedicated staff has been deputed for monitoring accuracy of forecast & schedules.

h. The Agricultural demand feeders in the State have been segregated and supply to these feeders is provided at different time frames excluding peak demand hours. Under Mukhyamantri Krushi Saur Vahini Yojana, dedicated Solar Generation Systems have been planned and implemented through which power supply to Agricultural feeders is provided. In such case, AG demand is not catered through the grid.

i. MSLDC is preparing Quarterly Operation Feedback Report wherein all the issues related to congestion in the existing network are elaborated. This report is submitted to STU & MSETCL which are responsible for planning & development as input for planning process.

j. MSLDC computes TTC/ATC for inter - area transfer of power between rest of Maharashtra and Mumbai for different scenarios of embedded generation in Mumbai area. Several actions have been initiated to augment transfer capability in this corridor to meet future demand growth of Mumbai area by importing power as it is less feasible to increase embedded generation.

k. The procedure for Congestion management as per MEGC 2020 is developed by STU in co-ordination with SLDC which is under regulatory process and approval.

l. The issue of implementation of the recommendation of SANTULAN report will be taken up with MERC.

Reply of Respondents MPPMCL & MPPTCL

11. MPPMCL and MPPTCL through combined affidavit dated 30.05.2022 has submitted as follows:

a. MPPMCL and MPPTCL have always endeavoured to put forth their best efforts to adhere to Grid discipline and also to ensure safe and secure operation of the

integrated Grid. During the period of consideration by the Petitioner, no Grid disturbance in the integrated grid could be attributed to the State of Madhya Pradesh. The facts and prevailing circumstances which lead to inadvertent over drawal in the State of Madhya Pradesh during the period of 15th August to 13th October, 2021 are as under:

i. MP is pre-dominantly an agriculture State. During the monsoon season, if dry spell observed for a longer period the agriculture pump load starts increasing which cannot be assessed accurately and variability is to be managed by the System Operator as well as by the MPPMCL.

ii. The Wind Generation has contributed substantially during the summer and monsoon season in catering to the consumer load of the State. Accuracy of forecasting of Wind Generation is about 75% on day ahead basis as well as on real time revisions. The unpredictability of Wind Generation on some of the occasions causes overdrawal / under drawal from the Grid beyond IEGC deviation limits.

iii. Due to low reservoir level, Madhya Pradesh could not get desired generation from the Indira Sagar, Omkareshwar and Sardar Sarovar Hydro Projects.

iv. The situation of coal shortage forced Singahji TPS to run only 2 units that too on technical minimum. One unit of 660 MW capacity of Khargone NTPC in which MP is having 50% share was also under long outage. Violation on part of Madhya Pradesh had been slightly on higher side during the last week of August, 2021 as several units of IPPs and NTPC were either under Forced Outage or Planned Outage.

v. State of Madhya Pradesh does not depend on meeting consumers demand by over drawal from the Grid as it is having adequate capacity of Hydro Generation for meeting peak demand as well as contingent requirement. However, as no option was available, M P Power Management Co. Ltd. has purchased power from the open market to meet short term demand.

vi. The over drawal by Madhya Pradesh from the Grid to the tune of 700 to 1100 MW has not been persistent. MP is pre-dominantly an agricultural State and 10

hours three-phase committed supply (6 Hrs. + 4 Hrs.) in three groups has been given for irrigation purpose.

b. The development of Energy Portfolio Management System by Power Finance Corporation Consultancy Limited (PFCCL) for MP Power Management Co. Ltd. is in final stage. This System shall take care of optimum scheduling of power as well as quantum to be sold / purchased under Short Term Open Access. Thus, the manual errors which may cause over drawal or under drawal from the Grid would be minimized.

c. The Automatic Demand Management Scheme (ADMS) has been in place in the State of MP since long. 65 numbers of Load Trimming Scheme (LTS) have been installed in State Transmission Utility (STU) network in MP at critical locations to ensure safe, secure & reliable operation of the Grid under any contingency.

d. The Renewable Energy Management Centre (REMC) is functional with RE Desk at MP SLDC. RE Generators located within the State of MP are also submitting the forecasted generation to SLDC on day ahead basis as well as revise the forecasting during the real time of operation.

Reply of MSEDCL

12. MSEDCL vide affidavit dated 31.05.2022 mainly submitted as under:

a. Petitioner has not considered that in Maharashtra, other than MSEDCL there are other Distribution Companies which are carrying out business of Electricity Distribution which are Adani Electricity Mumbai Limited, Brahan Mumbai Electric Supply & Transport (BEST), TATA Power, Indian Railway, EON Khardi Phase-I, EON Khardi, Phase-II, GEPL SEZ, KRC, LBSCM, MBPPL & Niddar. Petitioner has also not considered any of Intra State Generators which may also responsible for Frequency variation.

b. The summary of the actions taken by MSEDCL to balance its Load- Generation imbalances are as below:

i. The Hydro resources contracted by MSEDCL were utilised to their maximum possible capacity even though there is restriction on use of Water on Annual Basis during the mentioned period.

ii. During the period from 15th Aug-2021 to 13th Oct-2021, MSEDCL has purchased 679.36 MUs from Market with rate of Rs. 20 per unit with Maximum purchase Quantum being upto 3600 MW.

iii. The regular Meetings were taken with all the Thermal Contracted Generators for improving Coal stock. Further, to optimise the coal utilisation, Generators (MSPGCL, APML, Dhariwal, etc.) were asked to provide Maximum possible generation (DC) during peak Demand period and to run plan near to Technical Minimum during off-peak period

iv. MSEDCL also explored option of Banking of Power from Other States and scheduled 200 MW power from 16th Oct -2021 to 30th Nov 2021 & 16th Feb 2022 to 31st March 2022 from Tata Power Delhi Distribution Company Ltd (TPDDL).

v. In order to manage morning peak & evening peak demands the three-phase availability to Agricultural consumers was reduced by 2 hours i.e. restricted to 08 hours in both the slots. Further in order to manage demand/ ramp of demand the time staggered manner time schedule to each AG group is issued to avoid sudden rise/drop in demand due to Agricultural load switching.

c. Even after taking all of the above efforts by MSEDCL, there were some over-drawl instances in the state, for which MSEDCL alone cannot be considered responsible, as other DISCOM / generators are also involved.

d. Being a RE rich State, Maharashtra has a UI limit of +/- 250 MW. Out of 357 instances of Over-Drawl above 250 MW, there are 20 Over-Drawl instances when Grid Frequency was more than 50.05 Hz and does not fall under violation of clause 7.1 of CERC (DSM & related matter) regulation 2014. Hence even after such acute power shortage, violation for state as a whole is only 5.85% and out of which 1.05% violation when frequency below 49.85 Hz.

e. From Market Monitoring report of Aug-2021 to Oct-2021, the Maharashtra net UI energy was negative which clearly indicated that Maharashtra was not using Grid as source of power as it was not relied on Grid Energy; in fact, energy was supplied to the Grid.

f. MSEDCL has installed SCADA in 8 Major Towns viz. Amravati, Nasik, Pune, Malegaon, Sangli, Solapur, Greater Mumbai, and Kolhapur and to have real time data visibility of all Distribution Substation, Tender was floated under "Substation Monitoring Scheme" on 03.07.2019; however, the same has not materialized due to poor response for the Tender. Subsequently, Tender was again floated on 14.12.2021 but due to poor response to said tender, extensions has been given upto 06.06.2022. Once this scheme materializes, MSEDCL would have real time data of all Distribution Substation.

g. During the said period Maharashtra had scheduled 8798.95 MUs and drawn 8662.47 MUs. Hence effectively there has been an under-drawl during this period by Maharashtra with respect to the scheduled drawl. The UI during the said period is 136.48 MU.

h. Further, to meet out the peak demand, MSEDCL has most of Power Purchase Agreements under Long Term. MSEDCL has tried to meet the demand through its contracted sources and even has operated hydro generation at full capacity risking the availability of water supply for generation during the peak summer months of April and May 2022.

i. Though generators have latest techniques to forecast solar and wind generations, there are forecasting errors which take place at the time of actual injection. The concept of flexible RE and RE with storage is coming up to cope up with the variation in RE generation.

j. As per clauses 4.1, 5.3, 5.14 of the MERC (REF&S) Regulation 2018, all RE Generator (Wind & Solar) having installed capacity above 5 MW needs to submit its schedule to MSLDC. The Deviation charges are levied only when Absolute Deviation which is based on Installed capacity exceeds 15%. Due to this clause, deviation of RE Generators also affect MSEDCL, as they have not been penalized for less Generation upto 15% of its installed capacity/available capacity.

k. MSEDCL for the upcoming years has already taken up the power purchase planning so as to meet the shortage in supply due to continued planned/forced outage and short supply of coal. MSEDCL has requested to tie up power from

NTPC plants having PPA with those States which have surrendered their power due to surplus scenario in their State.

l. With regards to additional reserves, SLDC has already issued guidelines for Spinning Reserves in the State of Maharashtra where all beneficiaries have to keep 3% of spinning reserves with respect to the on-bar generation. The guidelines are under public consultation and are expected to be finalized soon.

Submissions of Petitioner:

13. The Petitioner vide affidavit dated 20.06.2022 in their rejoinder to the replies filed by MPPMCL & MP-SLDC, MSEDCL and MSLDC has mainly submitted as follows:

With respect to the reply of MPPMCL and MPPTCL

a. The Real Time Market (introduced from 01.06.2020) is an excellent avenue for the Respondents to manage their imbalances closer to real time by suitably changing positions (buy/sell) depending on the prevailing load-generation conditions.

b. From the frequency vs. over-drawal plots for Madhya Pradesh it was seen that they have violated DSM volume limit of 250 MW in 802 number of time blocks during the said observation period. This indicates that the implemented logic for the ADMS schemes needs to be reviewed and linked to the level of prevailing frequency, and the extent and duration of over-drawal in line with the volume limits as per the Grid Code and the DSM Regulations.

With respect to the reply of MSEDCL and MSLDC

c. MSEDCL is the only regional entity of Maharashtra whose scheduling, energy accounting and deviation settlement fall under the control area jurisdiction of WRLDC. Despite the measures employed by MSEDCL, there were over drawal by Maharashtra in several time blocks and the over-drawal was in excess of the DSM volume limit of 250 MW in 406 number of time blocks. This calls for a review

of the existing demand management plan as well as action towards having adequate reserves at the disposal of the SLDC.

d. While the actions taken by MSLDC are appreciated, it was desirable that the generation which were given zero schedule by the distribution companies and kept under reserve shut down should have been revived at the earliest.

e. Similarly, the provision for spinning reserves suggested in the CERC order dated 13.10.2015 in Pet. No. 11/SM/2015 must be implemented urgently. Even though no major grid disturbance occurred during the period (15.08.2021 to 13.10.2021), still, the grid was subjected to a significant period of stressed operation due to persistent low frequency and over-drawal by the Respondents.

Reply of Respondent SLDC Gujarat

14. Gujarat SLDC vide affidavit dated 08.06.2022 opposed the modification of the prayers by the Petitioner. Gujarat SLDC has mainly submitted as follows:

a. The State of Gujarat has faced an unprecedented power change scenario starting from August 2021 in last one decade due to the following:

   i. Outage of units of APL (Mundra)

   ii. Coal quality/ shortage issue in State owned generating plants at WTPS, UTPS and STPS

   iii. Outage of CGPL UMPP in which Gujarat has 1800 MW share.

   iv. Very sharp rise in variable cost of gas plants and intermittency of wind and solar generation.

   v. Intermittency of wind and solar generation.

b. Any revision in schedule made in odd time blocks was facilitated in 7th time block and any revision in schedule made in even time blocks was facilitated in 8th time block by WRLDC, therefore it was difficult for SLDC to manage unscheduled drawl within the limit timely.

c. The numbers of under drawl blocks are higher than over drawl blocks for the period 15.08.2021 to 30.09.2021. It shows that there was no intention to meet

power requirement by over drawing from the grid. The State utilities were highly dependent on market to meet their demand (30 to 40% energy from STOA market instrument).

d. Gujarat SLDC has imposed restriction measures on the Agricultural feeders to control the overdrawal from the grid. In the month of September 2021, there was wide spread rain across the state because of which the agriculture demand dropped down naturally.

e. The SLDC instructed for load relief by putting restriction on Jyoti Gram Yojana (one of the flagship scheme of Government of Gujarat for supplying 24 x 7 3-ph power to rural and villages of the State) from 01.10.21. SLDC-Gujarat has never instructed for load restriction in JGY feeders in last twelve years, which signifies the sincerity of SLDC towards such warranted period.

f. SLDC Gujarat took proactive actions to minimize over drawl and not to depend on unscheduled over drawl and always strive to maintain unscheduled drawl within the limit. The steps taken by SLDC Gujarat are as follows:

   i. Taken up matter with all Distribution Companies to meet their demand with internal sources of generation & not to rely on market or over draw from the grid.

   ii. Taken up matter with GUVNL for reducing agriculture supply hours and for implementation of staggered day in Industries.

   iii. Placed its best efforts for accurate demand, wind and solar forecasting on daily / day ahead / weekly and monthly basis.

   iv. Instructed all State GENCOs to expedite revival of thermal units from forced / planned shutdown and to give their maximum declaration during peak hours and to improve their ramp rates.

   v. Extended technical minimum support to ISGS stations in the range of 10-100 MW

   vi. Took prompt actions for optimizing the internal generation, revision in requisition from ISGS schedules, scheduling URS as and when available.

   vii. To restrict over drawl from grid SLDC Gujarat imposed load restriction measures.

g. In real-time, SLDC Gujarat has put their all-out efforts to restrict loading on Important ISTS elements within the safe limit(s) by means of increasing internal generation, taking demand restriction measures, diverting flow on less loaded corridors etc.

h. On request of SLDC Gujarat, the Member Secretary, WRPC called a meeting on 03.12.2021 for finalizing automatic LTS as suggested by WRLDC in the meeting dated 25.10.2021.

i. The various steps taken by SLDC Gujarat for proper demand estimation are as follows:

   (a) In accordance with clause 5.3 (b) of IEGC Regulations, 2010, the demand estimations for different time horizons are being carried out for system study & operational planning purpose regularly by SLDC Gujarat. The scheme is being reviewed regularly by the SLDC.

   (b) In accordance with Regulation 5.3 of IEGC Regulations, 2010, SLDC Gujarat has already developed methodology for daily/ weekly/monthly/yearly demand estimation (MW, MVAr and MWh) for operational purposes. Based on this demand estimate and the estimated availability from different sources, SLDC Gujarat also plans demand management measures like load shedding, power cuts, etc.

j. ADMS scheme is already implemented and in operation in the State owned Discoms. Presently, the ADMS system in the Gujarat State owned Discoms is in working & GO-LIVE conditions.

k. There are 23 numbers of LTS schemes deployed successfully in Gujarat grid for secure and reliable grid operation.

l. There are two hydropower projects in Gujarat. One is Kadana (4 x 60 MW) and another is Ukai (4 x 75 MW). The generation at Kadana Hydro station is regulated as per the need of irrigation department. These Hydro plants are old & so Plant operators as well as Irrigation department do not allow the frequent starts / stops in a day.

m. The State Generating Company's units are old and not much flexible because of which ramp rates of these units are not up to the mark. The minimum operating limit is 75% in all most all units. The.

n. Since, any revision in schedule made in odd time blocks was facilitated in 7th time block and any revision in schedule made in even time blocks was facilitated in 8th time block by WRLDC, it was difficult for SLDC to manage unscheduled drawl within the limit timely.

o. The functioning of REMC has been operationalized in existing premise of SLDC Gujarat effective from 01.04.2020. Three external FSP and one internal forecasting tool provides the forecast through RE forecasting tools. All RE generators schedules are being take place through RE scheduling tool.

p. SLDC Gujarat prepares demand and resource availability reports yearly, quarterly and day ahead basis. These reports are being reviewed time to time and shared with stakeholders to confirm load estimate and generation availability.

q. The various special protection schemes have been armed in Gujarat Power System to avoid cascading and to minimize the impact of grid disturbances. The run back, SPS are deployed in all bigger sized Power Stations. The 17 Nos. load trimming schemes on Important ICTs & on heavily load 132 KV / 220 KV lines and 7 Nos. under voltage load shedding schemes are deployed in Gujarat Power System to ensure secure and reliable grid operation.

Rejoinder of the petitioner to the replies filed by the SLDC Gujarat

15. The Petitioner vide affidavit dated 06.07.2022 in his rejoinder to the reply filed by SLDC Gujarat has mainly submitted as under:

a. Frequency control and imbalance handling are a continuum and the grid users need to plan for different kinds of reserves (primary, secondary and tertiary) at intra-state level to address the last mile imbalances over different time horizons starting from a few seconds to less than an hour.

b. Despite of implementation of ADMS/ LTS, it was seen that during the said period (15.08.2021-13.10.2021) Gujarat has over drawn in excess of the deviation limit of 250 MW in 856 number of time blocks in violation of Regulation 5.4.1 and 6.4.7 of IEGC and Regulation 7.1 of the DSM Regulations. This indicates that

the implemented logic for the ADMS schemes in Gujarat needs to be revisited.

c. Accordingly, the necessary demand management measures specified in the Grid Code (ref. Regulations 5.4.1, 5.4.2 and 6.4.7 of IEGC Regulations 2010) must be implemented without any further delay and kept enabled at all times. Similarly, the provision for spinning reserves suggested in the CERC order dated 13.10.2015 in Pet. No. 11/SM/2015 must be implemented urgently.

Hearing dated 29.11.2022

16. During the hearing dated 29.11.2022, the Commission directed the WRLDC to convene a meeting with the Respondent SLDCs of the concerned State and to prepare a State-wise report inter-alia including the actions measures to be taken by the concerned SLDCs at the State level in the event of over drawls at the lower frequencies after having the detailed discussions/consultations in this regard and file a report thereafter and the Commission reserved the matter for order.

Reply of Chhattisgarh SLDC (CSLDC)

17. Chhattisgarh SLDC vide affidavit dated 26.04.2023 mainly submitted as follows:

a. State Transmission Unit have taken up the issue of low ATC and accordingly several schemes so far have been worked out which will further increase the ATC limit of Chhattisgarh after implementation of the schemes. Currently, the implementation is in progress.

b. Statistics as worked out by Petitioner and Chhattisgarh indicate simultaneous OD and sale in short term market, however, the same was due to unexpected variations in system demand and already committed sale and was not intentional.

c. Taking 2840 MW as capacity, the maximum total thermal generation outage works out to be 39.78% i.e. 1130 MW of installed thermal capacity.

d. The maximum thermal outage in a day during the mentioned period was 27.12 MUs. There were 9 No. instances of forced thermal unit outage in the month of August 2021, 10 No. instances of forced thermal unit outage in the month of September 2021 and 10 No. instances of forced thermal unit outage in the month of October 2021.

e. In order to control over drawl, unscheduled load shedding is the only reliable demand control tool with the answering Respondent to control over drawl arising out of errors in estimations, forced outages, recall of URS power and RTM bids not getting cleared. CSLDC has exercised the option of unscheduled load shedding for 111 times in the month of August 2021, 16 times in the month of September 2021 and 39 times in the month of October 2021 and has tried to manage the things in order to effectively control over drawl.

f. CSLDC had tried its best to control the over drawl thermal generation outages and rising demand and other several constraints as mentioned in the above paragraphs. Despite, the challenges as mentioned above, the answering Respondent has diligently performed their function and work without fail. There was no deliberate or intentional violation.

Submissions of WRLDC

18. WRLDC in compliance to RoP for hearing dated 29.11.2022, has convened online meetings with the four SLDCs (i.e. Gujarat, Madhya Pradesh, Maharashtra and Chhattisgarh) as under:

S No.	Date	Meeting conducted with
1	29-Dec-2022	SLDC Gujarat
2	30-Dec-2022	SLDC Madhya Pradesh
3	06-Jan-2023	SLDC Maharashtra
4	09-Jan-2023	SLDC Chhattisgarh

19. The summary of the action plan to be implemented by the SLDCs as discussed during the meetings are as follows:

a. Preparation of quarterly resource adequacy statement by SLDCs and sensitisation amongst intra-state entities (Discoms) for advance planning to meet the estimated demand during peak demand period.

b. Timely implementation of additional demand management measures.

c. Renewable energy forecasting/scheduling should be done more accurately on day ahead basis, instead of intraday revisions.

d. Review the ADMS logic and modify it as per the provisions of latest DSM Regulations to ensure faster demand disconnection while over drawing beyond the volume limit.

e. Review of supply side issues (coal shortage) periodically and take up with appropriate agencies/ authorities well in advance to ensure fuel security for their intra-state generators.

f. Implement the ADMS scheme across all Discoms (i.e. both state DISCOMs and private DISCOMs). Wherever the ADMS scheme is still not implemented the SLDCs should Expedite implementation of ADMS and make sure that it is designed as per the provisions of latest DSM Regulations.

g. Identification of radial feeders for manual tripping as emergency measures under SLDC instruction to control over drawal in case the ADMS fails to act in time.

h. Implementation of the framework for spinning reserves within the state at the earliest.

20. Based on the deliberations with the respective State SLDCs, WRLDC has sought appropriate directions to the Respondents and to adhere to action plan.

Analysis and decision

21. We have perused the submissions of the Petitioner as well as Respondents and have also carefully perused the action plan discussed by the Petitioner with different SLDCs as directed by the Commission.

22. The Petitioner has mainly contended that due to over drawal by some of the state entities, the frequency went below the lower limit (49.90 Hz) on multiple occasions during the period during Mid-Aug to Mid-Oct 2021. The frequency remained below 49.90 Hz for a cumulative duration of 117 hours during the said period and even touched very low values ranging from 49.5-49.7 Hz & frequency remained below 49.7 Hz for a cumulative duration of 4.2 hours. On a few occasions, the grid frequency even touched 49.5 Hz and massive over-drawl from the grid by several constituents due to various reasons aggravated the situation.

23. Petitioner had issued a number of warning messages to the overdrawing States to control their over-drawal as per Regulations 5.4.2 of the IEGC on various occasions. The Petitioner has submitted that during the said period, several factors contributed to a fast rise in electricity demand viz. extended by dry weather spell due to early receding of monsoon, demand revival in many states after the 2nd wave of COVID etc. Supply constraints viz. lower fuel supply for coal fired power plants, lower hydro reservoir levels, planned & forced generation outage, reduction in wind/ solar generation etc. further stressed the load generation balance.

24. Petitioner has mainly sought the issuance of necessary directions to the Respondents to avoid over-drawl from the Grid in compliance to the Grid Code and DSM Regulations, to ensure generation adequacy of the state at all times as per their demand estimation & fuel supply position, ensuring proper forecasting of the demand, Implementation of Automatic Demand Management Schemes (ADMS)/ Load Trimming Schemes, better coordination among hydro

generation, agriculture load segregation and any specific load side ramp up/ down limits to avoid large deviations, and implement intra-state reserves.

25. The respective SLDCs of Gujarat, Maharashtra, Madhya Pradesh and Chhattisgarh have submitted that they have taken different steps to control the over-drawl so as to maintain the grid stability and security on the receipt of Overdrawal messages from the WRLDC. The common reasons for the over-drawl as submitted by all the states during the said period are summarized as follows:

a) The unpredictability of Wind Generation on some of the occasions causes overdrawal / under drawal from the Grid beyond IEGC deviation limits.

b) Fall in generation of thermal power plants of Central/State Sector due to low fuel supply /non- availability of sufficient Domestic Coal.

c) The Hydro Generation could not be maximized due to deficient rains.

d) Very sharp rise in variable cost of gas plants led to uneconomical dispatch of gas units.

e) Considerable rise in demand due to delayed rain.

26. The Respondent SLDCs have submitted that due to an un-anticipated incremental increase in the total energy consumption in the months of Mid-Aug to Mid-Oct 2021, it was not possible for SLDCs to accurately schedule their power. Despite this, they took various steps to arrest the grid frequency when the frequency was below 49.85 Hz and to avoid the overdrawal from the Grid. On the receipt of the over-drawl messages from WRLDC, a number of instructions/ e-mails were sent to the Discoms to curtail over-drawl. SLDCs have also conveyed the emergent need to maintain grid discipline and curtail over-drawl to DISCOMS on various platforms. Purchase of additional power as well

as unscheduled load shedding was also done by the states for adhering to the Grid discipline. SLDCs have submitted that they have acted in a manner so as to diligently comply with the provisions of the Grid Code and directions of WRLDC and taken all possible steps to curtail over-drawal of power.

27. The petitioner in their rejoinder(s) to the reply filed by the respondent(s) has appreciated the efforts put by various respondents to bring the grid back to normal operating condition, however, the Petitioner also stated that grid can't be left vulnerable to the allegedly uncontrollable factors and should be brought to normal operating conditions by various different measures available at the discretion of the respondents.

28. We have considered the submissions of the Petitioner and Respondents. Let us peruse various provisions under the Electricity Act and the various regulatory provisions.

29. Section 29 of Electricity Act 2003, provides as follows:

"29. (1) The Regional Load Despatch Centre may give such directions and exercise such supervision and control as may be required for ensuring stability of grid operations and for achieving the maximum economy and efficiency in the operation of the power system in the region under its control.

(2) Every licensee, generating company, generating station, sub-station and any other person connected with the operation of the power system shall comply with the direction issued by the Regional Load Despatch Centres under sub-section (1).

(3) All directions issued by the Regional Load Despatch Centres to any transmission licensee of State transmission lines or any other licensee of the State or generating company (other than those connected to inter State transmission system) or sub-station in the State shall be issued through the State Load Despatch Centre and the State Load Despatch Centres shall ensure that such directions are duly complied with the licensee or generating company or sub-station.

(4) The Regional Power Committee in the region may, from time to time, agree on matters concerning the stability and smooth operation of the integrated grid and economy and efficiency in the operation of the power system in that region.

(5) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the regional grid or in relation to any direction given under sub-section (1), it shall be referred to the Central Commission for decision : Provided that pending the decision of the Central Commission, the directions of the Regional Load Despatch Centre shall be complied with by the State Load Despatch Centre or the licensee or the generating company, as the case may be.

(6) If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (2) or sub-section (3), he shall be liable to penalty not exceeding rupees fifteen lacs."

As per above if any licensee, generating company or any other person fails to comply with the directions issued by RLDC under sub-section (2) or sub-section (3), he shall be liable to penalty not exceeding rupees fifteen lakhs.

30. Section 142 of Electricity Act 2003, provides as follows:

*"**Section 142 (Punishment for non-compliance of directions by Appropriate Commission):***
In case any complaint is filed before the Appropriate Commission by any person or if that Commission is satisfied that any person has contravened any of the provisions of this Act or the rules or regulations made thereunder, or any direction issued by the Commission, the Appropriate Commission may after giving such person an opportunity of being heard in the matter, by order in writing, direct that, without prejudice to any other penalty to which he may be liable under this Act, such person shall pay, by way of penalty, which shall not exceed one lakh rupees for each contravention and in case of a continuing failure with an additional penalty which may extend to six thousand rupees for every day during which the failure continues after contravention of the first such direction."

As per above, if a person has contravened any of the provisions of the Act or the rules or regulations made thereunder, he shall be liable to penalty which shall not exceed one lakh rupees for each contravention and in case of a continuing failure with an additional penalty which may extend to six thousand rupees for every day during which the failure continues.

31. Further, relevant provisions of IEGC 2010 and the DSM Regulations are reproduced as follows:

Regulation 5.2(m) of IEGC:

"(m) All Users, SEB, SLDCs, RLDCs, and NLDC shall take all possible measures to ensure that the grid frequency always remains within the 49.9-50.05 Hz band."

Regulation 5.3(c) of IEGC: (Demand Estimation by states)

"(c) Each SLDC shall develop methodologies/mechanisms for daily/ weekly/monthly/yearly demand estimation (MW, MVAr and MWh) for operational purposes. Based on this demand estimate and the estimated availability from different sources, SLDC shall plan demand management measures like load shedding, power cuts, etc. and shall ensure that the same is implemented by the SEB/distribution licensees. All SEBs/distribution licensees shall abide by the demand management measures of the SLDCs and shall also maintain historical database for demand estimation."

Regulation 5.4.1 of IEGC:

"This section is concerned with the provisions to be made by SLDCs to effect a reduction of demand in the event of insufficient generating capacity, and inadequate transfers from external interconnections to meet demand, or in the event of breakdown or congestion in intra-state or inter-state transmission system or other operating problems (such as frequency, voltage levels beyond normal operating limit, or thermal overloads, etc.) or overdrawal of power vis-à-vis of the regional entities beyond the limits mentioned in UI regulation of CERC"

Regulation 5.4.2 of IEGC:

5.4.2 Demand Disconnection

a) *SLDC/ SEB/distribution licensee and bulk consumer shall initiate action to restrict the drawal of its control area, from the grid, within the net drawal schedule.*

b) *The SLDC/SEB/distribution licensee and bulk consumer shall ensure that requisite load shedding is carried out in its control area so that there is no Over drawal.*

c) *Each User/STU/SLDC shall formulate contingency procedures and make arrangements that will enable demand disconnection to take place, as instructed by the RLDC/SLDC, under normal and/or contingent conditions. These contingency procedures and arrangements shall regularly be / updated by User/STU and monitored by RLDC/SLDC. RLDC/SLDC may direct any User/STU to modify the above procedures/arrangement, if required, in the interest of grid security and the concerned User/STU shall abide by these directions.*

d) *The SLDC through respective State Electricity Boards/Distribution Licensees shall also formulate and implement state-of-the-art <u>demand management schemes for automatic demand management</u> like rotational load shedding, demand response …… etc. before 01.01.2011 to reduce overdrawal in order to comply para 5.4.2 (a) and (b). …….A Report detailing the scheme and periodic reports on progress of implementation of the schemes shall be sent to the Central Commission by the concerned SLDC.*

e) *In order to maintain the frequency within the stipulated band and maintaining the network security, the interruptible loads shall be arranged in four groups of loads, for scheduled power cuts/load shedding, loads for unscheduled load shedding,*

loads to be shed through under frequency relays/ df/dt relays and loads to be shed under any System Protection Scheme identified at the RPC level. These loads shall be grouped in such a manner, that there is no overlapping between different Groups of loads. In case of certain contingencies and/or threat to system security, the RLDC may direct any SLDC/ SEB/distribution licensee or bulk consumer connected to the ISTS to decrease drawal of its control area by a certain quantum. Such directions shall immediately be acted upon. SLDC shall send compliance report immediately after compliance of these directions to RLDC.

f) *To comply with the direction by RLDC, SLDC may direct any SEB/ distribution licensee/bulk consumer connected to the STU to curtail drawal from grid. SLDC shall monitor the action taken by the concerned entity and ensure the reduction of drawal from the grid as directed by RLDC.*

g) *RLDCs shall devise standard instantaneous message formats in order to give directions in case of contingencies and/or threat to the system security to reduce deviation from schedule by the bulk consumer, SLDC/State Utility/ ISGS/Regional Entity/Injecting Utility at different overdrawal / underdrawal / over-injection/under-injection condition depending upon the severity. The concerned SLDC/other regional entity shall ensure immediate compliance with these directions of RLDC and send a compliance report to the concerned RLDC.*

h) *All Users, SLDC/SEB distribution licensee or bulk consumer shall comply with direction of RLDC/SLDC and carry out requisite load shedding or backing down of generation in case of congestion in transmission system to ensure safety and reliability of the system…….*

i) *The measures taken by the User's, SLDC SEB/distribution licensee or bulk consumer shall not be withdrawn as long as the frequency remains at a level lower than the limits specified in para 5.2 or congestion continues, unless specifically permitted by the RLDC/SLDC"*

Regulation 6.4.7 and 6.4.8 of IEGC:

"7. The SLDC, SEB / distribution licensee shall always restrict the net drawal of the state from the grid within the drawal schedules keeping the deviations from the schedule within the limits specified in the Deviation Settlement Mechanism Regulations. The concerned SEB/distribution licensee/User, SLDC shall ensure that their automatic demand management scheme mentioned in clause 5.4.2 acts to ensure that there is no over-drawal. If the automatic demand management scheme has not yet been commissioned, then action shall be taken as per manual demand management scheme to restrict the net drawal from grid to within schedules and all actions for early commissioning of Automatic Demand Management Scheme (ADMS) shall be initiated.

8. The SLDCs/STUs /Distribution Licensees shall regularly carry out the necessary exercises regarding short-term demand estimation for their respective States/area, to enable them to plan in advance as to how they would meet their consumers' load without overdrawing from the grid."

Regulation 7. (1) [DSM Regulations]

"The overdrawal/underdrawal of electricity by any buyer (except Renewable Rich States) during the time block shall not exceed 12% of its scheduled drawal or 150 MW, whichever is lower, when grid frequency is "49.85 Hz and above and below 50.05 Hz.

Provided that over-drawal/under-drawal of electricity by any Renewable Rich State during the time block shall not exceed limits as specified in Annexure-III, when grid frequency is "49.85 Hz and above and below 50.05 Hz"

…..

Provided that no over-drawal of electricity by any buyer shall be permissible when grid frequency is 'below 49.85 Hz" and no under-drawal of electricity by any buyer shall be permissible when grid frequency is '50.05 Hz and above'.

……..

Annexure III

Deviation Limits for Renewable Rich States

S. No.	*States having combined installed capacity of Wind and Solar projects*	*Deviation Limits (MW)- "L"*
1	*1000-3000 MW*	*200*
2	*>3000 MW*	*250*

……..."

As per the above, it is required that all regional entities viz. states/distribution licensees/bulk consumers must take requisite measures to adhere to their drawal schedule and must not over-draw from the grid when grid frequency is 'below 49.85 Hz' and must not under-draw from the grid when grid frequency is '50.05 Hz and above' for reliable & secure operation of the grid and also to adhere the instructions of the concerned RLDC.

32. The Operating Procedure for the Western Region issued by WRLDC in July 2021 in compliance with Regulation 5.1 (f) of Indian Electricity Grid Code provides as under:

"3.5 Tertiary Frequency Control

……..

b) Measures during low frequency conditions

All constituents shall carry out day ahead operational planning by balancing availability from all sources and expected demand. Any deficit may be managed through day-ahead STOA and (PX) collective transactions and inform WRLDC about the unscheduled load shedding planned to manage the deficits on day-ahead basis. When frequency is in decaying trend:

i. All ISGS shall endeavor to maintain their actual net injection to as per their scheduled dispatch.

ii. Whenever frequency falls below 49.9 Hz, all partly loaded generating units, particularly of overdrawing constituents shall pick up additional load to bring back declining system frequency to the IEGC specified band i.e. 49.9-50.05 Hz.

iii. All the constituents shall endeavor to ensure that their drawl from the grid is not more than their schedule by maximizing generation in line with Deviation Settlement Mechanism Regulation, by implementing unscheduled/distress load shedding. They may arrange to buy power through intra-day STOA or Real Time Market (RTM) to ensure that their drawl remains as per schedule. The violation of Indian Electricity Grid Code (IEGC) message will be issued as per format enclosed at Annex-X.

iv. Each regional constituent shall make arrangements that will enable manual demand disconnection to take place as instructed by WRLDC/SLDCs under contingent conditions.

v. The measures undertaken to reduce the drawl from the grid shall not be withdrawn as long as the frequency / voltage remain at a low level unless specially permitted by WRLDC.

vi. In case of certain contingencies and / or threat to system security, WRLDC may direct SLDCs/Utilities to increase/decrease its drawal/generation by a certain quantum. Such directions shall immediately be acted upon.

vii. NLDC may initiate RRAS up to control low frequency.

viii. For distress load shedding, all SLDCs to check the availability of "list of radial feeders (pre-identified)" and assess load relief obtainable, when the system frequency is below 49.9 Hz

ix. In line with Central Electricity Authority (Grid Standards) Regulations 2010, regulation 9&10, the utilities shall make arrangements for automatic load shedding (Annex-VI) and islanding schemes to ensure system security (Annex-VII).

x. A comprehensive defense plan of Western region is enclosed at Annex-V. SLDCs to implement measures under the comprehensive defense plan and inform WRLDC accordingly.

4.3 Demand estimation

……

l) Emergency Measure by WRLDC In case of continuous violation in terms of under / over drawal by a constituent WRLDC shall issue alert / warning messages to the constituent to bring its drawal back within the limit as specified in the CERC (Deviation Settlement Mechanism & Related Matters) Regulations-2014 and subsequent amendments. If the constituent fails to comply, WRLDC may revise the schedule of constituent in accordance with IEGC clause 6.4.12 and IEGC clause 6.5.20. In case of persistent overdrawal by a Control Area, as an ***Emergency measure****, WRLDC shall issue instruction for manual opening of identified feeders/ICTs."*

33. We observe from the list of violation messages issued by WRLDC during the period 15.08.2021 to 13.10.2021, that it had issued 713 number of violation messages to the overdrawing constituents to control their over-drawal.

34. We observe that on multiple occasions, WRLDC was constrained to take emergency measures (i.e. manual tripping of identified feeders to contain over-drawal) as per the WR Grid Operating Procedure. No. of emergency measures taken by the WRLDC on each State during the period of Mid August to October 2021 is as below:

Constituent Name	**No. of Emergency Measures implemented by WRLDC due to failure by the state to control OD despite repeated warning**
Gujarat	39
Maharashtra	22
Madhya Pradesh	27
Chhattisgarh	7

35. From the above data, it is observed that there were number of instances of over-drawl by the respective States due to which WRLDC was constrained to take emergency measures. We are of the view that the continuous over-drawl from the Grid by the respective States could have been detrimental for the security and reliability of the Grid. This is a matter of concern for all the respective States and such kind of act is undesirable for the secured operation of the Grid.

36. States have submitted that during the subject period, there were several factors such as unpredictability of Wind Generation on some of the occasions causing overdrawal / under drawal from the Grid beyond IEGC deviation limits, fall in generation of thermal power plants of Central/State Sector due to low fuel supply /non- availability of sufficient Domestic Coal, low reservoir levels due to deficient rains, very sharp rise in variable cost of gas plants, led to uneconomical dispatch of gas units and considerable rise in demand due to delayed rain which have resulted in over-drawl by the States on some instances. We observe that the overdrawal by the States took takes the grid to a stressed situation which must be avoided. It is also is necessary that reserves are maintained by the States on day to day basis so that overdrawal is minimised in such situation and comply with the directions of RLDC as the Grid cannot be left in vulnerable condition.

37. On a direction from the Commission, WRLDC convened meetings with all respondent SLDCs during Dec. 2022- January 2023. WRLDC sought action plan from respective State SLDCs on following issues:

i. Demand Estimation and Generation Resource Adequacy
ii. Fuel Security and Adequacy statements
iii. Demand Management measures
iv. Improving demand & RE forecasting
v. Demand disconnection Measures
vi. Maintaining Generation Reserves (Spinning Reserves) in state.
vii. Ramp Management

38. During the meeting with WRLDC, State SLDCs submitted the status as well as the action plan by respective States. Considering the submissions of Petitioner, Respondents and the action plan discussed by WRLDC with respective SLDCs, we direct as follows:

a. The states to expedite the work on the implementation of ADMS (Automatic Demand Management System). If the ADMS is already implemented, review the existing ADMS logic and modify it as per the provisions of the latest DSM Regulations to ensure faster demand disconnection and expedite the work of revision in criteria for ADMS operation/ ADMS logic if required. Till the implementation of ADMS, manual load shedding of radial feeders identified by SLDCs may be done based on instructions of the concerned SLDCs, without any delay during emergency conditions and the details of the same shall be shared with WRLDC. The Status of the implementation of ADMS shall be updated to the NRLDC on quarterly basis by the respective SLDC.

b. All the Respondent states should have in place better demand forecasting/ estimation systems so that there is minimum deviation from the schedule allocated to each drawing entity. SLDCs need to improve their current forecasting infrastructure for accurate forecasting of renewable generation. Further, Specialized RE forecasting tools for accurate RE forecasting & Scheduling may be developed so that variability of RE Generation can be handled in advance by the SLDCs. States should focus on reduction in forecast error to less than 2% in the day ahead forecast.

c. Management of the load in such a manner that the demand ramp should be limited to not more than 100 MW as per Grid Code. There should be efficient coordination with generators and staggering of power supply plan of agriculture feeders to be done on regular basis keeping in view the ramp constraints.

d. Actions to be taken to ensure adequate generation resources & to maintain balanced portfolio at all times and to avoid over drawl. Long term demand estimation for all-time horizons may be carried out and adequate generation may be planned accordingly.

e. Advance information on coal stock of thermal plants should be available so as to ensure the availability of thermal generating units. Review of coal stock position of thermal plants should be carried out on regular basis and matter should be taken up with appropriate agencies/authorities well in advance to ensure fuel security for their generators.

f. In case of Hydro Power plants, advance information on Water Availability should be available to ensure generating units availability. Advance information would help in better management of real time grid operation.

g. Tertiary reserves should be maintained in a decentralized fashion by each state control area for a quantum as assigned by NLDC or WRLDC.

h. The States should take advance action for managing their demand portfolio and make prior arrangements for procurement of power and ensure portfolio balancing at all times without overdrawing power from the grid.

i. To take prompt action to control overdrawal on receipt of the warning messages from the WRLDC in proper coordination (using advanced technology) with Discoms for ensuring immediate compliance of warning messages issued by WRLDC and send a compliance report to WRLDC. SLDCs shall prepare a standard operating procedure/protocol to be followed by SLDC & Discom to control the overdrawal immediately.

j. In case grid frequency falls below the band, all the SLDCs should always be ready for implementation of emergency measures for controlling over-drawls under low frequency conditions to safeguard the grid. In this regard healthiness and availability of AUFLS (Automatic Under Frequency Load Shedding) and df/dt load shedding schemes must be ensured.

k. Strictly adhere to the provisions envisaged under the IEGC for safe, reliable and economical operation of the grid and maintain drawal from the grid as per drawal schedule and avoid overdrawing from the grid in compliance with Prevailing Grid Code and DSM Regulations so as to ensure safety & security of the grid and obviate any possibility of a grid disturbance.

We direct the respondents to strictly adhere to the action plan as above. SLDCs are directed to submit quarterly report to the WRLDC on status of implementation of the action plan. Any modification in action plan, keeping in view issues arising while implementation, may be discussed and finalised in RPC.

39. We have also perused the list of messages as submitted by WRLDC as follows:

S.No	Date / Time	Message No.	From	To	Remarks
250	2021-09-10 08:36:13	1125	WRLDC	Chattisgarh	UD Violation
251	2021-09-11 11:08:39	1266	WRLDC	Chattisgarh	UD Violation
252	2021-09-12 15:45:15	1363	WRLDC	Chattisgarh	OD Violation message
253	2021-09-14 17:21:13	1594	WRLDC	Chattisgarh	OD
254	2021-09-14 17:31:36	1595	WRLDC	Chattisgarh	OD
255	2021-09-14 22:35:22	1642	WRLDC	Chattisgarh	To control UD
256	2021-09-15 16:54:07	1731	WRLDC	Chattisgarh	OD
257	2021-09-16 08:30:28	1795	WRLDC	Chattisgarh	u/d
258	2021-09-21 16:48:38	2363	WRLDC	Chattisgarh	OD Violation message
259	2021-09-22 17:45:44	2533	WRLDC	Chattisgarh	o/d
260	2021-09-24 18:21:17	2826	WRLDC	Chattisgarh	OD Violation
261	2021-09-24 18:41:51	2835	WRLDC	Chattisgarh	OD Violation
262	2021-09-27 21:04:21	3210	WRLDC	Chattisgarh	Violation message for OD
263	2021-09-30 06:15:12	3456	WRLDC	Chattisgarh	OD violation
264	2021-09-30 06:44:09	3458	WRLDC	Chattisgarh	OD violation msg
265	2021-09-18 01:12:00	1938	WRLDC	DNH	UD message
266	2021-09-01 09:29:50	23	WRLDC	Gujarat	OD violation
267	2021-09-01 09:49:01	28	WRLDC	Gujarat	U/D
268	2021-09-02 09:32:40	147	WRLDC	Gujarat	Violation message - OD
269	2021-09-02 16:35:46	194	WRLDC	Gujarat	Violation message for OD
270	2021-09-02 17:09:51	205	WRLDC	Gujarat	Violation message for OD
271	2021-09-02 19:33:05	239	WRLDC	Gujarat	Over drawl violation
272	2021-09-02 23:34:53	258	WRLDC	Gujarat	OD
273	2021-09-03 12:10:18	302	WRLDC	Gujarat	Violation message for U/D
274	2021-09-03 12:27:53	304	WRLDC	Gujarat	Violation message for U/D
275	2021-09-03 15:55:37	316	WRLDC	Gujarat	OD Violation Message
276	2021-09-03 16:22:39	318	WRLDC	Gujarat	Persistent overdrawl by Gujarat since 15:45 hrs

As per above, the messages issued to the States are of following types (a) Violation message for O/D, (b) Non-compliance for overdrawl control, (c) Over Drawl Violation, (d) Violation message for under-drawl, (e) Persistent Over Drawl Violation.

40. We have perused the Operating procedure prevalent during the said period which provides as follows:

"*In case of continuous violation in terms of under / over drawal by a constituent WRLDC shall issue alert / warning messages to the constituent to bring its drawal back within the limit as specified in the CERC (Deviation Settlement Mechanism & Related Matters) Regulations-2014 and subsequent amendments. If the constituent fails to comply, WRLDC may revise the schedule of constituent in accordance with IEGC clause 6.4.12 and IEGC clause 6.5.20. In case of persistent overdrawal by a Control Area, as an* ***Emergency measure****, WRLDC shall issue instruction for manual opening of identified feeders/ICTs."*.

41. However, the logic of sending different types of messages such as (a) Violation message for O/D, (b) Non-compliance for overdrawl control, (c) Over Drawl Violation, (d) Violation message for under-drawl, (e) Persistent Over Drawl violation is not found in the Operating Procedure of WRLDC. We are of the view that the Petitioner should clearly define the logic for issuance of various types of messages in the Operating Procedure so that whenever any message is issued, the states are clear about the type of message. In any case, a State SLDC should itself monitor its overdrawl rather than waiting for a message from RLDC. The SLDCs should be proactive in controlling their overdrawl based on grid parameters of frequency and voltage.

42. In light of above discussions and the action plan finalized in consultation with States, at present we are not inclined to levy any penalties. In case, the Petitioner faces any issues regarding implementation of action plan or non-compliance of directions issued by the Petitioner, it may approach the Commission as per law.

43. The Petition No. 68/MP/2022 is disposed of in terms of the above.

Sd/	**Sd/**	**Sd/**
(P. K. Singh)	**(Arun Goyal)**	**(I.S. Jha)**
Member	**Member**	**Member**