सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

संख्या: उ.क्षे.वि.स./ प्रचालन/106/01/2023/ 1255-1296 दिनांक: 07.02.2023

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 203वीं बैठक का कार्यवृत।

Subject: Minutes of 203rd OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 203वीं बैठक दिनांक 18.01.2023 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है। यदि कार्यवृत पर कोई टिप्पणी हो तो कार्यवृत जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजें।

203rd meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 18.01.2023. The Minutes of this meeting has been uploaded on the NRPC website http://164.100.60.165. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि

Santosh
07.02.23

(संतोष कुमार)
अधीक्षण अभियंता (प्रचालन)

सेवा में,

उ.क्षे.वि.स. के प्रचालन समन्वय उप-समिति के सभी सदस्य

18-ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016 फोन:011-26513265 ई-मेल: seo-nrpc@nic.in वेबसाईट: www.nrpc.gov.in
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उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 203वीं बैठक का कार्यवृत्त

203rd meeting of OCC of NRPC was held on 18.01.2023 through video conferencing.

खण्ड-क: उ.क्षे.वि.स. **PART-A:NRPC**

1. Confirmation of Minutes

Minutes of 202nd OCC meeting was issued on 06.01.2023.

- In regard to Agenda No. 7(NR Islanding scheme), UPSLDC representative requested OCC forum to modify para 7.4 as mentioned below:

" UP representative also informed forum that around 40 sub-stations are covered in both the islanding scheme of UP and procurement for UFR's for 20 sub-station has already being done and for rest 20 sub-station it is under progress. Further, he highlighted that there are total 4 to 5 sub-stations of NTPC and PGCIL covered under UP islanding scheme and opined that UFR's at these sub-stations shall be installed and maintained by respective entity."

to be replaced with

" UP representative also informed forum that around 40 sub-stations are covered in Unchahar islanding scheme of UP and procurement for UFRs for 20 sub-station has already been done and for rest 20 sub-station, it is under progress. Further, he highlighted that there are total 4 to 5 sub-stations of NTPC and PGCIL covered under UP islanding scheme and opined that UFR's at these sub-stations shall be installed and maintained by respective entity."

OCC confirmed the minutes with above modifications.

2. Review of Grid operations of December 2022

Anticipated vis-à-vis Actual Power Supply Position (Provisional) for December2022

Reasons submitted by States for significant deviation of actual demand from anticipated figures during the month of December 2022 are as under:

- **Delhi**

Peak Demand and Energy Requirement in December-2022 did not increase due to warmer December month in comparison to previous year's December month.

- **Himachal Pradesh**

The Anticipation in Energy Requirement in respect of Himachal Pradesh for the month of December, 2022 came on the lower side due to the forced shutdown of two major cement industries.

- **Punjab**

It is intimated that actual maximum demand and actual energy requirement are more as compared to anticipated maximum demand and anticipated energy requirement respectively because of long dry spell, increase in overall demand of consumers and late onset of winters in the state of Punjab during the month of December 2022.

3. Maintenance Programme of Generating units and Transmission Lines

The maintenance programme of generating units and transmission lines for the month of February 2023 was deliberated in the meeting on 17.01.2023.

4. Anticipated Power Supply Position in Northern Region for February 2023

The updated anticipated Power Supply Position for February 2023 is as below:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	110	290	No Revision submitted
	Requirement	120	240	
	Surplus / Shortfall	-10	50	
	% Surplus / Shortfall	-8.3%	20.8%	
DELHI	Availability	2678	5000	17-Jan-23
	Requirement	1990	5000	
	Surplus / Shortfall	688	0	
	% Surplus / Shortfall	34.5%	0.0%	
HARYANA	Availability	4270	11270	No Revision submitted
	Requirement	3960	8470	
	Surplus / Shortfall	310	2800	
	% Surplus / Shortfall	7.8%	33.1%	
HIMACHAL PRADESH	Availability	979	2050	10-Jan-23
	Requirement	998	2047	
	Surplus / Shortfall	-19	3	
	% Surplus / Shortfall	-1.9%	0.1%	
J&K and LADAKH	Availability	1250	1750	26-Dec-22
	Requirement	1750	2900	
	Surplus / Shortfall	-500	-1150	
	% Surplus / Shortfall	-28.6%	-39.7%	
PUNJAB	Availability	4860	11380	18-Jan-22

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Requirement	3780	8200	
	Surplus / Shortfall	1080	3180	
	% Surplus / Shortfall	28.6%	38.8%	
RAJASTHAN	Availability	7510	18770	17-Jan-23
	Requirement	8190	16100	
	Surplus / Shortfall	-680	2670	
	% Surplus / Shortfall	-8.3%	16.6%	
UTTAR PRADESH	Availability	8960	19500	16-Jan-23
	Requirement	8820	19800	
	Surplus / Shortfall	140	-300	
	% Surplus / Shortfall	1.6%	-1.5%	
UTTARAKHAND	Availability	1109	2310	06-Jan-23
	Requirement	1134	2350	
	Surplus / Shortfall	-25	-40	
	% Surplus / Shortfall	-2.2%	-1.7%	
NORTHERN REGION	Availability	31725	67400	
	Requirement	30742	60700	
	Surplus / Shortfall	984	6700	
	% Surplus / Shortfall	3.2%	11.0%	

5. Submission of breakup of Energy Consumption by the states

5.1. The updated status on the submission of energy consumption breakup is presented below:

State / UT	From	To
Delhi	Apr-2018	Oct-2022
Haryana	Apr-2018	Nov-2022
Himachal Pradesh	Apr-2018	Nov-2022
Punjab	Apr-2018	Nov-2022
Rajasthan	Apr-2018	Nov-2022
Uttar Pradesh	Apr-2018	Oct-2022
Uttarakhand	Apr-2018	Sep-2022

5.2. OCC forum again expressed concern on non-submission of energy breakup data by UTs of J&K & Ladakh, and Chandigarh despite repeated reminders.

5.3. NRLDC representative presented to the forum category wise breakup (i.e. domestic, commercial, agricultural, industrial, traction and other) of energy

consumption by the States of Northern Region. Copy of the presentation is attached as ***Annexure-A.0.***

5.4. Respective SLDC's were asked to discuss these figures with the concerned Discoms of their region and submit their views to the OCC forum.

6. Follow-up of issues from various OCC Meetings - Status update

6.1. The updated status of agenda items is enclosed at ***Annexure-A.I.***

6.2. In 195thOCC, SLDCs were requested again to coordinate with respective Transmission Utilities of states/UTs and submit details about the updated status of Down Stream network by State Utilities from ISTS Station (enclosed as ***Annexure-A-I.I***) before every OCC meeting.

7. NR Islanding scheme

7.1. In the meeting (203rd OCC), NRPC representative apprised that a meeting was held on 11th January 2023, and concern of Himachal Pradesh regarding the under frequency setting of generators was discussed.

7.2. In the meeting held on 11.01.2023, setting received from generators involved in Kullu-Manali islanding scheme was deliberated and it was found that their under frequency protection setting can be set below 47.9 Hz.

7.3. In the meeting held on 11.01.2023, however, with regard to Shimla-Solan islanding scheme some HEPs were requested to intimate there under frequency protection setting within one week.

8. Coal Supply Position of Thermal Plants in Northern Region

8.1. In the meeting, NRPC representative apprised the forum about the coal stock position of generating stations in northern region during current month (till 10thJanuary 2023).

8.2. Average coal stock position of generating stations in northern region, having critical stock, during first nine days of January 2023 is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd. (Days)	Actual Stock (Days)
KOTA TPS	1240	71.97	24	2.9
SURATGARH TPS	1500	47.33	24	2.7
TALWANDI SABO TPP	1980	71.15	24	3.6
CHHABRA-I PH-1 TPP	500	77.60	24	1.4
KALISINDH TPS	1200	34.96	24	1.8
SURATGARH STPS	1320	0.00	24	3.9
CHHABRA-I PH-2 TPP	500	61.65	24	1.0

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd. (Days)	Actual Stock (Days)
CHHABRA-II TPP	1320	48.10	24	1.3

8.3. In the meeting, above mentioned generating stations were requested to take adequate measures.

8.4. NRLDC representative apprised OCC forum that Secretary Power took a review meeting on coal and power supply on 08.12.2022 and it was highlighted in the meeting that

- *Realistic assessment of domestic coal availability should be done by all State/Central Gencos & IPPs from all sources (CIL/SCCL and Captive) and accordingly requirement of imported coal for blending, as done in the previous years, should be planned and worked out.*
- *All Central/State Gencos should ensure availability of their Gas Based Power Plants during the above mentioned crunch period and accordingly arrangements of supply of gas to these gas based power plants should be ensured.*

8.5. OCC forum asked all constituents/stakeholders of northern region to comply with the above cited directions of the Ministry.

9. Planned Annual Outage of Jhajjar Power Limited Unit#1 in the year 2023 (Agenda by Jhajjar Power Limited)

9.1. Jhajjar Power Limited vide letter dated 21.12.2022 (copy attached as Annexure-A.III of agenda) has intimated that HPPC vide their letter dated 20.07.2022 consented to JPL's planned major outage of Unit-1 for 35 days beginning March 3, 2023 and ending on April 7, 2023.

9.2. Based on Grid Controller of India's forecast of very high electricity demand in April-May 2023, MoP has directed all TPPs for zero planned maintenance schedule from April 1 to May 15, 2023.

9.3. In this regard, as per the discussion held in 28th LGBR sub-committee meeting of NRPC the planned outage of Jhajjar Power Limited was revised from March 03, 2023 to March 31, 2023 for 29 days.

9.4. Jhajjar Power Limited has mentioned in the aforesaid letter that revised outage duration of 29 days will not be sufficient to complete the major overhauling and instead 45 days are required owing to critical activities in FGD overhauling and related issues such as Chimney Flue can titanium lining repair. Henceforth, they have requested for the major overhauling of Unit#1 from May 15, 2023 to June 30, 2023 for 45 days.

9.5. After detailed deliberation, Jhajjar Power Limited representative agreed on proposal of 28th LGBR sub-committee meeting of NRPC and informed OCC forum that they have taken up the matter with their FGD procurer and would be availing the shutdown as decided in LGBR sub-committee meeting from March 03, 2023 and shall give their best efforts to ensure that overhauling activity is completed by 31st March'23 and if required they may prepone the shutdown by few days.

9.6. MS, NRPC directed Jhajjar Power Limited that they shall bring the machine on bar by 31st March'23 and if required they may prepone the shutdown start date by few days.

10. No plant should be allowed planned outage during the peak demand period i.e. crunch period in April-May 2023 (Agenda by NRPC Sectt..)

10.1. Agenda withdrawn by NRPC Sectt.

11. Frequent tripping of MEJA-BARA lines due to FOG (Agenda by Meja Thermal Power Station)

11.1. Meja TPS vide mail dated 12.01.2023 has intimated that frequent tripping of MEJA-BARA lines in the month of January' 23, led to long outage of MEJA unit-1 and fluctuation in unit-2 load. This has caused severe reliability issues and threat to system stability.

11.2. Description of events is as follows:

- MEJA-BARA LINE -2 TRIPPED 4: 34 HRS ON 1-1-23, ZONE-1 fault AT BARA END AND ZONE-2 FAULT AT MEJA END. CAUSED HEAVY VOLTAGE JERK AT MEJA END LEADING TO MEJA UNIT-1 TRIP. HUGE LOAD HUNTING IN UNIT-2 ALSO.
- SAME EVENET AGAIN APPEARED AT 7:49 HRS ON 3-01-23 AGAIN LEADING TO TRIP OF UNIT-1 AND HEAVY DAMAGE IN PT-R PHASE. RESORATION WORK STILL IN PROGRESS.IN ABOVE EVENTS, CARRIER NOT RECIEVED AT MEJA END, LEADING TO DELAYED TRIPPING OF BREAKAR AT MEJA.
- SAME EVENT REPEATED TODAY, 6.1.23 AT 6:36 HRS IN LINE-2 AND 3:48 HRS IN LINE-1 ON ZONE-2. CAUSED LOAD HUNTING IN UNIT-2 FROM 490 MW TO 597 MW AND TRIP OF SOME AUXILARIES.
- On 11.01.2023 also, MEJA-BARA LINE-1 &2 TRIPPED AT 03:04 & 03:48 HRS RESPECTIVELY. At Meja end, line-2 both breakers tripped, while only tie breaker of line-1 opened. Carrier did not receive in line-2.

11.3. On the cited matter, UPSLDC representative informed forum that SLDC held a meeting on 07.01.2023 with officials of Bara, Meja& UPPTCL and it was observed that pre-winter maintenance of MEJA-BARA transmission lines was not done and there are some protection related issues at generating station end.

11.4. Further, SLDC representative intimated that another round of meeting was held on 16.01.2023, wherein transmission licensee mentioned that there are cement factories near Bara generating plant and due to the pollution, dust accumulation was observed till tower 13 and subsequently shutdown was taken and porcelain insulators on the cited line were cleaned.

11.5. NRLDC representative intimated forum that they have been requesting all utilities to carry out pre-winter maintenance activities since Sep'22 and requesting them to furnish status in OCC meetings since Sep'22.

11.6. Further, NRLDC representative mentioned that these numerous trippings could have been avoided if pre-winter maintenance of lines would have been carried out by concerned transmission licensee timely.

11.7. As UPPTCL representative highlighted that there are industries near Bara, which is leading to pollution in the area, it was advised that concerned utility may also explore possibility and plan for replacement of porcelain insulators with polymer insulators.

11.8. UPSLDC representative apprised forum that a joint committee has been formed having officials of Meja, Bara generating utilities and UPPTCL to study the protection related issues at generating station end. Further, he intimated forum that presently there is no maintenance of PLCC at the generating station due to ownership issues, henceforth issues of delayed fault clearance are being currently reported.

11.9. UPSLDC representative apprised forum that in the meeting held on 16.01.2023 the generating stations have agreed to maintain the PLCC, however, commercial aspects are yet to be sorted out.

11.10. On the cited matter MS, NRPC asked the concerned stakeholders to expeditiously resolve the commercial issues as it is a serious issues and is detrimental to the machines. Further, UPPTCL shall explore the possibility for replacement of porcelain insulators with polymer insulators for Meja-Bara lines.

12. Approval of utilization of 2x50 MVAR Reactors and 4 nos. associated line bays at Meerut (Agenda by Powergrid, NR-1)

12.1. Powergrid, NR-1 representative apprised forum that this agenda was also discussed in 198th OCC wherein CTU was asked to deliberate this agenda

in their upcoming consultation meeting for evolving transmission schemes and thereafter CTU's views may be discussed in subsequent OCC meeting.

12.2. In the meeting, CTU representative mentioned that it is overall good development that existing bay has been utilized and expenditure of one bay is avoided. With regard to Point no. a) of Para 12.2 of the above cited agenda, CTU representative intimated that it has already been agreed in 4th meeting of NCT and for point no. b), he mentioned that Powergrid, NR-1 is free to use 2 no. of 50 MVAR reactors and one no. of 400kV line bay as a bus reactor under any scheme they desire.

12.3. MS, NRPC opined that for point no. C, as currently there is no futuristic plan for Utilization of balance 2 nos. switchable line reactor 400kV bays, henceforth there is no merit to pass the extra financial burden on constituents and they may be used as regional spares.

13. Energization of bays & reactors without commissioning of elements at 765/400/220kV Bhadla-2 S/s to achieve system redundancy (Agenda by Powergrid, NR-1)

13.1 Powergrid, NR-1 vide letter dated 12.01.2023 (copy attached as Annexure-A.VI of agenda) mentioned that 765/400/220KV Bhadla-2 substation is connected to many solar generators and very critical substation for evacuation of solar power since July'21. As per the existing scheme, 765kV & 400kV systems are of 1½ breaker scheme and 220kV system is with DMT scheme.

13.2 Further, Powergrid, NR-1 mentioned that commissioning of 765KV D/C Bhadla-II – Sikar - II line and 2nd circuit of 765KV D/C Bhadla-II – Fatehgarh-II lines are delayed due to various reasons beyond control of POWERGRID, the following are recommended for consideration in the OCC:

a) Energization of 719th, 722nd, 713th, 716th Bays for system redundancy

b) Energization of 4 x 240MVAR line reactors earmarked with aforesaid elements for better voltage control as Bhadla Region is witnessing severe voltage variation issues during day and night resulting into nos. of Reactors switching operations in morning and evening/night hours to control the system voltage.

c) Commercial operation of these elements subsequent upon commissioning.

13.3 OCC forum agreed to the same for effective reactive power management.

14. LC-oscillations/resonance in over-compensated 765kV transmission lines in Northern Region-1 (Agenda by Powergrid, NR-1)

14.1. NRPC representative apprised forum that this agenda was also discussed in 198th OCC wherein CTU was asked to carry out studies for LC oscillation/resonance for the overcompensated lines.

14.2. CTU representative intimated forum that they have conducted some PSSE studies on the cited matter related to voltage stability and reactive power stability and same has been submitted to NRLDC.

14.3. Further, CTU representative informed that because of some software issues related to resonance study in PSSE and same would be conducted in another software.

15. Frequent switching of transmission line to control system voltage (Agenda by Powergrid, NR-1)

15.1 Powergrid, NR-1 vide letter dated 12.01.2023 (copy attached as Annexure-A.VII of agenda) forwarded a communication from ED(AM), CC, wherein concern was expressed regarding frequent opening of transmission lines to control the system voltage.

15.2 MS, NRPC opined that to ensure reliability of system for effective voltage control during winter months, grid operator on case to case basis may explore the possibility of opening of lines before the voltage shoots up to a high level which may affect the reliability of switchyard equipment.

16. Additional Agenda No. 1. Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park (agenda by Adani Green Energy Limited)

16.1 Adani Green Energy Limited representative apprised forum that they have planned Special Protection Scheme (SPS) for implementation at 400/220kV substation of 1000 MW Fatehgarh solar Park to avoid black out at time of tripping of any one ICT. Scheme is attached as **Annexure – AA.I of additional agenda.**

16.2 Further, he intimated that the proposed scheme was shared with Grid Controller of India by Adani Group for the reviewing. Observations/suggestions of Grid Controller of India is attached **Annexure – AA.II of additional agenda.** Grid Controller of India has suggested that with the minor modification, the SPS can be implemented after the approval of OCC forum.

16.3 Adani Green Energy Limited representative after incorporating the suggestions of Grid India presented the revised SPS scheme attached as **Annexure – AA.II of additional agenda.**

16.4 NRLDC representative asked Adani Green to submit a report after conducting the mock testing of the scheme.

16.5 OCC forum approved the revised SPS scheme.

17. Additional Agenda No. 2. Approval to disable the Special Protection System (SPS) implemented at Dhauliganga Power Station (agenda by NHPC)

17.1 NHPC representative apprised forum that the Special Protection Scheme (SPS) has been implemented at Dhauliganga Power Station since Sept' 2018 to avoid tripping of all units due to oscillation in the system, introduced by tripping of one line. Recently, both 220 KV Dhauliganga-Pithoragarh (approx. 76 KM) and 220 KV Dhauliganga-Bareilly (approx. 235 KM) lines are terminated at Jauljivi Sub Station and line length has reduced to 35 km (approx.).

17.2 Moreover, the 400 KV Jauljivi-Bareily line#1 & Line#2 has also been commissioned. As such it was envisaged that evacuation of total generation from Dhauliganga Power Station through single line (220kV) may not introduce oscillation as line length became short. Accordingly, based on the instruction of NRLDC such SPS system has been disabled.

17.3 Further, NHPC representative mentioned that the agenda is being put up for post-facto approval of OCC to "**Disable the SPS scheme at Dhauliganga Power Station**".

17.4 OCC agreed to the same.

18. Additional Agenda No. 3. Full Capacity demonstration of NTPC NR Gas stations (agenda by NTPC)

18.1 In the meeting, NTPC representative apprised forum that vide direction from MoP, CEA and subsequent LGBR Sub Committee Meeting of NRPC, regarding availability of all Thermal Generating Machines at full capacity during high demand season, all Machines are to demonstrate full capacity ahead of high demand season to prove its availability.

18.2 Further, he mentioned that since most of the times gas stations are operating in open cycle and full capacity is not proven as Steam turbines are not put in operation for long.

18.3 NTPC requested forum that to prove desired capacity, schedule in close cycle may be provided by NRLDC for each module for minimum 15-20 Hrs.

18.4 MS, NRPC opined that to ensure full capacity of Gas Based Power Plants during the crunch demand period of April'23, in holistic view NLDC may be asked to explore possibility to facilitate the Full Capacity demonstration of NTPC NR Gas stations.

18.5 NRLDC representative asked NTPC to share with them plausible tentative plan with them and then the matter would be taken up with NLDC.

खण्ड-ख: उ.क्षे.भा.प्रे.के. **Part-B: NRLDC**

19. NR Grid Highlights for December 2022

NRLDC representative highlighted following points related to NR grid operation for December 2022:

- Maximum energy consumption of Northern Region was **1165 Mus** on 30th December'22 and it was 7.0 % higher than December' 2021 (1088 Mus 22th December'21)
- Average energy consumption per day of Northern Region was **1106 Mus** and it was 8.4 % higher than December'21 (1020 Mus per day)
- Maximum Demand met of Northern Region was **59004 MW** on 28th December'22 @12:00 hours (*based on data submitted by Constituents)* as compared to 55546 MW on 20th December'21 @11:00 hours

Northern Region all time high value recorded in December'22:

States	Max. Demand Met During the day(MW)		As per SCADA instantaneous data	Energy Consumption (MU)	
	As per hourly data Submitted by States (MW)/Format 28	As on date		As per PSP (Mus)	As on date
Rajasthan	16612	27-12-2022 10:30hrs	16725 10:20 hrs	-	-
J&K(UT) and Ladakh (UT)	-	- -	- -	62.54	28.12.22

- **Comparison of Average Energy Consumption (MUs/Day) of NR States for the December'21 vs December'22**

क्षेत्र/राज्य	दिसंबर - 2021	दिसंबर- 2022	%अंतर
चंडीगढ़	3.5	3.8	6.2
दिल्ली	66.6	70.2	5.4
हिमाचलप्रदेश	34.0	34.3	1.1
हरियाणा	128.4	139.4	8.5
जम्मूऔरकश्मीर	54.0	57.7	6.8

पंजाब	132.0	139.5	5.7
राजस्थान	265.1	305.8	15.4
उत्तराखंड	39.4	39.9	1.4
उत्तरप्रदेश	297.5	315.6	6.1
उत्तरीक्षेत्र	**1020.5**	**1106.1**	**8.4**

Frequency Data

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
Dec'22	50.00	50.55	49.41	12.8	57.4	29.8
Dec'21	50.00	50.34	49.62	6.9	73.1	19.9

Detailed presentation on grid highlights of Dec'2022 as shared by NRLDC in OCC meeting is attached as Annexure-B.I.

20. Grid Operation related issues

a) Detailed Procedure For Estimation of the Requirement of SRAS and TRAS at Regional Level

NRLDC representative stated that adequate reserves are required to be maintained in a distributed manner with both the regional entities at the regional level and at the State level for each state control area as per the IEGC or the State Grid Code as the case may be.

The Nodal Agency i.e. National Load Despatch Centre (NLDC) shall, in coordination with Regional Load DespatchCentres (RLDCs) and State Load DespatchCentres (SLDCs), estimate the quantum of requirement of Secondary Reserves for SRAS and Tertiary Reserves for TRAS at the regional level after factoring in the reserves for each state control area, for such period and based on such methodology as specified in the IEGC and publish the same on its website

There would be assessment of reserves on year ahead basis, quarter ahead basis week-ahead basis, day ahead basis and intra-day basis.

Hon'ble Commission approved procedure provides an interim methodology for estimation of reserves in accordance with Regulation 6(1) of the Central Electricity Regulatory Commission (CERC) (Ancillary Services) Regulations, 2022, hereinafter referred to as the "AS Regulations".

Detailed procedure as approved by Hon'ble Commission is available @ https://posoco.in/download/detailed-procedure-for-estimation-of-the-requirement-of-secondary-reserve-ancillary-service-sras-and-tertiary-reserve-ancillary-service-tras-at-regional-level/?wpdmdl=49385.

In the meeting it was mentioned that in line with the procedure, data as per the formats RAS1 and RAS2 have to be submitted by all the SLDCs. The last date for submission of Format-RAS1 & Format-RAS2 is 15th January 2023. States were asked to submit the data at the earliest, if not submitted already.

OCC forum noted the same.

b) Issues related to Rajasthan state control area

NRLDC representative stated that as discussed in 59 and 60 NRPC meeting, RVPN was asked to submit pointwise reply to following issues:

- Action plan to meet the 16000-17000MW peak demand during winter
- Establishing additional connectivity of 400 kV Alwar from Bhiwadi / Bassi / Phagi. Gas generation at Dholpur may also help till connectivity established
- Minimising planned/ forced outage of intrastate thermal generating units
- Operating intrastate RE generators in voltage control mode
- Load MVAR drawl management including identification of nodes at 220kV and 132kV level which are drawing huge MVAR from the grid
- Expediting upgradation of 400kV Jodhpur (Kankani) to 765kV along with associated 765kV lines
- Additional reactive power support devices for maintaining grid voltages within IEGC prescribed limits

In 202 OCC meeting, Rajasthan SLDC informed that they are awaiting response from STU for some points.

NRLDC representative asked Rajasthan SLDC to submit reply for points that have been compiled at their end and for other points reply may be submitted after receipt of same from STU. Rajasthan SLDC agreed for the same.

In 203 OCC meeting, NRLDC representative stated that following issues persist in Rajasthan stat control area:

N-1 non-compliance of 400/220kV ICTs

- From, the available data of last one month it can be seen that loading of 400/220kV ICTs is remaining very high since last two weeks (under import of 6500-7500MW)
- Loading of 400/220kV ICTs may be kept below their N-1 contingency limits and at places where SPS is installed, loading needs to be such that SPS relief is able to manage loading within safe limits in case of N-1 contingency.
- Plots showing loading of highly loaded 400/220kV ICTs such as Jodhpur, Merta, Ajmer, Chittorgarh, Bikaner, Bhilwara, Bhinmal along with their N-1 contingency limits were presented in the meeting.
- As per information available with NRLDC, there is no SPS implemented at 400/220kV Bikaner, Bhinmal and Bhilwara ICTs and therefore loading of these ICTs needs to be below their N-1 contingency limits.

Huge MVAR drawl at 400/220kV RVPN substations:

During solar generation period of 10:00-14:00hrs, with Rajasthan demand of 15000-16500MW, significant MVAr drawls have been observed at 400kV Jodhpur (RS), 400kV Kankani(RS), 400kV Bhinmal, 400kV Bikaner(RS) and 400kV Merta. It is to be noted that such huge MVAR drawl is leading to low voltages in Rajasthan state control area and also aggravating the low voltage scenario in the RE evacuation pockets.

ICTs MW drawl, MVAr drawl, Power factor and S/s voltage for Solar hours (10:00-14:00hrs) for Rajasthan Control area (Dec'22-Jan'23)					
400/220 Sub-Station_ICTs	ICTs Capacity (MVA)	MW Drawl	MVAr Drawl	Power factor	Voltage(kV)
Jodhpur (RVPN)	2*315	400-550	200-350	0.73-0.75	375-385
Kankani (RVPN)	(315+500)	400-550	150-300	0.87-0.90	360-370
Merta (RVPN)	2*315	400-550	150-250	0.90-0.92	380-390
Bhinmal(Powergrid)	2*315	400-500	200-350	0.82-0.85	370-390
Bikaner(RVPN)	2*315	400-550	200-400	0.60-0.80	360-390
Ratangarh (RVPN)	3*315	600-800	300-450	0.80-0.90	380-390
Bhilwara (RVPN)	(315+500)	400-550	100-200	0.91-0.95	380-390
Hindaun (RVPN)	2*315	400-550	100-200	0.90-0.95	340-370
Alwar (RVPN)	2*315	250-350	100-200	0.86-0.95	330-360
Barmer (RVPN)	2*315	200-250	150-200	0.60-0.90	380-390
Akal # (RVPN)	315+ 3*500	100 -200	100-200	0.80-0.95	380-390
Ramgarh# (RVPN)	3*500	200 -300	100-150	0.80-0.95	360-390
Bhadla (RVPN)	3*500	1200-1300 (injection)	200-400	0.95-0.98	360-390

NRLDC representative stated that load MVAR drawl management including identification of nodes at 220kV and 132kV level which are drawing huge MVAR from the grid and remedial actions for the same is carried out on priority.

RVPN representative stated that 13no.s 25MVAr bus reactors and 1 no. 125MVAr bus reactor have been approved and are under installation. 500MVAr STATCOM are pending with CEA for approval.

NRLDC representative stated that these are actions for high voltage management, however, the issues highlighted above are low voltage. Immediate actions are required from RVPN side as any grid event may lead to cascade tripping and major grid disturbance in Rajasthan area.

Rajasthan SLDC representative stated that they have taken up the matter with higher officials to stagger the load groups to 6-12am and 12-6pm instead of supplying all loads during peak solar generation time.

Detailed plots of MW Vs MVAr drawl of ICTs and Voltage Vs Power factor profile of ICTs at above mentioned Sub-stations are attached as Annexure-B.I of agenda.

Apart from above mentioned sub-stations, 400kV Ramgarh, 400kV Akal, 400kV Barmer, 400kV Hindaun and 400kV Alwar also suffer from significant low voltage issues.

Frequent voltage oscillation events have also been observed during solar generation period 10:00hrs-14:00hrs in Rajasthan control area as well as in ISTS RE pooling stations. In this situation, Rajasthan need to take following actions on immediate basis:

1. Improve the power factor and reduce the MVAr drawls at above mentioned sub-stations.
2. Quantum of load and time block wise breakup being connected in Jodhpur-Kankani and Merta load center area may be reviewed.
3. Check whether oscillation is getting initiated on connecting load during Solar/Wind ramping period and when Rajasthan demand exceeds 14500MW.
4. Explore the possibilities of installing PMU at Kankani, Ramgarh, Akal,Bhadla (RS) and Bikaner (RS) substations to locate the exact source of oscillation and analyse Rajasthan Intra-state RE plants behavior during any event of fault.

Apart from above, it was requested that POWERGRID may expedite commissioning of STATCOMs in ISTS-RE Pooling substations. During commissioning of STATCOMs, it may be ensured that POD (power oscillation damping) functionality is enabled and study report of POD may be shared with NRLDC before first time charging for any comments/ observations.

POWERGRID NR-1 represented agreed for the same.

Multiple events related to tripping of 400/220kV Hindaun ICTs have also occurred in Nov 2022 –Jan 2023. It is to be noted that there are sometimes

telemetry related issues also at 400/220kV Hindaun S/s due to which NRLDC is not able to monitor ICT loadings at 400/220kV Hindaun.

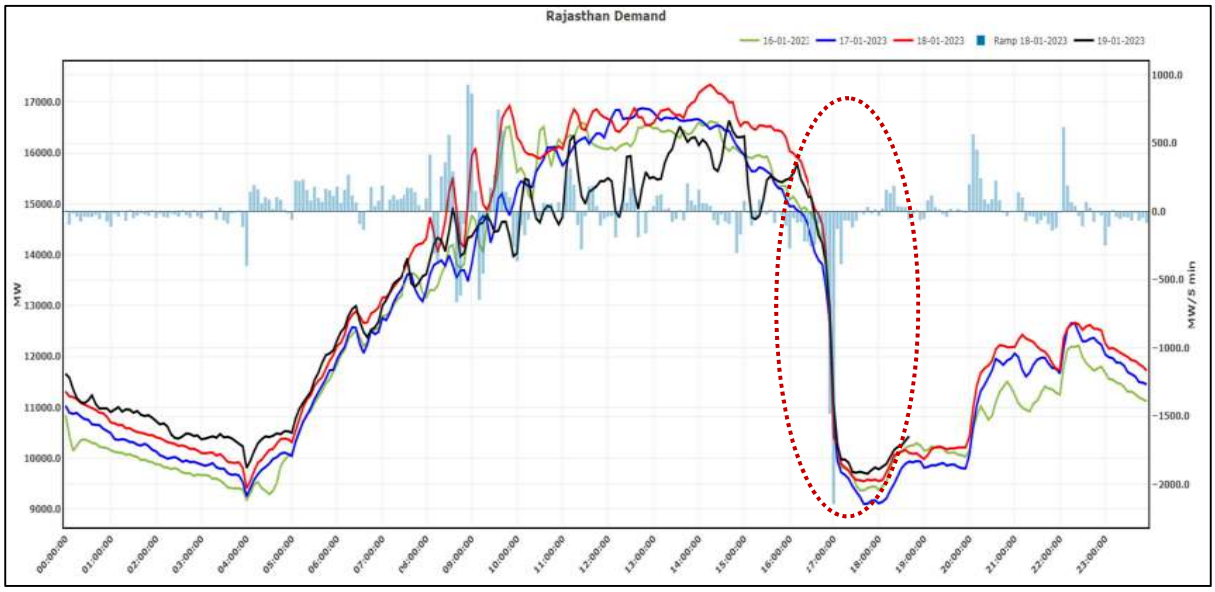
Following instances have been observed related to overload tripping of 400/220kV Hindaun ICTs:

S. No.	400/220 kV 315 MVA ICT Name	Outage Date	Time	Revival Date	Time
1	ICT 2 at Hindaun(RS)	17-11-2022	13:06	17-11-2022	13:33
2	ICT 1 at Hindaun(RS)	17-11-2022	13:06	17-11-2022	13:30
3	ICT 2 at Hindaun(RS)	17-11-2022	14:43	17-11-2022	15:13
4	ICT 1 at Hindaun(RS)	17-11-2022	14:43	17-11-2022	15:09
5	ICT 2 at Hindaun(RS)	29-11-2022	02:10	29-11-2022	03:28
6	ICT 1 at Hindaun(RS)	27-12-2022	11:12	27-12-2022	11:36
7	ICT 2 at Hindaun(RS)	27-12-2022	11:12	27-12-2022	11:41
8	ICT 2 at Hindaun(RS)	05-01-2023	13:22	05-01-2023	13:57
9	ICT 1 at Hindaun(RS)	05-01-2023	13:22	05-01-2023	13:56

NRLDC representative suggested that RVPN plans a SPS for 400/220kV Hindaun ICTs and needs to make sure that 400/220kV ICT loading remains within N-1 contingency limits.

RVPN representative stated that new 500MVA ICT has already been approved for 400/220kV Hindaun and SPS at 400/220kV Hindaun would also be planned.

Disconnection of load (more than 4000MW) in Rajasthan is being observed at 17:00 hrs since 14.01.2023. This results in large deviation from schedule (in the range of 1500MW), high frequency and high voltage and hence is threat to grid security. This sudden disconnection shall be avoided and load management shall be carried out in a staggered manner.



CGM(SO), NRLDC highlighted that this is serious violation of grid code by Rajasthan and needs to be attended at the earliest. Such actions have led to high voltages in the grid and even tripping of lines on overvoltage.

Rajasthan SLDC representative stated that the trend was first observed on 14.01.2023. DISCOM has started taking action of disconnecting feeders carrying current more than 40A after 5pm as per decision in meeting taken by Principal Secretary, Rajasthan. DISCOMs have been asked to avoid such disconnection of load to avoid severe impact on the grid. However, actions from DISCOMs are still awaited. Rajasthan SLDC stated they shall resolve the issue after discussing internally.

Rajasthan was once again asked to submit pointwise reply to the issues highlighted by NRLDC.

c) Low CUF and large deviations by ISTS connected RE generators

NRLDC representative stated that as per clause (1)(r) of Regulation 2 of the Central Electricity Regulatory Commission regulation (Deviation Settlement Mechanism and related matters) (Second Amendment) Regulations, 2015 as quoted below:

Quote:

"(ii) After sub-clause (q) under clause (1) of Regulation 2, new sub-clause (r) shall be added as under:- (r) 'Available Capacity (AvC)' for wind or solar generators which are regional entities is the cumulative capacity rating of the wind turbines or solar inverters that are capable of generating power in a given time-block."

Un Quote.

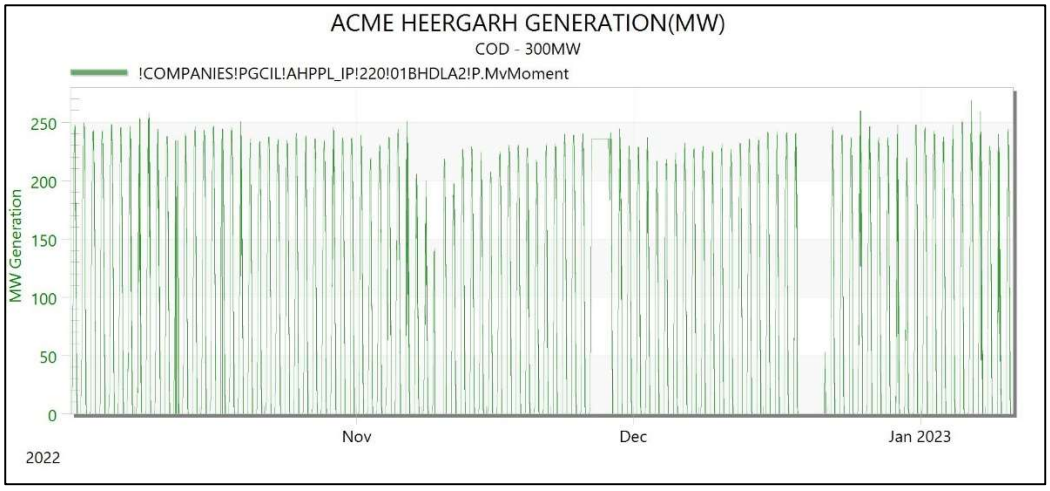
The Plant (ACME Heergarh) has already declared full COD for 300MW on 25.05.2022. Similarly, Azure Mapple also has declared full COD for 257MW on 31.03.2022.

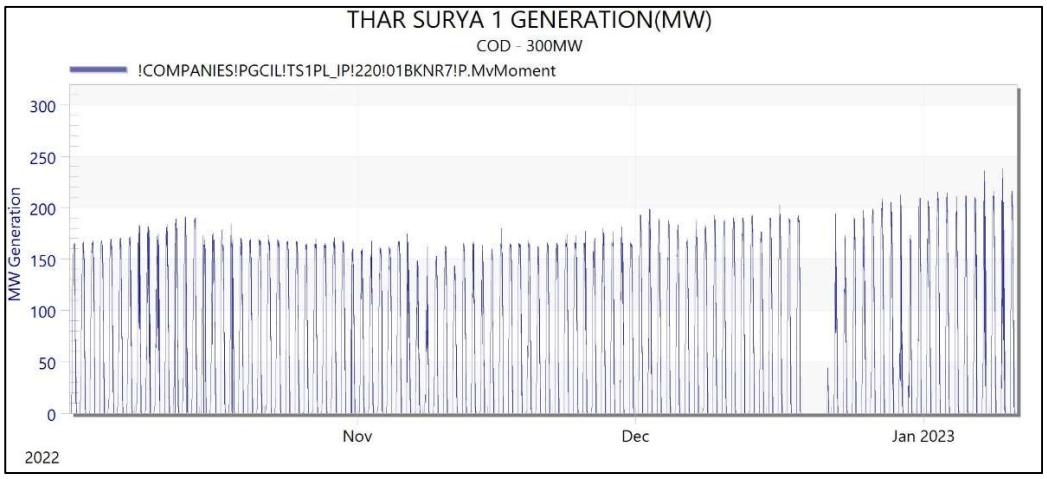
Since last few month it has been observed that max generation of ACME Heergarh plant is ~250MW and plant is not able to schedule/generate up to full COD for 300MW. Low CUF are observed in ACME Heergarh/AzureMapple and these plants are not generating up to Declared capacity/Available Capacity value on continuous basis. Communication regarding this have been sent by NRLDC but response is yet to be received.

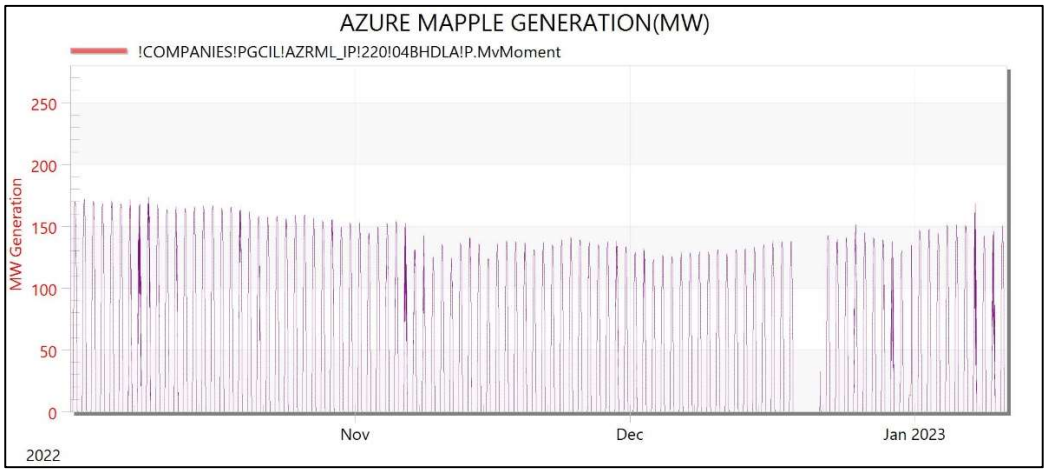
Recently same issue is observed in TharSuyra1.

Trend Graph for these plants is shown below for reference.

Plant Name	CoD quantum (MW)	Actual generation (MW)
ACME Heergarh	300	230-250
TharSuyra1	300	170-200
AzureMapple	257	140-170







OCC forum noted the same.

d) Numerous tripping of lines during fog hours

NRLDC representative stated that the importance of carrying out insulator cleaning and replacement of damaged insulators was discussed in the 199th – 202nd OCC meetings and 58th -60th NRPC meetings i.e. since September 2022, it was expected that all utilities would carry out pre-winter maintenance of lines timely. In order to avoid/mitigate tripping of lines during foggy (smog) weather in winter season, preventive actions like cleaning/washing of insulators, replacement of conventional insulators with polymer insulators have been recommended and are being taken every year.

Even after insulator cleaning and replacement work carried out by utilities, number of tripping are also being observed in real-time especially during pre-dominant fog hours. Such frequent tripping are big challenge in ensuring safe and secure operation of grid and also reduce life of transmission lines due to frequent flashovers/ trippings. These line tripping are apart from the lines already opened to manage high voltage. Since around 40-60 EHV lines are opened to control high voltage on daily basis and further 40-50 lines are tripping during fog timings, it becomes really challenging for the system operator to ensure safe and reliable grid operation.

Moreover, these figures are only for lines for which switching codes are issued by NRLDC. Apart from these lines, there are numerous other intrastate lines which are opened on high voltage or trip during fog conditions which are not monitored at RLDC level.

Following important lines have tripped on two or more than two occasions in Jan 2023 during fog hours timings:

- 400 KV Varanasi-Biharshariff (PG) Ckt-1
- 220 KV Badarpur(NT)-Alwar MIA(RS) (RS) Ckt-1
- 400 KV Bara(UP)-Meja TPS(MUN) (UP) Ckt-1
- 400 KV Bara(UP)-Meja TPS(MUN) (UP) Ckt-2

- 400 KV Varanasi-Biharshariff (PG) Ckt-2
- 400 KV Aligarh-Sikandrabad (UP) Ckt-1
- 400 KV Muktsar-Makhu (PS) Ckt-2
- 765 KV Anpara_C(LAN)-Unnao(UP) (UP) Ckt-1

Although fog related tripping have reduced from mid-December, all concerned transmission licensees were once again requested to review insulator cleaning/ washing activities and replacement of porcelain insulators by polymer insulators at their end and further plan for such activities on priority in the lines reportedly tripping during fog hours.

Members agreed for the same.

e) **Participation of hydro stations in Automatic Generation Control**

NRLDC representative stated that frequency profile of Indian grid for last few weeks has been poor and frequency has been outside the IEGC band for significant amount of time. One of the tool which is helpful in maintaining the frequency with in the IEGC band is Automatic Generation Control (AGC) which has been implemented across number of plants in the country including Northern region. For AGC control to be effective for the wired machines, it is desirable that generating stations keep their units in AGC remote mode whenever they are generating.

However, recently it is being observed that some of the hydro stations in Northern region are not keeping their units in AGC remote mode for all the time. For 03 Jan 2023, it was reported that despite availability of communication, the time for which the hydro stations participated in secondary frequency control was low as shown below:

Plant Name	% time Communication Link Availability	% time On bar	% AGC Remote when station was on bar and communication available
DHAULIGANGA	100	36	0
CHAMERA2	100	42	0
CHAMERA1	100	20	0
SEWA2	91	18	7
NJPC	100	37	14
CHAMERA3	100	45	38
TEHRI	100	56	54

NLDC/NRLDC are pursuing with the stations to operate in AGC-remote mode whenever units are brought on bar. However, it is requested that the generating

station control room personnel may be advised to keep their units in AGC remote mode whenever they are generating. This would enhance the quantum of regulating reserve in the grid for frequency control.

NHPC representative stated that it was considered that code has to be taken from NLDC every time to put the units in AGC remote/local mode and accordingly, units were running in local mode. However, it has now been clarified by NLDC recently that there is no requirement of code from NLDC for switching to remote/local mode and units are to be kept in AGC remote mode all the time and accordingly, it would be practiced in future.

SJVN and THDC representative also agreed to make sure that in future, generating units would be kept in AGC remote mode whenever they are generating.

f) Long outage of transmission elements

NRLDC representative stated that following important grid elements are out since long time and utilities were requested to provide update in the meeting:

S. No.	Element Name	**Owner**	Outage Date	Reason	**Update as received in 203 OCC meeting**
1	400/220 kV 500 MVA ICT 1 at Bhiwani(BB)	**BBMB**	31-07-2022	Tripped due to tripping of 220 KV Bhiwani-Hissar ckt-2. ICT under inspection.	Transformer being diverted from Panipat(BBMB). Timeline to be intimated separately.
2	400/220 kV 315 MVA ICT 3 at Mundka(DV)	**DTL**	05-09-2022	Fire observed on both sides bushing of 315 MVA ICT-3.	Works on borrowing Transformer from POWERGRID. Would be charged before summer season.
3	400KV Bus 1 at Vishnuprayag(JP)	**JPVL**	02-12-2021	Bus bar protection operated at Vishnuprayag. Sparking in Bus Coupler CB.	–
4	400KV Bus 2 at Parbati_3(NH)	**NHPC**	14-09-2022	Rectification work in Generator GIS Bay CB.	–
5	400KV Bus 2 at Parbati_2(NH)	**NHPC**	29-07-2020	Fire incident took place in Generating unit, control cables of Bus coupler CB damaged.	–
6	220 KV Kishenpur(PG) -Mir Bazar(PDD)	**PDD JK**	19-02-2022	Tower no. 170 collapsed.	–

	(PDD) Ckt-1				
7	FSC(40%) of 400 KV Kala Amb(PKTL)-Sorang(Greenko) (Greenko) Ckt-1 at Kala Amb(PKTL)		26-09-2022	To attend Unbalance current that is rapidly increasing in B phase.	Not in service due to low current
8	50 MVAR Non-Switchable LR on Allahabad-Fatehpur (PG) Ckt-2 @Allahabad(PG)		27-11-2021		–
9	50 MVAR Non-Switchable LR on Allahabad-Fatehpur (PG) Ckt-1 @Allahabad(PG)	**POWERGRID**	27-11-2021	Requirement of reactor being studied by CTUIL. Update to be provided by POWERGRID	–
10	FSC(40%) of 400 KV Fatehpur-Mainpuri (PG) Ckt-1 at Mainpuri(PG)		24-10-2021	VME protection system was blocking the FSC back to in service	–
11	FSC(40%) of 400 KV Fatehpur-Mainpuri (PG) Ckt-2 at Mainpuri(PG)		29-01-2022		–
12	50 MVAR LR ON 400 KV AKAL-RAMGARH (RS) CKT-1 @RAMGARH(RS)	**RRVPNL**	23-04-2018	Reactor is out as line is yet to be commissioned. Shifted to Bhadla line.	–

13	50 MVAR Non-Switchable LR on Akal-Jodhpur (RS) Ckt-1 @Jodhpur(RS)		07-07-2022	To take-out Line Reactor out of service due to high DGA violation; for internal inspection by OEM.	_
14	50 MVAR LR on Akal-Jodhpur (RS) Ckt-1 @Akal(RS)		17-08-2021	NA	_
15	125 MVAR Bus Reactor No 1 at 400 KV Jaisalmer(RS)		01-11-2022	To replace the burnt TB in the M.K Box and wiring to be done in M.K box.	_
16	125 MVAR Bus Reactor No 1 at 400 KV Akal(RS)		30-11-2022	Buchholz relay trip as conservator tank is empty.	_
17	50 MVAR BUS REACTOR NO 1 AT 400KV PANKI(UP)	**UPPTCL**	29-01-2022	Replacement of 50 MVAR Bus reactor by new 125 MVAR Bus Reactor.	Erection work completed except one bus Isolator of Bay, 30 Jan 2023
18	220 KV Gazipur(DTL)-Noida Sec62(UP) (UP) Ckt-1		30-04-2022	Tower tilted on one side at tower no 10 from Gazipur (DTL) end.	Line under break down , no further status till now . Fund not provided by MCD, Delhi.
19	400/220 kV 315 MVA ICT 1 at Muradnagar_1(UP)		13-03-2020	Buccholz relay alarm and Local Breaker Backup protection operated.	TWC approved on 09.12.2021 for replacement with 500MVA new ICT . November 2023
20	400/220 kV 500 MVA ICT 2 at Noida Sec 148(UP)		19-08-2020	ICT tripped on REF protection. Transformer caught fire and got damaged.	ICT received from BHEL , December 2022
21	50 MVAR Non-Switchable LR on Agra-Unnao (UP)		28-10-2021	R and Y phase bushing damaged at Agra(UP).	Testing done by OEM, Report awaited. BHEL submitted report that it is irreparable Now further Design unit

	Ckt-1 @Agra(UP)				UPPTCL will decide. Design Unit advised to propose 63 MVAR line reactor, Dec 2023
22	50 MVAR Bus Reactor No 1 at 400KV Moradabad(UP)		03-12-2021	R-phase bushing damaged.	Alloted from 400 kV design , Jan 2023
23	400KV Bus 3 at Gorakhpur(UP)		21-02-2022	Disc insulator of B phase 400 kV transfer Bus coupler damaged	Bus healthy
24	220 KV Gazipur(DTL)-Shahibabad(UP) (UP) Ckt-2		30-04-2022	Line remains charge at No load from UP end. Manually open at 19:30 on 30/04/22 due bending of tower no. 4	Line under break down , no further status till now . Fund not provided by MCD, Delhi.
25	400/220 kV 240 MVA ICT 2 at Orai(UP)		24-09-2022	Differential protection Trip, REF protection Trip.	Testing from outside agency was done. Result sent to higher authority. New ICT will be planned.

It was requested to expedite restoration of the above-mentioned Grid elements at the earliest and also provide an update regarding their expected restoration date/time.

Regarding 765kV AnparaD-Unnao, it was informed by UPPTCL representative that the line is expected to be charged by 10th March 2023.

Members were asked to provide update for other elements through mail and also update in outage software.

21. TTC/ATC of state control areas for winter 2022

Most of the NR states except J&K, Ladakh and Chandigarh U/Ts are sharing basecase and ATC/TTC assessment with NRLDC. OCC has advised all states to timely declare TTC/ATC for prospective months and revise the figures as per requirement.

Based on feedbacks received till date, SLDCs were requested to go through the tentative ATC/TTC limits for February 2023 (Annexure-B.II of agenda) and provide comments. If no comments are received, these limits will be assumed confirmed and uploaded on NLDC website. SLDCs are also requested to upload these limits in their respective websites. States were also requested to regularly provide update regarding the upcoming transmission elements which would improve import capability of respective state control area.

Loading of 400/220kV ICTs and important 220kV lines observed above or close to N-1 contingency limits is also attached as Annexure-B.III of agenda.

UP

UP SLDC to provide update on:

- ATC/TTC limits for low demand period i.e. winter months based on anticipated state generation scenario.
- Status of Obra and Sohawal SPS

In 201 OCC meeting, UP representative stated that testing of SPS of Sohawal is completed and will be operational in 2-3 days. Regarding SPS of Obra, order been placed to Siemens and work will be completed within 30 days.

In 202 OCC meeting, UP representative stated that Obra SPS is likely to be commissioned by end of Jan 2023. For Sohawal SPS, some work regarding SCADA is pending and would be commissioned shortly.

In 203 OCC meeting, UP representative stated that Sohawal SPS has been implemented and Obra SPS is likely to be commissioned by end of Feb2023.

Haryana

Haryana SLDC informed the following:

- ATC/TTC limits for low demand period i.e. winter months based on anticipated state generation scenario has been shared with NRLDC
- Regarding N-1 non-compliance at 400/220kV Dipalpur: As intimated by XEN/TS, Panipat, feasibility regarding installation of additional 400/220kV ICTs already submitted, but M/s JKTPL (Now Indigrid) authorities (400kV Dipalpur) deny for installation of additional ICTs due to commercial reasons.
- Panipat BBMB: As intimated by XEN/TS, Panipat, the matter has been taken up with 400kV S/Stn. BBMB, Panipat regarding installation of additional ICT or augmentation of ICTs but BBMB Panipat replied that “Installation of additional ICT or augmentation of ICTs is not possible due to space constraints”. As intimated by PD&C wing, the creation of 400kV TikriKhurd by DTL will provide relief to the ICTs at Panipat BBMB (Dec-24)

NRLDC representative stated that the above issues may not be attended before paddy 2023, for ATC/TTC enhancement. Accordingly, it was requested to take up the matter on priorty with STU.

J&K

Loading of 400/220kV Amagarh ICTs was above N-1 contingency limits for last 30 days. 220kV Amargarh-Ziankote D/C lines are also N-1 non-compliant for most of the time during winter months.

In 202 and 203 OCC meetings, it was discussed that proposal for capacity augmentation was discussed in OCC/ NRPC meeting but could not be finalised. Therefore, till capacity is augmented at 400/220kV Amargarh, any N-1 contingency

is likely to lead to tripping of both ICTs as they are loaded beyond their N-1 contingency limit and there would be load loss in valley area.

Apart from above, there are issues related to huge MVAR drawl by J&K control area during winter season.

Not assessing its ATC. J&K representatives had intimated during 47th TCC and 49th NRPC meeting that they would be sharing ATC/TTC assessment with NRLDC from October 2021, however the same is still awaited.

J&K and Ladakh U/Ts are once again requested to advise the concerned officers to evaluate their ATC/TTC limits in coordination with NRLDC and share latest assessment with NRLDC and NRPC. J&K officers may also take online/ offline assistance from NRLDC officers if required.

It was again requested that SLDCs may ensure that loading of ICTs and lines are below their N-1 contingency limits. While requisitioning power from various sources, states should take care to limit their scheduled drawl as well as actual drawl in real time within the Available Transfer Capability (ATC) limits assessed by SLDC and NRLDC. NRLDC is continuously sending emails in real-time for ensuring N-1 compliances as well as restricting schedule till ATC limit and maximizing internal generation. SLDCs need to ensure this during real-time operation.

22. MVAR support from generators

In the meeting it was discussed that during winter season, demand of Northern region is low and high voltages are a common phenomenon predominantly in Punjab, Haryana and Delhi area. Even after several actions being taken by control centers, it is seen that there is persistent high voltage in Northern region. The reactive power absorption by generators becomes an important resource that helps in managing high voltages in the grid. However, even after continuous follow up in OCC meetings, it is seen that MVAR data telemetry is poor/ inaccurate from few of the generating stations. For some of the generators it is seen that there is inadequate reactive power absorption based on their capability curve especially during night hours. The performance of generators in absorption of reactive power for last 30 days (10 Dec 2022 – 10 Jan 2023) is shown below:

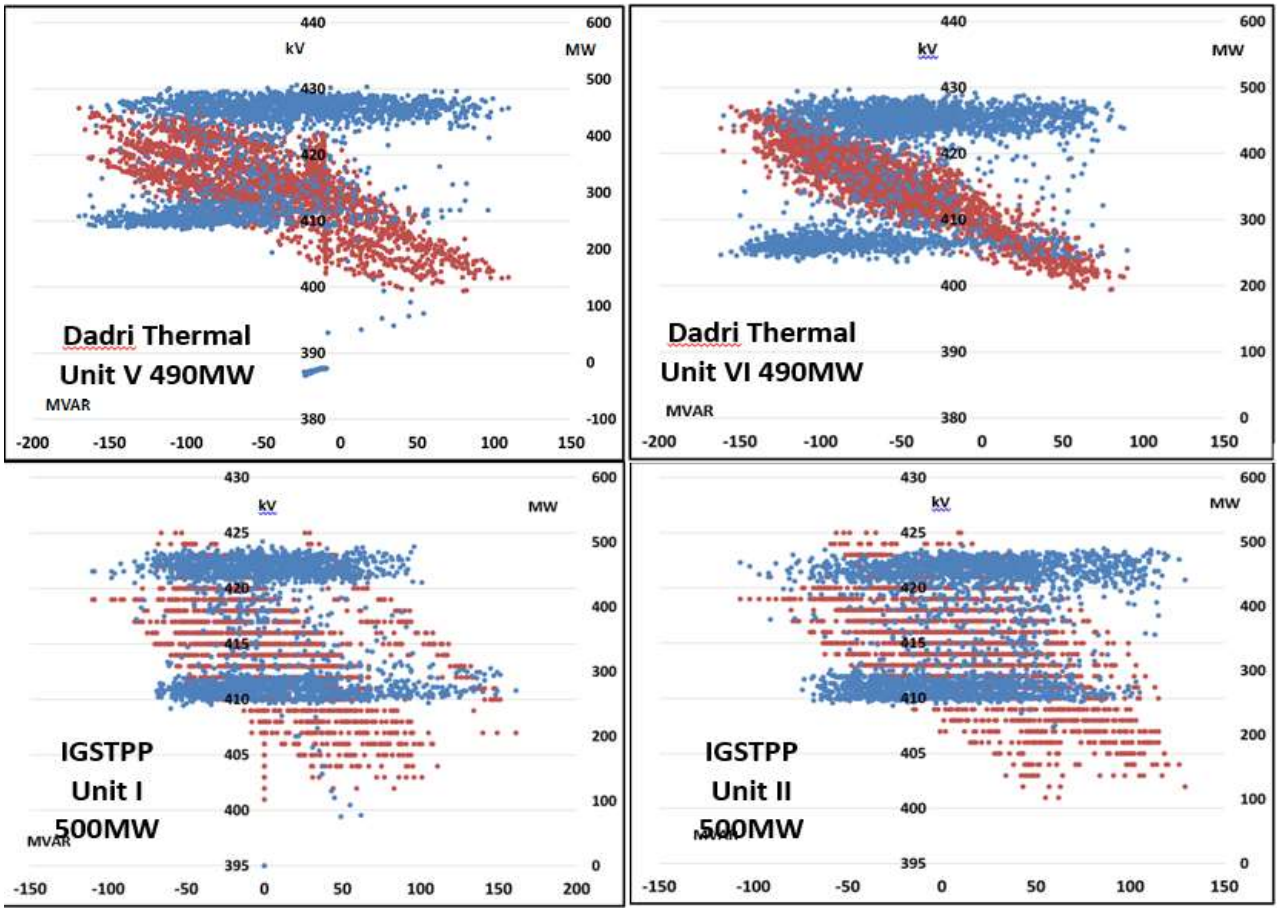
S.No.	Station	Unit No.	Capacity	Geographical location	MVAR capacity as per capability curve (on LV side)	MVAR performance (-) Absorption (+) Generation (HV side data)	Voltage absorption above (in KV)
1	Dadri NTPC	1	490	Delhi-NCR	-147 to 294	-160 to 100	415
		2	490		-147 to	-150 to 60	410

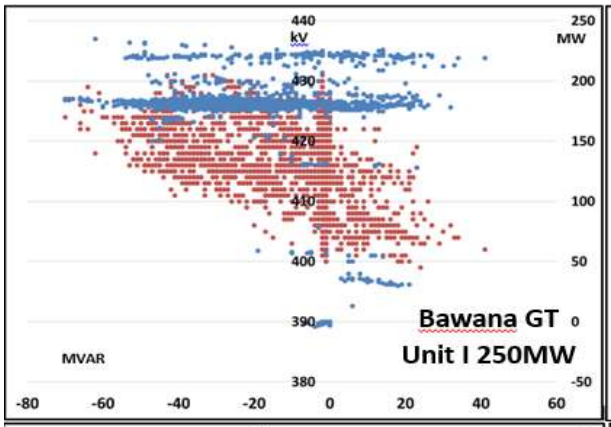
					294		
2	Singrauli NTPC	1	200	UP	-60 to 120	-25 to 10	405
		2	200		-60 to 120	-20 to 10	405
		3	200		-60 to 120	-30 to 5	404
		4	200		-60 to 120	-30 to 0	404
		5	200		-60 to 120	-30 to 20	405
		6	500		-150 to 300	-60 to 30	405
		7	500		-150 to 300	-70 to 20	404
3	Rihand NTPC	1	500	UP	-150 to 300	-40 to 40	405
		2	500		-150 to 300	-30 to 60	405
		3	500		-150 to 300	-80 to 10	400
		4	500		-150 to 300	-60 to 50	404
4	Kalisindh RS	1	600	Rajasthan	-180 to 360	-130 to 120	Not clear
		2	600		-180 to 360	-130 to 50	Not clear
5	Anpara C UP	1	600	UP	-180 to 360	-40 to 80	770
		2	600		-180 to 360	-50 to 80	768
6	TalwandiSaboo PB	1	660	Punjab	-198 to 396	-220 to 0	410
		2	660		-198 to 396	-210 to 0	410
		3	660		-198 to 396	-	-
7	Kawai RS	1	660	Rajasthan	-198 to 396	-60 to 90	406
		2	660		-198 to 396	-60 to 60	406

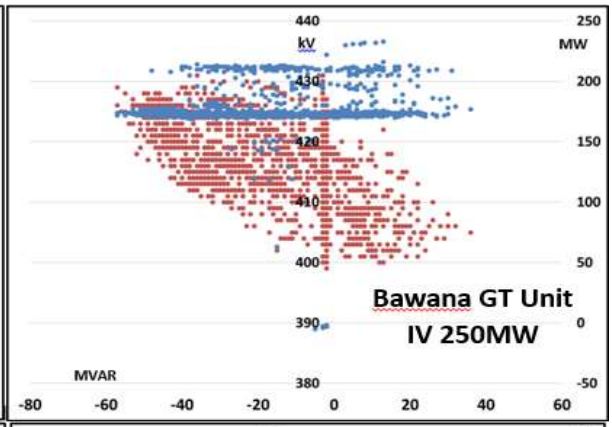
8	IGSTPP Jhajjar	1	500	Haryana	-150 to 300	-90 to 100	415
		2	500		-150 to 300	-80 to 100	415
		3	500		-150 to 300	-	-
9	Rajpura (NPL)	1	700	Punjab	-210 to 420	-220 to 0	405
		2	700		-210 to 420	-220 to 0	405
10	MGTPS	1	660	Haryana	-198 to 396	-140 to 80	412
		2	660		-198 to 396	-150 to 70	412
11	Bawana	1	216	Delhi-NCR	-65 to 130	-60 to 20	415
		2	216		-65 to 130	-	-
		3	216		-65 to 130	-60 to 30	415
		4	216		-65 to 130	-	-
		5	253		-65 to 130	-50 to 50	415
		6	253		-65 to 130	-40 to 40	415
12	Bara PPGCL	1	660	UP	-198 to 396	-50 to 150	780
		2	660		-198 to 396	-70 to 100	780
		3	660		-198 to 396	-30 to 150	780
13	Lalitpur TPS	1	660	UP	-198 to 396	-50 to 80	765
		2	660		-198 to 396	-60 to 40	765
		3	660		-198 to 396	-80 to 90	760
14	Anpara D UP	1	500	UP	-150 to 300	-70 to 30	760
		2	500		-150 to 300	-50 to 50	765

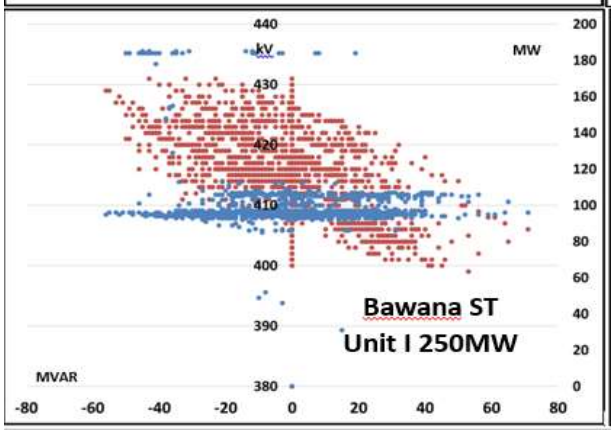
15	Chhabra TPS	1	250	Rajasthan	-75 to 150	-50 to 20	405
		2	250		-75 to 150	-50 to 20	405
		3	250		-75 to 150	-	-
		4	250		-75 to 150	-	-
		5	660		-198 to 396	-70 to 100	408
		6	660		-198 to 396	-60 to 100	408

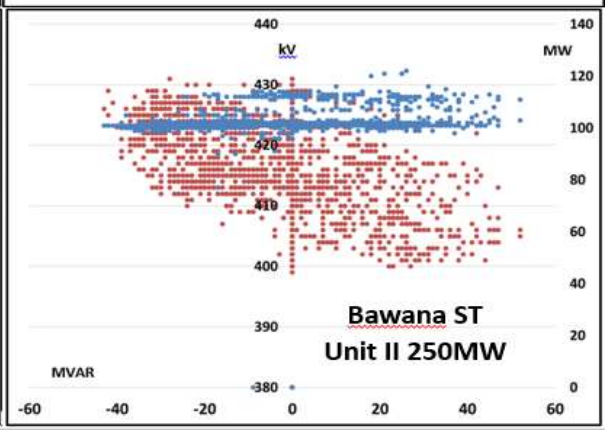
All generating stations are requested to resolve any issues related to telemetry and make sure that MVAr absorption is as per grid requirement and capability curve of machine. It was highlighted that NRLDC control room also highlights this issue in real-time with generating stations. Plots for concerned units are shown below:

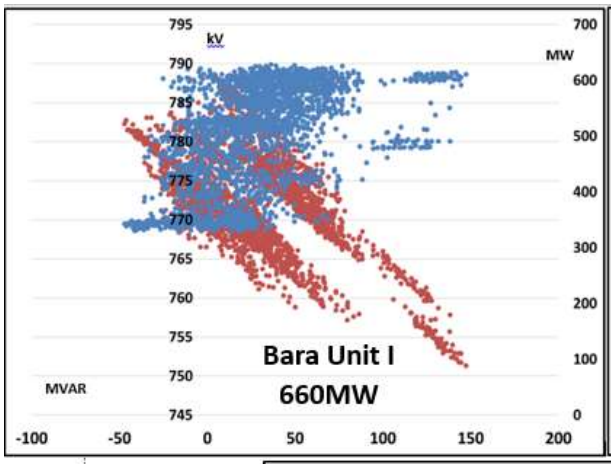


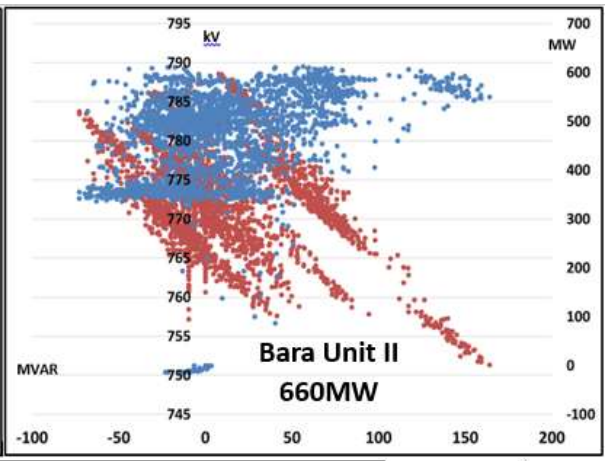

kV
MW
MVAR
Bawana GT
Unit I 250MW

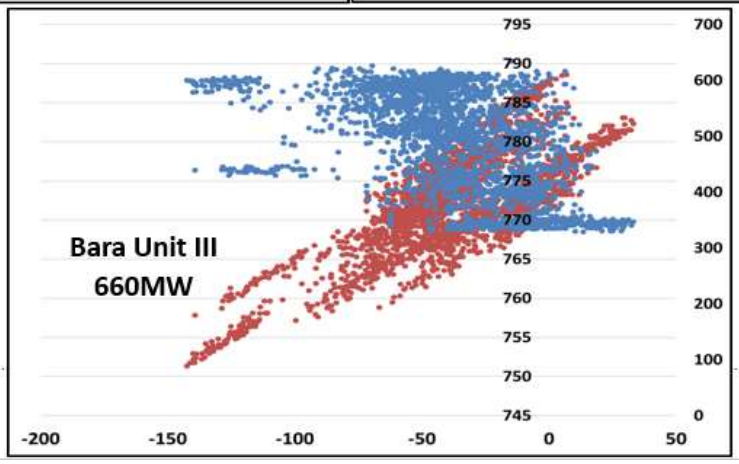

kV
MW
MVAR
Bawana GT Unit
IV 250MW


kV
MW
MVAR
Bawana ST
Unit I 250MW


kV
MW
MVAR
Bawana ST
Unit II 250MW


kV
MW
MVAR
Bara Unit I
660MW


kV
MW
MVAR
Bara Unit II
660MW


Bara Unit III
660MW

Some of the generating units such as Dadri, Bawana, IGSTPP Jhajjar and Bara need to explore possibility of further MVAR absorption. Generators may also set their Vsch (voltage set point) such that units are absorbing MVAR as per their capability and grid requirement.

NTPC representative agreed to check the matter with Dadri generating station.

IGSTPP Jhajjar representative stated that there is requirement of tap change of Generator transformer and they are exploring the possibility of Generator transformer tap change for better reactive power response with their Operational Services team.

23. Frequent forced outages of transmission elements in the month of December'22:

The following transmission elements were frequently under forced outages during the month of **December 22**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	220 KV Ganguwal(BB)-Jamalpur(BB) (PS) Ckt-1	3	Punjab
2	220 KV Hissar(BB)-Chirawa(RS) (BB) Ckt-1	4	BBMB
3	220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-1	4	Delhi
4	400 KV Aligarh-Sikandrabad (UP) Ckt-1	5	UP
5	400 KV Harduaganj -Sikandrabad (UP) Ckt-1	4	UP
6	400 KV Jhajjar(APCL)-Mundka(DV) (APCL) Ckt-2	4	Haryana
7	400 KV Muktsar-Makhu (PS) Ckt-2	4	Punjab
8	400 KV Suratgarh(RVUN)-Ratangarh(RS) (RS) Ckt-2	4	Rajasthan
9	400 KV TalwandiSaboo(PSG)-Muktsar(PS) (PS) Ckt-1	4	Punjab

The complete details are attached at **Annexure-B.V**of agenda.

Discussion during the meeting:

- **220 KV Ganguwal(BB)-Jamalpur(BB) (PS) Ckt-1:** *BBMB representative informed that A/R in the line was healthy however they have taken up issue of its non-operation with PSTCL as line is maintained by PSTCL. PSTCL representatives were not present in the meeting.*

- **220 KV Hissar(BB)-Chirawa(RS) (BB) Ckt-1:***BBMB representative informed that three (no.) of the tripping is due to frequency related protection operation and one on fault. He further informed that they are checking the UFR &df/dt relay and issue with A/R operation in the line.*

- **220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-1:** *Delhi representative informed that frequent tripping occurred due to fog and as line is radial A/R operation need to be checked at Mandola end.*

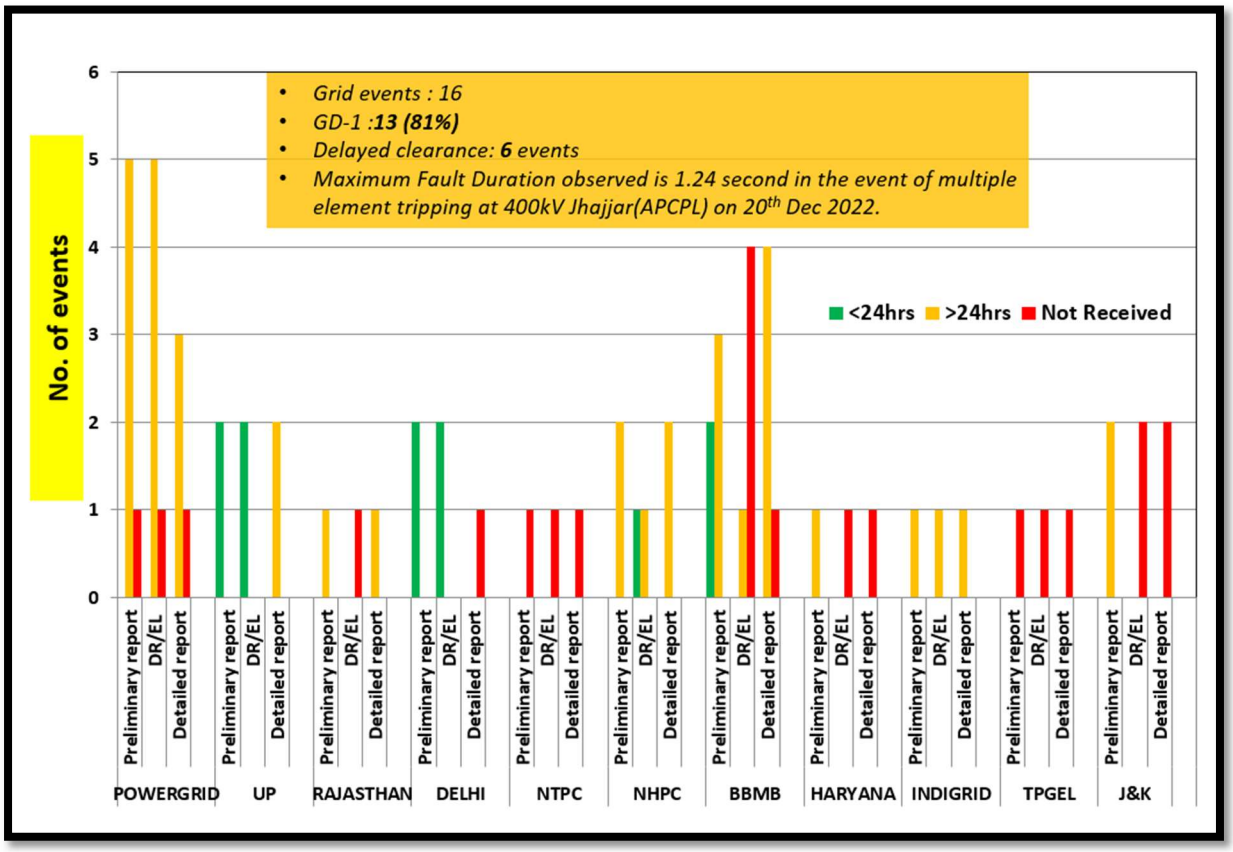
- **400 KV Aligarh-Sikandrabad (UP) Ckt-1:** *UP representative informed that there was an issue in A/R operation at Sikandrabad end, same has been resolved and successful A/R operation occurred on 09th Jan 2023 during transient fault. NRLDC representative further asked about the reason of frequent fault in line, whether fault are occurring due to insulator issues. UP representative informed that most of the insulators are of polymer type however they will again confirm the status of insulators in line. He further informed that there were reporting of faults due to birds from transmission wing.*
- **400 KV Harduaganj -Sikandrabad (UP) Ckt-1:** *UP representative informed that WUPPTCL team has reviewed the protection settings and A/R operation, nothing abnormal found. A/R operation of the line is under observation, if any issue is found then accordingly further actions will be taken.*
- **400 KV Jhajjar(APCL)-Mundka(DV) (APCL) Ckt-2:** *APCL representative informed that first tripping occurred on Y-B phase to phase fault due to kite thread, during second tripping line successfully auto reclosed from Jhajjar end & during third tripping also A/R operated at Jhajjar end. Delhi representative informed that there is PLCC issue at Mundka end which is maintained by NTPC/APCL, same will be checked and corrected in coordination with the NTPC/APCL.*
- **400 KV Suratgarh(RVUN)-Ratangarh(RS) (RS) Ckt-2:** *Rajasthan representative informed that A/R at Suratgarh end was kept not functional due to faulty relay, purchase order of the same has been placed, present status will be share shortly.*

NRLDC representative emphasized that A/R (auto re-closer) issue was found in many of these tripping. He further sensitized all the utilities to ensure healthiness/ in service of A/R in 220 kV and above transmission lines in compliance to CEA Grid Standards. He further informed that most of the tripping are transient in nature but due to non-operation of A/R, it resulted into tripping of the transmission element thus and reducing the reliability of

the grid. All the utilities shall endeavor to keep auto re-closer in service and in healthy condition for 220 kV and above voltage level transmission line.

Frequent outages of such elements affect the reliability and security of the grid. Hence, utilities are once again requested to look into such frequent outages and share the remedial measures taken/being taken in this respect

24. Multiple element tripping events in Northern region in the month of December '22:



A total of 16 grid events occurred in the month of December '22 of which **13** are of GD-1 category, **02** are of GI-2 Category & 01 is of GI-1 category. The preliminary report of all the events have been issued from NRLDC. A list of all these events is attached at **Annexure-B.VI** of agenda.

Further, despite persistent discussions/follow-up in various OCC/PCC meetings, it is observed that provisions 5.2(r) and 5.9.4(d) of the IEGC, pertaining to reporting of events / tripping to RLDC, is not being complied with by many utilities.

Maximum Fault Duration observed is 1240 msec in the event of multiple element tripping at 400kV Jhajjar(APCPL) at 06:49hrs on 20th Dec22. During this event, all four (04) evacuating lines tripped on multiple phase to earth fault and due to which generation loss of approx. 1400MW occurred at Jhajjar(APCPL).

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total 6events out of **15** grid events occurred in the month. The other events with delayed clearance of faults are as follows:

i. **Multiple elements tripping at 220/66kV Hiranagar(J&K) at 20:57hrs on 04th Dec22, fault clearance time of 680ms:**

NRLDC representative informed that fault in 220kV Hiranagar-Ghatti ckt-2 didn't clear due to issue in CB which further led to the multiple elements tripping at Hiranagar end. He asked about the status of actions taken at Hiranagar end. Representatives of J&K were not present in the meeting.

ii. **Multiple elements tripping at 220/66kV Pong(BB) at 15:03hrs on 06th Dec22, fault clearance time of 480ms:**

BBMB representative informed that details are yet to be received, follow-up are being taken up and details will be shared as soon it received.

iii. **Multiple elements tripping at 220/132kV Dehar(BB) at 11:52hrs on 13th Dec22, fault clearance time of 640ms:**

BBMB representative informed that details are yet to be received, follow-up are being taken up and details will be shared as soon it received.

iv. **Multiple elements tripping at 400/220/kV Panipat(BBMB) at 00:29hrs on 20th Dec22, fault clearance time of 1080ms:**

BBMB representative informed that details are yet to be received, follow-up are being taken up and details will be shared as soon it received.

Multiple incidents of load loss at Hinduan(Raj) is observed during recent past due to tripping of 400/220kV 315MVA ICT-1&2 at Hinduan(Raj) on overloading. Considering large demand in Rajasthan control are and increased frequency of tripping of ICTs at Hinduan, expeditious commissioning of network is need of an hour.

Remedial actions taken by constituents to avoid such multiple elements tripping may be shared.

Members may take necessary preventive measures to avoid such grid incidents / disturbances in future and report actions taken by respective utilities in OCC & PSC forum. Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & Detailed Report of the events to RLDC in line with the regulations.

Regarding event of maximum delayed clearance of fault during event at 400kV Jhajjar APCPL, Haryana representative informed that Main-1 protection of 400kV Jhajjar-Daulatabad ckt-1 didn't sense the fault and Main-2 protection

was already out since 02:32hrs of the same day due to DC supply failure. Due to non-operation of Main-1 & Main-2 protection, fault cleared with the tripping of 400kV Jhajjar-Daulatabad ckt-2. NRLDC representative asked about the corrective actions taken and whether Main-1 protection is now healthy or not. Haryana representative informed that DC supply was restored on next day of the event and testing of Main-1 protection was due, present status of the same will be shared.

NRLDC representative emphasized on attending alarms i.e., DC supply failure etc. in real time so that remedial actions can be taken to avoid any incident. He further said that protection related corrective actions need to be completed within one week in coordination with the APCPL Jhajjar and to share the confirmation of action taken with NRLDC/NRPC.

NRLDC representative raised concern about poor status of report updation by BBMB & J&K on the tripping portal. He further stated that timely report submission is an important activity and all constituents are advised to take this on priority and upload the reports.

OCC suggested all the NR constituents to update the information on tripping portal developed by NRLDC. All the constituents agreed to take proactive actions in this regard to minimize the tripping.

Members were asked to take expeditious actions to avoid such tripping in future, Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & Detailed Report of the events in line with the regulations. Members agreed to take action in this regard.

25. Operation of UFR &df/dt relay and SPS in NR Region

On 20th & 25th Dec 2022, tripping of feeders on UFR operation is reported from Rajasthan, Haryana, BBMB & UP control area. As per PMU, frequency didn't drop below 49.41Hz. As frequency for triggering UFR relay is 49.4Hz, tripping of feeders on UFR operation at 49.41Hz may be reviewed. Rest of the constituents are also requested to share the details of tripping on UFR if occurred in their control area.

On 11th Jan 2023 at 00:40hrs, 765kV Anpara_C-Unnao(UP) ckt tripped on R-N phase to earth fault. As per SCADA, MW loading of line during antecedent condition was ~1268MW. As per SPS scheme implemented at Anpara_C& D generation complex, case-2 of SPS would have triggered. However, as per SCADA, no tripping and back down of generation observed. SLDC-UP is requested to share the details of SPS operation and any observation regarding the same.

NRLDC representative requested all the constituents to share the details of UFR, df/dt operation in their control area. He further requested to review the settings and healthiness of UFR &df/dt relay in their respective control area.

He further asked about the reason of non-operation of SPS during recent three (no.) events. UP representative informed that hardware of the SPS is installed at Anpara-D. During investigation operating system of Main server was found crashed and due to which connectivity of Main server with RTU got

affected. Currently SPS is operational via alternate system and in parallel issue with the Main server is being attended and same will be restored shortly.

26. Details of tripping of Inter-Regional lines from Northern Region for December' 22:

S. No.	Name of Transmission Element Tripped	Owner/ Utility	Outage		Load Loss/ Gen. Loss	Brief Reason (As reported)	Category as per CEA Grid standards	# Fault Clearance Time (>100 ms for 400 kV and 160 ms for 220 kV)	*FIR Furnished (YES/NO)	DR/EL provided in 24 hrs (YES/NO)	Remarks
			Date	Time							
1	765 KV Fatehpur-Sasaram (PG) Ckt-1	POWERGRID	20-Dec-22	04:08	Nil	Phase to earth fault Y-N	NA	NA	yes	yes	As per DR, line successfully autoreclosed on Y-N fault, later tripped on fault in reclaim time. Fault due to dense fog.
2	400 KV Balia-Bihartariff (PG) Ckt-2	POWERGRID	21-Dec-22	03:41	Nil	Phase to earth fault R-N	NA	NA	yes (After 24 hrs)	yes (After 24 hrs)	As per DR, line tripped after unsuccessful A/R operation on permanent R-N fault.
3	400 KV Gorakhpur(PG)-Muzaffarpur(PG) (POWERLINK) Ckt-2	POWERGRID	22-Dec-22	01:03	Nil	Phase to earth fault R-N	NA	NA	yes (After 24 hrs)	yes (After 24 hrs)	As per DR, line tripped after unsuccessful A/R operation on permanent R-N fault.
4	400 KV Gorakhpur(PG)-Muzaffarpur(PG) (POWERLINK) Ckt-1	POWERGRID	23-Dec-22	01:26	Nil	Phase to earth fault Y-N	NA	NA	yes (After 24 hrs)	yes (After 24 hrs)	As per DR, line tripped after unsuccessful A/R operation on permanent Y-N fault.
5	400 KV Vindhyachal(PG)-Vindhyachal(NT) (PG) Ckt-1	POWERGRID	23-Dec-22	17:25	Nil	Tripped from NTPC end. R-phase jumper broken at VSTPS end.	NA	NA	yes (After 24 hrs)	NA	As per PMU at Varanasi(PG), R-N fault with delayed clearance in 200ms is observed.
6	400 KV RAPS_D(NP)-Shujalpur(PG) (RTCL) Ckt-2	NPCIL	23-Dec-22	18:07	Nil	DT received at Sujalpur end during Busbar relay testing work	NA	NA	No	No	
7	220 KV Auraiya(NT)-Mehgaon(MP) (MPSEB) Ckt-1	MPPTCL	26-Dec-22	06:57	Nil	Bus bar protection operated at Auraiya.	NA	NA	No	No	As per PMU at Agra(PG), R-N phase to earth fault with delayed clearance in 920ms is observed.
8	220 KV Auraiya(NT)-Malanpur(MP) (PG) Ckt-1	POWERGRID	27-Dec-22	00:04	Nil	Phase to earth fault R-N	NA	NA	No	No	As per PMU at Agra(PG), R-N phase to earth fault with no A/R operation is observed.
9	220 KV Auraiya(NT)-Malanpur(MP) (PG) Ckt-1	POWERGRID	27-Dec-22	09:57	Nil	R-N fault, Zone-1, Dist. 95.80km from Auraiya. Fault in WR portion.	NA	NA	No	No	As per PMU at Agra(PG),no fault is observed.

A total of 09 inter-regional lines tripping occurred in the month of December'22. The list is attached at **Annexure-B.VII** of agenda**.** The status of receipt of preliminary reports, DR/EL within 24hrs of the event and fault clearing time as per PMU data has also been mentioned in the table. The non-receipt of DR/EL & preliminary report within 24hrs of the event from SLDCs / ISTS licensees / ISGSs is in violation of regulation 5.2(r) of IEGC and regulation 15(3) of CEA Grid Standards. As per regulations, all the utilities shall furnish the DR/EL, flag details & preliminary report to RLDC/RPC within 24hrs of the event. They shall also furnish the detailed investigation report within 7 days of the event if fault clearance time is higher than that mandated by CEA (Grid Standard) Regulations.

With respect to tripping of 220kV Auraiya-Malanpurckt and 220kV Auraiya-Mehgaonckt, NTPC representative informed that there is issue related to PLCC at MPPTCL end and same has been already communicated to MPPTCL & WRLDC. As of now no feedback regarding action take has been received in this regard.

NRLDC representative requested members to advise the concerned for taking corrective action to avoid such tripping as well as timely submission of the information.

27. Status of submission of DR/EL and tripping report of utilities for the month of December'22.

The status of receipt of DR/EL and tripping report of utilities for the month of December'2022 is attached at **Annexure-B.VIII**of agenda. It is to be noted that as per the IEGC provision under clause 5.2 (r), detailed tripping report along with DR & EL has to be furnished within 24 hrs of the occurrence of the event. However, it is evident from the submitted data that reporting status is not satisfactory and needs improvement.

NRLDC representative stated that status of Punjab, INDIGRID, Rajasthan, J&K, BBMB & NHPC is not satisfactory and needs improvement.

Punjab representative informed that they have started monitoring the reporting status closely and necessary follow-up actions will be taken to improve the reporting status of Punjab.

NHPC representative also assured to improve the reporting status.

Members may please note and advise the concerned for timely submission of the information. It is requested that DR/EL of all the trippings shall be uploaded on Web Based Tripping Monitoring System "http://103.7.128.184/Account/Login.aspx" within 24 hours of the events as per IEGC clause 5.2.r and clause 15.3 of CEA grid standard. Apart from prints of DR outputs, the corresponding COMTRADE files may please also be submitted in tripping portal / through email.

28. Status of PSS tuning/ re-tuning and Step Response Test of generator

Since 182nd OCC meeting, this point was discussed and Utilities were requested to submit the present status of PSS tuning/re-tuning and Step Response Test of their respective generators as per the below mentioned format.

S. No.	Name of the Generating Station	Date of last PSS tuning / re-tuning performed (in DD/MM/YYYY format)	Date of last Step Response Test performed (in DD/MM/YYYY format)	Report submitted to NRLDC (Yes/ No)	Remarks (if any)

The status of test performed till date is attached at **Annexure-B.IX**of agenda.

It is to be noted that as per regulation 5.2(k) of IEGC, Power System Stabilizers (PSS) in AVRs of generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the CTU/RPC from time to time.

Members were requested to update about their future plan for PSS tuning as there is no significant progress despite including this agenda in every OCC meeting and a separate meeting may be called for detail discussion on this matter.

NRLDC representative informed that all the units who have done Step response test before 2018 were requested to plan the exciter step-response test as soon as possible and submit the tentative schedule of step-response test on the units with NRPC/ NRLDC. He further informed that till date Schedule has been received from Rajasthan and UP Control area. He further requested that members may kindly accord due priority in this regard and update about their future plan for PSS tuning as there is little progress despite including this agenda in every OCC meeting.

1. Frequency response characteristic:

Three FRC based event occurred in the month of **December-2022**. Description of the event is as given below:

Table:

S. No.	Event Date	Time (In hrs.)	Event Description	Starting Frequency (in Hz)	End Frequency (in Hz)	*Δf*
1	20-Dec-22	06:48hrs	At 06:47hrs on 20th Dec'22, 400 KV Jhajjar(APCL)-Daulatabad(HV) (HV) Ckt-1 tripped on Y-N phase to earth fault, fault distance was ~25km from Jhajjar end. At the same time, 400 KV Jhajjar(APCL)-Daulatabad(HV) (HV) Ckt-2 also tripped from Jhajjar end in Z-3 (~102km) along with 400/220kV 315MVA ICT-4 at Daulatabad(HV).	50.09	50.05	0.04

			With the tripping of Mundka-2 (tripped at 02:32hrs) & Daulatabad-1&2 lines, only one line i.e., 400KV Jhajjar(APCL)-Mundka(DV) (APCL) Ckt-1 was available for power evacuation and its MW loading increased to ~1400MW. Further at 06:49hrs, 400KV Jhajjar(APCL)-Mundka(DV) (APCL) Ckt-1 also tripped on R-N phase to earth fault, fault occurred due to snapping of jumper at tower location no 119. With the tripping of all four (04) lines at Jhajjar(APCPL), all three 500MW running units at Jhajjar(APCPL) carrying total ~1400MW tripped due to loss of evacuation path.			

Status of Data received till date:

Data has been received from NTPC Singrauli, NTPC Tanda, Kawai TPS, TSPL, NHPC, UP, Delhi & HPGCL Yamuna Nagar.

Memebers who haven't shared the data yet are requested to share the data and analysis of FRC of their control area.

FRC of the generating units during the event are as follows:

Generator	20-Dec-22 event	Generator	20-Dec-22 event
Singrauli TPS	53%	Salal HEP	0%
Rihand-1 TPS	-33%	Tanakpur HEP	-19%
Rihand-2 TPS	8%	Uri-1 HEP	-5%
Rihand-3 TPS	66%	Uri-2 HEP	0%
Dadri-1 TPS	73%	Dhauliganga HEP	406%
Dadri -2 TPS	-47%	Dulhasti HEP	144%
Unchahar TPS	No generation	Sewa-II HEP	111%
Unchahar stg-4 TPS	No generation	Parbati-3 HEP	29%
Jhajjar TPS	-41%	Jhakri HEP	143%
Dadri GPS	621%	Rampur HEP	31%
Anta GPS	-99%	Tehri HEP	24%
Auraiya GPS	7%	Koteswar HEP	0%
Narora APS	0%	Karcham HEP	156%
RAPS-B	0%	Malana-2 HEP	No generation
RAPS-C	2%	Budhil HEP	0%
Chamera-1 HEP	No generation	Bhakra HEP	No generation
Chamera-2 HEP	11%	Dehar HEP	No generation
Chamera-3 HEP	-322%	Pong HEP	8%
Bairasiul HEP	9%	Koldam HEP	577%
		AD Hydro HEP	0%

Generator	20-Dec-22 event	Generator	20-Dec-22 event
PUNJAB		UP	
Ropar TPS	-15%	Obra TPS	8%
L.Mohabbat TPS	156%	Harduaganj TPS	220%
Rajpura TPS	23%	Paricha TPS	-6%
T.Sabo TPS	No generation	Rosa TPS	-46%
Goindwal Sahib TPS	141%	Anpara TPS	2%
Ranjit Sagar HEP	-36%	Anpara C TPS	44%
Anandpur Sahib HEP	16%	Anpara D TPS	0%
HARYANA		Bara TPS	0%
Panipat TPS	26%	Lalitpur TPS	No generation
Khedar TPS	0%	Meja TPS	0%
Yamuna Nagar TPS	No generation	Vishnuprayag HEP	0%
CLP Jhajjar TPS	33%	Alaknanda HEP	3%
Faridabad GPS	No generation	Rihand HEP	0%
RAJASTHAN		Obra HEP	15%
Kota TPS	-12%	UTTARAKHAND	
Suratgarh TPS	4%	Gamma Infra GPS	No generation
Kalisindh TPS	-179%	Shravanti GPS	No generation
Chhabra TPS	No generation	Ramganga HEP	No generation
Chhabra stg-2 TPS	No generation	Chibra HEP	-5%
Kawai TPS	212%	Khodri HEP	-9%
Dholpur GPS	No generation	Chilla HEP	3%
Mahi-1 HEP	-111%	HP	
Mahi-2 HEP	No generation	Baspa HEP	No generation
RPS HEP	0%	Malana HEP	-15%
JS HEP	60%	Sainj HEP	-2%
DELHI		Larji HEP	-26%
Bawana GPS	-50%	Bhabha HEP	No generation
Pragati GPS	No generation	Giri HEP	48%
		J&K	
		Baglihar-1&2 HEP	-96%
		Lower Jhelum HEP	No generation

NRLDC representative requested all the constituents to timely share the details of FRC w.r.t. their control area and also analyse the FRC of generating units of their control area. He further requested to take corrective actions and also take initiative of conducting PFR testing of generating units for further turning and improvement.

29. Mock black start exercises in NR:

As per Indian Electricity Grid Code (IEGC) clause 5.8(b)

"*Detailed plans and procedures for restoration after partial/total blackout of each user's/STU/CTU system within a Region, will be finalized by the concerned user's/STU/CTU in coordination with the RLDC. The procedure will be reviewed, confirmed and/or revised once every subsequent year. Mock trial runs of the procedure for different subsystems shall be carried out by the users/CTU/STU at least once every six months under intimation to the RLDC*".

Mock Black-start exercise of power stations therefore needs to be carried out in-order to ensure healthiness of black start facility.

The summary of last conducted mock black start exercise of ISGS hydro & gas stations during 2020-21 & 2021-22 is tabulated below:

Hydro Power Stations:

Name of stations	**Last conducted exercise date**	**Remark**
Uri-I, II HEP, Lower Jhelum HEP, Upper Sindh and Kishenganga	_	
Dhauliganga	28th Dec 2021	Exercise carried out successfully
Bairasiul	04th Dec 2020	
Sewa-2	29th May 2022	
N. Jhakri and Rampur	17th Dec 2019	
Karcham and Baspa	29th Dec 2021	Exercise was partially successful
Budhil	_	
Parbati-3 and Sainj	22nd Dec 2020	Black start of only Parbati-3 was carried out successfully.

		Sainj to explore blackstart capability.
Salal	-	
Chamera-3	-	
Kishenganga	-	
Koteshwar	19th Jan 2022	Exercise carried out successfully
Chamera-1 and Chamera-2	08th Dec 2020	
Malana-2, AD Hydro and Phozal	08th Jan 2021	
Tehri	12th Jan 2022	
Koldam	22nd Jan 2021	Partially successful.

Gas Power Stations:

Name of stations	**Last conducted exercise date**	**Remark**
Anta GPS	09th Feb 2021 (with load) 01st Feb 2022 (without load)	Exercise carried out successfully
Auraiya GPS	-	
Dadri GPS	28th Jan 2022 (without load)	Exercise carried out successfully

The winter months are off peak hydro period and therefore good time to carry out such exercises. Therefore, the schedule of mock exercise dates for different hydro & Gas power station need to be finalized. The power stations may propose the tentative date for mock black start exercise of their generating units. Power stations may confirm and inform to all the concerned persons of control centre/ substations to facilitate the exercise.

Hydro Power Stations:

Name of stations	**Tentative Date for Mock Black start exercise** **(Proposed by power plants)**
*Uri-I, II HEP, Lower Jhelum HEP, Upper Sindh and Kishenganga	**31st Jan 2023**
Dhauliganga	**28th Feb 2023**
*Bairasiul	**Conducted successfully on 30th Nov 2022**
Sewa-2	**12th Jan 2023**
*N. Jhakri and Rampur	**Conducted successfully on 09th Dec 2022**
Karcham and Baspa	
*Budhil	
*Parbati-3 and Sainj	**To be rescheduled**
*Salal	**To be rescheduled**
*Chamera-3	**27th Jan 2023**
*Kishenganga	
Koteshwar	**Conducted successfully on 07th Dec 2022**
*Chamera-1 and Chamera-2	**Conducted successfully on 02nd Dec 2022**
*Malana-2, AD Hydro and Phozal	**16th Jan 2023 (to be rescheduled)**
Tehri	**Conducted successfully on 14th Dec 2022**
*Koldam	**Conducted successfully on 11th Nov 2022**

*Mock Black start exercise not carried out during Year 2021-22

Gas Power Stations:

Name of stations	**Tentative Date for Mock Black start exercise** **(proposed by power plants)**
Anta GPS	23rd Jan 2023

*Auraiya GPS	Mar 2023
Dadri GPS	Jan 2023

*Mock Black start exercise not carried out during Year 2021-22

NRLDC representative requested other constituents also to share their schedule for mock black start exercise of Hydro/Gas units.

SLDC's may also carryout mock black-start of station in their respective control area & inform the tentative dates to the OCC as well as outcome of these exercises. The proposed Hydro Power Stations to undergo the exercise are as follows:

S. NO.	Utility	Hydro Power Station	Installed Capacity(MW)
1	J&K	Baglihar	3x150
2		Baglihar stage-2	3x150
3		Lower Jhelum	3x35
4		Upper Sindh	2x11+3x35
5		Larji	3x42
6		Bhabha	3x40
7		Malana -I	2x43
8		Baspa	3x100
9	Punjab	Anandpur Sahib	4x33.5
10		RanjitSagar	4x150
11	Rajasthan	Mahi-I&II	2x25+2x45
12		Rana PratapSagar	4x43
13		JawaharSagar	3x33
14		Gandhi Sagar	5x23
15		Dholpur GPS	3x110
16		Ramgarh GPS	1x35.5+2x37.5+1x110
17	UP	Rihand	6x50
18		Obra	3x33
19		Vishnuprayag	4x100
20		Srinagar (Alaknanda)	4x82.5
21		Gamma Infra	2x76+1x73

22	Uttarakhand	Shravanti	6x75
23		Ramganga	3x66
24		Chibro	4x60
25		Khodri	4x30
26		Chilla	4x36
27		ManeriBhali-I&II	3x30+4x76
28	Delhi	IP Extn GTs	6x30+3x30
29		Pragati GPS	2x104.6+1x121.2
30		Rithala	3x36
31	Haryana	Faridabad GPS	2x137.75+1x156.07

Punjab representative informed that mock black start exercise of RSD HEP will be scheduled shortly.

Regarding mock black start exercise of SingoliBhatwari HEP, Uttarakhand representative informed that supply to Josimath is fed from 132/66kV Srinagar S/s. Hence, switching at Srinagar S/s is not desirable at this moment of time, seeing crucial load at Josimath.

NRLDC representative further said that self-start exercise of SingoliBhatwari Unit may be explored without affecting Srinagar S/s.

UP representative informed that Mock black start exercise of Obra&Rihand HEP is planned on 07th Feb 2023, however they are planning to conduct it early. Update of the same will be shared.

Regarding Tanakpur HEP, NHPC representative informed that mock black start exercise at Tanakpur HEP not conducted yet in past even a single time, reason of the same is not available. However, black start facility and self-start facility at Tanakpur HEP is available. NRLDC representative said that procedure for the same can be prepared and feasibility of mock black start exercise at Tanakpur HEP may be explored.

NTPC representative informed that mock black start exercise of Anta GPS is planned in January 2023.

SLDCs shall submit the reports of black start exercise in their respective control area. SLDCs may also identify further generating stations/unit for black start exercise.

30. Revision of document for Reactive Power Management and System Restoration Procedure (SRP) for Northern Region:

Reactive Power Management document for Northern region have been revised and shared with all the constituents on 31st Dec 2022. Document is available at NRLDC website with following link:

https://nrldc.in/download/nr-reactive-power-management-2023/?wpdmdl=11903

Document is password protected and password has already been shared with all the NR constituents through letter dated 30st Dec 2022.

System restoration procedure document for Northern region has been revised on 31stJan 2022 & updated document link is as below:

https://nrldc.in/wp-content/uploads/2022/01/System-Restoration-Procedure_NR_2022.pdf

Document is password protected and for password request can be sent to nrldcso2@gmail.com Constituents are requested to go through the document and provide any modification/addition in respect of their system. SLDC/Generating utilities are requested to kindly update and share the restoration procedure in respect of their state/generating station.

Constituents were requested to provide the feedback, suggestion and updated information by 15st Jan 2023.

All the NR constituent may please go through these document and provide the feedback, suggestion if any. All the state SLDCs are also requested to kindly prepare these documents for their own control area.

31. Additional Agenda:Status of Bus bar protection:

Clause - 4 in schedule - V of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010 reads as

"Bus bar protection and local breaker backup protection shall be provided in 220kV and higher voltage interconnecting sub- stations as well as in all generating station switchyards".

During analysis of many grid incidents/disturbances, it has been found that the Busbar protection at the affected substation was **not present or non-operational** which resulted in considerably increasing both the number of affected elements and fault clearance time. Accordingly, it becomes critical to monitor and keep Busbar protection at all the 220 kV and above voltage level substations healthy and operational.

Constituents were requested vide NRLDC letter dated 28th Dec 2022 to furnish status of Busbar protection in the following format in your control area positively by **15 January 2023.**

As of now details are received from POWERGRID(NR-1 & NR-2) and Vishnuprayag HEP(UP)

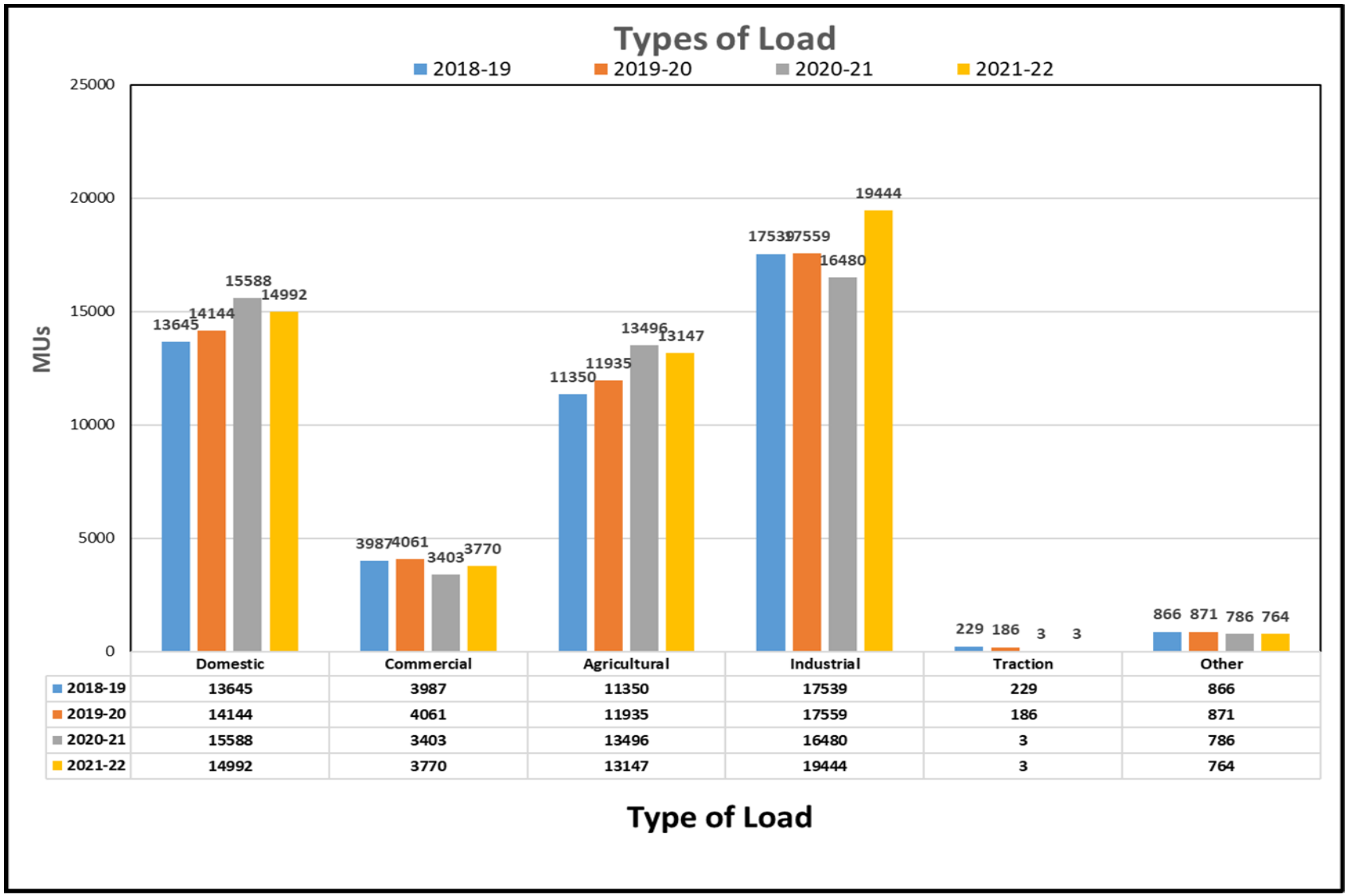
NTPC representative informed that details w.r.t. to NTPC S/s has been e-mailed.

Members are requested to share the details w.r.t. above subject at the earliest.

203rd OCC Meeting

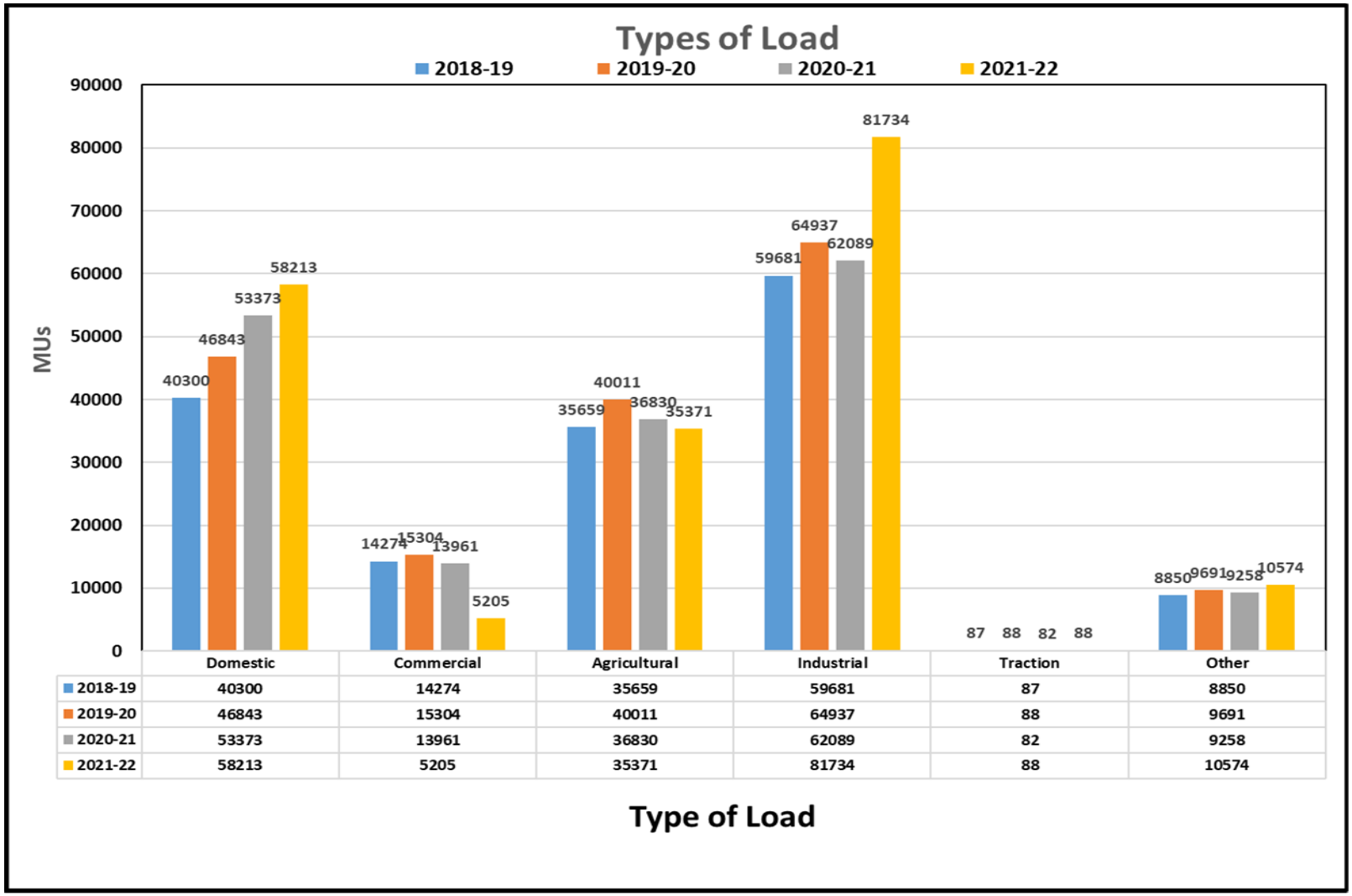
18.01.2023

Breakup of Energy consumption of states: Punjab



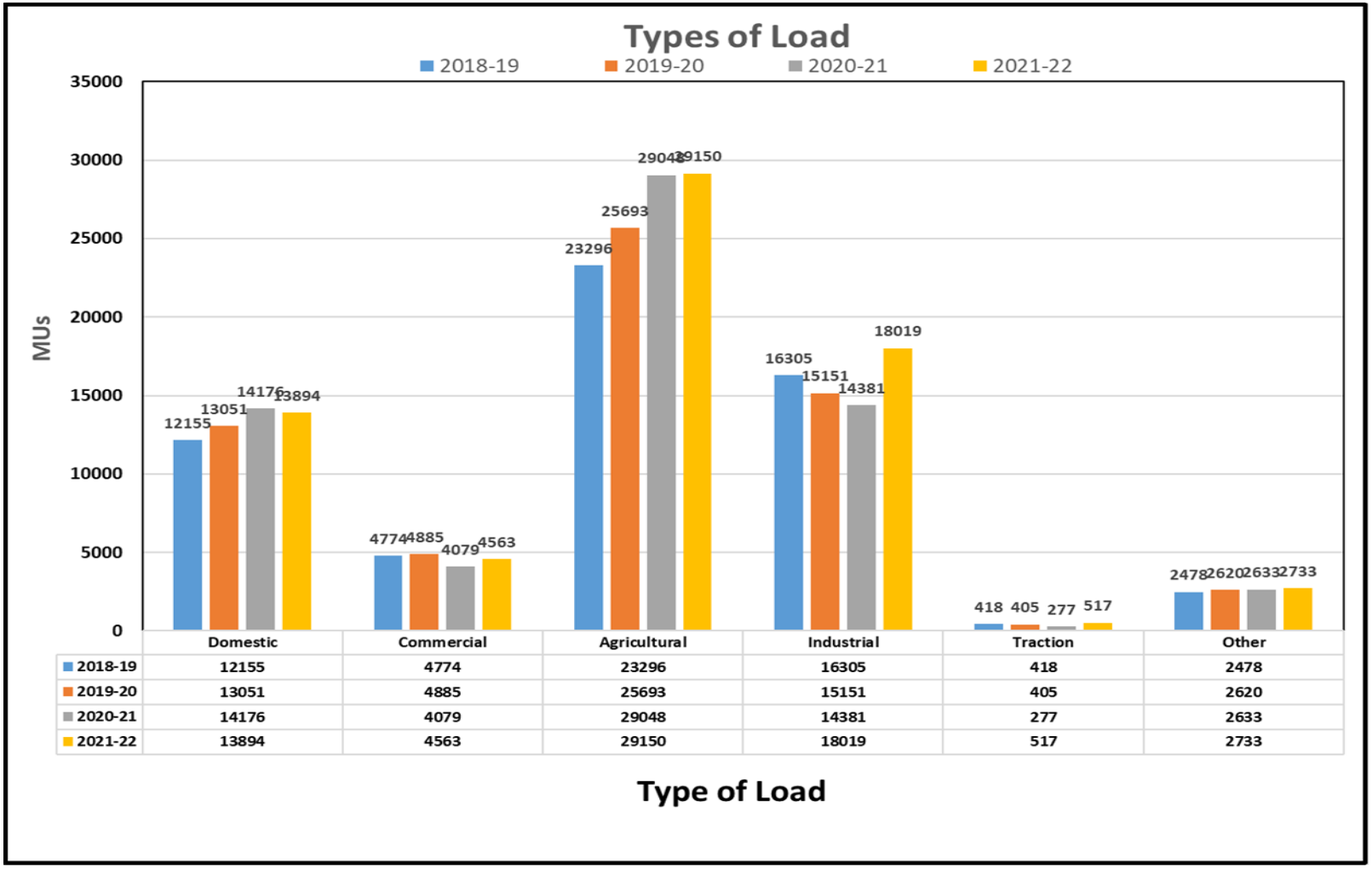
	Domestic	Commercial	Agricultural	Industrial	Traction	Other
2018-19	13645	3987	11350	17539	229	866
2019-20	14144	4061	11935	17559	186	871
2020-21	15588	3403	13496	16480	3	786
2021-22	14992	3770	13147	19444	3	764

Breakup of Energy consumption of states: Haryana



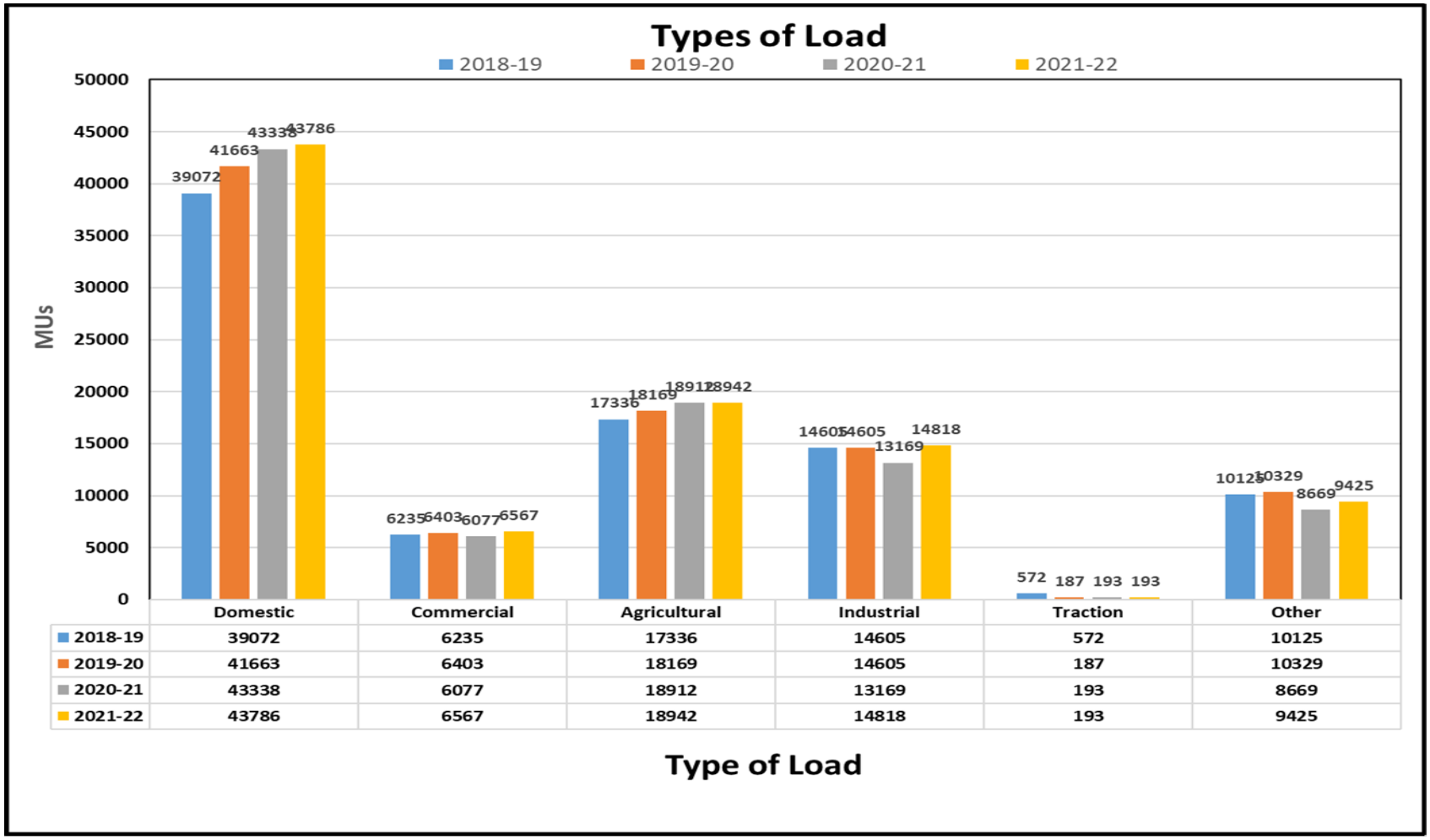
	Domestic	Commercial	Agricultural	Industrial	Traction	Other
2018-19	40300	14274	35659	59681	87	8850
2019-20	46843	15304	40011	64937	88	9691
2020-21	53373	13961	36830	62089	82	9258
2021-22	58213	5205	35371	81734	88	10574

Breakup of Energy consumption of states: Rajasthan



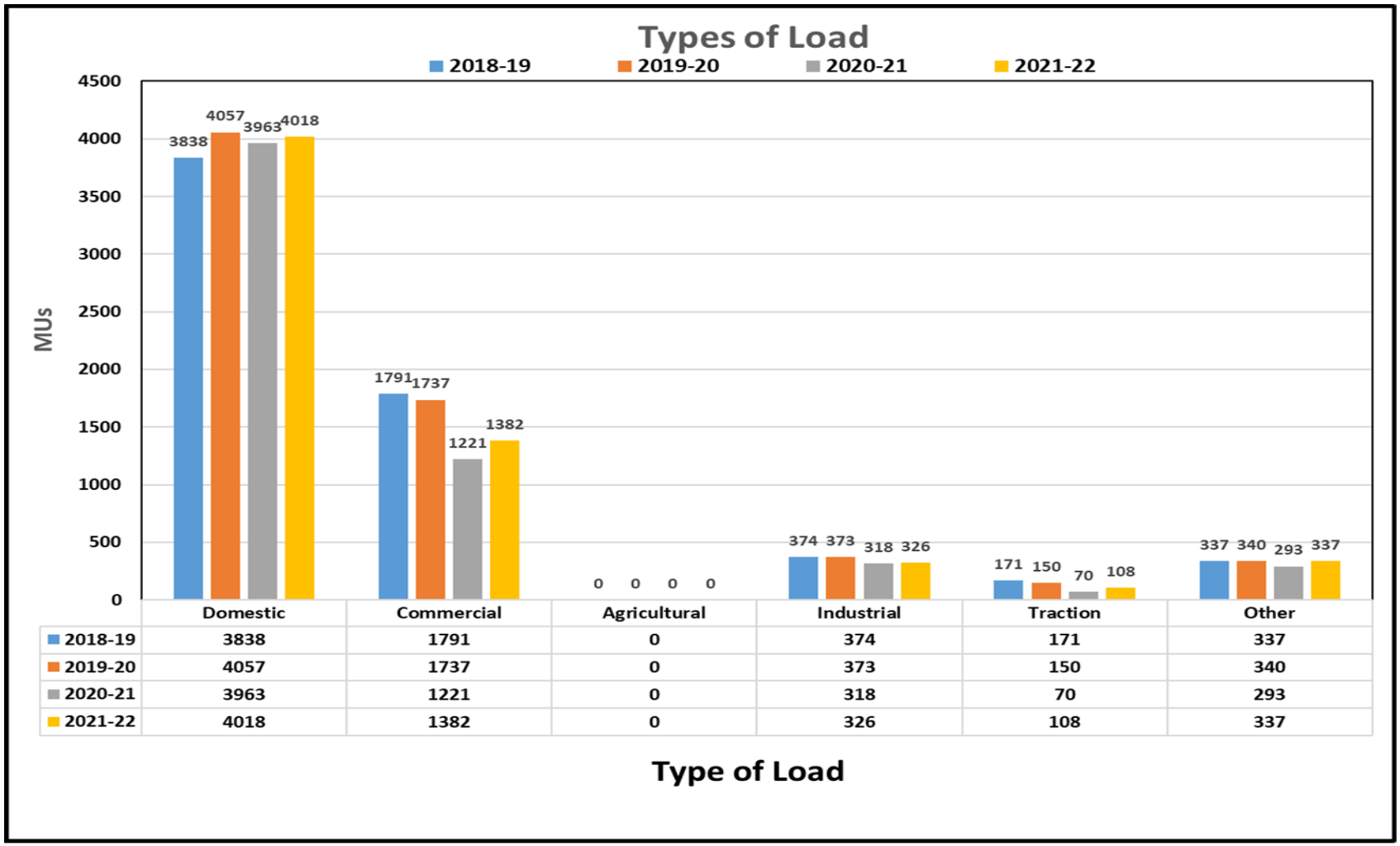
	Domestic	Commercial	Agricultural	Industrial	Traction	Other
2018-19	12155	4774	23296	16305	418	2478
2019-20	13051	4885	25693	15151	405	2620
2020-21	14176	4079	29048	14381	277	2633
2021-22	13894	4563	29150	18019	517	2733

Breakup of Energy consumption of states: UP



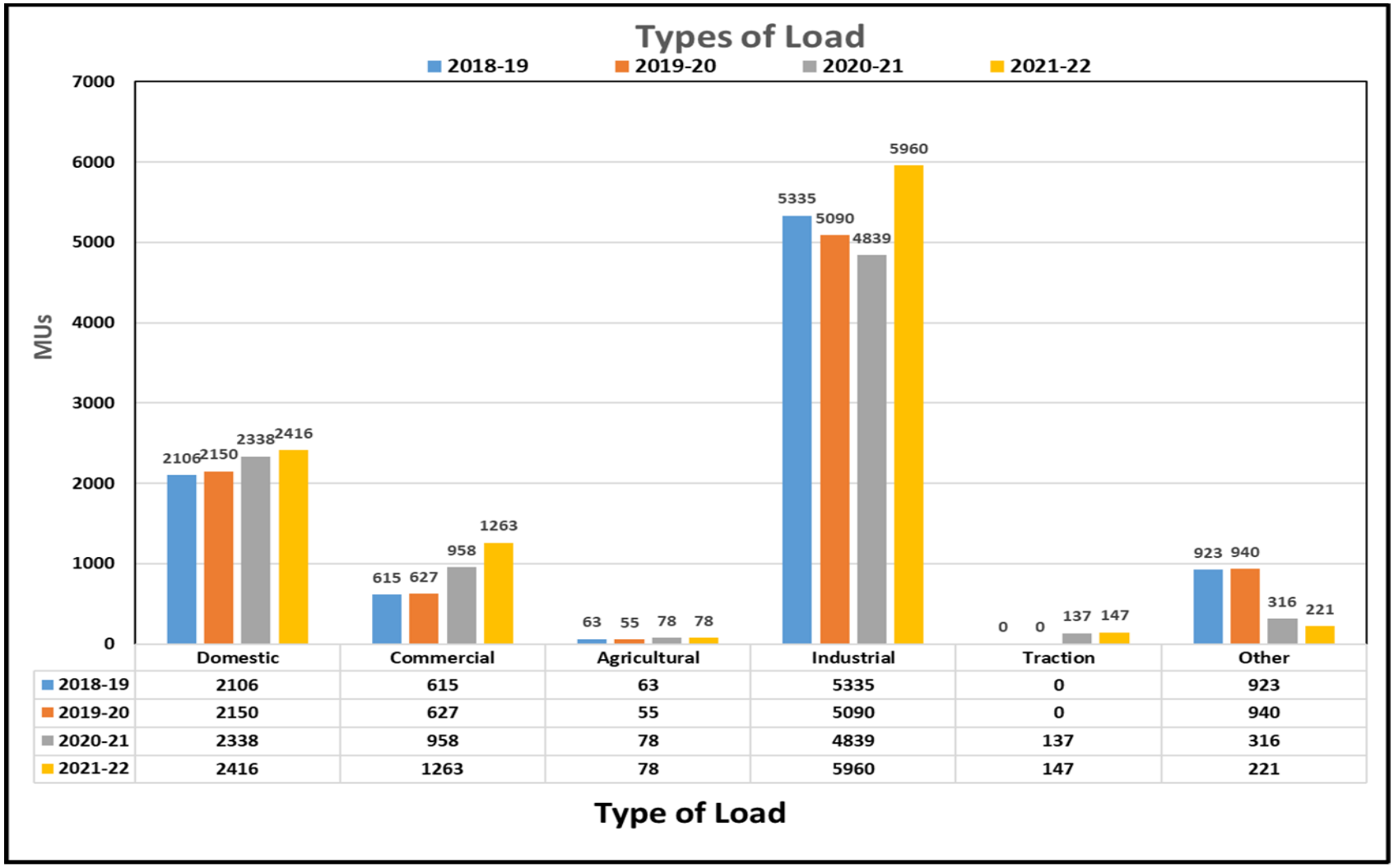
	Domestic	Commercial	Agricultural	Industrial	Traction	Other
2018-19	39072	6235	17336	14605	572	10125
2019-20	41663	6403	18169	14605	187	10329
2020-21	43338	6077	18912	13169	193	8669
2021-22	43786	6567	18942	14818	193	9425

Breakup of Energy consumption of states: Delhi



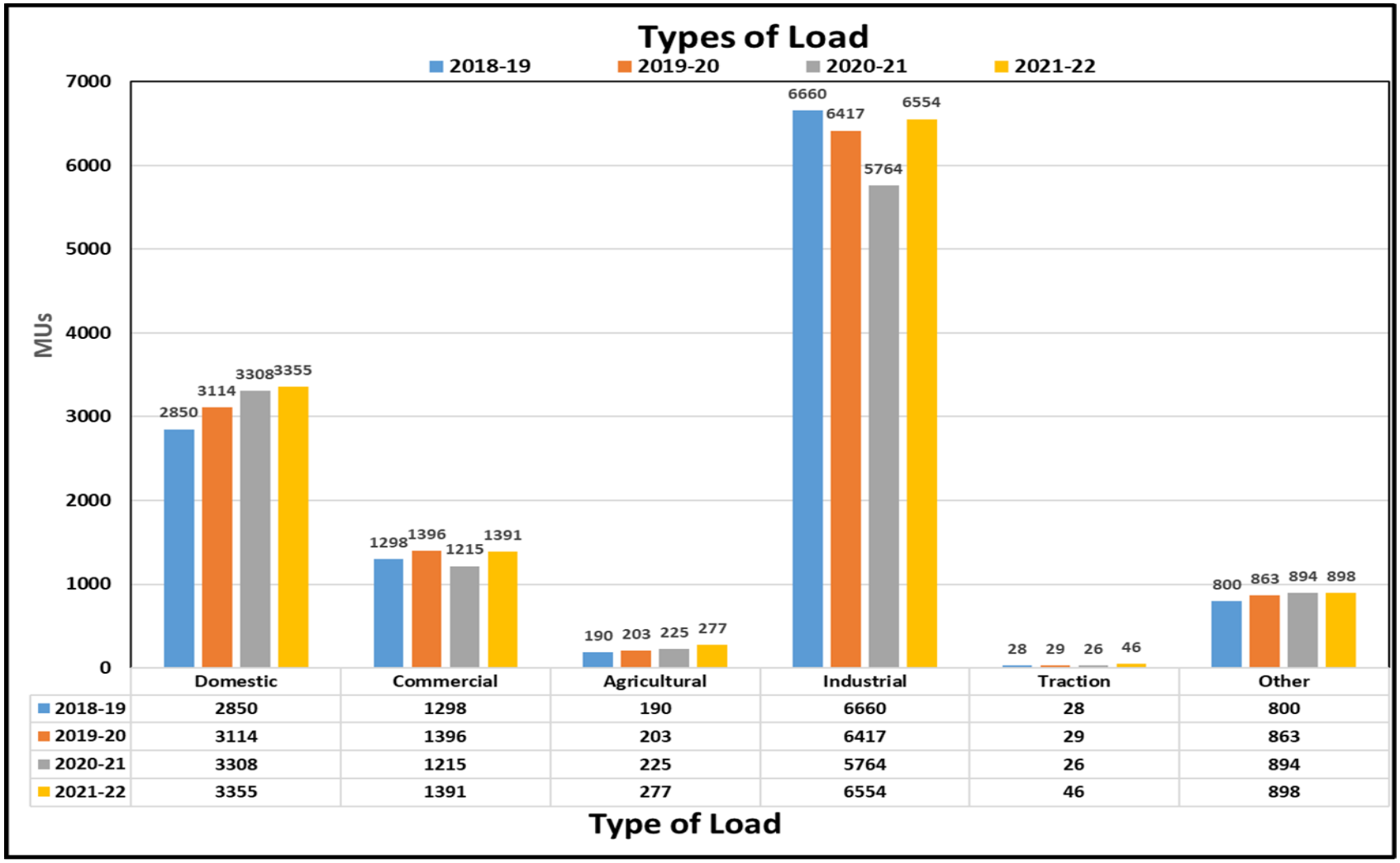
	Domestic	Commercial	Agricultural	Industrial	Traction	Other
2018-19	3838	1791	0	374	171	337
2019-20	4057	1737	0	373	150	340
2020-21	3963	1221	0	318	70	293
2021-22	4018	1382	0	326	108	337

Breakup of Energy consumption of states: HP



	Domestic	Commercial	Agricultural	Industrial	Traction	Other
2018-19	2106	615	63	5335	0	923
2019-20	2150	627	55	5090	0	940
2020-21	2338	958	78	4839	137	316
2021-22	2416	1263	78	5960	147	221

Breakup of Energy consumption of states: Uttarakhand



Follow up issues from previous OCC meetings

Annexure-A.I

<table>
<tr><td>1</td><td>Down Stream network by State utilities from ISTS Station</td><td>Augmentation of transformation capacity in various existing substations, addition of new substations along with line bays as well as requirement of line bays by STUs for downstream network are under implementation at various locations in Northern Region. Further, 220kV bays have already been commissioned at various substations in NR. For its utilization, downstream 220kV system needs to be commissioned.</td><td>List of downstream networks is enclosed in Annexure-A.I.I.</td></tr>
<tr><td>2</td><td>Progress of installing new capacitors and repair of defective capacitors</td><td>Information regarding installation of new capacitors and repair of defective capacitors is to be submitted to NRPC Secretariat.</td><td>Data upto following months, received from various states / UTs:
<table><tr><td>◎</td><td>CHANDIGARH</td><td>Sep-2019</td></tr><tr><td>◎</td><td>DELHI</td><td>Nov-2022</td></tr><tr><td>◎</td><td>HARYANA</td><td>Aug-2022</td></tr><tr><td>◎</td><td>HP</td><td>Jan-2022</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not Available</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jul-2022</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Dec-2022</td></tr><tr><td>◎</td><td>UP</td><td>Dec-2022</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Dec-2022</td></tr></table>All States/UTs are requested to update status on monthly basis.</td></tr>
<tr><td>3</td><td>Healthiness of defence mechanism: Self-certification</td><td>Report of mock exercise for healthiness of UFRs carried out by utilities themselves on quarterly basis is to be submitted to NRPC Secretariat and NRLDC. All utilities were advised to certify specifically, in the report that “All the UFRs are checked and found functional”.</td><td>Data upto following months, received from various states / UTs:
<table><tr><td>◎</td><td>CHANDIGARH</td><td>Not Available</td></tr><tr><td>◎</td><td>DELHI</td><td>Dec-2022</td></tr><tr><td>◎</td><td>HARYANA</td><td>Dec-2022</td></tr><tr><td>◎</td><td>HP</td><td>Nov-2022</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not Available</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jun-2022</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Sep-2022</td></tr><tr><td>◎</td><td>UP</td><td>Dec-2022</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Dec-2022</td></tr><tr><td>◎</td><td>BBMB</td><td>Dec-2022</td></tr></table>All States/UTs are requested to update status for healthiness of UFRs on monthly basis for islanding schemes and on quartely basis for the rest .</td></tr>
<tr><td></td><td></td><td>In compliance of NPC decision, NR states/constituents agreed to raise the AUFR settings by 0.2 Hz in 47th TCC/49th NRPC meetings.</td><td>Status:
<table><tr><td>◎</td><td>CHANDIGARH</td><td>Not Available</td></tr><tr><td>◎</td><td>DELHI</td><td>Increased</td></tr><tr><td>◎</td><td>HARYANA</td><td>Increased</td></tr><tr><td>◎</td><td>HP</td><td>Increased</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not increased</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Increased</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Increased</td></tr><tr><td>◎</td><td>UP</td><td>Increased</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Increased</td></tr><tr><td>◎</td><td>BBMB</td><td>Increased</td></tr></table></td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td colspan="3">BBMB was requested to submit the updated self certification report indicating increase of 0.2 Hz in AUFR settings, within one week. J&K and LADAKH were requested to update status for increasing settings of UFRs.</td></tr>
<tr><td>4</td><td>Status of FGD installation vis-à-vis installation plan at identified TPS</td><td>List of FGDs to be installed in NR was finalized in the 36th TCC (special) meeting dt. 14.09.2017.
All SLDCs were regularly requested since 144th OCC meeting to take up with the concerned generators where FGD was required to be installed.
Further, progress of FGD installation work on monthly basis is monitored in OCC meetings.</td><td colspan="3">Status of the information submission (month) from states / utilities is as under:
◎ HARYANA Sep-2022
◎ PUNJAB Sep-2022
◎ RAJASTHAN Nov-2022
◎ UP Sep-2022
◎ NTPC Feb-2022
FGD status details are enclosed as Annexure-A.I.II.
All States/utilities are requested to update status of FGD installation progress on monthly basis.</td></tr>
<tr><td>5</td><td>Information about variable charges of all generating units in the Region</td><td>The variable charges detail for different generating units are available on the MERIT Order Portal.</td><td colspan="3">All states/UTs are requested to submit daily data on MERIT Order Portal timely.</td></tr>
<tr><td>6</td><td>Status of Automatic Demand Management Sysytem in NR states/UT's</td><td>The status of ADMS implementation in NR, which is mandated in clause 5.4.2 (d) of IEGC by SLDC/SEB/DISCOMs is presented in the following table:</td><td colspan="3">Status:
◎ DELHI Fully implemented
◎ HARYANA Scheme not implemented
◎ HP Scheme not implemented
◎ PUNJAB Scheme not implemented
◎ RAJASTHAN Under implementation. Likely completion schedule is 31.03.2023.
◎ UP Scheme implemented by NPCIL only</td></tr>
</table>

7	Reactive compensation at 220 kV/ 400 kV level at 15 substations			
	State / Utility	Substation	Reactor	Status
i	POWERGRID	Kurukshetra	500 MVAr TCR	Testintg is under progress and Anticipated commissioning: Dec'22
ii	DTL	Peeragarhi	1x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iv	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
v	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vii	DTL	Electric Lane	1x50 MVAr at 220 kV	Under Re-tendering due to Single Bid
viii	PUNJAB	Dhuri	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	400kV Reactors - LOA issued on dated. 17.08.2021 and date of completion of project is 18 months from the date of LOA. 220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA.
ix	PUNJAB	Nakodar	1x25 MVAr at 220 kV	220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA.
x	PTCUL	Kashipur	1x125 MVAR at 400 kV	Price bid has been opened and is under evaluation
xi	RAJASTHAN	Akal	1x25 MVAr	1x25 MVAR Reactor at Akal has been commissioned on dated 25th July' 2022.

xii	RAJASTHAN	Bikaner	1x25 MVAr	Main bus shutdown is required for commissioning of 1x25 MVAR reactor at Bikaner, same is expected upto March’ 2023.
xiii	RAJASTHAN	Suratgarh	1x25 MVAr	1x25 MVAR Reactor at Suratgarh has been commissioned on dated 25th November’ 2022.
xiv	RAJASTHAN	Barmer & others	13x25 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd. Schedule time is 18 months.
xv	RAJASTHAN	Jodhpur	1x125 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd. Schedule time is 18 months.

Annexure-A-I.I

1. Down Stream network by State utilities from ISTS Station:

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
1	400/220kV, 3x315 MVA Samba	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays.	-	PDD, J&K to update the status.
2	400/220kV, 2x315 MVA New Wanpoh	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV New Wanpoh - Alusteng D/c Line	-	PDD, J&K to update the status.
				• 220 kV New Wanpoh - Mattan D/c Line	-	PDD, J&K to update the status.
3	400/220kV, 2x315 MVA Amargarh	Commissioned: 6 Total: 6	Utilized: 6 Unutilized: 2	• 220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri	-	PDD, J&K to update the status.
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• 220kV Bhadson (Kurukshetra) – Ramana Ramani D/c line	-	HVPNL to update the status.
5	400/220 kV, 2x315 MVA Dehradun	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• Network to be planned for 4 bays	-	PTCUL to update the status.
6	Shahjahanpur, 2x315 MVA 400/220 kV	Commissioned: 6 Approved/Under Implementation:1 Total: 7	Utilized: 5 Unutilized: 1 (1 bays to be utilized shortly) Approved/Under Implementation:1	• 220 kV D/C Shahajahanpur (PG) - Gola line	Feb'23	Updated in 201st OCC by UPPTCL
				• LILO of Sitapur – Shahjahanpur 220 kV SC line at Shahjahanpur (PG)	Commissioned	Energization date: 25.02.2022 updated by UPPTCL in 196th OCC
7	Hamirpur 400/220 kV Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4 (2 bays to be utilized shortly)	• 220 kV Hamirpur-Dehan D/c line	Commissioned	Commisioned date: 09.06.2022. Updated in 198th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
8	Sikar 400/220kV, 1x 315 MVA S/s	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• LILO of 220 kV Sikar (220 kV GSS)-Dhod S/c line at Sikar (PG)	Commissioned	LILO of 220 kV S/C Sikar-Dhod line at 400 kV GSS PGCIL, Sikar has been charged on dt. 31.03.2022
				• Network to be planned for 2 bays.	-	Against the 3rd ICT at 400 kV GSS Sikar, only 2 bays were constructed and same has been utilized by RVPN by constructing LILO of 220 kV S/C Sikar – Dhod line as updated by RVPNL in 195th OCC
9	Bhiwani 400/220kV S/s	Commissioned: 6 Total: 6	Utilized: 0 Unutilized: 6	• 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line	Commissioned	Updated in 202nd OCC by HVPNL
				• 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line.	Jun'23	Issue related to ROW as intimated in 202nd OCC by HVPNL.
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Apr'24	Issue related to ROW as intimated in 192nd OCC.HVPNL to update the status.
10	Jind 400/220kV S/s	Commissioned: 4 Approved:4 Total: 8	Utilized: 4 Unutilized: 0 Approved:4	• LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind) with 0.5 sq inch ACSR conductor	May'24	Updated in 197th OCC by HVPNL
11	400/220kV Tughlakabad GIS	Commissioned: 6 Under Implementation: 4 Total: 10	Utilized: 6 Unutilized: 0 Under Implementation:4	• RK Puram – Tughlakabad (UG Cable) 220kV D/c line – March 2023.	-	DTL to update the status.
				• Masjid Mor – Tughlakabad 220kV D/c line.	-	DTL to update the status.
12	400/220kV Kala Amb GIS (TBCB)	Commissioned: 6 Total: 6	Utilized: 0 Unutilized: 6	• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s	Mar'23	Updated in 198th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
13	400/220kV Kadarpur	Commissioned: 8	Utilized: 0	• LILO of both circuits of 220 KV Pali - Sector 56 D/C line at Kadarpur along with augmentation of existing conductor from 220 KV Sector-56 to LILO point with 0.4 sq inch AL-59 conductor.	Mar'23	Updated in 197th OCC by HVPNL

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
13	Sub-station	Total: 8	Unutilized: 8	• LILO of both circuits of 220KV Sector 65 - Pali D/C line at Kadarpur along with augmentation of balance 0.4 sq. inch ACSR conductor of 220 kV Kadarpur - Sector 65 D/C line with 0.4sq inch AL-59 conductor	May'23	Updated in 197th OCC by HVPNL
14	400/220kV Sohna Road Sub-station	Commissioned: 8 Total: 8	Utilized: 2 Unutilized: 4	• LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road	Jun'23	Updated in 197th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	Jun'23	Updated in 197th OCC by HVPNL
15	400/220kV Prithla Sub-station	Commissioned: 8 Total: 8	Utilized: 2 Unutilized: 4 Under Implementation:2	• Prithla - Harfali 220kV D/c line with LILO of one ckt at Meerpur Kurali	Commissioned	Commisioned date: 31.12.2021. Updated in 198th OCC by HVPNL
				• LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line	-	HVPNL to update the status
				• 220kV D/C for Sector78, Faridabad	02.03.2023	Updated in 198th OCC by HVPNL
				• Prithla - Sector 89 Faridabad 220kV D/c line	31.03.2024	Under Implementation (Mar'24). Updated in 198th OCC by HVPNL
16	400/220kV Sonepat Sub-station	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 2 Unutilized: 2 Under Implementation:2	• LILO of both circuits of 220kV Samalkha - Mohana line at Sonepat	-	HVPNL to update the status.
				• Sonepat - HSIISC Rai 220kV D/c line	Mar'23	Line work is complete howere substation work is under progress. Updated in 201st OCC by HVPNL
17	400/220kV Neemrana Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• LILO of Bhiwadi - Neemrana 220kV S/c line at Neemrana (PG)	-	Work order is finalized as updated in 201st OCC by RVPNL.. 5 months from layout finalization.
18	400/220kV Kotputli Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Kotputli - Pathreda 220kV D/c line	-	Bid documents under approval as updated in 195th OCC by RVPNL.
19	400/220kV Jallandhar Sub-station	Commissioned: 10 Total: 10	Utilized: 8 Unutilized: 2	• Network to be planned for 2 bays	May'24	LILO of 220 kV BBMB Jalandhar - Butari line at 400 kV PGCIL Jalandhar being planned. Work expected to be completed by May 2024. Updated in 198th OCC by PSTCL.
20	400/220kV Roorkee Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Roorkee (PG)-Pirankaliyar 220kV D/c line	Commissioned	Roorkee (PG)-Pirankaliyar 220kV D/c line comiisioned in 2020 as intimated by PTCUL in 197th OCC
21	400/220kV Lucknow Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 2 bays	Mar'23	• Lucknow -Kanduni, 220 kV D/C line expected energization date Mar'23 updated by UPPTCL in 203rd OCC _____ • No planning for 2 no. of bays upated by UPPTCL in 196th OCC. The same has been communicated to Powergrid.
22	400/220kV Gorakhpur Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	Feb'23	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line expected energization date Feb'23 updated by UPPCL in 202nd OCC
23	400/220kV Fatehpur Sub-station	Commissioned: 8 Under Implementation:2 Total: 10	Utilized: 6 Unutilized: 2 Under Implementation:2	• Network to be planned for 2 bays	-	• UPPTCL intimated that 02 no. of bays under finalization stage. In 201st OCC, UPPTCL intimated that it is finalized that Khaga s/s will be connected (tentative time 1.5 years). _____ • No planning for 2 no. of bays updated by UPPTCL in 196th OCC. The same has been communicated to Powergrid.
24	400/220kV Abdullapur Sub-station	Commissioned: 10 Under Implementation:2 Total: 12	Utilized: 10 Unutilized: 0 Under Implementation:2	• Abdullapur – Rajokheri 220kV D/c line	Oct'22	Updated in 198th OCC by HVPNL

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
25	400/220kV Pachkula Sub-station	Commissioned: 8 Under tender:2 Total: 10 Out of these 10 nos. 220kV Line Bays, 2 bays would be used by the lines being constructed by POWERGRID (Chandigarh-2) and balance 8 nos. bays would be used by HVPNL	Utilized: 2 Unutilized: 4 Under Implementation:2	• Panchkula – Pinjore 220kV D/c line	Jun'23	Updated in 203rd OCC by HVPNL
				• Panchkula – Sector-32 220kV D/c line	Jun'23	Updated in 203rd OCC by HVPNL
				• Panchkula – Raiwali 220kV D/c line	Commissioned	Updated in 194th OCC by HVPNL
				• Panchkula – Sadhaura 220kV D/c line: Sep'23	Sept'23	Updated in 194th OCC by HVPNL
26	400/220kV Amritsar S/s	Commissioned:7 Approved in 50th NRPC- 1 no. Total: 8	Utilized: 6 Unutilized: 1 Approved in 50th NRPC- 1 no.	• Amritsar – Patti 220kV S/c line	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.
				• Amritsar – Rashiana 220kV S/c line (2 bays shall be required for above lines. However, 1 unutilized bay shall be used for Patti and requirement of one additional bay approved for Rashiana by NRPC)	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.
27	400/220kV Bagpat S/s	Commissioned: 8 Total: 8	Utilized:6 Unutilized: 2	• Bagpat - Modipuram 220kV D/c line	Commissioned	Updated in 201st OCC by UPPTCL
28	400/220kV Bahardurgarh S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• Network to be planned for 2 bays.	Mar'24 and July'24	Updated in 198th OCC by HVPNL
29	400/220kV Jaipur (South) S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• Network to be planned for 2 bays.	-	LILO case of 220 kV Dausa – Sawai Madhopur line at 400 kV GSS Jaipur South (PG) is under WTD approval as updated by RVPNL in 195th OCC
30	400/220kV Sohawal S/s	Commissioned: 8 Total: 8	Utilized: 8	• Sohawal - Barabanki 220kV D/c line	Commissioned	Energization date: 14.04.2018 updated by UPPTCL in 196th OCC
				• Sohawal - New Tanda 220kV D/c line	Commissioned	Energization date: 28.05.2019 updated by UPPTCL in 196th OCC
				• Network to be planned for 2 bays	Commissioned	• Sohawal - Gonda 220kV S/c line (Energization date: 27.04.2020) updated by UPPTCL in 196th OCC _____ • Sohawal - Bahraich 220kV S/c line (Energization date: 15.02.2021) updated by UPPTCL in 196th OCC
31	400/220kV, Kankroli	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	-	RVPNL to update the status
32	400/220kV, Manesar	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 4 bays	-	One bay 220 kV Manesar (PG)-Panchgaon ckt commissioned on 05.09.2022
33	400/220kV, Saharanpur	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	Jan'23	Saharanpur(PG)-Devband D/c line expected energization date Jan'23 updated by UPPTCL in 202nd OCC
34	400/220kV, Wagoora	Commissioned: 10 Total: 10	Utilized: 6 Unutilized: 4	• Network to be planned for 4 bays	-	PDD, J&K to update the status.
35	400/220kV, Ludhiana	Commissioned: 9 Total: 9	Utilized: 8 Unutilized: 1	• Network to be planned for 1 bay	Mar'23	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work expected to be completed by March 2023.Updated in 198th OCC by PSTCL.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
36	400/220kV, Chamba (Chamera Pool)	Commissioned: 3 Under tender:1 Total: 4	Utilized:3 Unutilized: 0 Under tender:1	• Stringing of 2nd ckt of Chamera Pool – Karian 220kV D/c line	-	Stringing of 2nd Circuit of Chamera Pool-Karian Tansmission line has been completed & terminal bay at 400/220 kV chamera pooling substation (PGCIL) is not ready.Updated in 198th OCC by HPPTCL
37	400/220kV, Mainpuri	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	-	• 02 no. of bays under finalization stage updated by UPPTCL in 196th OCC. Mainpuri S/s planned. Land is not finalized, therefore timeline not available as intimated by UPPTCL in 201st OCC.
38	400/220kV, Patiala	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays	May'24	2 Nos. bays for 400 kV PGCIL Patiala - 220 kV Bhadson (D/C) line being planned. Work expected to be completed by May 2024. Updated in 198th OCC by PSTCL.

2. Establishment of new 400/220kV substations in Northern Region:

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule		Downstream connectivity by States
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Mar'22		DTL to update the status
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Apr'22		Chandigarh to update the status.
3	400/220kV Jauljivi GIS Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. bays would be used by the lines being constructed by PTCUL.	2x315	Feb'22		• 220kV Almora-Jauljibi line • 220kV Brammah-Jauljibi line PTCUL to update the status of lines.

FGD Status

Updated status of FGD related data submission

NTPC (25.02.2022)
MEJA Stage-I (Updated by UP on 18.06.2022)
RIHAND STPS
SINGRAULI STPS
TANDA Stage-I
TANDA Stage-II
UNCHAHAR TPS
UPRVUNL (14.11.2022)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (14.11.2022)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (11.01.2023)
CHHABRA SCPP
CHHABRA TPP
KALISINDH TPS
KOTA TPS
SURATGARH SCTPS
SURATGARH TPS

Updated status of FGD related data submission

Lalitpur Power Gen. Co. Ltd. (17.10.2022)
Lalitpur TPS
Lanco Anpara Power Ltd. (18.06.2022)
ANPARA-C TPS

HGPCL (14.09.2022)
PANIPAT TPS
RAJIV GANDHI TPS
YAMUNA NAGAR TPS

Adani Power Ltd. (18.02.2022)
KAWAI TPS

Rosa Power Supply Company (18.06.2022)
Rosa TPP Phase-I
Prayagraj Power Generation Company Ltd. (17.10.2022)
Prayagraj TPP
APCPL (25.02.2022)
INDIRA GANDHI STPP

Pending submissions

GVK Power Ltd.
GOINDWAL SAHIB

NTPC
DADRI (NCTPP)
Talwandi Sabo Power Ltd.
TALWANDI SABO TPP
L&T Power Development Ltd.
Nabha TPP (Rajpura TPP)

Target Dates for FGD Commissioning (Utility-wise)

Adani Power Ltd.	KAWAI TPS U#1 (Target: 31-12-2024), KAWAI TPS U#2 (Target: 31-12-2024)
APCPL	INDIRA GANDHI STPP U#1 (Target: 30-09-2022), INDIRA GANDHI STPP U#2 (Target: 30-09-2022), INDIRA GANDHI STPP U#3 (Target: 30-09-2022)
GVK Power Ltd.	GOINDWAL SAHIB U#1 (Target: 30-04-2020), GOINDWAL SAHIB U#2 (Target: 29-02-2020)
HGPCL	PANIPAT TPS U#6 (Target: 30-04-2021), PANIPAT TPS U#7 (Target: 28-02-2021), PANIPAT TPS U#8 (Target: 31-12-2020), RAJIV GANDHI TPS U#1 (Target: 30-04-2022), RAJIV GANDHI TPS U#2 (Target: 28-02-2022), YAMUNA NAGAR TPS U#1 (Target: 31-12-2021), YAMUNA NAGAR TPS U#2 (Target: 31-10-2021)

NTPC	DADRI (NCTPP) U#1 (Target: 31-12-2020), DADRI (NCTPP) U#2 (Target: 31-10-2020), DADRI (NCTPP) U#3 (Target: 31-08-2020), DADRI (NCTPP) U#4 (Target: 30-06-2020), DADRI (NCTPP) U#5 (Target: 30-06-2022), DADRI (NCTPP) U#6 (Target: 30-06-2022), RIHAND STPS U#1 (Target: 30-06-2024), RIHAND STPS U#2 (Target: 30-06-2024), RIHAND STPS U#3 (Target: 31-12-2023), RIHAND STPS U#4 (Target: 31-12-2023), RIHAND STPS U#5 (Target: 30-06-2023), RIHAND STPS U#6 (Target: 30-06-2023), SINGRAULI STPS U#1 (Target: 30-06-2024), SINGRAULI STPS U#2 (Target: 30-06-2024), SINGRAULI STPS U#3 (Target: 30-06-2024), SINGRAULI STPS U#4 (Target: 30-06-2024), SINGRAULI STPS U#5 (Target: 30-06-2024), SINGRAULI STPS U#6 (Target: 31-03-2023), SINGRAULI STPS U#7 (Target: 31-03-2023), UNCHAHAR TPS U#1 (Target: 31-12-2023), UNCHAHAR TPS U#2 (Target: 31-12-2023), UNCHAHAR TPS U#3 (Target: 30-06-2024), UNCHAHAR TPS U#4 (Target: 30-06-2024), UNCHAHAR TPS U#5 (Target: 30-06-2024), UNCHAHAR TPS U#6 (Target: 30-06-2022), MEJA Stage-I U#1 (Target: 31-12-2022), MEJA Stage-I U#2 (Target: 31-03-2023), TANDA Stage-I U#3 (Target:), TANDA Stage-I U#4 (Target:), TANDA Stage-II U#3 (Target: 31-12-2022), TANDA Stage-II U#4 (Target: 31-12-2022)

L&T Power Development Ltd (Nabha)	Nabha TPP (Rajpura TPP) U#1 (Target: 30-04-2021), Nabha TPP (Rajpura TPP) U#2 (Target: 28-02-2021)
Lalitpur Power Gen. Company Ltd.	LALITPUR TPS U#1 (Target: 31-12-2026), LALITPUR TPS U#2 (Target: 30-09-2026), LALITPUR TPS U#3 (Target: 30-06-2026)
Lanco Anpara Power Ltd.	ANPARA C TPS U#1 (Target: 31-12-2023), ANPARA C TPS U#2 (Target: 31-12-2023)
Prayagraj Power Generation Company Ltd.	PRAYAGRAJ TPP U#1 (Target: 31-12-2024), PRAYAGRAJ TPP U#2 (Target: 31-12-2024), PRAYAGRAJ TPP U#3 (Target: 31-12-2024)
PSPCL	GH TPS (LEH.MOH.) U#1 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#2 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#3 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#4 (Target: 31-12-2024), GGSSTP, Ropar U#3 (Target: 31-03-2022), GGSSTP, Ropar U#4 (Target: 31-05-2022), GGSSTP, Ropar U#5 (Target: 31-07-2022), GGSSTP, Ropar U#6 (Target: 30-09-2022)

Rosa Power Supply Company	ROSA TPP Ph-I U#1 (Target: 31-12-2026), ROSA TPP Ph-I U#2 (Target: 31-12-2026), ROSA TPP Ph-I U#3 (Target: 31-12-2026), ROSA TPP Ph-I U#4 (Target: 31-12-2026)
RRVUNL	KOTA TPS U#5 (Target: 31-08-2022), KOTA TPS U#6 (Target: 31-08-2022), KOTA TPS U#7 (Target: 31-08-2022), SURATGARH TPS U#1 (Target: 31-12-2026), SURATGARH TPS U#2 (Target: 31-12-2026), SURATGARH TPS U#3 (Target: 31-12-2026), SURATGARH TPS U#4 (Target: 31-12-2026), SURATGARH TPS U#5 (Target: 31-12-2026), SURATGARH TPS U#6 (Target: 31-12-2026), SURATGARH SCTPS U#7 (Target: 28-02-2025), SURATGARH SCTPS U#8 (Target: 28-02-2025), CHHABRA TPP U#1 (Target: 31-12-2026), CHHABRA TPP U#2 (Target: 31-12-2026), CHHABRA TPP U#3 (Target: 31-12-2026), CHHABRA TPP U#4 (Target: 31-12-2026), CHHABRA SCPP U#5 (Target: 28-02-2025), CHHABRA SCPP U#6 (Target: 28-02-2025), KALISINDH TPS U#1 (Target: 28-02-2025), KALISINDH TPS U#2 (Target: 28-02-2025)
Talwandi Sabo Power Ltd.	TALWANDI SABO TPP U#1 (Target: 28-02-2021), TALWANDI SABO TPP U#2 (Target: 31-12-2020), TALWANDI SABO TPP U#3 (Target: 31-10-2020)
UPRVUNL	ANPARA TPS U#1 (Target: 31-12-2023), ANPARA TPS U#2 (Target: 31-12-2023), ANPARA TPS U#3 (Target: 31-12-2023), ANPARA TPS U#4 (Target: 31-12-2023), ANPARA TPS U#5 (Target: 31-12-2023), ANPARA TPS U#6 (Target: 31-12-2023), ANPARA TPS U#7 (Target: 31-12-2023), HARDUAGANJ TPS U#8 (Target: 31-12-2024), HARDUAGANJ TPS U#9 (Target: 31-12-2024), OBRA TPS U#9 (Target: 31-12-2024), OBRA TPS U#10 (Target: 31-12-2024), OBRA TPS U#11 (Target: 31-12-2024), OBRA TPS U#12 (Target: 31-12-2024), OBRA TPS U#13 (Target: 31-12-2024), PARICHHA TPS U#3 (Target: 30-04-2022), PARICHHA TPS U#4 (Target: 31-12-2024), PARICHHA TPS U#5 (Target: 31-12-2024), PARICHHA TPS U#6 (Target: 31-12-2024)

सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

सं: उ.क्षे.वि.स./प्रचालन/106/01/2023/478- 519 दिनांक: 17.01.2023

विषय: प्रचालन समन्वय उप-समिति की 203वीं बैठक की अतरिक्त कार्यसूची।
Subject: Additional Agenda of 203rd OCC meeting.

प्रचालन समन्वय उप-समिति की **203वीं** बैठक का आयोजन वीडियो कॉन्फ्रेंसिंग के माध्यम से दिनांक **18.01.2023** को **10:30** बजे से किया जायेगा। उक्त बैठक की कार्यसूची उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है।

बैठक में सम्मिलित होने के लिए लिंक व पासवर्ड सभी सदस्यों को ई-मेल द्वारा प्रदान किया जाएगा।

कृपया बैठक में उपस्थित होने की सुविधा प्रदान करें।

203rd meeting of the Operation Co-ordination sub-committee will be conducted through Video Conferencing on **18.01.2023** from **10:30 Hrs**. The additional agenda of this meeting has been uploaded on the NRPC web-site http://164.100.60.165.

Santosh 17/1/23

(संतोष कुमार)
अधीक्षण अभियंता (प्रचालन)

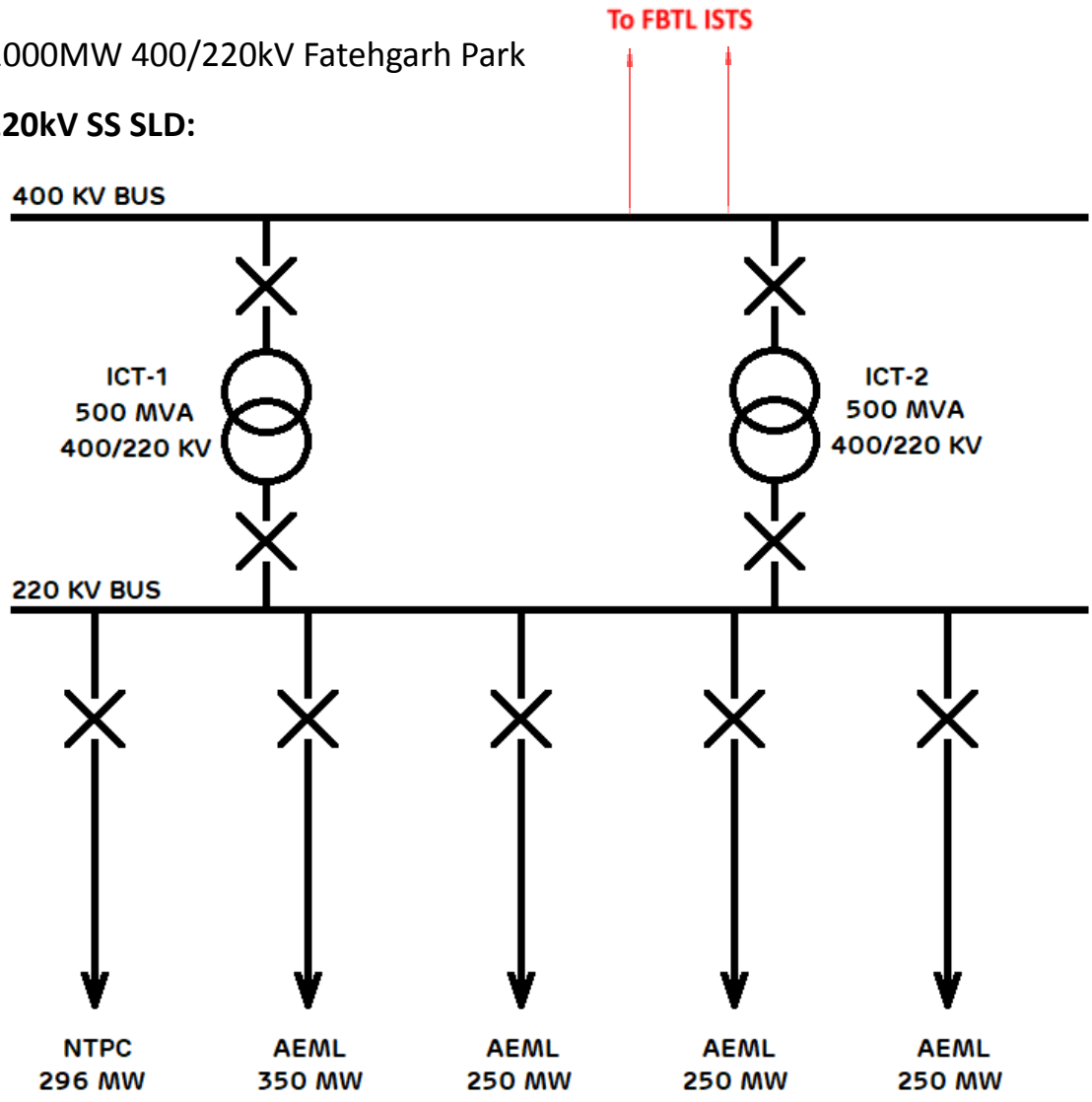
सेवा में : प्रचालन समन्वय उप समिति के सभी सदस्य।
To : All Members of OCC

18-ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016 फोन:011-26513265 ई-मेल: seo-nrpc@nic.in वेबसाईट: www.nrpc.gov.in
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 e- mail: seo-nrpc@nic.in Website: www.nrpc.gov.in

Special Protection Scheme

PSS: 1000MW 400/220kV Fatehgarh Park

400/220kV SS SLD:



Pre-Condition:

In 400/220kV Fatehgarh Solar Park, Following generating plants are connected with grid connectivity of 1000MW.

1. 296MW NTPC Solar Project
2. 250MW AEML Solar PSS-1
3. 350MW AEML Solar PSS-2
4. 250MW AEML Wind PSS-3

→ 700MW AEML Hybrid Project

5. 260MW AEML Wind PSS-4

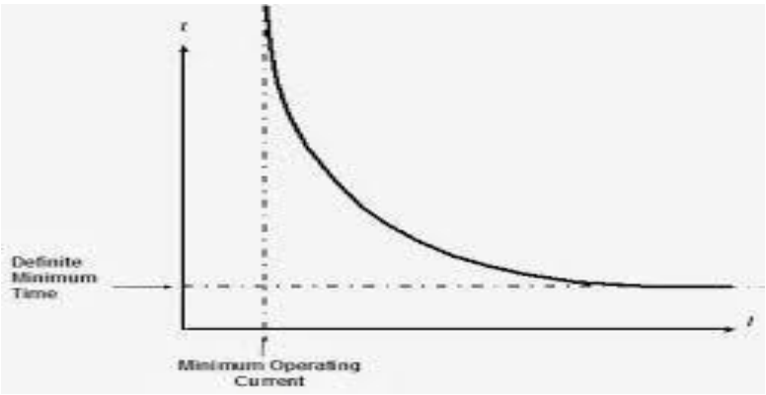
Total connected generation capacity in 700MW AEML Hybrid project is 1110MW i.e., 600MW Solar & 510MW Wind.
During normal operating condition Master PPC shall control AEML generation to 700MW at 220kV bus of Fatehgarh Park by curtailing solar generation if total connected generation exceeds > 700MW.
Normally, both ICTs shall run in parallel condition with maximum generation transfer capacity is **1000MW.**
Full generation scenario shall be observed during daytime when solar generation is at peak.
Considering pro-rata generation case of AEML hybrid project. During peak generation, its Solar & Wind component would be generating 380MW & 320MW respectively.

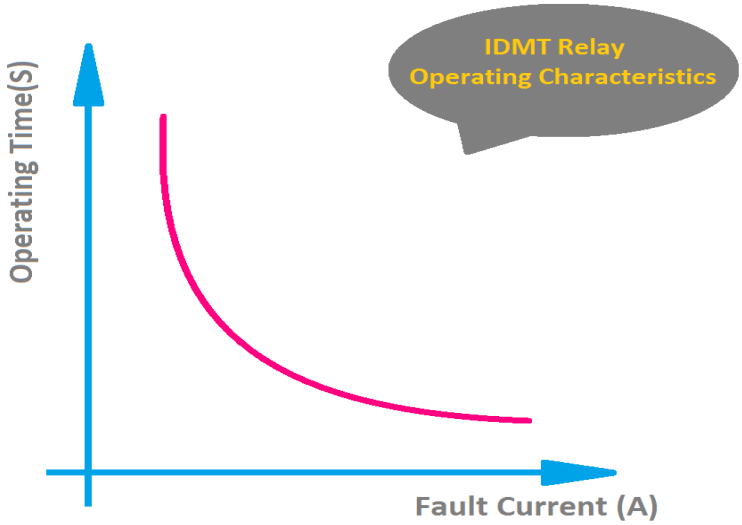
Need of Special Protection Scheme (SPS)

During peak or full generation period when cumulative generation on both the ICTs exceeds > 500MW up to 1000MW, if any of one ICT trips then entire load shall be transferred to other ICT leading to overload condition and subsequent tripping.
To avoid such blackout, total generation should be restricted up to 500MW in above condition by means of shedding generation at 220kV level. Response time of Master PPC to control generation at Inverter or WTG level is not very quick so that tripping of ICT on IDMT O/C protection can be avoided.
Hence, SPS scheme is required to be developed by using Definite Time (DT) O/C protection in 400kV side numerical relay (RET670) of ICT with multiple O/C stages which would trip multiple feeders with different time delays.
Three DT O/C stages shall be configured with PS corresponding to 550MVA loading of ICT (considering 10% continuous overload capacity of ICT) with three different time delays which would trip three different 220kV feeders as per the selected priority.
Time delay setting for DT stages shall be set in coordination with IDMT O/C protection operation time for ICT at different loading conditions and ensured that DT stage shall trip first and overload condition of ICT is avoided.

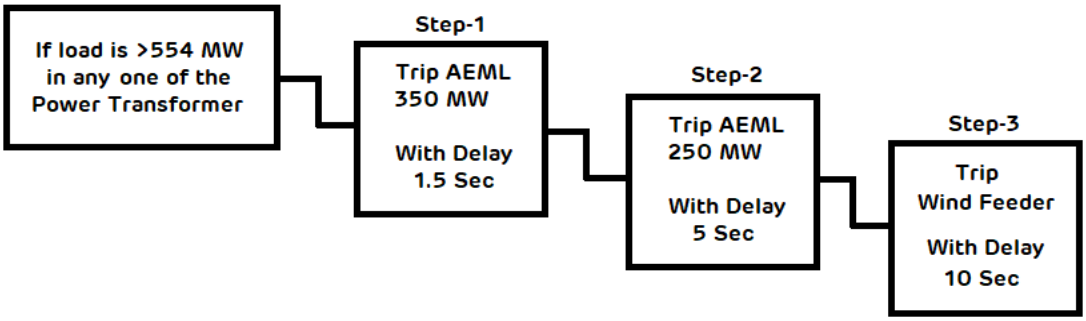
In case, if AREPRL is injecting 1000MW (Full contracted capacity) (i.e. 500MW each ICT), tripping of any ICT due to any reason would lead to loading on other 400/220kV, 500MVA ICT around 1000MW.

What is the maximum Instantaneous O/C setting of the ICT?





SPECIAL PROTECTION SCHEME (SPS) STEPS WITH TIME DELAY:


If load is >554 MW in any one of the Power Transformer
Step-1
Trip AEML 350 MW
With Delay 1.5 Sec
Step-2
Trip AEML 250 MW
With Delay 5 Sec
Step-3
Trip Wind Feeder
With Delay 10 Sec

Email **Pradeep Kumar**

FW: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

From : Narendran Ojha <Narendran.Ojha@adani.com> Tue, Jan 17, 2023 10:14 AM

Subject : FW: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

7 attachments

To : Pradeep Kumar <pradeep.cea@gov.in>

Cc : Santosh Kumar <seo-nrpc@nic.in>

Dear Sir,

Request you to consider Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park in the Agenda of 203rd OCC of NRPC.

Thanks & Regards,
Narendra Ojha
Associate Manager - Business Development | Adani Group
Mob +91 99798 47639, Phone: 011-49287728, Extension:77728 |
narendran.ojha@adani.com | www.adani.com
Adani Group, National Council of YMCA of India,
Gate No.-5, Bharat Yuvak Bhawan,
1, Jai Singh Road,New Delhi-110001, India

From: Narendra Kumar Ojha
Sent: Monday, January 9, 2023 6:04 PM
To: 'Santosh Kumar' <seo-nrpc@nic.in>
Cc: 'Somara Lakra (सोमारा लाकरा)' <somara.lakra@grid-india.in>; 'Alok Kumar (आलोक कुमार)' <alok.kumar@grid-india.in>; 'Gaurav Malviya (गौरव मालवीय)' <gauravmalviya@grid-india.in>; 'Gaurav Singh (गौरव सिंह)' <gauravsingh@grid-india.in>; 'Suruchi Jain (सुरुचि जैन)' <suruchi.jain@grid-india.in>; 'Deepak Kumar' <deepak.kr@grid-india.in>; 'Shashank Tyagi (शशांक त्यागी)' <shashank@grid-india.in>; 'NRLDC SO 2' <nrldcso2@grid-india.in>; 'R K Porwal (आर के पोरवाल)' <rk.porwal@grid-india.in>; 'Ibtesam Asif' <asif@grid-india.in>; Sunilkumar Desai <SUNIL.DESAI3@adani.com>; Raxit Nathani <Raxitr.Nathani@adani.com>
Subject: RE: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

https://drive.google.com/drive/folders/1K-nJAOSYSNS1m_gCBlASGaoeZeV4_Wjy?usp=share_link

Dear Sir,

Due to heavy file size the below mail was not delivered to email ids of Grid-India. We are hereby submitting the link so that those documents can be accessed.

Thanks & Regards,

Narendra Ojha
9979847639

From: Narendra Kumar Ojha
Sent: Monday, January 9, 2023 11:23 AM
To: Santosh Kumar <seo-nrpc@nic.in>
Cc: NARESH BHANDARI <ms-nrpc@nic.in>; Mr. SAUMITRA MAZUMDAR <seo-nrpc@nic.in>; Somara Lakra (सोमारा लाकरा) <somara.lakra@grid-india.in>; Alok Kumar (आलोक कुमार) <alok.kumar@grid-india.in>; Sameer Ganju <Sameer.Ganju@adani.com>; Ketan Dave <Ketan.Dave1@adani.com>; Hiren Tailor <Hiren.Tailor@adani.com>; Rajesh Kumar Gupta <Rajesh.Gupta@adani.com>; Mahendra singh dabi <Mahendrasingh.dabi@adani.com>; Gaurav Malviya (गौरव मालवीय) <gauravmalviya@grid-india.in>; Gaurav Singh (गौरव सिंह) <gauravsingh@grid-india.in>; Suruchi Jain (सुरुचि जैन) <suruchi.jain@grid-india.in>; Deepak Kumar <deepak.kr@grid-india.in>; Shashank Tyagi (शशांक त्यागी) <shashank@grid-india.in>; NRLDC SO 2 <nrldcso2@grid-india.in>; Jigar Thakkar <Jigar.Thakkar@adani.com>; Raxit Nathani <Raxitr.Nathani@adani.com>; D Velmurugan <velmurugan.dhanapal@adani.com>; Sureshkumar Mistri <Sureshkumar.Mistri@adani.com>; R K Porwal (आर के पोरवाल) <rk.porwal@grid-india.in>; Ibtesam Asif <asif@grid-india.in>; Sunilkumar Desai <SUNIL.DESAI3@adani.com>; Sameer Ganju <Sameer.Ganju@adani.com>
Subject: RE: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

Dear Sir,

With reference to the Agenda No.-14 (Additional Agenda No.2: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park (Agenda by Adani Green Energy Limited) discussed in 199th OCC, Detailed study documents for the proposed SPS was submitted by Adani Green Energy Limited to NRLDC. After detailed study as per below communications, NRLDC had suggested us to put this agenda in next OCC/NRPC meeting.

Kindly request you to consider this agenda in the next OCC (203rd) to be held on 17th & 18th Jan 2023.

Thanks & Regards,
Narendra Ojha
9979847639

From: Ibtesam Asif <asif@grid-india.in>
Sent: Wednesday, December 21, 2022 4:22 PM
To: Sunilkumar Desai <sunil.desai3@adani.com>
Cc: NARESH BHANDARI <ms-nrpc@nic.in>; Mr. SAUMITRA MAZUMDAR <seo-nrpc@nic.in>; Somara Lakra (सोमारा लाकरा) <somara.lakra@grid-india.in>; Alok Kumar (आलोक कुमार) <alok.kumar@grid-india.in>; Sameer Ganju <Sameer.Ganju@adani.com>; Ketan Dave <Ketan.Dave1@adani.com>; Hiren Tailor <hiren.tailor@adani.com>; Rajesh Kumar Gupta <rajesh.gupta@adani.com>; Mahendra singh dabi <Mahendrasingh.dabi@adani.com>; Gaurav Malviya (गौरव मालवीय) <gauravmalviya@grid-india.in>; Gaurav Singh (गौरव सिंह) <gauravsingh@grid-india.in>; Suruchi Jain (सुरुचि जैन) <suruchi.jain@grid-india.in>; Deepak Kumar <deepak.kr@grid-india.in>; Shashank Tyagi (शशांक त्यागी) <shashank@grid-india.in>; NRLDC SO 2 <nrldcso2@grid-india.in>; Narendra Kumar Ojha <Narendran.Ojha@adani.com>; Jigar Thakkar <Jigar.Thakkar@adani.com>; Raxit Nathani <raxitr.nathani@adani.com>; D Velmurugan <velmurugan.dhanapal@adani.com>; Sureshkumar

Mistri <sureshkumar.mistri@adani.com>; R K Porwal (आर के पोरवाल) <rk.porwal@grid-india.in>
Subject: Re: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

Dear Sir/Ma'am,

Proposed SPS scheme seems OK.

As discussed, STEP-1 Delay need to be changed from 1.5sec to 1sec (tripping of feeders connected to 350MW solar generation).

As mentioned in trailing mail *"As per present setting adopted in the relay IDMT O/C over current will operate within 3 Sec at the time of 1000MW (1444A) Load condition".*

Further, it has been deliberated telephonically by AGEL that 1444A at 400kV side is RMS current for 3sec. Hence, ICT can safely carry (1.732*400*1.444) 1000MVA for 3sec. (Type test report of 400/220kV, 500MVA ICTs may be shown by AGEL for ensuring the same).
It was also deliberated that IDMT characteristics in trailing mail shows the RMS current setting.

SPS may be implemented with the proposed scheme along with minor modification as discussed **only after the approval in OCC/RPC forum.** Hence, it is requested to bring the same along with all the communications/comments (in reference to the 199th OCC meeting) in next OCC/NRPC meeting for approval of proposed SPS scheme for Adani Solar Park_1000MW_Fatehgarh-I (AREPRL).

सादर एवं धन्यवाद | Thanks & regards
इब्तेसाम आसिफ | Ibtesam Asif
सहायक प्रबंधक | Assistant Manager (SO - II)
उत्तरीय क्षेत्रीय भार प्रेषण केंद्र |NRLDC
Grid Controller of India Limited
Formerly known as
Power System Operation Corporation Ltd. (POSOCO)

From: Sunilkumar Desai <sunil.desai3@adani.com>
Sent: 03 December 2022 15:11:38
To: Ibtesam Asif
Cc: NARESH BHANDARI; Mr. SAUMITRA MAZUMDAR; Somara Lakra (सोमारा लाकरा); Alok Kumar (आलोक कुमार); Sameer Ganju; Ketan Dave; Hiren Tailor; Rajesh Kumar Gupta; Mahendra singh dabi; Gaurav Malviya (गौरव मालवीय); Gaurav Singh (गौरव सिंह); Suruchi Jain (सुरुचि जैन); Deepak Kumar; Shashank Tyagi (शशांक त्यागी); NRLDC SO 2; Narendra Kumar Ojha; Jigar Thakkar; Raxit Nathani; D Velmurugan; Sureshkumar Mistri
Subject: FW: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

Dear Sir,

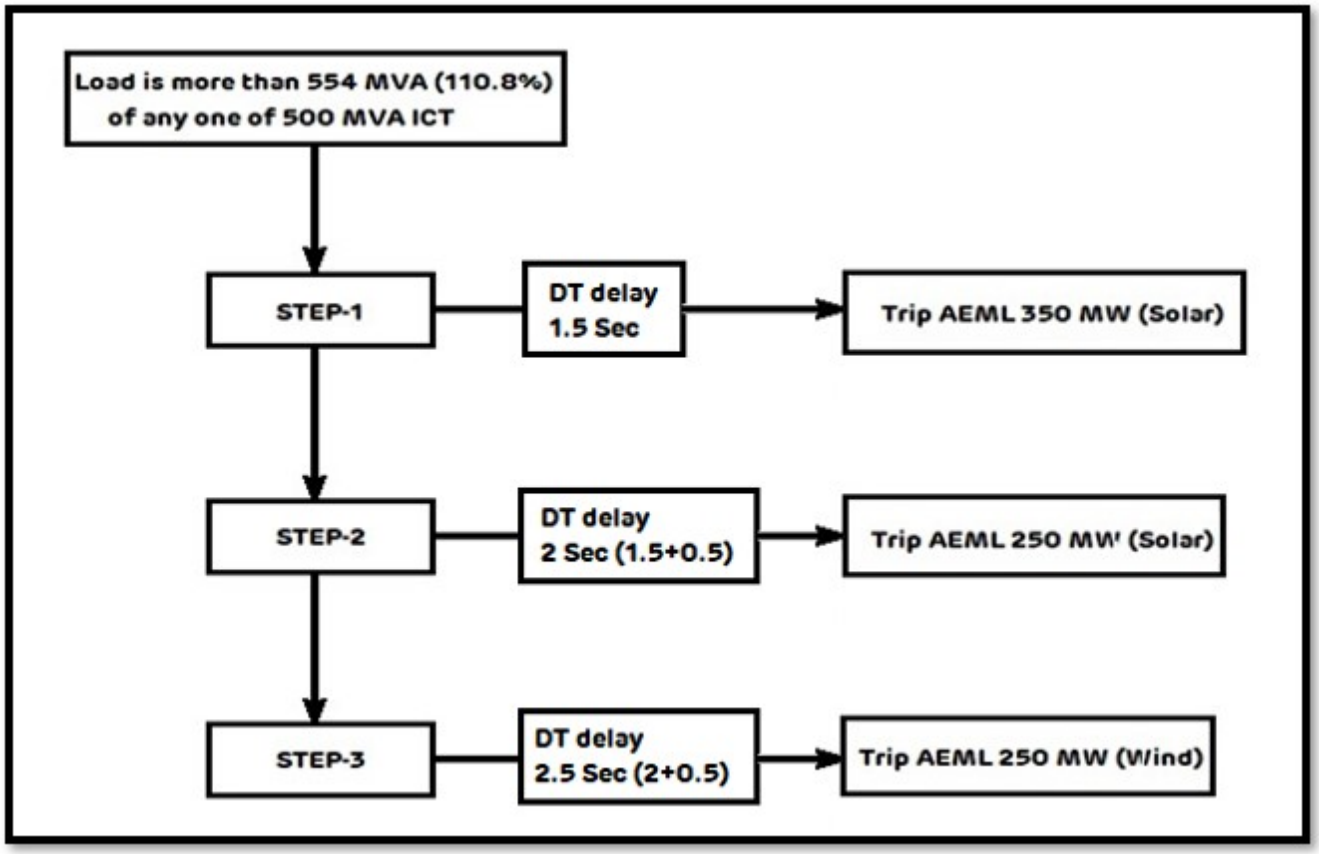
Kindly find attached clarifications on your comments on SPS scheme for your approval.

1. **In case, if AREPRL is injecting 1000MW (Full contracted capacity) (i.e. 500MW each ICT), tripping of any ICT would lead to loading on other 400/220kV, 500MVA ICT around 1000MW.**

As per present setting adopted in the relay IDMT O/C over current will operate within 3 Sec at the time of 1000MW (1444A) Load condition.

So that we are in need to implement SPS to restrict the load from downstream 220kV level by tripping of 3 Line feeders' step by step within 3Sec.

- 1st Step AEML 350MW (Solar) Feeder will trip after 1.5 Sec if the load is more than 554MVA (110.8%) of any one of 500MVA ICT.
- 2nd Step AEML 250MW (Solar) Feeder will trip after 2 Sec (1.5+0.5) if the load is again more than 554MVA (110.8%) of any one of 500MVA ICT.
- 3rd Step AEML 250MW (Wind) Feeder will trip after 2.5 Sec (2+0.5) if the load is again more than 554MVA (110.8%) of any one of 500MVA ICT.



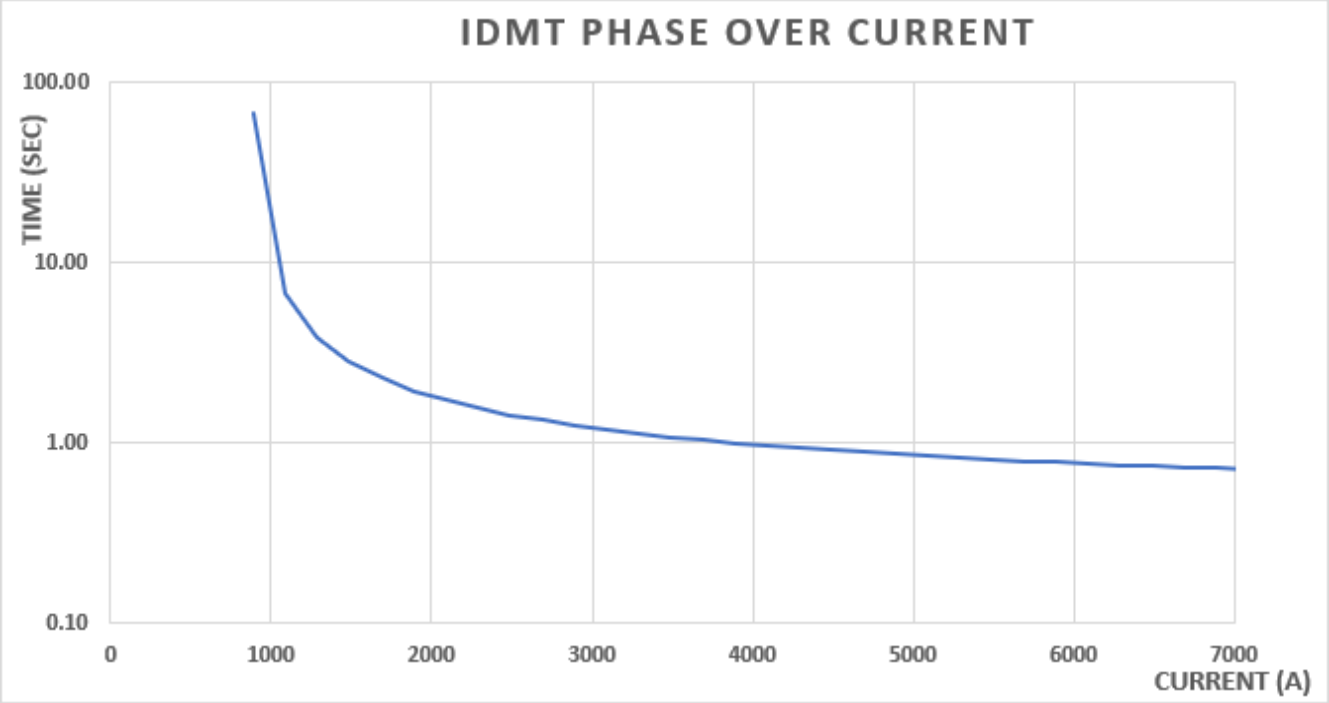
NOTE: for 500 MVA ICT Short circuit withstand time is 2 Sec. and Short circuit withstand current (3-Ph) 6.1 kA on HV side, 12.28 kA on IV side and 9.06 kA on LV side as per technical data sheet provided by OEM and the same has been attached for your reference.

2. **What is the maximum Instantaneous O/C setting of the ICT?**

Unrestrained Differential current **9.6*I Base (9.6X722{FLC}=6931 A ~ 4801 MVA)** has been set for Instantaneous tripping of ICT.

3. **Kindly provide the IDMT relay characteristic of 400/220kV, 500MVA ICTs.**

As per present scenario IEC Normal Inverse characteristic adopted for O/C IDMT stage.



4. **Kindly provide the present protection settings of 400/220kV, 500MVA ICTs.**

Relay setting are attached.

Regards,
Sunil Desai
8980016167

From: Ibtesam Asif <asif@posoco.in>
Sent: Monday, November 21, 2022 10:31 AM
To: Narendra Kumar Ojha <Narendran.Ojha@adani.com>
Cc: NARESH BHANDARI <ms-nrpc@nic.in>; Mr. SAUMITRA MAZUMDAR <seo-nrpc@nic.in>; Somara Lakra (सोमारा लाकरा) <somara.lakra@posoco.in>; Alok Kumar (आलोक कुमार) <alok.kumar@posoco.in>; Sameer Ganju <Sameer.Ganju@adani.com>; Ketan Dave <Ketan.Dave1@adani.com>; Hiren Tailor <hiren.tailor@adani.com>; Rajesh Kumar Gupta <rajesh.gupta@adani.com>; Sunilkumar Desai <sunil.desai3@adani.com>; Mahendra singh dabi <Mahendrasingh.dabi@adani.com>; Gaurav Malviya (गौरव मालवीय) <gauravmalviya@posoco.in>; Gaurav Singh (गौरव सिंह) <gauravsingh@posoco.in>; suruchi.jain <suruchi.jain@posoco.in>; Deepak Kumar <deepak.kr@posoco.in>; Shashank Tyagi (शशांक त्यागी) <shashank@posoco.in>; NRLDC SO 2 <nrldcso2@posoco.in>
Subject: Re: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

Dear Sir,

In reference to trailing mail, please see the below NRLDC observations on proposed SPS scheme of Adani Renewable Energy Park Rajasthan Ltd. (AREPRL)_1000MW.

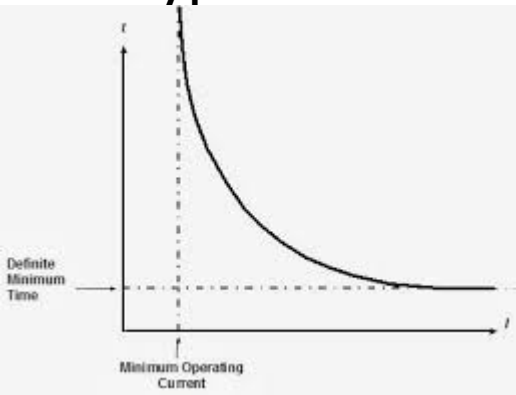
AREPRL comments:

1. Three DT O/C stages shall be configured with PS corresponding to 550MVA loading of ICT (considering 10% continuous overload capacity of ICT) with three different time delays which would trip three different 220kV feeders as per the selected priority.
2. Time delay setting for DT stages shall be set in coordination with IDMT O/C protection operation time for ICT at different loading conditions and ensured that DT stage shall trip first and

overload condition of ICT is avoided.

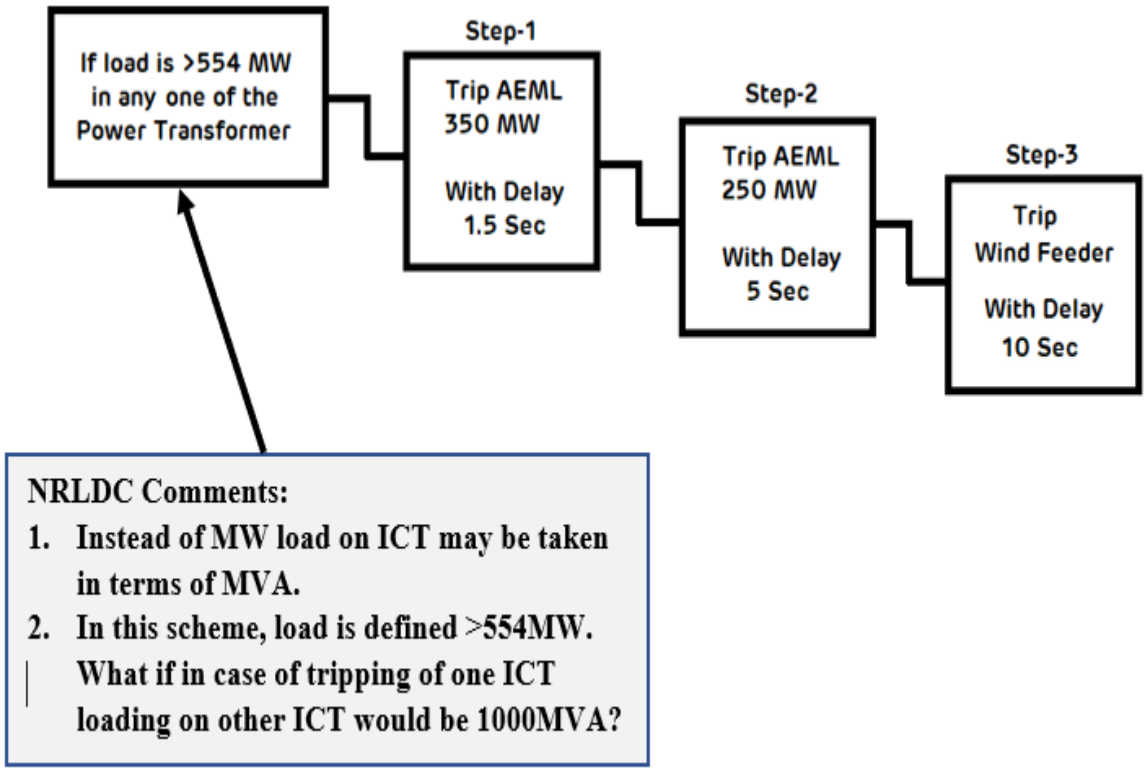
NRLDC Comments on proposed SPS scheme for 400/220kV, 500MVA ICT at Fatehgarh Park (AREPRL):

1. **In case, if AREPRL is injecting 1000MW (Full contracted capacity) (i.e. 500MW each ICT), tripping of any ICT would lead to loading on other 400/220kV, 500MVA ICT around 1000MW.**
2. **What is the maximum Instantaneous O/C setting of the ICT?**
3. **Kindly provide the IDMT relay characteristic of 400/220kV, 500MVA ICTs.**



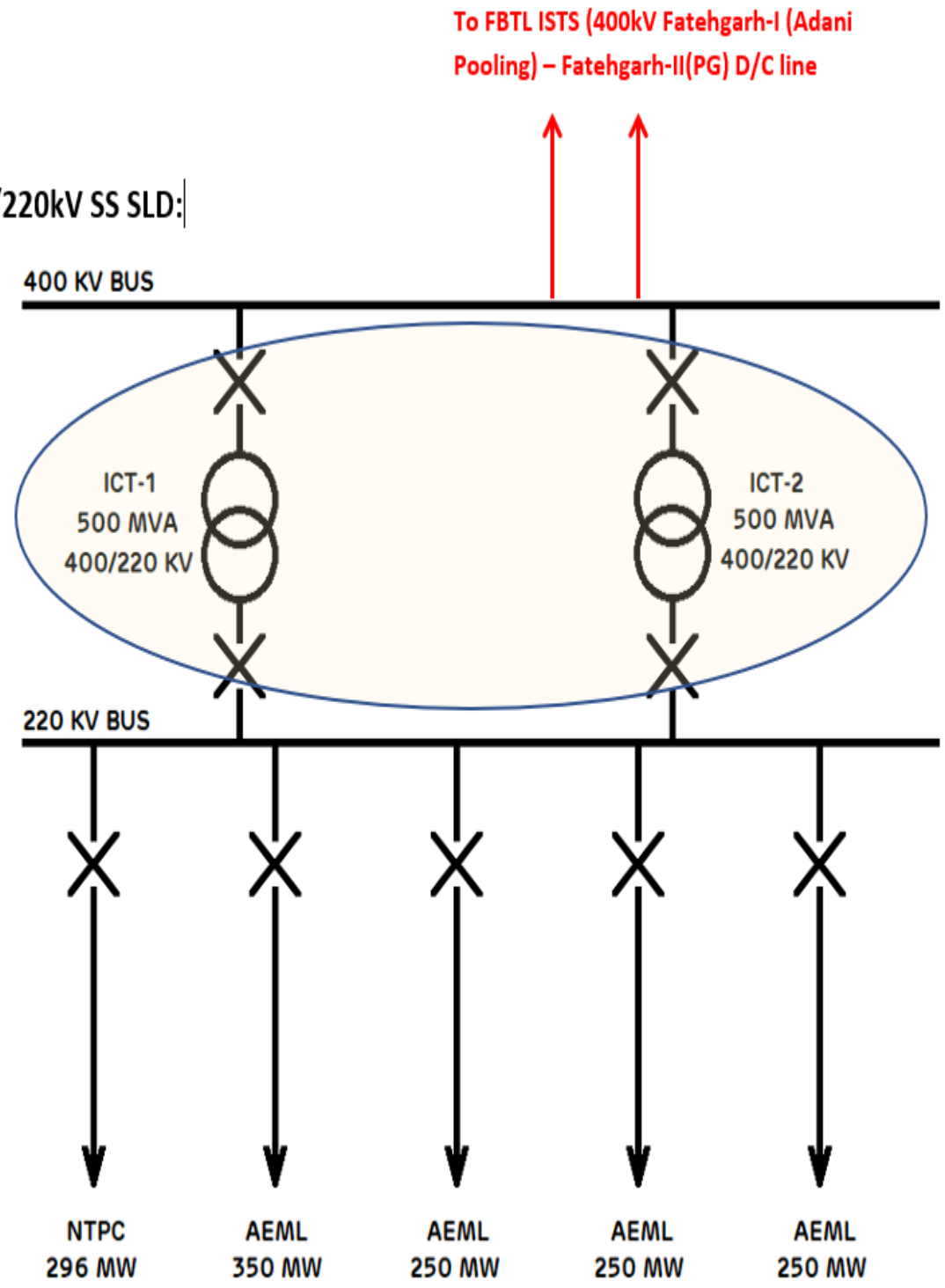
4. **Kindly provide the present protection settings of 400/220kV, 500MVA ICTs.**

Proposed SPS logic of AREPRL and NRLDC observation



AREPRL SLD:

400/220kV SS SLD:



In 400/220kV Fatehgarh Solar Park, Following generating plants are connected with grid connectivity of 1000MW.

1. 296MW NTPC Solar Project
2. 250MW AEML Solar PSS-1
3. 350MW AEML Solar PSS-2
4. 250MW AEML Wind PSS-3
5. 260MW AEML Wind PSS-4

700MW AEML Hybrid Project

AREPRL = AHEJ4L + NTPC Nedan.

- **AHEJ4L (Adani Hybrid Energy Jaisalmer Four Ltd._AEML) is having Installed capacity of 1110MW i.e., 600MW Solar & 510MW Wind, and contracted capacity of 700MW.**
- **NTPC Nedan Solar plant is having installed and contracted capacity of 296MW.**
- **Total installed capacity of AREPRL is 1406MW and contracted capacity is 1000MW.**

PPT presented by AREPRL in 191st OCC meeting and AREPRL write up on SPS scheme is enclosed herewith for reference.

Kindly furnish the AREPRL comments on NRLDC observation for proposed SPS scheme of Adani solar park_Fathegarh for further necessary actions.

सादर एवं धन्यवाद | Thanks & regards
इब्तेसाम आसिफ | Ibtesam Asif
सहायक प्रबंधक | Assistant Manager (SO - II)
उत्तरीय क्षेत्रीय भार प्रेषण केंद्र |NRLDC
Grid Controller of India Limited (GRID-INDIA)

From: Narendra Kumar Ojha <Narendran.Ojha@adani.com>
Sent: 21 October 2022 17:55
To: Ibtesam Asif; NRLDC SO 2
Cc: NARESH BHANDARI; Mr. SAUMITRA MAZUMDAR; Somara Lakra (सोमारा लाकरा); Alok Kumar (आलोक कुमार); Sameer Ganju; Ketan Dave; Hiren Tailor; Rajesh Kumar Gupta; Sunilkumar Desai; Mahendra singh dabi
Subject: Special Protection Scheme (SPS) at 400/220kV Fatehgarh Park

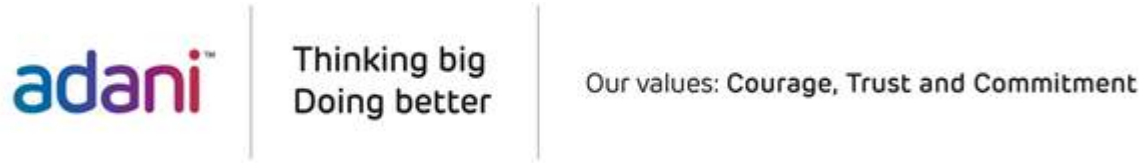
Dear Sir,

In continuation with the trailing mail, this agenda was discussed in 199th OCC meeting of NRPC.

PFA the required documents for setting of SPS at 400/220kV Fatehgarh Park. Kindly accord your approval.

Thanks & Regards,
Narendra Ojha
Associate Manager - Business Development | Adani Group
Mob +91 99798 47639, Phone: 011-49287728, Extension:77728 |

narendran.ojha@adani.com | **www.adani.com**
Adani Group, National Council of YMCA of India,
Gate No.-5, Bharat Yuvak Bhawan,
1, Jai Singh Road,New Delhi-110001, India

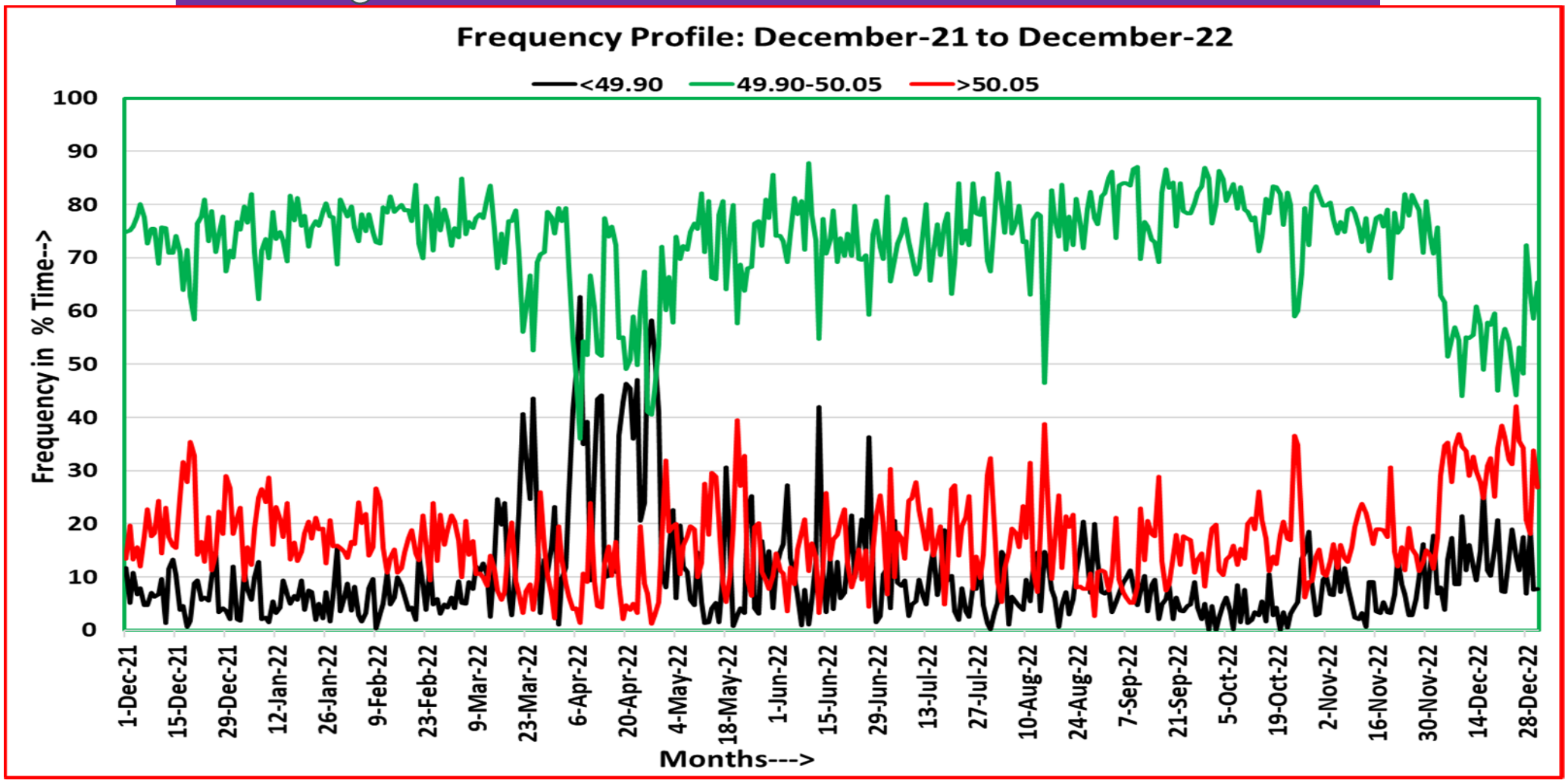


प्रचालन समन्वय उपसमिति की बैठक
दिसंबर - 2022

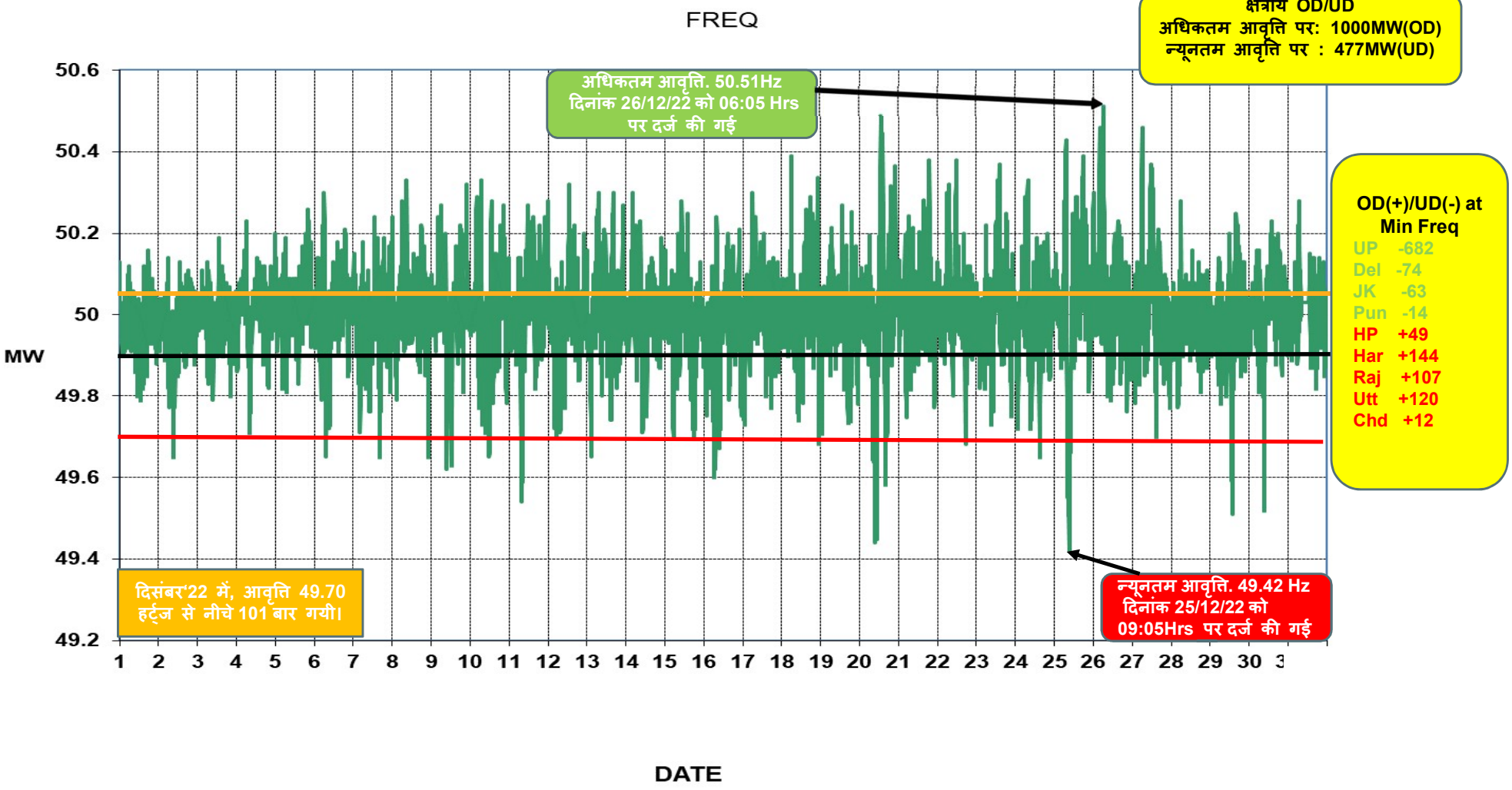
पिछले एक साल मे आवृत्ति की स्थिति

आवृत्ति बैंड	दिसम्बर 2021	जनवरी 2022	फ़रवरी 2022	मार्च 2022	अप्रैल 2022	मई 2022	जून 2022	जुलाई 2022	अगस्त 2022	सितम्बर 2022	अक्टूबर 2022	नवम्बर 2022	दिसंबर 2022
< 49.7 Hz(%)	0.03	0.02	0.08	0.46	4.94	0.27	0.42	0.42	0.49	0.17	0.04	0.13	1.11
<49.8 Hz(%)	0.71	0.53	0.55	2.92	13.60	1.94	2.41	1.78	2.02	0.91	0.46	0.76	3.96
<49.9 Hz(%)	6.92	5.84	5.99	14.50	31.98	9.83	12.45	7.82	8.77	5.94	4.88	6.70	12.78
49.90-50.05 Hz(%)	**73.14**	**75.66**	**77.06**	**73.42**	**59.30**	**72.23**	**73.38**	**73.45**	**75.77**	**80.77**	**78.27**	**77.00**	**57.39**
50.05-50.10 Hz(%)	15.09	15.17	14.36	10.28	7.35	12.95	11.46	14.84	11.99	11.55	14.04	13.88	11.99
>50.10 Hz(%)	3.89	3.21	2.51	1.72	1.35	4.11	2.43	3.58	3.00	1.65	2.63	2.30	13.77
>50.20 Hz(%)	0.25	0.11	0.08	0.08	0.08	0.88	0.28	0.31	0.47	0.08	0.18	0.12	4.07
औसत आवृत्ति	50.00	50.00	50.00	49.98	49.93	50.00	49.99	50.00	50.00	50.00	50.00	50.00	50.00

आवृत्ति की स्थिति: दिसंबर -2021 से 2022



दिसंबर -2022 के दौरान आवृत्ति की स्थिति
(As per 5 Minute SCADA data)



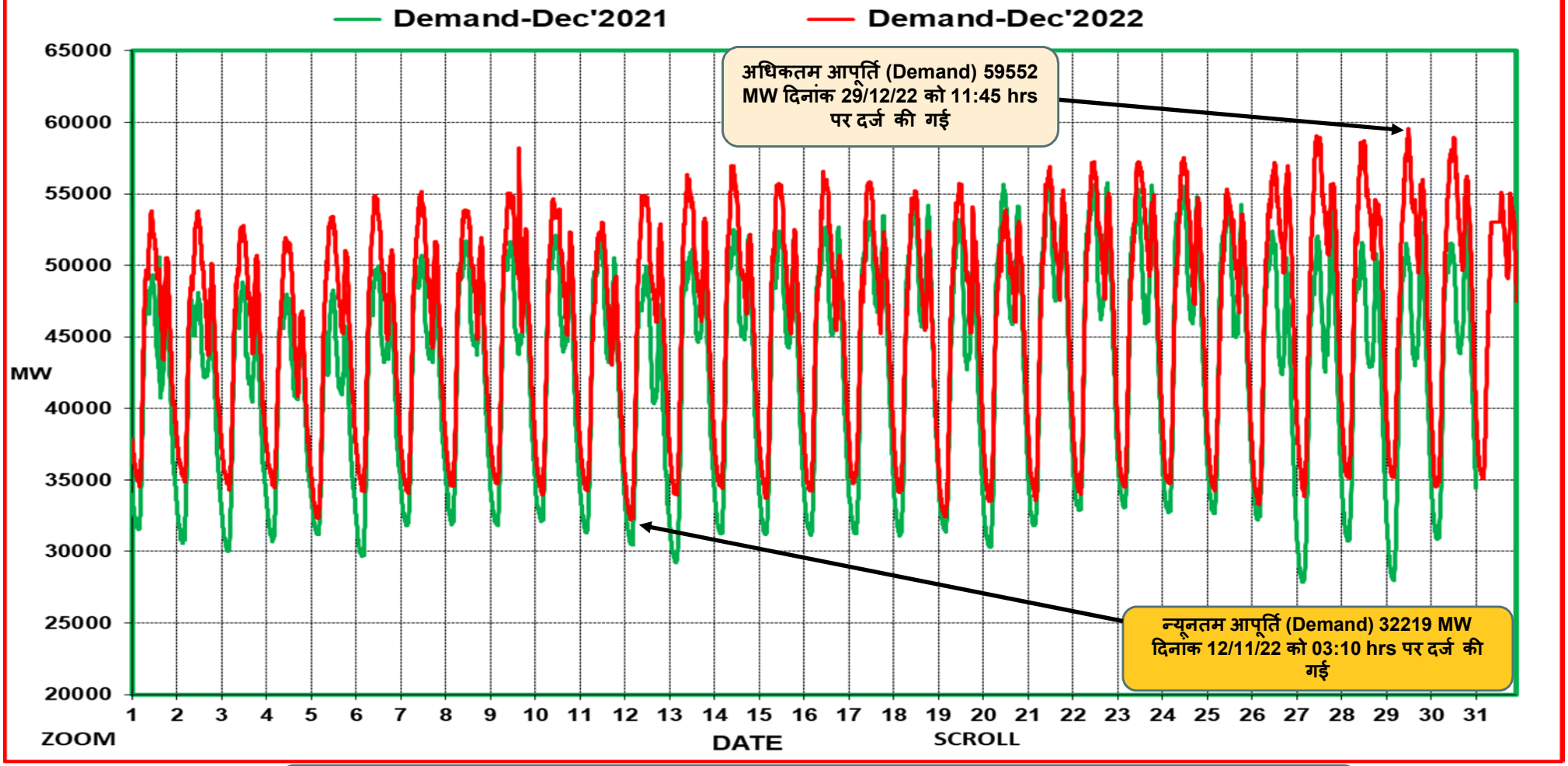
दिसंबर-2022 के दौरान अधिकतम मांग (Demand Met), अधिकतम ऊर्जा खपत (Energy consumption) और अब तक का कीर्तिमान (राज्यों द्वारा जमा आंकड़ों के अनुसार)

ग्रिड-इंडिया GRID-INDIA

राज्य	अधिकतम मांग (MW) (in Dec'22)	दिनांक / समय	रिकॉर्ड अधिकतम मांग (in MW) (upto Nov'22)	दिनांक / समय	अधिकतम ऊर्जा खपत (MU) (in Dec'22)	दिनांक	रिकॉर्ड अधिकतम ऊर्जा खपत (MU) (Upto Nov'22)	दिनांक
पंजाब	8091	24.12.22 at 09:00	14295	22.08.22 को 14:45 बजे	148.6	24.12.22	334.45	29.06.22
हरियाणा	7984	16.12.22 at 12:00	12768	28.06.22 को 11:56 बजे	137.25	24.12.22	266.15	07.07.21
राजस्थान	16468	30.12.22 at 13:00	16023	28.11.22 को 11:30 बजे	313.0	18.12.22	328.86	09.09.22
दिल्ली	4868	28.12.22 at 10:00	7695	29.06.22 को 15:10 बजे	80.9	27.12.22	153.52	28.06.22
उत्तर प्रदेश	19159	29.12.22 at 19:00	26589	09.09.22 को 21:39 बजे	348.5	30.12.22	547.360	19.08.22
उत्तराखंड	2389	30.12.22 at 17:00	2594	14.06.22 को 21:00 बजे	45.3	29.12.22	54.27	15.06.22
हिमाचल प्रदेश	2004	07.12.22 at 07:45	2030	07.01.22 को 10:00 बजे	36.5	29.12.22	36.91	28.06.22
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	2831	29.12.22 at 19:00	2967	30.09.22 को 07:00 बजे	61.1	26.12.22	59.95	17.01.22
चंडीगढ़	282	30.12.22 at 08:00	426	08.07.21 को 15:00 बजे	4.7	30.12.22	8.41	08.07.21
उत्तरी क्षेत्र #	59004	28.12.22 at 12:00	77006	28.06.22 को 11:50 बजे	1165.2	30.12.22	1737.09	28.06.22

उत्तरी क्षेत्र अधिकतम मांग (Demand Met) as per SCADA Data

क्षेत्रीय विद्युत आपूर्ति (Demand) दिसंबर 2021 बनाम दिसंबर 2022 (As per 5 Minute SCADA data)

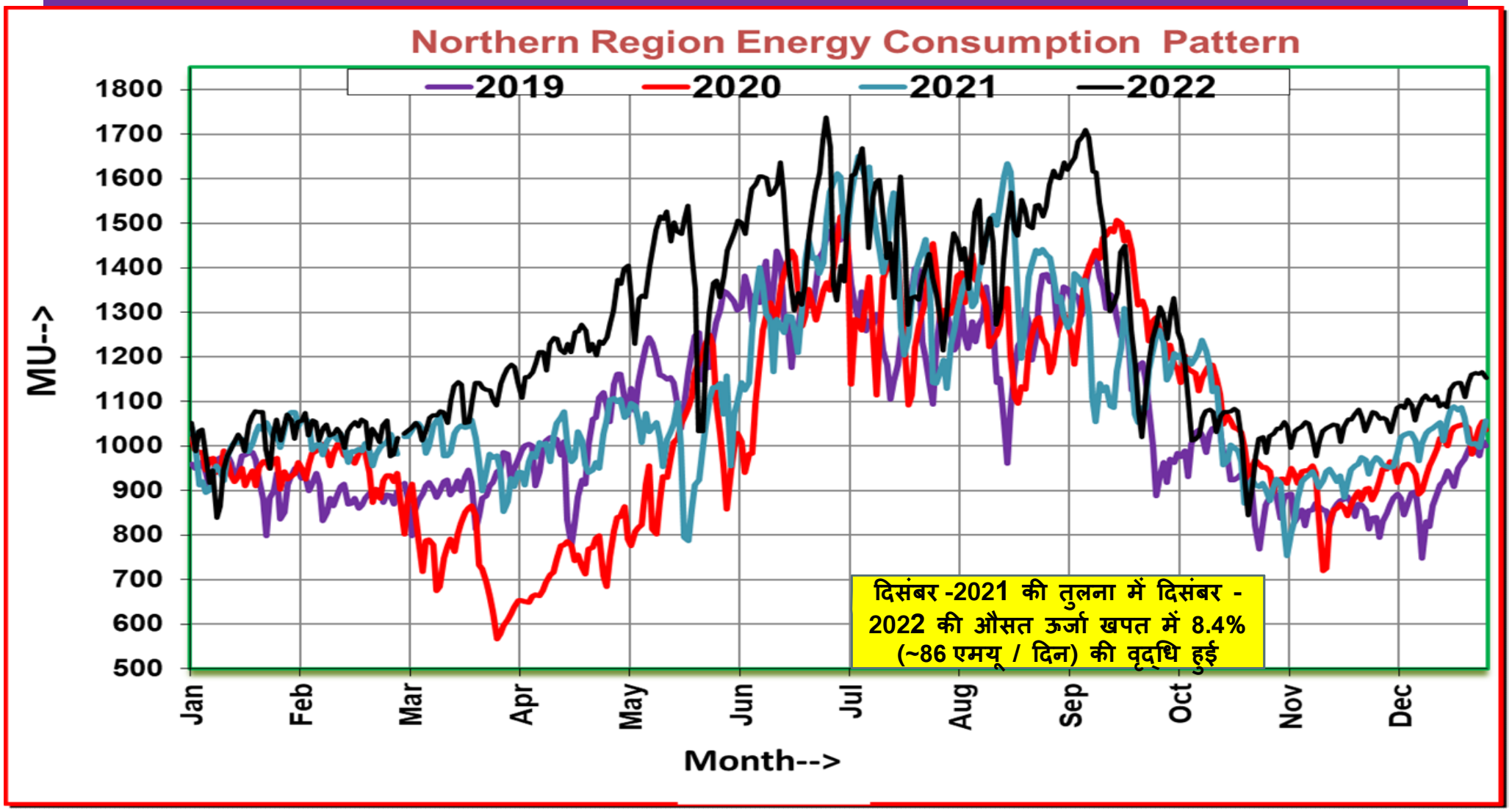


दिसंबर -2021(42948MW) की तुलना में दिसंबर -2022(46193MW) की औसत विद्युत आपूर्ति में 7.56% (~3245MW) की वृद्धि हुई

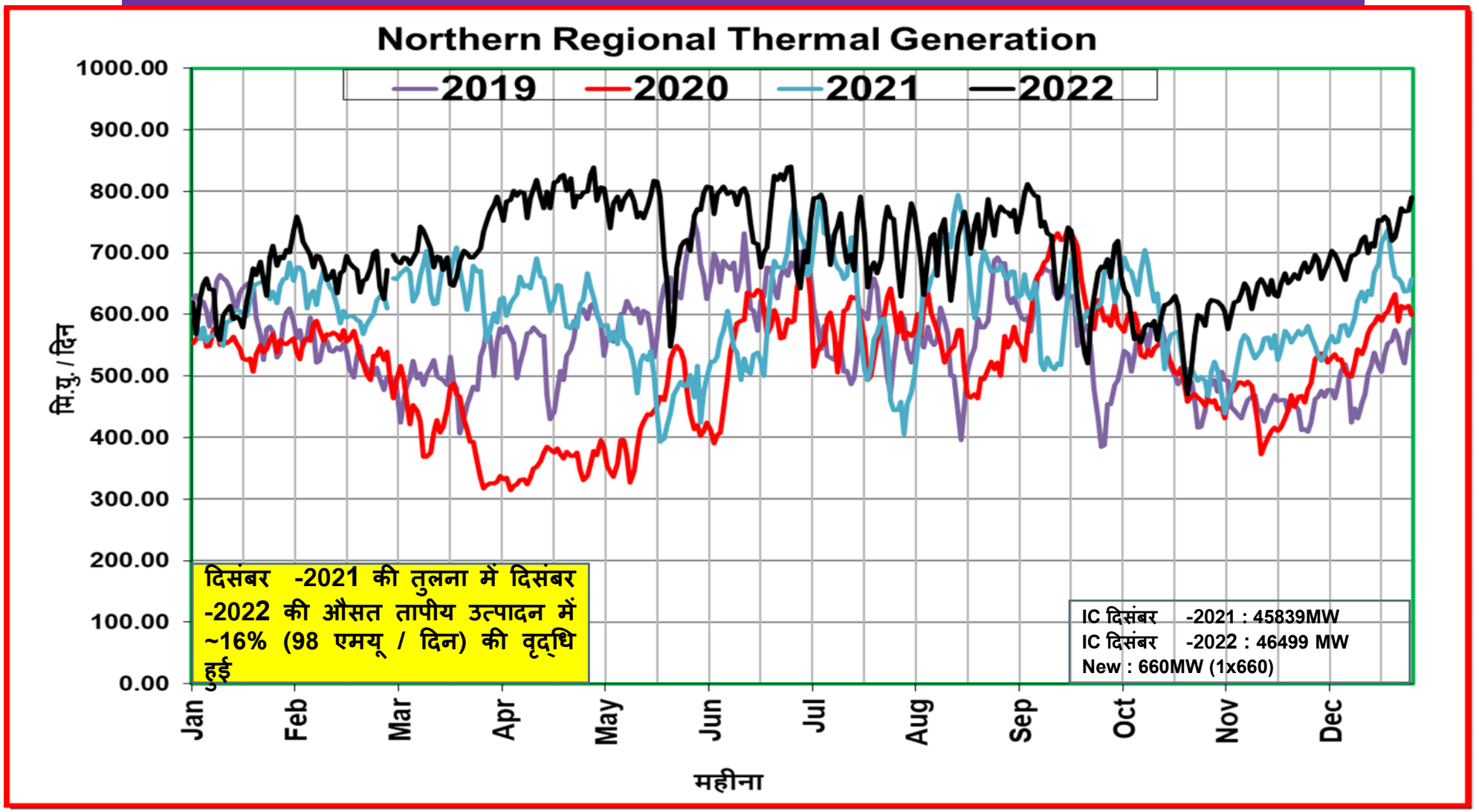
उत्तरी क्षेत्र की औसत ऊर्जा खपत में वृद्धि(% में) दिसंबर-2022/ दिसंबर-2021 / दिसंबर-2020

राज्य	दिसंबर -2020	दिसंबर -2021	दिसंबर -2022	% वृद्धि (दिसंबर -2021 vs दिसंबर -2020)	% वृद्धि (दिसंबर -2022 vs दिसंबर -2021)
पंजाब	122.98	132.04	139.52	7.36%	**5.66%**
हरियाणा	130.37	128.43	139.37	-1.49%	**8.52%**
राजस्थान	251.94	265.07	305.76	5.21%	**15.35%**
दिल्ली	65.99	66.63	70.21	0.96%	**5.38%**
उत्तर प्रदेश	285.89	297.49	315.56	4.06%	**6.07%**
उत्तराखंड	38.77	39.37	39.91	1.53%	1.38%
चंडीगढ़	3.62	3.54	3.75	-2.27%	**6.20%**
हिमाचल प्रदेश	31.60	33.97	34.35	7.52%	1.10%
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	51.87	53.99	57.66	4.10%	**6.79%**
उत्तरी क्षेत्र	**983.03**	**1020.52**	**1106.09**	**3.81%**	**8.38%**

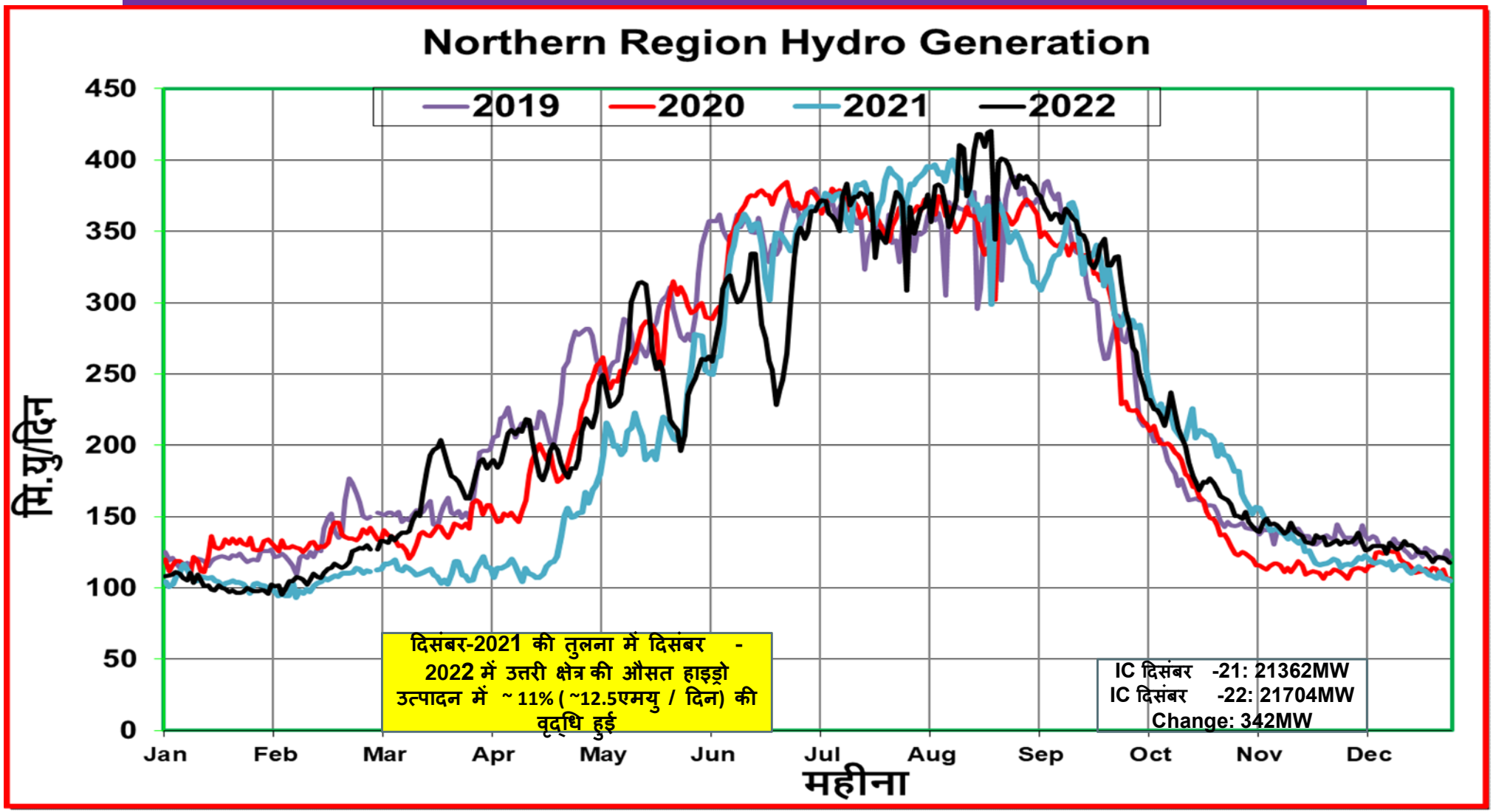
उत्तरी क्षेत्र की ऊर्जा खपत(MUs)



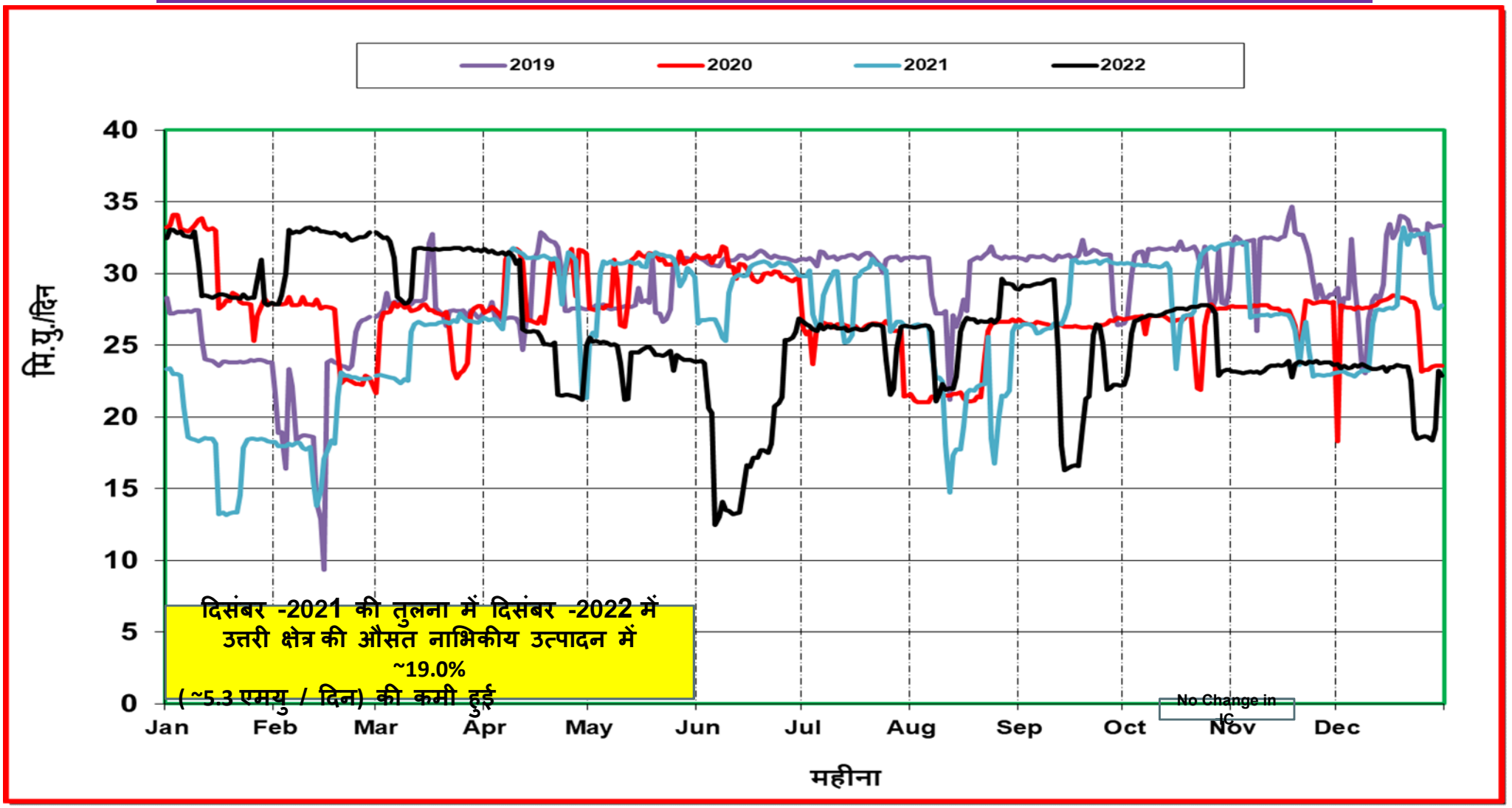
उत्तरी क्षेत्र की तापीय (Thermal) उत्पादन की स्थिति(Mus/Day)



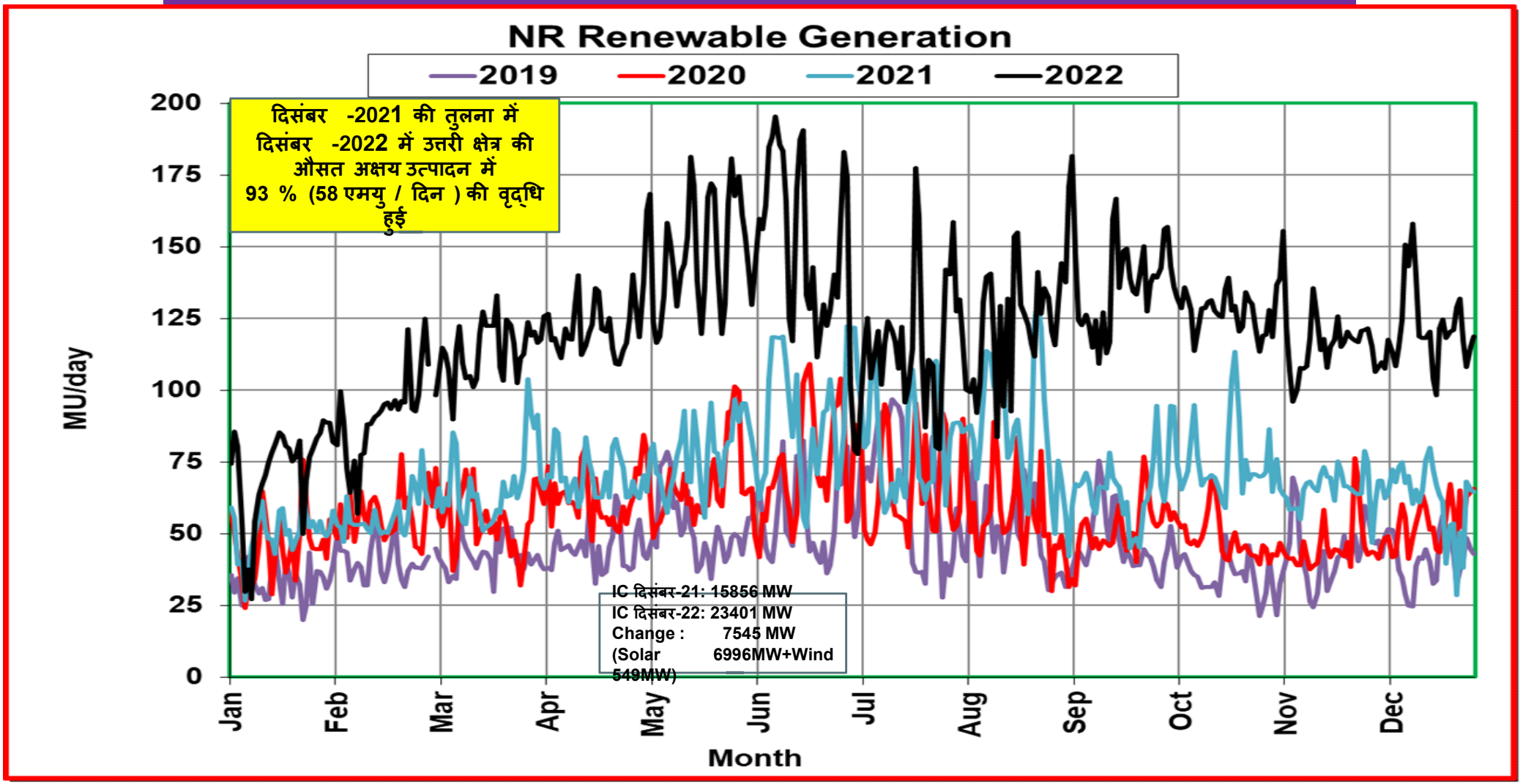
उत्तरी क्षेत्र की जलीय (हाइड्रो) उत्पादन की स्थिति(Mus/Day)



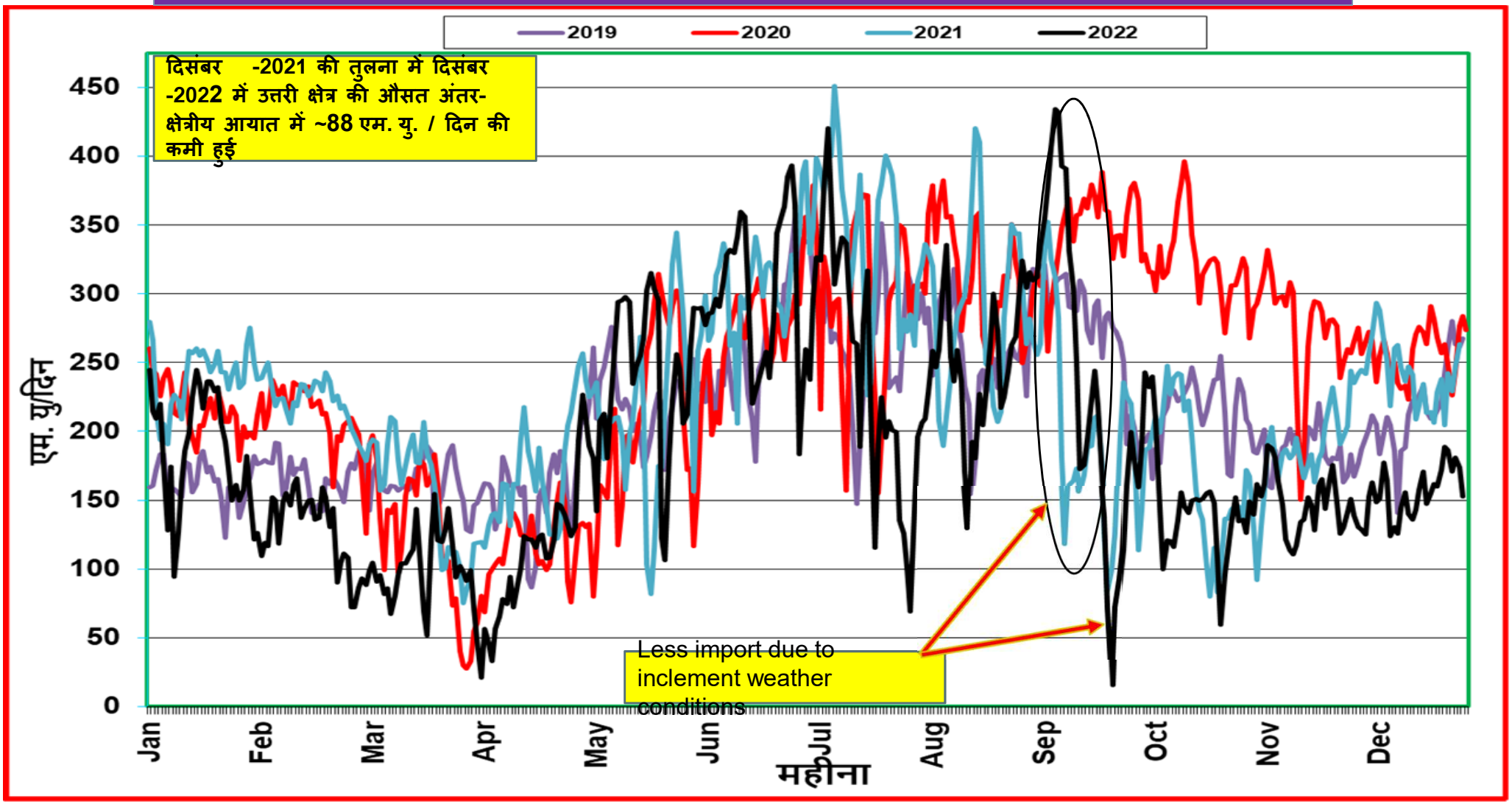
उत्तरी क्षेत्र की नाभिकीय उत्पादन की स्थिति (Mus/Day)



(Mus/Day)


NR Renewable Generation
2019
2020
2021
2022
दिसंबर -2021 की तुलना में
दिसंबर -2022 में उत्तरी क्षेत्र की
औसत अक्षय उत्पादन में
93 % (58 एमयु / दिन) की वृद्धि
हुई
IC दिसंबर-21: 15856 MW
IC दिसंबर-22: 23401 MW
Change : 7545 MW
(Solar 6996MW+Wind
549MW)
MU/day
200
175
150
125
100
75
50
25
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

अंतर-क्षेत्रीय आयात(Mus/Day) की स्थिति



वास्तविक सारांश -
दिसंबर -2021 बनाम दिसंबर -2022

	दिसंबर -2021 (मि.यु. /दिन)	**दिसंबर - 2022 (मि.यु. /दिन)**	**दिसंबर माह में वृद्धि (मि.यु./दिन)**
तापीय (Thermal) उत्पादन	616.42	714.27	97.85
जलीय (Hydro) उत्पादन	113.96	126.46	12.50
नाभिकीय (Nuclear) उत्पादन	27.60	22.35	-5.26
अंतर-क्षेत्रीय (Inter-Regional) कुल आयात	241.78	153.44	-88.34
अक्षय (Renewable) उत्पादन	62.26	120.08	57.81
कुल उपलब्धता	**1062.02**	**1136.6**	**74.56**

RE Penetration

	Maximum Daily MU Penetration			
	December '2022		Record upto November '2022	
	Max % Penetration	Date	Max % Penetration	Date
Punjab	4.00	14-12-2022	12.28	01-04-2020
Rajasthan	18.28	13-12-2022	36.47	22-10-2021
UP	3.27	14-11-2022	4.07	30-10-2021
NR	14.29	13-12-2022	15.90	25-10-2022

	Maximum Instantaneous Penetration in MW			
	December '2022		Record upto November '2022	
	Max % Penetration	Date	Max % Penetration	Date
Punjab	6.34	28-12-2022	26.87	22-04-2020
Rajasthan	28.37	13-12-2022	68.38	31-03-2020
UP	11.54	14-12-2022	15.13	01-04-2021
NR	32.81	13-12-2022	42.96	25-10-2022

B.20

Outage Summary For December 2022									
CONSTITUENTS	PLANNED (A)	FORCED OUTAGES (B=C+D)	EMERGENCY SHUTDOWNS (C)	TRIPPING (D)	% PLANNED SHUTDOWNS (A/(A+C))	% EMERGENCY SHUTDOWNS(C/(A+C))	% ESD SHUTDOWNS(C/B)	% TRIPPING (D/B)	TOTAL OUTAGES (A+B)
POWERGRID	367	254	180	74	67.1%	32.9%	70.9%	29.1%	621
UPPTCL	112	135	52	83	68.3%	31.7%	38.5%	61.5%	247
RRVPNL	78	72	32	40	70.9%	29.1%	44.4%	55.6%	150
PSTCL	97	48	7	41	93.3%	6.7%	14.6%	85.4%	145
BBMB	54	64	14	50	79.4%	20.6%	21.9%	78.1%	118
HVPNL	40	48	19	29	67.8%	32.2%	39.6%	60.4%	88
Adani Solar	46	6	4	2	92.0%	8.0%	66.7%	33.3%	52
PKTCL	27	3	2	1	93.1%	6.9%	66.7%	33.3%	30
DTL	8	21	6	15	57.1%	42.9%	28.6%	71.4%	29
HPPTCL	17	10	6	4	73.9%	26.1%	60.0%	40.0%	27
NTPC	13	11	2	9	86.7%	13.3%	18.2%	81.8%	24
PFTL	12	1	0	1	100.0%	0.0%	0.0%	100.0%	13
PTCUL	7	4	2	2	77.8%	22.2%	50.0%	50.0%	11
ADHPL	10	0	0	0	100.0%	0.0%	0.0%	0.0%	10
Renew Solar	8	2	1	1	88.9%	11.1%	50.0%	50.0%	10
AZURE	6	3	1	2	85.7%	14.3%	33.3%	66.7%	9
AEPL	1	7	3	4	25.0%	75.0%	42.9%	57.1%	8
NTPC Solar	4	4	3	1	57.1%	42.9%	75.0%	25.0%	8
PDD JK	3	4	1	3	75.0%	25.0%	25.0%	75.0%	7
MAHINDRA Solar	6	0	0	0	100.0%	0.0%	0.0%	0.0%	6
POWERLINK	1	5	1	4	50.0%	50.0%	20.0%	80.0%	6
APCPL	0	5	1	4	0.0%	100.0%	20.0%	80.0%	5
ATIL	4	1	1	0	80.0%	20.0%	100.0%	0.0%	5
JPL	4	1	1	0	80.0%	20.0%	100.0%	0.0%	5
THAR SURYA1	0	5	4	1	0.0%	100.0%	80.0%	20.0%	5
PKATL,JPL	1	3	1	2	50.0%	50.0%	33.3%	66.7%	4
TPGEL	3	1	1	0	75.0%	25.0%	100.0%	0.0%	4
NRSS XXIX	0	3	3	0	0.0%	100.0%	100.0%	0.0%	3
EDEN	0	3	1	2	0.0%	100.0%	33.3%	66.7%	3
NHPC	1	2	0	2	100.0%	0.0%	0.0%	100.0%	3
Saurya Urja	0	2	0	2	0.0%	0.0%	0.0%	100.0%	2
PKTSL	1	1	0	1	100.0%	0.0%	0.0%	100.0%	2
RAILWAYS	2	0	0	0	100.0%	0.0%	0.0%	0.0%	2
SBSRPC-11	0	2	2	0	0.0%	100.0%	100.0%	0.0%	2
TOTAL	**933**	**731**	**351**	**380**	**72.7%**	**27.3%**	**48.0%**	**52.0%**	**1664**

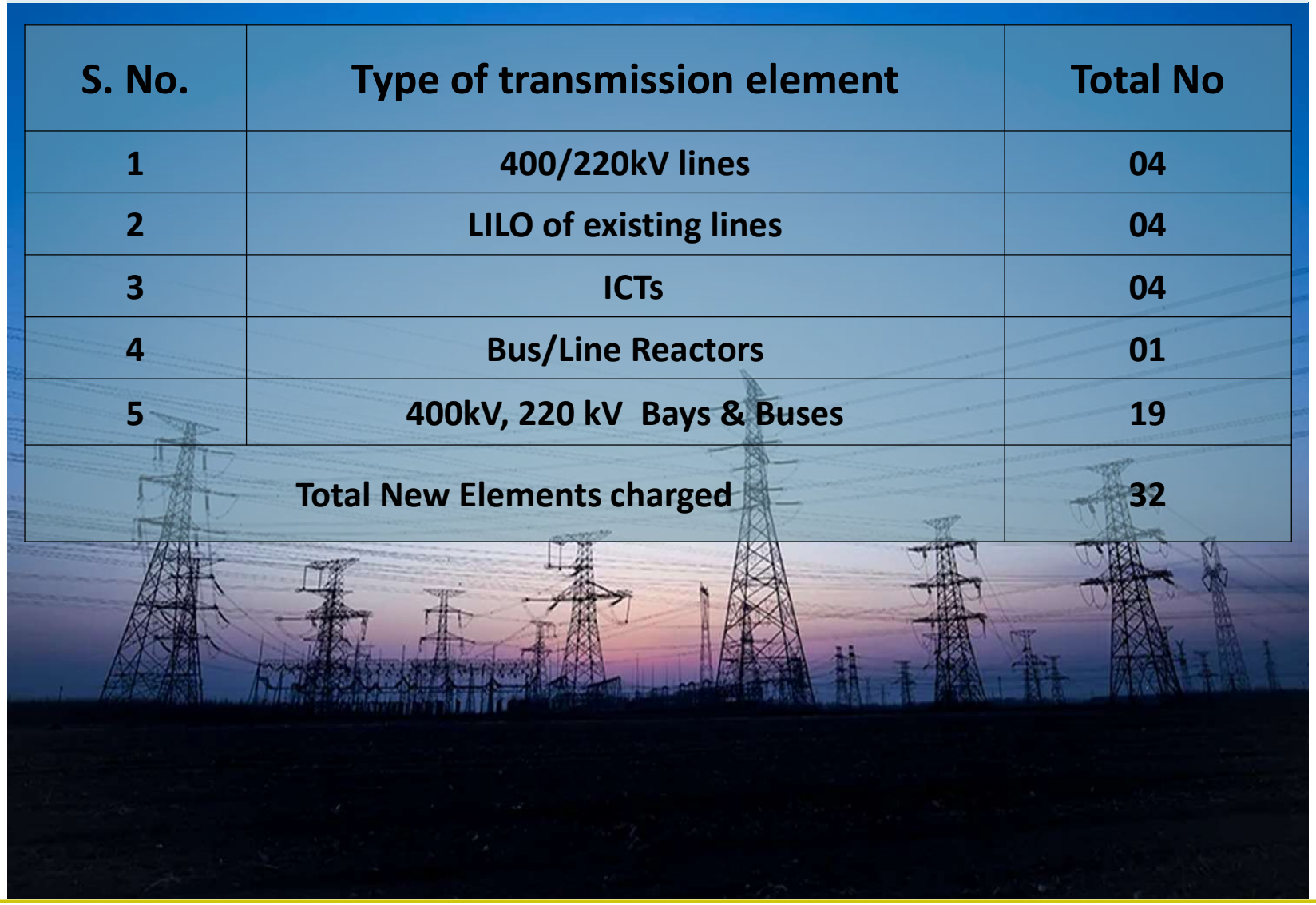
B.20

OUTAGE SUMMARY OF LAST THREE MONTHS							
MONTH	PLANNED	FORCED OUTAGES	EMERGENCY SHUTDOWNS	TRIPPING	% PLANNED as of TOTAL S/D	% EMERGENCY SHUTDOWNS	TOTAL OUTAGES (A+B)
	(A)	(B=C+D)	(C)	(D)	(A/(A+C))	(C/(A+C))	
September-22	676	724	375	349	64.3%	35.7%	1400
October-22	818	648	309	339	72.6%	27.4%	1466
November-22	1072	476	254	222	80.8%	19.2%	1548
December-22	**933**	**731**	**351**	**380**	**72.7%**	**27.3%**	**1664**

B.20

New Elements First Time Charged During December 2022

S. No.	Type of transmission element	Total No
1	400/220kV lines	04
2	LILO of existing lines	04
3	ICTs	04
4	Bus/Line Reactors	01
5	400kV, 220 kV Bays & Buses	19
Total New Elements charged		32



B.20

TRANSMISSION LINES						
S.NO.	**Agency/Owner**	**LINE NAME**	**Length (KM)**	**Conductor Type**	**DATE**	**Remarks**
1	HVPNL	220kV Bhiwani(PG)-Bhiwani(HV)-1	14.552	Moose	01-Dec-2022	
2	HVPNL	220kV Bhiwani(PG)-Bhiwani(HV)-2	14.552	Moose	01-Dec-2022	
3	THDC	Antitheft charging of 400kV Aligarh(PG)-Khurja STPP (TH) -1 from Aligarh(PG)	35.152	Twin Moose	24-Dec-2022	
4	THDC	Antitheft charging of 400kV Aligarh(PG)-Khurja STPP (TH) -2 from Aligarh(PG)	35.152	Twin Moose	24-Dec-2022	

LILO OF EXISTING TRANSMISSION LINES						
S.NO.	**Agency/Owner**	**LINE NAME**	**Length (KM)**	**Conductor Type**	**DATE**	**Remarks**
1	POWERGRID	400kV Jauljivi (PG)-Bareilly_2(PG)-1 (LILO Length-1.6KM at Jauljivi(PG) AND 7.866KM at Bareilly_2(PG) end)	204.727	Twin Moose	02-Dec-2022	LILO of 400kV Bareilly(UP) - Dhauliganga(NH) D/C Line (Initially charged at 220kV) at Jauljivi (PG)
2	HVPNL, POWERGRID	220kV Palla(HV)-Faridabad Sec-78 (HV)-1	11.8	ZEBRA	01-Dec-2022	LILO of 220kV FGPP(NTPC) - Palla (HVPNL) circuit-2 at Faridabad Sector-78 (HVPNL)
3	HVPNL, POWERGRID	220kV Faridabad(NT)-Faridabad Sec-78 (HV)-1	8.051	ZEBRA	01-Dec-2022	
4	POWERGRID, RRVPNL	400kV Bikaner(PG)-Bikaner(RS)-2	32.9	Quad Moose	22-Dec-2022	Interim arrangement after bypassing Bhadla (RS) station in Bikaner (PG)- Bhadla (RS)-Bikaner (RS) lines

B.20

ICTs/ GTs / STs							
S.NO.	**Agency/Owner**	**SUB-STATION**	**ICT NO**	**Voltage Level (kV)**	**CAPACITY (MVA)**	**DATE**	**Remarks**
1	POWERGRID	Fatehgarh_II (PG)	8	400/220/33	500	16-Dec-2022	
2	NTPC_NOKHRA	Nokhra SL_BHD2 (NTPC)	2	220/33	100	16-Dec-2022	
3	POWERGRID	Kurukshetra(PG) – Coupling transformer of TCR	1	400/33	167	24-Dec-2022	
4	NTPC	Unchahar(NT)- FGD Transformer	2	220/33	50	24-Dec-2022	

BUS/LINE REACTORS						
S.NO.	**Agency/Owner**	**SUB-STATION**	**BR NO**	**Voltage Level (kV)**	**CAPACITY (MVA)**	**DATE**
1	POWERGRID	63MVAr (3*21MVAr) Switchable Line reactor of 400kV Jauljivi (PG)-Bareilly_2(PG)-1 at Jauljivi (PG)	2	400	63	02-Dec-2022

B.20

GENERATING UNITS							
SL. NO.	**Location**	**OWNER/UNIT NAME**	**Unit No/Source**	**Capacity added (MW)**	**Total/Installed Capacity (MW)**	**DATE**	**Remarks**
1	Rajasthan	Avada Sunrays_Bhadla_2 (PG)	Solar	54.4	320	08.12.2022	
2	Rajasthan	NTPC Nokhra_Fatehgarh_2 (PG)	Solar	137.5	300	19.12.2022	
		Total Solar Generation addition		**191.9**			


धन्यवाद